SIEMENS

SIMOVERT MASTERDRIVES Vector Control

Compendium

Edition: AE

Order No.: 6SE7087-6QX60

These Operating Instructions are valid for software release from V 3.3.

We reserve the right to make changes to functions, technical data, standards, drawings and parameters.

We have checked the contents of this document to ensure that they coincide with the described hardware and software. However, differences cannot be completely excluded, so that we do not accept any guarantee for complete conformance. However, the information in this document is regularly checked and necessary corrections will be included in subsequent editions. We are grateful for any recommendations for improvement.

For **START-UP** of the unit, please refer to Section **"First Start up"** in the **operating instructions** supplied with the inverters/converters.

In the following, we would like to give you some tips on how to proceed further and how to use the **COMPENDIUM** for detailed **PARAMETERIZATION** of the units.

Preparatory measures for detailed parameterization

☞ Make yourself familiar with the **connection diagrams of the power and control terminals**: You can find these in the **operating instructions** for the units and options in the section "Connecting-up" and in Section of this Compendium, "Configuration and Connection Examples"
(in the case of optional boards, consult the "Description" section as well).
The operating instructions are supplied with the units.

☞ Make yourself familiar with the **basic functions of the units** (brief introduction): see the following sections in this **Compendium**:

- ♦ Section 4: "**Function blocks and parameters**"
(blocks, connectors, binectors, parameters, data sets, BICO system)
- ♦ Sections 5.1 to 5.3: "**Parameterization**"
(parameter menus, operator control and displays on the PMU (operator control panel))
(Section 5.4 "Parameter input via the OP1S" and section 5.5 "SIMOVIS/Drive Monitor" only if necessary)

DETAILED PARAMETERIZATION (COMPENDIUM):

GENERAL TIPS

- ♦ The units can be parameterized with the PMU / OP1S (operator control panels) or with a PC and the SIMOVIS software package.
- ♦ If you need more detailed information about specific parameters, connectors or binectors, you can find a "**parameter list**", with a **connector and binector list** added onto the end, plus an overview of the **data-set parameters** (assignment of the indices) in the appendix of the Compendium.
(Please note the "Explanations" at the beginning of the parameter list!)
These lists can be used as a **reference whenever necessary.**
- ♦ If faults or alarms occur during start-up (Fxxx , Axxx), you can find detailed descriptions of them in the appendix under "**Faults and Alarms**".
- ♦ The units are delivered with their **factory setting**.
If you want to restore the factory setting in the case of a repeat start-up, incorrect inputs or a change between the type of start-up indicated below (Sections 1.), 2.) and 3.)), this can be done at any time with the function described in Section 6.1, "**Parameter reset to factory setting**".
(**Abbreviated instructions:** P053 = 6 > P060 = 2 > P970 = 0)

The following are the different types of start-up. In the annex, there are some tips on information to be found in the internet.

1.) Parameterization of the basic unit during initial start-up

2.) Parameterization of the unit by means of downloading if data backup is provided

♦ Annex (tips on information in the internet)

1.) Parameterization of the basic unit during initial start-up

Choose the method of start-up you require:

1.1) Initial start-up:

a.) Quick parameterization
(QUICK standard start-up in order to quickly "turn" the motor for the first time, for example, and to test its basic functioning)
- See Section 6.2.1.

b.) "Menu-guided start-up" with PC / SIMOVIS 5.3
(QUICK standard start-up in order to quickly "turn" the motor for the first time, for example, and to test its basic functioning)
- See SIMOVIS (menu: " Parameters" > submenu: "Menu-guided start-up")

c.) Detailed parameterization
- See Section 6.3 and 6.4
- After completing parameterization in accordance with Section 6.3, you can immediately operate the drive for test purposes:
(precondition: P366 = 0 (STANDARD)):
  - P555.i1 = 5:
  The ON switch of the PMU can be used to switch the drive ON and OFF (coast to stop without electrical braking torque).
  - P462.i1 = 10 sec; P464.i1 = 10 sec; the raise/lower key of the PMU can therefore be used to adjust the setpoint
  (ramp-up/ramp-down times = 10 sec). In operation, the PMU indicates the actual frequency in Hz.

For further parameterization, see the following "Notes on how to proceed further".

Notes on how to proceed further

☞ You should always **refer to the function diagrams first (graphic illustration of functions)** before carrying out **further parameterization** (process data (control values, setpoints and actual values), functions etc.) or **diagnosis**.
They can be found in the appendix of the Compendium.

The function diagrams are subdivided into those for basic functions, free function blocks and supplementary boards (EBx, SCBx).

Use the list of contents (at the beginning of the function diagrams) to look for functions.

First read the following pages:

♦ **Basic functions**:
"General": Pages [10], [12], [14], [15], [20], [30]
"Diagnostics": Pages [510], [515]
"Functions": Pages [540]

♦ **Free function blocks** (if used):
"Sampling times, sampling sequence": Page [702]
(see also Section 7.1: "Functions / Basic functions")
An overview of the setpoint channel, closed-loop and open-loop control modes and also of the general display variables is given by diagrams r0 to r5 and a0 in section 6.2.1 "Parameterizing with parameter modules" (quick parameterization).
Reference is given there to the relevant page number of the associated function diagram.

♦ **Control word** commands and **status word** messages:
In addition to the function diagrams (pages [180], [190], [200], [210]), you can find detailed descriptions of the individual commands /messages in Section 9, "Process data".

♦ **Interfaces** (USS, PROFIBUS, SIMOLINK, CAN):
In addition to the function diagrams, you can find detailed descriptions of the interface functions in Section 8, "Communication".

2.) Parameterization of the unit by means of downloading if data backup is provided:

The parameter settings to be entered for your application are available, stored in the OP1S or as a SIMOVIS file.

3.1) Start-up if data protection provided:

a.) Parameter set stored in the OP1S:
Download by means of OP1S
- See Sections 6.2.3 and 5.4

b.) Parameter set available as a SIMOVIS file:
Download by means of SIMOVIS
- See Section 5.5.6.1 and Section 6.2.3 or on-line help of SIMOVIS

♦ **ANNEX (tips on information in the internet):**

Information and software in the INTERNET relating to SIMOVERT MASTERDRIVES:

- In the INTERNET, you can find the following: software releases (DOWNLOAD of current firmware for the units), additions and alterations to the manuals / Compendium, frequently asked questions, service contact points, a HOTLINE and so on.

Definitions and Warnings

Qualified personnel

For the purpose of this documentation and the product warning labels, a "Qualified person" is someone who is familiar with the installation, mounting, start-up, operation and maintenance of the product. He or she must have the following qualifications:

- ♦ Trained or authorized to energize, de-energize, ground and tag circuits and equipment in accordance with established safety procedures.
- ♦ Trained or authorized in the proper care and use of protective equipment in accordance with established safety procedures.
- ♦ Trained in rendering first aid.

DANGER

indicates an imminently hazardous situation which, if not avoided, will result in death, serious injury and considerable damage to property.

WARNING

indicates a potentially hazardous situation which, if not avoided, could result in death, serious injury and considerable damage to property.

CAUTION

used with the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION

used without safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

NOTICE

NOTICE used without the safety alert symbol indicates a potential situation which, if not avoided, may result in an undesireable result or state.

NOTE

For the purpose of this documentation, "Note" indicates important information about the product or about the respective part of the documentation which is essential to highlight.

WARNING

Hazardous voltages are present in this electrical equipment during operation.

Non-observance of the warnings can thus result in severe personal injury or property damage.

Only qualified personnel should work on or around the equipment

This personnel must be thoroughly familiar with all warning and maintenance procedures contained in this documentation.

The successful and safe operation of this equipment is dependent on correct transport, proper storage and installation as well as careful operation and maintenance.

NOTE

This documentation does not purport to cover all details on all types of the product, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the local SIEMENS sales office.

The contents of this documentation shall not become part of or modify any prior or existing agreement, commitment or relationship. The sales contract contains the entire obligation of SIEMENS AG. The warranty contained in the contract between the parties is the sole warranty of SIEMENS AG. Any statements contained herein do not create new warranties or modify the existing warranty.

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SIMOVERT MASTERDRIVES

VECTOR CONTROL

Compendium

in Volume 1

- System Description
- Configuration and Connection Examples
- Instructions for Design of Drives in Conformance with EMC Regulations
- Function blocks and parameters
- Parameterization
- Parameterizing steps
- Functions
- Communication
- Process Data

in Volume 2

- Function diagrams
- Parameter lists
- Faults Alarms
- Lists of stored motors
- Dimension Drawings

Version AE

6SE7087-6QX60

Contents

Annex

1 System Description

1.1 Overview

The SIMOVERT MASTERDRIVES MC (Motion Control) belongs to the SIMOVERT MASTERDRIVES product group. This product group represents an overall modular, fully digital component system for solving all drive tasks posed by three-phase drive engineering. The availability of a high number of components and the provision of various control functionalities enable it to be adapted to the most diversified applications.

Control functionality

The control functionality is determined by the software stored in the inverter and converter modules. The following different control versions are provided within the SIMOVERT MASTERDRIVES product group:

- Vector control (VC)
  Vector control with encoder for applications requiring a high degree of torque precision and dynamic response,
  Vector control without encoder for simple applications (e.g. pumps, fans), and u/f control
- Motion control (MC)
  Vector control for servo applications, optionally with higher-level technology functions

Components

The SIMOVERT MASTER DRIVES product group comprises the following components:

- Converters
- Inverters
- Rectifier units
- Rectifier/regenerative feedback units (RE, AFE)
- Active front end (AFE) incoming units
- Braking units and braking resistors
- DC link bus for cabinet units
- Interference suppression filter
- Line commutating reactor
- Line filters
- Fuses
- Output filters (dv/dt and sine filter)
- Technology modules
- Optional boards:
  - Sensor boards (SBx) for speed and position sensing
  - Communication boards (CBx) for field bus interfacing
  - SIMOLINK (SLx) for fast transmission of setpoints and actual values
- Accessories

1.2 System Description

The Vector Control functionality is matched to the drive system requirements. The vector current control enables fast current injection into the motor windings in conjunction with short sampling times. The related highly dynamic build-up of the torque provides a good basis for higher-level closed-loop control circuits.

It is possible to choose between current control types and U/f controls. The control type U/f control can be used to operate both synchronous and asynchronous motors. The current control types are available both without and with various different encoder types for speed acquisition for asynchronous motors.
As a special application, externally excited synchronous machines can be operated in control type speed control with encoders (current control type).

The Vector Control functionality is available both in converter and inverter modules which are designed for a line voltage range of 380 V -15 % to 480 V + 10 %.

All units are provided with a comprehensive basic functionality which can be expanded, if required, by extensive technology and communication functions by the use of software and hardware options. This enables the units to be adapted to the most diversified conditions of service. All closed-loop control functions are implemented with freely assignable function blocks which can be combined as desired. This enables the software to be flexibly adapted to various applications.

Menu structures stored in the unit software simplify start-up and visualization of the drives in conjunction with various operator control panels. PC-assisted tools enable effective parameter setting and data security.

Performance features

The units with Vector Control functionality have the following performance features:

- ♦ Available as a converter and as an inverter module
- ♦ Output range from 0.55 kW to 2300 kW
- ♦ Various configurations possible for multi-axis drives
- ♦ Integrated DC link bus module and fusing
- ♦ Integrated function "Safe STOP" (unit-specific)
- ♦ Control functions:
  - U/f characteristic curve
  - U/f characteristic curve for textile applications
  - Speed control with encoder
  - Torque control with encoder
  - Encoderless speed control
- ♦ Integrated USS interface for the configuration of simple bus systems
- ♦ Interfacing of various field buses:
  - PROFIBUS
  - CAN bus
- ♦ Drive networking with up to 200 nodes via SIMOLINK
- ♦ Integrated technology functions for positioning, synchronism and cam disk
- ♦ Start-up and diagnostics functions
- ♦ Comprehensive converter functions:
  - Restart on the fly
  - Kinetic back-up
  - Automatic restart
  - Flexible yielding
  - DC braking
- ♦ Menu prompting
- ♦ Graded operator control and visualization by means of an integrated simple standard operator control panel, a user-friendly operator control panel or via PC
- ♦ Uniform PC-capable programming software (SIMOVIS)
- ♦ In accordance with the currently applicable European standards, CE designation
- ♦ UL/CSA approval

1.3 Construction Sizes

The power components (converter, inverter, rectifier unit and regenerative feedback unit) used for the vector control functionality are available in two types of construction. With reference to the converter/inverter, control versions are available which are assigned to the following output ranges:

- ♦ Compact 2.2 kW to 37 kW
- ♦ Chassis 45 kW to 2300 kW
- ♦ Compact PLUS type 0.55 kW to 18.5 kW

1.4 Communication

A differentiated communication concept makes it possible to use the correct communication medium depending on the requirements. The following communication interfaces are available:

- Integrated serial interface(s) with USS protocol for parameter setting, operator control and visualization of the units with OP1S or PC
- Optional boards for various field bus interfaces (e.g. Profibus DP) for integration in the automation
- Optional board for interfacing SIMOLINK for fast data exchange between technologically linked drives or peer-to-peer for transfer of technological digital setpoint and actual values between the drives.

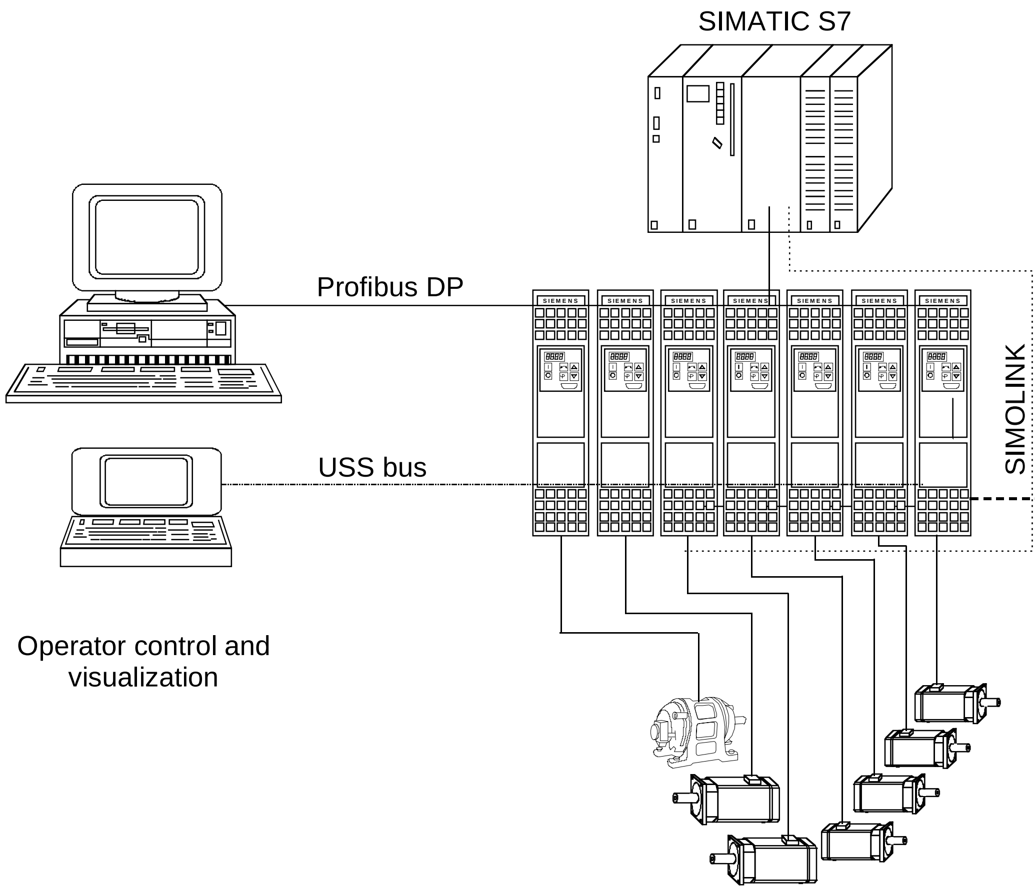


Fig. 1-1 Communication

2 Configuration and Connection Examples

DANGER

The device must be disconnected from its voltage supplies (24 V DC electronics supply and DC link / mains voltage) before the control and encoder leads are connected or disconnected!

2.1 Compact PLUS type units

2.1.1 Single-axis drive

The single-axis drive (see Fig. 2-1) is used if only single-drive tasks need to be accomplished or if power equalization through several axes is either undesired or not possible.

For this purpose, a converter is used that is directly connected to the 3-phase supply via an external main contactor, a line filter and a line reactor as necessary. Any regenerative energy is stored in the capacitor module or reduced in the braking resistor.

2.1.2 Multi-axis drive up to 3 axes

In the case of multi-axis drives (see Fig. 2-2) a converter (AC-AC) can be combined with inverters (DC-AC). The converter rectifies the line voltage and supplies the inverters with direct voltage via the DC link bus module. The power supply integrated in the converter further provides the 24 V supply voltage for the electronics of a maximum of 2 inverters.

CAUTION

If more than 2 inverters are connected, the 24 V supply for the electronics must be provided by an external power supply.

The total rated output currents of the inverters supplied by a converter must not exceed the rated output current of the feeding converter (in the case of 6SE7021-0EP60 only half the rated output current).

The regenerative energy generated in one axis can either be used up by the other motors, stored in the capacitor module or reduced in the braking resistor.

2.1.3 Multi-axis drive

In the case of multi-axis drives (see Fig. 2-3) with more than 3 axes, several inverters are connected to the line voltage via a common rectifier unit.

An external power supply is required for the 24 V supply voltage for the inverter electronics.

The regenerative energy originating in one axis can be used by the other motors, stored in the capacitor module or dissipated in the braking resistor.

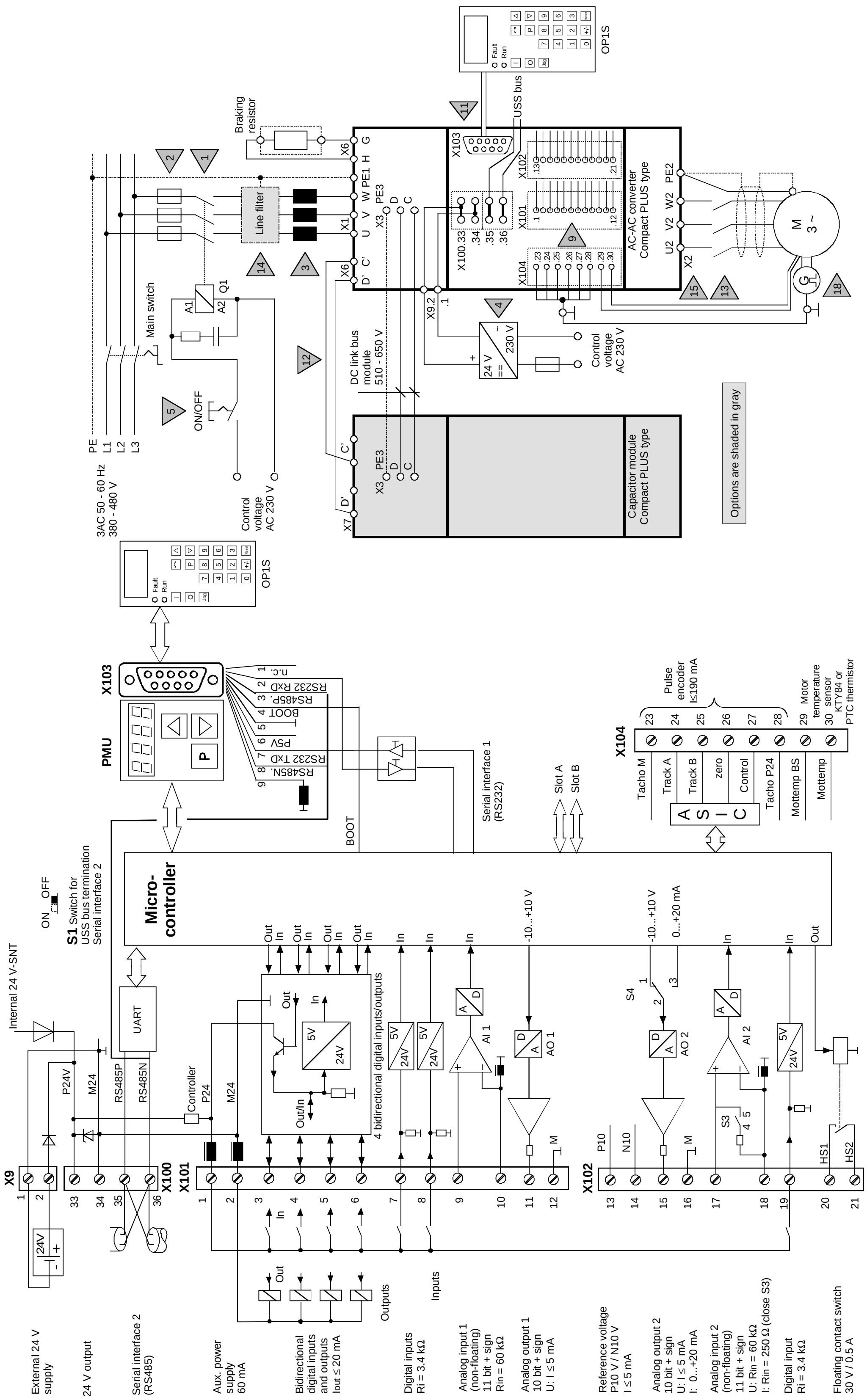


Fig. 2-1 Configuration example of a single-axis drive of the Compact PLUS type

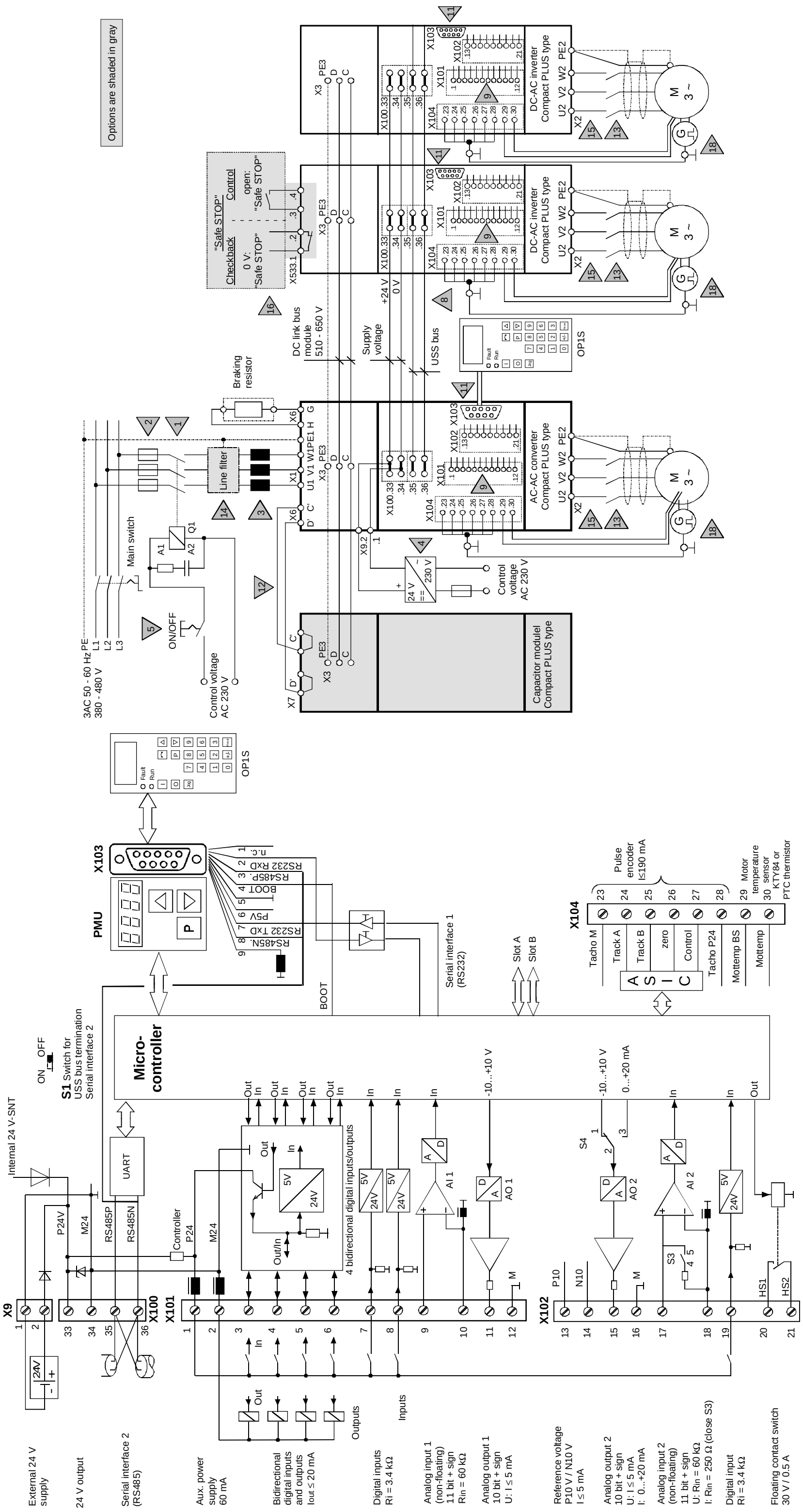


Fig. 2-2 *Configuration example of a multi-axis drive with up to 3 axes of the Compact PLUS type*

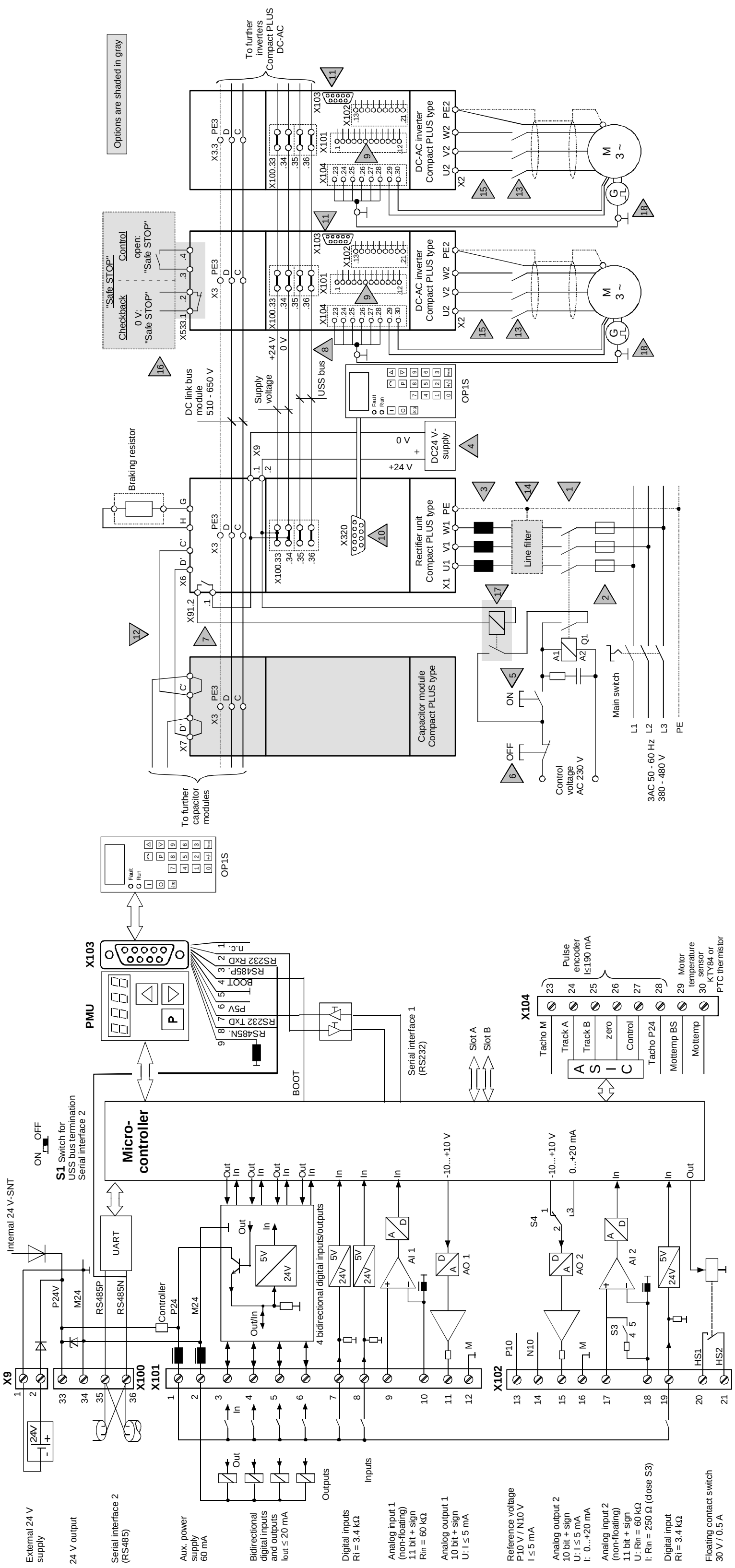


Fig. 2-3 Configuration example of a multi-axis drive with rectifier unit of the Compact PLUS type

2.1.4 Configuration and Connection Examples (Compact PLUS)

NOTE

The following explanations refer to the numbered gray triangles in Figs. 2-1 to 2-3. These figures are just examples of possible configurations of drives. The necessary individual components have to be clarified according to the specific task.

The information and notes required for dimensioning the individual components and the respective order numbers can be found in the Catalog.

1) Line contactor Q1

All the equipment is connected to the line via the line contactor, which is used to separate it from the line if required or in the event of a fault. The size of the line contactor depends on the power rating of the connected converter or inverter.
If the line contactor is controlled from the converter, the main contactor checkback time P600 should be set to at least 120 ms.

2) Line fuses

According to their response characteristic and to suit the requirements, the line fuses protect the connected cables and also the input rectifier of the unit.

3) Line commutating reactor

The line commutating reactor limits current spikes, reduces harmonics and is necessary for keeping system perturbations to within the limits laid down by VDE 0160.

4) 24 V power supply

The external 24 V supply is used to maintain the communication and diagnostics of the connected-up units even with powered-down line voltage.

The following criteria apply regarding dimensioning:

- ♦ A current of 1 A must be provided for the rectifier unit, and a current of 2 A for each inverter connected.
- ♦ When the 24 V supply is powered up, an increased inrush current will be generated that has to be mastered by the power supply.
- ♦ No controlled power supply unit has to be used; the voltage must be between 20 V and 30 V.

5) ON/OFF

In the case of a single drive and a multi-axis drive without a rectifier unit, a switch is used to energize or de-energize the line contactor. When they are switched off, the drives are not brought to a controlled standstill, but are braked only by the load.

In the case of a multi-axis drive with a rectifier unit, a pushbutton is used to energize the line contactor. The line contactor is kept energized by means of a lock-type contact connected to the fault signaling relay of the rectifier unit, as long as no fault is detected at the rectifier unit.

6) OFF switch

Operating the OFF switch causes the line contactor to open immediately.

The drives are not brought to a controlled standstill, but are braked only by the load.

7) Fault signaling relay	If a fault occurs in the rectifier unit, a fault message is output via the connecting contacts of the signaling relay. When the 24 V supply is connected, the relay closes as long as no fault is present. In the event of a fault, the lock of the line contactor is opened, the contactor drops out and the drives coast down.
8) Internal USS bus	The USS bus is used for the internal communication of the units and only has to be connected if it is required.
9) X101	The digital inputs and outputs and the analog input and output have to be assigned according to the requirements of the drives. **CAUTION**: Terminal X101.1 may **not** be connected with the external 24V supply.
10) X320 interface of the rectifier unit	The X320 interface of the rectifier unit serves only for permanently connecting the user-friendly OP1S operator control panel and for connection to the on-line inverters. Please refer to the relevant operating instructions for the applicable measures and notes for correct operation.
11) X103 serial interface	The serial interface is used to connect the user-friendly OP1S operator control panel or a PC. It can be operated either according to the RS232 or the RS485 protocol. Please refer to the relevant operating instructions for the applicable measures and notes for correct operation.
12) Precharging the capacitor module	When a capacitor module is used, the terminals for precharging the capacitors must be connected.
13) Output contactor	The use of an output contactor is purposeful if a motor needs to be electrically isolated from the converter/inverter with the DC link charged.
14) Line filter	Use of a line filter is necessary if the radio interference voltages generated by the converters or rectifier units need to be reduced.
15) Motor supply line	The Siemens cables described in the catalog should be used for connecting the converter and the motor to each other.
16) Safe STOP (Option)	The "Safe Stop" option enables the power supply for the transmission of pulses into the power section to be interrupted by a safety relay. This ensures that the unit will not generate a rotating field in the connected motor.
17) Auxiliary contactor	The auxiliary contactor is used to interrupt the self-holding condition of the main contactor in the event of a fault signal. It must be used if the control voltage for line contactor Q1 is 230 V AC. The auxiliary contactor is not required if a line contactor with a control voltage of 24 V DC is used.
18) Pulse generator	Used to acquire the motor speed and allows speed-controlled operation with the highest degree of dynamic response and precision.

Braking resistor

The brake choppers are already included in the Compact PLUS rectifier units and converters. Only a suitable external braking resistor has to be connected up, if required.

See also Chapter 11.7.

Encoder cable

You will find preassembled encoder cables in Catalog DA65.10, chapter 3. Please note that different encoder cables are required for encoders and multiturn encoders. If the wrong encoder cable is used for one or the other, fault F051 (during operation) or alarm A018 or A019 is generated.

DANGER

The encoder cable must only be connected and plugged in when the converter is disconnected from the supply (24 V and DC link). Damage to the encoder could result if this advice is not heeded.

2.2 Compact and chassis-type units

2.2.1 Water-cooled units

If you are using **water-cooled** MASTERDRIVES please note that the permissible operating pressure depends on the construction type.

Type B to G

Operating pressure ≤ 1 bar. Operating pressures above 1 bar not permitted! If the system is to be operated at higher pressure, the pressure on each unit must be reduced to 1 bar initial pressure.

Type ≥ J

Operating pressure ≤ 2.5 bar. Operating pressures above 2.5 bar not permitted! If the system is to be operated at higher pressure, the pressure on each unit must be reduced to 2.5 bar initial pressure.

2.2.2 Single units

The following two configuration examples show the wiring of a converter (AC-AC) and an inverter (DC-AC).

The mains and motor connections and the connection to the braking unit and fan can be seen on the right-hand side of the diagram.

The control terminal strips of the CUVC control board (Vector Control) are shown enlarged for clarity on the left-hand side of the diagram.

Fig. 2-2 shows wiring examples for analog and digital inputs and outputs.

You will also find descriptions of the terminals in the operating instructions in the chapter entitled "Connecting-up".

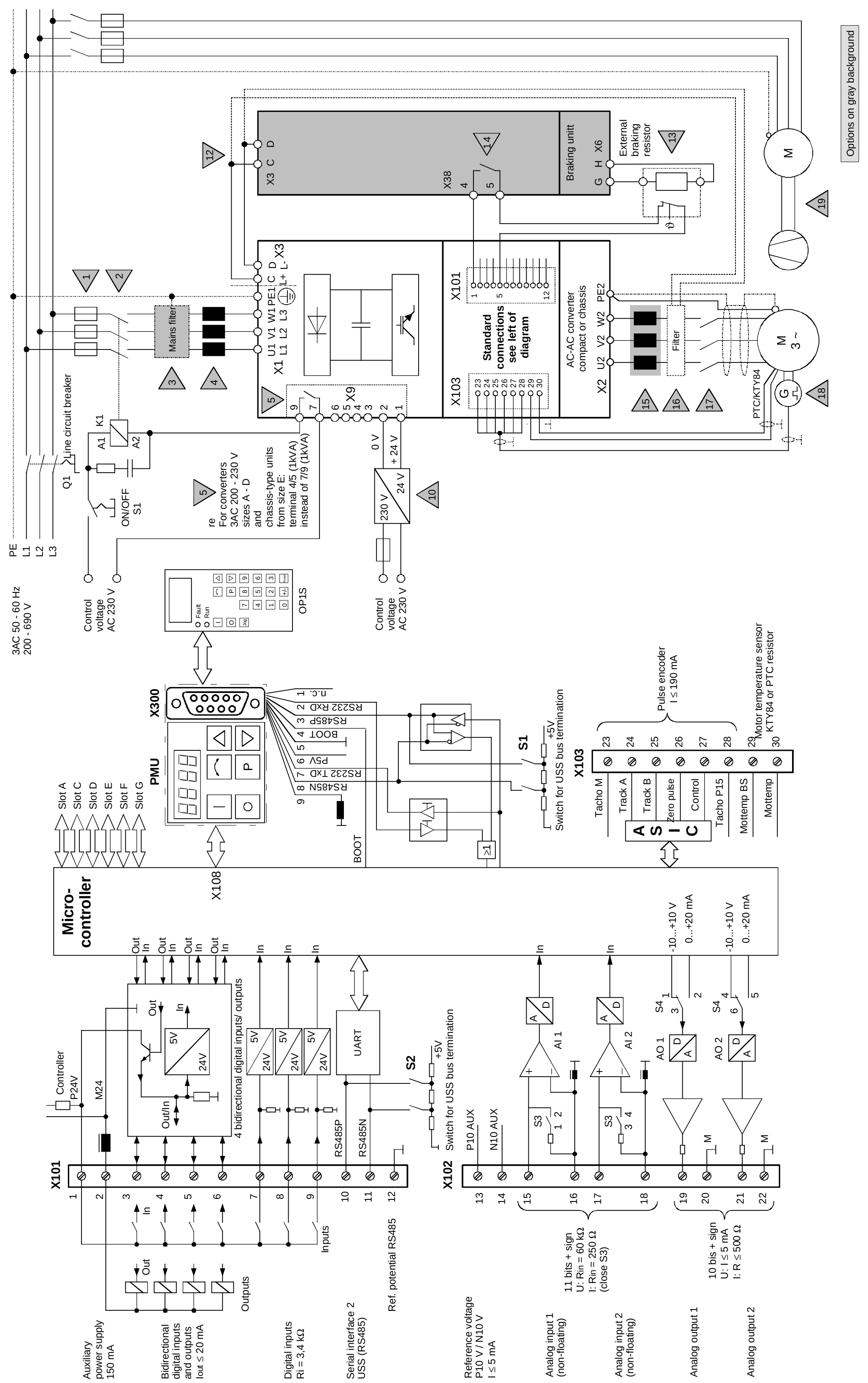


Fig. 2-4 Configuration example for compact or chassis-type unit (AC-AC)

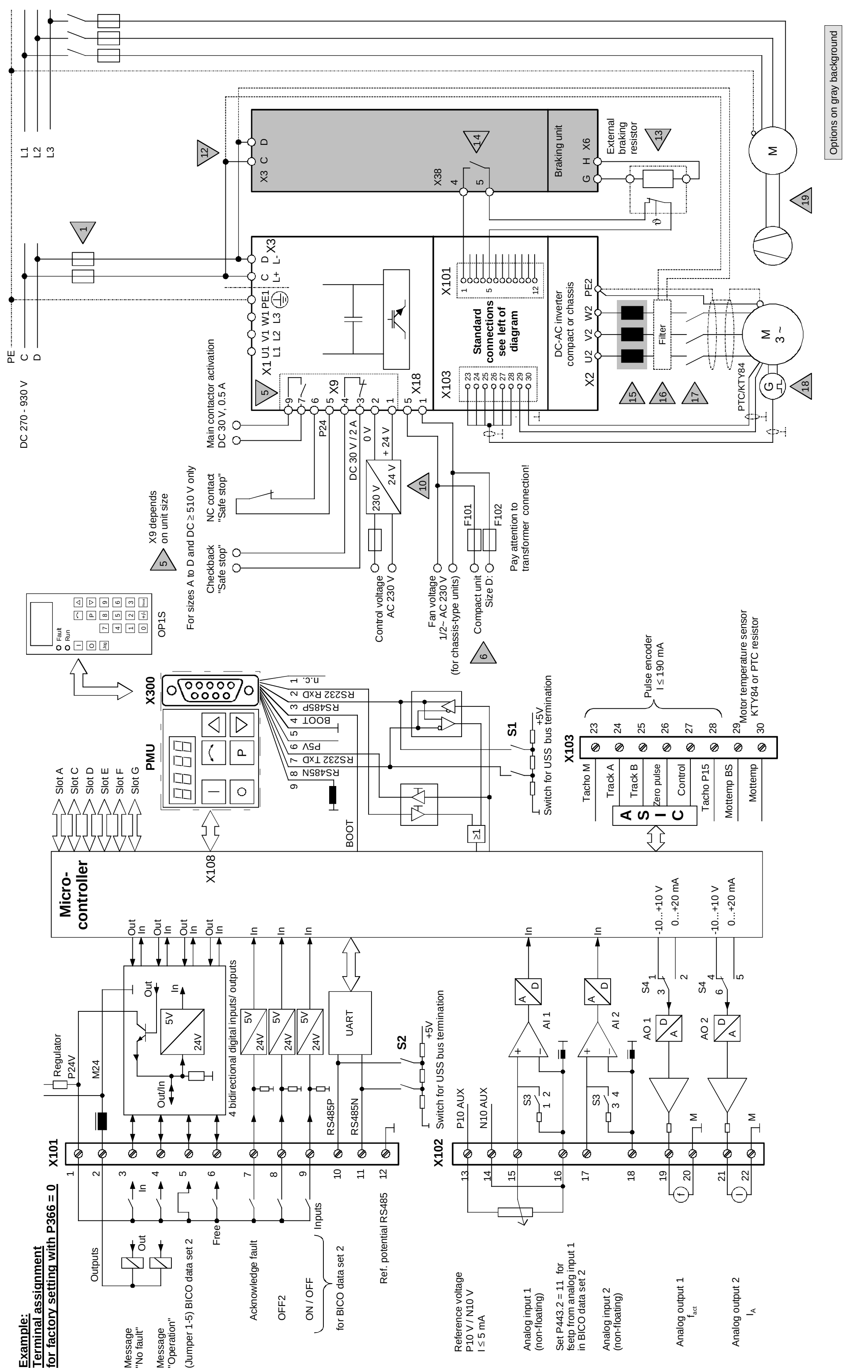


Fig. 2-5 Configuration example for compact or chassis-type unit (DC-AC)

2.2.3 Configuration example with rectifier/regen.feedback unit

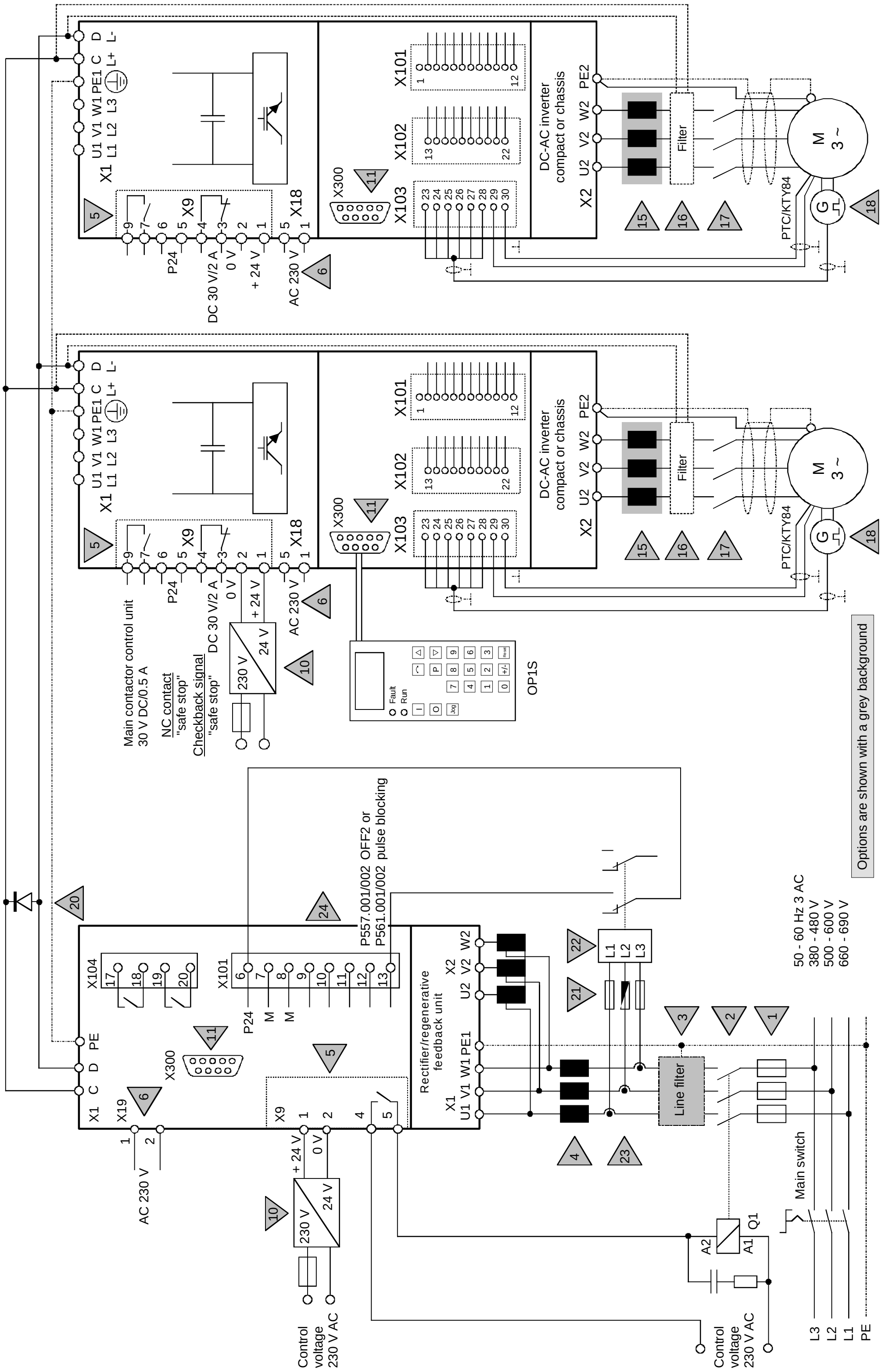


Fig. 2-6 Configuration example with rectifier/regenerative feedback unit

2.2.4 Explanations relating to the configuration examples (Compact and chassis-type units)

NOTE

The following explanations refer to the numbered gray triangles in Figs. 2-1 to 2-3. These diagrams each show a drive configuration example. The need for the individual components must be clarified according to the given application.

In the catalog you will find the necessary information and notes concerning the ratings of the individual components and the pertinent order numbers.

1) Line fuses

The line fuses afford protection against short circuit and, depending on their utilization category (gL, gR or aR), also protect the connected conductors and rectifier or input rectifier of the unit.

2) Line contactor K1

The converter or rectifier units, or infeed/regenerative feedback unit is connected to the power supply via the line contactor and disconnected in case of need or in the event of a fault.

The system is dimensioned according to the output of the connected converter, rectifier unit or rectifier/regenerative feedback unit.

3) Radio interference suppression filter

A radio interference suppression filter is required whenever the radio interference voltages originating from converters or rectifier units must be reduced according to EN 61800-3.

4) Line commutating reactor

The line commutating reactor limits current peaks and reduces harmonics. It is also required, among other things, for compliance with the permissible system perturbations according to EN 50178 and compliance with the radio interference suppression voltages.

5) Control terminal strip X9

The X9 1/2 control terminals are provided with a connection for supplying devices requiring an external 24 V DC control voltage.

Terminals X9 7/9 on the compact units (inverters) and X9 4/5 on the chassis units (converter and inverter) allow the output of an isolated digital signal, e.g. to control a main contactor.

Function "SAFE STOP" on compact inverters and input units (converters and inverters) with option K80

With the "SAFE STOP" function, a safety relay can be used to interrupt the power supply for pulse transmission in the power section. This ensures that the inverter cannot operate the connected motor.

6) Fan power supply for inverter devices

On all chassis and compact units of type D, a supply voltage of 230 V AC 50/60 Hz is required for the fans. The chassis units are connected via X18:1.5 and the compact units are connected directly to fan fuses F101 and F102.

10) 24 V auxiliary power supply

The external 24 V power supply serves to back up the communications and diagnostics functions of the connected devices when the line voltage is switched off. Rectifier units always require an external 24 V power supply.

The following criteria apply to dimensioning:

- ♦ Currents (see Catalog DA65.10)
- ♦ When the 24 V supply is switched in, an inrush current has to be dealt with by the power supply.
- ♦ There is no need to install a stabilized power supply; the voltage range must be kept between 20 V and 30 V.

11) X300 serial interface

The serial interface is used for connecting the OP1S operator pane or a PC. It can be operated according to the RS232 or the RS485 protocol, as desired.

Please refer to the operating instruction for information concerning proper operation.

15) Output reactors

Limit the capacitive currents arising from long motor cables and make it possible to operate motors situated a long way from the converter/inverter.
(See Catalog DA65.10 Chapter 6).

16) Sine wave filter du/dt-Filter

Limit the rate of voltage rise occurring at the motor terminals and the voltage peak (du/dt-Filter) or generate a sinusoidal voltage characteristic (sine wave filter) at the motor terminals (see Catalog DA65.10, Chapter 6).

17) Output contactor

An output contactor serves a useful purpose wherever, with charged DC link, a motor has to be electrically isolated from the convert/rectifier unit.

18) Pulse generator

Used to acquire the motor speed and allows speed-controlled operation with the highest degree of dynamic response and precision.

19) Motor fan

Is to be operated in the case of separately ventilated motors.

20) Freewheeling diode

For protection of the connected inverters against commutation failure.

21) Fuse

To protect the signal cables of a phase failure relay.

22) Phase failure relays

Types suitable for a system voltage of 400 V 3 AC:

- ♦ Siemens 5TT3407 suitable for TN systems
- ♦ Dold IL9079001 suitable for TN, TT and IT systems
  Address: E. Dold & Söhne KG, PF 1251, D 78114 Furtwangen
  Tel.: +49 7723/6540, Fax.: +49 7723/654356

The maximum response delay time is 20 ms.

The phase failure relays must be connected according to their construction type.

23) Voltage transformer

If the supply voltage deviates from 400 V, voltage transformers with a primary voltage corresponding to supply voltage U1 and U2 = 400 V on the secondary side must be used.

The voltage transformers should correspond to class 0.5 or 1; size 3 VA

Transformers available on request from:

Ritz Messwandler GmbH & Co.
Salomon-Heine-Weg 72
D-20251 Hamburg
Tel.: +49 40/51123-0, Fax.: +49 40/51123-111

ELGE Elektro-Apparate GmbH
Grenzweg 3
D-91233 Neunkirchen
Tel.: +49 9123/6833

24)

The output of the phase failure relay controls a digital input of the rectifier/regenerative feedback unit on the CUR. Depending on the requirements of the system, this input is assigned function AUS2 (trip command with direct pulse disable P557.i) and disables the thyristors to avoid a commutation failure very effectively.

2.3 Examples of motor junction wiring

2.3.1 Shielded cabling meeting EMC requirements to maintain EMC limit values

The limit values of class A for industrial plants are met with the cabling as shown in Fig. 2-7 and Fig. 2-8.

The limit values of class B1 for public networks are met with the cabling as shown in Fig. 2-8.

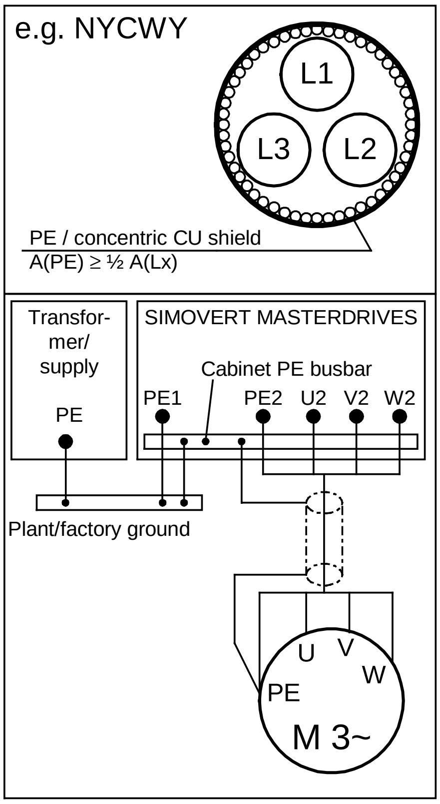


Fig. 2-7 Protodur power cable:
NYCY -0.6/1kV
NYCWY -0.6/1kV

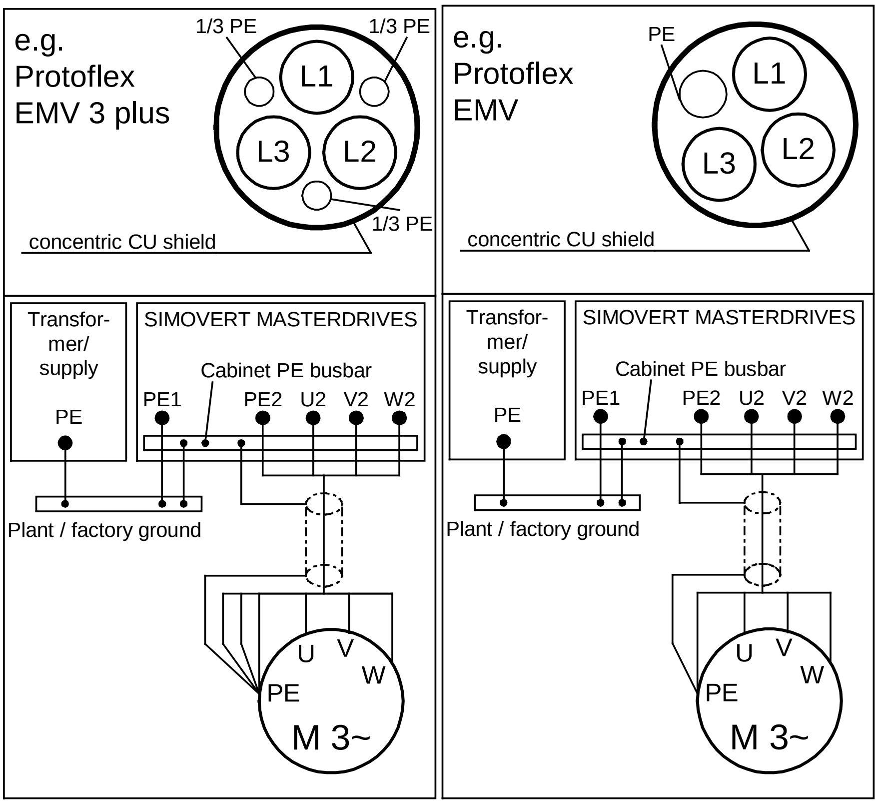


Fig. 2-8 Protoflex power cable 2YSLCY-J -0.6/1kV

2.3.2 Unshielded cabling

Cabling installed according to the following figure is sufficient for technical operation of the drive.

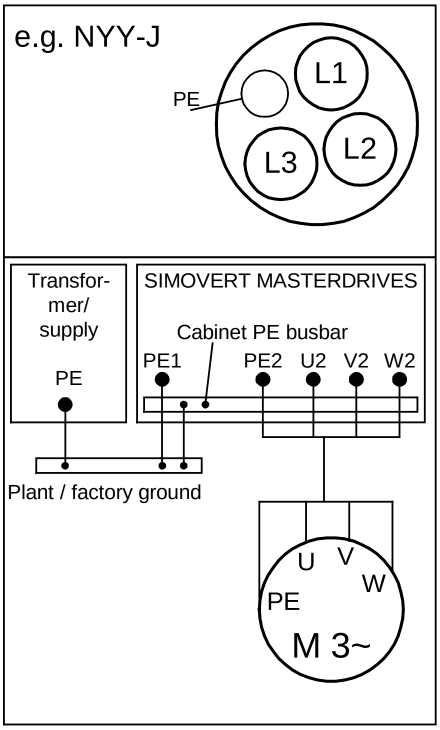


Fig. 2-9 Protodur power cable NYY-J -0.6/1kV

2.4 "Safe STOP" function

NOTICE

The "SAFE STOP" function of SIMOVERT MASTERDRIVES (also known as "Starting lockout" in SIMODRIVE 611) satisfies EN 60 204-1/DIN VDE 0113 Part 1 Section 5.4, "Devices for switching off and preventing unexpected starting", but does not satisfy Section 5.3, Main switch function (isolating from the power supply). The main switch function can be performed only by the use of an electrically isolating switching element. The "SAFE STOP" function is also suitable for implementing the stop function according to Category 0 and 1 as defined by EN 60 204-1 / VDE 0113 Part 1, Section 9.2.2.
The requirements for the behavior of the control functions in the case of a fault (EN 60204-1, Section 9.4) are met by fulfillment of the requirements of EN 954-1 acc. to Category 3.

Purpose of the "SAFE STOP" function

The SAFE STOP function is supplied as standard with SIMOVERT MASTERDRIVES of the compact series of inverter units in sizes A to D (with the exception of converters and inverters for 270 V DC to 310 V DC). In the case of chassis units and Compact PLUS units, this function is obtainable in the form of the K80 option.

The "SAFE STOP" function prevents unexpected starting from standstill of the connected motor. The "SAFE STOP" function should not be activated until after the drive is at standstill, because otherwise no further braking is possible. That is why the drive must be brought to standstill and secured by means of an external machine control. The "SAFE STOP" function interrupts the power supply used to drive the IGBT modules.

NOTICE
Residual risk

A residual risk remains in the event of two faults occurring at the same time. The drive can then turn through a small angle (permanent-field synchronous servomotors, e. g. 1FT6, 1FK6: 4-pole 90°, 6-pole 60°, 8-pole 45°; asynchronous motors: in the remanence range max. 1 slot division, or about 5° to15°).

The "SAFE STOP" function does not electrically isolate the equipment and therefore gives not protection from "electric shock".

The whole machine must be isolated from the supply system by opening the main switch (EN 60204/5.3) in the event of production shutdowns or for maintenance, repair and cleaning work on the machine or plant.

When used with the positively-driven signal contacts of the compact inverter units, the "SAFE STOP" function has to be connected to terminal strip X9: 3/4 (chassis units: terminal strip X533: 1/2) in the line contactor circuit or EMERGENCY OFF circuit. If there is any doubt as to whether the SAFE STOP relay is functioning correctly with respect to the operating mode of the machine, the drive concerned must be electrically isolated from the power supply, e. g. by means of a line contactor. The "SAFE STOP" function and the associated mode of operation must not be used again until after the fault has been remedied.

NOTICE

When the "SAFE STOP" function is activated, it is possible in some cases for the "Operating" status signal to be generated at the converter/inverter. But the pulses are **not** released and so the motor **cannot** turn. A hazard is therefore **ruled out**.

From the control, with the aid of ’Checkback SAFE STOP’ (X9 Pin 3/4; X533 Pin 1/2), make sure that the SAFE STOP function cannot be deactivated in converter statuses other than ’READY FOR OPERATION’ or ’READY FOR SWITCHING ON’.

In order that the converter/inverter control recognizes the ’SAFE STOP’ status and proceeds to process this status in the sequencing control, a binary input of the CUVC control unit must be activated, thereby generating the OFF2 command (cf. P555...P557) and hence a starting lockout.

When the OFF2 command is activated via "SAFE STOP", the converter status changes to ’Starting lockout’.

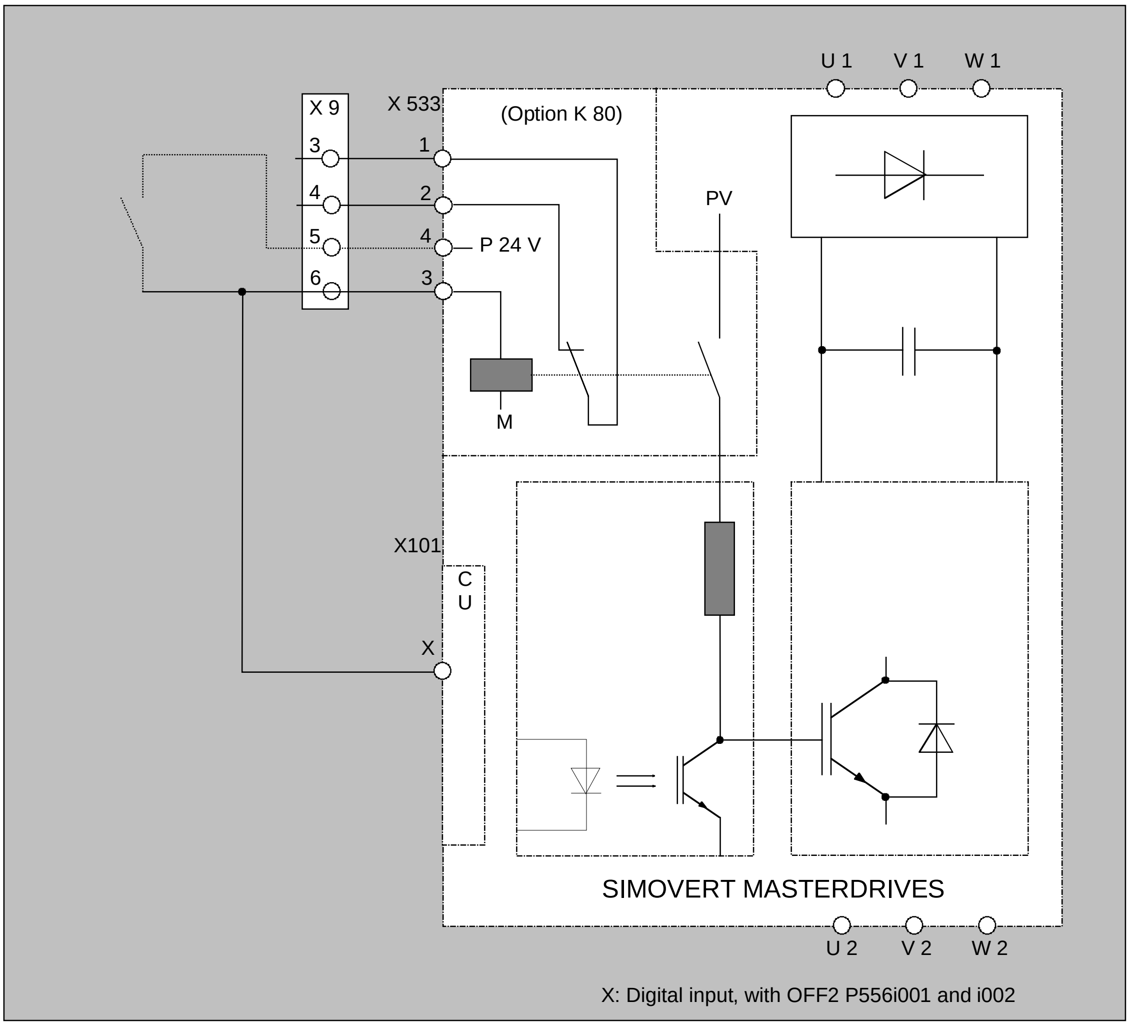


Fig. 2-10 Configuration of the "Safe STOP" function in a SIMOVERT MASTERDRIVES unit

Operating principle of "SAFE STOP"

The power supply to the individual motor windings is controlled by means of the inverter power sections. A pulse formation logic drives the 6 IGBT power transistors in a rotating-field-oriented pattern.

In each transistor arm, an optocoupler/fiber optic cable is connected between the control logic and the control amplifier of the power section for potential isolation.

As it cannot be ruled out that the inverter electronics will generate a pulse pattern capable of producing a rotating field (without a start command being present), a method was found of safely preventing the pulse pattern from reaching the ignition and control inputs of the IGBTs. The "SAFE STOP" ACTIVE function implements an electrical separation (interrupt) between the power supply and the driver electronics of the IGBT inverter, thereby preventing the motor from turning. The "SAFE STOP" function is activated by an external NO contact and is active when the "SAFE STOP relay" has dropped out. In the event of failure of the "SAFE STOP" function, the "SAFE STOP" checkback contacts must separate the drive from the power supply by means of a line contactor or the EMERGENCY STOP circuit.

No rotating-field-oriented operation of the power transistors is possible while the "SAFE STOP" function is active. Simultaneous welding of two IGBTs is the worst case leading to the residual risk described in the above.

NOTICE

- The motor can no longer develop torque while the "SAFE STOP" function is activated. Non-self-locking drives must be secured by means of a mechanical brake.
- The "SAFE STOP" function is not suitable for bringing a running motor to a standstill as quickly as possible, because this function turns off the control pulses and so the motor is braked only by the load.

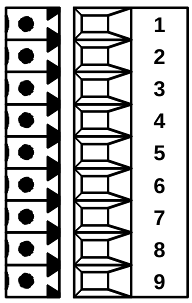
Advantage: The "SAFE STOP" function makes it unnecessary to provide motor contactors.

Connection of the "SAFE STOP" function

In the case of compact inverter units, the "SAFE STOP" function is addressed via terminal strip X9:5/6, while in the case of chassis units it is addressed via terminal strip X533:3/4. When dropped out, the SAFE STOP relay activates the "SAFE STOP" function.

Closure of terminals X9:3/4, or terminals X533:1/2 signifies that the "SAFE STOP" function is active. These terminals provide a potential-free signal of the status of the "SAFE STOP" function.

X9

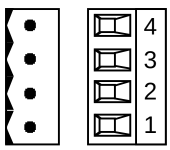


Terminal	Designation	Description	Range
1	+24 V (in)	24 V voltage supply	DC 24 V ≤ 2.5 A
2	0 V	Reference potential	0 V
3	Contact 1	"Safe STOP" checkback	2 A
4	Contact 2	"Safe STOP" checkback	DC30 V
5	P24 DC	"Safe STOP" supply voltage	10...30 mA
6	Switched signal	"Safe STOP" control input	DC 30 V
7	HV control	Main contactor control	
8	Not connected	Not used	
9	HV control	Main contactor control	DC30 V, 0.5 A

Connectable cross-section: 1.5 mm² (AWG 16)

Table 2-1 Terminal connections of external aux. voltage supply DC 24 V, Safe STOP, main contactor control for compact units

X533



Terminal	Designation	Description	Range
4	P24 DC	"Safe STOP" supply voltage	DC24 V
3	Switched signal	"Safe STOP" control input	30 mA
2	Contact 2	"Safe STOP" checkback	DC 30 V
1	Contact 1	"Safe STOP" checkback	2 A [1]

Connectable cross-section: 2.5 mm² (AWG 12)

Table 2-2 Terminal connections of the K80 Option "Safe STOP" on chassis units

[1] Compact PLUS tpye: 1 A

3 Instructions for Design of Drives in Conformance with EMC Regulations

3.1 Foreword

The modular design of SIMOVERT MASTERDRIVES permits a large number of possible drive converter/equipment combinations so that it is not practical to provide a separate description for every individual combination here. It is more purposeful for this document to provide basic information and generally applicable rules so that you can configure your particular drive converter/equipment combination in an "electromagnetically compatible" manner.

The drives are operated in widely varying environments and any additionally used components (control systems, switch-mode power sections, etc.) can differ considerably as far as their noise immunity and noise emission levels are concerned. For this reason, it is permissible to deviate from the EMC regulations on a case-to-case basis after individual investigation.

In the context of the EMC Law, SIMOVERT MASTERDRIVES are considered as "components" rather than "units". For a better understanding of these instructions, however, the generally used term "units" is used.

With effect from June 1996, the "EMC product standard including special test methods for electric drive units" EN 61800-3 (VDE 0160 T100, IEC 1800-3) is applicable for frequency converters. Before this product standard came into force, the standards EN 50081 with EN 55011 and EN 50082 with IEC 801 were applicable. These are no longer relevant for frequency converters now that the product standard has come into force.

Please contact your local Siemens office regarding any other queries you may have relating to EMC.

3.2 Principles of EMC

3.2.1 What is EMC?

EMC stands for "Electromagnetic Compatibility" and, in accordance with the EMC Law §2(7), it defines "the capability of a unit to operate satisfactorily in an electromagnetic environment, without itself causing electromagnetic disturbances which would be unacceptable for other electrical units in this environment".

In principle, this means that units should not interfere with each other. And this is a feature that you have always looked for in your electrical products!

3.2.2 Noise emission and noise immunity

EMC is dependent on two characteristics of the units concerned - the emitted noise and the noise immunity. Electrical equipment can either be treated as a noise source (transmitter) and/or a noise receiver. Electromagnetic compatability exists when the existing interference sources do not affect the function of the noise receivers. It is also possible for a unit to be both an interference source and an interference receiver at the same time. For example, the power section of a frequency converter can be regarded as a noise source, whereas the control section can be regarded as a noise receiver.

The **noise emission** of frequency converters is governed by the European Standard EN 61800-3. The cable-related noise at the mains connection is measured under standard conditions as radio interference voltage. Electromagnetically emitted noise is measured as radio interference (radiated noise). The standard defines limit values "First environment" (public supply networks) and "Second environment" (industrial networks).

When the equipment is connected up to the public supply, the maximum harmonics specified by the local power supply company must be observed.

The **noise immunity** of a unit describes how it behaves when subjected to electromagnetic noise/interference. The requirements and evaluation criteria for the behaviour of the electrical units are also laid down in standard EN 61800-3.

3.2.3 Industrial and domestic applications

Limit values are laid down for emitted noise and noise immunity depending on the application for which the units are envisaged. A differentiation is made between industrial and domestic environments. In industrial environments, the noise immunity of the units must be very high, but lower requirements are made concerning the emitted noise. In domestic environments, i.e. when connected to public supply systems, there are strict regulations concerning emitted noise but, on the other hand, the units can be designed with a lower noise immunity.

If the drive is an integral part of a system, it does not initially have to satisfy any demands regarding emitted noise and noise immunity. However, the EMC Law specifies that a system must as a whole be electromagnetically compatible within its environment. Within the system, the owner will, in his own interest, make sure that his equipment is electromagnetically compatible.

Without a radio interference suppression filter, the emitted noise of the SIMOVERT MASTERDRIVES frequency converters exceeds the limit value "First environment". Limit values are currently still under discussion for the "Second environment" sector (see EN 61800-3 section 6.3.2). However, their high noise immunity makes them insensitive to the noise emitted by units in their vicinity. If all control components of the system (e.g. automation devices) have a noise immunity suitable for industrial environments, then it is not necessary for every drive to maintain this limit value.

3.2.4 Non-grounded systems

In some industrial sectors, non-grounded supplies (IT supplies) are used to increase the availability of the plant/installation. In the event of a ground fault, no fault current flows, and the plant can still produce. However, when a radio interference suppression filter is used, a fault current will flow when a ground fault occurs, which may cause shutdown of the drives or even the destruction of the radio interference suppression filter. In order to minimize this fault current, the radio interference suppression filter has to be designed differently which will quickly reach the physical limits. Radio interference suppression filters additionally affect the concept of non-grounded supply networks and can thus result in a safety risk when used with these networks (see Product Standard EN 61800-3: 1996). If required, radio interference suppression should thus be realized at the grounded primary side of the supply transformer or with a single special filter at the secondary side. The special filter also generates leakage currents to ground. A ground-leakage monitor which is usually used in non-grounded systems has to be adjusted to the special filter.

3.3 The frequency converter and its electromagnetic compatibility

3.3.1 The frequency converter as a noise source

Mode of operation of SIMOVERT MASTERDRIVES

SIMOVERT MASTERDRIVES frequency converters operate with a voltage-source DC link.

In order to keep the power losses as low as possible, the inverter switches the DC link voltage to the motor winding in the form of voltage blocks.

An almost sinusoidal current flows in the motor.

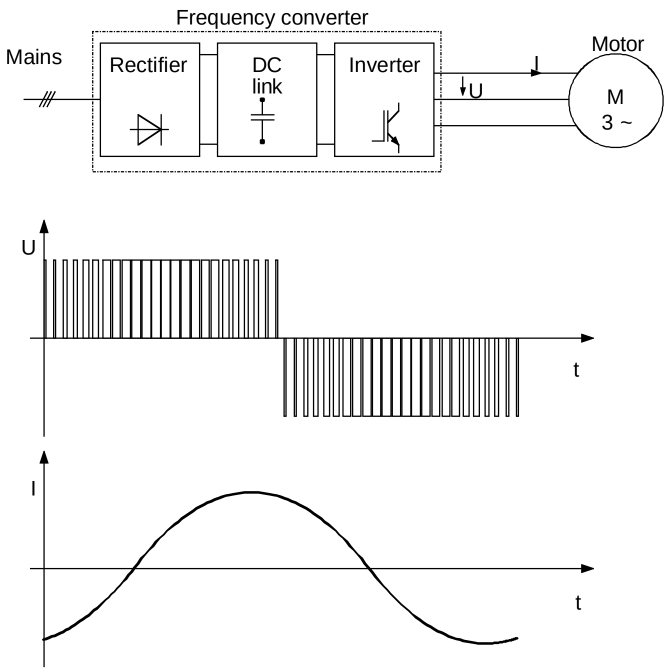


Fig. 3-1 Block diagram showing output voltage V and motor current I of a frequency converter

The described mode of operation in conjunction with high-performance semiconductor switching elements have made it possible to develop compact frequency converters which now play a vital role in drive technology.

As well as having many advantages, the fast semiconductor switches also have one disadvantage:

A pulse-type noise current flows to ground through parasitic capacitances C_P at each switching edge. Parasitic capacitances exist between the motor cable and ground, and also within the motor.

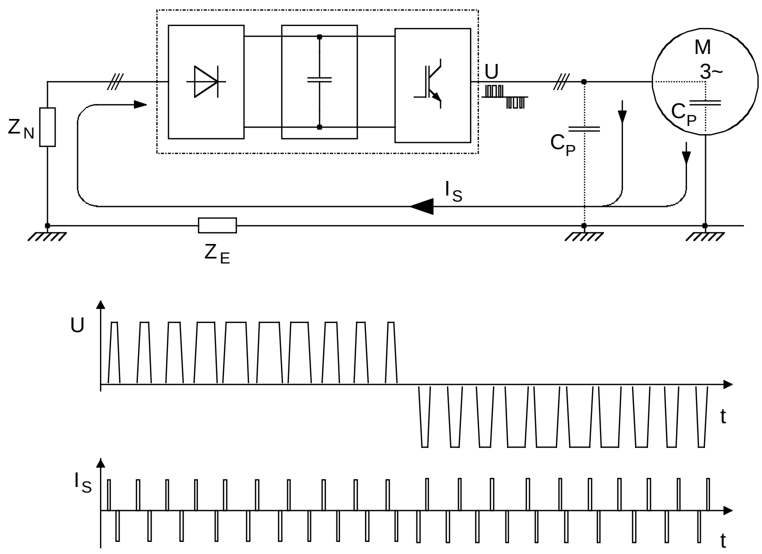


Fig. 3-2 Block diagram showing output voltage V and fault current Is

The source of the fault current I_S is the inverter, which is the reason why the fault current must also flow back to the inverter. Impedance Z_N and ground impedance Z_E act in the return flow path. Impedance Z_N forms parasitic capacitances between the supply cable and ground, which is connected in parallel with the impedance (between phase and ground) of the supply transformer. The noise current itself and the voltage drops across Z_N and Z_E caused by the noise current can also affect other electrical units.

Frequency converters generate the high-frequency noise currents which have already been described. In addition, low-frequency harmonics should be taken into account. As a result of rectification of the line supply, a non-sinusoidal line current is drawn which causes a distortion of the line supply voltage.

Measures to reduce noise emission

Low-frequency harmonics are reduced using **line reactors**.

The high-frequency noise emission can only be reduced if the generated noise current is correctly routed. Using non-shielded motor cables, the noise current flows in an undefined fashion back to the frequency converter, e.g. via foundation/base frame grounders, cable ducts, cabinet frames. These current paths have a very low resistance for currents with a frequency of 50 or 60 Hz. However, the noise current induces a high-frequency component, which can result in problematical voltage drops.

A **shielded motor cable** is absolutely necessary to enable the fault current to flow back to the frequency converter in a defined fashion. The shield must be connected to the housing of the frequency converter and to the motor housing through a large surface area. The shield now forms the easiest path for the noise current to take when returning to the frequency converter.

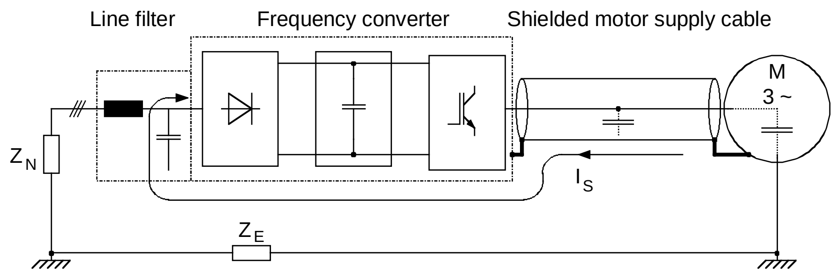


Fig. 3-3 Flow of the noise current with shielded motor cable

A shielded motor cable with a **shield connected at both sides** causes the noise current to flow back to the frequency converter through the shield.

Although (almost) no voltage drop arises across impedance Z_E for shielded motor cables, the voltage drop across impedance Z_N can affect other electrical units.

For this reason, a **radio interference suppression filter** should be installed in the supply feeder cable to the frequency converter. Arrangement of the components as per the following figure.

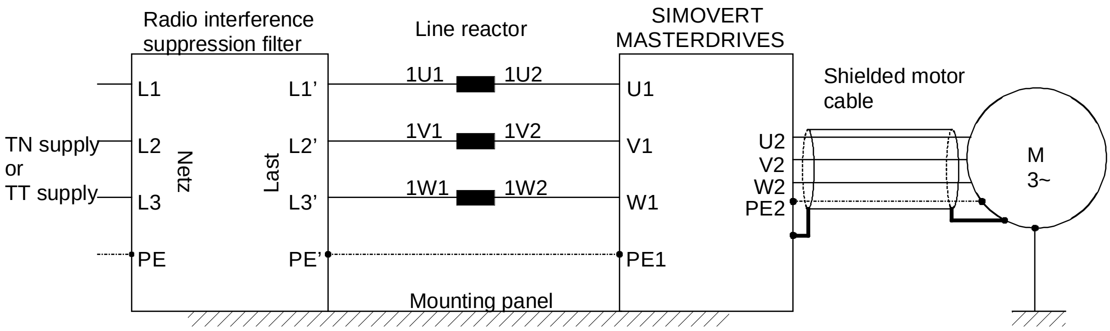


Fig. 3-4 Arrangement of the components

Radio interference suppression filters and frequency converters must be connected through a low-ohmic resistance for the high-frequency noise currents. In practice, this requirement is best satisfied by mounting the frequency converters and radio interference suppression filters on a common panel. Frequency converters and radio interference suppression filters must be connected to the mounting panel through the largest possible surface area.

The SIMOVERT MASTERDRIVES must be installed in an enclosed **cabinet** in order to limit the radio interference radiation. In particular, the radio interference radiation is determined by the control section with its microprocessor and it is therefore comparable with the noise emitted from a computer. If there are no radio transmission services in the immediate vicinity of the SIMOVERT MASTERDRIVES, there is no need for a high-frequency-sealed cabinet.

Radio interference radiation is not limited if the units are installed in racks. In this case, adequate shielding should be provided by suitably designing the equipment room/area.

3.3.2 The frequency converter as a noise receiver

Ways in which noise is received

Noise can enter a unit either galvanically, inductively or capacitively.

The equivalent circuit diagram shows a noise source which causes noise current I_S in the unit due to capacitive coupling effects. The magnitude of the coupling capacitance C_K is determined by the cabling and the mechanical design.

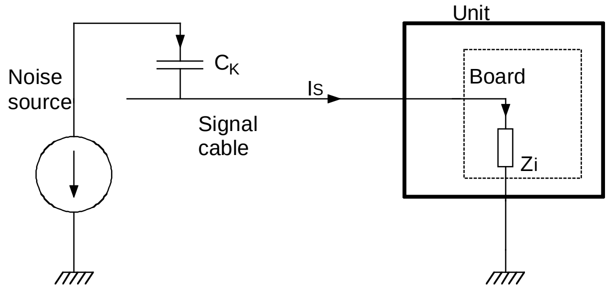


Fig. 3-5 Capacitive coupling for non-shielded signal cables

Noise current I_S produces a voltage drop across impedance Z_i. If the noise current flows through a board with fast electronic components (e.g. microprocessor), even a small spike in the µs area and an amplitude of just a few volts can lead to disturbing noise.

Measures to increase noise immunity

The most effective way of preventing noise being coupled-in is to rigorously **separate power and signal cables.**

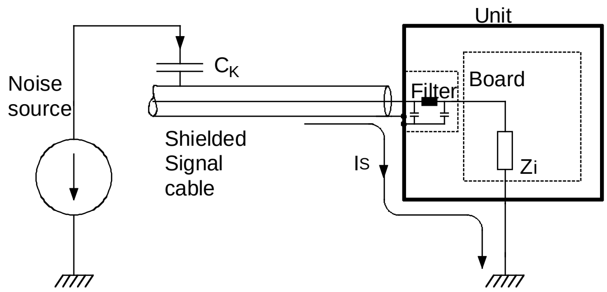


Fig. 3-6 Increasing the noise immunity by using shielded signal cables

The inputs and outputs of the SIMOVERT MASTERDRIVES control section are fitted with filters that keep noise currents I_S separate from the electronics. The filters also smooth the useful signal. In the case of signal cables with extremely high-frequency signals, e.g. from the digital tachometer, this smoothing has a disturbing effect. As no smoothing is possible on account of its functionality, **shielded signal cables** have to be used here. The noise current now flows back to the noise source via the shield and the housing.

The shields of **digital signal cables** always have to be connected at both ends, i.e. at the transmitter and at the receiver!

In the case of **analog signal cables,** low-frequency noise can arise if the shield is connected at both ends (hum is coupled-in). In this case, the shield must only be connected at one end at the SIMOVERT MASTERDRIVES. The other end of the shield should be grounded through a capacitor (e.g. 10 nF/100 V type MKT). This capacitor enables the shield to be connected at both ends after all as far as high-frequency noise is concerned.

3.4 EMC planning

If two units are not electromagnetically compatible, the noise radiated by the noise transmitter can be reduced, or the noise immunity of the noise receiver can be increased. Noise sources are often power electronic units with a large current drain. Complex filters are necessary to reduce their noise emission. Noise receivers especially include control devices and sensors/transmitters, as well as their evaluation circuit. Not so much effort and cost is required to increase the noise immunity of low-power units. In industrial environments, it is therefore more cost-effective to increase the noise immunity than to reduce the noise emission.

To maintain the "Second environment" limit value class specified in EN 55011, the radio interference voltage at the mains connection point can be a maximum of 79 dB (µV) between 150 kHz and 500 kHz, and a maximum of 73 dB (µV) between 500 kHz und 30 MHz. When expressed in volts, these values are 9 mV and 4.5 mV respectively!

Before radio interference measures can be applied, it must first be clarified at which locations you or your customer require EMC. See the following example:

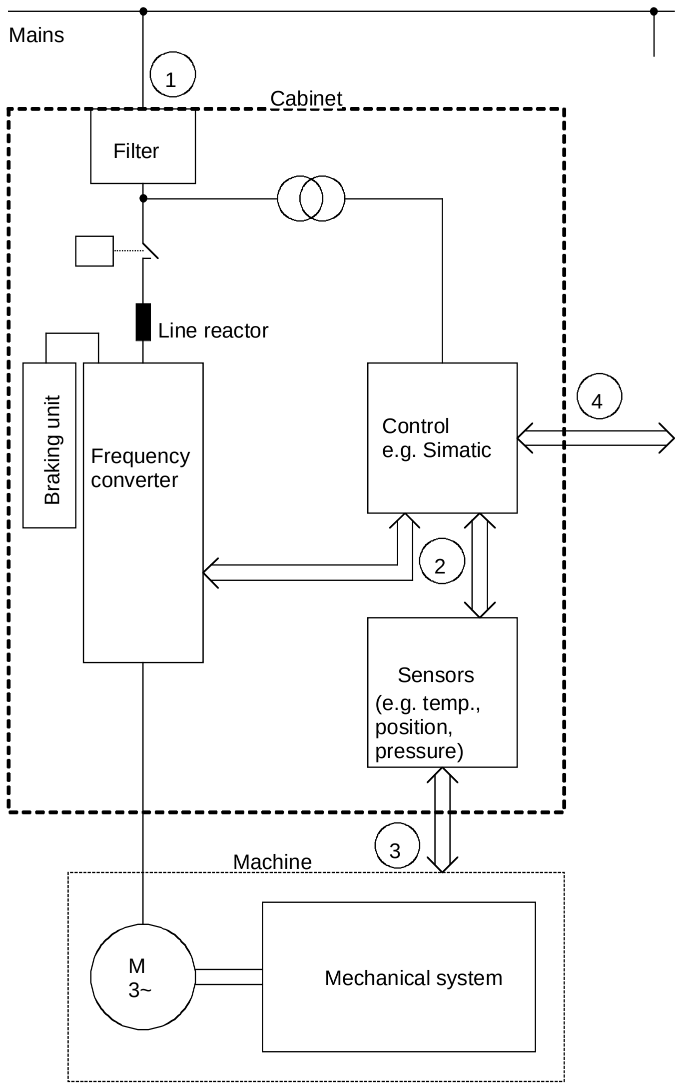


Fig. 3-7 Block diagram of a drive system

The purpose of a frequency converter is to drive a motor. The frequency converter, the relevant open-loop control and sensor system are accommodated in a cabinet. The emitted noise has to be limited at the mains connection point and therefore radio interference suppression filters and line reactors are installed in the cabinet.

Assuming that all requirements are met at Point ① - can it be supposed that electromagnetic compatibility exists?

This question cannot just be answered with "yes" because EMC has to be reliably ensured inside the cabinet as well. It is possible that the control system produces electromagnetic influences at interfaces ② and ④, and the sensor system at interfaces ② and ③.

Therefore, a radio interference suppression filter by itself cannot ensure EMC!

See the following sections.

3.4.1 The zone concept

The most cost-effective measure of reducing interference is to spatially separate the noise sources and the noise receivers. This must, however, already be taken into account during the planning stage of a machine/system. The first question that has to be answered is whether the unit used is a noise source or a noise receiver. Noise sources in this connection are, for example, frequency converters, braking units, contactors.

Noise receivers are, for example, automation devices, encoders and sensors.

The machine/system is then divided up into EMC zones and the units are assigned to these zones. Each zone has its own requirements regarding noise emission and noise immunity. The zones have to be spatially separated, which is best done using a metal housing or, within a cabinet, using grounded partitions. If necessary, filters have to be used at the zone interfaces. The zone concept is explained using the following diagram as an example which shows a simplified drive system:

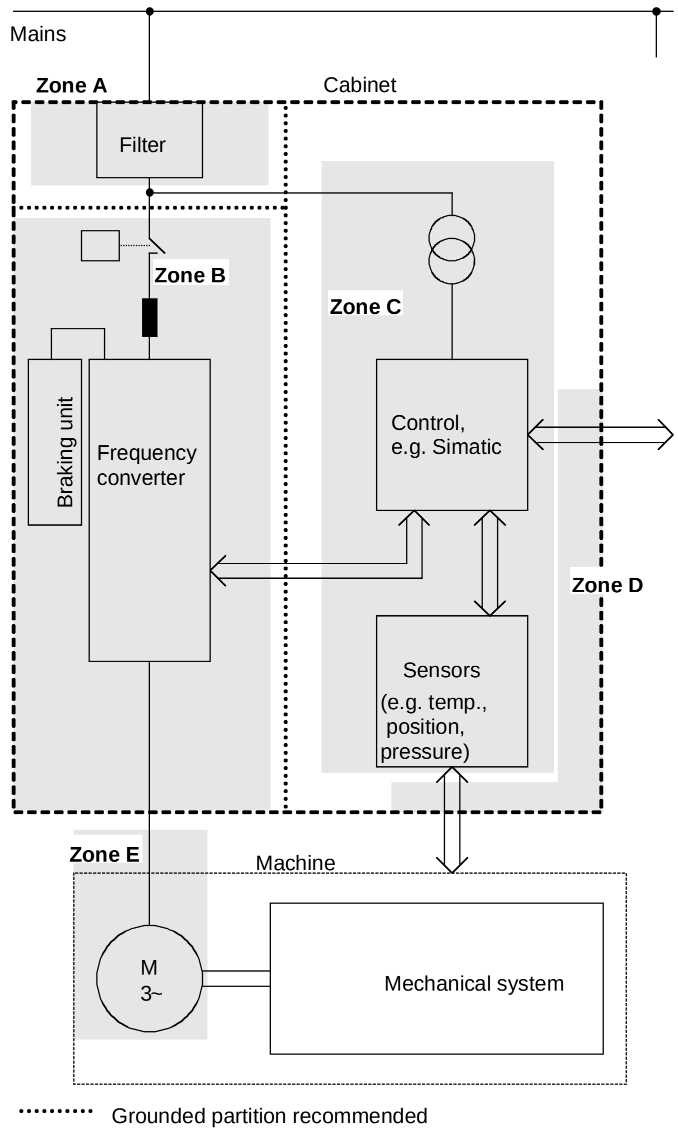


Fig. 3-8 Sub-dividing a drive system into zones

- Zone A is the cabinet connection to the line supply including filter. The emitted noise should be kept at specific limit values here.
- Zone B contains the line reactor and the noise sources: frequency converter, braking unit, contactor.
- Zone C accommodates the control transformer and the noise receivers: control and sensor system.
- Zone D forms the interface between the signal and control cables to the periphery. A defined noise immunity level is required here.
- Zone E comprises the three-phase motor and the motor supply cable.
- The zones should be spatially separated in order to achieve electromagnetic de-coupling.

- Minimum clearance 20 cm.
- De-coupling by means of grounded partitions is even better. It is not permissible to route cables which have been assigned to various zones together in the same cable ducts!
- If necessary, filters should be installed at the interface locations between the zones.
- Non-shielded signal cables can be used within one zone.
- All bus cables (e.g. RS 485, RS 232) and signal cables leaving the cabinet must be shielded.

3.4.2 Use of filters and coupling elements

EMC cannot be brought about just by installing filters! Measures such as shielded motor feeder cables and spatial separation are also necessary.

Radio interference suppression filters

Radio interference suppression filters reduce the cable-related noise interference voltage at the mains connection point. In order to maintain the limit values ("First environment" or "Second environment"), a radio interference suppression filter is necessary, irrespective of whether a dv/dt or sinusoidal filter is used at the output of the frequency converter.

dv/dt filters

dv/dt filters are used in the first place to protect the motor winding, by reducing the maximum voltage stressing, and in the second place, the reduced voltage gradient will result in a lower noise current.

Sinusoidal filters

Sinusoidal filters are low-pass filters which generate an almost sinusoidal voltage from the voltage blocks which the converter switches at the output terminals. The voltage gradient and the maximum voltage peaks are limited even more effectively than in the case of dv/dt filters.

Coupling elements

In addition, data line filters and/or coupling elements may be required at the interfaces between the zones. Coupling elements with electrical isolation (e.g. isolating amplifiers) prevent the noise from being propagated from one zone to the next. Isolating amplifiers particularly have to be provided in the case of analog signals.

3.5 Design of drives in conformance with EMC regulations

3.5.1 Basic EMC rules

Rules 1 to 13 are generally applicable. Rules 14 to 20 are particularly important for limiting noise emission.

Rule 1 All of the metal cabinet parts must be connected through the largest possible surface areas (not paint on paint). If required, use serrated washers. The cabinet door must be connected to the cabinet through grounding straps which must be kept as short as possible.

NOTE Grounding installations/machines is essentially a protective measure. However, in the case of drive systems, this also has an influence on the noise emission and noise immunity. A system can either be grounded in a star configuration or each component grounded separately. Preference should be given to the latter grounding system in the case of drive systems, i.e. all parts of the installation to be grounded are connected through their surface or in a mesh pattern.

Rule 2 Signal cables and power cables must be routed separately (to eliminate coupled-in noise). Minimum clearance: 20 cm. Provide partitions between power cables and signal cables. The partitions must be grounded at several points along their length.

Rule 3 Contactors, relays, solenoid valves, electromechanical operating hours counters, etc. in the cabinet must be provided with quenching elements, for example, RC elements, diodes, varistors. These quenching devices must be connected directly at the coil.

Rule 4 Non-shielded cables associated with the same circuit (outgoing and incoming conductor) must be twisted, or the surface between the outgoing and incoming conductors kept as small as possible in order to prevent unnecessary coupling effects.

Rule 5 Eliminate any unnecessary cable lengths to keep coupling capacitances and inductances low.

Rule 6 Connect the reserve cables/conductors to ground at both ends to achieve an additional shielding effect.

Rule 7 In general, it is possible to reduce the noise being coupled-in by routing cables close to grounded cabinet panels. Therefore, wiring should be routed as close as possible to the cabinet housing and the mounting panels and not freely through the cabinet. The same applies for reserve cables/conductors.

Rule 8 Tachometers, encoders or resolvers must be connected through a shielded cable. The shield must be connected to the tachometer, encoder or resolver and at the SIMOVERT MASTERDRIVES through a large surface area. The shield must not be interrupted, e.g. using intermediate terminals. Pre-assembled cables with multiple shields should be used for encoders and resolvers (see Catalog DA65).

Rule 9

The cable shields of digital signal cables must be connected to ground at both ends (transmitter and receiver) through the largest possible surface area. If the equipotential bonding is poor between the shield connections, an additional equipotential bonding conductor with at least 10 mm² must be connected in parallel to the shield, to reduce the shield current. Generally, the shields can be connected to ground (= cabinet housing) in several places. The shields can also be connected to ground at several locations, even outside the cabinet.

Foil-type shields are not to be favoured. They do not shield as well as braided shields; they are poorer by a factor of at least 5.

Rule 10

The cable shields of **analog** signal cables can be connected to ground at both ends if the equipotential bonding is good. Good equipotential bonding is achieved if Rule 1 is observed.

If low-frequency noise occurs on analog cables, for example: speed/measured value fluctuations as a result of equalizing currents (hum), the shields are only connected for analog signals at one end at the SIMOVERT MASTERDRIVES. The other end of the shield should be grounded through a capacitor (e.g. 10 nF/100 V type MKT). However, the shield is still connected at both ends to ground for high frequency as a result of the capacitor.

Rule 11

If possible, the signal cables should only enter the cabinet at one side.

Rule 12

If SIMOVERT MASTERDRIVES are operated from an external 24 V power supply, this power supply must not feed several consumers separately installed in various cabinets (hum can be coupled-in!). The optimum solution is for each SIMOVERT MASTERDRIVE to have its own power supply.

Rule 13

Prevent noise from being coupled-in through the supply.

SIMOVERT MASTERDRIVES and automation units/control electronics should be connected-up to different supply networks. If there is only one common network, the automation units/control electronics have to be de-coupled from the supply using an isolating transformer.

Rule 14

The use of a radio interference suppression filter is obligatory to maintain limit value class "First environment" or "Second environment", even if sinusoidal filters or dv/dt filters are installed between the motor and SIMOVERT MASTERDRIVES.

Whether an additional filter has to be installed for further consumers, depends on the control used and the wiring of the remaining cabinet.

Rule 15

A noise suppression filter should always be placed close to the fault source. The filter must be connected to the cabinet housing, mounting panel, etc. through a large surface area. A bare metal mounting panel (e.g. manufactured from stainless steel, galvanized steel) is best, as electrical contact is established through the entire mounting surface. If the mounting panel is painted, the paint has to be removed at the screw mounting points for the frequency converter and the noise suppression filter to ensure good electrical contact.

The incoming and outgoing cables of the radio interference suppression filter have to be spatially separated/isolated.

Rule 16

In order to limit the noise emitted, all variable-speed motors have to be connected-up using shielded cables, with the shields being connected to the respective housings at both ends in a low-inductive manner (through the largest possible surface area). The motor feeder cables also have to be shielded inside the cabinet or at least shielded using grounded partitions. Suitable motor feeder cable e.g. Siemens PROTOFLEX-EMV-CY (4 x 1.5 mm^2 ... 4 x 120 mm^2) with Cu shield. Cables with steel shields are unsuitable.

A suitable PG gland with shield connection can be used at the motor to connect the shield. It should also be ensured that there is a low-impedance connection between the motor terminal box and the motor housing. If required, connect-up using an additional grounding conductor. **Do not use plastic motor terminal boxes!**

Rule 17

A line reactor has to be installed between the radio interference suppression filter and the SIMOVERT MASTERDRIVES.

Rule 18

The line supply cable has to be spatially separated from the motor feeder cables, e.g. by grounded partitions.

Rule 19

The shield between the motor and SIMOVERT MASTERDRIVES must not be interrupted by the installation of components such as output reactors, sinusoidal filters, dv/dt filters, fuses, contactors. The components must be mounted on a mounting panel which simultaneously serves as the shield connection for the incoming and outgoing motor cables. Grounded partitions may be necessary to shield the components.

Rule 20

In order to limit the radio interference (especially for limit value class "First environment "), in addition to the line supply cable, all cables externally connected to the cabinet must be shielded.

Examples of these basic rules:

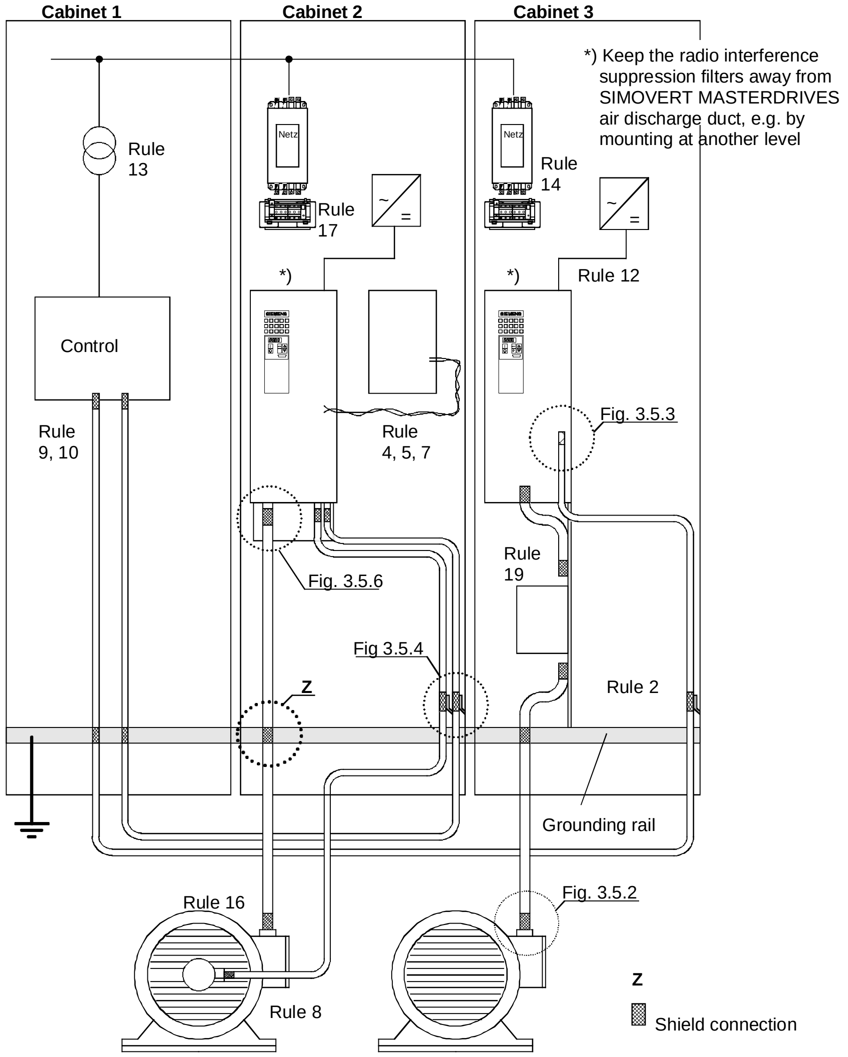


Fig. 3-9 Examples for applying the basic EMC rules

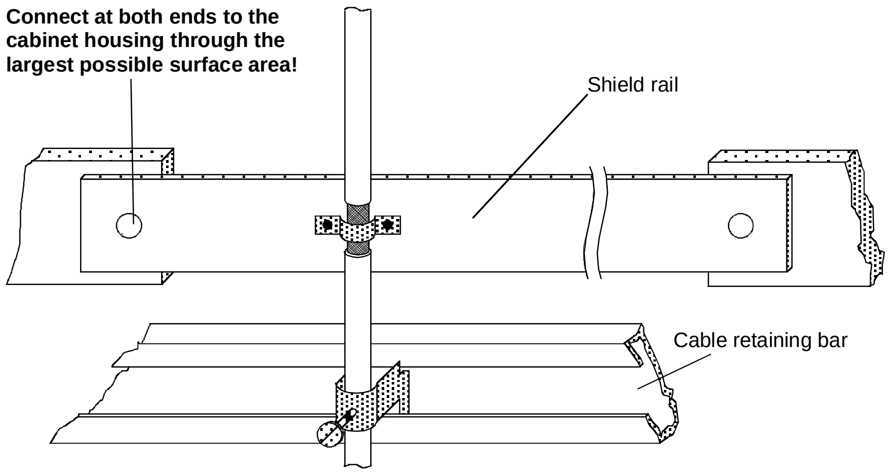


Fig. 3-10 Connecting the motor cable shield where the cable enters the cabinet

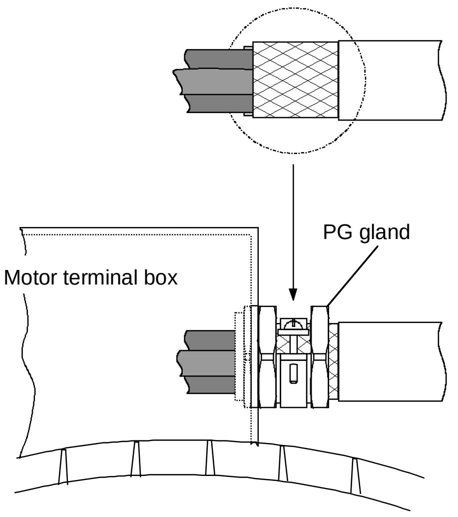


Fig. 3-11 Shield connection at the motor

The shield can be connected through a PG gland (nickel-plated brass) with a strain relief bar. Thus, the degree of protection IP 20 can be achieved.

For higher degrees of protection (up to IP 68), there are special PG glands with shield connection, e.g.:

♦ SKINDICHT SHVE, Messrs. Lapp, Stuttgart

♦ UNI IRIS Dicht or UNI EMV Dicht, Messrs. Pflitsch, Hückeswagen

It is not permissible to use plastic motor terminal boxes!

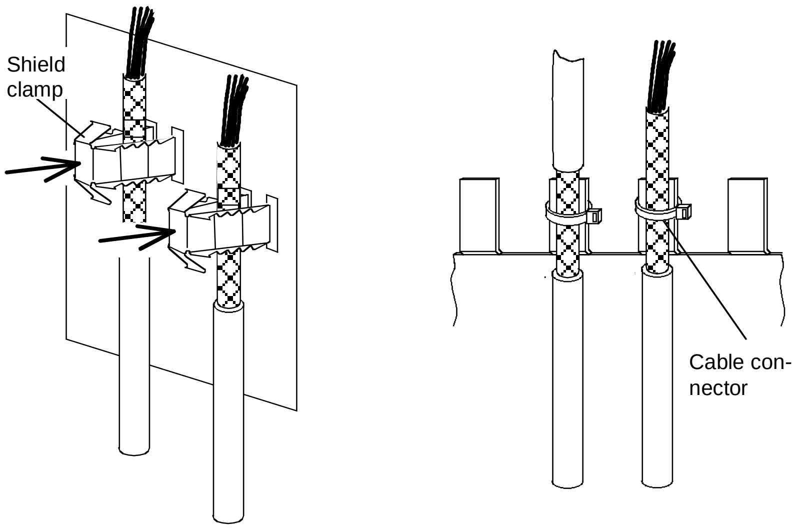


Fig. 3-12 Connecting the signal cable shields for SIMOVERT MASTERDRIVES

- Every SIMOVERT MASTERDRIVES has shield clamps to connect the signal cable shields.
- For chassis units (sizes ≥ E), the shields can be additionally connected using cable connectors at the shield connecting locations.

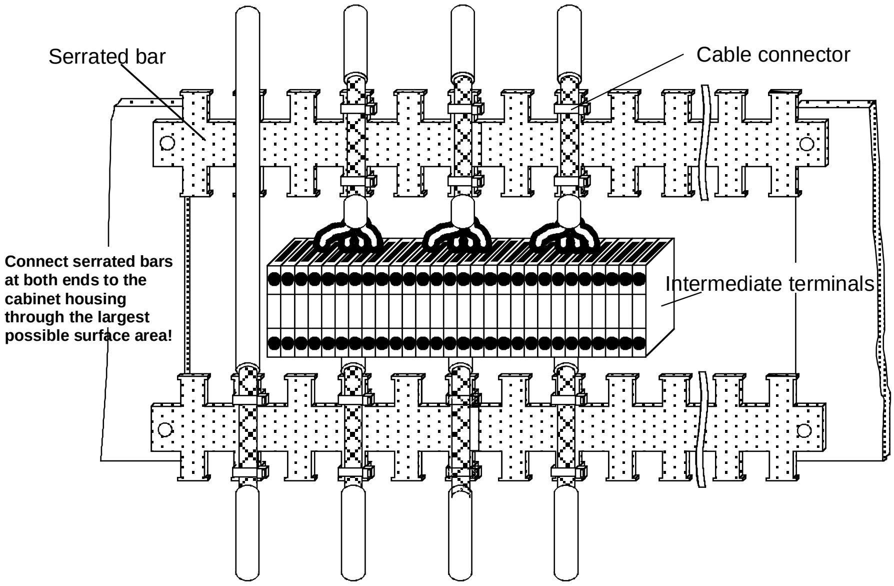


Fig. 3-13 Connecting signal cable shields in the cabinet

Wherever possible, intermediate terminals should not be used as they reduce the shielding effect!

3.5.2 Examples

Drive unit of Compact type

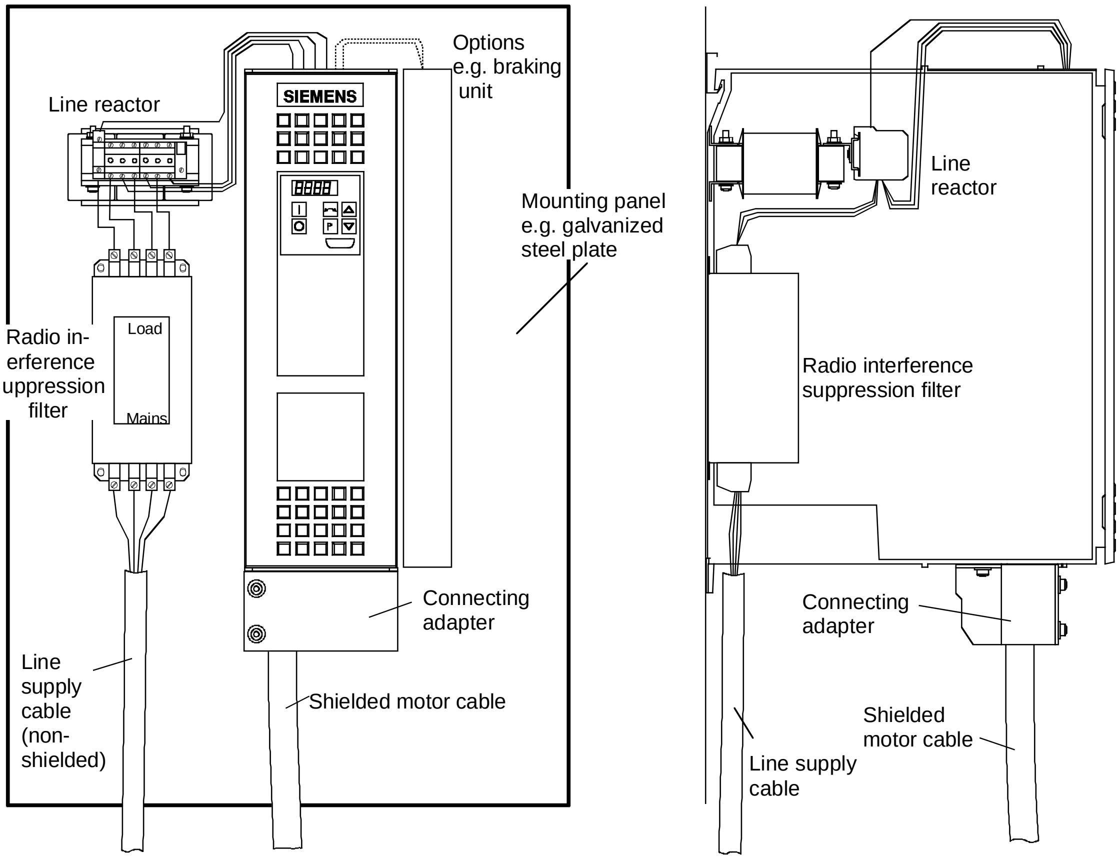


Fig. 3-16 Example of a Compact type unit with radio interference suppression filter and line reactor

The cabling should be kept as short as possible. The line supply cable to the radio interference suppression filter must be routed separately away from other cables (zone concept!).

The motor must be connected using a shielded cable! The shield must be connected through the largest possible surface area at the motor and drive converter. The optional connecting adapter can be used to connect the shield to SIMOVERT MASTERDRIVES.

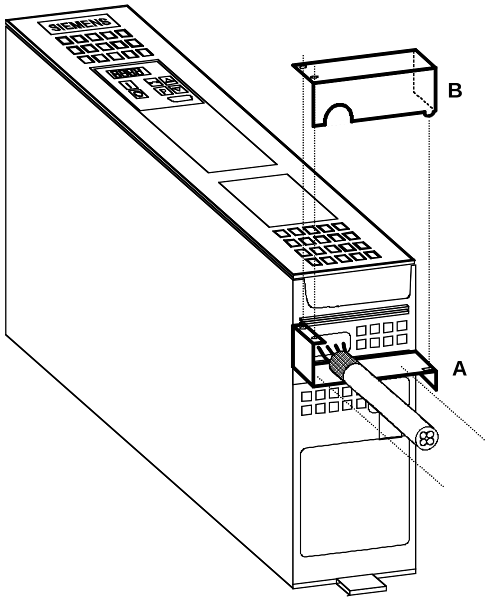


Fig. 3-17 Mounting the connecting adapter

- Screw lower section A to SIMOVERT MASTERDRIVES.
- Mount SIMOVERT MASTERDRIVES on the mounting panel.
- Connect the shielded motor cable and shield to section A through the largest possible surface area, e.g. attach using cable connectors.
- Locate upper part B and screw into place. The shields of signal cables can be connected to the upper section.

Chassis type drive unit

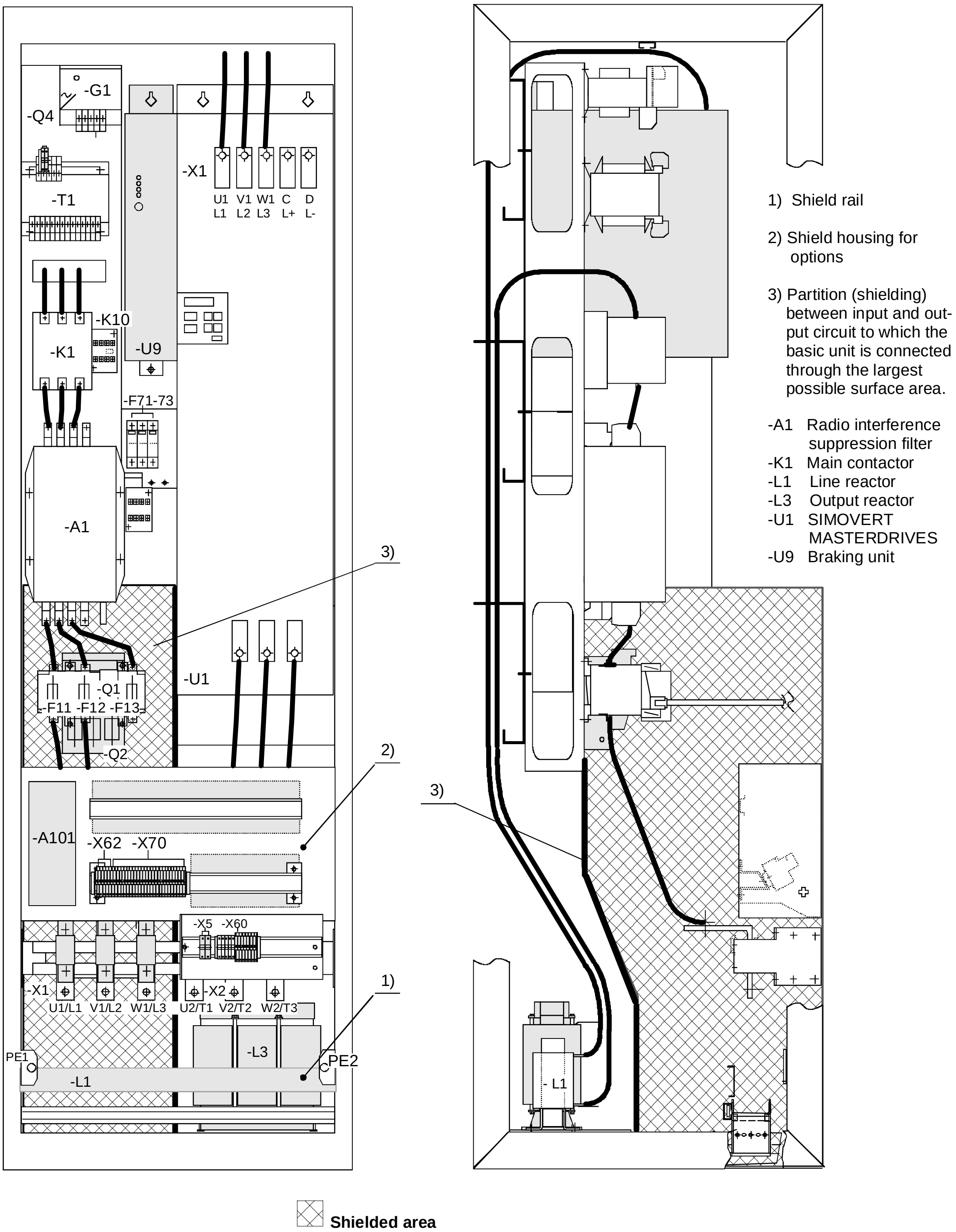


Fig. 3-18 Example of a chassis unit mounted in the cabinet with radio interference suppression filter and line reactor

Example of correct cable routing

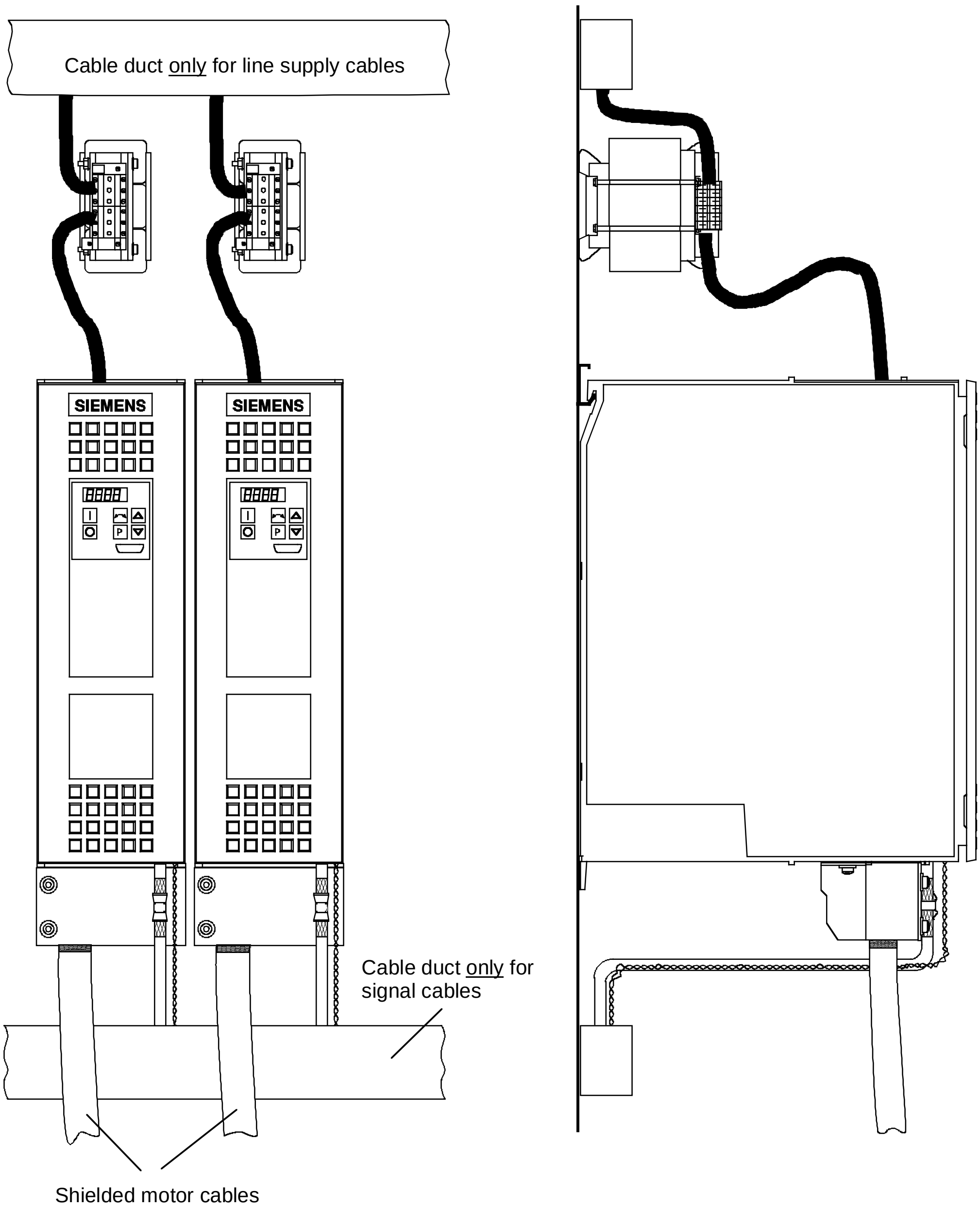


Fig. 3-19 Installation with separate cable ducts

Installation with cable ducts only for the line supply cables. Line supply cables are non-shielded.

The motor and signal cables are routed separately from each other.

The shields of the motor and signal cables have to be mounted on the shield connections through the largest possible surface area.

Example of incorrect cable routing

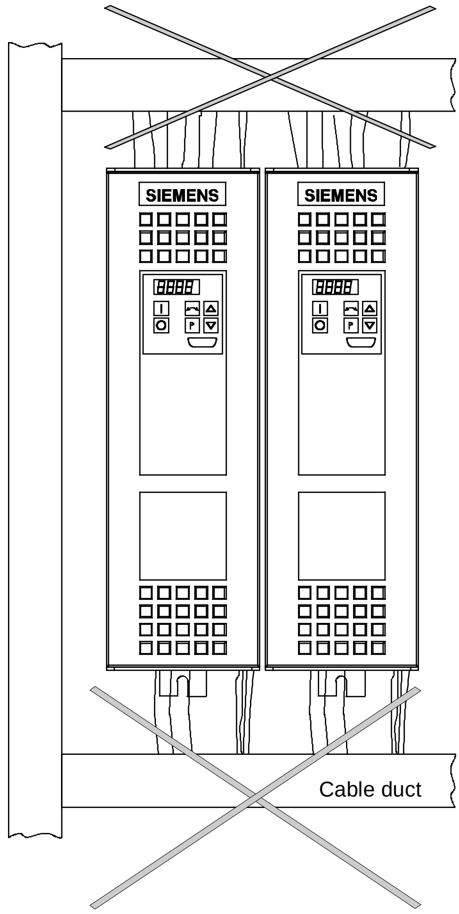


Fig. 3-20 Installation with cable ducts

Installation with cable ducts, mounted on a painted mounting panel. All of the cables are non-shielded.

Optically this layout looks good.

But from an EMC perspective, this installation is useless!

The motor and signal cables are routed in parallel in the lower cable duct. The same is true for line supply cables and external power supplies in the upper cable duct. All of the cables are then routed together in the vertical cable duct.

Cabling such as this allows noise to be easily propagated and coupled-in!

3.6 Assignment of SIMOVERT MASTERDRIVES, radio interference suppression filters and line reactors

The assignment of SIMOVERT MASTERDRIVES, radio interference suppression filters and line reactors is specified in Catalog DA 65.1 and DA 65.11 and the Operating Instructions for the 6SE70 radio interference suppression filters.

The 6SE70 radio interference suppression filters were checked to make sure they maintain the limit values, using layouts consisting of SIMOVERT MASTERDRIVES and the associated line reactors. The components were mounted in cabinets (Type 8MC) in observance of the specified rules. The motor feeder cable was 30 m long.

3.7 Specified standards

EN 55011:	1991	Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment
EN 50081-1:	1992	Generic emission standard Part 1: Residential, commercial and light industry
EN 50081-2:	1993	Generic emission standard Part 2: Industrial environment
EN 50082-1:	1992	Generic immunity standard Part 1: Residential, commercial and light industry
EN 50082-2:	1995	Generic immunity standard Part 2: Industrial environment
EN 61800-3:	1996	EMC product standard including special test methods for variable-speed electric drive units

4 Function blocks and parameters

Control functions

A large number of open-loop and closed-loop control functions, communication functions, as well as diagnostics and operator control functions are implemented in the software of the converters and inverters by means of function blocks. These function blocks can be parameterized and freely interconnected.

The interconnection method can be compared with electrical circuit engineering where various function units, e.g. integrated circuits or other components are interconnected by cables.

The difference is, however, that function blocks are interconnected not by cables, but via software.

4.1 Function blocks

Functions are implemented in function blocks. The function scope of the individual function blocks depends on its special task.

The function blocks are provided with inputs, outputs and parameters and are processed in time slots.

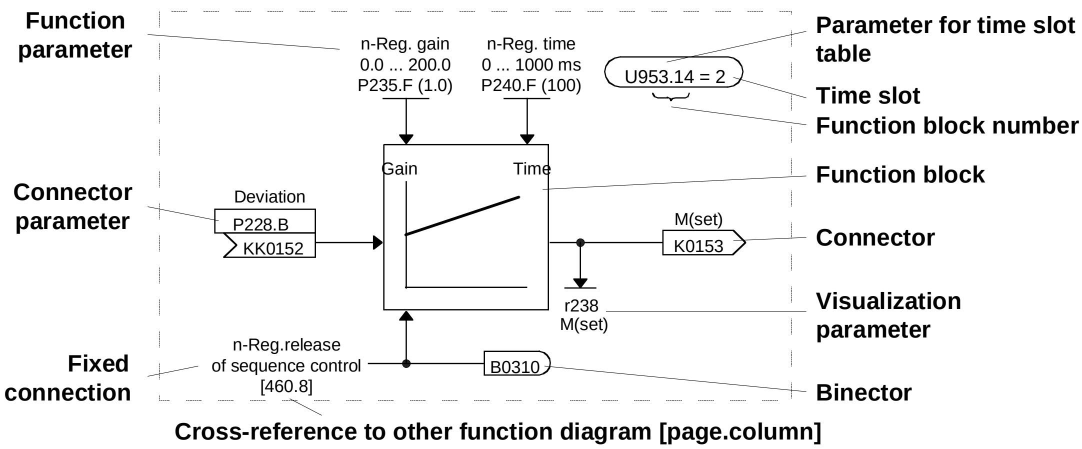


Fig. 4-1 A function block

Function block number

Each function block has a function block number (FB number) by which it can be clearly identified. With the FB number, you can define which time slot can be used for processing a large number of function blocks. For this purpose, each function block is allocated an indexed parameter which contains the relevant FB number in its parameter number and its parameter index.

Example:

U950.01 is the code of FB number 001
U953.50 is the code of FB number 250
U953.99 is the code of FB number 299
U954.74 is the code of FB number 374

The parameter for selecting the time slot as well as the corresponding factory setting are indicated in the function diagrams for each function block. This data takes the form of an ellipse in order to distinguish it optically from the other elements of a function block.

In addition to the time slot, the processing sequence can also be determined for most of the function blocks.

4.2 Connectors and binectors

Connectors and binectors are elements which are used to exchange signals between individual function blocks. They are each cyclically filled by function blocks with one signal value. Other function blocks can then call up these values, depending on parameterization.

Connectors

Connectors can be likened to storage locations which are used to archive "analog" signals. They are clearly designated. Each connector designation comprises the connector name, the connector number and an identification letter.

The identification letter depends on the numerical representation:

- K Connector with word length (16 bit)
- KK Connector with double-word length (32 bit, increased accuracy)

The connector number always has four digits.

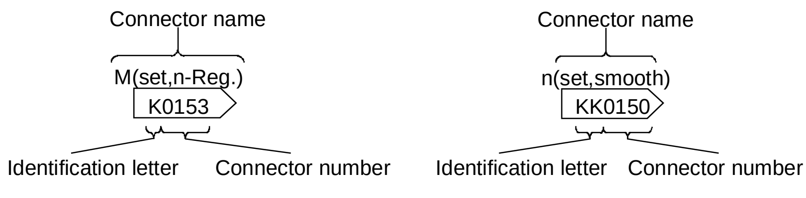


Fig. 4-2 Connectors with word lengths of 16 bit and 32 bit

Value range of the connectors

The values stored in the connectors are normalized values, with a few exceptions (e.g. connectors for control words).

The value range of these connectors covers a percentage value range of:

- -200 % (8000H / 8000 0000H for double-word connectors) to
- +199,99 % (7FFFH / 7FFF FFFFH for double-word connectors).

100 % corresponds to the value 4000H (4000 0000H for double-word connectors).

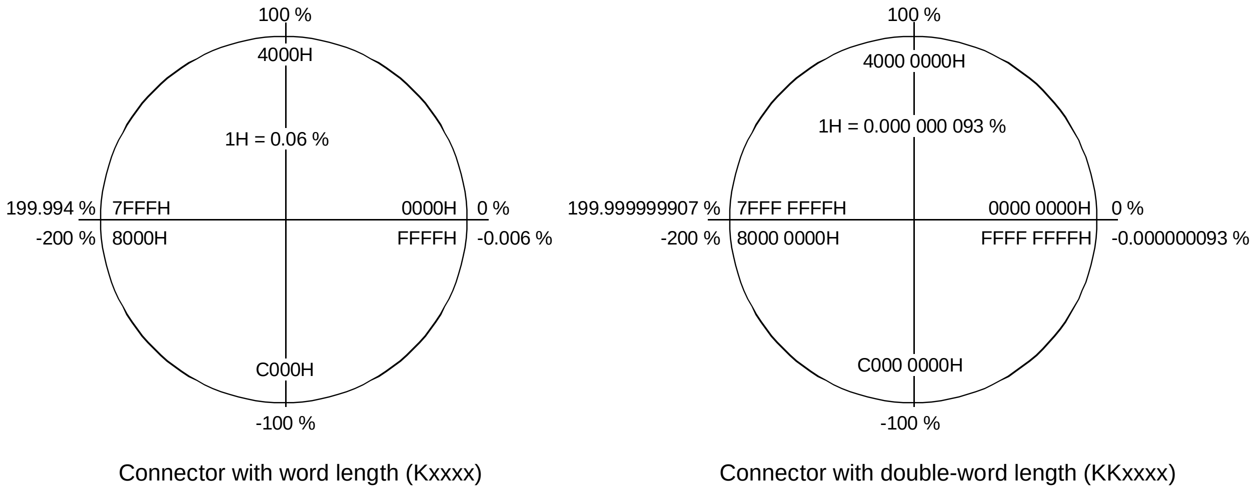


Fig. 4-3 Value range and assignment of the figure ranges for connectors

Binectors

Function blocks archive the **bi**nary (digital) output information in binary con**nectors**, the binectors. Binectors can therefore be likened to storage locations used for storing binary signals. They are clearly identified. Each binector designation comprises the binector name, the binector number and an identification letter. The identification letter is B.

The binector number always has four digits.

On account of their definition, binectors can only assume the two states "0" (logically no) and "1" (logically yes).

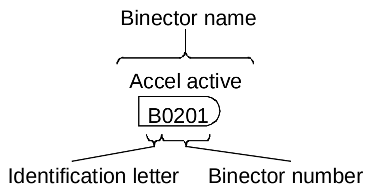


Fig. 4-4 Binectors

4.3 Parameters

Parameters are the intervention points for adapting function blocks to an application, for interconnecting function blocks via connectors and binectors and for visualizing internal signals.

The various parameters are differentiated according to their function as follows:

- ♦ Function parameters (can be read and written)
- ♦ BICO parameters (can be read and written)
- ♦ Visualization parameters (can only be read).

Each parameter is clearly designated. The parameter designation comprises the parameter name and the parameter number, and enables every parameter to be clearly identified. In addition to the parameter name and the parameter number, many parameters also have a parameter index. With the aid of this index, it is possible to store several values for one parameter under one parameter number.

The function diagrams indicate the factory setting for every BICO parameter and every function parameter. They further indicate the value ranges for the changeable function parameters.

Parameter numbers on the PMU

The parameter numbers shown on the parameterizing unit (PMU) which is directly mounted on the unit consist of a letter and a three-digit number.

The following applies for the letters:

- ♦ Upper-case letters (P, U, H and L) represent the BICO parameters and function parameters which can be changed
- ♦ Lower-case letters (r, n, d and c) represent the visualization parameters which cannot be changed.

The three-digit number covers the value range from 000 to 999; but not all values are used.

Parameter numbers on the OP1S

The OP1S operator control panel enables parameters to be selected directly by their parameter numbers. As the OP1S only has a numerical keypad, the letter of the parameter number must be replaced by a number. The following replace mode is applicable:

- ♦ "P"xxx and "r"xxx are replaced by "0"xxx
- ♦ "H"xxx and "d"xxx are replaced by "1"xxx
- ♦ "U"xxx and "n"xxx are replaced by "2"xxx
- ♦ "L"xxx and "c"xxx are replaced by "3"xxx

Examples:

Select r004 on OP1S: Input 0004
Select P050 on OP1S: Input 0050
Select U123 on OP1S: Input 2123
Select L411 on OP1S Input 3411

Function parameters

The response of a function block is determined by function parameters. Typical examples of function parameters are:

- Normalization of an input signal
- Acceleration or deceleration times in the ramp-function generator
- Proportional gain (Kp) and integral time (Tn) in the speed controller.

Function parameters can be indexed. The significance of the parameter values stored in the various indices depends on the definition of the respective parameter. A special group is formed by the function parameters which are part of the so-called function data sets.

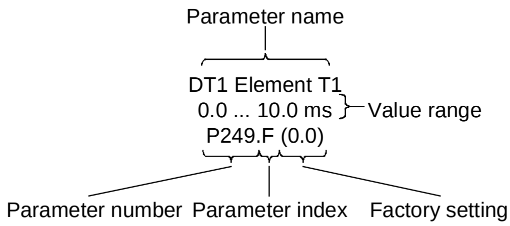


Fig. 4-5 Function parameters

Function data sets (Setpoint data sets)

Special function parameters are put together in function data sets. These parameters are marked in the function diagrams with the parameter index **.F**.

The parameters concerned are indexed four-fold, which means that one parameter value can be stored under each parameter index, i.e. a total of four parameter values can be stored.

The active function data set determines which value is currently being used. If function data set 1 is active, the parameter value stored in parameter index 1 is used. If function data set 2 is active, the parameter value stored in parameter index 2 is used, etc.

Example:

P462.1 = 0.50
P462.2 = 1.00
P462.3 = 3.00
P462.4 = 8.00

A total of 4 values are stored under parameter P462 (Accel Time). If function data set 1 is active, the acceleration time is 0.50 secs. If function data set 2 is active, the acceleration time is 1.00 secs. If function data set 3 is active, the acceleration time is 3.00 secs and if function data set 4 is active, the acceleration time is 8.00 secs.

The individual function data sets are selected by means of control word bits 16 and 17 in control word 2 (P576.B and P577.B). Changeover is possible at any time.

The active function data sets are displayed via the visualization parameter r013 (Active FuncDSet).

NOTE

Changeover of all the indexed parameters of the function data sets between parameter indices 1, 2, 3 and 4 is always effected jointly.

Using function parameter P364, it is possible to copy the parameter settings of one function data set (index 1, 2, 3 or 4) into another function data set.

Motor parameters

The motor parameters enable the converter to the be adapted to the connected motor and enable the open-loop and closed-loop control structure to be adapted. Typical examples for motor parameters are:

- Rated motor data from the rating plate
- Specification of the connected tachometer
- Current and output limits

Motor parameters are indexed 4-fold.

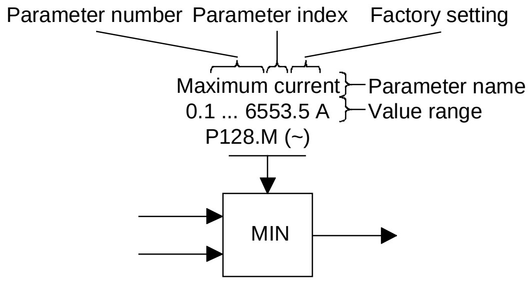


Fig. 4-6 Motor parameters

Motor data sets

Selected function parameters are put together in motor data sets. These parameters are marked in the function diagrams with the parameter index **.M**

The parameters concerned are indexed four-fold, which means that one parameter value can be stored under each parameter index of these parameters, i.e. a total of four parameters can be stored.

The active motor data block (MDS) determines which value is currently being used. If MDS1 is active, the parameter value stored in parameter index 1 is used, if MDS2 is active, the parameter value stored in parameter index 2 is used, etc

Example:

P100.1 = 4
P100.2 = 3
P100.3 = 1
P100.4 = 1

A total of 4 values are stored under parameter P100 (Control Mode). If motor data set 1 is active, the drive operates in speed control with a tachometer. If the motor data set 2 is active, the drive operates in frequency control without a tachometer. If motor data set 3 and 4 are active, the drive operates in v/f control.

Individual motor data sets are selected via control word bits 18 and 19 in control word 2 (P578.B and P579.B).

Changeover is only possible in the powered-down state.

NOTE

All indexed parameters of the motor data sets are always changed over jointly between parameter indices 1, 2, 3 and 4.

Using function parameter P362, it is possible to copy the parameter settings of one motor data set (index 1, 2, 3 or 4) into another motor data set.

BICO parameters

With BICO parameters, you can determine the sources of the input signals of a function block. This means that you can use BICO parameters to define the connectors and binectors from which a function block reads in its input signals. In this manner, you can "softwire" the function blocks stored in the units to meet your requirements. This is referred to as the BICO system.

For every BICO parameter, the type of input signals (connector or binector) which you can connect to the inputs is specified. BICO parameters have the following identification:

- B Binector parameter
  for connecting binectors
- K Connector parameter
  for connecting connectors with word length (16 bit)
- KK Connector parameter
  for conneting connectors with double-word length (32 bit)

Reciprocal "softwiring" of binectors and connectors is not permitted. However, you can always connect connector with word length and double-word length to the connector parameters.

BICO parameters are available in two forms; they can either be

- non-indexed, or
- double-indexed.

BICO data sets (Basic/reserve data sets)

Selected BICO parameters are put together in BICO data sets. These parameters are marked in the function diagrams with the parameter index **.B.**

The parameters concerned are double-indexed, which means that one parameter value can be stored under each parameter index of these parameters, i.e. a total of two parameter values can be stored.

The active BICO data set determines which value is currently being used. If BICO data set 1 is active, the parameter value stored in parameter index 1 is used. If BICO data set 2 is active, the parameter value stored in parameter index 2 is used.

Example:
P554.1 = 10
P554.2 = 2100

A total of 2 values are stored under parameter P554 (Src ON/OFF1). If BICO data set 1 is active, the ON command comes from digital input 1 of the basic unit. If BICO data set 2 is active, the ON command comes from bit 0 of the first data word received by serial interface 1.

Individual BICO data sets are selected by means of control word bit 30 in control word 2 (P590.

The active BICO data set is displayed via visualization parameter r012 (Active BICO DS).

NOTE

All indexed BICO parameters are always switched jointly between parameter index 1 and 2.

Using function parameter P363, it is possible to copy the parameter settings of one BICO data set (index 1 or 2) into another BICO data set.

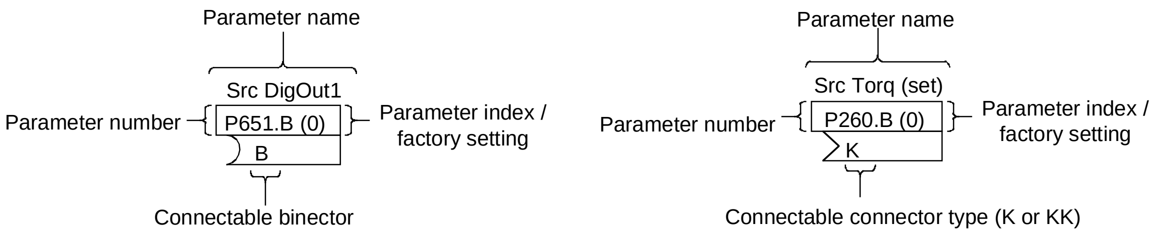


Fig. 4-7 Connectors with word lengths of 16 bit and 32 bit

Visualization parameters

Visualization parameters are used for visualizing internal quantities (e.g. applicable output current). These parameters are only displayed and cannot be changed by you.

To distinguish them from the other parameters, they are designated with a lower-case letter (r, n, d and c) in the parameter number.

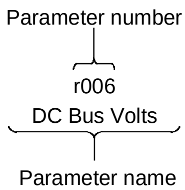


Fig. 4-8 Visualization parameters

4.4 Connecting up function blocks (BICO system)

BICO system is the term used to describe the method of creating connections between function blocks. This is performed with the aid of **bi**nectors and **co**nnectors. The name **BICO** system is derived from these two terms.

A connection between two function blocks consists of a connector or binector on the one side, and a BICO parameter on the other side. The connection is always made from the point of view of the input of a function block. You must always assign an output to an input. Assigment is made by entering in a BICO parameter the number of the connector or the binector from which the required input signals are read in. You are allowed to enter the same connector and binector numbers several times in different BICO parameters and thus use output signals of one function block as input signals for several other function blocks.

Example:
In the following figure, connector K0152 is connected to connector parameter P228. For this purpose, you must assign the number of connector K0152 as the value to the connector parameter P228 , i.e. in this case 152.

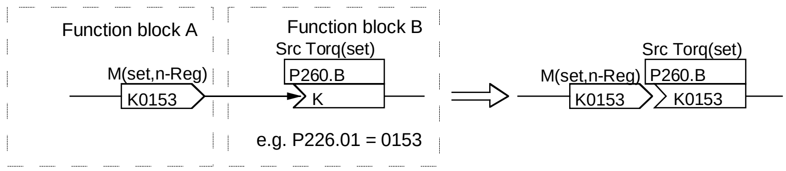


Fig. 4-9 Connecting two function blocks

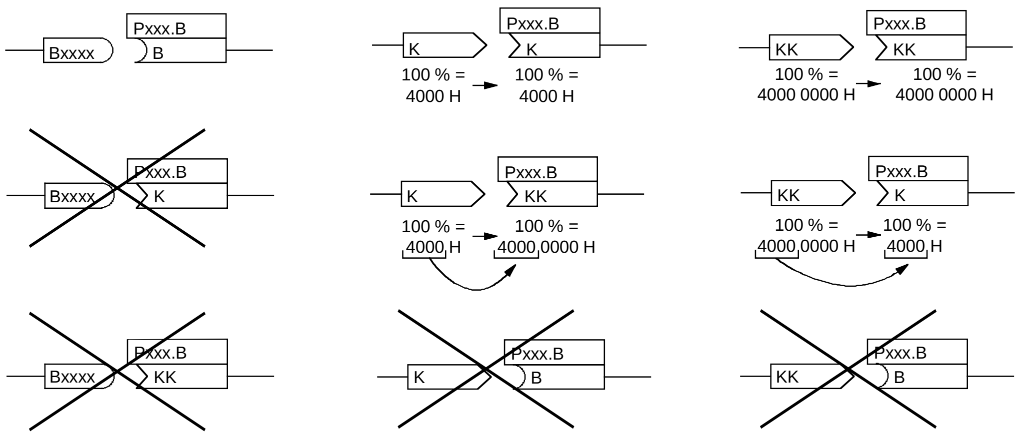


Fig. 4-10 Possible and impossible BICO connections

Interconnecting different connector types

Depending on their characteristics, connectors either have a length of a word (16 bit) or a double-word (32 bit). Accordingly, function blocks have BICO parameters which are suitable for connecting the respective connector type. It is, however, possible in principle to mix the types among the connectors. The word length is then automatically adjusted according to the following mode:

Interconnection of a word connector to	a word connector parameter	Value stays the same
	a double-word connector parameter	Value is taken over in high-word, low-word is filled up with 0000H
Interconnection of a double-word connector to	a word connector parameter	Value is taken over from high-word, low-word deleted
	a double-word connector parameter	Value stays the same

NOTICE

When a double-word connector is interconnected to a word connector parameter, the signal resolution will drop from 32 bit to 16 bit. As the low-word is cut off, the information of the lower-order 16 bit of the double-word connectors is then lost.

5 Parameterization

5.1 Parameter menus

Parameters with related functions are compiled in menus for structuring the parameter set stored in the units. A menu thus represents a selection out of the entire supply of parameters of the unit.

It is possible for one parameter to belong to several menus. The parameter list indicates which individual menus a parameter belongs to. Assignment is effected via the menu number allocated to each menu.

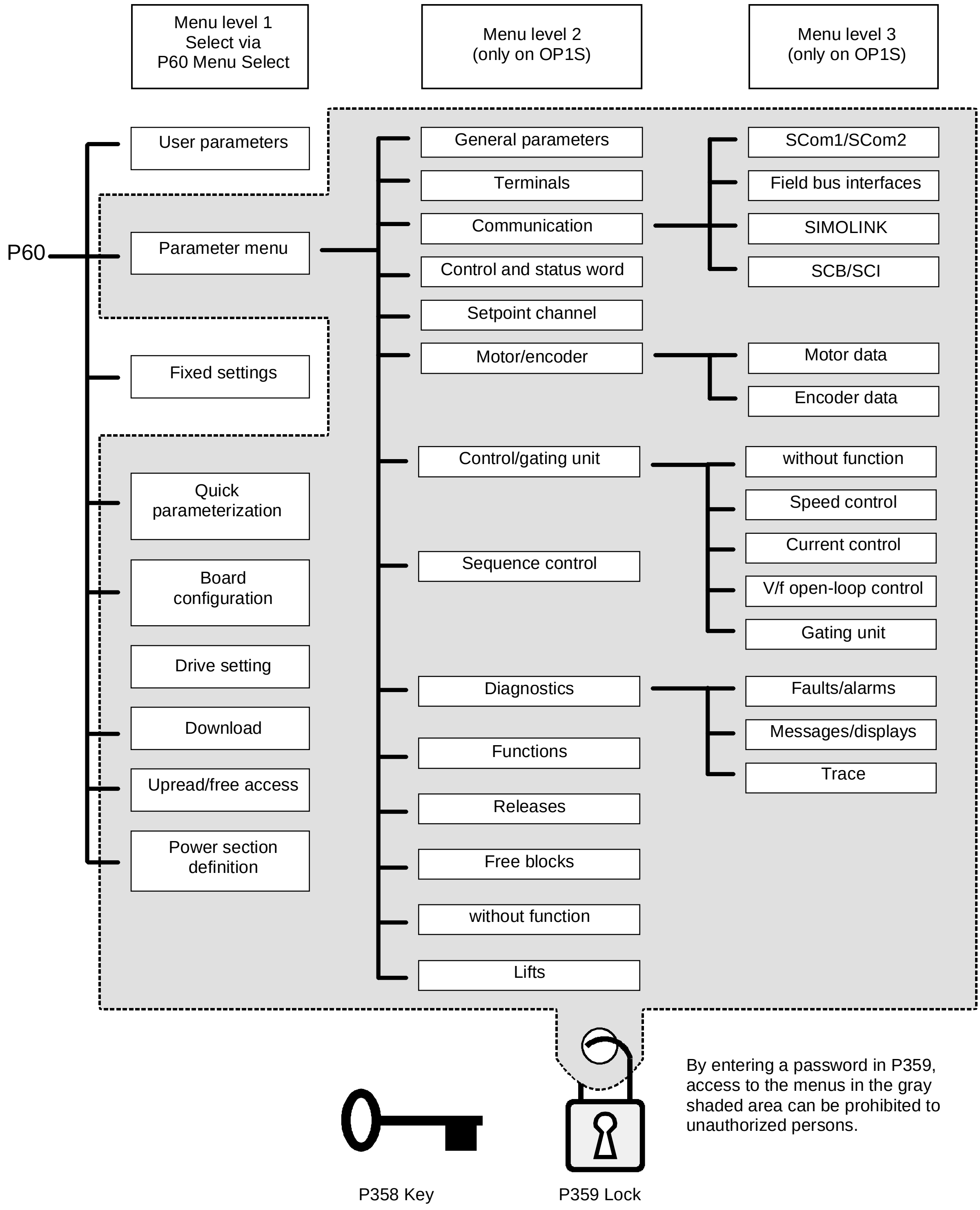


Fig. 5-1 Parameter menus

Menu levels

The parameter menus have several menu levels. The first level contains the main menus. These are effective for all sources of parameter inputs (PMU, OP1S, SIMOVIS, field bus interfaces).

The main menus are selected in parameter P60 Menu Selection.

Examples:
P060 = 0 "User parameters" menu selected
P060 = 1 "Parameter menu" selected
...
P060 = 8 "Power section definition" menu selected

Menu levels 2 and 3 enable the parameter set to be more extensively structured. They are used for parameterizing the units with the OP1S operator control panel.

Main menus

P060	Menu	Description
0	User parameters	• Freely configurable menu
1	Parameter menu	• Contains complete parameter set • More extensive structure of the functions achieved by using an OP1S operator control panel
2	Fixed settings	• Used to perform a parameter reset to a factory or user setting
3	Quick parameterization	• Used for quick parameterization with parameter modules • When selected, the unit switches to status 5 "Drive setting"
4	Board configuration	• Used for configuring the optional boards • When selected, the unit switches to status 4 "Board configuration"
5	Drive setting	• Used for detailed parameterization of important motor, encoder and control data • When selected, the unit switches to status 5 "Drive setting"
6	Download	• Used to download parameters from an OP1S, a PC or an automation unit • When selected, the unit switches to status 21 "Download"
7	Upread/free access	• Contains the complete parameter set and is used for free access to all parameters without being restricted by further menus • Enables all parameters to be upread by an OP1S, PC or automation unit
8	Power section definition	• Used to define the power section (only necessary for units of the Compact and chassis type) • When selected, the unit switches to status 0 "Power section definition"

Table 5-1 Main menus

User parameters

In principle, parameters are firmly assigned to the menus. However, the "User parameters" menu has a special status. Parameters assigned to this menu are not fixed, but can be changed. You are thus able to put together the parameters required for your application in this menu and structure them according to your needs.

The parameters to be included in the "User parameters" menu are selected in parameter P360 (Select UserParam). This parameter is indexed and permits the input of 100 parameter numbers. The sequence in which the parameter numbers are entered also determines the sequence in which they appear in the "User parameters" menu. If parameters with parameter numbers greater than 999 are to be included in the menu, they have to be input in the usual notation for the OP1S (replacing letters by figures).

Example

Parameterization of P360	Contained in "User parameters" menu:	
P360.1 = 053	P053 Parameter access	(always contained)
P360.2 = 060	P060 Menu select	(always contained)
P360.3 = 462	P462 Accel Time	
P360.4 = 464	P464 Decel Time	
P360.5 = 235	P235 n-Reg Gain1	
P360.6 = 240	P240 n-Reg Time	
P360.7 = 2306	U306 Timer5 Time_s	

Table 5-2 Example: Parameterizing a user menu

Lock and key

In order to prevent undesired parameterization of the units and to protect your know-how stored in the parameterization, it is possible to restrict access to the parameters by defining your own passwords with the parameters:

- P358 key and
- P359 lock.

If P358 and P359 do not have the same parameterization, only the "User parameters" and the "Fixed settings" menus can be selected in parameter P60 (Menu selection). This means that only the enabled parameters in the "User parameters" menu and the parameters of the "Fixed settings" menu are accessible to the operator. These restrictions are canceled again only if P358 and P359 are given the same parameter setting.

You should proceed in the following manner when using the lock and key mechanism:

1. Adopt key parameter P358 in the "User parameters" menu (P360.x = 358).
2. Program the lock parameter P359 in both parameter indices with your specific password.
3. Change over to the "User parameters" menu.

Depending on the parameterization of the key parameter P358 (the same or not the same as P359), you can now leave the "User parameters" menu and carry out or not carry out further parameterization (Exception: "Fixed settings" menu).

Examples:

Lock	**Key**	**Event**
P359.1 = 0 P359.2 = 0 (Factory setting)	P358.1 = 0 P358.2 = 0 (Factory setting)	Lock and key have the same parameter setting, all menus are accessible.
P359.1 = 12345 P359.2 = 54321	P358.1 = 0 P358.2 = 0	Lock and key do not have the same parameter setting, only the "User parameters" and "Fixed settings" menus are accessible.
5-3.2 = 54321	P358.1 = 12345 P358.2 = 54321	Lock and key have the same parameter setting, all menus are accessible.

Table 5-3 Examples of using the lock and key mechanism

NOTE

If you should forget or lose your password, access to all the parameters can only be restored by carrying out a parameter reset to factory setting ("Fixed settings") menu.

5.2 Changeability of parameters

The parameters stored in the units can only be changed under certain conditions. The following preconditions must be satisfied before parameters can be changed:

Preconditions	Remarks
• Either a function data set, a motor data set or a BICO parameter must be involved (identified by upper-case letters in the parameter number)	Visualization parameters (identified by lower-case letters in the parameter number) cannot be changed.
• Parameter access must be granted for the source from which the parameters are to be changed.	Release is given in P053 Parameter Access.
• A menu must be selected in which the parameter to be changed is contained.	The menu assignment is indicated in the parameter list for every parameter.
• The unit must be in a status which permits parameters to be changed.	The statuses in which it is possible to change parameters are specified in the parameter list.

Table 5-4 Preconditions for being able to change parameters

NOTE

The current status of the units can be interrogated in parameter r001.

Examples

Status (r001)	P053	Result
"Ready for ON" (09)	2	P222 Src n(act) can only be changed via the PMU
"Ready for ON" (09)	6	P222 Src n(act) can be changed via the PMU and SCom1 (e.g. OP1S)
"Operation" (14)	6	P222 Src n(act) cannot be changed on account of the drive status

Table 5-5 Influence of drive status (r001) and parameter access (P053) on the changeability of a parameter

5.3 Parameter input via the PMU

The PMU parameterizing unit enables parameterization, operator control and visualization of the converters and inverters directly on the unit itself. It is an integral part of the basic units. It has a four-digit seven-segment display and several keys.

The PMU is used with preference for parameterizing simple applications requiring a small number of set parameters, and for quick parameterization.

PMU in units of the Compact PLUS type

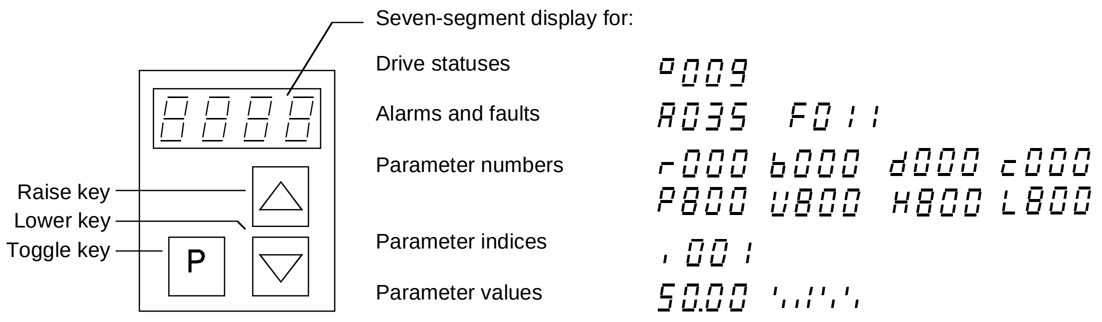


Fig. 5-2 PMU in units of the Compact PLUS type

Key	Significance	Function
P	Toggle key	• For switching between parameter number, parameter index and parameter value in the indicated sequence (command becomes effective when the key is released) • If fault display is active: For acknowledging the fault
△	Raise key	For increasing the displayed value: • Short press = single-step increase • Long press = rapid increase
▽	Lower key	For lowering the displayed value: • Short press = single-step decrease • Long press = rapid decrease
P + △	Hold toggle key and depress raise key	• If parameter number level is active: For jumping back and forth between the last selected parameter number and the operating display (r000) • If fault display is active: For switching over to parameter number level • If parameter value level is active: For shifting the displayed value one digit to the right if parameter value cannot be displayed with 4 figures (left-hand figure flashes if there are any further invisible figures to the left)
P + ▽	Hold toggle key and depress lower key	• If parameter number level is active: For jumping directly to operating display (r000) • If parameter value level is active: For shifting the displayed value one digit to the left if the parameter value cannot be displayed with 4 figures (right-hand figure flashes if there are any further invisible figures to the right)

Table 5-6 Operator control elements of the PMU (Compact PLUS type)

PMU in units of the Compact and chassis type

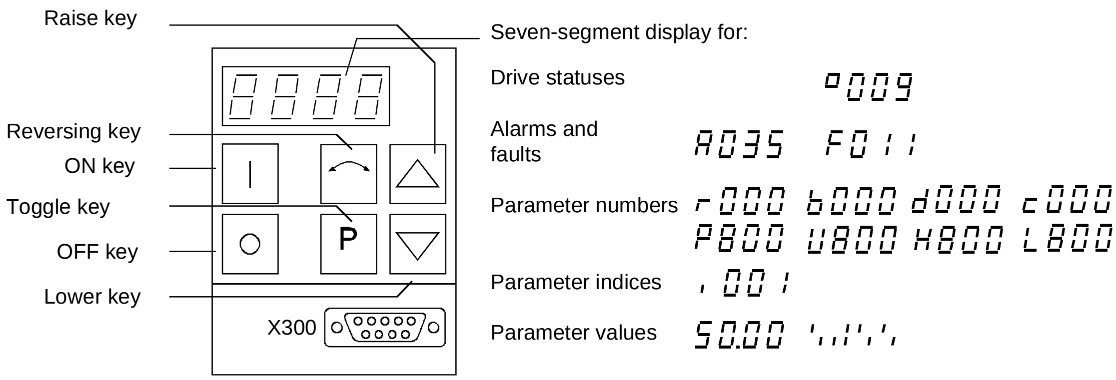


Fig. 5-3 PMU parameterizing unit

Key	Meaning	Function
I	ON key	• For energizing the drive (enabling motor activation). • If there is a fault: For returning to fault display
O	OFF key	• For de-energizing the drive by means of OFF1, OFF2 or OFF3 (P554 to 560) depending on parameterization.
⌒	Reversing key	• For reversing the direction of rotation of the drive. The function must be enabled by P571 and P572
P	Toggle key	• For switching between parameter number, parameter index and parameter value in the sequence indicated (command becomes effective when the key is released). • If fault display is active: For acknowledging the fault
△	Raise key	For increasing the displayed value: • Short press = single-step increase • Long press = rapid increase
▽	Lower key	For lowering the displayed value: • Short press = single-step decrease • Long press = rapid decrease
P + △	Hold toggle key and depress raise key	• If parameter number level is active: For jumping back and forth between the last selected parameter number and the operating display (r000) • If fault display is active: For switching over to parameter number level • If parameter value level is active: For shifting the displayed value one digit to the right if parameter value cannot be displayed with 4 figures (left-hand figure flashes if there are any further invisible figures to the left)
P + ▽	Hold toggle key and depress lower key	• If parameter number level is active: For jumping directly to the operating display (r000) • If parameter value level is active: For shifting the displayed value one digit to the left if parameter value cannot be displayed with 4 figures (right-hand figure flashes if there are any further invisible figures to the right)

Table 5-7 Operator control elements on the PMU

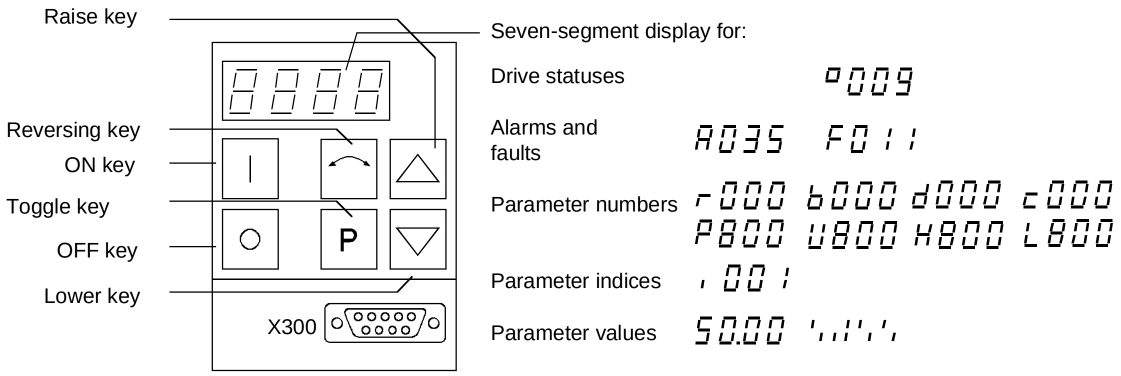


Fig. 5-4 PMU parameterizing unit

Toggle key (P key)

As the PMU only has a four-digit seven-segment display, the 3 descriptive elements of a parameter

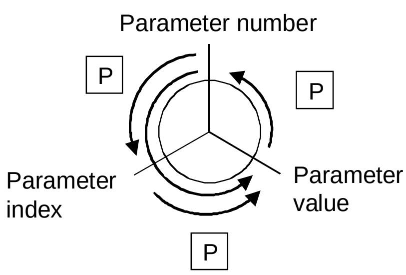
- Parameter number,
- Parameter index (if parameter is indexed) and
- Parameter value

cannot be displayed at the same time. For this reason, you have to switch between the individual descriptive elements by depressing the toggle key. After the desired level has been selected, adjustment can be made using the raise key or the lower key.

With the toggle key, you can change over:

- from the parameter number to the parameter index
- from the parameter index to the parameter value
- from the parameter value to the parameter number

If the parameter is not indexed, you can jump directly to the parameter value.



NOTE

If you change the value of a parameter, this change generally becomes effective immediately. It is only in the case of acknowledgement parameters (marked in the parameter list by an asterisk ‘ * ’) that the change does not become effective until you change over from the parameter value to the parameter number.

Parameter changes made using the PMU are always safely stored in the EEPROM (protected in case of power failure) once the toggle key has been depressed.

Example

The following example shows the individual operator control steps to be carried out on the PMU for a parameter reset to factory setting.

Set P053 to 0002 and grant parameter access for PMU

P053	↗ P ↘	0000	↗ Δ ↘	0001	↗ Δ ↘	0002	↗ P ↘	P053

Select P060

P053	↗ Δ ↘	P060

Set P060 to 0002 and select "Fixed settings" menu

P060	↗ P ↘	1	↗ Δ ↘	2	↗ P ↘	P060

Select P970

P060	↗ Δ ↘	P366	↗ Δ ↘	P970

Set P970 to 0000 and start parameter reset

P970	↗ P ↘	1	↗ Δ ↘	0	↗ P ↘	°005

5.4 Parameter input via the OP1S

5.4.1 General

The operator control panel (OP1S) is an optional input/output device which can be used for parameterizing and starting up the units. Plain-text displays greatly facilitate parameterization.

The OP1S has a non-volatile memory and can permanently store complete sets of parameters. It can therefore be used for archiving sets of parameters, but first the parameter sets must be read out (upread) from the units. Stored parameter sets can also be transferred (downloaded) to other units.

The OP1S and the unit to be operated communicate with each other via a serial interface (RS485) using the USS protocol. During communication, the OP1S assumes the function of the master whereas the connected units function as slaves.

The OP1S can be operated at baud rates of 9.6 kBd and 19.2 kBd, and is capable of communicating with up to 32 slaves (addresses 0 to 31). It can therefore be used in a point-to-point link (e.g. during initial parameterization) or within a bus configuration.

The plain-text displays can be shown in one of five different languages (German, English, Spanish, French, Italian). The language is chosen by selecting the relevant parameter for the slave in question.

Order numbers

Components	**Order Number**
OP1S	6SE7090-0XX84-2FK0
Connecting cable 3 m	6SX7010-0AB03
Connecting cable 5 m	6SX7010-0AB05
Adapter for installation in cabinet door incl. 5 m cable	6SX7010-0AA00

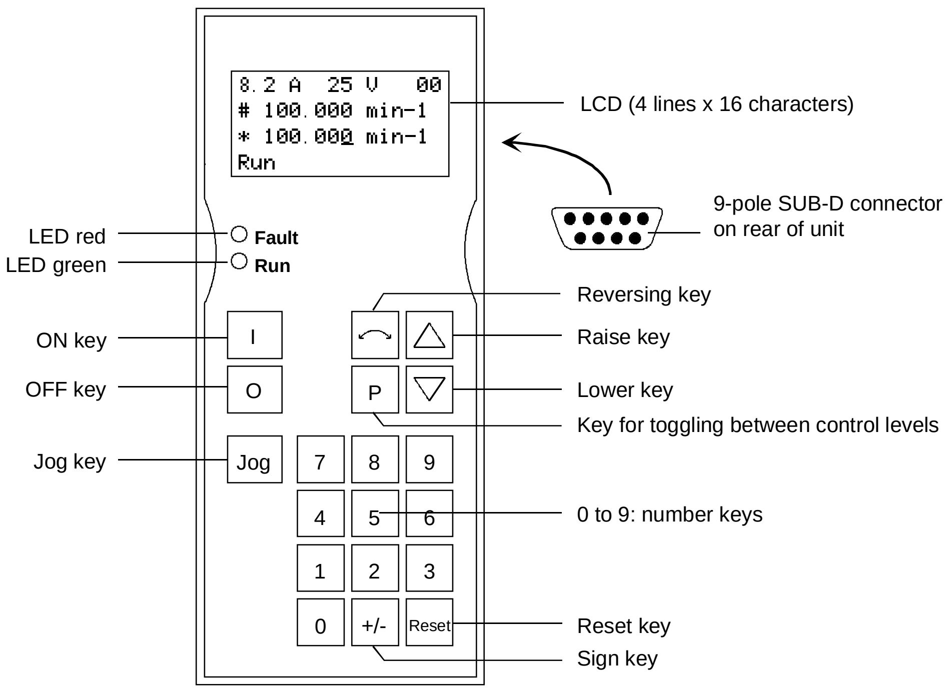
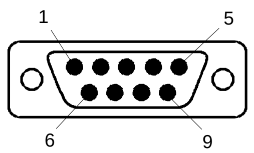


Fig. 5-5 View of the OP1S

OP1S connections



Pin	Designation	Meaning	Range
1			
2			
3	RS485 P	Data via RS485 interface	
4			
5	N5V	Ground	
6	P5V	5 V aux. voltage supply	±5%, 200 mA
7			
8	RS485 N	Data via RS485 interface	
9		Reference potential	

Table 5-8 OP1S connections

5.4.2 Connecting, run-up

5.4.2.1 Connecting

The OP1S can be connected to the units in the following ways:

- ♦ Connection via 3 m or 5 m cable (e.g. as a hand-held input device for start-up)
- ♦ Connection via cable and adapter for installation in a cabinet door
- ♦ Plugging into MASTERDRIVES Compact units (for point-to-point linking or bus configuration)
- ♦ Plugging into MASTERDRIVE Compact PLUS units (for bus configuration)

Connection via cable

The cable is plugged into the Sub D socket X103 on units of the Compact PLUS type and into Sub D socket X300 on units of the Compact and chassis type.

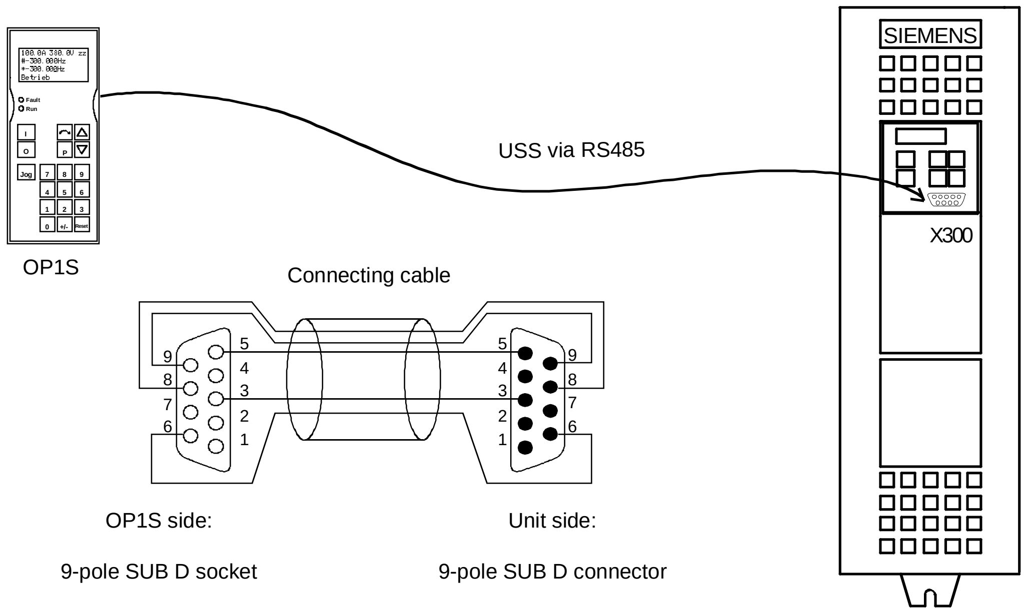


Fig. 5-6 The OP1S directly connected to the unit

Plugging into units of the Compact and chassis type

Carefully penetrate the pre-punched holes for the fixing screws in the front panel of the Compact units. Plug the OP1S onto the Sub D socket X300 and screw it tight using the two screws (M5 x 10, accessory pack) from the inside of the front panel.

5.4.2.2 Run-up

After the power supply for the unit connected to the OP1S has been turned on or after the OP1S has been plugged into a unit which is operating, there is a run-up phase.

NOTICE

The OP1S must not be plugged into the Sub D socket if the SCom1 interface parallel to the socket is already being used elsewhere, e.g. bus operation with SIMATIC as the master.

NOTE

In the as-delivered state or after a reset of the parameters to the factory setting with the unit's own control panel, a point-to-point link can be adopted with the OP1S without any further preparatory measures.

When a bus system is started up with the OP1S, the slaves must first be configured individually. The plugs of the bus cable must be removed for this purpose (see section "Bus operation").

During the run-up phase, the text "Search slave" is shown in the first line of the display, followed by "Slave found" and the found slave number as well as the set baud rate.

```
Slave found
Adress:   [00]
Baudrate:  [6]
```

Example of a display after the run-up phase (6 corresponds to 9.6 kBd)

After approximately 4 s, the display changes to

```
    SIEMENS
MASTERDRIVES VC
6SE7016-1EA61
SW:V3.0 OP:V2T20
```

Example of what is displayed after a slave address has been found

After a further 2 s, there is a changeover to the operating display. If it is not possible to start communicating with the slave, an error message “Error: Configuration not ok” appears. About 2 s later, a request is made for new configuration.

```
New config?

#yes
 no
```

Error message displayed when communication is not possible

If the "P" key is pressed, the connected unit is reconfigured, i.e. the interface parameters are set to the standard values.

Number of PKWs (P702):	127
Number of PZDs (P703):	2 or 4
Telegram failure time (P704):	0 ms

If communication with the slave is still impossible, the reasons may be as follows:

- ♦ Defective cabling
- ♦ Bus operation with two or more slaves with the same bus address (see section "Bus operation")
- ♦ The baud rate set in the slave is neither 9.6 nor 19.2 kBd

In the latter case, an error message "Error: No slave found" appears. The unit’s own PMU control panel must then be used to set parameter P701 (baud rate) to 6 (9.6 kBd) or 7 (19.2 kBd) or to reset the parameters to the factory setting.

5.4.3 Operator control

5.4.3.1 Operator control elements

Key	Meaning	Function
I	ON key	• For energizing the drive (enabling motor activation). The function must be enabled by P554.
O	OFF key	• For de-energizing the drive by means of OFF1, OFF2 or OFF3. The function must be enabled by P554 to P560.
Jog	Jog key	• For jogging with jog setpoint 1 (only effective when the unit is in the "Ready to start" state). This function must be enabled by P568.
	Reversing key	• For reversing the direction of rotation of the drive. This function must be enabled by P571 and P572.
P	Toggle key	• For selecting menu levels and switching between parameter number, parameter index and parameter value in the sequence indicated. The current level is displayed by the position of the cursor on the LCD display (the command comes into effect when the key is released). • For conducting a numerical input.
Reset	Reset key	• For leaving menu levels • If fault display is active: For acknowledging the fault. This function must be enabled by P565.
△	Raise key	For increasing the displayed value • Short press = single-step increase • Long press = rapid increase • If motorized potentiometer is active, this is for raising the setpoint. This function must be enabled by P573.
▽	Lower key	For lowering the displayed value: • Short press = single-step decrease • Long press = rapid decrease • If motorized potentiometer is active, this is for lowering the setpoint. This function must be enabled by P574.
+/-	Sign key	• For changing the sign so that negative values can be entered
0 to 9	Number keys	• Numerical input

Table 5-9 Operator control elements

5.4.3.2 Operating display

After run-up of the OP1S, the following operating display appears:

```
    0.0A  0V  00
#      0.00 min-1
*      0.00 min-1
Ready.
```

Example of an operating display in the "Ready" status

The values shown in the operating display (except for slave number, 1st line on the far right) can be specified by means of parameterization:

1st line, left (P0049.001)	in the example "Output current"
1st line, right (P0049.002)	in the example "DC link voltage"
2nd line actual value (P0049.003)	in the example "Actual speed" (only a visualization parameter)
3rd line setpoint (P0049.004)	in the example "Speed setpoint"
4th line (P0049.005)	in the example "Operating state"

In the operating display, the actual value is indicated with "#" and the setpoint with "*".

In addition to the operating display on the display unit, the operating state is indicated by the red and green LEDs as follows:

	Flashing	**Continuous**
red LED	Alarm	Fault
green LED	Ready for ON	Operation

Table 5-10 Operating displays

5.4.3.3 Basic menu

When the "P" key is pressed, a changeover is made from the operating display to the basic menu.

P

```
  0.0 A  0 V  00
#      0.00 min-1
*      0.00 min-1
Ready.
```

```
VectorControl
*Menu Selection
 OP: Upread
 OP: Download
```

Display of the basic menu

The basic menu is the same for all units. The following selections can be made:

- Menu selection
- OP: Upread
- OP: Download
- Delete data
- Change slave
- Config. slave
- Slave ID

As not all the lines can be shown at the same time, it is possible to scroll the display as required with the "Lower" and "Raise keys.

∇ ∇ ∇ ∇

```
VectorControl
*Menu Selection
 OP: Upread
 OP: Download
```

```
VectorControl
*Menu Selection
#OP: Upread
 OP: Download
```

```
VectorControl
*Menu Selection
 OP: Upread
#OP: Download
```

```
VectorControl
 OP: Upread
 OP: Download
#Delete data
```

```
VectorControl
 OP: Download
 Delete data
#Change slave
```

and so on

Example of switching from one line to the next

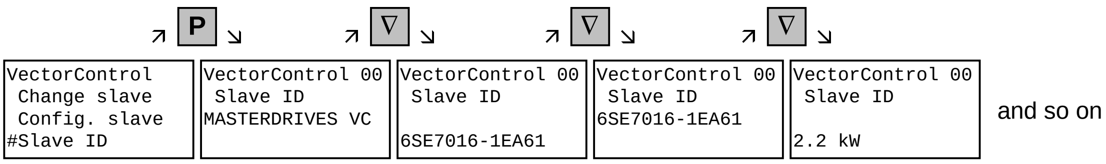
The currently active function is indicated by the "*" symbol and the selected function by the "#" symbol. After the "P" key has been pressed, the relevant symbol jumps to the selected function. The "Reset" key is for returning to the operating display.

5.4.3.4 Slave ID

With the "Slave ID" function, the user can request information about the connected slave. The slave ID consists, for example, of the following lines:

MASTERDRIVES VC
6SE7016-1EA61
2.2 kW
V3.0
15.02.1998

Starting from the basic menu, the "Slave ID" function is selected with "Raise" or "Lower" and activated with "P". As all the lines cannot be shown at the same time, it is possible to scroll the display as required with the "Lower" and "Raise" keys. In addition, the slave number is shown at the top on the right-hand side.



Example of a slave ID

5.4.3.5 OP: Upread

With the "OP: Upread" function, the parameters of the connected slave can be upread and stored in the flash memory inside the OP1S. Parameters of a possibly inserted technology board are not taken into account (e.g. T100, T300). The SIMOVIS program is required here. Starting from the basic menu, the "OP: Upread" function is selected with "Lower" or "Raise" and started with "P". If the available memory is insufficient, the procedure is interrupted with an appropriate error message. During upread, the OP1S indicates the parameters currently being read. In addition, the slave number is shown at the top on the right-hand side.

	P
VectorControl *Menu selection #OP: Upread OP: Download	VectorControl 00 Upread Pxxx

Example: Selecting and starting the "Upread" procedure

With "Reset", the procedure can be interrupted at any time. If the upread procedure has been completed in full, the user is requested to enter an ID with a maximum of 12 characters for the stored parameter set. This identification can, for example, consist of the date and two differentiating numbers. It is entered with the numerical keypad. With "Lower" a number which has been entered can be deleted.

	1	9	0	9	1	
VectorControl 00 Upread Enter ID -	VectorControl 00 Upread Enter ID 1-	VectorControl 00 Upread Enter ID 19-	VectorControl 00 Upread Enter ID 190-	VectorControl 00 Upread Enter ID 1909-	VectorControl 00 Upread Enter ID 19091-	and so on

Example of entering an ID

When "P" is pressed, the message "Upread OK" appears and the display changes to the basic menu.

5.4.3.6 OP: Download

With the "OP: Download" function, a parameter set stored in the OP1S can be written into the connected slave. Parameters of a possibly inserted technology board are not taken into account (e.g. T100, T300). The SIMOVIS program is required here. Starting from the basic menu, the "OP: Download" function is selected with "Lower" or "Raise" and activated with "P".

	P	
VectorControl *Menu selection OP: Upread #OP: Download		Download *1909199701 MASTERDRIVES VC

Example: Selecting and activating the "Download" function

One of the parameter sets stored in the OP1S must now be selected with "Lower" or "Raise" (displayed in the second line). The selected ID is confirmed with "P". The slave ID can now be displayed with "Lower" or "Raise" (see section "Slave ID"). The "Download" procedure is then started with "P". During download, the OP1S displays the currently written parameter.

	P		P	
Download *1909199701 MASTERDRIVES VC		Download *1909199701 MASTERDRIVES VC		VectorControl 00 Download Pxxx

Example: Confirming the ID and starting the "Download" procedure

With "Reset", the procedure can be stopped at any time. If downloading has been fully completed, the message "Download ok" appears and the display returns to the basic menu.

After the data set to be downloaded has been selected, if the identification of the stored software version does not agree with the software version of the unit, an error message appears for approximately 2 seconds. The operator is then asked whether downloading is to be discontinued.

	P		P		2 s	
Download *1909199701 MASTERDRIVES VC		Download *1909199701 MASTERDRIVES VC		Error: Different IDs		VectorControl 00 Stop download? #yes no

Yes: The "Download" procedure is discontinued.

No: The "Download" procedure is carried out.

5.4.3.7 Delete data

With the "Delete data" function, the user can delete parameter sets stored in the OP1S, thus, for example, creating space for new parameter sets. Starting from the basic menu, the "Delete data" function is selected with "Lower" or "Raise" and activated with "P".

P

```
VectorControl
 OP: Upread
 OP: Download
#Delete data
```

```
Delete data
*1909199701
MASTERDRIVES VC
```

Example: Selection and activation of the "Delete data" function

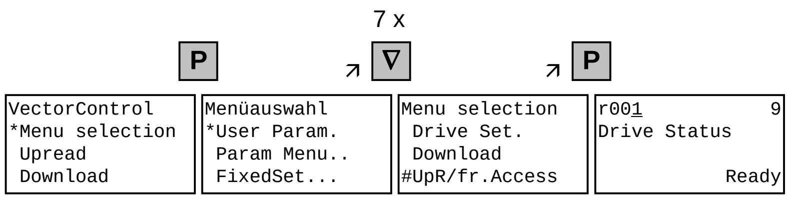
One of the parameter sets stored in the OP1S must now be selected with "Lower" or "Raise" (displayed in the second line). With "P", the selected ID is confirmed. The slave ID can now be displayed with "Lower" or "Raise" (see section "Slave ID"). The "Delete data" procedure can now be started with "P". After completion, the message "Data deleted" appears and the display returns to the basic menu.

5.4.3.8 Menu selection

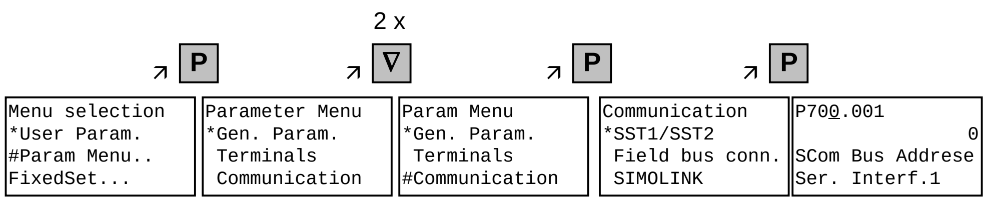
The actual parameterization and start-up of the connected slave is performed by means of the "Menu selection" function. Starting from the basic menu, the "Menu selection" function is selected with "Lower" or "Raise". By pressing "P", the unit-specific sub-menu is displayed with the following choices:

- ♦ User Param.
- ♦ Param Menu..
- ♦ FixedSet...
- ♦ Quick Param...
- ♦ Board Conf.
- ♦ Drive Set
- ♦ Download
- ♦ UpR/fr.Access
- ♦ Power Def.

Two or more dots after these items mean that there is a further sub-menu level. If "Parameter menu.." is selected, access is possible to all parameters via correspondingly structured sub-menus. If "UpR/fr. Access" is selected, direct access is gained to the parameter level.



Example: Selecting the parameter level by means of UpR/fr.access



Example: Selecting a parameter via sub-menus

Parameter display and parameter correction

A parameter number can be selected from the parameter level directly with the numerical keys or with "Raise"/"Lower". The parameter number is shown as a three-figure quantity. In the event of four-figure parameter numbers, the first figure (1, 2 or 3) is not displayed. A distinction is made with the letters (P, H, U etc.).

	0	4	9
r001 9 Drive Status Ready	r000	r004	r049.001 4 OP OperDisp 1. line, on left

Example: Direct input of the parameter number with the numerical keypad

	Δ	Δ	Δ
r001 9 Drive Status Ready.	r002 0 min-1 Actual speed	r004 0.0 A Output Amps	r006 0 V DC Bus Volts

Example: Correcting the parameter number by means of "Raise"

If the parameter is found not to exist when the number is entered, a message "No PNU" appears. A non-existent parameter number can be skipped by selecting "Raise" or "Lower".

How the parameters are shown on the display depends on the type of parameter. There are, for example, parameters with and without an index, with and without an index text and with and without a selection text.

Example: Parameter with index and index text

```
P704.001
            0 ms
SCom Tlg OFF
Ser.Interf.1
```

1st line: Parameter number, parameter index

2nd line: Parameter value with unit

3rd line: Parameter name

4th line: Index text

Example: Parameter with index, index text and selection text

```
P701.001       6
SCom Baud rate
Ser Interf.1
       9600 Baud
```

1st line: Parameter number, parameter index, parameter value

2nd line: Parameter name

3rd line: Index text

4th line: Selection text

Example: Parameter without index, with selection text, binary value

```
P053     0006Hex
Parameter Access
0000000000000110
    ComBoard: No
```

1st line: Parameter number, parameter value, hexadecimal parameter value

2nd line: Parameter name

3rd line: Parameter value, binary

4th line: Selection text

Transition between the parameter number, parameter index and parameter value levels is made with "P".

Parameter number → "P" → Parameter index → "P" → Parameter value

If there is no parameter index, this level is skipped. The parameter index and the parameter value can be corrected directly with the "Raise"/"Lower" keys. An exception to this are parameter values shown in binary form. In this case, the individual bits are selected with "Raise"/"Lower" and corrected with the numerical keys (0 or 1).

If the index number is entered by means of the numerical keys, the value is not accepted until "P" is pressed. If the "Raise" or "Lower" keys are used to correct the number, the value comes into effect immediately. The acceptance of an entered parameter value and return to the parameter number does not take place until "P" is pressed. The level selected in each case (parameter number, parameter index, parameter value) is marked with the cursor. If an incorrect parameter value is entered, the old value can be obtained by pressing "Reset". The "Reset" key can also be used to go one level lower.

Parameter value → "Reset" → Parameter index → "Reset" → Para.No.

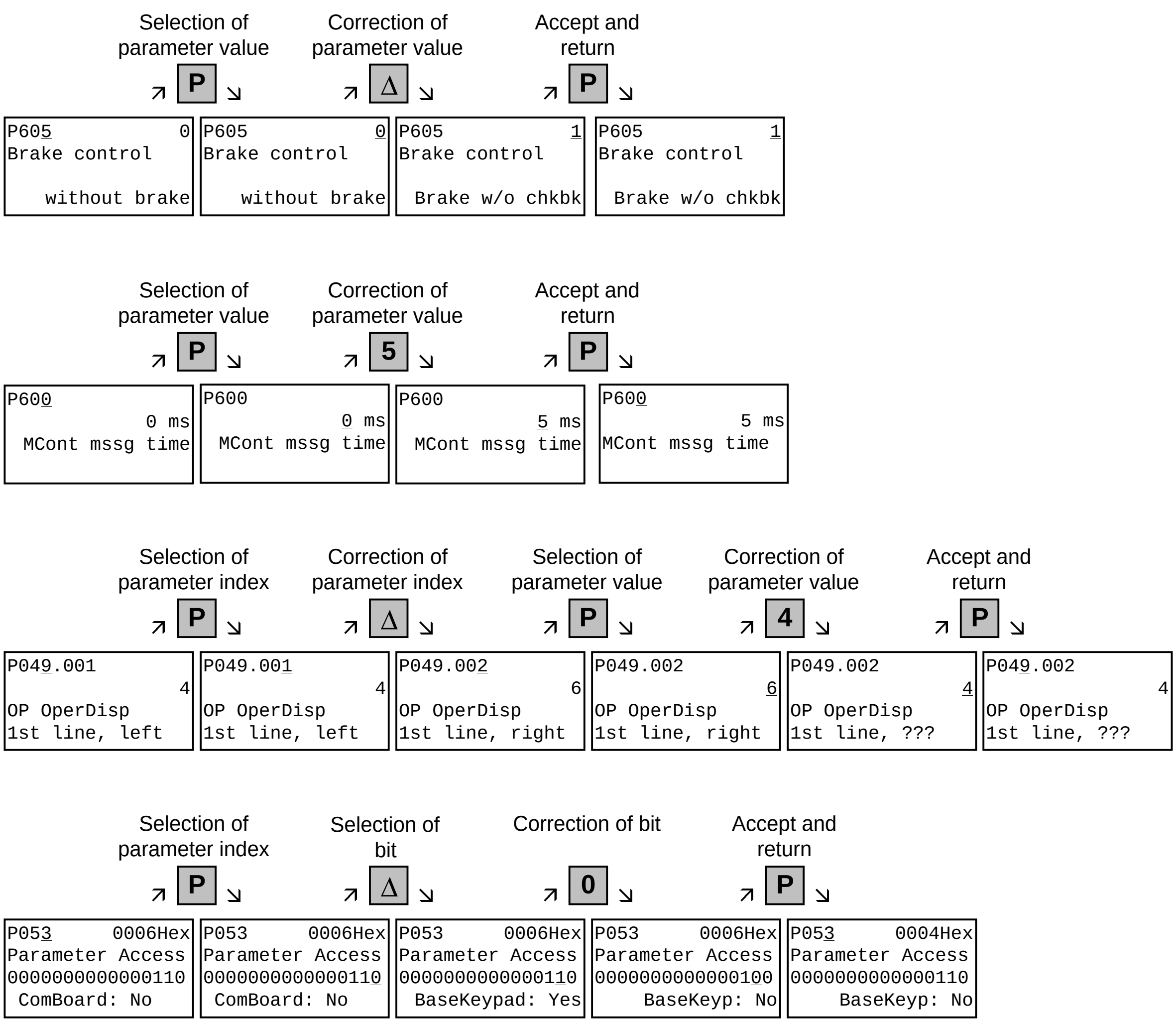
Parameters which can be changed are shown in upper-case letters and visualization parameters which cannot be changed are shown in lower-case letters. If a parameter can only be changed under special conditions or if an incorrect value has been entered with the numerical keys, an appropriate message follows, e.g.:

- "Value not perm." Incorrect value entered
- "Value <> min/max" Value too large or too small
- "P53/P927?" No parameter access
- "Operating status?" Value can only be changed in the "Drive setting" status, for example

With "Reset", the message is deleted and the old value is re-instated.

NOTE Parameter changes are always stored with power-failure protection in the EEPROM of the unit connected to the OP1S.

Example of parameter correction



Some parameters may also be displayed without a parameter number, e.g. during quick parameterization or if "Fixed setting" is selected. In this case, parameterization is carried out via various sub-menus.

Example of how to proceed for a parameter reset.

```
        ↗ [P] ↘        ↗ [P] ↘         ↗ [∇] ↘ (2 x)
  0.0 A  0 V  00   VectorControl      Menu Selection   Menu Selection
#      0.00 min-1  *Menu selection    *User Param.     *User Param.
*      0.00 min-1   OP: Upread         Param Menu..     Param Menu..
Ready.              OP: Download       Fixed Set...    #Fixed Set...
```

Selection of fixed setting

```
[P] ↘          ↗ [∇] ↘          ↗ [P] ↘          ↗ [Δ] ↘
Fixed Setting     Fixed Setting     Fixed Setting     Factory Setting
*Select FactSet   *Select FactSet    FactSet.         #FactSet.
 FactSet.         #FactSet.         *No FactSet       *No FactSet
```

Selection of factory setting

```
[P] ↘          ↗ wait ↘
Factory Setting   Menu Selection
#FactSet.         *User Param..
*No FactSet        Param. Menu..
busy............   FixedSet...
```

Start of factory setting

NOTE

It is not possible to start the parameter reset in the "Run" status.

Fault and alarm messages

A fault or alarm message is indicated by the red LED. In the event of a fault, the red LED lights up and stays on. A fault message appears in the 3rd and 4th line of the operating display.

Δ

```
0.0 A  0 V  00      0.0 A  0 V  00
#      0.00 min-1   #      0.00 min-1
F065: SCom Tlg             1T  3h  2"
Fault         1/1   Fault         1/1
```

Example of a fault display

The fault number and the respective text are shown in the 3rd line. Up to 8 fault messages can be stored but only the first fault to occur is shown on the display. Several subsequent faults are shown in the 4th line, e.g. with 1/3 (first of three). Information on all faults can be obtained from the fault memory. With "Raise"/"Lower", the associated operating hours are shown when a fault is waiting to be remedied.

After the cause of a fault has been removed, the fault is acknowledged with "Reset" inside the operating display (the "Reset" key must be appropriately parameterized. See section "Issuing commands via the OP1S"). By pressing "P" and "Lower" at the same time, it is possible to skip back directly to the operating display from the parameter level.

When there is an alarm, the red LED flashes. A warning appears in the 4th line of the operating display.

```
8.2 A  520 V  00
#    100.00 min-1
*    100.00 min-1
-33:Overspeed
```

Example of an alarm display

The alarm number and the respective text is shown in the 4th line. There can be several alarms at the same time but only the first alarm to occur is shown on the display. Several alarms are shown in the 4th line before the alarm number with an "+” instead of "-”. Information on all alarms can be obtained with the alarm parameters r953 to r969.

An alarm cannot be acknowledged. As soon as the cause no longer exists, the alarm/display disappears automatically.

5.4.3.9 Issuing commands via the OP1S

Control functions and setpoint specifications for the connected unit can be selected with the corresponding keys of the OP1S, for example during start-up. To do so, the sources of the control commands have to be added to the corresponding bits of word 1 of the SCom1 interface [1], or SCom2 interface [2]. For setpoint specification, the sources of the setpoints must be appropriately "interconnected". In addition, the setpoint to be changed is to be parameterized as a displayed value in the 3rd line of the operating display.

Key	Function	Parameter number	Parameter value
I O	ON/OFF1	P554 Source ON/OFF1	2100 [1] / 6100 [2]
△ ▽	Motorized potentiometer: setpoint higher, lower (only effective within the operating display)	P573 Source Raise MOP P574 Source Lower MOP P443 Source Main Setpoint P049.004 Setpoint Operating Disp	2113 [1] / 6113 [2] 2114[1] / 6114 [2] KK0058 (MOP Output) 424 (MOP Out)
0 to 9 or △ ▽	Setpoint specification by means of fixed septoint (only effective within the operating display. If entered with numerical key, confirm with "P")	P443 Source Main Setpoint P573 Source Raise MOP P574 Source Lower MOP P049.004 Setpoint Operating Disp	KK0040 (Fixed setpoints) 0 0 e.g. 401 (selected fixed setpoint)
⌒	Reversing	P571 Source clockwise direc. of rotation P572 Source anti-clockwise direc. of. rotation	2111 [1] / 6111 [2] 2112 [1] / 6112 [2]
Reset	Acknowledging (only effective within the operating display)	P565 Source Acknowledge	2107 [1] / 6107 [2]
Jog	Jogging with jog setpoint 1 (only effective in the "Ready" status)	P568 Source Jog Bit 0 P448 Jog Setpoint 1	2108 [1] / 6108 [2] Setpoint in %

NOTE

The OFF function can also be performed with OFF2 or OFF3 instead of OFF1. For this, the source of OFF2 (P555) or OFF3 (P556) must be "interconnected" to 2101 [1] / 6101 [2] or 2102 [1] / 6102 [2] respectively in addition to setting P554.

1) only applicable for Compact/chassis unit

2) only applicable for Compact PLUS

5.4.4 Bus operation

In order to start operating a bus system with the OP1S, the slaves must first be configured individually. To do this, the bus connecting cable between the slaves must be interrupted (pull out the bus-cable plug). For configuration, the OP1S is connected with each slave one after the other. A precondition for carrying out the configuration is a baud rate of 9.6 or 19.2 kBd set in the slave (see section "Run-up").

5.4.4.1 Configuring slaves

Starting from the basic menu, the "Config. slave" function is selected with "Lower"/"Raise" and activated with "P". The user is now requested to enter a slave address.

P

```
VectorControl      Configuration
 Delete data        Address:00
 Change slave
#Config. slave
```

Example of activating the "Config. slave" function

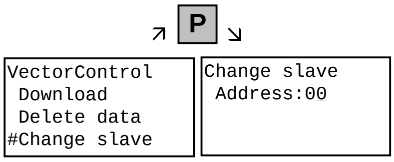
After a different slave address for each slave has been entered by means of the "Raise" key or with the numerical keypad and confirmed with "P", configuration is carried out, i.e. the interface parameters are set to the standard value (see section "Run-up"). In addition, the slave address is entered and a baud rate of 9.6 kBd is set in the slave. After configuration has been completed, the message "Configuration ok" appears, followed by a return to the basic menu. If the configuration of all slaves has been successfully completed, bus operation can be started after the bus connection between the slaves has been restored.

NOTE

During bus operation, each slave must have a different address (P700). Bus operation is also possible at 19.6 kBd (set P701 to 7). The baud rate, however, must be set the same in all slaves.

5.4.4.2 Changing slaves

During bus operation, a specific slave can be selected via the OP1S with the "Change slave" function without any re-plugging. Starting from the basic menu, the "Change slave" function is selected with the "Lower"/"Raise" key and activated with "P". The user is then requested to enter a slave address.



Example of activating the "Change slave" function

After the slave address has been entered with "Raise"/"Lower" and confirmed with "P", a change is made to the required slave and the display returns to the basic menu. If the slave cannot be found, an error message is output.

5.4.5 Technical data

Order number	6SE7090-0XX84-2FK0
Supply voltage	5 V DC ± 5 %, 200 mA
Operating temperature	0 °C to +55 °C
Storage temperature	-25 °C to +70 °C
Transport temperature	-25 °C to +70 °C
Environment class • Humidity • Pollution resistance	Acc. to DIN IEC 721 Part 3-3/04.90 3K3 3C3
Protection class	II acc. DIN VDE 0160 Part 1/05.82 IEC 536/1976
Degree of protection • Front • Rear	Acc. to DIN VDE 0470 Part 1/11.92 IP54 EN60529 IP21
Dimensions W x H x D	74 x 174 x 26 mm
Standards	VDE 0160/E04.91 VDE 0558 Part 1/07.87 UL, CSA

Table 5-11 Technical data

5.5 Parameter input with SIMOVIS / DriveMonitor

Operation of SIMOVIS/ DriveMonitor via the PC and USS interfaces is described below.

5.5.1 Installation and connection

5.5.1.1 Installation

A CD is included with the devices of the MASTERDRIVES Series when they are delivered. The operating tool supplied on the CD (SIMOVIS/DriveMonitor) is automatically installed from this CD. If "automatic notification on change" is activated for the CD drive on the PC, user guidance starts when you insert the CD and takes you through installation of SIMOVIS/DriveMonitor. If this is not the case, start file "Autoplay.exe" in the root directory of the CD.

5.5.1.2 Connection

There are two ways of connecting a PC to a device of the SIMOVERT MASTERDRIVES Series via the USS interface. The devices of the SIMOVERT MASTERDRIVES Series have both an RS232 and an RS485 interface.

RS232 interface

The serial interface that PCs are equipped with by default functions as an RS232 interface. This interface is not suitable for bus operation and is therefore only intended for operation of a SIMOVERT MASTERDRIVES device.

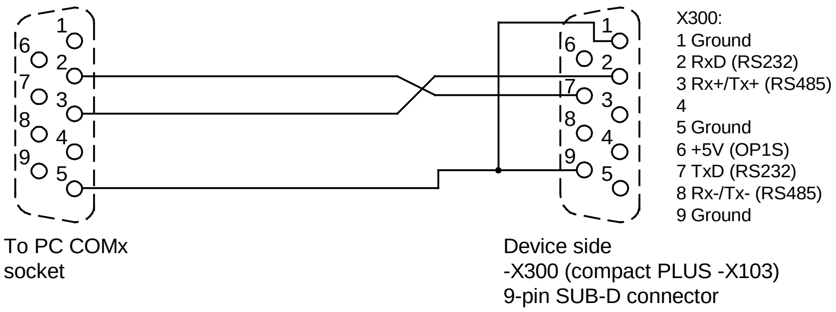


Fig. 5-7 Connecting cable for connecting PC COM(1-4) to SIMOVERT MASTERDRIVES X300

NOTICE

SIMOVIS/DriveMonitor must not be operated via the Sub-D socket X300 if the SST1 interface parallel to it is already being used for another purpose, e.g. bus operation with SIMATIC as the master.

RS485 interface

The RS485 interface is multi-point capable and therefore suitable for bus operation. You can use it to connect 31 SIMOVERT MASTERDRIVES with a PC. On the PC, either an integrated RS485 interface or an RS232 ↔ RS485 interface converter is necessary. On the device, an RS485 interface is integrated into the -X300 (compact PLUS -X103) connection. For the cable: see pin assignment -X300 and device documentation of the interface converter.

5.5.2 Bus configuration (SIMOVIS)

After you have launched SIMOVIS, the "SIMOVIS bus configuration" window appears. Here you must define, how many devices are to be addressed by SIMOVIS, of what type (device series from the SIMOREG or SIMOVERT families) these devices are, and how the connection with the devices is configured.

5.5.2.1 Creating a project

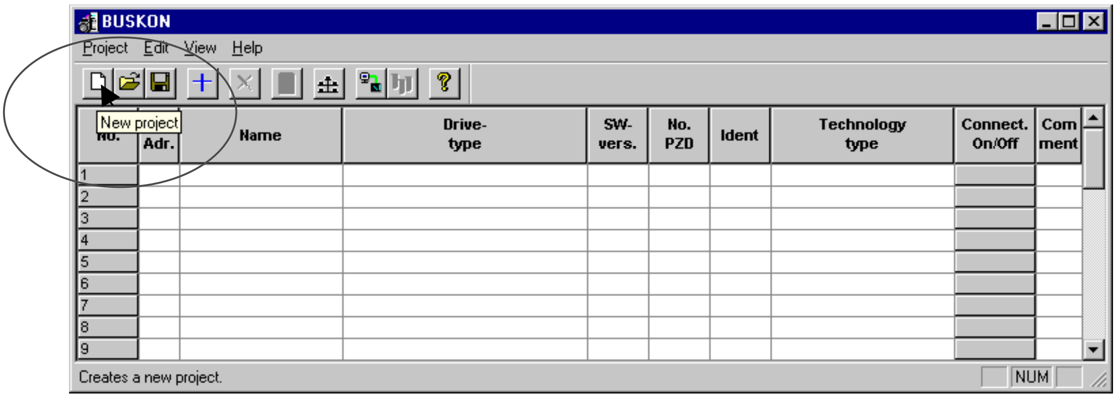


Fig. 5-8 Creating a project

First create a project. That is done as follows:

- If the toolbar is being displayed, you can create a project by clicking on the button *New project* (see Fig. 5-8) or selecting the menu command *Project* → *New*.
- After that, enter a project name that is not yet being used in field "Filename" in the following dialog box (Fig. 5-9) and save the project with button *Save*.

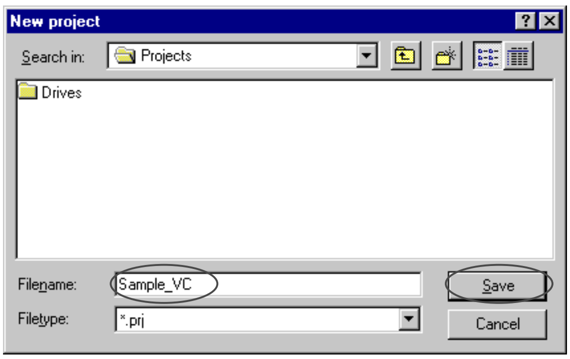


Fig. 5-9 Dialog box for creating a project

5.5.2.2 Setting the interface

For each project, you can configure the USS interface individually. When configuring, you must specify the baudrate and select a PC interface (COM 1-4). To set the interface, please proceed as follows:

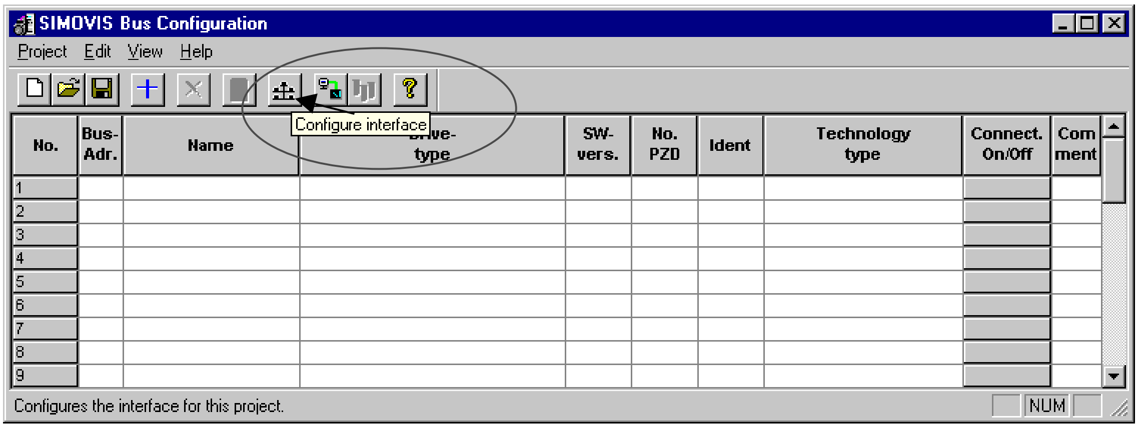


Fig. 5-10 Configuring the interface

If the toolbar is being displayed, click on button *Configure interface* (see Fig. 5-10) or select the menu command *Edit → Interface*. In window "Communication" you can then specify the required COM interface of the PC (COM1 to COM4) and the required baudrate (see Fig. 5-11 [1]).

NOTE

Set the baudrate to the baudrate parameterized in the SIMOVERT MASTERDRIVES (P701) (factory setting 9600 baud).

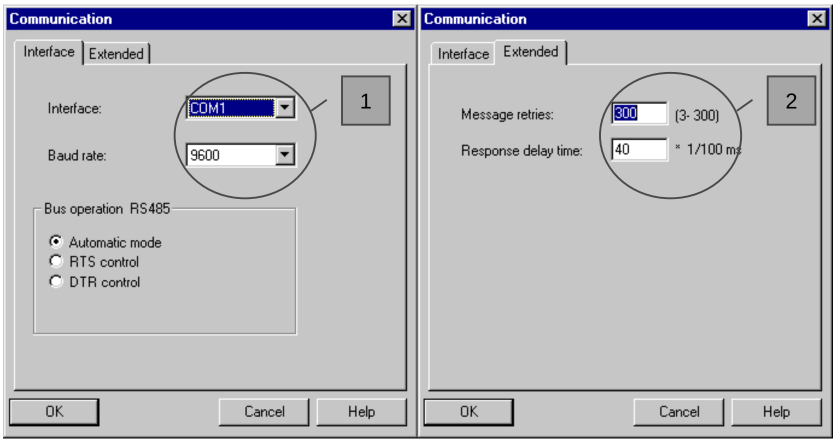


Fig. 5-11 Communication

You can also set:

- Operating mode of bus operation (RS485); for the setting, see the description of the interface converter RS232/RS485
- Request repetitions and response timeout on tab card "Extended", (see Fig. 5-11 [2]). Here, you can increase the values already set if communication errors occur frequently.

5.5.2.3 Selecting a device

After you have set the interface, select the connected device. This can be done in one of two ways:

- Set the device with "Add drive".
  If the toolbar is being displayed, click on button *Add drive* or select the menu command *Edit → Add drive*.

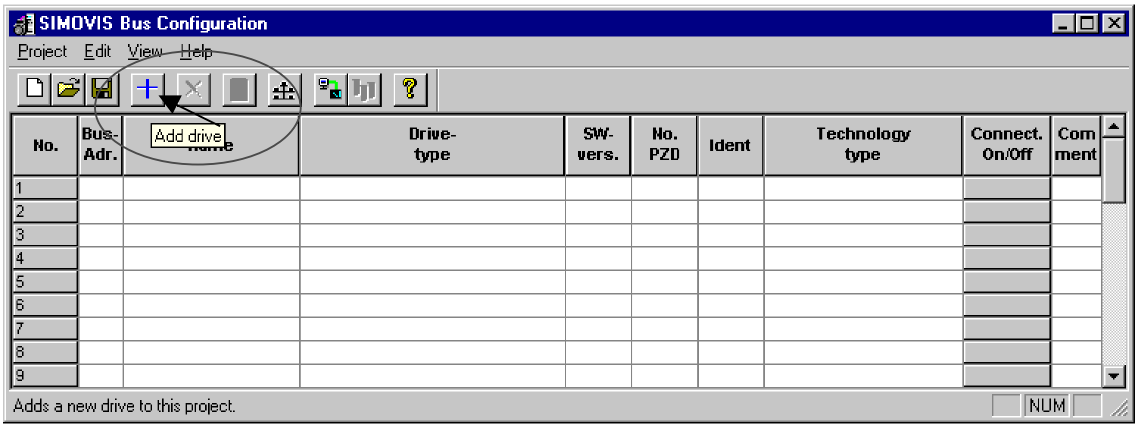


Fig. 5-12 Add drive

In window "Add a drive", the next free bus address is displayed in field "Bus adress" as a recommended value.

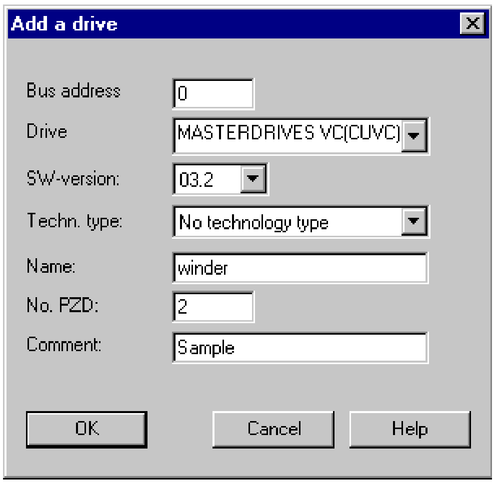


Fig. 5-13 Window for adding a device

NOTE

The bus address specified must match the SST bus address (P700) parameterized in the SIMOVERT MASTERDRIVES.

In dropdown list box "Drive" you can select the device type (e.g. MASTERDRIVES VC(CUVC)). You can only select stored devices.

In dropdown list box "SW-version" you can set the software version of the device. (For software versions not listed, see Section 5.5.6.6 "Learning a database".)

You can select the technology type that is to run on a T100, T300, or T400 technology module in dropdown list box "Techn. type".

If you require, you can enter any additional information about the device in field "Comment".

NOTE

Field "No. PZD" has no special significance for the parameterization of MASTERDRIVES. If you require operation using SIMOVIS, set this field to 4.

If the value is changed, it must be/remain ensured that the setting value in the program matches the value in parameter P703 of the drive at all times.

♦ Set the device with *Connect to all devices/identify devices*
You can select this function using the toolbar or the menu command *Edit → Connect to drives/ identify drives*. For this function, it is necessary that there is a physical connection with the device and that the baudrate set in SIMOVIS is the same as that set in the device parameterized.

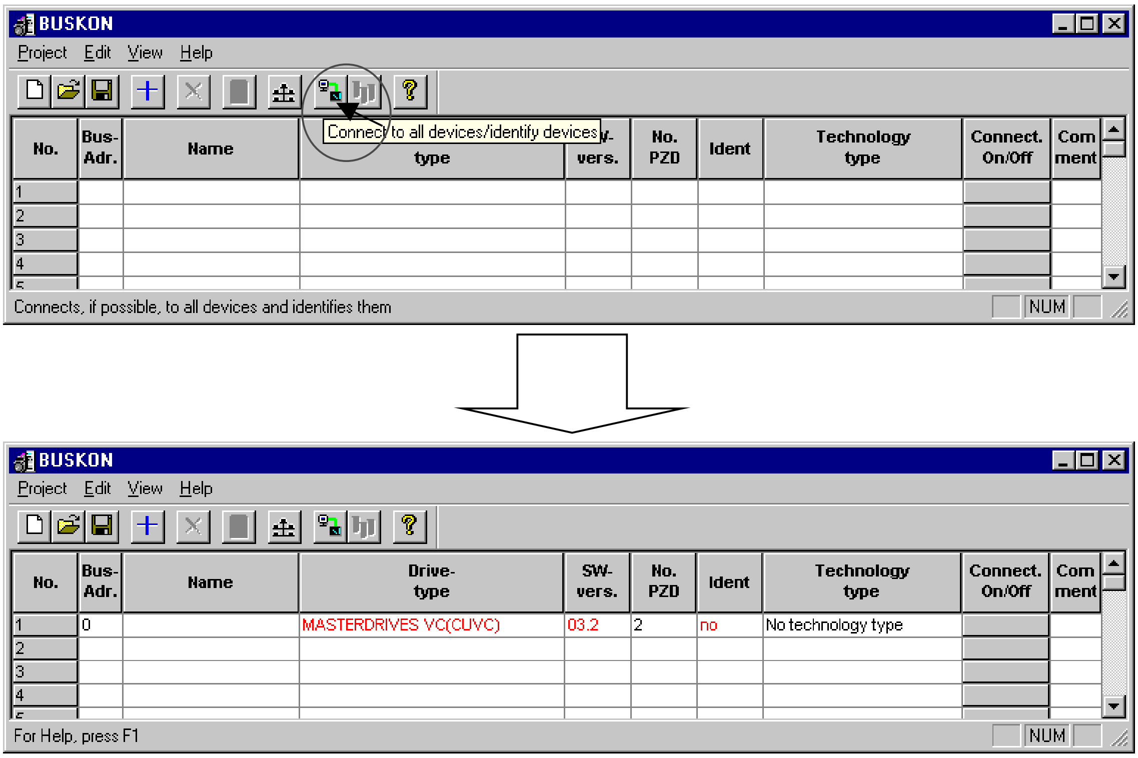


Fig. 5-14 Automatic identification

5.5.2.4 Testing the connection

To establish the connection with the device, click on field "Connect. On/Off" in the row of the device in question in the bus configuration table. With the set interface data, an attempt is then made to establish a connection. The color of the field then indicates the status of the connection (see Fig. 5-15):

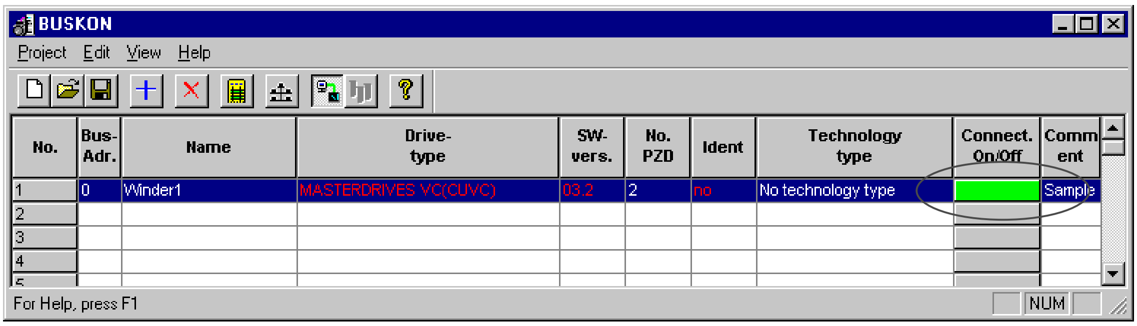


Fig. 5-15 Connection

green	Connection up, everything OK
yellow	Connection up, an alarm is pending on the device
red	Connection up, a fault is pending on the device
black	Connection not possible. Possible reasons for this: Incorrect PC interface, incorrect baudrate, device with this bus address does not exist, connection broken.

5.5.3 Drive configuration DriveMonitor

Unlike SIMOVIS, DriveMonitor starts with an empty drive window. You cannot perform bus and drive configuration here.

5.5.3.1 Setting the interface

You can configure the interface with menu *Tools* → *ONLINE Settings*.

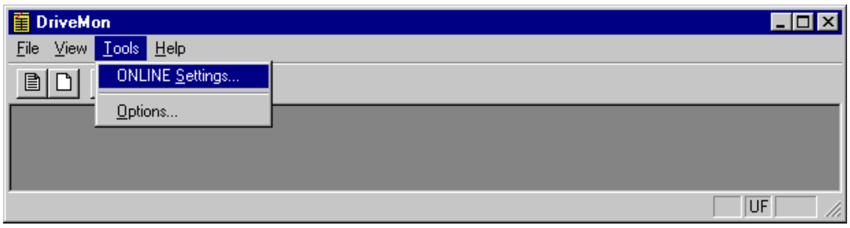


Fig. 5-16 Online settings

The following settings (Fig. 5-17) are possible:

- **Tab card "Bus Type",** options
  USS (operation via serial interface)
  Profibus DP (only if DriveMonitor is operated under Drive ES).
- **Tab card "Interface"**
  You can enter the required COM interface of the PC (COM1 to COM4) and the required baudrate here.

NOTE Set the baudrate to the baudrate parameterized in SIMOVERT MASTERDRIVES (P701) (factory setting 9600 baud).

Further settings: operating mode of the bus in RS485 operation; setting according to the description of the interface converter RS232/RS485

- **Tab card "Extended"**
  Request retries and Response timeout; here you can increase the values already set if communication errors occur frequently.

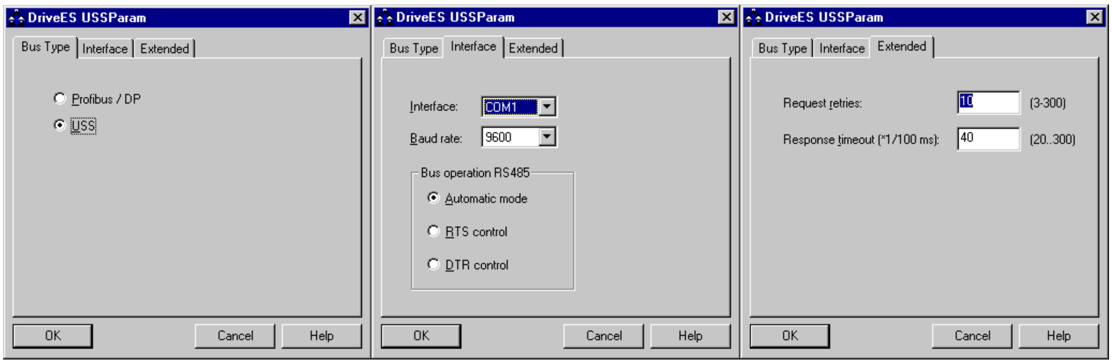


Fig. 5-17 Interface configuration

5.5.3.2 Drive settings

With menu *File*→ *New* →... you can create a new drive for parameterization (see Fig. 5-18). The system creates a download file (*.dnl), in which the drive characteristic data (type, software version) are stored. You can create the download file on the basis of an empty parameter set or the factory setting.

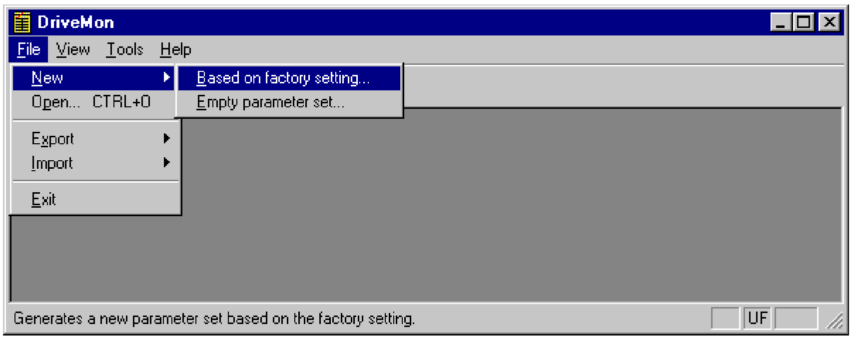


Fig. 5-18 Creating a new drive

Once you have created a drive, you can start it again with the menu function *File* → *Open* for parameterization by opening the download file.

When you create a new drive, the window "Properties - Drive" (Fig. 5-19) opens. Here you must enter the following data:

- In dropdown list box "Device type", select the type of device (e.g. MASTERDRIVES VC(CUVC)). You can only select the devices stored.
- In dropdown list box "Software version", you can select the software version of the device. You can generate databases for (new) software versions that are not listed when you start online parameterization.

- You can select the technology type that is to run on the technology module T100, T300, or T400, in dropdown list box "Technology type".
- You must only specify the bus address of the drive during online operation (switchover with button Online/Offline)

NOTE

The specified bus address must be the same as that of the parameterized SST bus address in SIMOVERT MASTERDRIVES (P700).

NOTE

Field "Number of PCD" has no special significance for the parameterization of MASTERDRIVES. If you require operation using SIMOVIS, set this field to 4.

If the value is changed, it must be/remain ensured that the setting value in the program matches the value in parameter P703 of the drive at all times.

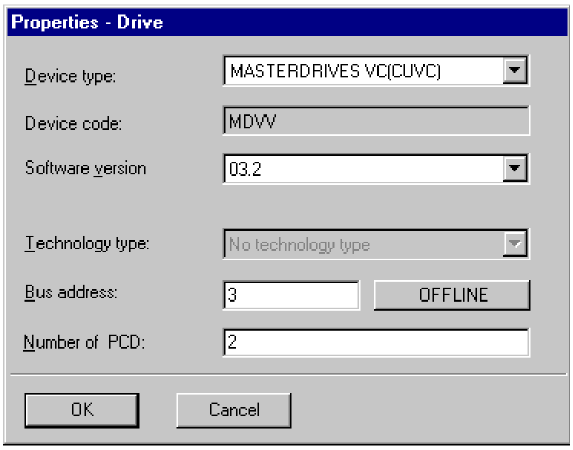


Fig. 5-19 Drive setting

After you have confirmed the drive settings with *ok*, you can still specify the name and the storage location of the download file to be created. After that, the parameter list opens in offline mode (Fig. 5-20).

With buttons *Offline, Online (RAM), Online (EEPROM)* (Fig. 5-20 [1]) you can switch modes. When you switch to online mode, device identification is performed. If the configured device and the real device do not match (device type, software version), an alarm appears. If an unknown software version is recognized, the option of creating the database is offered. (This process takes several minutes.)

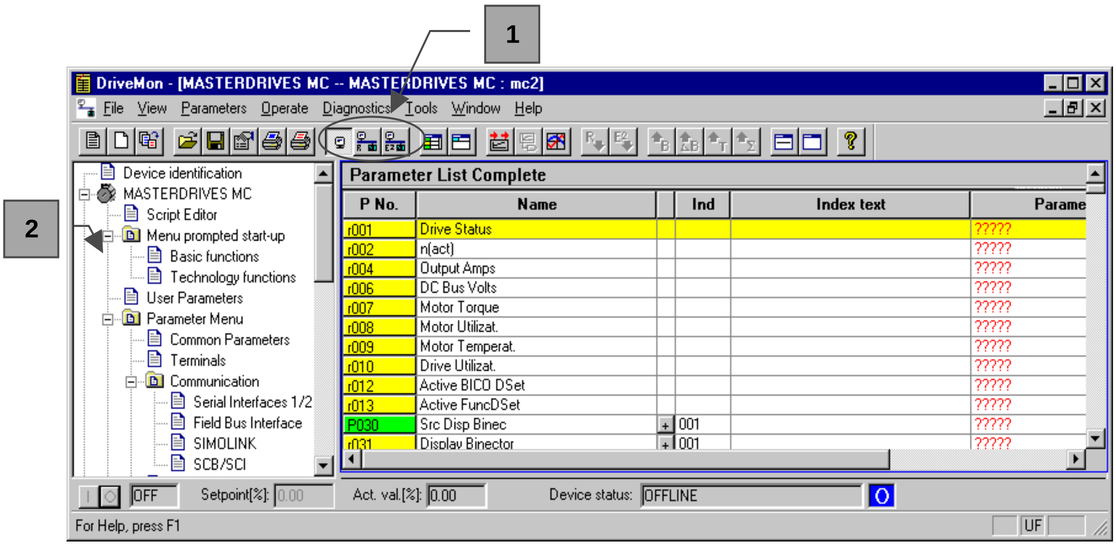


Fig. 5-20 Drive window/parameter list

The DriveMonitor drive window offers one feature that the SIMOVIS drive window does not have, a directory tree for navigation (Fig. 5-20 [2]). You can deselect this additional operating tool in menu *View*.

Otherwise there is no difference between operation and parameterization of DriveMonitor and SIMOVIS.

5.5.4 Parameterization

5.5.4.1 Calling up the drive window (SIMOVIS)

You can open the drive window from the bus configuration window in one of the following ways:

- Double-click on the device to be parameterized (Fig. 5-21 [2])
- Call-up on the toolbar *Parameterize drive* (Fig. 5-21 [1])
- Call-up with the menu command *Edit → Parameterize drive* (Fig. 5-21 [3])

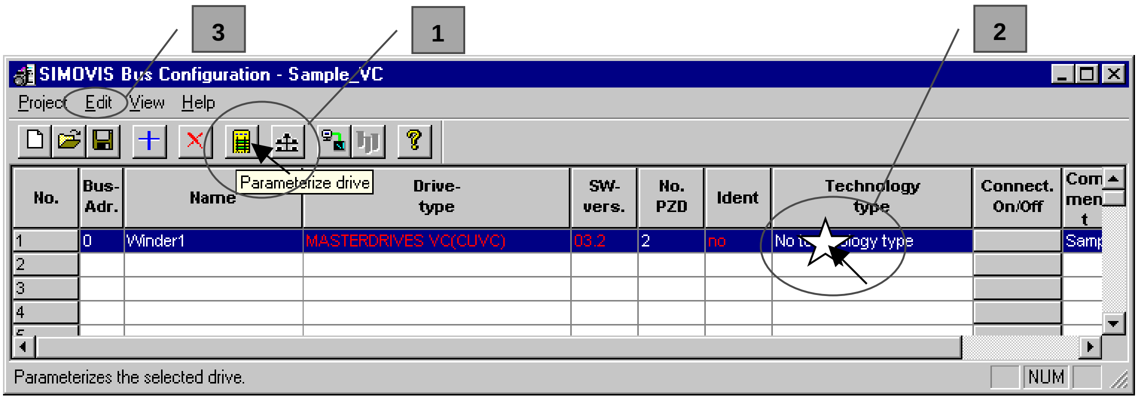


Fig. 5-21 Parameterizing a device

The drive window is then opened with an empty parameter list (*free parameterization*).

5.5.4.2 Drive window

NOTE

DriveMonitor starts immediately with the empty drive window without bus configuration. (See Section 5.5.3 "Drive configuration DriveMonitor".) After you have set the drive or opened a download file, the parameter list is displayed.

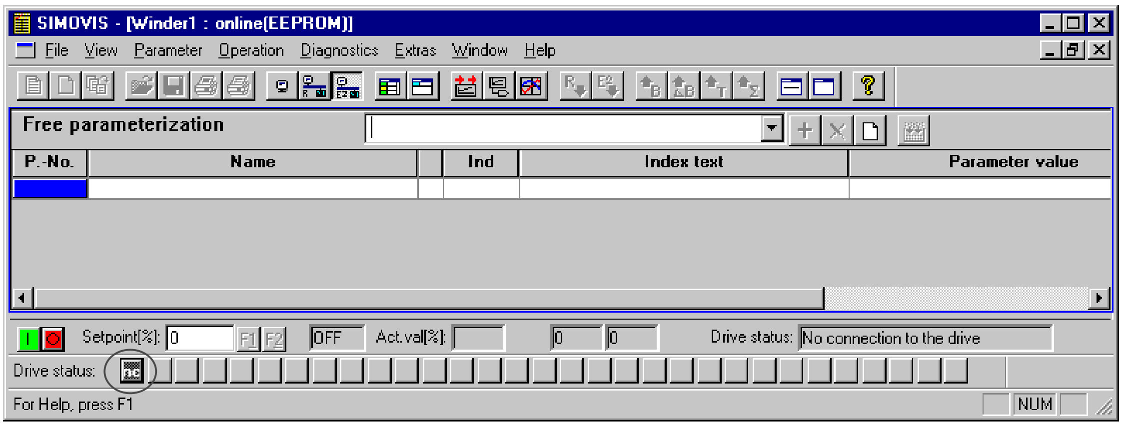


Fig. 5-22 Drive window

The drive window contains all elements required for the parameterization and operation of the connected device. In the lower bar (see Fig. 5-22), the status of the connection with the device is displayed:

Connection and device ok

Connection ok, device in fault state

Connection ok, device in alarm state

Device is parameterized offline


No connection with the device can be established (only offline parameterization possible).

NOTE

If no connection with the device can be established because the device does not physically exist or is not connected, you can perform offline parameterization. First switch to offline mode. In this mode, you can edit the parameter data set on the basis of the factory setting. In that way, you can create an individually adapted download file, which you can load into the device later.

5.5.4.3 Operating modes

You can switch between operating modes using the toolbar (Fig. 5-23 [1]) or menu *View* (Fig. 5-23 [2]).

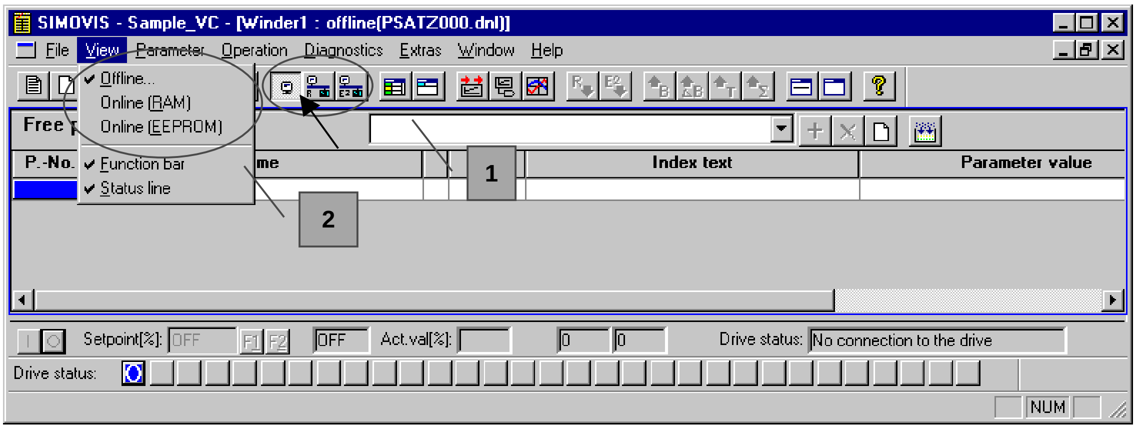


Fig. 5-23 Operating modes

The following modes are available:

- **Offline**
  In this mode, you can edit a parameter set on the basis of the factory setting (default for *View Offline*) or on the basis of a parameter file. You can open or create a parameter data set that is based on a file with menu *File → Open...* bzw. *File → New → Empty parameter set*. You can transfer the parameter data sets created or changed in this way into the device later with the download function.
- **Online RAM**
  In this mode, the edited parameter values are read out of the device online. The parameter changes are only written to the RAM and will therefore be lost when the device is switched off.
- **Online EEPROM**
  In this mode, the edited parameter values are read out of the device online. The parameter changes are written to the EEPROM and are therefore stored in the device nonvolatilely.

5.5.4.4 Parameterization options (Menu Parameter)

Menu *Parameter* contains several selection options for parameterization.

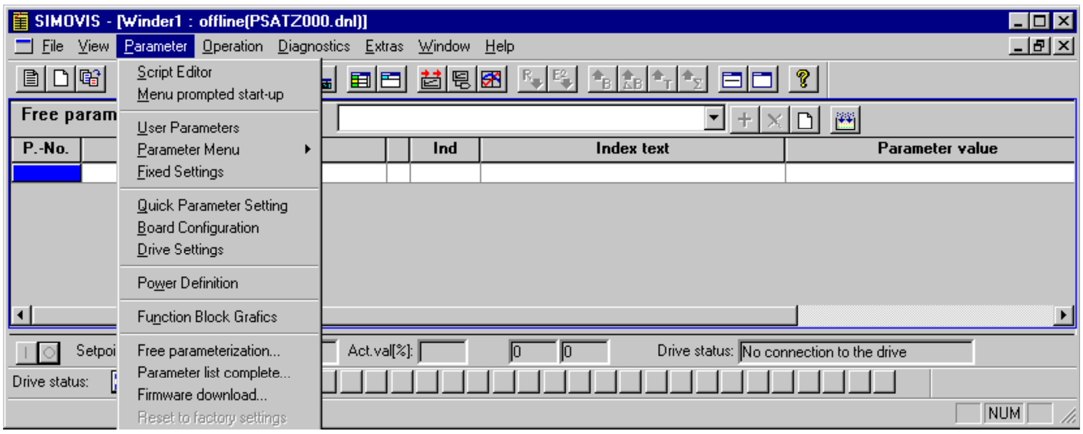


Fig. 5-24 Menu Parameter

Drive menus according to the device

The selection is made in SIMOVIS/ DriveMonitor in accordance with the assignment of parameters to individual menus. (If permissible), the selection in Parameter menu (P60) is automatically set to the correct value. MASTERDRIVES VC/MC contains the following parameter menus:

- **User parameters (P60 = 0)**
  In this menu, only the parameters defined in the device as user parameters (P360) are visible.
- **Parameter menu (P60 = 1)**
  This menu is further subdivided. The parameters are assigned to function groups. In that way, you can perform a particular parameterization task effectively without global knowledge of the parameter set.

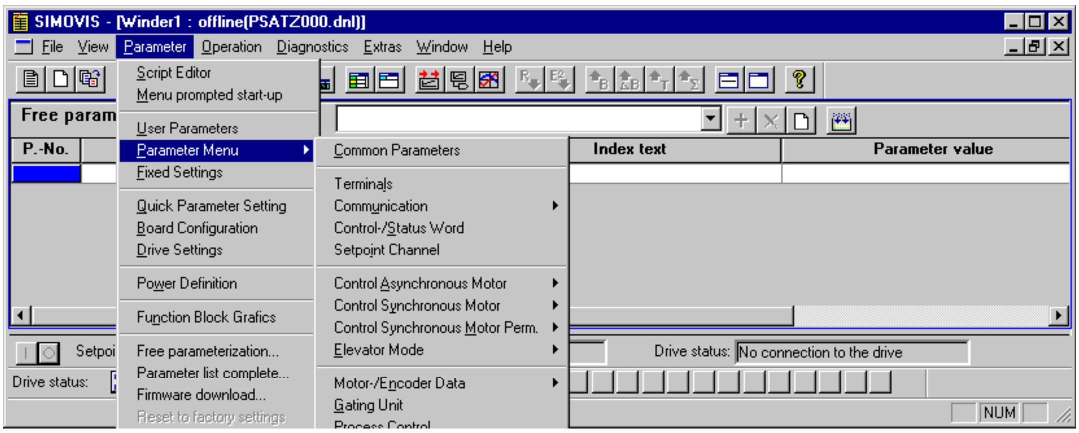


Fig. 5-25 Parameter menu

- **Fixed Settings (P60 = 2)**
  In this menu, the parameters required to make the factory setting are displayed.
- **Quick Parameter Setting (P60 = 3)**
  In this menu, the parameters required to perform quick parameterization are displayed.
- **Board Configuration (P60 = 4)**
  In this menu, the parameters required to perform board definition are displayed.
- **Drive Settings (P60 = 5)**
  In this menu, the parameters required to set the motor are displayed.
- **Power Definition (P60 = 8)**
  In this menu, the parameters required to define the power section are displayed.

SIMOVIS / DriveMonitor parameter menus

- **Free parameterization**
  In menu *Free parameterization*, you can create individual parameter lists. First click on button *New list* on the toolbar of "Free parameterization" (Fig. 5-26 [1]). Then enter a name for the list in the window to the left of that (Fig. 5-26 [2]) and store the list with button *Add list* (Fig. 5-26 [3]). You can make a selection of lists already created with the dropdown text field on the toolbar.

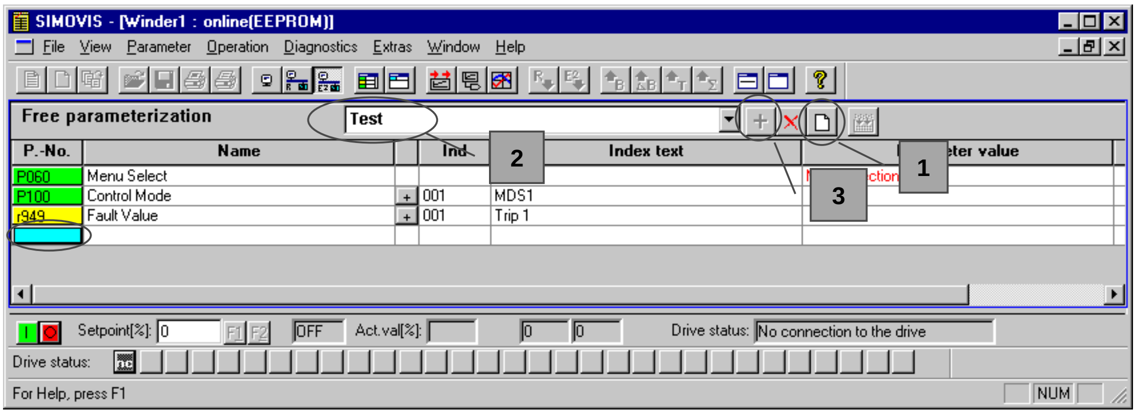


Fig. 5-26 Creating a parameter list

A new parameter list initially appears empty. At the end of the parameter list, the user can then enter the required parameter number by clicking on the last empty field, entering the number, and confirming with *Enter*. You can delete parameters that you do not require by selecting them with a mouse click and pressing *Enter*.

♦ **Parameter list complete**
In menu *Parameter list complete*, all parameters stored in the device are displayed. The visibility and changeability of the parameter value depends on the device status. (See Chapter Parameter list column "Read/Write".)

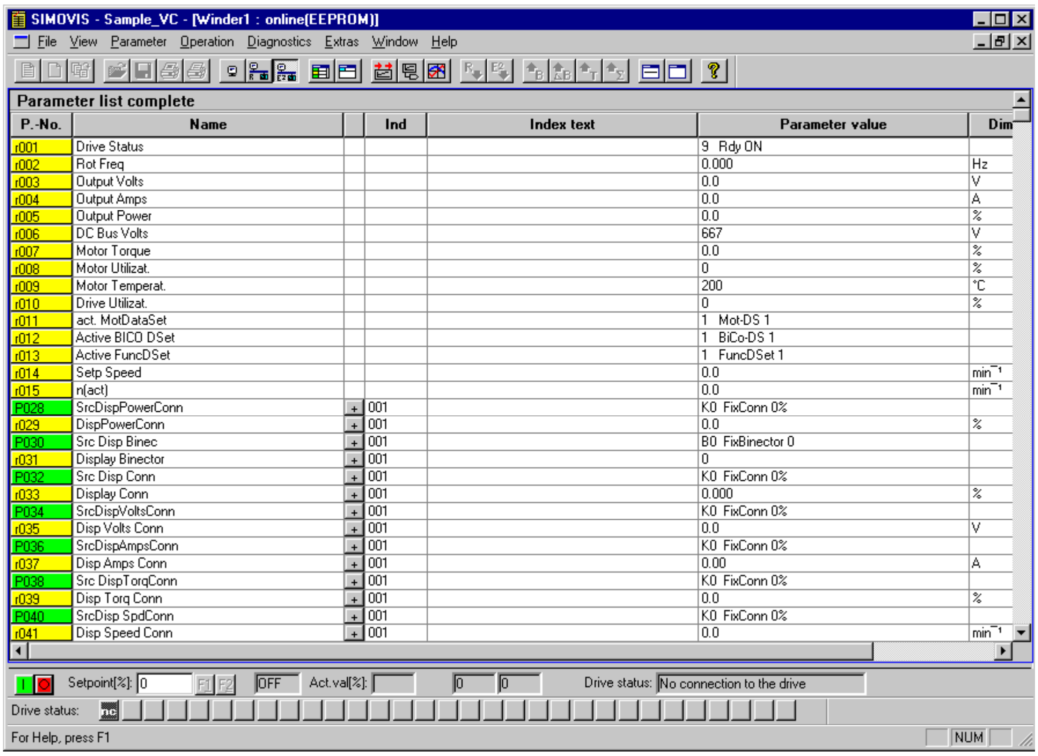


Fig. 5-27 Parameter list of all parameters

5.5.4.5 Structure of the parameter lists, parameterization with SIMOVIS/DriveMonitor

Parameterization using the parameter list is basically the same as parameterization using PMU (See Chapter "Parameterizating steps"). The parameter list provides the following advantages:

- Simultaneous visibility of a larger number of parameters
- Text display for parameter names, parameter value, binectors, and connectors
- On a change of parameters: Display of parameter limits or possible parameter values

The parameter list has the following structure:

Field No.	Field Name	Function
1	P. Nr	Here the parameter number is displayed. You can only change the field in menu *Free parameterization*.
2	Name	Display of the parameter name, in accordance with the parameter list
3	Ind	Display of the parameter index for indexed parameters. To see more than index 1, click on the [+] sign. The display is then expanded and all indices of the parameter are displayed
4	Index text	Meaning of the index of the parameter
5	Parameter value	Display of the current parameter value. You can change this by double-clicking on it or selecting and pressing *Enter*.
6	Dim	Physical dimension of the parameter, if there is one

5.5.5 Operation with USS

Using SIMOVIS/DriveMonitor, you can not only parameterize but also perform simple operation of the device. You can define a setpoint and display an actual value. For control purposes, you can define a control word and display a status word.

5.5.5.1 Requirements

For operation via the USS interface, you must implement minimum connector/binector wiring at the MASTERDRIVE VC/MC end:

Minimum settings

Wire the first word received via the serial interface SST1 Word1 to the control word of the drive:

Basic device parameters	**SST1 binector**	**Comment**
P554	B2100	required (acc. to fast parameterization)
P555	B2101	required (acc. to fast parameterization)
P558	B2102	not required for the basic functionality
P561	B2103	not required for the basic functionality
P562	B2104	not required for the basic functionality
P563	B2105	not required for the basic functionality
P564	B2106	not required for the basic functionality
P565	B2107	required (acc. to fast parameterization)
P568	B2108	required (acc. to fast parameterization)
P569	B2109	not required for the basic functionality
P571	B2111	required (acc. to fast parameterization)
P572	B2112	required (acc. to fast parameterization)
P573	B2113	not required for the basic functionality
P574	B2114	not required for the basic functionality
P575	B2115	not required for the basic functionality

Then wire the second word received via the serial interface word, SST1 Word2, to the setpoint of the drive (e.g. for speed setpoint P443 = K2002).

The drive must transmit the following values for monitoring purposes:

- Status_word1 in the first word transmitted (P707.1 = K032)
- The actual value in the second word transmitted (e.g. for speed actual value P707.2 = KK148).

You can also make this setting, which is the minimum required, with function *Quick Parameter Setting → Select Setpoint Source* (P368) = USS. In that case, however, only the control word wiring marked *necessary* is established.

Complete setting

Drive control and monitoring is performed in four process data words. For that purpose, set PZD = 4 during device selection. (See Section 5.5.2.3 "Selecting a device".)

In addition to the minimum setting, also establish the following wiring:

- To ensure that the double connectors are available with full resolution, also transmit the setpoint and actual value in Word3. Example of speed setpoint and speed actual value: Wire P443 = KK2032, P707.3 = KK148.
- Control_word2 and Status_word2 are also made available for operation. This is done by wiring the fourth word received via the serial interface (B2400...B2415) to Control_word2 of the drive.
- Transmit Status_word2 with the fourth word of the serial interface (P707.4 = K033).

With this parameterization, the full scope of operation and monitoring available under SIMOVIS/DriveMonitor is functional.

5.5.5.2 Operating functions

In the drive window, you can operate the device SIMOVERT MASTERDRIVES VC/MC by the following means:

Operating bar

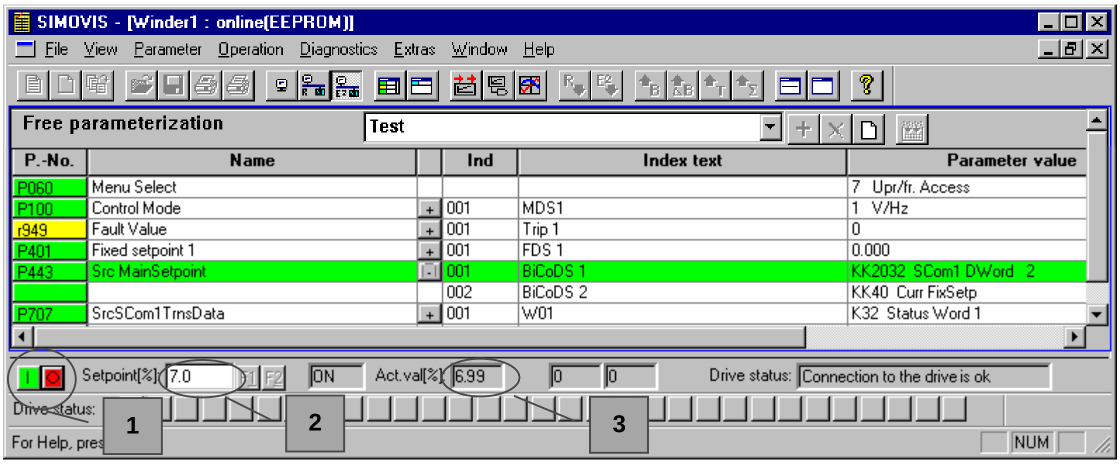


Fig. 5-28 Operating bar

- ON/OFF (Fig. 5-28 [1])
  You can activate or deactive the drive using the ON/OFF buttons  or  buttons on the status bar.
- Setpoint setting and actual value display (Fig. 5-28 [2] [3])
  On the status bar, you can specify a setpoint by clicking on the field Setpoint and entering a setpoint. You can then apply the setpoint by pressing *Enter*.

By **menu selection** you can explicitly operate the control word or monitor the status word.

- **Control word**
  You can call up the display of control word 1 or 2 with menu *Operation* → *Control word 1* or *Control word 2*.

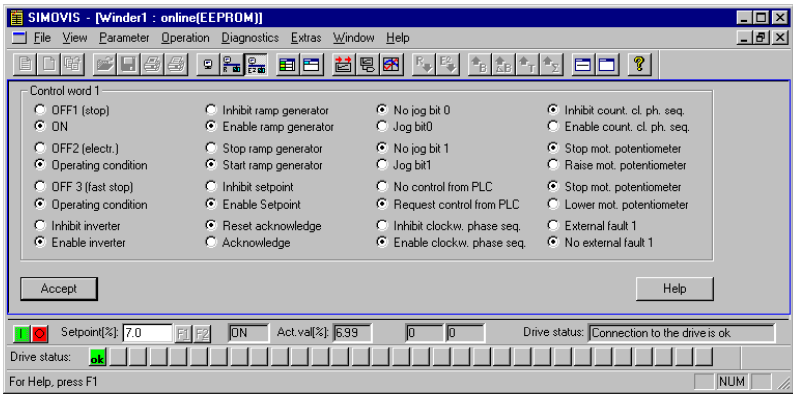


Fig. 5-29 Control word 1

In this display, you can set each control word bit individually. Apply the setting by clicking on button *Accept*.

- **Status word**
  You can call up the display of status word 1 or 2 with menu *Operation* → *Status word 1* or *Status word 2*.
  In this display, you can display the status word bits individually and in plain text.

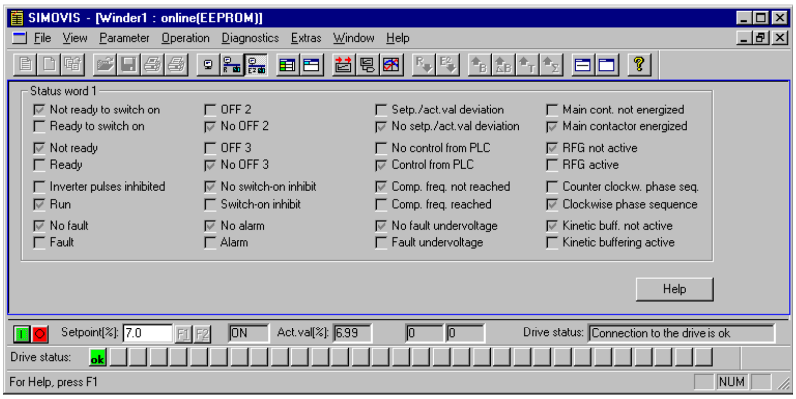


Fig. 5-30 Status word 1

5.5.6 Service functions

5.5.6.1 Upread/download

You can read out and store the parameterization of the connected device with function *Upread*. You can call up the function with menu *Datei → Upread → Grundgerät...* (Fig. 5-31 [1]) or on the toolbar (Fig. 5-31 [2]). You can select either a complete upread of all parameters or readout of those values that are different from the factory setting.

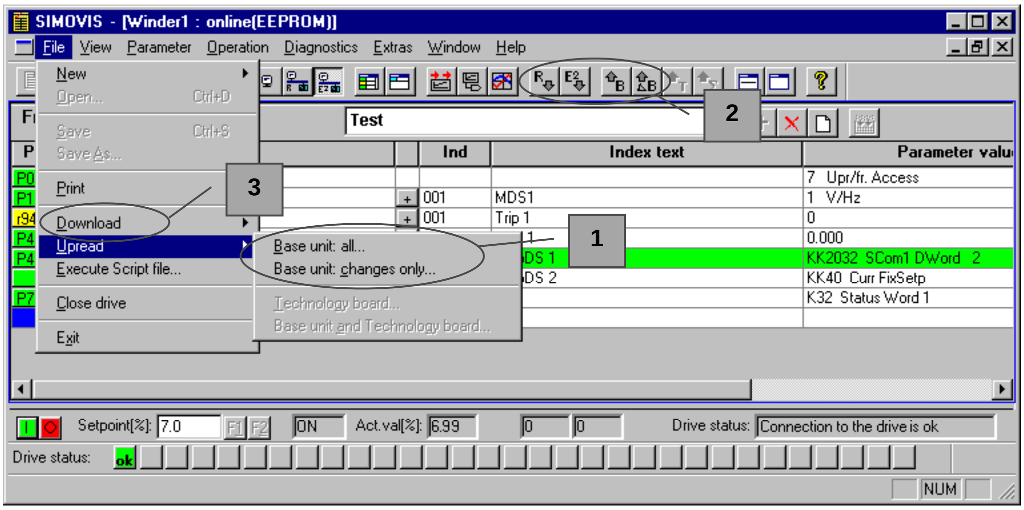


Fig. 5-31 Upread/Download

The values read out are stored under the name specified in a file with extension .dnl. After the function has finished, the message *UpRead for file XXX successful/terminated with errors* is displayed and you must acknowledge it.

You can transmit the files created in this way into a device with function *Download*. You can call up the function with menu *File → Download...* (Fig. 5-31 [3]) or on the toolbar (Fig. 5-31 [2]). You can transmit the parameter values both nonvolatilely (*Save [EEPROM]*) and volatilely (*Write [RAM]*).

NOTE

When you download with SIMOVIS/DriveMonitor, certain parameters (such as the power section definition P070) are not written. You will find the list of parameters that will not be written in the *.ini file assigned to the device type under the heading "[DontWrite]".
Example of a path of the *.ini file in MASTERDRIVE VC in SIMOVIS:
c:\Siemens\SIMOVIS\System\Drives\MASTERDRIVES VC(CUVC)\MDVV.ini
in DriveMonitor:
c:\Siemens\STEP7\p7vrvisx\system\device\MDVV\MDVV.ini

5.5.6.2 Script files

Description

Script files are used to parameterize devices of the MASTERDRIVES series as an alternative to downloading a parameter set. A script file is a pure text file that must have the filename extension ***.ssc**. The script file executes individual commands using a simple command syntax for the purpose of device parameterization. (You can write the script files using a simple text editor, such as WordPad.)

You can launch execution of a script file with menu command *File → Execute Script file*.

Advantages:

- ♦ Structured format according to functions/function modules possible, because
  - You can arrange the parameters in any order and insert any comments.
  - With jump functions (CALL commands) you can call up function modules (minimization of data to be managed, parameterization, of possible sources of error and of the configuration effort)
- ♦ Interactive communication e.g. by MSG / LOCALMSG commands (guiding the customer, final customer)
- ♦ It is possible to force, monitor, and wait for converter states and to start "background calculations" in the converter.

Commands

Commands are interpreted line by line. You can mark off comments with "REM" or a semicolon ";".

Tabs and blanks are permissible both as a separator between the command and the arguments and at the beginning of a line.

A line to be interpreted consists of a command and arguments, and can have the following appearance:

<tab><command><tab><1.argument><tab><2.argument>etc.

<u>Example of a command sequence:</u>

WRITE	60	0	5	(Meaning: Set par. 60 to value 5)
WAIT	1	0	5	(Meaning: Wait until the converter is in status drive setting)
WRITE	96	0	1	(Meaning: Set par. 96 to value 1)

♦ **READ**

Command:	READ
Description:	For reading parameter values. The value read is written to the logfile.
Max. arguments:	2
Syntax:	READ PNU IND

The parameter number is absolutely necessary.

If index 255 is specified, all indices of the parameter are read out and written to the logfile.

The index is optional.

If you forget the index in an indexed parameter, or if the index is 0, index 1 is interpreted automatically. If the index is specified for an unindexed parameter, it is ignored.

♦ **WRITE**

Command:	WRITE
Description:	For writing parameter values.
Max. arguments:	3
Syntax:	WRITE PNU IND PWE

The parameter number is absolutely necessary.

For an indexed parameter, 3 arguments must be present. If there are fewer than 3 arguments, the line is ignored.

For an unindexed parameter, 2 or 3 arguments must be present. If there are 3 arguments, the 2nd argument is the index and is ignored. If there are fewer than 2 arguments, the line is ignored.

♦ **WAIT**

Command: WAIT

Description: A defined length of time is allowed to elapse before a certain parameter is assigned a defined value.

Max. arguments: 4

Syntax: WAIT PNU IND PWE1/PWE2/PWE3 ZEIT

The parameter number is absolutely necessary.

Specifying the time is optional. If you do not specify a time, the function waits until the expected parameter value comes about. If you specify a time in seconds (positive integer), the same condition applies but for no longer than the time specified. The WAIT command is ignored if SIMOVIS / DriveMonitor is in the offline state. For the parameter number, you can specify up to three values, which are ORed. The separator between the values is the character "/" and must be without gaps (no spaces or tabs). The parameter values are considered to be an argument.

Specify the values (PWE) as they appear in the download file because they are not converted to numeric values.

Example: 0000000001010111 and not 87
0x21E and not 542

For indexed parameters, 3 arguments must be present. If there are fewer than 3 arguments, the line is ignored.

For unindexed parameters, 2 or 3 arguments must be present. If there are 3 arguments, the 2nd argument is the index and is ignored. If there are fewer than 2 arguments, the line is ignored.

♦ **TIME**

Command: TIME

Description: Allows the specified time to elapse before the following scripts are further processed.

Max. arguments: 1

Syntax: TIME ZEIT

The TIME command is ignored if SIMOVIS / DriveMonitor is in the offline state. You must specify the time as a positive integer number of seconds. If there is more than one argument, the following arguments are ignored. If there is no argument after the command, the line is ignored.

♦ CALL

Command:	CALL
Description:	Another script file is executed and then execution of the calling script file is resumed at the next instruction.
Max. arguments:	1
Syntax:	CALL PFAD

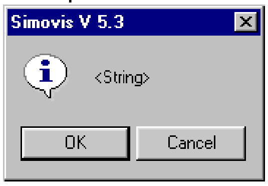
Under PFAD, you must specify the script file to be called by its full pathname. If there is more than one argument, the following arguments are ignored. If there is no argument after the command, the line is ignored.

♦ MSG

Command:	MSG
Description:	The string following the command up to the end of line is displayed as information on the screen in a message box.
Max. arguments:	1
Syntax:	MSG STRING

The message box includes an *OK* and a *Cancel* button. The information symbol also appears next to the string. Execution of the script file is halted until you click on the *OK* button. If you click on the *Cancel* button, execution of the script file is terminated.

Example:



♦ LOCALMSG

Command:	LOCALMSG
Description:	This command works like MSG except that when you click on the "Cancel" button, only execution of the current script file is terminated and not script execution as a whole.
Max. arguments:	1
Syntax:	LOCALMSG STRING

In that way, you can terminate scripts that have been called up with the CALL command from a script file without terminating execution of the higher-level script(s).

♦ PRINT

Command: PRINT

Description: This command places the string specified as the argument up to the end of line in the LOG file.

Max. arguments: 1

Syntax: PRINT STRING

♦ EXECDIALOG STRING

Command: EXECDIALOG STRING

Description:

- This command starts a dialog box from which you can launch individual script commands. You can enter the parameters in the dialog box. You can have this logged into the current logfile. (You can activate logging in the dialog box.) The following commands can be implemented at present: READ, WRITE, PRINT, TIME, CALL, WAIT, MSG, LOCALMSG

The string following the command up to the end of line is displayed as information.

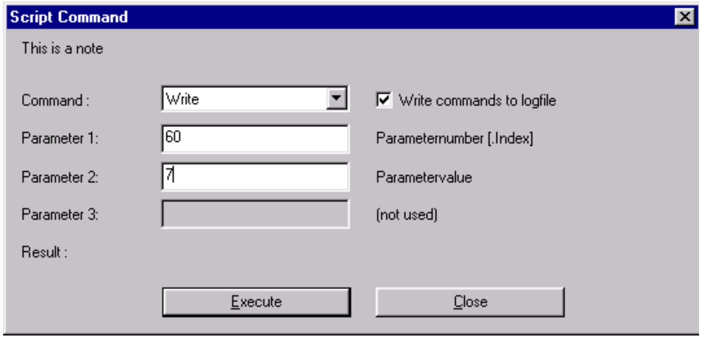
Max. arguments: 1

Syntax: EXECDIALOG STRING

The following window is displayed, in which you can enter the commands interactively. If you click on button *Execute* the command set is executed. If you click on *Close*, the dialog box will be closed and script execution resumed.

Example:

EXECDIALOG This is a note



♦ **PARAMDIALOG**

Command:	PARAMDIALOG
Description:	This command starts the standard dialog box of SIMOVIS / DriveMonitor, in which you can change a parameter. It is the same dialog box that appears when you double-click on a parameter in the parameter list.
Max. arguments:	2
Syntax:	PARAMDIALOG PNU IND

Example: PARAMDIALOG 61 0

♦ **BEGINDESCRIPTION..............ENDDESCRIPTION**

Command:	BEGINDESCRIPTION .... ENDDESCRIPTION
Description:	This command brackets off any text, which is displayed to the user as information. This description is only evaluated with Drive ES.
Max. arguments:	
Syntax:	BEGINDESCRIPTION The description to be displayed ENDDESCRIPTION

♦ **BEGINLINKS...............ENDLINKS**

Command:	BEGINLINKS .... ENDLINKS
Description:	This command brackets off a list of information combinations. The information combinations are files, with which the content of the script file can be described in greater detail. This description is only evaluated with Drive ES.
Max. arguments:	
Syntax:	BEGINLINKS C:\SIMOVIS\Doc\querschneider.pdf C:\SIMOVIS\Doc\querschneider.jpg ENDLINKS

♦ **Logging script files**

Script execution is logged by default. You can deactivate logging with the command Set Log Off or reactivate it with Set Log On. If logging is active, SIMOVIS / DriveMonitor creates a file with the same name as the script file being executed but with the extension "LOG”. All commands of a transmission are logged in this file with their results. The "LOG” file is stored in the file containing the script file.

5.5.6.3 Trace

Trace is an add-on for SIMOVIS/DriveMonitor that permits visualization of recorded data. You can also store the data read out of the device and open it again later. It is also possible to import such data into text processing programs, such as Microsoft Word, or into spreadsheet programs, such as Microsoft Excel.

You can perform simple measurements of amplitudes and instants using two movable cursors.

WARNING

MASTERDRIVES MC:
If you are operating SIMOVIS-TRACE via the basic device interface X103, the technology option F01 will be affected. This causes sudden setpoint changes in the curve writing function (cracking) and, in automatic mode, it causes incorrect processing of the traversing data sets.

You can start the trace (device-internal cyclic store function) with menu command *Diagnostics* → *Trace* or on the toolbar .

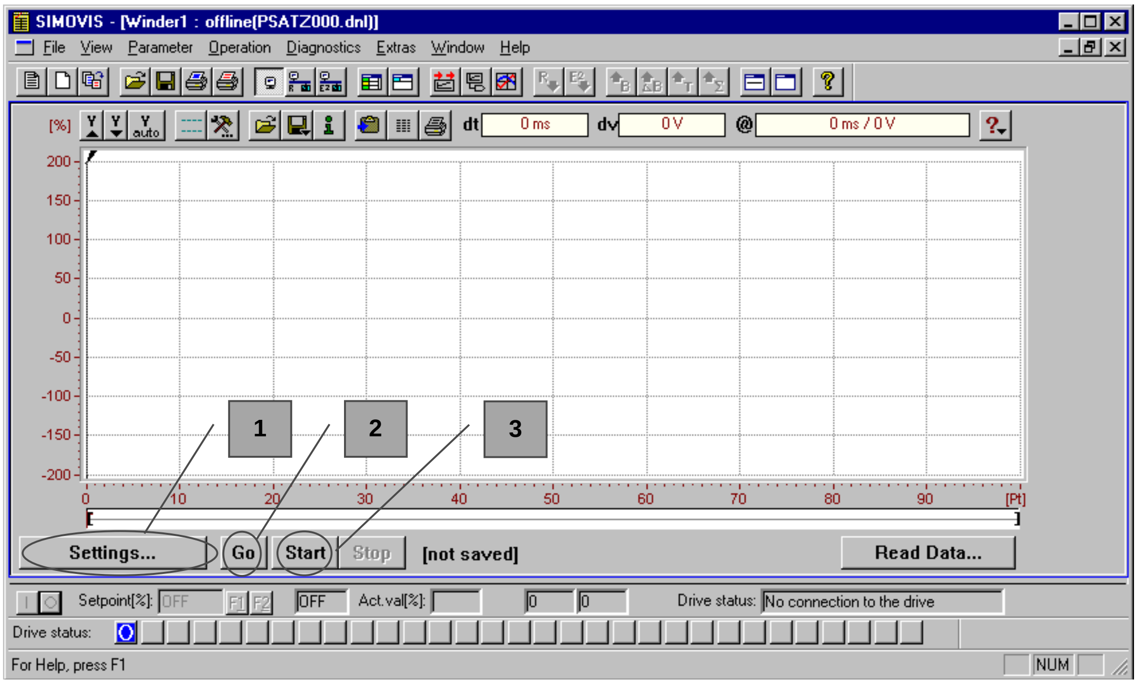


Fig. 5-32 Trace initial window

After an initialization phase, the initial window appears (Fig. 5-32) from which further operation starts.

Setting the recording data

With button *Record Settings* (Fig. 5-32 [1]) you can open the window for defining the recording data and the trigger condition.

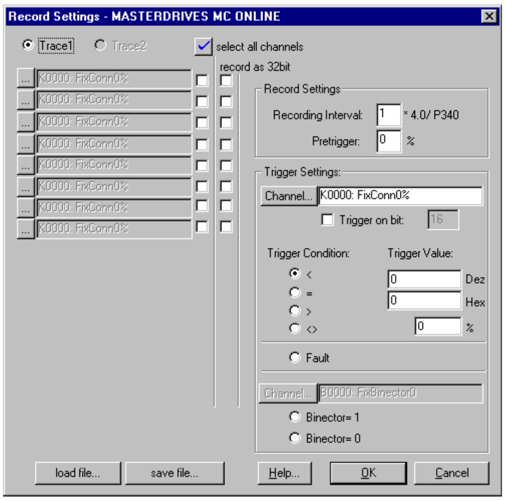


Fig. 5-33 Recording settings

In this window, you can specify the connectors you want to have recorded in the eight available channels. If you click on the associated button, the connectors available in the MASTERDRIVES VC/MC are displayed. You can deactivate unnecessary channels (checkbox). For double connectors, you can activate 32-bit recording.

In addition to the recording settings, you must also specify the sampling rate in field "Recording Interval", the trigger derivation action in field "Pretrigger", and the trigger setting. For the trigger setting, you can select the connector or binector via which triggering is performed (button *Channel*) and the trigger condition is specified. As trigger conditions for the connectors, you can use comparison operators less than (<), equal to (=), greater than (>), and not equal to (<>) and triggering on a certain bit of the connector (e.g. for status words) and the triggering on a fault. For connectors, specify the state (0 or 1) at which you want to trigger as the trigger source.

After you have exited the recording settings, recording is activated with the *Start* (Fig. 5-32 [3]) button. Recording starts as soon as the trigger condition is fulfilled. When recording is completed, the data are read out of the device and displayed in the trace window (see Fig. 5-34).

With button *Go* (Fig. 5-32 [2]), you can activate recording immediately without taking the trigger condition into account.

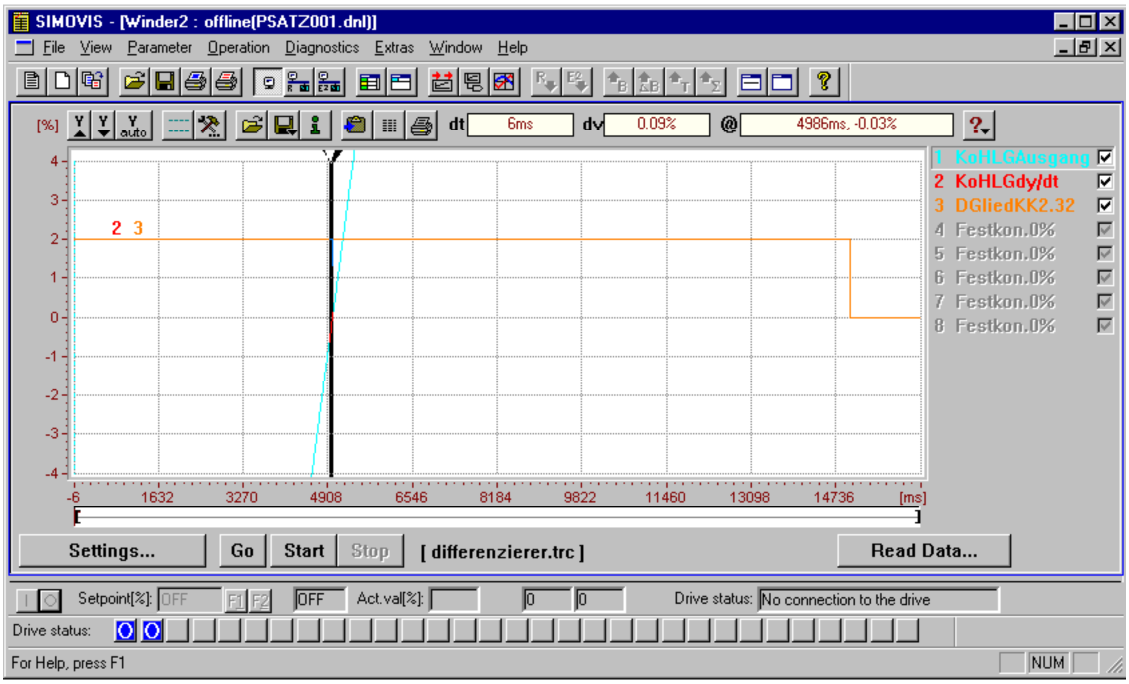


Fig. 5-34 Example trace

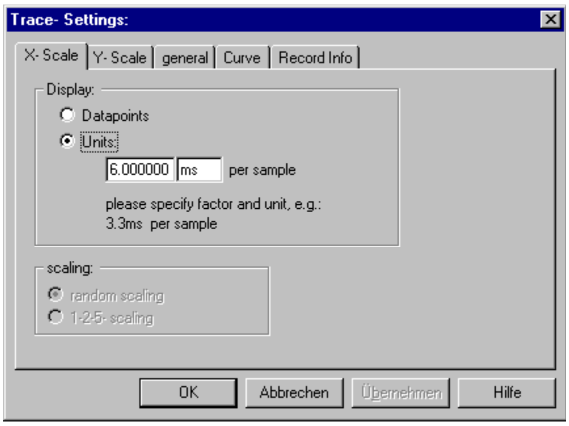
Display of the data

You can adapt the graphic display to your individual needs. Some displays only apply for the active curve (curve name highlighted). You can change the active curve by clicking on the curve description (to the right of the graphic window).

Trace settings

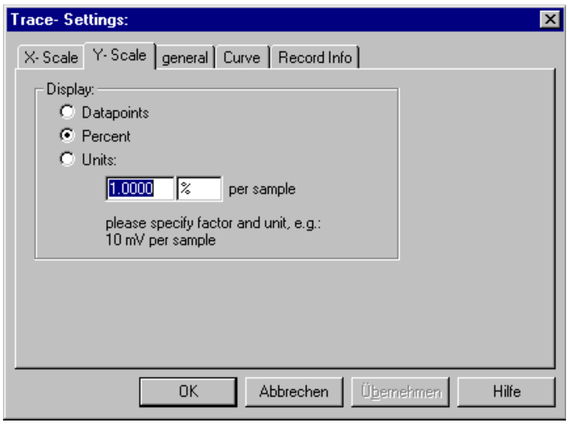
On the trace toolbar, you can call up the graphic trace settings with the function button . The trace settings contain the following tab cards:

- X- Scale



Display in data points:	Scaling is performed in data points. The triggering time is interpreted as the data point zero so that data points are scaled negatively to the left of the trigger time (pretrigger).
Display in units:	Scaling of the X-axis is performed taking the freely defined factor and unit text into account, e.g.: 3.2 ms per sampled value. This type of display is by default automatically correct in [ms] for trace recordings, which results in correct time scaling.

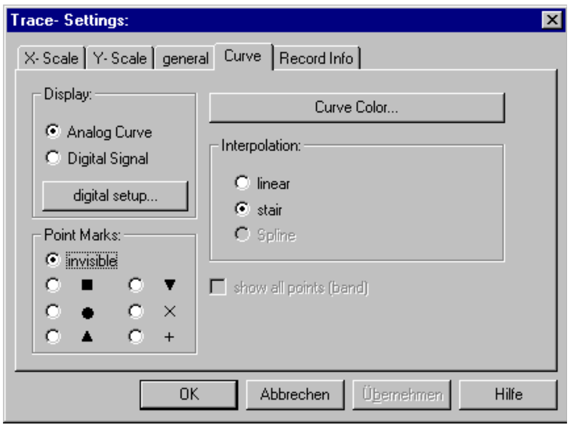
♦ Y-Scale (only valid for the active curve)



Display in data points:	Scaling is performed in data points.
Display as a percentage:	Scaling is performed as a percentage. 16384 (4000Hex) = 100 % for 16-bit curves and 1073741824 (40000000Hex) = 100 % for 32-bit curves.
Display in units:	Scaling of the Y-axis is performed taking the freely defined factor and unit text into account, e.g. 10 mV per sampled value.

♦ general
Generally valid settings of the trace display.
Visibility of the grid, cursor, and curve numbers.
Background color
Settings for the clipboard and WMF export

♦ Curve (only valid for the active curve)



Settings for displaying the trace curve.

Analog Curve: Display as a linear value

Digital Signal: Bitwise display of the 16-bit value recorded. You can define which bits are displayed in *digital setting*.

Point Marks: Way the individual data points are identified.

Note:
Data point identifiers are not displayed graphically until the zoom factor is large enough to allow you to distinguish between them.

Interpolation: linear: Linear connection between the data points.

stair: Curve display as a step function.

Amplification setting

You can change the amplification of a trace (active curve). To do that, click on the appropriate button above the Y-scale.  The *auto* button scales the Y-axis in such a way that the smallest and largest value recorded fit into the display.

Offset

To obtain a better overview, you can shift individual traces (active curve) and thus superimpose traces. Drag the Y-scale using the mouse (by drag and drop).

Defining the visible area

Using the *Zoombar* 
below the curve display, you can set the visible portion of the time axis using the movable boundaries [ ]. You can also set the zoom to *All* or to *last View* in the context menu (mouse click on the zoombar with the right mouse button).

Measurement of time and amplitude

Using the two freely movable cursor bars, you can ascertain both the absolute signal amplitude and the instant, and the difference between two signal amplitudes and instants.

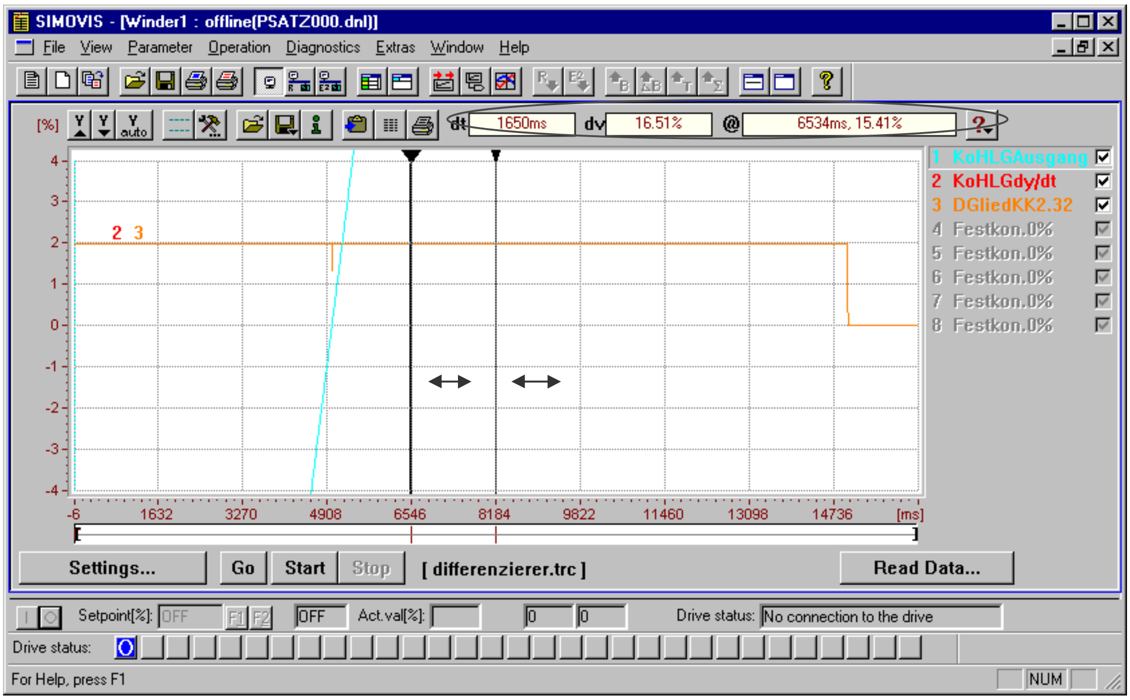


Fig. 5-35 Cursor

When you start the function the cursor bars are at the right-hand edge of the display. Then you can position them anywhere in the display by drag and drop. In field @, the absolute values of the position of the cursor you are clicking on are displayed, in field "dt" the time difference, and in field "dv" the signal amplitude difference between the positions of the two cursors (see Fig. 5-35).

Data management

You can save the trace curves recorded in SIMOVIS/DriveMonitor, export them, or reload them to view them again.

- Saving and exporting trace data:
  You can save trace data in the form of trace files (.trc), as a WMF file (e.g. for exporting or linking in text files) or as an ASCII file (display in columns, e.g. for export into spreadsheet programs).
  Select button *Save Trace file* on the toolbar.
- Loading trace data from the file:
  With button *Open trace file* you can load and view data stored as a trace file.
- Copying trace data into the clipboard:
  To copy the trace display directly into a graphics or text processsing program, you can use the button *Copy traces to clipboard* to copy it into the clipboard in WMF format and then paste it into the target program with *Insert*.
- Printing the curve display:
  With button *Print all visible traces* you can print out the curve display.

5.5.6.4 Diagnostic menu

In menu *Diagnostics* on the menu bar, you can display the parameters as predefined parameter lists for diagnostic purposes.

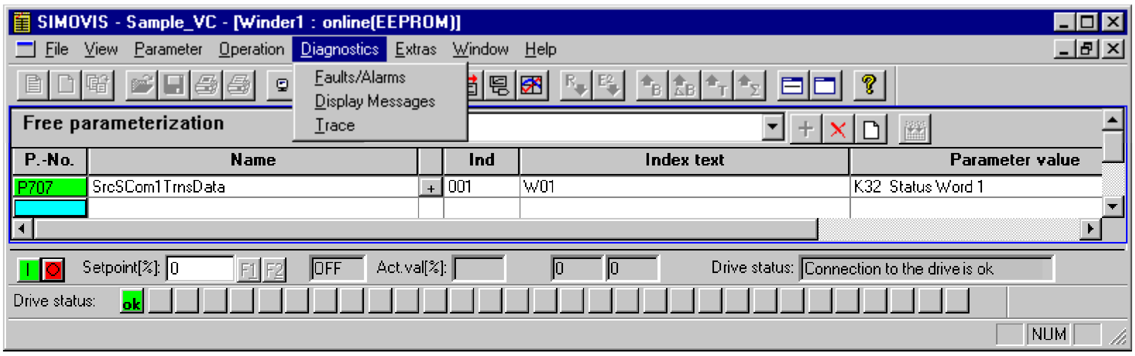


Fig. 5-36 Menu diagnostics

The parameter lists faults/alarms and messages/displays are available. In each of these, only those parameters are displayed that are relevant for the faults and alarms and for messages and displays. You can change or monitor the parameters just like in any other parameter list.

5.5.6.5 Menu prompted start-up

The function *Menu prompted start-up* is available under SIMOVIS/DriveMonitor for MASTERDRIVE VC/MC for simple parameterization with user guidance. In *Menu prompted start-up*, the user is guided through parameterization of the drive by forms. Here, not parameter numbers but texts and selection fields are shown, which makes operation easier to understand. This means that freedom of parameterization is restricted to some extent but is sufficient for standard applications.

Restrictions

The following restrictions apply to menu prompted start-up:

- Parameterization is only performed for the 1st data set (motor data set, function data set, BICO data set).
- A limited selection of setpoint sources is available, for MASTERDRIVE VC they are:
  - PMU and motor potentiometer
  - Analog setpoint and terminal block
  - Fixed setpoints via terminal block
  - Motor potentiometer via terminal block
  - Fixed setpoint via OP1S
  - OP1S and motor potentiometer
  - Serial interface (USS) SIMOVIS
  - Profibus DP and terminal block

NOTE

The selection option of the setpoint sources is restricted by the type of closed-loop control selected.

- No parameterization of special solutions (externally excited synchronous machine, factory setting for elevators and hoisting gear) is possible.
- No parameterization of additional IO boards (EB1, EB2, SCI)

Procedure

You can call up prompted start-up from the drive window either with the button on the toolbar or with menu *Parameter→ Menu prompted start-up* (see Fig. 5-37 [1]).

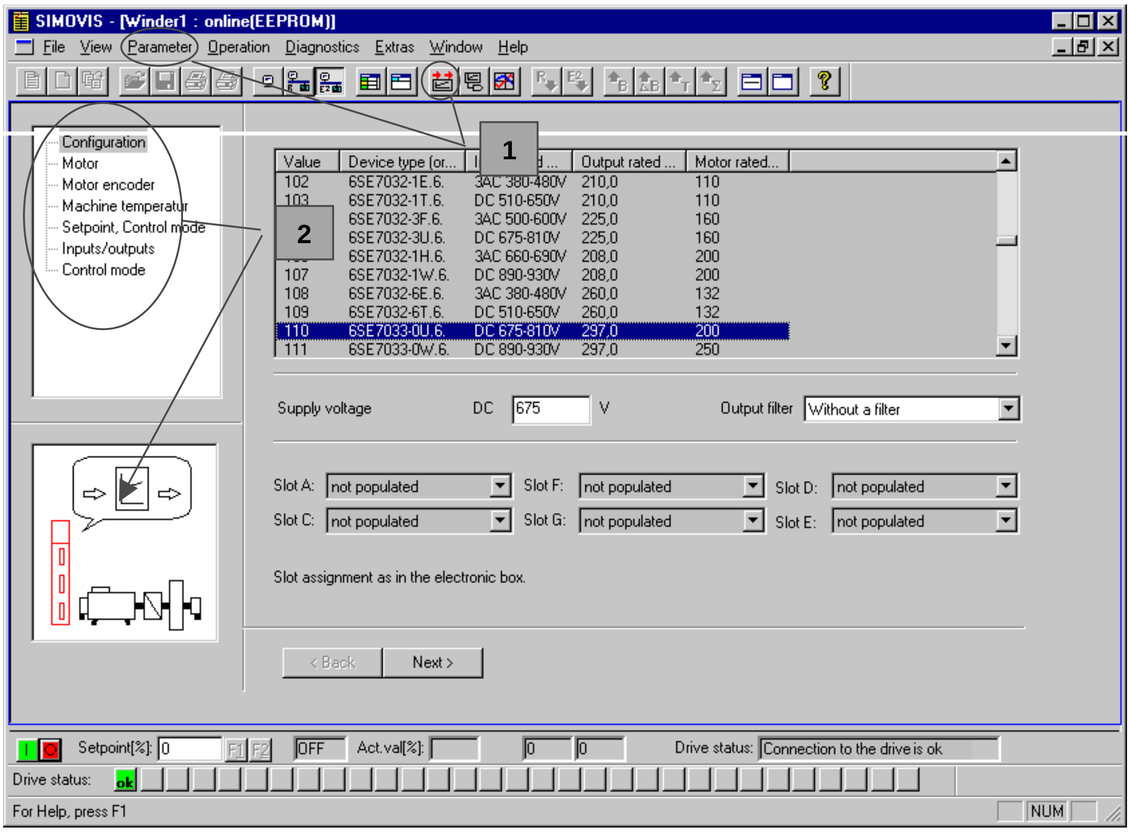


Fig. 5-37 *Initial window for prompted start-up*

In online mode, the field values displayed are initialized to the existing device parameterization, in offline mode to the existing offline data set. (If no special data set has been loaded, this is the factory setting)

After initialization, the form for parameterization of the device data (Fig. 5-37) appears as the initial window of Menu prompted start-up. All input forms have the following layout:
On the left-hand side, you will find the context display (Fig. 5-37 [2]) with an indication in words and graphics of the part of guided parameterization to which the form belongs. Below the form, you will find function buttons for switching between forms (*Next, Back*). In the form, fields for parameterization are displayed. The fields contain recommended values. You can change the values by typing them in directly or by selection from the dropdown list boxes.

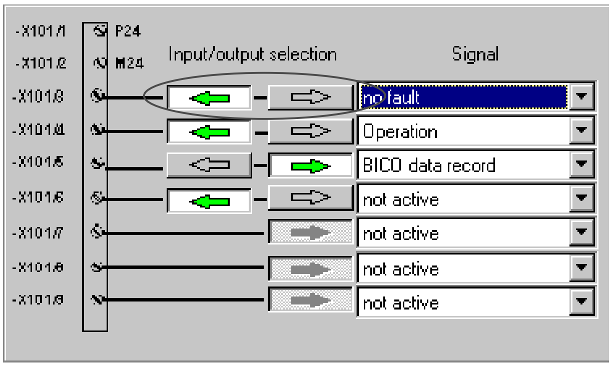


Fig. 5-38 Terminal wiring

When you specify the terminal wiring (Fig. 5-38), you can switch between the input and output for bidirectional inputs/outputs using the function buttons. For parameterization of the inputs and outputs (both the digital and the analog I/Os), only a limited selection of wiring options are offered in the dropdown list boxes.

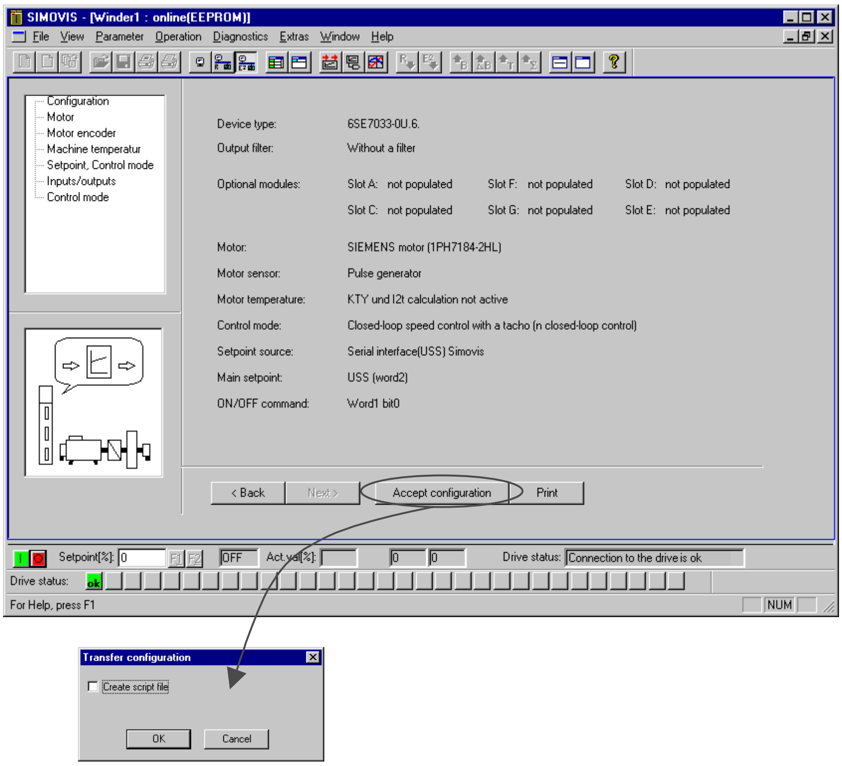


Fig. 5-39 Menu prompted start-up: Summary

To complete guided parameterization, a form with the most important basic data of the parameterization you have just performed is displayed by way of a summary. You can then transfer the values to the device with button *Accept configuration* (Fig. 5-38).

It is also possible to have a script file generated for the parameterization you have just performed (e.g. to parameterize other devices in exactly the same way, or to provide a record of the parameterization in offline mode).

NOTE

With menu prompted start-up, first the factory setting is made with *Accept configuration*, all previous parameterization in the device is reset. (The factory setting type is retained.)

For MASTERDRIVE MC, menu prompted start-up also exists for starting up the technology functions. The appearance and operation are analogous to that of menu prompted start-up for the basic device.

5.5.6.6 Learning a database

If a known device type has an unknown firmware version, it is possible to learn the parameter sets (names, factory setting values, min and max limits) under SIMOVIS/DriveMonitor.

NOTE

In order to establish a connection, it is necessary to specify a firmware version. It is advisable to select the predecessor version of the firmware version to be learned if possible.

Procedure for SIMOVIS

In the window "Bus Configuration" establish a connection with the device (see Section 5.5.2.4 "Testing the connection"). After that, you can learn the parameter set with button *Generate database* or with menu *Edit→ Create ("lern")*. This process can take several minutes. After that, this firmware version is also available to you for parameterization.

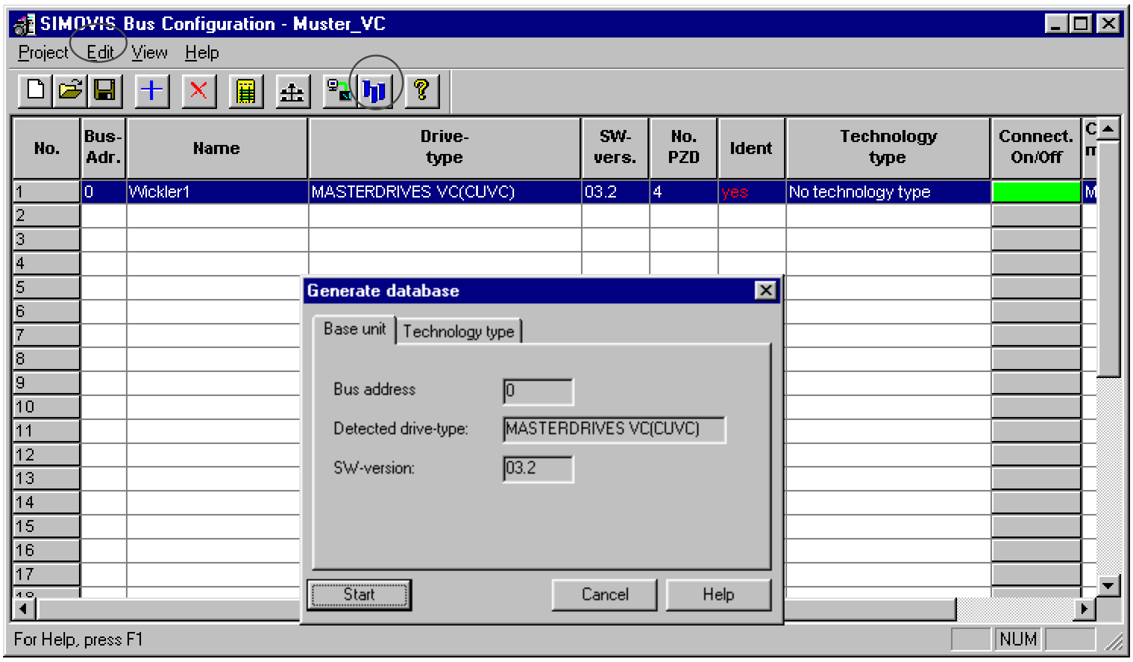


Fig. 5-40 Function "Learning"

Procedure for DriveMonitor

When you switch to online mode, device identification is performed. You can also trigger device identification with menu *Parameters→ Device identification*. If an unknown software version is detected, you are offered the option (Fig. 5-41 button *Generate database*), of generating the database. (This process takes several minutes.)

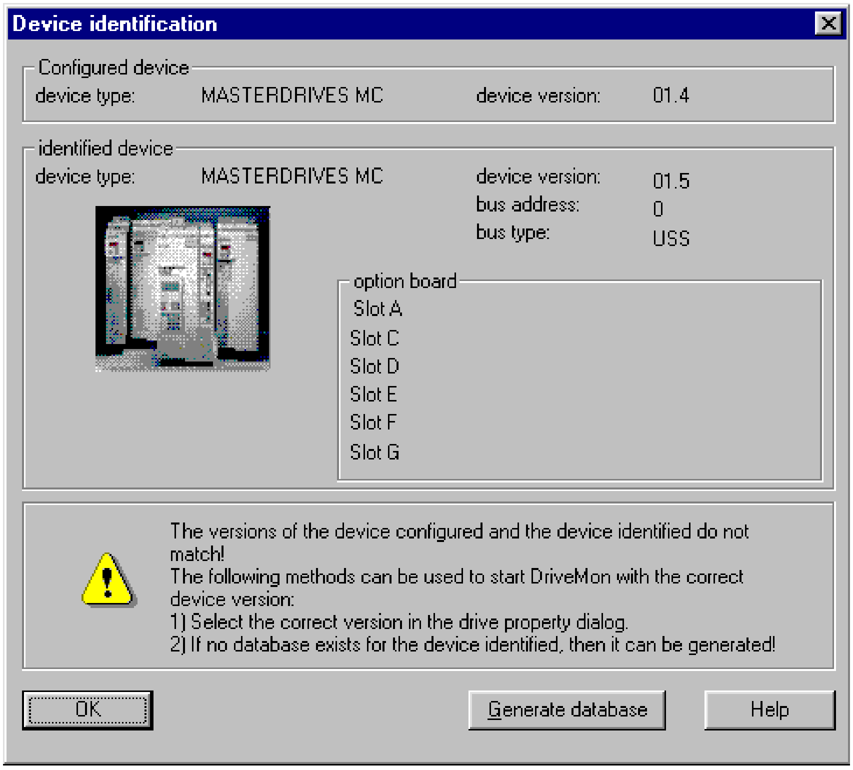


Fig. 5-41 Creating a database

NOTE

Because the device function scope is unknown for the unknown firmware versions, the functionality is restricted to a minimum in the parameterization window. The functions "Trace", "Menu prompted start-up", and the drive menus are therefore not available.

It is not possible to learn a known firmware version, the message *The database for VC/MC with software-version XXX already exists!* appears.

6 Parameterizing steps

The chapter entitled "Parameterizing Steps" describes the parameter assignments to be made for starting up SIMOVERT MASTERDRIVES:

In addition to this chapter, you should also refer to Chapter 3 (First Start-Up) and Chapter 8 (Parameterization) in the operating instructions.

The parameterizing steps are divided into different categories:

- Parameter reset to factory setting (6.1)
- Quick parameterization procedures (6.2)
- Detailed parameterization (6.3)

Parameter reset to factory setting

The factory setting is the defined initial state of all the parameters of a unit. The units are delivered with this setting.

A detailed description is given in section 6.1.

Quick parameterization procedures

The quick parameterization procedures can always be used when the exact application conditions of the units are known and no tests with the associated extensive parameter corrections are required.

The following quick parameterization procedures are described in section 6.2:

1. Quick parameterization, P060 = 3
   (Parameterizing with parameter modules)
2. Parameterizing with user settings
   (Fixed settings or factory settings, P060 = 2)
3. Parameterizing with existing parameter files
   (Download, P060 = 6)

Depending on the specific conditions prevailing in each case, parameters can either be assigned in detail (see section 6.3) or with one of the specified quick procedures.

By activating a fixed setting (P060 = 2) the parameters of the unit can also be reset to the original values.

Detailed parameterization

Detailed parameterization should always be used in cases where the exact application conditions of the units are not known beforehand and detailed parameter adjustments need to be made locally, e.g. on initial start-up.

The description of detailed parameterization in section 6.3 is divided into the following main steps:

1. Power section definition (P060 = 8)
2. Board definition (P060 = 4)
3. Drive definition (P060 = 5)
4. Function adjustment.

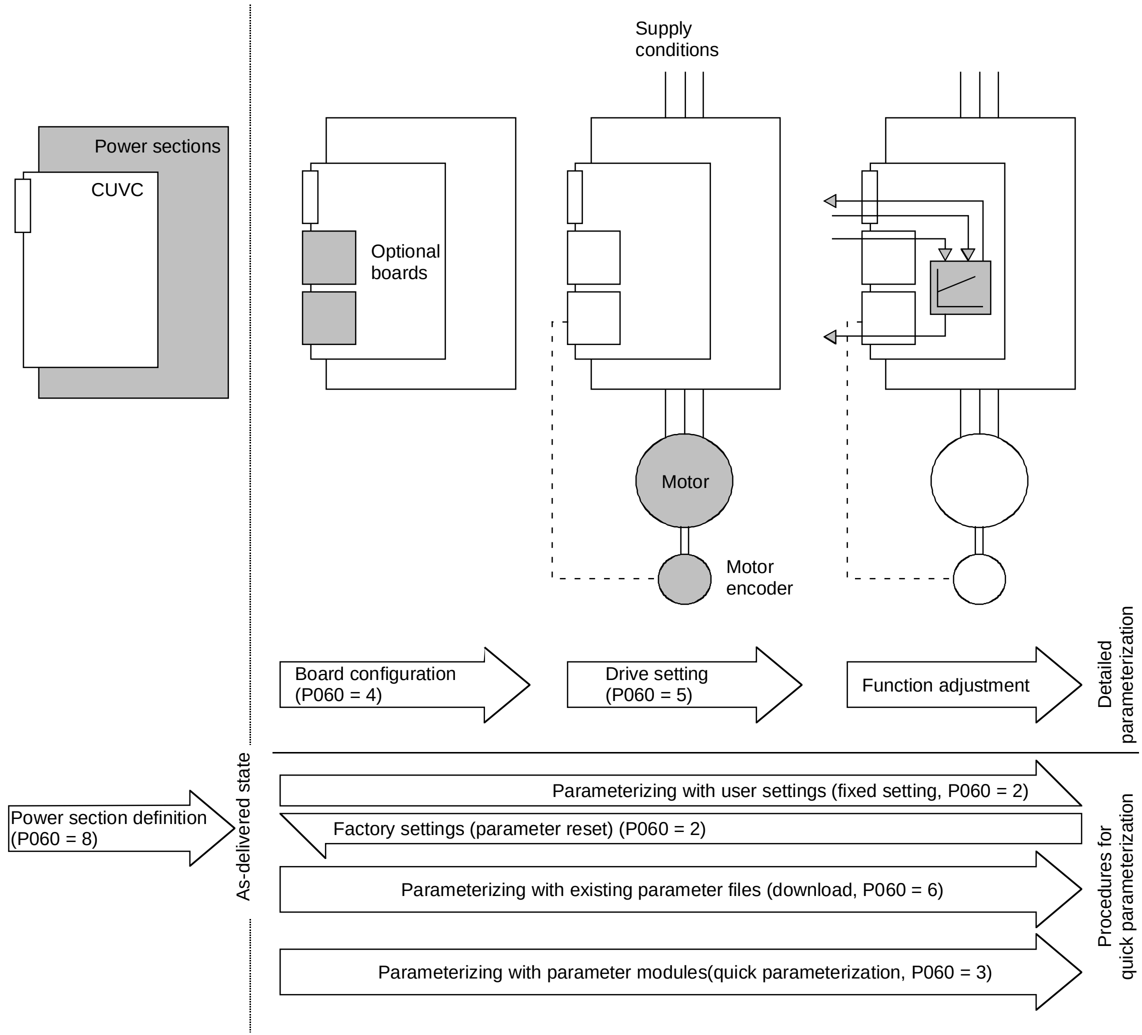


Fig. 6-1 Detailed and quick parameterization

6.1 Parameter reset to factory setting

The factory setting is the defined initial state of all parameters of a unit. The units are delivered with this setting.

You can restore this initial state at any time by resetting the parameters to the factory setting, thus canceling all parameter changes made since the unit was delivered.

The parameters for defining the power section and for releasing the technology options and the operating hours counter and fault memory are not changed by a parameter reset to factory setting.

Parameter number	Parameter name
P050	Language
P070	Order No. 6SE70..
P072	Rtd Drive Amps
P073	Rtd Drive Power
P366	Select FactSet
P947	Fault memory
P949	Fault value

Table 6-1 Parameters which are not changed by the factory setting

If the parameters are reset to the factory setting via one of the parameters (SST1, SST2, SCB, 1.CB/TB, 2.CB/TB), the interface parameters of that interface are not changed either. Communication via that interface therefore continues even after a parameter reset to the factory setting.

Parameter number	Parameter name
P053	Parameterization enable
P700	SST bus address
P701	SST baud rate
P702	SST PKW number
P703	SST PZD number
P704	SST frame failure

Table 6-2 The factory setting is made either via interface SST1 or SST2: Parameters that are not changed by the factory setting either. ***None*** *of the indices of the parameters is changed.*

Parameter number	Parameter name
P053	Parameterization enable
P696	SCB protocol
P700	SST bus address
P701	SST baud rate
P702	SST PKW number
P703	SST PZD number
P704	SST frame failure

Table 6-3 The factory setting is made via interface SCB2: Parameters that are not changed by the factory setting either. ***None*** *of the indices of the parameters is changed.*

Parameter number	Parameter name
P053	Parameterization enable
P711 to P721	CB parameters 1 to 11
P722	CB/TB frame failure
P918	CB bus address

Table 6-4 The factory setting is made either via interface 1.CB/TB or 2.CB/TB: Parameters that are not changed by the factory setting either. ***None*** *of the indices of the parameters is changed.*

NOTE

Parameter factory settings which are dependent on converter or motor parameters are marked with '(~)' in the block diagrams.

P053 = 6

Grant parameter access
6: Parameter changes permitted via PMU and serial interface SCom1 (OP1S [1] and PC)

↓

P060 = 2

Select "Fixed settings" menu

↓

P366 = ?

Select desired factory setting
0: Standard with PMU, setpoint via MOP (BICO1)
1: Standard with OP1S, setpoints via fixed setpoints (BICO1)
2: Cabinet unit with OP1S, setpoint via fixed setpoints (BICO1)
3: Cabinet unit with PMU, setpoint via MOP (BICO1)
4: Cabinet unit with OP1S and NAMUR terminal strip (SCI) [1], setpoint via MOP (BICO1)

Note: This parameter was correctly set prior to delivery of the unit and only needs to be changed in exceptional cases.

re 0 to 3: In BICO data set 2 activation/deactivation is carried out via the terminal strip and the setpoint is specified via fixed setpoint (P405).

↓

P970 = 0

Start parameter reset
0: Parameter reset
1: No parameter change

Unit carries out parameter reset and then leaves the "Fixed settings" menu

Fig. 6-2 Sequence for parameter reset to factory setting

1) only applicable for Compat/chassis unit

Factory settings dependent on P366

Parameters dependent on	Designation of the parameter on the OP1S	Factory setting with PMU		Factory setting with OP1S		Cabinet unit with OP1S or terminal strip		Cabinet unit with PMU or terminal strip		Cabinet unit with NAMUR terminal strip (SCI) [1]	
P366	(Src = Source)	P366 = 0		P366 = 1		P366 = 2		P366 = 3		P366 = 4	
		BICO1 (i001)	BICO2 (i002)	BICO1 (i001)	BICO2 (i002)	BICO1 (i001)	BICO2 (i002)	BICO1 (i001)	BICO2 (i002)	BICO1 (i001)	BICO2 (i002)
P443	Src MainSetpoint	KK058	KK040	KK040	KK040	KK040	KK040	KK058	KK040	KK058	K4102
P554	Src ON/OFF1	B0005 [1] B0022 [2]	B0022	B2100 [1] B6100 [2]	B0022	B2100 [1] B6100 [2]	B0022	B0005 [1] B0022 [2]	B0022	B2100	B4100
P555	Src1 OFF2	B0001	B0020	B0001	B0020	B0001	B0001	B0001	B0001	B0001	B0001
P556	Src2 OFF2	B0001	B0001	B0001	B0001	B0001	B0001	B0001	B0001	B0001	B4108
P565	Src1 Fault Reset	B2107	B2107	B2107 [1] B6107 [2]	B2107 [1] B6107 [2]	B2107 [1] B6107 [2]	B2107 [1] B6107 [2]	B2107	B2107	B2107	B2107
P566	Src2 Fault Reset	B0000	B0000	B0000	B0000	B0000	B0000	B0000	B0000	B4107	B4107
P567	Src3 Fault Reset	B0000	B0018	B0000	B0018	B0000	B0010	B0000	B0010	B0000	B0000
P568	Src Jog Bit0	B0000	B0000	B2108 [1] B6108 [2]	B0000	B2108 [1] B6108 [2]	B0000	B0000	B0000	B0000	B0000
P571	Src FWD Speed	B0001	B0001	B2111 [1] B6111 [2]	B0001	B2111 [1] B6111 [2]	B0001	B0001	B0001	B2111	B4129
P572	Src REV Speed	B0001	B0001	B2112 [1] B6112 [2]	B0001	B2112 [1] B6112 [2]	B0001	B0001	B0001	B2112	B4109
P573	Src MOP UP	B0008	B0000	B0000	B0000	B0000	B0000	B0008	B0000	B2113	B4105
P574	Src MOP Down	B0009	B0000	B0000	B0000	B0000	B0000	B0009	B0000	B2114	B4106
P575	Src No ExtFault1	B0001	B0001	B0001	B0001	B0018	B0018	B0018	B0018	B0018	B0018
P588	Src No Ext Warn1	B0001	B0001	B0001	B0001	B0020	B0020	B0020	B0020	B0020	B0020
P590	Src BICO DSet	B0014	B0014	B0014	B0014	B0012	B0012	B0012	B0012	B4102	B4102
P651	Src DigOut1	B0107	B0107	B0107	B0107	B0000	B0000	B0000	B0000	B0107	B0107
P652	Src DigOut2	B0104	B0104	B0104	B0104	B0000	B0000	B0000	B0000	B0104	B0104
P653	Src DigOut3	B0000	B0000	B0000	B0000	B0107	B0107	B0107	B0107	B0000	B0000
P693.1	SCI AnaOutActV 1	K0000	K0000	K0000	K0000	K0000	K0000	K0000	K0000	KK020	KK020
P693.2	SCI AnaOutActV 2	K0000	K0000	K0000	K0000	K0000	K0000	K0000	K0000	K0022	K0022
P693.3	SCI AnaOutActV 3	K0000	K0000	K0000	K0000	K0000	K0000	K0000	K0000	K0024	K0024
P698.1	Src SCI DigOut 1	B0000	B0000	B0000	B0000	B0000	B0000	B0000	B0000	B0100	B0100
P698.2	Src SCI DigOut 2	B0000	B0000	B0000	B0000	B0000	B0000	B0000	B0000	B0120	B0120
P698.3	Src SCI DigOut 3	B0000	B0000	B0000	B0000	B0000	B0000	B0000	B0000	B0108	B0108
P698.4	Src SCI DigOut 4	B0000	B0000	B0000	B0000	B0000	B0000	B0000	B0000	B0107	B0107
P704.3	SCom TlgOFF SCB	0 ms	0 ms	0 ms	0 ms	0 ms	0 ms	0 ms	0 ms	100 ms	100 ms
P796	Compare Value	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	2.0	2.0
P797	Compare Hyst	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	1.0	1.0
P049.4	OP OperDisp	r229	r229	P405	P405	P405	P405	r229	r229	r229	r229

Table 6-5 Factory setting dependent on P366

1) only applicable for Compact/chassis unit
2) only applicable for Compact PLUS

All other factory setting values are not dependent on P366 and can be taken from the parameter list or from the block diagrams (in the Compendium).

The factory settings for Index 1 (i001) of the respective parameter are displayed in the parameter list.

Significance of the binectors and connectors for factory setting:

Entry	Description	See function diagram (in Compendium)
B0000	Fixed binector 0	-15.4-
B0001	Fixed binector 1	-15.4-
B0005 1)	PMU ON/OFF	-50.7-
B0008	PMU MOP UP	-50.7-
B0009	PMU MOP DOWN	-50.7-
B0010	DigIn1	-90.4-
B0012	DigIn2	-90.4-
B0014	DigIn3	-90.4-
B0016	DigIn4	-90.4-
B0018	DigIn5	-90.4-
B0020	DigIn6	-90.4-
B0022	DigIn7	-90.4-
B0100	Rdy for ON	-200.5-
B0104	Operation	-200.5-
B0107	No fault	-200.6-
B0108	No OFF2	-200.5-
B0120	CompV OK	-200.5-
B2100	SCom1 Word1 Bit0	-100.8-
...		
B2115	SCom1 Word1 Bit15	-100.8-
B4100 1)	SCI1 Sl1 DigIn	-Z10.7- / -Z30.4-
...		
B4115 1)	SCI1 Sl1 DigIn	-Z30.8-
B6100	SCom2 Word1 Bit0	-101.8-
...		
B6115	SCom2 Word1 Bit15	-101.8-
r229	n/f(set,smooth)	-360.4- / -361.4- / -362.4- / -363.4- / -364.4-

1) only applicable for Compact/Chassis unitt

Entry	Description	See function diagram (in Compendium)
P405	Fixed setpoint 5	-290.3-
KK0020	Speed (smoothed)	-350.8- / -351.8- / -352.8-
K0022	Output Amps (smoothed)	-285.8- / -286.8-
K0024	Torque (smoothed)	-285.8-
KK0040	Current FixSetp	-290.6-
KK0058	MOP (Output)	-300.8-

Bxxxx =	Binector =	freely assignable digital signal (values 0 and 1)
Kxxxx =	Connector =	freely assignable 16-bit signal (4000h = 100 %)
KKxxxx =	Double connector =	freely assignable 32-bit signal (4000 0000h = 100 %)

Use of binectors for **digital inputs** in factory settings:

When B0010 to B0017 (DigIn1 to 4) are used, the corresponding digital outputs cannot be used!

P366	**0**	**0**	**1**	**1**	**2**	**2**	**3**	**3**	**4**	**4**
BICO data set	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**
B0010						P567		P567		
B0012					P590	P590	P590	P590		
B0014	P590	P590	P590	P590						
B0016		P580		P580		P580		P580		P580
B0018		P567		P567	P575	P575	P575	P575	P575	P575
B0020		P555		P555	P588	P588	P588	P588	P588	P588
B0022		P554		P554		P554		P554		

Meaning of the parameters in the factory setting:

Entry	Description	See function diagram (in Compendium)
P554	Src ON/OFF1	-180-
P555	Src1 OFF2(electr)	-180-
P567	Src3 Fault Reset	-180-
P575	Src No ExtFault1	-180-
P580	Src FixSetp Bit0	-190-
P588	Src No Ext Warn 1	-190-
P590	Src BICO DSet	-190-

6.2 Quick parameterization procedures

The following quick procedures are always used in cases where the application conditions of the units are exactly known and no tests and related extensive parameter corrections are required. Typical examples of applications for quick parameterization are when units are installed in standard machines or when a unit needs replacing.

6.2.1 Quick parameterization, P060 = 3 (Parameterizing with parameter modules)

Pre-defined, function-assigned parameter modules are stored in the units. These parameter modules can be combined with each other, thus making it possible to adjust your unit to the desired application by just a few parameter steps. Detailed knowledge of the complete parameter set of the unit is not required.

Parameter modules are available for the following function groups:

1. Motors (input of the rating plate data with automatic parameterization of open-loop and closed-loop control)
2. Open-loop and closed-loop control types
3. Setpoint and command sources

Parameterization is effected by selecting a parameter module from each function group and then starting quick parameterization. In accordance with your selection, the necessary unit parameters are set to produce the desired control functionality. The motor parameters and the relevant controller settings are calculated using automatic parameterization (P115 = 1).

NOTE

Parameterizing with parameter modules is carried out only in BICO data set 1 and in function and motor data set 1.

Quick parameterization is effected in the "Download" converter status. Since quick parameterization includes the factory settings for all parameters, all previous parameter settings are lost.

Quick parameterization incorporates an abridged drive setting, (e.g. pulse encoder always with pulse number/revolution 1024). The complete procedure is given in the "Drive setting" section.

Function diagram modules

Function diagram modules (function diagrams) are shown after the flow chart for parameter modules stored in the unit software. On the first few pages are the :

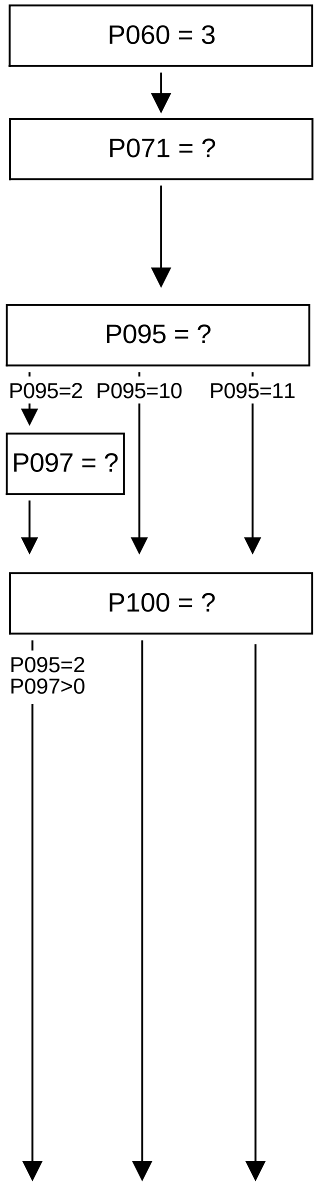
- setpoint and command sources (sheets s0 to s83), on the following pages are the
- analog outputs and the display parameters (sheet a0) and the
- open-loop and closed-loop control types (sheets r0 to r5).

It is therefore possible to put together the function diagrams to exactly suit the selected combination of setpoint/command source and open/closed-loop control type. This will give you an overview of the functionality parameterized in the units and of the necessary assignment of the terminals.

The function parameters and visualization parameters specified in the function diagrams are automatically adopted in the user menu (P060 = 0) and can be visualized or changed there.

The parameter numbers of the user menu are entered in P360.

Reference is made in the function diagrams to the respective function diagram numbers (Sheet [xxx]) of the detail diagrams (in the Compendium).



Menu selection "Quick parameterization"

Input unit line voltage in V
AC units: r.m.s. alternating voltage
DC units: DC link voltage
The input is important, e.g. for voltage limitation control (Vdmax control, P515 = 1)

Enter the motor type
- 2: Compact-async. motor 1PH7 (=1PA6)/1PL6/1PH4
- 10: Async./sync. IEC (international standard)
- 11: Async./sync. NEMA (US standard)

Enter the code number for the connected motor of type 1PH7(=1PA6)/1PL6/1PH4
(Automatic parameterization is carried out if you enter P095 = 2 and P097 > 0)

Enter the open/closed-loop control type (sheet r0 to r5)
- 0: v/f open-loop control + n-controller with pulse encoder (P130 = 11)
- 1: v/f open-loop control
- 2: v/f open-loop control, textile
- 3: Vector control without tachometer (f-control)
- 4: Vector control with tachometer (n-speed) with pulse encoder (P130 = 11)
- 5: Torque control (M control) with pulse controller (P130 = 11)

For v/f control (0..2) a linear curve is set in P330 (P330 = 1: parabolic).
The pulse encoder has a pulse number of P151 = 1024 per revolution.
The following inputs of motor data are necessary if the motor deviates from the converter data, if one of the vector control types (P100 = 3, 4, 5) has been selected or if speed feedback is used (P100 = 0). In the case of motor outputs higher than approx. 200 kW one of the vector control types should be used.

P101 = ? — **Enter the rated motor voltage in V** ①
as per rating plate

P102 = ? — **Enter the rated motor current in A** ②
as per rating plate
(group drives: total of all motor currents)

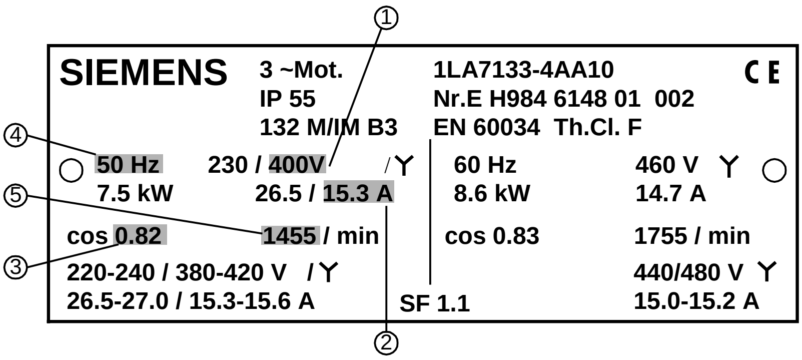
P104=? / **P105=?** — **IEC motor: Cos (phi)** as per rating plate ③
NEMA motor: nominal rating [Hp]
(group drives: total of all ratings)

P106=? — **NEMA motor: Enter the motor efficiency in %**
as per rating plate

P107 = ? — **Enter the rated motor frequency in Hz** ④
as per rating plate

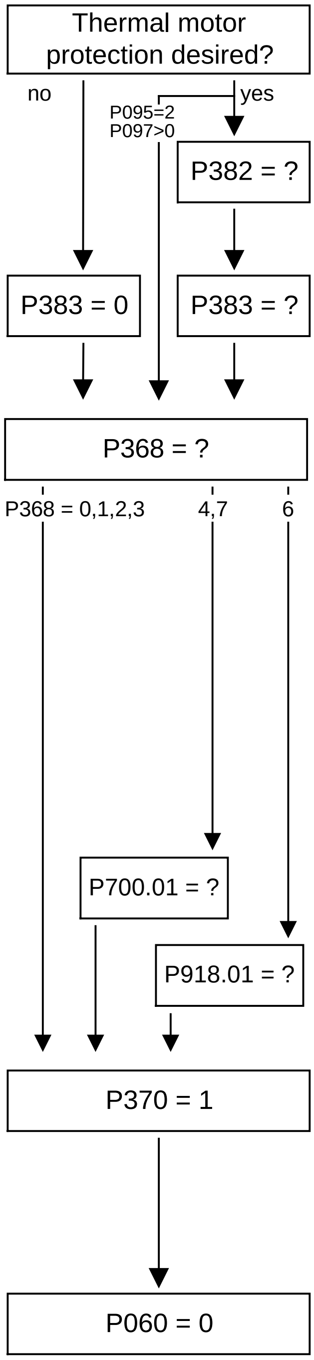
P108 = ? — **Enter the rated motor speed in rpm** ⑤
as per rating plate

P109 = ? — **Enter the motor pole pair number**
(is automatically calculated)



P114 = ? (P100=1,2)

WARNING!
INCORRECT SETTINGS CAN BE DANGEROUS!
For vector control only:
Process-related boundary conditions for control
0: Standard drives (default)
1: Torsion, gear play
2: Acceleration drives
3: Load surge
4: Smooth running characteristics
5: Efficiency optimization
6: Heavy-duty starting
7: Dynamic torque response in field-weakening range
See "Drive setting" section for description



System with motor protection according to UL regulation?
The motor temperature is calculated via the motor current.
(In the pre-setting, motor overload protection in accordance with UL regulation is activated!)

Specify motor cooling

0: self-ventilated
1: forced-ventilated
(automatically pre-set for P095 = 2, P097 > 0)

Enter the thermal time constant of the motor in s
The values can be taken from the table on the next page (automatically pre-set for P095 = 2, P097 > 0).
The motor load limit (P384.2) is pre-assigned to 100 %.

Select setpoint and command source
(sheet s0...s4, s6 - s83)

0: PMU + MOP 1) (Operation via the operator panel, see next page for description)
1: Analog and digital inputs on the terminal strip
2: Fixed setpoints and digital inputs on the terminal strip
3: MOP and digital inputs on the terminal strip
4: USS1 (e.g. with SIMATIC)
5: not used
6: PROFIBUS (CBP)
7: OP1S and fixed setpoints via SCom1 (X300: PMU) 1) / SCom2 (X103: PMU) 2)
8: OP1S and MOP via SCom1 (X300: PMU) 1) / SCom2 (X103: PMU) 2)

Enter the USS bus address

Enter the PROFIBUS address

Start of quick parameterization

0: No parameter change
1: Parameter change in acordance with selected combination of parameter modules
(automatic factory setting according to P366)
(followed by automatic parameterization as for P115 = 1)

Return to the user menu
End of quick parameterization

1) only applicable for Compact/Chassis unit
2) only applicable for Compact PLUS

P368 setpoint source

Settings PMU and motor-operated potentiometer (P368 = 0)

With this setting, it is possible to move the drive via the PMU:

ON / OFF	=	[I] / [O]	
Faster / slower	=	Arrow up / down	[△] [▽]
CCW / CW	=	Arrow left / right	

With the "[I] key" the motor is switched on and runs up to the minimum speed set in P457.

After that, you can increase the speed with the "[△]" key.

You can use the "[▽]" key to lower the speed.

The selection of setpoint sources (P368) may be restricted by the type of factory setting (P366).

Factory setting P366	**Setpoint source P368**
0 = PMU	0 ... 8 = All sources possible
1 = OP1S	7 = OP1S
2 = Cabinet unit OP1S	7 = OP1S
3 = Cabinet unit PMU	0 = PMU
4 = OP1S and SCI [1)]	8 = OP1S

P383 Mot Tmp T1

Thermal time constant of the motor

Setting notes

Activation of the i^2t calculation is made by setting a parameter value >= 100 seconds.

Example: for a 1LA5063 motor, 2-pole design, the value 480 seconds has to be set.

The thermal time constants for Siemens standard motors are given in the following table in seconds:

1) only applicable for Compact/Chassis unit

1LA-/1LL motors

Type	2-pole	4-pole	6-pole	8-pole	10-pole	12-pole
1LA5063	480	780	-	-	-	-
1LA5070	480	600	720	-	-	-
1LA5073	480	600	720	-	-	-
1LA5080	480	600	720	-	-	-
1LA5083	600	600	720	-	-	-
1LA5090	300	540	720	720	-	-
1LA5096	360	660	720	840	-	-
1LA5106	480	720	720	960	-	-
1LA5107	-	720	-	960	-	-
1LA5113	840	660	780	720	-	-
1LA5130	660	600	780	600	-	-
1LA5131	660	600	-	-	-	-
1LA5133	-	600	840	600	-	-
1LA5134	-	-	960	-	-	-
1LA5163	900	1140	1200	720	-	-
1LA5164	900	-	-	-	-	-
1LA5166	900	1140	1200	840	-	-
1LA5183	1500	1800	-	-	-	-
1LA5186	-	1800	2400	2700	-	-
1LA5206	1800	-	2700	-	-	-
1LA5207	1800	2100	2700	3000	-	-
1LA6220	-	2400	-	3300	-	-
1LA6223	2100	2400	3000	3300	-	-
1LA6253	2400	2700	3000	3600	-	-
1LA6280	2400	3000	3300	3900	-	-
1LA6283	2400	3000	3300	3900	-	-
1LA6310	2700	3300	3600	4500	-	-
1LA6313	2700	3300	3600	4500	-	-
1LA6316	2880	3480	3780	4680	-	-
1LA6317	2880	3480	3780	4680	-	-
1LA6318	-	-	3780	4680	-	-
1LA831.	2100	2400	2700	2700	3000	3000
1LA835.	2400	2700	3000	3000	3300	3300
1LA840.	2700	3000	3300	3300	3600	3600
1LA845.	3300	3300	3600	3600	4200	4200
1LL831.	1500	1500	1800	1800	2100	2100
1LL835.	1800	1800	2100	2100	2400	2400
1LL840.	2100	2100	2100	2100	2400	2400
1LL845.	2400	2100	2400	2400	2700	2700

Type	2-pole	4-pole	6-pole	8-pole	10-pole	12-pole
1LA135.	1800	2100	2400	-	-	-
1LA140.	2100	2400	2700	2700	-	-
1LA145.	2400	2700	3000	3000	3300	3300
1LA150.	3000	3000	3300	3300	3900	3900
1LA156.	3600	3300	3600	3600	4200	4200
1LL135.	1200	1200	1500	-	-	-
1LL140.	1500	1500	1800	1800	-	-
1LL145.	1800	1800	1800	1800	2100	2100
1LL150.	2100	1800	2100	2100	2400	2400
1LL156.	2400	2100	2100	2100	2400	2400

1LA7 motors

The data for 1LA5 motors are also applicable for 1LA7 motors with the same designation.

1PH6 motors

Type	1PH610	1PH613	1PH616	1PH618	1PH620	1PH622
T1 in s	1500	1800	2100	2400	2400	2400

Exceptions: 1PH610 at n = 1150 rpm: T1 = 1200 n

1PA6 motors (= 1PH7 motors)

Shaft height	100	132	160	180	225
T1 in s	1500	1800	2100	2400	2400

1PL6 motors

Shaft height	180	225
T1 in s	1800	1800

1PH4 motors

Shaft height	100	132	160
T1 in s	1500	1800	2100

NOTE

If 1PH7, 1PL6, or 1PH4 motors are parameterized in the list selection (P097), both the motor cooling (P382) and the thermal motor time constant (P383) are assigned the correct default values.

Reference quantities

Display of function parameters, monitoring parameters, and connectors are limited to double the reference value.

After fast parameterization, the reference and rated motor values are identical. This enables signal representation (e.g. via connectors) up to twice the rated motor values. If this is not sufficient, you can switch to the menu "Drive setting" (P060 = 5) to adapt the reference values. The following parameters are available for that purpose:

P350	Reference current	in A
P351	Reference voltage	in V
P352	Reference frequency	in Hz
P353	Reference speed	in rpm
P354	Reference torque	in Nm

Dependent reference values

Speed reference frequency and reference speed are always coupled via the number of pole pairs.

$$P353 = P352 \times \frac{60}{P109}$$

If one of the two parameters is altered, the second is converted using this equation.
The reference power (in W) is calculated from the reference torque and reference speed:

$$R_{W,ref} = \frac{P354 \times P353 \times 2 \times \pi}{60}$$

Power values of the closed-loop control are also stated as a percentage and refer to the reference power stated. Conversion to rated motor power is possible using the ratio $P_{W,ref}$ / $P_{mot,rated}$.

$$P_{mot,rated} = \frac{P113 \times 2 \times \pi \times P108}{60}$$

Automatic motor identification

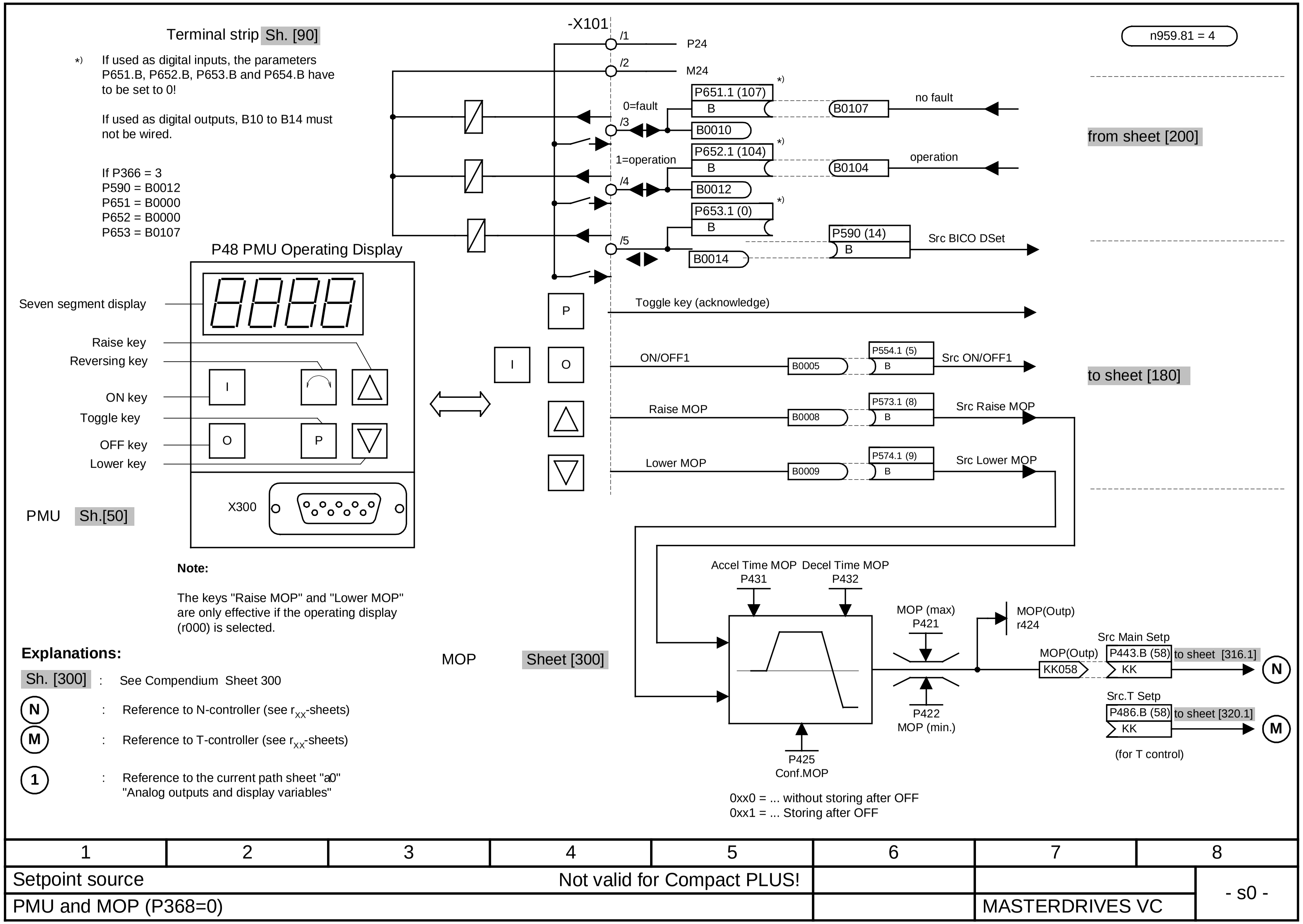
For exact determination of the motor parameters, it is possible to carry out automatic motor identification and speed controller optimization.

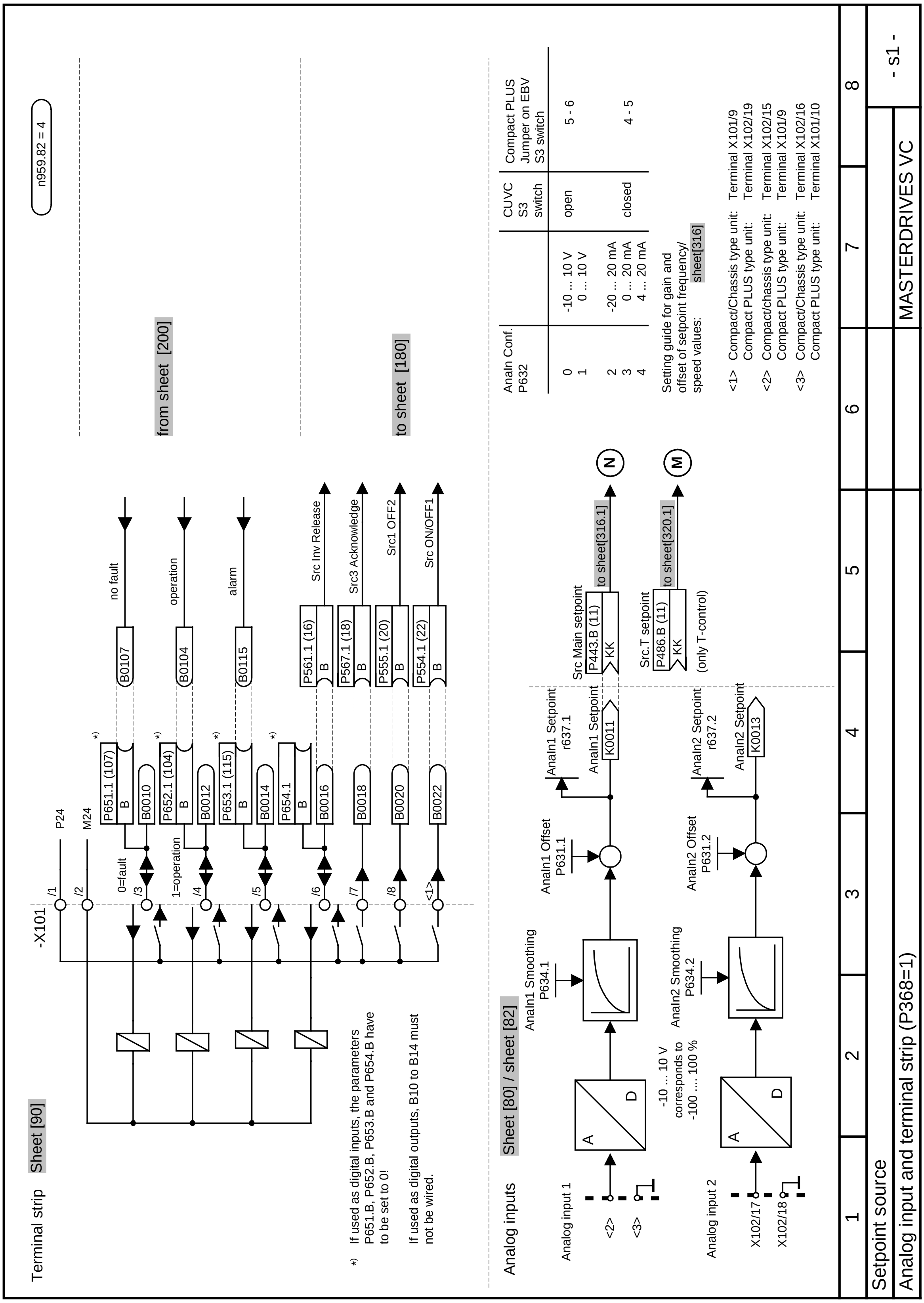
For this purpose, the procedures of the "Drive setting" have to be observed. If one of the vector control types (P100 = 3, 4, 5) of a converter without a sinusoidal output filter and of an induction motor without an encoder or with a pulse encoder (correct number of pulses in P151) is used, the motor identification procedure can be shortened. In this case, "Complete motor identification" has to be selected (P115 = 3) and the converter has to be powered up accordingly if the alarms A078 and A080 appear.

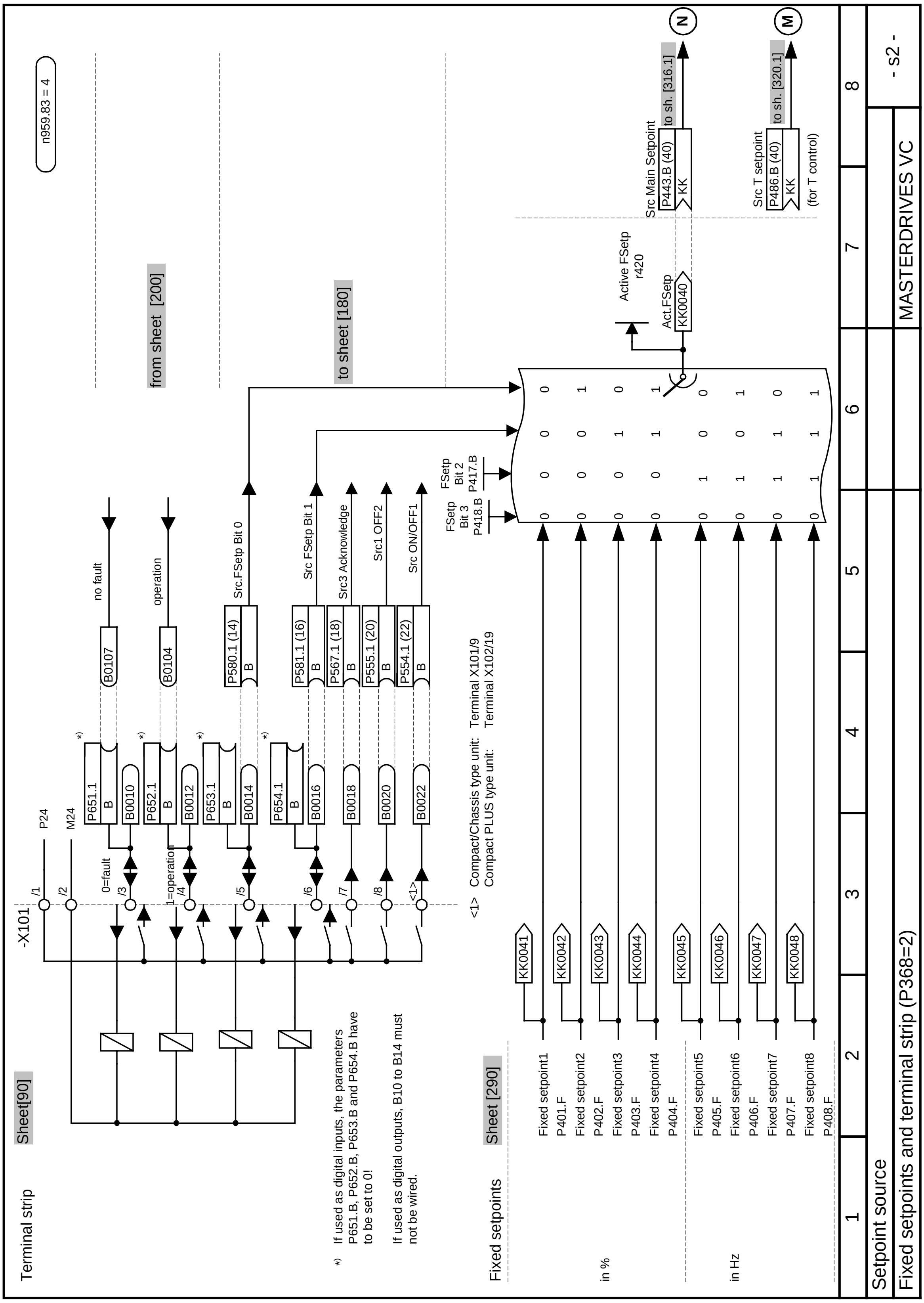
WARNING

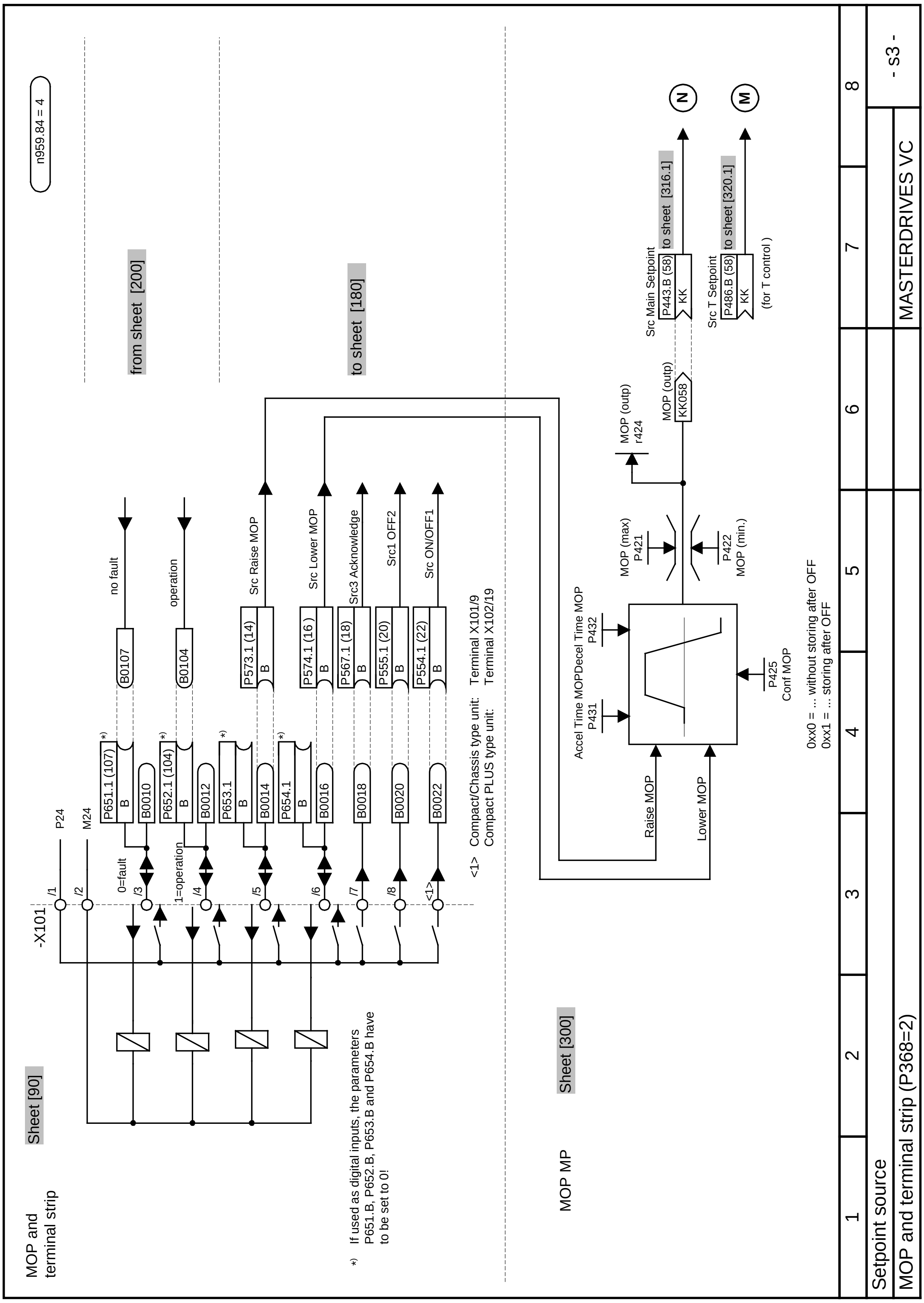
During motor identification inverter pulses are released and the drive rotates!

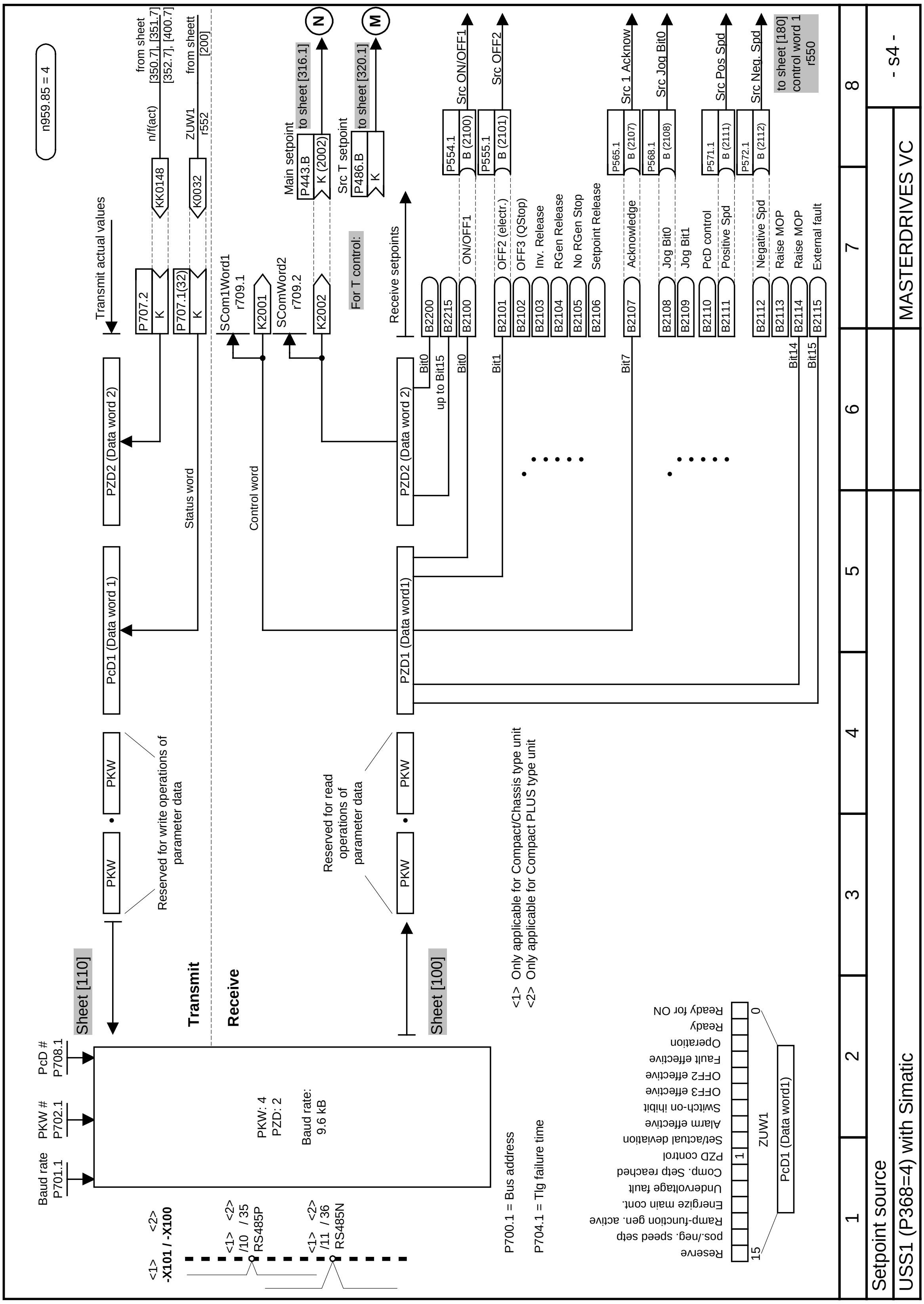
For reasons of safety, identification should first be carried out without coupling of the load.


Terminal strip Sh. [90]
*) If used as digital inputs, the parameters P651.B, P652.B, P653.B and P654.B have to be set to 0!
If used as digital outputs, B10 to B14 must not be wired.
If P366 = 3
P590 = B0012
P651 = B0000
P652 = B0000
P653 = B0107
-X101
/1
P24
/2
M24
0=fault
/3
1=operation
/4
/5
P651.1 (107)
B
B0010
P652.1 (104)
B
B0012
P653.1 (0)
B
B0014
*)
B0107
no fault
B0104
operation
P590 (14)
B
Src BICO DSet
from sheet [200]
n959.81 = 4
P48 PMU Operating Display
Seven segment display
Raise key
Reversing key
ON key
Toggle key
OFF key
Lower key
I
O
P
X300
PMU Sh.[50]
Toggle key (acknowledge)
ON/OFF1
B0005
P554.1 (5)
B
Src ON/OFF1
to sheet [180]
Raise MOP
B0008
P573.1 (8)
B
Src Raise MOP
Lower MOP
B0009
P574.1 (9)
B
Src Lower MOP
Note:
The keys "Raise MOP" and "Lower MOP" are only effective if the operating display (r000) is selected.
Explanations:
Sh. [300] : See Compendium Sheet 300
N : Reference to N-controller (see r$_{xx}$-sheets)
M : Reference to T-controller (see r$_{xx}$-sheets)
1 : Reference to the current path sheet "a0" "Analog outputs and display variables"
MOP
Sheet [300]
Accel Time MOP
P431
Decel Time MOP
P432
MOP (max)
P421
P422
MOP (min.)
P425
Conf.MOP
0xx0 = ... without storing after OFF
0xx1 = ... Storing after OFF
MOP(Outp)
r424
MOP(Outp)
KK058
Src Main Setp
P443.B (58)
KK
to sheet [316.1]
N
Src.T Setp
P486.B (58)
KK
to sheet [320.1]
M
(for T control)
1
2
3
4
5
6
7
8
Setpoint source
Not valid for Compact PLUS!
PMU and MOP (P368=0)
MASTERDRIVES VC
- s0 -

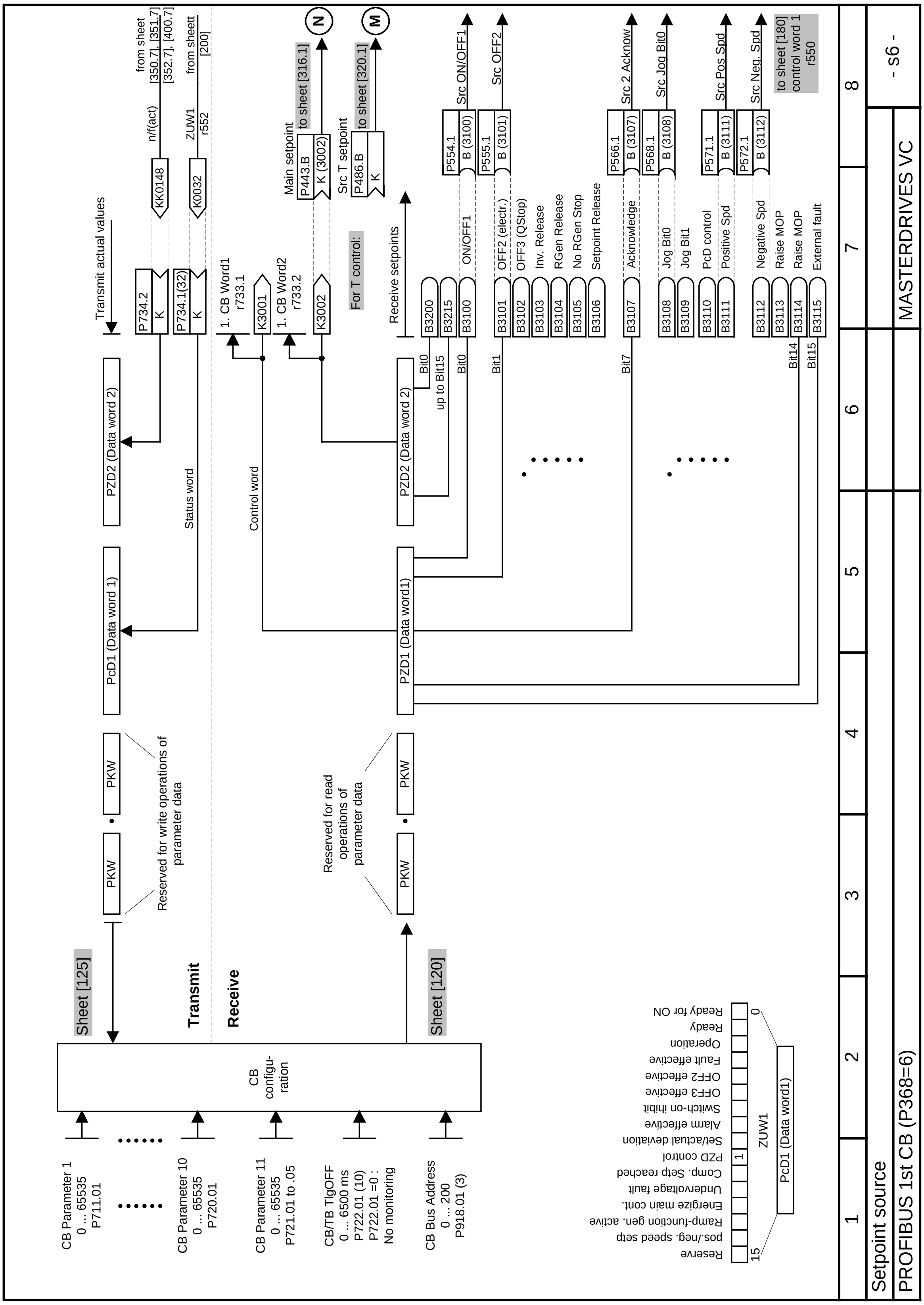

Terminal strip Sheet [90]
-X101
/1 P24
/2 M24
/3 0=fault
/4 1=operation
/5
/6
/7
/8
<1>
P651.1 (107) B
P652.1 (104) B
P653.1 (115) B
P654.1 B
B0010
B0012
B0014
B0016
B0018
B0020
B0022
*)
B0107 no fault
B0104 operation
B0115 alarm
from sheet [200]
P561.1 (16) B Src Inv Release
P567.1 (18) B Src3 Acknowledge
P555.1 (20) B Src1 OFF2
P554.1 (22) B Src ON/OFF1
to sheet [180]
n959.82 = 4
*) If used as digital inputs, the parameters P651.B, P652.B, P653.B and P654.B have to be set to 0!
If used as digital outputs, B10 to B14 must not be wired.
Analog inputs Sheet [80] / sheet [82]
Analog input 1
<2>
<3>
Analog input 2
X102/17
X102/18
A D
-10 ... 10 V corresponds to -100 .... 100 %
AnaIn1 Smoothing P634.1
AnaIn2 Smoothing P634.2
AnaIn1 Offset P631.1
AnaIn2 Offset P631.2
AnaIn1 Setpoint r637.1
AnaIn2 Setpoint r637.2
AnaIn1 Setpoint K0011
AnaIn2 Setpoint K0013
Src Main setpoint P443.B (11) KK to sheet[316.1] N
Src.T setpoint P486.B (11) KK to sheet[320.1] M
(only T-control)
AnaIn Conf. P632
CUVC S3 switch
Compact PLUS Jumper on EBV S3 switch
0 -10 ... 10 V open 5 - 6
1 0 ... 10 V
2 -20 ... 20 mA closed 4 - 5
3 0 ... 20 mA
4 4 ... 20 mA
Setting guide for gain and offset of setpoint frequency/speed values: sheet[316]
<1> Compact/Chassis type unit: Terminal X101/9
Compact PLUS type unit: Terminal X102/19
<2> Compact/chassis type unit: Terminal X102/15
Compact PLUS type unit: Terminal X101/9
<3> Compact/Chassis type unit: Terminal X102/16
Compact PLUS type unit: Terminal X101/10
1 2 3 4 5 6 7 8
Setpoint source
Analog input and terminal strip (P368=1)
MASTERDRIVES VC
- s1 -


Terminal strip
Sheet[90]
-X101
P24
M24
0=fault
1=operation
P651.1
B
B0010
P652.1
B0012
P653.1
B0014
P654.1
B0016
B0018
B0020
B0022
B0107
B0104
no fault
operation
P580.1 (14)
Src.FSetp Bit 0
P581.1 (16)
Src FSetp Bit 1
P567.1 (18)
Src3 Acknowledge
P555.1 (20)
Src1 OFF2
P554.1 (22)
Src ON/OFF1
from sheet [200]
to sheet [180]
n959.83 = 4
*) If used as digital inputs, the parameters P651.B, P652.B, P653.B and P654.B have to be set to 0!
If used as digital outputs, B10 to B14 must not be wired.
<1> Compact/Chassis type unit: Terminal X101/9
Compact PLUS type unit: Terminal X102/19
Fixed setpoints
Sheet [290]
in %
in Hz
Fixed setpoint1 P401.F
Fixed setpoint2 P402.F
Fixed setpoint3 P403.F
Fixed setpoint4 P404.F
Fixed setpoint5 P405.F
Fixed setpoint6 P406.F
Fixed setpoint7 P407.F
Fixed setpoint8 P408.F
KK0041
KK0042
KK0043
KK0044
KK0045
KK0046
KK0047
KK0048
FSetp Bit 3 P418.B
FSetp Bit 2 P417.B
Active FSetp r420
Act.FSetp KK0040
Src Main Setpoint P443.B (40)
to sh. [316.1]
Src T setpoint P486.B (40)
to sh. [320.1]
(for T control)
Setpoint source
Fixed setpoints and terminal strip (P368=2)
MASTERDRIVES VC
- s2 -

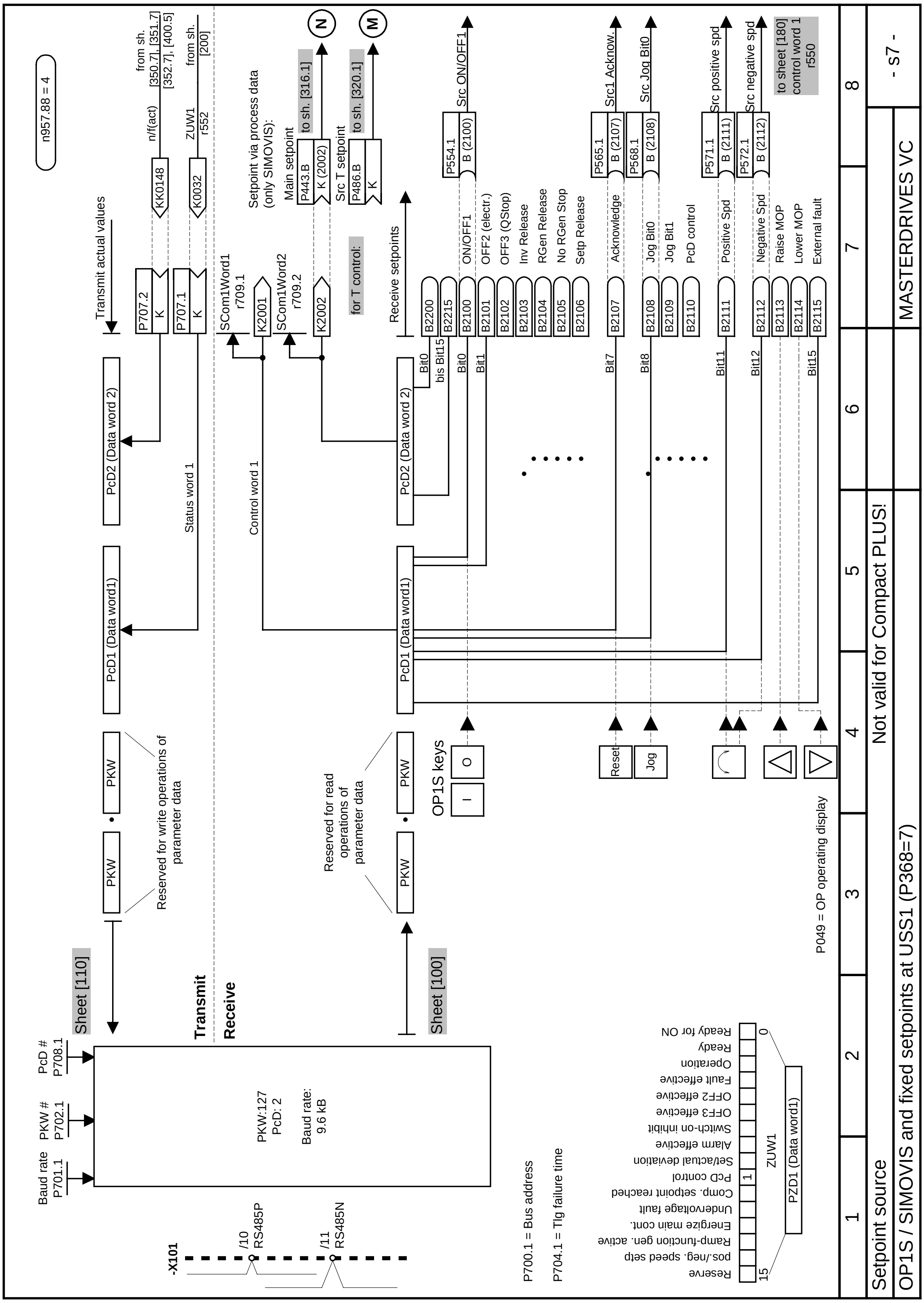

MOP and terminal strip
Sheet [90]
from sheet [200]
to sheet [180]
n959.84 = 4
-X101
P24
M24
/1
/2
/3
/4
/5
/6
/7
/8
0=fault
1=operation
<1>
P651.1 (107)
P652.1 (104)
P653.1
P654.1
B0010
B0012
B0014
B0016
B0018
B0020
B0022
B0107
B0104
no fault
operation
P573.1 (14)
P574.1 (16)
P567.1 (18)
P555.1 (20)
P554.1 (22)
Src Raise MOP
Src Lower MOP
Src3 Acknowledge
Src1 OFF2
Src ON/OFF1
*) If used as digital inputs, the parameters P651.B, P652.B, P653.B and P654.B have to be set to 0!
<1> Compact/Chassis type unit: Terminal X101/9
Compact PLUS type unit: Terminal X102/19
MOP MP
Sheet [300]
Raise MOP
Lower MOP
Accel Time MOP P431
Decel Time MOP P432
P425 Conf MOP
0xx0 = ... without storing after OFF
0xx1 = ... storing after OFF
MOP (max) P421
P422 MOP (min.)
MOP (outp) r424
MOP (outp) KK058
Src Main Setpoint P443.B (58)
to sheet [316.1]
Src T Setpoint P486.B (58)
to sheet [320.1]
(for T control)
N
M
1
2
3
4
5
6
7
8
Setpoint source
MOP and terminal strip (P368=2)
MASTERDRIVES VC
- s3 -



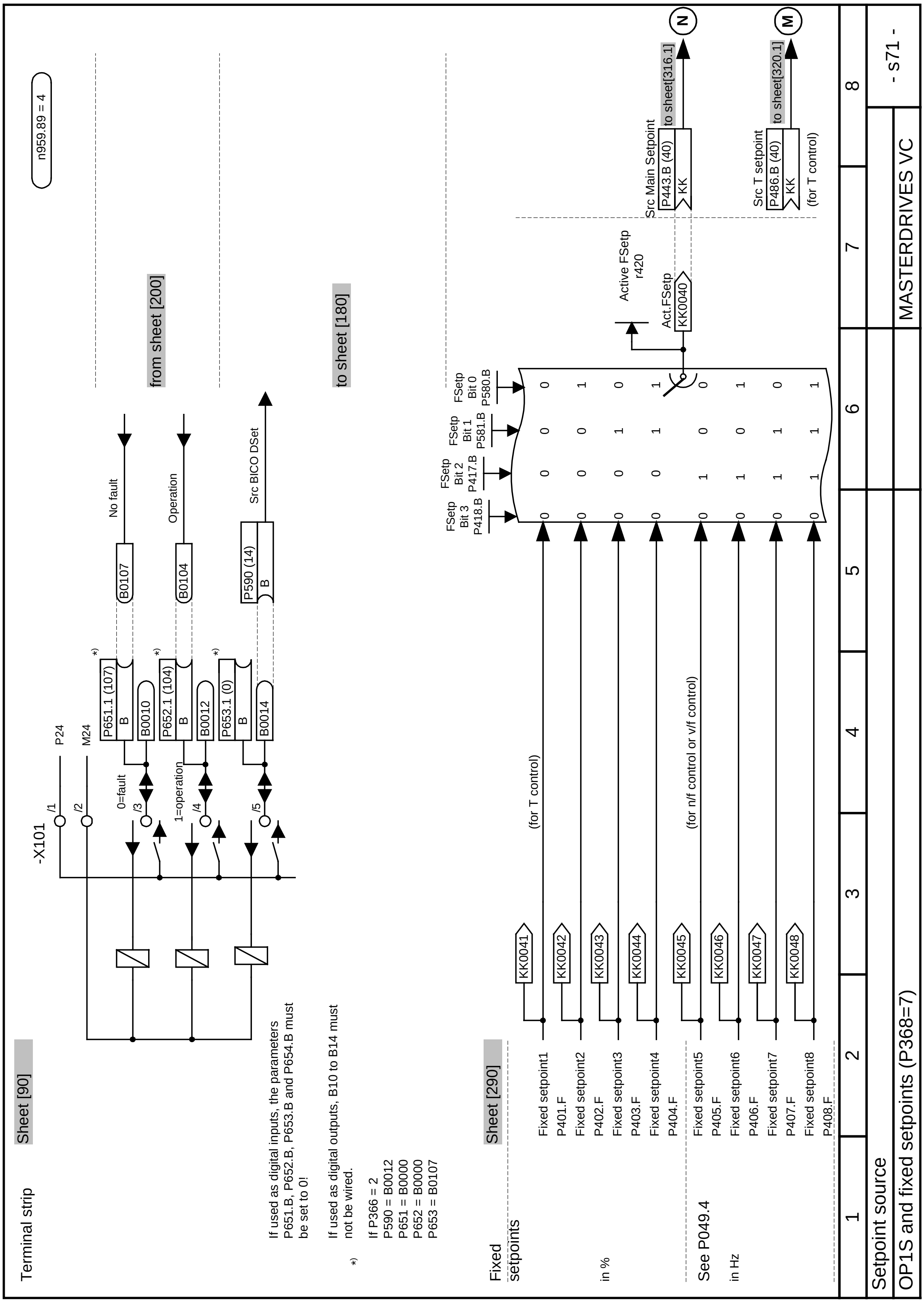
n959.85 = 4
Baud rate P701.1
PKW # P702.1
PcD # P708.1
PKW: 4
PZD: 2
Baud rate: 9.6 kB
Sheet [110]
Sheet [100]
Transmit
Receive
<1> -X101 / -X100 <2>
<1> /10 <2> / 35 RS485P
<1> /11 <2> / 36 RS485N
PKW
Reserved for write operations of parameter data
Reserved for read operations of parameter data
PcD1 (Data word 1)
PZD2 (Data word 2)
PZD1 (Data word1)
Transmit actual values
Receive setpoints
Status word
Control word
P707.2 K
P707.1(32) K
KK0148 n/f(act)
K0032 ZUW1 r552
from sheet [350.7], [351.7] [352.7], [400.7]
from sheett [200]
SCom1Word1 r709.1 K2001
SComWord2 r709.2 K2002
Main setpoint P443.B K (2002) to sheet [316.1]
Src T setpoint P486.B K to sheet [320.1]
For T control:
Bit0 up to Bit15
B2200 B2215
B2100 ON/OFF1 P554.1 B (2100) Src ON/OFF1
B2101 OFF2 (electr.) P555.1 B (2101) Src OFF2
B2102 OFF3 (QStop)
B2103 Inv. Release
B2104 RGen Release
B2105 No RGen Stop
B2106 Setpoint Release
B2107 Acknowledge P565.1 B (2107) Src 1 Acknow
B2108 Jog Bit0 P568.1 B (2108) Src Jog Bit0
B2109 Jog Bit1
B2110 PcD control
B2111 Positive Spd P571.1 B (2111) Src Pos Spd
B2112 Negative Spd P572.1 B (2112) Src Neg. Spd
B2113 Raise MOP
B2114 Raise MOP
B2115 External fault
Bit0 Bit1 Bit7 Bit14 Bit15
to sheet [180] control word 1 r550
<1> Only applicable for Compact/Chassis type unit
<2> Only applicable for Compact PLUS type unit
P700.1 = Bus address
P704.1 = Tlg failure time
ZUW1 PcD1 (Data word1)
Ready for ON
Ready
Operation
Fault effective
OFF2 effective
OFF3 effective
Switch-on inhibit
Alarm effective
Set/actual deviation
PZD control
Comp. Setp reached
Undervoltage fault
Energize main cont.
Ramp-function gen. active
pos./neg. speed setp
Reserve
1 2 3 4 5 6 7 8
Setpoint source
USS1 (P368=4) with Simatic
MASTERDRIVES VC
- s4 -

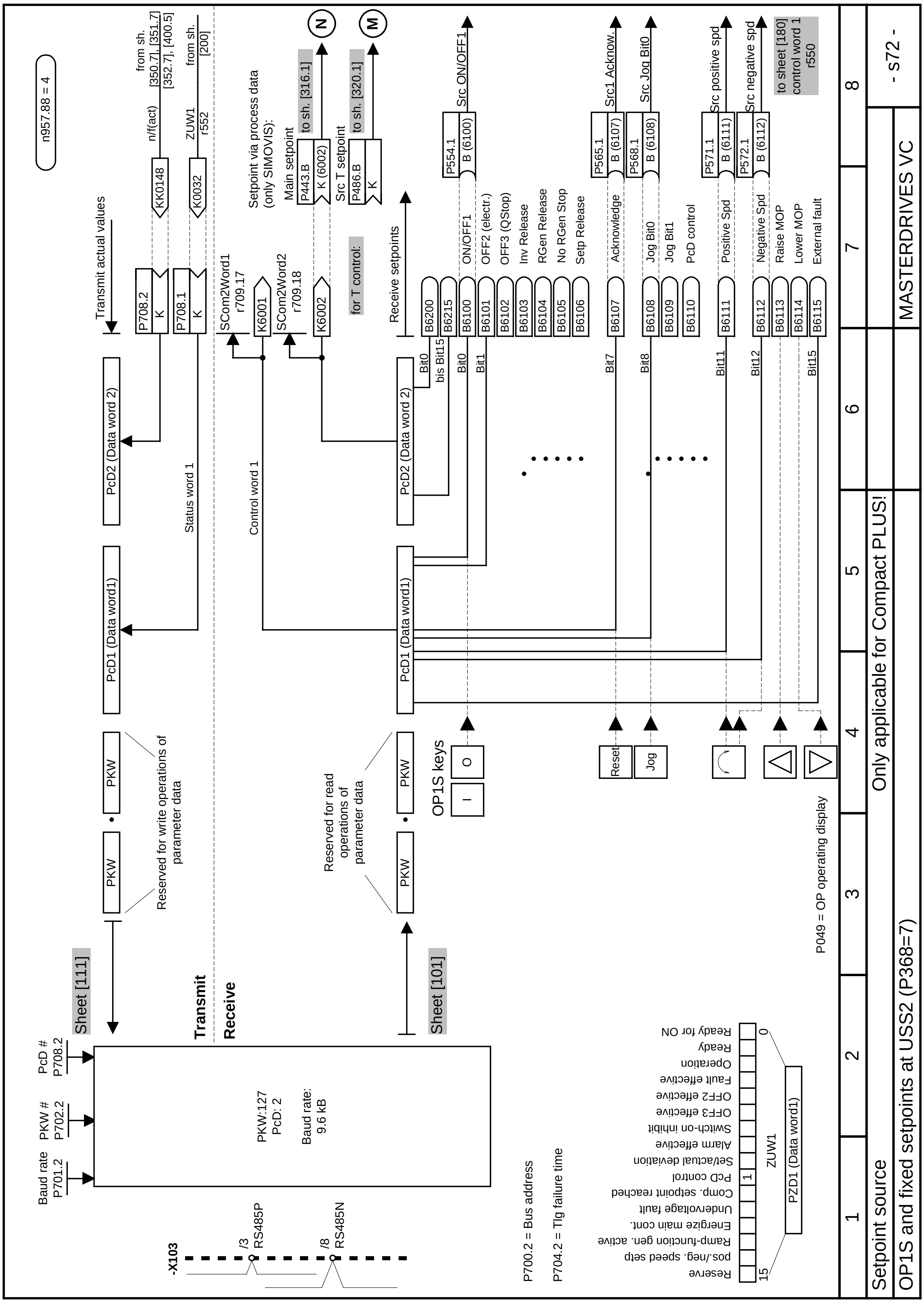


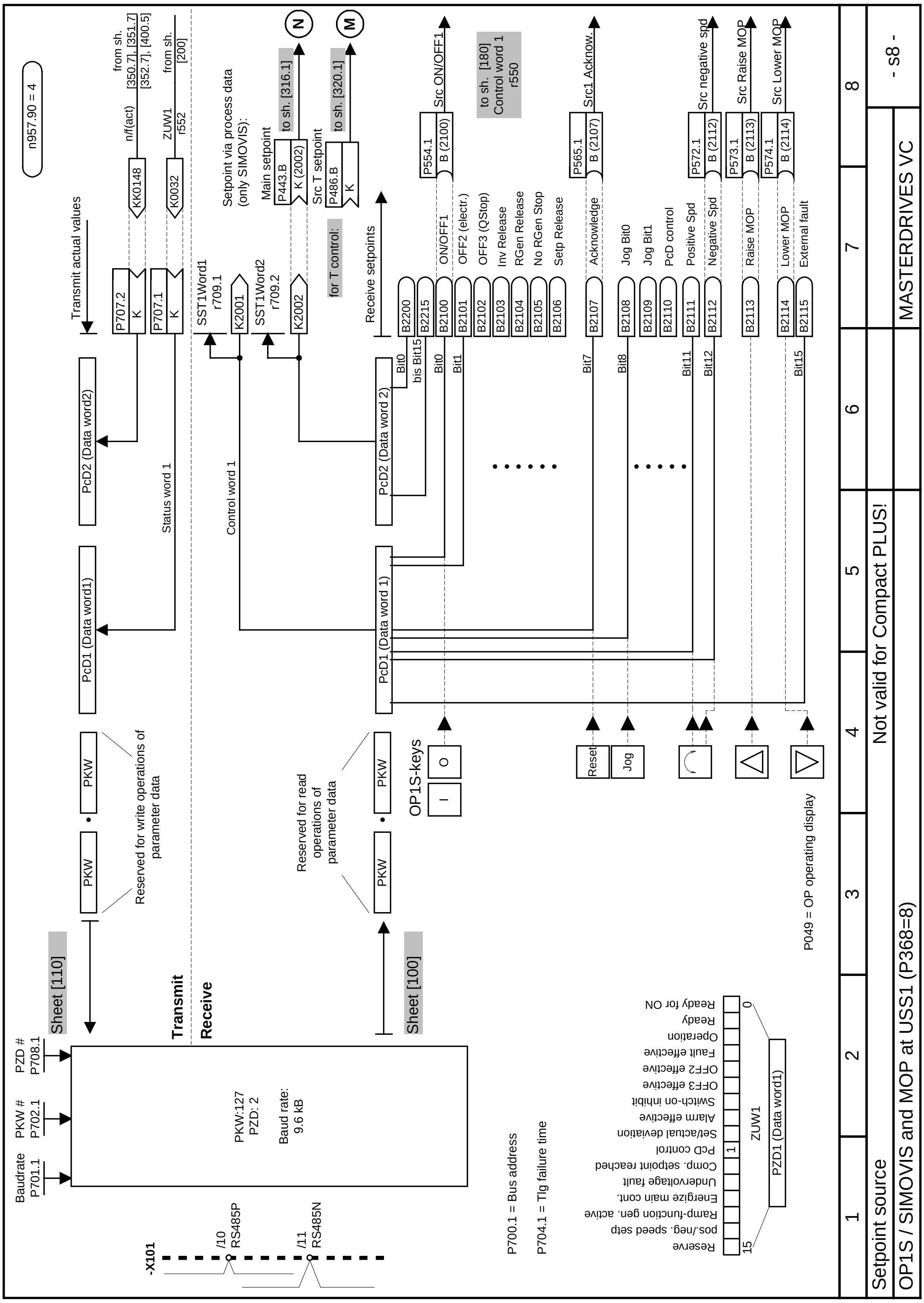
CB Parameter 1
0 ... 65535
P711.01
CB Parameter 10
0 ... 65535
P720.01
CB Parameter 11
0 ... 65535
P721.01 to .05
CB/TB TlgOFF
0 ... 6500 ms
P722.01 (10)
P722.01 =0 :
No monitoring
CB Bus Address
0 ... 200
P918.01 (3)
CB configu-ration
Sheet [125]
Sheet [120]
Transmit
Receive
PKW
Reserved for write operations of parameter data
Reserved for read operations of parameter data
PcD1 (Data word 1)
PZD2 (Data word 2)
PZD1 (Data word1)
Status word
Control word
Transmit actual values
P734.2
P734.1(32)
KK0148
K0032
n/f(act)
ZUW1
r552
from sheet [350.7], [351.7] [352.7], [400.7]
from sheett [200]
1. CB Word1
r733.1
K3001
1. CB Word2
r733.2
K3002
Main setpoint
P443.B
K (3002)
to sheet [316.1]
Src T setpoint
P486.B
to sheet [320.1]
For T control:
Receive setpoints
N
M
Bit0
up to Bit15
Bit1
Bit7
Bit14
Bit15
B3200
B3215
B3100 ON/OFF1
B3101 OFF2 (electr.)
B3102 OFF3 (QStop)
B3103 Inv. Release
B3104 RGen Release
B3105 No RGen Stop
B3106 Setpoint Release
B3107 Acknowledge
B3108 Jog Bit0
B3109 Jog Bit1
B3110 PcD control
B3111 Positive Spd
B3112 Negative Spd
B3113 Raise MOP
B3114 Raise MOP
B3115 External fault
P554.1 B (3100) Src ON/OFF1
P555.1 B (3101) Src OFF2
P566.1 B (3107) Src 2 Acknow
P568.1 B (3108) Src Jog Bit0
P571.1 B (3111) Src Pos Spd
P572.1 B (3112) Src Neg. Spd
to sheet [180]
control word 1
r550
ZUW1
PcD1 (Data word1)
0
1
15
Ready for ON
Ready
Operation
Fault effective
OFF2 effective
OFF3 effective
Switch-on inhibit
Alarm effective
Set/actual deviation
PZD control
Comp. Setp reached
Undervoltage fault
Energize main cont.
Ramp-function gen. active
pos./neg. speed setp
Reserve
1 2 3 4 5 6 7 8
Setpoint source
PROFIBUS 1st CB (P368=6)
MASTERDRIVES VC
- s6 -



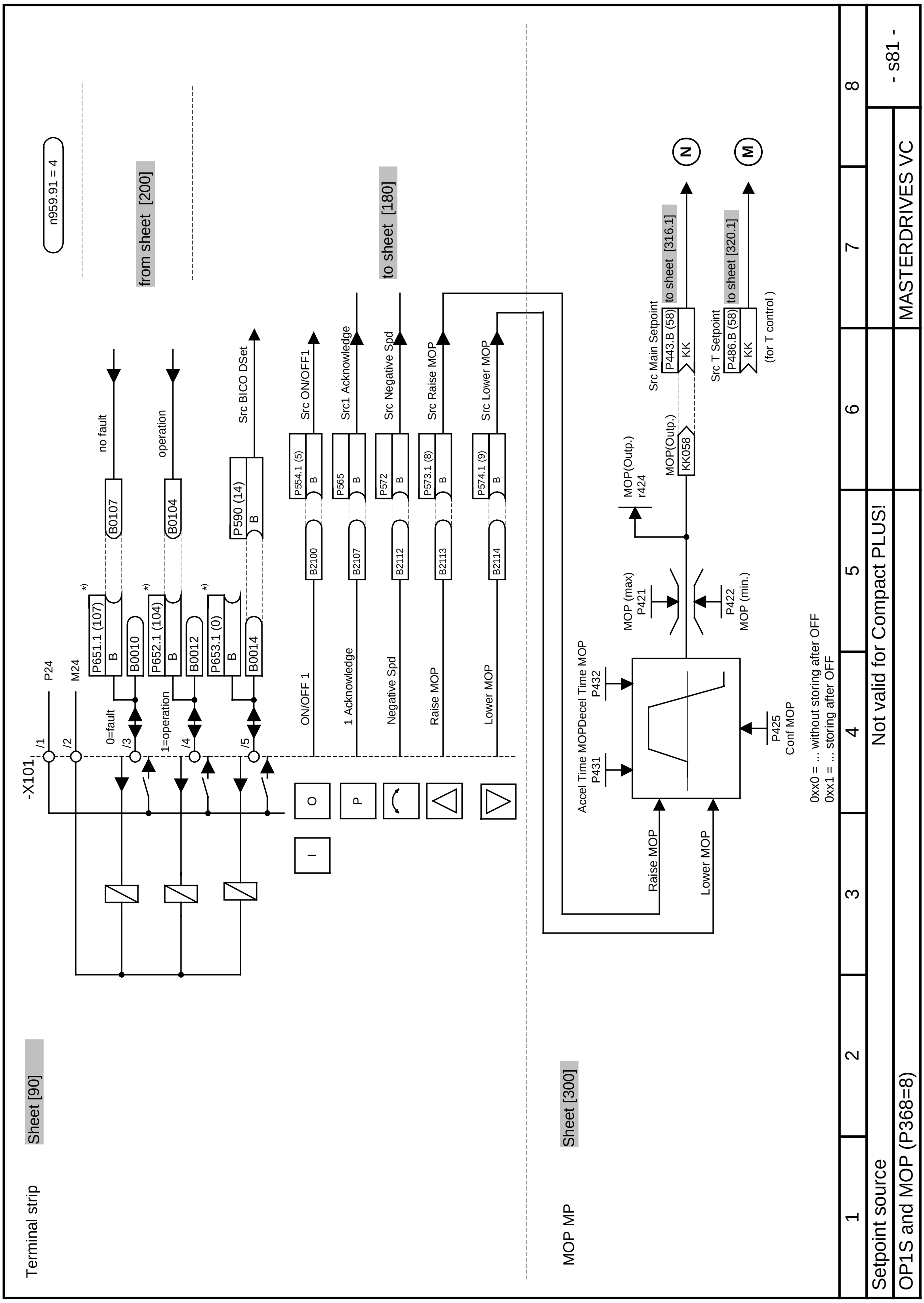
n957.88 = 4
Transmit actual values
Transmit
Receive
Sheet [110]
Sheet [100]
Baud rate P701.1
PKW # P702.1
PcD # P708.1
PKW:127
PcD: 2
Baud rate: 9.6 kB
-X101
/10 RS485P
/11 RS485N
P700.1 = Bus address
P704.1 = Tlg failure time
PKW
PcD1 (Data word1)
PcD2 (Data word 2)
Reserved for write operations of parameter data
Reserved for read operations of parameter data
Status word 1
Control word 1
P707.2 K
P707.1 K
KK0148
K0032
n/f(act)
ZUW1 r552
from sh. [350.7], [351.7] [352.7], [400.5]
from sh. [200]
SCom1Word1 r709.1
SCom1Word2 r709.2
K2001
K2002
Setpoint via process data (only SIMOVIS):
Main setpoint
P443.B K (2002)
to sh. [316.1]
Src T setpoint
P486.B K
to sh. [320.1]
for T control:
Receive setpoints
OP1S keys
I
O
Reset
Jog
P049 = OP operating display
Bit0 bis Bit15
B2200
B2215
B2100 ON/OFF1
B2101 OFF2 (electr.)
B2102 OFF3 (QStop)
B2103 Inv Release
B2104 RGen Release
B2105 No RGen Stop
B2106 Setp Release
B2107 Acknowledge
B2108 Jog Bit0
B2109 Jog Bit1
B2110 PcD control
B2111 Positive Spd
B2112 Negative Spd
B2113 Raise MOP
B2114 Lower MOP
B2115 External fault
P554.1 B (2100) Src ON/OFF1
P565.1 B (2107) Src1 Acknow.
P568.1 B (2108) Src Jog Bit0
P571.1 B (2111) Src positive spd
P572.1 B (2112) Src negative spd
to sheet [180] control word 1 r550
ZUW1
PZD1 (Data word1)
Reserve
pos./neg. speed setp
Ramp-function gen. active
Energize main cont.
Undervoltage fault
Comp. setpoint reached
PcD control
Set/actual deviation
Alarm effective
Switch-on inhibit
OFF3 effective
OFF2 effective
Fault effective
Operation
Ready
Ready for ON
Setpoint source
Not valid for Compact PLUS!
OP1S / SIMOVIS and fixed setpoints at USS1 (P368=7)
MASTERDRIVES VC
- s7 -

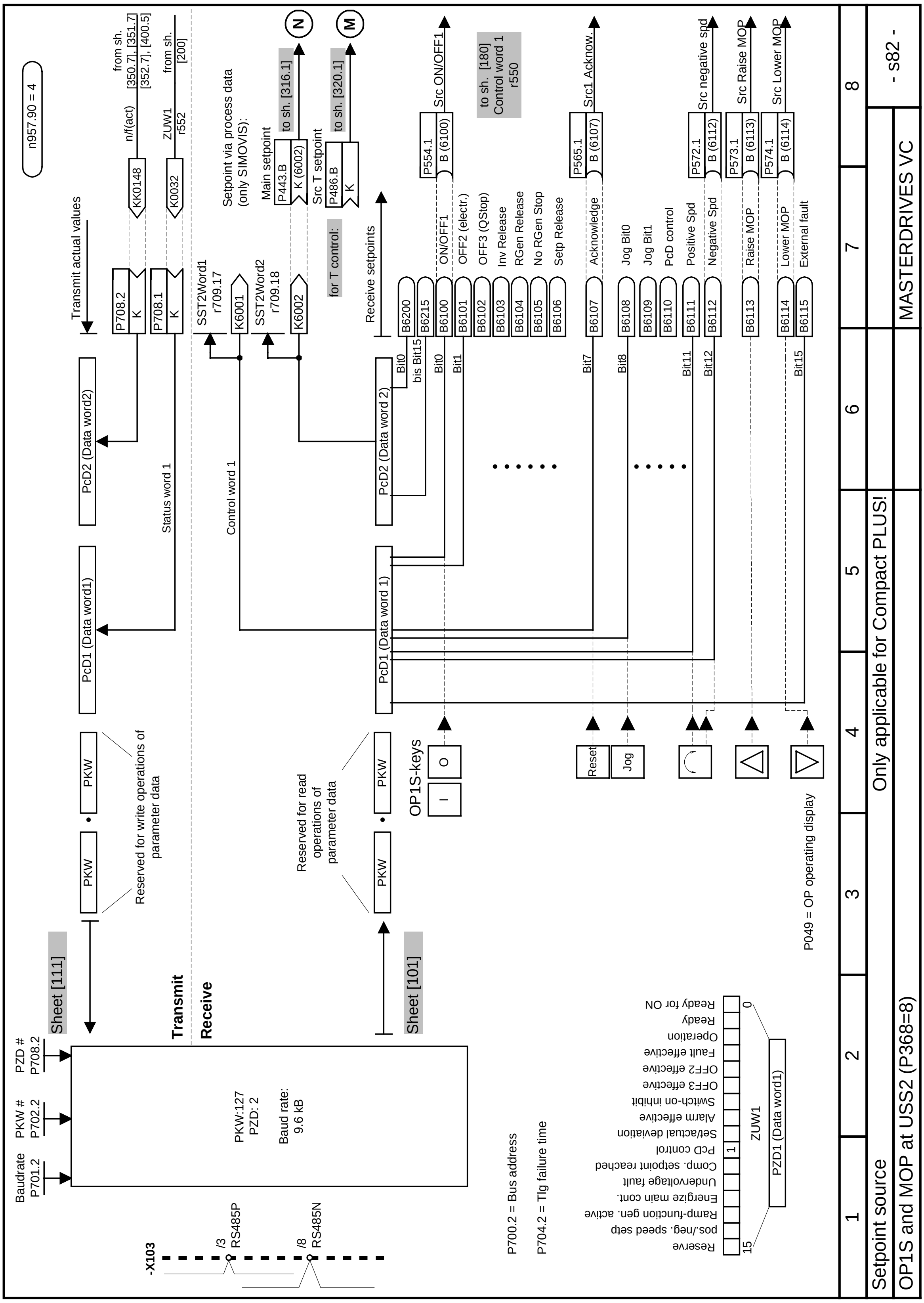

Terminal strip
Sheet [90]
-X101
/1
P24
/2
M24
0=fault
/3
1=operation
/4
/5
P651.1 (107)
B
B0010
P652.1 (104)
B
B0012
P653.1 (0)
B
B0014
*)
B0107
No fault
B0104
Operation
P590 (14)
B
Src BICO DSet
from sheet [200]
to sheet [180]
n959.89 = 4
If used as digital inputs, the parameters P651.B, P652.B, P653.B and P654.B must be set to 0!
If used as digital outputs, B10 to B14 must not be wired.
*)
If P366 = 2
P590 = B0012
P651 = B0000
P652 = B0000
P653 = B0107
Fixed setpoints
Sheet [290]
in %
See P049.4
in Hz
Fixed setpoint1
P401.F
Fixed setpoint2
P402.F
Fixed setpoint3
P403.F
Fixed setpoint4
P404.F
Fixed setpoint5
P405.F
Fixed setpoint6
P406.F
Fixed setpoint7
P407.F
Fixed setpoint8
P408.F
KK0041
KK0042
KK0043
KK0044
KK0045
KK0046
KK0047
KK0048
(for T control)
(for n/f control or v/f control)
FSetp Bit 3 P418.B
FSetp Bit 2 P417.B
FSetp Bit 1 P581.B
FSetp Bit 0 P580.B
0 0 0 0
0 0 0 1
0 0 1 0
0 0 1 1
0 1 0 0
0 1 0 1
0 1 1 0
0 1 1 1
Active FSetp r420
Act.FSetp
KK0040
Src Main Setpoint
P443.B (40)
KK
to sheet[316.1]
N
Src T setpoint
P486.B (40)
KK
(for T control)
to sheet[320.1]
M
1
2
3
4
5
6
7
8
Setpoint source
OP1S and fixed setpoints (P368=7)
MASTERDRIVES VC
- s71 -

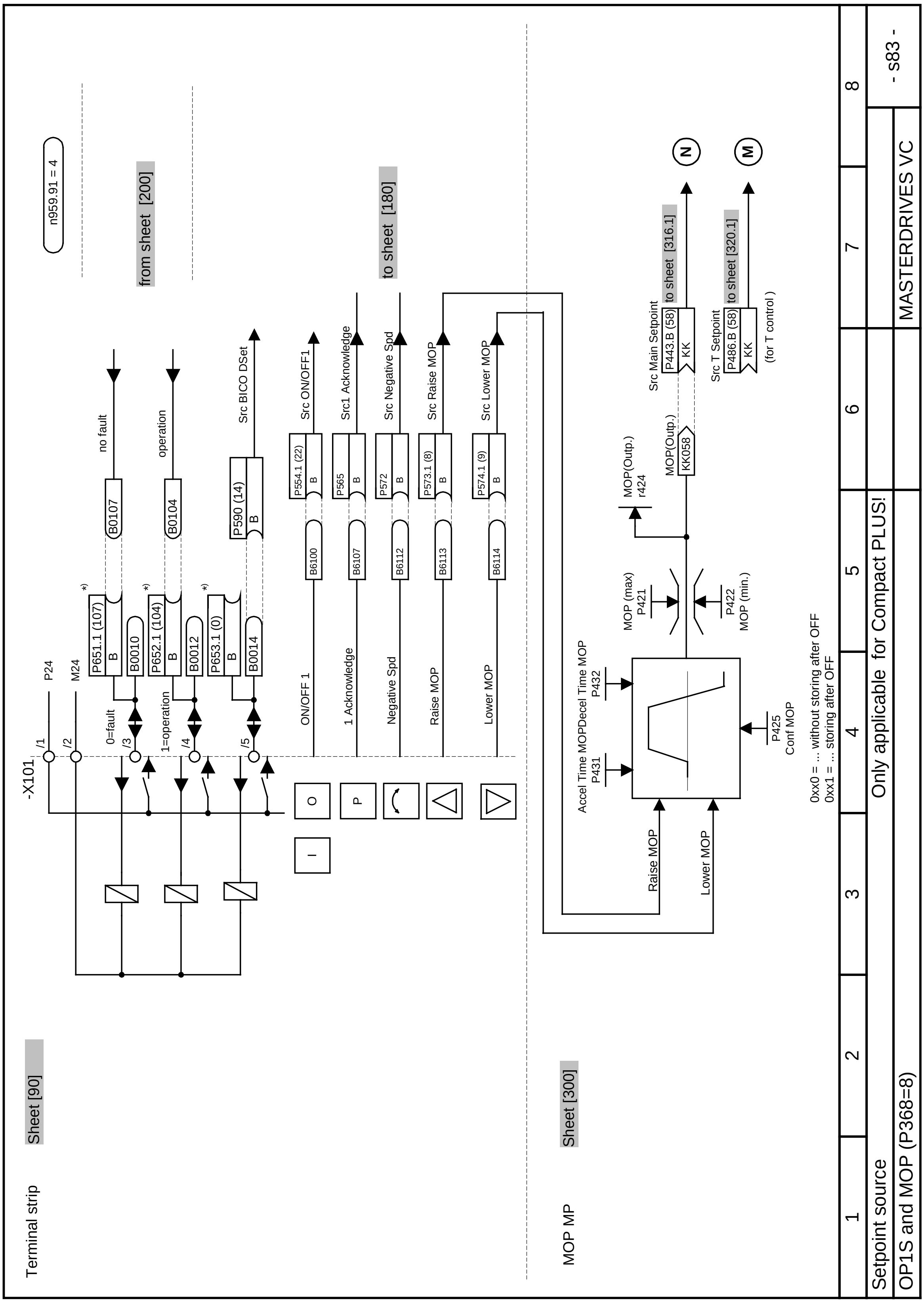

Setpoint source
OP1S and fixed setpoints at USS2 (P368=7)
Only applicable for Compact PLUS!
MASTERDRIVES VC
- s72 -
1 2 3 4 5 6 7 8
n957.88 = 4
Sheet [111]
Sheet [101]
Transmit
Receive
Baud rate P701.2
PKW # P702.2
PcD # P708.2
PKW:127
PcD: 2
Baud rate: 9.6 kB
-X103
/3 RS485P
/8 RS485N
P700.2 = Bus address
P704.2 = Tlg failure time
PKW
PKW
PcD1 (Data word1)
PcD2 (Data word 2)
Reserved for write operations of parameter data
Reserved for read operations of parameter data
Transmit actual values
Receive setpoints
Status word 1
Control word 1
P708.1 K
P708.2 K
KK0148 n/f(act)
K0032 ZUW1 r552
from sh. [350.7], [351.7] [352.7], [400.5]
from sh. [200]
SCom2Word1 r709.17
SCom2Word2 r709.18
K6001
K6002
Setpoint via process data (only SIMOVIS):
Main setpoint
P443.B K (6002)
to sh. [316.1]
Src T setpoint
P486.B K
to sh. [320.1]
for T control:
N
M
Bit0 bis Bit15
B6200
B6215
Bit0 B6100 ON/OFF1
Bit1 B6101 OFF2 (electr.)
B6102 OFF3 (QStop)
B6103 Inv Release
B6104 RGen Release
B6105 No RGen Stop
B6106 Setp Release
Bit7 B6107 Acknowledge
Bit8 B6108 Jog Bit0
B6109 Jog Bit1
B6110 PcD control
Bit11 B6111 Positive Spd
Bit12 B6112 Negative Spd
B6113 Raise MOP
B6114 Lower MOP
Bit15 B6115 External fault
P554.1 B (6100) Src ON/OFF1
P565.1 B (6107) Src1 Acknow.
P568.1 B (6108) Src Jog Bit0
P571.1 B (6111) Src positive spd
P572.1 B (6112) Src negative spd
to sheet [180] control word 1 r550
OP1S keys
I
O
Reset
Jog
P049 = OP operating display
ZUW1
PZD1 (Data word1)
15
1
0
Reserve
pos./neg. speed setp
Ramp-function gen. active
Energize main cont.
Undervoltage fault
Comp. setpoint reached
PcD control
Set/actual deviation
Alarm effective
Switch-on inhibit
OFF3 effective
OFF2 effective
Fault effective
Operation
Ready
Ready for ON



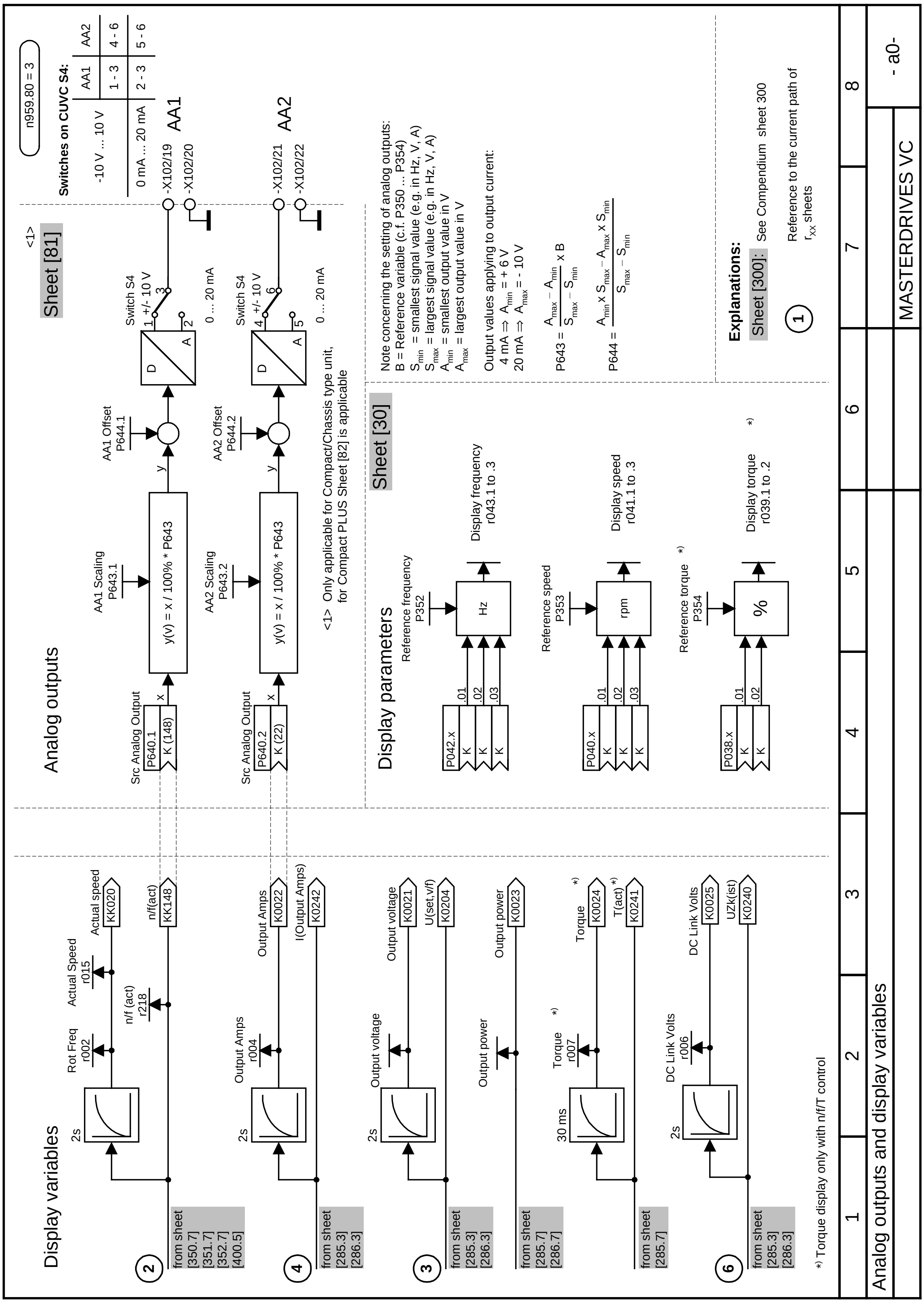
n957.90 = 4
Transmit actual values
P707.2
K
KK0148
n/f(act)
from sh. [350.7], [351.7] [352.7], [400.5]
P707.1
K
K0032
ZUW1
r552
from sh. [200]
SST1Word1
r709.1
K2001
SST1Word2
r709.2
K2002
Setpoint via process data (only SIMOVIS):
Main setpoint
P443.B
K (2002)
to sh. [316.1]
Src T setpoint
P486.B
K
to sh. [320.1]
for T control:
Receive setpoints
N
M
PcD2 (Data word2)
Status word 1
Control word 1
PcD1 (Data word1)
PKW
PKW
Reserved for write operations of parameter data
Reserved for read operations of parameter data
PcD2 (Data word 2)
PcD1 (Data word 1)
OP1S-keys
I
O
Reset
Jog
Bit0
bis Bit15
Bit0
Bit1
Bit7
Bit8
Bit11
Bit12
Bit15
B2200
B2215
B2100
B2101
B2102
B2103
B2104
B2105
B2106
B2107
B2108
B2109
B2110
B2111
B2112
B2113
B2114
B2115
ON/OFF1
OFF2 (electr.)
OFF3 (QStop)
Inv Release
RGen Release
No RGen Stop
Setp Release
Acknowledge
Jog Bit0
Jog Bit1
PcD control
Positive Spd
Negative Spd
Raise MOP
Lower MOP
External fault
P554.1
B (2100)
Src ON/OFF1
to sh. [180]
Control word 1
r550
P565.1
B (2107)
Src1 Acknow.
P572.1
B (2112)
Src negative spd
P573.1
B (2113)
Src Raise MOP
P574.1
B (2114)
Src Lower MOP
Baudrate
P701.1
PKW #
P702.1
PZD #
P708.1
Sheet [110]
Transmit
Receive
Sheet [100]
PKW:127
PZD: 2
Baud rate:
9.6 kB
-X101
/10
RS485P
/11
RS485N
P700.1 = Bus address
P704.1 = Tlg failure time
P049 = OP operating display
Reserve
pos./neg. speed setp
Ramp-function gen. active
Energize main cont.
Undervoltage fault
Comp. setpoint reached
PcD control
Setp/actual deviation
Alarm effective
Switch-on inhibit
OFF3 effective
OFF2 effective
Fault effective
Operation
Ready
Ready for ON
15
1
0
ZUW1
PZD1 (Data word1)
1
2
3
4
5
6
7
8
Setpoint source
Not valid for Compact PLUS!
OP1S / SIMOVIS and MOP at USS1 (P368=8)
MASTERDRIVES VC
- s8 -

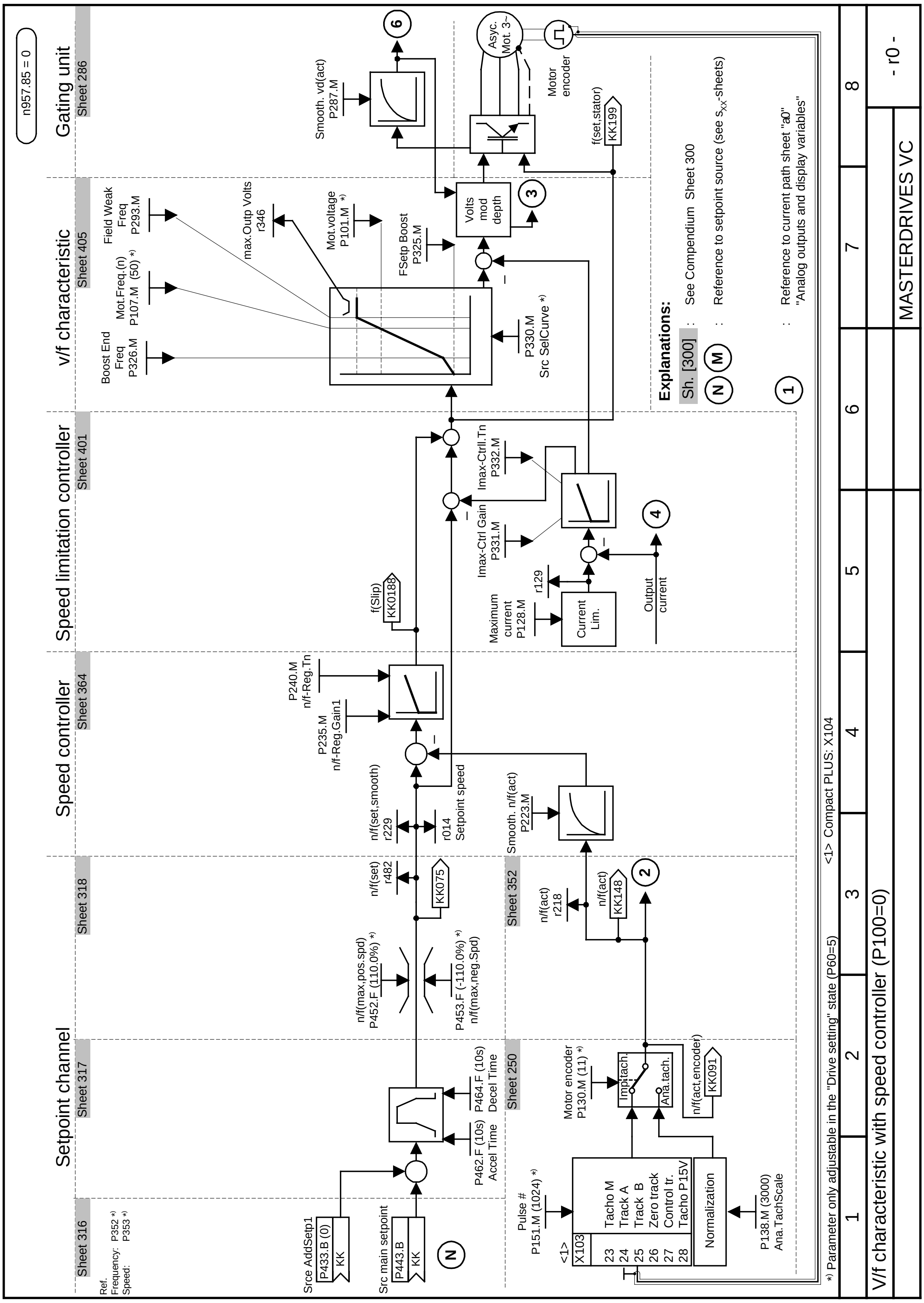

Terminal strip
Sheet [90]
-X101
/1
/2
P24
M24
/3
/4
/5
0=fault
1=operation
P651.1 (107)
B
B0010
P652.1 (104)
B
B0012
P653.1 (0)
B
B0014
*)
B0107
no fault
B0104
operation
from sheet [200]
n959.91 = 4
P590 (14)
B
Src BICO DSet
I
O
P
ON/OFF 1
1 Acknowledge
Negative Spd
Raise MOP
Lower MOP
B2100
B2107
B2112
B2113
B2114
P554.1 (5)
P565
P572
P573.1 (8)
P574.1 (9)
B
Src ON/OFF1
Src1 Acknowledge
Src Negative Spd
Src Raise MOP
Src Lower MOP
to sheet [180]
MOP MP
Sheet [300]
Raise MOP
Lower MOP
Accel Time MOP
P431
Decel Time MOP
P432
P425
Conf MOP
0xx0 = ... without storing after OFF
0xx1 = ... storing after OFF
MOP (max)
P421
MOP (min.)
P422
MOP(Outp.)
r424
MOP(Outp.)
KK058
Src Main Setpoint
P443.B (58)
KK
to sheet [316.1]
Src T Setpoint
P486.B (58)
KK
to sheet [320.1]
(for T control)
N
M
1
2
3
4
5
6
7
8
Setpoint source
OP1S and MOP (P368=8)
Not valid for Compact PLUS!
MASTERDRIVES VC
- s81 -

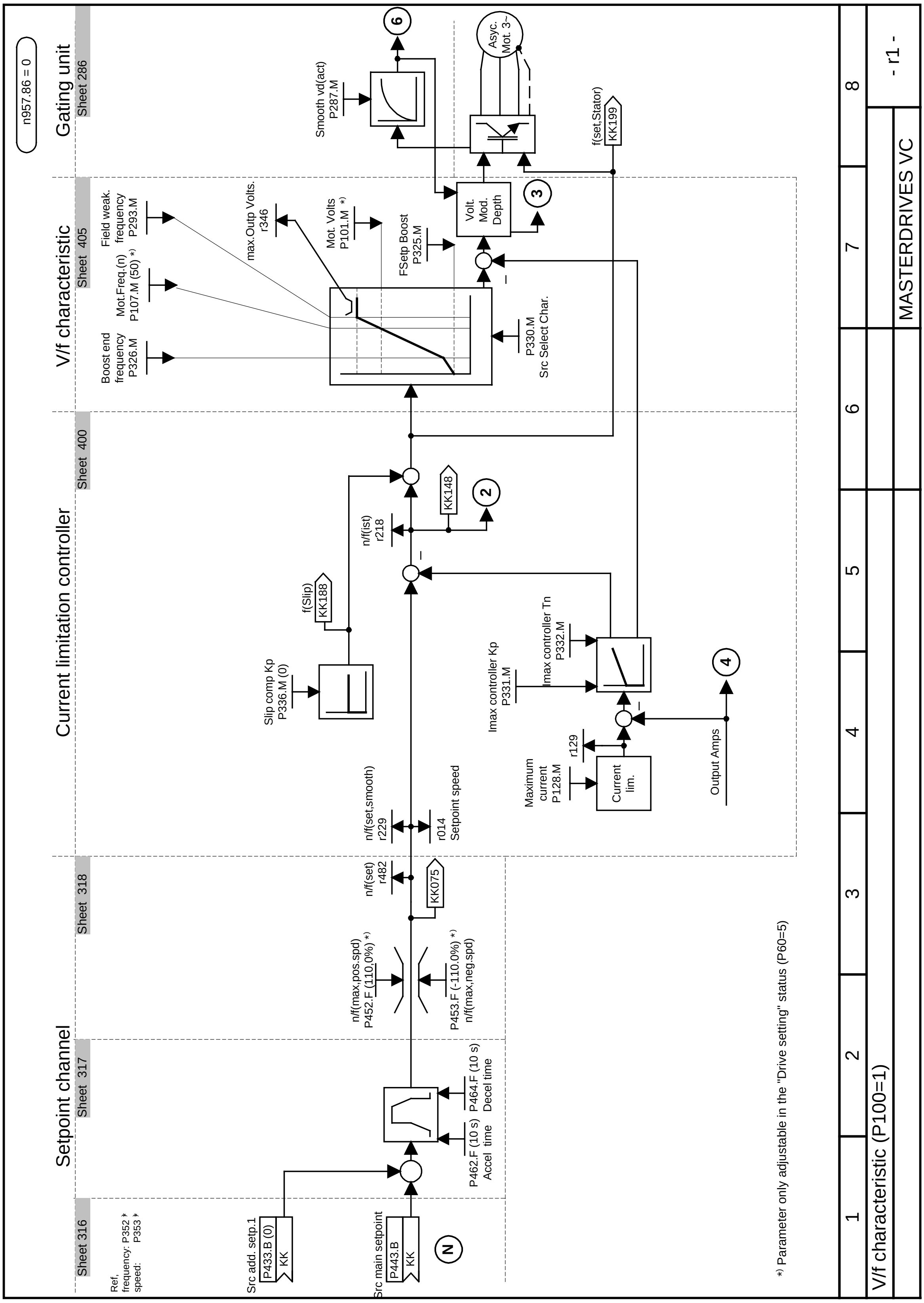

Setpoint source
OP1S and MOP at USS2 (P368=8)
Only applicable for Compact PLUS!
MASTERDRIVES VC
- s82 -
1
2
3
4
5
6
7
8
n957.90 = 4
-X103
/3 RS485P
/8 RS485N
Baudrate P701.2
PKW # P702.2
PZD # P708.2
PKW:127
PZD: 2
Baud rate: 9.6 kB
P700.2 = Bus address
P704.2 = Tlg failure time
Sheet [111]
Sheet [101]
Transmit
Receive
PKW
PcD1 (Data word1)
PcD2 (Data word2)
Reserved for write operations of parameter data
Reserved for read operations of parameter data
PcD1 (Data word 1)
PcD2 (Data word 2)
Transmit actual values
Status word 1
Control word 1
P708.2 K
P708.1 K
KK0148
K0032
n/f(act)
ZUW1 r552
from sh. [350.7], [351.7] [352.7], [400.5]
from sh. [200]
SST2Word1 r709.17
SST2Word2 r709.18
K6001
K6002
Setpoint via process data (only SIMOVIS):
Main setpoint
P443.B K (6002)
to sh. [316.1]
Src T setpoint
P486.B K
to sh. [320.1]
for T control:
Receive setpoints
N
M
Bit0
bis Bit15
Bit0
Bit1
Bit7
Bit8
Bit11
Bit12
Bit15
B6200
B6215
B6100 ON/OFF1
B6101 OFF2 (electr.)
B6102 OFF3 (QStop)
B6103 Inv Release
B6104 RGen Release
B6105 No RGen Stop
B6106 Setp Release
B6107 Acknowledge
B6108 Jog Bit0
B6109 Jog Bit1
B6110 PcD control
B6111 Positive Spd
B6112 Negative Spd
B6113 Raise MOP
B6114 Lower MOP
B6115 External fault
P554.1 B (6100)
Src ON/OFF1
to sh. [180] Control word 1 r550
P565.1 B (6107)
Src1 Acknow.
P572.1 B (6112)
Src negative spd
P573.1 B (6113)
Src Raise MOP
P574.1 B (6114)
Src Lower MOP
OP1S-keys
I
O
Reset
Jog
P049 = OP operating display
Reserve
pos./neg. speed setp
Ramp-function gen. active
Energize main cont.
Undervoltage fault
Comp. setpoint reached
PcD control
Set/actual deviation
Alarm effective
Switch-on inhibit
OFF3 effective
OFF2 effective
Fault effective
Operation
Ready
Ready for ON
15
1
0
ZUW1
PZD1 (Data word1)

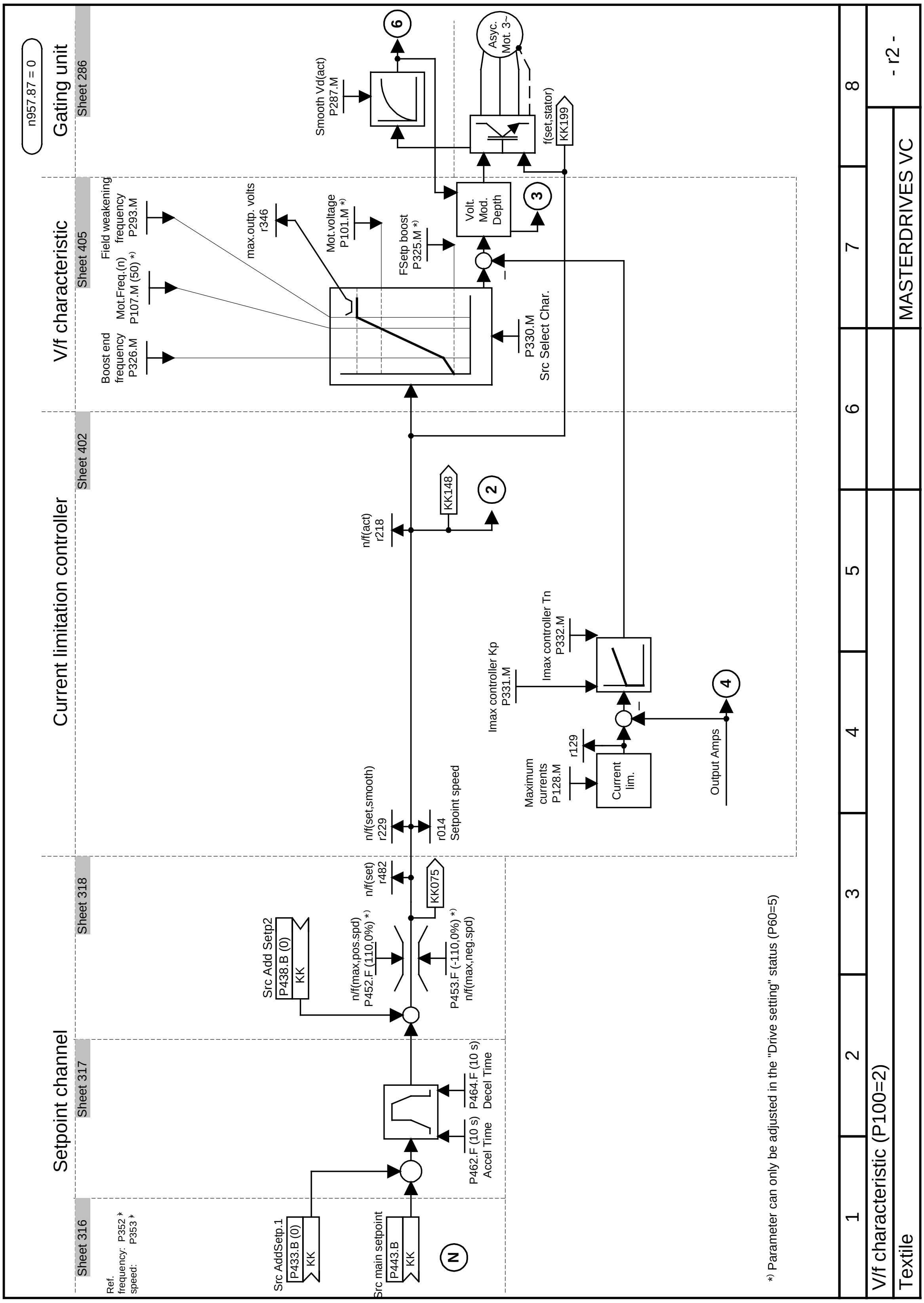


Terminal strip
Sheet [90]
n959.91 = 4
from sheet [200]
to sheet [180]
-X101
/1
/2
P24
M24
/3
0=fault
/4
1=operation
/5
*)
P651.1 (107)
B
B0010
P652.1 (104)
B0012
P653.1 (0)
B0014
B0107
no fault
B0104
operation
P590 (14)
Src BICO DSet
O
I
P
ON/OFF 1
1 Acknowledge
Negative Spd
Raise MOP
Lower MOP
B6100
B6107
B6112
B6113
B6114
P554.1 (22)
P565
P572
P573.1 (8)
P574.1 (9)
Src ON/OFF1
Src1 Acknowledge
Src Negative Spd
Src Raise MOP
Src Lower MOP
MOP MP
Sheet [300]
Raise MOP
Lower MOP
Accel Time MOP
P431
Decel Time MOP
P432
P425
Conf MOP
0xx0 = ... without storing after OFF
0xx1 = ... storing after OFF
MOP (max)
P421
P422
MOP (min.)
MOP(Outp.)
r424
MOP(Outp.)
KK058
Src Main Setpoint
P443.B (58)
KK
to sheet [316.1]
Src T Setpoint
P486.B (58)
to sheet [320.1]
(for T control)
N
M
1
2
3
4
5
6
7
8
Setpoint source
OP1S and MOP (P368=8)
Only applicable for Compact PLUS!
MASTERDRIVES VC
- s83 -

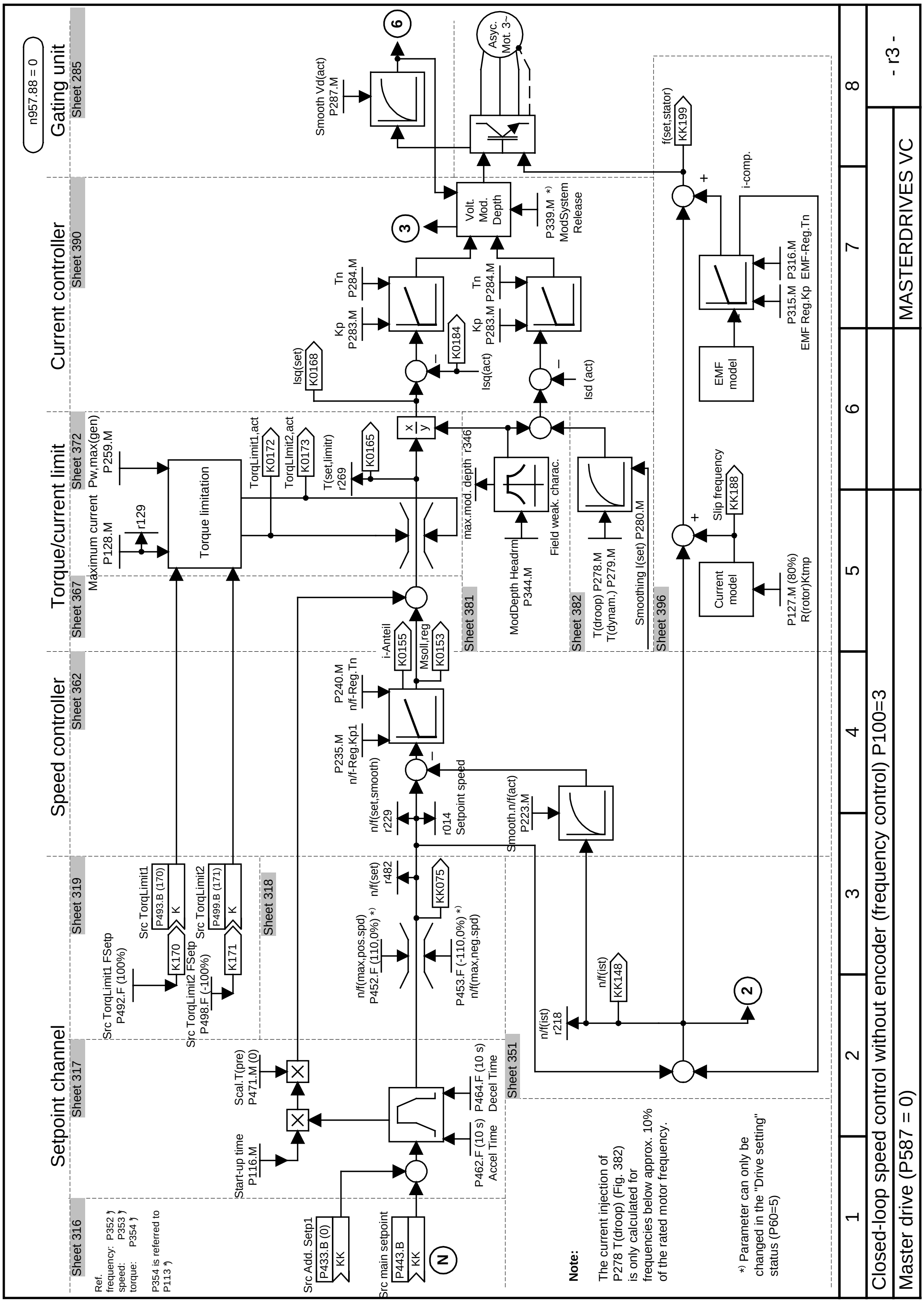

Display variables
Analog outputs
Display parameters
Sheet [81]
Sheet [30]
n959.80 = 3
Switches on CUVC S4:
-10 V ... 10 V
0 mA ... 20 mA
AA1
AA2
1 - 3
4 - 6
2 - 3
5 - 6
-X102/19
-X102/20
-X102/21
-X102/22
Switch S4
+/- 10 V
0 ... 20 mA
AA1 Offset
P644.1
AA2 Offset
P644.2
AA1 Scaling
P643.1
AA2 Scaling
P643.2
y(v) = x / 100% * P643
Src Analog Output
P640.1
K (148)
P640.2
K (22)
<1> Only applicable for Compact/Chassis type unit, for Compact PLUS Sheet [82] is applicable
Note concerning the setting of analog outputs:
B = Reference variable (c.f. P350 ... P354)
S_{min} = smallest signal value (e.g. in Hz, V, A)
S_{max} = largest signal value (e.g. in Hz, V, A)
A_{min} = smallest output value in V
A_{max} = largest output value in V
Output values applying to output current:
4 mA ⇒ A_{min} = + 6 V
20 mA ⇒ A_{max} = - 10 V
$P643 = \frac{A_{max} - A_{min}}{S_{max} - S_{min}} \times B$
$P644 = \frac{A_{min} \times S_{max} - A_{max} \times S_{min}}{S_{max} - S_{min}}$
Explanations:
Sheet [300]: See Compendium sheet 300
Reference to the current path of r_{xx} sheets
Reference frequency P352
Display frequency r043.1 to .3
Reference speed P353
Display speed r041.1 to .3
Reference torque *) P354
Display torque *) r039.1 to .2
P042.x
P040.x
P038.x
Rot Freq r002
Actual Speed r015
Actual speed KK020
n/f (act) r218
n/f(act) KK148
Output Amps r004
Output Amps K0022
I(Output Amps) K0242
Output voltage
Output voltage K0021
U(set,v/f) K0204
Output power
Output power K0023
Torque *) r007
Torque *) K0024
T(act) *) K0241
DC Link Volts r006
DC Link Volts K0025
UZk(ist) K0240
2s
30 ms
from sheet [350.7] [351.7] [352.7] [400.5]
from sheet [285.3] [286.3]
from sheet [285.7] [286.7]
from sheet [285.7]
*) Torque display only with n/f/T control
Analog outputs and display variables
MASTERDRIVES VC
- a0-

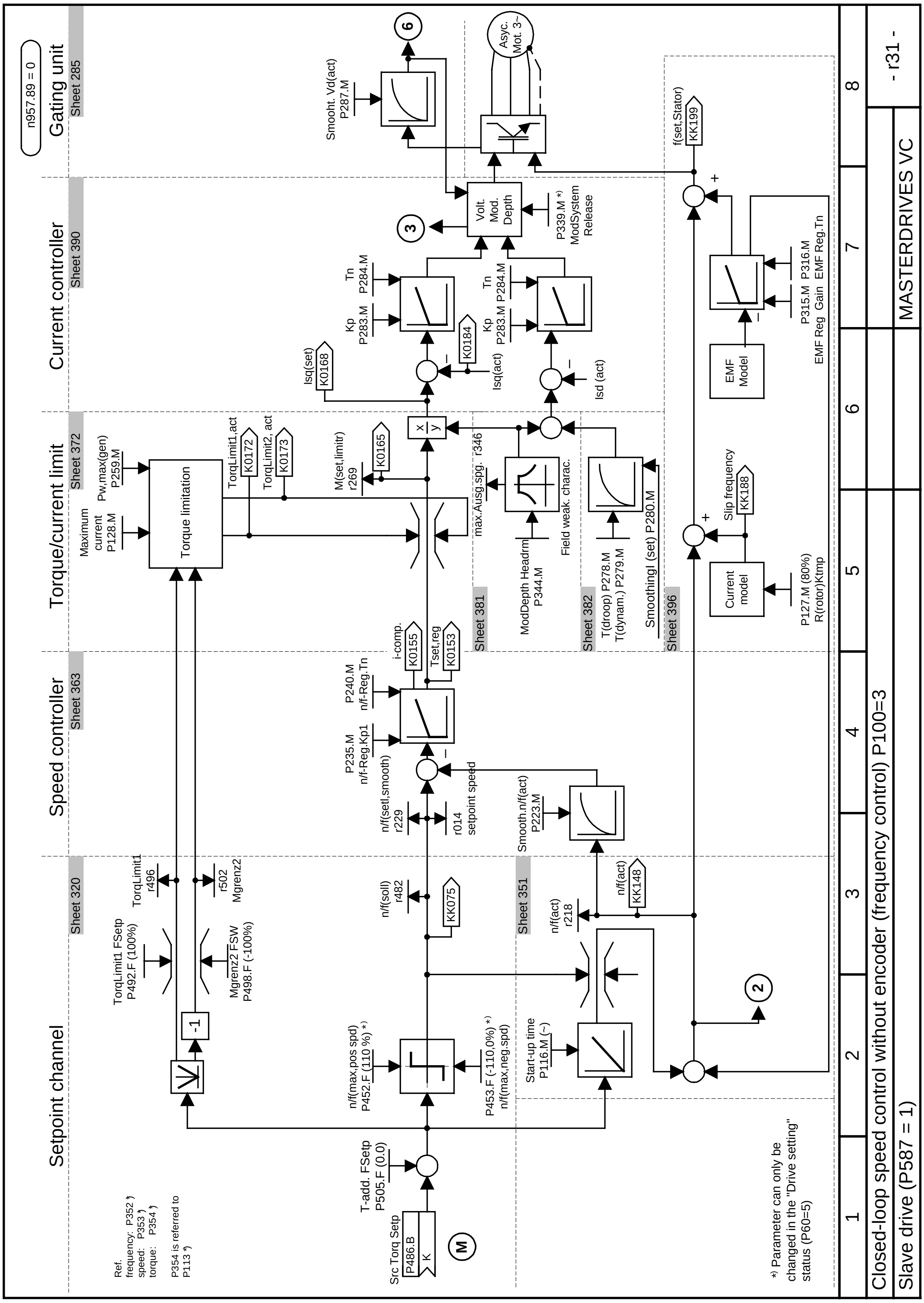

V/f characteristic with speed controller (P100=0)
MASTERDRIVES VC
- r0 -
Setpoint channel
Sheet 316
Sheet 317
Sheet 318
Speed controller
Sheet 364
Speed limitation controller
Sheet 401
v/f characteristic
Sheet 405
Gating unit
Sheet 286
n957.85 = 0
Ref.
Frequency: P352 *)
Speed: P353 *)
Srce AddSetp1
P433.B (0)
KK
Src main setpoint
P443.B
KK
P462.F (10s)
Accel Time
P464.F (10s)
Decel Time
Sheet 250
n/f(max,pos.spd)
P452.F (110.0%) *)
P453.F (-110.0%) *)
n/f(max,neg.Spd)
n/f(set)
r482
KK075
n/f(set,smooth)
r229
r014
Setpoint speed
P235.M
n/f-Reg.Gain1
P240.M
n/f-Reg.Tn
f(Slip)
KK0188
Maximum
current
P128.M
Current
Lim.
r129
Output
current
Imax-Ctrl Gain
P331.M
Imax-Ctrll.Tn
P332.M
Boost End
Freq
P326.M
Mot.Freq.(n)
P107.M (50) *)
Field Weak
Freq
P293.M
max.Outp Volts
r346
Mot.voltage
P101.M *)
FSetp Boost
P325.M
P330.M
Src SelCurve *)
Volts
mod
depth
Smooth. vd(act)
P287.M
Asyc.
Mot. 3~
Motor
encoder
f(set,stator)
KK199
Sheet 352
n/f(act)
r218
n/f(act)
KK148
Smooth. n/f(act)
P223.M
Pulse #
P151.M (1024) *)
<1>
X103
23 Tacho M
24 Track A
25 Track B
26 Zero track
27 Control tr.
28 Tacho P15V
Normalization
P138.M (3000)
Ana.TachScale
Motor encoder
P130.M (11) *)
Imp.tach.
Ana.tach.
n/f(act,encoder)
KK091
Explanations:
Sh. [300] : See Compendium Sheet 300
N M : Reference to setpoint source (see S_{XX}-sheets)
1 : Reference to current path sheet "a0" "Analog outputs and display variables"
*) Parameter only adjustable in the "Drive setting" state (P60=5)
<1> Compact PLUS: X104
1 2 3 4 5 6 7 8


n957.86 = 0
Setpoint channel
Current limitation controller
V/f characteristic
Gating unit
Sheet 316
Sheet 317
Sheet 318
Sheet 400
Sheet 405
Sheet 286
Ref. frequency: P352
speed: P353
Src add. setp.1
P433.B (0)
KK
Src main setpoint
P443.B
KK
N
P462.F (10 s)
Accel time
P464.F (10 s)
Decel time
n/f(max,pos.spd)
P452.F (110.0%) *)
P453.F (-110.0%) *)
n/f(max,neg.spd)
n/f(set)
r482
KK075
n/f(set,smooth)
r229
r014
Setpoint speed
Slip comp Kp
P336.M (0)
f(Slip)
KK188
n/f(ist)
r218
KK148
2
Maximum current
P128.M
Current lim.
r129
Imax controller Kp
P331.M
Imax controller Tn
P332.M
Output Amps
4
Boost end frequency
P326.M
Mot.Freq.(n)
P107.M (50) *)
Field weak. frequency
P293.M
max.Outp Volts.
r346
Mot. Volts
P101.M *)
FSetp Boost
P325.M
P330.M
Src Select Char.
Volt. Mod. Depth
3
Smooth vd(act)
P287.M
6
f(set,Stator)
KK199
Asyc. Mot. 3~
*) Parameter only adjustable in the "Drive setting" status (P60=5)
1
2
3
4
5
6
7
8
V/f characteristic (P100=1)
MASTERDRIVES VC
- r1 -

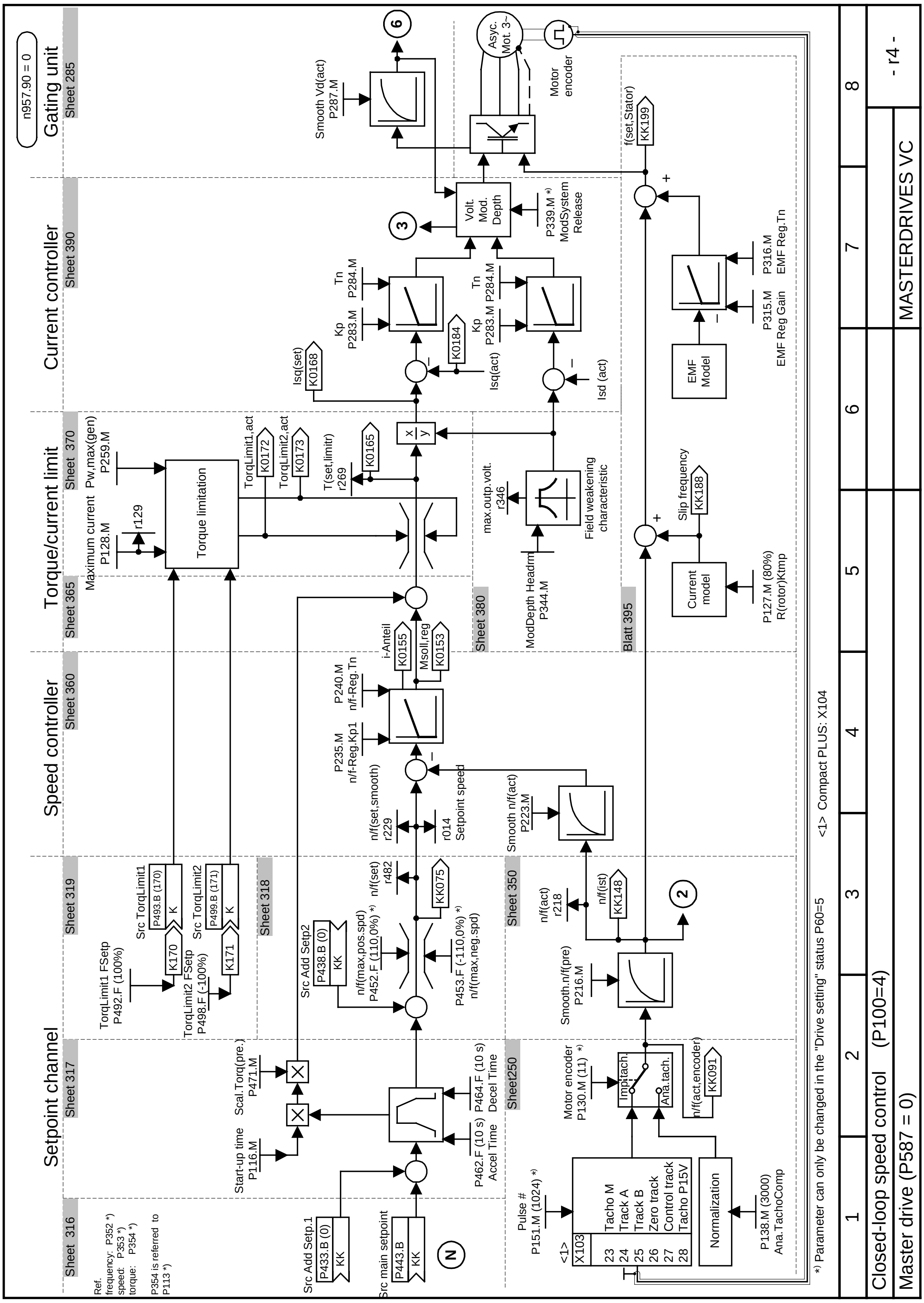


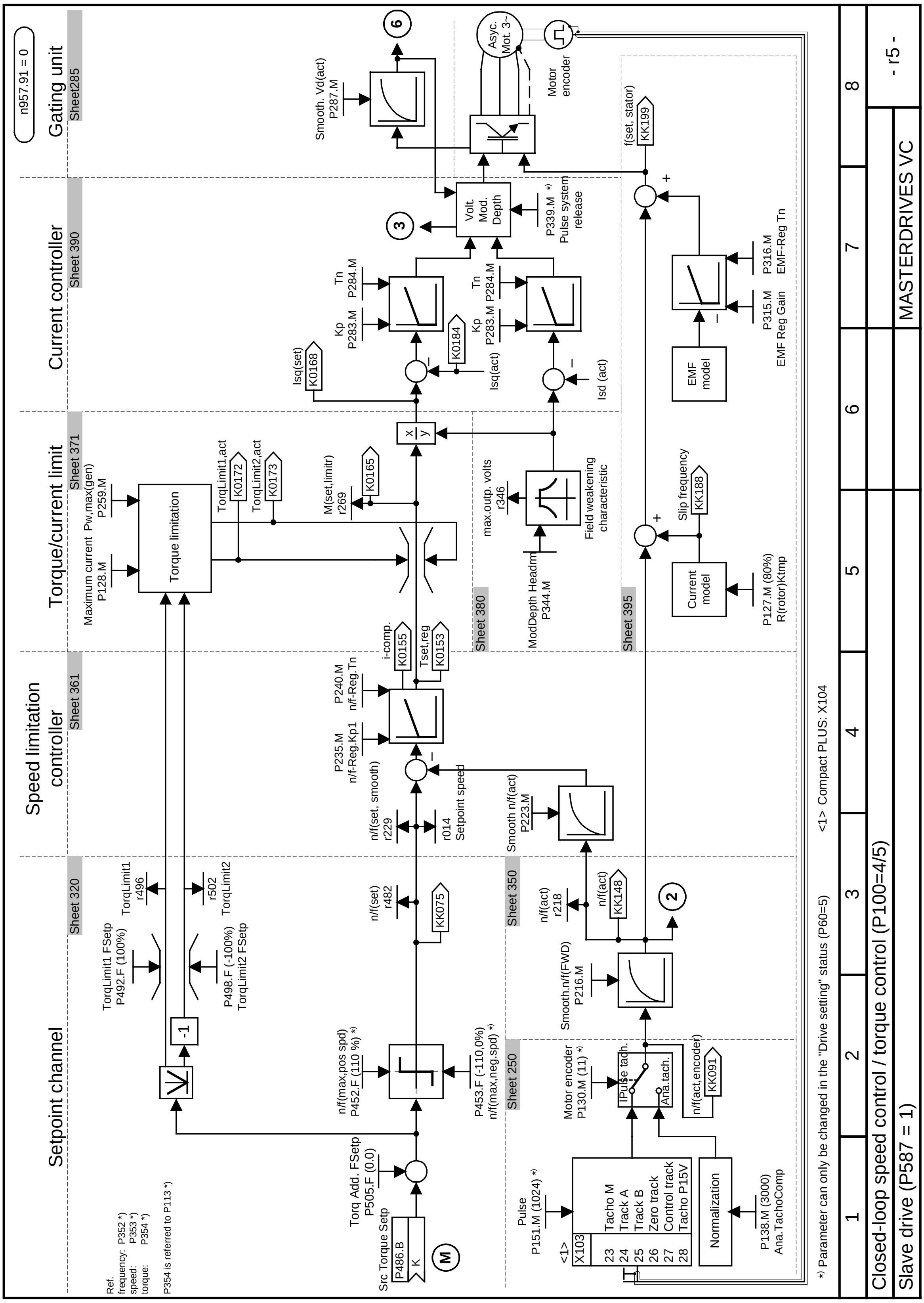
n957.87 = 0
Setpoint channel
Current limitation controller
V/f characteristic
Gating unit
Sheet 316
Sheet 317
Sheet 318
Sheet 402
Sheet 405
Sheet 286
Ref. frequency: P352 *) speed: P353 *)
Src AddSetp.1 P433.B (0) KK
Src main setpoint P443.B KK
N
P462.F (10 s) Accel Time
P464.F (10 s) Decel Time
Src Add Setp2 P438.B (0) KK
n/f(max,pos.spd) P452.F (110.0%) *)
P453.F (-110.0%) *) n/f(max,neg.spd)
n/f(set) r482
KK075
n/f(set,smooth) r229
r014 Setpoint speed
n/f(act) r218
KK148
2
Maximum currents P128.M
Current lim.
r129
Imax controller Kp P331.M
Imax controller Tn P332.M
4
Output Amps
Boost end frequency P326.M
Mot.Freq.(n) P107.M (50) *)
Field weakening frequency P293.M
max.outp. volts r346
Mot.voltage P101.M *)
FSetp boost P325.M *)
P330.M Src Select Char.
Volt. Mod. Depth
3
Smooth Vd(act) P287.M
6
f(set,stator) KK199
Asyc. Mot. 3~
*) Parameter can only be adjusted in the "Drive setting" status (P60=5)
1 2 3 4 5 6 7 8
V/f characteristic (P100=2)
Textile
MASTERDRIVES VC
- r2 -


n957.88 = 0
Setpoint channel
Speed controller
Torque/current limit
Current controller
Gating unit
Sheet 316
Sheet 317
Sheet 319
Sheet 318
Sheet 351
Sheet 362
Sheet 367
Sheet 372
Sheet 381
Sheet 382
Sheet 396
Sheet 390
Sheet 285
Ref. frequency: P352
speed: P353
torque: P354
P354 is referred to P113
Src Add. Setp1
P433.B (0)
Src main setpoint
P443.B
Start-up time
P116.M
Scal.T(pre)
P471.M (0)
P462.F (10 s) Accel Time
P464.F (10 s) Decel Time
Src TorqLimit1 FSetp
P492.F (100%)
Src TorqLimit2 FSetp
P498.F (-100%)
Src TorqLimit1
P493.B (170)
Src TorqLimit2
P499.B (171)
K170
K171
n/f(max,pos.spd)
P452.F (110,0%) *)
P453.F (-110,0%) *)
n/f(max,neg.spd)
n/f(set)
r482
KK075
n/f(ist)
r218
KK148
n/f(set,smooth)
r229
r014
Setpoint speed
Smooth.n/f(act)
P223.M
P235.M
n/f-Reg.Kp1
P240.M
n/f-Reg.Tn
i-Anteil
K0155
Msoll,reg
K0153
Maximum current
P128.M
r129
Pw,max(gen)
P259.M
Torque limitation
TorqLimit1,act
K0172
TorqLimit2,act
K0173
T(set,limitr)
r269
K0165
max.mod. depth r346
ModDepth Headrm
P344.M
Field weak. charac.
T(droop) P278.M
T(dynam.) P279.M
Smoothing I(set) P280.M
Isq(set)
K0168
Isq(act)
K0184
Isd (act)
Kp P283.M
Tn P284.M
Volt. Mod. Depth
P339.M *)
ModSystem Release
Smooth Vd(act)
P287.M
Asyc. Mot. 3~
f(set,stator)
KK199
i-comp.
Slip frequency
KK188
Current model
P127.M (80%)
R(rotor)Ktmp
EMF model
P315.M P316.M
EMF Reg.Kp EMF-Reg.Tn
Note:
The current injection of P278 T(droop) (Fig. 382) is only calculated for frequencies below approx. 10% of the rated motor frequency.
*) Parameter can only be changed in the "Drive setting" status (P60=5)
1 2 3 4 5 6 7 8
Closed-loop speed control without encoder (frequency control) P100=3
Master drive (P587 = 0)
MASTERDRIVES VC
- r3 -



Setpoint channel
Sheet 320
Speed controller
Sheet 363
Torque/current limit
Sheet 372
Current controller
Sheet 390
Gating unit
Sheet 285
n957.89 = 0
Ref. frequency: P352 *)
speed: P353 *)
torque: P354 *)
P354 is referred to P113 *)
Src Torq Setp
P486.B
K
M
T-add. FSetp
P505.F (0.0)
n/f(max,pos spd)
P452.F (110 %) *)
P453.F (-110,0%) *)
n/f(max,neg.spd)
Start-up time
P116.M (~)
TorqLimit1 FSetp
P492.F (100%)
Mgrenz2 FSW
P498.F (-100%)
-1
TorqLimit1
r496
r502
Mgrenz2
n/f(soll)
r482
KK075
Sheet 351
n/f(act)
r218
n/f(act)
KK148
Smooth.n/f(act)
P223.M
n/f(setl,smooth)
r229
r014
setpoint speed
P235.M
n/f-Reg.Kp1
P240.M
n/f-Reg.Tn
i-comp.
K0155
Tset,reg
K0153
Maximum current
P128.M
Pw,max(gen)
P259.M
Torque limitation
TorqLimit1,act
K0172
TorqLimit2, act
K0173
M(set,limitr)
r269
K0165
x
y
max.Ausg.spg. r346
Sheet 381
ModDepth Headrm
P344.M
Field weak. charac.
Sheet 382
T(droop) P278.M
T(dynam.) P279.M
Smoothingl (set) P280.M
Sheet 396
Current model
P127.M (80%)
R(rotor)Ktmp
Slip frequency
KK188
Isq(set)
K0168
Kp
P283.M
Tn
P284.M
K0184
Isq(act)
Isd (act)
EMF Model
P315.M P316.M
EMF Reg Gain EMF Reg.Tn
Volt. Mod. Depth
P339.M *)
ModSystem Release
f(set,Stator)
KK199
Smooht. Vd(act)
P287.M
Asyc. Mot. 3~
2
3
6
*) Parameter can only be changed in the "Drive setting" status (P60=5)
1
2
3
4
5
6
7
8
Closed-loop speed control without encoder (frequency control) P100=3
Slave drive (P587 = 1)
MASTERDRIVES VC
- r31 -


Setpoint channel
Speed controller
Torque/current limit
Current controller
Gating unit
n957.90 = 0
Torque limitation
Current model
EMF Model
Normalization
Asyc. Mot. 3~
Motor encoder
*) Parameter can only be changed in the "Drive setting" status P60=5
<1> Compact PLUS: X104
Closed-loop speed control (P100=4)
Master drive (P587 = 0)
MASTERDRIVES VC
- r4 -


Setpoint channel
Speed limitation controller
Torque/current limit
Current controller
Gating unit
n957.91 = 0
Torque limitation
*) Parameter can only be changed in the "Drive setting" status (P60=5)
<1> Compact PLUS: X104
Closed-loop speed control / torque control (P100=4/5)
Slave drive (P587 = 1)
MASTERDRIVES VC
- r5 -

Parameter assignments depending on setpoint source (P368) and control type (P100):

Parameter description		P368 = Setpoint source							
		P368 = 0 PMU + MOP 1)	P368 = 1 Analog inp. + terminals	P368 = 2 FSetp + terminals	P368 = 3 MOP + terminals	P368 = 4 USS	P368 = 6 PROFI-BUS	P368 = 7 OP1S + FSetp	P368 = 8 OP1S + MOP
P554.1	Src ON/OFF1	B0005	B0022	B0022	B0022	B2100	B3100	B2100 1) B6100 2)	B2100 1) B6100 2)
P555.1	Src OFF2	1	B0020	B0020	B0020	B2101	B3101	1	1
P561.1	Src InvRelease	1	B0016	1	1	1	1	1	1
P565.1	Src1 Fault Reset	B2107	B2107	B2107	B2107	B2107	B2107	B2107 1) B6107 2)	B2107 1) B6107 2)
P567.1	Src3 Fault Reset	0	B0018	B0018	B0018	0	0	0	0
P568.1	Src Jog Bit0	0	0	0	0	B2108	B3108	B2108 1) B6108 2)	0
P571.1	Src FWD Speed	1	1	1	1	B2111	B3111	B2111 1) B6111 2)	1
P572.1	Src REV Speed	1	1	1	1	B2112	B3112	B2112 1) B6112 2)	B2112 1) B6112 2)
P573.1	Src MOP Up	B0008	0	0	B0014	0	0	0	B2113 1) B6113 2)
P574.1	Src MOP Down	B0009	0	0	B0016	0	0	0	B2114 1) B6114 2)
P580.1	Src FixSetp Bit0	0	0	B0014	0	0	0	0	0
P581.1	Src FixSetp Bit1	0	0	B0016	0	0	0	0	0
P590	Src BICO DSet	B0014 *	0	0	0	0	B0014	B0014 *	B0014 **
P651.1	Src DigOut1	B0107 *	B0107	B0107	B0107	B0107	B0107	B0107 *	B0107 *
P652.1	Src DigOut2	B0104 *	B0104	B0104	B0104	B0104	B0104	B0104 *	B0104 *
P653.1	Src DigOut3	0 *	B0115	0	0	0	0	0 *	0 *
P654.1	Src DigOut4	0	0	0	0	0	0	0	0
Setpoint conn. parameter		KK0058	K0011	KK0040	KK0058	K2002	K3002	KK0040	KK0058

*** For factory setting P366 = 2, 3**

- P590 = B0012
- P651 = B0000
- P652 = B0000
- P653 = B0107

**** For factory setting P366 = 4 1):**

- P590 = B4102

Bxxxx = Binector (Digital signal; values 0 and 1)
Kxxxx = Connector (16-bit signal; 4000h = 100 %)
KKxxxx = Double connector (32-bit signal; 4000 0000h = 100 %)

v/f characteristic + n/f-control: Setpoint connector parameter (Setp-KP) = P443

T-control + n/f control: Setpoint connector parameter (Setp-KP) = P486

1) only applicable for Compact/Chassis unit
2) only applicable for Compact PLUS

		P100 = control type					
Parameter description		**P100 = 0 V/f + n**	**P100 = 1 V/f**	**P100 = 2 Textile**	**f-Reg. (P587 = 0)**	**n-Reg. (P587 = 0)**	**P100 = 5 T-Reg.**
P038.1	DispTorqConn.r39.1	-	-	-	-	-	Sw-KP
P038.1	DispTorqConn.r39.2	-	-	-	-	-	K0165
P040.1	DispSpdConn.r41.1	Setp CP	Setp CP	Setp CP	Setp CP	Setp CP	KK0150
P040.2	DispSpdConn.r41.2	KK0148	KK0148	KK0148	KK0148	KK0148	KK0148
P040.3	Disp Freq Conn.r41.3	-	-	-	KK0091	KK0091	KK0091
P042.1	Disp Freq Conn.r43.1	Setp CP	Setp CP	Setp CP	Setp CP	Setp CP	KK0150
P042.2	Disp Freq Conn.r43.2	KK0148	KK0148	KK0148	KK0148	KK0148	KK0148
P042.3	Disp Freq Conn.r43.3	KK0199	KK0199	KK0199	KK0091	KK0091	KK0091

6.2.2 Parameterizing with user settings

During parameterization by selecting user-specific fixed settings, the parameters of the unit are described with values which are permanently stored in the software. In this manner, it is possible to carry out the complete parameterization of the units in one step just by setting a few parameters.

The user-specific fixed settings are not contained in the standard firmware; they have to be compiled specifically for the customer.

NOTE

If you are interested in the provision and implementation of fixed settings tailored to your own requirements, please get in contact with your nearest SIEMENS branch office.

P060 = 2

Select "Fixed settings" menu

P366 = ?

Select desired factory setting

0...4: Factory settings
5: User setting 1 (currently as P366 = 0)
6: User setting 2 (currently as P366 = 0)
:
10: Lift and lifting equipment

P970 = 0

Start parameter reset

0: Parameter reset
1: No parameter change

Unit carries out parameter reset and then leaves the "Fixed settings" menu

Fig. 6-3 Sequence for parameterizing with user settings

6.2.3 Parameterizing by loading parameter files (download P060 = 6)

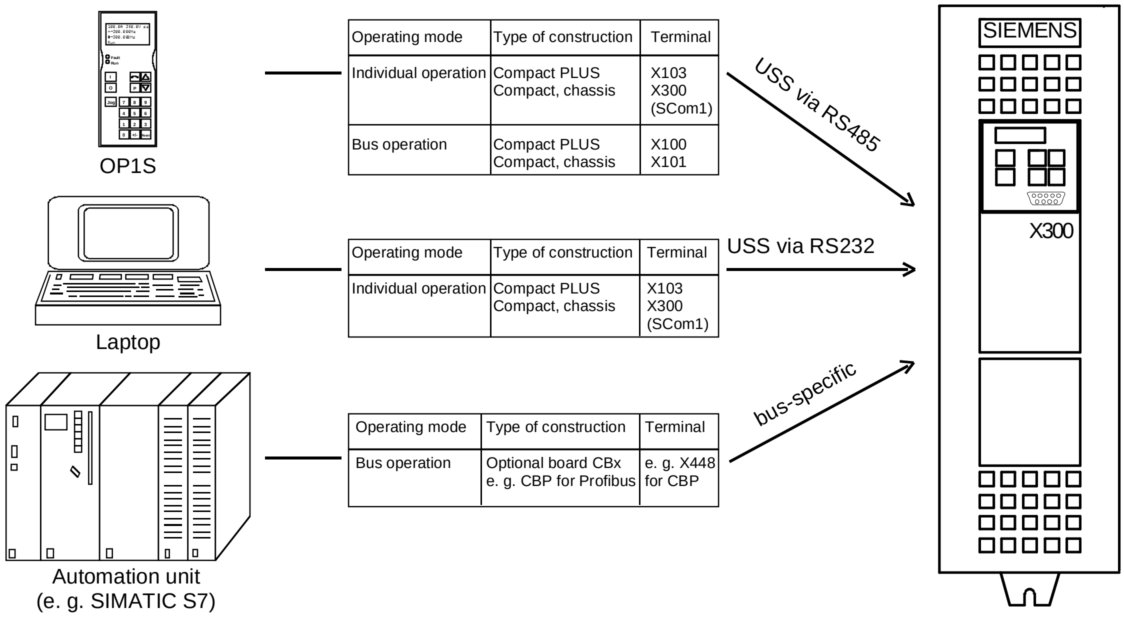
Download

When parameterizing with download, the parameter values stored in a master unit are transferred to the unit to be parameterized via a serial interface. The following can serve as master units:

1. OP1S operator control panel
2. PCs with SIMOVIS service program
3. Automation units (e.g. SIMATIC)

The interface SCom1 or SCom2 with USS protocol of the basic unit (SCom2 for Compact PLUS type unit (only OP1S)) and field bus interfaces used for parameter transfer (e.g. CBP for PROFIBUS DP) can serve as serial interfaces.

Using download, all changeable parameters can be set to new values.



Operating mode	Type of construction	Terminal
Individual operation	Compact PLUS Compact, chassis	X103 X300 (SCom1)
Bus operation	Compact PLUS Compact, chassis	X100 X101

Operating mode	Type of construction	Terminal
Individual operation	Compact PLUS Compact, chassis	X103 X300 (SCom1)

Operating mode	Type of construction	Terminal
Bus operation	Optional board CBx e. g. CBP for Profibus	e. g. X448 for CBP

Fig. 6-4 Parameter transfer from various sources by download

Downloading with the OP1S

The OP1S operator control panel is capable of upreading parameter sets from the units and storing them. These parameter sets can then be transferred to other units by download. Downloading with the OP1S is thus the preferred method of parameterizing replacement units in a service case.

During downloading with the OP1S, it is assumed that the units are in the as-delivered state. The parameters for power section definition are thus not transferred. (Refer to Section "Detailed parameterization, power section definition")

Parameter number	Parameter name
P060	Menu selection
P070	Order No. 6SE70..
P072	Rtd Drive Amps(n)
P073	Rtd Drive Power(n)

Table 6-6 Parameters you cannot overwrite during download

The OP1S operator control panel also stores and transfers parameters for configuring the USS interface (P700 to P704). Depending on the parameterization of the unit from which the parameter set was originally upread, communication between the OP1S and the unit can be interrupted on account of changed interface parameters after downloading has been completed. To enable communication to re-commence, briefly interrupt the connection between the OP1S and the unit (disconnect OP1S or the cable). The OP1S is then newly initialized and adjusts itself after a short time to the changed parameterization via the stored search algorithm.

Download with SIMOVIS / DriveMonitor

With the aid of the SIMOVIS and DriveMonitor PC programs, parameter sets can be upread from the units, saved to the hard disk or to floppy disks, and edited offline. These parameter sets, stored in parameter files, can then be downloaded to the units again.

The offline parameter editing facility can be used to produce special parameter files to suit a particular application. In such cases, the files need not contain the full set of parameters but can be limited to the parameters relevant to the application in question. For further information, see under "Upread / Download" in the "Parameterization" section.

NOTICE

Successful parameterization of the units by download is only ensured if the unit is in the "Download" status when the data is being transferred. Transition into this status is achieved by selecting the "Download" menu in P060.

P060 is automatically set to 6 after the download function has been activated in the OP1S or in the SIMOVIS service program.

If the CU of a converter is replaced, the power section definition has to be carried out before parameter files are downloaded.

If only parts of the entire parameter list are transferred by download, the parameters of the following table must always be transferred too, as these automatically result during the drive setting from the input of other parameters. During download, however, this automatic adjustment is **not** carried out.

Parameter number	Parameter name
P109	Pole pair number
P352	Reference frequency = P353 x P109 / 60
P353	Reference frequency = P352 x 60 / P109

Table 6-7 Parameters which always have to be loaded during download

If parameter P115 = 1 is set during download, the automatic parameterization is then carried out (according to the setting of parameter P114). In automatic parameterization, the controller settings are calculated from the motor rating plate data and the reference values P350 to P354 are set to the motor rated values of the first motor data set.

If the following parameters are changed during download, they are **not** then re-calculated by the automatic parameterization:

P116, P128, P215, P216, P217, P223, P235, P236, P237, P240, P258, P259, P278, P279, P287, P291, P295, P303, P313, P337, P339, P344, P350, P351, P352, P353, P354, P388, P396, P471, P525, P536, P602, P603.

6.2.4 Parameterization by running script files

As an alternative to parameter set downloading, script files serve for parameterizing MASTERDRIVES units.

A script file is a text file which makes use of a simple command syntax in order to execute individual commands for parameterizing a unit. Unlike parameter set downloading, this offers the advantages of structured design and interactive user prompting, and it is also possible to introduce converter statuses and to trigger "background computations" in the converter. For information about writing and running script files, see under "Script files" in the"Parametrization" section.

6.3 Detailed parameterization

Detailed parameterization should always be used in cases where the application conditions of the units are not exactly known beforehand and detailed parameter adjustments need to be carried out locally. An example of a typical application is initial start-up.

6.3.1 Power section definition

The power section definition has already been completed in the as-delivered state. It therefore only needs to be carried out if the CUVC needs replacing, and is not required under normal circumstances.

During the power section definition, the control electronics is informed which power section it is working with. This step is necessary for all Compact, chassis and cabinet type units.

WARNING

If CUVC boards are changed over between different units without the power section being re-defined, the unit can be destroyed when it is connected up to the voltage supply and energized.

The unit has to be switched to the "Power section definition" state for carrying out the power section definition. This is done by selecting the "Power section definition" menu. The power section is then defined in this menu by inputting a code number.

P060 = 8 — **Select "Power section definition" menu**

↓

P070 = ? — **Input the code number for the unit concerned**
The code number is allocated to the order numbers (MLFB).
The order number can be read off the unit's rating plate.
The list of units is on the following pages.

↓

P060 = 1 — **Return to parameter menu**

Fig. 6-5 Sequence for performing the power section definition

NOTICE

To check the input data, the values for the converter supply voltage in P071 and the converter current in P072 should be checked after returning to the parameter menu. They must tally with the data given on the unit rating plate.

PWE: Parameter value P070
In [A]: Rated output current in Ampere (P072)

6.3.1.1 List of units for Compact PLUS frequency converter

Order number	In [A]	PWE
6SE7011-5EP60	1.5	1
6SE7013-0EP60	3.0	3
6SE7015-0EP60	5.0	5
6SE7018-0EP60	8.0	7
6SE7021-0EP60	10.0	9
6SE7021-4EP60	14.0	13
6SE7022-1EP60	20.5	15
6SE7022-7EP60	27.0	17
6SE7023-4EP60	34.0	19

6.3.1.2 List of units for Compact PLUS inverter

Order number	In [A]	PWE
6SE7012-0TP60	2.0	2
6SE7014-0TP60	4.0	4
6SE7016-0TP60	6.1	6
6SE7021-0TP60	10.2	8
6SE7021-3TP60	13.2	12
6SE7021-8TP60	17.5	14
6SE7022-6TP60	25.5	16
6SE7023-4TP60	34.0	18
6SE7023-8TP60	37.5	20

6.3.1.3 List of units for Compact frequency converter

3 AC 200 V to 230 V

Order number	In [A]	PWE
6SE7021-1CA60	10.6	14
6SE7021-3CA60	13.3	21
6SE7021-8CB60	17.7	27
6SE7022-3CB60	22.9	32
6SE7023-2CB60	32.2	39
6SE7024-4CC60	44.2	48
6SE7025-4CD60	54.0	54
6SE7027-0CD60	69.0	64
6SE7028-1CD60	81.0	70

3AC 380 V to 480 V

Order number	In [A]	PWE
6SE7016-1EA61	6.1	3
6SE7018-0EA61	8.0	9
6SE7021-0EA61	10.2	11
6SE7021-3EB61	13.2	18
6SE7021-8EB61	17.5	25
6SE7022-6EC61	25.5	35
6SE7023-4EC61	34.0	42
6SE7023-8ED61	37.5	46
6SE7024-7ED61	47.0	52
6SE7026-0ED61	59.0	56
6SE7027-2ED61	72.0	66

3AC 500 V to 600 V

Order number	In [A]	PWE
6SE7014-5FB61	4.5	1
6SE7016-2FB61	6.2	5
6SE7017-8FB61	7.8	7
6SE7021-1FB61	11.0	16
6SE7021-5FB61	15.1	23
6SE7022-2FC61	22.0	30
6SE7023-0FD61	29.0	37
6SE7023-4FD61	34.0	44
6SE7024-7FD61	46.5	50

6.3.1.4 List of units for Compact inverter

DC 270 V to 310 V

Order number	In [A]	PWE
6SE7021-1RA60	10.6	15
6SE7021-3RA60	13.3	22
6SE7021-8RB60	17.7	28
6SE7022-3RB60	22.9	33
6SE7023-2RB60	32.2	40
6SE7024-4RC60	44.2	49
6SE7025-4RD60	54.0	55
6SE7027-0RD60	69.0	65
6SE7028-1RD60	81.0	71

DC 510 V to 650 V

Order number	In [A]	PWE
6SE7016-1TA61	6.1	4
6SE7018-0TA61	8.0	10
6SE7021-0TA61	10.2	12
6SE7021-3TB61	13.2	19
6SE7021-8TB61	17.5	26
6SE7022-6TC61	25.5	36
6SE7023-4TC61	34.0	43
6SE7023-8TD61	37.5	47
6SE7024-7TD61	47.0	53
6SE7026-0TD61	59.0	57
6SE7027-2TD61	72.0	67

DC 675 V to 810 V

Order number	In [A]	PWE
6SE7014-5UB61	4.5	2
6SE7016-2UB61	6.2	6
6SE7017-8UB61	7.8	8
6SE7021-1UB61	11.0	17
6SE7021-5UB61	15.1	24
6SE7022-2UC61	22.0	31
6SE7023-0UD61	29.0	38
6SE7023-4UD61	34.0	45
6SE7024-7UD61	46.5	51

6.3.1.5 List of units for chassis-type frequency converter

3AC 200 V to 230 V

Order number	In [A]	PWE
6SE7031-0CE60	100.0	13
6SE7031-3CE60	131.0	29
6SE7031-6CE60	162.0	41
6SE7032-0CE60	202.0	87

3AC 380 V to 480 V

Order number	In [A]	PWE Air-cooled	PWE Water-cooled
6SE7031-0EE60	92.0	74	-
6SE7031-2EF60	124.0	82	-
6SE7031-5EF60	146.0	90	-
6SE7031-8EF60	186.0	98	-
6SE7032-1EG60	210.0	102	-
6SE7032-6EG60	260.0	108	-
6SE7033-2EG60	315.0	112	-
6SE7033-7EG60	370.0	116	-
6SE7035-1EK60	510.0	147	233
6SE7036-0EK60	590.0	151	237
6SE7037-0EK60	690.0	164	168

3AC 500 V to 600 V

Order number	In [A]	PWE Air-cooled	PWE Water-cooled
6SE7026-1FE60	61.0	60	-
6SE7026-6FE60	66.0	62	-
6SE7028-0FF60	79.0	68	-
6SE7031-1FF60	108.0	78	-
6SE7031-3FG60	128.0	84	-
6SE7031-6FG60	156.0	94	-
6SE7032-0FG60	192.0	100	-
6SE7032-3FG60	225.0	104	-
6SE7033-0FK60	297.0	136	222
6SE7033-5FK60	354.0	141	227
6SE7034-5FK60	452.0	143	229

3AC 660 V to 690 V

Order number	In [A]	PWE Air-cooled	PWE Water-cooled
6SE7026-0HF60	55.0	58	-
6SE7028-2HF60	82.0	72	-
6SE7031-0HG60	97.0	76	-
6SE7031-2HF60	118.0	80	-
6SE7031-5HG60	145.0	88	-
6SE7031-7HG60	171.0	96	-
6SE7032-1HG60	208.0	106	-
6SE7033-0HK60	297.0	137	223
6SE7033-5HK60	354.0	142	228
6SE7034-5HK60	452.0	146	232

6.3.1.6 List of units for chassis-type inverter

DC 270 V to 310 V

Order number	In [A]	PWE
6SE7031-0RE60	100.0	20
6SE7031-3RE60	131.0	34
6SE7031-6RE60	162.0	86
6SE7032-0RE60	202.0	92

DC 510 V to 650 V

Order number	In [A]	PWE Air-cooled	PWE Water-cooled
6SE7031-0TE60	92.0	75	-
6SE7031-2TF60	124.0	83	-
6SE7031-5TF60	146.0	91	-
6SE7031-8TF60	186.0	99	-
6SE7032-1TG60	210.0	103	-
6SE7032-6TG60	260.0	109	-
6SE7033-2TG60	315.0	113	-
6SE7033-7TG60	370.0	117	-
6SE7035-1TJ60	510.0	120	206
6SE7036-0TJ60	590.0	123	209
6SE7037-0TK60	690.0	126	212
6SE7038-6TK60	860.0	127	213
6SE7041-1TM60	1100.0	134	-
6SE7041-1TK60	1100.0	135	221
6SE7041-3TM60	1300.0	140	226
6SE7041-6TM60	1630.0	150	236
6SE7042-1TQ60	2090.0	153	239
6SE7041-3TL60	1300.0	154	199
6SE7037-0TJ60	690.0	163	167
6SE7038-6TS60	6450.0	181	247
6SE7041-1TS60	6270.0	185	250
6SE7042-5TN60	2470.0	194	244

DC 675 V to 810 V

Order number	In [A]	PWE Air-cooled	PWE Water-cooled
6SE7026-1UE60	61.0	61	-
6SE7026-6UE60	66.0	63	-
6SE7028-0UF60	79.0	69	-
6SE7031-1UF60	108.0	79	-
6SE7031-3UG60	128.0	85	-
6SE7031-6UG60	156.0	95	-
6SE7032-0UG60	192.0	101	-
6SE7032-3UG60	225.0	105	-
6SE7033-0UJ60	297.0	110	200
6SE7033-5UJ60	354.0	114	202
6SE7034-5UJ60	452.0	118	204
6SE7035-7UK60	570.0	121	207
6SE7036-5UK60	650.0	124	210
6SE7038-6UK60	860.0	128	214
6SE7041-0UM60	990.0	130	216
6SE7041-1UM60	1080.0	132	218
6SE7041-2UM60	1230.0	138	224
6SE7041-4UM60 6SE7041-4UQ60	1400.0	144	230
6SE7041-6UM60 6SE7041-6UQ60	1580.0	148	234
6SE7041-1UL60	1080.0	155	195
6SE7042-4UR60	2450.0	157	
6SE7041-2UL60	1230.0	159	197
6SE7043-3UR60	3270.0	161	-
6SE7044-1UR60	4090.0	165	-
6SE7044-8UR60	4900.0	169	-
6SE7045-7UR60	5720.0	173	-
6SE7046-5UR60	6540.0	177	-
6SE7036-5US60	4940.0	179	245
6SE7038-6US60	6540.0	182	248
6SE7041-1US60	6160.0	186	251
6SE7041-2US60	5840.0	188	253
6SE7042-1UN60	2050.0	190	240
6SE7042-3UN60	2340.0	192	242

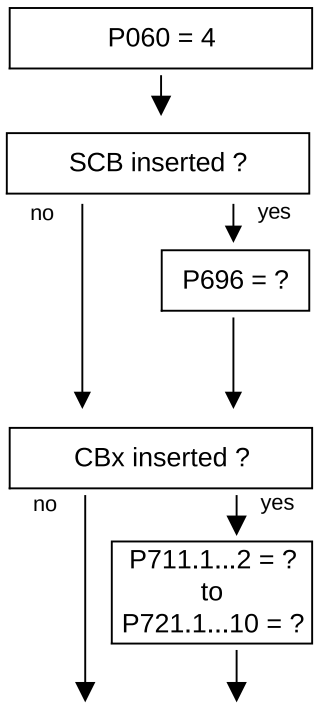
DC 890 V to 930 V

Order number	In [A]	PWE Air-cooled	PWE Water-cooled
6SE7026-0WF60	60.0	59	-
6SE7028-2WF60	82.0	73	-
6SE7031-0WG60	97.0	77	-
6SE7031-2WG60	118.0	81	-
6SE7031-5WG60	145.0	89	-
6SE7031-7WG60	171.0	97	-
6SE7032-1WG60	208.0	107	-
6SE7033-0WJ60	297.0	111	201
6SE7033-5WJ60	354.0	115	203
6SE7034-5WJ60	452.0	119	205
6SE7035-7WK60	570.0	122	208
6SE7036-5WK60	650.0	125	211
6SE7038-6WK60	860.0	129	215
6SE7041-0WM60	990.0	131	217
6SE7041-1WM60	1080.0	133	219
6SE7041-2WM60	1230.0	139	225
6SE7041-4WM60 6SE7041-4WQ60	1400.0	145	231
6SE7041-6WM60 6SE7041-6WQ60	1580.0	149	235
6SE7034-5WK60	452.0	152	238
6SE7041-1WL60	1080.0	156	196
6SE7042-4WR60	2450.0	158	-
6SE7041-2WL60	1230.0	160	198
6SE7043-3WR60	3270.0	162	-
6SE7044-1WR60	4090.0	166	-
6SE7044-8WR60	4900.0	170	-
6SE7045-7WR60	5720.0	174	-
6SE7046-5WR60	6540.0	178	-
6SE7036-5WS60	4940.0	180	246
6SE7038-6WS60	6540.0	183	249
6SE7041-1WS60	6160.0	187	252
6SE7041-2WS60	5840.0	189	254
6SE7042-1WN60	2050.0	191	241
6SE7042-3WN60	2340.0	193	243

6.3.2 Board configuration

During board configuration, the control electronics is informed in what way the installed optional boards have to be configured. This step is always necessary when CBx or SLB optional boards are used.

The unit must be switched to the "Board configuration" status for this purpose. This is done by selecting the "Board configuration" menu. In this menu, parameters are set which are required for adapting the optional boards to the specific application (e.g. bus addresses, baud rates, etc.). After leaving the menu, the set parameters are transferred and the optional boards are initialized.



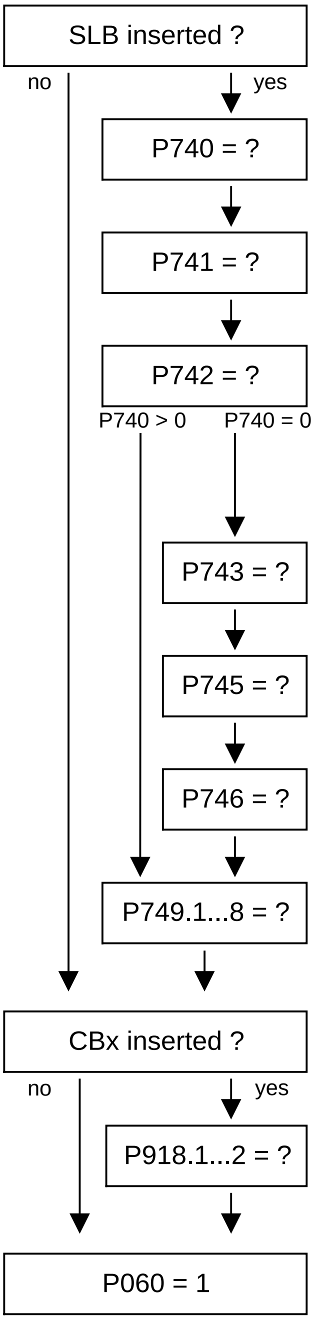
Select "Board configuration" menu

Serial communications board
NOTE: Not for Compact PLUS units

SCB protocol
0: SCI
1: USS 4-wire
2: USS 2-wire
3: Peer-to-Peer

Communications board (e.g. Profibus-DP)

Enter the CB parameters 1 to 11 necessary for the inserted communications boards CBx
The necessary CB parameters and their significance can be derived from the function diagrams of the individual communications boards.



SIMOLINK bus interface

Enter the SLB module address

0:	Unit operates as a dispatcher
greater than 0:	Unit operates as a transceiver

Enter the SLB telegram failure time in ms

0:	No monitoring
greater than 0:	Monitoring time in ms

Enter the SLB transmit power (for plastic fiber-optic cables)

1: weak	up to 15 m fiber-optic cable length
2: medium	up to 25 m fiber-optic cable length
3: strong	up to 40 m fiber-optic cable length
NOTE:	If glass fiber-optic cables are used, the possible lengths are increased by the factor 7.5.

Enter the number of modules (incl. dispatcher) in the SIMOLINK ring

Enter the number of channels per module

Enter the SIMOLINK cycle time in ms

Enter the SLB read addresses

Communications board (e.g. Profibus-DP)

Enter the CB bus addresses

Return to the parameter menu

Board codes

The visualization parameter r826.x is used for displaying the board codes. These codes enable the type of installed electronic boards to be determined.

Parameter	Index	Position
r826	1	Basic board
r826	2	Slot A
r826	3	Slot B
r826	4	Slot C (not for Compact PLUS)
r826	5	Slot D (not for Compact PLUS)
r826	6	Slot E (not for Compact PLUS)
r826	7	Slot F (not for Compact PLUS)
r826	8	Slot G (not for Compact PLUS)

If a T100, T300 or TSY [1)] technology board (mounting position 2) or an SCB1 [1)] or SCB2 [1)] (mounting position 2 or 3) is used, the board code can be found in the following indices:

Parameter	Index	Position
r826	5	Mounting position 2
r826	7	Mounting position 3

General board codes

Parameter value	Meaning
90 to 109	Mainboards or Control Unit
110 to 119	Sensor Board (SBx)
120 to 129	Serial Communication Board (Scx) [1)]
130 to 139	Technology Board
140 to 149	Communication Board (Cbx)
150 to 169	Special boards (Ebx, SLB)

1) only applicable for Compact/Chassis unit

Special board codes

Board	Meaning	Parameter value
CUVC	Control Unit Vector Control	92
CUMC	Control Unit Motion Control	93
CUMC+	Control Unit Motion Control Compact PLUS	94
CUVC+	Control Unit Vector Control Compact PLUS	95
CUA	Control Unit AFE	106
CUSA	Control Unit Sinus AFE	108
TSY	Tacho and synchronization board	110
SBP	Sensor Board Puls	111
SCB1	Serial Communication Board 1 (fiber-optic cable)	121
SCB2	Serial Communication Board 2	122
T100	Technology board	131
T300	Technology board	131
T400	Technology board	134
CBX	Communication Board	14x
CBP	Communication Board PROFIBUS	143
CBD	Communication Board DeviceNet	145
CBC	Communication Board CAN Bus	146
CBL	Communication Board CC-Link	147
CBP2	Communication Board PROFIBUS 2	148
EB1	Expansion Board 1	151
EB2	Expansion Board 2	152
SLB	SIMOLINK bus interface	161

6.3.3 Drive setting

The drive setting function extends the start-up facilities of quick parameterization.

During the drive setting, the control electronics is informed about the incoming voltage supply with which the drive converter is operating, about the connected motor and about the motor encoder. In addition, the motor control (V/f open-loop control or vector control) and the pulse frequency are selected. If required, the parameters necessary for the motor model can be calculated automatically. Furthermore, the normalization values for current, voltage, frequency, speed and torque signals are determined during the drive setting.

For start-up of the induction motor, first enter the manufacturer's parameters completely (see below):

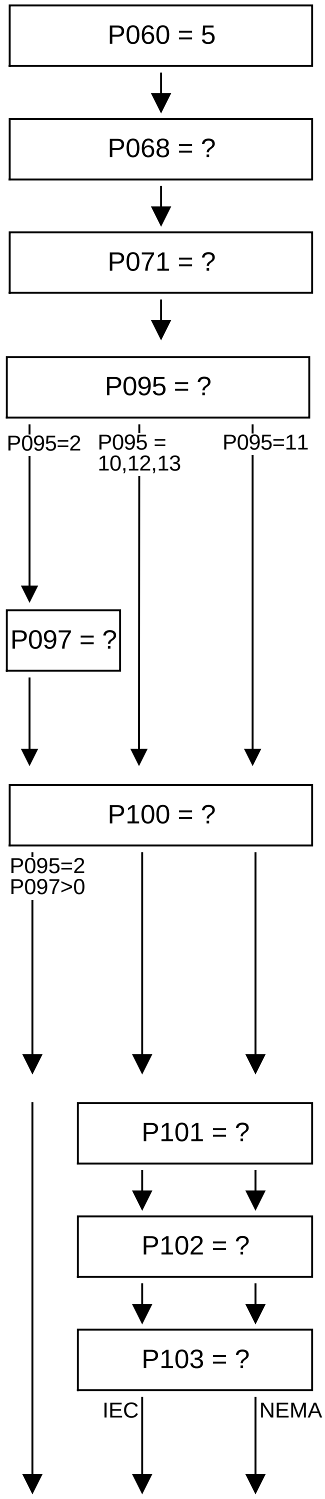
- In doing so, you must observe whether the induction motor has a star or a delta connection.
- You must always use the S1 data from the rating plate.
- You must enter the r.m.s. base frequency of the rated voltage and not the total r.m.s. value (including harmonic content) for converter operation.
- You must always enter the correct rated motor current **P102** (rating plate). If there are two different rated currents on the rating plate for special fan motors, you must use the value for M ~ n for constant torque (not M ~ n^2). A higher torque can be set with the torque and active-current limits.
- The accuracy of the rated motor current has a direct effect on the torque accuracy, as the rated torque is normalized to the rated current. If a rated current is increased by 4 %, this will also approximately result in a 4 % increase in the torque (referred to the rated motor torque).
- For group drives, you have to enter the total rated current **P102** = $x^*I_{mot,rated}$
- If the rated magnetizing current is known, you should enter it during the drive setting in **P103** (in % $I_{mot,rated}$). If this is done, the results of the "Automatic parameterization" (**P115** = 1) will be more precise.

- As the rated magnetizing current **P103** (not to be confused with the no-load current during operation with rated frequency **P107** and rated voltage **P101**) is usually not known, you can first enter 0.0 %. With the aid of the power factor (cosPHI) **P104,** an approximate value is calculated and displayed in **r119**.
  Experience shows that the approximation supplies values which are rather on the large side in the case of motors with a high rating (over 800 kW), whereas it supplies values which are slightly too low in the case of motors with low rating (below 22 kW).
  The magnetizing current is defined as a field-generating current component during operation at the rated point of the machine (U = **P101**, f = **P107**, n = **P108**, i = **P102**).
- The rated frequency **P107** and the rated speed **P108** automatically result in the calculation of the pole pair number **P109**. If the connected motor is designed as a generator and the generator data are on the rating plate (oversynchronous rated speed), you have to correct the pole pair number manually (increase by 1 if the motor is at least 4-pole), so that the rated slip (**r110**) can be correctly calculated.
- For induction motors, you have to enter the actual rated motor speed, and not the synchronous no-load speed in **P108**, i.e. the slip frequency at nominal load has to be derived from parameters **P107...P109**.
- The rated motor slip (1 - **P108**/60 x **P109**/**P107**) should usually be greater than 0.35 % x **P107.**
  These low values are, however, only achieved in the case of motors with a very high rating (above approx. 1000 kW).
  Motors with average rating (45..800 kW) have slip values around 2.0...0.6 %.
  Motors with low rating (below 22 kW) can also have slip values up to 10 %.
- It is possible to achieve a more accurate evaluation of the rated slip after standstill measurement (**P115** = 2) by taking into account the temperature evaluation for the rotor resistance **P127**.
  On cold motors (approx. 20 °C), the value is usually around 70 % (± 10 %) and on warm motors (operating temperature) around 100 % (± 10 %). If there are any large differences, you can proceed on the assumption that the rated frequency **P107** or the rated speed **P108** do not correspond to the real values.
- If the rated motor frequency (engineered!) is below 8 Hz, you have to set **P107** = 8.0Hz in the drive setting. The rated motor voltage **P101** has to be calculated in the ratio 8 Hz / $f_{Mot,N}$ and the rated motor speed **P108** should result in the same slip:
  P108 = ((8 Hz **- P107**$_{old}$) x 60 / **P109**) + **P108**$_{old}$.

WARNING

During motor identification (P115 = 2...7) inverter pulses are released and the drive rotates!

For reasons of safety, identification should first be carried out without coupling of the load.



Select "Drive setting" menu

Output filter
0 = without output filter
1 = with sinusoidal output filter
2 = with dv/dt output filter

Input unit line voltage in V
AC units: r.m.s. alternating voltage
DC units: DC link voltage

Enter type of motor
2: Compact asynchronous motor 1PH7(=1PA6)/1PL6/1PH4
10: Async./sync. IEC (international standard)
11: Async./sync. NEMA (US standard)
12: Sync. motor, separately excited (special applications, not V/f characteristic)
13: Sync. motor, permanently excited (special applications, not v/f characteristic)

Enter the code number for the connected motor of type 1PH7(=1PA6)/1PL6/1PH4
(See Appendix for list)
(Automatic parameterization is carried out if you set P095 = 2 and P097 > 0)

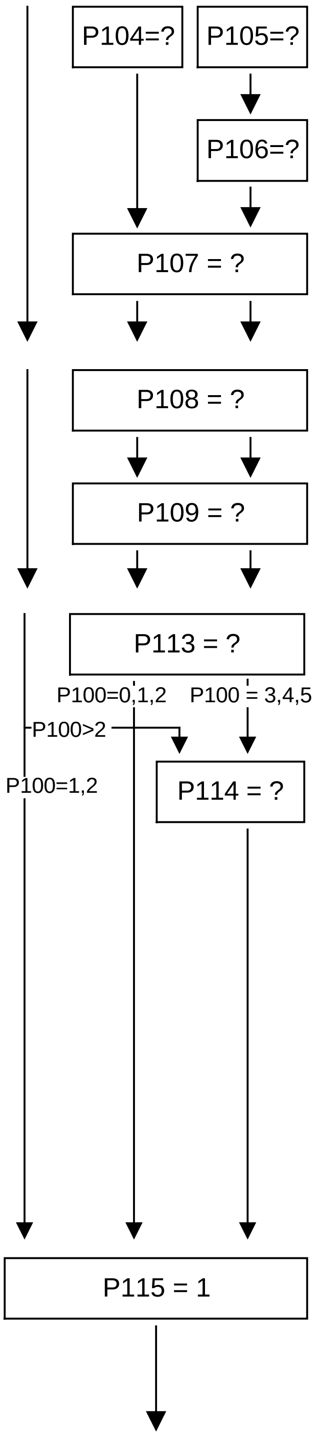
Enter the type of open/closed-loop control
0: v/f control + n control
1: v/f control
2: v/f control, textile
3: Speed control without tachometer (f control)
4: Speed control with tachometer (n control)
5: Torque control (M control)

Note: For motor ratings over approx. 200 kW one of the vector control types should be used (P100 > 2).

Enter the rated motor voltage in V
as per rating plate

Enter the rated motor current in A
as per rating plate
(Group drives: total of all motor currents)

Enter the motor magnetizing current as a % of the rated motor current
If value is not known, set P103 = 0, the value is then automatically calculated when you exit Drive setting (see r119).



IEC motor: Cos (phi) as per rating plate
NEMA motor: rated output [Hp]
(Group drives: total of all output ratings)

NEMA motor: Enter the motor efficiency in %
as per rating plate

Enter the rated motor frequency in Hz
as per rating plate

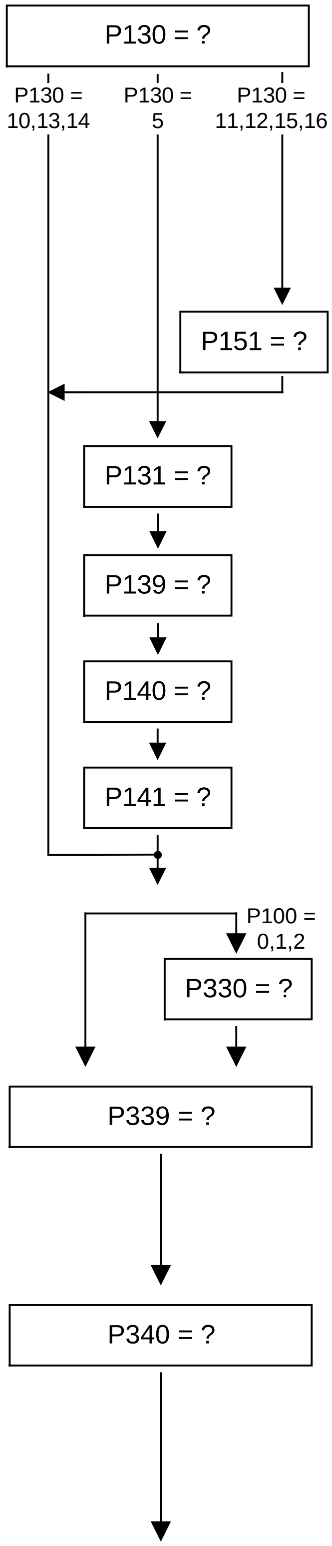
Enter the rated motor speed in rpm
as per rating plate

Enter the motor pole pair number
(This is calculated automatically)

Enter the rated motor torque in Nm
as per rating plate or motor catalog (this is only used for normalizing the process data and visualization parameters)

WARNING!
INCORRECT SETTINGS CAN BE DANGEROUS!
Process-related conditions for closed-loop control
0: Drive for standard applications (e.g. pumps)
1: Drive with strong torsion, gear play, large moments of inertia (e.g. paper machine)
2: Drive for very dynamic accelerations (without load inertia) (e.g. shears)
3: Drive for strong schock stressing (e.g. roll drive)
4: Drive with high smooth running characteristics at low speeds.
5: Drives with modest response requirements, which can be optimized in their efficiency with frequent part-load operation.
6: Drive with high starting torque.
7: Dynamic torque response in field-weakening range
See next section for description

Calculate motor model for "Automatic parameterization"
Reference values P350 to P354 are set to the rated motor values.
The motor parameters and controller settings are calculated.



Select the motor encoder

5: External SBP board
10: Without motor encoder
11: Pulse encoder (default if P095=2, P097>0)
12: Pulse encoder with control track
13: Analog input 1
14: Analog input 2
15: Pulse encoder with zero track
16: Pulse encoder with zero and control track

Enter the pulse number/revolution of the pulse encoder

Select TmpSensor

0: KTY84 (evaluation via P380/P381)
3: PT100 (evaluation only possible for SBP)

Configuration of setpoint encoder

Setpoint encoder pulse number

Reference frequency of setpoint encoder

Characteristic 0: Linear characteristic (constant torque drives)
1: Parabolic characteristic (fans/pumps)

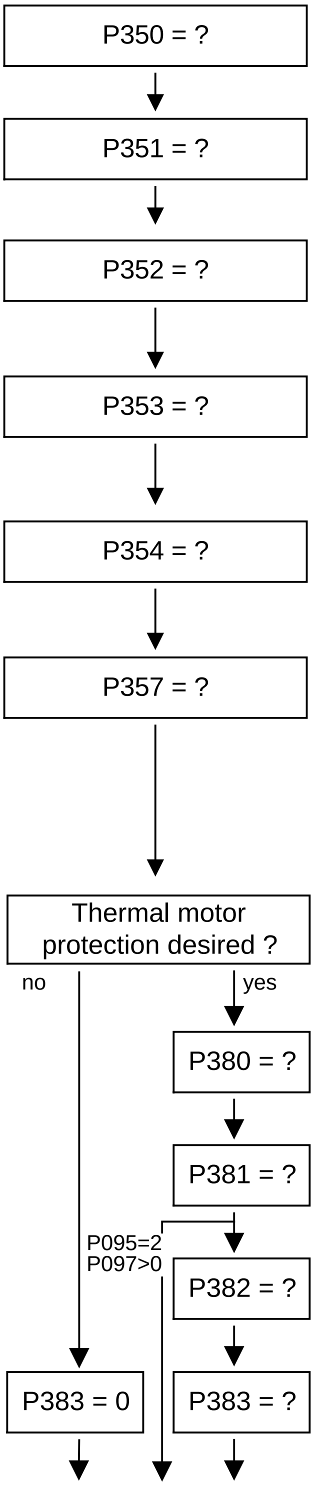
Release the edge modulation systems (FLM)

0: All systems
1: Edge modulation systems from 60 Hz
2: Edge modulation systems from 100 Hz
3: No edge modulation systems
4: Overmodulated space vector modulation

Enter the pulse frequency in kHz

Pulse frequency for asynchronous space vector modulation
Notes:

- The adjustable range depends on the converter/inverter
- An increase in the pulse frequency results in a reduction of the maximum output current (see "Technical Data", derating curves)



Enter the reference value for all current quantities in A
(Normalization quantity for current limitations as well as current setpoints and actual values) (see example in section 6.2.1)

Enter the reference value for all voltage quantities in V
(Normalization quantity for voltage limitations as well as voltage setpoints and actual values)

Enter the reference value for all frequency quantities in Hz
(Normalization quantities for frequency limitations, frequency setpoints and actual values) (see example in section 6.2.1)
Note: The parameter P353 is automatically adjusted.

Enter the reference value for all speed quantities in rpm
(Normalization quantity for speed limitations, speed setpoints and actual values) (see example in section 6.2.1)
Note: The parameter P352 is automatically adjusted.

Enter the reference value for all torque quantities in Nm
(Normalization quantity for torque limitations, torque setpoints and actual values) (see example in section 6.2.1)

Enter the sampling time T0 in ms
The sampling time T0 is for determining the calculating frequency of all functions.
The sampling times T1...T19 are multiples of sampling time T0
NOTICE: A very short sampling time T0 can lead to a calculation time overload if several function blocks are activated at the same time!

System with motor protection according to UL regulation?
The motor temperature is calculated via the motor current.
(Motor overload protection in accordance with UL regulation activated as default setting!)

Enter the motor temperature for output of the alarm A023 "Motor overtemperature" (evaluation with KTY84)
(PTC evaluation: P380 = 1 °C)

Enter the motor temperature for output of the fault F020 "Motor overtemperature" (evaluation with KTY84)
(PTC evaluation: P381 = 1 °C)

Specify motor cooling
0: self-ventilated
1: force-ventilated (default if P095 = 2, P097 > 0)

Enter the thermal time constant of the motor in s
(< 100 s: monitoring deactivated)
(default if P095 = 2, P097 > 0)

P384.02 = 0 | P384.02 = ?

Enter the motor load limit 1...300 %

P452 = ?

Enter the maximum frequency or speed in positive direction of rotation in %
The value is referred to P352 (reference frequency) and P353 (reference speed)

P453 = ?

Enter the maximum frequency or speed in negative direction of rotation in %
The value is referred to P352 (reference frequency) and P353 (reference speed)

P060 = 1

Return to the parameter menu

Note
When the "Drive settings" menu is exited, the entered parameter values are checked for their plausibility. Non-plausible parameter settings result in a fault. The erroneously set parameters are entered in parameter r949 (fault value).

P128 = ?

Enter the maximum output current in A

P462 = ?

Enter the acceleration time from standstill up to reference frequency (P352)

P463 = ?

Enter the unit for acceleration time P462
0 = Seconds
1 = Minutes
2 = Hours

P464 = ?

Enter the deceleration time from reference frequency (P352) up to standstill

P465 = ?

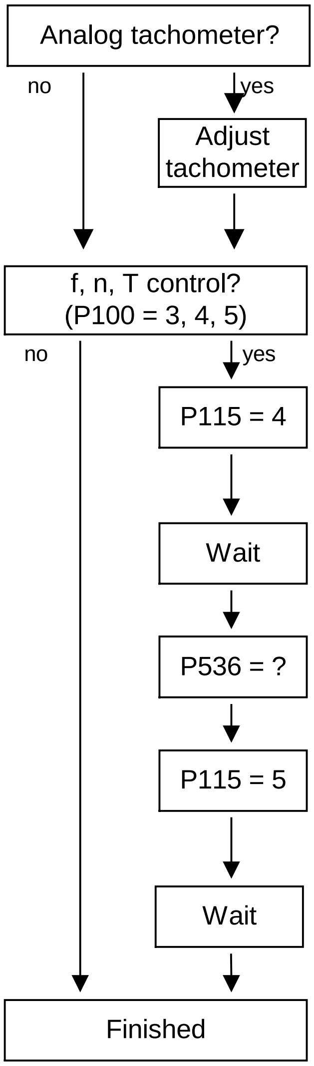
Enter the unit for deceleration time P464
0 = Seconds
1 = Minutes
2 = Hours

Sinusoidal filter (P068=1)
or
synchronous motor?

no | yes

P115 = 2

Calculate motor model "Motor identification at standstill"
NOTICE
Current flows through the motor and the rotor rotates!
After pressing the "P" key, the alarm message "A087" appears.
The converter must be turned on within 20 secs!



Analog tachometer present?

Adjust tachometer
Tachometer to ATI: See operating instructions for ATI
Tachometer to terminal strip: See function diagrams for analog inputs

Calculate motor model "No-load measurement"
NOTICE: Current flows through the motor, the rotor rotates!
After "P" key is pressed, the alarm message "A080" appears.
The converter must be switched on within 20 seconds!

Wait until the converter is "Ready for ON" again (°009)
For fault "Fxxx", refer to chapter "Faults and alarms"

Enter the dynamic performance of the speed control circuit in %
Important for subsequent controller optimization.

Calculate motor model "Controller optimization"
NOTICE: Current flows through the motor, the rotor rotates!
After "P" is pressed, the alarm message "A080" appears.
The converter must be switched on within 20 seconds!

Wait until the converter is powered-down
(Operating status "Ready for ON" (°009))
For fault "Fxxx", see chapter "Faults and alarms"

6.4 Notes regarding parameterization

The parameter list covers the setting parameters and visualization parameters of all available motor types (induction motors and synchronous motors), as well as all possible open-loop and closed-loop control modes (e.g. V/f characteristic, speed control).

The constellation under which this parameter is influenced or whether it is displayed at all is indicated under "Preconditions" in the parameter description.

Unless otherwise specified, all percentage values refer to the reference quantities in P350 to P354.

If reference quantities are changed, this will also change the significance of the parameters with percentage normalization (e.g. P352 = Maximum frequency).

Reference quantities

Reference variables are intended as an aid to presenting setpoint and actual value signals in a uniform manner. This also applies to fixed settings entered as a "percentage". A value of 100 % corresponds to a process data value of 4000h, or 4000 0000 h in the case of double values.

All setpoint and actual value signals (e.g. set speed and actual speed) refer to the physically applicable reference variables. In this respect, the following parameters are available:

P350	Reference current	in A
P351	Reference voltage	in V
P352	Reference frequency	in Hz
P353	Reference speed	in rpm
P354	Reference torque	in Nm

In quick parameterization mode and in automatic parameter assignment mode (P115 = 1(2,3)), these reference variables are set to the motor ratings. In case of automatic parameter assignment, this occurs only if the "Drive setting" converter status is activated.

Speed and frequency reference values

The reference speed and reference frequency are always connected by the pole pair number.

$$P353 = P352 \times \frac{60}{P109}$$

If one of the two parameters is changed, the other is calculated using this equation.

Since this calculation is not made on download (see section 6.2.3), these two quantities must always be loaded in the correct relationship.

If the setpoint and actual control signals are related to a desired reference speed in rpm, P353 must be set accordingly (P352 is calculated automatically). If a rotational frequency in Hz is to be used as the reference (calculated using the pole pair number P109), P352 must be set.

Torque reference value

Since the torque signals and parameters in the control system are always specified and displayed as a percentage, the ratio of the reference torque (P354) to the rated motor torque (P113) is always important for accuracy. If both values are the same, a display value of 100 % corresponds exactly to the rated motor torque, irrespective of the values actually entered in P354 and P113.

For purposes of clarity, however, it is advisable to enter the true rated torque of the drive in P113 (e.g. from catalog data).

$$P113 = \frac{P_{W\,(mot,\,rated)}}{\frac{2 \cdot \pi \cdot n(mot,rated)}{60}}$$

Reference power value

The reference power (in W) is calculated from the reference torque and reference speed:

$$R_{W,ref} = \frac{P354 \cdot P353 \cdot 2 \cdot \pi}{60}$$

Power values for the control system are also always specified as a percentage referred to the specified reference power. The ratio of $P_{W,ref}$ / $P_{mot,rated}$ can be used for conversion to the rated motor power.

$$P_{mot,rated} = \frac{P113 \cdot 2 \cdot \pi \cdot P108}{60}$$

Reference current value

If the reference torque P354 is increased, for example, the reference current P350 must be increased by the same factor, because the current increases at higher torque.

NOTE

Setting and visualization parameters in engineering units (e.g. Imax in A) must also be no more than twice the reference value.

If the reference quantities are changed, the physical value of all parameters specified as a percentage also changes; that is all the parameters of the setpoint channel, as well as the maximum power for the control system (P258, P259) and the static current for frequency control (P278, P279).

If the reference values and the rated motor values are identical (e.g. following quick parameterization), signal representation (e.g. via connectors) up to twice the rated motor values is possible. If this is not sufficient, you must change to the "Drive setting" menu (P060 = 5) to change the reference quantities.

Example

P107 = 52.00 Hz	Rated motor frequency
P108 = 1500.0 rpm	Rated motor speed
P109 = 2	Motor pole pair number

Pre-assignment:

P352 = 52.00 Hz	Reference frequency
P353 = 1560 rpm	Reference speed

For a maximum speed of four times the rated motor speed you must set the reference speed to at least 3000 rpm. The reference frequency is adjusted automatically (P352 = P353 / 60 x P109).

P352 = 100.00 Hz

P353 = 3000 rpm

A setpoint speed of 1500 rpm corresponds to a setpoint frequency of 50.00 Hz or an automation value of 50.0 %.

The representation range ends at 6000 rpm (2 x 3000 rpm).

This does not affect the internal representation range of the control system. Since the internal control signals refer to the rated motor quantities, there is always sufficient reserve control capacity.

The reference speed should normally be set to the desired maximum speed.

Reference frequencies of P352 = P107, P352 = 2 x P107, P352 = 4 x P107 are favorable for the calculating time.

For a maximum torque of three times the rated motor torque (P113) it is advisable to set the reference torque to between twice and four times the value of parameter P113 (for four to eight times the representation range).

Separately excited synchronous motors

Function diagrams and start-up instructions for separately excited synchronous motors (with damping cage and excitation via sliprings) are available as separate instructions.

The following parameters are only effective for these synchronous motors:

P75 to P88; P155 to r168, P187, P258, P274, P297, P298, P301, r302, P306 to P312.

Automatic parameterization and motor identification

The following parameters are calculated or set to fixed values during automatic parameterization (P115 = 1):

P116	P236	P295	P337
P117	P240	P303	P339
P120	P258	P306	P344
P121	P259	P313	P347
P122	P273	P315	P348
P127	P274	P316	P388
P128	P278	P319	P392
P161	P279	P322	P396
P215	P283	P325	P471
P216	P284	P326	P525
P217	P287	P334	P536
P223	P291	P335	P602
P235	P293	P336	P603

♦ P350 to P354 are only set to the rated motor quantities in the converter status "Drive setting" (P060 = 5) or "Quick parameterization (P060 = 3).

♦ In the converter state "Drive setting" (not in converter state "Ready"), automatic parameterization is also performed on selection of zero-speed measurement P115 = 2, 3.

♦ During the standstill measurement P115 = 2, 3, the following parameters are measured or calculated:
  - P103, P120, P121, P122, P127, P347, P349.
    The controller settings resulting from these values are in: P283, P284, P315, P316.

♦ During the rotating measurement P115 = 3, 4, P103 and P120 are adjusted.

♦ During the n/f controller optimization P115 = 5, the parameters P116, P223, P235, P236, P240 and P471 are determined.

In principle, automatic parameterization (P115 = 1) or motor identification (P115 = 2, 3) should be carried out as soon as one of the following parameters are adjusted in the converter status "Drive setting" (P060 = 5):

P068 = Output filter

P095 = Motor type

P097 = Motor number

P100 = Control type

P101...P109 = Motor rating plate data

P339 = Release of modulation system

P340 = Pulse frequency

P357 = Sampling time

In exceptional cases this is not necessary:

- ♦ If P068 is only adjusted between 0 and 2 (dv/dt filter).
- ♦ If P340 is adjusted in integer increments, e.g. from 2.5 kHz to 5.0 kHz...7.5 kHz... etc.
- ♦ If P339 is not set to over-modulated space vector modulation; if P339 = 4, 5 (over-modulated space vector modulation), the overrange limit P342 must also be reduced to limit torque ripple and motor heating.
- ♦ If changeover is made between speed and torque control (P100 = 4, 5).
- ♦ If changeover is made between speed and frequency control and the following parameters are adapted:

	f-control (P100 = 3)	**n-control (P100 = 4)**
P315 = EMF Reg.Kp	2 x Kp	Kp
P223 = Smooth.n/f(act)	≥ 0 ms	≥ 4 ms
P216 = Smooth. n/f(pre)	≥ 4.8 ms	≥ 0.0 ms
P222 = Src n/f(act)	KK0000	KK0000 (KK0091)

The speed controller dynamic response may have to be reduced in the case of encoder-less speed control (frequency control) (Reduce gain (P235); increase Tn (P240)).

Temperature monitoring of the motor

Activation of the measured value or PTC thermistor monitoring for the motor causes different fault and alarm signals depending on the setting of parameters P380 and P381. These are listed in the following table:

P380 / °C	**P381 / °C**	**Sensor**	**r009**	**Alarm A23 in ready**	**Alarm A23 in operation**	**Fault F20 in ready**	**Fault F20 in operation**
= 0	= 0	KTY84 for RL adapt.	if P386 = 2	-	-	-	-
= 0	= 1	PTC	no	-	-	-	yes 1)
= 1	= 0	PTC	no	yes 1)	yes 1)	-	-
= 1	= 1	PTC	no	yes 1)	-	-	yes 1)
= 0	> 1	KTY84	yes	-	-	-	yes 3)
> 1	= 0	KTY84	yes	yes 3)	yes 3)	yes 4)	yes 2)
> 1	> 1	KTY84	yes	yes 3)	yes 3)	yes 4)	yes 3)
= 1	> 1	KTY84	no	yes 1)	-	-	yes 3) 2)
> 1	= 1	KTY84	no	yes 3)	yes 3)	yes 4)	yes 2)

1) Alarm or fault are triggered on violation of the PTC thermistor temperature or on a cable break (not a cable short circuit).

2) Fault is only triggered on cable break or cable short-circuit.

3) Fault or alarm on violation of the temperature limit..

4) Fault is only triggered on cable short-circuit.

6.4.1 Drive setting according to process-related boundary conditions

In order to support start-up, process-related characteristics can be entered in **P114.** In a subsequent automatic parameterization **(P115** = 1) or motor identification **(P115** = 2, 3) and controller optimization **(P115** = 3, 5), parameter adjustments are made in the closed-loop control which are advantageous for the selected case, as experience has shown.

The parameter adjustments can be taken from the following table. The table clearly shows which parameters have a decisive influence on the closed-loop control. The values themselves are understood to be qualitative values and can be further adjusted according to the process-related requirements.

If the type of process-related boundary conditions is not evident in the current case (e.g. high smooth running characteristics at low speeds with simultaneously fast acceleration processes), the parameter settings can also be combined (manually). In any case, it is always sensible to perform start-up with the **standard setting** in order to then set the indicated parameters one after the other.

The settings of P114 = 2...4 are only possible if no gearless conditions are present

P114 =
- 0: Standard drive (e.g. pumps, fans)
- 1: Torsion, gear play and large moments of inertia (e.g. paper machines)
- 2: Acceleration drives with constant inertia (e.g. shears)
- 3: High load surge requirements (in the case of f-control only possible from approx. 20%fmot,n)
- 4: High smooth running characteristics at low speeds (in the case of n-control; with a high encoder pulse number)
- 5: Efficiency optimization at partial load by flux reduction (low dynamic loading drives)
- 6: High start-up torque (heavy-duty start-up)
- 7: Dynamic torque response in the field-weakening range (e.g. motor test beds)

Only deviations from the standard setting (P114 = 0) are indicated:

	P114 = 0	P114 = 1	P114 = 2	P114 = 3	P114 = 4	P114 = 5	P114 = 6	P114 = 7
P216=Smooth n/f(FWD)	0ms (n-ctrl.) 4ms (f-ctrl.)	4.8ms (n-ctrl.)						
P217=Slip Fail Corr'n.	0=off		2=on (n-ctrl)					2=on
P223=Smooth n/f(act)	4ms (n-ctrl.) 0ms (f-ctrl.)	100ms						
P235=n/f-Reg Gain1	3.0 or 5.0				12.0 (n-ctrl.)			
P236=n/f-Reg Gain2	3.0 or 5.0				12.0 (n-ctrl.)			
P273=Smooth Isq(set)	6*P357 (T0)							3*P357
P240=n/f-Reg Tn	400ms				40ms (n-ctrl.)			
P279=Torque (dynamic)	20.0%						80% (f-ctrl.)	0
P287=Smooth Vd(act)	9		0	0				
P291=FSetp Flux(set)	100%					110%		
P295=Efficiency Optim.	100%=off	99.9%				50%		
P303=Smooth Flux(set)	10-20ms	60ms				100 (n-ctrl.) 500 (f-ctrl.)		
P315=EMF Reg Gain	Gain(n)		1.5*Gain(n) (f-ctrl.)	1.5*Gain(n) (f-ctrl.)				
P339=ModSystRelease	0=All syst	3=only RZM	3=only RZM	3=only RZM	3=only RZM			3=only RZM
P344=ModDepthHeadrm	0.0%	3.0%	3.0%					30.0%
P536=n/f RegDyn(set)	50%	20%	100 (n-ctrl.) 50% (f-ctrl.)	200 (n-ctrl.) 100 (f-ctrl.)	200 (n-ctrl.) 50% (f-ctrl.)	25%	100 (n-ctrl.) 50% (f-ctrl.)	00% (n-ctrl.)

RZM = Space vector modulation

The gain Kp of the speed controller (P235, P236) depends on the inertia of the drive and has to be adapted if necessary.

Symmetrical optimum: P235 = 2 x P116 / P240

$Kp = 2 \times T_{start\text{-}up} / Tn$

The start-up time is the time taken by the drive to accelerate to rated speed when the rated torque is specified. This is determined during automatic speed controller optimization.

Notes for the setting of parameters

The following explanations provide additional information to that contained in the respective parameter descriptions.

With **P114** = 0, automatic parameterization is set for reliable operation of all application examples with average dynamic performance. The relevant parameter values are indicated in the first column of the table.

P216 **= Smooth n/f (FWD):**

Smoothing for the pre-control speed is only used with n/T closed-loop control if gearlessness results in steps in the speed signal. The time constant should not be greater than approx. 10 ms because the control could become unstable in such a case.

P217 **= Slip fail corr'n:**

The slip failure correction compensates for runtime effects of the digital closed-loop controls. In doing so, the speed signal is differentiated. A "clean" encoder signal is a prerequisite for its activation to make sure that no vibrations are induced.

P223 **= Smooth n/f(act):**

Whenever signal ripples of the speed actual-value for n/f control cause a rise in the speed control circuit (also in conjunction with mechanical resonances), smoothing P223 should be increased.

It is particularly necessary in the case of gearlessness and torsion to adjust the smoothing (if need be up to approx. 400 ms). At the same time, the integral-action time of the speed controller must be increased. The gain Kp has to be increased in order to reduce the setting times again.

P235, P236 **= n/f-Reg Gain1,2:**

The gain of the speed controller is set at high default values for n/T control in order to improve the smooth running characteristics. This is not purposeful in the case of f-control because the controller no longer operates at low speeds.

As the gain is dependent on the inertia of the drive, an automatic controller optimization should be carried out, if possible. A "clean" encoder signal is required for fast response values. The number of pulse encoder pulses should be above 2000 for speeds below 10 rpm.

P240 **= n/f-Reg. Tn:**

The integral-action time of the speed controller is written to values for 200 % dynamic response for n/T control. The value increases with the 4-fold value of P223.

P273 **= Smooth Isq (set):**

This smoothing can be reduced for dynamic current build-up in the field-weakening area. For this it is necessary to have sufficient modulation depth headroom (P344 = ModDepth Headrm), which generally requires a mains voltage or DC link voltage increased to the rated motor voltage.

Increasing P273 reduces overshoot of the actual current value in the event of sudden increases in torque with inadequate voltage reserves.

P279 **= Torque (dynamic):**

For a heavy-duty start, the dynamic torque is written at 80%T(mot,n) for f-control. As a result of this, the current amount (preset by P278 Torque(static) in the low-speed range (i model) when the ramp-function generator is active. The total torque from P278 and P279 must be at least 10 % higher than the greatest occurring load torque in order to prevent the drive from stalling.

P287 **= SmoothDCBusVolts(act):**

The Vd correction is set more dynamically by reducing the smoothing time, in order to ensure correct precontrol of the current controller if there are rapid changes in the DC link bus voltage. As smoothing is automatically increased in the range of optimized pulse patterns, it is sensible for the pulse-edge modulation (P339 = 3) to be disabled in this context.

P291 **= FSetp Flux (set):**

Flux setpoint in the basic speed range. A load-dependent flux boost to 110 % may be appropriate for efficiency optimization. For this, P295 must be set to values below 100 %.

P295 **= Efficiency Optim:**

Drives which are continuously operated in the partial load range (below 30 % load) can be improved in their efficiency by a load-dependent flux reduction (to a minimum of 50 %). The flux build-up and reduction is smoothed via P303. The dynamic performance of the speed controller has to be reduced.

If flux tracking is powered up (99.9 %), the differentiation of the flux setpoint for forming the field-generating current component is switched off. This enables a calmer controller response to be achieved in the field weakening range for slow acceleration and deceleration times without negatively influencing flux build-up und reduction. For fast acceleration, the field-generating current is reduced, but flux build-up and reduction are slowed down.

A further reduction of the value does not then make sense. The flux setpoint smoothing time constant P303 does not have to be increased as it does for load-dependent flux reduction.

P303 **= Smooth Flux (set):**

Smoothing of the flux setpoint must be switched on during load-dependent flux reduction in order to rule out the risk of unstable control performance.

In the field weakening range, the flux setpoint may have to be smoothed for the sake of a calmer control performance.

P315 **= cEMF Reg Gain:**

The EMF controller is responsible for generating the speed actual-value during frequency control. For dynamic closed-loop control, the EMF controller must therefore also be set more dynamically. In general, high-response drives without an encoder should only be used if the operating speeds are higher than approx. 20 %.

P339 **= ModSystemRelease:**

During complete pulse-edge modulation system release (P339 = 0) the modulation depth is raised to a maximum of 96 % (Uoff = Uon). For this, a switchover of the modulation systems in the gating unit is necessary (optimized pulse pattern = flange-edge modulation).As the sampling rate of current control decreases in this range while, on the other hand, the torque ripple increases slightly, pulse-edge modulation has to be disabled for highly dynamic and very sensitive systems (P339 = 3).

If space vector modulation is overmodulated (P339 = 4), the maximum modulation depth P342 must be restricted to approx. 90 %.

P344 **= ModDepth Headrm**

The modulation depth headroom increases the interval between the setpoint voltage and the maximum voltage in the field weakening area in a steady-state (not dynamic) manner. The modulation depth headroom prevents a switchover of the current controller dynamic response when it reaches the voltage limit.

P348 **= Dead Time Comp**

To reduce the torque ripple (with 6-fold stator frequency) in the speed range from approx. 10 Hz, it may be appropriate in the case of motors above approx. 11 kW to switch in the deadtime compensation of the gating unit. Software with at least version 3.1 and a CUVC controller module with a version higher than C are necessary in this case.

P536 **= n/f RegDyn(set):**

Dynamic response of the speed control circuit only affects the setting of the speed controller during automatic controller optimization (P115 = 5). A dynamic value of 200 % corresponds to the symmetrical optimum. This cannot be achieved on geared drives or with load-dependent flux reduction.

The dynamic response must, however, be increased in case of load surges and for requirements on the smooth running characteristics (and maybe in the case of rapid accelerations).

6.4.2 Changes to the function selection parameter (P052) VC(former)

The function selection parameter P052 of the firmware versions for the previous MASTERDRIVES VC units was used to select the various special functions and start-up steps. In order to make this important parameter more comprehensible for the user, the function groups "Special functions" and "Start-up steps" in the CUVC firmware have now been stored in two different parameters as follows:

P052 Function selection → **P060** Menu selection (Special functions)

P052 Function selection → **P115** Calculation of motor parameters

Fig. 6-6 Division of parameter P052(former) into P060 and P115

In addition to this, the new special function "User parameter" has been introduced, and the special function "Drive setting" (P052 = 5) has been subdivided into the functions "Quick parameterization" and "Drive setting". The new special function "Quick parameterization" involves parameterization for standard applications, and the new special function "Drive setting" involves parameterization for expert applications.

The special function "Download/Upread" (P052 = 3) has been subdivided into the functions "Download" and "Upread".

P060	Menu selection	P052 (former)	Function selection
0=	User parameter	--	See parameter list P060
1=	Parameter menu	0=	Return
2=	Fixed settings 1)	1=	Param. Reset
3=	Quick parameterization	5=	Drive Setting
4=	Board configuration	4=	HW Config.
5=	Drive setting	5=	Drive Setting
6=	Download	3=	Download
7=	Upread	3=	Download
8=	Power section definition	2=	MLFB input

1) Selection in the factory setting menu (P366 Factory setting type, activation with P970)

P115	Calculation of motor model	P052 (former)	Function selection
1=	Automatic parameterization	6=	Auto Param.
2=	Motor identification at standstill	7=	Mot ID Stop
3=	Complete motor identification	8=	Mot ID All
4=	No-load measurement	9=	No Load Meas
5=	n/f controller optimization	10=	Reg Optim.
6=	Self-test	11=	Auto Test
7=	Tachometer test	12=	Tach Test

The new special function P060 = 0 (User parameter) enables the user to put together an important list of parameters especially for his own application.

When P060 = 0 (User parameter) is selected, apart from parameters P053, P060 and P358, only those parameters whose numbers have been entered in indices 4 to 100 of parameter P360 are visible.

7 Functions

7.1 Basic functions

7.1.1 Time slots

The microprocessor system processes the function blocks sequentially. Each function block requires a certain calculating time and must be re-processed within a specified time. The microprocessor system therefore makes different times available to each individual function block. These times are designated as time slots.

A time slot is the period of time within which all output values of a function block are newly calculated.

NOTE

The following texts refer to function diagram 702 "Setting and monitoring the sampling times and sampling sequence".

The terms "Time slot" and "Sampling time" have a synonymous meaning in the documentation and are interchangeable.

7.1.1.1 Time slots T2 to T20

T2 represents the shortest possible time slot within which a function block can be processed. The sampling time T0 is set in parameter P357.

T2 = T0 = P357

The sampling time T0 forms the basis for all further time slots.

The time slots T3 to T10 and time slot T20 are available in addition to time slot T2. The time slots T3 to T10 are derived from the time slot T0.

Time slot T20 is used as an archive for function blocks which are not needed. Function blocks stored in time slot T20 are not processed.

Overview of the time slots

Time slot *)	Dependency on T0	Duration in ms
T2	T0	1.2
T3	2 x T0	2.4
T4	4 x T0	4.8
T5	8 x T0	9.6
T6	16 x T0	19.2
T7	32 x T0	38.4
T8	64 x T0	76.8
T9	128 x T0	153.6
T10	256 x T0	307.2
T20	none	archive

*) Value for P2950, P2951, P2952, P2953

7.1.1.2 Processing sequence

The time slots are processed in the sequence of their priority, whereby time slot T2 has the highest priority and time slot T10 the lowest priority. Each higher-priority time slot can interrupt a lower-priority time slot.

The sequence control of the converters and inverters starts every time slot automatically. If a higher-priority time slot is started, although another time slot is being processed, the time slot having the lower priority will be stopped and the time slot having the higher priority will then be processed before the interrupted time slot can be further processed.

Lower-priority time slots are lined up in a queue and are not processed until all higher-priority time slots are finished.

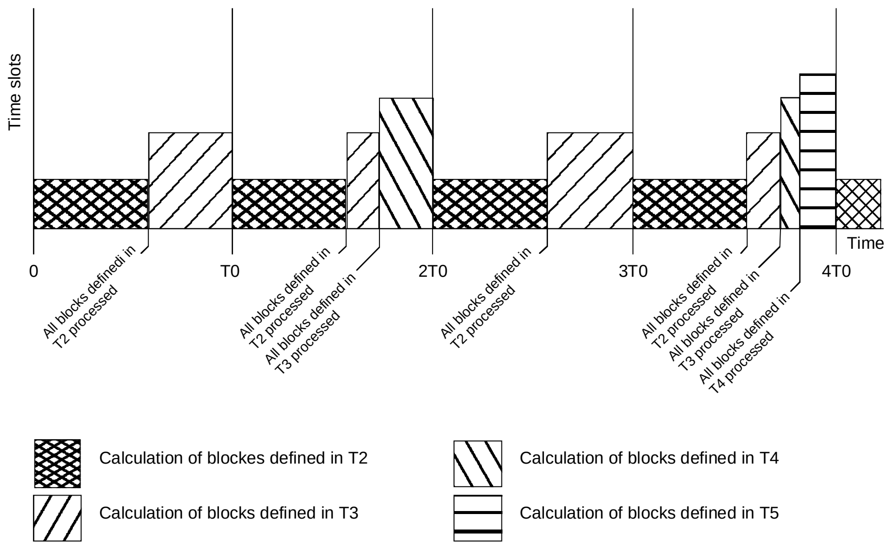


Fig. 7-1 Processing sequence of the time slots

7.1.1.3 Assignment of function blocks to time slots

To enable function blocks to carry out processing, a time slot (sampling time) must be assigned to each function block. Assignment is carried out by parameterizing in a table.

Time slot table

The time slot table consists of parameters U950 to U953. These parameters are indexed and have 100 indices each. Each index is assigned to precisely one function block. This means that the time slot in which the relevant function block is to be processed can be entered in the respective index.

The following applies regarding the assignment of the function block number to the parameter number with index:

Parameter number	Parameter index	Assigned function block
U950	001 ... 098 099	1 ... 98 99
U951	001 ... 098 099	101 ... 198 199
U952	001 ... 098 099	201 ... 298 299
U953	001 ... 098 099	301 ... 398 399

The following assignment applies regarding the parameterization of time slots in parameters U950 to U953:

Time slot	Parameter value
T2	2
T3	3
T4	4
T5	5
T6	6
T7	7
T8	8
T9	9
T10	10
T20	20

Examples:

1. Function block 350 should be processed in time slot T4:
   U953.50 = 4
2. Function block 390 should be processed in time slot T9:
   U953.90 = 9
3. Function block 374 should not be processed:
   U953.74 = 20

NOTE

When the units are delivered, time slots are already assigned to the function blocks. You should adjust these to suit your requirements once you have determined the interconnection of the function blocks.

7.1.2 Processing sequence of the function blocks

7.1.2.1 Time monitoring

Depending on the number and frequency of the blocks to be processed, the microprocessor system of the units has a varying degree of utilization. In order to avoid any dangerous overloading, the operating system has a time monitoring facility which

- ♦ monitors the system for its overall workload,
- ♦ monitors the various time slots to ensure they are being completely processed within the allocated time,
- ♦ generates a fault message if the calculating time for T2, T3, T4, T5 is not adequate and
- ♦ generates an alarm message if the calculating time for T2 to T7 is not adequate.

7.1.2.2 Influencing the time response

The time response affects two different areas:

- ♦ Calculation workload
- ♦ Control response

Calculation workload

You can influence the calculation workload as follows:

- ♦ By changing the sampling time P357. With a short sampling time, less calculating time is available per time slot. With a long sampling time, more calculating time is available per time slot.
- ♦ By assigning function blocks to different time slots.

If you assign too many function blocks to one time slot, it is no longer possible to process all function blocks within the specified time. The time monitoring facility generates an alarm message and de-energizes the unit if the alarm occurs repeatedly.

Control response

- ♦ You can influence the control response as follows
- ♦ By changing the sampling time P357. With a short sampling time, the reaction time is reduced. With a long sampling time, the reaction time is extended.
- ♦ By assigning function blocks to other time slots.
- ♦ By changing the processing sequence.
- ♦ By changing time-relevant parameters.

If you assign a function block to a slow time slot (e.g. T10), the result of this function block is only seldom re-calculated, i.e. the long processing time acts on the control circuit as a delay element. If you change the processing sequence of two consecutive function blocks by having an output block calculated before the associated input block, you will have integrated a delay element of the duration of one time slot into the control circuit.

Rules

You should observe the following rules regarding the assignment of function blocks to the time slot table and the processing table:

- ♦ Function blocks which can be combined to form a function group (with a mutual task) should be processed in the same time slot.
- ♦ Function blocks should be processed in the fastest necessary time slot, not in the fastest possible time slot.
- ♦ The sequence in which the function blocks are entered in the processing table should correspond to the signal flow.

7.2 Converter functions

7.2.1 Automatic restart (WEA)

Description

The automatic restart function (WEA) can be used for automatic fault acknowledgement and for automatic restart of the unit after a power failure has occurred (F006 "DC link overvoltage" and F008 "DC link undervoltage") as well as to permanently activate the "Flying restart" function, without the need for the operating personnel to intervene.

Please refer to the "Faults and Alarms" chapter regarding the fault messages F006 "DC link overvoltage" and F008 "DC link undervoltage".

Parameters for setting the automatic restart function (WEA)

P373.M **WEA**
Value range: 0 to 13

P373 = 0 WEA is inhibited.

P373 = 1 Only reset after power has been restored after power failure.

The fault message F008 "DC link undervoltage" (power failure) is acknowledged if this did not occur for an OFF or JOG command or for motor data identification MOTID.

The automatic restart function does **not** automatically switch on the converter.

P373 = 2 Restarting the drive after restoration of power.

The fault message F008 "DC link undervoltage" (power failure) is acknowledged if this did not occur for an OFF or JOG command or for motor data identification MOTID.

Once fault reset has occurred, the unit has to wait in the "Switch-on inhibit" status (008) for the wait time (P374) to elapse before the WEA function automatically restarts the unit.

If the flying restart function has been activated via the control word bit 23, the wait time (P374) is ignored.

The unit is only restarted if the ON command (control word bit 0) is still present once the power has been restored.
Therefore, the automatic restart function is not possible with a parameterized ON command (control word bit 0) via PMU or OP1!

P373 = 3 The drive is always powered up with automatic flying restart

As in the case of P373 = 2, however, the flying restart function is always activated irrespective of the control word bit 23.

The wait time (P374) is ignored.

Flying restart is activated every time the unit is switched on, even if no power failure has occurred beforehand!
A description of the additionally necessary settings for the flying restart function is contained in the "Flying restart" section.

P373 = 4 to 10 reserved

P373 = 11,12,13 Function as for P373 = 1, 2, 3, but the fault F006 "DC link overvoltage" is reset.

P374.M WEA wait time
Value range 0 s to 650 s

Wait time between recovery of power and restart of the converter when the automatic restart function is activated.

The wait time is not effective if P373 = 3, 13 or if control word bit 23 is set.

Alarm A065 (Auto restart active)

The alarm is set after a power failure when automatic restart is active, and is reset after switch-on of the unit and completion of precharging.

When the unit is restarted by the automatic restart function, the precharging time is not monitored, with the result that fault F002 "DC link precharging" cannot occur.

The unit can also be manually shut down during this switch-on phase by an OFF command (see Chapter "Faults and Alarms").

Special cases

- If the unit has an external aux. power supply, a fault is acknowledged and the unit is restarted dependent on parameter P373 even though there is still a power failure!
  The alarm A065 "Auto restart active" is continuously present until power has been restored!
- If other faults have occurred at the same time as fault message F008 "DC link undervoltage" (power failure), these are also acknowledged dependent on parameter P373!
- If the "Kinetic buffering" function is also activated, when the power fails, this is first executed before fault trip F008 occurs and before automatic restart intervenes.

WARNING

During power failures and activated automatic restart function (P373 = 2, 3, 12, 13), the unit can automatically restart when power is restored and after expiry of the wait time P374 (does not apply if the flying restart function is activated).

For this reason, the drive could be at a standstill for a long period of time and could be accidentally mistaken for being switched off.

If the drive area is approached when the drive is in this status, death or severe bodily injury or material damage could occur.

NOTICE

If the flying restart function is not activated and P373 = 2, overload trip F011 could occur or the motor could be suddenly braked when the unit is restarted and the motor is still rotating!
Thus, the wait time P374 must be selected high enough to ensure that the motor comes to a standstill before the switch-on command!

7.2.2 Kinetic buffering (KIB) (function diagram 600)

Description

The kinetic buffering function allows brief power failures to be buffered by utilizing the kinetic energy (i.e. inertia) of the connected load.

In this case, the frequency is controlled (closed-loop) so that the system losses are covered by a regenerative motor operation.

Function diagram 600 shows how kinetic buffering operates.

As the losses remain during the power failure, the converter output frequency has to be lower. The thus reduced speed must be taken into account.

When the supply returns, power is fed in from the supply and the converter output frequency returns to the selected reference frequency via a ramp-function generator function.

As long as the KIP function is switched in, the message **"KIB active"** is set by **status word bit 15**.

Parameters for setting the KIB function

P517.M **KIB FLR**
Value range 0 to 3

0 Kinetic buffering is not released.

1 Kinetic buffering is released.

2, 3 Flexible response is released.

P518.M **KIB initiation points**
Value range 65 % to 115 %

This parameter enables the KIB switch-in threshold to be set between 65 % and 115 %.
The switch-out threshold lies 5 % above the switch-in threshold (see chapter "Function diagrams").

For frequency / speed / torque control (P100 = 3, 4, 5), the drive is tripped with fault message F008 "DC link undervoltage" if:

- 61 % Vd rated is fallen short of
- or 10 % of the rated motor frequency (P107) is fallen short of
- or only for frequency control (P100 = 3): the control mode changes into the "current model" range
(B0253 from 1 "EMF model" to 0 "Current model")

NOTE

For kinetic buffering, values for P518 > 90 % only make sense if an Active Front End (AFE) is used as the rectifier/regenerative unit.

P519.M Dynamic response of the KIB controllers
Value range 0 % to 200 %

This parameter enables the response of the PID controller to be influenced.

The factory setting is 25 %. At 0 % the KIB function is switched off.

The controller output can be visualized via connector K0270 or K0271.

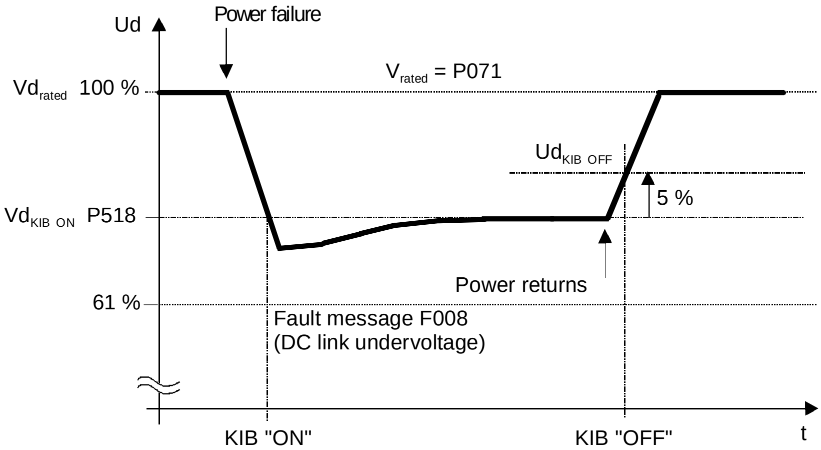


Fig. 7-2 Switch-in/switch-out threshold

$$Vd_{KIB\ ON} = P518 \times Vd_{rated}$$

Presetting: P518 = 76 %

$$Vd_{KIB\ OFF} = (P518 + 5\,\%) \times Vd_{rated}$$

Presetting: at P518 = 76 % ⇒ 81 %

$$Vd_{rated} = 1.315 \times P071$$

Parameters P520, P521 and P522 may only be adjusted by the service personnel.

7.2.3 Flexible response (FLR) (function diagram 605)

Description

With this function, the unit can continue to be operated during supply dips up to a minimum DC link voltage of 50 % of the rated value. The maximum converter output is decreased according to the current supply voltage during a voltage dip. If the "Flexible response" function is enabled, the modulation depth is limited to the range of asynchronous space vector modulation (reduction of the max. output voltage).

Function diagram 605 shows how the flexible response function operates.

NOTE

The maximum modulation depth can be taken from parameter r345. The maximum output voltage at the current operating point can be read off at parameter r346.

The message **"FLR active"** is set via the status word bit 15 as long as the FLR function is active.

Preconditions

A line commutating reactor of 4 % must be provided.

The power supply of the electronics must be ensured by an external 24 V supply at connector -X9 (see description of unit).

Thus, if an external main contactor is present, care must be taken to ensure that it does not drop out during a voltage dip.

When the power returns, it is not permissible that the voltage increases 50 % to 100 % of its rated value in less than 5 ms.

A maximum of 10 dips per hour are permitted to occur, with a minimum of 10 seconds time between them.

WARNING

Non-observance of the above can result in malfunctions or in destruction of the unit.

During a supply voltage dip, the available output of an induction motor is reduced

- approximately linear for operation with vector control,
- over-proportionally for operation with one of the V/f operating modes (P100 = 0, 1, 2)

Parameters for setting the flexible response function

P517.M KIB/FLR
Value range 0 to 3

0: Flexible response is disabled.
1: Kinetic buffering is released.
2: Flexible response is released with v/f = const.
3: Flexible response is released with f = const. (only for v/f characteristic mode P100 = 0, 1, 2).

P518.M FLR switch-in points
Value range 65 % to 115 %

This parameter enables the FLR switch-in threshold to be set between 65 % and 115 %.
The switch-out threshold is 5 % above the respective switch-in threshold (see chapter "Function diagrams").

NOTE

For flexible response, values for P518 > 90 % are not practical as otherwise the function may not be able to be switched out. If an Active Front End (AFE) is used as a rectifier/regenerative unit, the FLR function is automatically contained in the AFE.

P519.M Dynamic response of FLR
Value range 0 % to 200 %

This parameter enables the response of the PID controller to be changed.

The FLR controller is only released for v/f open/closed-loop control modes (P100 = 0, 1, 2) and P517 = 2.

The controller ensures that the v/f ratio remains constant. During a voltage dip, the output frequency of the converter and thus the speed of the motor can be reduced.

The factory setting is 25 %.

The controller output can be visualized via connector K0270 or K0271.

P523 FLR Vdmin
Value range 50 % to 76 %

This parameter enables the voltage threshold for fault message F008 (DC link undervoltage) to be reduced from 76 % (factory setting) down to 50 % (see chapter "Function diagrams").

P602 Excitation time
Value range 0.01 s to 10.00 s

If field weakening is achieved during a voltage dip, the output voltage is ramped-up which corresponds to twice the excitation time in the V/f control modes (P100 = 0, 1, 2) when the power returns. The excitation time is calculated during automatic parameterization (P115 = 1) and motor data identification (P115 = 2, 3).

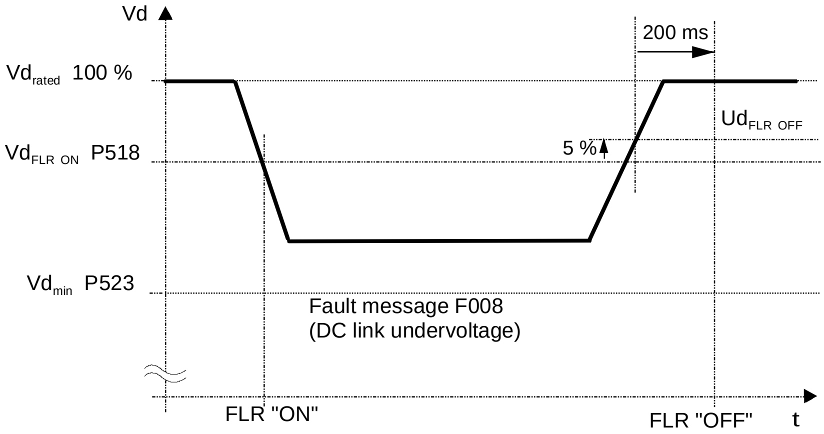


Fig. 7-3 Flexible response

$$Vd_{FLR\ ON} = P518 \times Vd_{rated}$$

Presetting: P518 = 76 %

$$Vd_{FLR\ OFF} = (P518 + 5\ \%) \times Vd_{rated}$$

Presetting: at P518 = 76 % $\Rightarrow$ 81 %

$$Vd_{FLR\ min} = P523 \times Vd_{rated}$$

$$Vd_{rated} = 1.315 \times P071$$

ParametersP520, P521 and P522 may only be adjusted by the service personnel.

7.2.4 Vdmax closed-loop control (function diagram 610)

Description

The Vdmax closed-loop control function allows briefly occurring regenerative loading to be handled without the unit shutting down with fault message F006 "DC link overvoltage". In this case, the frequency is controlled (closed-loop) so that the motor does not excessively enter over-synchronous operation.

For a steady-state load, the converter output frequency must increase. If a regenerative load exists for too long, the unit is shut down with F006 when the maximum frequency is reached (452, P453).

If regenerative loading occurs when the machine is decelerating too quickly (P464), this is automatically reduced so that the converter is operated at the voltage limit.

Function diagram 610 shows how the Vdmax closed-loop control function operates.

The Vdmax closed-loop control is also optimally suited for regenerative operation, which can occur when the speed stabilizes at the end of ramp-up.

Parameters for setting the Vdmax closed-loop control

P515.M Vdmax controller
Value range 0 and 1

0: The Vdmax controller is inhibited.
1: The Vdmax controller is released.

P516.M Dynamic response of the Vdmax controller
Value range 0 % to 200 %

This parameter enables the response of the PID controller to be influenced.

At 0 %, the Vdmax controller is shut down.

The factory setting is 25 %.

The controller output can be visualized via connector K0270 or K0271.

Alarm A041 "Vdmax controller inhibit"

The line voltage is too high or the converter supply voltage (P071) is incorrectly parameterized. The Vdmax controller is inhibited despite the parameter enable (P515 = 1), as otherwise the motor would immediately accelerate in operation to the maximum frequency.

The switch-in threshold for disabling the Vdmax controller is calculated as follows:

$$V_{d\,Max\,ON} = 119\% \times \sqrt{2} \times V_{supply,rated} = 168\%\ V_{supply,rated}$$

$$V_{supply,\,rated} = P071 \text{ for AC/AC converters and}$$

$$V_{supply,\,rated} = \frac{P071}{1{,}315} \text{ for DC/AC converters}$$

Parameters P520, P521 and P522 may only be adjusted by the service personnel.

7.2.5 DC current braking (DC brake) (function diagram 615)

Description

The DC current braking function allows the drive to be brought to a standstill in the shortest possible time. To realize this, a DC current is impressed in the motor windings, which, for an induction motor, results in a very high braking torque.

NOTICE

The "DC current braking" function is only practical for induction motors!

With the DC current braking function, the kinetic energy of the motor is converted into heat **in the motor.** The drive could overheat if it remains in this status for an excessive period of time!

Function diagram 615 shows how the DC current braking function operates.

Parameters for setting the DC current brake function

P603.M De-excitation time of the motor
Value range 0.01 s to 10.00 s

This parameter enables the minimum delay time between pulse inhibit and pulse enable to be set. This is to ensure that the motor is de-magnetized to at least 90% upon pulse enable.

The parameter is preset during automatic parameterization and motor data identification.

P395.M DC brake on/off
Value range 0 to 1

0: DC brake is not activated.

1: With the OFF3 command (quick stop), DC current braking is carried out.

P396 DC braking current

This parameter enables the setpoint current which is impressed for DC braking to be set. A maximum of 4 times the rated motor current can be entered.

P397.M DC braking duration
Value range 0.1 s to 99.9 s

This parameter enables the duration of DC current braking to be set.

P398.M Frequency at which DC braking commences
Value range 0.1 Hz to 600.0 Hz

With an OFF3 command, DC current braking is commenced at this frequency.

Sequence

- The DC brake is activated using the OFF3 command.
- The converter ramps along the parameterized OFF3 ramp (P466.1) down to the start of DC braking frequency (P398). Thus, the kinetic energy of the motor can be reduced without potentially endangering the drive. However, if the OFF3 deceleration time (P466.1) is selected too low, there is a potential danger that the drive could be faulted by a DC link overvoltage (F006).
- The inverter pulses are inhibited for the duration of the de-excitation time (P603).
- The required braking current (P396) is then impressed for the set braking duration (P397)
- The converter changes to the SWITCH-ON INHIBIT (008) or READY TO SWITCH ON (009) state.

7.2.6 Flying restart (function diagram 620)

Description

This function offers the possibility of connecting the converter to a motor which is still rotating. If the motor were to be switched on without the flying restart function, an overcurrent condition would occur, as the flux in the motor first has to be built up and the open/closed-loop control has to be set to the speed of the motor.

NOTE

It is not possible to implement a flying restart function for multi-motor drives as the motors have different run-down characteristics.

The following is executed, depending on whether a tachometer is enabled.

7.2.6.1 Flying restart without tachometer (with search) (P130 = 0)

NOTE

The "Flying restart without tachometer" (search) function is only practical for induction motors!

For "Flying restart without tachometer", the "standstill test" generates a braking torque which can cause drives with low moments of inertia to be decelerated!

Description

- A standstill test (DC current is briefly impressed) is executed after the de-excitation time (P603) has expired after the supply returns with active WEA (see section "Automatic restart function") or since the last shutdown time with "OFF2" command (inverter inhibit).
  The standstill test can be shut down with P527.1 = 0 %.
- If it is identified that the motor is at standstill, excitation and acceleration are started as for a standard start.

- If a motor standstill has not been identified, searching is started with the maximum frequency, clockwise rotating phase sequence (P452); if only COUNTER-CLOCKWISE phase sequence is selected (see section "Control word"), searching starts with the maximum frequency, clockwise rotating phase sequence (P453).
- The search frequency is linearly reduced down to 0 Hz, more specifically, by the parameterizable search speed **P526** (in Hz, referred to the time interval of 1 second). In this case, the parameterizable search current **P525** is impressed.
At P100 = 3 (frequency control), the implemented search current is limited to two times the rated magnetizing current (r119).
    - **P100 = 1** or **2** (V/f characteristic):
    The converter reference output voltage necessary for the search current is compared with the voltage of the V/f characteristic corresponding to the search frequency.
    If the motor frequency is found using this evaluation function, the search frequency is kept constant and the output voltage is changed to the voltage of the V/f characteristic with the excitation time constant (dependent on the excitation time P602)
    - **P100 = 3** (Frequency control):
    The converter reference output voltage necessary for the search current is compared with the search frequency corresponding to the EMF setpoint.
    If the motor frequency is found using this evaluation function, the search frequency is kept constant and the flux setpoint is changed to the rated flux with the excitation time constant (dependent on the excitation time (P602).
- Then the ramp-function generator is set to the search frequency.
If the ramp-function generator cannot be set as the supplementary setpoint is too high, the converter is shut down with **fault F018** "Ramp-function generator could not be set during flying restart".
Otherwise, the FLYING RESTART status (013) is exited and the motor is operated at the actual reference frequency (via the ramp-function generator).
- If the motor is not found, a standstill test at 0 Hz search frequency is re-executed and a search started in the other direction of rotation, with the rotating field enabled. If this search is also unsuccessful, switch-in is with 0 Hz.

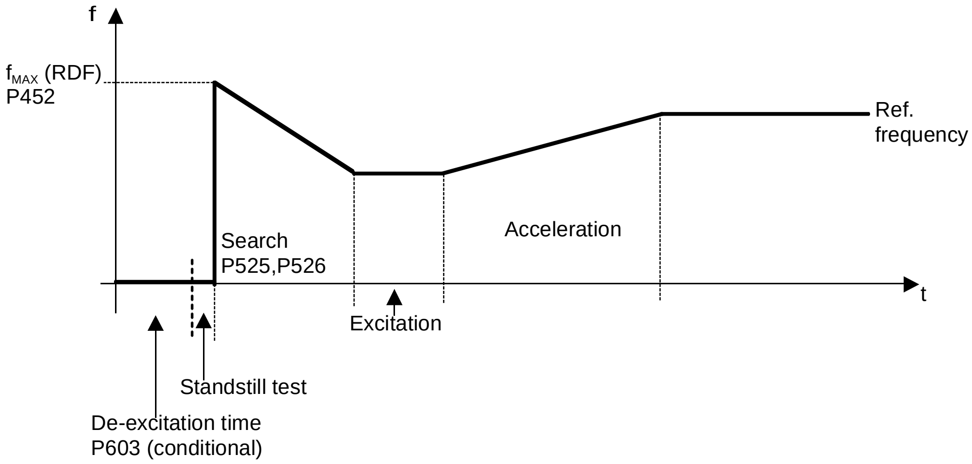


Fig. 7-4 Flying restart

7.2.6.2 Flying restart with tachometer (P130 <> 0)

Description

- ♦ After the de-excitation time (P603) has expired, afte the supply returns with activated WEA (see section "Automatic restart function) or since the last switch-off instant with "OFF2" command (Inverter inhibit), then:
  - For V/f control. the converter output voltage is increased linearly from 0 to the V/f characteristic value (determined from the measured smooth speed actual value within the excitation time (P602).
  - For vector control, the necessary magnetizing current is built up within the excitation time (P602).
- ♦ After the excitation time P602 has expired, the ramp-function generator is set to the smoothed speed actual value.
  If it is not possible to set the ramp-function generator, because the supplementary setpoint is too high, the converter is shut down with **fault F018** "Ramp-function generator could not be set during flying restart".
- ♦ Otherwise, the status FLYING RESTART (013) is exited and the motor is operated at the current reference frequency (via the ramp-function generator).
- ♦ For torque control (P100 = 5) or slave drive (see P587), the motor is operated at the current torque setpoint.

7.2.6.3 Parameters for setting the flying restart function

P583.B Flying restart enable
Value range 0 to 1

0: Flying restart is not enabled.
1: Flying restart is enabled with every ON command.

Exception: P373 = 3 or 13
The functions **Automatic restart and flying restart** (without taking into account the control word command "Flying restart enable" (bit 23)) are always activated.

Only for flying restart without tachometer (with search) (P130 = 0):

P525.M Flying restart search current
For V/f characteristic max. 4 times the rated motor current
For frequency control max. 2 times the magnetizing current (r119)
is implemented.

Setpoint of the impressed current when searching for the motor
Presetting via automatic parameterization.

P526.M Flying restart search speed
Value range 0.1 Hz to 100.0 Hz

Ramp gradient with which the frequency is changed when searching (in Hz, referred to 1 second).

The message **"Flying restart active"** is set via **status word bit 16** as long as the flying restart function is active.

WARNING

With the "Flying restart without tachometer" function (P373 = 3 with WEA or control word bit 23), the drive may suddenly accelerate as a result of the search current in spite of the fact that the drive is at a standstill and a 0 Hz setpoint!

Death, severe bodily injury or material damage can occur if the drive area is entered.

Standstill identification

Standstill identification can be optimized with P527 (r524) (only for service personnel). The standstill test can be deactivated with P527.1 = 0 % when the "flying restart without tachometer" function is active.

7.2.7 Temperature adaptation (function diagram 430)

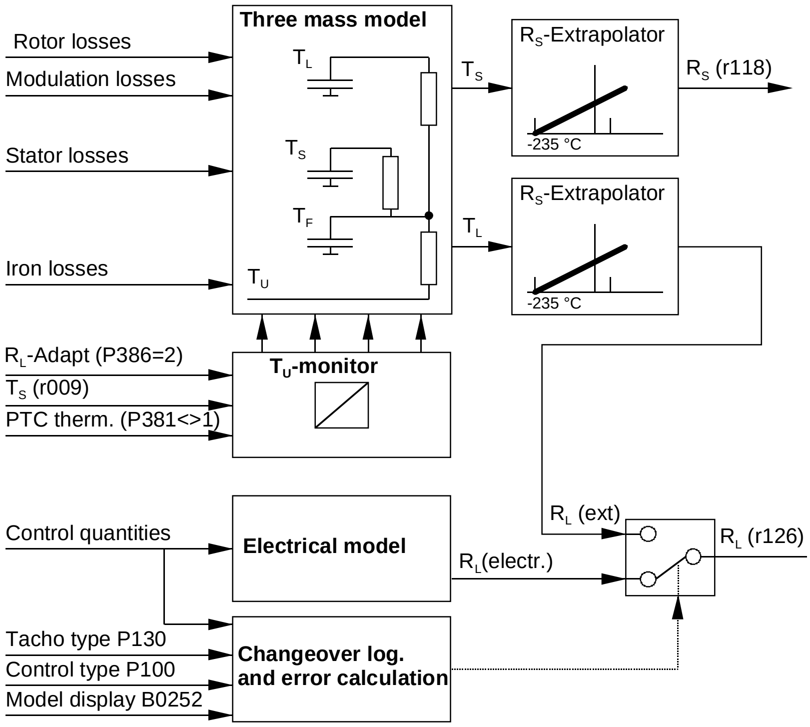


Fig. 7-5 Structure of temperature adaptation

Description

Temperature adaptation is used in order to reduce the torque error for n/f/T closed-loop control or speed errors for frequency control, which result from the temperature dependency of the stator and rotor resistances.

The resistances are calculated using a complex thermal three-mass model and, depending on the operating status, with an electrical motor model.

Temperature adaptation can be activated for the three closed-loop vector control types (P100 = 3, 4, 5).

The electrical model only operates for closed-loop speed/torque control (P100 = 4, 5) and if there is a pulse tachometer (P130 = 11, 12, 15, 16). In this case, the following error correction P217 should be activated.

Parameters for setting temperature adaptation

Basic settings

P386 RotResistTmpAdap
Value range 0 to 2

Temperature adaptation of the rotor and stator resistances.

0: Adaptation not active

1: Adaptation without measuring the stator temperature

2: Adaptation with KTY84 sensor available (connected to customer terminal X103 of the CU)

For the temperature measurement (**P386** = 2), the measurement quantity is displayed in **r009 (K0245).** A temperature sensor should be used if high demands are placed on the torque accuracy.

The motor temperature can also be read in via the connection in **P385** from an external measurement point (1 °C = 80 hex).

P387 (motor series) can be adjusted after adaptation is activated (**P386** > 0). If the motor is included in the listed motor series, this should be selected. It is then automatically determined whether the motor has an internal fan and which temperature rise of the motor series it corresponds to. Parameters **P388, P389, P390, P391** and **P392** are then suppressed.

P387	**Motor series**		**Internal fan (P389)**	**Temperature rise (P390)**	**Temperature rise of rotor (P391)**
1	1LA5 / 1LA7	⇒ determination	no	100 %	100 %
2	1LA6	⇒ determination	no	100 %	100 %
3	1LA8	⇒ determination	yes	100 %	100 %
4	1LA1	⇒ determination	yes	100 %	100 %
5	1PH6	⇒ determination	no	130 %	100 %
6	1PH7 (=1PA6)	⇒ determination	no	130 %	100 %
7	1PH4	⇒ determination	no	105 %	105 %
0	Unlisted motor	no determination	---	----	----

An unlisted motor is considered to be a motor from another manufacturer (**P387** = 0). Parameters **P388, P389, P390, P391** and **P392** have to be manually entered in this case (see special settings).

P388.M Motor weight
Value range 5 kg to 9999 kg

Total weight of the motor

The motor weight is estimated during automatic parameterization and before motor identification from the motor output and the pole pair number. It can be taken from the motor catalog for a more accurate calculation (if necessary, correct after automatic parameterization or MotId).

If **P387** is reset for a known motor series, the motor weight **P388** is kept for the calculation.

P392.M **Pv (iron)**
Value range 0.05 % to 10.00 %

Iron losses

The iron losses are calculated during automatic parameterization and before motor identification and refer to the apparent motor output.

The ambient temperature at the time of motor identification **(P115 = 2, 3)** has to be entered in **P379.**

P382.M **Motor cooling**
Value range 0 to 1

0: Naturally ventilated

1: Force ventilated (internally automatically assumed, if **P387** = 5, 6, 7)

After the temperature adaptation has been activated (**P386** = 1 or 2) and parameters **P387** to **P392** and **P379** and **P382** have been assigned, a motor identification (**P115** = 2, 3) must be carried out in order to determine the current rotor and stator resistance.

For a more accurate adaptation of the stator resistance - especially in the case of long feeder cables - before motor identification, the feeder cable resistance **P117** = Rcable has to be entered, referred to the rated motor impedance.

$$P117 = R_{cable}\ [\Omega] \times \frac{1.72 \times P102\,[A]}{P101\,[V]}$$

When temperature adaptation is active (**P386** > 0), the parameters **P127** "Temperature evaluation of rotor resistance" and **P121** "Stator and feeder cable resistance" are blocked for manual access. The adaptation itself sets them. The result is displayed in **r126** and **r118**.

r126 Rotor resistance

r118 Stator resistance (incl. feeder cable resistance **P117**)

At a power failure, the current adaptation values are lost. When the supply returns, the values determined during the last motor identification (**P115** = 1 or 2) for **P127** and **P121** are transferred.

If the adaptation values are to be kept even when there is a power failure, the electronic boards must be fed from a separate power supply.

When exiting adaptation with temperature measurement, the values are not stored because **P127** and **P121** always refer to the ambient temperature **P379**.

It is advisable, and even necessary in the case of adaptation with a temperature sensor, to carry out motor identification with the motor in a cold condition, so that when the converter is powered up after a longer down time the correct presetting is automatically effected. If there is a temperature sensor, the temperature model is then correctly preset even after a power failure.

Special settings

For sinusoidal operation of a motor (online operation or with an output filter **P068** = 1) at the rated operating point (rated load, rated voltage, rated current, rated frequency), increased temperatures are obtained in the rotor and in the stator windings. The difference between these temperatures and the ambient temperature is known as the temperature rise and is indicated in K (Kelvin).

The average temperature rises for the adaptation are set to **100 K** for the rotor and to **80 K** for the stator. For converter operation (pulse frequency 2.5 kHz, no output filter) an average temperature rise for the rotor of **110 K** is assumed.

If parameter **P390** "Temperature rise factor" is to be changed for a motor from a known series (e.g. 1LA5), then **P387 = 0** "Unlisted motor" must be entered so that parameters **P389, P390 a**nd **P391** are accessible. Parameter **P389** "Internal fan" has to be assigned in accordance with the table under "Basic settings".

If the actual temperature rises of the used motor deviate significantly from the average temperature rises, the temperature rise can be corrected with P390 (100 % = average temperature rise).

The factor for correcting the temperature rise can be calculated using the following equation:

$$P390 = \frac{\text{Temp rise of stator}}{80\,\text{K}} \times 100\%$$

In this calculation, the temperature rise of the rotor is automatically corrected with the same error.

$$\text{Rotor temp.rise (converter oper.)} = 110\,\text{K} \times \frac{P390}{100\%} \times \frac{P391}{100\%}$$

$$\text{Rotor temp.rise (sinusoidal oper.)} = 100\,\text{K} \times \frac{P390}{100\%} \times \frac{P391}{100\%}$$

With P391, it is possible to set the temperature rise in the rotor independent of the temperature rise factor of the stator.

7.2.8 Functions for automatic motor parameterization and identification

Description

The functions for automatic motor parameterization and identification are used to determine the motor parameters beyond what is stated on the rating plate.
Open-loop control is performed using parameter P115.
To obtain good closed-loop control behavior of the drive, it is necessary to perform motor identification.

7.2.8.1 Automatic parameterization (P115 = 1)

Function

Automatic parameterization is used to preset closed/open-loop control parameters depending on the drive setting (converter and motor data) and open/closed-loop control (P100).

Condition

"Automatic parameterization" can only be selected from the state "DRIVE SETTING" (005) or READY TO SWITCH ON (009).

Consequence

Only the parameters of the **currently** selected motor data set MDS are assigned default values! If "automatic parameterization" is selected from READY TO SWITCH ON (009), the reference variables (P350, P351, P352, P353, P354) are **not** assigned rated motor default values.

Flowchart (operation via PMU):

P060 = 5	Function selection "drive setting"
↓	
P115 = 1	Function selection "automatic parameterization"
↓	
$\boxed{\text{P}}$	

The operating display appears while the following parameters are reassigned:

P116	Startup time
P117	R(cable)
P120	Magnetizing reactance
P121	R(stator + cable)
P122	Total leakage reactance
P127	R(rotor) Ktmp
P128	Imax (maximum current value)
P161	i(op., minimum)
P215	Delta n(act.,perm.)
P216	Smoothing n/f feedforward control
P217	Carried-forward error comp.
P223	Smoothing n/f (act.)
P235	n/f controller Kp1
P236	n/f controller Kp2
P240	n/f controller Tn
P258	Pwmax(mot)
P259	Pwmax(gen)
P273	Smoothing Isq(soll)
P274	Isq(set) deg.
P278	M(static)
P279	M(dynamic)
P283	Current controller Kp
P284	Current controller Tn
P287	Smoothing Ud(act)
P293	Field weakening frequency
P295	Efficiency optimization

P303	Smoothing Psi(soll)
P306	EMF(max) controller Ti
P313	f(swit.EMF model)
P315	EMF controller Kp
P316	EMF controller Tn
P319	Current rise
P322	Acceleration current
P325	Voltage rise
P326	Final rise frequency
P334	IxR compensation Kp
P335	Smoothing Isq
P336	Slip compensation Kp
P337	Resonance attenuation Kp
P339	Pulse system enable
P344	Control margin
P347	Valve voltage compensation
P348	Dead time compensation
P388	Motor weight
P392	Pv(iron)
P396	DC braking current
P471	n/f controller feedforward contr. Kp
P525	Restart detection current
P536	n/f controller dynamics(set)
P602	Excitation time
P603	De-excitation time

If the parameter P103 (motor no-load current) has the value 0.0 %, the rated magnetization current is calculated and can then be read via r119. Otherwise the value is retained.

7.2.8.2 Motor identification at zero speed (P115 = 2)

Function

Motor identification at zero speed performs "automatic parameterization", then activates the ground fault test, the test pulse measurement, the leakage measurement, and performs DC measurement to improve the closed-loop control action.
Certain closed-loop control parameters are reassigned as a result.

Condition

"Motor identification at zero speed" can be selected from the state READY TO SWITCH ON (009).

Consequence

- Only the parameters of the **currently** selected motor data set (MDS) are preset!
- "Motor identification at zero speed" can be canceled at any time with an OFF command. The fault message F114 "Measurement canceled" is then triggered.
- To display the current measurement section of the "motor identification at zero speed", you can use the monitoring parameter r377 "Measurement section".
- If a fault occurs during measurement, then the test is canceled with a fault message.
  The fault message (r947) is stored in the fault memory together with the fault value (r949). The fault value describes the cause of the fault in greater detail. The fault messages, fault values, and alarms are described in Chapter "Faults and Alarms".

NOTE

"Motor identification at zero speed" is not possible during operation of the converter with synchronous machines or with converters with a sine filter (option)!

Flowchart (operation via PMU):

P115 = 2 — Function selection "motor identification at zero speed"

↓

P

The operating display appears again.

The alarm A078 "Zero-speed measurement following" is output, and the converter must be switched on within 20 s. Otherwise fault shutdown F114 "Measurement canceled" is triggered.

Switching on the converter

The alarm A078 "Zero-speed measurement following" is reset.

WARNING

Inverter pulses are enabled during motor identification at standstill, and the rotor can move into alignment!

The operating display appears while the following steps are executed automatically:

- Call-up of the "automatic parameterization"
- Ground-fault test:

  If the converter is operated in a grounded network, a ground fault of the connected motor (incl. leads) is detected if the ground current > 5 % $\hat{I}_{nom\ (converter)}$.

  Conductive defective valves in the inverter are also detected.

  The test consists of 7 steps. In the 1st step, no valve is fired, in the further steps, one and only one valve is fired in each case.

  In each step, the actual values of the output currents of phases U and W , the UCE feedback signals of the 3 phases, the overcurrent comparator, and the overvoltage comparator are monitored.

  The monitoring parameter r376 (ground-fault test result) from which the measurement result causing the fault can be read is available.

  Comment:
  The ground fault test can also be called up separately using parameter P375 (ground fault test) or deselected for the MOTID.

- Test pulses:
  Used to check the inverter and the connection with the motor. The result of the test can be queried in monitoring parameter r539 (test pulses result).
- Leakage measurement:
  By injecting suitable voltage pulses, the referenced total leakage x(sigma) of the connected motor is measured.
- DC measurement and resulting parameter change:
  In DC measurement, a direct current is injected successively in the direction of each output phase.
  No more than the magnitude of the peak value of the rated motor current is injected (maximum rated converter current). The pulse frequency of the converter is changed several times during the measurement.
  At the beginning of the zero-speed measurement, all parameters are calculated by "automatic parameterization".

Measured / calculated parameter values of zero-speed measurement:

P103	Motor no-load current
P120	Magnetizing reactance
P121	R (stator + cable)
P122	Total leakage reactance
P127	R(rotor) Ktmp
P283	Current controller Kp
P284	Current controller Tn
P315	EMF controller Kp
P316	EMF controller Tn
P347	Valve voltage compensation
P349	Dead time compensation time
P631	CU AnaIn offset (if analog tacho connected)

The measured values and the values calculated from them are only entered in the parameters after DC measurement has been completed without error. If measurement is canceled due to an off command or a fault, the parameter values that were calculated in automatic parameterization at the beginning of measurement are retained.

7.2.8.3 Complete motor identification (P115 = 3)

Function

Complete motor identification is used to improve the closed-loop control action in vector closed-loop control modes (P100 = 3, 4, or 5) and contains the functions:

- "Motor identification at zero speed" (contains "automatic parameterization")
- "No-load measurement " (contains "tacho test")
- "n/f controller optimization"

Condition

"Complete motor identification" can be selected from the state READY TO SWITCH ON (009).

Consequence

- Only the parameters of the **currently** selected motor data set (MDS) or function data set (FDS) are preset!
- "Complete motor identification" can be canceled at any time with an OFF command. The fault message F114 "Measurement canceled" is then triggered.
- To display the current measurement section of the "complete motor identification" you can use the monitoring parameter r377 "Measurement section".
  If a fault occurs during measurement, then the test is canceled with a fault message. The fault message (r947) is stored in the fault memory together with the fault value (r949). The fault value describes the cause of the fault in greater detail. The fault messages, fault values, and alarms are described in Chapter "Faults and Alarms".
- If P100 = 5 (m control) the duration of measurement is automatically switched over to mode n control.
- If P100 = 3 or 4 (f/n control and follower drive (cf. P587), measurement is canceled (F096).
- If the converter does not permit regenerative feedback (AFE, I/RF unit, or brake resistor), parameter P515 = 1 (Udmax controller on) should be set.
  If the converter still cancels measurement with the fault F006 (overvoltage in the DC link), the regenerative power should be limited to approx. –3 % to –0.1 % in parameter P259.

NOTE

"Motor identification at zero speed" is not possible during operation of the converter with synchronous machines or with converters with a sine filter (option)!

WARNING

During motor identification inverter pulses are released and the drive rotates!

For reasons of safety, identification should first be carried out without coupling of the load.

Flowchart (operation via PMU):

P060 = 5	**Drive settings**
P452, P453	**Maximum frequencies** The speed of the drive during measurement is limited to the parameter values for the maximum frequencies P452 (RDF) and P453 (LDF) in the current motor data set. The maximum frequencies must be set before measurement starts in such a way that any working machine coupled to the motor is not damaged.
P060 = 1	**Parameter menu**
P492, P498	**Maximum torque** The torque during measurement is limited to the parameter values for the torque limits P492 (M_{lim1}) and P498 (M_{lim2}) in the current motor data set. The torque limits must be set before measurement starts in such a way that any working machine coupled to the motor is not damaged.
P536	**Dynamic response factor** Set the required dynamic response of the speed controller (in %): 10% being the minimum and 200% being the maximum **Note:** Possible transmission backlash, etc.
P115 = 3	Function selection **"Complete motor identification"**
P	

The operating display appears (008/009):

The alarm A078 "Zero-speed measurement following" is output, and the converter must be switched on within 20 s. Otherwise fault shutdown F114 "Measurement canceled" occurs.

Switching on the converter

The alarm A078 "Zero-speed measurement following" is reset.

WARNING

The inverter is released, the motor carries current, and the rotor can align itself!

The operating display appears while the function "motor identification at zero speed" is executed automatically.

After completion of the subfunction, the operating display READY TO SWITCH ON (009) alternates with the alarm A080 "Rotating measurement following". The converter must be switched on within 20 s, otherwise the fault shutdown F114 "Measurement canceled" is triggered.

NOTE

If the converter is controlled via the terminal block or communication and pending ON command, the operating display READY TO SWITCH ON (008) appears after the subfunction has been completed. The ON command must be canceled so that measurement can be resumed.

NOTE

Even on cancellation at this point, the parameter changes of the preceding "Motor identification at zero speed" are stored.

Procedure:

Switching on the converter

Alarm A080 "Rotating measurement following" is reset.

WARNING

The inverter is released, the motor carries current, and the rotor rotates!

The operating display appears while the following steps are executed automatically:

- ♦ Call-up of the "No load measurement" including the tacho test at P100 = 4 or 5.
- ♦ Call-up of the "n/f controller optimization".

After completion of the selected function, the operating display READY TO SWITCH ON (009) or SWITCH-ON INHIBIT (008) appears.

7.2.8.4 No-load measurement (P115 = 4)

Function

No-load measurement is used to improve the closed-loop control action in vector closed-loop control modes (P100 = 3, 4, or 5) and is a subfunction of the "complete motor identification". The measurement is used to set the no-load current (P103, r119) and the magnetizing reactance of the motor.

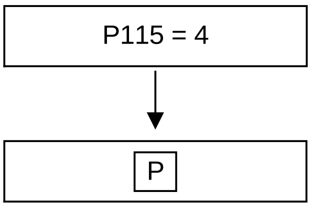
Condition

"No-load measurement" can be selected from the state READY TO SWITCH ON (009).

Consequence

- If speed or torque control (P100 = 4 or 5) is selected, a tacho test is also performed and if an analog tacho is used, analog tacho matching (P138) is set.
- The maximum speed of the drive during measurement is limited to the parameter values for the maximum frequencies P452 (RDF) and P453 (LDF).
- Only the parameters of the **currently** selected motor data set (MDS) are preset!
- "No-load measurement" can be canceled at any time with an OFF command. The fault message F114 "Measurement canceled" is then triggered.
- If a fault occurs during measurement, see Chapter "Faults and Alarms" for a detailed description of the fault message and the fault value!

Flowchart (for operation via PMU):



Function selection **"No-load measurement"**

The operating display appears (008/009):

The alarm A080 "Rotating measurement following" is output, and the converter must be switched on within 20 s. Otherwise fault shutdown F114 "Measurement canceled" is triggered.

Switching on the converter

The alarm A080 "Rotating measurement following" is reset.

WARNING

The inverter is released, the motor carries current, and the rotor rotates!

The operating display appears while the following steps are executed automatically:

- "Ground fault test": (only if selected via P375)
  see function "ground fault test" under "motor identification at zero speed"
- "Tacho test":
  Only if speed or torque control (P100 = 4 or 5) is selected, a tacho test is performed in addition. If an analog tacho is used, analog tacho matching (P138) is set.
- "No-load measurement":
  In steady-state closed-loop control operation, the following parameters are set as a result of measurement:
  P103 Motor no-load current in %
  P120 Magnetizing reactance

After completion of the selected function, the operating display READY TO SWITCH ON (009) or SWITCH-ON INHIBIT (008) appears.

7.2.8.5 n/f controller optimization (P115 = 5)

Function

n/f controller optimization is used to improve the closed-loop control action in vector closed-loop control modes (P100 = 3, 4, or 5) and is a subfunction of the "complete motor identification".

Condition

"n/f controller optimization" can be selected from the state READY TO SWITCH ON (009).

Consequence

- The function determines the mechanical moment of inertia of the drive and sets several parameters of the closed-loop control that depend on it.
  If speed or torque control (P100 = 4 or 5) is selected, a tacho test is also performed in addition.
- If P100 = 5 (m control) the duration of measurement is automatically switched over to mode n control.
- If P100 = 3 or 4 (f/n control and follower drive (cf. P587), measurement is canceled (F096).
- If the converter does not permit regenerative feedback (I/RF unit or brake resistor), parameter P515 = 1 (Udmax controller on) should be set.
  If the converter still cancels measurement with the fault F006 (overvoltage in the DC link), the regenerative power should be limited to approx. –3 % to –0.1 % in parameter P259.
- Only the parameters of the **currently** selected motor data set (MDS) or function data set (FDS) are preset!
- "n/f controller optimization can be canceled at any time with an OFF command. The fault message F114 "Measurement canceled" is then triggered.
- If a fault occurs during measurement, see Chapter "Faults and alarms " for a detailed description of the fault message and the fault value!
- "n/f controller optimization" automatically activates the "n controller feedforward control" (P471).

Flowchart (operation via PMU):

P060 = 5	**Drive settings**
↓	
P452, P453	**Maximum frequencies** The speed of the drive during measurement is limited to the parameter values for the maximum frequencies P452 (RDF) and P453 (LDF) in the current motor data set. The maximum frequencies must be set before measurement starts in such a way that any working machine coupled to the motor is not damaged.
↓	
P060 = 1	**Parameter menu**
↓	
P492, P498	**Maximum torque** The torque during measurement is limited to the parameter values for the torque limits P492 (M_{lim1}) and P498 (M_{lim2}) in the current motor data set. The torque limits must be set before measurement starts in such a way that any working machine coupled to the motor is not damaged.
↓	
P536	**Dynamic response factor** Set the required dynamic response of the speed controller (in %): 10% being the minimum and 200% being the maximum Note: Possible transmission backlash, etc.
↓	
P115 = 5	Function selection **"n/f controller optimization"**
↓	
$\boxed{P}$	

The operating display appears:

The alarm A080 "Rotating measurement following" is output, and the converter must be switched on within 20 s. Otherwise fault shutdown F114 "Measurement canceled" is triggered.

Switching on the converter

The alarm A080 "Rotating measurement following" is reset.

WARNING

The inverter is released, the motor carries current, and the rotor rotates!

The operating display appears while the following steps are executed automatically:

- "Tacho test":
  Only if speed or torque control (P100 = 4 or 5) is selected, a tacho test is performed in addition.
- "Controller optimization":
  By evaluation of the torque and speed curve after automatically performed speed setpoint changes, the inertia of the drive is determined and the speed controller is set.

  Measurement is performed several times in succession.

  Parameters set:

  P116 Start-up time (ramp-up time at rated torque from zero speed to rated speed)

  P223 Smoothing n/f(act)

  P235 n/f controller Kp1

  P236 n/f controller Kp2

  P240 n/f controller Tn

  P471 n/f controller feedforward control Kp

  P537 n/f controller dynamics(act)

  P538 n/f controller vibration oscillation frequency
- Only if the units are specified in seconds (P463/P465 = 0) for the ramp-up and ramp-down times (P462/P464):

  If it is ascertained during measurement that the set ramp-up and ramp-down times cannot be achieved with the preset torque limits, are they set to the minimum possible times:

  P462 Ramp-up time

  P464 Ramp-down time

  P467 Protection semiconductor Kp (only for frequency control: P100 = 3)

After completion of the selected function, the operating display READY TO SWITCH ON (009) or SWITCH-ON INHIBIT (008) appears, and the dynamic response of the speed controller which was achieved is indicated in parameter P537 (n/f controller dynamics(act)).
The dynamic response achieved might deviate from the setpoint set previously (P536) (because of a very large moment of inertia or an unsettled speed actual value signal).

7.2.8.6 Self test (P115 = 6)

Function

It is the same function as "motor identification at zero speed", **but no parameter values are changed**.

Condition

The "self test" can be selected from the state READY TO SWITCH ON (009).

Consequence

The "self test" is therefore suitable for testing the converter and the connected motor.

NOTICE

- The "self test " is not possible on converters with a sine filter (option)!
- For procedure and notes see: "Motor identification at zero speed".

WARNING

Inverter pulses are enabled, and the rotor can move into alignment!

7.2.8.7 Tacho test (P115 = 7)

Function

The tacho test is used to check the tacho (analog tacho and pulse encoder) in vector control modes with a tacho (P100 = 4 or 5).

Condition

The "tacho test" can be selected from the state READY TO SWITCH ON (009).

Consequence

The "tacho test can be canceled at any time with an OFF command. The fault message F114 "Measurement canceled" is then triggered.

If a fault occurs during measurement, see Chapter "Faults and Alarms" for a detailed description of the fault message and the fault value!

Flowchart

P115 = 7 — Function selection **"Tacho test"**

↓

P

The operating display appears:

The alarm A080 "Rotating measurement following" is output, and the converter must be switched on within 20 s. Otherwise fault shutdown F114 "Measurement canceled" is triggered.

Switching on the converter

The alarm A080 "Rotating measurement following" is reset.

WARNING

The inverter is released, the motor carries current, and the rotor rotates!

The operating display appears while the following tacho errors are checked for:

- ♦ For pulse encoders:
  - No tacho signal
  - Wrong polarity of the tacho signal
  - Wrong standardization of the tacho signal (P151 pulse enc. bar number)
  - One track of the pulse encoder missing
- ♦ For analog tachos:
  - No tacho signal
  - Wrong polarity of the tacho signal
  - Wrong matching of the tacho signal (P138 ana.tacho mat.) or potentiometer when using the ATI (option)

The result of the test can be queried in monitoring parameter r540 (tacho test result).

After successful completion of the selected function, the operating display READY TO SWITCH ON (009) or SWITCH-ON INHIBIT (008) appears.

7.3 Special functions

7.3.1 Loading firmware

The firmware supplied in the units is stored non-volatilely in electrically erasable memory chips, so-called flash EPROMs. If required, the firmware can be erased and overwritten with new firmware.

It is necessary to import new firmware if

- an extended function scope is available in a new firmware version and this needs to be used, or if
- user-specific firmware needs to be loaded into the units.

The firmware can be loaded using a laptop or PC and the data is transferred into the units via the serial interface SCom or SCom1. A special cable is necessary for importing the firmware.

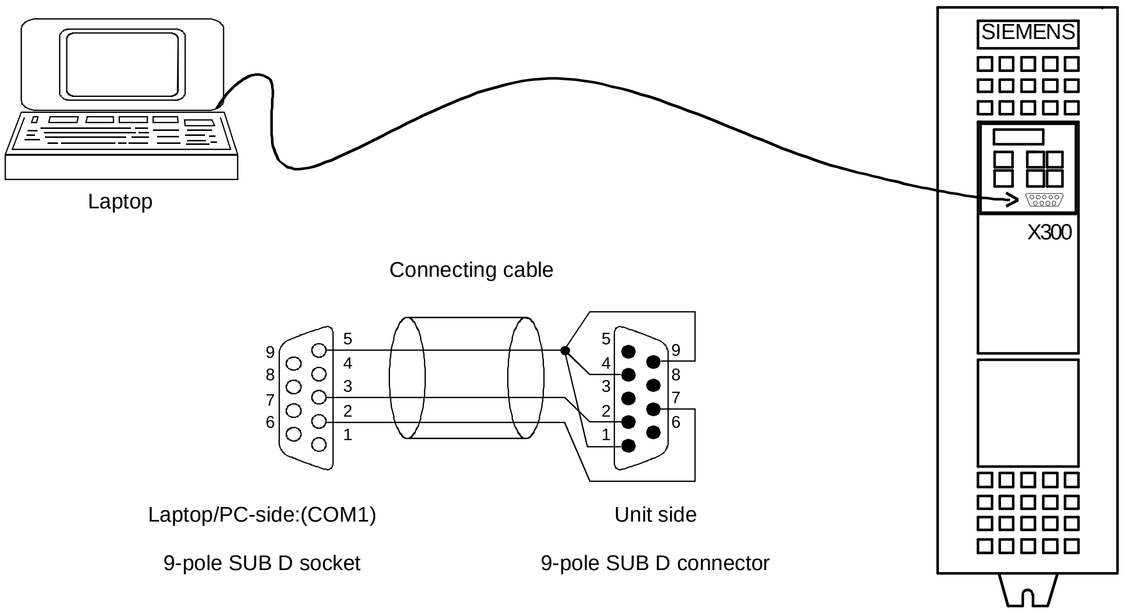


Fig. 7-6 Loading firmware by means of laptop or PC

Loading the firmware from a laptop/PC comprises the following work steps. All other programs that use the same PC port (COM1 or COM2), e.g. SIMOVIS, must first be closed.
In case problems occur under Windows NT with the loading program bsl.exe, the program WinBSL.exe is also provided on the SIMOVIS 5.4 CD.
Before loading the software, you should save your parameter settings (Upread with OP1S or SIMOVIS)! Make a note of the converter order number in P070 for definition of the power section later on.

Load boot files onto drive c:\boot\	Create a subdirectory called "boot" on your hard disk, change to this directory, load the compressed file containing the software (Vc_vxxx.exe; xxx = software version and ID) and double-click the file to inflate it. The firmware itself is in inflated files Vc_vxxx.b86 and Vcs_vxxx.b86. The files bsl.exe, bslvch.cfg, bslvcs.cfg, bslvc.bat, bslvch.bin and bslvcs.bin are required for loading the software.
↓	
Connect up and switch on the unit	First connect your laptop or PC (COM1 or COM2) to socket X300 using the specified cable (order No.: 9AK1012-1AA00) . Then power up the mains supply or the external 24 V power supply. If all connections are correct, the unit goes straight into boot mode and the PMU on the front section of the unit does not start (display: E).
↓	
Data transfer	Start data transfer on your laptop/PC by entering c:\boot\bslvc.bat com1 (or com2), depending which port you are using. The display of the data transferred so far indicates that data transfer is in progress. When data transfer has been completed, the unit initializes itself and goes into status °000 "Power section definition" or into the last active status. The PMU is active again in this status.
↓	
Parameterization	After removing the cable, you can commence parameterization.

If loading is aborted with the following error message although you have observed the correct procedure and made the connections to the correct ports,

Get Acknowledge-Byte: 0xD5
Error: Acknowledge-Byte 0xB5 expected!

You must call the batch file with the extension 0xD5 (bslvc 0xD5) or use a newer version of the program bsl.exe (Version 0.06 or higher) (supplied with Version 3.2 onwards).

WARNING

When loading a VC firmware < SW 3.30 onto a VC Compact PLUS unit, the output of FF13 "Incorrect firmware version" is not supported.

7.4 Functions for lifts and hoisting gear

7.4.1 Activating the function

The functions for elevators and hoisting gear are activated by setting U800 = 1
(=> the factory setting P366 = 10 for elevators and hoisting gear has the same effect).

Therefore the function diagrams are changed as follows:

Invalid (page)	Valid instead (page)
290	324
316	326
317	327
318	328
319	329
480	481

Please refer to the operating instruction for elevator and hoisting gear applications for detailed information concerning elevator commissioning.

7.4.2 Deviating technical data

Units intended for elevator applications with $U_{rat} \leq 480$ V (AC) or $U_{rat} \leq 650$ V (DC) have a current derating relative to the rated currents of units intended for the basic mode of operation. The following derating curve applies to the permissible rated current as a function of the set pulse frequency:

Units of 5.5 kW ≤ Pn ≤ 55 kW (400 V AC)

- Curve ① for supply voltages
  $U_{supply} < 440$ V (AC) or $U_{supply} < 590$ V (DC)
- Curve ② for supply voltages
  $U_{supply} > 440$ V (AC) or $U_{supply} > 590$ V (DC)

Units of 4 kW ≤ Pn ≤ 22 kW (230 V AC)

- Curve ① for all permissible supply voltages

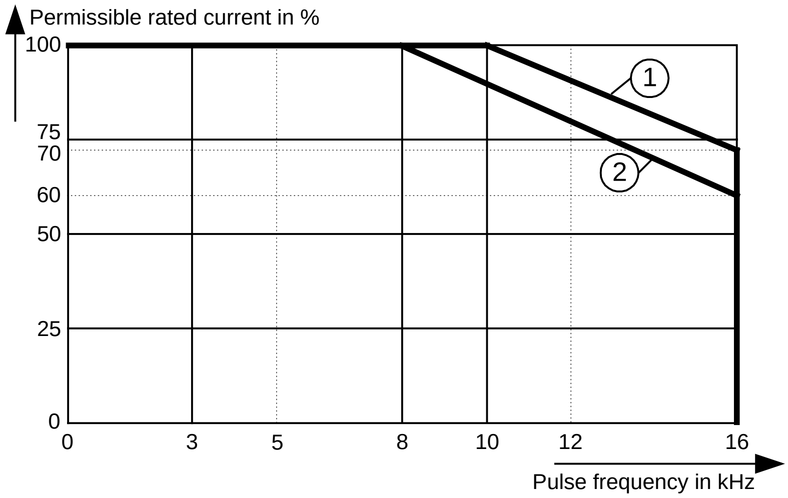


Fig. 7-7 Derating curve

Units with P_n 75 kW and 90 kW (400 V AC)

- Curve ① for supply voltages
  U_{supply} < 440 V (AC) or U_{supply} < 590 V (DC)
- Curve ② for supply voltages
  U_{supply} > 440 V (AC) or U_{supply} > 590 V (DC)

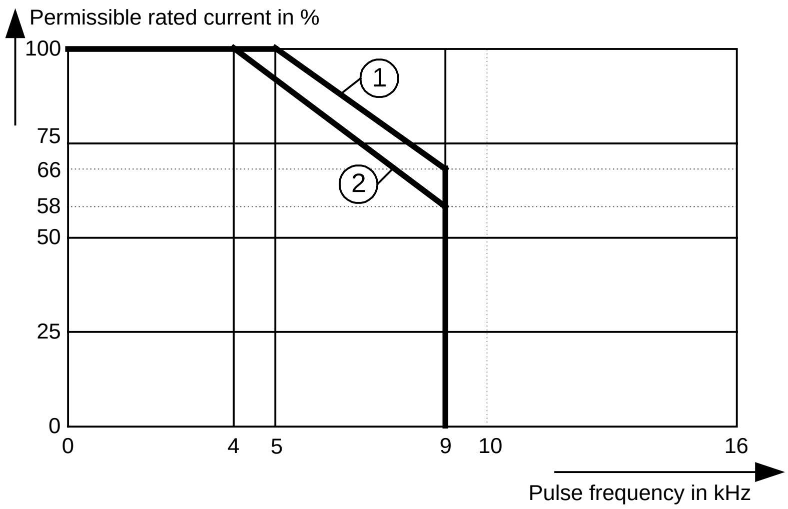
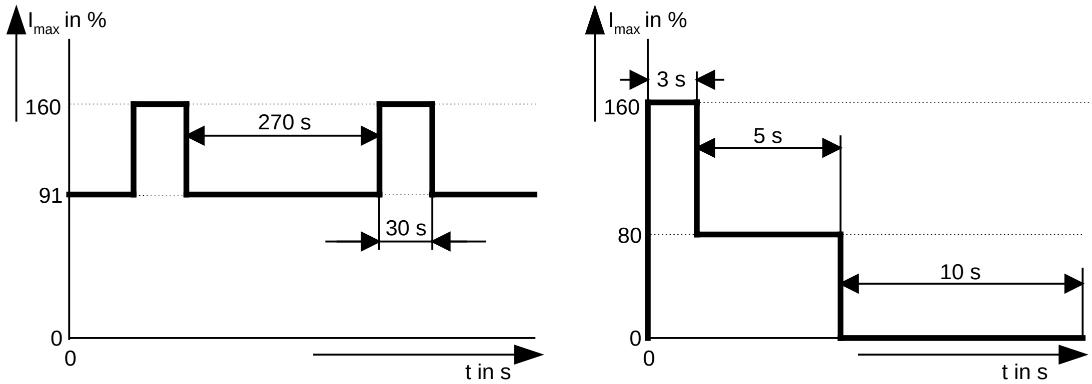


Fig. 7-8 Derating curve

In comparison with the standard derating curve, 100% rated current (or even 160 % for short-time overload) is permissible for higher frequencies (8 / 10 kHz for 4 kW ... 55 kW units, or 4 / 5 kHz for 75 kW and 90 kW units). In such cases, however, the mean loading of the converter must not exceed 60 % and the overload current (160 %) must be held for only
3 seconds (=> load cycle change). If these rules are broken, the pulse frequency will be reduced automatically and the standard load cycle will apply.



Standard load cycle

Load cycle "Elevator application" for 10 kHz / 5 kHz pulse frequency

7.4.3 Approach delay and short run

Approach delay U845

Changeover to the approach setpoint (FSW5) is carried out with a delay defined by the time specified in the parameter.

The delay time can serve to minimize the approaching time without having to displace limit switches. A precondition for activation is that the ramp-function generator is not ramping up and that the speed of the drive is above that of the approach setpoint.

Short run U846

The approach setpoint is delayed by the time indicated in the parameter in order to achieve longer acceleration in the case of short starting distances (ramp-function generator still ramping up).

In order to minimize the travelling time with approaching speed because the ramp-function generator does not fall below the given fixed setpoint in this case and the approach setpoint is thus reached earlier.

A pre-condition for activation is that the ramp-function generator is ramping up when a change is made to the approach setpoint.

7.4.4 Starting pulse (for hoisting gear)

The starting pulse is for "biasing" the speed controller.

Purpose:	To prevent "sagging" of the load when the brake is released and to ensure the load is assumed by the motor.
Precondition:	The brake must receive the release command and the motor must previously have been at zero current.

The following can be set:

Level of the starting pulse (as a % of the rated speed of the equipment):	U842
Decay time of the starting pulse (in ms):	U843
Smoothing of the starting pulse (in ms):	U841

7.4.5 Emergency operation

After a power-system failure, the converter is able to recognize powering up of the power system with batteries to a lower DC link voltage as emergency operation. For this purpose, a voltage window in which the battery voltage is located must be parameterized. A motor data set to be selected during emergency operation as well can also be specified in order to enable travelling with another type of control, for example, with lower voltage. With the pre-settings, operation in normal and emergency mode is possible with motor data set 1.

In emergency mode, an emergency-operation speed is selected instead of fixed setpoints 2 to 8.

During operation with battery voltage, the converter must be separated from the mains supply because it can be destroyed when supply is restored. The changeover to batteries and back to mains supply should be carried out by a higher-level control system.

Purpose	**Parameter No.**	**Description**	**Pre-assigned value**
Set voltage window for emergency operation	U837	Index 1: Min. emergency-op. voltage Index 2: Max. emergency-op. voltage	Index 1: 380 V Index 2: 380 V
Specify speed for emergency operation	U839	Desired speed during emergency operation for all selections of travelling setpoints	0.2 m/s
Specify motor data set during emergency operation	U838	Number of the motor data set which is selected during emergency operation	1
Motor data set during normal operation	P578 P579	Selection of 4 possible motor data sets: 0 0: MDS1 0 1: MDS2 1 0: MDS3 1 1: MDS4	P578: 0 P579: 0

7.4.6 Setpoint specification by means of fixed setpoints

Fixed setpoint selection has been changed relative to the basic operating mode.

The following selection procedures can be set by means of U822:

- Selection 1 from n — U822 = 0
- BCD coded selection — U822 = 1
- BCD coded selection with external trigger — U822 = 1, U821 = Trigger input

The value of the fixed setpoints must be indicated in **m/s** below the relevant parameter number.

Setpoints are selected according to the following method:

1 from n

Fixed setpoint	P580.1	P581.1	P417.1	P418.1	U818	U819	U820
FSW1 U810	0	0	0	0	0	0	0
FSW2 U811	1	0	0	0	0	0	0
FSW3 U812	0	1	0	0	0	0	0
FSW4 U813	0	0	1	0	0	0	0
FSW5 U814	0	0	0	1	0	0	0
FSW6 U815	0	0	0	0	1	0	0
FSW7 U816	0	0	0	0	0	1	0
FSW8 U817	0	0	0	0	0	0	1

BCD and BCD with trigger

Fixed setpoint	P580.1	P581.1	P417.1
FSW1 U810	0	0	0
FSW2 U811	1	0	0
FSW3 U812	0	1	0
FSW4 U813	1	1	0
FSW5 U814	0	0	1
FSW6 U815	1	0	1
FSW7 U816	0	1	1
FSW8 U817	1	1	1

For correct calculation of the motor speed from the fixed setpoints, the gear ratio (U802), pulley diameter (U803) and cabin suspension (U804) must be given!

7.4.7 Changed reference variables

The lifts and hoisting gear mode permits entry of fixed setpoints in m/s (U810 ... U817) as well as ramp-function generator parameters as accelerations in m/s^2 (U827, U828) and jerks in m/s^3 (U829, U830).

The corresponding entries in % or in seconds are deactivated.

The reference speed/reference frequency (P352, P353) are also deactivated and replaced by the rated system speed (U801).

For corrected calculation of the motor speed, the drive setting also has to be defined by the following parameters:

U801 = ?	**Rated system speed in m/s** Scaling for setpoints/actual values from/for automatic control and analog inputs/outputs
U802.01 = U802.02 =	**Gear ratio** Index 01 gear input (motor side) Index 02 gear output e.g.: I = 30:1; Index 01 = 30; Index 02 = 1
U803 =	**Diameter of pulley** in mm
U804 =	**Suspension of the cabin / load** 1= 1:1 Rope direct to the cabin 2= 2:1 One guide roller 4= 4:1 Two guide rollers
U805 =	**Max. permissible motor speed** rpm **Caution:** Limited permissible rated system speed values!
P060 = 1	Return to the **Parameter Menu** **Note: All** user parameters can be read!
Wait	Wait until the converter signals status °008 or °009. If there is a fault signal, see the "Fault and Warning Signals" chapter in the SIMOVERT MASTERDRIVES VC operating instruction.
Drive setting ready	The converter status, although not yet optimized, is now such that the drive can turn.

7.4.8 List of parameters changed as a result of factory setting

P0366 = 10 (factory setting for LIFT operation)

	Parameter	Designator of the parameter at the OP1S	(Factory setting for LIFT operation) P366 = 10	
		(Q. = Source)	BICO1 (i001)	BICO2 (i002)
Display	P048	PMU OperDisp	n848	
	P049.3	OP OperDisp	n848	
	P049.4	OP OperDisp	n808	
Closed-loop control	P128.1	Imax	160 % x P072	
	P128.2	Imax	160 % x P072	
	P128.3	Imax	160 % x P072	
	P128.4	Imax	160 % x P072	
Gating unit	P339.1	PulsSysEn	3	
	P339.2	PulsSysEn	3	
	P339.3	PulsSysEn	3	
	P339.4	PulsSysEn	3	
Setpoint channel	P443	SrcMainSetp	KK0040	KK0040
	P492.1	TLim 1 FixSetp	200.0 %	
	P492.2	TLim 1 FixSetp	200.0 %	
	P492.3	TLim 1 FixSetp	200.0 %	
	P492.4	TLim 1 FixSetp	200.0 %	
	P498.1	TLim 2 FixSetp	-200.0 %	
	P498.2	TLim 2 FixSetp	-200.0 %	
	P498.3	TLim 2 FixSetp	-200.0 %	
	P498.4	TLim 2 FixSetp	-200.0 %	

Control word

Parameter	Designator of the parameter at the OP1S	(Factory setting for LIFT operation) P366 = 10	
	(Src = Source)	BICO1 (i001)	BICO2 (i002)
P554	Src ON/OFF1	B5123	B0005
P555	Src 1OFF2	B0001	B0001
P561	Src InvRelease	B0000	B0000
P564	Src Setp Release	B0277	B0277
P571	Src FWD Speed	B0016	B0001
P572	Src REV Speed	B0001	B0001
P573	Src MOP UPr	B0008	B0000
P574	Src MOP Down	B0009	B0000
P581	Src FixSetp Bit1	B0020	B0000
P417	Src FixSetp Bit2	B0022	B0022
P418	Src FixSetp Bit3	B0018	B0018
P590	Src BICO DSet	B0000	

Brake actuation and signals

P601	Src DigOutMCon	B0275	B0275
P605	BrakeCtrl	1	
P609.1	Src BrakeClose	B0105	
P609.2	Src BrakeClose	B0099	
P609.3	Src BrakeClose	B0330	
P609.4	Src BrakeClose	B0000	
P610	Src BrakeThresh1	K0242	
P611	BrakeThresh1	1.0 %	
P614	Src PBrakeClos	B0857	
P615	Src BrakeThresh2	K0148	
P800.1	OFF Value	0.4 %	
P800.2	OFF Value	0.4 %	
P800.3	OFF Value	0.4 %	
P800.4	OFF Value	0.4 %	
P801.1	OFF Time	0.50 s	
P801.2	OFF Time	0.50 s	
P801.3	OFF Time	0.50 s	
P801.4	OFF Time	0.50 s	
U824	Vib Setp PulsFree	0.01 %	
U953.48	Sampling Times4	4	

AND element for inverter release

U221	Src AND1	B0278	B5125
U950.78	Sampling time	4	

Parameter	Designator of the parameter at the OP1S	(Factory setting for LIFT operation) P366 = 10	
	(Src = Source)	BICO1 (i001)	BICO2 (i002)
Digital inputs/outputs			
P651	Src DigOut1	B0000	B0000
P652	Src DigOut2	B0000	B0000
P674.1	EB2 Src RelayOut	B0107	
P674.2	EB2 Src RelayOut	B0104	
P674.3	EB2 Src RelayOut	B0851	
U953.13	Sampling Times 4	4	
U953.14	Sampling Times 4	4	
Lift operation			
P352	Ref Frequency	38.19 Hz	
P353	Ref Speed	1145 rpm	
P468	Rgen Round Type	1	
U800	Application	1	
U822	Sel FixSetp	0	

Table 7-1 Factory setting depending on P366

8 Communication

A differentiated communication concept makes it possible to use the correct communication medium for a specific requirement. The following communication interfaces are available:

- ♦ Integrated serial interface(s) with USS protocol for parameterization, operator control and visualization of the units with OP1S or PC
- ♦ Optional boards for various field bus interfaces (e.g. PROFIBUS DP) for integration into the automation
- ♦ Optional board for connecting up SIMOLINK for fast synchronous data transfer between technologically connected drives (e.g. angular synchronism).

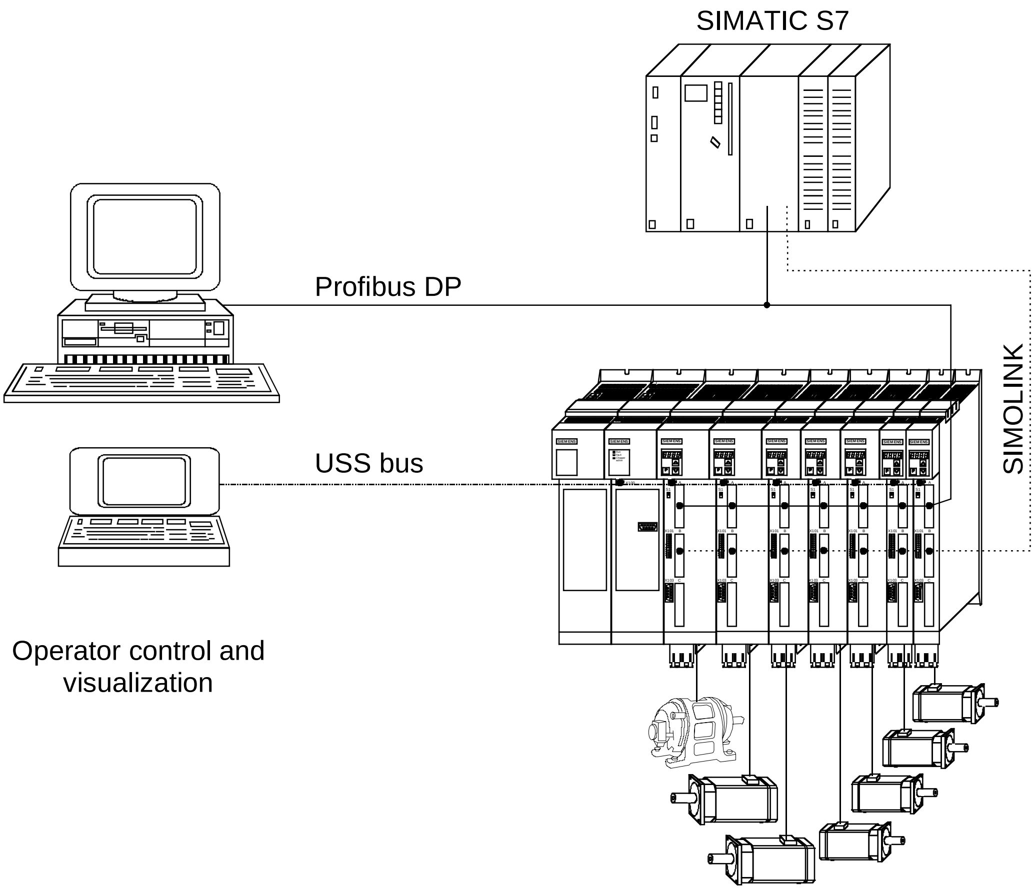


Fig. 8-1 Overview for communication

8.1 Universal Serial lnterface (USS)

Introduction

This documentation describes the application of the Universal Serial Interface Protocol (USS) for SIMOVERT MASTERDRIVES MC and VC.

NOTE

The USS protocol is a simple serial data transfer protocol, defined by Siemens AG, which is fully tailored to the requirements of drive technology. A detailed description of the protocol specifications, the physical interface, the bus structure as well as a definition of the transferred net data for drive applications are documented in the specification "Universal serial interface protocol USS® protocol" (Order No. E20125-D0001-S302-A1).

Using the USS protocol, a user can establish a serial bus link between a higher-level master system and several slave systems. Master systems can be, for example, PLCs or PCs. SIMOVERT MASTERDRIVES drive converters are always the slaves on the bus system. Furthermore, SIMOVERT MicroMaster, SIMOVERT P 6SE21 and 6RA23 and 6RA24 drive converters can be operated as slaves on the USS bus.

The USS protocol allows the user to implement both automation tasks with cyclical telegram traffic (⇒ a fixed telegram length is necessary) as well as visualization tasks. In this case, the protocol with variable telegram length is advantageous, as texts and parameter descriptions can be transferred in one telegram without chopping up the information.

8.1.1 Protocol specification and bus structure

Features

The USS protocol has the following significant features:

- Supports a multi-point-capable link, e.g. EIA RS 485 hardware or a point-to-point link, e.g. EIA RS 232.
- Master-slave access technique
- Single-master system
- Maximum 32 nodes (max. 31 slaves)
- Operation with variable or fixed telegram length
- Simple, reliable telegram frames
- The same bus mode of operation as with the PROFIBUS (DIN 19245 Part 1)
- Data interface to the basic unit according to PROFILE variable-speed drives. This means that, when the USS is being used, information is transferred to the drive in the same way as with the PROFIBUS-DP.
- Can be used for start-up, service and automation
- PC-based service tools (e.g. SIMOVIS) for SIMOREG and SIMOVERT
- Can be easily implemented in customized systems

8.1.1.1 Protocol specification

Introduction

The USS protocol defines an access technique according to the master-slave principle for communications via a serial bus. The point-to-point link is included as a sub-quantity.

One master and a maximum of 31 slaves can be connected to the bus. The individual slaves are selected by the master using an address character in the telegram. A slave can never transmit without first being initiated by the master so that direct information transfer between individual slaves is not possible. Communication takes place in the half-duplex mode.

The master function cannot be transferred (single-master system).

The following illustration shows a bus configuration using drive technology as an example.

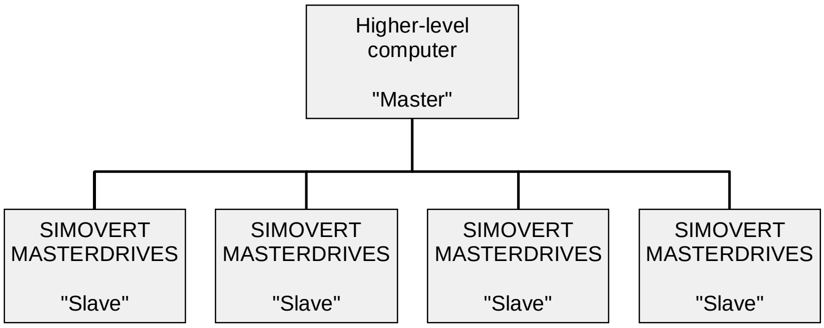


Fig. 8.1-1 Serial linking of SIMOREG/SIMOVERT drive converter (slaves) with a higher-level computer as the master

Telegram structure

Each telegram begins with the start character STX (= 02 hex), followed by the length information (LGE) and the address byte (ADR). The net characters then follow. The telegram is terminated by the BCC (Block Check Character).

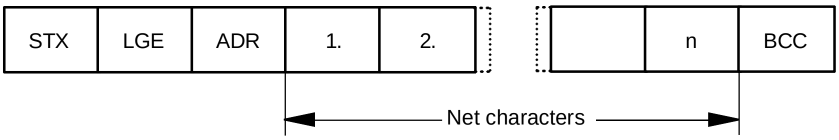


Fig. 8.1-2 Telegram structure

For single-word data (16 bit) in the net data block (= net character block), the high byte (first character) is always sent and then the low byte (second character). The same applies to double-word data: the high word is sent first followed by the low word.

The protocol does not identify tasks in the net characters. The contents of the net data for SIMOVERT MASTERDRIVES drive converters is dealt with in Section 8.1.3.

Data coding

Information is coded as follows:

- ♦ STX (start of text)
  ASCII characters: 02 hexadecimal
- ♦ LGE (telegram length)
  1 byte, contains the telegram length
- ♦ ADR (address byte)
  1 byte, contains the slave address and the telegram type (binary coded)
- ♦ Net characters
  Each one byte, contents are task-dependent
- ♦ BCC
  1 byte, Block Check Character

Assigning the address byte (ADR)

In the address byte, information other than the node number is coded: The individual bits in the address byte are assigned as follows:

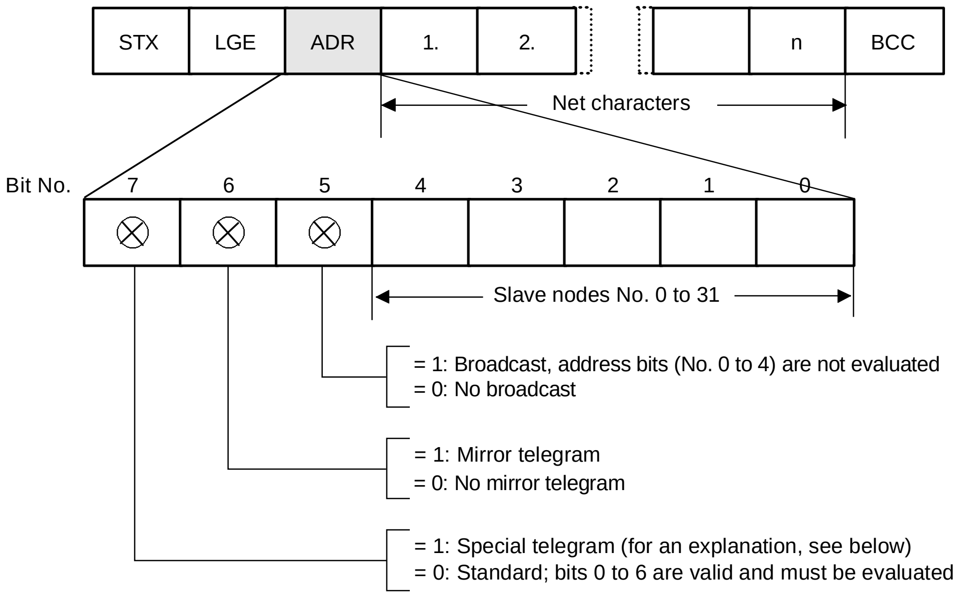


Fig. 8.1-3 Assignment of the address byte (ADR)

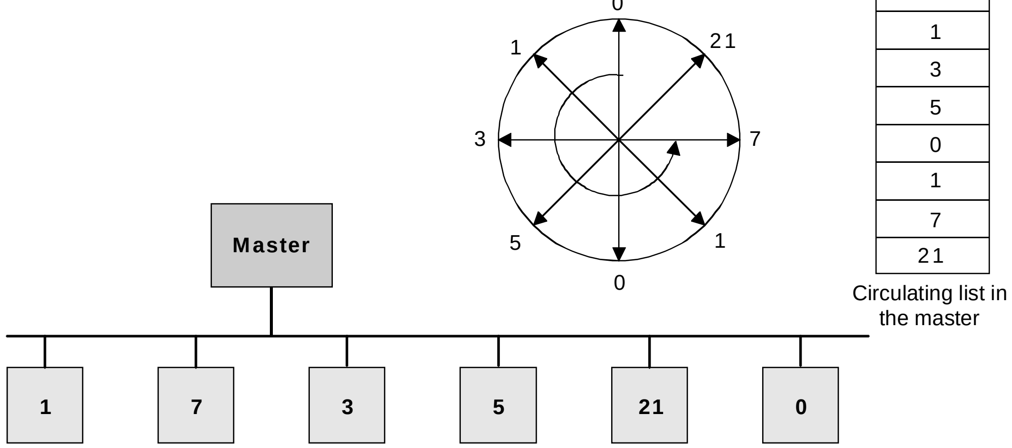
Data transfer procedure

The master ensures cyclical telegram data transfer. The master addresses all of the slave nodes one after the other with a task telegram. The addressed nodes respond with a reply telegram. In accordance with the master-slave procedure, the slave, after receiving the task telegram, must send the reply telegram to the master before the master can address the next slave node.

Handling data transfer

The sequence of the addressed slave nodes can be specified, for example, by entering the node numbers (ADR) in a circulating list (polling list) in the master. If it is necessary to address several slaves in a faster cycle than the other slaves, their node number can occur several times in the circulating list. A point-to-point link can be implemented by means of the circulating list, in which case only one node is entered into the circulating list.

Example of configuration



SIMOVERT MASTERDRIVES with the addresses 0, 1, 3, 5, 7 and 21

Nodes 0 and 1 are signalled twice as often as others

Fig. 8.1-4 Circulating list

Cycle time

The length of a cycle time is determined by the time needed for the sequential occurrence of data exchange with the individual nodes.

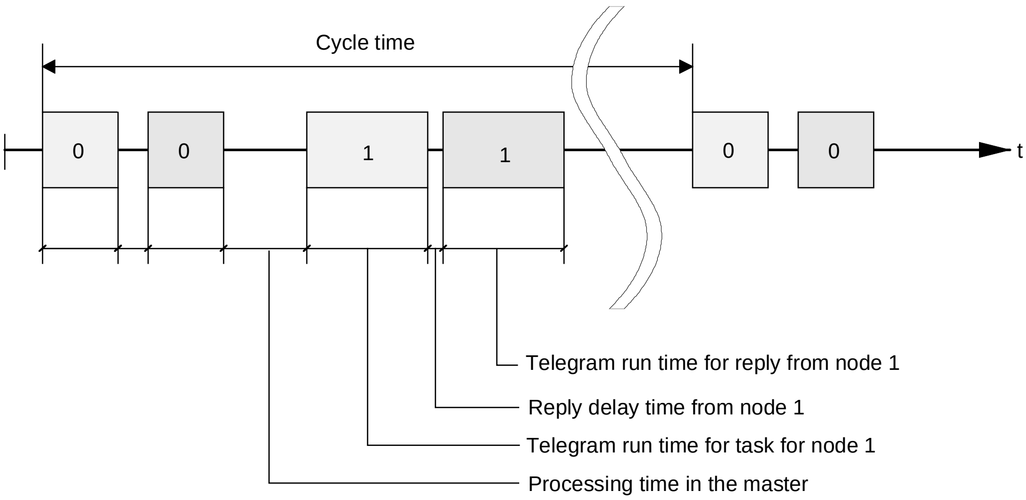


Fig. 8.1-5 Cycle time

Due to inconstant reply delay and processing times, the cycle time is not fixed.

Start interval

The STX start character (= 02 hexadecimal) by itself is not sufficient for the slaves to clearly identify the start of a telegram because the bit combination 02/hexadecimal can also occur in the net characters. For this reason, a no-character start interval of at least 2 character run-times before the STX is specified for the master. The start interval is part of the task telegram.

Baud rate in bit/s	Start interval in ms
9600	2,30 ms
19200	1,15 ms
38400	0,58 ms
76800	0,29 ms
93750	0,23 ms
187500	0,12 ms

Table 8.1-1 Minimum start intervals for various baud rates

Only an STX with a preceding start interval identifies the valid start of a telegram.

Data is always transferred in accordance with the diagram illustrated below (half-duplex mode):

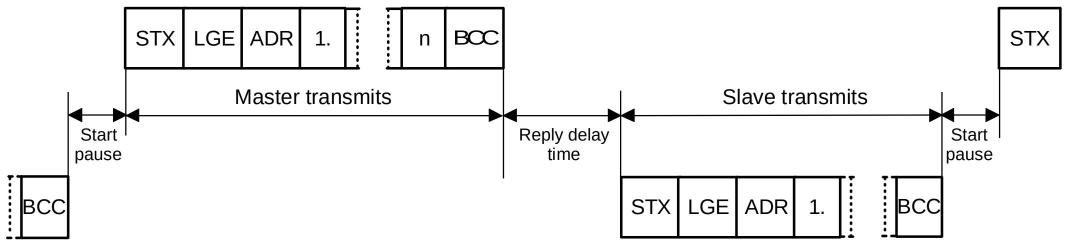


Fig. 8.1-6 Transmit sequence

Reply delay time

The time interval between the last character of the task telegram (BCC) and the start of the reply telegram (STX) is known as the **reply delay time**. The maximum permissible reply delay time is **20 ms, but it must not be less than the start interval**. If node x does not respond within the maximum permissible reply delay time, an error message is deposited in the master.
The master than sends the telegram for the next slave node.

8.1.1.2 Bus structure

The data transfer medium and the physical bus interface are essentially determined by what the bus system is used for.

The physical interface of the USS protocol is based on the "Recommended Standard RS-485". For point-to-point links, a sub-quantity of EIA RS-232 (CCITT V.24), TTY (20 mA current loop) or fiber-optic cables can be used as the physical interface.

The interfaces for SIMOVERT MASTERDRIVES are always RS 485 with 2-wire cable.

Exception: Either RS 485 or RS 232 can be connected at the 9-pin SUB D socket connector on the PMU (operator control and parameterizing unit) of the basic units.

NOTICE

This section describes how a USS field bus has to be structured in order to ensure reliable data transfer via the transfer medium in standard applications. Under special conditions of use, additional factors must be taken into account which require further measures or restrictions that are not described in this document.

Topology

The USS bus is based on a linear topology without branches.

Both ends of the line terminate at a node.

The maximum cable length and therefore the maximum distance between the master and the last slave is limited by the characteristics of the cable, the ambient conditions and the data transfer rate. With a data transfer rate of < 100 kbit/s, a maximum length of 1200 m is possible.

The number of nodes is limited to a maximum of 33 (1 master, 32 slaves).

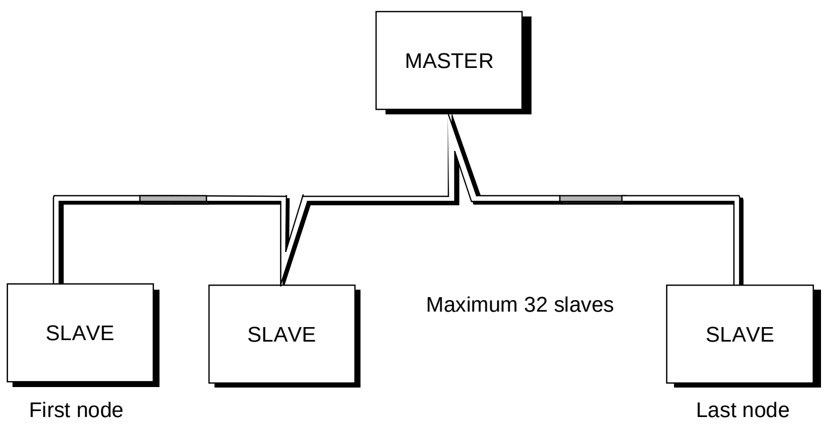


Fig. 8.1-7 USS bus topology

The two ends of a bus line (first node and last node) must be terminated with bus terminating networks.
Point-to-point connections are handled just like bus connections. One node has the master function and the other has the slave function.

Data transfer technology

Data is transferred in accordance with Standard EIA 485. RS 232 can be used for point-to-point links. Data transfer is always half-duplex – i.e. alternating between transmitting and receiving – and it must be controlled by the software. The half-duplex technique allows the same cables to be used for both data-transfer directions. This permits simple and inexpensive bus cabling, operation in environments subject to interference and a high data transfer rate.

Cable characteristics

A shielded, twisted two-wire cable is used as the bus cable.

Conductor diameter ∅	2 × ≈ 0,5 mm^2
Conductor	≥ 16 x ≤ 0,2 mm
Lay ratio	≥ 20 twists / m
Overall shield	Braided, tin-plated copper wire, diameter ∅ ≥ 1,1 mm^2 85 % optical coverage
Overall diameter∅	≥ 5 mm
External sheath	Depending on the requirements regarding flame retardation, deposits after burning etc.

Table 8.1-2 Structural data

NOTE

All information should only be considered as a recommendation. Deviations or different measures may be required depending on the particular requirements, the specific application and the conditions on site.

Thermal and electrical characteristics

Cable resistance (20°C)	≤ 40 Ω/km
Insulation resistance (20°C)	≥ 200 MΩ/km
Operating voltage (20°C)	≥ 300 V
Test voltage (20°C)	≥ 1500 V
Temperature range	-40 °C ≤ T ≥ 80 °C
Load capability	≥ 5 A
Capacitance	≤ 120 pF/m

Table 8.1-3 Thermal and electrical characteristics

Mechanical characteristics

Single bending: ≤ 5 x outer diameter
Repeated bending: ≤ 20 x outer diameter

Recommendations

1. Standard, without any special requirements:
Two-core, flexible, shielded conductor in accordance with VDE 0812, with colored PVC sheath.
PVC insulation resistant to oil and petroleum products.

- Type: LIYCY 2 x 0,5 mm^2
e.g. Metrofunk Kabel-Union GmbH
Postfach 41 01 09, 12111 Berlin
Tel 030-831 40 52, Fax: 030-792 53 43

2. Halogen-free cable (no hydrochloric acid is generated when the cable burns):
Halogen-free, highly flexible, resistant to extreme heat and cold.
Sheath manufactured from a special ASS silicon-based composite.

- Type: ASS 1 x 2 x 0,5 mm^2
e.g. Metrofunk Kabel-Union GmbH
Postfach 41 01 09, 12111 Berlin
Tel 030-831 40 52, Fax: 030-792 53 43

3. Recommended if halogen-free and silicon-free cables are required:

- Type: BETAflam G-M/G-G-B1 flex. 2 x 0,5 mm^2
e.g. Studer-Kabel-AG, CH 4658 Däniken

Cable lengths

The cable length is dependent on the data transfer rate and the number of connected nodes. The following cable lengths are possible given the specified cable characteristics:

Data transfer rate	Max. number of nodes	Max. cable length
9.6 kbit/s	32	1200 m
19.2 kbit/s	32	1200 m
93.75 kbit/s	32	1200 m
187.5 kbit/s	30	1000 m

Table 8.1-4 Cable lengths

8.1.2 The structure of net data

Information which, for example, a SIMATIC S5 control unit (= master) sends to a drive (= slave) or the drive sends to the control unit is placed in the net-data area of each telegram.

8.1.2.1 General structure of the net-data block

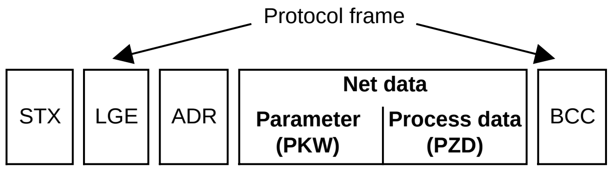
Introduction

The net-data block is divided into two areas:

- the PKW (parameter ID value) range
- the PZD (process data) range

Telegram structure

The structure of the net data in the USS-protocol telegram is shown below.



PKW: **Parameter ID value** (parameter area) PZD: **Process data** (process-data area)

- The **PKW area** relates to the handling of the parameter ID value (PKW) interface. The PKW interface is not a physical interface but a mechanism which handles parameter transfer between two communication partners (e.g. control unit and drive). This involves, for example, reading and writing parameter values and reading parameter descriptions and associated texts.
  All tasks which are performed via the PKW interface essentially involve operator control and visualization, service and diagnosis.
- The **PZD area** contains the signals required for the **automation** system:
  - Control word(s) and setpoint(s) from the master to the slave
  - Status word(s) and actual value(s) from the slave to the master.

Structure of the PKW and PZD areas

PKW area			PZD area		
PKE	IND	PKW elements	PZD1	• • •	PZD16
Variable length			Variable length		

The two areas together make up the net data block. This structure applies to telegrams from the master to the slave and vice versa.

8.1.2.2 PKW area

With the help of the PKW mechanism, the following tasks can be performed via any serial interface with the USS protocol:

- ♦ Reading and writing parameters in the basic unit and, if available, parameters on a technology board, e.g. T100
- ♦ Reading the description of a parameter (applies to parameters of the basic unit and of technology boards)
- ♦ Reading of texts assigned to the indices of an indexed parameter. (Applies to parameters of the basic unit and of the technology modules.)
- ♦ Reading of texts assigned to the values of a parameter. (Applies to parameters of the basic unit and of the technology modules.)

Settings in the PKW area

The PKW area can be varied. Depending on the particular requirement, **3-word, 4-word or variable word lengths** can be parameterized.

PKW area parameterized for 3 words

The following is an example of a structure when access (write/read) is made to **single-word** (16 bit) parameter values:

1st word	2nd word	3rd word
PKE	IND	PWE1
Parameter ID	**Index**	**Parameter value 1**

The PKW area must be permanently set to 3 words at the master and the slave. This setting is made during start-up and should not be altered any more during bus operation.

PKW area parameterized to 4 words

The following is an example of a structure when access (write/read) is made to **double-word** (32 bit) parameter values:

1st word	2nd word	3rd word	4th word
PKE	IND	PWE1	PWE2
		High-Word	Low Word
Parameter ID	**Index**	**Parameter value (double word)**	

Parameterization to a fixed length of 4 words applies to telegrams from the master to the slave and from the slave to the master. The setting must be made both at the master and at the slave and can no longer be altered during bus operation.

PKW area parameterized with variable word length

1st word	2nd word	3rd word	4th word		(m+2) word
PKE	IND	PWE1	PWE2	• • •	PWEm

With:

- 1 word ≤ m ≤ 110 words (maximum) when 16 PZD words (maximum) are contained in the net data block.
- 1 word ≤ m ≤ 126 words (maximum) when there is no PZD.

Telegram data transfer with variable telegram length means that the slave responds to a telegram from the master with a telegram whose length does not have to be the same length as the telegram from the master to the slave. The length of elements PEW 1 to PWE m in the reply telegram and what is contained in them depends on the task issued by the master. Variable length means that only the number of words necessary to pass on the appropriate information is transferred. The minimum length, however. is always 3 words.

If a slave, for example, transfers a parameter value which is a 16-bit quantity (e.g. the output voltage in parameter r003), then only 3 words of the PKW area are sent in the telegram from the slave to the master. With regard to the MASTERDRIVES MC/VC for example, if the current speed (parameter r002) is to be read, the PKW area in the telegram from the slave to the master is 4 words long since the speed is stored as a 32-bit quantity in parameter r002. Variable word-length parameterization is mandatory if, for example, all values are to be read at once from an "indexed" parameter or if the parameter description of a parameter is to be partially or completely read. This setting to variable word-length is made during start-up.

NOTICE

Do not use a variable word length if a SIMATIC S5 or SIMATIC S7 is the master.

Structure of the parameter area (PKW)

	Parameter ID			1st word
Bit No.:	15 12	11	10 0	
	AK	SPM	PNU	

	Parameter index		2nd word
Bit No.:	15 8	7 0	
	Index High	Index Low	

Parameter value		
Parameter value **High**	(PWE1)	3rd word
Parameter value **Low**	(PWE2)	4th word

AK: Task or reply ID

SPM: Toggle bit for processing of parameter-change reports

PNU: Parameter number

NOTE

The PKW area is transferred in increasing order, always starting with the 1st word.

Parameter ID (PKE), 1st word

The parameter ID (PKE) is always one word (16-bit quantity).

Bits 0 to 10 (PNU), together with bit 15 of the parameter index, make up the number of the desired parameter (see parameter list).

Number	PKE: Bits 0 to 10 (PNU)	Index: Bit 15	
1 - 999	1 - 999	0	Basic unit
2000 - 2999	0 - 999	1	Basic unit
1000 - 1999	1000 - 1999	0	Technology module
3000 - 3999	1000 - 1999	1	Technology module

Bit 11 (SPM) is the toggle for parameter-change reports. MASTERDRIVES do not support parameter change reports.

Bits 12 to 15 (AK) contain the task or reply ID.

The **task IDs** are sent in the telegram from the master to the slave. The meaning of the IDs is given in Table 8.1-5. Correspondingly, the **reply IDs** are transferred at this position in the telegram from the slave to the master (see Table 8.1-6). Depending on the task ID, only certain reply IDs are possible. If the reply ID is 7 (task cannot be executed), then an error number is entered in parameter value 2 (PWE2). The error numbers are shown in Table 8.1-7.

Task ID	Meaning	Reply ID	
		positive	negative
0	No task	0	7 or 8
1	Request parameter value	1 or 2	↑
2	Change parameter value (word)	1	│
3	Change parameter value (double word)	2	│
4	Request descriptive element [1]	3	│
6	Request parameter value (array)[1]	4 or 5	│
7	Change parameter value (array, word)[2]	4	│
8	Change parameter value (array, double word)[2]	5	│
9	Request the number of array elements	6	│
10	Reserved	-	│
11	Change parameter value (array, double word) and save in EEPROM [2]	5	│
12	Change parameter value (array, word) and save in EEPROM [2]	4	│
13	Change parameter value (double word) and save in EEPROM	2	│
14	Change parameter value (word) and save in EEPROM	1	↓
15	Read or change text (only supported via OP or SIMOVIS)	15	7 or 8

[1] The required element of the parameter description is specified in IND (2nd word)
[2] The required element of the indexed parameter is specified in IND (2nd word)

Table 8.1-5 Task IDs (master -> drive converter)

Reply ID	Meaning
0	No reply
1	Transfer parameter value (word)
2	Transfer parameter value (double word)
3	Transfer descriptive element [1]
4	Transfer parameter value (array, word) [2]
5	Transfer parameter value (array, double word) [2]
6	Transfer the number of array elements
7	Task cannot be executed (with error number)
8	No control/change rights for the PKW interface
9	Parameter change report (word)
10	Parameter change report (double word)
11	Parameter change report (array, word) [2]
12	Parameter change report (array, double word) [2]
13	Reserved
14	Reserved
15	Transfer text

* For table footnotes [1] and [2], see Table 8.1-5

Table 8.1-6 Reply IDs (drive converter -> master)

Example

Source for the ON/OFF1 command (control word1, bit 0):
P554 (=22A hex) Change parameter value (array, word) and save in the EEPROM.

	Parameter ID (PKE)				1st word
Bit No.:	15 … 12	11	10 … 0		
	AK	SPM	PNU		
	1 1 0 0	0 0 1 0	0 0 1 0	1 0 1 0	Binary value
	C	2	2	A	HEX value

- ♦ Bits 12 to 15: Value = 12 (= "C" hex); change parameter value (array, word) and save in the EEPROM
- ♦ Bits 0 to 11: Value = 554 (= "22A" hex); parameter number with a set change-report bit

Error numbers for reply "Task cannot be executed"

No.	Meaning
0	Inadmissible legal parameter number (PNU); if PNU is not available
1	Parameter value cannot be changed; if the parameter is a visualization parameter
2	Lower or upper limit exceeded
3	Erroneous sub-index
4	No array
5	Incorrect type of data
6	Setting not permitted (can only be reset)
7	Descriptive element cannot be changed; not possible
11	No operator control rights
12	Key word missing; Drive converter parameter: 'Access Key' and/or 'Parameter Special Access' not correctly set
15	No text array available
17	Task cannot be executed due to operating status; drive converter status does not permit the set task at the moment
101	Parameter number deactivated at the moment; Parameter has no function in the present state of the drive converter (e.g. type of closed-loop control)
102	Channel width too small; only for short channels The parameterized length of the PKW area is too large due to internal limitations of the drive converter. This error message can occur with the USS protocol on the T100 technology board only if access is made to parameters of the basic unit from this interface.
103	Number of PKWs incorrect; only for G-SCom 1/2 and SCB interface (USS); The error number is transferred in the following two cases: • if the task concerns all the indices of an indexed parameter (task index equal to 255) or the whole parameter description is requested and a variable telegram length has not been parameterized. • if the parameterized number of PKWs (process-data items) in the telegram is too small for the set task (e.g. alteration from the double word and the number of PKWs is 3 (words).
104	Parameter value not permissible; This error number is transferred if the parameter value which is to be transferred does not have an assigned function in the drive converter or cannot be accepted at the instant of the change for internal reasons (although it lies within the limits).
105	The parameter has been indexed e.g. task 'PWE change word' for indexed parameter
106	Task not implemented

Table 8.1-7 Error numbers for the reply ID "Task cannot be executed"

Example
Error message 104

The parameter ’SCom/SCB PKW #" P702:

- Minimum value: 0 (0 words)
- Maximum value: 127 (corresponds to: variable length)
- Permissible values for USS: 0, 3, 4 and 127.

If a change task with a PWE which is not 0, 3, 4 or 127 is issued to the drive converter, the reply is "Task cannot be executed" with error value 104.

Parameter index
(IND) 2nd word

The low-part of the index (bit 0 to 7), depending on the task, describes a definite element:

- desired array element in the case of indexed parameters,
- desired element of the parameter description,
- for indexed parameters with "index text": desired index text,
- for non-indexed parameters with "selection text": desired selection text.

Bits 8 to 14 must as a general rule all be equal to 0. The only exceptions are those parameters that are indexed and possess "selection texts". In this case bit 9 must be set to 1 to clearly identify the desired text type. The low-part then defines the desires "selection text".

Bit 15, together with bits 0 to 10 in the PKE, serves to constitute the number of a parameters (see Parameter coding).

Special significance
of index value 255
(low-part)

With regard to the task "Request (parameter element) descriptive element" (= AK 4) or tasks relating to the reading/writing of indexed parameters (= arrays), index value 255 has a special significance:

Task ID	Meaning
4	The complete (parameter) description is requested
6	Request all values of the indexed parameter This task can generate error message 102.
7, 8, 11 or 12	All values of the indexed parameter are to be changed. These tasks can generate error message 102.

Table 8.1-8 Tasks with index value 255

Example Parameter index

Source for ON/OFF1 command (control word 1, bit 0): P554 (= 22A hex)
Change parameter value of index 1.

	Parameter index				
Bit No.:	15 ... 8		7 ... 0		2nd word
	0	0	0	1	HEX value

Bit 0 to 7: Index or number of the descriptive element
Bit 8 to 14: 0
Bit 15: 0

Parameter value (PWE) 3rd and 4th words

Depending on the word length parameterization of the PKW area, the parameter value (PWE) is transferred as word or double word (32 bit). Only one parameter value can be transferred in a telegram.

If the word length of the PKW area is parameterized with 3 words, then only 16 bit parameters can be transferred. Parameter description elements larger than 16 bit and texts cannot be transferred.

If the word length of the PKW area is parameterized with 4 words, then 16 and 32 bit parameters can be transferred. Parameter description elements larger than 32 bit and texts cannot be transferred.

If the word length of the PKW area is parameterized with "Variable length" (127), then 16 and 32 bit parameters can be transferred. Parameter description elements and texts can also be transferred. Furthermore, all elements of an indexed parameter can be read or changed as a single task and the whole parameter description can be called (index value: low-part = 255).

Transfer of a 16-bit parameter value:

1. PKW area, fixed, 3 words:
   PWE1 contains the value
2. PKW area, fixed, 4 words:
   PWE2 (least significant word, 4th word) contains the value; PWE1 is set to 0.
3. PKW area, variable:
   PWE1 contains the value. There is no PWE2 or higher!

Transfer of one 32-bit parameter value:

1. PKW area, fixed, 3 words:
   Task is rejected with error message 103.
2. PKW area, fixed, 4 words:
   PWE1 (most significant word; 3rd word) contains the high-word of the double word
   PWE2 (least significant word; 4th word) contains the low-word of the double word.
3. PKW area, variable:
   As 2.; There is no PWE3 or higher!

Example Parameter value

Source for the ON/OFF1 command (control word 1, bit 0): P554 (= 22A hex)
Change parameter value of index 1 to the value 2100 (hex).

	Parameter value				
Bit No.:	31	24	23	16	3rd word, PWE1 (hex)
	0	0	0	0	
Bit No.:	15	8	7	0	4th word, PWE2 (hex)
	2	1	0	0	

Bit 0 to 15: Parameter value for 16-bit parameter or low component for 32-bit parameter
Bit 16 to 31: Value = 0 for 16-bit parameter or high component for 32-bit parameter

8.1.2.3 Process-data area (PZD)

In this area, process data are **continually** exchanged between the master and slaves. The process data to be exchanged with a slave is configured at the start of communications. The setpoint for the current is to be transferred to slave x in the second PZD (= PZD2), for example. This setting is fixed for the whole procedure of data transfer.

PZD1-PZD16 = Process data
(= control / status word(s) and setpoint(s) / actual value(s))

The control/status word(s), setpoint(s) and actual value(s) required for the automation system are transferred in this area.

The length of the PZD area is determined by the number of PZD elements and their size (e.g. word, double word). In contrast to the PKW area, which can be variable, the length of this area (master and slaves) must always be agreed on between the communication partners. The maximum number of PZD words per telegram is limited to 16 words. If only PKW data is to be transferred in the net data block, the number of PZDs may even be 0!

In PZD1, control word 1 or status word 1 is always transferred, depending on the direction of data transfer and, in PZD2, the main setpoint or the main actual value is always transferred, again depending on the direction of data transfer. In the subsequent process data areas PZD3 to PZDn, additional setpoints and actual values are sent. For SIMOVERT MASTERDRIVES, control word 2 or status word 2, if necessary, is transferred in PZD4.

Structure of the PZD area

1 word	1 word	1 word		1 word
PZD1	PZD2	PZD3	• • •	PZD16

Maximum 16 words
Minimum 0 words, i.e. no PZD area in the net data block

NOTE

PZDn is always transferred before PZDn+1 on the USS bus.

Task telegram (master ⇒ slave)

PZD1	PZD2 / PZD3	PZD4	PZD5 ... PZD16
Control word 1	Setpoint (32 Bit) / Setpoints (16 Bit)	Setpoint / Control word 2	Setpoints

Reply telegram (slave ⇒ master)

PZD1	PZD2 / PZD3	PZD4	PZD5 ... PZD16
Status word 1	Main actual value 1)	Actual values 1) / Status word 2	Actual values

1) Setpoint/actual value assignments are freely selectable, which means, for example, that the speed setpoint can be given in the task telegram in the PZD2, while the actual speed value can be returned in the reply telegram in the PZD2 (technologically useful). Or another actual value can be returned, such as actual torque value, actual position value or actual current value.

8.1.3 Interface overview

The following section describes all of the presently available SIMOVERT MASTERDRIVES MC/VC interfaces which use the USS protocol.

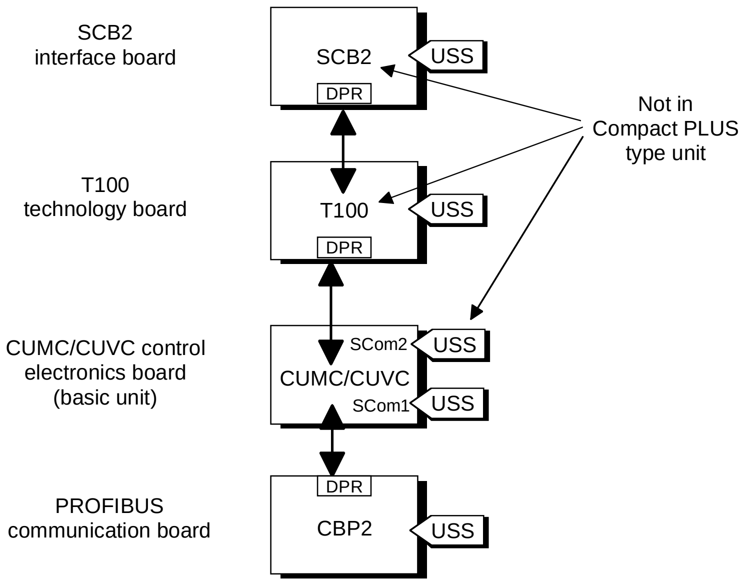


Fig. 8.1-8 Interface overview

Basic unit with CUMC/CUVC/CUVP

In the SIMOVERT MASTERDRIVES MC series, the control electronics board, CUMC (Control Unit Motion Control) or CUVC (Control Unit Vector Control), is used. Depending on the type of basic unit, it has at least one serial interface with the USS protocol. The following table shows the available interfaces:

Board	Number of interfaces	Physical interface	Baud rate [kBit/s]
CUMC in Compact PLUS unit	1 interface with USS protocol Designation: SCom1	RS485 / 2-wire at terminal strip X100 or RS232 or RS485 / 2-wire at 9-pole SUB-D socket X103	max. 38.4
CUMC in Compact and chassis type unit	2 interfaces with USS protocol Designation: SCom1 and SCom2	RS485 / 2-wire on terminal strip X103 (SCom1 and SCom2) or RS232 or RS485 / 2-wire at 9-pole SUB-D socket X300 (SCom1)	max. 38.4
CUVC in Compact and chassis type unit	2 interfaces with USS protocol Designation: SCom1 and SCom2	RS485 / 2-wire on terminal strip X101 (SCom2) and RS232 or RS485 / 2-wire at 9-pole SUB-D socket X300 (SCom1)	max. 38.4
CUVP in Compact PLUS unit	2 interfaces with USS protocol Designation: SCom1 and SCom2	RS485 / 2-wire on terminal strip X100 (SCom2) and RS232 or RS485 / 2-wire at 9-pole SUB-D socket X103	max. 38.4

Table 8.1-9 Interfaces on the CU board

NOTICE

All the interfaces on the CU boards are non floating (not electrically isolated).

SCB 2 supplementary board

The SCB2 (Serial Communications Board) is an expansion board of the SIMOVERT MASTERDRIVES. The board has a floating RS485 interface. Either the peer-to-peer protocol or the USS protocol can be used at this interface.

NOTE

The supplementary SCB2 board cannot be built into the Compact PLUS type of unit.

Board	Number of interfaces	Physical interface
SCB2	1 interface with USS protocol	RS485 / 2-wire at terminal strip X128

Table 8.1-10 Interface on the SCB 2 board

NOTE

For a more detailed description of the SCB 2, refer to the instruction manual, "Serial Communication Board 2"
(Order No.: 6SE7087-6CX84-0BD0).

T100 technology board

The T100 technology board is an expansion board of the SIMOVERT MASTERDRIVES. The board has two, non-floating RS485 interfaces. One interface is permanently provided for the peer-to-peer protocol, the other is for the USS protocol.

NOTE

The T100 technology board cannot be built into the Compact PLUS type of unit.

Board	Number of interfaces	Physical interface
T100	1 interface with USS protocol and 1 interface for peer-to-peer linking	RS485 / 2-wire at terminal strip X132

Table 8.1-11 Interfaces on the T100 board

NOTE

For a more detailed description of the T100, refer to the instruction manual "Technology Board T100" [Order No. 6SE7080-0CX87-0BB0, (hardware) and 6SE7080-0CX84-0BB0 (software)].

CBP2 supplementary board

The CBP2 interface board (Communication Board PROFIBUS 2) is an extension board of the SIMOVERT MASTERDRIVES. The board has a floating RS485 interface. For this interface, either the PROFIBUS protocol or the USS protocol can be used.

Board	Number of interfaces	Physical interface
CBP2	1 interface with USS protocol	RS485 / 2-wire at terminal strip X448

Table 8.1-12 Interface on the CBP2 board

NOTE

A more detailed description of the CBP2 can be found in the operating instructions "CBP/CBP2 - Communication Board PROFIBUS" (Order No.: 6SE7087-6NX84-0FF0).

8.1.4 Connecting-up

DANGER

- The equipment is operated at high voltages. They must be in a no-voltage condition (off load) during all connecting work!
- When work is being done on the unit, it must be in a no-load condition, i.e. it must be disconnected and locked-out from the line supply.
- Only appropriately qualified personnel may work on or with the equipment.
- Death, severe bodily injury or considerable material damage may result if this warning is not complied with.
- Due to the DC link capacitors, there are still hazardous voltage levels in the equipment for at least 5 minutes after it has been disconnected from supply. There must therefore be a delay of at least 5 minutes before the unit is opened.
- The power terminals and the control terminals can still carry hazardous voltage even when the motor has been shut down.

8.1.4.1 Bus cable connection

On SIMOVERT MASTERDRIVES, connection of the USS bus cable depends on the control version and, in the case of MC units, it is dependent on the respective type of construction.

MC, VC, "Compact PLUS" type

With the "Compact PLUS" type of unit, either terminal strip X100 or connector X103 can be used to connect up the USS bus cable. The exact pin assignment is given in the relevant operating instructions for the basic unit.

MC, "Compact type" and "chassis type"

With "Compact type" and "chassis type" units, the SCom1 and SCom2 interfaces can be operated at the same time on terminal strip X103 with the USS protocol. Alternatively, connector X300 can be used as SCom1. The exact pin assignment of terminal strip X103 or connector X300 is given in the relevant operating instructions of the basic unit.

VC, "Compact type" and "chassis type"

In the case of the "Compact type" and "chassis type" units, either the connection of terminal strip X101 (SCom2) or X300 (SCom1) can be used to connect up the USS bus cable. The exact pin assignment of terminal strip X101 or connector X300 is given in the relevant operating instructions of the basic unit.

SCB 2 board

In the case of the SCB2 board, the bus cable is terminated at terminal strip X128. The exact pin assignment and other notes on termination are given in the operating instructions for the SCB2.

Technology board T100

In the case of the T100 technology board, the USS protocol is implemented at interface 1. The bus cable is terminated at terminal strip X132. The exact pin assignment and other notes on termination are given in the hardware operating instructions for the T100.

8.1.4.2 Fitting the bus cable

At all interfaces to the CUMC, CUVC control electronics, the SCB2 board and the T100, except for connectors X103 and X300 or X448 (9-pin SUB-D connectors), the USS bus cable is connected by means of screw/plug-in terminals. The correct method of connecting the bus cable at the connector is shown in the following diagram.

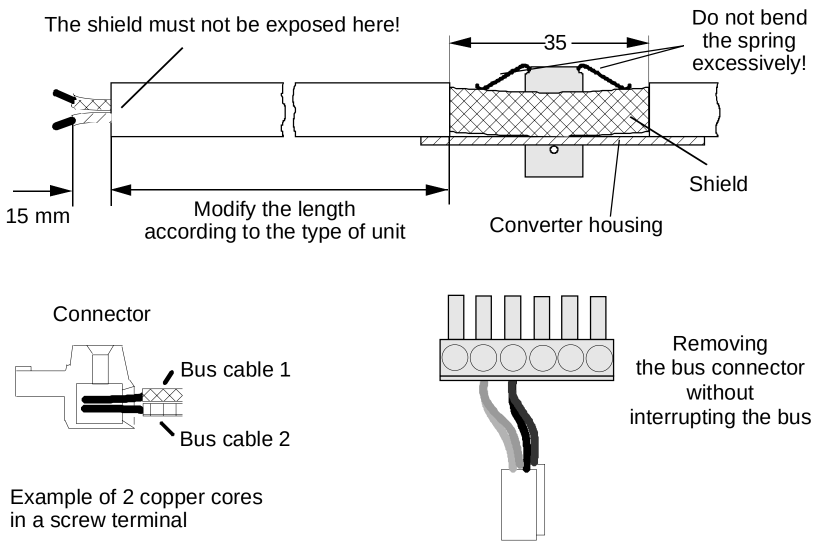


Fig. 8.1-9 Connecting up the bus cables

NOTE

It must be ensured that both copper cores are securely held inside the screw terminal.

8.1.4.3 EMC measures

For interference-free operation of the USS, it is absolutely necessary that the following measures are carried out:

Shielding

Shielding is necessary for damping magnetic, electrical and electromagnetic interference fields. Interference currents are discharged to earth by the shield braiding via the housing earth.

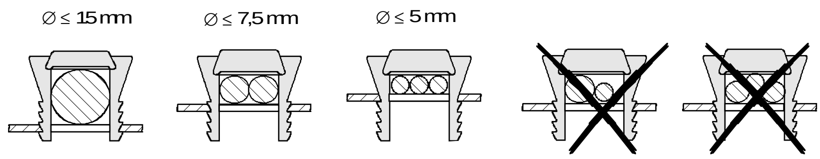
NOTE

The bus cables must be twisted and shielded and are to be routed separately from power cables, the minimum clearance being 20 cm. The shield must be connected through the largest possible surface area on both sides, i.e. the shield of the bus cable between 2 converters must be connected to the converter housing at **both** ends. The same applies to the shield of the bus cable between master and converter.

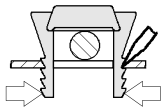
If bus and power cables intersect, they must do so at an angle of 90 °.

- With regard to the bus cable, the shield must not be exposed in the bus connector. Shielding is provided by the shield clamps (Compact type units) or shield clamps and cable ties (chassis type units) at the converter housing. How to use the shield clamps is shown in the following illustration. It must be ensured that the solid copper core is not damaged when the insulation is removed from the ends of the conductors.
- It must also be ensured that the shield of every bus cable is connected where the cable enters the cabinet as well as at the converter housing!

Snap in the shield clamp



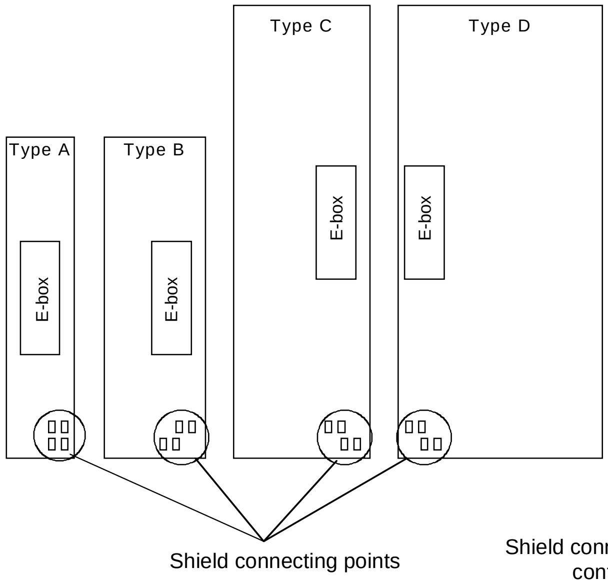
Release the shield clamp



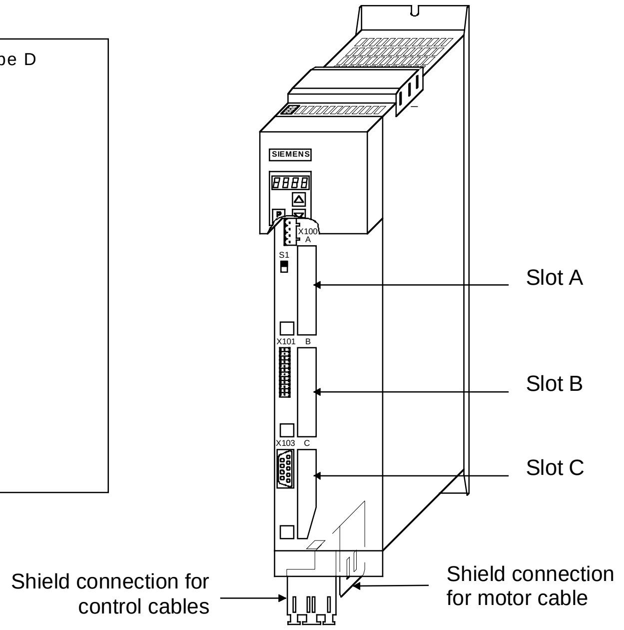
Squeeze the shield clamp together with your hand or a screwdriver and pull upwards.

Fig. 8.1-10 Using the shield clamps

Compact type and chassis type units



Compact PLUS MC:



Compact PLUS VC:

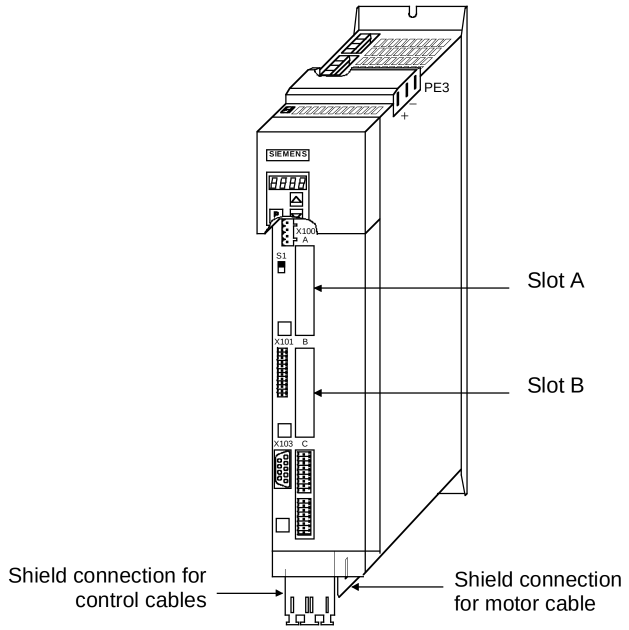


Fig. 8.1-11 Position of the shield connecting points

Equipotential bonding

Equipotential bonding is necessary in order to prevent differences in potential (e.g. due to different supply voltages) between the individual bus nodes (converters and master system).

- This is achieved with the help of equipotential-bonding conductors:
  - 16 mm^2 Cu for equipotential-bonding conductors up to 200 m in length
  - 25 mm^2 Cu for equipotential-bonding conductors more then 200 m in length
- The equipotential-bonding conductors are to be laid so that there is the smallest possible surface area between a conductor and any signal cables.
- The equipotential-bonding conductor must be connected to the earth electrode/protective conductor through the largest possible surface area.

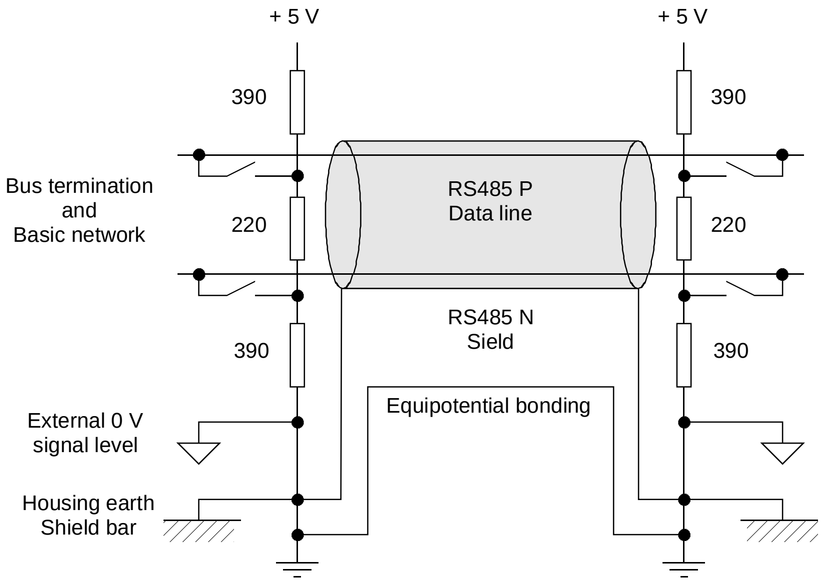


Fig. 8.1-12 Shielding and equipotential bonding

Laying cables

Instructions for laying cables:

- Bus cables (signal cables) must not be laid close to and parallel to power cables.
- Signal cables and the associated equipotential-bonding cables must be laid as closely together as possible and kept as short as possible.
- Power cables and signal cables must be laid in separate cable ducts.
- Shields must be connected through the largest possible surface area.

For more information on electromagnetically compatible installation of systems, see for example Chapter 3 of the Compendium or the description "Instructions for Design of Drives in Conformance with EMC Regulations" (Order No. 6SE7087-6CX87-8CE0).

8.1.4.4 Bus termination, USS protocol

In order to ensure interference-free USS operation, the bus cable must be terminated with bus terminating resistors at both ends. The bus cable from the first USS node to the last USS node is to be regarded as **one** bus cable. The USS bus therefore must be terminated twice. The bus terminating resistors must be switched in at the **first** bus node (e.g. master) and **last** bus node (e.g. converter).

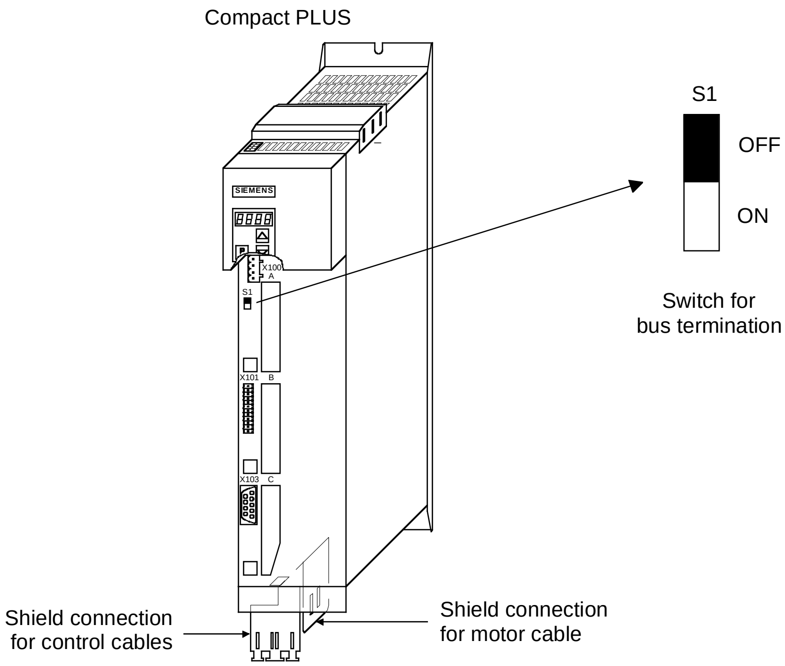


Fig. 8.1-13 S1 bus-terminating switches in the Compact PLUS type of unit

NOTE

In the Compact and chassis type units, two mutually independent USS interfaces (SCom1 and SCom2) are available. Switch S1 or S2 is provided for switching in the terminating resistor.

If the bus-terminating node is a T100 board, the bus terminating resistors are switched in through the two plug-in jumpers, X8 and X9.

NOTE

- When the unit is supplied, the terminating resistors are not switched in!
- Please note that the bus termination is switched in only at the first bus node (e.g. SIMATIC S 5/CP524) and last bus node (e.g. CUMC)! When the matching resistors are being set, the electronics box must be **isolated from supply**!
- **Data transmission faults possible on the bus!**
During active bus operation, the units with a **switched-in** terminating resistor must not be disconnected from supply. The matching resistor when disconnected from supply (off-load) is no longer effective because the terminating resistor obtains its voltage from the connected unit.

Bus connection via terminal strip

The following illustration shows an example of the bus connection at terminal strip X100 (Compact PLUS). If the connector at terminal strip X100 of one node is removed, data transfer via bus is **not** interrupted. The other nodes on the bus continue to be supplied with data via the bus.

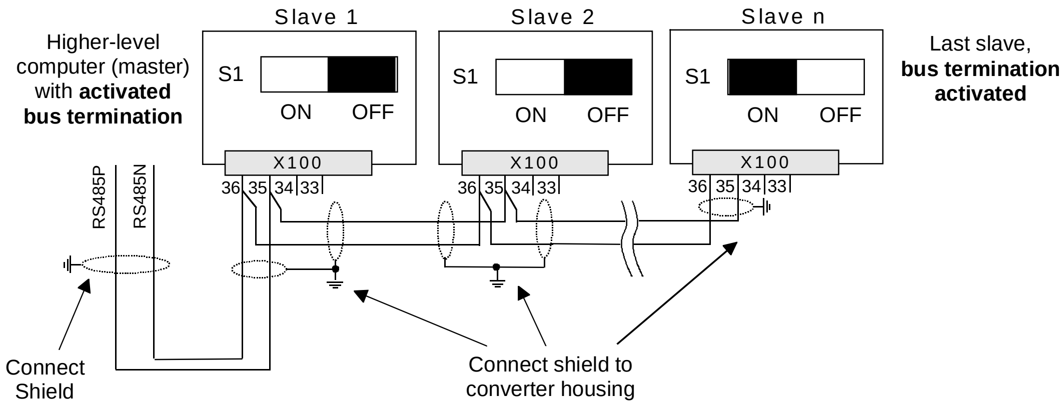


Fig. 8.1-14 Connection of the 2-wire bus cable at terminal strip X100 (Compact PLUS)

Bus connection via connector X103

The following illustration shows the structure of a bus connection via the 9-pin connector, X103 (Compact PLUS).

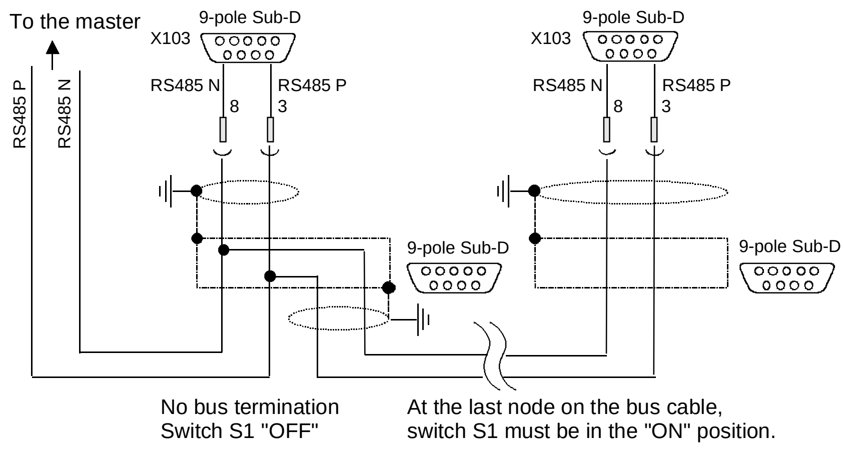


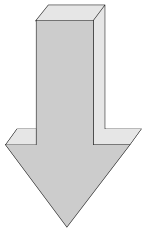
Fig. 8.1-15 Connection of the 2-wire bus cable at terminal strip X103 (Compact PLUS)

8.1.5 Start-up

The USS protocol can be started up in two steps:

1. Parameterization of the USS protocol at the "selected" interface
2. Parameterization of process-data interconnections and the "parameterizing enable" for the selected interface.

Parameterizing the USS protocol
Create the right conditions: • Set P060 = 1 (menu selection)
Parameterize the interface: Settings to be made: • P682 (SCB protocol) only applies to the SCB2, • P700 (SCom/SCB BusAddr), P701 (SCom/SCB baud rate), • P702 (SCom/SCB PKW #), P703 (SCom/SCB PcD # and P704 (SCom/SCB TlgOFF)



Parameterizing the parameterizing enable and process-data interconnections
Set the **parameterizing enable** via USS at the selected interface: • Set P053 (parameter access)
Set process-data interconnections: • For status words and actual values: P707 (Src SCom 1 TrnsDat) and P708 (Src SCom 2 TrnsDat) for CUMC P690 (SCB actual value) for SCB 2 board • For control words and setpoints: e.g. P554 (control word, bit 0) to P591 (control word, bit 32), P443 (Src Main Setp), P433 (Src Add Setp1), etc.

8.1.5.1 Parameterization of the USS protocol (1st step)

The USS protocol is parameterized at serial interfaces SCom 1 and SCom 2 on the CU board of the basic units or at the serial interface on the SCB 2 board by means of the following parameters: **P682, P700, P701, P702, P703** and **P704**.

NOTE

The USS protocol is parameterized at the serial interface of the T100 technology board by means of the "technology parameters" H290, H291, H292, H293, H294 and H295. These parameters are part of the T100 (see software instruction manual of the T100).

Example 1

USS protocol at the SCom1 on MASTERDRIVES MC

As already described in Section 8.1.3, the bus cable for the SIMOVERT MASTERDRIVES MC can be connected either at terminal strip X100/X103 ("Compact PLUS" type) or at connector X103/X300 ("Compact" and "chassis" types).

- Settings:
  USS protocol with 19.2 kbit/s and 3-word PKW area and 2-word PZD area
  - 3-word PKW area:
    With this setting, all parameters whose values are 16-bit quantities (1 word) can be read and written via the USS protocol.
  - 2-word PZD area:
    Transfers control word 1 and a setpoint (each of them 16 bit) from the master to the converter and status word 1 and an actual value (each of them 16 bit) from the converter to the master.
- Preconditions:
  P060 = 1 or 7 (default setting)
- Parameterizing the SCom 1 interface (applies to X100 or X103 ("Compact PLUS" type) and X103 or X300 ("Compact" and "chassis" types) at the same time):

Parameter number	Parameter	Index and value (index i001 for SCom 1)	Comments
P700	SCom/SCB BusAddr	i001 = 0	Bus address SCom1 = 0
P701	SCom/SCB Baud	i001 = 7	19.2 kbit/s
P702	SCom/SCB PKW #	i001 = 3	3-word PKW (SCom 1)
P703	SCom/SCB PcD #	i001 = 2	2-word PZD (SCom 1)
P704	SCom/SCB TlgOFF	i001 = 0 to 6500	0: No monitoring >0: Monitoring time in ms

Example 2

USS protocol at the SCom2 (only in Compact type and chassis type units)

- Setting:
  USS protocol with 38.4 kbit/s and 4-word PKW area and 6-word PZD area
  - 4-word PKW area:
    With this setting, all parameters whose values are 16-bit (= 1 word) or 32-bit (double word) quantities can be read or written via the USS protocol.
  - 6-word PZD area:
    Transfers control words 1 and 2 and a maximum of four setpoints (each of them 16 bits) from the master to the converter or control words 1 and 2 (each one of them 16 bits) and a maximum of four actual values (each one of them 16 bits) from the converter to the master.
- Preconditions:
  P060 = 1 or 7
- Parameterizing the SCom2 interface (CUMC: X103, CUVC: X101):

Parameter number	Parameter	Index and value (index i002 for SCom 2)	Comments
P700	SCom/SCB BusAddr	i002 = 15	Bus address, SCom 2 = 15
P701	SCom/SCB Baud	i002 = 8	38.4 kbit/s
P702	SCom/SCB PKW #	i002 = 4	4-word PKW (SCom 2)
P703	SCom/SCB PcD #	i002 = 6	6-word PZD (SCom 2)
P704	SCom/SCB TlgOFF	i002 = 0 to 6500	0: No monitoring >0: Monitoring time in ms

Example 3 **USS protocol at the SCB2 board**

- Settings:
  USS protocol with 19.2 kbit/s and 4-word PKW area and 2-word PZD area
  - 4-word PKW area:
    With this setting, all parameters whose values are 16-bit (= 1 word) or 32-bit (double word) quantities can be read or written via the USS protocol.
  - 2-word PZD area:
    Transfers control word 1 and a setpoint (each of them 16 bit) from the master to the converter and control word 1 and an actual value (each of them 16 bit) from the converter to the master.
- Preconditions:
  P060 = 1 or 7
- Parameterization of the interface on the SCB2 board:

Parameter number	Parameter	Value	Comments
P682	SCB protocol	2	Physical bus cable, 2-wire USS protocol (according to /1/, only USS operation with 2 wires is defined.

Parameter number	Parameter	Index and value (index i003 for SCB2)	Comments
P700	SCom/SCB BusAddr	i003 = 21	Bus address SCom2 = 21
P701	SCom/SCB Baud rate	i003 = 7	19.2 kbit/s
P702	SCom/SCB PKW #	i003 = 4	4-word PKW
P703	SCom/SCB PcD #	i003 = 2	2-word PZD
P704	SCom/SCB TlgOFF	i003 = 0 to 6500	0: No monitoring >0: Monitoring time in ms

Example 4

USS protocol on the CBP2 board

- Settings:
  USS protocol with 19.2 kbit/s and 4-word PKW area and 2-word PZD area
  - 4-word PKW area:
    With this setting, all parameters whose values are 16 bit- (= 1 word) or 32-bit variables (double word) can be read or written by means of the USS protocol.
  - 2-word PZD area:
    Transmission of control word 1 and a setpoint (each 16 bits) from the master to the converter and of status word 1 and an actual value (each 16 bits) from the converter to the master.
- Requirements:
  P060 = 1 or 7
- Parameterization of the interface on the CBP2 board:

Parameter number	Parameter	Value	Comments
P713.x	CBP2 protocol	2	A change from PROFIBUS to USS protocol and vice versa only comes into effect when the voltage of the drive is turned off and then on again.

Parameter number	Parameter	Value	Comments
P918.x	CBP2 BusAddr	21	Bus address CBP2 = 21
P718.x	CBP2 Baud	7	19.2 kbit/s
P719.x	CBP2 PKW #.	4	4-word PKW
P720.x	CBP2 PcD #.	2	2-word PZD
P722.x	CBP2 TlgOFF.	0...6500	0: No monitoring >0: Monitoring time in ms

8.1.5.2 Parameterizing the parameterizing enable and process-data interconnections (2nd step)

Parameterization of the parameterizing enable

During start-up, an interface with the USS protocol must be explicitly enabled for parameterization in order to be able to change (= write) the parameters of a SIMOVERT MASTERDRIVES via this interface – this applies to the parameters of the basic unit (P/U parameters) and to the technology-board parameters (H/L parameters).

NOTE

Access to the SIMOVERT MASTERDRIVES via USS protocol is only possible if, during start-up, the PKW area is appropriately defined to contain 3, 4 words (fixed length) or a variable PKW length (= value 127) in the useful (net) data area.

The following rules apply to this:

- All parameters (P, r, U and n parameters of the basic units, or H, d, L and c parameters of the technology board) can be read out via any interface. **For reading purposes**, it is **not** necessary that the interface has been enabled for parameterization.

P, U, H and L parameters:	Can be read and written
r, n, d and c parameters:	Can only be read

- Parameterizing enable is specified in **parameter P053** (parameter access). This parameter **can always be written** from any interface.
- Several interfaces can be in possession of a parameterizing enable simultaneously.

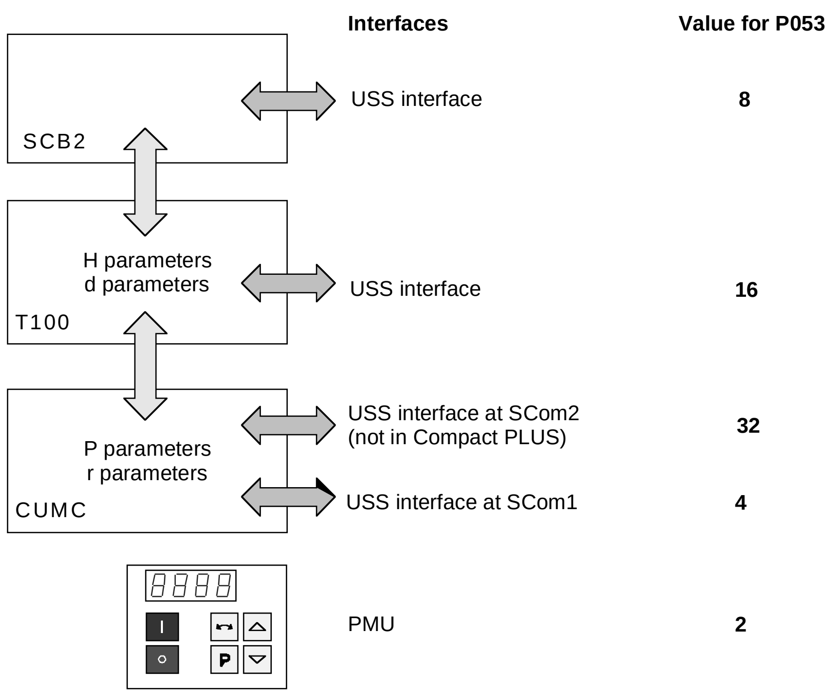


Fig. 8.1-16 Parameterizing enable for the USS interfaces

The rules for generating the value which is entered in parameter P053 for specifying parameter access is explained with the following example.

Example

Setting the parameterizing enable for SIMOVERT MASTERDRIVES with SCB2

Setting:
Write access to the parameters of the basic units (P parameters) via the PMU as well as via the USS protocol at both SCom1 interfaces and on SCB2

Parameter number	Value	Comments
P053	14	2 = PMU, 4 = SCom1, 8 = SCB2 ⇒ value = 2 + 4 + 8 = 14

Parameterizing process-data interconnections

As already described in Section 8.1.2.3 (PZD area), the PZD area consists of a maximum of 16 words. During start-up, the length of this area is defined in words using parameter P703 (SST/SCB PZD #). This definition applies to the telegram from the master to the converter and, vice versa, to the telegram from the converter back to the master. In the telegram from the master to the converter, the PZD area contains control word 1 or control word 2 and the setpoints. In the telegram from the converter to the master, status word 1 or status word 2 and the actual values are transferred.

1 word	1 word	1 word		1 word
PZD1	PZD2	PZD3	• • •	PZD16

Maximum 16 words
Minimum 0 words, i.e. no PZD area in the net data block

NOTE

Here, process-data interconnection is only described for the basic units. Process-data interconnection for the technology boards is described in their instruction manual.

"Interconnecting" control word 1 and control word 2

The two control words (bits 0 to 15) and 2 (bits 16 to 31) give commands and external information to the converter. A select parameter is assigned to each control-word bit, e.g. bit 0 of parameter P554. The select parameter specifies from which source(s) this control bit can be influenced (= changed).

USS interface, from which control word bits 0 to 15 (= control word 1) are to be changed (source)	**Values to which select parameters P554 to P575 are to be set**
SCom1	**2**1xy
SCom2	**6**1xy
SCB2	**4**5xy

Note:

- e.g. **2**1xy:
  The first digit (here 2) identifies the interface SST1 as source.
  The second digit (here 1) indicates that it is the 1st word in the PZD area of the telegram. "xy" (= 00 to 15) identifies the bit position.

NOTE

Control word 1 is always transferred in the 1st word of the PZD area in the USS protocol.

Example 1

- The control word command "ON/OFF1" should be taken from bit 0 in the 1st PZD word of SST1.
- The control word command "OFF2" should be taken from bit 1 in the 1st PZD word of SST1.
- The control word command "ACK" should be taken from bit 7 in the 1st PZD word of SST1.

Parameter number	**Parameter**	**Index and value** (index i001 for BICO data set 1) (index i002 for BICO data set 2)	**Comments**
P554	Source ON/OFF1	i001 = 2001	ON/OFF from SCom1
P555	Source 1 OFF2	i001 = 2001	Operating condition/OFF2 from SCom1
P565	Source 1 ACK	i001 = 2107	Edge 0 ⇒ 1

etc.

Values of select parameters P576 to P591

The following values of select parameters P576 to P591 are to be set for the USS interfaces:

USS interface from which control-word bits 16 to 31 (= control word 2) are to be changed (source)	Values to which select parameters P576 to P591 are to be set
SCom1	**2**4xy
SCom2 (not with the Compact PLUS)	**6**4xy
SCB2	**4**8xy

Note:

- e.g. **4**8xy:
  The first position (in this case, 4) identifies the interface on SCB 2 as the source.
  The second digit (here 8) indicates that it is the 4th word in the PZD area of the telegram (5 signifies the 1st word). "xy" (= 00 to 15) identifies the bit position.

NOTE

If necessary, control word 2 is always transferred in the 4th word of the PZD area in the USS protocol.
⇒ Set PZD area to a length of at least 4 words (P703).

Example 2

- Bit 0 for switching over the function data set should be taken from bit 0 in the 4th PZD word of SCB2.
- Bit1 for switching over the function data set should be taken from bit 1 in the 4th PZD word of SCB2.

Parameter number	Parameter	Index and value (index i001 for BICO data set 1) (index i002 for BICO data set 2)
P576	Source FDS Bit 0	i001 = 4800
P577	Source FDS Bit 1	i001 = 4801

etc.

"Interconnection" of setpoints

The user can select the source from which the setpoints for the converter are to be taken. This is done in the same way in which control-word bits are "interconnected". This is now illustrated with two examples.

Example 1

The "wiring" of the setpoints is done via parameters P443 (source main setpoint) and P433 (source supplementary setpoint 1).

Source for setpoints	**Value for parameters P443 and P428**
Interface allocation: SCom1 SCB2	 20xx 45xx
Position of the setpoints (16 bit quantify) in the PZD area: In the 2nd word ⇒ 02 In the 3rd word ⇒ 03 etc.	xx = 02, 03, 04 (only if control word 2 is not transferred), 05, up to 16

The main setpoint comes from SCom 1 and is located in the 2nd word of the PZD area. The supplementary setpoint comes from the USS interface on SCB 2 and is also located in the 2nd word of the PZD area (for BICO data set 1).

Parameter number	**Parameter**	**Index and value** (index i001 for BICO data set 1) (index i002 for BICO data set 2)
P443	Source of main setpoint	i001 = 2002
P433	Source of supplementary setpoint 1	i001 = 4502

Example 2

The "wiring" of the setpoints is done via parameters **P443** (source main setpoint), **P433** (source supplementary setpoint 1), **P438** (source supplementary setpoint 2), and so on. For a detailed description, see the instruction manual.

Source for the setpoints	**Values for parameters P443, P433, P438 and so on**
Interface allocation: **SCom1** **SCom2** **SCB2**	 **2**0xx **6**0xx **4**5xx
Position of the setpoints (16-bit quantity) in the PZD area: In the **2**nd word ⇒ 0**2** In the **3**rd word ⇒ 0**3** and so on	xx = 02,03, 04 (only if control word 2 is not transferred), 05, up to 16
Position of the setpoints (32-bit quantity) in the PZD area: In the 2nd word + 3rd word ⇒ 3**2** Rules for generating: xx = 30 (indicates 32-bits) + position in the PZD area at which the 32-bit setpoint begins. In the **3**rd word and 4th word ⇒ 3**3** and so on	x x = 32,33 (only if control word 2 is not transferred), 34 (only if control word 2 is not transferred), 35, up to 45

NOTE

When 32-bit quantities are being transferred, the high word is located in PZD n and the low word in PZD n+1
⇒ For example, 32-bit setpoint in PZD2 and PZD3; the high-word is then transferred in PZD2 and the low word in PZD3 via the USS bus.

The main setpoint (32-bit quantity) comes from SCom1 and is located in the 2nd word and 3rd word of the PZD area. Control word 2 is in the 4th word. In the 5th and 6th words, supplementary setpoint 1 (32-bit quantity) is transmitted (for BICO data set 1).

Parameter number	**Parameter**	**Index and value** (index i001 for BICO data set 1) (index i002 for BICO data set 2)
P443	Source of main setpoint	i001 = 2032
P433	Source of supplementary setpoint 1	i001 = 2035

"Interconnection" of status words 1 and 2 and the actual values

The two status words 1 (bits 0 to 15) and 2 (bits 16 to 31) send messages from the converter to a higher-level converter system.

An indexed parameter is assigned to each interface. Each index is assigned to a net-data word in the PZD area. For example, index i001 to the 1st word, index i002 to the 2nd word and so on up to i016.

Parameter number	**Parameter**	**Index and value** (index i001 for BICO data set 1) (index i002 for BICO data set 2)
SCom1	707 (SCom1 actual values)	i001 to 016
SCom2 (not with the Compact PLUS)	708 (SCom2 actual values)	i001 to 016
SCB2	706 (SCB actual values)	i001 to 016

NOTE

Status word 1 is always transferred in the 1st word of the PZD area in the USS protocol.

Example 1

"Interconnection" of status word 1 and the actual speed/frequency (KK0091) at interface SCom1.

- Precondition:
  PZD area at least 2 words in length; P703, i001 ≥ 2 is set.

Parameter No.	**Parameter**	**Index and value**	**Comments**
P707	SCom1 actual values	i00**1** = 0032	1st word in the PZD area: status word (K0032)
		i00**2** = 0091	2nd word in the PZD area: actual speed/frequency (KK0091, only H-Word)
		i003 to i016 = 0	3rd to 16th word in the PZD area (if parameterized): "Not interconnected"

Example 2

"Interconnection" of status word 1, status word 2, actual speed (KK0091) and the actual DC link voltage (K0240) at the interface on SCB2.

- Precondition:
  PZD area at least 5 words in length; P703, i003 ≥ 5 is set.

Parameter number	Parameter	Index and value	Comments
P706	SCB actual values	i00**1** = 0032	1st word in the PZD area: status word (K0032)
		i00**2** = 0091	2nd word in the PZD area: high word of the actual speed (KK0091)
		i00**3** = 0091	3rd word in the PZD area: low word of the actual speed (KK0091)
		i00**4** = 0033	4th word in the PZD area: status word 2 (K0033)
		i00**5** = 0240	5th word in the PZD area: Vd(act) (K0240)

NOTE

When 32-bit quantities are being transferred, the high word is located in PZD n, the low word in PZD n+1.
⇒ For example, 32-bit actual value of KK0091 in PZD2 and PZD3.

8.2 PROFIBUS

In addition to the CBP communications board, there is the CBP2 with extended functionality. It replaces but remains fully compatible with the CBP.

In the following, "CBP" refers to both boards. Any individual features which a board possesses are specially indicated.

8.2.1 Product description of the CBP communications board

The CBP communications board (Communications board PROFIBUS) is for linking SIMOVERT MASTERDRIVES® to higher-level automation systems via PROFIBUS-DP.

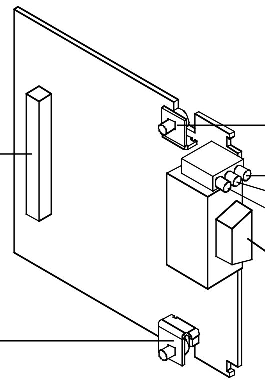


Fig. 8.2-1 View of the communications board

Technical data

The communications board has three LEDs (green, yellow, red) for providing information on the current operating status.

Voltage is supplied from the basic unit through the system's plug-in connector.

The CBP has a 9-pole SUB D socket (X448) which is provided for connecting it up to the PROFIBUS system in accordance with the PROFIBUS standard. All connections of this RS485 interface are short-circuit-proof and floating.

The CBP supports baud rates of 9.6 kbaud to 12 Mbaud and is also suitable for connecting fiber-optic cable by means of optical link plugs (OLPs).

NOTE

For reasons of space, optical link plugs cannot be used for Compact units, types 1 and 2!

Functionality

- Useful data is exchanged with the master according to the "PROFIBUS profile for variable-speed drives", PROFIdrive.
- Acyclical communications channel for transferring parameter values up to a length of 101 words with a SIMATIC S7-CPU.
- Acyclical communications channel for linking the PC-based Drive ES start-up and service tool.
- Automatic adoption of the useful data structure defined in the master.
- Monitoring of the bus interface.
- Supporting of SYNC-type PROFIBUS control commands for synchronized data transfer from the master to several slaves.
- Supporting of FREEZE-type PROFIBUS control commands for synchronized data transfer from several slaves to the master.
- Extremely simple parameterization of the CBP via the PMU of the basic unit.

Extended functionality of the CBP2

- Flexible configuration of the setpoints/actual values up to a maximum of 16 process data words
- Clock synchronization at the isochronous PROFIBUS for synchronization of processing by the master and slaves (MASTERDRIVES MC only)
- Cross traffic for direct data exchange between slaves
- Direct access to a drive by a SIMATIC OP
- USS protocol

Extension by PROFIdrive V3 functions in conjunction with CBP2 from V2.20

- Acyclical parameter channel in accordance with PROFIdrive profile, version 3, with data block 47
- Standard telegrams 1 to 6

For MASTERDRIVES MC and during use of T100 or T300, please pay attention to the note in Section 2.3.2 "TB Blocks".

8.2.2 Description of the CBP's functions on the PROFIBUS-DP

Definition

PROFIBUS is an international, open field bus standard with a wide scope of application in production and process automation. Neutrality and openness are guaranteed by international standards EN 50170 and IEC 61158.

The PROFIBUS-DP enables very fast, time-critical transfer of data on the field level.

With the PROFIBUS, a distinction is made between masters and slaves.

- **Masters** determine data traffic on the bus and are also designated in the literature as active nodes.
  There are two classes of master:
  - DP-Master Class 1 (DPM1):
    These are central stations (e.g. SIMATIC S5, S7 and SIMADYN D) which exchange information with the slaves in defined communications cycles.
  - DP-Master Class 2 (DPM2):
    Units of this type are programming units, planning units or control and monitoring units which are used for configuring, starting up or monitoring systems in operation.
- **Slaves** (e.g. CBP, CB15 etc.) can only acknowledge the messages they receive or transfer messages to a master when the latter requests a slave to do so. Slaves are also designated as passive nodes.

Protocol architecture

The protocol architecture of the PROFIBUS-DP is oriented to the OSI (Open System Interconnection) reference model in accordance with the international standard, ISO 7498, and uses layers 1 and 2 as well as the user interface.

Transmission equipment

When transmission equipment is being selected, criteria such as high transmission speed and simple, inexpensive wiring and cabling is of primary importance. PROFIBUS supports transmission according to RS485 and also transmission by means of fiber-optic cable.

The transmission speed can be selected between 9.6 kbaud and 12 Mbaud. The **same speed is specified for all units** on the bus when the system is started up for the first time.

Bus-access procedure

The PROFIBUS works according to the token-passing procedure, i.e. the masters become token holders for a defined time window in a logical ring. Within this time window, the master can communicate with other masters. Alternatively, it can communicate with slaves by using a lower-level master-slave procedure.

The PROFIBUS-DP mainly uses the master-slave method and data is usually exchanged with the drives cyclically.

Data exchange via PROFIBUS

This enables very rapid data exchange between the higher-level systems (e.g. SIMATIC, SIMADYN D, PC/PGs) and the drives. Access to the drives is always made according to the master-slaves method. The drives are always the slaves and each slave is clearly defined by its address.

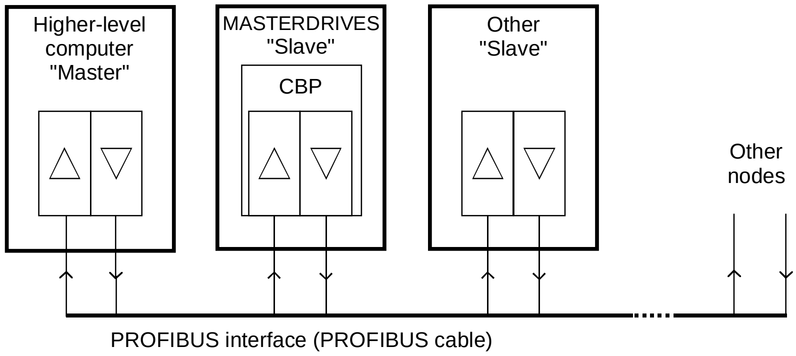


Fig. 8.2-2 PROFIBUS interfaces

The cyclical communications functions are determined by the PROFIBUS-DP basic functions in accordance with EN 50170.

For purposes of parameterization during cyclical data exchange with intelligent drives, acyclical extended communications functions are also used which are defined in PROFIBUS Guideline No. 2.081 (German) or 2.082 (English).

The following illustration contains an overview of the communications functions which are enabled with the CBP.

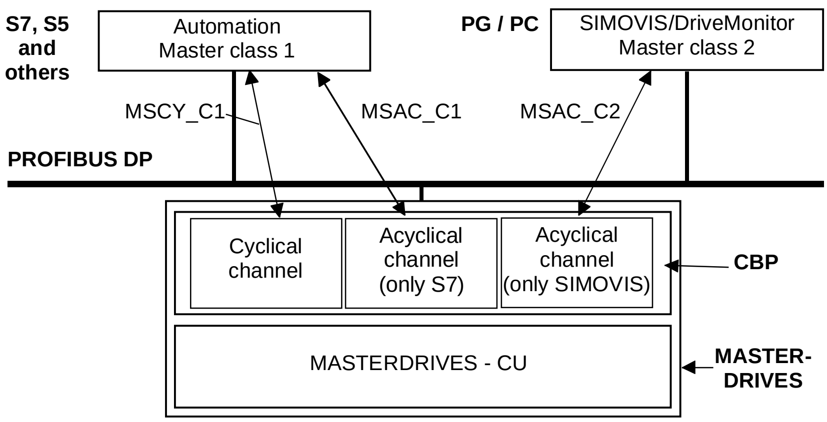


Fig. 8.2-3 Data-traffic channels of the CBP

The following illustration contains an overview of the communications functions which are enabled with the CBP2:

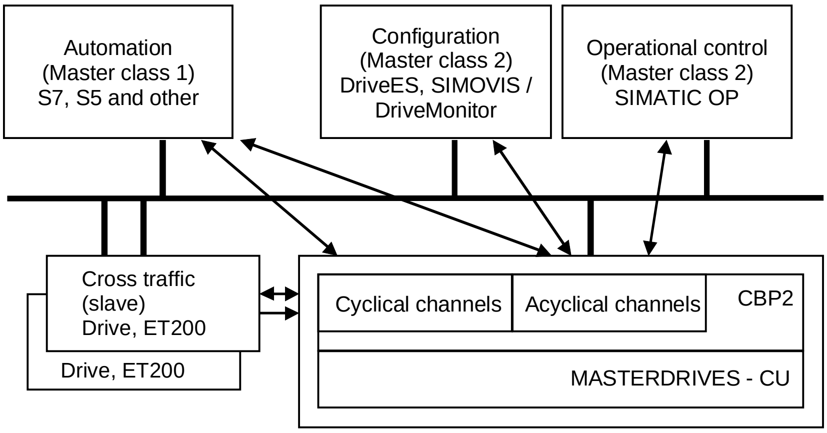


Fig. 8.2-4 Data-traffic channels of the CBP2

8.2.2.1 Cyclical data transmission

DANGER

When interconnecting connectors, binectors, and double word connectors, please note that simultaneous interconnection of a connector, and a double word connector with the same name is not permitted, because when a double word connector (e. g. KK3032) is connected, the meanings of the connectors K3002 and K3003 are swapped round (high-word and low-word exchanged).

On MASTERDRIVES MC and Compact Plus on software version V1.50 and higher and on MASTERDRIVES CUVC on software version V3.23 and higher, simultaneous use of connectors and double word connectors with the same name is mutually interlocked (see also function diagrams [121] and [131]).

Because the binectors are not included in the interlocking (to ensure compatibility for older configurations), their significance changes according to whether the pertinent word or double word is wired.

The structure of useful data as PPOs

Useful data for the **cyclical MSCY_C1 channel** (see Figs. 8.2-3 and 8.2-4) is structurally defined in the PROFIBUS profile for variable-speed drives version 2 as a parameter process data object (PPO).

Frequently, the **cyclical MSCY_C1 channel** is simply called the STANDARD channel as well.

NOTES

Data is exchanged with the MASTERDRIVES in accordance with the specifications of the PNO guideline "PROFIBUS profile for variable-speed drives". PROFIdrive CBP and CBP2 V2.10 implement PROFIdrive version 2 (PNO: Order No. 3071).
CBP2, V2.20 and later, implements PROFIdrive Version 3 (PNO: Order No. 3172) as a compatible expansion. The useful data structure described below is still supported.

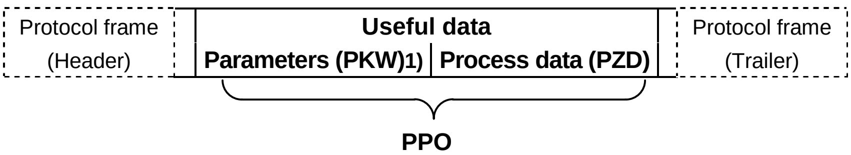
For the drives, the guideline specifies the useful-data structure with which a master can access the drive slaves by means of cyclical MSCY_C1 data transfer. With MSCY_C1 data transfer, useful data is divided up into two areas which can be transmitted in each telegram:

- The process data area (PZD), i.e. control words and setpoints or status information and actual values
- The parameter area (PKW) for reading/writing parameters – e.g. reading out faults – and for reading out information on the characteristics of a parameter such as reading out the min./max. limits etc.

The type of PPO (see next page) used by the PROFIBUS-DP master to communicate with the converter can be configured from the master when the bus system is started up. Which type of PPO is selected depends on the task of the drive in the automation network. The process data are always transmitted. In the drive, they are processed with the highest priority and in the shortest time slots. The process data are used to coordinate the drive with the other units in the automation network, e.g. for power on/off, entering setpoints etc.

With the help of the parameter area, the user can access all the parameters in the converter via the bus system as required. For example, detailed diagnostic information, alarms and so on can be read out. In this way, a higher-level system, (e.g. a PC), can be used to call additional information for visualization of the drive without affecting process data transmission.

The telegrams of cyclical data transfer therefore have the following basic structure:



1) PKW: Parameter identifier value

There are five types of PPO:

- Useful data **without** a parameter area with two words or six words of process data
- or useful data **with** a parameter area and two, six or ten words of process data.

	PKW				PZD									
	PKE	IND	PWE		PZD1 STW1 ZSW1	PZD2 HSW HIW	PZD3	PZD4	PZD5	PZD6	PZD7	PZD8	PZD9	PZD10
	1st Word	2nd Word	3rd Word	4th Word	1st Word	2nd Word	3rd Word	4th Word	5th Word	6th Word	7th Word	8th Word	9th Word	10th Word
PPO1														
PPO2														
PPO3														
PPO4														
PPO5														

PKW: Parameter ID value

PZD: Process data

PKE: Parameter ID

IND: Index

PWE: Parameter value

STW: Control word 1

ZSW: Status word 1

HSW: Main setpoint

HIW: Main actual value

Table 8.2-1 Parameter process data object (PPO types)

Dividing the useful data into parameter identifier values and process data enables different tasks to be carried out.

Parameter data area (PKW)

With the PKW (parameter identifier value) part of the telegram, any parameter in the converter can be observed and/or altered. The mechanisms of task/reply IDs necessary for this are described later in the chapter "Mechanisms of PKW processing".

Process data area (PZD)

With the process data part, control words and setpoints (tasks: master → converter) or status words and actual values (replies: converter → master) are transferred.

The transferred process data only have an effect if the control-word bits, the setpoints, the status words and the actual values are routed in the basic unit in accordance with the chapter "Process data wiring".

The following page gives an overview of typical ways of routing process data to the basic unit. For this routing of the data, the term "process data wiring" is often used.

NOTE

The following process data wiring only applies if a technology board has not been mounted.
If a technology board is used (e.g. T400, T300, T100), the process data wiring in the manual for the technology board is to be used.

Telegram: Master → Converter	**PZD**									
(Setpoint channel)	PZD 1 STW1 1st word	PZD 2 HSW 2nd word	PZD 3 3rd word	PZD 4 4th word	PZD 5 5th word	PZD 6 6th word	PZD 7 7th word	PZD 8 8th word	PZD 9 9th word	PZD 10 10th word
Combination values for:										
16-bit process data	3001	3002	3003	3004	3005	3006	3007	3008	3009	3010
16-/32-bit process data (example)	3001	3032		3004	3035		3037		3039	
Alternatives	3001	3032		3004	3005	3036		3038		3010
	3001	3002	3003	3004	3035		3007	3038		3010
Process data quantity for:										
PPO types 1 and 3	PZD2									
PPO types 2 and 4	PZD6									
PPO type 5	PZD10									

Telegram: Converter → Master	**PZD**									
(Actual-value channel)	PZD 1 ZSW1	PZD 2 HIW	PZD 3	PZD 4	PZD 5	PZD 6	PZD 7	PZD 8	PZD 9	PZD 10
Assignment of actual-value parameters for	P734	P734	P734	P734	P734	P734	P734	P734	P734	P734
16-bit process data	P694	P694	P694	P694	P694	P694	P694	P694	P694	P694
	i001	i002	i003	i004	i005	i006	i007	i008	i009	i010
16-/32-bit process data (example)	P734	P734		P734	P734		P734	P734		P734
	P694	P694		P694	P694		P694	P694		P694
	i001	i002 = i003		i004	i005 = i006		i007	i008 = i009		i010
	Parameters for FC (CU1), VC (CU2) and SC (CU3)									

PZD:	Process data	HSW:	Main setpoint
STW:	Control word	HIW:	Main actual value
ZSW:	Status word		

Table 8.2-2 Fixed assignment and combination values

NOTE

If a second CBP is being operated in the converter, then the "8000" connectors will be applicable for the second CBP instead of the "3000" connectors, and parameter P736 will be applicable instead of parameter P734 (see function diagrams for CB/TB boards in Chapter 12).

CBP2 - Free configuration

Extended functionality of the CBP2 in a SIMATIC STEP7 environment with DriveES:

In addition to the five types of PPO, free configuration of the cyclical data is possible.

Up to 16 process data words can be configured, even with a different number of setpoints and actual values. The consistency ranges can be flexibly adjusted.

A parameter area (PKW) can be configured irrespective of the number of process data items.

CBP2, V2.20 and later, standard telegrams

On version V2.20 and later of the CBP2, cyclic data transmission is implemented via standard telegrams in accordance with PROFIdrive profile, version 3.

The CBP2 supports standard telegrams 1 to 6 (cf. Section 8.2.7.3 "Process data interconnection via standard tele").

8.2.2.2 Acyclical data transfer

Extended DP functions

The PROFIBUS-DP has now been improved to include other methods of data transfer. In addition to cyclical data transfer, the extended PROFIBUS-DP enables the following forms of data transfer as defined in PROFIBUS guidelines No. 2.081 (German) or 2.082 (English):

- Acyclical data transfer at the same time as cyclical data transfer
- Alarm processing

Acyclical data transfer enables:

- the exchange of larger amounts of useful data up to 206 bytes
- a reduction in the number of peripheral addresses in the SIMATIC by means of relocating the PKW area from cyclical to first acyclical data transfer
- as a result, also reduction of the bus cycle time due to shorter telegrams in cyclical data transfer
- simultaneous access by Drive ES (PG/PC) for diagnosis and parameterization by means of the second data transfer

Realization of the extended DP functions

The different masters or the different methods of data transfer are represented in the CBP by corresponding channels (see Fig. 8.2-4):

- **Cyclical data transfer with a Class 1 master (MSCY_C1)**
  Use of DATA-EXCHANGE and the PPO types in accordance with the PROFIdrive profile
- **Acyclical data transfer** with the same **Class 1 master (MSAC_C1)**
  Use of the PROFIBUS functions, DDLM_READ and DDLM_WRITE
  The contents of the transferred data block corresponds to the structure of the parameter area (PKW) in accordance with the USS specification (with data block 100)
  or (for CBP2 V2.20 and later only)
  the structure of the acyclic parameter channel according to PROFIdrive profile, version 3 (with data block 47).
- **Acyclical data transfer with DriveES (Class 2 master; MSAC_C2)**
  The DriveES can access parameters and process data in the basic units acyclically.
- **CBP2: acyclical data traffic with SIMATIC OP (second Class 2 master; MSAC_C2) only**
  SIMATIC OP can access parameters in the basic units acyclically.
- CBP2 V2.20 and later only: Instead of DriveES or SIMATIC OP an external master (Class 2 Master) compliant with acyclic parameter channel according to PROFIdrive profile version 3 with data block 47 can also access the converter.

8.2.2.3 Acyclical master class 1, automation (PLC)

MSAC_C1 channel

Acyclical communication between the DP master Class 1 (DPM1) and the DP slaves takes place via supplementary service access point 51. In a service sequence, the DPM1 establishes a link to the slave, this link being designated MSAC_C1. Establishment of this link is closely related to the link for cyclical data transfer between the DPM1 and the slaves. Once a link has been established, the DPM1 can conduct cyclical data transfer via the MSCY_C1 link and, at the same time, acyclical data transfer via the MSAC_C1 link.

The MSAC_C1 channel enables READING and WRITING of any of the data blocks in the slave. These data blocks are accessed with the PROFIBUS functions, DDLM_Read and DDLM_Write.

For processing parameters, the CBP supports a data block with the index 100 in slot 2. Because the parameters can only be altered infrequently in comparison to the process data, the parameter area of the telegram can be removed from the fast cyclical channel in order to save bus resources.

NOTE

With the CBP2, version V2.20 and later, a class 1 master automation (PLC) can also utilize acyclic parameter access according to PROFIdrive V3, cf. Section 8.2.4 "PROFIdrive V3: Acyclic parameter accessing with data block 47".

Telegram structure

The following illustration shows the telegram structure for data transfer via the acyclical MSAC_C1 channel.

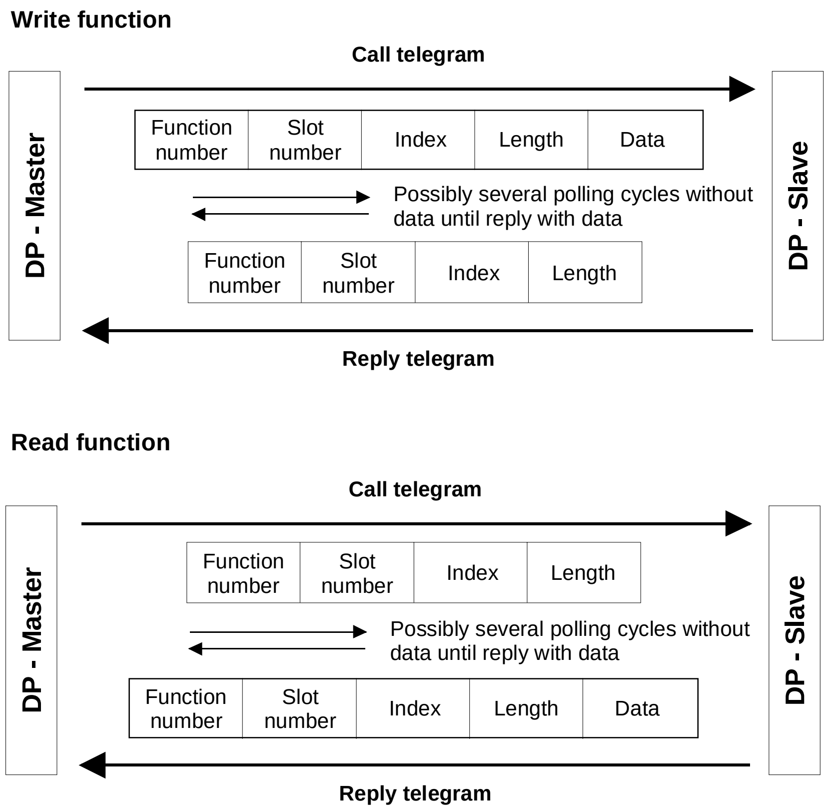


Fig. 8.2-5 Sequence of a Read and Write function

Sequence of a PKW task

The following sequence is necessary for handling a PKW task:

1. With the function DDLM_Write, a PKW task is transferred in the data block with the index 100 to the CBP.
2. A positive acknowledgement of DDLM_Write is awaited.
3. With the function DDLM_Read, the PKW reply is requested by the CBP in the data block with the index 100.
4. The PKW reply to the task is contained in the positive acknowledgement of DDLM_Read.

The contents of the data block with the index 100 corresponds to the structure of the PKW area of the telegram in accordance with the USS specification.

With the PKW (parameter identifier value) area, any parameter in the converter can be visualized and/or altered. The mechanisms of task/reply IDs necessary for this are described later in the chapter "Mechanisms of PKW processing".

In the MSAC_C1 channel, larger amounts of data can be transferred at the same time than by means of PPOs in the cyclical channel. The whole data unit is used exclusively for transmitting parameters.

It offers the same possibilities, however, as in the USS specification, i.e. complete arrays can also be processed with one task (IND = 255). All values of the array are directly transmitted one after the other in a data block. The maximum length of a data block is 206 bytes.

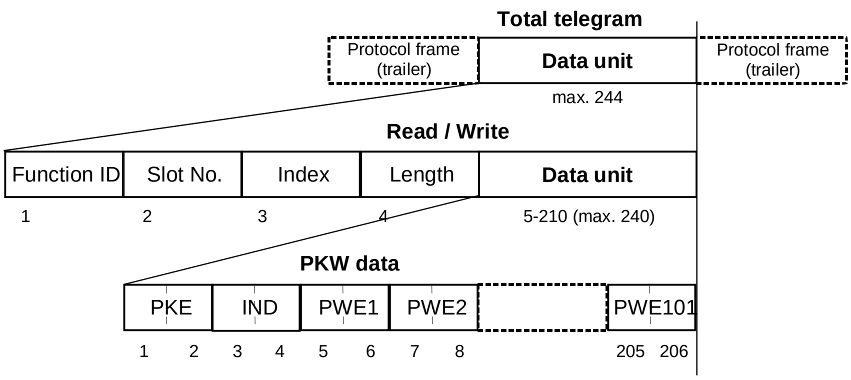


Fig. 8.2-6 Structure of PKW data in cyclical data transfer

NOTE

Process data (PZDs) cannot be stipulated via this acyclical MSAC_C1 channel.

Example for the SIMATIC S7

In the SIMATIC S7, the data block with the index 100 corresponds to the data record DS100.

From the SIMATIC S7 side, data can be exchanged via the MSAC_C1 channel with the system functions SFC 58 "WR_REC" and SFC 59 "RD_REC".

When the system functions are called, the parameter **RECNUM is to be set to 100.**

If the logical address of the CBP is determined by means of SFC 5 "GADR_LGC", the parameters are to be provided with the following when SFC 5 is called:

SUBNETID	=	ID of the planned DP master system in accordance with the hardware configuration
RACK	=	Node / bus address of the CBP
SLOT	=	2
SUBSLOT	=	0
SUBADDR	=	0

The function-block package, DVA_S7 (see also section 8.2.7.2), is a standard method of data exchange between the SIMATIC S7 and the CBP via the acyclical MSAC_C1 channel. The user is provided with a data block as the data interface. This data block has a TRANSMIT MAILBOX and a RECEIVE MAILBOX, thus considerably reducing the expenditure on the application for the user.

8.2.2.4 Acyclical master class 2 - Configuration (DriveES)

MSAC_C2 channel for the Drive ES

The MSAC_C2 channel on the CBP must be reserved for the start-up and service tool Drive ES.

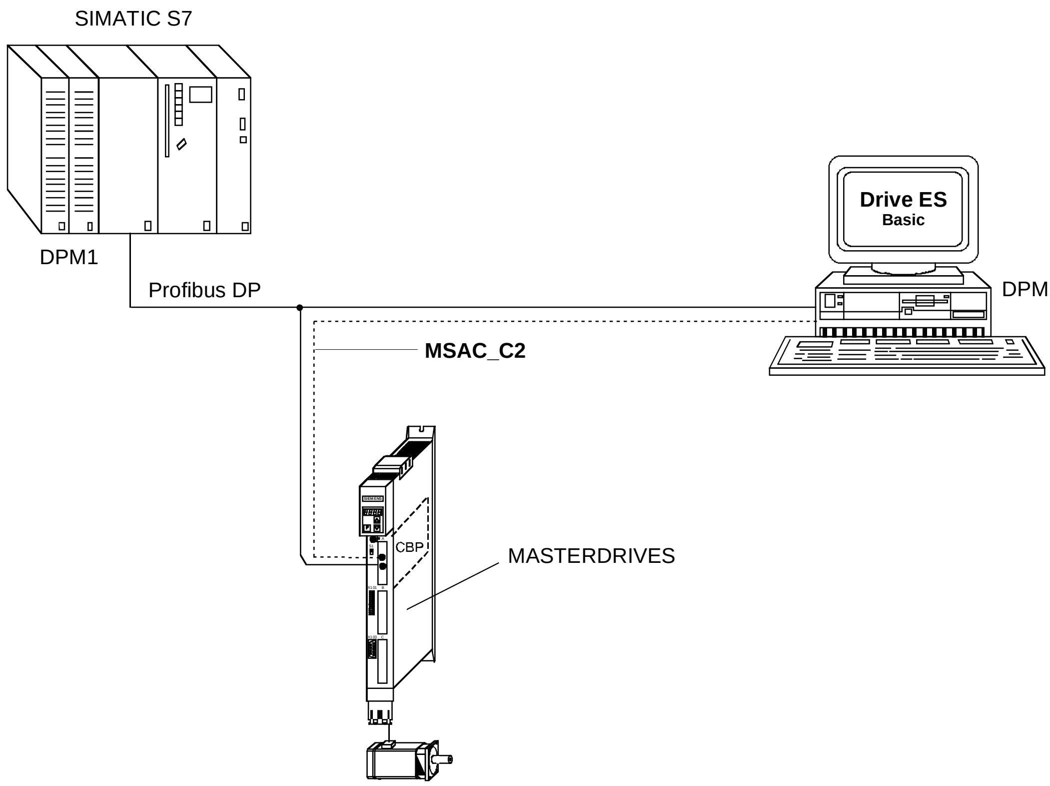


Fig. 8.2-7 Drive ES with Profibus

8.2.2.5 Acyclical master class 2 - Operator control (SIMATIC OP)

Functionality only with CBP2.

With a SIMATIC OP as the PROFIBUS DP master, you can achieve direct access to a drive.

A drive with a CBP2 behaves like a SIMATIC S7 towards a SIMATIC OP. For access to the drive parameters, the following simple illustration applies:

Parameter number = Data block number

Parameter subindex = Data block offset

All SIMATIC OPs and TDs with the final digit 7 are suitable.

ProTool

You can configure SIMATIC OP with "ProTool". The following specific settings for drives are to be entered during configuration with Pro Tool.

Open-loop control

Control units: Protocol always **"SIMATIC S7 - 300/400"**, additional parameters:

Field	**Value**
Network parameter - Profile	**DP**
Network parameter - Baud rate	(as selected)
Communications partner - Address	(the PROFIBUS address of the drive)
Communications partner - Slot/rack	Don't care, 0

Variable

Variables: "General" register:

Field	**Value**
Name	(as selected)
Control unit	(as selected)
Type	Depending on parameter value addresses, e.g.: **INT:** for I2, O2 **DINT:** for I4, O4 **WORD:** for V2, L2
Range	**DB**
DB (data block number)	Parameter number **1 to 3999**
DBB, DBW, DBD (data block offset)	Subindex **0:** for non-indexed parameters **1 to 101:** for indexed parameters
Length	(not activated)
Acquisition cycle	(as selected)
Number of elements	**1**
Places after the decimal point	(as selected)

NOTES

- You can operate a SIMATIC OP together with a drive, irrespective of any automation system which may be present. A simple "point-to-point" connection with only two nodes is possible.
- The "Variable" OP functions can be used for drives. Other functions cannot be used (e.g. "Messages" or "Recipes").
- Access is possible to individual parameter values. Access is not possible to whole arrays, descriptions or texts.
- The parameter values transferred to the OP are the non-standardized internal values of the drive. You can influence the value displayed on the OP with "Functions" in Pro Tool (e.g. "Linear conversion").
- The diagnostic output on the SIMATIC OP is limited. In the case of unsuccessful attempts at access, the CB diagnostic parameter, r732.22. and the following can help you further. See Section "Diagnosis and Troubleshooting".

8.2.3 Mechanisms for processing parameters via the PROFIBUS

Parameter area (PKW)

With the PKW mechanism (for PPO types 1, 2 and 5 and when the acyclical channels, MSAC_C1 and MSAC_C2, are used), you can perform the following tasks:

- Handling and visualizing parameters (read/write)
- Transferring and acknowledging parameter change reports (not realized)

The parameter area always contains at least 4 words.

	Parameter ID			(PKE)	
Bit No.:	15 12	11	10	0	1^{st} word
	AK	SPM	PNU		

	Parameter index		(IND)	
Bit No.:	15 8	7 0		2^{nd} word
	The structure and significance depend on the type of data transfer (see following pages)			

Parameter value	(PWE)	
Parameter value **High**	(PWE1)	3^{rd} word
Parameter value **Low**	(PWE2)	4^{th} word

AK: Task ID or reply ID

SPM: Toggle bit for processing the parameter change report

PNU: Parameter number

Table 8.2-3 Structure of the parameter area (PKW)

Parameter ID (PKE), 1st word

The parameter ID (PKE) is always a 16-bit value.

Bits 0 to 10 (PNU) contain the number of the required parameter.

Bit 11 (SPM) is the toggle bit for parameter change reports.

Bits 12 to 15 (AK) contain the task ID or the reply ID.

With regard to the task telegram (master → converter), the significance of the task ID is given in Table 8.2-4. Task IDs 10 to 15 are specifically for MASTERDRIVES and are not specified in the PROFIBUS-DP profile.

With regard to the reply telegram (converter → master), the significance of the reply ID is given in Table 8.2-5. Reply IDs 11 to 15 are specifically for MASTERDRIVES and are not specified in the PROFIBUS-DP profile. Only certain reply IDs are possible, depending on the task ID. If the reply ID has the value 7 (task cannot be executed), an error number is deposited in parameter value 2 (PWE2) in accordance with Table 8.2-6.

Task ID	Significance	Reply ID	
		positive	**negative**
0	No task	0	7 or 8
1	Request parameter value	1 or 2	↑
2	Change parameter value (word)	1	
3	Change parameter value (double word)	2	
4	Request description element [1]	3	
5	Change description element (not with CBP)	3	
6	Request parameter value (array) [1]	4 or 5	
7	Change parameter value (array, word) [2]	4	
8	Change parameter value (array, double word) [2]	5	
9	Request the number of array elements	6	
10	Reserved	-	
11	Change parameter value (array, double word) and store in the EEPROM [2]	5	
12	Change parameter value (array, word) and store in the EEPROM [2]	4	
13	Change parameter value (double word) and store in the EEPROM	2	
14	Change parameter value (word) and store in the EEPROM	1	↓
15	Read or change text (not with CBP)	15	7 or 8

Table 8.2-4 Task IDs (master -> converter)

Reply ID	Significance
0	No reply
1	Transfer parameter value (word)
2	Transfer parameter value (double word)
3	Transfer description element [1]
4	Transfer parameter value (array, word) [2]
5	Transfer parameter value (array, double word) [2]
6	Transfer the number of array elements
7	Task cannot be executed (with error number)
8	No operator change rights for the PKW interface
9	Parameter change report (word)
10	Parameter change report (double word)
11	Parameter change report (array, word) [2]
12	Parameter change report (array, double word) [2]
13	Reserved
14	Reserved
15	Transfer text (not with CBP)

[1] The required element of the parameter description is specified in IND (2nd word)

[2] The required element of the indexed parameter is specified in IND (2nd word)

Table 8.2-5 Reply IDs (converter -> master)

Example

Source for the ON/OFF1 command (control word 1, bit 0):
P554 (=22A Hex)

Change parameter value (array, word) and store in the EEPROM

	Parameter ID (PKE)				1st word
Bit No.:	15 12	11	10	0	
	AK	SPM	PNU		
	1 1 0 0	0 0 1 0	0 0 1 0	1 0 1 0	Binary value
	C	2	2	A	HEX value

- Bits 12 to 15: Value = 12 (= "C" Hex); change parameter value (array, word) and store in the EEPROM
- Bits 0 to 11: Value = 554 (= "22A" Hex); parameter number without set bit for the parameter change report

No.	Significance	
0	Non-admissible parameter No. (PNU)	If the PNU does not exist
1	Parameter value cannot be changed	If the parameter is a visualization parameter
2	Upper or lower limit exceeded	–
3	Erroneous subindex	–
4	No array	–
5	Incorrect data type	–
6	Setting not allowed (can only be reset)	–
7	Description element cannot be changed	Generally not possible for MASTERDRIVES
11	No operator control rights	–
12	Key word missing	Drive converter parameter "access key" and/or "parameter special access" not correctly set
15	No text array available	–
17	Task cannot be executed due to operating status	Drive converter status does not permit the present task
101	Parameter number deactivated at present	Specific to MASTERDRIVES
102	Channel width too small	Specific to MASTERDRIVES: only for short channels
103	Incorrect number of PKWs	Specific to MASTERDRIVES: only for G-SST1/2 and SCB interface (USS)
104	Parameter value not admissible	Specific to MASTERDRIVES
105	The parameter is indexed	e.g. task: "PWE, change word" for indexed parameters
106	Task not implemented	

Table 8.2-6 Error numbers for the reply "Task cannot be executed" (drive converter parameters)

Comment on error number 103

Error number 103 is only relevant to the G-SST1, 2 interface and the SCB interface. It is transferred in the following two cases:

- If the task involves indices of an indexed parameter (task index equal to 255) or the complete parameter description is requested and a variable telegram length has not been parameterized.
- If the set task is too small for the parameterized number of PKW data in the telegram (e.g. the double word and the PKW number is changed to 3 (words)).

Comment on error 104

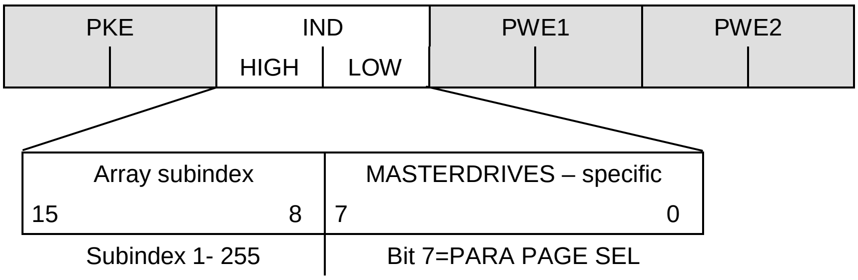
This error number is transferred if the parameter value which is to be adopted has not been assigned a function in the drive converter or cannot be adopted at the time of the change for internal reasons (although it lies within the limits).
This error number always occurs, for example, when only values explicitly entered in a table are valid for a parameter value and are not transferred exactly (e.g. the number of PKW data for the USS interfaces for which only the explicit values 0, 3, 4 and 127 are allowed).

Parameter index (IND) 2nd word

The assignment of the index (**IND**) is to be regarded as a special feature or difference between what is specified in the PPOs and what is specified for the acyclical channels MSAC_C1 and MSAC_C2.

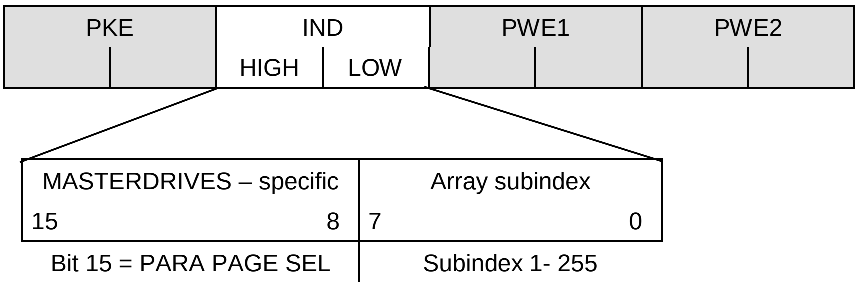
The array sub-index (also designated in shorter form as the sub-index in the PROFIBUS profile) is an 8-bit value and, during cyclical data transfer, is transferred in the most significant byte (bits 8 to 15) of the parameter index (IND). The least significant byte (bits 0 to 7) is not defined in the profile DVA. In the PPO of the CBP, the least significant byte of the parameter index is used in order to be able to address additional technology parameters or parameters of free components in the MASTERDRIVES by means of parameter page selection.

Structure of IND with cyclical communication by means of PPOs



The array subindex is an 8-bit value and, with acyclical data transfer (MSAC_C1), is always transferred in the least significant byte (bits 0 to 7) of the parameter index (IND). The function of parameter-page selection for additional technology parameters or parameters of free components in the MASTERDRIVES is assumed here by the most significant byte (bits 8 to 15) of the parameter index. This structure corresponds to the stipulations of the USS specification.

Structure of IND with acyclical communication via MSAC_C1



The function of the IND

For an indexed parameter, if the subindex in a task is transferred with the values between 1 and 254, the required index of the parameter is transferred. The significance of the individual indices of the parameter can be found in the "Parameter List" of the operating instructions for the converter.

When a description element is being processed, the number of the required element is transferred. The significance of the description elements is given in the PROFIBUS profile "Variable-speed drives", PROFIdrive version V2 (PNO: Order No. 3071).

The value 255 for the array subindex is of special importance. If the array subindex is transferred with 255, all indices of an indexed parameter are transferred simultaneously in one data block.

This function is useful only for acyclical data transfer via MSAC_C1. The transferred data block has the same structure as in the USS specification (see Fig. 8.2-7). The maximum size of a data block is 206 bytes.

The bit for parameter page selection has the following effect:

If this bit is equal to 1, the parameter number (PNU) transferred in the PKW task is provided with an offset of 2000 in the CBP and then passed on.

Parameter designation (acc. to parameter list)	**Serial parameter number**	**Required addressing of the parameter via PROFIBUS**		
		PNU [decimal]	**PNU [hex.]**	**Bit *)**
P000 - P999 (r000 - r999)	0 - 999	0 - 999	0 - 3E7	= 0
H000 - H999 (d000 - d999)	1000 - 1999	1000 -1999	3E8 - 7CF	= 0
U000 - U999 (n000 - n999)	2000 - 2999	0 - 999	0 - 3E7	= 1
L000 - L999 (c000 - c999)	3000 - 3999	1000 - 1999	3E8 - 7CF	= 1

*) Parameter page selection

Example

Source for the ON/OFF command (control word 1, bit 0):
P554 (=22A Hex)

Change parameter value of index 1 (structure of the IND according to PPO)

	Parameter index (IND)				
					2nd word
Bit No.:	15	8	7	0	
	0 0 0 0	0 0 0 1	0 0 0 0	0 0 0 0	Binary value
	0	1	0	0	HEX value

- ♦ Bits 8 to 15: Index of parameter P554
- ♦ Bits 0 to 7: Value = 0

Parameter value (PWE) 3rd and 4th words

The parameter value (PWE) is always transferred as a double word (32 bits). In a PPO telegram, only one parameter value can be transferred.

A 32-bit parameter value is composed of PWE1 (most significant word, 3rd word) and PWE2 (least significant word, 4th word).

A 16-bit parameter value is transferred in PWE2 (least significant word, 4th word). In this case, you must set PWE1 (most significant word, 3rd word) to 0 in the PROFIBUS-DP master.

Example for CUMC/ CUVC

Source for the ON/OFF command (control word 1, bit 0): P554 (= 22A Hex)

Change parameter value of index 1 to the value 3100

	Parameter value		(PWE)			
Bit No.:	31	24	23	16	3rd word (PWE1)	(hex)
	0	0	0	0		
Bit No.:	15	8	7	0	4th word (PWE2)	(hex)
	3	1	0	0		

- Bits 0 to 15: Parameter value for 16-bit parameter or low component for 32-bit parameter
- Bits 16 to 31: Value = 0 for 1-bit parameter or high component for 32-bit parameter

Rules for task/reply processing

- A task or a reply can only relate to one parameter value.
- The master must repeat a task until it receives the appropriate reply.
- The master identifies the reply to a task which has been set:
  - By evaluating the reply ID
  - By evaluating the parameter number, PNU
  - If necessary, by evaluating the parameter index, IND
  - If necessary, by evaluating the parameter value, PWE.
- The task must be sent complete in one telegram; telegrams with split tasks are not permissible. The same applies to the reply.
- With regard to reply telegrams which contain parameter values (actual values), the slave (CBP) always replies with the latest current values if the telegram is repeated.
- If the PKW interface requires no information during cyclical operation (only PZD data are important), the "No task" task must be sent.

WARNING

When you change the initialization function of software version V1.3x to V1.40 and higher, or VC firmware from 3.22 to 3.23 and higher, the behavior of the converter also changes (reverting to the behavior of software versions V1.2x and lower again) as follows:

If the electronics supply is switched off on a converter that is in state "READY" and is connected to an automation system via a field bus (PROFIBUS, CAN, DEVICE-NET, or CC-Link), this causes a fault message for this converter in the automation system.
If the automation system nevertheless sends a control word STW1 with valid authorization (bit 10 = 1) and a pending ON command (bit 0 = 1) to this converter, this can cause the converter to switch on and go straight into "OPERATION" state when the electronics supply is connected at the converter.

8.2.4 PROFIdrive V3: Acyclic parameter accessing with data block 47

NOTE

Acyclic parameter accessing with data block 47 is supported by the CBP2 with firmware version V2.20 and later.

A detailed description of acyclic parameter accessing with data block 47 can be found in PROFIBUS Profiles, PROFIdrive (PNO: Order No. 3172).

General properties

- Compatibility with PKW tasks in accordance with PROFIdrive profile version 2
- 16-bit wide address for each parameter number and subindex
- Transfer of complete arrays or areas thereof, or the entire parameter description
- Transfer of different parameters in one access operation (multi-parameter tasks)
- Only **one** parameter task is processed at a time (no pipelining)
- A parameter task/response must fit into one data block (max. 240 bytes). Tasks/responses are **not split** over several data blocks. The maximum length of data blocks can be less than 240 bytes as a result of slave property or bus configuration.
- **"Multi-parameter"** tasks are defined for optimized, simultaneous access to different parameters (e.g. HMI screen contents).
- Data block 47 can be processed by acyclical channels MSAC_C1 and MSAC_C2.

Subindex 0

The definition of an array has been changed in IEC 61158 as compared to the definition in EN 50170.

The PROFIdrive profile version 2 is compliant with EN 50 170, according to which the subindex of an indexed parameter or array begins with index 1. In the current IEC standard 61158, access to an indexed parameter or array begins with the index 0.

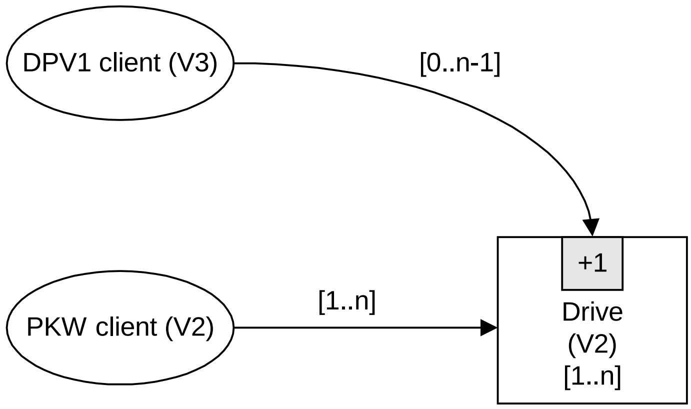
As a consequence, the parameter model and the DPV1 parameter channel had to be adapted in PROFIdrive profile version 3 so as to ensure compliance with the IEC standard.

Compatibility with the PKW mechanism in PROFIdrive profile version 2

MASTERDRIVES still utilizes the parameter model to PROFIdrive V2 on its internal interface. MASTERDRIVES can be accessed via data block 47 as a DPV1 client with the CBP2. For tasks using DB47, the CBP2 thus adds an offset of 1 to the parameter subindex.

Cyclical parameter accessing via PKW and acyclical parameter accessing using data block 100 can still be utilized as before.

MASTERDRIVES MC with parameter model to PROFIdrive profile version 2. In combination with the CBP2, DPV1 can be utilized in accordance with PROFIdrive profile version 3.



Special features / restrictions

- Access operations to simple parameters (i.e. parameters without indices) must be identified by "No. of elements" = 0.
- Changing the sub-areas of an array is not supported by the CBP2, in other words, it is possible to transfer a write task either for one index or for all indices. To alter a complete parameter array, the number of values must be equal to or greater than the array size.
- The editing of texts or descriptions is not supported.
- Reading of several or all texts from a text array via a parameter task is not supported, i.e. only one text from one text array (subindex) can be read with one parameter task.

8.2.4.1 Comparison between parameter tasks to PROFIdrive version 2 and 3

	PKW to PROFIdrive profile V2	DPV1 parameter tasks to PROFIdrive profile V3	Remarks
Task reference	-	New! 8-bit	Task/response identification
Task identifier	Request/change value/des./texts 4-bit	Request/change 8-bit	Distinction value/description/text as additional attribute
No. of parameters	-	New! 8-bit	Multi-parameter tasks
Parameter number	0..1999 (11 bits)	Content as for PKW 16-bit	Parameter number = 0 not allowed
Subindex	1..255 (8 bits)	Content as for PKW - 1 16-bit	Offset in subindex due to modified array definition: DPV1 subindex = PKW subindex – 1
No. of elements	- (always "1")	New 8-bit	Access to simple parameters (nonindexed parameters) is defined in DB47 with "No. of elements" = 0.
Attribute	-	New 8-bit	Distinction value/description/text
Total length	2 words	5 words	

8.2.4.2 Example of "Request parameter value", simple

Parameter task:

			Offset
Task header	Task reference	Task identifier = Request parameter	0
	Axis = 0	No. of parameters = 1	2
Parameter address	Attribute = value	No. of elements = 0 (!)	4
	Parameter number		
	Subindex = 0 (don't care)		
			10

Positive parameter response with word:

Response header	Task ref. mirrored	Response identifier = Request parameter (+)	0
	Axis mirrored	No. of parameters = 1	2
Parameter value	Format = word	No. of values = 1	4
	Value		6
			8

Positive parameter response with double word:

Response header	Task ref. mirrored	Response identifier = Request parameter (+)	0
	Axis mirrored	No. of parameters = 1	2
Parameter value	Format = double word	No. of values = 1	4
	Value		6
			10

Negative parameter response:

Response header	Task ref. mirrored	Response identifier = Request parameter (-)	0
	Axis mirrored	No. of parameters = 1	2
Parameter value	Format = error	No. of values = 1	4
	Error value		6
			8

8.2.4.3 Example of "Change parameter value", simple

Parameter task:

			Offset
Task header	Task reference	Task identifier = Change parameter	0
	Axis = 0	No. of parameters = 1	2
Parameter address	Attribute = value	No. of elements = 0 (!)	4
	Parameter number		
	Subindex = 0 (don't care)		
Parameter value	Format = word	No. of values = 1	10
	Value		12
			14

Positive parameter response:

Response header	Task ref. mirrored	Response identifier = Change parameter (+)	0
	Axis mirrored	No. of parameters = 1	2
			4

Negative parameter response:

Response header	Task ref. mirrored	Response identifier = Change parameter (-)	0
	Axis mirrored	No. of parameters = 1	2
Parameter value	Format = error	No. of values = 1	4
	Error value		6
			8

8.2.4.4 Example of "Request parameter value", more than one array element

Parameter task:

			Offset
Task header	Task reference	Task identifier = Request parameter	0
	Axis = 0	No. of parameters = 1	2
Parameter address	Attribute = value	No. of elements = 5	4
	Parameter number		
	Subindex = 0		
			10

Positive parameter response:

Response header	Task ref. mirrored	Response identifier = Request parameter (+)	0
	Axis mirrored	No. of parameters = 1	2
Parameter value	Format = word	No. of values = 5	4
	Value 1		6
	Value 2		
	Value 3		
	Value 4		
	Value 5		
			16

Negative parameter response:

Response header	Task ref. mirrored	Response identifier = Request parameter (-)	0
	Axis mirrored	No. of parameters = 1	2
Parameter value	Format = error	No. of values = 1	4
	Error value		6
			8

8.2.4.5 Example of "Change parameter value", more than one array element

NOTE

Changing the sub-areas of an array is not supported by the CBP2, in other words, it is possible to transfer a write task either for one index or for all indices. To alter a complete parameter array, the number of values must be equal to or greater than the array size.

The following example shows a write operation to one parameter with 5 subindices.

Parameter task:

			Offset
Task header	Task reference	Task identifier = Change parameter	0
	Axis = 0	No. of parameters = 1	2
Parameter address	Attribute = value	No. of elements = 5	4
	Parameter number		
	Subindex = 0		
Parameter value	Format = word	No. of values = 5	10
	Value 1		12
	Value 2		
	Value 3		
	Value 4		
	Value 5		
			22

Positive parameter response:

Response header	Task ref. mirrored	Response identifier = Change parameter (+)	0
	Axis mirrored	No. of parameters = 1	2
			4

Negative parameter response:

Response header	Task ref. mirrored	Response identifier = Change parameter (-)	0
	Axis mirrored	No. of parameters = 1	2
Parameter value	Format = error	No. of values = 1	4
	Error value		6
			8

8.2.4.6 Example of "Request parameter value", multi-parameter

Parameter task:

			Offset
Task header	Task reference	Task identifier = Request parameter	0
	Axis = 0	No. of parameters = 3	2
1st parameter address	Attribute = value	No. of elements = 1	4
	Parameter number		
	Subindex = 7		
2nd parameter address	Attribute = value	No. of elements = 100	10
	Parameter number		
	Subindex = 0		
3rd parameter address	Attribute = value	No. of elements = 2	16
	Parameter number		
	Subindex = 13		
			22

Parameter response (+): All part accesses o.k.

			Offset
Response header	Task ref. mirrored	Response identifier = Request parameter (+)	0
	Axis mirrored	No. of parameters = 3	2
1st parameter value(s)	Format = word	No. of values = 1	4
	Value		6
2nd parameter value(s)	Format = word	No. of values = 100	8
	Value 1		10
	Value 2		
	...		
	Value 100		
3rd parameter value(s)	Format = double word	No. of values = 2	210
	Value1		212
	Value2		
			220

Parameter response (-): First and third part access o.k., second part access errored

Response header	Task ref. mirrored	Response identifier = Request parameter (-)	0
	Axis mirrored	No. of parameters = 3	2
1st parameter value(s)	Format = word	No. of values = 1	4
	Value		6
2nd parameter value(s)	Format = error	No. of values = 1	8
	Error value		10
3rd parameter value(s)	Format = double word	No. of values = 2	12
	Value1		14
	Value2		
			22

8.2.4.7 Example of "Change parameter value", multi-parameter

Parameter task:

			Offset
Task header	Task reference	Task identifier = Change parameter	0
	Axis = 0	No. of parameters = 3	2
1st parameter address	Attribute = value	No. of elements = 1	4
	Parameter number		
	Subindex = 7		
2nd parameter address	Attribute = value	No. of elements = 100	10
	Parameter number		
	Subindex = 0		
3rd parameter address	Attribute = value	No. of elements = 2	16
	Parameter number		
	Subindex = 0		
1st parameter value(s)	Format = word	No. of values = 1	22
	Value		24
2nd parameter value(s)	Format = word	No. of values = 100	26
	Value 1		28
	Value 2		
	...		
	Value 100		
3rd parameter value(s)	Format = double word	No. of values = 2	228
	Value1		230
	Value2		
			238

Parameter response (+): All part access o.k.

Response header	Task ref. mirrored	Response identifier = Change parameter (+)	0
	Axis mirrored	No. of parameters = 3	2
			4

Parameter response (-): First and third part access o.k., second part access errored

Response header	Task ref. mirrored	Response identifier = Change parameter (-)	0
	Axis mirrored	No. of parameters = 3	2
1st parameter value(e)	Format = zero	No. of values = 0	4
2nd parameter value(e)	Format = error	No. of values = 2	6
	Error value		8
	Errored subindex		10
3rd parameter value(e)	Format = zero	No. of values = 0	12
			14

8.2.4.8 Request description, individual

Parameter task:

			Offset
Task header	Task reference	Task identifier = Request parameter	0
	Axis = 0	No. of parameters = 1	2
Parameter address	Attribute = description	No. of elements = 1	4
	Parameter number		
	Subindex = n		
			10

Positive parameter response with word (e.g. ID code):

Response header	Task ref. mirrored	Response identifier = Request parameter (+)	0
	Axis mirrored	No. of parameters = 1	2
Parameter value	Format = word	No. of values = 1	4
	Value		6
			8

Positive parameter response with text:

Response header	Task ref. mirrored	Response identifier = Request parameter (+)	0
	Axis mirrored	No. of parameters = 1	2
Parameter value	Format = byte	No. of values = 16	4
	Byte 1	Byte 2	6
	...	...	
	Byte 15	Byte 16	
			22

Negative parameter response:

Response header	Task ref. mirrored	Response identifier = Request parameter (-)	0
	Axis mirrored	No. of parameters = 1	2
Parameter value	Format = error	No. of values = 1	4
	Error value		6
			8

8.2.4.9 Request description, total

Parameter task:

			Offset
Task header	Task reference	Task identifier = Request parameter	0
	Axis = 0	No. of parameters = 1	2
Parameter address	Attribute = description	No. of elements = 0 (don't care)	4
	Parameter number		
	Subindex = 0 (!)		
			10

Positive parameter response:

Response header	Task ref. mirrored	Response identifier = Request parameter (+)	0
	Axis mirrored	No. of parameters = 1	2
Parameter value	Format = byte	No. of values = (Bytes)	4
	ID code		6
	(etc.)		
	...		
	...	...	
			6 + description

Negative parameter response:

Response header	Task ref. mirrored	Response identifier = Request parameter (-)	0
	Axis mirrored	No. of parameters = 1	2
Parameter value	Format = error	No. of values = 1	4
	Error value		6
			8

8.2.4.10 Request text, individual

Parameter task:

			Offset
Task header	Task reference	Task identifier = Request parameter	0
	Axis = 0	No. of parameters = 1	2
Parameter address	Attribute = text	No. of elements = 1	4
	Parameter number		
	Subindex = n		
			10

Positive parameter response:

Response header	Task ref. mirrored	Response identifier = Request parameter (+)	0
	Axis mirrored	No. of parameters = 1	2
Parameter value	Format = byte	No. of values = 16	4
	Byte 1	Byte 2	6
	...	...	
	Byte 15	Byte 16	
			22

Negative parameter response:

Response header	Task ref. mirrored	Response identifier = Request parameter (-)	0
	Axis mirrored	No. of parameters = 1	2
Parameter value	Format = error	No. of values = 1	4
	Error value		6
			8

8.2.5 Mounting methods / CBP slots

NOTE

The CBP can be directly built into Compact PLUS units. In all other types of unit in this series, it is mounted on the CUMC or CUVC or it can be connected in the electronics box with an adaptation board.

8.2.5.1 CBP mounting slots in MC Compact PLUS units

NOTE

You can mount the CBP optional board (Communications board PROFIBUS) in any slot. Bear in mind, however, that an encoder board always needs slot C.

Position of the slots

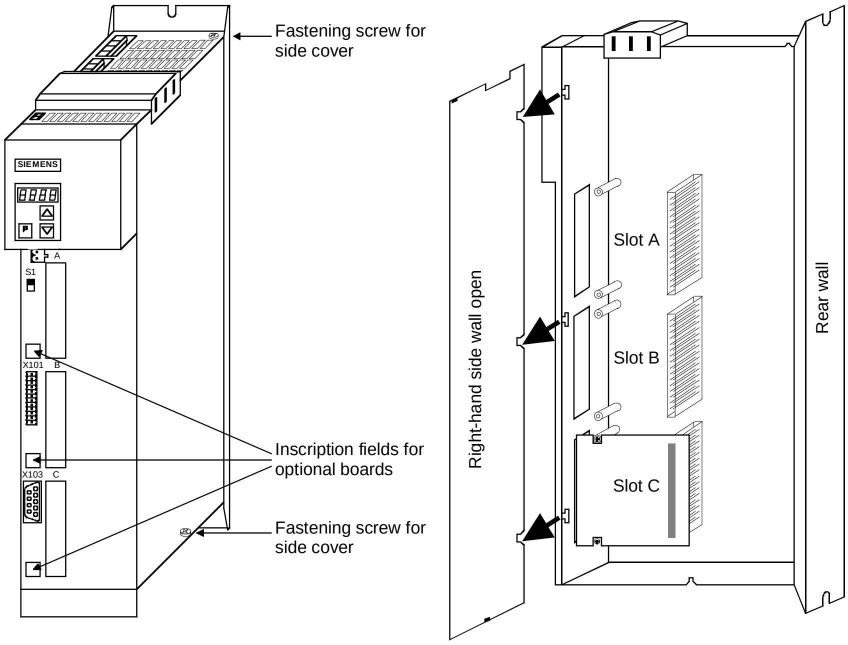


Fig. 8.2-8 Position of the slots (with side wall on the right removed)

DANGER

Due to the DC link capacitors, hazardous voltages are still present in the converter up to 5 minutes after it has been disconnected from the power supply. Before opening the converter, wait until the capacitors have completely discharged.

A maximum of two CBPs can be operated in the Compact PLUS type unit. The following configurations are defined (see function diagrams in Chapter 12):

- If two CBPs are inserted, the CBP which is inserted into the slot with the lower slot letter is considered the **first** CB/TB.
- If two CBPs are inserted, the CBP which is inserted into the slot with the higher slot letter is considered the **second** CB/TB.

8.2.5.2 CBP slots in Compact units and chassis-type units with the CUs of function classes Motion Control (CUMC) and Vector Control (CUVC)

Slots

In the electronics box of Compact and chassis-type converters and inverters, there are up to six slots available for mounting an optional board. The slots are designated with the letters A to G. There is no slot B, however, in these types of unit; it is only used in Compact PLUS type units.

If you wish to use slots D to G, you must first mount the LBA (Local Bus Adapter, Order No. 6SE7090-0XX84-4HA0) and the corresponding adaption board ADB (Order No. 6SX7010-0KA00).

NOTE

You can operate the CBP optional board (Communications board PROFIBUS) in any slot. Bear in mind, however, that an encoder board always needs slot C and that the LBA has to use a particular sequence of slots.

The CBP can be mounted on the adaptation board in both slots, i.e. at the BOTTOM and/or at the TOP.

Position of the slots

The slots are located at the following positions:

- Slot A CU board Top
- Slot C CU board Bottom
- Slot D Adaptation board in mount. pos. 2 Top
- Slot E Adaptation board in mount. pos. 2 Bottom
- Slot F Adaptation board in mount. pos. 3 Top
- Slot G Adaptation board in mount. pos. 3 Bottom

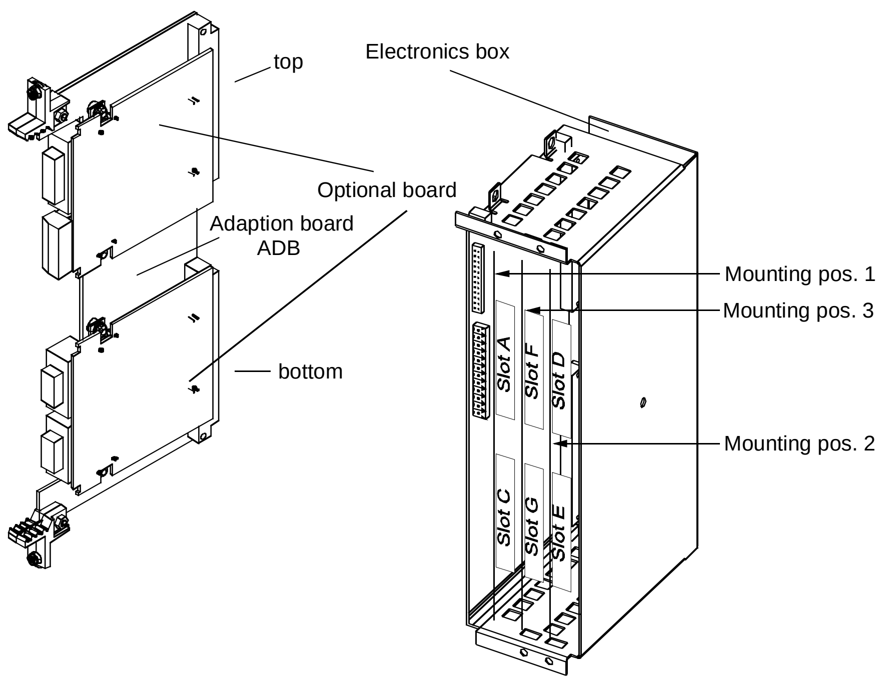


Fig. 8.2-9 Adaptation board with optional boards and position of the slots for Compact units and chassis-type units

DANGER

Due to the DC link capacitors, hazardous voltages are still present in the converter up to 5 minutes after it has been disconnected from the power supply. Before opening the converter, wait until the capacitors have completely discharged.

For technical reasons, certain sequences for using the slots are stipulated for the LBA.

If only one adaptation board with optional boards is inserted in the electronics box, it must always be inserted in slot +1.B2 (ON THE RIGHT), i.e. mounting position 2.

If a technology board T100 / T300 or T 400 is inserted in the electronics box in addition to the adaptation board with CBP, it must be inserted in slot +1.B2 (mounting position 2). In this case, the adaptation board with CBP is inserted in slot +1.B3 (mounting position 3).

A maximum of either two CBPs or one CBP plus one T100/T300/T400 technology board can be operated in the electronics box of the converter. The following configurations are defined (see function diagrams in Chapter 12):

- ♦ The CBP is regarded as the first CB/TB if one of the following configurations exist:
  - Exactly one CBP is inserted in slots A to G on the electronics box and no T100/T300/T400 technology board is inserted.
  - If two CBPs are inserted, the CBP which is inserted in the slot with the lower slot letter.
- ♦ The CBP is regarded as the second CB/TB if one of the following configurations is present:
  - A T100/T300/T400 technology board is inserted and the CBP in the electronics box is inserted in slots A to G.
  - In the case of two CBPs, the one inserted in the slot with the higher slot letter.

8.2.5.3 CBP slots in Compact and chassis-type units with the CUs of function classes FC (CU1), VC (CU2) or SC (CU3)

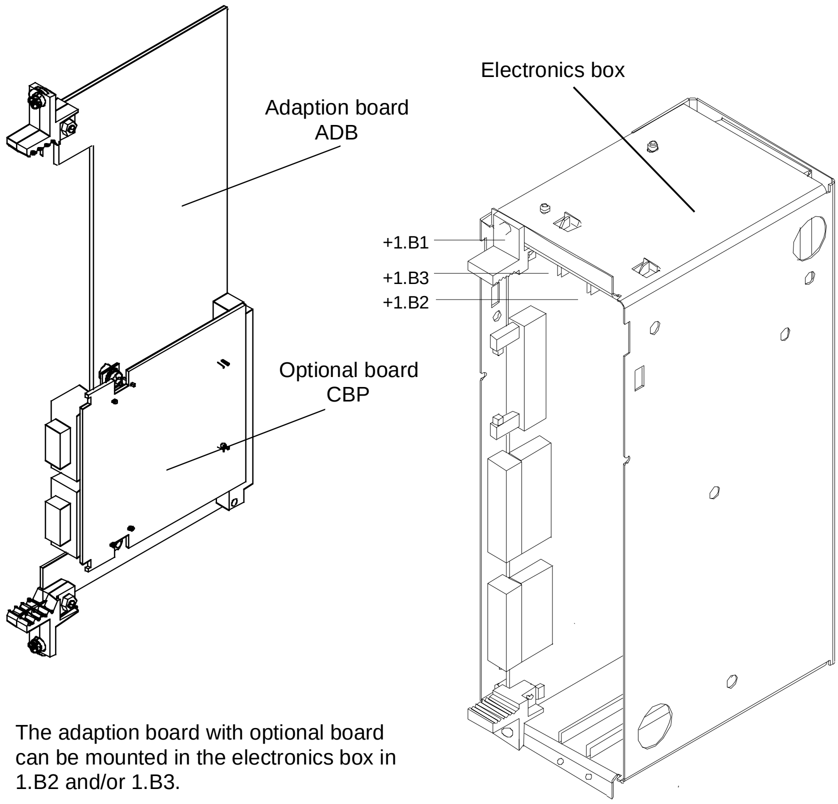


Fig. 8.2-10 Electronics box with free slots (+1.B2 and +1.B3) and adaptation board with CBP

On the adaptation board ADB (Order No. 6SX7010-0KA00), **only one** CBP can be mounted in slot X198, i.e. at the BOTTOM.

If the CBP is mounted with adaptation board, the LBA (Local Bus Adapter, LBA, Order No. 6SE7090-0XX84-4HA0) must first be mounted.

NOTE

If only one optional board is used, it must always be inserted in slot +1.B2 (on the RIGHT) in the electronics box.

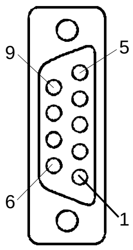
If, in addition to the CBP, a technology board (T100 / T300 or T400) is inserted in the electronics box, it must be inserted in slot +1.B2. In this case, the CBP is inserted in slot +1.B3.

8.2.6 Connecting up the CBP to the PROFIBUS

8.2.6.1 Assignment of plug-in connector X448

Connecting up

The CBP optional board has a 9-pin Sub-D socket (X448) which is provided for connecting the CBP to the PROFIBUS system. The connections are short-circuit proof and floating.



Pin	Designation	Significance	Area
1	SHIELD	Ground connection	
2	-	Not connected	
3	RxD/TxD-P	Receive/transmit data P (B/B´)	RS485
4	CNTR-P	Control signal	TTL
5	DGND	PROFIBUS data reference potential (C/C´)	
6	VP	Power supply Plus	5 V ± 10 %
7	-	Not connected	
8	RxD/TxD-N	Receive/transmit data N (A/A´)	RS485
9	-	Not connected	

Table 8.2-7 Pin assignment of X448 connection

8.2.6.2 Connecting up the bus cable by means of the RS485 bus connecting system

With the PROFIBUS, data transfer according to RS485 is most frequently used. A twisted, shielded copper cable with one pair of wires is used.

Up to a maximum of 124 units can be connected to a PROFIBUS phase. In one bus segment, up to 32 units can be connected together in a linear structure. If there are more than 32 nodes, repeaters (power amplifiers) must be used in order to link up the individual bus segments.

Maximum cable lengths

The maximum cable length depends on the baud rate (transmission speed).

The maximum cable length can be increased by using repeaters but no more than three repeaters may be connected in series.

The maximum cable lengths given in the following table can only be ensured if PROFIBUS bus cables are used (e.g. Siemens PROFIBUS-cable with MRPD 6XV 1830-0AH10).

Baud rate	Max. cable length in a segment [m]	Max. distance between 2 stations [m]
9.6 to 187.5 kbaud	1000	10000
500 kbaud	400	4000
1.5 Mbaud	200	2000
3 to 12 Mbaud	100	1000

Table 8.2-8 Permissible cable length of a segment with RS485 repeaters

Rules for laying cables

When you are laying the bus cable, you must not:

- twist it
- stretch it
- or squash it

In addition to this, you must take into account any influences on electromagnetic compatibility (EMC).

For further information, see for example Chapter 3 of the Compendium or the description "Instructions for Design of Drives in Conformance with EMC Regulations" (Order No. 6SE7087-6CX87-8CE0).

Bus connectors

You need bus connectors in order to connect the PROFIBUS to a CBP. There are different types of bus connector with degree of protection IP20. Their different uses are shown in the table below.

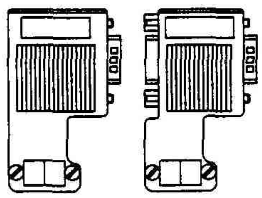
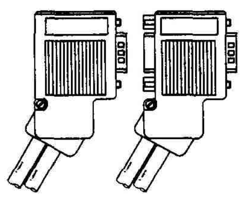
Order No.	6ES7 972-0BA11-0XA0 6ES7 972-0BB11-0XA0	6ES7 972-0BA40-0XA0 6ES7 972-0BB40-0XA0
Appearance		
PG socket	0BA11: no 0BB11: yes	0BA40: no 0BB40: yes
Max. baud rate	12 Mbaud	12 Mbaud
Terminating resistor	Can be connected as required	Can be connected as required
Outgoing cable	Vertical	slanting
Interfaces • PROFIBUS nodes • PROFIBUS cable	• 9-pole Sub-D socket • 4 terminal blocks for wires up to 1.5 mm^2	• 9-pole Sub-D socket • 4 terminal blocks for wires up to 1.5 mm^2
Connectable diameter of PROFIBUS cable	8 ± 0.5 mm	8 ± 0.5 mm
Recommended for		
• **IM 308-B**	●	
• **IM 308-C**	●	
• **S5-95U**		●
• **S7-300**	●	
• **S7-400**	●	●
• **M7-300**	●	
• **M7-400**		●
• **CBP**	●	●

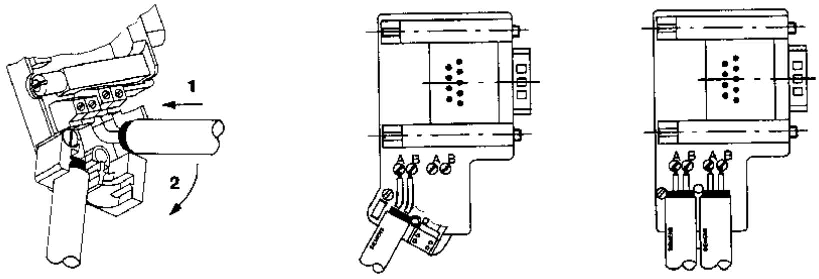
Table 8.2-9 Structure and application of bus connectors with IP20 protection

For more information on ordering and additional descriptions, see the A&D AS catalog "Industrial Communication" IK 10
(Order No. E86060-K6710-A101-A6).

Installing the bus cable

Bus cable connection for first and last nodes on the bus[1]

Bus cable connection for other nodes on the bus



[1] The bus cable must be connected on the left!

Fig. 8.2-11 Connecting up the bus cable to the bus connector

Bus termination

Each bus segment must be fitted with a resistor network, the bus termination, at each end.

If the recommended bus connectors can be used, the bus termination can be connected or disconnected by means of switches.

Terminating resistor connected	on / off	Terminating resistor **not** connected	on / off

Fig. 8.2-12 Switch positions for connected or disconnected bus termination resistor

If these bus connectors are not used, the user must ensure installation of a bus termination network at the first and last bus station in accordance with the following illustration.

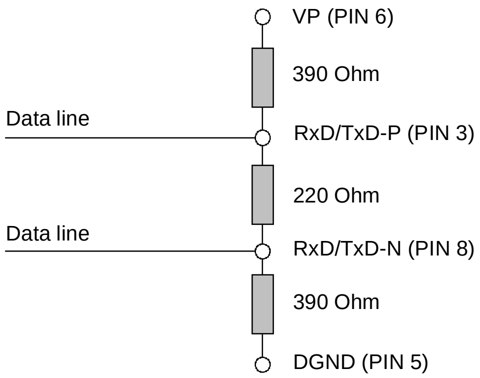


Fig. 8.2-13 Bus termination network

NOTICE

A bus segment must always be terminated at both ends with a matching resistor. This is not the case, for example, if the last slave with bus connector is not live. Because the bus connector obtains its voltage from the station, the matching resistor has no effect.

Make sure that the stations at which the matching resistor is connected is always supplied with voltage.

Pulling out the bus connector

You can pull out the bus connector with looped-through bus cable from the PROFIBUS-DP interface at any time without interrupting data transfer on the bus.

Connection example

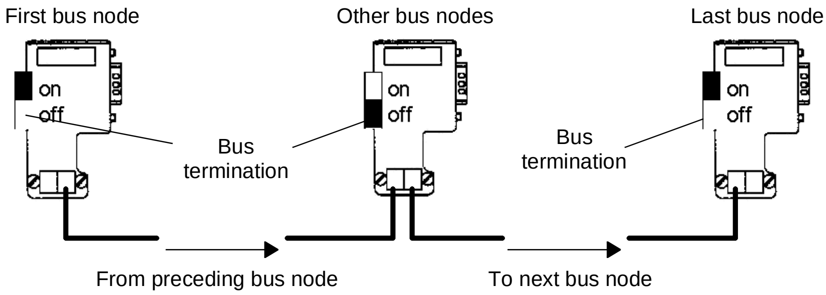


Fig. 8.2-14 Bus segment in linear structure (max. 32 stations per segment)

8.2.6.3 Connecting the bus cable with the fiber-optic cable system

For applications in an environment which is subjected to a high level of interference, fiber-optic cables can also be used with the PROFIBUS-DP. The specification of fiber-optic-cable transmission is defined in PROFIBUS guideline No. 2.021.

For connecting fiber-optic cables to the CBP, an OLP (Optical Link Plug) can be used which provides integrated conversion of the RS485 signals in fiber-optic cables and vice versa.

Area of application

With the optical link plugs (OLPs), optical PROFIBUS networks in ring form can easily be created (single-fiber ring with plastic fiber-optic cables).

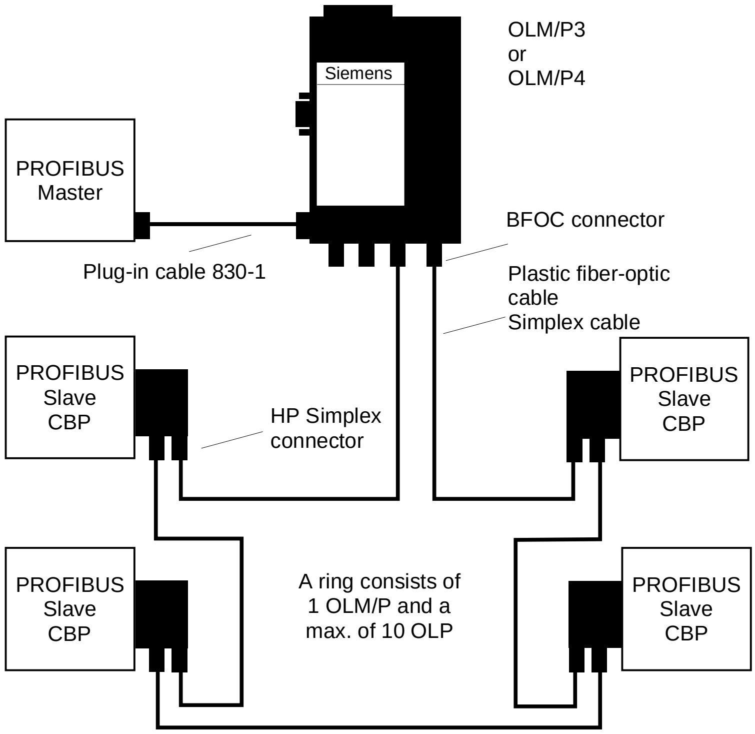


Fig. 8.2-15 Example of a system configuration with OLPs

The OLP can be directly plugged into the 9-pole SUB-D socket of the CBP. Power is supplied to the OLP via the 9-pole SUB-D connector of the CBP.

The transmission reliability of PROFIBUS networks is greatly increased by using fiber-optic cable instead of twisted two-wire cable. As a result, the network is insensitive to interference due to EMC problems or overvoltages.

Considerable cost savings are achieved by using plastic fiber-optic cables which are also easy to fit. Additional grounding is no longer necessary either.

Functions

- Connection of a PROFIBUS slave to an optical single-fiber ring
- Cable length between 2 OLPs with plastic fiber-optic cable from 1 m to 25 m
- Maximum circumference of a single-fiber ring: 275 m
- Transmission rate of 93.75 kbit/s to 1.5 Mbit/s; can be adjusted by means of plug-in jumpers (this can be checked through inspection windows in the connector housing)
- OLP single-fiber rings can be integrated in PROFIBUS networks by means of OLM/Ps

Requirements for use

- One OLM/P per single-fiber ring is necessary as a coordinator.

Ordering data

OLP / OLM for PROFIBUS	Order No.
OLP Optical link plug for creating optical single-fiber rings with plastic fiber-optic cables; including 2 HP Simplex connectors and mounting instructions	6GK1 502-1AA00
OLM/P3 Optical link module for plastic fiber-optic cables, 3-channel version with signaling contact, including 2 BF OC connectors	6GK1 502-3AA10
OLM/P4 Optical link module for plastic fiber-optic cables, 4-channel version with signaling contact, including 4 BFOC-connectors	6GK1 502-4AA10

For more information on ordering and additional descriptions, see the A&D AS catalog "Industrial Communication" IK 10 (Order No. E86060-K6710-A101-A6).

8.2.6.4 Shielding of the bus cable / EMC measures

In order to ensure interference-free operation of the PROFIBUS-DP, especially in the case of data transmission with RS485, the following measures are imperative:

Shielding

- For the PROFIBUS bus cable, the shield in the bus connector should be connected to the CBP. Shielding is also provided by the shield clamps (in the event of Compact units) or by the shield clamps and cable ties (in the event of chassis-type units) on the converter housing. The following illustrations show you how to use the shield clamps. When removing the insulation from the various core ends, please ensure that the solid copper core is not damaged.
- Please ensure that the shield of each bus cable is connected to protective earth, both where it enters the cabinet as well as at the converter housing.

NOTE

Bus cables are to be laid at an angle of 90 ° to power cables if it is necessary that the two kinds of cable intersect.

NOTE

The bus cables must be twisted and shielded and are to be laid separately from the power cables at a minimum distance of 20 cm. The braided shield and, if necessary, the underlying foil shield as well, are to be connected on both sides through a large surface area so that they are highly conductive, i.e. the shield of the bus cable between two converters is to be connected to the converter housing at both ends of the cable. The same applies to the shielding of the bus cable between the PROFIBUS-DP master and the converters.

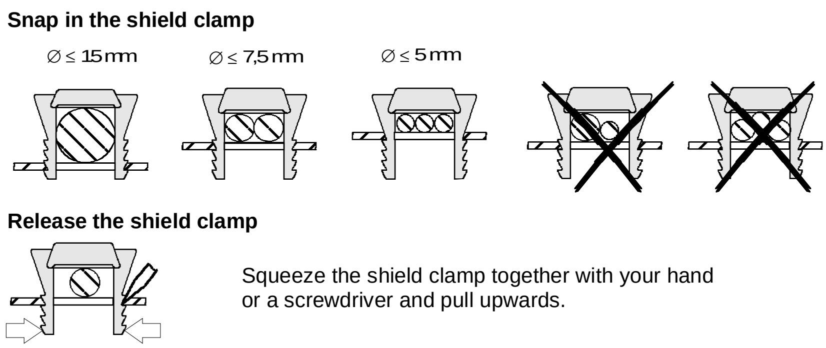


Fig. 8.2-16 Using the shield clamps

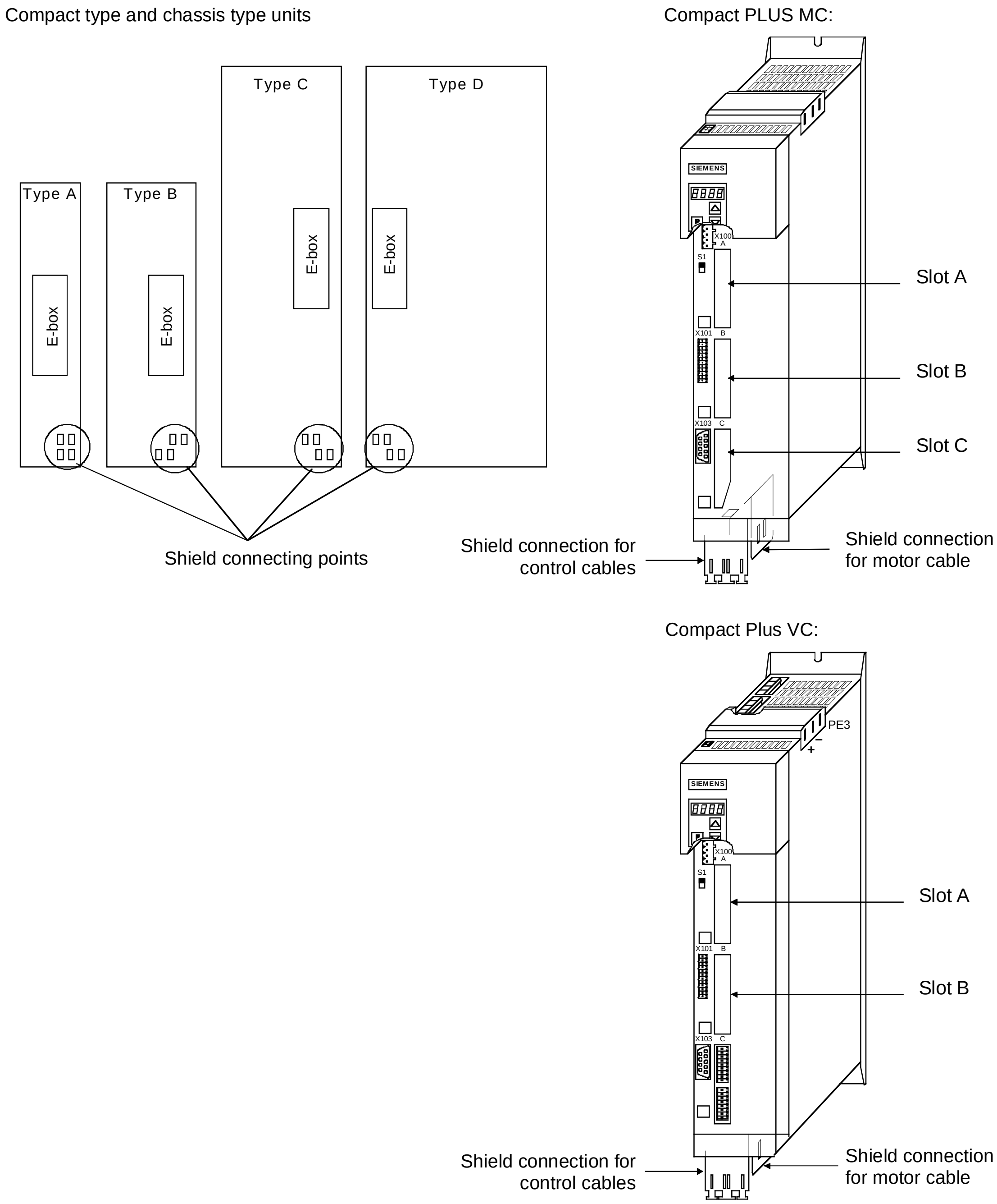


Fig. 8.2-17 Position of the shield connecting points

If so many control cables are used that two shield clamps are insufficient, the "EMC shielded housing" option is to be used.

Potential equalization

- Please avoid differences in potential (e.g. as a result of different power supply levels) between the converters and the PROFIBUS-DP master.
- Use equipotential bonding cables:
  - 16 mm^2 Cu equipotential bonding cables up to 200 m
  - 25 mm^2 Cu equipotential bonding cables over 200 m
- Route the equipotential bonding cables so that there is the smallest possible surface between the equipotential bonding cables and signal cables.
- Connect equipotential bonding cables to the ground/protective conductor through the largest possible surface area.

Laying cables

Instructions for laying cables:

- Bus cables (signal cables) must not be laid close to and parallel to power cables.
- Signal cables and the associated equipotential-bonding cables must be laid as closely together as possible and kept as short as possible.
- Power cables and signal cables must be laid in separate cable ducts.
- Shields must be connected through the largest possible surface area.

For more information on electromagnetically compatible installation of systems, see for example Chapter 3 of the Compendium or the description "Instructions for Design of Drives in Conformance with EMC Regulations" (Order No. 6SE7087-6CX87-8CE0).

8.2.7 Starting up the CBP

NOTE

With regard to basic parameterization, please note the differences to the types of unit with the older function classes FC (CU1), VC (CU2) and SC (CU3). These differences are described below.

In order to make these differences clear, the parameter numbers and other deviations are either printed in dark gray or have a dark-gray background.

8.2.7.1 Basic parameterization

NOTE

For the CBP optional board, it is not necessary to adjust the baud rate.

Basic parameterization with Compact PLUS, CUMC and CUVC

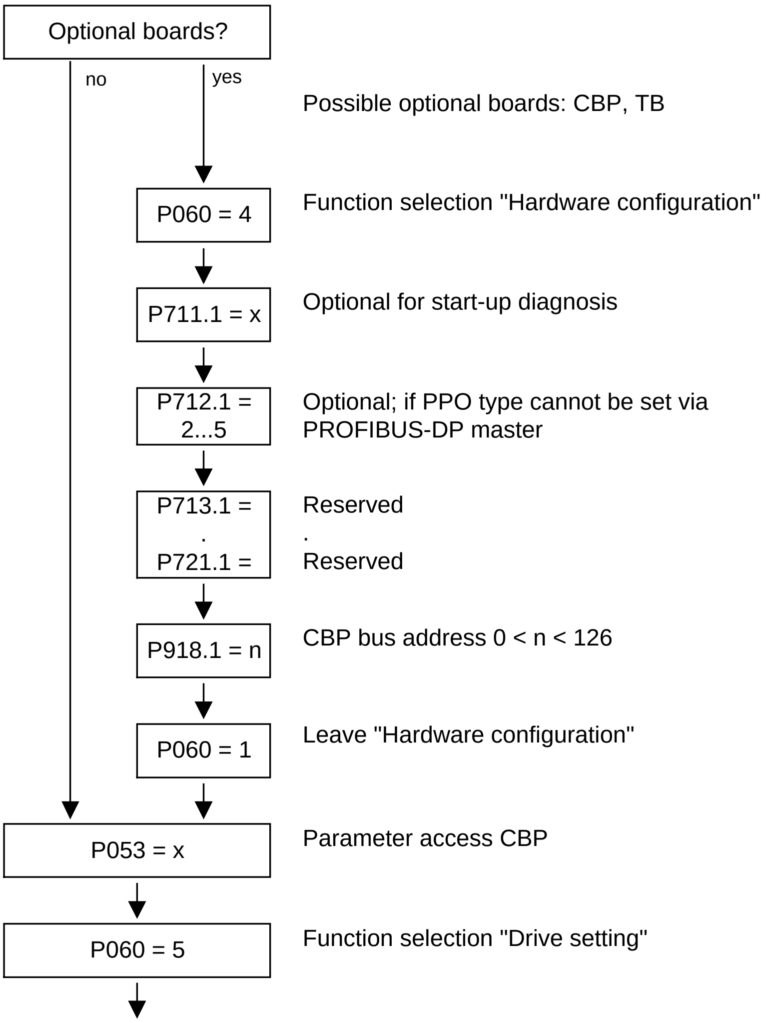


Fig. 8.2-18 Parameterization of "Hardware configuration" for Compact PLUS, CUMC and CUVC

In the case of MASTERDRIVES MC (CUMC) and MC+ (Compact+) from firmware version V1.4 onwards, the CB parameters P918 and P711 to P721 can also be changed in the "Drive setting" status (P060 = 5).

Basic parameterization for FC (CU1), VC (CU2) and SC (CU3)

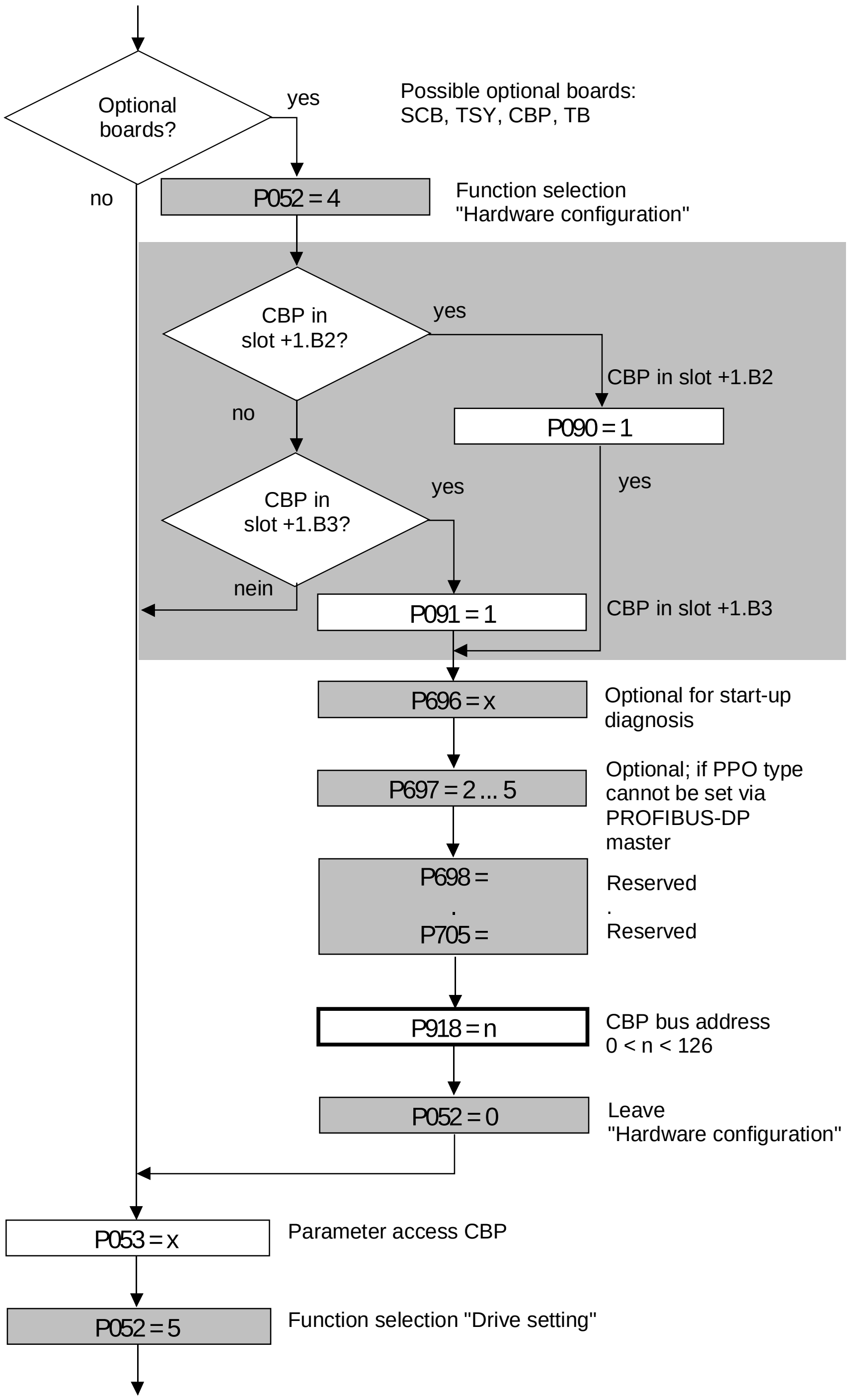


Fig. 8.2-19 Parameterization of "Hardware configuration" for FC (CU1), VC (CU2) and SC (CU3)

NOTE

All grayed out parameters are only valid for units with the functions FC (CU1), VC (CU2) and SC (CU3).

NOTE

The following conventions apply to all parameters with index (e.g. P918.x) given below:

- Index 1 is valid for the first CBP
- Index 2 is valid for the second CBP

To determine which CBP is the first and which the second, see Section 8.2.4 "Mounting methods / CBP slots".

P053 (parameter access)
This parameter is significant for the CBP if you wish to set or change parameters of the converter (including technology) by means of the PKW part of the PROFIBUS telegrams. In this case, please set parameter P053 to an uneven number (e.g. 1, 3, 7 etc.). With parameter P053, you can define the positions (PMU, CBP etc.) from which parameters may be altered. Example: P053 = 1: Parameter access only CBP = 3: Parameter access CBP+PMU = 7: Parameter access CBP+PMU+SCom1 (OP) If changing parameters (= parameter access) has been enabled via the CBP (P053 = 1, 3 etc.), all other parameter settings can be made from the PROFIBUS-DP master via the bus. For the additional setting of parameters which concern data transfer via the PROFIBUS-DP (e.g. process data (PZD) combination), you must know the PPO type used for the transfer of useful data.

P060	**P052**
Function selection "Hardware setting"	

P090 (board position 2) or P091 (board position 3)
You can also change these parameters if the CBP exchanges useful data via the PROFIBUS-DP. In this way, you can isolate the PROFIBUS-DP interface from the converter with the appropriate parameterization. In this case, the CBP changes over to the PROFIBUS-DP status "Static Diagnosis", i.e. the CBP causes the PROFIBUS-DP master to exit the data-exchange mode and only to request diagnostic telegrams from the CBP.

P918.x (CBP Bus Address)	**P918 (CBP Bus Address)**
The CBP accepts the address set in parameter P918 only after voltage recovery or a reset. After the CBP has been parameterized, it is no longer possible to change the address. Any attempt to do so leads to fault number F080. An address change only becomes effective after the power supply to the electronics box has been turned off and then turned on again!	

P711.x (CBP Parameter 1)	P696 (CBP Parameter 1)
With this parameter, you can activate special diagnostic information for start-up and service. During normal operation, P711 / P696 has the value 0 (default setting).	

P712.x (CBP Parameter 2)	P697 (CBP Parameter 2)
If you are using a PROFIBUS-DP master system where it is possible to set the identification byte and thus specify the type of PPO (e.g. IM308B/C for SIMATIC S5), you do not need to do anything with P712 / P697 (simply bypass this parameter P712 / P697)! If you are using a PROFIBUS-DP master system where it is not possible to specify the PPO type at the converter by means of the identification byte (e.g. CP5431 for SIMATIC S5), you can specify a PPO type with parameter P712 / P697. With the default setting (P712 / P697= 0), the CBP automatically sets the type of PPO. P712 / P697 = 0: PPO1 (default setting) = 1: PPO1 = 2: PPO2 = 3: PPO3 = 4: PPO4 = 5: PPO5	

P713.x (CB Parameter 3)	P698 (CBP Parameter 3)
Only CBP2 Communications protocol: P713 / P698 = 0: PROFIBUS (Default setting) (P713 / P698 = 1: reserved) P713 / P698 = 2: USS Only selected parameters are relevant (see below). A change from the PROFIBUS to the USS protocol and vice versa does not come into effect until after the voltage has been switched off and then on again.	

P714.x (CB Parameter 4)	P699 (CBP Parameter 4)
Only CBP2 Write requests of a SIMATIC OP are stored permanently (EEPROM) or temporarily (RAM). P714 / P699 = 0: EEPROM (default setting) P714 / P699 = 1: RAM	

P715.x (CB Parameter 5)	P700 (CBP Parameter 5)
Only CBP2 Failure of a cross-traffic relationship is signaled as a fault or alarm. P715 / P700 = 0: Fault (default setting) In the event of failure, transmission of all setpoints to the basic unit is stopped. This leads to fault F082 P715 / P700 = 1: Alarm The failure is only signaled by alarm A088. With regard to the missing setpoints, those last received are retained.	

NOTE

After the above settings have been made, the CBP is logged-on in the converter and is ready to establish connections to the PROFIBUS-DP. It is not yet possible to process the process data via the PROFIBUS-DP after this has been done.

This additionally requires the type of process data interconnection described in the following section 8.2.6.2.

USS

For USS-relevant parameter numbers, only CBP2 with P713.x = 2:

CBP2 parameter number	Meaning	Corresponds to Scom/ SCB parameter number
P918.x	Bus address	P700
P718.x (CB parameter 8)	Baud rate 6 = 9.6 kbaud 7 = 19.2 kbaud 8 = 38.4 kbaud	P701
P719.x (CB parameter 9)	Number of PKWs	P702
P720.x (CB parameter 10)	Number of PZDs	P703
P722.x	Telegram failure time	P704

Further information on the USS protocol can be found in Section 8.1, USS.

8.2.7.2 Process data interconnection in the units

Definition

Process data interconnection involves the linking up of setpoints and control bits to the RAM interface. The transferred process data only become effective when the used bits of the control words as well as the setpoints, status words and actual values are allocated (connected) to the dual-port RAM interface.

The CBP stores the received process data at fixed pre-determined addresses in the dual-port RAM. Each item of process data (PZDi, i = 1 to 10) is assigned a connector (e.g. 3001 for PZD1). The connector is also used to determine whether the PZDi (i = 1 to 10) is a 16-bit value or a 32-bit value.

With the help of selector switches (e.g. P554.1 = selector switch for bit 0 of control word 1), the setpoints or the individual bits of the control words can be assigned to a particular PZDi in the dual-port RAM. In order to do this, the connector belonging to the required PZDi is assigned to the selector switch.

NOTE

In function classes CUMV, CUVC and Compact PLUS, the control words STW1 and STW2 are also available in bit form on so-called binectors (explanations of BICO systems can be found in Chapter 4 "Function Blocks and Parameters").

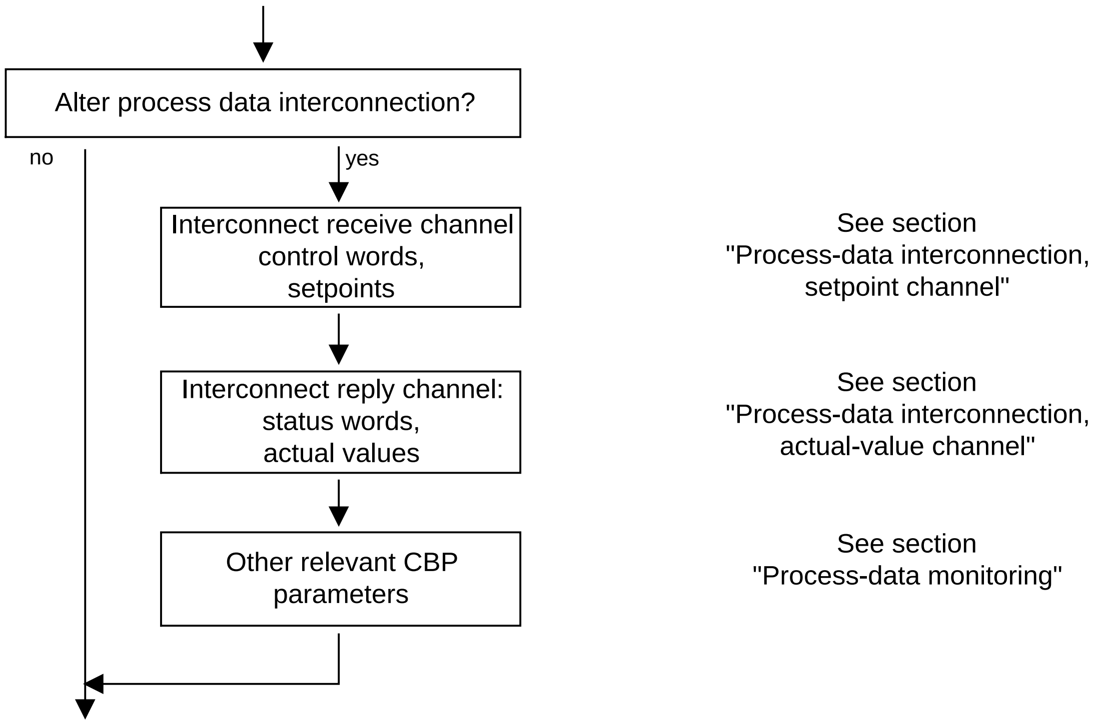


Fig. 8.2-20 Procedure for changing process data

NOTICE

Rewiring from 16 to 32 bit and vice versa should not be done while the equipment is in operation, because the changeover takes several milliseconds, during which time the data on the bus are not consistent (high and low can change places).

Examples

The following pages contain examples of how the transferred data are allocated in the units by means of process data interconnection.

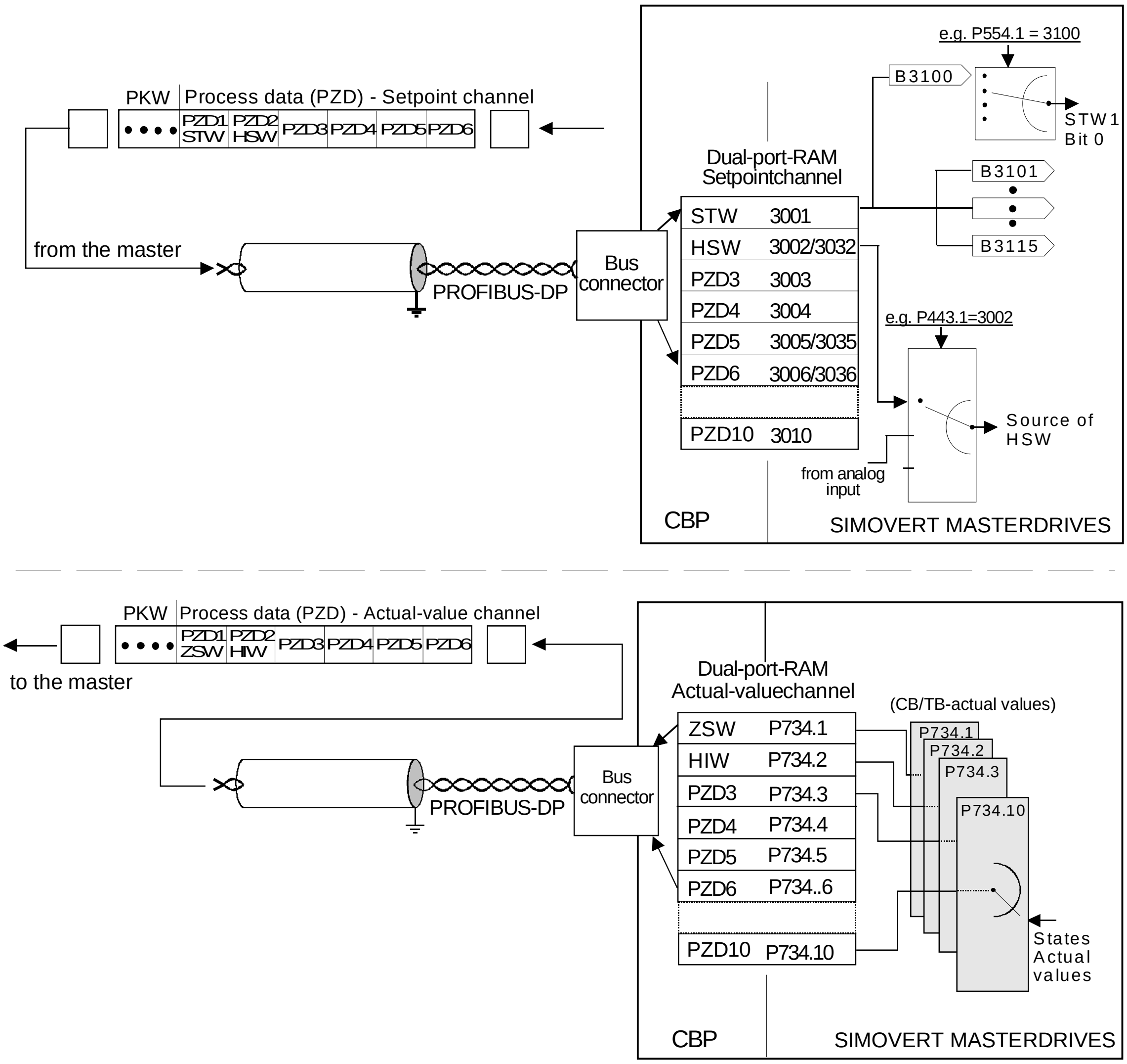
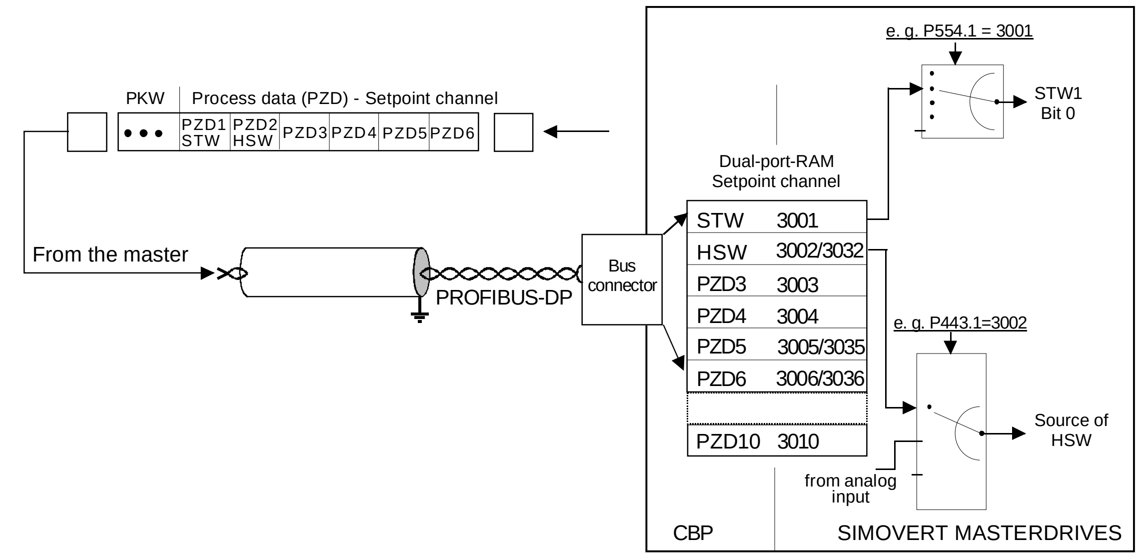


Fig. 8.2-21 Example of process data interconnection of the first CB board in function classes Motion Control Compact PLUS, CUMC and CUVC



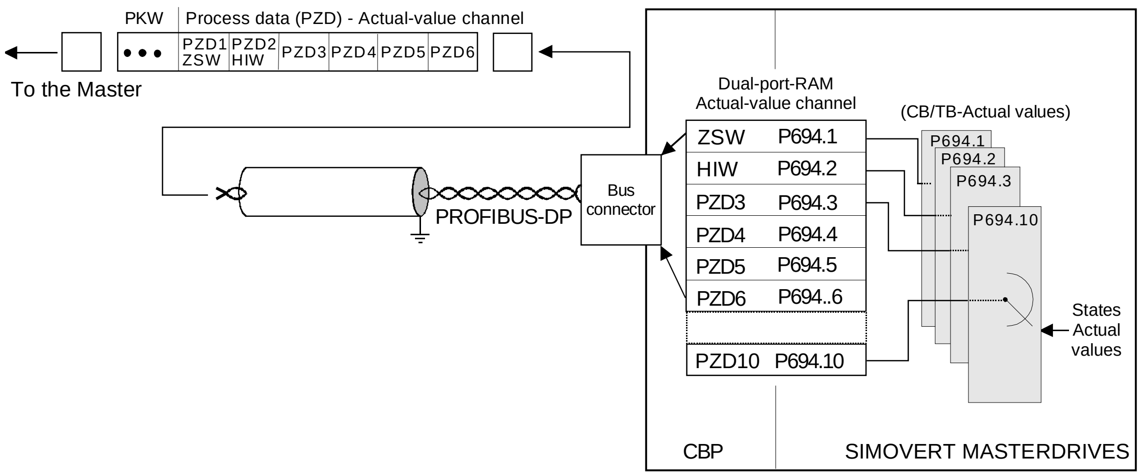


Fig. 8.2-22 *Example of process data interconnection for function classes FC (CU1), VC (CU2) and SC (CU3)*

Process data interconnection, setpoint channel

Master → Converter

- The "tens digit" of the connector is used to distinguish between a 16-bit process data item (e.g. 3002) and a 32-bit process data item (e.g. 3032).
- If a process data item is transferred as a 16-bit quantity, assign the required PZDi-relevant connector for a 16-bit process data item to the selector switch (see "Process data linkage"). (Example: If a 16-bit process data item is assigned to PZD2, the relevant connector is 3002).
- If a process data item is transferred as a 32-bit process data item, assign the required PZDi-relevant connector for a 32-bit process data item to the selector switch (see "Process data interconnection"). For this, use the connector of the least-significant PZDi (Example: If a 32-bit process data item is assigned to PZD2 + PZD3, the relevant connector is 3032)
- The first word (associated connector : 3001 or the binectors 3100 to 3115) of the received process data is always assigned to control word 1 (STW1).
- The second word is always assigned to the main setpoint (HSW).
- If the main setpoint is transferred as a 32-bit process data item, it is also assigned to word 3. In this case, the most-significant part of the main setpoint is transferred in word 2 and the least-significant part is transferred in word 3.
- If a control word 2 (STW2) is transferred, the fourth word (relevant connector = 3004 or binectors 3400 to 3415) is always assigned to STW2.

NOTE

In PPO types 1 and 3, the PZD part only consists of two words. Here, only control word 1 and the main setpoint (as 16-bit value) can be linked up to the dual-port RAM interface.

- The connector for the setpoint channel is always a 4-digit one. The connectors assigned to the process data (PZD1 to PZD10) are shown in the function diagram of the relevant CU board.
  The connectors are entered at the PMU as 4-digits values (e.g. 3001). When parameterization is done via the PROFIBUS-DP, the connector is entered via the bus and also via the PMU (e.g. connector 3001 is transferred as 3001_{hex}).

NOTE

Process data interconnection of the setpoint channel can also be carried out via the PROFIBUS-DP if P053 has previously been set to an uneven value.

Please bear in mind that control word 1 (STW1) has the value 0 during the parameterization phase (process data interconnection)!

Interlocking of connectors and double connectors

MC V1.50 and higher / CUVC V3.23 and higher

DANGER

When interconnecting connectors, binectors, and double word connectors, please note that simultaneous interconnection of a connector, and a double word connector with the same name is not permitted, because when a double word connector (e. g. KK3032) is connected, the meanings of the connectors K3002 and K3003 are swapped round (high-word and low-word exchanged).

On MASTERDRIVES MC and Compact Plus on software version V1.50 and higher and on MASTERDRIVES CUVC on software version V3.23 and higher, simultaneous use of connectors and double word connectors with the same name is mutually interlocked (see also function diagrams [121] and [131]).

Because the binectors are not included in the interlocking (to ensure compatibility for older configurations), their significance changes according to whether the pertinent word or double word is wired.

Example for the setpoint channel

PZD interconnection for the bits of control word 1 (STW1), the main setpoint (HSW) and the bits of control word 2 (STW2).

At the converter via PMU		Meaning
P*554*.1 = 3100	P*554*.1 = 3001	Control word 1 bit 0 (Src ON/OFF1) via DPR interface (word 1)
P*555*.1 = 3101	P*555*.1 = 3001	Control word 1 bit 1 (SrcON/OFF2) via DPR interface (word 1)
P*443*.1 = 3002	P*443*.1 = 3002	16-bit main setpoint (Src Main Setpoint) via DPR interface (word 2)
P*588*.1 = 3411	P*588*.1 = 3004	Control word 2 bit 28 (Src No Ext Warn1) via DPR interface (word 4)

If the factory setting of the converter is used, the above example of parameterization is a functioning way of interconnecting process data (setpoints).

- *Italics:*
  Parameter number (if the PMU is a decimal number, via PROFIBUS-DP as an equivalent HEX number).
- Single underline:
  Index (if the PMU is a decimal number, via PROFIBUS-DP as an equivalent HEX number).
- Double underline:
  Interconnection value: defines whether the parameter selected by the *parameter number* is transferred as a 16-bit value or as a 32-bit value and at which position in the PZD-setpoint telegram (PZDi), the parameter is transferred.
  - White background = MASTERDRIVES Compact PLUS, CUMC or CUVC (first CBP)
  - Grey background = MASTERDRIVES FC (CU1), VC (CU 2) or SC (CU 3)

Process data interconnection, actual-value channel

The actual-value process data (PZDi, i = 1 to 10) are assigned to the appropriate status words and actual values by the indexed parameter P734.i / P694.i (CB/TB actual values). Each index stands for a process data item (e.g. 5 → PZD5 etc.). Please enter the number of the connector or parameter whose value and corresponding process data item you wish to transfer in parameter P734 / P694 under the relevant index.

The status word is always to be transferred in the PZD1 word of the PZD reply (actual-value channel), and the main actual value in PZD2. What additional items are assigned to the PZD (PZD1 up to, if necessary, PZD10) is not specified. If the main actual value is transferred as a 32-bit value, then it is assigned to PZD2 and PZD3.

Example for the actual-value channel

PZD interconnection for status word 1 (ZSW1), the main actual value (HIW) and status word 2 (ZSW2).

At the converter via PMU		Meaning
P*734*.1 = 32	P*694*.1 = 968	Status word 1 (K032 / P968) is transferred in the actual-value channel by means of PZD1.
P*734*.2 = 151	P*694*.2 = 218	The actual speed n/f (KK151 / P218) is transferred in the actual-value channel by means of PZD2 (here, as a 16-bit quantity; PZD3 is empty).
P*734*.4 = 33	P*694*.4 = 553	Status word 2 (K033 / P553) is transferred in the actual-value channel by means of PZD4.

Example: 32-bit main actual value

P*734*.2 = 151	P*694*.2 = 218	The actual speed n/f (KK151 / P218) is transferred in the actual-value channel by means of PZD2 ...
P*734*.3 = 151	P*694*.3 = 218	... **and** as a 32-bit value by means of PZD3.

- *Italics:*
  P734 / P694 (CB/TB actual value), if PMU is shown as a decimal number, transferred via PROFIBUS-DP as an equivalent HEX (2B6 Hex).
- Single underline:
  Index (if PMU is a decimal number, via PROFIBUS-DP as an equivalent HEX number): Specifies at which position in the PZD actual-value telegram the actual value selected by the parameter number is transferred.
- Double underline:
  Parameter number of the required actual value.
  - White background = MASTERDRIVES Compact PLUS, CUMC or CUVC (first CBP)
  - Grey background = MASTERDRIVES FC (CU1), VC (CU 2) or SC (CU 3)

NOTE

If actual values are transferred as a 32-bit data item, you must enter the appropriate connector number at two consecutive words (indices).

8.2.7.3 Process data interconnection via standard telegrams

Definition

PROFIdrive profile version V3 defines standard telegrams for cyclical data exchange.

Telegram selection

Process data can be interconnected for standard telegrams by means of a Script file.

Structure of standard telegrams

See also PROFIdrive version 3 (PNO: Order No. 3172).

Standard telegram 1:

PZD number	1	2
Setpoint	STW1	NSOLL_A

PZD number	1	2
Actual value	ZSW1	NIST_A

Standard telegram 2:

PZD number	1	2	3	4
Setpoint	STW1	NSOLL_B		STW2

PZD number	1	2	3	4
Actual value	ZSW1	NIST_B		ZSW2

Standard telegram 3:

PZD number	1	2	3	4	5
Setpoint	STW1	NSOLL_B		STW2	G1_STW

PZD number	1	2	3	4	5	6	7	8	9
Actual value	ZSW1	NIST_B		ZSW2	G1_ZSW	G1_XIST1		G1_XIST2	

Standard telegram 4:

PZD number	1	2	3	4	5	6
Setpoint	STW1	NSOLL_B		STW2	G1_STW	G2_STW

PZD number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Actual value	ZSW1	NIST_B		ZSW2	G1_ZSW	G1_XIST1		G1_XIST2		G2_ZSW	G2_XIST1		G2_XIST2	

Standard telegrams 5 and 6 are derived from standard telegrams 3 and 4 for the Dynamic Servo Control (DSC) function.

Standard telegram 5:

PZD number	1	2	3	4	5	6	7	8	9
Setpoint	STW1	NSOLL_B		STW2	G1_STW	XERR		KPC	

PZD number	1	2	3	4	5	6	7	8	9
Actual value	ZSW1	NIST_B		ZSW2	G1_ZSW	G1_XIST1		G1_XIST2	

Standard telegram 6:

PZD number	1	2	3	4	5	6	7	8	9	10
Setpoint	STW1	NSOLL_B		STW2	G1_STW	G2_STW	XERR		KPC	

PZD number	1	2	3	4	5	6	7	8	9	...
Actual value	ZSW1	NIST_B		ZSW2	G1_ZSW	G1_XIST1		G1_XIST2		...

...	...	10	11	12	13	14
...	...	G2_ZSW	G2_XIST1		G2_XIST2	

Signals:

Signal No.	Meaning	Abbreviation	Length 16/32-bit	Sign
1	Control word 1	STW1	16	
2	Status word 1	ZSW1	16	
3	Control word 2	STW2	16	
4	Status word 2	ZSW2	16	
5	Speed setpoint A	NSOLL_A	16	with
6	Actual speed A	NIST_A	16	with
7	Speed setpoint B	NSOLL_B	32	with
8	Actual speed B	NIST_B	32	with
9	Encoder 1 control word	G1_STW	16	
10	Encoder 1 status word	G1_ZSW	16	
11	Encoder 1 actual position 1	G1_XIST1	32	
12	Encoder 1 actual position 2	G1_XIST2	32	
13	Encoder 2 control word	G2_STW	16	
14	Encoder 2 status word	G2_ZSW	16	
15	Encoder 2 actual position 1	G2_XIST1	32	
16	Encoder 2 actual position 2	G2_XIST2	32	
25	Control deviation	XERR	32	with
26	Position controller gain factor	KPC	32	with

8.2.7.4 Process data monitoring

NOTE

Please note the different parameter numbers for the types of unit with the older function classes FC (CU1), VC (CU2) and SC (CU3).

In order to make these differences clear, these parameter numbers are either printed in dark gray or have a dark-gray background.

P722.x (CB/TB TlgOFF)	**P695 (CB/TB TlgOFF)**
With parameter P722. / P695, you can determine whether entering of process data into the dual-port RAM by the CBP is to be monitored by the converter. For parameter P722 ♦ Index 1 is applicable for the first CBP and ♦ Index 2 is applicable for the second CBP. To determine which CBP is the first one and which is the second one, see section 8.2.4 "Mounting methods / CBP slots".	

If process data monitoring has been activated, a fault in the DP master is followed by a reaction of the converter, irrespective of the reply-monitoring time in the CBP.

&	P722.x ≠ 0	P722.x = 0	P695 ≠ 0	P695 = 0
Response monitor active	Reaction Yes	Reaction No	Reaction Yes	Reaction No
Response monitor inactive	Reaction No	Reaction No	Reaction No	Reaction No

Table 8.2-10 Process data monitoring depending on P722.1/P695 and the response monitor t_{WD}

When the DP master is being configured, it is specified whether telegram traffic with the master is to be monitored by the slave (CBP). If response-monitoring is active, the PROFIBUS-DP master passes on a time value t_{WD} (watchdog time) to the CBP when a connection is made.

If the response-monitoring time expires, the CBP ceases to write process data into the dual-port RAM. When this is combined with P722.x / P695, it is therefore possible to plan your process data monitoring.

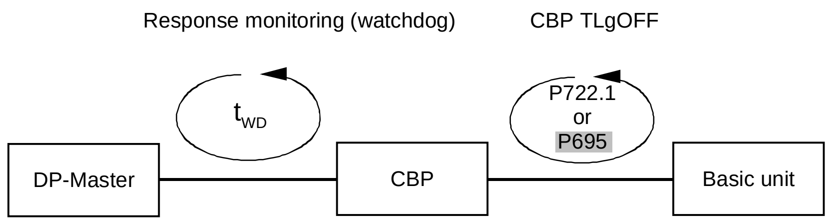


Fig. 8.2-23 Effect of t_{WD} and P722.1 / P695

	Response-monitoring time t_{WD}				
	Yes		No		
P722.x P695	CPU (AG) in STOP	IM308B/C in STOP or Simatic "Supply off	CPU (AG) in STOP	IM 308B/C in STOP	Simatic "Supply off"
0 ms	Converter continues to run with the useful data last received. Alarm A083	Converter continues to run with the useful data last received. Alarm A083/A084	Converter continues to run with the useful data last received.	Converter continues to run with the useful data last received. Alarm A083	Converter continues to run with the useful data last received.
10 ms	Fault trip with F082 after: Watchdog time + 10 ms	Fault trip with F082 after: Watchdog time + 10 ms	Converter continues to run with the useful data last received. Fault trip with F082 after restart of CPU.	Fault trip with F082 after: 10 ms	Converter continues to run with the useful data last received.

Table 8.2-11 Interaction of P722 / P695 and response monitoring (watchdog)

Always set parameter P722.x / P695 to 10 for operation with the CBP. Monitoring of process data is thus activated/deactivated by the value of the response-monitoring (watchdog) time solely via the PROFIBUS-DP! The converter monitors entering of process data into the dual-port RAM from the instant at which the CBP enters process data into the dual-port RAM for the first time. Fault F082 can only be tripped after this instant!

Process data whose complete control word (PZD1) has the value zero is not passed on by the CBP to the dual-port RAM (warning A083)!

A fault is followed by a fault trip after

- ♦ Watchdog time + 10 ms
- ♦ The 10 ms correspond to the value 10 of parameter P722 / P695 and can be neglected with respect to the response-monitoring value.
- ♦ For additional operation with a Class II master, please bear in mind the information in the section "Diagnosis with the Class II master" of Chapter 8.2.8.4.

DANGER

If the "ON" command (bit 0) is interconnected with the dual-port RAM interface, the following must be done for safety reasons:

An "OFF2" or "OFF3" command must be additionally parameterized to the terminal strip/PMU as otherwise the converter cannot be powered down by means of a defined command when there is a communications breakdown!

8.2.8 Settings for the PROFIBUS-DP master (Class 1)

PROFIBUS units have different performance characteristics.
In order to ensure that all master systems can correctly communicate with the CBP in all the ways possible, the characteristic features of the CBP are summarized in the form of an electronic data sheet (data file).

These so-called master files describe the characteristic features of a type of unit clearly and completely in an exactly specified format.

For the different master systems, the characteristics are summarized in a standardized master file (GSD) and, for the SIMATIC, in a type-description file specific to the SIMATIC.

Master file (GSD)

The CBP2 V2.20 supports PROFIdrive version 3. The device master file (GSD) is stored as an ASCII file (SIEc8045.GSD) on the floppy disk supplied with the CBP.

The GSD allows you to configure standard telegrams 1 to 6. It has been generated according to revision 4 for PROFIBUS DP-V2.

To ensure complete compatibility between CBP and CBP2 V2.10, PPO types can still be used for configuring purposes, as described below.

The CBP2 V2.20 can also be operated on the device master file for the CBP and CBP2 V2.1 (SIEM8045.GSD).

Type-description file

The type-description file is also available as an ASCII file (SI8045AX.200 and SI8045TD.200) on the floppy disk which accompanies the CBP.

Selecting the type of PPO

So-called identification bytes are transferred in the configuration telegram of the PROFIBUS-DP master. These bytes determine the type of PPO for the useful-data telegram.

These bytes can be assigned different values for selecting a particular type of PPO (except for PPO type 1). For PPO type 4, for example, either identification byte 0 = 245 and identification byte 1 = 0 can be entered or only identification byte 0 = 245. If an unknown combination of identification bytes is received, the CBP sets the bit "parameterization error" in the diagnostic telegram to the PROFIBUS-DP master.

PPO	Identification byte 0			Identification byte 1			Identification byte 2			Identification byte 3			COMET200
type	Dec	Hex	COM	Dec	Hex	COM	Dec	Hex	COM	Dec	Hex	COM	Version
1	243	F3	4AX	241	F1	2AX							V4.x/V5.x
2	243	F3	4AX	243	F3	4AX	241	F1	2AX	0	0	0	V4.x/V5.x
2	243	F3	4AX	243	F3	4AX	241	F1	2AX				V4.x/V5.x
2	243	F3	4AX	245	F5	6AX							V5.x
3	241	F1	2AX	0	0	0							V4.x/V5.x
3	0	0	0	241	F1	2AX							V4.x/V5.x
3	241	F1	2AX										V4.x/V5.x
4	0	0	0	243	F3	4AX	241	F1	2AX	0	0	0	V4.x/V5.x
4	0	0	0	243	F3	4AX	241	F1	2AX				V4.x/V5.x
4	0	0	0	243	F5	6AX							V5.x
4	245	F5	6AX	0	0	0							V5.x
4	245	F5	6AX										V5.x
5	243	F3	4AX	243	F3	4AX	243	F3	4AX	241	F1	2AX	V4.x/V5.x
5	243	F3	4AX	243	F3	4AX	241	F1	2AX	243	F3	4AX	V4.x/V5.x
5	243	F3	4AX	249	F9	10AX							V5.x

Table 8.2-12 Values for the identification bytes

8.2.8.1 Operating the CBP with a SIMATIC S5

When the CBP is used with a **SIMATIC S5**, it is operated as a **standard DP slave**.
As possible master boards, the IM308 B or the IM308 C can be used, or even the CP5431 in limited form.
The planning tools COM ET200 or COM PROFIBUS are available for configuring the master station.

If older versions of these planning tools are used, you must copy the master file or type-description file from the accompanying floppy disk into the appropriate sub-directory of the planning software.

COM ET200 up to Version V4.x

When configuring the CBP, please use the SI8045TD.200 type-description file on the floppy disk.

Please copy the type-description file into the directory containing the COM ET 200 files in the PG/PC.

Example

CD C:\COMET200
COPY A:\SI8045TD.200 C:

The type of PPO is selected in the configuration mask of COM ET200 up to Version V4.x by entering identification bytes in accordance with the above table of identification bytes.

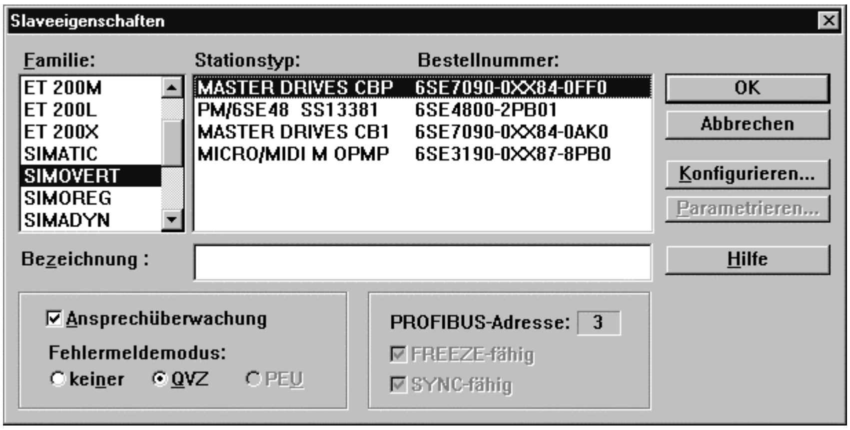
COM ET200 WIN and COM PROFIBUS

When configuring the CBP, please use the SI8045AX.200 type-description file on the floppy disk only if the CBP has not yet been included in the supplied version of the COM package.

Then copy the type-description file into the "TYPDAT5X" directory of the COM installation in the PG/PC.

From COM PROFIBUS V3.2 onwards, the CBP is included as standard and the type-description files on the floppy disk are then of no significance.

When a CBP is being configured (pull out the selector buttons "DRIVES" on the bus cable) and the suggested slave address is confirmed, a selection mask called "Slave characteristics" appears on the screen. It has the following appearance:



The required type of PPO is selected with this planning tool from a selection table called "Required configuration". This table appears automatically when the menu item "Configure" is selected.

More information on how to configure data exchange between a CBP and a SIMATIC S5 can be found in the description accompanying the DVA_S5 module package.

Using the DVA_S5 module package

The DVA_S5 module package (variable-speed drives with the SIMATIC S5) implements data transfer between SIMATIC and SIMOVERT slaves in accordance with the PROFIBUS profile for variable-speed drives and thus facilitates creation of the user program. A data module with the same appearance is always provided as the data interface, irrespective of which S5-CPU the program runs on. The programmer, therefore, does not need any detailed knowledge of the SIMATIC S5 system architecture or of the system functions which may be required.

The DVA_S5 module package can be obtained from A&D WKF Fürth/Germany under MLFB 6DD1800-0SW0.

8.2.8.2 Operating the CBP with a SIMATIC S7

CBP as S7 slave

The CBP can be operated in two ways with a **SIMATIC** S7:

- As a standard DP slave
- As a standard DP slave with extended functionality for SIMATIC S7

Integrated PROFIBUS interfaces

The CPUs with integrated PROFIBUS interface such as CPU315-2DP, CPU413-2DP, CPU414-2DP or CPU416-2DP etc. can be used as the possible S7 master.

The master station as well as the whole PROFIBUS network is configured in the STEP 7 hardware manager.

CBP as a standard DP slave

Requirement: STEP 7 from V3.0 upwards

If your STEP 7 hardware catalog does not yet contain the entry "MASTERDRIVES CBP", proceed as follows:

Copy the type-description file S18045AX.200 from the supplied floppy disk into the STEP 7 index STEP7 à S7DATA à GSD.

From STEP 7 version V4.01, the CBP is contained as standard in the hardware catalog, i.e. from version V4.01 onwards, the floppy disks are of no significance.

In the "Extras" menu of the SIMATIC hardware configuration, then select the menu item "Update GSD files" and carry out this command.

You will find the CBP in the "Hardware catalog" menu under "PROFIBUS-DP à Further field devices à Simovert". It appears there under the name "MASTERDRIVES CBP".

CBP as a standard DP slave with extended functionality

To enable the CBP to be connected as a standard DP slave with extended functionality for SIMATIC S7 (e. g. acyclical communication with SIMOVIS/DriveMonitor) to the PROFIBUS-DP, a so-called DVA_S7 object manager has to be installed as an add-on to STEP 7. The DVA_S7 object manager is part of the DVA_S7 module package.

STEP7 basis software, Version V3.1 and upwards, is a requirement for installation of the DVA_S7-OM.

The DVA_S7-OM takes on the function of a master file or type-description file and supplements the unit characteristics stored there with all the necessary S7 characteristics.

S7 diagnosis

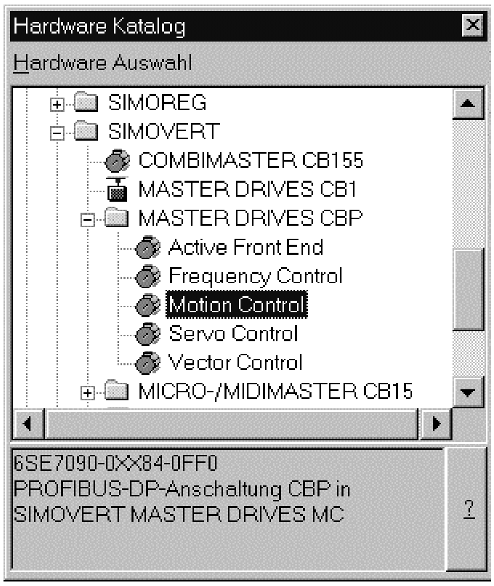
If the CBP is configured in SIMATIC S7 using the DVA_S7 object manager, a diagnosis alarm is automatically generated for the converter fault in the S7-CPU. This diagnosis alarm is derived from bit 3 of the status word (collective fault) and results in a **STOP of the S7-CPU if the OB82 (diagnostics organization block) is not programmed.**
For the correct processing of the diagnosis alarm, the status word of the converter always has to be transferred unchanged as the first word from the converter to the CBP (see section "Process data interconnection").

NOTE

When a converter fault occurs, the CBP2 does not generally trigger a diagnosis alarm.

The behavior of the S7-CPU during complete failure of a configured drive or during an interruption in the bus cable can be controlled by programming the relevant system organization modules OB86 and OB122. If these system modules are not programmed, the S7-CPU also goes into the STOP state if a configured drive fails or if a bus is interrupted. Refer to Chapter 3 of the programming manual for the S7-300/400 for detailed descriptions on the indicated system organization modules.

After installation of the DVA_S7-OM , the CBP is shown as follows in the hardware catalog:



The type of PPO is selected in the hardware manager from the register "Configuration" of the "Characteristics – DP slave" mask which is automatically shown on the screen when the selection (e.g. Motion Control) is confirmed.

More information on planning data exchange between a CBP and a SIMATIC S7 can be found in the description accompanying the DVA_S7 module package.

If the DVA_S7 module package is not used, the system features regarding data consistency have to be observed by the user program. In particular, this means that access can only be made via the system functions SFC14 and SFC15 to all consistent data areas > 4 bytes.

The PKW and the PZD parts are regarded as two independent consistent data areas.

	PKW	PZD (4, 12 or 20 bytes)
PPO1	(8 bytes)	(4 bytes)
PPO2	(8 bytes)	(12 bytes)
PPO3	–	(4 bytes)
PPO4	–	(12 bytes)
PPO5	(8 bytes)	(20 bytes)

CP342-5DP

At the present time, the CBP can be operated with a CP342-5DP only as a standard DP slave because S7 functions are not yet supported by the CP342-5DP. In order to operate the CBP as a standard slave, the equipment master file or the type-description file must be incorporated into the STEP7 basic software (see integrated DP interfaces).

The DVA_S7 module package

The SIMATIC DVA_S7 module package (variable-speed drives on SIMATIC S7) implements data transfer between the drive and SIMATIC S7 in accordance with the PROFIBUS profile for variable-speed drives and thus facilitates creation of the user program. A data module with the same appearance is always provided as the data interface, irrespective of which S7 CPU the program runs on. The programmer does not therefore need any detailed knowledge of the SIMATIC S7 system architecture or of the necessary system functions.

As already mentioned, the DVA_S7 object manager is part of the scope of supply of the DVA_S7 module package.

The DVA_S7 module package can be obtained from A&D WKF Fürth/Germany under MLFB 6SX 7005-0CB00.

8.2.8.3 Operating the CBP with a non-Siemens system

When used with a non-Siemens master system, the CBP can be operated only as a standard DP slave.

Required master file

The equipment master file (GSD file) on the floppy disk contains all the information which a DP master system needs for integrating the CBP as a standard DP slave in its PROFIBUS configuration.

If the non-Siemens master system allows direct integration of a master file, the SIEM8045.GSD file can be copied into the relevant sub-directory.

If this is not possible, the required information will have to be taken from the SIEM8045.GSD file.

8.2.8.4 Operating the CBP2 with extended functions with a SIMATIC S7

The extended functions "Cross traffic" and "Clock synchronization" are described in detail in PROFIBUS Profile Drive Technology, Version 3.

DriveES SlaveOM

The functions described here presuppose the planning tool, STEP7, and driveES with the slave OM for the CBP2.

- Free configuration: Up to 16 process data can be configured in each case, separated into setpoints and actual values.
- Cross traffic: Direct slave-to-slave communication without going the long way round via the DP master.
- Clock synchronization: Synchronization of master and slave applications at the isochronous PROFIBUS.

Free configuration is possible with all DP masters which are configured with STEP7.

Cross traffic and clock synchronization presuppose DP masters which support this functionality, i.e. all S7-CPUs, for example, with the characteristic "equidistance".

Configuration

For free configuration and cross traffic, carry out configuration completely with the slave OM in the "Configuration" register. In the drive, only correct interconnection of the setpoints and actual values has to be carried out.

Clock synchronization

Configure Clock synchronization with the slave OM in the "Clock synchronization" register. In addition, some parameters in the drive have to be set (MASTERDRIVES MC only).

Detailed help can be obtained in the on-line help for the slave OM.

8.2.8.5 CBP2 with cross traffic operated with a SIMATIC S7

The cross traffic function enables direct slave-to-slave communication on the PROFIBUS without having to go the long way round via the DP master. A DP master, however, is needed "to keep time".

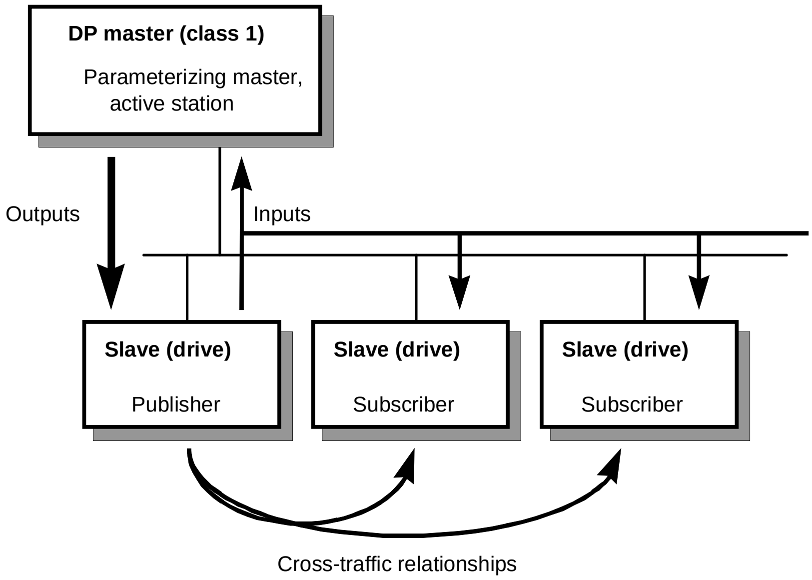


Fig. 8.2-24 Cross traffic

Configurations

With cross traffic, you can configure communication between DP slaves in various ways, e.g.

- "Broadcast": Stipulation of a master setpoint from a master drive to all drives.
- "Peer-to-peer": Passing on a setpoint from one drive to the next.

Definitions:

Encoder

- Cross-traffic encoder (publisher): All inputs of a DP slave capable of cross traffic are transmit data in relation to cross traffic. They can be received by the DP master or by DP slaves capable of cross traffic. Transmitting takes place automatically by means of a broadcast. Explicit configuration of the cross-traffic encoder is not necessary.

Receiver

- Cross-traffic receiver (subscriber): The sources for the setpoints are specified by means of configuration. The outputs of the DP master or the inputs of a DP slave as the cross-traffic encoder are possible sources (in the case of drives, their actual values). There are no restrictions on the way in which master outputs and slave inputs are mixed (with word granularity).

Drives capable of cross traffic can also receive data from themselves (feedback loop).

You need:

- ♦ STEP7 from Version 5.0 with Servicepack 2 or Servicepack 4 (Servicepack 3 is not suitable) or Version 5.1
- ♦ DriveES with slaveOM for CBP2
- ♦ S7-Profibus-Master with the "equidistance" property
- ♦ DP slaves which are capable of cross traffic as communication partners (e.g. drives or ET200)
- ♦ CBP2

Cross traffic is independent of the basic unit used. The functionality is completely provided in the CBP2.

You can configure cross traffic with the slave OM in the mask, "Configuration".

Quantities

Receive/transmit data: maximum of 16 words of setpoints/actual values per drive, can be divided up in any way on DP master and DP slaves capable of cross traffic.

Number of transmission channels: a broadcast channel which the DP master and any number of DP slaves can receive.

Number of receive channels: max. eight.

Example

The following illustration contains a cross-traffic configuration with two cross-traffic encoders (publishers) and a drive with CBP2 as the cross-traffic receiver (subscriber).

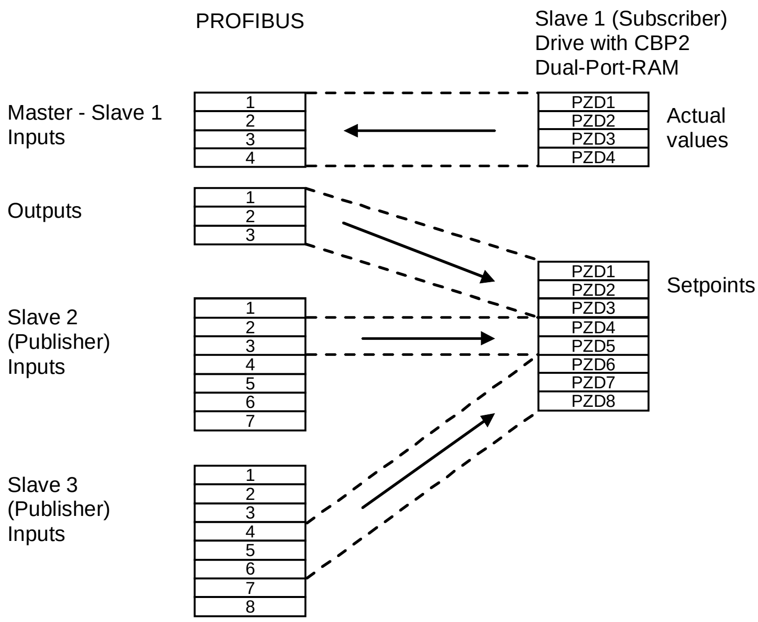


Fig. 8.2-25 Example of a cross-traffic configuration

8.2.8.6 CBP2 with clock synchronization operated with a SIMATIC S7

Only applies to MASTERDRIVES MC, not VC.

8.2.8.7 CBP2 with clock synchronization on a PROFIBUS master in accordance with PROFIdrive V3

Only applies to MASTERDRIVES MC, not VC.

8.2.9 MASTERDRIVES as PROFIdrive V3-Slave

MASTERDRIVES VC from V3.3, with CBP2 from V2.2, can be parameterized as a PROFIdrive V3 slave. Applications with isochronous Profibus, in particular DSC, apply to MASTERDRIVES MC only, not MASTERDRIVES VC.

8.2.10 Diagnosis and troubleshooting

NOTE

With regard to basic parameterization, please note the differences to the types of unit with the older function classes FC (CU1), VC (CU2) and SC (CU3). These differences are described below.

In order to make these differences clear, the parameter numbers and other deviations are either printed in dark gray or have a dark-gray background.

8.2.10.1 Evaluating the possibilities of hardware diagnosis

LED displays

The three LED displays are located on the front of the CBP. These are as follows:

- CBP operating (red)
- Data exchange with the basic unit (yellow)
- Transfer of useful data via the PROFIBUS (green)

Diagnostic LEDs give the user rapid information on the status of the CBP at any particular instant.
More detailed diagnostic information can be read out directly from the diagnostics memory of the CBP by means of a diagnostic parameter.

NOTE

During normal operation, all three LEDs light up synchronously and for the same length of time (flashing)!

The stationary status of an LED (on or off) indicates an unusual operating status (parameterization phase or fault)!

LED	Status	Diagnostic information
Red	Flashing	CBP operating; voltage supply on
Yellow	Flashing	Fault-free data exchange with the basic unit
Green	Flashing	Fault-free cyclical useful data traffic with a master, class 1, via PROFIBUS

Table 8.2-13 LED display of the CBP

LED	Status	Diagnostic information
Red Yellow Green	Flashing Flashing Off	No cyclical useful data traffic with a master, class 1, via PROFIBUS –DP due to e.g. EMC interference, bus connector pulled out, polarity reversal of connections, node number not supplied with useful data by the master. Acyclical useful data traffic with a master, class 2 (DriveES, SIMOVIS/DriveMonitor, SIMATIC OP) does not affect the green LED.

Table 8.2-14 Online operation without useful data

LED	Status	Diagnostic information
Red	Off/On	Voltage supply for CBP cut off; replace CBP or basic unit
Yellow	Off/On	Data exchange with the basic unit not possible; replace CBP or basic unit
Green	Off/On	No cyclical useful data traffic with a master, class 1, via PROFIBUS is possible; PROFIBUS cable not connected or defective

Table 8.2-15 Fault display CBP

In the following, all exceptional operating conditions are listed which are displayed as such by the CBP.

LED	Status	Diagnostic information
Red Yellow Green	Flashing Off On	CBP is waiting for the basic unit to begin initialization
Red Yellow Green	On Off Flashing	CBP is waiting for the basic unit to complete initialization
Red Yellow Green	Flashing On Off	Checksum error in flash EPROM of the CBP (Download firmware again or replace CBP)
Red Yellow Green	Flashing On On	Error in RAM test of the CBP Replace CBP (external RAM, DPRAM or SPC3-RAM defective)
Red Yellow Green	Flashing Off Off	Only CBP2 DP slave software detects serious fault Note fault number in r732.8 and inform Customer Service

Table 8.2-16 Exceptional operating conditions

LED	Status	Diagnostic information
Red Yellow Green	Off Off Flashing	Only CBP2 USS protocol has been set

Table 8.2-17 USS

8.2.10.2 Fault and alarm display on the basic unit

If faults occur during communication between the PROFIBUS and the CBP, corresponding fault or alarm messages are displayed on the PMU or on the OP of the basic unit.

Alarms

Alarm number		**Meaning**
First CB/TB	**Second CB**	
A 081	A 089	The ID byte combinations sent by the DP master in the configuration telegram do not correspond with the permitted ID byte combinations (see table 8.2-12) Consequence: No connection established with the PROFIBUS-DP master; new configuration is necessary.
A 082	A 090	No valid PPO type can be established from the configuration telegram from the DP master. Consequence: No connection established with the PROFIBUS-DP master, new configuration is necessary.
A 083	A 091	No net data or invalid net data (e.g. complete control word STW1=0) are being received by the DP master. Consequence: The process data are not being transferred to the DPR. If parameter P722 (P695) is not equal to zero, this will result in fault message F 082 being tripped (see chapter "Process data monitoring".
A 084	A 092	Telegram traffic between DP master and CBP has been interrupted (e.g. cable break, bus connector disconnected or DP master switched off). Consequence: If parameter P722 (P695) is not equal to zero, this will result in fault message F 082 being tripped (see chapter "Process data monitoring").
A 086	A 094	Failure of heartbeat counter recognized by basic unit. Consequence: Interruption of communication to the automation system
A 087	A 095	DP slave software detects serious fault. Fault number in diagnostic parameter r732.8 Consequence: Communication no longer possible. Secondary fault F082

Alarm number		Meaning
First CB/TB	**Second CB**	
A 088	A 096	Only CBP2 At least one configured cross-traffic encoder is not yet active or has failed. For details, see CBP2 diagnostic parameters. Consequence: If a encoder is still not active, the relevant setpoints are set to null as a substitute. If a cross-traffic encoder fails, transmission of the setpoints to the basic unit may be interrupted, depending on the setting in P715. Secondary fault F082.

Table 8.2-18 Alarm display on the basic unit

Assignment

The alarm number for the first CB/TB applies to the following configurations:

- ♦ Exactly one CBP has been plugged into slots A to G in the electronics box and no T100/T400 technology board has been plugged in
- ♦ If two CBPs have been plugged in, the alarm number applies to the one which has been plugged into the slot with the lower slot letter.

The alarm number for the second CB applies to the following configurations:

- ♦ One T100/400 technology board has been plugged in and the CBP in the electronics box has been plugged into slots A to C.
- ♦ If two CBPs have been plugged in, the alarm number applies to the one which has been plugged into the slot with the higher letter.

NOTE

The alarm A 082 / A 090 can also be displayed on the basic unit the first time the CBP is started as long as telegrams are not being exchanged with a DP master, e.g. because the bus cable has not yet been connected.

Fault displays

Fault number		Meaning
First CB/TB	**Second CB**	
F080	F085	Fault in the dual-port RAM Remedy: CBP probably defective, i.e. replace CBP
F081 Fault value (r949) = 0	F081 Fault value (r949) = 2	Fault in the heartbeat counter. The heartbeat counter is no longer being incremented by the CBP due to an internal fault. The CBP is not plugged in correctly or is defective Remedy: Check the connection. If necessary, replace CBP
F082 Fault value (r949) = 1	F082 Fault value (r949) = 2	Telegram failure in the dual-port-RAM (DPR). The telegram failure monitoring time set by means of parameter P722 (P695) has expired (see chapter "Process data monitoring"). The bus has been interrupted or all net data are transferred with 0 (see also A083) Remedy: Check bus cable incl. connecting plug. In the DP-master, assign values not equal to zero to control word STW1.

Table 8.2-19 Fault display on the basic unit

Assignment

The fault number for the first CB/TB applies to the following configurations:

- ♦ Exactly one CBP has been plugged into slots A to G in the electronics box and no T100/T300/T400 technology board has been plugged in.
- ♦ If two CBPs have been plugged in, the fault number applies to the one which has been plugged into the slot with the lower slot letter.

The fault number for the second CB applies to the following configurations:

- ♦ One T100/T300/T400 technology board has been plugged in and the CBP in the electronics box has been plugged into slots A to C
- ♦ If two CBPs have been plugged in, the fault number applies to the one which has been plugged into the slot with the higher letter.

8.2.10.3 Evaluating CBP diagnostic parameters

(For CBP2 diagnosis, see section 8.2.8.6)

NOTE

Please note that, for types of unit with the older function classes FC (CU1), VC (CU2) and SC (CU3), indexed parameter r731.i is to be used appropriately instead of r732.i

In order to support start-up and for service purposes, the CBP stores diagnostic information in a diagnostics buffer. The diagnostic information can be read out with the indexed parameter r732.i (CB/TB diagnosis).

If two CBPs are plugged-in in the electronics box, the diagnostic area for the second CBP begins in parameter r732 from index 33 onwards, i.e. in order to read out the diagnostic information of the second CBP, an offset of 32 must be added to the index of the first CBP as well (see table 8.2-19).

CBP diagnostic parameters

Area of the first CBP	
Meaning	**Parameter No.**
CBP_Status	P732.1
SPC3_Status	P732.2
SPC3_Global_Controls	P732.3
Counter: telegrams received without faults (only DP standard)	P732.4 (Low)
Reserved	P732.4 (High)
Counter "TIMEOUT"	P732.5 (Low)
Reserved	P732.5 (High)
Counter "CLEAR DATA"	P732.6 (Low)
Reserved	P732.6 (High)
The following diagnostic entries are overwritten if PROFIBUS-DP telegram diagnosis is selected by means of P711 / P696 (CB parameter 1)	
Counter: Heartbeat-counter fault	P732.7 (Low)
Reserved	P732.7 (High)
Number of bytes for special diagnosis	P732.8 (Low)
Reserved	P732.8 (High)
Mirroring slot Identifier 2	P732.9 (Low)
Mirroring slot Identifier 3	P732.9 (High)
Mirroring P918 (CB bus address), only low part	P732.10 (Low)
Reserved	P732.10 (High)
Counter re-configuration by CU	P732.11 (Low)
Counter initializations	P732.11 (High)
Fault detection DPS manager fault (8 bits)	P732.12 (Low)
Reserved	P732.12 (High)

Area of the first CBP	
Meaning	**Parameter No.**
Determined PPO type (8 bits)	P732.13 (Low)
Reserved	P732.13 (High)
Mirroring "DWORD-Specifier-ref"	P732.14
Mirroring "DWORD-Specifier-act"	P732.15
Counter DPV1:DS_WRITE, positive acknowledgement	P732.16 (Low)
Reserved	P732.16 (High)
Counter DPV1: DS_WRITE, negative acknowledgement	P732.17 (Low)
Reserved	P732.17 (High)
Counter DPV1:DS_READ, positive acknowledgement	P732.18 (Low)
Reserved	P732.18 (High)
Counter DPV1:DS_READ, negative acknowledgement	P732.19 (Low)
Reserved	P732.19 (High)
Counter DP/T: GET DB99, positive acknowledgement	P732.20 (Low)
Counter DP/T: PUT DB99, positive acknowledgement	P732.20 (High)
Counter DP/T: GET DB100, positive acknowledgement	P732.21 (Low)
Counter DP/T: PUT DB100, positive acknowledgement	P732.21 (High)
Counter DP/T: GET DB101, positive acknowledgement	P732.22 (Low)
Counter DP/T: PUT DB101, positive acknowledgement	P732.22 (High)
Counter DP/T-service negative acknowledgement	P732.23 (Low)
Counter DP/T: application relation, positive acknowledgement	P732.23 (High)
Reserved	P732.24
Gen-Date: day, month	P732.25
Gen-Date: year	P732.26
Software version	P732.27
Software version	P732.28
Software version: flash EPROM checksum	P732.29
Reserved	:
Reserved	P732.31

Area of the second CBP	
Meaning	**Parameter No.**
CBP_Status	P732.33
SPC3_Status	P732.34
SPC3_Global_Controls	P732.35
	:
Software-Version: Flash-EPROM-Checksum	P732.61
Reserved	:
Reserved	P732.64

Table 8.2-20 CBP diagnostics buffer

8.2.10.4 Meaning of information in the CBP diagnostic channel

(For CBP2 diagnosis, see section 8.2.8.6)

P732.1
(090H, CBP_Status)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Bit

- Bit 0
  "CBP Init": CBP is presently being initialized or is waiting for initialization from the BASE BOARD
  (normal operation: not set)
- Bit 1
  "CBP Online": CBP selected via board mounting position 2" (DPRAM Offset Address 0x54) or via board mounting position 3" (DPRAM Offset Address 0x55) by the BASE BOARD
  (normal operation: set)
- Bit 2
  "CBP Offline": CBP selected neither via board mounting position 2" (DPRAM Offset Address 0x54) nor via board mounting position 3" (DPRAM Offset Address 0x55) by the BASE BOARD
  (normal operation: not set)
- Bit 3
  Value range exceeded "CB bus address" (P918) (BASE BOARD).
  (normal operation: not set)
- Bit 4
  Diagnostic mode activated [CB parameter 1 (P711 / P696) <> 0].
  (normal operation: not set)
- Bit 8
  Incorrect identification byte transferred (incorrect configuration telegram from the PROFIBUS DP master).
  (normal operation: not set)
- Bit 9
  Incorrect PPO type (incorrect configuration telegram from the PROFIBUS DP master).
  (normal operation: not set).
- Bit 10
  Correct configuration received from the PROFIBUS DP master
  (normal operation: set).
- Bit 12
  Fatal error detected by the DPS manager SW
  (normal operation: not set)
- Bit 13
  Program in endless loop in main c (is only escaped from if a reset is made)
- Bit 15
  Program in communications online loop (is only escaped from if re-initialization is carried out by the BASE BOARD)

P732.2 (092H, SPC3_Status)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Bit

- Bit 0 — Offline/Passive Idle
  0 = SPC3 is offline (normal operation)
  1 = SPC3 is in passive-idle
- Bit 1 — Reserved
- Bit 2 — Diag-Flag
  0 = Diagnostics buffer collected by the master
  1 = Diagnostics buffer not collected by master
- Bit 3 — RAM Access Violation, memory accessed > 1.5kByte
  0 = No address violation (normal operation)
  1 = With addresses >1536 bytes, retreat made from respective address 1024 and access is made under this new address
- Bits 4,5 — DP-State 1..0
  00 = Status "Wait_Prm"
  01 = Status"Wait_Cfg"
  10 = Status"DATA_EX"
  11 = Not possible
- Bits 6,7 — WD-State 1..0
  00 = Status"Baud_Search"
  01 = Status"Baud_Control"
  10 = Status"DP_Control"
  11 = Not possible from PROFIBUS DP master
- Bits 8,9,10,11 — Baud rate 3..0
  0000 = 12 mbaud
  0001 = 6 mbaud
  0010 = 3 mbaud
  0011 = 1.5 mbaud
  0100 = 500 kbaud
  0101 = 187.5 kbaud
  0110 = 93.75 kbaud
  0111 = 45.45 kbaud
  1000 = 19.2 kbaud
  1001 = 9.6 kbaud
  Rest = Not possible
- Bits 12,13, 14,15 — SPC3-Release 3..0:
  0000= Release 0
  Rest = Not possible

P732.3 (094H, SPC3_Global_Controls)

Bits remain set until the next DP global command.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Bit

- Bit 0 Reserved
- Bit 1 1 = Clear_Data telegram received
- Bit 2 1 = Unfreeze telegram received
- Bit 3 1 = Freeze telegram received
- Bit 4 1 = Unsync telegram received
- Bit 5 1 = Sync telegram received
- Bits 6,7 Reserved

P732.4 (Low-Byte), 096H	Counter for telegrams received error-free (only DP standard) Counter for received DP net telegrams
P732.5 (Low-Byte), 098H	Counter TIMEOUT Counter is incremented if the "TIMEOUT" signal is identified. This occurs if, for example, the bus connector is pulled out when response-monitoring has been activated (at the DP master).
P732.6 (Low-Byte), 09AH	Counter CLEAR DATA Is incremented if the "CLEAR DATA" is identified (see also P732.3). Occurs, for example, if the IM308B is set in "STOP".
P732.7 (Low-Byte), 09CH	Counter Heartbeat-Counter Error Is incremented if the heartbeat-counter is not changed by the BASE-/TECH-BOARD within approx. 800 ms.
P732.8 (Low-Byte), 09EH	Number of bytes during special diagnosis Number of bytes entered after P732.9 during special diagnosis selected by means of CB parameter 1.
732.9 (Low-Byte), 0A0H	Mirroring slot Identifier 2 Read out of the DPRAM during run up: Offset Address 054H, with VC,FC and SC, corresponds to parameter P090.
732.9 (High-Byte), 0A1H	Mirroring slot Identifier 3 Read out of the DPRAM during run up: Offset Address 055H, with VC,FC and SC, corresponds to parameter P091.
P732.10 (Low-Byte), 0A2H	Mirroring P918 Read out of the DPRAM during run up: "CB Bus address" (only Low-byte)
P732.11 (Low-Byte), 0A4H	Counter Re-configuration by CU Re-configuration requested by BASE BOARD in online mode
732.11 (High-Byte), 0A5H	Counter Initialization Is incremented during run through of the initialization routine
P732.12 (Low Byte), 0A6H	DPS Manager Error Error detection in the event of a fatal DPS manager error
P732.13 (Low-Byte), 0A8H	PPO type PPO type detected from configuration telegram
P732.13 (High-Byte), 0A9H	Reserved
P732.14, 0AAH u. 0ABH	Mirroring "DWORD-Specifier-ref" Read out of the DPRAM during run up: updated cyclically
P732.15, 0ACH u. 0ADH	Mirroring "DWORD-Specifier-act Read out of the DPRAM during run up: updated cyclically

732.16 (Low-Byte), 0AEH	Counter DS_WRITE acknowledgement negatively
P732.16 (High-Byte), 0AFH	Reserved
732.17 (Low-Byte), 0B0H	Counter DS_WRITE acknowledged positively
P732.17 (High-Byte), 0B1H	Reserved
732.18 (Low-Byte), 0B2H	Counter DS_READ acknowledged negatively
P732.18 (High-Byte), 0B3H	Reserved
P732.18 (High-Byte), 0B3H	reserved
P732.19 (Low-Byte), 0B4H	Counter DS_READ acknowledged positively
P732.19 (High-Byte), 0B5H	reserved
P732.20 (Low-Byte), 0B6H	Counter GET DB99 acknowledged positively
P732.20 (High-Byte), 0B7H	Counter PUT DB99 acknowledged positively
732.21 (Low-Byte), 0B8H	Counter GET DB100 acknowledged positively
P732.21 (High-Byte), 0B9H	Counter PUT DB100 acknowledged positively
732.22 (Low-Byte), 0BAH	Counter GET DB101 acknowledged positively
P732.22 (High-Byte), 0BBH	Counter PUT DB101 acknowledged positively
732.23 (Low-Byte), 0BCH	Counter DPT-Service acknowledged negatively
P732.23 (High-Byte), 0BDH	Counter Applic positively acknowledged Increment during set-up DPT service application relation
P732.24 (Low-Byte), 0BEH	reserved
P732.24 (High-Byte), 0BFH	reserved
P732.25 0C0H and 0C1H	Creation date Day and month when CBP firmware created (Display: 0304 = 03.04.)
P732.26 0C2H and 0C3H	Creation data Year when CBP firmware created (Display = Year)
P732.27 0C4H and 0C5H	Software-Version Software version V X.YZ (Display X)
P732.28 0C6H and 0C7H	Software-Version Software version V X.YZ (Display YZ)
P732.29 0C8H and 0C9H	Flash-EPROM Checksum Is read out of the flash EPROM during run-up

8.2.10.5 Additional methods of diagnosis for start-up personnel

(See section 8.2.8.7 for extended CBP2 diagnosis)

NOTE

The CB parameters, P711 to P721, have two indices. The following convention applies to this:

Index 1 is valid for the first CBP

Index 2 is valid for the second CBP

In order to determine which CBP is the first and which the second, see Section 8.2.4 "Mounting methods / CBP slots".

CB parameter 1
Telegram diagnosis

With P711 / P696 (CB parameter 1), special diagnostic entries for the CBP diagnostics buffer can be selected. If P711 / P696 is set to a value not equal to zero during parameterization of the CBP by the converter, telegram contents of the PROFIBUS-DP telegram are cyclically entered into the CBP diagnostics buffer, depending on the set value.

The entries are made in rising sequence beginning with r732.9 (r732.10, r732.11 etc.) in the same way as the corresponding useful data are transferred via the PROFIBUS-DP, namely high-byte before low-byte, high-word before low-word. The original entries (i.e. when P711 / P696 = "0") are overwritten, beginning with r732.9.

Entries r732.1 to 732.8 retain their meaning.

Detailed knowledge of PROFIBUS-DP telegrams is needed in order to evaluate these diagnostic entries.

It is only possible to set parameter P711 / P696 when the "Hardware Configuration" function is being selected (P060 or. P052).

NOTE

Parameter P711 / P696 is only to be set to a value other than zero for diagnostic purposes because continuous transfer of diagnostic information to the DPRAM reduces the data throughput rate of the CBP!

The original entries in parameter r732 / r731 are overwritten, beginning with r732.9 / r731.9.

PMU:

P711 / P696 = 0	Telegram diagnosis = Off
P711 / P696 = 1 to 26	Telegram diagnosis = ON

Telegram entries

P711 P696	= 0	No supplementary diagnosis (default setting)		
The following entries apply to cyclical data transfer via MSZY-C1				
P711 P696	= 1	PPO useful data in the CBP receive buffer	Useful-data telegram (master → converter)	Length depends on PPO type
P711 P696	= 2	PPO useful data in the CBP transmit buffer	Useful-data telegram (converter → master)	Length depends on PPO type
P711 P696	= 3	Configuration buffer	Useful-data telegram (master → converter)	Length = 25 bytes
P711 P696	= 4	Parameterization buffer	Parameterization telegram (master → converter)	Length = 10 bytes
The following entries apply to cyclical data transfer via MSAC-C1				
P711 P696	= 10	Useful data of the DS100	Data unit in DS_WRITE to DS100	Max. 32 bytes
P711 P696	= 11	Useful data of the DS100	Data unit in DS_READ to DS100	Max. 32 bytes
The following entries apply to acyclical data transfer via MSAC-C2				
P711 P696	= 21	Useful data in the DB99	Data unit in PUT to the DB99	Max. 32 bytes
P711 P696	= 22	Useful data in the DB99	Data unit in GET to DB99	Max. 32 bytes
P711 P696	= 23	Useful data in the DB100	Data unit in PUT to DB100	Max. 32 bytes
P711 P696	= 24	Useful data in the DB100	Data unit in GET to DB100	Max. 32 bytes
P711 P696	= 25	Useful data in the DB101	Data unit in PUT to DB101	Max. 32 bytes
P711 P696	= 26	Useful data in the DB101	Data unit in GET to DB101	Max. 32 bytes

Table 8.2-21 Selection of PROFIBUS-DP telegram entries

Example 1

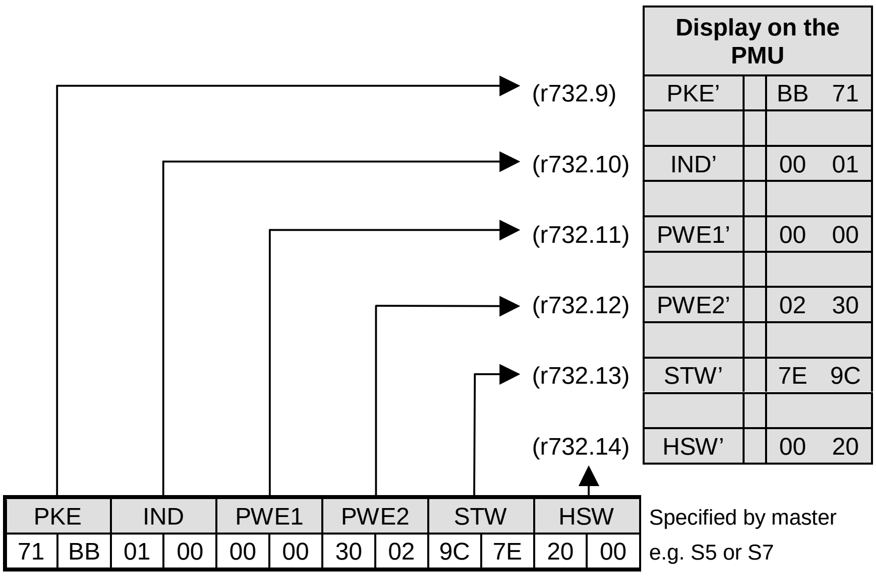
Parameter P711 / P696 = 1
The useful data (PPO) received from the DP master via the cyclical standard channel MSCY_C1 are entered in the diagnostics buffer.

PPO type = 1
Four words, PKW part plus control word 1 (STW1) and the main setpoint (HSW), are received. The PKW part is placed, beginning with the PKE, in parameter r732.9; STW1 and also the HSW are placed from parameter r732.13 onwards (high part at the least significant address).

In the following example, a WRITE request from the DP master is shown with the value "3002" in parameter P443.

The control word is specified with $9C7E_{Hex}$ in the DP master and 2000_{Hex} is specified as the setpoint.

The values in r732 are displayed in Motorola format, i.e. high-byte and low-byte are shown inverted in relation to what is displayed in the other parameters.



Visualization parameter r733

In order to visualize the received **process data** (PZD), parameter r733 can also be used. In parameter r733, all process data are displayed normally, i.e. in Intel format, in the same way as they are used in the MASTERDRIVES.

The PKW interface cannot be visualized by means of parameter r738 and r739.

The index ranges used in parameters r733, r738 and r739 are shown in the function diagrams in the appendix.

NOTE

In the examples and in the following tables, information with an apostrophe (e.g. PKE') means that, with these values, the high-byte and the low-byte are swapped round in relation to the original value, as for example in the programmable controller.

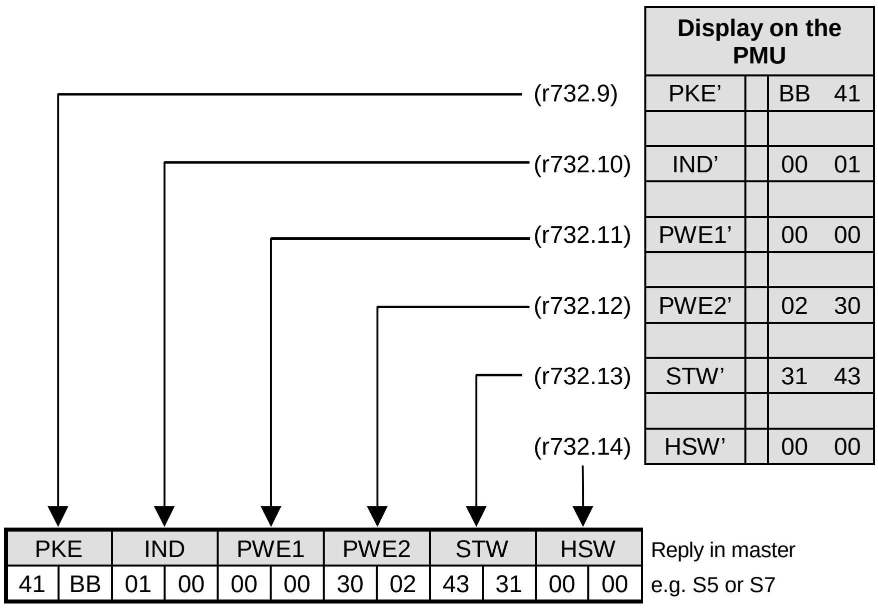
Example 2

Parameter P711 / P696 = 2
The useful data (PPO) sent to the DP master via the standard cyclical channel MSCY_C1 are entered into the diagnostics buffer.

PPO-type = 1
Four words are sent, PKW part plus status word 1 (ZSW1) and the main actual value (HIW). The PKW part is stored, beginning with the PKE, in parameter r732.9 and ZSW1 as well as the HIW from parameter r732.13 onwards (high part at the least significant address).

In the following example, the reply (to the DP master) to the WRITE request in example 1 is shown in parameter P443 with the value "3002".
The status word is returned by the converter with 4331_{Hex}; 0000_{Hex} is given as the actual value.

The values in r732 are displayed in Motorola format, i.e. high-byte and low-byte are shown inverted in relation to what is displayed in the other parameters.



Telegram contents (communication with Master 1)

Display in r732	When P711 = 1 or 2		When P711 = 3	When P711 = 4		When P711 = 10	When P711 = 11
	PPOs 1,2, or5	PPOs 3 or 4	Different depending on PPO	Parameteriz. telegram			
ii 09	PKE’	PZD1’	00 04	Byte 2 u 1		PKE’	PKE’
ii 10	IND’	PZD2’	AD 00	Byte 4 u 3		IND’’ 2)	IND’’ 2)
ii 11	PWE1’	PZD3’ *	04 C4	Ident-No.		PWE1’	PWE1’
ii 12	PWE2’	PZD4’ *	00 00	Byte 8 u 7		PWE2’	PWE2’
ii 13	PZD1’	PZD5’ *	40 BB	Byte 10 u 9		PWE3’	PWE3’
ii 14	PZD2’	PZD6’ *	00 04	xxx		PWE4’	PWE4’
ii 15	PZD3’ *	xxx	8F 00	xxx		PWE5’	PWE5’
ii 16	PZD4’ *	xxx	C2 C0	xxx		PWE6’	PWE6’
ii 17	PZD5’ *	xxx	per PPO	xxx		PWE7’	PWE7’
ii 18	PZD6’ *	xxx	per PPO	xxx		PWE8’	PWE8’
ii 19	PZD7’ **	xxx	per PPO	xxx		PWE9’	PWE9’
ii 20	PZD8’ **	xxx	per PPO	xxx		PWE10’	PWE10’
ii 21	PZD9’ **	xxx	per PPO	xxx		PWE11’	PWE11’
ii 22	PZD10’ **	xxx	1)	xxx		PWE12’	PWE12’
ii 23	xxx	xxx	xxx	xxx		PWE13’	PWE13’
ii 24	xxx	xxx	xxx	xxx		PWE14’	PWE14’

1) The 25 bytes with slot-oriented S7 type identifications are always entered, even if the CBP is configured with identification bytes by an S5 or a non-Siemens master.

2) As regards IND’, high-byte and low-byte are inverted in relation to the IND': this is based on a different definition of the useful data for PPOs and acyclically transferred sets of data.

* only for PPO2 and 4

** only for PPO5

Structure and content of the parameterization telegram									
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10
DP-Status	WD_Fac 1	WD_Fac 2	TSDR - min	PNO-Ident-No.		Group-Ident	DPV1-Status 1	DPV1-Status 2	DPV1-Status 3

Table 8.2-22 Telegram contents in parameter r732i09 which can be read out (communication with Master 1)

Telegram contents (communication with SIMOVIS / DriveMonitor)

Display im r732	When P711 = 21	When P711 = 22	When P711 = 23	When P711 = 24	When P711 = 25	When P711 = 26
ii 09	PZD rights	PZD rights	PKE’	PKE’	PZD1’	PZD1’
ii 10	xxx	xxx	IND’’	IND’’	PZD2’	PZD2’
ii 11	xxx	xxx	PWE1’	PWE1’	PZD3’	PZD3’
ii 12	xxx	xxx	PWE2’	PWE2’	PZD4’	PZD4’
ii 13	xxx	xxx	PWE3’	PWE3’	PZD5’	PZD5’
ii 14	xxx	xxx	PWE4’	PWE4’	PZD6’	PZD6’
ii 15	xxx	xxx	PWE5’	PWE5’	PZD7’	PZD7’
ii 16	xxx	xxx	PWE6’	PWE6’	PZD8’	PZD8’
ii 17	xxx	xxx	PWE7’	PWE7’	PZD9’	PZD9’
ii 18	xxx	xxx	PWE8’	PWE8’	PZD10’	PZD10’
ii 19	xxx	xxx	PWE9’	PWE9’	PZD11’	PZD11’
ii 20	xxx	xxx	PWE10’	PWE10’	PZD12’	PZD12’
ii 21	xxx	xxx	PWE11’	PWE11’	PZD13’	PZD13’
ii 22	xxx	xxx	PWE12’	PWE12’	PZD14’	PZD14’
ii 23	xxx	xxx	PWE13’	PWE13’	PZD15’	PZD15’
ii 24	xxx	xxx	PWE14’	PWE14’	PZD16’	PZD16’

Table 8.2-23 Telegram contents in parameter r732i09 which can be read out (communication with SIMOVIS/DriveMonitor)

CB parameter 3 (DPRAM monitor)

By means of CB parameter 3, i.e. P713 / P698, a hex monitor can be activated with which addresses of the dual-port RAM can be read out on the CBP.

DANGER

Parameter P713 / P698 is to be reserved exclusively for suitably trained start-up personnel.

In order to use the hex monitor to best effect, appropriate detailed knowledge of the structure of the dual-port RAM is necessary.
In P713 / P698, only the offset address (decimal) is entered.

If CB Parameter 3 is set to a value other than "0", 12 bytes are cyclically entered in diagnostic parameter r732 from r732.9 onwards. This is done from the absolute address set in CB parameter 3 (decimal) onwards.
CB Parameter 3 has the highest priority and disables entries by CB parameter 1.

Diagnosis with PROFIBUS Class II Master

A Class II master (normally a PG programming unit) can be used for start-up and diagnosis. During start-up/testing, the Class II master assumes the function of the Class I master for the selected station. The exchange of useful data with the slave, however, is not cyclical.

8.2.10.6 CBP2 diagnostic parameters

Meaning of standard diagnosis with P711.x = 0

Parameter No.	Content (high byte)	Content (low byte)
r732.1	CBP2 status (same content as CBP)	
r732.2	DPC31 status (same content as CBP, SPC3 status)	
r732.3	Global control (same content as CBP)	
r732.4	Counter: CLEAR DATA (alteration if, e.g. SIMATIC in "Stop")	Counter: fault-free cyclical telegrams
r732.5	Counter: Heartbeat counter fault from basic unit	Counter: Watchdog state changed (alteration during plugging/unplugging of connector or C1 master is coming/going)
r732.6	Mirroring: Slot identifier 3	Mirroring: Slot identifier 2
r732.7	PNO identification (0x8045)	
r732.8	Number of valid bytes in r732.9 to r732.24 when P711.x > 0 (special diagnosis) or: fault number DP slave software for alarm A087	
	r732.9 to r732.24 have a different meaning in the case of special CB diagnosis with P711.x > 0	
r732.9	Cross traffic: address encoder 1	Encoder 2
r732.10	Encoder 3	Encoder 4
r732.11	Encoder 5	Encoder 6
r732.12	Encoder 7	Cross traffic: address encoder 8
r732.13	CBP2 itself works as a cross-traffic encoder	PPO type (0xFF: no PPO)
r732.14	Cross traffic: number of configured encoders	Cross traffic: Score Board, one bit per encoder (Bit 0 = Encoder 1, ... Bit 7=Encoder 8) 0: Encoder inactive 1: Encoder configured and active
r732.15	Counter: repeated cyclical PKW request	Counter: new cyclical PKW task
r732.16	Counter: C1 DS100 Write/Read negative	Counter: C1 DS100 Write/Read positive
r732.17	Counter: DriveES Write/Read negative	Counter: DriveES Write/Read positive
r732.18	Counter: DriveES Control negative	Counter: DriveES Control positive
r732.19	Counter: DriveES Setpoints negative	Counter: DriveES Setpoints positive
r732.20	Counter: S7 Protocol negative	Counter: S7 Protocol positive
r732.21	Counter: Abort C2 master	Counter: Initiate C2 master
r732.22	S7 protocol access fault: For fault number, see following table	
r732.23	S7 protocol access fault: Data block number or parameter number	
r732.24	S7 protocol access fault: Data block offset or index word	
r732.25	Generating date: Day	Generating date: Month
r732.26	Generating date: Year	
r732.27	Software version	
r732.28	Software version	
r732.29	Software version: Flash-EPROM checksum	

Fault S7 protocol (r732.22), fault numbers < 150 correspond to PKW fault numbers:

No.	Cause	Remedy (e.g. in ProTool)
	No. 0 .. 199: S7 task has been changed into a parameter task. Fault detection in the BASE/TECH BOARD. Additional info in r732.23, r732.24: parameter number, index word.	
0	There is no parameter number	Check data block number
1	Parameter value cannot be altered	-
2	Top or bottom limit exceeded	-
3	There is no subindex	Check data block offset
4	Access to single value with array identifier	Set data block offset = 0
5	Access to word with double word task or vice versa	Use correct type of data (e.g. INT for word, DINT for double word)
6	Setting not allowed (can only be reset)	-
7	Description element cannot be altered	(should not occur here)
11	No parameter change rights	-
12	Keyword missing	-
15	There is no text array	-
17	Task cannot be executed due to operating status	-
101	Parameter number deactivated at the moment	-
102	Channel width too small	(should not occur here)
103	PKW number incorrect	(should not occur here)
104	Parameter value not permissible	-
105	Access to array parameter with single identifier	Set data block offset > 0
106	Task not implemented	-
	No. 200-209: S7 task is formally defective. Error detection in the COM BOARD. Additional info in r732.23, r732.24: data block number, data block offset	
200	Error in variables address (no addiional info)	Permissible: range of "Data block"
201	Data block number not permissible	Permissible: 1...31999
202	Data block offset not permissible	Permissible: 0...116, 10001...10116, 20000...20010
203	Non-permissible "Type" during access to parameter value	Permissible: CHAR. BYTE, INT, WORD, DINT, DWORD, REAL
204	Non-permissible "Number of elements" during access to parameter value	Permissible: effective 2 or 4 byte
205	Non-permissible "Type" during access to text	Permissible: CHAR, BYTE
206	Non-permissible "Type" during access to description	Permissible: CHAR. BYTE, INT, WORD, DINT, DWORD, REAL
207	Non-permissible odd "Number of elements" in the case of type CHAR or BYTE	Correct the "Number of elements"
208	Non-permissible change of text/description	-
209	Inconsistency in the write task: "Type" and "Number of elements" does not match "Type of data" and "Length of data"	(Defective communications partner)

No.	Cause	Remedy (e.g. in ProTool)
	No. 220: S7 task has been changed into a parameter task. Reply from BASE/TECH BOARD is defective. Error detection in the COM BOARD. Additional info in r732.23, r732.24: data block number, data block offset.	
220	Parameter reply does not match task	(Defective BASE/TECH BOARD)
	No. 240: Fault detection in the COM BOARD; without additional info	
240	Reply too long for reply telegram	(Defective communications partner)

Diagnosis of clock synchronization with "SIMOLINK" diagnostic parameter r748 (MASTERDRIVES MC only):

r748.x	(Content of SIMOLINK SLB)	Content of PROFIBUS CBP2
r748.1	Number of error-free synchronizing telegrams	
r748.2	CRC error	Internal
r748.3	Number of timeout errors	Internal
r748.4	Last bus address signaled	Internal
r748.5	Address of the node which sends the special telegram "Timeout"	Internal
r748.6	Active SYNC-interrupt delay	Internal
r748.7	Position of the node in the ring	Internal (deviation of pulse period, configured on CU and set via PROFIBUS)
r748.8	Number of nodes in the ring	Maximum permissible deviation of the pulse period
r748.9	Synchronism deviation (65535: Synchronization not active) should fluctuate between 65515 and 20	
r748.10	Corrected pulse period in units of 100 ns	
r748.11	T0 counter (0 if synchronization active)	Internal
r748.12	Internal	Internal
r748.13	Internal	Internal
r748.14	Timer	Internal
r748.15	Bus cycle time implemented	
r748.16	Internal	Internal

8.2.10.7 Special CBP2 diagnosis for start-up personnel

Special diagnosis with P711.x > 0

Image of the C1 master telegrams

P711.x	Display in r732.9..24 (32 bytes)	
1	Output: PKW and setpoints from the master	Maximum 32 bytes
2	Input: PKW and actual values to the master	Maximum 32 bytes
3	Configuring telegram from the master	Byte 0 – 31
50	End identifier: 0x5A, 0xA5	Byte 32 - 63
51		Byte 64 - 95
52		Byte 96 - 127
53		Byte 128 - 159
54		Byte 160 - 191
55		Byte 192 - 223
56		Byte 224 - 244
4	Parameterizing telegram from the master	Byte 0 – 31
60	End identifier: 0x5A, 0xA5	Byte 32 - 63
61		Byte 64 - 95
62		Byte 96 – 127
63		Byte 128 – 159
64		Byte 160 – 191
65		Byte 192 – 223
66		Byte 224 – 244

Diagnosis of configuration and parameterization

P711.x	r732.x	
30	r732.9	Result of parameterizing telegram evaluation (see table)
	r732.10	Result of evaluating cross-traffic parameterization (see table)
	r732.11	Result of configuring telegram evaluation (see table)
	r732.12	PPO type 1-5; if free configuration, then 0xff
	r732.13	Length of the input data to the master (without PKW) in bytes
	r732.14	Length of the output data from the master (without PKW) in bytes
	r732.15	Double-word specifier setpoints
	r732.16	Double-word specifier actual values
	r732.17	Free memory in the multi-port RAM of the DPC31 in bytes

The value output in parameter P732.9 (P711.x = 30) arises due to bit-by-bit OR linking of the following parameters. In the case of errors in the block for cross-traffic parameterization, the detailed fault codes are to be entered in parameter P732.10. Only if P732.10 contains the value 0 can the clear causes of the fault be read out of P732.9. If P732.10 <> 0, the content of P732.9 is falsified and the errors leading to abort cannot be clearly determined!

Value	Meaning
0x0000	Parameterizing telegram is error free
0x0001	Unknown master, length of para. telegram <10 and <>7
0x0002	Unknown para. block. The following are supported: 0xE1 – Equidistance, 0xE2 – Cross traffic
0x0004	It was not possible to fully identify the para. telegram
0x0008	It was not possible to set up the parameter buffer in the DPC31. (Memory size insufficient!)
0x0010	The block for equidistance parameterization has an incorrect length (24 + 4 = 28 bytes)
0x0020	The CU has not opened the RCC channel (no CU SW-version with equidistance capability) or cannot process the RCC channel
0x0040	Non-permissible parameter (e.g. bus cycle time and pulse frequency do not correlate)
0x0080	Tbase-dp is larger than 16 bits after de-normalization
0x0100	Tdp is larger than 16 bits
0x0200	Tdx is larger than Tdp
0x0400	The free computing time is not sufficient. (Tdp-Tdx is too small)
0x0800	The para. telegram contains an invalid value for Isochronous Mode Supported (permissible values 0, 0xE1)
0x1000	Unknown equidistance mode set by the BASEBOARD

Table 8.2-24 Paramter-telegram evaluation r732.9 / P711 = 30

Value	Meaning
0x0000	Parameterizing block cross-traffic error-free
0x1001	Default return value
0x1002	The version of the filter table is not supported. Identifier 0xE2 is supported.
0x1004	The data area of the CBP2 (16 word PZD) is exceeded.
0x1008	The pick-off has an odd number of bytes. Only word-by-word pick-offs are permitted.
0x1010	The maximum number of pick-offs has been exceeded. (A maximum of 8 pick-offs are allowed, including pick-off of own data)
0x1020	No links have been configured in the cross-traffic parameterizing block
0x1040	A pick-off does not indicate the beginning of a process data word
0x1080	The permissible telegram length which is to be read has been exceeded (maximum 244 bytes).
0x1100	The reserved memory area in the multi-Port RAM has been exceeded.
0x1200	Non-permissible publisher address 1-125
0x1400	Several links to a publisher are not permissible.

Table 8.2-25 Parameter-telegram evaluation, cross-traffic, r732.10 / P711 = 30

Diagnosis of the setpoint source (especially during cross traffic)

P711.x	**r732.x**	**Content**	**High byte**	**Low byte**
31	r732.9	Setpoint source: 0: Master 1 to 8: cross-traffic encoder 9: -	Setpoint 2	Setpoint 1
	P732.10		Setpoint 4	Setpoint 3
	P732.11		Setpoint 6	Setpoint 5
	P732.12		Setpoint 8	Setpoint 7
	P732.13		Setpoint 10	Setpoint 9
	P732.14		Setpoint 12	Setpoint 11
	P732.15		Setpoint 14	Setpoint 13
	P732.16		Setpoint 16	Setpoint 15
	P732.17	Byte offset of the setpoint within the setpoint source (value range 0 to 30)	Setpoint 2	Setpoint 1
	P732.18		Setpoint 4	Setpoint 3
	P732.19		Setpoint 6	Setpoint 5
	P732.20		Setpoint 8	Setpoint 7
	P732.21		Setpoint 10	Setpoint 9
	P732.22		Setpoint 12	Setpoint 11
	P732.23		Setpoint 14	Setpoint 13
	P732.24		Setpoint 16	Setpoint 15

Diagnosis of clock synchronization

P711.x	**r732.x**	**Content**
32	r732.9	Interrupt enable by BASEBOARD
	r732.10	RCC parameter 1
	r732.11	RCC parameter 2
	r732.12	Synchronization mode from the BASEBOARD

8.2.11 Appendix

Technical data

Order number	CBP: 6SE7090-0XX84-0FF0 CBP2: 6SE7090-0XX84-0FF5
Size (length x width)	90 mm x 83 mm
Degree of pollution	Degree of pollution 2 acc. to IEC 664-1 (DIN VDE 0110/T1), Moisture condensation during operation is not permissible
Mechanical strength	To DIN IEC 68-2-6 (if board is correctly mounted)
In stationary use	
• displacement	0.15 mm in the frequency range 10 Hz to 58 Hz
• acceleration	19.6 m/s^2 in the frequency range > 58 Hz to 500 Hz
During transport	
• displacement	3.5 mm in the frequency range 5 Hz to 9 Hz
• acceleration	9.8 m/s^2 in the frequency range > 9 Hz to 500 Hz
Climatic class	Class 3K3 to DIN IEC 721-3-3 (during operation)
Method of cooling	Natural air cooling
Permissible ambient or coolant temperature	
• during operation	0° C to +70° C (32° F to 158° F)
• during storage	-25° C to +70° C (-13° F to 158° F)
• during transport	-25° C to +70° C (-13° F to 158° F)
Permissible moisture stress	Relative humidity ≤ 95 % during transport and storage ≤ 85 % during operation (condensation not permissible)
Supply voltage	5 V ± 5 %, max. 600 mA, internally from the basic unit
Output voltage	5 V ± 10 %, max. 100 mA, electrically isolated supply (X448/Pin 6) • for bus termination of the serial interface or • for supplying an OLP (Optical Link Plug)
Data transfer rate	max. 12 MBaud

Table 8.2-26 Technical data

Block diagram of the CBP

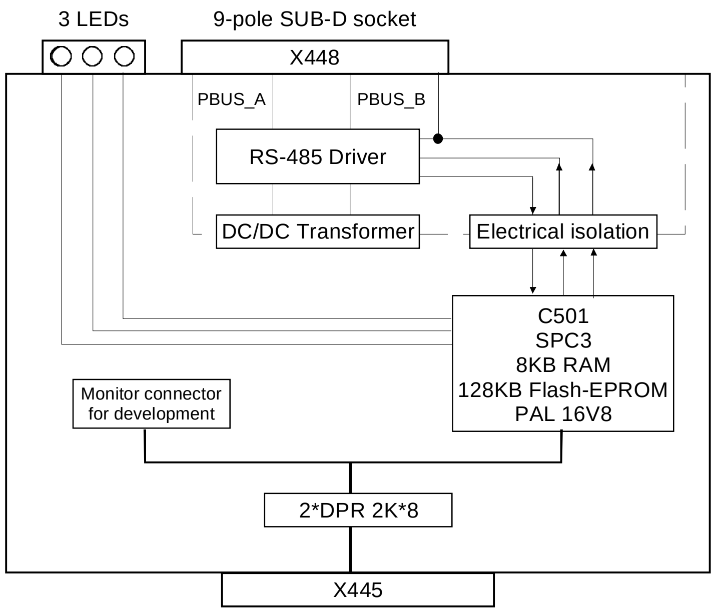


Fig. 8.2-26 Block diagram of the CBP

8.3 SIMOLINK

8.3.1 General principles

Definition

SIMOLINK (**Si**emens **Mo**tion **Link**) is a digital, serial data transfer protocol with a fiber-optic cable as its transfer medium. The SIMOLINK drive link has been developed for extremely fast and strictly cyclical transfer of process data (control information, setpoints, actual values and status information) between individual MASTERDRIVES MC/VC units or between MASTERDRIVES MC/VC units and a higher-level control system with synchronization of all connected nodes to a common system clock.

Application

SIMOLINK enables highly dynamic and accurate synchronism of all connected MASTERDRIVES MC units to be realized on account of its extremely fast data transfer by transmitting a strictly time-equidistant and jitter-free SYNC telegram in each cycle. Typical areas of use are, for example, all applications requiring a high degree of synchronism (angular synchronism) of individual MASTERDRIVES MC units to each other. A typical area of application is, for example, the replacement of previously mechanically coupled moving axes by individual electric drives, e.g. for printing machines. SIMOLINK can further be used in highly dynamic coordination tasks of individual MASTERDRIVES MC/VC units, such as in the motion control of individual axes on packing machines.

Components

SIMOLINK consists of the following components:

- SIMOLINK master
  Interface for higher-level automation systems,
  e.g. SIMATIC FM458 or SIMADYN (see Chapter 8.3.8)
- SIMOLINK board (SLB)
  Interface for drives (see Chapter 8.3.4)
- SIMOLINK switch (see following section)
- Fiber-optic cable
  Connecting medium of nodes on the SIMOLINK ring (see Chapter 8.3.4)

The SIMOLINK master and the SIMOLINK board are active nodes on SIMOLINK. The SIMOLINK switch is a passive node.

- Active nodes can receive and send telegrams and can read or write the contained information.
- Passive nodes can only pass on received telegrams. It is not possible for them to process the information contained therein.

SIMOLINK switch

The SIMOLINK switch is a passive node which has a "switching" function between two SIMOLINK rings.

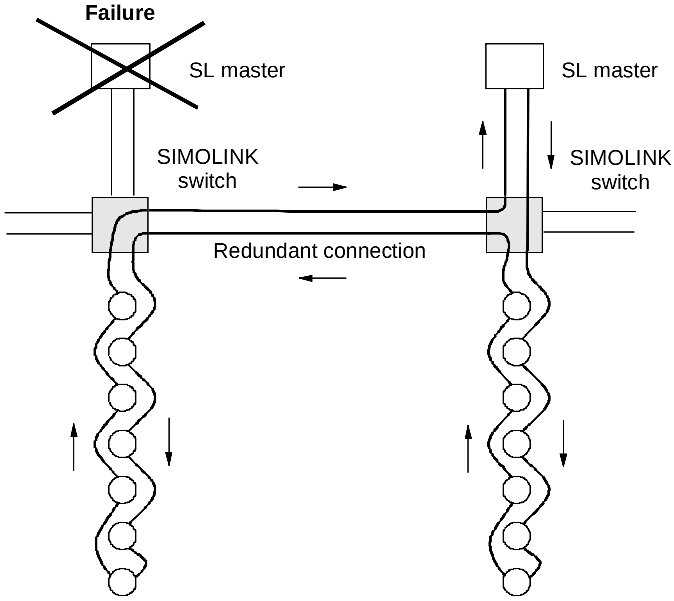


Fig. 8.3-1 Example of an application for the SIMOLINK switch

SIMOLINK features

- The transfer medium is a fiber-optic cable. Either glass or plastic fiber-optic cables can be used.
- SIMOLINK has the structure of a ring of fiber-optic cables where each node acts as a signal amplifier.
- Thus, the following distances can be realized, depending on the selected medium:
  - max. 40 m between each node on a plastic fiber-optic cable or
  - max. 300 m between each node on a glass-fiber-optic cable.
- Up to 201 active nodes [1)] can be interlinked on SIMOLINK.

1) From now on, the active nodes are only referred to in the text as nodes

- MASTERDRIVES MC only:
  Synchronization of the nodes is effected through a SYNC telegram which is generated by a node with a special function, the dispatcher function, and is received simultaneously by all other nodes. The SYNC telegram is generated absolutely time-equidistantly and jitter-free. The time between two SYNC telegrams is the bus cycle time of SIMOLINK and, at the same time, it corresponds to the common clock time for synchronization of all connected nodes.
- Data transfer between nodes is effected strictly cyclically in the bus cycle clock time. This means that all data written or read by the nodes is transferred between two SYNC telegrams. Upon receipt of the SYNC telegram, the previously received data in every MASTERDRIVES MC/VC unit is passed on to the control system of the converter as being the currently applicable data. This ensures that the latest applicable data is available to all nodes on the bus at the same time.

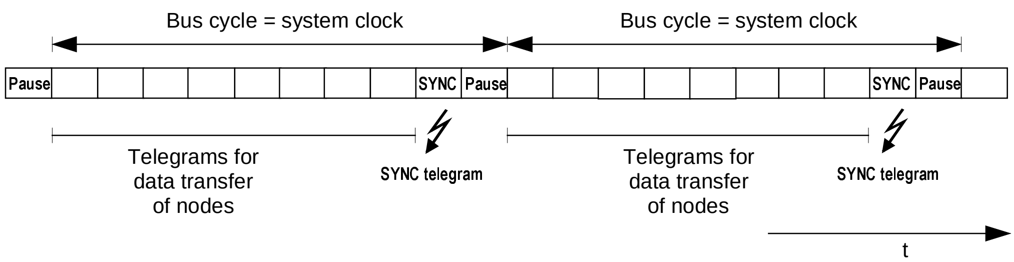


Fig. 8.3-2 SIMOLINK telegram traffic

- The transfer rate is a fixed 11 MBit/s
- A 32 bit word can be transferred in each telegram. The total length of each telegram is 70 bit, including the 32 bit net information. Thus, at a transfer rate of 11 Mbit/sec, a telegram has a transfer time of $6.\overline{36}\ \mu s$.
- SIMOLINK has a very high data throughput. This means that all the telegrams are sent without an interval directly one after the other. For example, with a selected bus cycle time of 1 ms, 155 telegrams with data contents (value of 32 bit per telegram) can be transferred via SIMOLINK.
- The functionality of the SIMOLINK application defines the assignment of telegrams to nodes. There are two possible applications:
  - the peer-to-peer functionality and
  - the master/slave functionality.

Peer-to-peer functionality

This field of application describes all applications for which there is no dedicated logical master for distributing information via SIMOLINK. A typical application example here today is the "Continuous material throughput" which is implemented with the peer-to-peer protocol, in which drives have equal rights in a logical sense (peer-to-peer) in their exchange of information with each other. In accordance with the definition of the term "peer-to-peer", (communication between equals), this function is described as the "Peer-to-peer" functionality on SIMOLINK. This functionality enables extremely fast, synchronized and absolutely freely selectable transfer of data (no restrictions imposed by the physical bus configuration as in the peer-to-peer protocol) between MASTERDRIVES MC/VC units. The system needs to be designed with a "timing generator" for generating the telegram traffic and which keeps the bus system fully functional. The SIMOLINK dispatcher provides the interface to this function in the converter. The term "Dispatcher" is used to describe the principle characteristic of this interface: independent, constant dispatching of telegrams. The interfaces in the other MASTERDRIVES MC/VC units on SIMOLINK operate as "Transceivers".

The term "Transceiver" is made up of the words "Transmitter" and "Receiver". It means that a transceiver can receive and then send telegrams, but it cannot initiate telegram traffic itself (main difference to the dispatcher).

Master/slave functionality

In this case, a central station (logical master) supplies all the other nodes (logical slaves) on the bus system with information (control bits, setpoints, etc.) This function is referred to hereafter as the "Master/slave" functionality. It refers to the logics of data transfer between the nodes on SIMOLINK. The system needs to be configured with a SIMOLINK interface in the central station (master) in this application field. This interface is both the logical master for data transfer and the initiator and monitor for telegram traffic on SIMOLINK (= dispatcher function). This interface, including its functions contained in an automation system, is referred to as the "SIMOLINK master".

The interfaces in the other nodes, e.g. in the converters, are "SIMOLINK transceivers".

NOTE

There is always only one node with a dispatcher function in the SIMOLINK ring. This is either a SIMOLINK board with dispatcher parameterization or a SIMOLINK master.

8.3.2 Peer-to-peer functionality

Each node on SIMOLINK has an active function either as a transceiver or as a dispatcher. There is always only one node with a dispatcher function in the SIMOLINK ring. All the other nodes are transceivers.

Bus topology

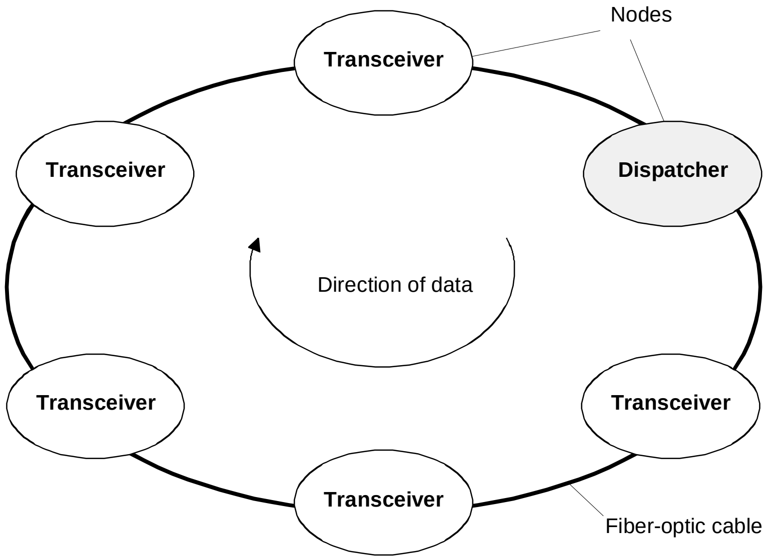


Fig. 8.3-3 SIMOLINK with dispatcher

Dispatcher

A table (= task table) is defined in the SIMOLINK dispatcher in which all telegrams are entered in the order in which they are sent. Each telegram has an address section (= node address) and a subaddress section (= channel number) in the telegram header. The telegrams are entered in the task table with ascending address and subaddress sections. The SIMOLINK dispatcher initiates telegram traffic by dispatching all the telegrams one after the other, beginning with the telegram with the lowest address and subaddress section according to the entry in the task table. As soon as the SIMOLINK dispatcher has dispatched all the telegrams, it sends a synchronization telegram (SYNC telegram) and a pause telegram. After this, it dispatches the first telegram from the task table again without any delay.

NOTE

The dispatcher can upread or overwrite the data contents of telegrams, as can every transceiver.

Transceiver

Each transceiver receives the telegrams (all of them) initiated by the dispatcher and can upread their data contents (value of 32 bit per telegram) or overwrite them with their own data, in accordance with a determined rule. The received telegrams are passed on to the next node in the ring, irrespective of whether the data contents have been read, overwritten or revised. Nodes with a transceiver function cannot maintain data traffic in the ring on their own.

8.3.3 Application with peer-to-peer functionality

Principle

The peer-to-peer functionality with SIMOLINK corresponds in principle to the peer-to-peer link with which you may already be familiar from MASTERDRIVES and SIMOREG, i.e. exchange of process data between MASTERDRIVES MC/VC units with the following additional advantages:

- ♦ Very fast (11 Mbit/s; one hundred and fify 32-bit data in 1 ms)
- ♦ Freely selectable, i.e. every MASTERDRIVES MC/VC can send process data to every other MASTERDRIVES MC/VC, or receive data from it.
- ♦ Maximum of sixteen 32-bit data per MASTERDRIVES MC/VC possible via SIMOLINK; i.e. every MASTERDRIVES MC/VC can receive up to 8 32-bit data via SIMOLINK, and send up to 8 32-bit data to other MASTERDRIVES MC/VC units.

Basic principle of addressing

The telegram address is not interpreted as a "destination address" (which determines to whom the information is to be sent), but is understood to be a "source address". This indicates where the information is coming from.

Dispatchers and transceivers write their information (= data) in the telegrams assigned to them (node address = address in telegram) on the bus. Dispatchers and transceivers can read every telegram on the bus. For this purpose, the nodes have separate storage areas for receive data and transmit data.

Addressing mechanism - writing

The dispatcher and transceiver nodes only transmit information (= write data) in the telegrams which are assigned to them via the address. A maximum of 8 x 32-bit data can be transferred in 8 telegrams (same address and channel number from 0 to 7). A channel number is assigned to each 32-bit value and thus clearly also a telegram on the bus.

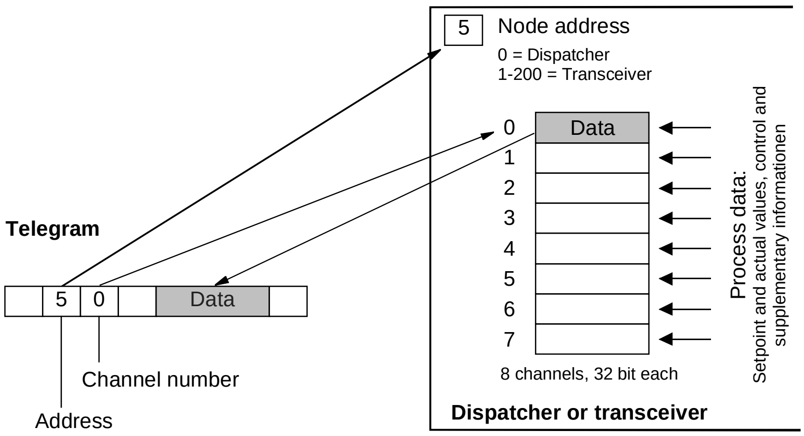


Fig. 8.3-4 Writing data

Addressing mechanism - reading

The active nodes (dispatcher and transceivers) can read the data of any telegram on the bus (also their own telegrams; separate storage areas for transmit data and receive data). A maximum of 8 different telegrams (8 x 32-bit data) can be read. For this purpose, **those** addresses and channel numbers whose data are to be read are parameterized as receive telegrams in the dispatcher or in the transceivers. This parameterization is carried out before data traffic is started up; in the case of MASTERDRIVES, for example, via the parameters of the converter.

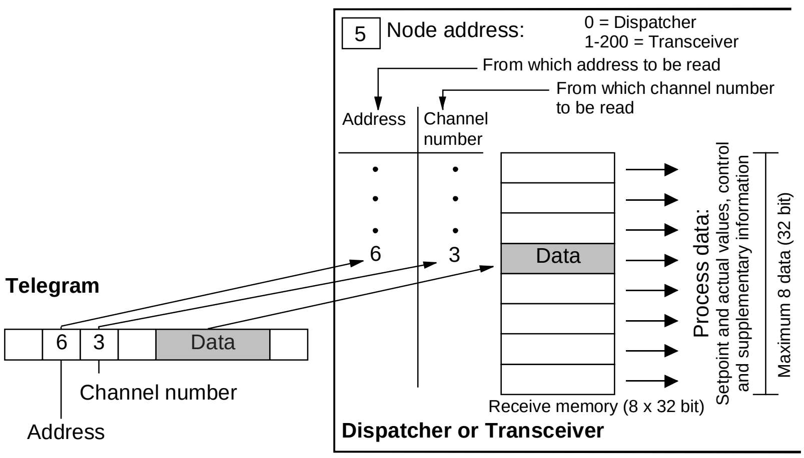


Fig. 8.3-5 Reading data

Example

The node with the address 5 (= transceiver interface) can "deposit" a maximum of 8 x 32 bit data on the bus. This means that the transceiver writes its data (32 bit in each case) in telegrams with address 5 and channel numbers 0 to 7. All the active nodes on SIMOLINK (the dispatcher as well as the transceivers) can decide whether they want to read this data. If, for example, a node wants to read the data of node 5 (= address 5) with channel number 2, this has to be configured accordingly. In this case, the address 5 and the channel number 2 have to be configured as the "Reading address".

Data transfer

In the "Peer-to-peer" application with the dispatcher, only process data (control and status words, setpoints and actual values) are transferred. When using a data area in the telegram, in the case of process data with word size (= 16 bit), two process data per telegram can also be transferred or read.

NOTE

All usable telegrams must be entered in the task table of the dispatcher.

Applications

Typical applications for SIMOLINK are the implementation of digital setpoint cascades in which one or more setpoints can be given to the slave drives by a MASTERDRIVES MC/VC unit acting as master drive.

8.3.4 Components of the peer-to-peer functionality

SLB optional board

The SLB optional board (*SIMOLINK board*) is used for linking drives to SIMOLINK.

Each SLB optional board is a node on SIMOLINK.

The optional board is provided with three LED displays which supply information on the current operating status.

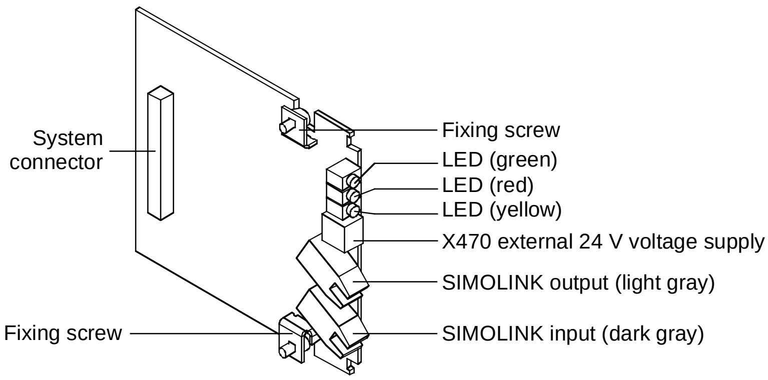


Fig. 8.3-6 SLB optional board (SIMOLINK board)

The SLB optional board links the converters/inverters to SIMOLINK. It can be used as the SIMOLINK dispatcher or as a SIMOLINK transceiver. The functionality is determined by parameterization.

Fiber-optic cable medium

A fiber-optic cable is used as the transfer medium in SIMOLINK. Plastic or glass-fiber optic cables can be used.

For cable lengths (the distance between two nodes) up to a maximum of 40 m, plastic cables are used.

NOTE

Recommendation:
Plastic fiber-optic cables from Siemens; CA-1V2YP980/1000,200A

For cable lengths (distance between two nodes) up to max. 300 m, fiber-optic cables with a glass core and a plastic sheath can be used.

NOTE

Recommendation:
Fiber-optic cables with glass core from Siemens; CLY-1V01S200/230,10A

The above-mentioned fiber-optic cables do not have an outer sheath. When using them for wiring outside switch cabinets, the cables must either be laid in cable ducts or conduits or suitable cables with an outer sheath must be used. On cables with an additional outer sheath, this must be removed before fixing the connector at the end of the cable as the connectors cannot accommodate the sheath. Therefore, when selecting the cable, one must make sure that the then remaining outer fiber diameter of 2.2 mm for attaching the connector is maintained.

24 V voltage supply

The SLB optional board has a 24 V voltage input for the external voltage supply of the board. This ensures that data transfer is maintained in SIMOLINK even with powered-down converter/inverter.

Changeover between internal voltage supply from the converter/inverter and external voltage supply is carried out automatically, with priority being given to the external voltage supply.

NOTICE

A changeover must not be performed during bus operation because it generates a reset signal on the option board as a result of which bus operation is interfered with.

8.3.5 Parameterization of the peer-to-peer functionality

The data traffic is determined by the parameterization of the dispatcher and the transceivers.

The configuration for enabling process data to be sent from a MASTERDRIVES MC/VC unit is determined by the BICO technique. The BICO technique is also used to determine the position in the control system at which the received process data are to act.

NOTE

Setting is carried out exclusively by means of the parameters of the MASTERDRIVES MC/VC unit. No additional configuration tool is required.

Parameterization of the SLB is carried out via the PMU, the OP1S or a PC with the SIMOVIS start-up tool.

The following parameterizations are necessary for configuring the SLB:

- **P740: SLB node address**
  0: simultaneous selection of dispatcher function
  1 - 200: simultaneous selection of transceiver function
- **P741: SLB telegram failure time** (dispatcher and transceiver)
  The telegram failure time is a parameterizable failure time which is stored in every node. The telegram failure time determines the maximum time between two HW interrupts. The HW interrupt is generated by the interface after receipt of a SYNC telegram.
  If a node does not receive a SYNC telegram within this time (→ no HW interrupt), the "TlgOFF" diagnostic bit is set in every node in which the telegram failure time is running.
  The telegram failure time is activated after receipt of the first SYNC telegram.
  The telegram failure time should be at least twice as long as the SIMOLINK cycle time.
  If you use the SIMOLINK, telegram failure monitoring should be activated! P741 = 4 x P746 (SLB bus cycle time) is recommended for the SLB telegram failure time. See also the function diagram [140].

♦ **P742: SLB transmit power** (dispatcher and transceiver)
The power of the fiber-optic transmit block for every node can be set by a parameter.
The transmit power can be set in the stages 3 = 40 m, 2 = 25 m and 1 = 15 m cable length. This scaling means, for example, that in stage "2" a transmit power is set for bridging a distance of up to 25 m plastic fiber-optic cable.

- Localization of fault sources in the medium upon start-up:
  Hidden fault sources on the transfer medium which may not be possible to detect with full power strength can be better localized by reducing the transmit power. Possible causes of the faults may, for example, be that the bending radii are too small or that the contacts of the fiber-optic cable fibers in the connector are poor.
- Ageing of the fiber-optic cable components:
  By reducing the transmit power, the ageing process of the fiber-optic cable components can be slowed down.

♦ **P743: Number of nodes** (dispatcher and transceivers)
With this function, each node can compensate for its individual time delay t_{delay} for compensation of runtime delays caused by the signal conversion in each node.
Formula for transceivers at the n-th position in the ring:

$t_{delay,n}$ = [number of nodes - n] x 3 bit times;

The "Number of nodes" value is specified to the nodes as a parameter.

NOTE The position n at which the node is situated in the ring is calculated automatically in the SIMOLINK starting cycle.

The SL master or dispatcher sends a special telegram with the address 253 "Count nodes" and the starting value 1. Each transceiver which receives this telegram remembers this number (= Count number) and then increments the data contents by the value 1. In this way, the node has the count number 1 directly after the SL master or dispatcher while the SL master or dispatcher has the maximum count number, which also corresponds to the number of node. The result of this procedure can be checked in parameters r748 Index 7 (position of the node in the ring) and r748 Index 8 (number of nodes in the ring).

NOTE The formula stated above neglects the throughput delay of the SIMOLINK switch. Generally, this is permissible as the switch, for example, is usually situated at the beginning of the ring and thus does not cause any delay between transceivers.

The transceiver n waits $t_{delay,n}$ before it can give an HW interrupt to the unit application after receipt of the SYNC telegram. This ensures that the interrupts to the unit applications of all nodes are effected as synchronously as possible.

Normally, this parameter does not have to be altered. The dispatcher passes on the determined number of nodes to the slaves automatically. The latter deduce the necessary delay time from this if the parameter has been set to 0 (= automatic calculation). Only in the case of high accuracy requirements and special influences (SIMOLINK switch, long leads) might it be necessary to manually alter this parameter.

The calculated delay time $t_{vz,n}$ (normalized to 3 bit times) can be checked in parameter r748 Index 6.

- **P744: SLB selection** (dispatcher and transceiver)
  Only MASTERDRIVE MC: Is for selecting source of synchronization and data when there are two SIMOLINK boards or CBPs in a MASTERDRIVES unit.
- **P745: SLB channel number** (dispatcher)
  This parameter is used to set the number of used channels (max. 8). The selected value is firmly applicable for all nodes on the bus.
- **P746: SLB cycle time** (dispatcher)
  This is used to set the bus cycle time. The bus cycle time can be set from 0.20 ms to 6.50 ms in a 10 µs grid.

NOTE

The dispatcher determines the task table from the SLB channel number and the SLB cycle time (consecutive numbering, starting with node address 0 and channel number 0, at first incrementing the channel number) in accordance with the following formula:

$$n = \left(\frac{P746 + 3.18\ \mu s}{6.36\ \mu s} - 2 \right) \times \frac{1}{P745}$$

n: Number of addressable nodes (checked at r748 Index 4)

Task table example:

P746 = 0.20 ms; P745 = 2; → n = 15

Address	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8
Channel	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

Address	9	9	10	10	11	11	12	12	13	13	14	14	255	255
Channel	0	1	0	1	0	1	0	1	0	1	0	1	0	0

Only those addresses and channels listed in the task table are processed.

- **P 749: SLB read address** (dispatcher and transceiver)
  Is for setting the channels to be read. Input is in the notation address.channel. Up to 8 channels can be defined by the 8 parameter indices. The data in these channels are transferred via connectors K7001 - K7016 or KK7031-KK7045.

- ♦ **P 751: Source SLB transmit data**
  Used to select the connectors to be transmitted via SLB channels 1 to 8 (subdivided into low-word and high-word). Double connectors must be entered in two consecutive indices, so that they are transmitted with the full resolution.

- ♦ **P 755: SIMOLINK configuration (dispatcher)**
  When data are transferred from one slave to another, the problem arises that the dead time on the bus depends on the node address of the transceiver. Specifically, this means that data transfer from slave 2 to slave 1 via the dispatcher takes one cycle time longer than data transfer between slave 1 and slave 2. The reason for this is that the data are collected by the dispatcher and are not transmitted onward until the next cycle. This problem can be eliminated by addressing each transceiver twice in one SLB cycle, a first time to obtain the current data of the transceiver which are then available in the dispatcher, and a second time to transmit that data onward, although the number of addressable nodes are thereby reduced by half.
  Parameter values (only dispatcher):

  - xxx0: No dead time compensation
  - xxx1: Dead time compensation activated → Number of addressable nodes = n / 2

  When 2 SIMOLINKs are operated in a converter, data adoption and synchronization can be changed over from one to the other (cf. P 744). If this changeover is also to be possible during operation (converter status °014), this is to be enabled by the user. This function is only provided in the case of MASTERDRIVE MC units.
  Parameter values:

  - xx0x: No changeover during operation (converter status °014)
  - xx1x: Changeover of synchronization and data transfer allowed during operation

  In the case of operation in a ring with a master which triggers the bus cycle externally (e.g. SIMADYN D), the MASTERDRIVE slaves are to be configured for exact adherence to the bus cycle time. Otherwise, it is assumed internally that the bus cycle time is determined by the particular number of telegrams. The actual bus cycle time does not then correspond exactly to the time which has been set. This function is only provided in the case of units which can be synchronized (MASTERDRIVE MC).
  Parameter values:

  - x0xx: Bus cycle time corresponding to the calculated number of telegrams (normal operation)
  - x1xx: Exact adherence to the set bus cycle time

8.3.6 Diagnostics of the peer-to-peer functionality

The following diagnostics information is available to the user:

LED displays

Three LED displays are provided on the front section of the SLB optional board which supply information on the current operating status.

Operating display

LED	Status	Diagnostic information
Green	Flashing	Fault-free net data transfer via SIMOLINK
Red	Flashing	SLB operating
Yellow	Flashing	Data exchange with basic unit is okay

Table 8.3-1 SLB operating display

Fault display

LED	Status	Diagnostic information
Green	off/on	No net data exchange possible via SIMOLINK; bus cable is not connected or is defective
Red	off/on	Voltage supply for SLB cut off; replace SLB or basic unit
Yellow	off/on	No data exchange with the basic unit; bus cable is not connected or is defective; replace SLB or basic unit

Table 8.3-2 SLB fault display

Binectors

- **B0041: Time out:**
  Bit = 1 indicates that an interruption has occurred in cyclic data transfer. This status remains active until cyclic data transfer has been resumed.

NOTE

The reaction time is permanently stored in the SLB and cannot be changed.

Every time "Time out" occurs, the SLB diagnostics parameter (r748, Index 3) is incremented by the value 1 (→ statistics).
At the same time, the address of the node that has first noticed the interruption in the ring can be upread in r748, Index 5.

- **B0040: SLB telegram failure**
  Bit = 1 indicates that the telegram failure time set in the "SLB TlgOFF" parameter (P741) has run out in this node, without a valid SYNC signal having been received.
- **B0042: Start alarm**
  Bit = 1 indicates that the SIMOLINK ring is physically open and that a start cannot be carried out. This status is also signaled by alarm A002.
  Bit = 0 indicates that the SIMOLINK ring is physically closed.
- **B0043: Drive synchr.** (only MC)
  Bit = 1 indicates whether the CU is synchronized to the SIMOLINK BUS. Corresponds to the inverse of alarm A003.

- **B0047: SLB2 timeout** (only MC)
  Bit = 1 indicates that a timeout has been detected on the passive SIMOLINK bus.
- **B0048: SLB2 start** (only MC)
  Bit = 1 indicates that the passive SIMOLINK ring is physically open and a start cannot be carried out. This binector corresponds to alarm A004.
- **r748: SLB diagnostics**

  The diagnostic parameter is used to retrieve various status data of the SIMOLINK bus. The following information can be read from the various indices:

  r748.1: Number of error-free SYNC telegrams (corresponds to the bus cycles that have elapsed without error).

  r748.2: Number of CRC errors (telegrams with errors).

  r748.3: Number of timeout errors (bus interrupt). Note: On bus initialization, data traffic is interrupted several times, causing some timeout errors.

  r748.4: (Dispatcher only) last addressable address; on initialization the last address addressable in the selected configuration is entered here.

  r748.5: Address of the station that has signaled timeout.

  r748.6: Here, the hardware interrupt delay is stored that was calculated from the number of stations set (P743), or from the number of stations transferred during initialization (with automatic parameterization P743 = 0), and the position of the station in the SLB ring.

  r748.7: Position of the station in the SLB ring (result of the count during initialization).

  r748.8: Number of stations in the SLB ring (result of the count during initialization).

  r748.9: (MASTERDRIVES MC) deviation from the synchronization point. Cannot be synchronized, the value is set to NO_SYNCHRONIZATION (= 65535). Should not fluctuate outside 65515 (-20) and 20.

  r748.10: Pulse period adapted to the bus cycle time in 100 ns (e.g. pulse frequency 5kHz ⇒ display value 2000). If no synchronization is possible, the value NO_SYNCHRONIZATION (= 65535) is entered.

  r748.11: Current state of the T0 counter. Should be 0 for active synchronization (MASTERDRIVE MC only).

  r748.14: Current state of the time slice counter.
  Should be 0 for active synchronization (MASTERDRIVES MC only).

  r748.15: Bus cycle time implemented in 10 µs.

  r748.16: Bus cycle time transmitted during initialization from the master/dispatcher in 10µs.

- **r750: SLB receive data**
  In indices 1 to 16, the received data word 1 to 16 are displayed.
- **r752: SLB transmit data**
  In indices 1 to 16, the received data word 1 to 16 (corresponds to channel 1 to 8) are displayed.

8.3.7 Synchronization of the control circuits by means of the bus cycle time (MC only)

The bus cycle time must be in a defined proportion to the time slots of the individual closed-loop control units in order to synchronize the decentralized lower-level control loops in the converters. The following applies to the time slots in the case of MASTERDRIVES MC:

- Current control in time slot T_0
- Speed control in time slot $T_1 = 2\ T_0$
- Position control in time slot $T_2 = 4\ T_0$
- Synchronism $T_3 = 8\ T_0$ or $T_4 = 16\ T_0$

Standard parameterization

- The time slot T_0 = 1/pulse frequency is set on the MASTERDRIVES MC by selecting the pulse frequency (P340).
  Thus the following applies to the selection of the bus cycle time:

Bus cycle time P746 = 1 / P340 * 2^n n = slowest time slot to be synchronized T_n; where $n \in N = \{2, 3, ...\}$ T_2 can be synchronized as a minimum. Individual synchronization of T_0 or T_1 cannot be implemented.

- Example:
  If the position control loops of the various converters have to be synchronized to each other, the selected bus cycle time has to be a 2^n-fold quantity of 4 T_0. At a pulse frequency of P340 = 5.0 kHz the resulting bus cycle time P746 is at least 0.80 ms (4 * 200 µs).

Synchronization of the slow time slots at a low bus cycle time

In a number of applications it is necessary to set a low bus cycle time and at the same time to synchronize the slower time slots. For this purpose, it is necessary to transfer additional time slot information from the dispatcher over the SIMOLINK to the transceivers. This information is generated in the dispatcher at connector K260. It must be transferred via the SIMOLINK and input to the transceivers at parameter P753. In parameter P754, the slowest time slot to be synchronized is set.

Example:

The bus cycle time should be as short as possible while at the same time the synchronization control is synchronized in T_4 for all drives. At a pulse frequency of 5 kHz (P340), the shortest bus cycle time is 0.80 ms (P746). The dispatcher sets connector K260 to SIMOLINK word 3 (P751 Index 3 = 260) for all transceivers (P753 = 7003). Parameter P754 is set to 4 (for T_4) at the dispatcher and at the transceivers.

Synchronization parameter assignment

Parameters:

- **P 746: SLB cycle time** (dispatcher)
  Serves for setting the bus cycle time. The bus cycle time can be set from 0.20 ms to 6.50 ms in increments of 10 µs. The bus cycle time of the dispatcher is transferred automatically to the slaves. The bus cycle time in effect can be upread from parameter r748 Index 15.
- **P753: Sync. time counter** (transceiver)
  Input parameter for additional time slot information from the dispatcher. This parameter must be connected to the SIMOLINK-connector (K7001 - K7016), which contains the time slot information.
- **P754: Max. sync. time slot** (dispatcher and transceiver)
  The slowest time slot n to be synchronized is entered here. This function will not work unless parameter P753 is connected correctly.

  Connectors:
  K260: Time counter (dispatcher only)
  This connector contains additional time slot information from the dispatcher.

8.3.8 Synchronization diagnostics (MC only)

The following diagnostics information is available to the user:

Binectors

- **B0043: Drive synchronism**
  Bit = 1 indicates that the drive is running is synchronism.
  Bit = 0 indicates that the drive is not yet running is synchronism or cannot be synchronized. This status is also signaled by alert A003.

Parameters

- **r748 Index 9: Synchronism deviation**
  The value should vary between -20 (= 65515) and 20, if synchronization is functioning. A stable value of 65535 indicates that synchronization is turned off because the pulse frequency (P340) and the SLB cycle time do not go together.
- **r748 Index 11: T0 counter**
  The value should always be 0 when synchronization is functioning.

8.3.9 Switchover of the synchronization source (MC only)

MASTERDRIVES MC devices provide the option of plugging in and parameterizing two SIMOLINK modules and two CBP2s. Because of the physical situation, synchronization on only one of the communication modules and data transfer from only one of the two SIMOLINK modules is possible. Connecting up a second SIMOLINK ring would not therefore enable transfer of more data. The only possible applications are installations in which different machine configurations with different SIMOLINK-ring nodes are desired or necessary or where redundancy of the SIMOLINK rings is desired or necessary.

Parameter

- **P744: SLB selection** (dispatcher and transceiver)
  BICO parameter, Index 1, is for selecting a source (binector) by means of which the active SIMOLINK (synchronization and data source) is defined when two SIMOLINK boards are present in a MASTERDRIVES unit.
  By means of Index 2, the Profibus can be selected as the synchronization source. A SIMOLINK, if present, can no longer be used to transfer data; it only works as a transmitter in order to maintain telegram traffic in the SLB ring.
  The synchronization source is selected according to the following scheme:

	744.1	744.2
SLB1 (lower slot) active	0	0
SLB2 (higher slot) active	1	0
CBP active	x	1

- **P755: SIMOLINK configuration**
  If a 1 is set at the second position of the configuration parameter, changeover between the two SIMOLINK boards can be enabled during operation. This is only possible if the bus cycle time is the same even if changeover is enabled during operation.
  - xx0x: No changeover during operation (converter status °014)
  - xx1x: Changeover of synchronization and data transfer allowed during operation

Description of functioning

When two SIMOLINK boards are being operated in one unit, the active board is used for data transfer (same as when only one board is present). The passive board is initialized (SIMOLINK ring starts) and sends the parameterized transmit data. Synchronization and data transfer by the passive board is not possible. Transmit and read data are the same for the active and passive SIMOLINK. Different parameterizations of the two SIMOLINK boards are only possible in the case of the following parameters:

- Node address (P740)
- Number of nodes (P743)
- Number of channels (P745)
- Bus cycle time (P746)

The 1st index is allocated to SLB1 (lower slot) and the 2nd index is allocated to SLB2 (higher slot). Which of the two SLBs is the active one is determined by the selection (P744).

The diagnostic parameter (P748) always indicates the data of the active SIMOLINK.

If it has not been ensured by a master (e.g. SYMADYN D) that the two SIMOLINK rings are working synchronously, it can be assumed that, when a changeover is made to the passive SIMOLINK, there is no synchronization at first. The drives are synchronous with the bus again only after the synchronization time (at 5 kHz pulse frequency and 3.2 ms bus cycle time, maximum 7 sec.). In the case of applications where synchronicity is an essential component of functioning, changeover during operation should not be carried out.

Changeover during operation must be explicitly enabled by the user (P755). In addition, changeover during operation is prevented if synchronization to the previously passive SIMOLINK is not possible because different bus cycle times (P746) have been selected.

8.3.10 Special data and application flags

For special functions, further options for data transmission are available via the SIMOLINK bus.

Application flags

With application flags it is possible to transmit an additional four binary items of information. These are not explicitly assigned to any station, i.e. every station can read and set the application flags. Resetting is only possible via the dispatcher/master.

Parameterization:
P747 Q.SLB Appl.Flags:
Used to specify the binectors to be used as application flags.
B7010 to B7013:
These binectors indicate the applications flags received.

Special data

In addition to the 8 telegrams per station, a total of four special telegrams with 32 bits of useful data are available for data transmission in the SIMOLINK bus. The special telegrams can be read by any station but only written by the dispatcher (currently only MASTERDRIVES MC) / master.

Parameterization:
P756 Q.SLB special data: (dispatcher only)
Used to specify the double connectors to be transmitted as special data.
KK7131 to KK7137:
These connectors indicate the special data received.

8.3.11 Configuration (example of peer-to-peer functionality)

Technology Angular synchronism with 3 MASTERDRIVES MC units.

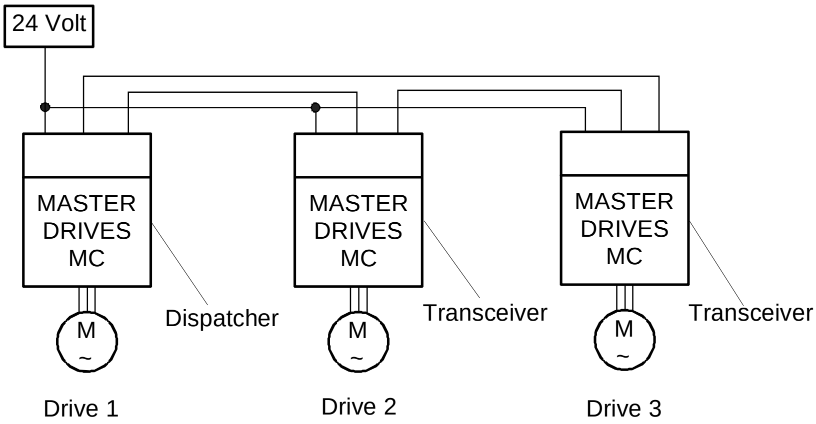


Fig. 8.3-7 Configuration example of peer-to-peer functionality

- Drive 1, master drive with integrated virtual master axis
  The master speed setpoint for the drive group is specified via an analog input or via the PROFIBUS DP.

  The integrated virtual master axis function generates a position, speed and acceleration setpoint for slave drives 2 and 3. In addition, the slave drives are powered up/down by the master drive (control word). This means that every slave drive is given its individual control word.
  Vice versa the slave drives send their individual status word to the master drive. This results in the following table:

		Receive		
		Master drive 1	**Slave drive 2**	**Slave drive 3**
Transmit	Master drive 1		STW_2 s_{set} n_{set} a_{set}	STW_3 s_{set} n_{set} a_{set}
	Slave drive 2	ZW_2		
	Slave drive 3	ZW_3		

Table 8.3-3 Transmitting and receiving control/status words between master and slave drives

- Drive 2 and 3, slave drives with integrated position control

Communication

The 3 SIMOLINK interfaces must be parameterized as follows for transmitting the process data:

♦ SLB in master drive 1 (dispatcher)
The following 5 process data have to be transferred (written):

- STW_2 = control word for drive 2
- STW_3 = control word for drive 3
- s_{set} = position setpoint
- n_{act} = speed setpoint
- a_{act} = acceleration setpoint

5 telegrams (= 5 channels) are required for this.

♦ SLB in slave drive 2 (transceiver)
One item of process data is transferred in ZW_2 (written).
For this, one telegram (= 1 channel) is required.
ZW_2 = status word of drive 2

♦ SLB in slave drive 3 (transceiver)
One item of process data is transferred in ZW_3 (written).
For this, one telegram (= 1 channel) is required.
ZW_3 = status word of drive 3

Parameterization of the dispatcher

The following parameter settings are of significance for the dispatcher as the master drive:

♦ **P740 = 0** (Dispatcher function)

♦ **P745 = 5** (SLB channel number)
This means that each node is provided with five telegrams for writing.

NOTE

The setting always depends on the requirements of the node with the largest required number of channels. In this example, this is the dispatcher (master drive 1) with five telegrams.

♦ **P746 = 1 ms** (SLB cycle time)
A sufficient number of additional telegrams are automatically added to non-addressed nodes as is required to achieve this cycle time.

Synchronization of the control loops in the converter via the bus cycle time: The bus cycle time must be in a defined relation to the time slots of the individual controls for synchronization of the decentralized lower-level control loops in the converters. The following is applicable for the time slots on MASTERDRIVES units:

- Current control in time slot T_0
- Speed control in time slot 2 T_0
- Position control in time slot 4 T_0

- The time slot T_0 = 1/pulse frequency is set on MASTERDRIVES units by selecting the pulse frequency (P340). Thus the following applies for the selection of the bus cycle time:

Bus cycle time = 2^n x slowest time slot to be synchronized; where $n \in N = \{2, 3, ...\}$

Example:
If the position control loops of the various converters have to be synchronized to each other, the selected bus cycle time has to be an n-fold quantity of 4 T_0.

Parameterization of the transceivers

Transceiver (slave drive 2) is given the node address 1 and transceiver (slave drive 3) is given the node address 2.

Parameterization of process data monitoring

The following diagrams show the assignment of the process data to be read or written using the example of master drive 1 and slave drive 2.

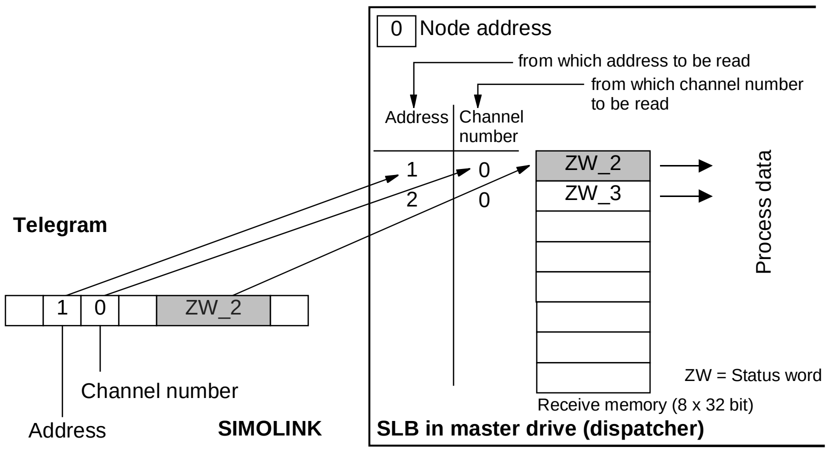


Fig. 8.3-8 Master drive 1, reading data

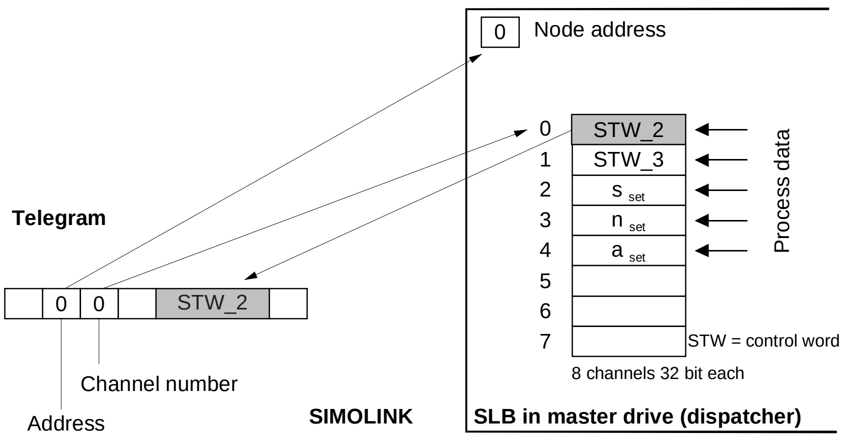


Fig. 8.3-9 Master drive 1, writing data

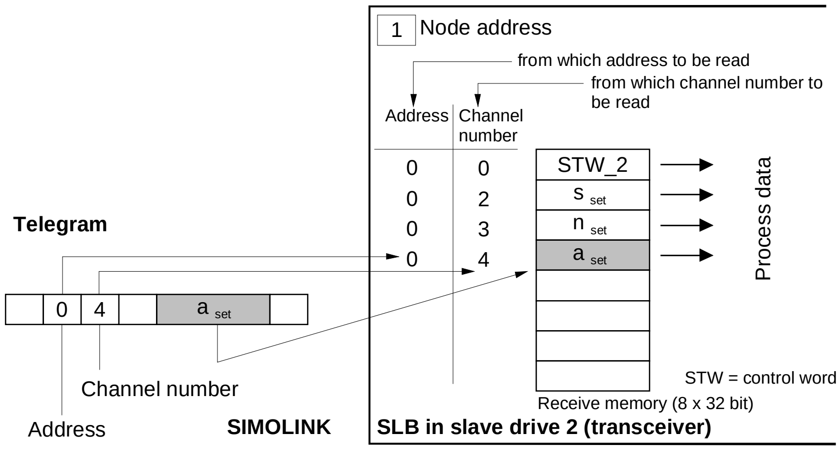


Fig. 8.3-10 Slave drive 2, reading data

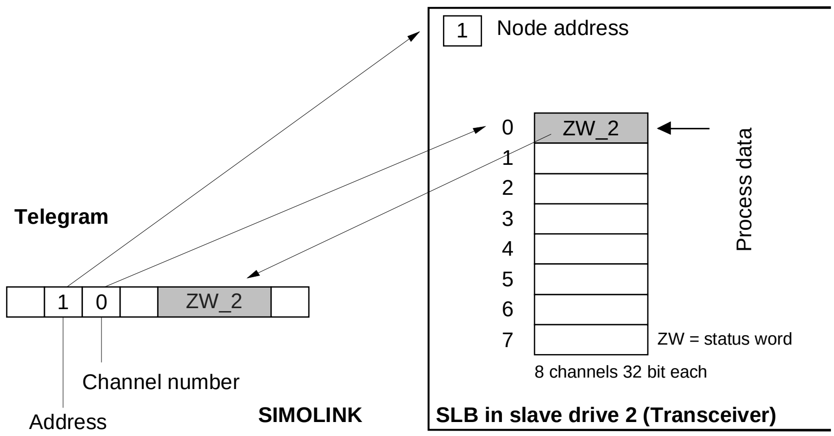


Fig. 8.3-11 Slave drive 2, writing data

8.3.12 Master/slave functionality

In the master-slave functionality, an SL master (SIMOLINK interface) operates in an automation system instead of the dispatcher (peer-to-peer).

There is always only one SL master in the SIMOLINK ring. All the other nodes are transceivers.

Bus topology

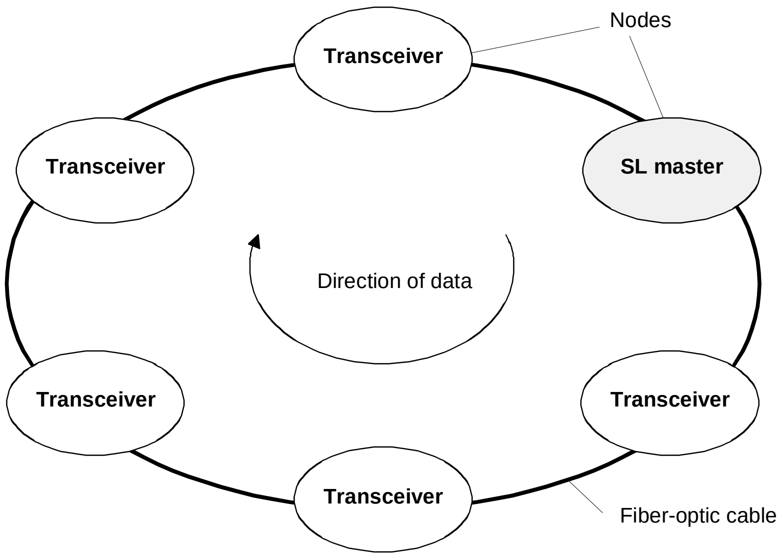


Fig. 8.3-12 SIMOLINK ring with SL master

SL master

The SL master is the SIMOLINK interface in "higher-level" open-loop and closed-loop control systems or industrial PCs. As far as the central control of telegram traffic is concerned, there is no difference between the dispatcher and the SL master. The task table also specifies in the case of the SL master which and how many telegrams the SL master shall send via the bus in one bus cycle.

Differences to the dispatcher:

- ♦ The applications of the "Master/slave" functionality require a different mechanism for data transfer than used in the "Peer-to-peer" functionality.
- ♦ Flexible address list (address gaps are possible), i.e. the task table can be configured a lot more freely.
- ♦ The number of channels used per transceiver can be individually determined and does not have to be identical. The maximum number of channels per transceiver is generally restricted to 8.
- ♦ The SL master itself has 8 channels for data transfer, just as in the case of the dispatcher or transceiver, however, at the same time it can use the telegrams with the address and channel number code of the transceivers for its data transfer.

NOTE

The SL master uses the "intelligence" and the possibilities offered by the open/closed-loop control system or the PC for configuring the task table. The following SL masters are currently available:

- SIMOLINK module in SIMATIC FM458
- Expansion board ITSL in SIMADYN D

Transceiver

In accordance with the peer-to-peer functionality

8.3.13 Application with master/slave functionality

Principle

This configuration is not based on the principle of freely selectable data transfer between MASTERDRIVES MC/VC units because control is effected from a higher-level automation system.

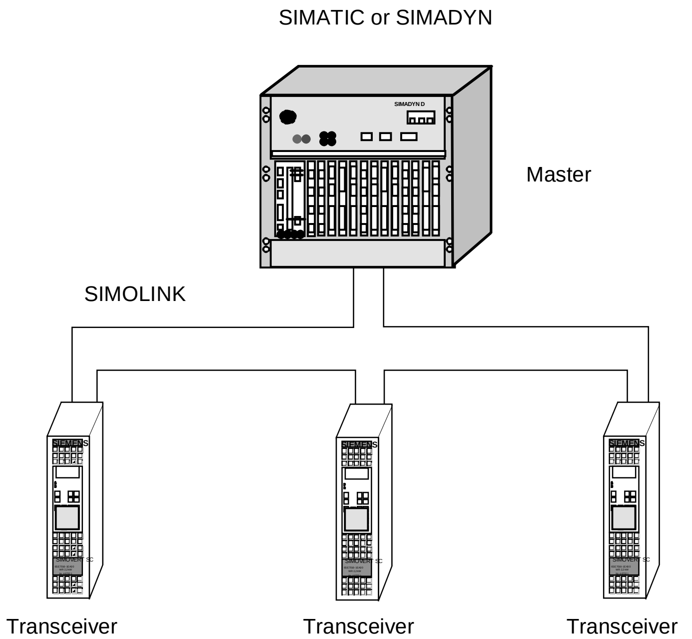


Fig. 8.3-13 Application example of master/slave functionality

There is a SIMOLINK interface in the automation system which also operates as a logical master in addition to the dispatcher function. This means that the automation system dispatches a maximum of eight 32 bit data back to the master by overwriting received telegrams with the dispatch information. This is the typical structure of data exchange according to the master/slave principle.

Rules for the exchange of data

- Each transceiver can read a maximum of 8 telegrams, however, the difference to the peer-to-peer functionality is that only telegrams which have an address corresponding to the address of the node or the master address 0 are read.
  Note: These telegrams must, of course, be entered in the task table of the master.
- As in the case of the peer-to-peer functionality, each transceiver can only write data on telegrams whose telegrams have the address of the transceiver.
- The master can read and write on all telegrams.

The master can implement data exchange between two transceivers by transferring the received data of one transceiver to the telegrams (= address) of the other.

NOTE

Every transceiver can also read the telegrams of any other node. However, whether the read data are receive or transmit data, depends on where the respective nodes are situated in the SIMOLINK ring (definite data traffic in the SIMOLINK ring).

NOTICE

The SIMADYN-D master can be operated in different SIMOLINK operating modes.
Modes 3 to 5 are suitable for error-free data traffic with MASTERDRIVES. Especially when using the asynchronous mode (= 1) problems can arise on the MASTERDRIVES MC/VC because the hardware interrupt generated by the bus cycle might not be equidistant and hardware interrupts triggered in too quick succession will cause a computation time overflow in the MASTERDRIVES MC/VC basic unit.

8.4 CBC Communications Board

8.4.1 Product description

The optional CBC board (Communication Board CAN) is used for connecting drives to higher-level automation units and other field units by means of the CAN (Controller Area Network) protocol.

View

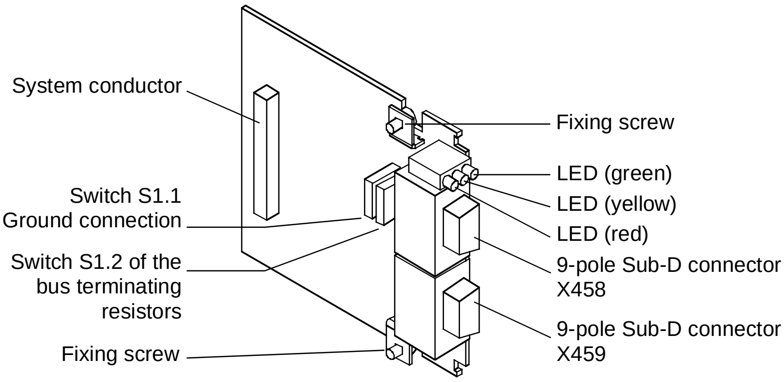


Fig. 8.4-1 View of the optional CBC board

Technical information

The optional board has three LEDs (green, yellow and red) for providing information on the current operating status.

It is supplied with voltage via the basic unit.

The CBC can be simply plugged into the electronics box of the converter and works with all software and hardware output-states of the MASTERDRIVES converters.

The CBC has a 9-pole Sub-D connector (X458) and a 9-pole Sub-D socket (X459) for connecting it to the CAN bus. The pins of these connecting elements are identically assigned and connected through internally. They are also short-circuit proof and floating.

Functions

The CAN (Controller Area Network) protocol is permanently specified in the international standards recommendation, ISO-DIS 11898. Here, however, only the electrical part of the physical and the data link layers are specified (layer 1 and layer 2 in the ISO-OSI-7 layer reference model). The CiA, with its DS 102-1 recommendation, defines the bus interface and the bus medium for use as an industrial field bus.

The CBC complies with the specifications in ISO-DIS 11898 and in DS 102-1.

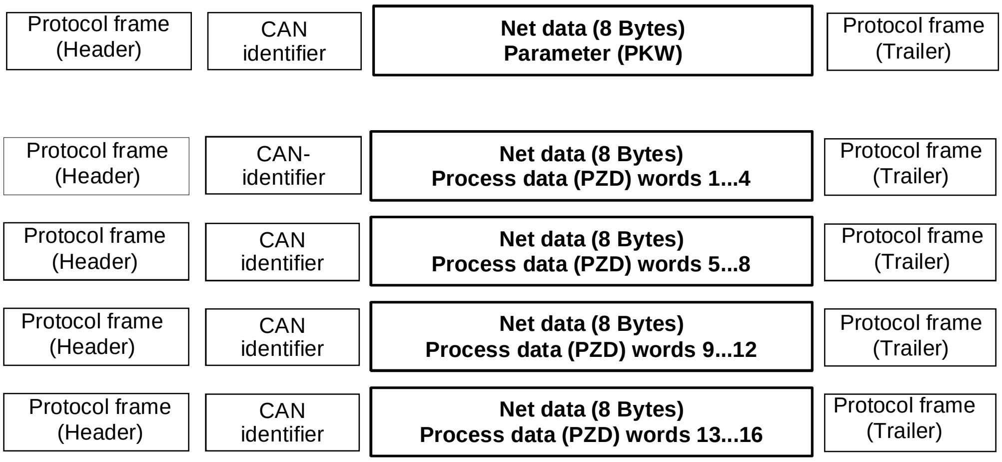
A data profile for variable-speed drives similar to the VDI/VDE guideline 3689 "PROFIBUS profile for variable speed drives" has not yet been defined. The specifications of the "PROFIBUS profile for variable speed drives" are therefore used for the net data.

For the drives, VDI/VDE guideline 3689 specifies the net-data structure with which a communications partner can access the drive slaves. The net-data structure is divided into two areas:

- The process-data area, i.e. control words and setpoints or status information and actual values
- The parameter area for reading/writing parameter values, e.g. reading out faults and reading out information on the properties of a parameter such as reading out min./max. limit values etc.

The number of process data (maximum 16) and activation of the parameter interface is parameterized on the unit. The parameterization of the net-data structure depends on the function of the drive within the overall automation system. The process data are processed with the highest priority and in the shortest time slices. The process data are for controlling the drive within the overall automation system, e.g. power-on/power-off, stipulation of setpoints, etc.

With the help of the parameter area, the user has free access to all parameters in the converter (CU and, if necessary, the TB) via the bus system. This facility can be used, for example, for reading out detailed diagnostic information, fault messages and so on. Information for visualizing the drive can thus be called using a higher-level system, e.g. a PC, without affecting the transfer of process-data.



PKW: Parameter ID word
PZD: Process data

Fig. 8.4-2 Structure of the net data in the telegrams of the CAN protocol

Controlling and operating the MASTERDRIVES converters via the CAN bus

In the process-data area (see Fig. 1-2), all the information is transferred which is necessary for controlling a speed-controlled drive in an integrated technical process. Control information (control words) and setpoints are given to the converter by the CAN-bus master. In the reverse direction, information on the status of the converter (status words) and actual values are transferred.

The CBC communications board stores the received process data in the dual-port RAM in the sequence in which they are transferred in the telegram.

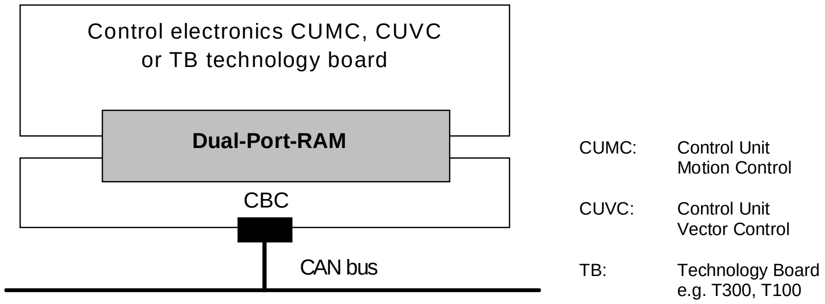


Fig. 8.4-3 Coupling of the CBC to the converter via the dual-port RAM interface

An address is assigned to each word in the dual-port RAM. The contents of the dual-port RAM in the converter (CU + if necessary the TB) can be freely routed by means of parameters, e.g. the second word in the process-data area of the telegram as a speed setpoint sent to the ramp-function generator connected downstream. The same mechanism applies to other setpoints and to each individual bit of the control word. The procedure is also used in the reverse direction for transferring actual values and the status words.

Besides supporting the normal exchange of process data, the CBC communications board also supports broadcasting (same process data for all drives on the bus), multicasting (same process data for a group of drives on the bus) and cross traffic (data exchange between the individual drives without participation of a CAN-bus master).

Diagnostic LEDs quickly provide the user with information on the current status of the CBC. Detailed diagnostic information can be directly read out of the diagnostics memory of the CBC by means of a diagnostic parameter.

8.4.2 Mounting methods / CBC slots

NOTE

The CBC can be directly mounted into Compact PLUS units. In all other types of unit in this series, it is mounted on the CUMC or CUVC or connected in the electronics box with an adapter board.

8.4.2.1 Mounting positions of the CBC in MC Compact PLUS units

NOTE

In principle, the optional CBC board (Communications Board CAN) can be mounted in any slot. Please bear in mind, however, that an encoder board always requires Slot C.

Position of the slots

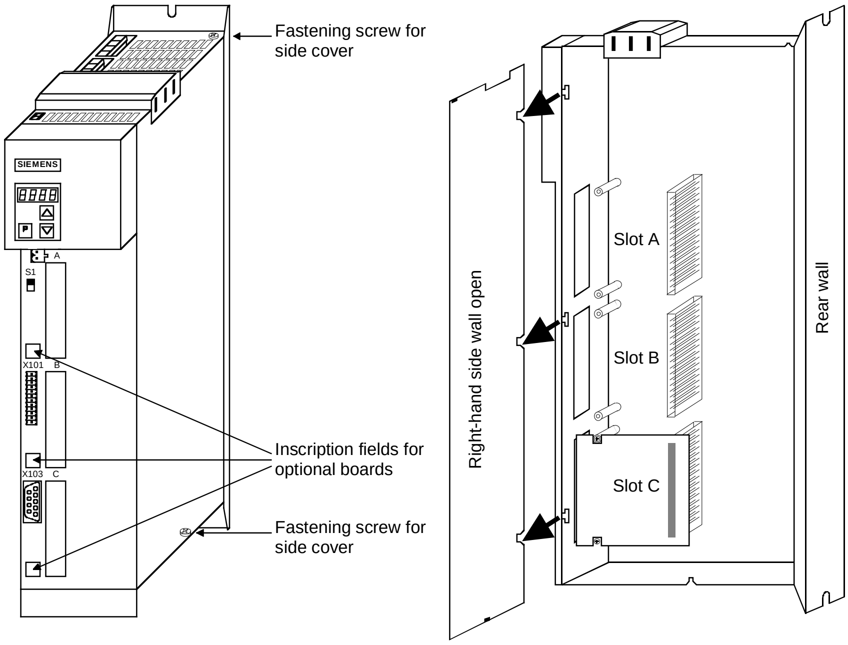


Fig. 8.4-4 Position of the slots (with side wall on the right removed)

DANGER

Due to the DC link capacitors, hazardous voltages are still present in the converter up to 5 minutes after it has been disconnected from the power supply. Before opening the converter, wait until the capacitors have completely discharged.

8.4.2.2 Mounting positions of the CBC in Compact and chassis units of function classes MC (CUMC) and VC (CUVC)

Slots

In the electronics box of the compact-type and chassis-type converters and inverters, there are up to six slots available for installing an optional board. The slots are marked with the letters A to G. Slot B is not present in these types of unit; it is used in Compact PLUS units.

If you wish to use Slots D to G, you must first mount the LBA (Local Bus Adapter) and the corresponding adapter board (MLFB).

NOTE

In principle, you can operate the optional CBC board (Communication Board CAN) in any slot. Please bear in mind, however, that an encoder board always needs Slot C and that the LBA requires the slots to be used in a particular sequence.

The CBC can be mounted on the adapter board in both slots, i.e. TOP and/or BOTTOM.

Position of the slots

The slots are located at the following positions:

- Slot A CU board Top
- Slot C CU board Bottom
- Slot D Adaptation board in mount. pos. 2 Top
- Slot E Adaptation board in mount. pos. 2 Bottom
- Slot F Adaptation board in mount. pos. 3 Top
- Slot G Adaptation board in mount. pos. 3 Bottom

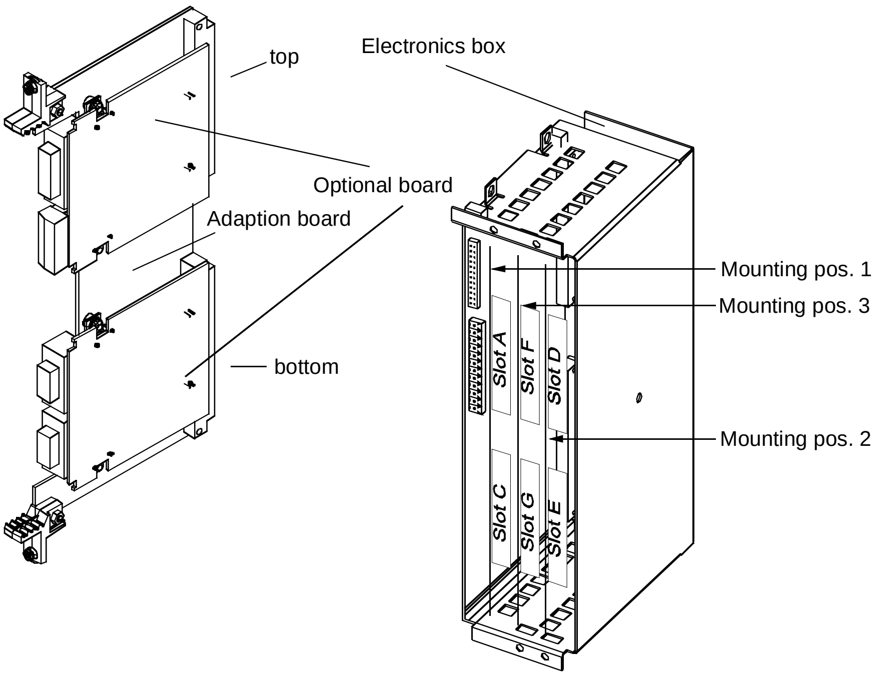


Fig. 8.4-5 Adaptation board with optional boards and position of the slots for Compact units and chassis-type units

DANGER

Due to the DC link capacitors, hazardous voltages are still present in the converter up to 5 minutes after it has been disconnected from the power supply. Before opening the converter, wait until the capacitors have completely discharged.

For technical reasons, certain sequences for using the slots are stipulated for the LBA.

If only one adaptation board with optional boards is inserted in the electronics box, it must always be inserted in slot +1.B2 (ON THE RIGHT), i.e. mounting position 2.

If a T100 / T300 or T400 technology board is plugged into the electronics box in addition to the adapter board with CBC, the technology board must be plugged into position +1.B2. In this case, the CBC is plugged into position +1.B3.

8.4.2.3 Mounting positions of the CBC in Compact type and chassis type units with the CU of the function classes FC (CU1), VC (CU2) or SC (CU3)

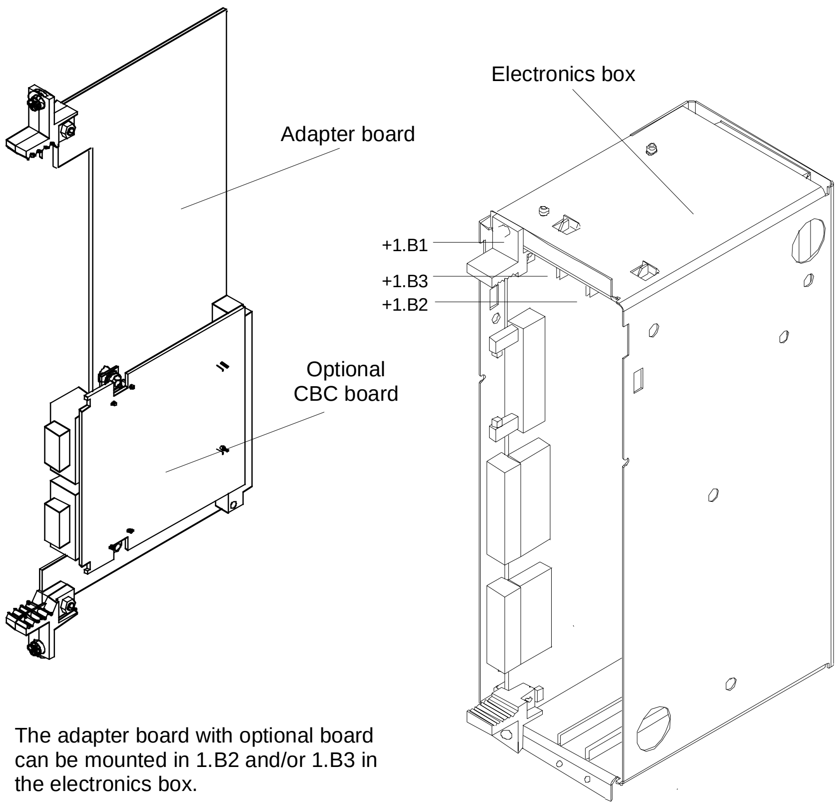


Fig. 8.4-6 Electronics box with free slots (+1.B2 and +1.B3) and adapter board with CBC

On the adapter board, **only one** CBC may be mounted in position X 198, i.e. BOTTOM.

In order to mount the CBC with adapter board, the LBA (Local Bus Adapter) backplane adapter must first be mounted.

NOTE

If only one optional board is used, it must always be plugged in position +1.B2 (RIGHT) in the electronics box.

If, in addition to the CBC, a technology board (T100 / T300 or T400) is plugged into the electronics box, the technology board must be plugged into position +1.B2. In this case, the CBC is plugged into position +1.B3.

8.4.2.4 Mounting positions of the CBC in VC Compact PLUS units

NOTE

In principle, the optional CBC board (Communications Board CAN) can be mounted in any slot.

Position of the slots

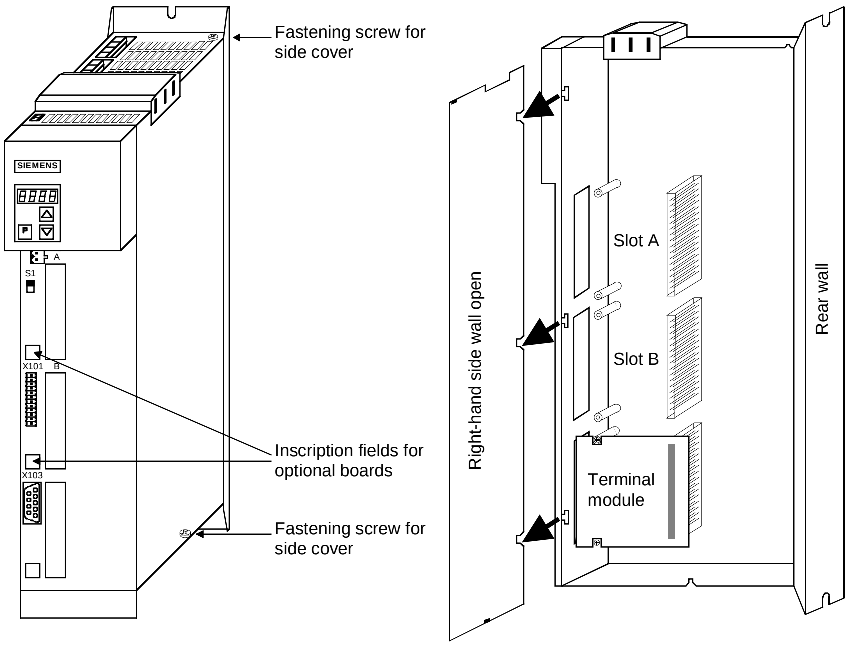


Fig. 8.4-7 Position of the slots (with side wall on the right removed)

DANGER

Due to the DC link capacitors, hazardous voltages are still present in the converter up to 5 minutes after it has been disconnected from the power supply. Before opening the converter, wait until the capacitors have completely discharged.

8.4.3 Connecting

DANGER

The SIMOVERT MASTERDRIVES are operated with high voltages.
Any work on the unit may only be carried out by qualified personnel.
If this warning is ignored, serious bodily injury or considerable damage to property can occur as a consequence.

Because of the DC link capacitors, there continues to be dangerous voltage in the unit until up to 5 minutes after disconnection. The unit must not therefore be opened until at least this length of time has expired.

Even when the motor is at a standstill, the power terminals and the control terminals can carry voltage. During work on the converter, it is to be disconnected from supply.

When handling the opened converter, it must be kept in mind that live components are exposed.

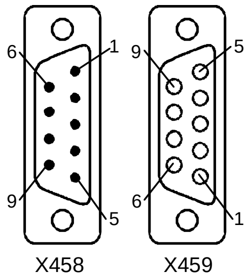
NOTICE

The CBC contains electrostatically sensitive components. These components can very easily be destroyed by improper handling.

8.4.3.1 Connection of the bus cable

The optional CBC board has a 9-pole Sub-D connector (X458) and a 9-pole Sub-D socket (X459) which are provided for connection to the CAN bus.
Both terminals are identically assigned and connected through internally. They are also short-circuit proof and floating.

X458, X459



Pin	Designation	Significance
1	-	Not assigned
2	CAN_L	CAN_L bus cable
3	CAN_GND	CAN ground (ground M5)
4	-	Not assigned
5	-	Not assigned
6	CAN_GND	CAN ground (ground M5)
7	CAN_H	CAN_H bus line
8	-	Not assigned
9	-	Not assigned

Table 8.4-1 Terminals X458 (pins) and X459 (socket)

The two Sub-D connectors X458 and X459 are identically assigned and all conductors are connected through internally.

The bus cable must have at least four cores, stranded in pairs, with a wave resistance of 120 ohms, e.g. the PYCYM wiring cable from SIEMENS.

Order No.: 5DV5 002 PYCYM 2 x 2 x 0.6

As a plug, the Sub-D connector SBM 383 from SIEMENS is recommended:

Connector components	Order No.
9-pole male connector	V42254-A1115-A209
9-pole female connector	V42254-A1115-B209
Housing (shielded)	V42254-A6000-G109
Knurled-head screw for screw interlocking	V42254-A112-V009

Mounting the bus cable

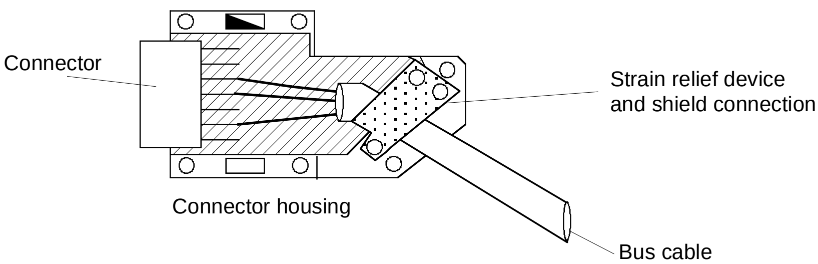


Fig. 8.4-8 Connecting the bus cables

- When stripping the insulation off the shield, make sure that the shield is not damaged!
- When stripping the insulation off the core ends, make sure that the copper core is not damaged!

Data transfer rate	Max. cable length (in m)
10 kBit/s	1000
20 kbit/s	1000
50 kBit/s	1000
100 kBit/s	750
125 kBit/s	530
250 kBit/s	270
500 kBit/s	100
800 kBit/s	20
1 Mbit/s	9

Table 8.4-2 Cable length in relation to the baud rate

8.4.3.2 EMC measures

For fault-free CAN bus operation, the following measures are necessary:

Shielding

NOTICE

The bus cables must be twisted and shielded and are to be routed separately from power cables, the minimum clearance being 20 cm. The shield must be connected through the largest possible surface area on both sides, i.e. the shield of the bus cable between 2 converters must be connected to the converter housing or the connector housing at **both** ends. The same applies to the shield of the bus cable between the CAN bus master and the converter.

If bus and power cables intersect, they must do so at an angle of 90 °.

With regard to the CAN bus, there are two ways of attaching the shield:

1. Attaching the shield with the help of shield clamps:
   The shield of the bus cable can be attached to the converter housing with the help of shield clamps (Compact units) or shield clamps and cable ties (chassis units). How to use the shield clamps is shown in Fig. 8.4-8 and Fig. 8.4-9. In this case, the shield must not be exposed in the bus connector at the CBC but at the converter housing (see Fig. 8.4-10).
2. Attaching the shield in the connector housing:
   The shield of the bus cable can be connected to the shield of the connector housing and is then connected to the CBC board via the connector and to ground as well (see Fig. 8.4-7).

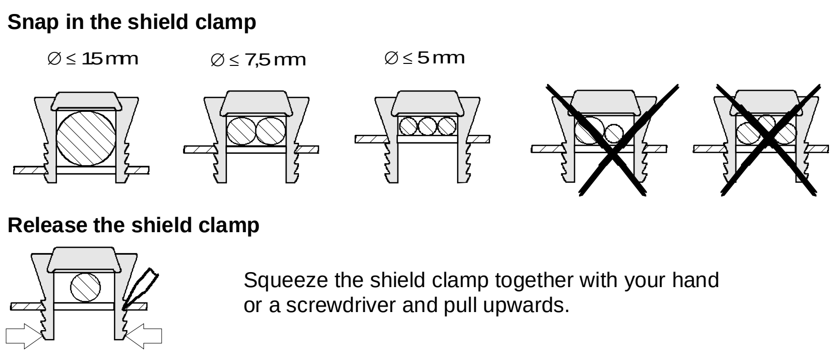


Fig. 8.4-9 Using the shield clamps

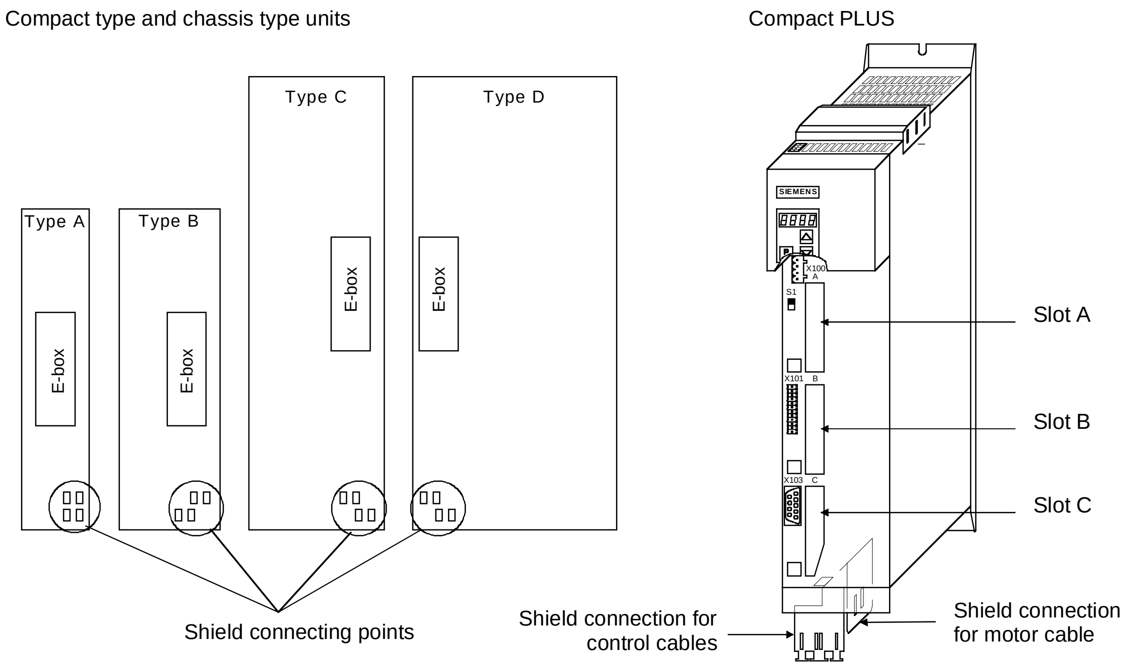


Fig. 8.4-10 Position of the shield connecting points

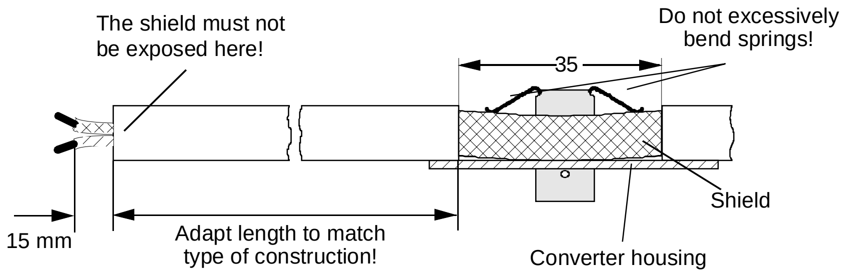


Fig. 8.4-11 Removing insulation from the cable when shield clamps are used

Potential equalization

- Please avoid differences in potential (e.g. as a result of different power supply levels) between the converters and the PROFIBUS-DP master.
- Use equipotential bonding cables:
  - 16 mm^2 Cu equipotential bonding cables up to 200 m
  - 25 mm^2 Cu equipotential bonding cables over 200 m
- Route the equipotential bonding cables so that there is the smallest possible surface between the equipotential bonding cables and signal cables.
- Connect equipotential bonding cables to the ground/protective conductor through the largest possible surface area.

Laying cables

Please comply with the following instructions when laying cables:

- Do not lay bus cables (signal cables) directly parallel to power cables.
- Lay signal cables and the associated equipotential bonding cables with the lowest possible distance between them and on the shortest routes.
- Lay power cables and signal cables in separate cable ducts.
- Attach shields through a large surface area.

8.4.3.3 Bus termination of the CAN bus (jumper S1.2)

For fault-free operation of the CAN bus, the bus cable must be terminated with bus terminating resistors at both ends (see Fig. 8.4-11). The bus cable from the first CAN bus node up to the last CAN bus node is to be regarded as **one** bus cable so that the CAN bus must only be terminated twice.

The bus terminating resistors must be connected into the circuit at the first bus node (e.g. the master) and the last bus node (e.g. the slave). If the bus-terminating node is a CBC, please close jumper S1.2 of the DIP-FIX switch, S1, on the CBC board!

NOTE

Please ensure that the bus termination is only connected in the circuit at the first bus node and the last bus node (e.g. CBC)!

Jumper	Function	As supplied
S1.2	Bus termination X458/459	Open (no bus termination)

Table 8.4-3 Bus termination with switch S1

8.4.3.4 Ground connection (jumper S1.1)

Jumper S1.1 normally remains open. If the CAN bus interface of the master is operated as a ground-free interface, you can close jumper S1.1 on one converter in order to connect the bus to ground.

Jumper	Function	As supplied
S1.1	Ground connection, interface ground (X458/459)	Open (no bus termination)

Table 8.4-4 Ground connection with switch S1

NOTE

For fault-free operation of the CAN bus, the bus cable must be terminated with bus terminating resistors at both ends. The bus cable from the first CAN bus node up to the last CAN bus node is to be regarded as one bus cable so that the CAN bus must only be terminated twice.

Switch S1.2 of the bus terminating resistors is located on the optional board behind connector X458.

NOTE

If the CAN bus interface of the master is to be operated ground-free, you can close switch S1.1 at one node in order to connect the bus to ground.

The switch for ground connection is located on the optional board behind connector X458.

8.4.3.5 Interface X458 / X459 with jumper strip S1

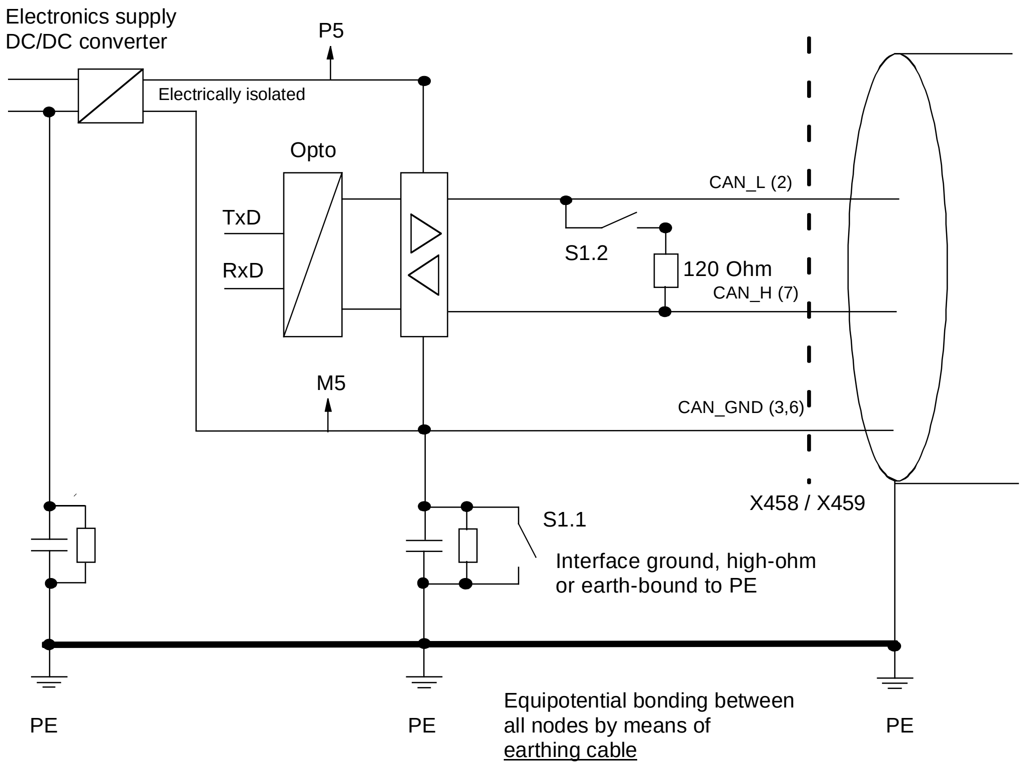


Fig. 8.4-12 Function of jumper strip S1

8.4.3.6 Recommended circuits

Replacing the CBC with bus interruption

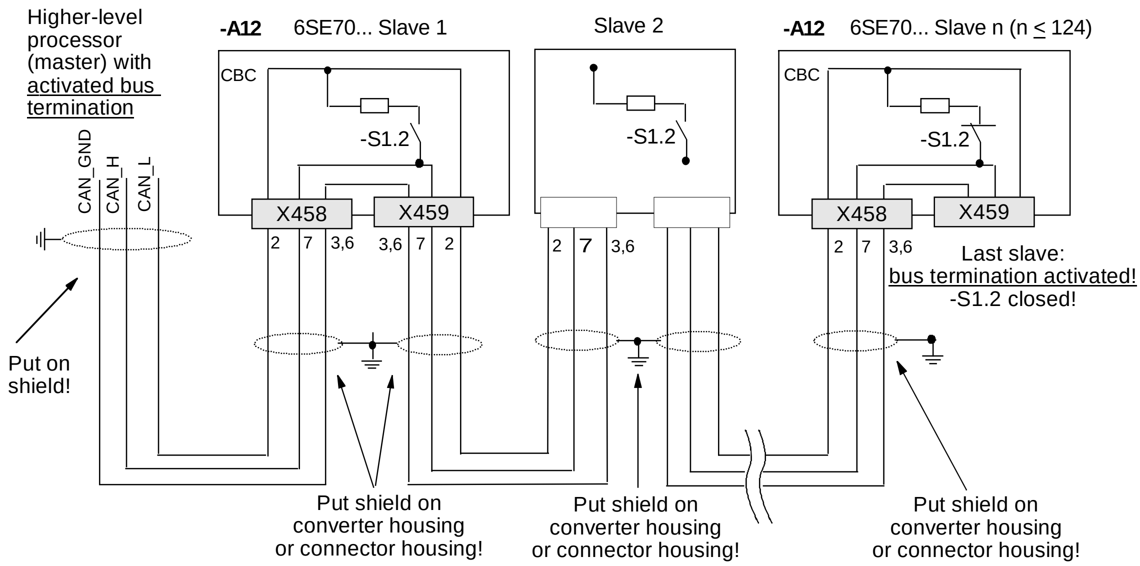


Fig. 8.4-13 Bus connection interrupted when connector X458 or X459 is pulled out

Replacing the CBC without bus interruption

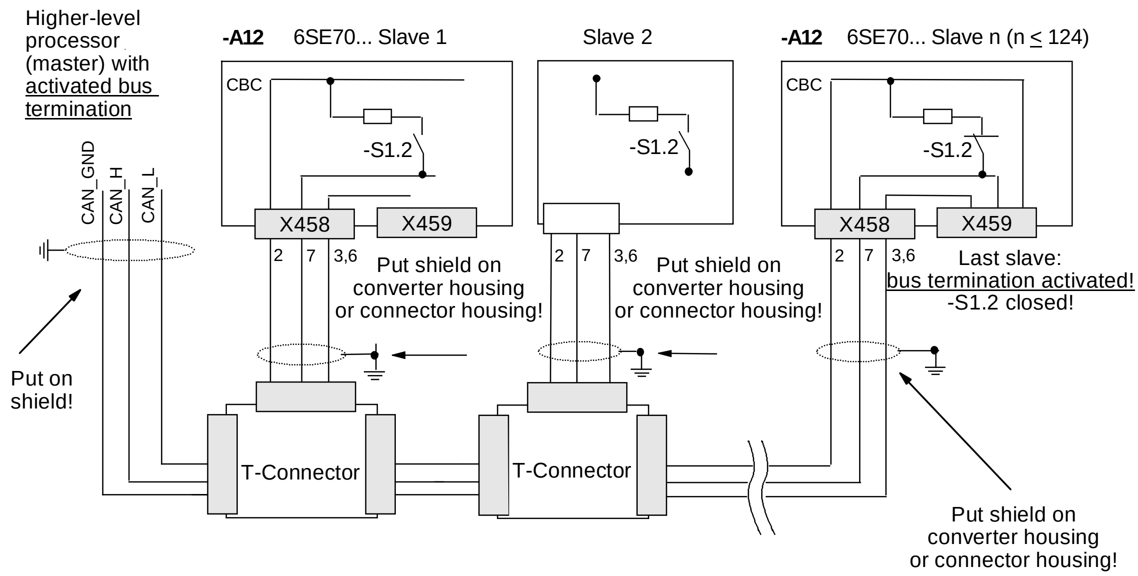


Fig. 8.4-14 Bus connection not interrupted when connector X458 is pulled out

8.4.4 Data transfer via the CAN bus

8.4.4.1 General

With regard to the transfer of net (useful) data, a distinction is made between parameter data (PKW data) and process data (PZD data) (see also Section 8.4.1 "Product description").

Protocol frame (Header)	CAN identifier	**Net data (8 Bytes) Parameter (PKW)**	Protocol frame (Trailer)
Protocol frame (Header)	CAN-identifier	**Net data (8 Bytes) Process data (PZD) words 1...4**	Protocol frame (Trailer)
Protocol frame (Header)	CAN identifier	**Net data (8 Bytes) Process data (PZD) words 5...8**	Protocol frame (Trailer)
Protocol frame (Header)	CAN identifier	**Net data (8 Bytes) Process data (PZD) words 9...12**	Protocol frame (Trailer)
Protocol frame (Header)	CAN identifier	**Net data (8 Bytes) Process data (PZD) words 13...16**	Protocol frame (Trailer)

PKW: Parameter ID word
PZD: Process data

Fig. 8.4-15 Structure of the net data in the telegrams of the CAN protocol

A CAN data telegram consists of the protocol header, the CAN identifier (ID), up to 8 bytes of net data and the protocol trailer.

The CAN identifier is used for unambiguously identifying the data telegram. In the standard message format, a total of 2048 different CAN identifiers are possible and, in the extended message format, 2^{29} CAN identifiers. The extended message format is tolerated by the CBC but not evaluated.

The CAN identifier also specifies the priority of the data telegrams. The lower the number of the CAN identifier, the higher its priority. If two or more bus nodes want to send data telegrams at the same time, the CAN telegram with the lowest CAN identifier and thus the highest priority is accepted.

A maximum of 8 bytes of net data can be transferred in a CAN data telegram. The PKW area always consists of 4 words or 8 bytes, i.e. the data can be transferred in a single data telegram.

In contrast to this, the process data area for MASTERDRIVES consists of 16 words, i.e. a total of 4 data telegrams are needed to transfer all possible process data.

8.4.4.2 Parameter area (PKW)

With the PKW mechanism, you can perform the following tasks:

- reading parameters
- writing parameters
- reading the parameter description
  (parameter type, max./min. value, etc.)

The parameter area is always composed of 4 words.

1st word:

Parameter ID (PKE)				
Byte 1			Byte 0	
Bit No.: 15	12	11	10	0
AK		SPM	PNU	

2nd word:

Parameter index (IND)			
Byte 3		Byte 2	
Bit No.: 15	8	7	0
Bit 15 = PARA PAGE SEL		Index	

	Parameter value (PWE)	
3rd word:	Byte 5	Byte 4
	Parameter value **Low** (PWE1)	
4th word:	Byte 7	Byte 6
	Parameter value **High** (PWE2)	

AK: Task or reply ID
SPM: Toggle bit for processing the parameter change report (not supported by the CBC)
PNU: Parameter number

Parameter ID (PKE)

The parameter ID (PKE) is **always** a 16-bit value.

Bits 0 to 10 (PNU) contain the number of the required parameter. The meaning of the parameters can be found in the section, "Parameter list", of the converter operating instructions.

Bit 11 (SPM) is the toggle bit for parameter change reports.

NOTE

Parameter change reports are not supported by the CBC.

Bits 12 to 15 (AK) contain the task reply ID.

The meaning of the task ID for the task telegram (master → converter) is shown in Table 8.4-5. It corresponds to the specifications in the "PROFIBUS profile for variable-speed drives". Task IDs 10 to 15 are specific to SIMOVERT MASTERDRIVES and are not defined in the PROFIBUS profile.

The meaning of the reply ID for the reply telegram (converter → master) is shown in Table 8.4-6. This also corresponds to the specifications in the "PROFIBUS profile for variable-speed drives". Reply IDs 11 to 15 are specific to SIMOVERT MASTERDRIVES and are not defined in the PROFIBUS profile. If the reply ID has the value 7 (task cannot be executed), an error number is placed in parameter value 1 (PWE1).

Task ID	**Meaning**	**Reply ID**	
		positive	**negative**
0	No task	0	7 or 8
1	Request parameter value	1 or 2	↑
2	Change parameter value (word) for non-indexed parameters	1	
3	Change parameter value (double word) for non-indexed parameters	2	
4	Request descriptive element [1]	3	
5	Change descriptive element **(not with the CBC)**	3	
6	Request parameter value (array) [1]	4 or 5	
7	Change parameter value (array, word) for indexed parameters [2]	4	
8	Change parameter value (array, double word) for indexed parameters [2]	5	
9	Request number of array elements	6	
10	Reserved	-	
11	Change parameter value (array, double word) and store in the EEPROM [2]	5	
12	Change parameter value (array, word) and store in the EEPROM [2]	4	
13	Change parameter value (double word) and store in the EEPROM	2	
14	Change parameter value (word) and store in the EEPROM	1	↓
15	Read or change text **(not with the CBC)**	15	7 or 8

1 The required element of the parameter description is specified in IND(2nd word)

2 The required element of the indexed parameter is specified in IND(2nd word)

Table 8.4-5 Task ID (master -> converter)

Reply ID	Meaning
0	No reply
1	Transfer parameter value in the case of non-indexed parameters (word)
2	Transfer parameter value in the case of non-indexed parameters (double word)
3	Transfer descriptive element [1]
4	Transfer parameter value (array, word) in the case of indexed parameters [2]
5	Transfer parameter value (array, double word) in the case of indexed parameters [2]
6	Transfer number of array elements
7	Task cannot be executed (with error number)
8	No operator change rights for the PKW interface
9	Parameter change report (word) **(not with the CBC)**
10	Parameter change report (double word) **(not with the CBC)**
11	Parameter change report (array, word) [2] **(not with the CBC)**
12	Parameter change report (array, double word) [2] **(not with the CBC)**
13	Reserved
14	Reserved
15	Transfer text **(not with the CBC)**

1 The required element of the parameter description is specified in IND (2nd word)
2 The required element of the indexed parameter is specified in IND (2nd word)

Table 8.4-6 Reply ID (converter -> master)

Example of parameter identifier

Source for the ON/OFF command (control word 1, bit 0): P554 (=22A Hex)
Change parameter value (array, word) and store in the EEPROM.

1st word	Parameter ID (PKE)			
Bit No.:	15 12	11	10	0
	AK	SPM	PNU	
	Byte 1		Byte 0	
Binary value	1 1 0 0	0 0 1 0	0 0 1 0	1 0 1 0
HEX value	C	2	2	A

Bits 12 to 15: Value = 12 (= "C" Hex); change parameter value (array, word) and store in the EEPROM

Bits 0 to 11: Value = 554 (= "22A" Hex); parameter number without a set parameter change report bit

Error numbers in the case of reply "Task cannot be executed"

Error numbers in the case of reply "Task cannot be executed" (converter parameters).
The error numbers are transferred in the 3rd word (PWE1) of the reply.

No.	Meaning	
0	Non-permissible parameter number (PNU)	If there is no PNU
1	Parameter value cannot be changed	If the parameter is a visualization parameter
2	Upper or lower limit exceeded	–
3	Erroneous subindex	–
4	No array	In the case of tasks for indexed parameters, to a non-indexed parameter e.g. Task: ‘Change parameter value (word, array)’ for non-indexed parameter
5	Incorrect data type	–
6	Setting not allowed (can only be reset)	–
7	Descriptive element cannot be altered	Task never possible with MASTERDRIVES
11	No operator control rights	–
12	Key word missing	Converter parameter: ‘Access key' and/or 'Parameter special access' not correctly set
15	No text array present	–
17	Task cannot be executed because of operating status	Converter status does not permit the set task at the moment
101	Parameter number deactivated at present	–
102	Channel width too small	Parameter reply too long for the CAN telegram
103	PKW: number incorrect	*Cannot occur with the CBC*
104	Parameter value not admissible	–
105	The parameter is indexed	In the case of tasks for non-indexed parameters, to an indexed parameter e.g. Task: 'PWE, change word' for indexed parameter
106	Task not implemented	–

Comment on error number 102:

This error number is transferred if the parameter reply to a parameter task is longer than the available 8 bytes of the CAN data telegram and therefore cannot be transferred. The data are not divided up to create several telegrams.

Comment on error number 104:

This error number is transferred if, in the converter, no function has been assigned to the parameter value which is to be adopted or if the value cannot be accepted at the time of the change for internal reasons (even though it is within the limits).

Table 8.4-7 Error numbers in the case of reply "Task cannot be executed" (converter parameter)

Example

The parameter ‘PKW number’ for the G-SST1 (number of net data in the PKW channel):

Minimum value: 0 (0 words)
Maximum value: 127 (corresponds to variable length)
Permissible values for USS: 0, 3, 4 and 127

If a change task with a PWE other than 0, 3, 4 or 127 is sent to the converter, the reply is: 'Task cannot be executed' with error value 104.

Parameter index (IND) 2nd word

The index is an 8-bit word and is always transferred over the CAN bus in the low byte (bits 0 to 7) of the parameter index (IND). The high byte (bits 8 to 15) of the parameter index (IND) contains the parameter page selection bit (bit 15).

The parameter page selection bit acts as follows:

If this bit = 1, the parameter number (PNU) transferred in the PKW request is given an offset of 2000 in the CBP and then passed on.

Parameter designation (as per parameter list)	Serial parameter number	Parameter addresses via PROFIBUS		
		PNU [decimal]	PNU [hex.]	Bit *)
P000 - P999 (r000 - r999)	0 - 999	0 - 999	0 - 3E7	= 0
H000 - H999 (d000 - d999)	1000 - 1999	1000 - 1999	3E8 - 7CF	= 0
U000 - U999 (n000 - n999)	2000 - 2999	0 - 999	0 - 3E7	= 1
L000 - L999 (c000 - c999)	3000 - 3999	1000 - 1999	3E8 - 7CF	= 1

*) Parameter page selection

In the case of an indexed parameter, the required index is transferred. The meaning of the indices can be found in the section, "Parameter list", of the instruction manual for the converter.

In the case of a descriptive element, the number of the required element is transferred. The meaning of the descriptive elements can be found in the "PROFIBUS profile for variable-speed drives" (VDI/VDE 3689).

Example Parameter index

Source for the ON/OFF1 command (control word 1, bit 0):
P554 (=22A Hex)
Change parameter value of index 1.

2nd word	Parameter index (IND)			
Bit No.:	15	8	7	0
	Byte 3		Byte 2	
Binary value	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 1
HEX value	0	0	0	1

Bits 8 to 15: Bit 15 parameter page selection bit
Bits 0 to 7: Index or number of the descriptive element

Parameter value (PWE) 3rd and 4th word

The parameter value (PWE) is **always** transferred as a double word (32 bits). **Only one** parameter value can ever be transferred in a telegram.

A 32-bit parameter value is composed of PWE1 (least significant word, 3rd word) and PWE2 (most significant word, 4th word).

A 16 bit parameter value is transferred in PWE1 (least significant word, 3rd word). In this case, you must set PWE2 (most significant word, 4th word) to the value 0.

Example Parameter value

Source for the ON/OFF1 command (control word 1, bit 0):
P554 (=22A Hex)
Change parameter value of index 1 to the value 3100.

	Parameter value (PWE)			
3rd word (PWE1)	Byte 5		Byte 4	
Bit No.:	15	8	7	0
HEX value	3	1	0	0

4th word (PWE2)	Byte 7		Byte 6	
Bit No.:	31	24	23	16
HEX value	0	0	0	0

Bits 8 to 15: Parameter value in the case of 16-bit parameter or low component in the case of 32-bit parameter

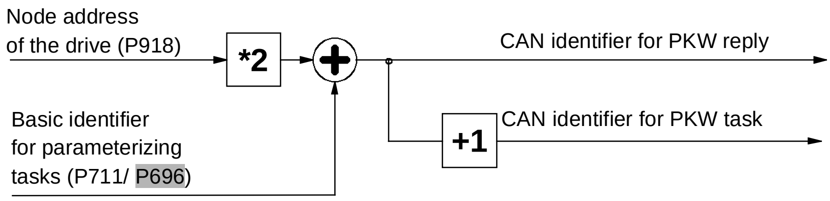
Bits 16 to 31: Value = 0 in the case of 16-bit parameter or high component in the case of 32-bit parameter

CAN identifiers for parameter processing

Two unambiguous CAN identifiers are needed for parameter processing, one for the PKW task and one for the PKW reply. In contrast to other protocols, the CAN protocol only recognizes identifiers and not node addresses. Practical experience shows, however, that it is useful to define node addresses here as well for reasons of clarity. For parameter processing, the individual CAN identifiers of the drive can thus be generated from the node address (P918 "CB bus address") and the basic identifier value (P711 / P696 "CB parameter 1").

NOTE

A parameter on a gray background is only valid for MASTERDRIVES with CU1, CU2 or CU3.



- CAN identifier for the parameter task (PKW task):
  (value in P711 / P696) + (value in P918)*2
- CAN identifier for the parameter reply (PKW reply):
  (value in P711 / P696) + (value in P918)*2 + 1

In addition to the PKW task, a PKW task broadcast is possible, i.e. a parameter task is simultaneously processed by all bus nodes. The CAN identifier for this is set in parameter P719 / P704 "CB parameter 9". The node address does not go in here as the task is to be processed by all slaves. The associated parameter reply is made with the regular CAN identifier for the PKW reply as described above.

Example

Parameter-value processing, i.e. the reading and writing of parameter values of the drives, is to take place in the whole CAN network, from identifier 1000 onwards.

Specification of the identifiers for PKW task and PKW reply:

Drive with node address 0:
1. P711 / P696 = 1000 (PKW basic identifier)
2. P918 = 0 (node address)
⇒ PKW task ID = 1000 PKW reply ID = 1001

Drive with node address 1:
1. P711 / P696 = 1000 (PKW basic identifier)
2. P918 = 1 (node address)
⇒ PKW task ID = 1002 PKW reply ID = 1003
and so on.

Rules for task/reply processing

- The length of the task or reply is always 4 words.
- The least significant byte (in the case of words) or the least significant word (in the case of double words) is always sent first.
- **One** task or **one** reply can only relate to **one** parameter value.
- The slave does not send the reply to a parameter task until the data are received from the MASTERDRIVES unit.
  During normal operation, this lasts 20 to 150 ms, depending on the type of MASTERDRIVES unit.
- In certain states of the converters (especially in initialization states), parameter processing is not carried out at all or only with a long delay. Here, a delay of up to 40 seconds can be expected for the reply.
- The master can only issue a new parameter task after receiving the reply to a previously issued task.
- The master identifies the reply to a task which has been set:
  - By evaluating the reply ID
  - By evaluating the parameter number, PNU
  - If necessary, by evaluating the parameter index, IND
  - If necessary, by evaluating the parameter value, PWE.
- The task must be sent complete in one telegram; telegrams with split tasks are not permissible. The same applies to the reply.

8.4.4.3 Process data area (PZD)

Control words and setpoints (tasks: master → converter) or status words and actual values (replies: converter → master) can be transferred by means of the process data.

The transferred process data only come into effect if the used bits of the control words, setpoints, status words and actual values have been routed (softwired) to the dual-port RAM interface.

For softwiring of the PZD, the number **i** of the process data (PZDi, i = 1 to 16) is entered in the connection value.

NOTE

The process-data connection as described here does not apply if a technology board has been mounted.

If a technology board (e.g. T300, T100) is used, the process-data connection is indicated the technology board manual.

Telegram: master → converter (Setpoint channel)	PZD receive															
	PZD 1 STW1	PZD 2 HSW	PZD 3	PZD 4	PZD 5	PZD 6	PZD 7	PZD 8	PZD 9	PZD 10	PZD 11	PZD 12	PZD 13	PZD 14	PZD 15	PZD 16
	1st word	2nd word	3rd word	4th word	5th word	6th word	7th word	8th word	9th word	10th word	11th word	12th word	13th word	14th word	15th word	16th word
Connectors for:																
16-bit process data	3001	3002	3003	3004	3005	3006	3007	3008	3009	3010	3011	3012	3013	3014	3015	3016
16-/32-bit PZDs	3001	3032		3034		3006	3037		3039		3041		3043		3045	
(Example)	3001	3032		3004	3005	3036		3038		3040		3042		3044		3016
See Section 8.4.5.2	3001	3002	3033		3035		3007	3038		3010	3041		3013	3044		3016

Telegram: converter → master (actual-value channel)	PZD send															
	PZD 1 ZSW	PZD 2 HIW	PZD 3	PZD 4	PZD 5	PZD 6	PZD 7	PZD 8	PZD 9	PZD 10	PZD 11	PZD 12	PZD 13	PZD 14	PZD 15	PZD 16
	1st word	2nd word	3rd word	4th word	5th word	6th word	7th word	8th word	9th word	10th word	11th word	12th word	13th word	14th word	15th word	16th word
Connectors for:																
Assignment of actual-value parameters in the case of 16-bit process data	P734 P694 i001	P734 P694 i002	P734 P694 i003	P734 P694 i004	P734 P694 i005	P734 P694 i006	P734 P694 i007	P734 P694 i008	P734 P694 i009	P734 P694 i010	P734 P694 i011	P734 P694 i012	P734 P694 i013	P734 P694 i014	P734 P694 i015	P734 P694 i016
16-/32-bit process data (examples)	P734 P694 i001	P734 P694 i002 = i003		P734 P694 i004= i005		P734 P694 i006	P734 P694 i007= i008		P734 P694 i009= i010		P734 P694 i011= i012		P734 P694 i013 = i014		P734 P694 i015	
See also Section 8.4.5.2	P734 P694 i001	P734 P694 i002	P734 P694 i003 = i004		P734 P694 i005 = i006		P734 P694 i007	P734 P694 i008= i009		P734 P694 i010	P734 P694 i011 = i012		P734 P694 i013	P734 P694 i014 = i015		P734 P694 i016

PZD: Process data
STW: Control word
ZSW: Status word
HSW: Main setpoint
HIW: Main actual value

Table 8.4-8 Permanently specified assignments and connectors

NOTE

A parameter on a gray background is only valid for MASTERDRIVES with CU1, CU2 or CU3.

CAN identifiers for process-data processing

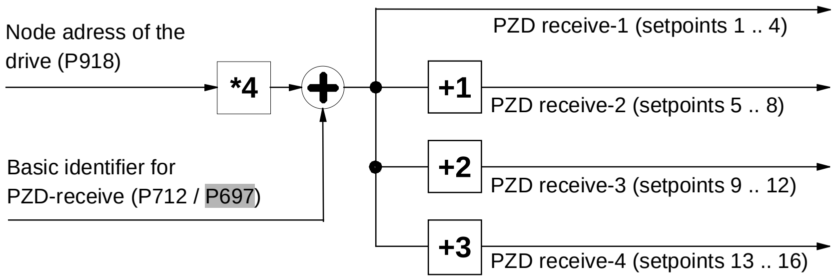
Basic process-data processing consists of the two functions, "Receiving process-data" (PZD receive) and "Sending process-data" (PZD send). A total of 16 process-data words are possible from the MASTERDRIVES units, both in the receive and in the send direction. For each direction, therefore, a total of 4 CAN messages are needed because each individual CAN telegram can only transfer 4 process-data words. This means that 4 unambiguous CAN identifiers are needed both for PZD send and PZD receive. As in parameter processing, node addresses and a basic identifier are also defined in order to achieve better communication.

NOTE

A parameter on a gray background is only valid for MASTERDRIVES with CU1, CU2 or CU3.

PZD receive

For the PZD receive function, the same PZD-receive basic identifier is set for all units on the bus by means of CB parameter P712 / P697, "CB parameter 2". Unique identification is achieved by means of the node address in parameter P918, "CB bus address", which must be different for each bus node. A total of 4 CAN identifiers are assigned.



CAN identifier for the 1st PZD-receive CAN telegram (words 1 to 4):
(value in 712 / P697) + (value in P918)*4

CAN identifier for the 2nd PZD-receive CAN telegram (words 5 to 8):
(value in 712 / P697) + (value in P918)*4 + 1

CAN identifier for the 3rd PZD-receive CAN telegram (words 9 to 12):
(value in 712 / P697) + (value in P918)*4 + 2

CAN identifier for the 4th PZD-receive CAN telegram (words 13 to 16):
(value in 712 / P697) + (value in P918)*4 + 3

Example

PZD-receive processing, i.e. the receiving of control words and setpoints in the whole CAN network, is to take place from identifier 200 onwards. Control word 1 is received in the 1st word, a 32-bit main setpoint in the 2nd and 3rd words, control word 2 in the 4th word and an additional setpoint in the 5th word.

Specification of the identifiers for PZD receive:

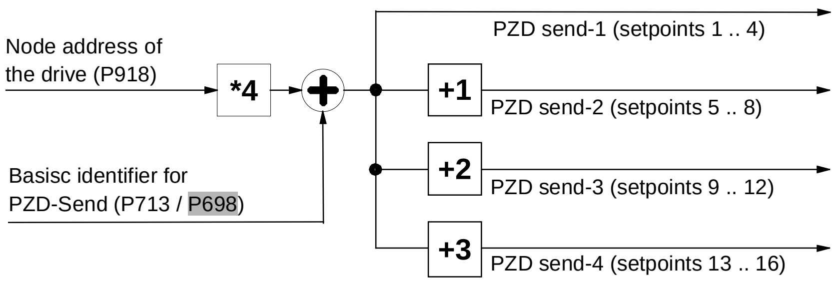
Drive with node address 0:
1. P712 / P697 = 200 (PZD-receive basic identifier)
2. P918 = 0 (node address)
⇒ PZD-receive 1 = 200 PZD-receive 2 = 201
PZD-receive 3 = 202 PZD-receive 4 = 203

Drive with node address 1:
1. P712 / P697 = 200 (PZD-receive basic identifier)
2. P918 = 1 (node address)
⇒ PZD-receive 1 = 204 PZD-receive 2 = 205
PZD-receive 3 = 206 PZD-receive 4 = 207
and so on.

Connecting the setpoints in the drive:
P443.01 (Source of main setpoint) = 3032
P554.01 (Source of ON/OFF1) = 3100 / 3001 (use of control word 1)
P433.01 (Source of additional setpoint) = 3005

PZD-send

For PZD-send, the same PZD-send basic identifier is set for all units on the bus by means of CB parameter P713 / P698, "CB parameter 3". The number of CAN identifiers actually assigned and CAN telegrams sent depends on P714 / P699, "CB parameter 4", where the number of words to be sent (between 1 and 16) is specified.



CAN identifier for the 1st PZD-send CAN telegram (words 1 to 4):
(value in P713 / P698) + (value in P918)*4

CAN identifier for the 2nd PZD-send CAN telegram (words 5 to 8):
(value in P713 / P698) + (value in P918)*4 + 1

CAN identifier for the 3rd PZD-send CAN telegram (words 9 to 12):
(value in P713 / P698) + (value in P918)*4 + 2

CAN identifier for the 4th PZD-send CAN telegram (words 13 to 16):
(value in P713 / P698) + (value in P918)*4 + 3

Example

PZD-send processing, i.e. the sending of status words and actual values, is to take place in the whole CAN network from identifier 100 onwards. Control word 1 is sent in the 1st word, the actual speed as a 32-bit value in the 2nd and 3rd words, status word 2 in the 4th word, the output voltage in the 5th word, the output current in the 6th word and the current torque in the 7th word.

Specification of the identifiers for PZD-send:

Drive with bus address 0:
1. P713 / P698 = 100 (PZD-send basic identifier)
2. P714 / P699 = 7 (number of actual values)
3. P918 = 0 (node address)
⇒ PZD-send 1 = 100 PZD-send 2 = 101
(PZD-send 3 = 102 PZD-send 4 = 103)

Drive with node address 1:
1. P713 / P698 = 100 (PZD-send basic identifier)
2. P714 / P699 = 7 (number of actual values)
3. P918 = 1 (node address)
⇒ PZD-send 1 = 104 PZD-send 2 = 105
(PZD-send 3 = 106 PZD-send 4 = 107)
and so on (PZD-send 3 and PZD-send 4 are not sent because the number of actual values (P714 / P699) is only 7)

Connection of the actual values in the drive:

P734.01 = 32 / P694.01 = 968	(status word 1)
P734.02 = 151/ P694.02 = 218	(main actual value as a 32-bit value ->)
P734.03 = 151/ P694.03 = 218	(same connector-/parameter numbers in 2 consecutive indices)
P734.04 = 33 / P694.04 = 553	(status word 2)
P734.05 = 189/ P694.05 = 3	(output voltage)
P734.06 = 168/ P694.06 = 4	(output current)
P734.07 = 241/ P694.07 = 5	(torque)

CAN identifiers for addition process-data functions

The PZD-receive-broadcast function is for simultaneously sending setpoints and control information from the master to all slaves on the bus. The CAN identifier must be the same for all slaves which use this function. This CAN identifier is entered by means of P716 / P701, "CB parameter 6".
The CAN identifier for the first PZD-receive-broadcast CAN telegram (words 1 to 4) then corresponds to the contents of P716 / P701.

- CAN identifier for the 1st PZD-receive-broadcast CAN telegram (words 1 to 4): **(value in P716 / P701)**
- CAN identifier for the 2nd PZD-receive-broadcast CAN telegram (words 5 to 8): **(value in P716 / P701) + 1**
- CAN identifier for the 3rd PZD-receive-broadcast CAN telegram (words 9 to 12): **(value in P716 / P701) + 2**
- CAN identifier for the 4th PZD-receive-broadcast CAN telegram (words 13 to 16): **(value in P716 / P701) + 3**

PZD-receive multicast

The PZD-receive-multicast function is for simultaneously sending setpoints and control information from the master to a group of slaves on the bus. The CAN identifier must be the same for all slaves within this group which use this function. This CAN identifier is entered by means of P717 / P702, "CB parameter 7". The CAN identifier for the first PZD-receive-multicast CAN telegram (words 1 to 4) then corresponds to the contents of P717 / P702.

- ♦ CAN identifier for the 1st PZD-receive-multicast CAN telegram (words 1 to 4): **(value in P717 / P702)**
- ♦ CAN identifier for the 2nd PZD-receive-multicast CAN telegram (words 5 to 8): **(value in P717 / P702) + 1**
- ♦ CAN identifier for the 3rd PZD-receive-multicast CAN telegram (words 9 to 12): **(value in P717 / P702) + 2**
- ♦ CAN identifier for the 4th PZD-receive-multicast CAN telegram (words 13 to 16): **(value in P717 / P702) + 3**

PZD-receive cross

The PZD-receive-cross function is for receiving setpoints and control information from another slave. With this function, process data can be exchanged between the drives without a CAN-bus master being present. The CAN identifier of PZD-receive cross for the receiving slave must be matched to the CAN identifier of PZD-send of the slave which is sending. This CAN identifier is entered by means of P718 / P703, "CB parameter 8". The CAN identifier for the first PZD-receive-cross telegram (words 1 to 4) then corresponds to the contents of P718 / P703.

- ♦ CAN identifier for the 1st PZD-receive-cross CAN telegram (words 1 to 4): **(value in P718 / P703)**
- ♦ CAN identifier for the 2nd PZD-receive-cross CAN telegram (words 5 to 8): **(value in P718 / P703) + 1**
- ♦ CAN identifier for the 3rd PZD-receive-cross CAN telegram (words 9 to 12): **(value in P718 / P703) + 2**
- ♦ CAN identifier for the 4th PZD-receive-cross CAN telegram (words 13 to 16): **(value in P718 / P703) + 3**

Notes and rules for process-data processing

- The least significant byte (in the case of words) or the least significant word (in the case of double words) is always sent first.
- **Control word 1** must always be contained in the 1st word of the received setpoints. If control word 2 is needed, this must be in the 4th word.
- **Bit 10 "Control of drive unit"** must always be set in control word 1, otherwise the new setpoints and control words are not accepted by the converter.
- The **consistency of the process data** is only ensured within the data of a CAN telegram. If more than four words are needed, they must be split up among several CAN telegrams because only four words can be transferred in a CAN telegram. Because the converter scans the setpoints asynchronously to telegram transfer, it may happen that the first CAN telegram is accepted by the current transfer cycle whereas the second CAN telegram still originates from the old transfer cycle. Related setpoints, therefore, should always be transferred in the same CAN telegram. If this is not possible due to the peculiarities of the installation, consistency can still be ensured by means of bit 10 "Control of drive unit". To do this, a CAN telegram is first sent in which bit 10 of the control word has been deleted. As a result, the setpoints are no longer accepted by the converter. All the CAN telegrams still needed are then sent. Finally, another CAN telegram is sent in which bit 10 of the control word has been set. As a result, all setpoints and control words are accepted in the converter at the same time.
- The described process-data functions for receiving setpoints and control words (PZD receive, PZD-receive broadcast, PZD-receive multicast and PZD-receive cross) can be used simultaneously. The transferred data overlap each other in the converter, i.e. the 1st word in the CAN telegrams PZD-receive 1, PZD-receive broadcast 1, PZD-receive multicast 1 and PZD-receive cross 1 is always interpreted in the converter as the same control word 1. The best way of combining these possibilities depends on the concrete application.

DANGER

When you change the initialization function of software version V1.3x to V1.40 and higher, or VC firmware from 3.22 to 3.23 and higher, the behavior of the converter also changes (reverting to the behavior of software versions V1.2x and lower again) as follows:

If the electronics supply is switched off on a converter that is in state "READY" and is connected to an automation system via a field bus (PROFIBUS, CAN, DEVICE-NET, or CC-Link), this causes a fault message for this converter in the automation system.
If the automation system nevertheless sends a control word STW1 with valid authorization (bit 10 = 1) and a pending ON command (bit 0 = 1) to this converter, this can cause the converter to switch on and go straight into "OPERATION" state when the electronics supply is connected at the converter.

8.4.5 Start-up of the CBC

NOTE

Please note the basic parameter differences (described below) to units with the old function classes FC (CU1), VC (CU2) and SC (CU3).
These parameter numbers are printed on a dark gray background for purposes of distinction.

8.4.5.1 Basic parameterization of the units

Basic parameterization for MASTERDRIVES with CUMC or CUVC

Optional boards? (no / yes)	Possible optional boards: CBC, CBP, TB
P060 = 4	Function selection "hardware configuration"
P711 = 0...2000	Basis identifier for PKW task / PKW reply
P712 = 0...2000	Basis identifier for PZD-receive
P713 = 0...2000	Basis identifier for PZD-send
P714 = 1...16	Number of PZDs for PZD-send
P715 = 0...65535	Update rate for PZD-send
P716 = 0...2000	Basis identifier for PZD-receive broadcast
P717 = 0...2000	Basis identifier for PZD-receive mulitcast
P718 = 0...2000	Basis identifier for PZD-receive cross transfer
P719 = 0...2000	Basis identifier for PZD-request broadcast
P720 = 0...8	Baud rate
P721.01 = 0	CAN-profile (at the present only 0 possible) (optional)
P721.02 = 0...65535	Bus timing (optional)
P918 = n	CBC bus address (0 ≤ n < 128)
P060 = 0	Leave "hardware configuration"
P722 = 0...65535	For setting the telegram failure time in ms (0 = deactivated)
P053 = x	Parameterization enable CBC
P060 = 5	Function selection "drive setting"

Fig. 8.4-16 Parameterization of the "hardware configuration" for MASTERDRIVES with CUMC or CUVC

Basic parameterization for MASTERDRIVES with CU1, CU2 or CU3

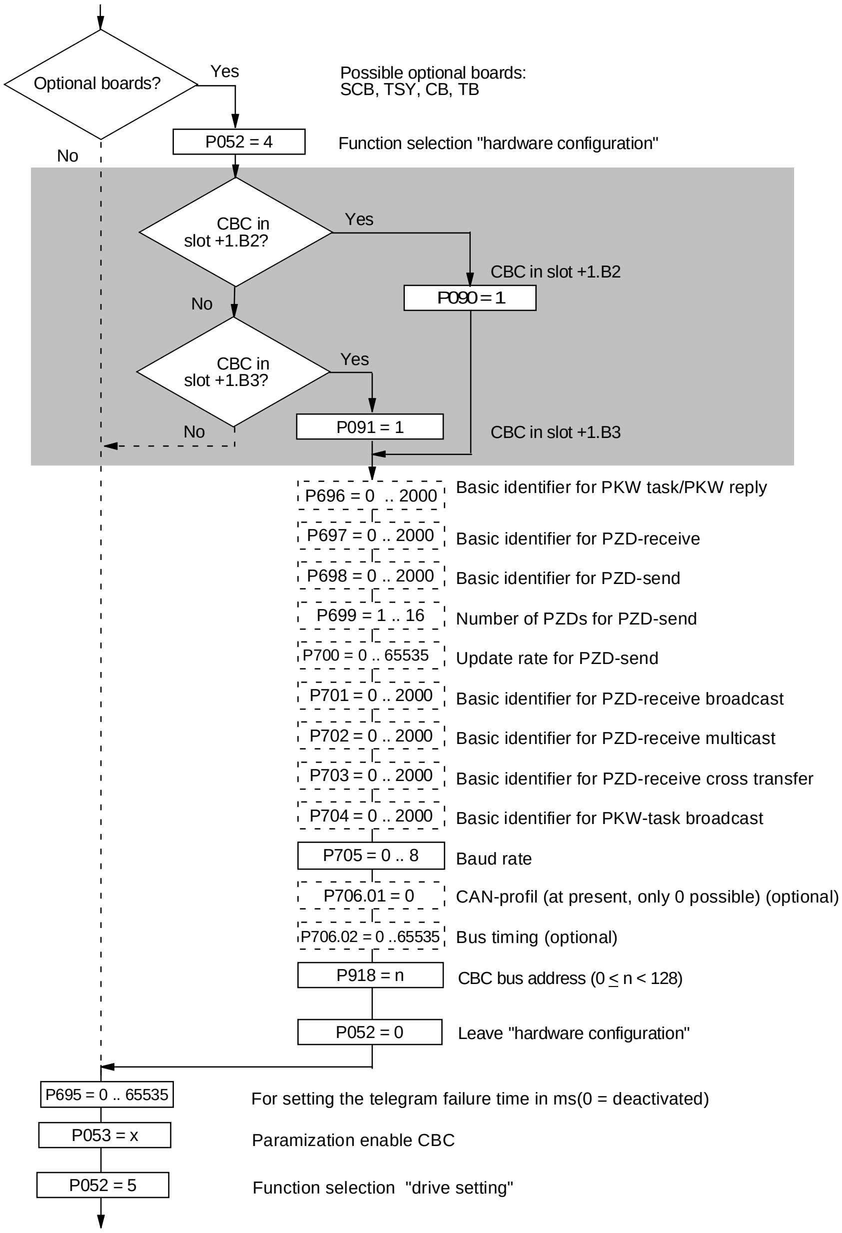


Fig. 8.4-17 Parameterization of the "hardware configuration" for MASTERDRIVES with CU1, CU2 or CU3

P053 (parameterizing enable)
This parameter is significant for the CBC if you wish to set or change parameters of the converter (incl. technology) by means of parameterizing tasks (PKW task or PKW-request broadcast). In this case, set parameter P053 (see also the parameter list in the instruction manual of the converter) to an odd value (e.g. 1, 3, 7 etc.). With parameter P053, you specify the positions (PMU, CBC etc.) from which it is permissible to change parameters. E.g.: P053 = 1: Parameterizing enable only CBC = 3: Parameterizing enable CBC+PMU = 7: Parameterizing enable CBC+PMU+SCom1 (OP) If the parameter change (= parameterizing enable) is enabled via the CBC (P053 = 1, 3 etc.), all further parameters can be set from the CAN-bus master via the bus. For further setting of parameters which concern data transfer via the CAN bus (e.g. process-data connection (softwiring)), you must know the number of process-data words received from the slave.

P060	P052
Function selection "Hardware setting"	

P090 (board slot 2) or P091 (board slot 3)
You can alter these parameters even when the CBC is exchanging net data via the CAN bus. You can thus parameterize the CAN-bus interface away from the converter. In this case, the CBC ceases communication via the bus and neither receives nor sends CAN data telegrams.

P711 (CB parameter 1)	P696 (CB parameter 1)
Basic identifier for PKW task (parameter task) With this parameter, the basic identifier can be set for a PKW task (parameter task). The actual CAN identifier for a PKW task is calculated from this parameter and the node address (P918) according to the following equation: (Parameter value of P711/ P696) + (Parameter value of P918)*2 The CAN identifier for a PKW reply (parameter reply) is the number subsequent to this, namely (Parameter value of P711/ P696) + (Parameter value of P918) *2 + 1 With the value 0 (pre-assigned) in this parameter, parameterization via the CAN bus is deactivated. If the calculated CAN identifier for the PKW task or PKW reply is outside the valid range (1 to 2000) or if it overlaps another CAN identifier, error F080 appears when status 4 "hardware configuration" is left. After acknowledgement of the error, you are in the "hardware configuration" status again and can correct the incorrect parameterization. **Example:** The basic identifier for parameterization in P711 / P696 is set to 1500. The node address in P918 is 50. The CAN identifier is thus 1500 + 50*2 = 1600 for a PKW task and 1601 for a PKW reply.	

P712 (CB parameter 2)	P697 (CB parameter 2)

Basic identifier for PZD receive (receiving process data)
With this parameter, the basic identifier for PZD receive (receive process data = setpoints / control words) can be set. The actual CAN identifier for PZD receive is calculated from this parameter and the node address (P918) according to the following equation:

(Parameter value of P712 / P697) + (Parameter value of P918)*4

Because only four setpoints (= 8 bytes) can be transferred with a CAN data telegram but sixteen setpoints are supported by MASTERDRIVES units, a total of four CAN data telegrams with four CAN identifiers are needed for transferring setpoints. The following three CAN identifiers are therefore also provided for PZD receive. The following table applies:

Contents	CAN identifier
Control word 1 / Setpoint 2 / Setpoint 3 / Setpoint 4 or Control word 2	P712/P697 + P918*4
Setpoint 5 to Setpoint 8	P712/P697 + P918*4 + 1
Setpoint 9 to Setpoint 12	P712/P697 + P918*4 + 2
Setpoint 13 to Setpoint 16	P712/P697 + P918*4 + 3

With the value 0 (pre-assigned) in this parameter, PZD receive is deactivated.

If the calculated CAN identifier for PZD receive is outside the valid range (1 to 2000) or if it overlaps another CAN identifier, error F080 appears when status 4 (hardware configuration) is left. After acknowledgement of the error, you are in the "hardware configuration" status again and can correct the incorrect parameterization.

Example:
The basic identifier for PZD receive in P712 / P697 is set to 500. The node address in P918 is 50. This results in a CAN identifier of 500 + 50*4 = 700 for the first CAN data telegram of PZD receive. The further CAN data telegrams for PZD receive have CAN identifiers 701 to 703.

P713 (CB parameter 3)	P698 (CB parameter 3)

Basic identifier for PZD-send (sending process data)
With this parameter, the basic identifier for PZD-send (sending process data = status words / actual values) can be set. The actual CAN identifier for PZD-send is calculated from this parameter and the node address (P918) according to the following equation:

(Parameter value of P713 / P698) + (Parameter value of P918)*4

Because only four actual values (= 8 bytes) can be transferred with a CAN data telegram but sixteen actual values are supported by MASTERDRIVES units, a total of four CAN data telegrams with four CAN identifiers are needed for transferring the actual values. The following table applies:

Contents	CAN identifier
Status word 1 / Actual value 2 / Actual value 3 / Actual value 4 or Status word 2	**P713/P698 + P918*4**
Actual value 5 to Actual value 8	**P713/P698 + P918*4 + 1**
Actual value 9 to Actual value 12	**P713/P698 + P918*4 + 2**
Actual value 13 to Actual value 16	**P713/P698 + P918*4 + 3**

With the value 0 (pre-assigned) in this parameter, PZD-send is deactivated.

If the calculated CAN identifier for PZD-send is outside the valid range (1 to 2000) or if it overlaps another CAN identifier, the error F080 appears when status 4 "hardware configuration" is left. After acknowledgement of the error, you are in the "hardware configuration" status again and can correct the incorrect parameterization.

Which values are sent is specified in parameters P713.01 / P694.01 to P713.16 / P694.16 by entering the relevant parameter numbers.

Exemple:
The basic identifier for PZD-send in P713 / P698 is set to 200. The node address in P918 is 50. This results in a CAN identifier of 200 + 50*4 = 400 for the first CAN data telegram of PZD-send. The further CAN data telegrams for PZD-send have CAN identifiers 401 to 403.

P714 (CB parameter 4)	P699 (CB parameter 4)
Number of process data to be sent in the case of PZD-send With this parameter, the number of process data to be sent in the case of PZD-send is specified. Valid values are 1 to 16 words. From this information, the actual number and the length of the CAN data telegrams are determined. If the number of process data is outside the valid range (1 to 16), error F080 appears when status 4 "hardware configuration" is left. After acknowledgement of the error, you are in the "hardware configuration" status again and can correct the incorrect parameterization. **Example:** The basic identifier for PZD-send in P713 / P698 is set to 200. The node address in P918 is 50. This results in a CAN identifier of 200 + 50*4 = 400 for the first CAN data telegram of PZD-send. If the number of process data (P714 / P699) is now 10, a CAN data telegram with four words with CAN identifier 400 and a telegram with CAN identifier 401 is sent as is a CAN data telegram with two words and CAN identifier 402. These are the entered 10 words of process data. CAN identifier 403 is unused and is not sent.	

P715 (CB parameter 5)	P700 (CB parameter 5)
Up-date rate for PZD-send With this parameter, the up-date rate is set in milliseconds for PZD-send, i.e. the time base in which new actual values are to be sent from the unit. Meaning of the parameter values: • 0: Actual values are only sent on request (remote transmission requests). • 1 to 65534: Actual values are sent according to the time set in ms or on request (Remote Transmission Requests). 65535: Actual values are sent if the values have changed (event) or on request (remote transmission requests). This function should only be used if the values to be transferred only rarely change because, otherwise, the bus load becomes very high.	

P716 (CB parameter 6)	P701 (CB parameter 6)

CAN identifier for PZD-receive broadcast
With this parameter, the CAN identifier for PZD-receive broadcast (receiving process data = setpoints / control words) can be set. A broadcast telegram is to be received by all slaves on the bus. This parameter must be set the same for all slaves.

Because only four setpoints (= 8 bytes) can be sent with a CAN data telegram but 16 setpoints are supported by MASTERDRIVES units, a total of four CAN data telegrams with four CAN identifiers are needed for transferring the setpoints. The following three CAN identifiers are therefore also provided for PZD-receive broadcast. The following table applies:

Contents	CAN identifier
Control word 1 / Setpoint 2 / Setpoint 3 / Setpoint 4 or Control word 2	**P716/**P701
Setpoint 5 to Setpoint 8	**P716/**P701 **+ 1**
Setpoint 9 to Setpoint 12	**P716/**P701 **+ 2**
Setpoint 13 to Setpoint 16	**P716/**P701 **+ 3**

With the value 0 (pre-assigned) in this parameter, PZD-receive broadcast is deactivated.

If the calculated CAN identifier for PZD-receive broadcast is outside the valid range (1 to 2000) or if it overlaps another CAN identifier, error F080 appears when status 4 "hardware configuration" is left. After acknowledgement of the error, you are in the "hardware configuration" status again and can correct the incorrect parameterization.

Example:
The CAN identifier for PZD-receive broadcast in P716 / P701 is set to 100. This results in a CAN identifier of 100 for the first CAN data telegram of PZD-receive broadcast. The further CAN data telegrams for PZD-receive broadcast have CAN identifiers 101 to 103.

P717 (CB parameter 7)	P702 (CB parameter 7)

CAN identifier for PZD-receive multicast
With this parameter, the CAN identifier for PZD-receive multicast (receiving process data = setpoints / control words) can be set. A multicast telegram is to be received by a group of slaves on the bus. This parameter must be set the same for all slaves in this group.

Because only four setpoints (= 8 bytes) can be transferred with one CAN data telegram but 16 setpoints are supported by MASTERDRIVES units, a total of four CAN data telegrams with four CAN identifiers are needed for transferring the setpoints. The following three CAN identifiers are therefore also provided for PZD-receive multicast. The following table applies:

Contents	CAN identifier
Control word 1 / Setpoint 2 / Setpoint 3 / Setpoint 4 or Control word 2	**P717/**P702
Setpoint 5 to Setpoint 8	**P717/**P702 **+ 1**
Setpoint 9 to Setpoint 12	**P717/**P702 **+ 2**
Setpoint 13 to Setpoint 16	**P717/**P702 **+ 3**

With the value 0 (pre-assigned) in this parameter, PZD-receive multicast is deactivated.

If the CAN identifiers for PZD-receive multicast are outside the valid range (1 to 2000) or if they overlap another CAN identifier, error F080 appears when status 4 "hardware configuration" is left. After acknowledgement of the error, you are in the "hardware configuration" status again and can correct the incorrect parameterization.

Example:
The CAN identifier for PZD-receive multicast in P717 / P702 is set to 50. This results in a CAN identifier of 50 for the first CAN data telegram of PZD-receive multicast. The further CAD data telegrams for PZD-receive multicast have CAN identifiers 51 to 53.

P718 (CB parameter 8)	P703 (CB parameter 8)

CAN identifier for PZD-receive cross
With this parameter, the CAN identifier for PZD-receive cross (receiving process data = setpoints / control words) can be set. By means of cross data traffic between slaves, the actual values sent by a slave (by means of PZD-send) can be used as setpoints by another slave. For this, the parameter value of this parameter is set to the CAN identifier of the CAN data telegram from which the setpoints are to be obtained.

Because only four setpoints (= 8 bytes) can be transferred with one CAN data telegram but 16 setpoints are supported by MASTERDRIVES units, a total of four CAN data telegrams with four CAN identifiers are needed for transferring the setpoints. The following three CAN identifiers are therefore also provided for PZD-receive cross. The following table applies:

Contents	CAN identifier
Control word 1 / Setpoint 2 / Setpoint 3 / Setpoint 4 or Control word 2	**P718/**P703
Setpoint 5 to Setpoint 8	**P718/**P703 **+ 1**
Setpoint 9 to Setpoint 12	**P718/**P703 **+ 2**
Setpoint 13 to Setpoint 16	**P718/**P703 **+ 3**

With the value 0 (pre-assigned) in this parameter, PZD-receive cross is deactivated.

If the CAN identifiers for PZD-receive cross are outside the valid range (1 to 2000) or if they overlap another CAN identifier, error F080 appears when status 4 "hardware configuration" is left. After acknowledgement of the error, you are in the "hardware configuration" status again and can correct the incorrect parameterization.

Example:
The data telegram with CAN identifier 701 is to be used as setpoint 5 to setpoint 8. For this, the CAN identifier for PZD-receive cross in P718 / P703 must be set to 700. This results in a CAN identifier of 700 for the first CAN data telegram of PZD-receive cross. The further CAN data telegrams have CAN identifiers 701 to 703, i.e. the data telegram 701 results in setpoint 5 to setpoint 8.

P719 (CB parameter 9)	P704 (CB parameter 9)

CAN identifier for PKW-task broadcast
With this parameter, the CAN identifier for PKW-task broadcast (parameter task) can be set. A broadcast telegram is to be received by all slaves on the bus. This parameter must therefore be set the same for all slaves. With the help of this function, a parameter task can be simultaneously issued to all slaves on the bus.

The parameter reply is given with the CAN identifier of the PKW-reply (see P711 / P696), namely

(Parameter value of P711 / P696) + (Parameter value of P918)*2 + 1

With the value 0 (pre-assigned) in this parameter, PKW-task broadcast is deactivated.

If the calculated CAN identifier for PKW-task broadcast is outside the valid range (1 to 2000) or if it overlaps another CAN identifier, error F080 appears when status 4 "hardware configuration" is left. After acknowledgements of the error, you are in the "hardware configuration" status again and can correct the incorrect parameterization.

Example:
The basic identifier for parameterization in P711 / P696 is set to 1500. The node address in P918 is 50. This results in a CAN identifier of 1500 + 50*2 = 1600 for PKW-task and 1601 for PKW-reply. The CAN identifier for PKW-reply broadcast in P719 / P704 is set to 1900. A parameter task can be issued by means of PKW-task broadcast, namely with CAN identifier 1900, whereas the reply is given with CAN identifier 1601 by means of PKW-reply.

P720 (CB parameter 10)	P705 (CB parameter 10)

Baud rate of the slave on the CAN bus
With this parameter, the baud rate of the slave on the CAN bus is set. The following applies:

If the baud rate is outside the valid range, error F080 appears when status 4 "hardware configuration" is left. After acknowledgement of the error, you are in the "hardware configuration" status again and can correct the incorrect parameterization.

Parameter value	0	1	2	3	4	5	6	7	8
Baud rate [kBit/s]	10	20	50	100	125	250	500	800	1000

P721 (CB parameter 11)	P706 (CB parameter 11)

Special CAN bus settings

This parameter is only present in MASTERDRIVES units from the following software versions onwards:

MASTERDRIVES	Software version
SIMOVERT MASTERDRIVES MC	≥ 1.0
SIMOVERT MASTERDRIVES FC	≥ 1.3
SIMOVERT MASTERDRIVES VC	≥ 1.3
SIMOVERT MASTERDRIVES SC	≥ 1.2
SIMOVERT MASTERDRIVES E/R	≥ 3.1
SIMOVERT MASTERDRIVES AFE	≥ 1.0

- **Index i001:** With this parameter, different CAN profiles can be set in future. At the present time, only the value 0 (pre-assigned) is valid.
- **Index i002:** With this parameter, the bus timing on the CAN bus can be influenced. With the value 0 (pre-assigned), the internal setting resulting from the baud rate is made. All other values are directly set without a plausibility check.

This parameter should generally be allowed to keep its pre-assigned setting of 0!

Meaning of the parameter-value bits:

Bit0 - Bit5: BRP (Baud rate prescaler).
Bit6 - Bit7: SJW SJW (Synchronization Jump Width). Maximum shortening or lengthening of a bit time by means of resynchronization.
Bit8 - Bit11: TSEG1 (Time Segment 1). Time intervals before the scanning time. Valid values are 2 to 15.
Bit12 - Bit14: TSEG2 (Time Segment 2). Time interval after the scanning time. Valid values are 1 to 7. In addition TSEG2 must be greater than SJW.
Bit 15: Not assigned

Internal standard pre-assignments of the bus timing, depending on the baud rate:

Baud rate	BRP	SJW	TSEG1	TSEG2	Hex value
10 kBit (P720/P705 = 0)	39	2	15	2	2FA7
20 kBit (P720/P705 = 1)	19	2	15	2	2F93
50 kBit (P720/P705 = 2)	7	2	15	2	2F87
100 kBit (P720/P705 = 3)	3	2	15	2	2F83
125 kBit (P720/P705 = 4)	3	1	12	1	1C43
250 kBit (P720/P705 = 5)	1	1	12	1	1C41
500 kBit (P720/P705 = 6)	0	1	12	1	1C40
800 kBit (P720/P705 = 7)	0	1	6	1	1640
1 MBit (P720/P706 = 8)	0	1	4	1	1440

P721 (CB parameter 11)	P706 (CB parameter 11)
Formula for calculating the baud rate from the constants: time quantum = tq = (BRP+1) * 2 * tClk Clock Period = tClk = 62.5 ns (at 16 MHz) Synchronization segment = tSync-Seg = tq Time Segment 1 (before scanning time) = tTSeg1 = (TSEG1+1)*tq Time Segment 2 (after scanning time) = tTSeg2 = (TSEG2+1)*tq Bit time = tSync-Seg + tTSeg1 + tTSeg2 Baud rate = 1 / bit time The parameter value corresponds to the value of the bit timing register of the CAN component. A more exact description of this bit timing register can be found in the manual of the CAN module of the C167CR or in the manual of the component, INTEL 82527 (extended CAN).	

P918.1 (CBC bus address)	P918 (CBC bus address)
Here, the node address of the unit on the CAN bus is set. It is included in the calculation of the CAN identifier for parameter tasks and replies (PKW task / PKW reply) and process data (PZD-receive / PZD-send). (See also P711 / P696, P712 / P697 and P713 / P698).	

NOTE

When the above settings have been made, the CBC is regarded as registered in the converter and is ready for communication via the CAN bus.
Changing parameters or specifying process data via the CAN bus is not yet possible after this step.
Parameterization must first be enabled and the process data still have to be softwired in the converter.

8.4.5.2 Process-data softwiring in the units

Definition

Process data interconnection involves the linking up of setpoints and control bits to the RAM interface. The transferred process data only become effective when the used bits of the control words as well as the setpoints, status words and actual values are allocated (connected) to the dual-port RAM interface.

The received process data are stored by the CBC at fixed, pre-defined addresses in the dual-port RAM. A connector (e.g. 3001 for PZD1) is assigned to each item of process data (PZDi, i = 1 to 10). The connector also determines whether the corresponding PDZi (i = 1 to 10) is a 16-bit value or a 32-bit value.

With the help of selector switches (e.g. P554.1 = selector switch for bit 0 of control word 1), the setpoints or the individual bits of the control words can be assigned to a particular PZDi in the dual-port RAM. In order to do this, the connector belonging to the required PZDi is assigned to the selector switch.

NOTE

In function classes CUMV, CUVC and Compact PLUS, the control words STW1 and STW2 are also available in bit form on so-called binectors (explanations of BICO systems can be found in Chapter 4 "Function Blocks and Parameters").

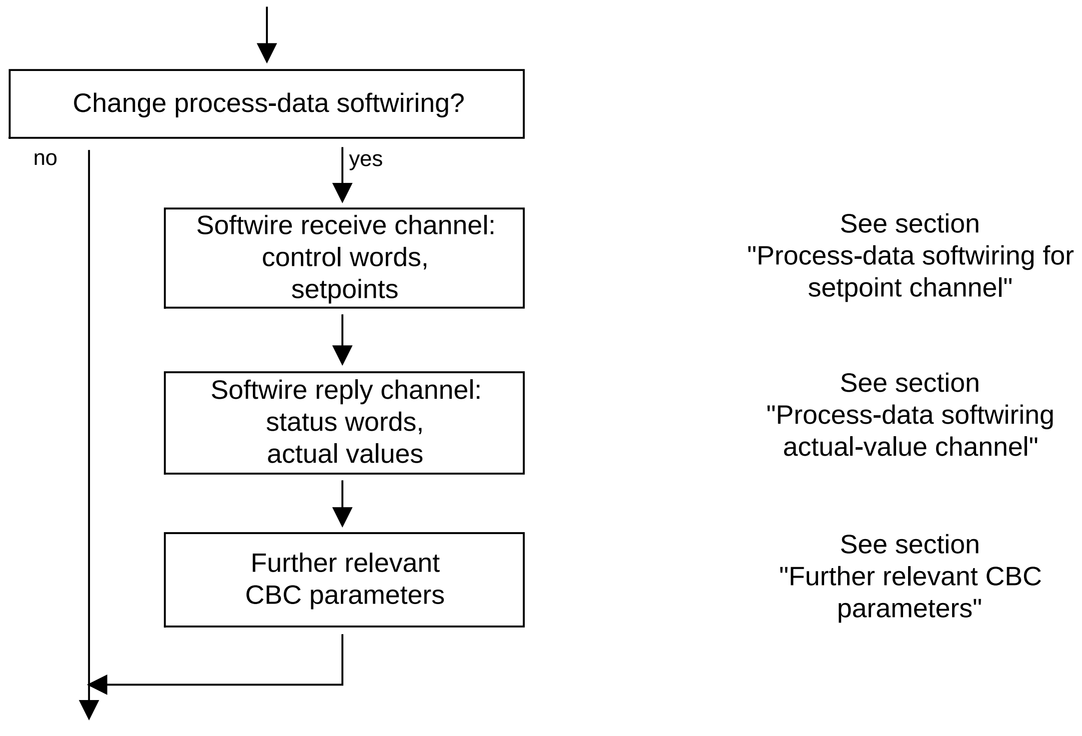


Fig. 8.4-18 Procedure for altering process data

Example

On the following pages, you will find examples of how the transferred data are routed in the units by means of process-data softwiring (logical connection).

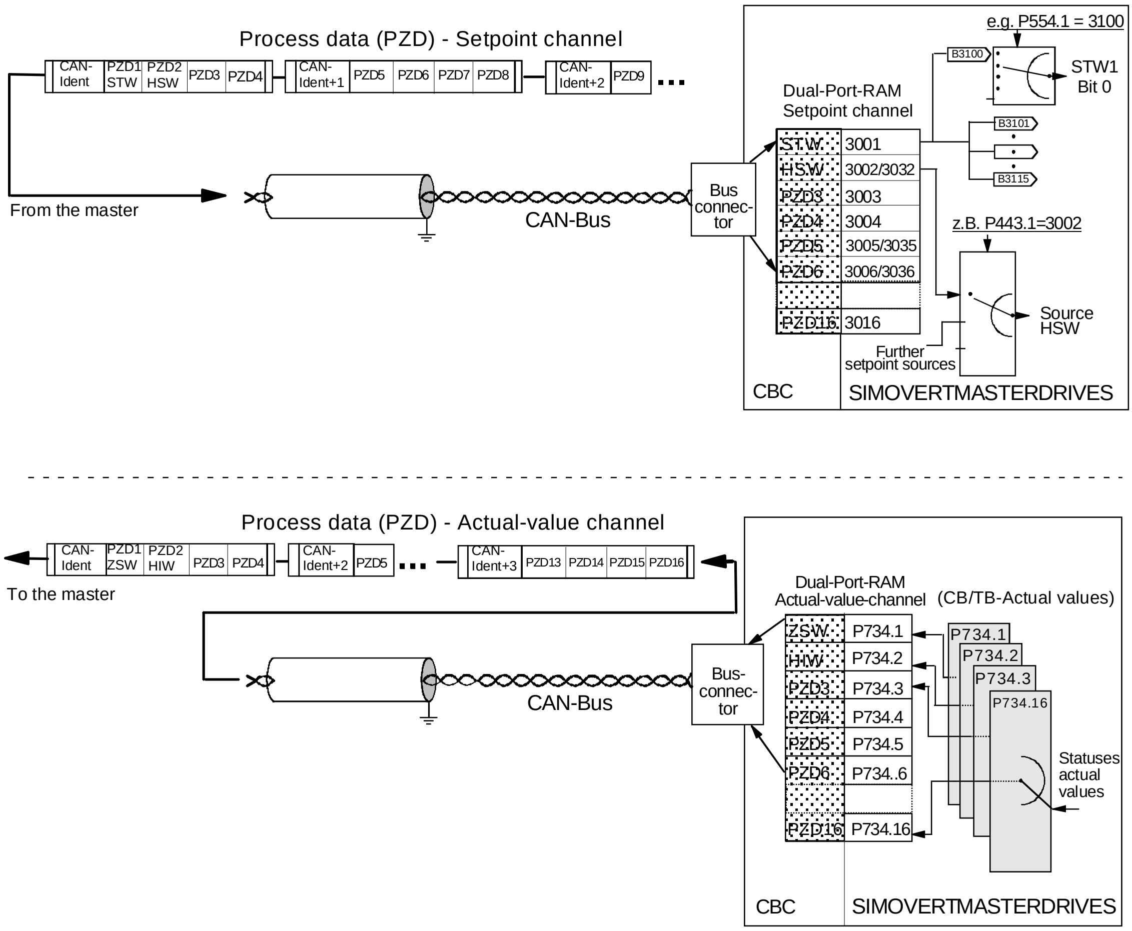
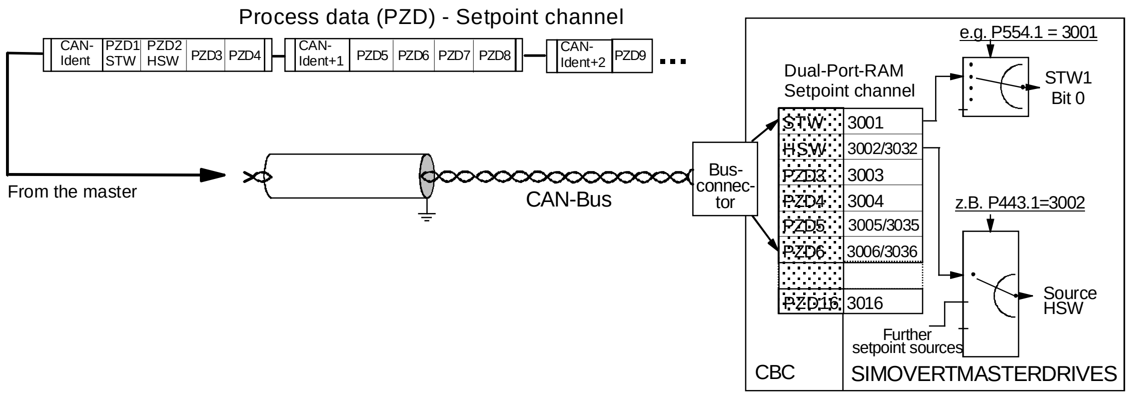


Fig. 8.4-19 Example of process-data connection for function classes CUMC and CUVC



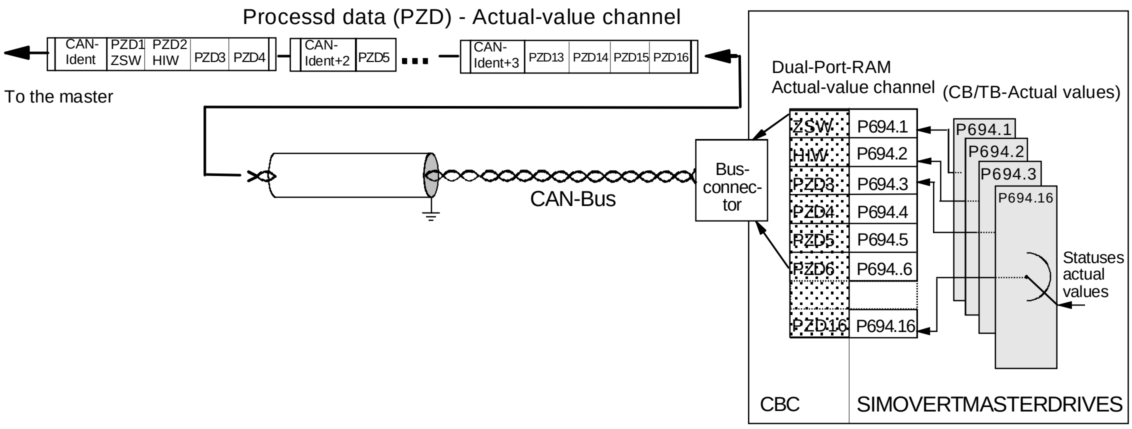


Fig. 8.4-20 *Example of process-data interconnection for function classes CU1, CU2 or CU3*

Process-data connection - Setpoint channel

- The "tens digit" of the binector enables a distinction to be made between a 16-bit item of process data (e.g. 3002) and a 32-bit item of process data (e.g. 3032).
- If an item of process data is transferred as a 16-bit quantity, you must assign the connector which belongs to the desired PZDi and which is for a 16-bit item of process data (e.g. if PZD2 is assigned a 16-bit item of process data, the relevant connector is 3002) to the selection switch (see section "Process data" in the instruction manual of the converter).
- If an item of process data is transferred as a 32-bit quantity, you must assign the connector which belongs to the desired PZDi and which is for a 32-bit item of process data (e.g. if PZD2+PZD3 are assigned a 32-bit item of process data, the relevant connector is 3032) to the selection switch (see section "Process data" in the instruction manual of the converter).
- The first word (relevant connector: 3001) of the received process data is always allocated to control word 1 (STW1). The meaning of the control-word bits is given in the operating instructions for the converter in the section, "Start-up aids".
- The second word is always allocated to the main setpoint (HSW).
  If the main setpoint is transferred as a 32-bit item of process data, it also occupies word 3. In this case, the most significant component is transferred in word 2 and the least significant component in word 3.
- If a control word 2 (STW2) is transferred, the fourth word (relevant connector = 3004) is always allocated to STW2. The meaning of the control-word bits is given in the instruction manual for the converter in the section, "Start-up aids".
- The connector is always a four-digit number. The connectors assigned to the process data (PZD1 to PZD16) are given in the function plan.
- The connector is entered at the PMU as a 4-digit number (e.g. 3001). During parameterization via the CAN bus, the connector is entered via the bus in the same way as via the PMU (e.g. connector 3001 is transferred as 3001(hex)).

NOTE

Process-data connection (softwiring) of the setpoint channel can also be carried out via the CAN bus as long as P053 has previously been set to an odd number.

Example for the setpoint channel

PZD connection for the bits of control word 1 (STW1) and of the main setpoint (HSW) and the bits of control word 2 (STW2).

At the converter via the PMU		Meaning
P*554*.1 = 3100	P*554*.1 = 3001	Control word 1 bit 0 (Source ON/OFF1) via DPR interface (word 1)
P*555*.1 = 3101	P*555*.1 = 3001	Control word 1 bit 1 (Source ON/OFF2) via DPR interface (word 1)
P*443*.1 = 3002	P*443*.1 = 3002	16-bit main setpoint (Source main setpoint) via DPR interface (word 2)
P*588*.1 = 3412	P*588*.1 = 3004	Control word 2 bit 28 (Src no ext. alarm1) via DPR interface (word 4)

Based on the factory setting of the converter, the above example of parameterization represents a functioning method of connecting (softwiring) the process data (setpoints).

Italics:

Parameter number (for the PMU as a decimal number; via the CAN bus as an equivalent HEX number).

Single underline:

Index (for the PMU as a decimal number, via the CAN bus as an equivalent HEX number).

Double underline:

Connector: defines whether the parameter selected by means of the *parameter number* is transferred as a 16-bit value or as a 32-bit value and at which position in the PZD setpoint telegram (PZDi) the parameter is transferred.

- White background = MASTERDRIVES, CUMC or CUVC
- Grey background = MASTERDRIVES FC (CU1), VC (CU 2) or SC (CU 3)

Process-data connection - Actual-value channel

The actual-value process data (PZDi, i = 1 to 16) are assigned to the corresponding status words and actual values by means of the indexed parameter P734.i / P694.i (CB/TB actual values). Each index stands for an item of process data (e.g. B. 5 → PZD5 and so on). Please enter the number of the parameter - whose value you wish to transfer with the corresponding process data - in parameter P734.i / P694.i (see also "Parameter list") under the relevant index.

The status word should be entered in the PZD1 word of the PZD reply (actual-value channel) and the main actual value in the PZD2 word. Further assignment of the PZDs (PZD1 to PZD16, if necessary) is not defined. If the main actual value is sendted as a 32-bit value, it is assigned to PZD2 and PZD3.

The meaning of the status-word bits can be found in the operating instructions of the converter in the section "Start-up aids".

Example for the actual-value channel

PZD connection for status word 1 (ZSW1), the main actual value (HIW) and status word 2 (ZSW2)

At the converter via the PMU		Meaning
P*734*.1 = 32	P*694*.1 = 968	Status word 1 (K032 / P968) is transferred in the actual-value channel by means of PZD1.
P*734*.2 = 151	P*694*.2 = 218	The actual speed n/f (KK151 / P218) is transferred in the actual-value channel by means of PZD2 (here as a 16-bit quantity; PZD3 not occupied here).
P*734*.4 = 33	P*694*.4 = 553	Status word 2 (K033 / P553) is transferred in the actual-value channel by means of PZD4.

Example: 32-bit main actual value

P*734*.2 = 151	P*694*.2 = 218	The actual speed n/f (KK151 / P218) is transferred in the actual-value channel by means of PZD2 ...
P*734*.3 = 151	P*694*.3 = 218	... and by means of PZD3 as a 32-bit value.

Italics:

P734 / P694 (CB/TB actual values), for the PMU, shown as a decimal number; via the CAN bus, transferred as an equivalent HEX number (2B6 Hex).

Single underline:

Index (for the PMU, as a decimal number; via the CAN bus, as an equivalent HEX number). Specifies at which position in the PZD actual-value telegram (PZDi) the actual value selected by means of the parameter number is to be transferred.

Double underline:

Parameter number of the desired actual value.

- White background = MASTERDRIVES, CUMC or CUVC
- Grey background = MASTERDRIVES FC (CU1), VC (CU 2) or SC (CU 3)

NOTE

If actual values are sent as a 32-bit datum, you must enter the associated connector number at two consecutive words (indices).

Other relevant CBC parameters

P722 (CB/TB TlgOFF)	P695 (CB/TB TlgOFF)
Telegram failure time With parameter P722 / P695 (see also operating instructions of the converter, section "Parameter list"), you can specify whether the entry of process data into the dual-port RAM by the CBC is to be monitored by the converter. The parameter value of this parameter corresponds to the telegram failure time in ms. The pre-assigned value of this parameter is 10 ms, i.e. there must be a maximum of 10 ms between two received process-data CAN telegrams, otherwise the converter switches off with F082. With the parameter value 0, the monitoring function is de-activated. The converter monitors the entry of process data into the dual-port RAM from that point of time at which the CBC enters process data into the dual-port RAM for the first time. Only from this point of time onwards can error F082 be triggered!	

DANGER

If the "On" command (bit 0) has been softwired to the dual-port RAM, the following measures must be taken for reasons of safety:

An "OFF2" or "OFF3" command (see instruction manual of the converter, section "Control word") must be additionally parameterized to the terminal strip / PMU as, otherwise, the converter can no longer be turned off by means of a defined command if the communications system breaks down!

P692 (Reaction TlgOFF)
Reaction to telegram failure With parameter P692 (see also instruction manual of the converter, section "Parameter list"), you can specify how the converter is to react to telegram failure. With the parameter value 0 "Fault", the converter immediately switches off with fault F082. The drive coasts to a stop. With parameter value 1 "OFF3 (fast stop)", the drive carries out an OFF3 command (OFF with fast stop) and only then assumes a fault status with fault F082.

P781.i13 (fault delay; only applies to CUMC and CUVC)
With this parameter, P731.13, fault F082 can be delayed, i.e. the drive is not turned off immediately when a fault occurs but only after expiry of the time entered in the parameter. This makes it possible to react flexibly to a bus failure. With the help of binector B0035 "CB/TB telegram failure", the drive can be shut down (OFF1 or OFF3) by making the fault delay longer than the ramp-down time.

8.4.6 Diagnosis and troubleshooting

NOTE

With regard to basic parameterization, please note the differences to the types of unit with the older function classes FC (CU1), VC (CU2) and SC (CU3). These differences are described below.

In order to make these differences clear, the parameter numbers and other deviations are either printed in dark gray or have a dark gray background.

8.4.6.1 Evaluation of hardware diagnostics

LED displays

On the front of the optional CBC board, there are three LED displays which give information on the current operating status. The following LEDs are provided:

- CBC on (red)
- Data exchange with the basic unit (yellow)
- Telegram traffic via CAN (green)

Status display

LED	Status	Diagnostic information
Red	Flashing	CBC in operation; voltage supply on
Yellow	Flashing	Fault-free data exchange with the basic unit
Green	Flashing	Fault-free process-data transfer via the CAN bus

Table 8.4-9 Status display of the CBC

Fault displays

LED	Status	Diagnostic information
Red	Flashing	Cause of fault:
Yellow	Continuously lit	Serious fault in the CBC
Green	Continuously lit	Remedy: replace CBC

Table 8.4-10 Fault display for CBC faults

LED	Status	Diagnostic information
Red	Flashing	CBC is waiting for the start
Yellow	Off	of parameterization by the
Green	Continuously lit	converter / inverter

Table 8.4-11 Fault display during parameterization

LED	Status	Diagnostic information
Red	Flashing	CBC is waiting for completion
Yellow	Continuously lit	of parameterization by the
Green	Off	converter / inverter

Table 8.4-12 Fault display during parameterization

LED	Status	Diagnostic information
Red	Flashing	No net-data traffic via the CAN bus,
Yellow	Flashing	e.g. bus connector pulled out, EMC fault,
Green	Off	interchanged connection, nodes are not being supplied with net data via the CAN bus

Table 8.4-13 Fault display during operation

NOTE

During normal operation, all three LEDs light up synchronously and for the same length of time (flashing)!

The stationary status of an LED (on or off) indicates an unusual operating status (parameterization phase or fault)!

8.4.6.2 Fault displays and alarms on the basic unit

If errors/faults occur in CAN-bus communication with the CBC, corresponding errors or alarms are also displayed on the PMU or OP1S of the basic unit.

Alarms

Alarm	Meaning
A 083	CAN telegrams with errors are being received or sent and the internal error counter has exceeded the alarm limit. • The CAN telegrams with errors are ignored. The data last sent remain valid. If these CAN telegrams contain process data, the telegram-failure monitor (P722 / P695) can respond – depending on the setting – with error F082 (DPR telegram failure). If the PKW CAN telegrams contain errors or are defective, there is no reaction in the converter. ⇒ Check parameter P720 / P705 (baud rate) for each bus node and, if necessary, correct. ⇒ Check cable connection between the bus nodes ⇒ Check cable shield. The bus cable must be shielded on both sides. ⇒ Lower the EMC loading ⇒ Replace CBC board
A 084	CAN telegrams with errors are being received or sent and the internal error counter has exceeded the fault limit. • The CAN telegrams with errors are ignored. The data last sent remain valid. If these CAN telegrams contain process data, the telegram monitor (P722 / P695) – depending on the setting – can respond with error F082 (DPR telegram failure). If the PKW CAN telegrams contain errors or are defective, there is no reaction in the converter. ⇒ Check parameter P720 / P705 (baud rate) for each bus node and, if necessary, correct. ⇒ Check CAN-bus master ⇒ Check cable connection between the bus nodes ⇒ Check cable shield. The bus cable must be shielded on both sides. ⇒ Lower the EMC loading ⇒ Replace CBC board

• Possible cause
⇒ Remedy

Table 8.4-14 Alarm displays on the basic unit

Alarms A083 and A084 are also stored as information in alarm parameter 6 (r958). The individual alarms are assigned to the corresponding bits in r958 (Bit x = 1: alarm present):

r958	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Bit

Bit 2: Alarm A083
Bit 3: Alarm A084

Fault/error display

When the CBC is combined with the control/technology board (CU/TB), the following fault messages can occur:

Fault	Meaning
F 080	**TB/CB Init.:** Incorrect initialization and parameterization of the CBC via the dual-port RAM interface (DPR interface) • CBC selected with parameter P090/P091, but not inserted (not in the case of CUMC or CUVC) ⇒ Correct parameter P090 P091, insert CBC • Parameterization for CBC false, cause of incorrect parameterization in diagnostic parameter r731.01 ⇒ Correct CB parameter P711-P721 / P696 - P706. Correct CB bus address P918 • CBC defective ⇒ Replace CBC
F 081	**DPR heartbeat:** The CBC is no longer processing the heartbeat counter. • CBC not correctly inserted into the electronics box ⇒ Check CBC • CBC defective ⇒ Replace CBC
F 082	**DPR telegram failure:** The telegram-failure time set by means of parameter P722 / P695 has expired • CAN-bus master has failed (green LED on the CBC is continuously off) • Cable connection between the bus nodes has been interrupted (green LED on the CBC is continuously off) ⇒ Check the bus cable • EMC loading of the bus cable too high. ⇒ Refer to EMC notes • Telegram monitoring time has been set too low (the green LED on the CBC flashes) ⇒ Increase the parameter value in P722 / P695 • CBC defective ⇒ Replace CBC

• Possible cause
⇒ Remedy

Table 8.4-15 Fault displays on the basic unit

8.4.6.3 Evaluation of the CBC diagnostic parameter

NOTE

Please note that, for types of unit with the older function classes FC (CU1), VC (CU2) and SC (CU3), indexed parameter r731.i is to be used appropriately instead of r732.i

The CBC stores this information in a diagnostics buffer to support start-up and for service purposes. The diagnostic information can be read out with indexed parameter r732.i (CB/TB diagnosis). This parameter is displayed as a hexadecimal. The CBC diagnostics buffer is assigned as follows:

CBC-diagnosis parameter

Meaning	r731.i	r732.i
Fault detection configuration	r731.1	r732.1
Counter: telegrams received without faults/errors	r731.2	r732.2
Counter: lost PZD telegrams	r731.3	r732.3
Counter for Bus-Off states	r731.4	r732.4
Counter for error-warning states	r731.5	r732.5
Assigned internally	r731.6	r732.6
Assigned internally	r731.7	r732.7
Assigned internally	r731.8	r732.8
Assigned internally	r731.9	r732.9
Counter for PZD telegrams sent without errors/faults	r731.10	r732.10
Counter for faults during transfer of PZD telegrams	r731.11	r732.11
Assigned internally	r731.12	r732.12
Assigned internally	r731.13	r732.13
Counter for PKW tasks processed without errors/faults	r731.14	r732.14
Counter for faults/errors during processing of PKW tasks	r731.15	r732.15
Type of fault/error in the case of faults during processing of PKW tasks	r731.16	r732.16
Assigned internally	r731.17	r732.17
Counter for lost PKW tasks	r731.18	r732.18
Reserved	r731.19	r732.19
Reserved	r731.20	r732.20
Reserved	r731.21	r732.21
Reserved	r731.22	r732.22
Reserved	r731.23	r732.23
Assigned internally	r731.24	r732.24
Assigned internally	r731.25	r732.25
Software version	r731.26	r732.26
Software identification	r731.27	r732.27
Software date, day/month	r731.28	r732.28
Software date, year	r731.29	r732.29

Table 8.4-16 CBC diagnostics buffer

8.4.6.4 Meaning of CBC diagnosis

P732.1

Fault detection configuration

If an invalid value or an invalid combination of parameter values is contained in the CB parameters, the converter switches to fault mode with fault F080 and fault value 5 (r949). The cause of the incorrect parameterization can then be determined by means of this index of CB diagnostic parameter r731.

Value (hex)	Meaning
00	No fault/error
01	Incorrect bus address (P918)
02	Incorrect CAN ID in the case of a PKW task (P711 / P696)
03	*Internal*
04	*Internal*
05	Incorrect CAN ID in the case of a PKW-task broadcast (P719 / P704)
06	*Internal*
07	Incorrect CAN ID in the case of a PZD-receive (P712 / P697)
08 -0C	*Internal*
0D	Incorrect CAN ID in the case of a PZD-send (P713 / P698)
0E	PZD-send length is 0 (P714 / P699)
0F	PZD-send length to great (>16) (P714 / P699)
10 - 13	*Internal*
14	Incorrect CAN ID in the case of a PZD-receive broadcast (P716 / P701)
15	Incorrect CAN ID in the case of a PZD-receive multicast (P717 / P702)
16	Incorrect CAN ID in the case of a PZD-receive cross (P718 / P703)
17	Invalid baud rate (P720 / P705)
18 - 22	*Internal*
23	Incorrect CAN protocol type (P721 / P706.01)
24	PKW-request broadcast (P719 / P704) without PKW task (P711 / P696)
25 .. 2F	*Reserved*
30	Overlapping of CAN identifier PKW <-> PKW-broadcast
31	Overlapping of CAN identifier PKW <-> PZD-receive
32	Overlapping of CAN identifier PKW <-> PZD-send
33	Overlapping of CAN identifier PKW <-> PZD-receive broadcast
34	Overlapping of CAN identifier PKW <-> PZD-receive multicast
35	Overlapping of CAN identifier PKW <-> PZD-receive cross
36	Overlapping of CAN identifier PKW-broadcast <-> PZD-receive
37	Overlapping of CAN identifier PKW-broadcast <-> PZD-send
38	Overlapping of CAN identifier PKW-broadcast <-> PZD-receive broadcast

Value (hex)	Meaning
39	Overlapping of CAN identifier PKW-broadcast <-> PZD-receive-Multicast
3A	Overlapping of CAN identifier PKW-broadcast <-> PZD-receive cross
3B	Overlapping of CAN identifier PZD-receive <-> PZD-send
3C	Overlapping of CAN identifier PZD-receive <-> PZD-receive-Broadcast
3D	Overlapping of CAN identifier PZD-receive <-> PZD-receive multicast
3E	Overlapping of CAN identifier PZD-receive <-> PZD-receive cross
3F	Overlapping of CAN identifier PZD-send <-> PZD-receive broadcast
40	Overlapping of CAN identifier PZD-send <-> PZD-receive multicast
41	Overlapping of CAN identifier PZD-send <-> PZD-receive cross
42	Overlapping of CAN identifier PZD-receive broadcast <-> PZD-receive multicast
43	Overlapping of CAN identifier PZD-receive broadcast <-> PZD-receive cross
44	Overlapping of CAN identifier PZD-receive multicast <-> PZD-receive cross

r731.02

Counter PZD-receive CAN telegrams
Counter for PZD CAN telegrams received error-free since voltage ON.

r731.03

Counter Lost PZD CAN telegrams
Counter for lost PZD telegrams since voltage ON. If the CAN-bus master sends process-data telegrams faster than the slave can process them, telegrams are lost. These lost telegrams are totaled here.

r731.04

Counter Bus-Off
Counter of the bus-off states since voltage ON (alarm A084).

r731.05

Counter Error-Warning
Counter of the error-warning states since voltage ON (alarm A083).

r731.10

Counter PZD-send CAN telegrams
Counter for PZD telegrams sent error-free since voltage ON.

r731.11

Counter Errors PZD-send CAN telegrams
Counter for errors during sending of PZD telegrams, i.e. when a PZD telegram was to be sent but it was not possible, e.g. in the case of bus overload.

r731.14 **Counter PKW CAN telegrams**

Counter for PKW tasks and replies processed error-free since voltage ON.

r731.15 **Counter Errors PKW CAN telegrams**

Counter for errors during processing of PKW tasks, e.g. due to bus overload or missing reply from the basic unit.

r731.16 **Error type PKW CAN telegrams**

Here, an error identifier is entered if an error occurs during processing of a PKW task.

Value	Meaning
0	No error
1	*Internal*
2	*Internal*
3	*Internal*
4	*Internal*
5	*Internal*
6	*Internal*
7	*Internal*
8	*Internal*
9	Error during sending of PKW reply (in the case of waiting for a free channel)
10	*Internal*
11	Time out in the case of waiting for a PKW reply from the basic unit (basic unit does not process any PKW tasks)
12	Time out in the case of waiting for a free channel (bus overload)

r731.18 **Counter Lost PKW CAN telegrams**

Counter for PKW tasks lost since voltage ON. If the CAN-bus master sends PKW tasks faster than the slave can process them, PKW tasks are lost. These lost PKW tasks are totaled here.

r731.26 **Software version**

r731.27 **Software identifier**

r731.28 **Software date**

Software date, day (high byte) and month (low byte) shown in hexadecimal form

r731.29 **Software date**

Software date, year (shown in hexadecimal form)

8.4.7 Appendix

Technical data

Order No.	6SE7090-0XX84-0FG0
Size (length x width)	90 mm x 83 mm
Degree of pollution	Pollution degree 2 to IEC 664-1 (DIN VDE 0110/T1), Moisture condensation during operation is not permissible
Mechanical specifications During stationary use • deflection • acceleration During transport • deflection • acceleration	To DIN IEC 68-2-6 (if board correctly mounted) 0.15 mm in the frequency range 10 Hz to 58 Hz 19.6 m/s^2 in the frequency range > 58 Hz to 500 Hz 3.5 mm in the frequency range 5 Hz to 9 Hz 9.8 m/s^2 in the frequency range > 9 Hz to 500 Hz
Climatic class	Class 3K3 to DIN IEC 721-3-3 (during operation)
Type of cooling	Natural-air cooling
Permissible ambient or cooling-medium temperature • during operation • during storage • during transport	 0° C to +70° C (32° F to 158° F) -25° C to +70° C (-13° F to 158° F) -25° C to +70° C (-13° F to 158° F)
Humidity rating	Relative humidity ≤ 95 % during transport and storage ≤ 85 % during operation (moisture condensation not permissible)
Supply voltage	5 V ± 5 %, max. 500 mA, internally from the basic unit

9 Control word and status word

9.1 Description of the control word bits

The operating statuses can be read in visualization parameter r001: e.g. READY TO POWER-UP: r001 = 009

The function sequences are described in the sequence in which they are actually realized.

Function diagrams 180 and 190 refer to further function diagrams in the Compendium.

Bit 0: ON/OFF 1 command (↑ "ON") / (L "OFF1")

Condition

Positive edge change from L to H (L → H) in the READY TO POWER-UP condition (009).

Result

- ♦ PRECHARGING (010)
  Main contactor (option)/bypass contactor, if available, are switched-in (closed).
  The DC link is pre-charged.
- ♦ READY (011)
  If the drive was last powered-down with "OFF2", the next condition is only selected after the de-energization time (P603) has expired since the last shutdown
- ♦ GROUND FAULT TEST (012), only when the ground fault test has been selected (P375).
- ♦ RESTART ON THE FLY (013), if restart on the fly (control word bit 23 via P583) has been enabled**.**
- ♦ RUN (014).

Condition

LOW signal and P100 = 3, 4 (closed-loop frequency/speed control)

Result

- ♦ OFF1 (015), if the drive is in a status where the inverter is enabled.
  - For P100 = 3, 4 and slave drive, the system waits until the higher-level open-loop/closed-loop control shuts down the drive.
  - For P100 = 3, 4 and master drive, the setpoint at the ramp-function generator input is inhibited (setpoint = 0), so that the drive decelerates along the parameterized down ramp (P464) to the OFF shutdown frequency (P800).

  After the OFF delay time (P801) has expired, the inverter pulses are inhibited, and the main contactor (option/bypass contactor), if available, are opened.
  If the OFF1 command is withdrawn again when the drive is ramping-down, (e.g. as the result of an ON command), ramp-down is interrupted, and the drive goes back into the RUN (014) condition.

- For PRECHARGING (010), READY (011), RESTART-ON-THE-FLY (013) or MOT-ID-STANDSTILL (018), the inverter pulses are inhibited, and the main contactor (option)/bypass contactor, if available, is opened.
- SWITCH-ON INHIBIT (008); compare status word 1, bit 6
- READY-TO-POWER-UP (009), if "OFF2" or "OFF3" are not present.

Condition Low signal and P100 = 5 (closed-loop torque control)

Result

- An OFF2 command (electrical) is executed.

Bit 1: OFF2 command (L "OFF2") electrical

Condition LOW signal

Result

- The inverter pulses are inhibited, and the main contactor (option)/bypass contactor, if available, are opened.
- POWER-ON INHIBIT (008), until the command is removed.

NOTE The **OFF2** command is simultaneously connected from three sources (P555, P556 and P557)!

Bit 2: OFF3 command (L "OFF3") (fast stop)

Condition LOW signal

Result

- This command has two possible effects:
  - DC braking is enabled (P395 = 1):
    DC BRAKING (017)
    The drive decelerates along the parameterized downramp for OFF3 (P466) until the frequency for the start of DC braking is reached (P398).
    The inverter pulses are then inhibited for the duration of the de-energization time (P603).
    After this, the drive DC brakes with an adjustable braking current (P396) for a braking time which can be parameterized (P397).
    The inverter pulses are then inhibited and the main contactor (option)/bypass contactor, if available, is opened.
  - DC braking is not enabled (P395 = 0):
    The setpoint is inhibited at the ramp-function generator input (setpoint = 0), so that the drive decelerates along the parameterized downramp for OFF3 (P466) to the OFF shutdown frequency (P800).
    The inverter pulses are inhibited after the OFF delay time (P801) has expired, and the main/bypass contactor, if used, is opened. If the OFF3 command is withdrawn while the drive is decelerating, the drive still continues to accelerate.

- For PRE-CHARGING (010), READY (011), RESTART-ON-THE-FLY (013) or MOT-ID STANDSTILL (018), the inverter pulses are inhibited, and the main/bypass contactor, if used, is opened.
- If the drive operates as slave drive, when an OFF3 command is issued, it automatically switches-over to the master drive.
- POWER-ON inhibit (008), until the command is withdrawn.

NOTE The **OFF3** command is simultaneously effective from three sources (P558, P559 and P560)!

Priority of the **OFF** commands: **OFF2** > **OFF3** > **OFF1**

Bit 3: Inverter enable command (H "inverter enable")/(L "inverter inhibit")

Condition HIGH signal, READY (011) and the de-energization time (P603) has expired since the last time that the drive was shutdown.

Result

- RUN (014)
  The inverter pulses are enabled and the setpoint is approached via the ramp-function generator.

Condition LOW signal

Result

- For RESTART-ON-THE-FLY (013), RUN (014), KINETIC BUFFERING with pulse enable, OPTIMIZATION OF THE SPEED CONTROLLER CIRCUIT (019) or SYNCHRONIZATION (020):
- The drive changes over into the READY (011), condition, and the inverter pulses are inhibited.
- If OFF1 is active (015), the inverter pulses are inhibited, the main/bypass contactor, if used, is opened, and the drive goes into the POWER-ON INHIBIT (008) condition.
- If OFF3 is active (016 / fast stop), the inverter inhibit command is ignored, fast stop is continued and, after shutdown (P800, P801), the inverter pulses are inhibited.

Bit 4: Ramp-function generator inhibit command (L "RFG inhibit")

Condition LOW signal in the RUN (014) condition.

Result

- The ramp-function generator output is set to setpoint = 0.

Bit 5: Ramp-function generator hold command (L "RFG hold")

Condition LOW signal in the RUN (014) condition.

Result

- The actual setpoint is "frozen at the ramp-function generator output".

Bit 6: Setpoint enable command (H "setpoint enable")

Condition HIGH signal and the de-energization time have expired (P602).

Result
- The setpoint at the ramp-function generator input is enabled.

Bit 7: Acknowledge command (↑ "Acknowledge")

Condition Rising (positive) edge change from L to H (L → H) in the FAULT condition (007).

Result
- All of the current faults are deleted after they have been previously transferred into the diagnostics memory.
- POWER-ON INHIBIT (008), if no actual faults are present.
- FAULT (007), if there are no faults.

NOTE The **Acknowledge** command is simultaneously effective from the three sources (P565, P566 and P567) and always from the PMU!

Bit 8: Inching 1 ON command (↑ "Inching 1 ON") / (L "Inching 1 OFF")

Condition Positive (rising) edge change from L to H (L → H) in the READY TO POWER-UP (009) condition.

Result
- An ON command is automatically executed (refer to control word bit 0), and inching frequency 1 (P448) is enabled in the setpoint channel.
  The ON/OFF1 command (bit 0) is ignored for active inching operation!
  The system must wait until the de-energization time (P603) has expired

Condition LOW signal

Result
- An OFF1 command is automatically executed (refer to control word bit 0).

Bit 9: Inching 2 ON command (↑ "Inching 2 ON") / (L "Inching 2 OFF")

Condition Rising (positive) edge change from L to H (L → H) in the READY TO POWER-UP (009) condition.

Result
- An ON command is automatically executed (refer to control board bit 0), and inching frequency 2 (P449) is enabled in the setpoint channel.
  The ON/OFF1 command (bit 0) is ignored if inching is active.
  The system must wait until the de-energization time (P603) has expired.

Condition LOW signal

Result
- An OFF1 command is automatically executed (refer to control word bit 0).

Bit 10: Control from the PLC command (H "control from the PLC")

Condition
HIGH signal; the process data PZD (control word, setpoints) are only evaluated if the command has been accepted; this data is sent via the SST1 interface of the CU, the CB/TB interface (option) and the SST/SCB interface (option).

Result
- ♦ If several interfaces are used, only the process data of the interfaces are evaluated, which send an H signal.
- ♦ For an L signal, the last values are received in the appropriate dual port RAM of the interface.

NOTE
An H signal appears in the visualization parameter r550 "control word 1", if **one** of the interfaces sends an H signal!

Bit 11: Clockwise rotating field command (H "clockwise rotating field")

Condition
HIGH signal

Result
- ♦ The setpoint is influenced in conjunction with bit 12 "counter-clockwise rotating field".

Bit 12: Counter-clockwise rotating field command (H "counter-clockwise rotating field")

Condition
HIGH signal

Result
- ♦ The setpoint is influenced in conjunction with bit 11 "clockwise-rotating field".

NOTE
The **counter-clockwise rotating field** and the **clockwise rotating field** command have no influence on supplementary setpoint 2, which is added after the ramp-function generator (RFG)!

Bit 13: Command to raise the motorized potentiometer (H "raise motorized potentiometer")

Condition
HIGH signal

Result
- ♦ The motorized potentiometer in the setpoint channel is driven in conjunction with bit 14 "motorized potentiometer, lower".

Bit 14: Command to lower the motorized potentiometer (H "lower motorized potentiometer")

Condition
HIGH signal

Result
- ♦ The motorized potentiometer in the setpoint channel is driven in conjunction with bit 13 "raise motorized potentiometer".

Bit 15: Command external fault 1 (L "External fault 1")

Condition
LOW signal

Result
- ♦ FAULT (007) and fault message (F035).
  The inverter pulses are inhibited, the main contactor/bypass contactor, if used, is opened.

Bit 16: Function data set FDS bit 0 command

Result

- In conjunction with bit 17 "FDS BIT 1" one of the four possible function data sets is energized.

Bit 17: Function data set FDS bit 1 command

Result

- In conjunction with bit 16 "FDS BIT 0" one of the four possible function data sets is energized.

Bit 18: Motor data set, MDS bit 0 command

Condition

READY TO POWER-UP (009), PRE-CHARGING (010) or READY (011)

Result

- One of the four possible motor data sets is energized in conjunction with bit 19 "MDS BIT 1".

Bit 19: Motor data set, MDS bit 1 command

Condition

READY TO POWER-UP (009), PRE-CHARGING (010) or READY (011)

Result

- One of the four possible motor data sets is energized in conjunction with bit 18 "MDS BIT 0".

Bit 20: Fixed setpoint FSW bit 0 (LSB) command

Result

- In conjunction with bit 21 "FSW BIT 1", one of the four possible fixed setpoints is energized to input as percentage fixed setpoints, referred to the reference frequency P352 or reference speed P353.

Bit 21: Fixed setpoint FSW bit 1 (MSB) command

Result

- In conjunction with bit 20 "FSW BIT 0" one of the four possible fixed setpoints is energized for input as percentage fixed setpoints, referred to the reference frequency P352 or the reference speed P353.

Bit 22: Synchronizing enable command (H "synchronizing enable")

Condition

- For converter sychronization (P534 = 1):
  HIGH signal, TSY (option) available and P100 = 2 (V/f characteristic for textile applications).
- For line synchronization (P534 = 2):
  HIGH signal, TSY (option) P100 = 1, 2 or 3

Result

- The command enables the synchronizing function.

Bit 23: Restart-on-the-fly enable command (H "restart-on-the-fly enable")

Condition HIGH signal

Result
- ♦ The command enables the restart-on-the-fly function.

Bit 24: Droop/technology controller enable command (H "droop/technology controller enable")

Condition HIGH signal

Result
- ♦ The command enables the droop function, if P100 (open-loop/closed-loop control type) is assigned 3 (closed-loop frequency control) or 4 (closed-loop speed control), parameter P246 <> 0 and the inverted pulses of the drive converter are enabled.
  The speed/frequency controller output, fed back as negative signal to the speed/frequency setpoint, can be set via parameter P245 (source steady-state) and P246 (scaling steady-state)

Bit 25: Controller enable command (H "controller enable")

Condition HIGH signal and the drive converter inverter pulses are enabled.

Result
- ♦ The speed controller output is enabled for the appropriate control type (P100 = 0,4,5).

Bit 26: Command, external fault 2 (L "External fault 2")

Condition LOW signal; it is only activated from the READY (011) condition onwards and after an additional time delay of 200 ms.

Result
- ♦ FAULT (007) and fault message (F036).
  The inverter pulses are inhibited, the main contactor, if available, is opened.

Bit 27: Slave/master drive command (H "Slave drive")/(L "Master drive")

Condition HIGH signal, P100 (open-loop/closed-loop control type) = 3, 4 (closed-loop frequency/speed control), and the drive inverter pulses are enabled.

Result
- ♦ Slave drive: The closed-loop control acts as closed-loop torque control (M closed-loop control). With f closed-loop control, precise torque control is not possible until from about 10 % of motor rated speed onwards.

Condition LOW signal, P100 (open-loop/closed-loop control type) = 3, 4 (closed-loop frequency/speed control), and the drive converter inverter pulses are enabled.

Result
- ♦ Master drive: The closed-loop control operates as closed-loop speed or frequency control (closed-loop frequency/speed control).

Bit 28: Command, external alarm 1 (L "External alarm 1")

Condition LOW signal

Result
- The operating status is maintained. An alarm message is issued (A015).

Bit 29: Command, external alarm 2 (L "External alarm 2")

Condition LOW signal

Result
- The operating status is maintained. An alarm message is issued (A016).

Bit 30: Select, BICO data sets (H "data set 2") / (L "data set 1")

Condition HIGH signal

Result
- The parameter settings of data set 2 for all binector and connector commands and signals, are activated.

Condition LOW signal

Result
- The parameter settings of data set 1 for all binector and connector commands and signals, are activated.

Bit 31: Main contactor checkback signal command (H "main contactor checkback signal")

Condition HIGH signal, corresponding to the wiring and parameterization of the main contactor (option). The checkback time can be set in P600.

Result
- Checkback signal, "main contactor energized" (closed).

9.2 Description of the status word bits

Bit 0: Message, "Ready to power-up" (H)

HIGH signal POWER-ON INHIBIT (008) or READY TO POWER-UP (009) status

Significance

- The power supply, the open- and closed-loop control are operational.
- The inverter pulses are inhibited.
- If an external power supply and a main contactor (option)/bypass contactor are available, it is possible to bring the DC link into a no-voltage condition, when the drive converter is in this status!

Bit 1: Message, "Ready" (H)

HIGH signal PRE-CHARGING (010) or READY (011) status

Significance

- The power supply, the open-loop and the closed-loop control are operational.
- The unit is powered-up.
- Pre-charging has been completed.
- The DC link has been ramped-up to the full voltage.
- The inverter pulses are still inhibited.

Bit 2: Message, "Run" (H)

HIGH signal RESTART-ON-THE-FLY (013), RUN (014), OFF1 (015) or OFF3 (016)

Significance

- The unit is functioning.
- The inverter pulses are enabled.
- The output terminals are live.

Bit 3: Message "Fault" (H)

HIGH signal Fault (007) status

Significance

- A fault has occurred.

Bit 4: Message "OFF2" (L)

LOW signal OFF2 command available

Significance

- The OFF2 command was output (control word bit 1).

Bit 5: Message "OFF3" (L)

LOW signal OFF3 (016) status, and/or OFF3 command available

Significance

- The OFF3 command was output (control word bit 2).

Bit 6: Message "Power-on inhibit" (H)

HIGH signal POWER-ON INHIBIT (008) status

Significance

- The power supply, open-loop and closed-loop control are operational.
- If an external power supply and a main contactor (option)/bypass contactor are available, it is possible to bring the DC link voltage in this drive converter status into a no-voltage condition!
- The message is available as long as an OFF2 command is present via control word bit 1 or an OFF3 command is available via control word bit 2 after the setpoint has been ramped-down, or an ON command is available via control word bit 0 (edge evaluation).

Bit 7: Message, "Alarm" (H)

HIGH signal Alarm (Axxx)

Significance

- An alarm has been issued.
- The signal is present until the cause has been resolved.

Bit 8: Message "Setpoint-actual value deviation" (L)

LOW signal Alarm, "Setpoint-actual value deviation" (A034)

Significance

- The frequency actual value deviates from the frequency setpoint (reference value, by a value which exceeds P794 (setpoint-actual value deviation, frequency), for a time which is longer than P792 (setpoint-actual value deviation time).
- The bit is again set as H signal, if the deviation is less than parameter value P792.

Bit 9: Message "PZD control requested" (H)

HIGH signal Still present.

Bit 10: Message, "Comparison frequency reached" (H)

HIGH signal The parameterized comparison frequency has been reached.

Significance

- The absolute frequency actual value is greater than or equal to the parameterized comparison frequency (P796).
- The bit is again set to L signal, as soon as the absolute value of the comparison frequency (P796), minus the parameterized comparison frequency hysteresis (P797 as %, referred to the comparison frequency (P796)) is fallen below.

Bit 11: Message "Fault, undervoltage" (H)

HIGH signal "Undervoltage in the DC link" fault (F008)

Significance
- The DC link voltage has fallen below the permissible limit value.

Refer to the Section "Fault- and alarm messages"

Bit 12: Message "Main contactor energized" (H)

HIGH signal The main contactor (AC unit)/precharging contactor (DC unit) (option) is operated.

Significance
- The main contactor/precharging contactor (option) can be driven with the appropriate wiring and parameterization.

Bit 13: Message "RFG active" (H)

HIGH signal Ramp-function generator active

Significance
- The ramp-function generator output (r480 / KK0073) is not equal to the ramp-function generator input (r460 / KK0072).
  A hysteresis, which can be parameterized (P476 as %, referred to the rated system frequency P352), can only be taken into account for an analog setpoint input.
- When the "Synchronizing" function is selected, alarm A069 is initiated, as long as the ramp-function generator is active in the setpoint channel of the synchronizing converter.
  The synchronizing operation is not started as long as the ramp-function generator is active.

Bit 14: Message, "Clockwise rotating field" (H)/ "Counter-clockwise rotating field" (L)

HIGH signal Clockwise rotating field

Significance
- The frequency setpoint for the closed-loop control (speed/frequency setpoint, r482 / KK0075) is greater than or equal to 0.

LOW signal Counter-clockwise rotating field

Significance
- The frequency setpoint for the closed-loop control (speed/frequency setpoint, r482 / KK0075) is less than 0.

Bit 15: Message "KIP/FLN active" (H)

HIGH signal The kinetic buffering (KIP) function or flexible response (FLN) is active.

Significance
- KIP: A brief power failure is bypassed using the kinetic energy of the connected load.
- FLN: The converter can be operated up to a minimum DC link voltage of 50% of the rated value.

Bit 16: Message "Restart-on-the-fly active" (H)

HIGH signal
The restart-on-the-fly function is active, or the excitation time (P602) is running.

Significance
- The drive converter is switched to a motor which is still rotating.
- Overcurrent is prevented as a result of the restart-on-the-fly function.
- The excitation time (magnetization time) is active.

Bit 17: Message "Synchronism has been reached" (H)

HIGH signal
Synchronism has been reached.

Significance
- Synchronism has been reached.

Prerequisite
TSY (option) available and P100 (open-loop/closed-loop control type) = 2 (V/f characteristic for textile applications) or P100 = 1, 2, 3 at line synchronism (P534 = 2).

Bit 18: Message "Overspeed" (L)

LOW signal
Alarm "Overspeed" (A033)

Significance
- The frequency actual value is either:
- greater than the maximum frequency for the clockwise rotating field (P452) plus a hysteresis (P804 as %, referred to P452) or
- less than the maximum frequency for the counter-clockwise rotating field (P453) plus a hysteresis (P804 as %, referred to P453).
- The bit is again set to an H signal as soon as the absolute value of the frequency actual value is less than or equal to the absolute value of the appropriate maximum frequency.

Bit 19: Message "External fault 1" (H)

HIGH signal
"External fault 1"

Significance
- A "External fault 1" is present in control word, bit 15.

Output at the terminal strip (PEU, CUVC, TSY, SCI1/2, EB1, EB2) with L signal.

Bit 20: Message "External fault 2" (H)

HIGH signal
"External fault 2"

Significance
- A "External fault 2" is present in control word bit 26.

Output at the terminal strip (PEU, CUVC, TSY, SCI1/2, EB1, EB2) with L signal.

Bit 21: Message "External alarm" (H)

HIGH signal "External alarm"

Significance

- An "external alarm 1" is present in control word bit 28, or, "external alarm 2" in control word bit 29.

Output at the terminal strip (PEU, CUVC, TSY, SCI1/2, EB1, EB2) with L signal.

Bit 22: Message "Alarm i^2t drive converter" (H)

HIGH signal Alarm "i^2t alarm, inverter" (A025)

Significance

- If the instantaneous load status is maintained, then the drive converter will be thermally overloaded.

Output at the terminal strip (PEU, CUVC, TSY, SCI1/2, EB1, EB2) with L signal.

Bit 23: Message "Fault, converter overtemperature" (H)

HIGH signal "Inverter temperature too high" fault (F023)

Significance

- The limiting inverter temperature has been exceeded.

Output at the terminal strip (PEU, CUVC, TSY, SCI1/2, EB1, EB2) with L signal.

Bit 24: Message "Alarm, converter overtemperature" (H)

HIGH signal Alarm, "inverter temperature too high" (A022)

Significance

- The inverter temperature threshold to release an alarm has been exceeded.

Output at the terminal strip (PEU, CUVC, TSY, SCI1/2, EB1, EB2) with L signal.

Bit 25: Message "Alarm, motor overtemperature" (H)

HIGH signal Alarm "Motor overtemperature"

Significance

- It involves an "I^2t alarm, motor" (A029) or an overtemperature alarm from the KTY (P380 > 1) or PTC thermistor (P380 = 1).
- The alarmis initiated either by calculating the motor load (r008 / K0244) or from the KTY84 sensor (r009 / K0245).
- Parameters involved in the calculation:
  P380 (mot. temp. alarm), P382 (motor cooling),
  P383 (mot. temp.T1), P384 (mot. load limit).

Output at the terminal strip (PEU, CUVC, TSY, SCI1/2, EB1, EB2) with L signal.

Bit 26: Message "Fault, motor overtemperature" (H)

HIGH signal Fault, "Motor overtemperature"

Significance

- It involves an "I^2t fault, motor" (F021) or an overtemperature fault, from KTY (P381 > 1) or PTC thermistor (P381 = 1).

Output at the terminal strip (PEU, CUVC, TSY, SCI1/2, EB1, EB2) with L signal.

Bit 27: Reserve

Bit 28: Message, "Fault, motor stalled/locked" (H)

HIGH signal Fault, "Motor stalled or blocked" (F015)

Significance

- The drive has either stalled or is locked.

Precondition

- Blocking recognition at P100 = 3, 4 f/n control: setpoint/actual value deviation has occurred (bit 8), torque limit (B0234) reached, speed < 2 % and time in P805 expired
- In the case of M control (P100 = 5) or slave drive (P587), blocking is not recognized.

Output at the terminal strip (PEU, CUVC, TSY, SCI1/2, EB1, EB2) with L signal.

Bit 29: Message "Bypass contactor energized" (H)

HIGH signal The bypass contactor is energized after precharging has ended (applies only to AC units equipped with bypass contactor).

Significance

- A bypass contactor (option) can be energized with the appropriate wiring and parameterization.

Bit 30: Message "Alarm sync. error" (H)

HIGH signal Alarm, "Synchronizing error" (A070)

Significance

- After successful synchronization, the phase deviation is greater than the parameterized tolerance range (P531).

Prerequisite TSY (option) available and P100 (open-loop/closed-loop control type) = 2 (V/f characteristic for textile applications) or P100 = 1, 2, 3 at line synchronism (P534 = 2).

Output at the terminal strip (PEU, CUVC, TSY, SCI1/2, EB1, EB2) with L signal.

Bit 31: Message "Pre-charging active" (H)

HIGH signal PRE-CHARGING (010) condition

Significance

- Pre-charging is realized after an ON command.

Function diagrams

MASTERDRIVES VC function diagram - List of contents of the basic functions

The following function diagrams are **not** in this instruction (sep. exc. sync.):

- 251 -	- 383 -	- 431 -
- 369 -	- 384 -	- 487 -
- 373 -	- 391 -	- 551 -
- 374 -	- 397 -	

MASTERDRIVES VC function diagram - List of contents

of the free blocks

of the supplementary boards

Page	Title	V/f control			n control		f control		T control
		V/f char.	+ n ctrl	Textile	Master dr.	Slave dr.	Master dr.	Slave dr.	
280	Measured-value sensing	x	x	x	x	x	x	x	x
285	Evaluation of set/actual values for voltage/current/torque/output				x	x	x	x	x
286	Evaluation of set/actual values for V/f open-loop control	x	x	x					
316	Setpoint channel (part 1), master drive	x	x	x	x		x		
317	Setpoint channel (part 2), master drive	x	x	x	x		x		
318	Setpoint channel (part 3), master drive	x	x	x	x		x		
319	Setpoint channel (part 4), master drive	x	x	x	x		x		
320	Setpoint channel, slave drive					x		x	x
350	Speed/position processing				x	x			x
351	Speed processing						x	x	
352	V/f characteristic with speed controller		x						
360	Speed controller				x				
361	Speed limiting controller					x			x
362	Speed controller						x		
363	Speed limiting controller							x	
364	V/f characteristic with speed controller		x						
365	DT1 element, droop and torque pre-control				x				
366	DT1 element, torque control and speed control, slave drive					x			x
367	DT1 element, droop and torque pre-control						x		
370	Torque/current limitation				x				
371	Torque/current limitation					x			x
372	Torque/current limitation						x		
373	Torque/current limitation							x	
375	Fast torque setpoint				x				
380	Flux calculation				x	x			x
381	Flux calculation						x	x	
382	Current setpoint						x	x	
390	Current controller				x	x	x	x	x
395	Motor model, frequency				x	x			x
396	Motor model, frequency						x	x	
400	Current limitation, V/f characteristic	x							
401	Current limitation, V/f characteristic with speed controller		x						
402	Current limitation, V/f characteristic textile			x					
405	V/f characteristic	x	x	x					
420	Gating unit	x	x	x	x	x	x	x	x
430	Temperature model				x	x	x	x	x
470	Braking control	x	x	x	x	x	x	x	x
480	Messages	x	x	x	x	x	x	x	x

Note:
n control = speed control with speed controller (P100=4)
f control = speed control without speed controller (P100=3)
T control = torque control (P100=5)

Changeover from master to slave drive is only possible with closed-loop control types P100 =3/4 closed-loop speed control **with/without** encoder (control word 2 bit 27 [190.5]).
The closed-loop control then operates as torque control (as P100 = 4).

Explanation of the symbols used in the function diagram

Parameter

r007 n007 — Display parameters

P123 U123 — Setting parameters

U345 (50,00)
0 ...120 % — Setting parameter, not indexed (factory setting: 50.00 Range 0 ... 120%)

U345.3 — Setting parameter, indexed, index 3

U345.B — Setting parameter, belongs to BiCo data set (2 indices)

U345.F — Setting parameter, belongs to function data set (4 indices)

U345.M — Setting parameter, belongs to the motor data set (16 indices)

Connectors/binectors

K0000 — Connector (freely interconnectable 16 bit signal; number representation: 100% corresponds to 4000hex; corresponds to 16384dec)

KK0001 — Double connector (freely intercon-nectable 32 bit signal; number representation: 100% corresponds to 40000000hex; corresponds to 1073741824dec)

B0000 — Binector (freely interconnectable binary signal), can be output via digital output [90], [91], [92]

P531 (326)
K — Selection of any connector (factory setting: P531=326, i.e. connector K326 selected)

Place for entering the selected connector

P432 (546)
KK — Selection of any double connector (factory setting: P432=546, i.e. connector KK546 selected)

P597 (1)
B .01
B .02
B .03 — Selection of 3 binectors via indexed parameters (binector B001 is selected in the factory setting for all 3 outputs, i.e. fixed value "1", see below)

0	B0000
1	B0001
0%	K0000
100% (=16384)	K0001
200% (=32767)	K0002
-100% (=-16384)	K0003
-200% (=-32767)	K0004
0	KK0000
100% (=1 073 741 824)	KK0001
200% (=2 147 483 647)	KK0002
-100% (=-1 073 741 824)	KK0003
-200% (=-2 147 483 647)	KK0004

Automatic conversion between connectors and double connectors

Converting a connector to a double connector:

K0139 → U531 KK

K139 is converted to a double connector by entering it in the high word of the double connector and by setting its low word to zero.

Converting a double connector to a connector:

KK0149 → U584 K

KK149 is converted to a connector by entering its high word in the connector.

Cross references

[702.5] — The signal comes from / goes to sheet 702, signal path 5 of function diagram

Sampling time of the main processor

T0 = Basic sampling time = P357

Sampling time of the gating unit processor

Tp = n/fpuls ≥ 0.4 ms (n = 1 ... 7) fpulse = P340

e.g.

P340=2.5 kHz	n=1	Tp=0.4 ms
P340=4.0 kHz	n=2	Tp=0.5 ms

Indication of the block number and the sampling time for the free blocks

U953.14 = ___(xx) — The block has the number 314. The block can be activated via U953.14 and its sampling time selected (see sheet 702).

n959.02 = 7 — The block is permanently assigned to a sampling time

Calculating time of the free blocks

{8 µs} — Blocks of the indicated type require a typical calculating time of proximately 8 microseconds (rough guide value).

If the total available calculating time is exceeded, the monitoring system shown on sheet 702 will respond.

General visualization paramaters

Parameter	Connector
r001 Drive Status	K0249
r002 Rot freq	KK0020
r003 Output Volts	K0021
r004 Output Amps	K0022
r005 Output power	K0023
r006 DC Bus Volts	K0025
r007 Motor Torque	K0024
r008 Motor Utilization	K0244
r009 Motor Tmp	K0245
r010 Drive Utilization	K0246
r069 SW Version	
r828 SW ID	
r014 Setp Speed	KK0150
r015 n(act)	KK0020

r001 Drive Status

0: MRPD Input
4: H/W Setting
5: System Set
7: Fault
8: ON locked
9: Rdy ON
10: Precharging
11: Ready for Operation
12: Ground fault test
13: "Flying restart" function active
14: Operation
15: OFF 1
16: OFF 3
17: "DC braking" active
18: Mot ID
19: Speed controller opt.
20: "Synchronization" function active
21: Download

Menu Select
P060

0: User param
1: M:Parameter
2: M:Fixed Set
3: M:Quick Startup
4: Board Def
5: Drive Setting
6: Download
7: UpR/fr access
8: M:Power Def

Pxxx.M ⇒ Motor data set parameter (4 indices)
Switchover by control word bit 18/19 [190/2]

act. MotDataSet (Motor-Daten-Satz)
r011 → K0034

Pxxx.B ⇒ BiCo - Data set parameter (2 indices)
(corresponds to the basic/reserve data set)
Switchover by control word bit 30 [190/2]

Active BICO DSet
r012 → K0035

Pxxx.F ⇒ Function data set parameter (4 indices)
(corresponds to the setpoint data set)
Switchover by control word bits 16 / 17 [190/2]

Active FuncDSet (Function Data Set)
r013 → K0036

Normalization variables for closed-loop and open-loop control of the unit or the equipment (4000 (0000)Hex = 100 % of the base value)

P350 (~):	Ref Amps	(0.0 ... 6553.5 A)	
P351 (~):	Ref Volts	(100 ... 2000 V)	(also for DC link voltages)
P352 (50):	Ref Frequency	(4.00 ... 600.00 Hz)	
P353 (1500):	Ref Speed	(1 ... 36000 1/min)	
P354 (~):	Ref Torque	(0.10 ... 900 000.00 Nm)	(with P113 = Rated motor torque)
	Ref Tmp	256 °C	
	Ref power	P353 x P354 x 2 Pi / 60	(with P113 = Rated motor torque)
	Ref angle	90°	(0° = 360°, 0 % = 400 %)

Physical size
in A, V, Hz, 1/min, °C, °

$$\frac{4000(0000)\text{Hex}}{\text{RefParameter}}$$

Process quantity with normalization
4000 (0000)Hex = 100 %

Torque and output in %

Motor Torque

$$\frac{4000\text{Hex}}{100\%} \cdot \frac{\text{P113}}{\text{P354}} \cdot \frac{\text{P108}}{\text{P353}}$$

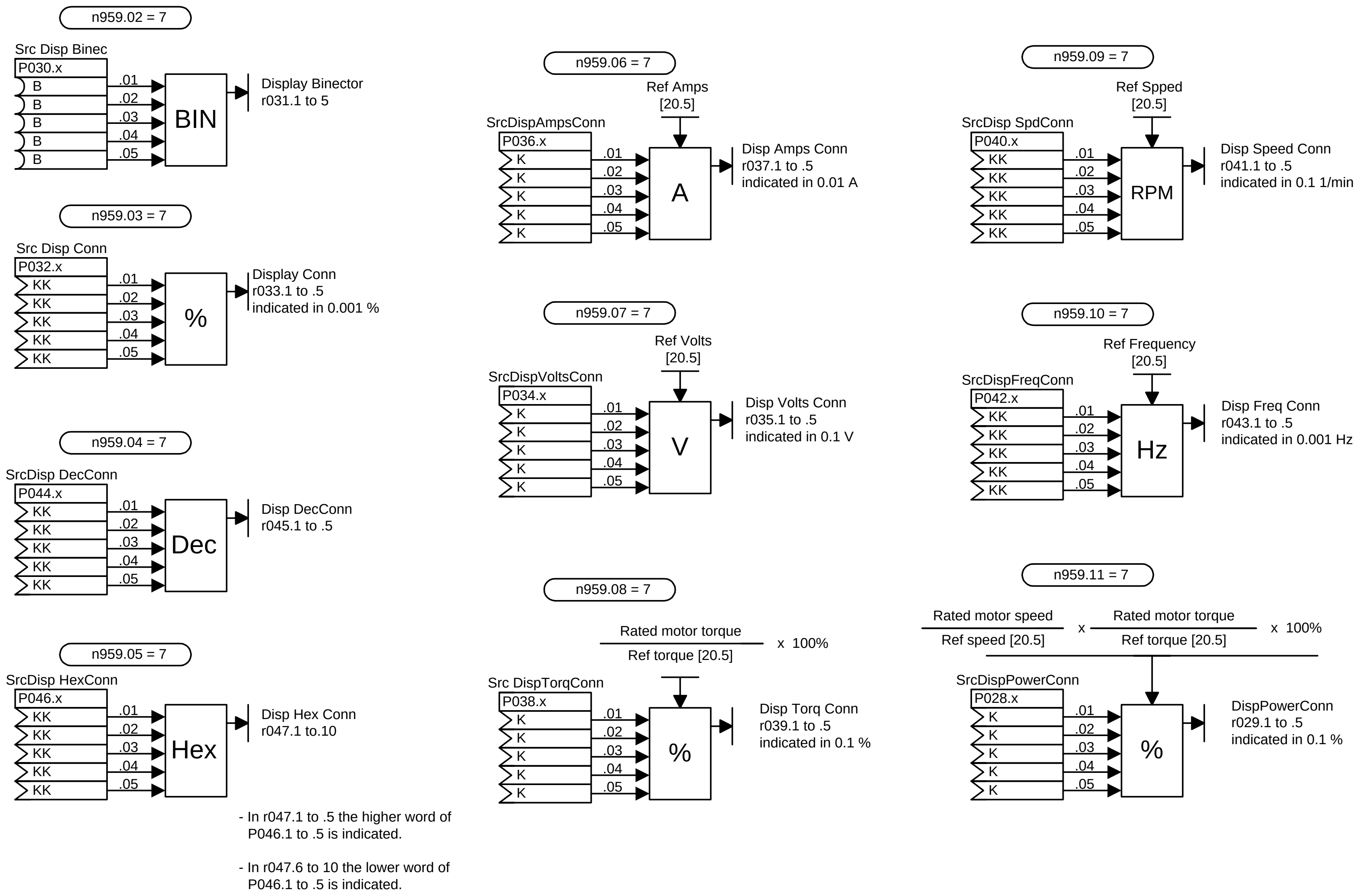
4000 (0000)Hex = 100 %

Notes:

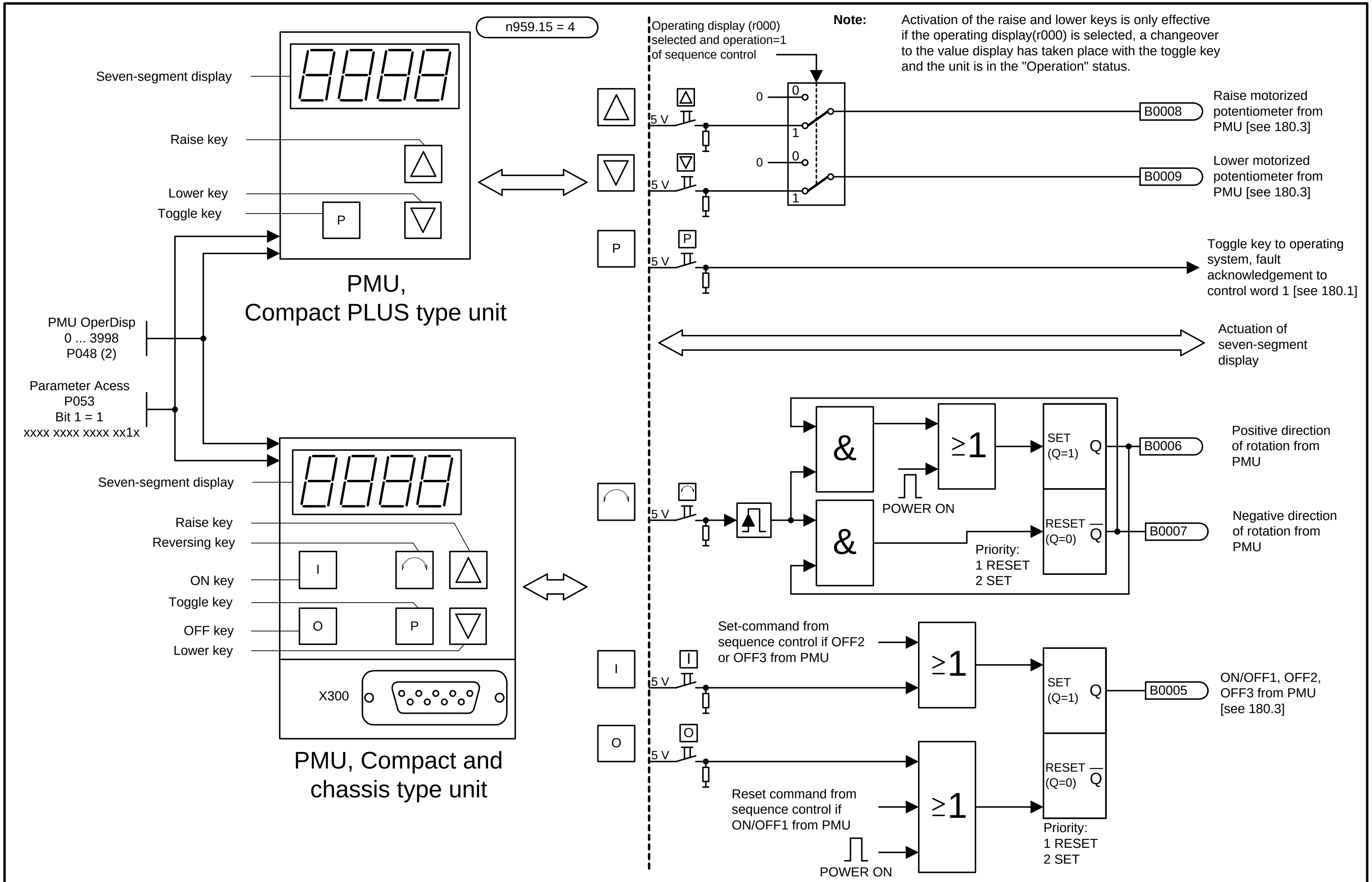
1. Both the limit values of the control (e.g. speed, torque, current) and the normalizations of the internal and external setpoint and actual-value data are influenced.

2. When calculation of the motor model (P115) is selected, the values are pre-assigned to motor rated quantities (only in converter status r001=5).

3. The listed parameter values can only be changed in the "Drive setting" menu (P060 = 5).

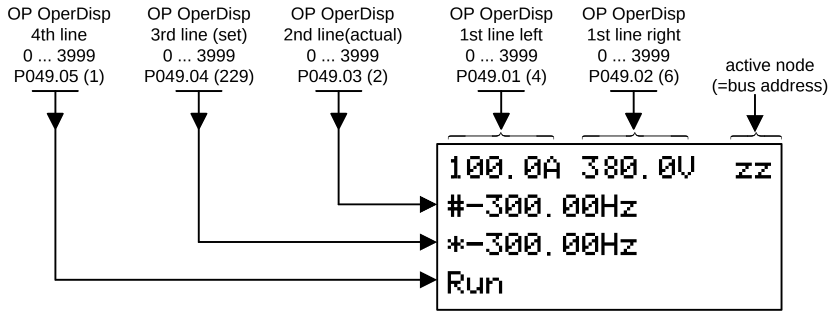

n959.02 = 7
Src Disp Binec
P030.x
B
.01 .02 .03 .04 .05
BIN
Display Binector
r031.1 to 5
n959.03 = 7
Src Disp Conn
P032.x
KK
%
Display Conn
r033.1 to .5
indicated in 0.001 %
n959.04 = 7
SrcDisp DecConn
P044.x
Dec
Disp DecConn
r045.1 to .5
n959.05 = 7
SrcDisp HexConn
P046.x
Hex
Disp Hex Conn
r047.1 to.10
- In r047.1 to .5 the higher word of P046.1 to .5 is indicated.
- In r047.6 to 10 the lower word of P046.1 to .5 is indicated.
n959.06 = 7
Ref Amps
[20.5]
SrcDispAmpsConn
P036.x
K
A
Disp Amps Conn
r037.1 to .5
indicated in 0.01 A
n959.07 = 7
Ref Volts
[20.5]
SrcDispVoltsConn
P034.x
V
Disp Volts Conn
r035.1 to .5
indicated in 0.1 V
n959.08 = 7
Rated motor torque / Ref torque [20.5] x 100%
Src DispTorqConn
P038.x
%
Disp Torq Conn
r039.1 to .5
indicated in 0.1 %
n959.09 = 7
Ref Spped
[20.5]
SrcDisp SpdConn
P040.x
RPM
Disp Speed Conn
r041.1 to .5
indicated in 0.1 1/min
n959.10 = 7
Ref Frequency
[20.5]
SrcDispFreqConn
P042.x
Hz
Disp Freq Conn
r043.1 to .5
indicated in 0.001 Hz
n959.11 = 7
Rated motor speed / Ref speed [20.5] x Rated motor torque / Ref torque [20.5] x 100%
SrcDispPowerConn
P028.x
%
DispPowerConn
r029.1 to .5
indicated in 0.1 %

1	2	3	4	5	6	7	8



1	2	3	4	5	6	7	8

PMU	fp_vc_050_e.vsd	Function diagram	- 50 -
Keypad, functionality and wiring	16.05.01	MASTERDRIVES VC	



- A maximum of 6 characters (value + unit) are available for the display P049.01 und P049.02 respectively.

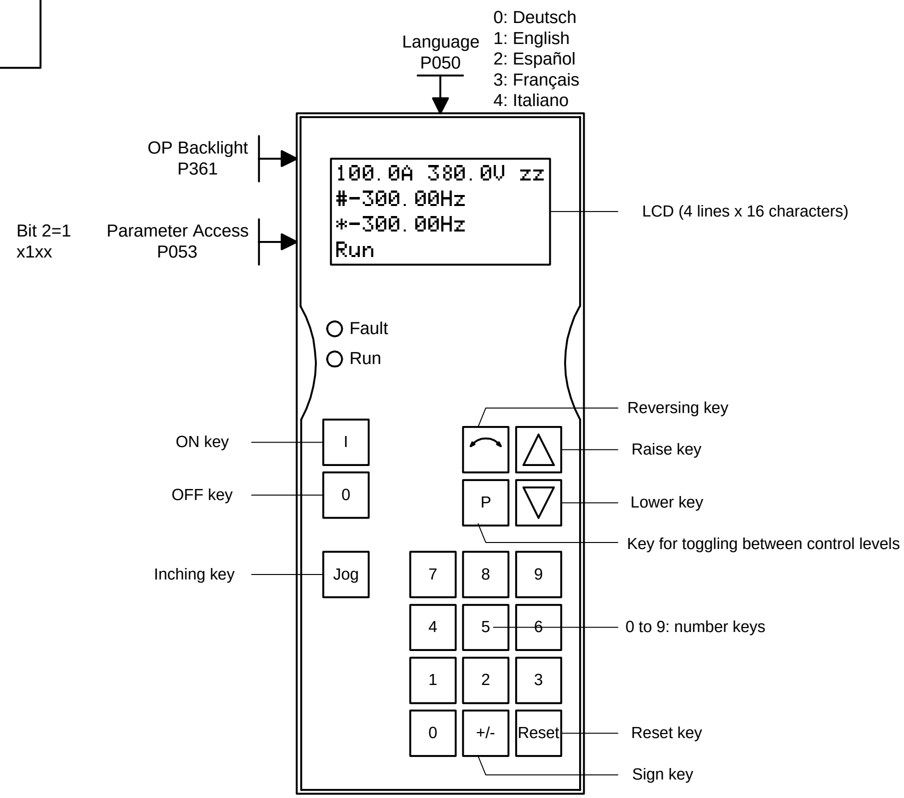
- The 2nd line (P049.03) is provided for displaying actual values.
- The 3rd line (P049.04) is provided for displaying setpoint values.

- To enable the setpoint to be changed in the operating display, its parameter number must be entered there. :
e. g. P049.04 = 405 = Fixed setpoint 5

The control commands are transferred via word 1 in the USS protocol.

I / 0	B2100	ON/OFF1 from OP1S
	B2101	OFF2 from OP1S
	B2102	OFF3 from OP1S
△	B2113	Raise MOP from OP1S
▽	B2114	Lower MOP from OP1S
⌒	B2111	Positive speed direction from OP1S
	B2112	Negative speed direction from OP1S
Reset	B2107	Acknowledgement from OP1S
Jog	B2108	Inching from OP1S

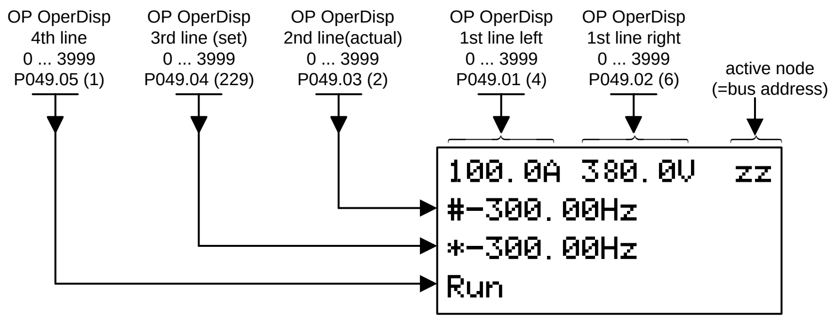
See connection to control word [180.3]



Not valid for Compact PLUS

1	2	3	4	5	6	7	8

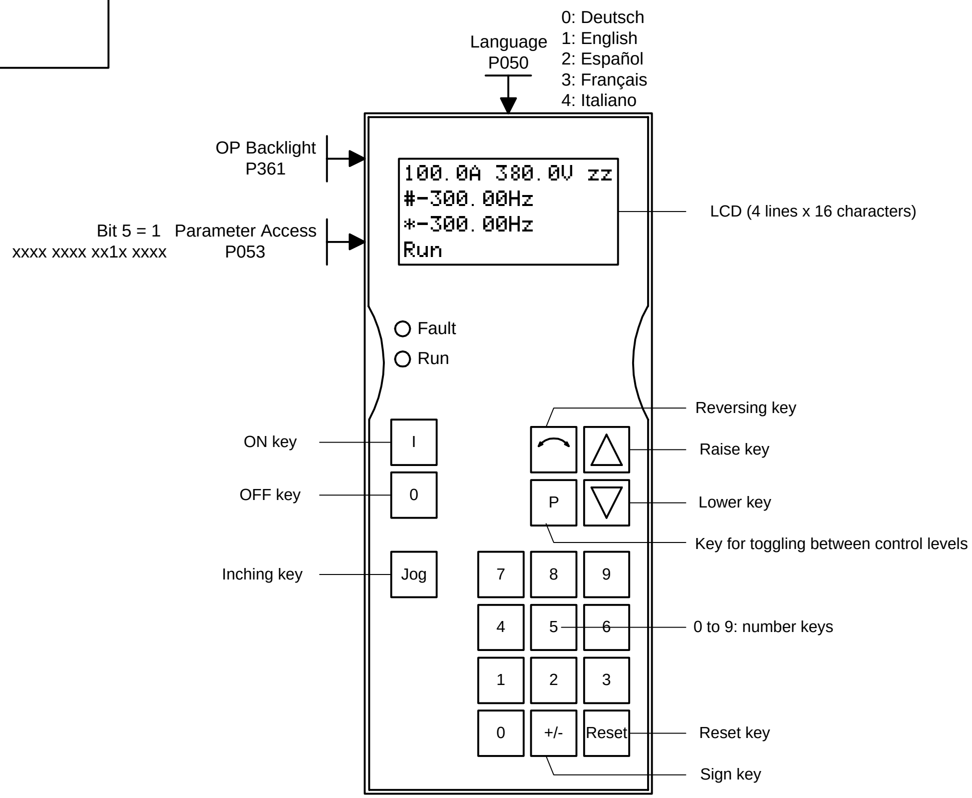
OP1S	fp_vc_060_e.vsd	Function diagram	- 60 -
Operating display	24.07.01	MASTERDRIVES VC	



- A maximum of 6 characters (value + unit) are available for the display P049.01 und P049.02 respectively.

- The 2nd line (P049.03) is provided for displaying actual values.
- The 3rd line (P049.04) is provided for displaying setpoint values.

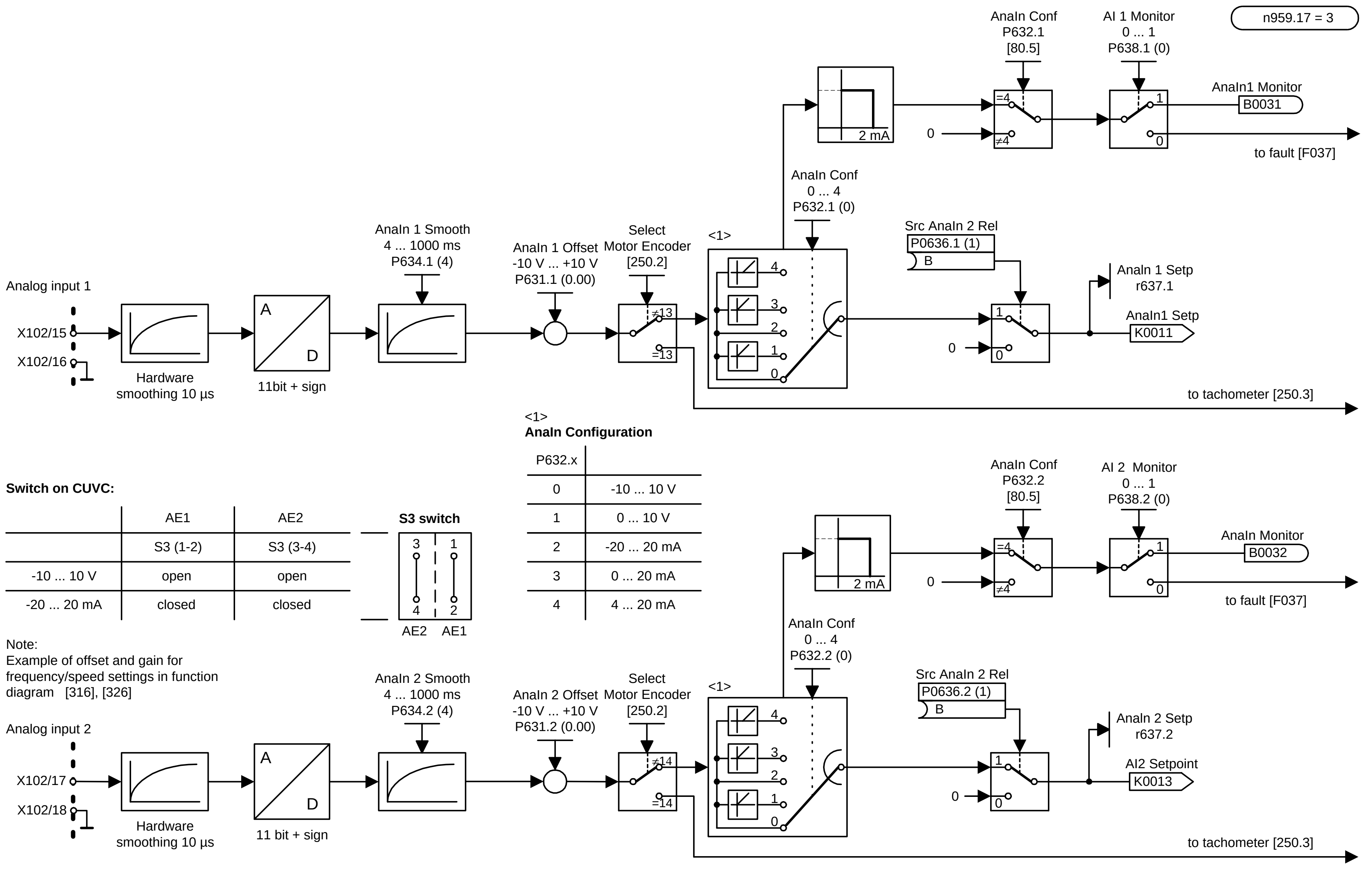
- To enable the setpoint to be changed in the operating display, its parameter number must be entered there. :
  e. g. P049.04 = 405 = Fixed setpoint 5



The control commands are transferred via word 1 in the USS protocol.

Key	Binector	Function
I / 0	B6100	ON/OFF1 from OP1S
	B6101	OFF2 from OP1S
	B6102	OFF3 from OP1S
Raise	B6113	Raise MOP from OP1S
Lower	B6114	Lower MOP from OP1S
Reversing	B6111	Positive speed direction from OP1S
	B6112	Negative speed direction from OP1S
Reset	B6107	Acknowledgement from OP1S
Jog	B6108	Inching from OP1S

See connection to control word [180.3]



Switch on CUVC:

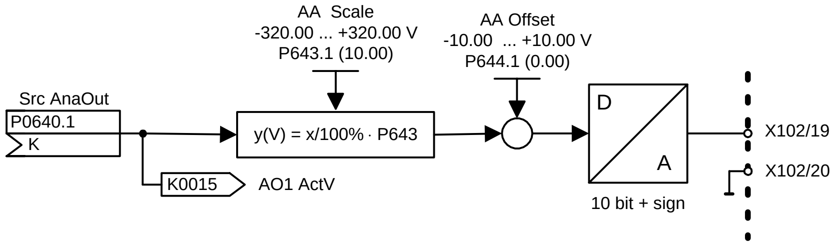
	AE1	AE2
	S3 (1-2)	S3 (3-4)
-10 ... 10 V	open	open
-20 ... 20 mA	closed	closed

<1>
AnaIn Configuration

P632.x	
0	-10 ... 10 V
1	0 ... 10 V
2	-20 ... 20 mA
3	0 ... 20 mA
4	4 ... 20 mA

Note:
Example of offset and gain for frequency/speed settings in function diagram [316], [326]

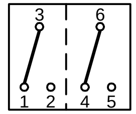
n959.19 = 3

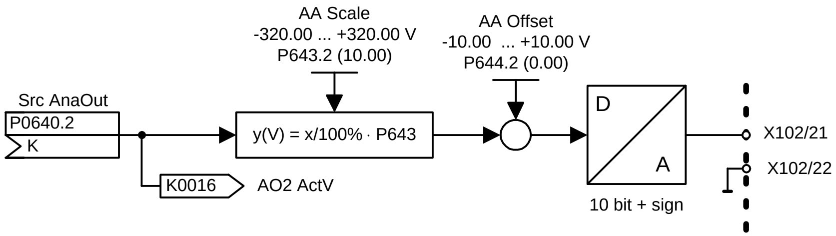


Switch on CUVC:

A01	
S4 (1-3)	-10 ... 10 V
S4 (2-3)	20 ... 0 mA

S4 switch





Switch on CUVC:

A02	
S4 (4-6)	-10 ... 10 V
S4 (5-6)	20 ... 0 mA

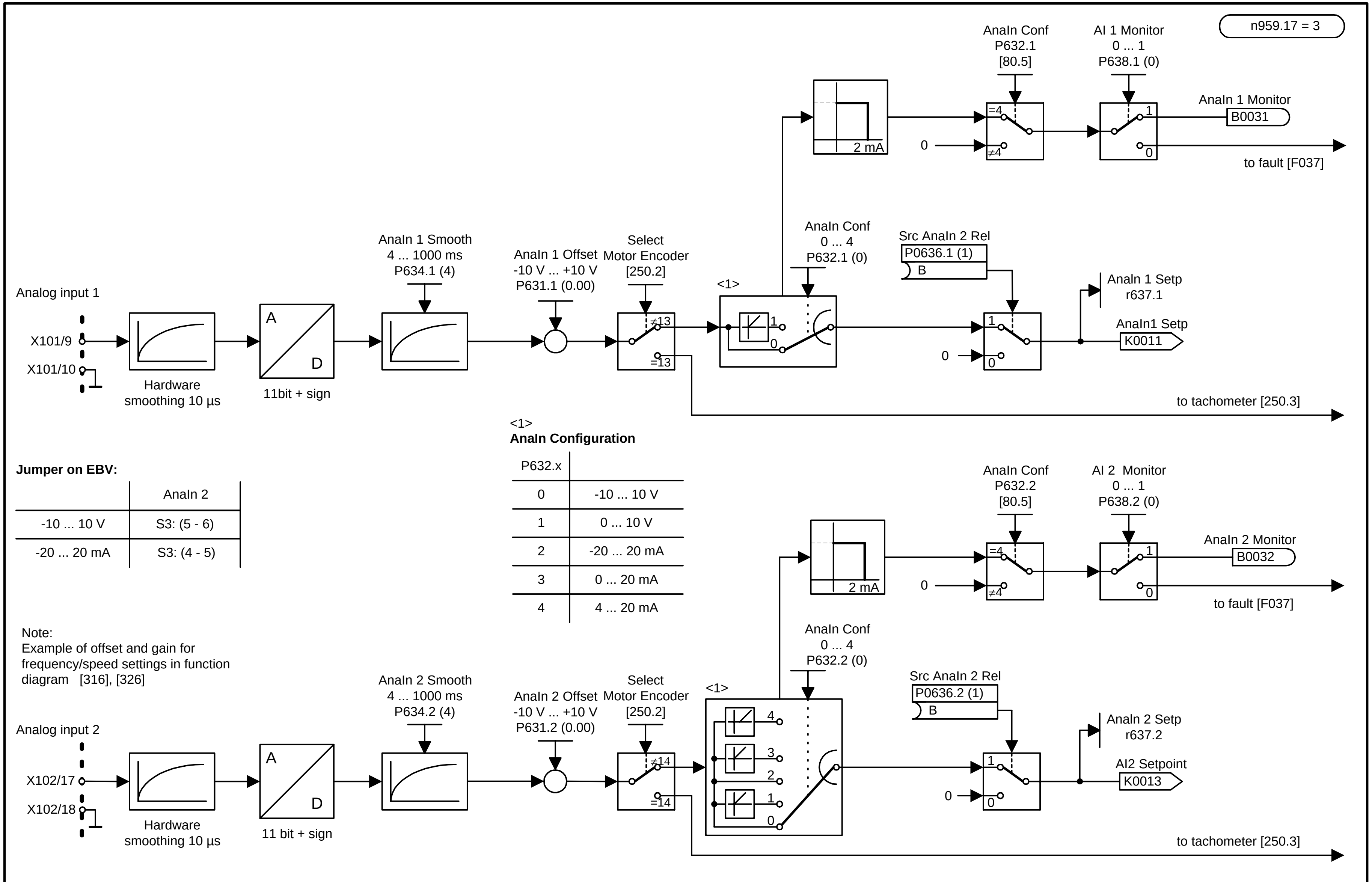
Notes on settings:
B = Base value (compare P350 ... P354)
S_{min} = Smallest signal value (e.g. in Hz, V, A)
S_{max} = Largest signal value (e.g. in Hz, V, A)
A_{min} = Smallest output value inV
A_{max} = Largest output value in V

Output values in the case of current output:
4 mA ⇒ A_{min} = + 6 V
20 mA ⇒ A_{max} = - 10 V

$$P643 = \frac{A_{max} - A_{min}}{S_{max} - S_{min}} \times B$$

$$P644 = \frac{A_{max} + A_{min}}{2} - P643 \frac{S_{max} - S_{min}}{2 \times B}$$

$$P644 = \frac{A_{min} * S_{max} - A_{max} * S_{min}}{S_{max} - S_{min}}$$



Jumper on EBV:

	AnaIn 2
-10 ... 10 V	S3: (5 - 6)
-20 ... 20 mA	S3: (4 - 5)

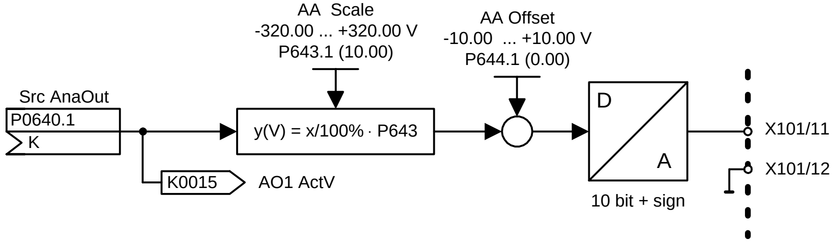
<1>
AnaIn Configuration

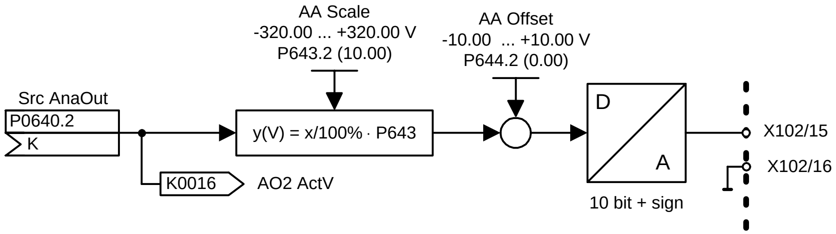
P632.x	
0	-10 ... 10 V
1	0 ... 10 V
2	-20 ... 20 mA
3	0 ... 20 mA
4	4 ... 20 mA

1	2	3	4	5	6	7	8

CUVC terminals; type Compact PLUS	fp_vc_082_e.vsd	Function diagram	- 82 -
Analog inputs, voltage and current specification	24.07.01	MASTERDRIVES VC	

n959.19 = 3





Jumper on EBV:

	A02
S4 (1-2)	-10 ... 10 V
S4 (2-3)	20 ... 0 mA

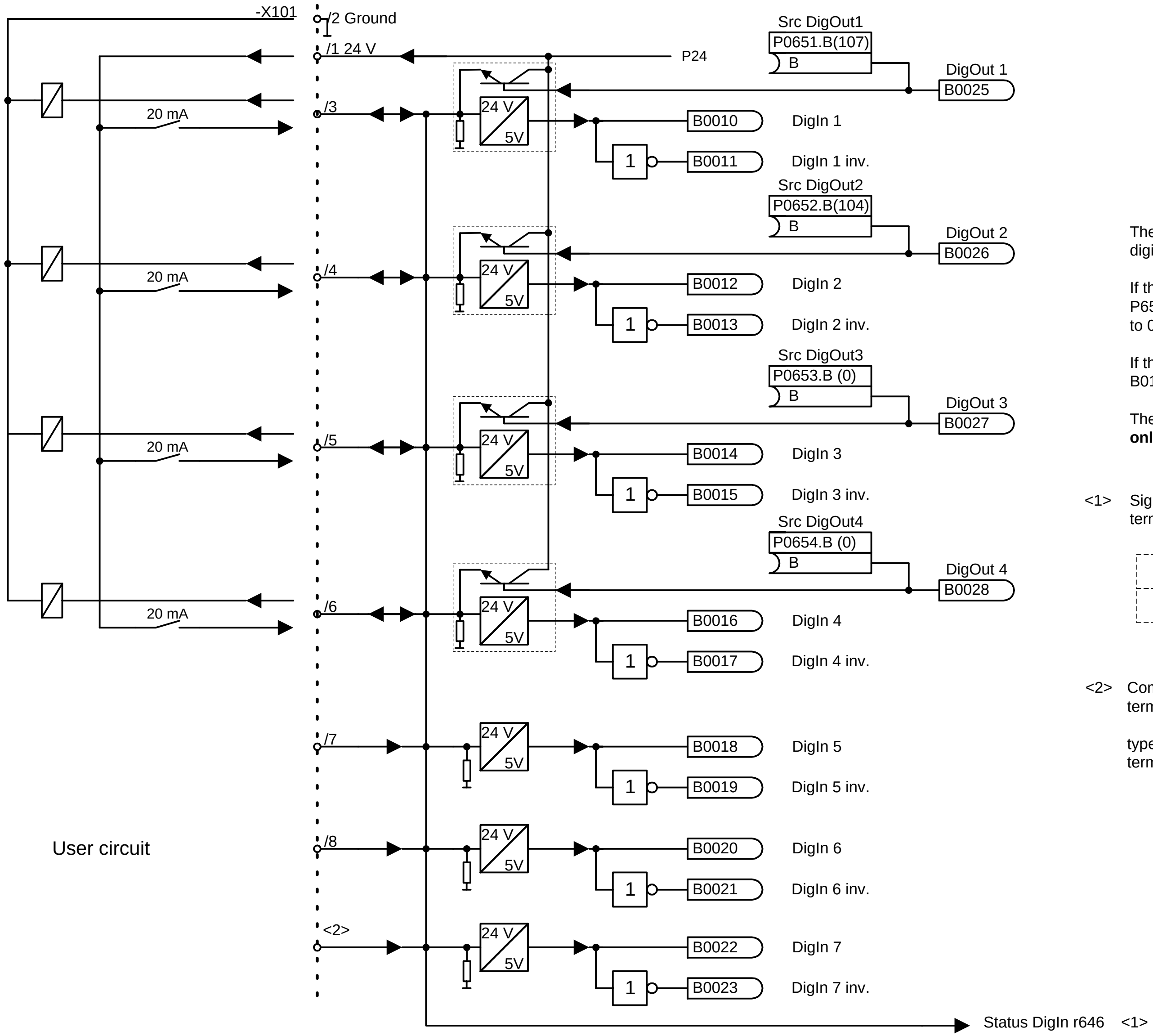
Notes on settings:
B = Base value (compare P350 ... P354)
S_{min} = Smallest signal value (e.g. in Hz, V, A)
S_{max} = Largest signal value (e.g. in Hz, V, A)
A_{min} = Smallest output value inV
A_{max} = Largest output value in V

Output values in the case of current output:
4 mA $\Rightarrow$ A_{min} = + 6 V
20 mA $\Rightarrow$ A_{max} = - 10 V

$$P643 = \frac{A_{max} - A_{min}}{S_{max} - S_{min}} \times B$$

$$P644 = \frac{A_{max} + A_{min}}{2} - P643 \frac{S_{max} - S_{min}}{2 \times B}$$

$$P644 = \frac{A_{min} * S_{max} - A_{max} * S_{min}}{S_{max} - S_{min}}$$



Inputs U950.13 = ___(4)

Outputs U950.23 = ___(4)

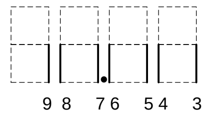
The terminals -X101/3 to -X101/6 can be used as digital inputs or digital outputs.

If they are used as digital inputs, the parameters P651.B, P652.B, P653.B and P654.B have to be set to 0.

If they are used as digital outputs, B010 ... B017 must not be used.

The terminals -X101/7 to -X101/9 (X102/19) can **only** be used as digital inputs.

<1> Signal status display for digital input/output terminals on the PMU in r646:

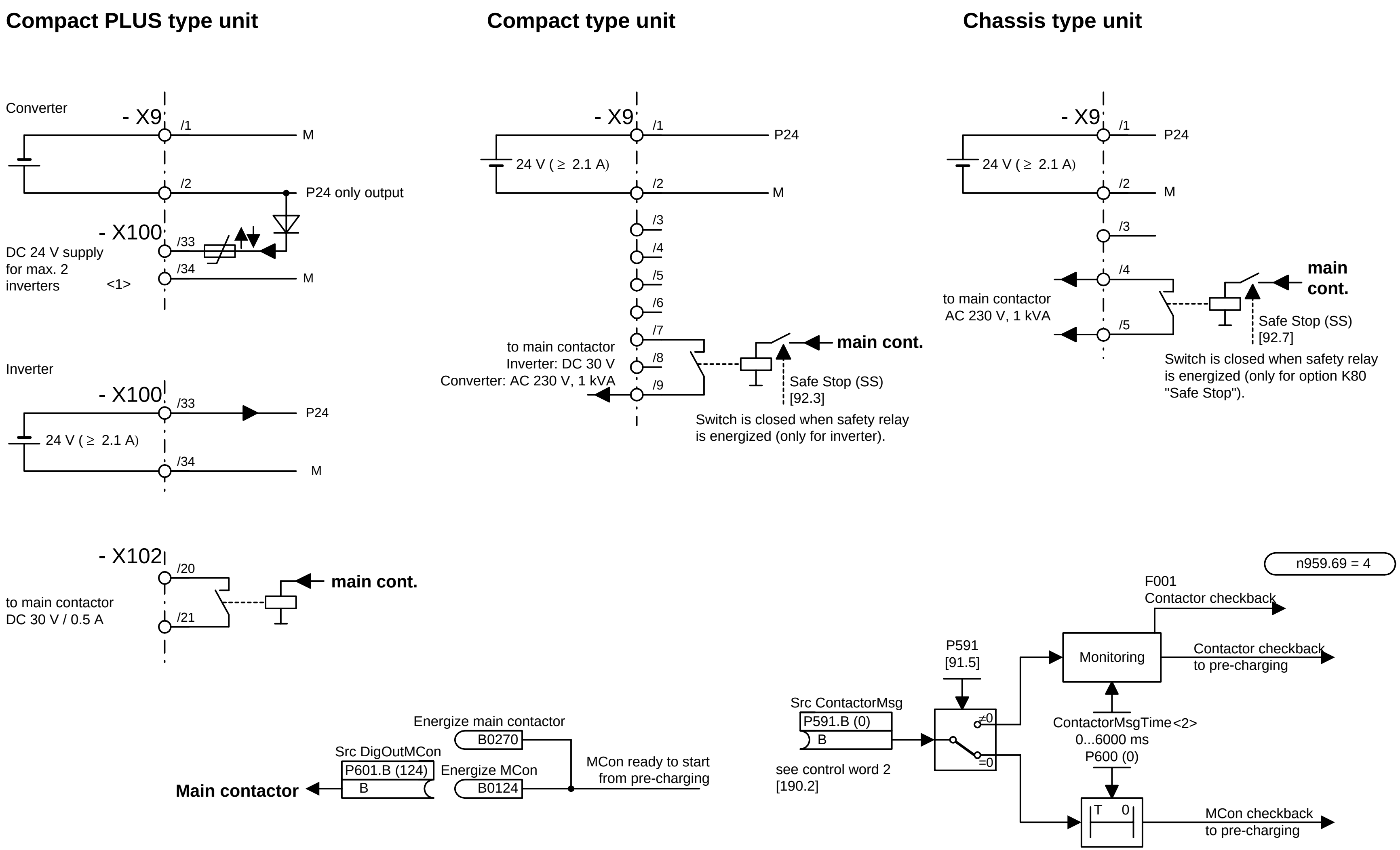


<2> Compact/Chassis type unit: terminal X101/9

type Compact PLUS: terminal X102/19

1	2	3	4	5	6	7	8

CUVC terminals	fp_vc_090_e.vsd	Function diagram	- 90 -
Digital inputs/outputs	24.07.01	MASTERDRIVES VC	

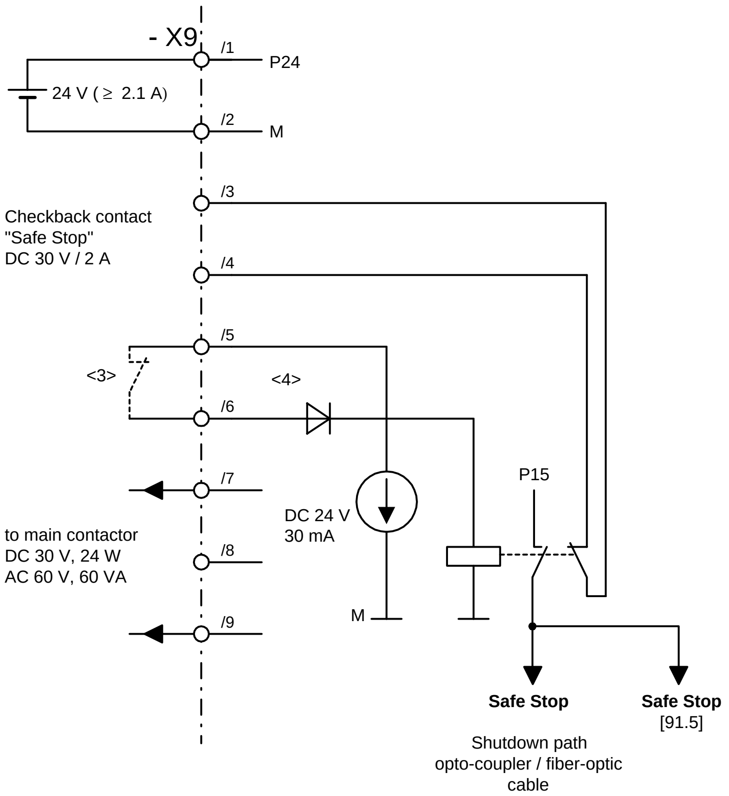


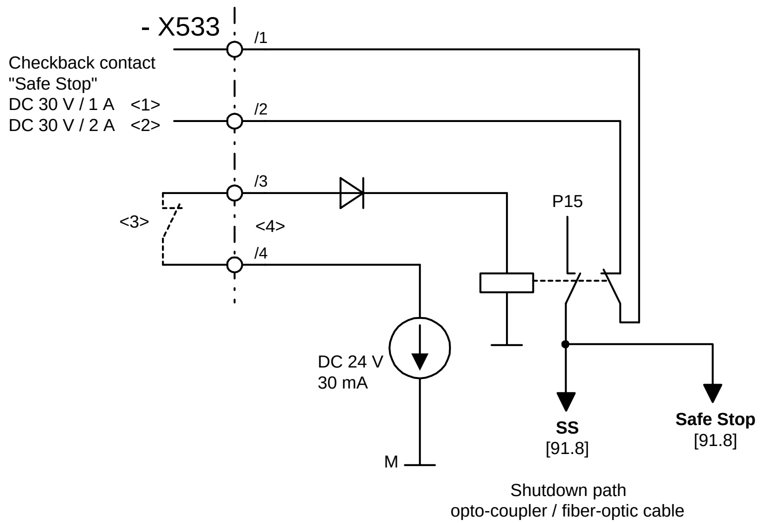
<1> For 0.75 kW converter only one inverter

<2> A value of approx. 500 ms is recommended as the main contactor checkback time

Compact type unit (only inverter)

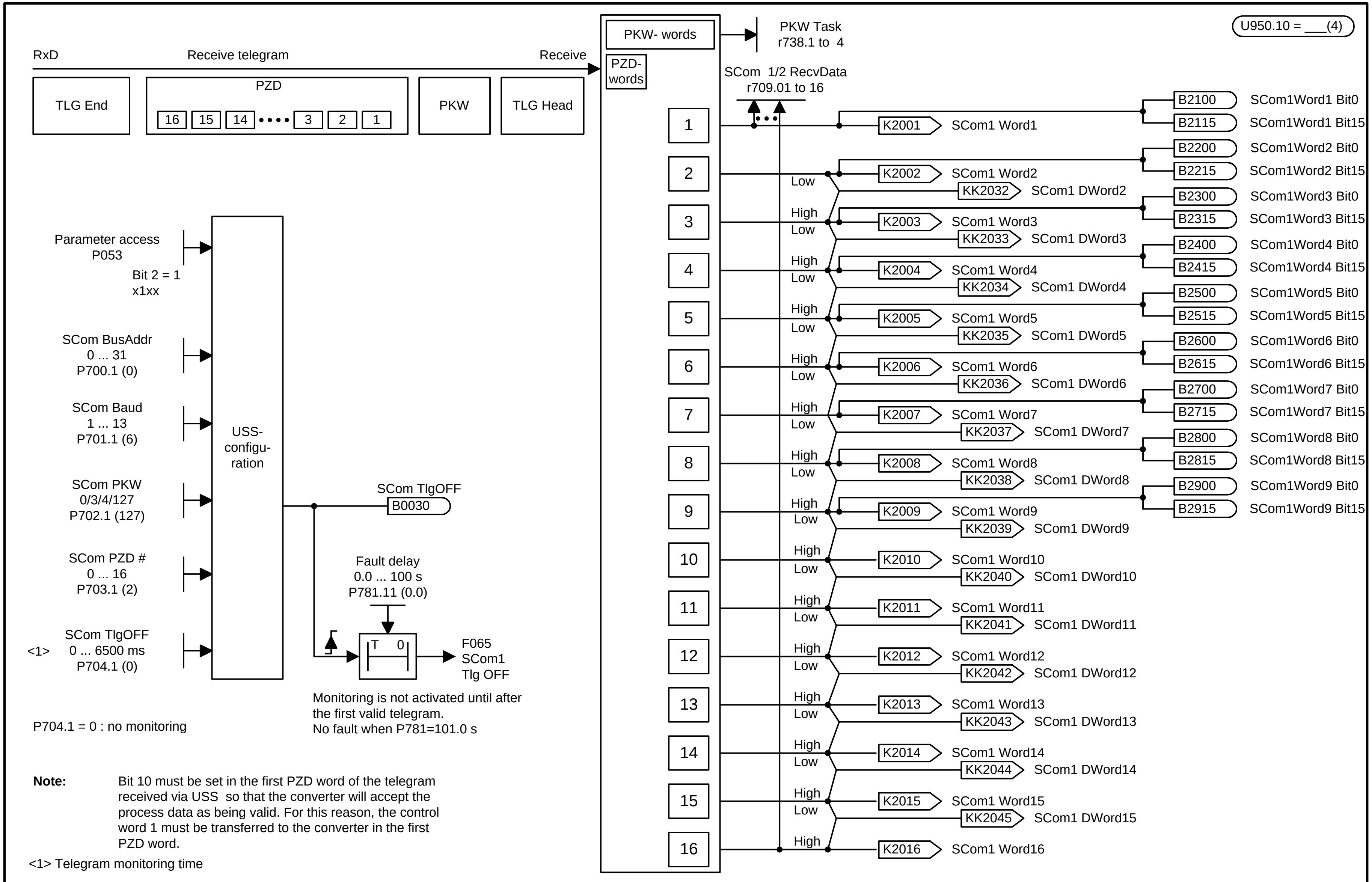
Compact PLUS type unit <1> Chassis type unit <2>





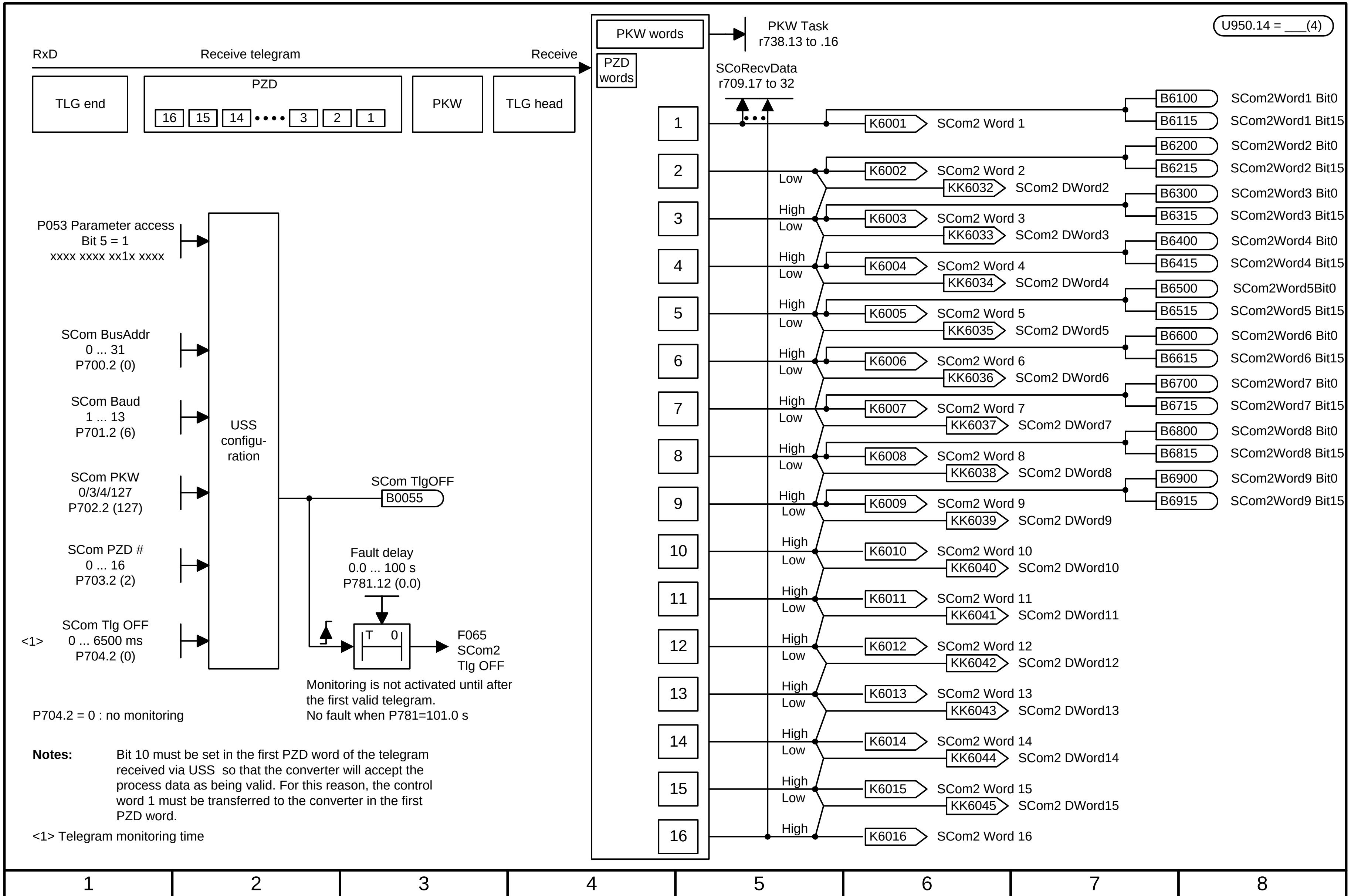
<3> Safety switch "Safe Stop" active when switch is open

<4> results in OFF2 [180.2]

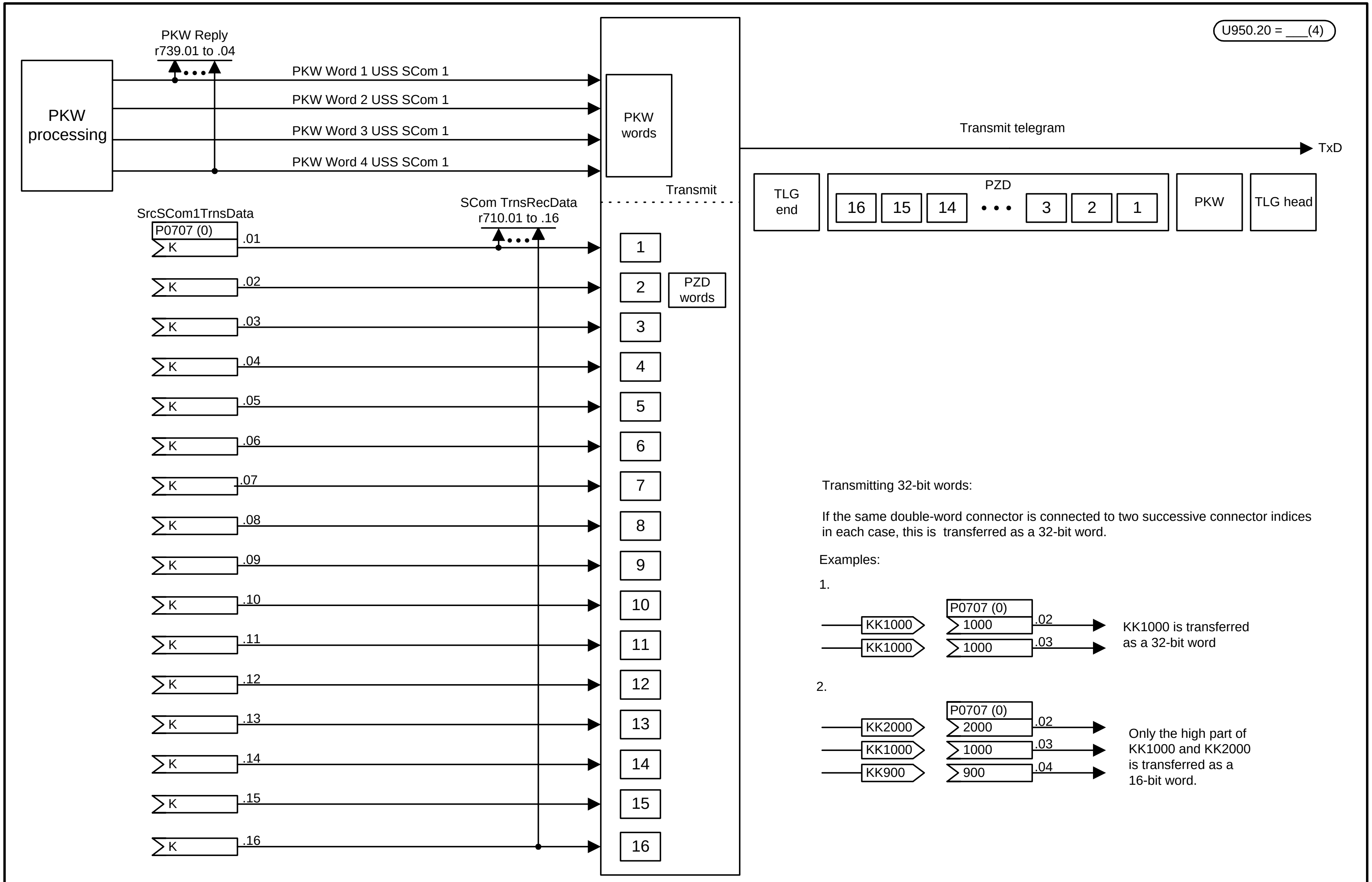


U950.10 = ___(4)
RxD
Receive telegram
Receive
TLG End
PZD
16 15 14 • • • • 3 2 1
PKW
TLG Head
PKW- words
PZD- words
PKW Task
r738.1 to 4
SCom 1/2 RecvData
r709.01 to 16
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Low
High
K2001 SCom1 Word1
K2002 SCom1 Word2
KK2032 SCom1 DWord2
K2003 SCom1 Word3
KK2033 SCom1 DWord3
K2004 SCom1 Word4
KK2034 SCom1 DWord4
K2005 SCom1 Word5
KK2035 SCom1 DWord5
K2006 SCom1 Word6
KK2036 SCom1 DWord6
K2007 SCom1 Word7
KK2037 SCom1 DWord7
K2008 SCom1 Word8
KK2038 SCom1 DWord8
K2009 SCom1 Word9
KK2039 SCom1 DWord9
K2010 SCom1 Word10
KK2040 SCom1 DWord10
K2011 SCom1 Word11
KK2041 SCom1 DWord11
K2012 SCom1 Word12
KK2042 SCom1 DWord12
K2013 SCom1 Word13
KK2043 SCom1 DWord13
K2014 SCom1 Word14
KK2044 SCom1 DWord14
K2015 SCom1 Word15
KK2045 SCom1 DWord15
K2016 SCom1 Word16
B2100 SCom1Word1 Bit0
B2115 SCom1Word1 Bit15
B2200 SCom1Word2 Bit0
B2215 SCom1Word2 Bit15
B2300 SCom1Word3 Bit0
B2315 SCom1Word3 Bit15
B2400 SCom1Word4 Bit0
B2415 SCom1Word4 Bit15
B2500 SCom1Word5 Bit0
B2515 SCom1Word5 Bit15
B2600 SCom1Word6 Bit0
B2615 SCom1Word6 Bit15
B2700 SCom1Word7 Bit0
B2715 SCom1Word7 Bit15
B2800 SCom1Word8 Bit0
B2815 SCom1Word8 Bit15
B2900 SCom1Word9 Bit0
B2915 SCom1Word9 Bit15
Parameter access
P053
Bit 2 = 1
x1xx
SCom BusAddr
0 ... 31
P700.1 (0)
SCom Baud
1 ... 13
P701.1 (6)
SCom PKW
0/3/4/127
P702.1 (127)
SCom PZD #
0 ... 16
P703.1 (2)
SCom TlgOFF
<1> 0 ... 6500 ms
P704.1 (0)
USS-
configu-
ration
SCom TlgOFF
B0030
Fault delay
0.0 ... 100 s
P781.11 (0.0)
T 0
F065
SCom1
Tlg OFF
Monitoring is not activated until after
the first valid telegram.
No fault when P781=101.0 s
P704.1 = 0 : no monitoring
Note: Bit 10 must be set in the first PZD word of the telegram received via USS so that the converter will accept the process data as being valid. For this reason, the control word 1 must be transferred to the converter in the first PZD word.
<1> Telegram monitoring time

1	2	3	4	5	6	7	8



U950.14 = ___(4)
RxD
Receive telegram
Receive
TLG end
PZD
16 15 14 •••• 3 2 1
PKW
TLG head
PKW words
PZD words
PKW Task
r738.13 to .16
SCoRecvData
r709.17 to 32
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
High
Low
K6001 SCom2 Word 1
K6002 SCom2 Word 2
KK6032 SCom2 DWord2
K6003 SCom2 Word 3
KK6033 SCom2 DWord3
K6004 SCom2 Word 4
KK6034 SCom2 DWord4
K6005 SCom2 Word 5
KK6035 SCom2 DWord5
K6006 SCom2 Word 6
KK6036 SCom2 DWord6
K6007 SCom2 Word 7
KK6037 SCom2 DWord7
K6008 SCom2 Word 8
KK6038 SCom2 DWord8
K6009 SCom2 Word 9
KK6039 SCom2 DWord9
K6010 SCom2 Word 10
KK6040 SCom2 DWord10
K6011 SCom2 Word 11
KK6041 SCom2 DWord11
K6012 SCom2 Word 12
KK6042 SCom2 DWord12
K6013 SCom2 Word 13
KK6043 SCom2 DWord13
K6014 SCom2 Word 14
KK6044 SCom2 DWord14
K6015 SCom2 Word 15
KK6045 SCom2 DWord15
K6016 SCom2 Word 16
B6100 SCom2Word1 Bit0
B6115 SCom2Word1 Bit15
B6200 SCom2Word2 Bit0
B6215 SCom2Word2 Bit15
B6300 SCom2Word3 Bit0
B6315 SCom2Word3 Bit15
B6400 SCom2Word4 Bit0
B6415 SCom2Word4 Bit15
B6500 SCom2Word5Bit0
B6515 SCom2Word5 Bit15
B6600 SCom2Word6 Bit0
B6615 SCom2Word6 Bit15
B6700 SCom2Word7 Bit0
B6715 SCom2Word7 Bit15
B6800 SCom2Word8 Bit0
B6815 SCom2Word8 Bit15
B6900 SCom2Word9 Bit0
B6915 SCom2Word9 Bit15
P053 Parameter access
Bit 5 = 1
xxxx xxxx xx1x xxxx
SCom BusAddr
0 ... 31
P700.2 (0)
SCom Baud
1 ... 13
P701.2 (6)
SCom PKW
0/3/4/127
P702.2 (127)
SCom PZD #
0 ... 16
P703.2 (2)
SCom Tlg OFF
<1> 0 ... 6500 ms
P704.2 (0)
USS configu- ration
SCom TlgOFF
B0055
Fault delay
0.0 ... 100 s
P781.12 (0.0)
T 0
F065
SCom2
Tlg OFF
Monitoring is not activated until after the first valid telegram.
No fault when P781=101.0 s
P704.2 = 0 : no monitoring
Notes: Bit 10 must be set in the first PZD word of the telegram received via USS so that the converter will accept the process data as being valid. For this reason, the control word 1 must be transferred to the converter in the first PZD word.
<1> Telegram monitoring time
1 2 3 4 5 6 7 8

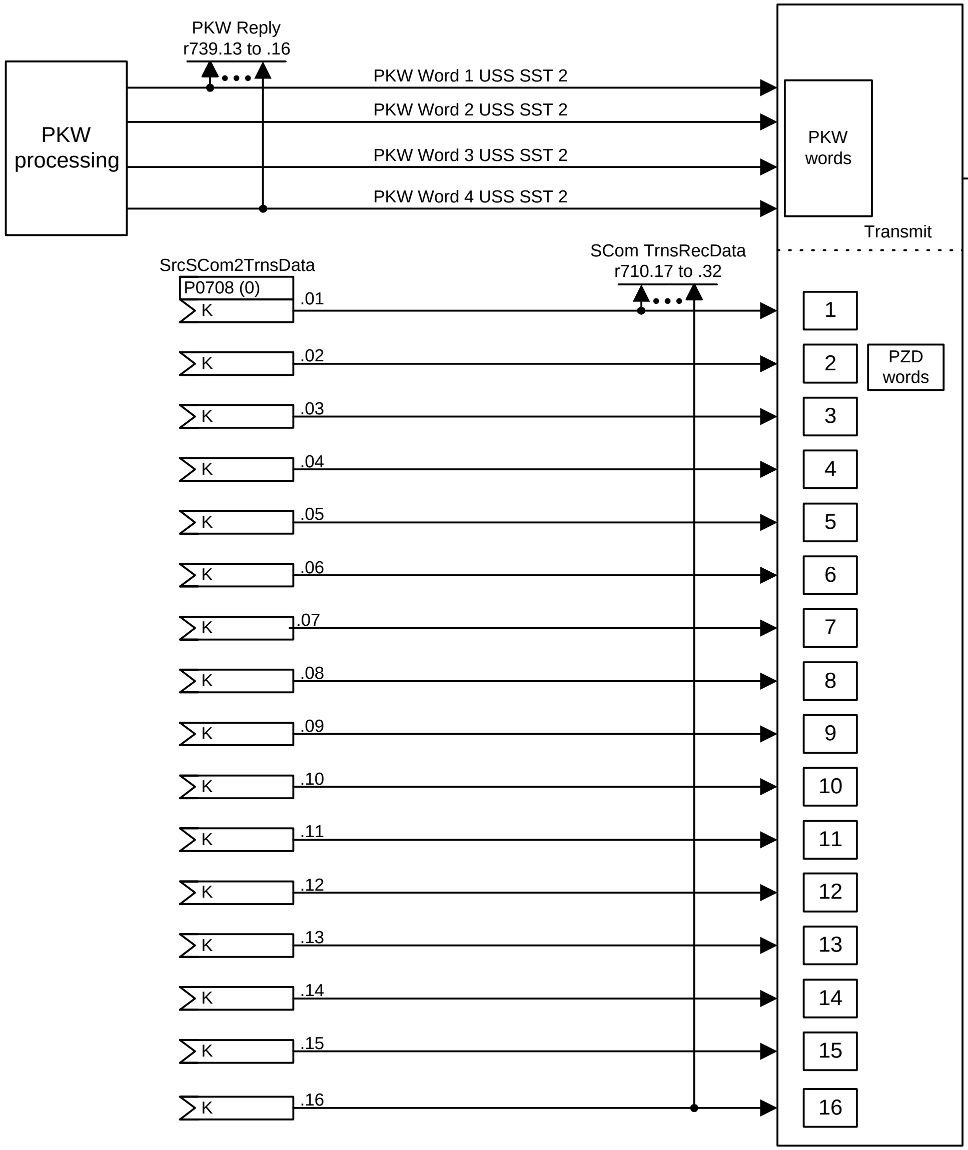


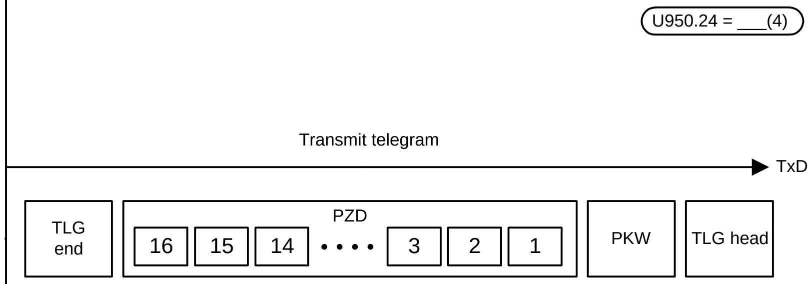
Transmitting 32-bit words:

If the same double-word connector is connected to two successive connector indices in each case, this is transferred as a 32-bit word.

Examples:

1	2	3	4	5	6	7	8
USS/SCom1					fp_vc_110_e.vsd	Function diagram	- 110 -
Transmitting					09.04.98	MASTERDRIVES VC	



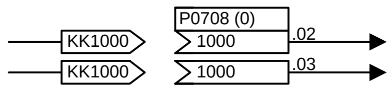


Transmitting 32-bit words:

If the same double-word connector is connected to two successive connector indices in each case, this is transferred as a 32-bit word.

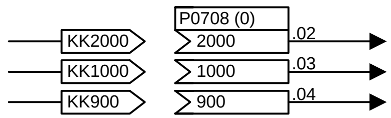
Examples:

1.

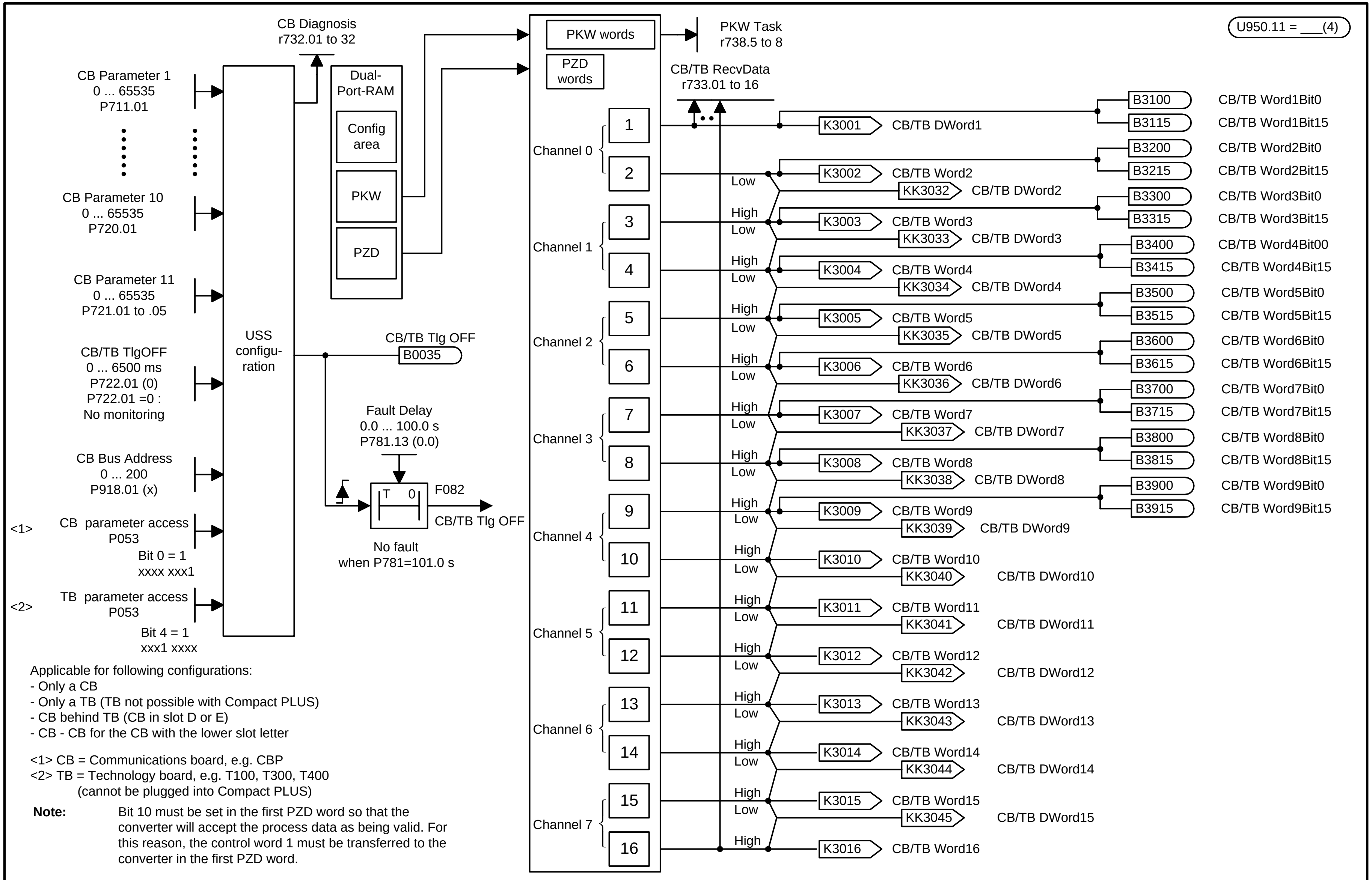


KK1000 is transferred as a 32-bit word

2.



Only the high part of KK1000 and KK2000 is transferred as a 16-bit word.



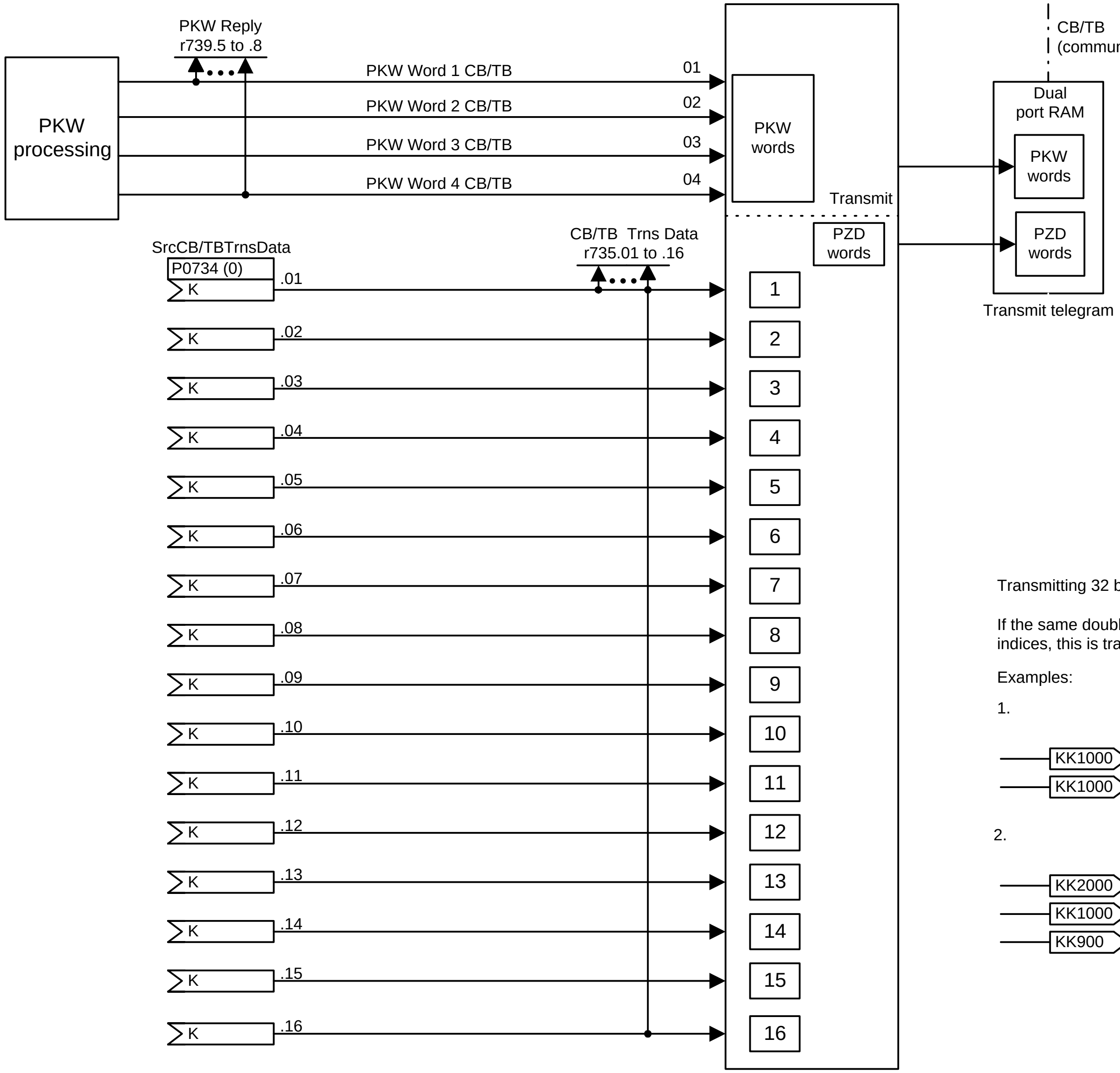
Applicable for following configurations:
- Only a CB
- Only a TB (TB not possible with Compact PLUS)
- CB behind TB (CB in slot D or E)
- CB - CB for the CB with the lower slot letter

<1> CB = Communications board, e.g. CBP
<2> TB = Technology board, e.g. T100, T300, T400
(cannot be plugged into Compact PLUS)

Note: Bit 10 must be set in the first PZD word so that the converter will accept the process data as being valid. For this reason, the control word 1 must be transferred to the converter in the first PZD word.

1	2	3	4	5	6	7	8

U950.21 = ___(4)

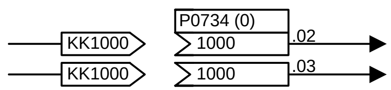


Transmitting 32 bit words:

If the same double-word connector is connected up to two successive connector indices, this is transferred as a 32 bit word.

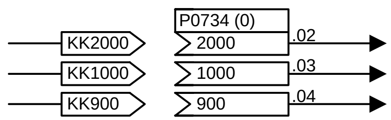
Examples:

1.



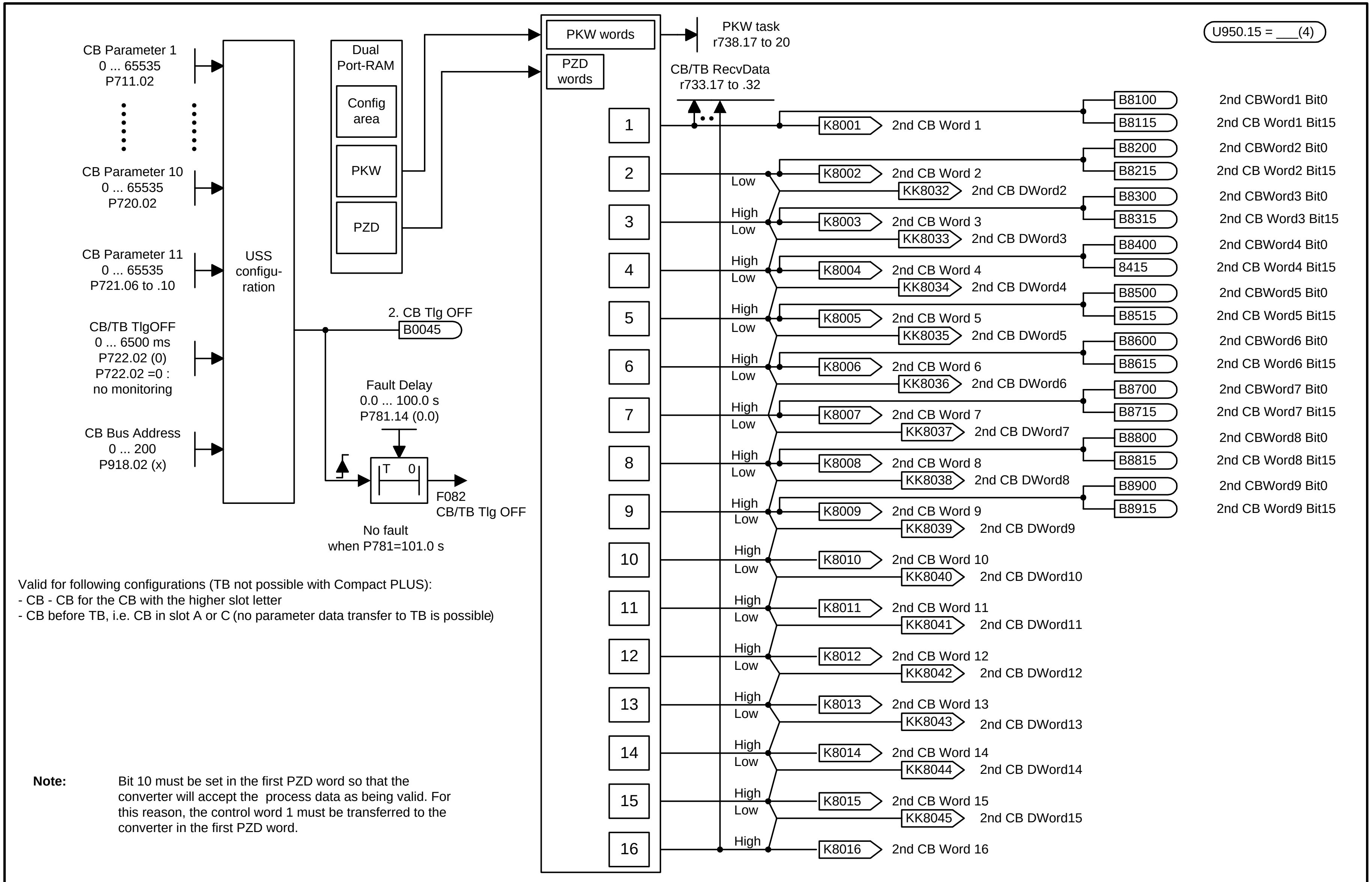
KK1000 is transferred as a 32 bit word

2.



Only the high part of KK1000 and KK2000 is transferred as a 16 bit word.

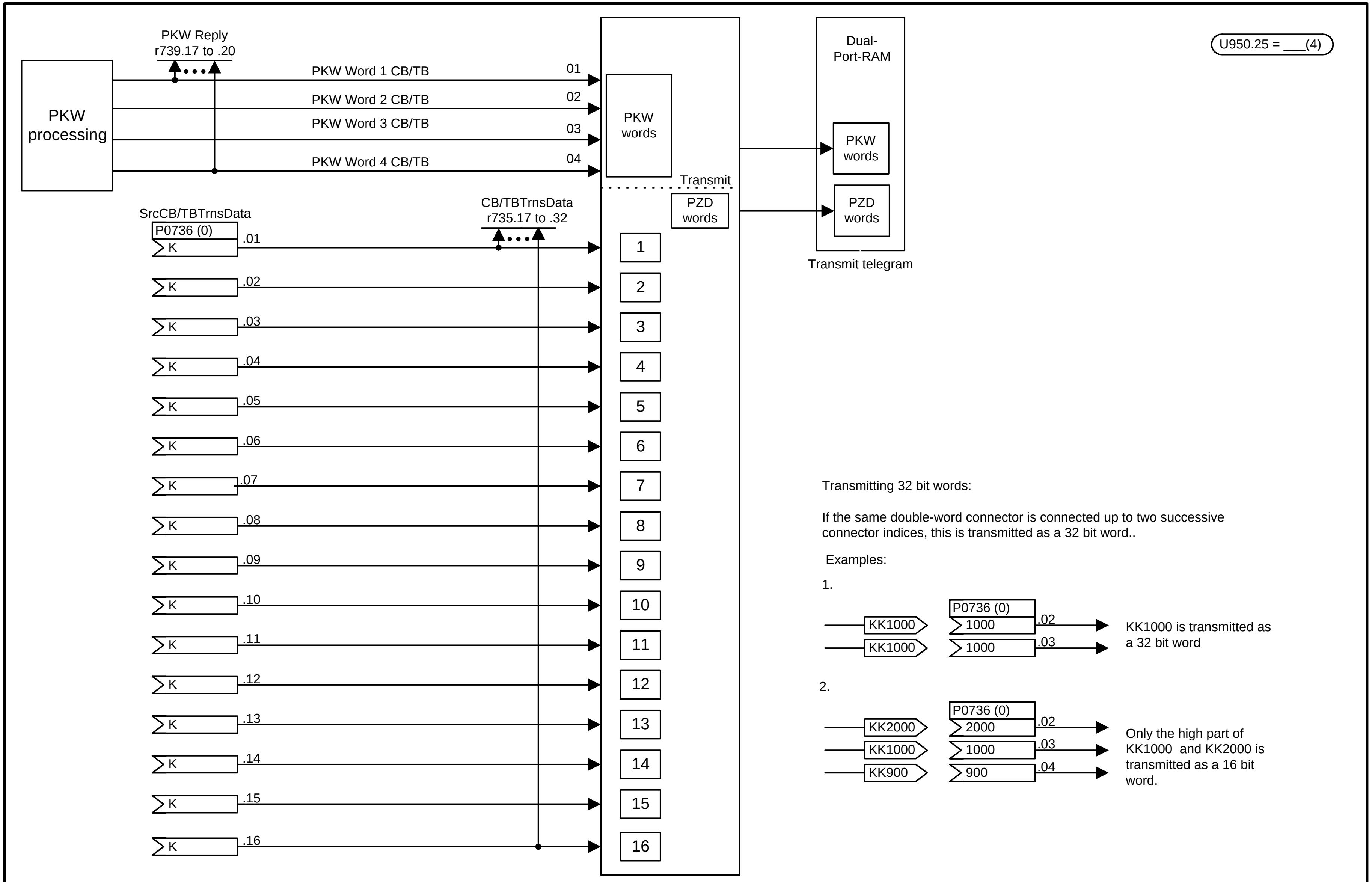
1	2	3	4	5	6	7	8



Valid for following configurations (TB not possible with Compact PLUS):
- CB - CB for the CB with the higher slot letter
- CB before TB, i.e. CB in slot A or C (no parameter data transfer to TB is possible)

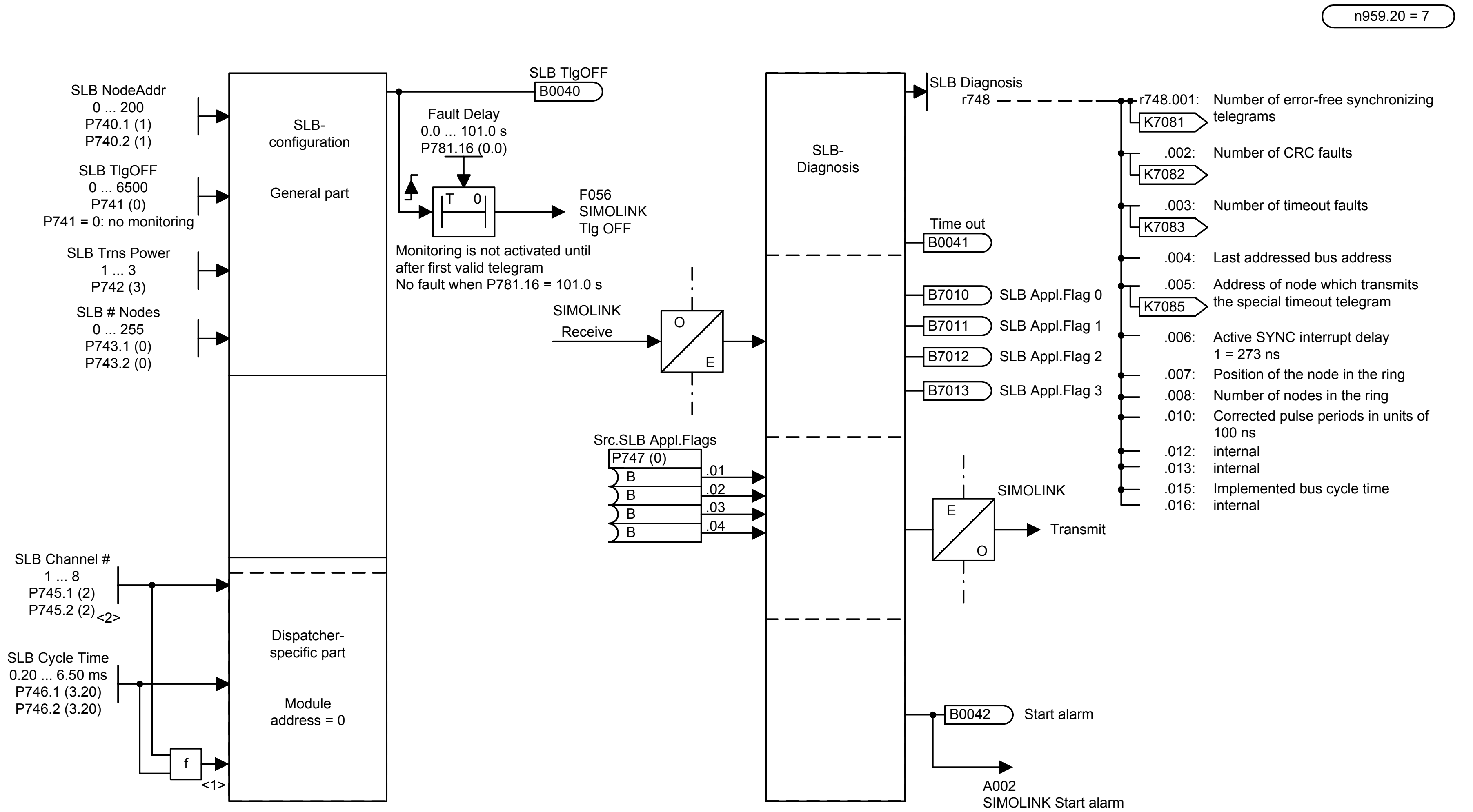
Note: Bit 10 must be set in the first PZD word so that the converter will accept the process data as being valid. For this reason, the control word 1 must be transferred to the converter in the first PZD word.

1	2	3	4	5	6	7	8



1	2	3	4	5	6	7	8

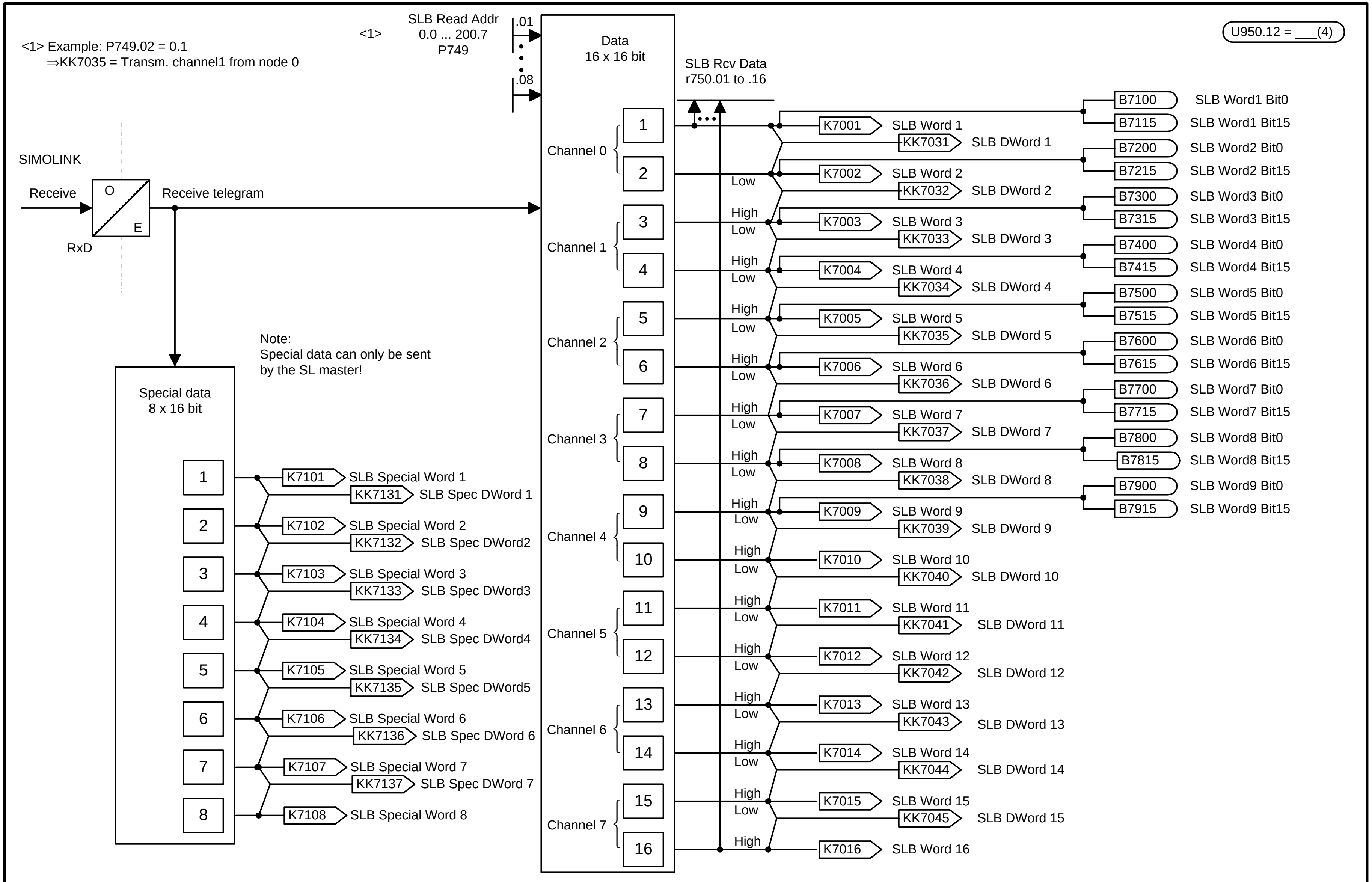
Second CB/TB board (higher slot letter)	fp_vc_135_e.vsd	Function diagram	- 135 -
Transmitting	09.04.98	MASTERDRIVES VC	



<1> f: Number of addressed nodes $= \left(\frac{P746 + 3{,}18\,us}{6{,}36\,us} - 2\right) \times \frac{1}{P745}$; 6,36us = time for 1 telegram (3,18 due to rounding)

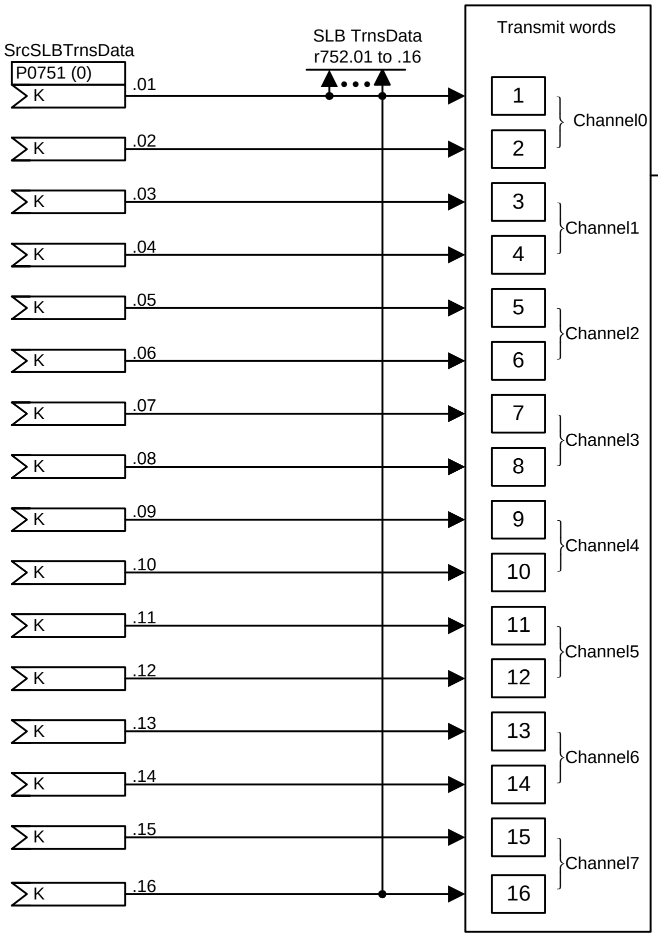
<2> Number of channels = Number of transmission channels (32-bit transmit words) per node; is according to the node which uses the most transmission channels.

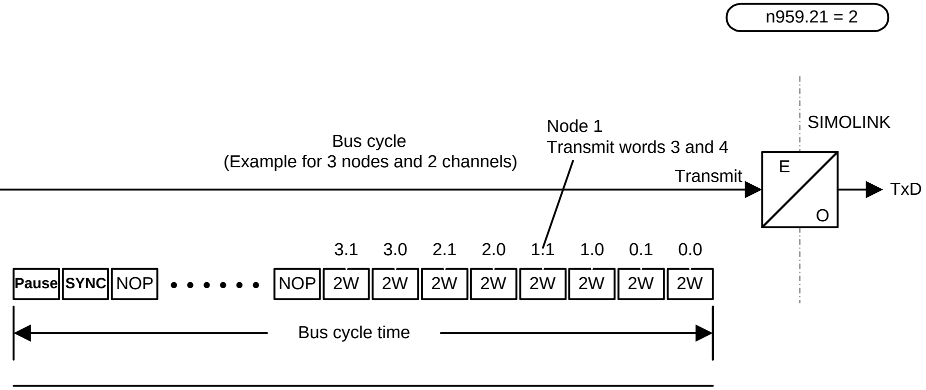
When SIMOLINK is used, telegram failure monitoring should always be activated!
For the SLB telegram failure time
P741 = 4* P746 (SLB bus cycle time) is recommended.



1	2	3	4	5	6	7	8

SIMOLINK Board	fp_vc_150_e.vsd	Function diagram	- 150 -
Receiving	09.04.98	MASTERDRIVES VC	





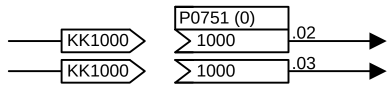
- Each module can read out all circulating telegrams.
- Each telegram consists of 2 words = 2 x 16 bit.
- Each module can only describe the telegrams of its own module address.
- In the above example, module 1 can describe telegrams 1.0 and 1.1.
- The dispatcher (module address 0) provides the SYNC signal after the defined bus cycle time.
- The number of nodes is determined by establishing the bus cycle time and the number of channels. The dispatcher transmits as many telegrams with ascending node address and channel number as the bus cycle time permits.
- If the total number of telegrams requires less time than the bus cycle time, the time up to the SYNC signal is filled up with NOP (No Operation) telegrams.
- The total number of telegrams (modules x channels) is limited to 1023.

Transmitting 32 bit words:

If the same double-word connector is connected up to two successive connector indices, this is transmitted as a 32 bit word.

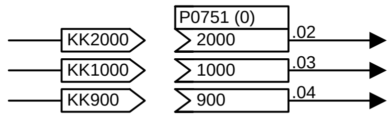
Example:

1.



KK1000 is transmitted as a 32 bit word.

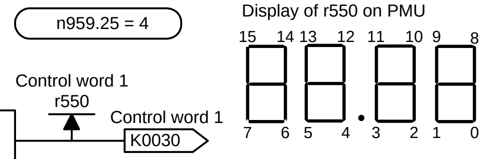
2.

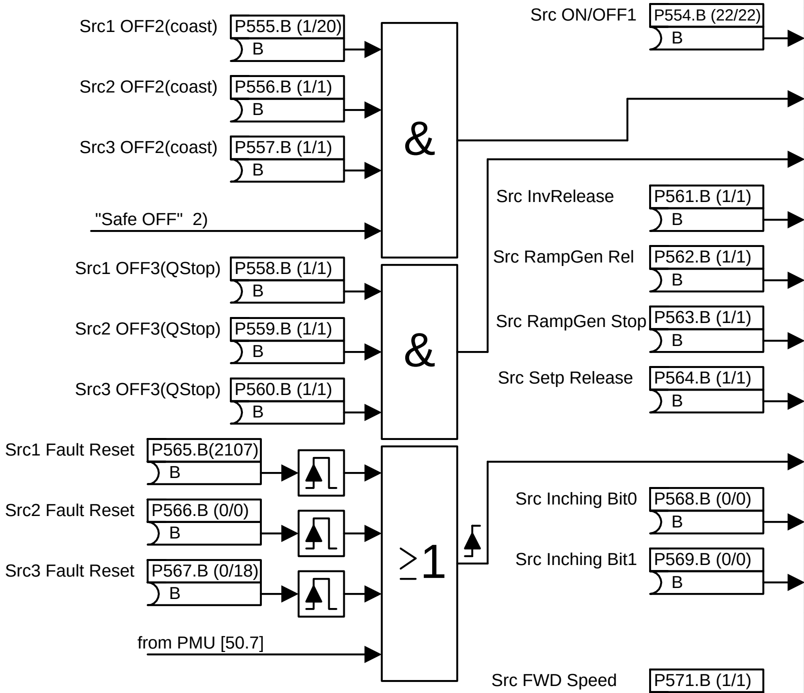


Only the high part of KK1000 and KK2000 is transmitted as a 16 bit word.

1	2	3	4	5	6	7	8

SIMOLINK board	fp_vc_160_e.vsd	Function diagram	- 160 -
Transmitting	09.04.98	MASTERDRIVES VC	





Bit No.	Meaning	
Bit 0	**0=OFF1, Shutdown via ramp-function generator, followed by pulse disable,** 1=ON, operating condition (edge-controlled)	to sequence control 1) to braking control [470.1] to setpoint processing [300.5]
Bit 1	**0=OFF2, pulse disable, motor coasts down** 1=Operating condition	to sequence control 1) to braking control [470.1]
Bit 2	**0=OFF3, quick stop** 1=Operating condition	to sequence control 1) to braking control [470.1] to setpoint processing [318.3], [328.3]
Bit 3	**1=Inverter enable, pulse enable** 0=Pulse disable	to sequence control 1)
Bit 4	**1=Ramp-function generator enable** 0=Set ramp-function generator to 0	to setpoint processing [317.6], [327.6]
Bit 5	**1=Start ramp-function generator** 0=Stop ramp-function generator	to setpoint processing [317.6], [327.6]
Bit 6	**1=Setpoint enable** 0=Setpoint disable	to setpoint processing [317.1], [327.1]
Bit 7	**0 =>1 Edge fault acknowledgement**	B0094 Fault acknowl. 3) to sequence control 1)
Bit 8	**1=Inching bit0**	to sequence control 1) to setpoint processing [316.1], [318.2], [326.1], [328.2]
Bit 9	**1=Inching bit1**	to sequence control 1) to setpoint processing [316.1], [318.2], [326.1], [328.2]
Bit 10	**1=Control requested** 0=No control requested	**Note:** This bit must be set in the first PZD word of the telegram received from serial interfaces, so that the converter will accept the process data as being valid (compare USS, PROFIBUS, etc.)
Bit 11	**1=Clockwise phase sequence enable** 0=Clockwise phase sequence disable	to setpoint processing [316.4], [326.4]
Bit 12	**1=Counter-clockwise phase sequence** enable 0=Counter-clockwise phase sequence disable	to setpoint processing [316.4], [326.4]
Bit 13	**1=Raise mot. potentiometer**	to setpoint processing [300.1]
Bit 14	**1=Lower mot. potentiometer**	to setpoint processing [300.1]
Bit 15	**0=External fault 1** 1=No external fault	to sequence control 1) to fault processing

1) The sequence control is the internal control (software) for realizing the drive status (r001)

Pre-assignment of the BICO parameters:
1. Binector valid for BICO data set 1
2. Binector valid for BICO data set 2

2) "OPTION" / With Kompact PLUS devices [92.6]

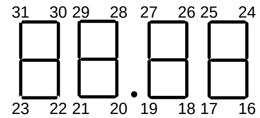
3) The signal remains high on acknowledgement for T10 (= 204.8 ms with 5 kHz pulse frequency).

n959.26 = 4

Control word 2
r551

Control word 2 → K0031

Display of r551 on the PMU



Source	Parameter	Bit No.	Meaning	Output
Src FuncDSetBit0	P576.B (0/0) B	Bit 16	**Select fixed setpoint bit 0**	B0092 FuncDSet Bit 0; to data sets [540.4]
Src FuncDSetBit1	P577.B (0/0) B	Bit 17	**Select fixed setpoint bit 1**	B0093 FuncDSet Bit 1; to data sets [540.4]
Src MotDSet Bit0	P578.B (0/0) B	Bit 18	**Select motor data set bit 0**	to data sets [540.4]
Src MotDSet Bit1	P579.B (0/0) B	Bit 19	**Select motor data set bit 1**	to data sets [540.4]
Src FixSetp Bit0	P580.B (0/16) B	Bit 20	**Select fixed setpoint bit 0**	to fixed setpoints [290.6]
Src FixSetp Bit1	P581.B (0/0) B	Bit 21	**Select fixed setpoint bit 1**	to fixed setpoints [290.6]
Src Sync Release 2)	P582.B(5002) B	Bit 22	**1= Enable synchronizing** 0=Synchronizing disabled	to synchronization [X02] 2)
Src Fly Release	P583.B (0/0) B	Bit 23	**1=Enable flying restart** 0=Flying restart disabled	to sequence control 1)
Src Droop Rel	P584.B (0/0) B	Bit 24	**1=Enable droop, speed controller** 0=Droop, speed controller disabled	to speed control [365.7], [367.4]
Src n-Reg Rel	P585.B (1/1) B	Bit 25	**1=Enable speed controller** 0=Speed controller disabled	to speed control [360.5], [361.5]; 1 → No.n-Reg Rel B0099
Src No ExtFault2	P586.B (1/1) B	Bit 26	**0=External fault 2** 1=No external fault 2	to sequence control 1) to fault processing
Src Master/Slave	P587.B (0/0) B	Bit 27	**0=Master drive (speed control)** 1=Slave drive (torque control)	to speed control to fixed setpoints
Src No Ext Warn1	P588.B (1/1) B	Bit 28	**0=External alarm 1** 1=No external alarm **1**	to sequence control 1) to alarm processing
Src No Ext Warn2	P589.B (1/1) B	Bit 29	**0=External alarm 2** 1=No external alarm 2	to sequence control 1) to alarm processing
Src BICO DSet	P590.B (14) B	Bit 30	**0=Select BICO data set 1** 1=Select BIC data set 2	to data sets [540.4]
Src ContactorMsg	P591.B (0/0) B	Bit 31	**0=No checkback, waiting time P600 active** 1=Checkback main contactor	to sequence control 1)

Separate function diagrams are available for master and slave drive control!

1) The sequence control is the internal control (software) for realizing the drive status (r001).

Pre-assignment of the BICO parameters:
1. Binector valid for BICO data set 1
2. Binector valid for BICO data set 2

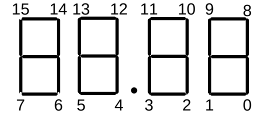
2) not Compact PLUS

n959.27 = 4

Status word 1 r552 → Status word 1 K0032

Source	Bit No.	Meaning	Binector	Label	Inverted binector	Label
from sequence control 1)	Bit 0	**1=Ready to switch on** 0=Not ready to switch on	B0100	Rdy for ON	B0101	Not Rdy for ON
from sequence control 1)	Bit 1	**1=Ready for operation (DC link loaded, pulses disabled)** 0=Not ready for operation	B0102	Rdy for Oper	B0103	NotRdy for Oper
from sequence control 1)	Bit 2	**1=Run (voltage at output terminals)** 0=Pulses disabled	B0104	Operation	B0105	Not operating
from sequence control 1)	Bit 3	**1=Fault active (pulses disabled)** 0=No fault	B0106	Fault	B0107	No fault
from sequence control 1)	Bit 4	**0=OFF2 active** 1=No OFF2	B0108	No OFF2	B0109	OFF2
from sequence control 1)	Bit 5	**0=OFF3 active** 1=No OFF3	B0110	No OFF3	B0111	OFF3
from sequence control 1)	Bit 6	**1=Switch-on inhibit** 0=No switch-on inhibit (possible to switch on)	B0112	Blocked	B0113	Not blocked
from alarm processing	Bit 7	**1=Warning active** 0=No warning	B0114	Alarm	B0115	No alarm
from messages [480.7]	Bit 8	**1=No setpoint/actual value deviation detected** 0=Setpoint/actual value deviation	B0116	No Deviation	B0117	Deviation
from sequence control 1)	Bit 9	**1=PZD control requested (always 1)**				
from messages [480.7]	Bit 10	**1=Comparison value reached** 0=Comparison value not reached	B0120	CompV OK	B0121	CompV not OK
from fault processing	Bit 11	**1=Low voltage fault** 0=No low voltge fault	B0122	Low Voltage	B0123	No Low Voltage
from sequence control 1)	Bit 12	**1=Request to energize main contactor** 0=No request to energize main contactor	B0124	Energize MCon	B0125	N.Energ.MCon
from setpoint processing [317.8], [327.8]	Bit 13	**1=Ramp-function generator active** 0=Ramp-function generator not active	B0126	RampGen active	B0127	RampGen n.act.
from messages [480.7]	Bit 14	**1=Positive speed setpoint** 0=Negative speed setpoint	B0128	Speed Setp FWD	B0129	Speed Setp REV
From KIB/FLR control [600.8], [605.8]	Bit 15	**1=Kinetic buffering/flexible response active** 0=Kinetic buffering/flexible response inactive	B0130	KIB/FLR active	B0131	KIB/FLR n.active

Display of r552 on the PMU



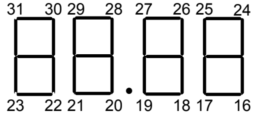
1) The sequence control is the internal control (software) for realizing the drive status (r001).

n959.28 = 4

Status word 2 r553 → Status word 2 K0033

Source	Bit No.	Meaning	Binector		Inverted binector	
from sequence control 1)	Bit 16	**1=Flying restart or excitation active** 0=Flying restart not active or excitation finished	B0132	Fly/Exc active	B0133	Fly/Exc n.act. 2)
from synchronization [X01.6]	Bit 17	**1=Synchronism achieved** 0=Synchronism not achieved	B0134	Sync reached	B0135	Sync n.reached 3)
from messages [480.7]	Bit 18	**0=Overspeed** 1=No overspeed	B0136	Overspeed	B0137	No Overspeed
from sequence control 1)	Bit 19	**1=External fault 1 active** 0=No external fault 1	B0138	Ext Fault 1	B0139	No Ext Fault 1
from sequence control 1)	Bit 20	**1=External fault 2 active** 0=No external fault 2	B0140	Ext Fault 2	B0141	No Ext Fault 2
from sequence control 1)	Bit 21	**1=External warning active** 0=No external warning	B0142	Ext Warning	B0143	No Ext Warning
from alarm processing	Bit 22	**1=Converter overload warning active** 0=No converter overload warning	B0144	Ovld Warn Drive	B0145	No OvldWarn Drv
from fault processing	Bit 23	**1=Converter overtemperature fault active** 0=No converter overtemperature fault	B0146	Tmp Flt Drive	B0147	No Tmp Flt Drv
from alarm processing	Bit 24	**1=Converter overtemperature warning active** 0=No converter overtemperature warning	B0148	TmpWarn Drive	B0149	No TmpWarn Drv
from alarm processing	Bit 25	**1=Motor overtemperature warning active** 0=No motor overtemperature warning	B0150	TmpWarnMotor	B0151	No TmpWarnMotor
from fault processing	Bit 26	**1=Motor overtemperature fault active** O=No motor overtemperature fault	B0152	TmpFltMotor	B0153	No TmpFltMotor
	Bit 27	**Reserve**				
from block/pullout diagnosis [485.8]	Bit 28	**1=Motor pulled out/blocked fault active** 0=No motor pulled out/blocked fault	B0156	Motor PullOut	B0157	No MotorPullOut
from sequence control 1)	Bit 29	**1=Bypass contactor energized (only AC units)** 0=Bypass contactor not energized	B0158	ChrgRelay close	B0159	ChrgRelay open
from synchronization [X01.6] 3)	Bit 30	**1=Fault during synchronization** 0=No fault during synchronization	B0160	Sync Fault	B0161	No Sync Fault 3)
from sequence control 1)	Bit 31	**1=Pre-charging active** 0=Pre-charging not active	B0162	Prechrg active	B0163	Prechrg n.act.

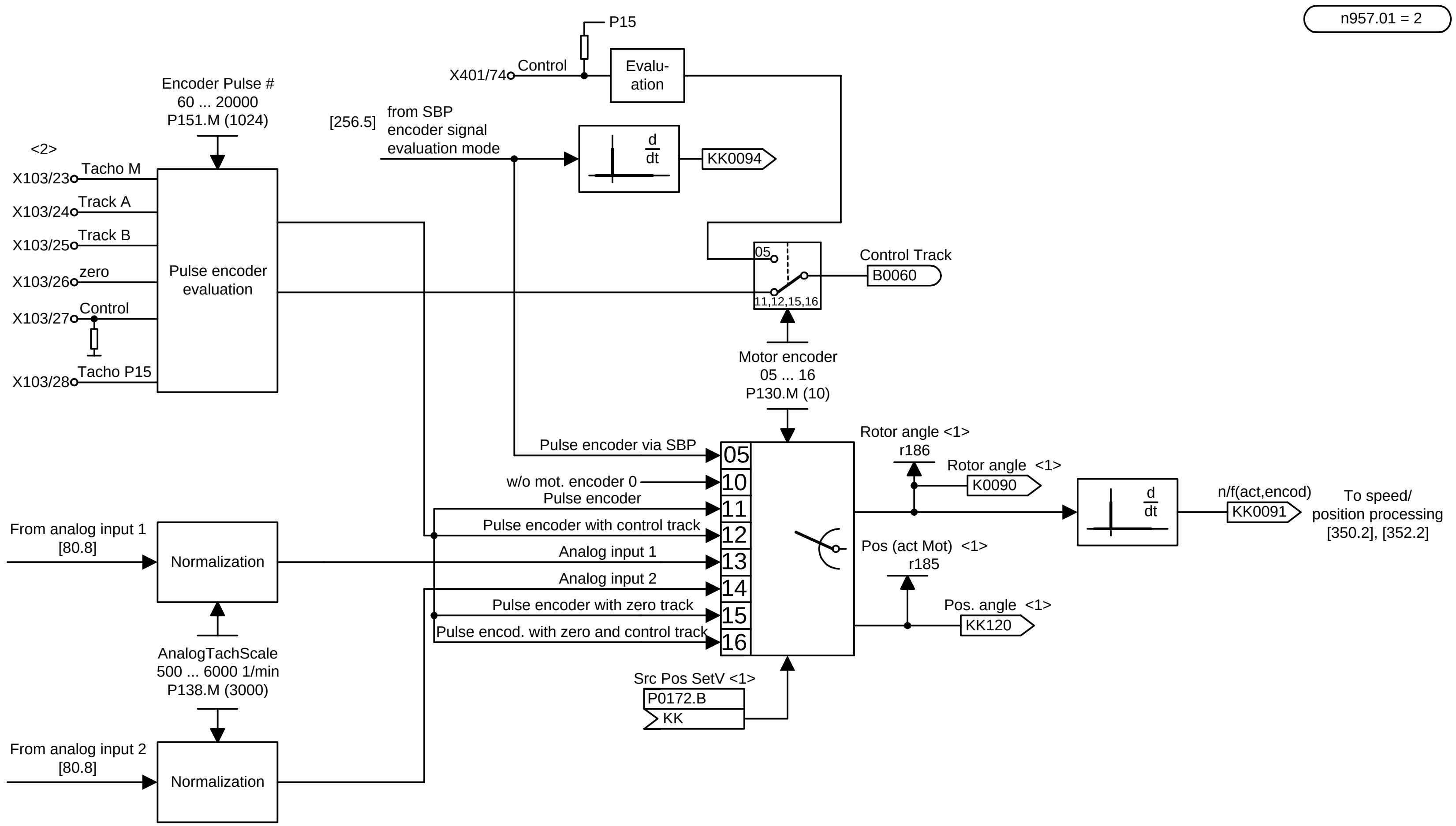
Display of r553 on the PMU



1) The sequence control is the internal control (software) for realizing the drive status (r001).

2) in addition ExcitationEnd B0255

3) not Compact PLUS



<1> Angle displayed only at P130 = 15,16

<2> Compact PLUS: terminal strip X104

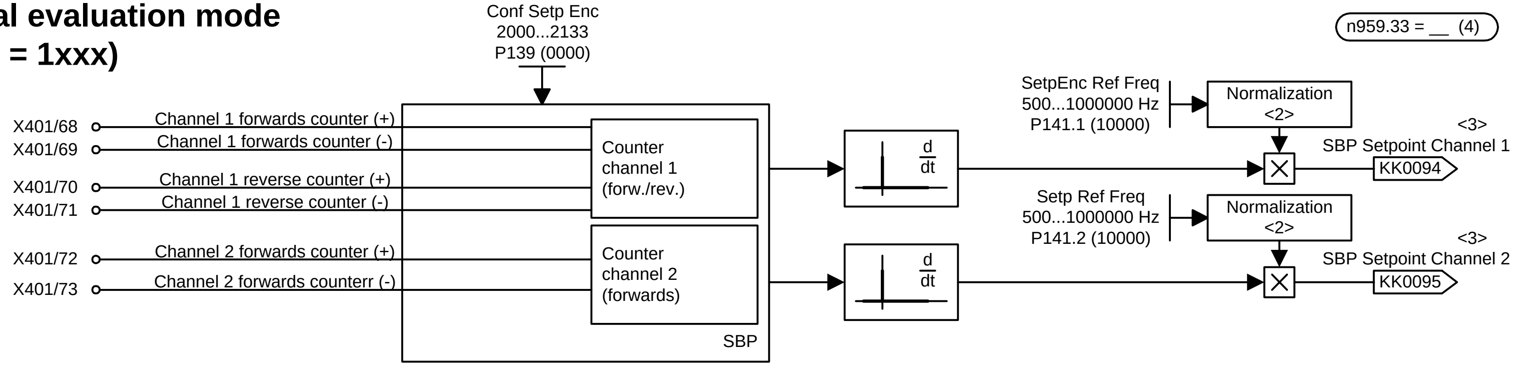
1	2	3	4	5	6	7	8

Encoder evaluation	fp_vc_250_e.vsd	Function diagram	- 250 -
Speed/position processing	24.07.01	MASTERDRIVES VC	

Frequency signal evaluation mode (P139 = 1xxx)

Terminal assignment X400:
60...67: n.c.

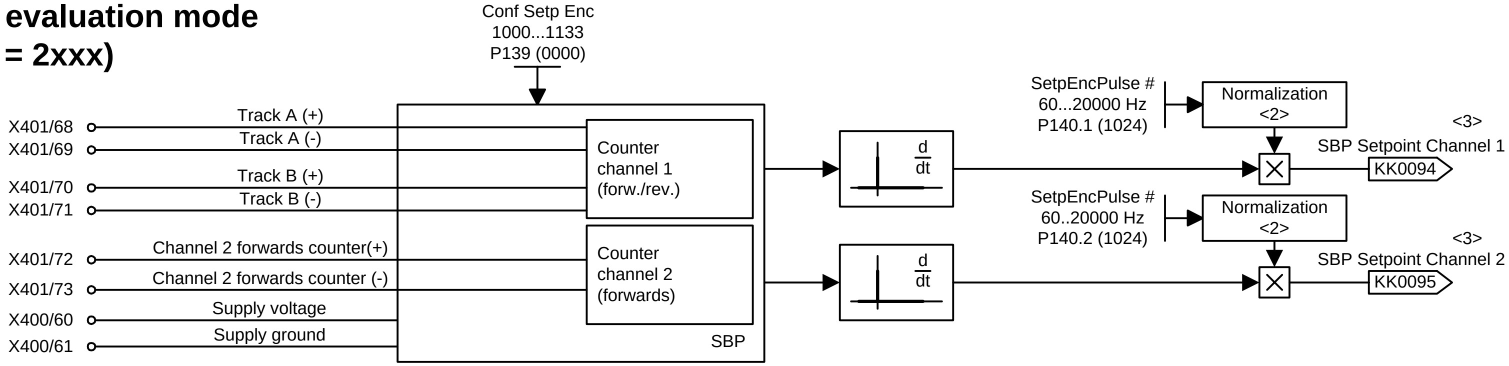
Terminal assignment X401: <1>
68: Forward counter channel 1+
69: Forwards counter channel 1-
70: Reverse counter channel 1+
71: Reverse counter channel 1-
72: Forwards counter channel 2+
73: Forwards counter channel 2-
74: n.c.
75: n.c.



Encoder signal evaluation mode (P139 = 2xxx)

Terminal assignment X400:
60: Supply voltage
61: Supply ground
62...67: n.c.

Terminal assignment X401: <4>
68: Track A+ (channel 1)
69: Track A- (channell 1)
70: Track B+ (channel 1)
71: Track B- (channel 1)
72: Forwards counter channel 2+
73: Forwards counter channel 2-
74: n.c.
75: n.c.



<1> maximum input frequency: 1 MHz

<2> Normalization via
- Frequency signal evaluation mode
  Frequency (frequencies stated in P141.1 and .2 correspond to the output of 100% to the connectors KK0094 and KK0095.
- Encoder signal evaluation mode
  Pulse number (pulse numbers of connected encoders stated in P140.1 and .2)

<3> optional smoothing s. Function Diagram 735

<4> maximum input frequency: 410 kHz

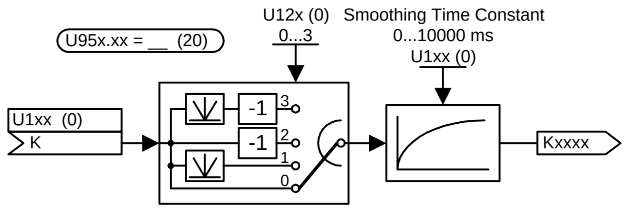
Setting P139:

Input level A/B track
xxx0: Channel 1 / encoder input HTL unipolar
xxx1: Channel 1 / encoder input TTL unipolar
xxx2: Channel 1 / encoder input HTL differential input
xxx3: Channel 1 / encoder input TTL / RS422

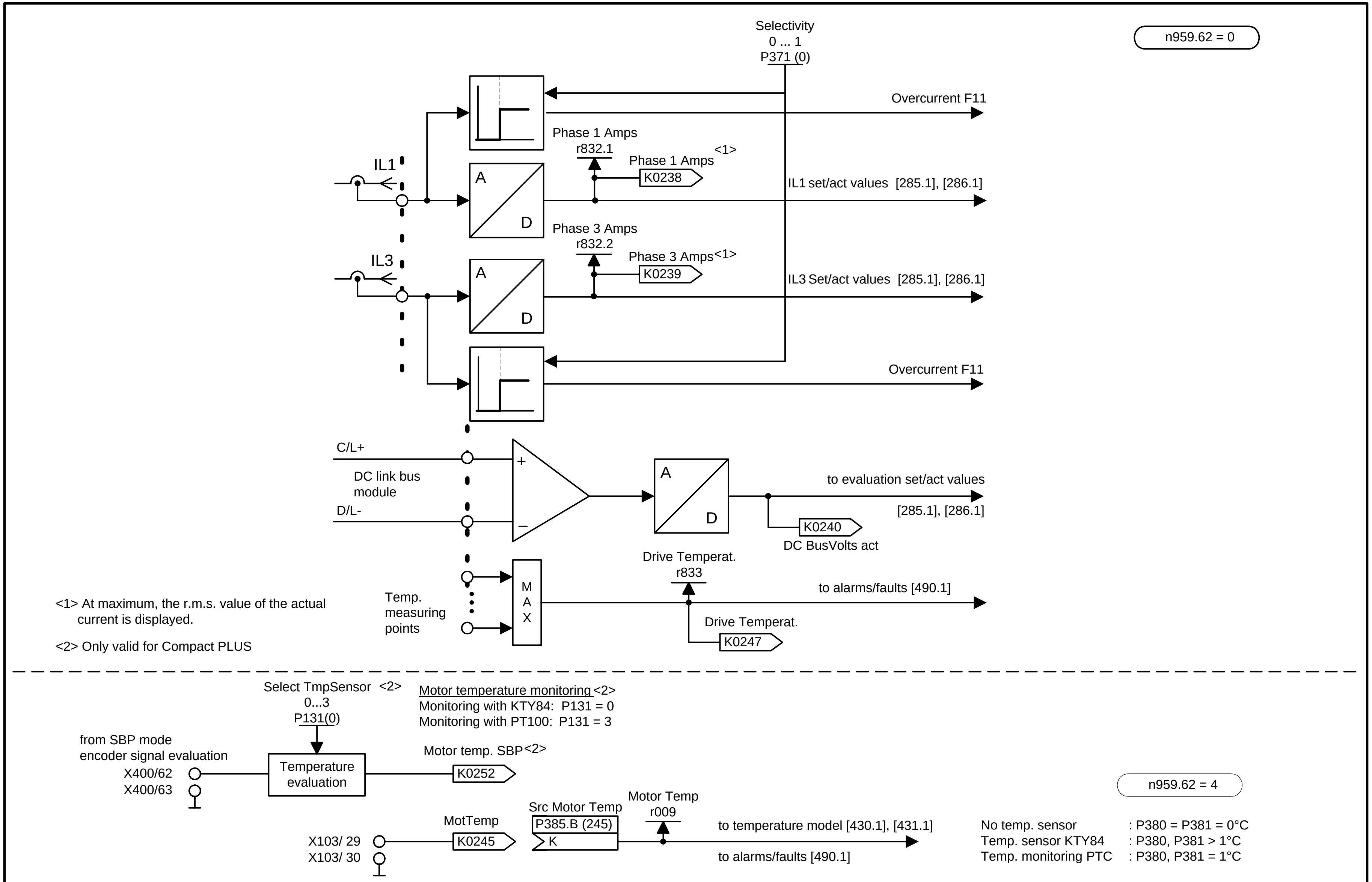
Input level zero track
xx0x: Channel 2 HTL unipolar
xx1x: Channel 2 TTL unipolar
xx2x: Channel 2 HTL differential input
xx3x: Channel 2 TTL / RS422

Mode of setpoint evaluation
0xxx: Frequency signal evaluation deactivated
1xxx: Frequency signal evaluation mode
2xxx: Encoder signal evaluation mode

Encoder power supply
x0xx: 5V
x1xx: 15V

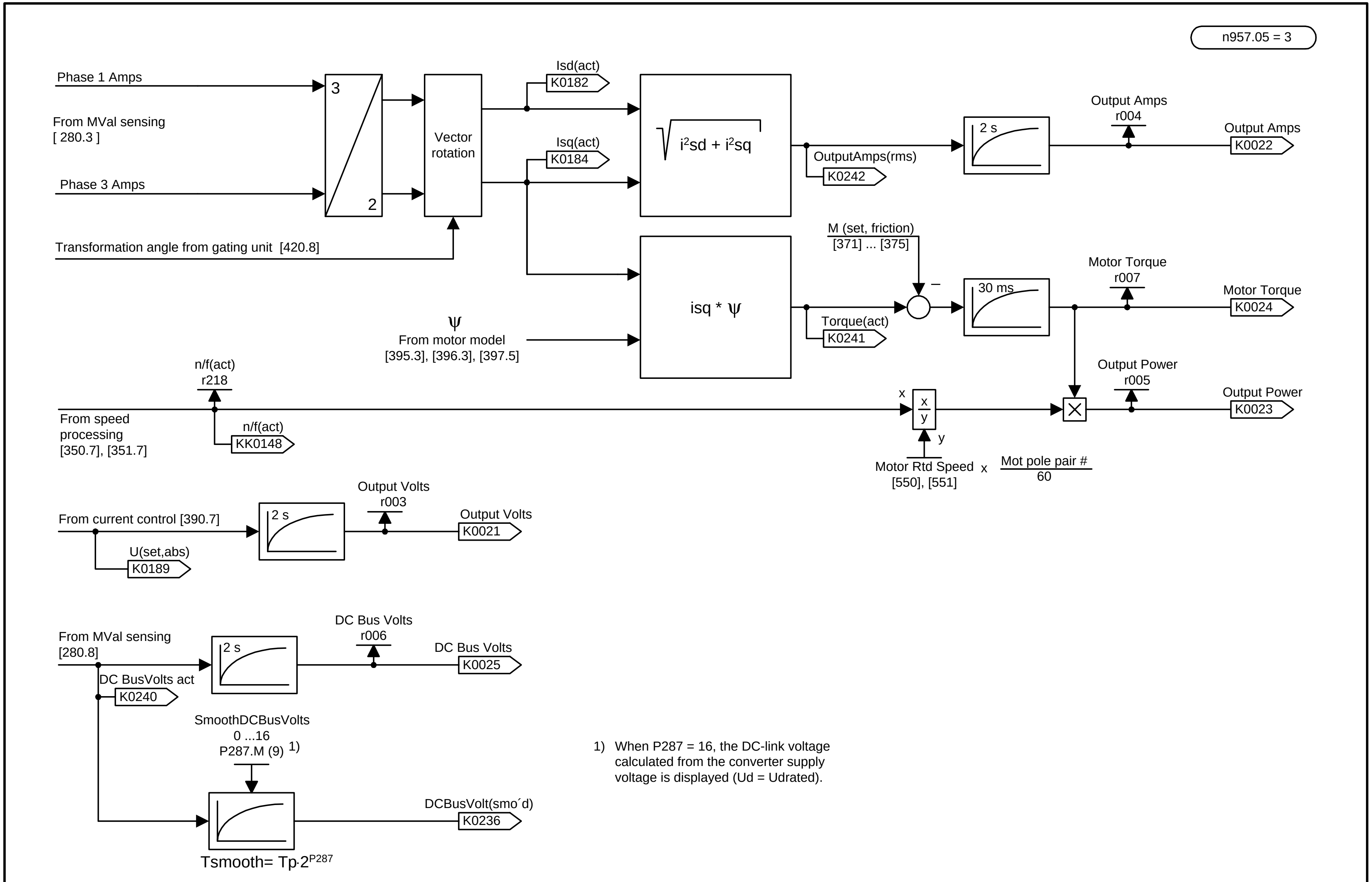


1	2	3	4	5	6	7	8
Setpoint input					fp_vc_256_e.vsd	Function diagram	- 256 -
Setpoint input via external frequency or encoder signals with the SBP optional board					02.07.00	MASTERDRIVES VC	



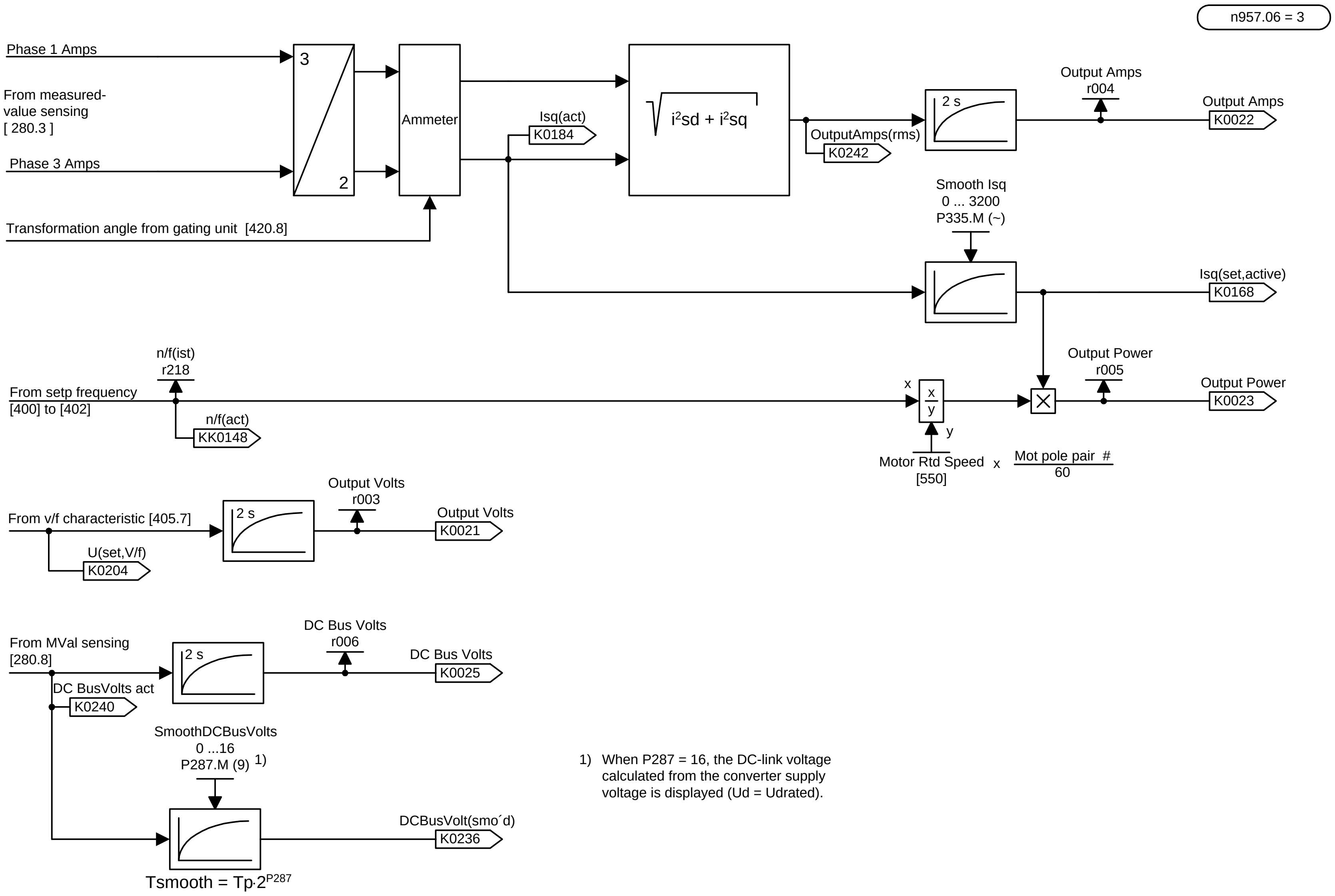
1	2	3	4	5	6	7	8

Measured-value sensing	fp_vc_280_e.vsd	Function diagram	- 280 -
n/f/T control, master/slave drive, v/f control	24.10.01	MASTERDRIVES VC	



1	2	3	4	5	6	7	8

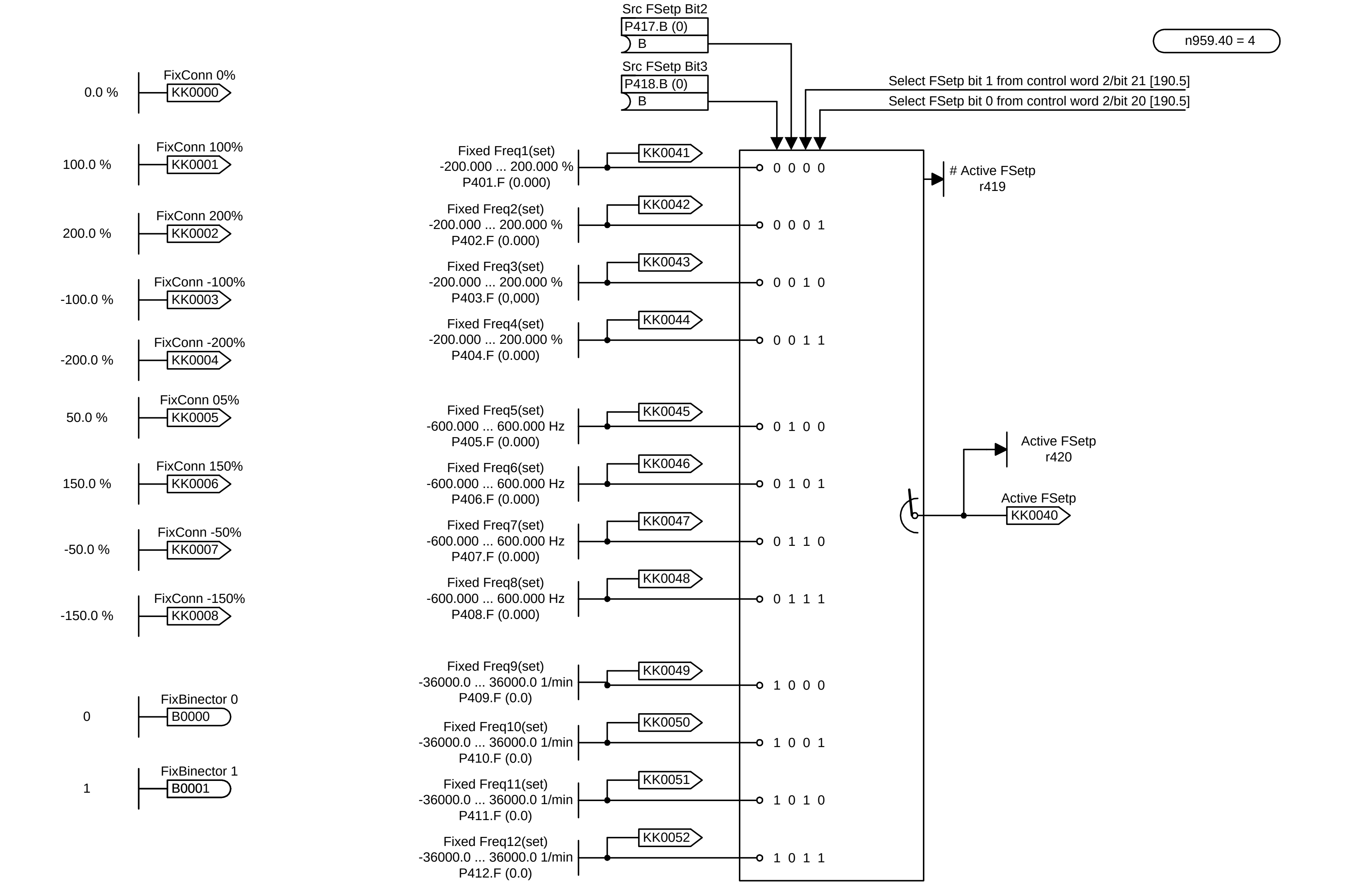
Evaluation of setpoints/actual values for voltage/current/torque/output	fp_vc_285_e.vsd	Function diagram	- 285 -
n/f/T control, master/slave drive	12.10.01	MASTERDRIVES VC	



1) When P287 = 16, the DC-link voltage calculated from the converter supply voltage is displayed (Ud = Udrated).

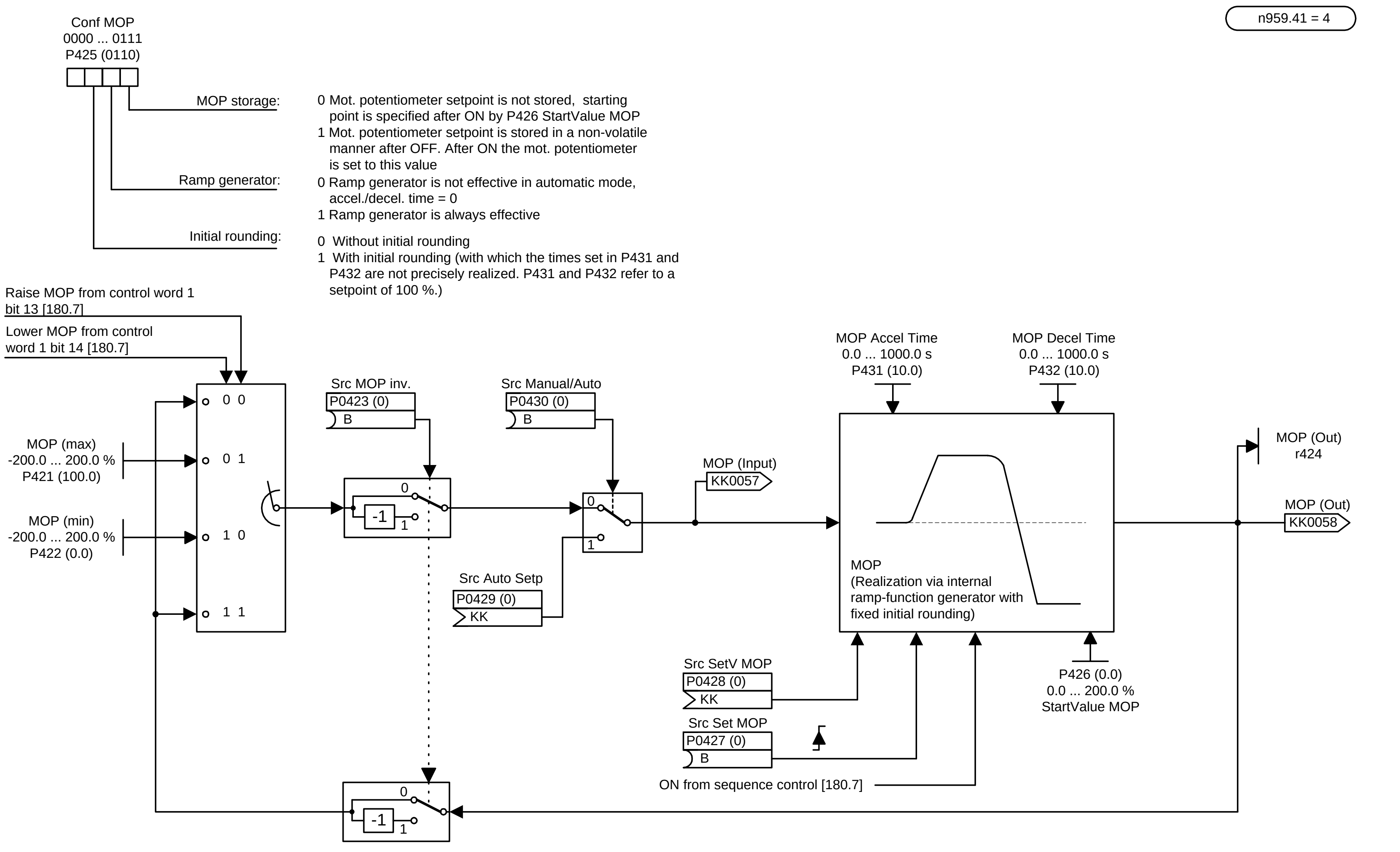
1	2	3	4	5	6	7	8

Evaluation of set/actual values for voltage/current/torque/output	fp_vc_286_e.vsd	Function diagram	- 286 -
V/f open-loop control	12.10.01	MASTERDRIVES VC	



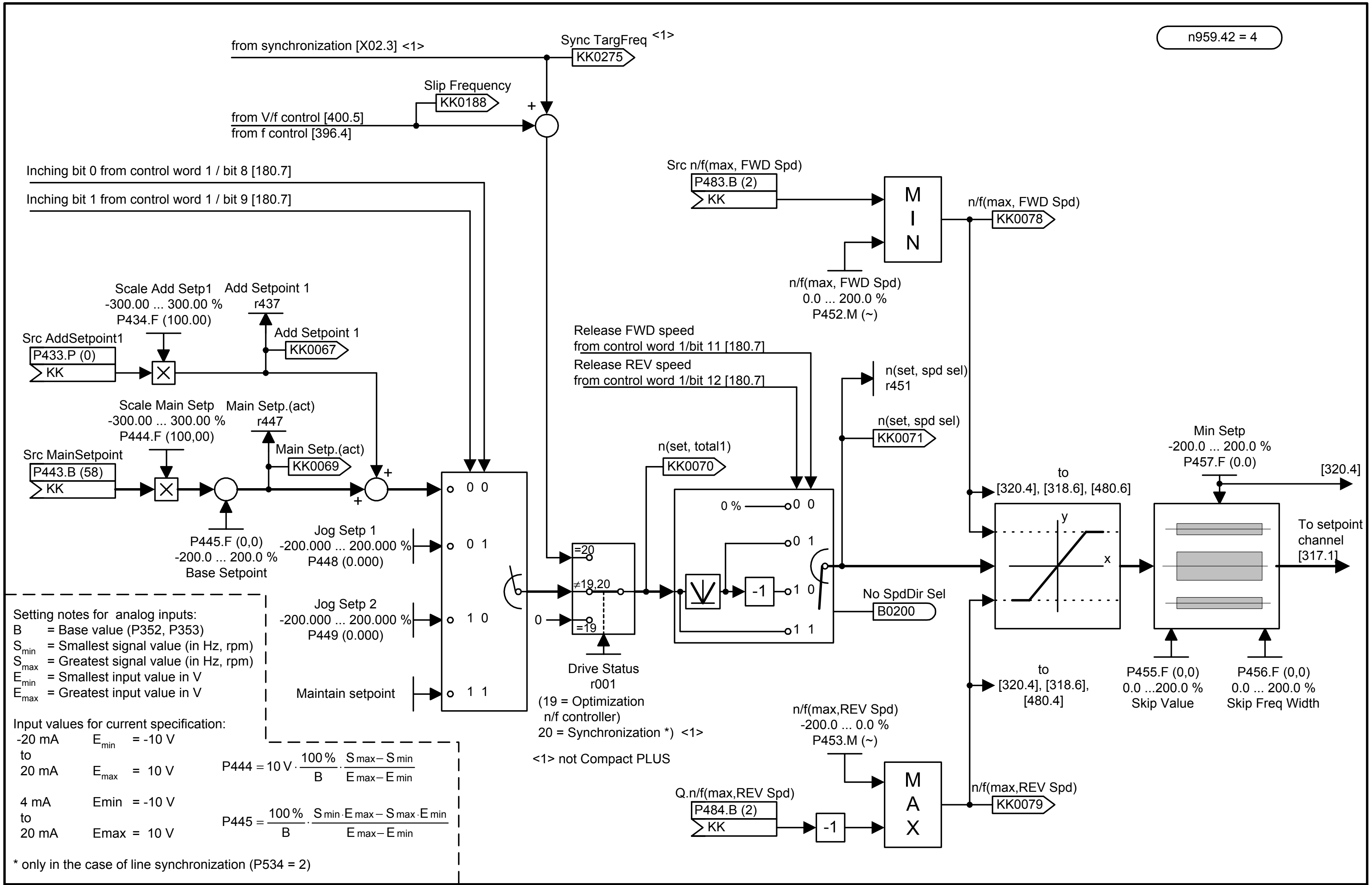
1	2	3	4	5	6	7	8

Setpoint channel	fp_vc_290_e.vsd	Function diagram	- 290 -
Fixed setpoints	31.01.98	MASTERDRIVES VC	



1	2	3	4	5	6	7	8

Setpoint channel	fp_vc_300_e.vsd	Function diagram	- 300 -
Motorized potentiometer	31.01.98	MASTERDRIVES VC	



Setting notes for analog inputs:
B = Base value (P352, P353)
S_{min} = Smallest signal value (in Hz, rpm)
S_{max} = Greatest signal value (in Hz, rpm)
E_{min} = Smallest input value in V
E_{max} = Greatest input value in V

Input values for current specification:

-20 mA to 20 mA	E_{min} E_{max}	= -10 V = 10 V
4 mA to 20 mA	Emin Emax	= -10 V = 10 V

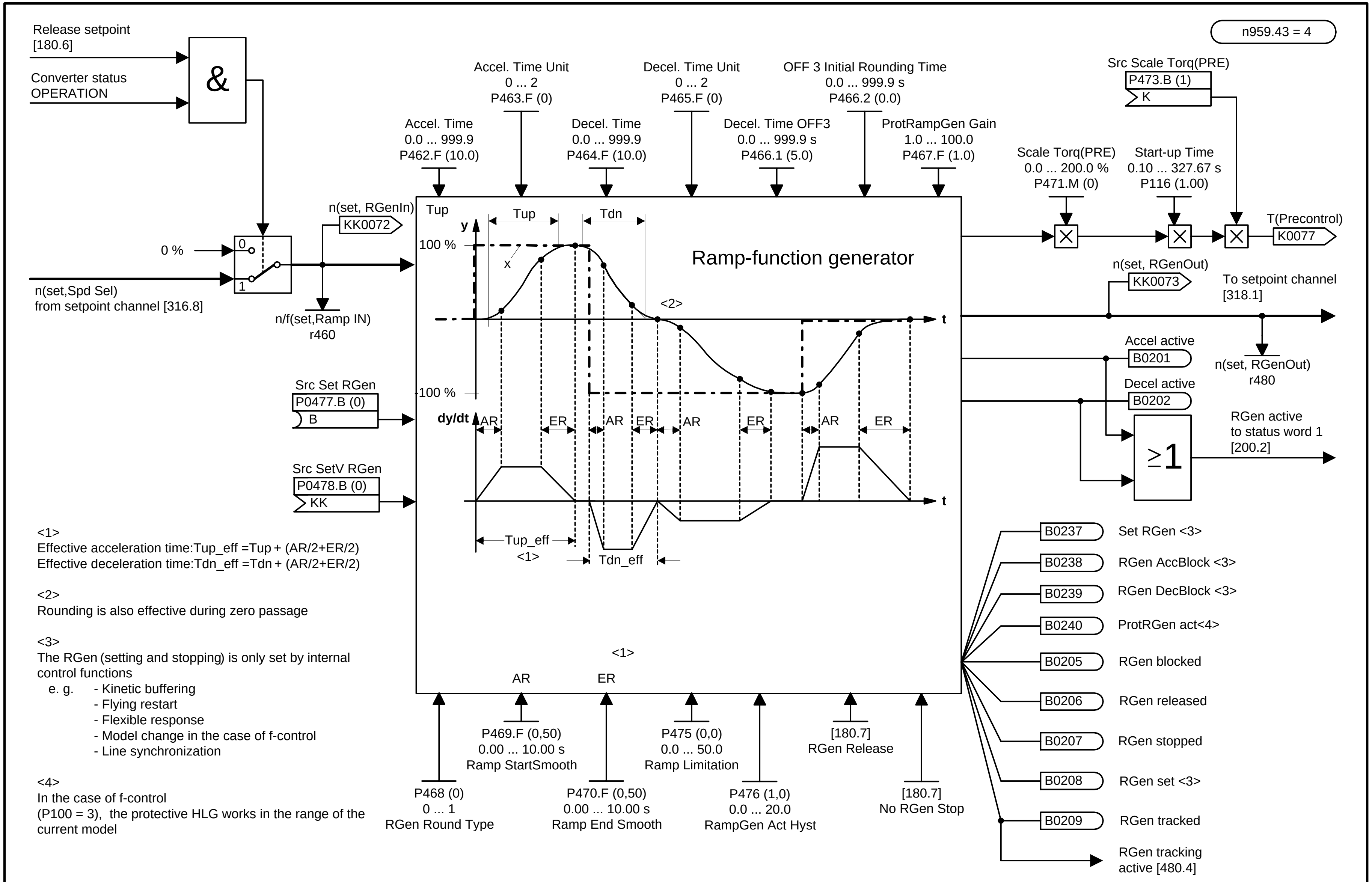
$$P444 = 10\,V \cdot \frac{100\,\%}{B} \cdot \frac{S_{max} - S_{min}}{E_{max} - E_{min}}$$

$$P445 = \frac{100\,\%}{B} \cdot \frac{S_{min} \cdot E_{max} - S_{max} \cdot E_{min}}{E_{max} - E_{min}}$$

* only in the case of line synchronization (P534 = 2)

1	2	3	4	5	6	7	8

Setpoint channel (part 1)	fp_vc_316_e.vsd	Function diagram	- 316 -
Master Drive	24.07.01	MASTERDRIVES VC	



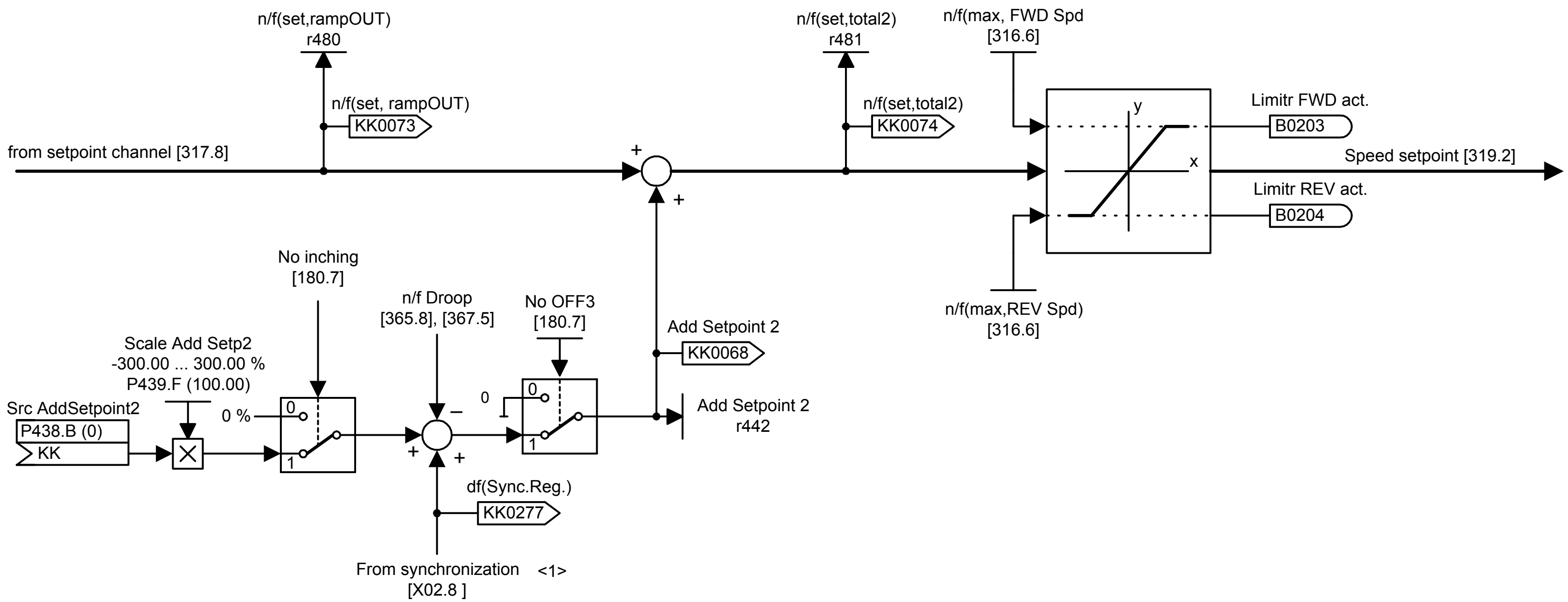
<1>
Effective acceleration time:Tup_eff =Tup + (AR/2+ER/2)
Effective deceleration time:Tdn_eff =Tdn + (AR/2+ER/2)

<2>
Rounding is also effective during zero passage

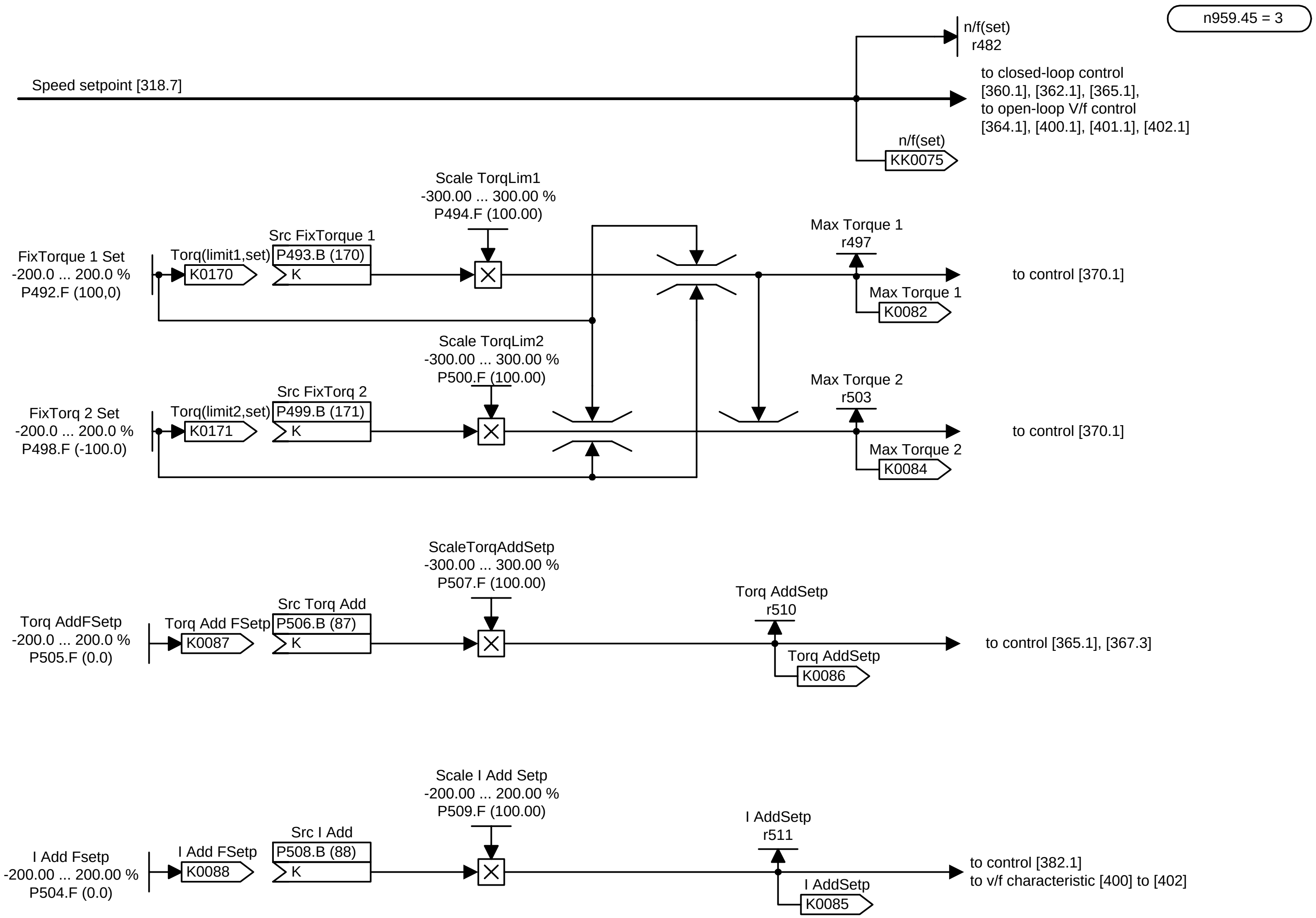
<3>
The RGen (setting and stopping) is only set by internal control functions
e. g. - Kinetic buffering
- Flying restart
- Flexible response
- Model change in the case of f-control
- Line synchronization

<4>
In the case of f-control
(P100 = 3), the protective HLG works in the range of the current model

1	2	3	4	5	6	7	8

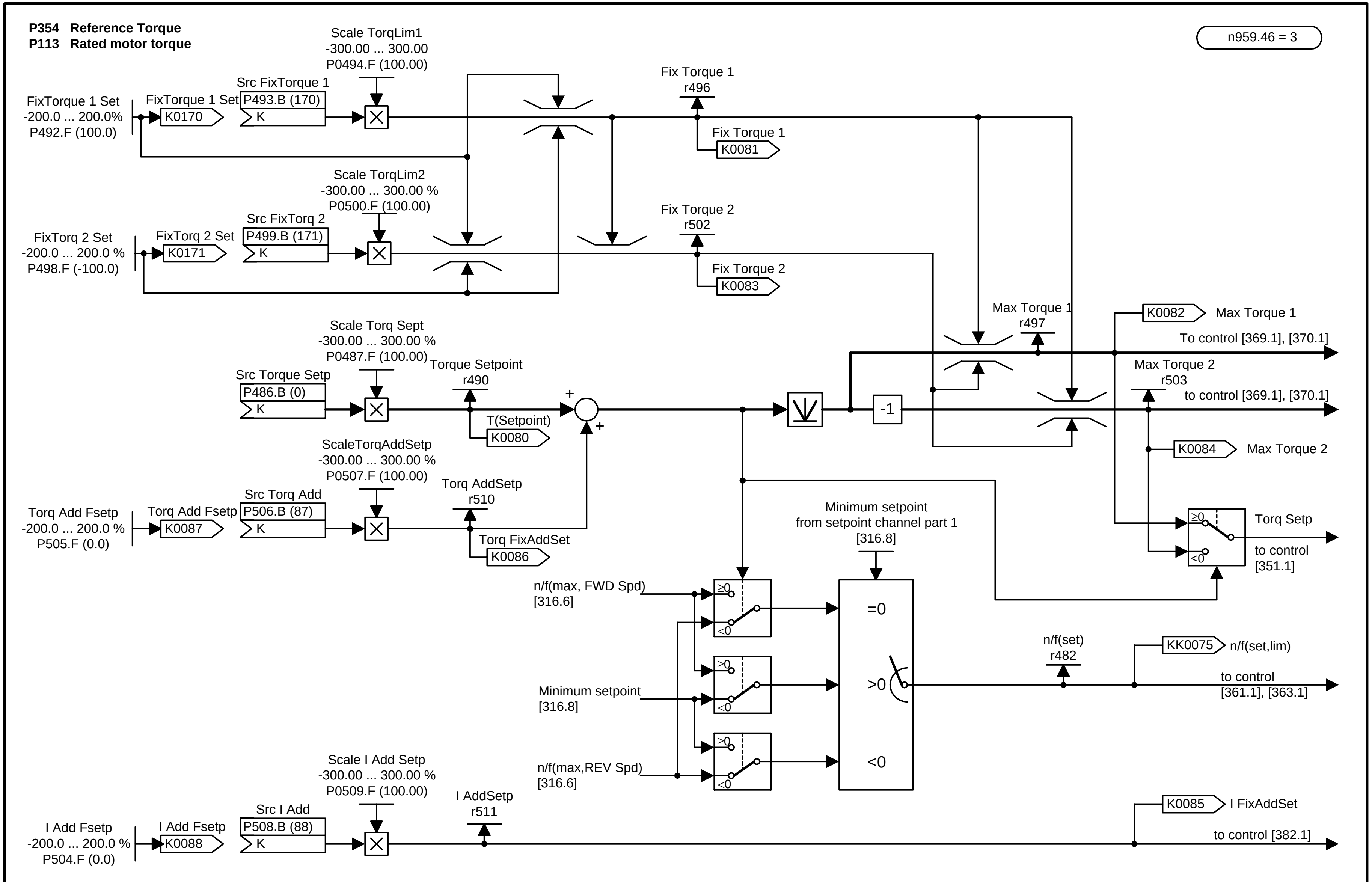


<1> not Compact PLUS



1	2	3	4	5	6	7	8

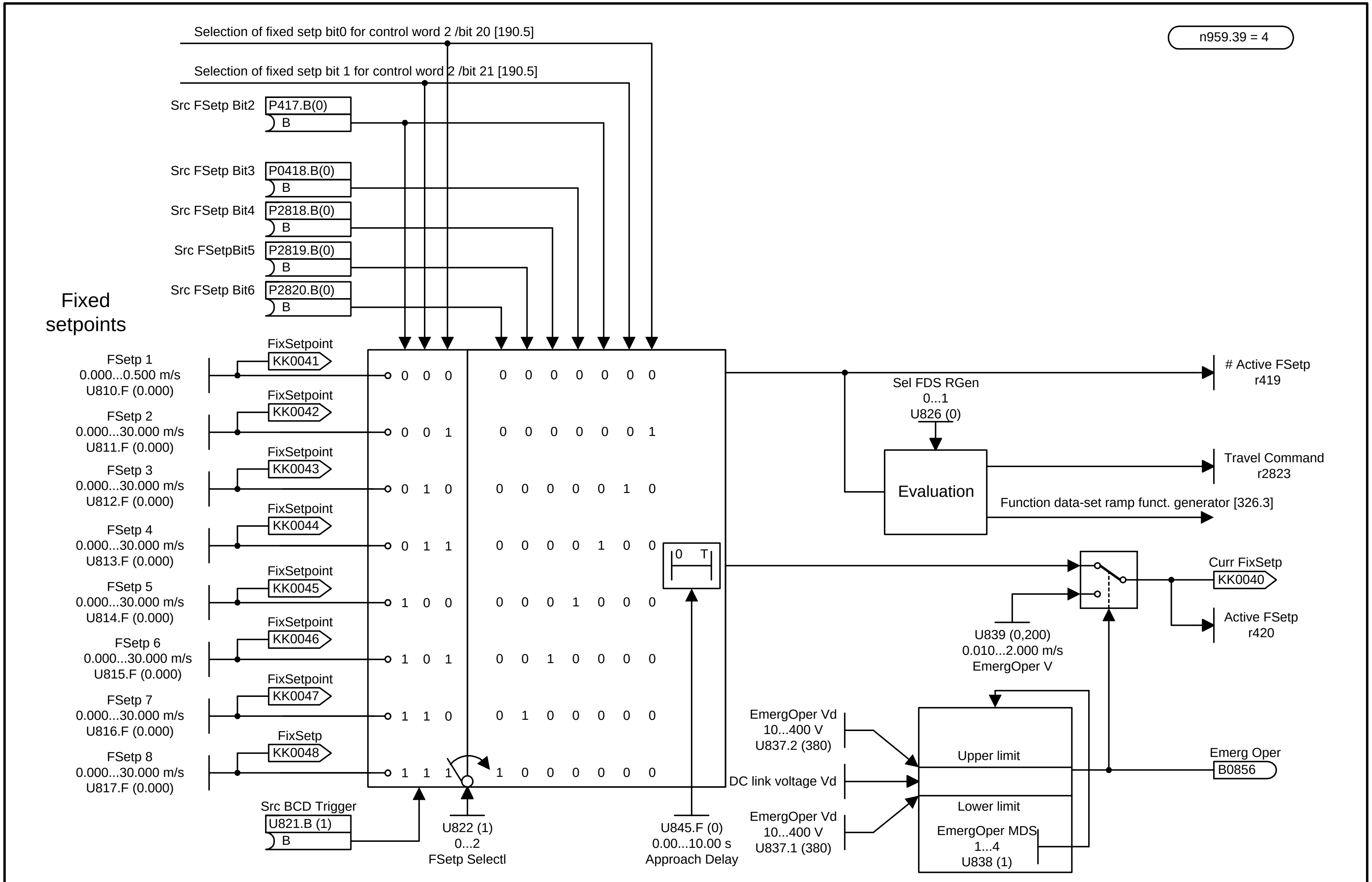
Setpoint channel (part 4)	fp_vc_319_e.vsd	Function diagram	- 319 -
Master drive	31.01.98	MASTERDRIVES VC	



1	2	3	4	5	6	7	8

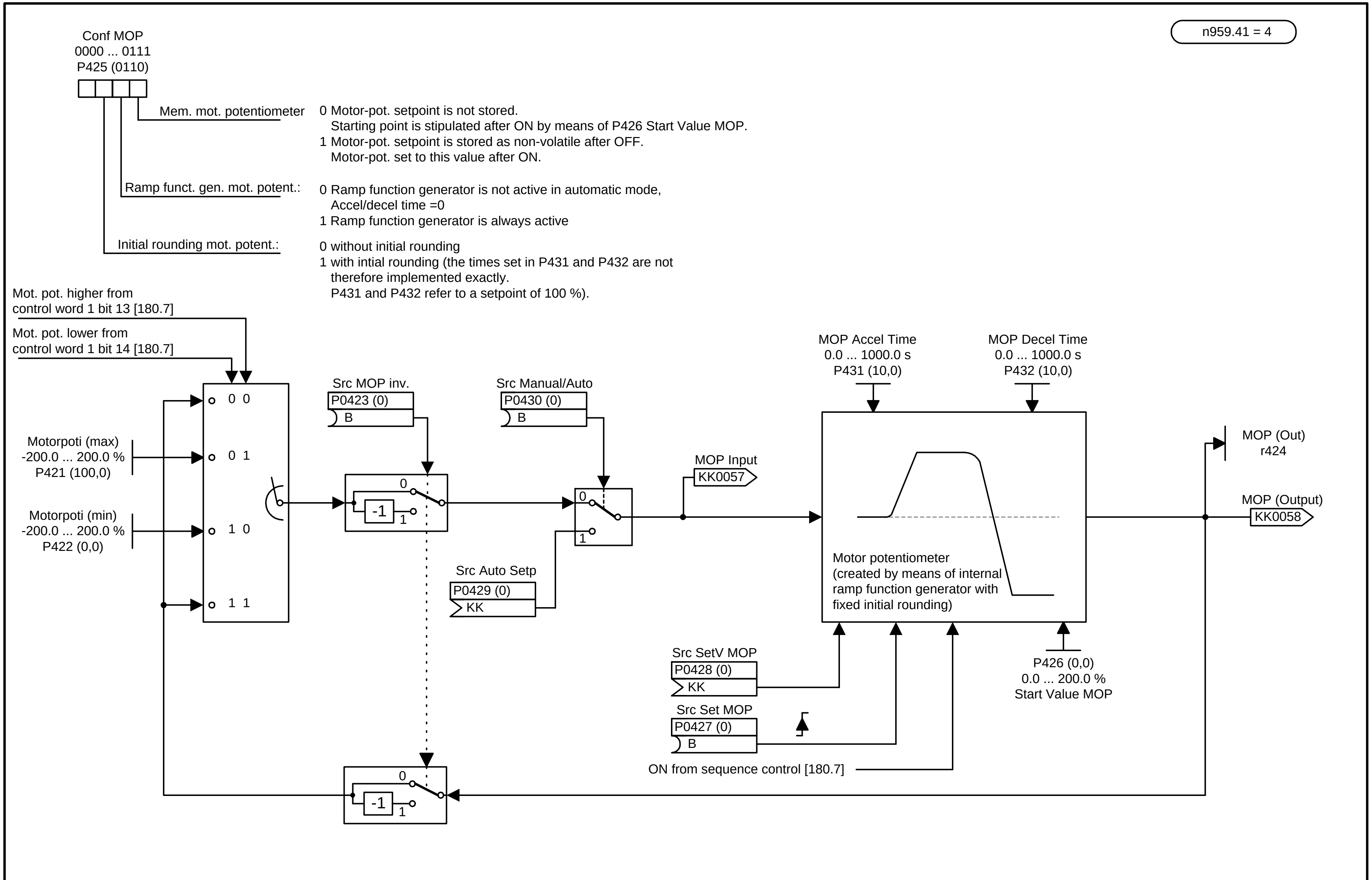
Setpoint channel | fp_vc_320_e.vsd | Function diagram | - 320 -

Slave drive | 31.01.98 | MASTERDRIVES VC



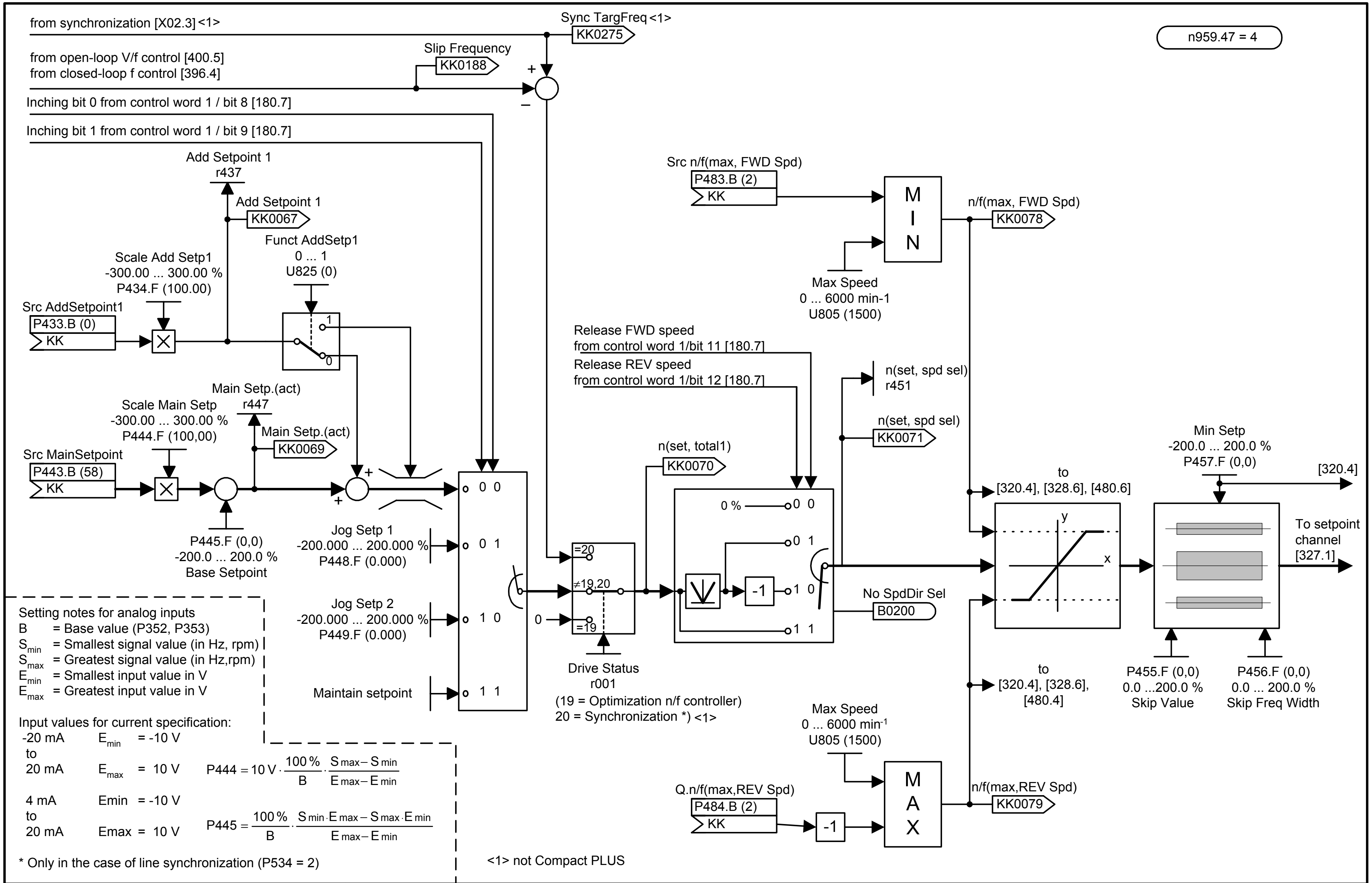
1	2	3	4	5	6	7	8

Setpoint channel	fp_vc_324_e.vsd	Function diagram	- 324 -
Fixed setpoints, lift and hoisting-gear applications (U800=1)	26.10.01	MASTERDRIVES VC	



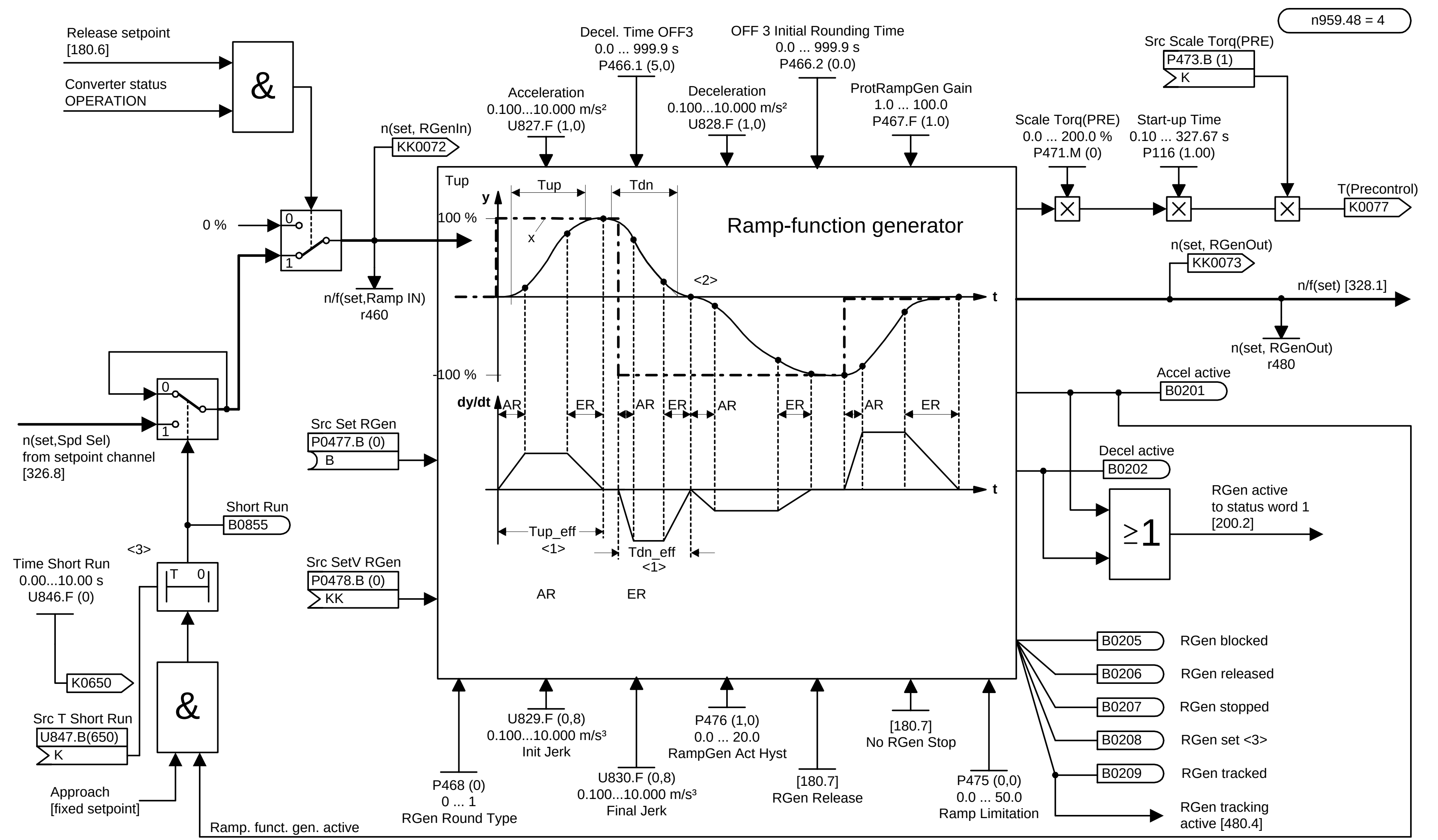
1	2	3	4	5	6	7	8

Setpoint channel	fp_vc_325_e.vsd	Function diagram	- 325 -
Motor potentiometer	10.10.98	MASTERDRIVES VC	



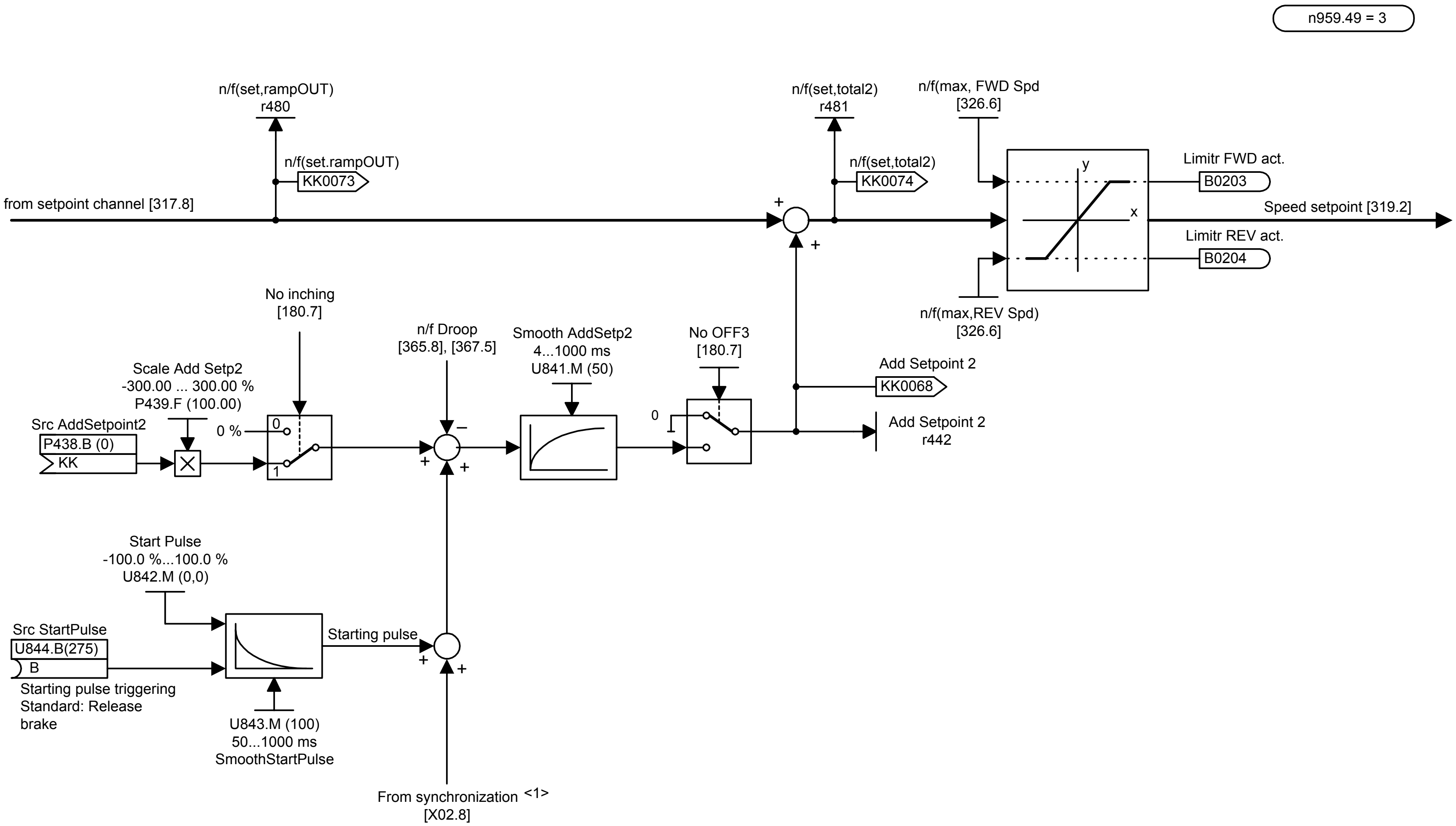
1	2	3	4	5	6	7	8

Setpoint channel (Part 1)	fp_vc_326_e.vsd	Function diagram	- 326 -
Master Drive, Lift And Hoisting-Gear Applications (U800 = 1)	26.10.01	MASTERDRIVES VC	



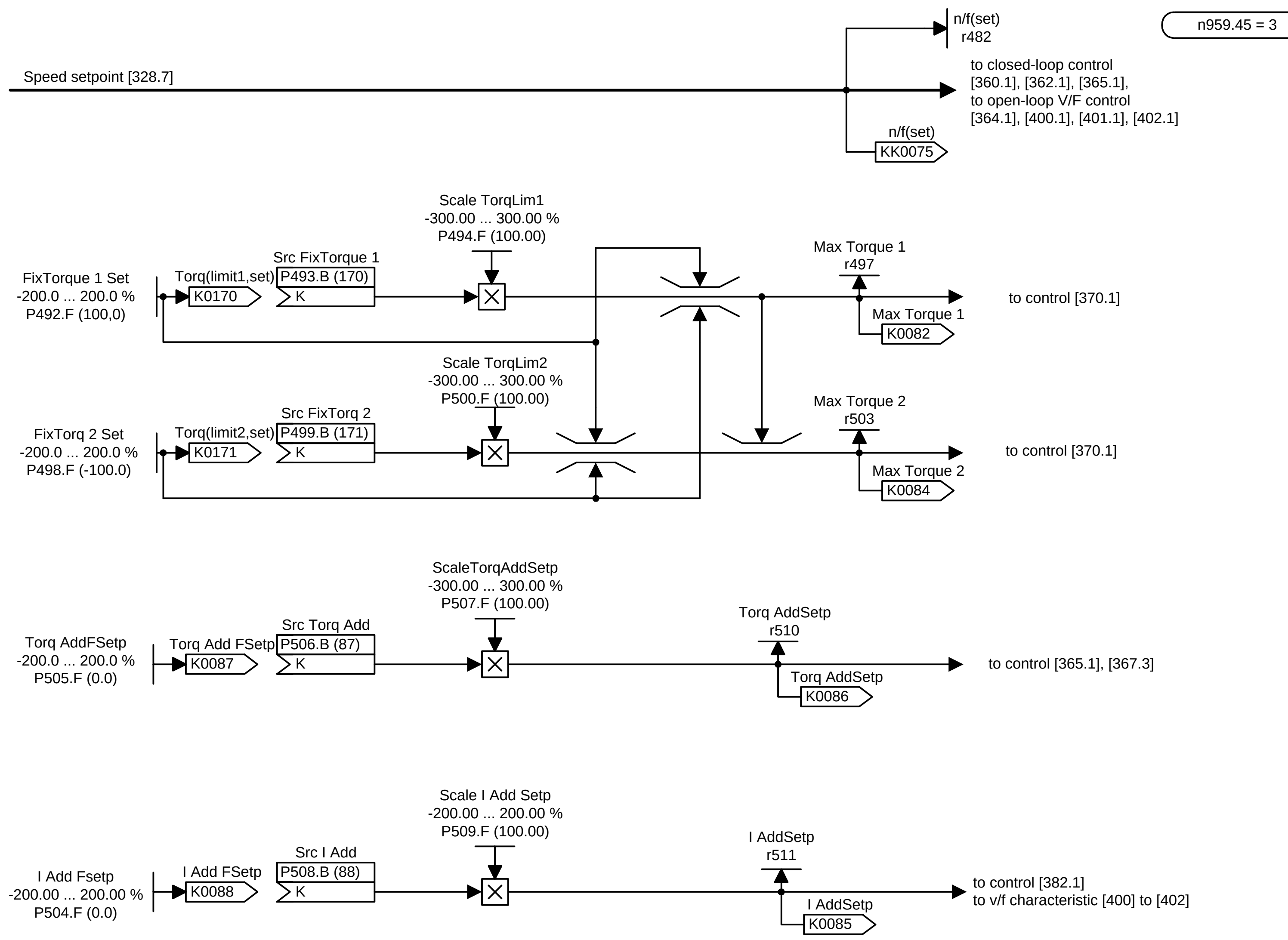
<1> Effective acceleration time:Tup_eff =Tup + (AR/2+ER/2)
Effective deceleration time:Tdn_eff =Tdn + (AR/2+ER/2)
<2> Rounding has an effect even for zero passage
<3> $T_v = T_{ab}$ · Connector value

1	2	3	4	5	6	7	8
Setpoint channel (Part 2)					fp_vc_327_e.vsd	Function diagram	- 327 -
Master drive + ramp function generator, lift and hoisting-gear applications (U800 = 1)					26.10.01	MASTERDRIVES VC	



<1> not Compact PLUS

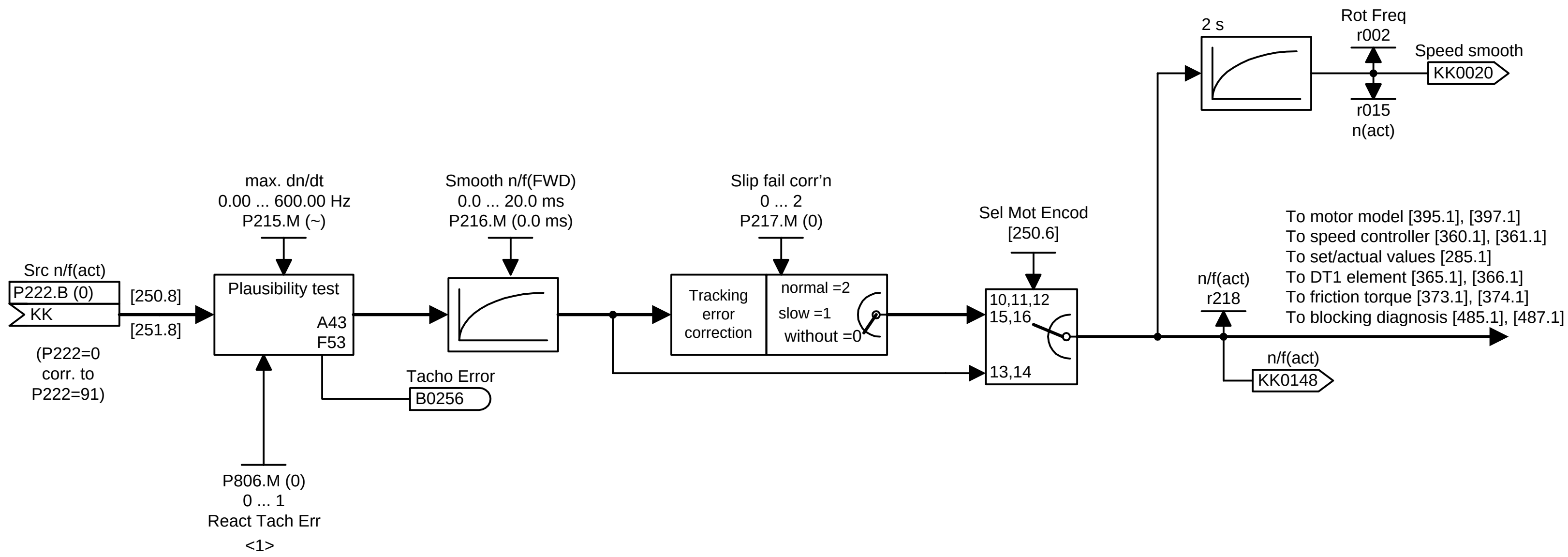
1	2	3	4	5	6	7	8
Setpoint channel (part 3)					fp_vc_328_e.vsd	Function diagram	- 328 -
Master drive, lift and hoisting-gear applications (U800 = 1)					26.10.01	MASTERDRIVES VC	



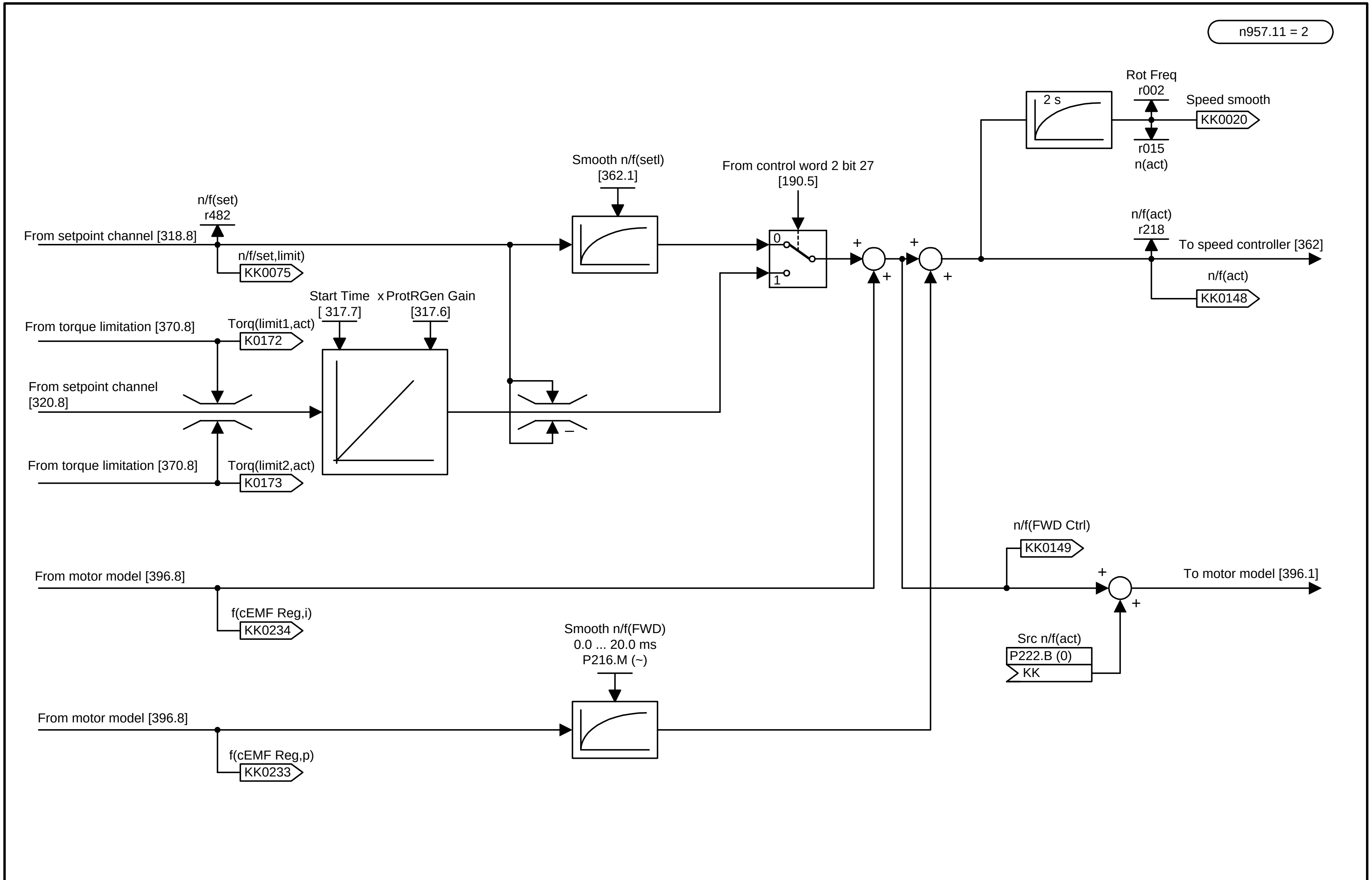
1	2	3	4	5	6	7	8

Setpoint channel (part 4)	fp_vc_329_e.vsd	Function diagram	- 329 -
Master drive, lift and hoisting-gear applications (U800 = 1)	26.10.01	MASTERDRIVES VC	

n957.10 = 2



<1> Only in the case of n-control (P100 = 4)
Not in the case of synch. motor (P95=12)

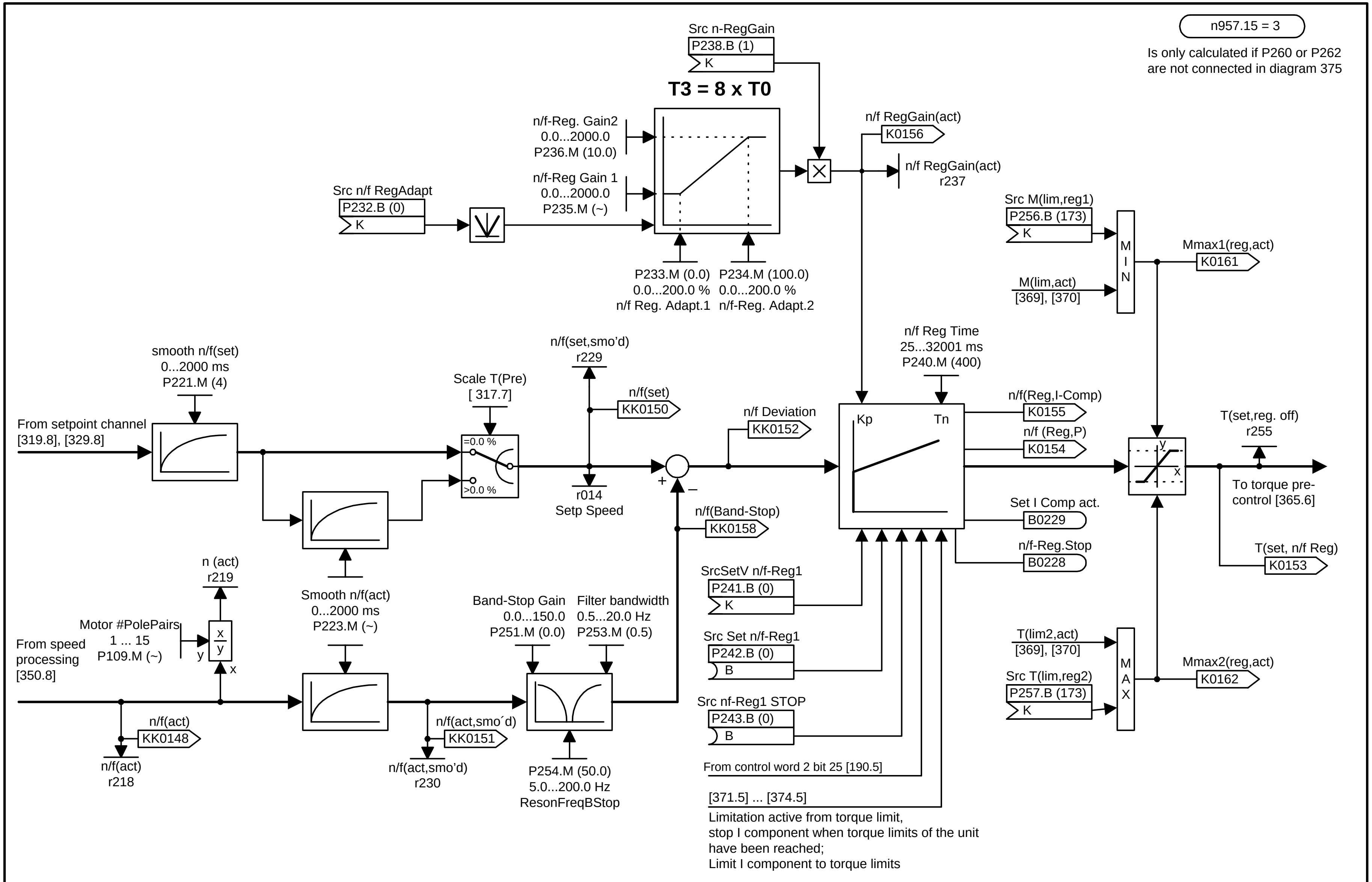


1	2	3	4	5	6	7	8

Speed processing	fp_vc_351_e.vsd	Function diagram	- 351 -
Frequency control, master/slave drive	31.01.98	MASTERDRIVES VC	

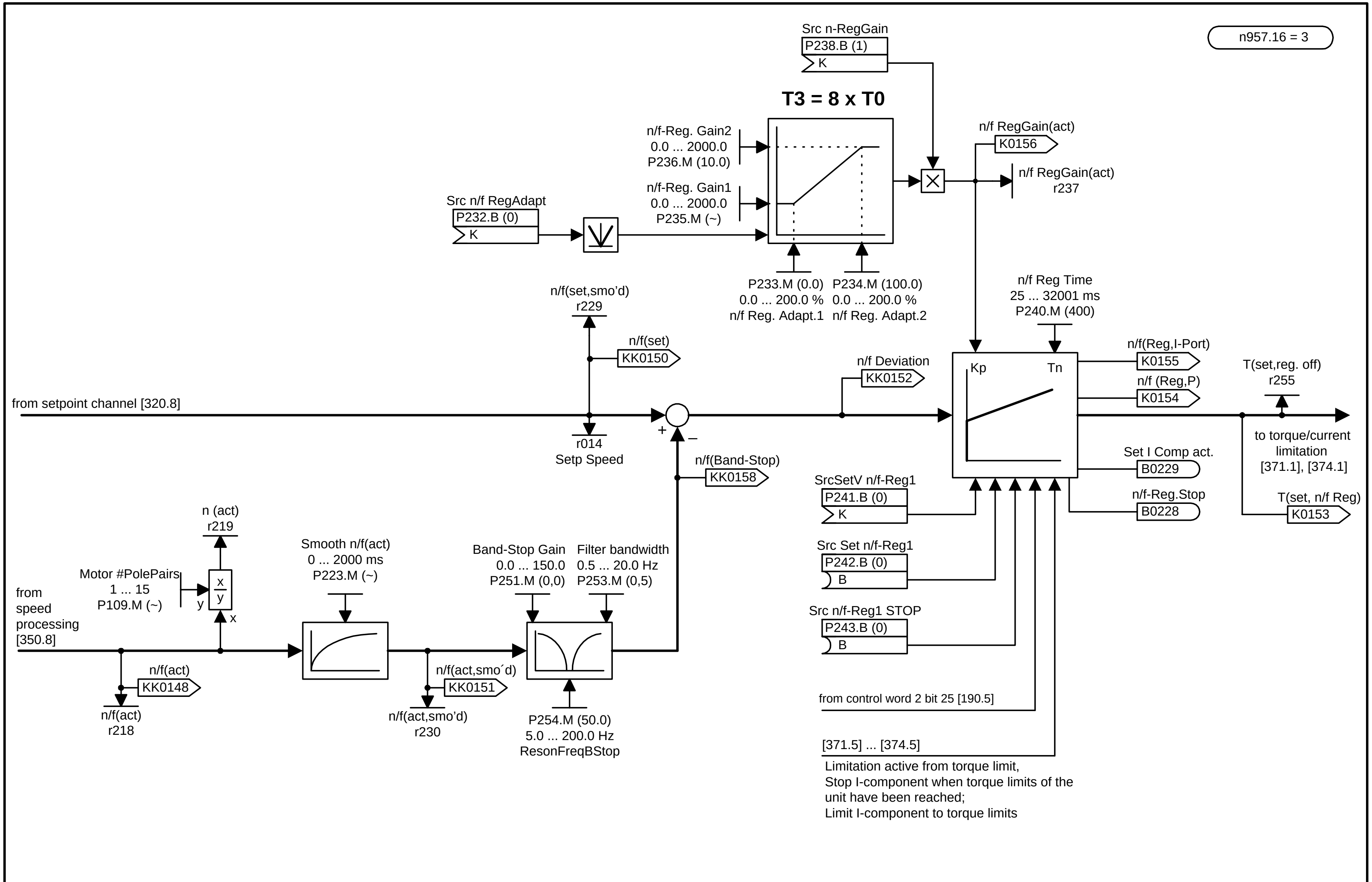
1	2	3	4	5	6	7	8

Speed/position processing	fp_vc_352_e.vsd	Function diagram	- 352 -
v/f characteristic with speed controller	31.01.98	MASTERDRIVES VC	



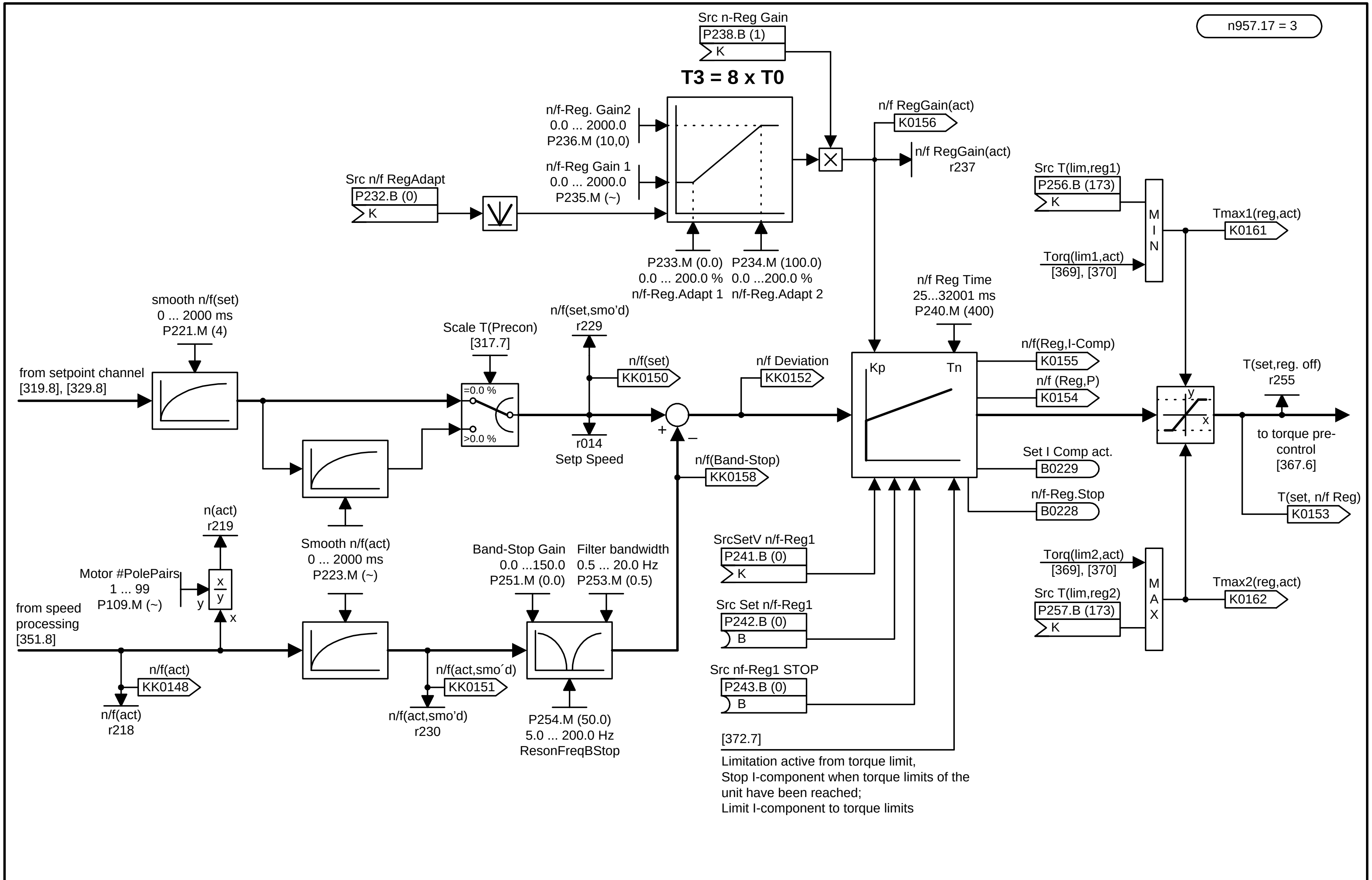
1	2	3	4	5	6	7	8

Speed controller	fp_vc_360_e.vsd	Function diagram	- 360 -
Speed control, master drive	09.04.98	MASTERDRIVES VC	



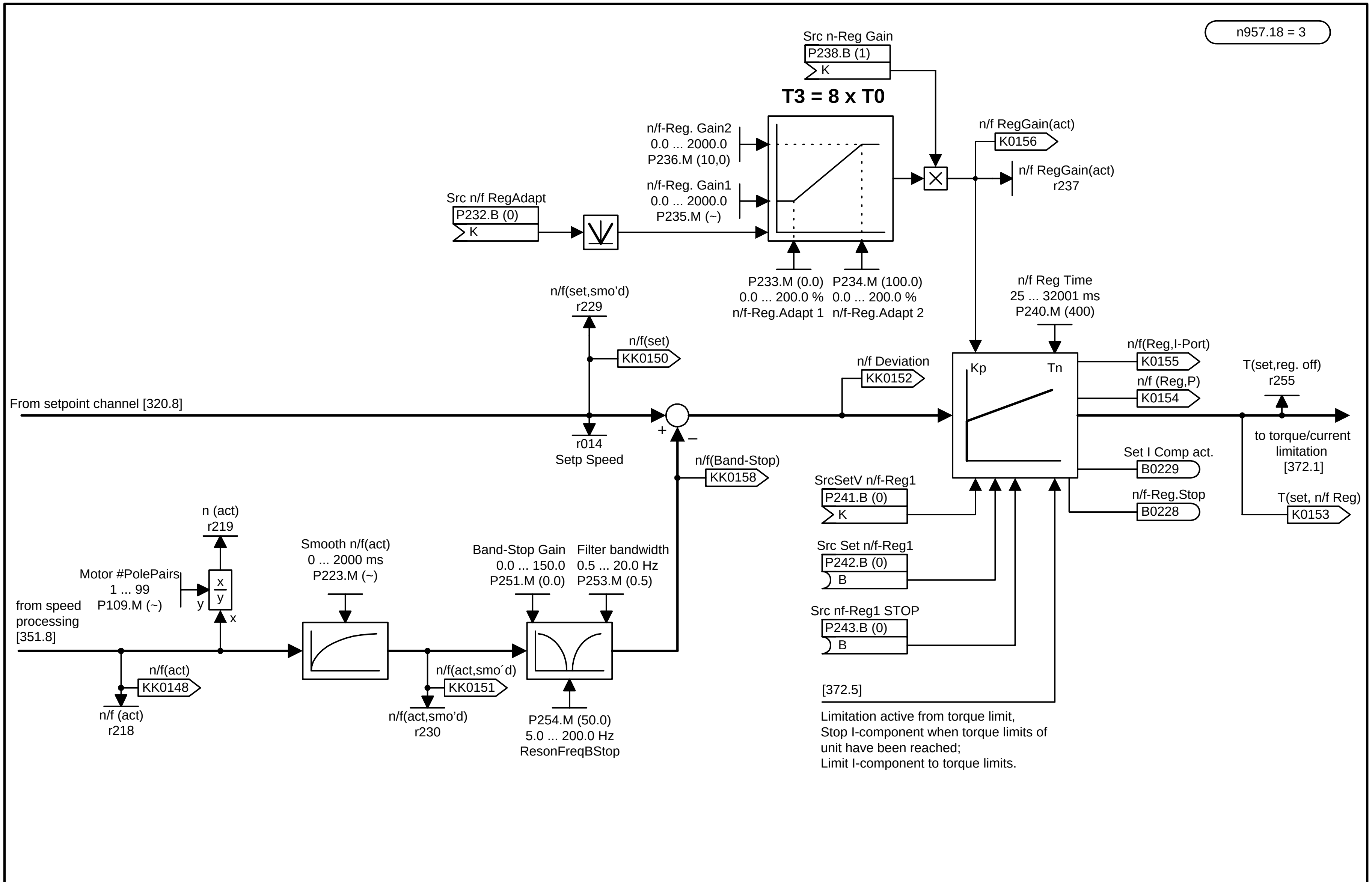
1	2	3	4	5	6	7	8

Speed limiting controller	fp_vc_361_e.vsd	Function diagram	- 361 -
Torque control and speed control/slave drive	09.04.98	MASTERDRIVES VC	



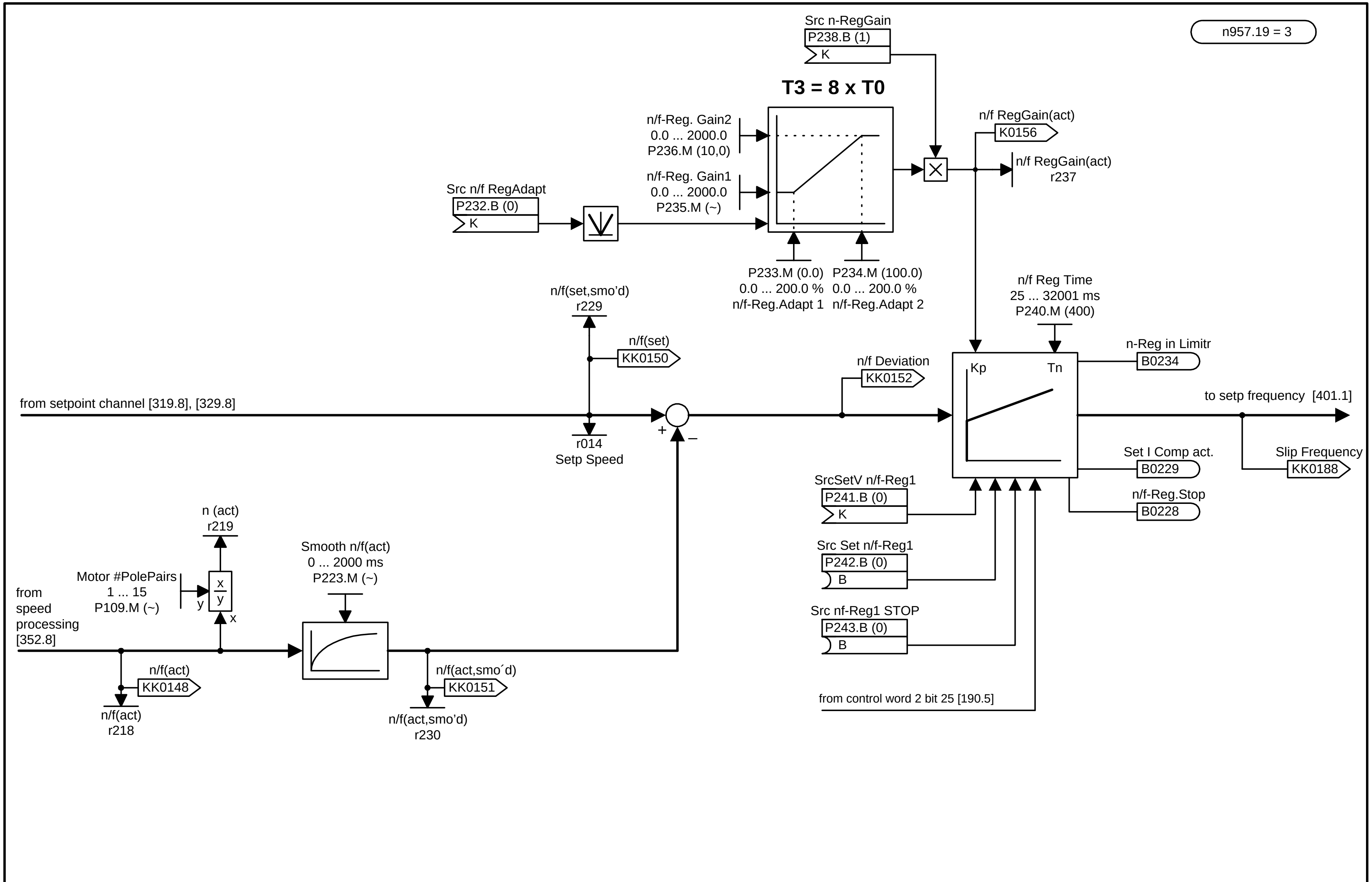
1	2	3	4	5	6	7	8

Speed controller	fp_vc_362_e.vsd	Function diagram	- 362 -
Frequency control, master drive	09.04.98	MASTERDRIVES VC	



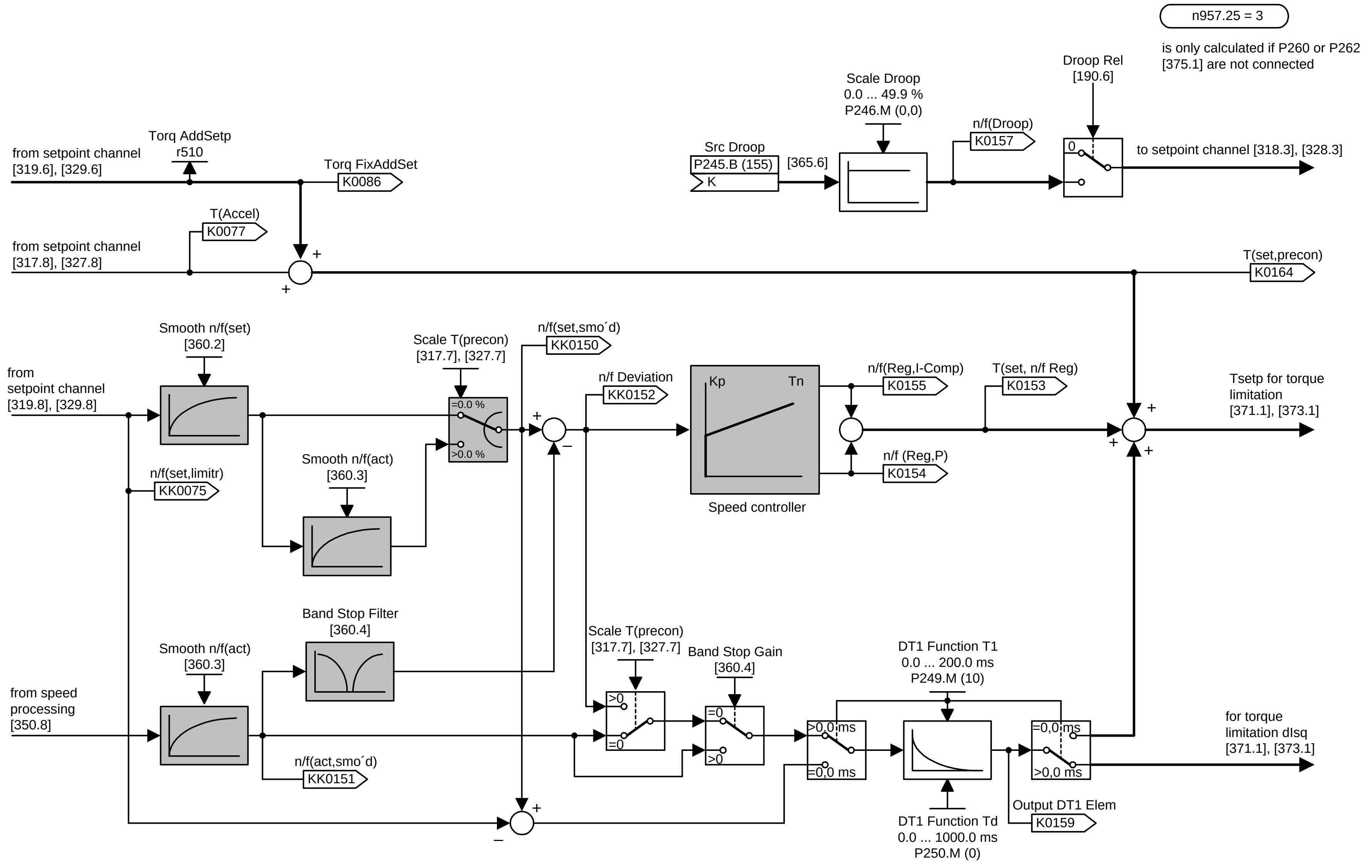
1	2	3	4	5	6	7	8

Speed limiting controller	fp_vc_363_e.vsd	Function diagram	- 363 -
Frequency control, slave drive	09.04.98	MASTERDRIVES VC	



1	2	3	4	5	6	7	8

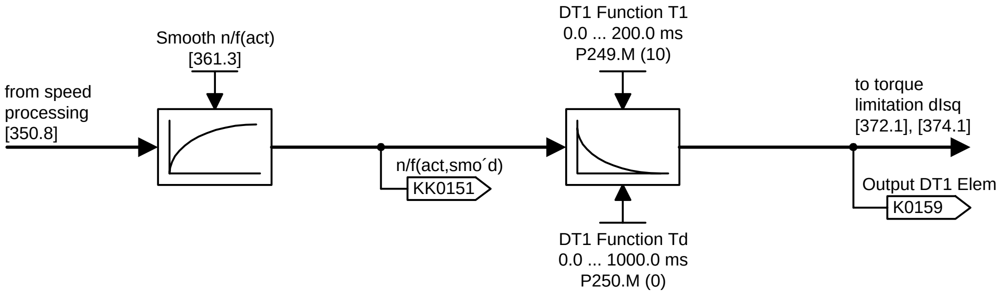
Speed controller	fp_vc_364_e.vsd	Function diagram	- 364 -
V/f characteristic with speed controller	09.04.98	MASTERDRIVES VC	



1	2	3	4	5	6	7	8

DT1 element, droop and torque pre-control	fp_vc_365_e.vsd	Function diagram	- 365 -
Speed control, master drive	09.04.98	MASTERDRIVES VC	

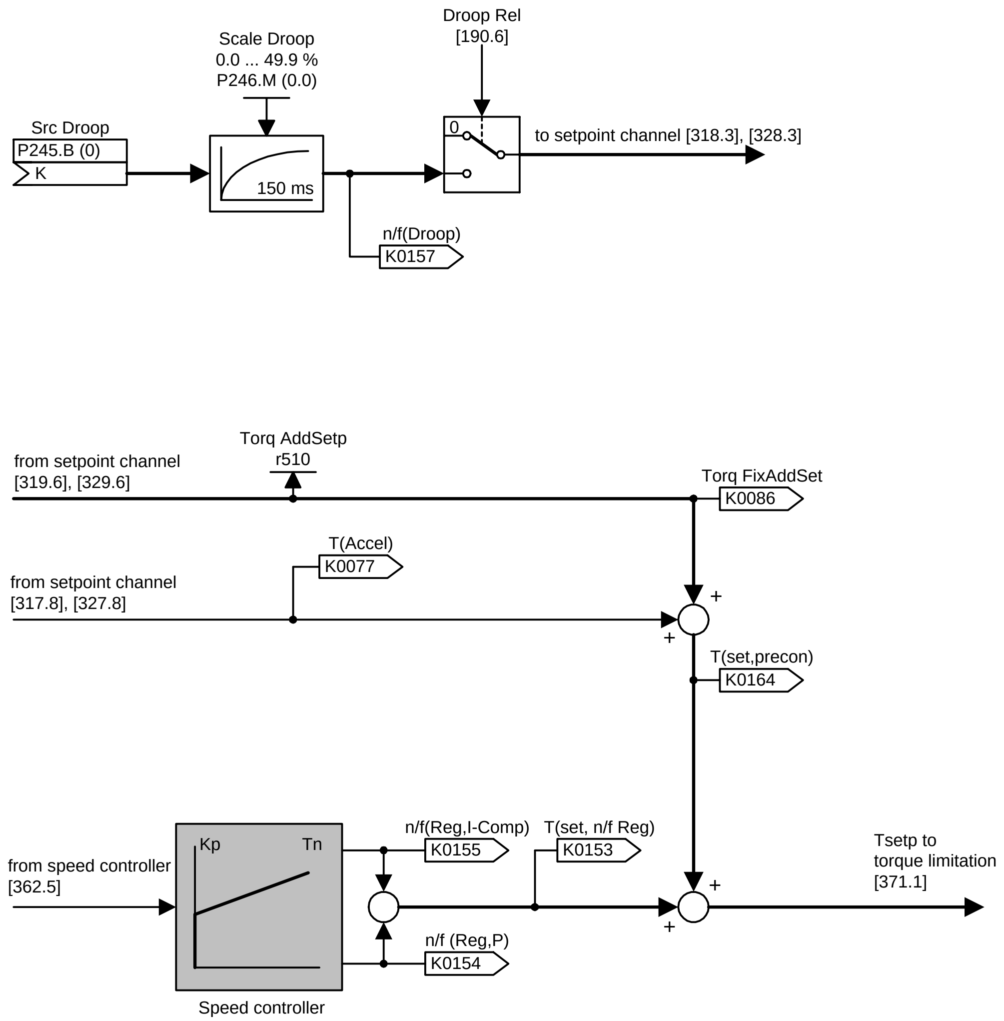
n957.26 = 3



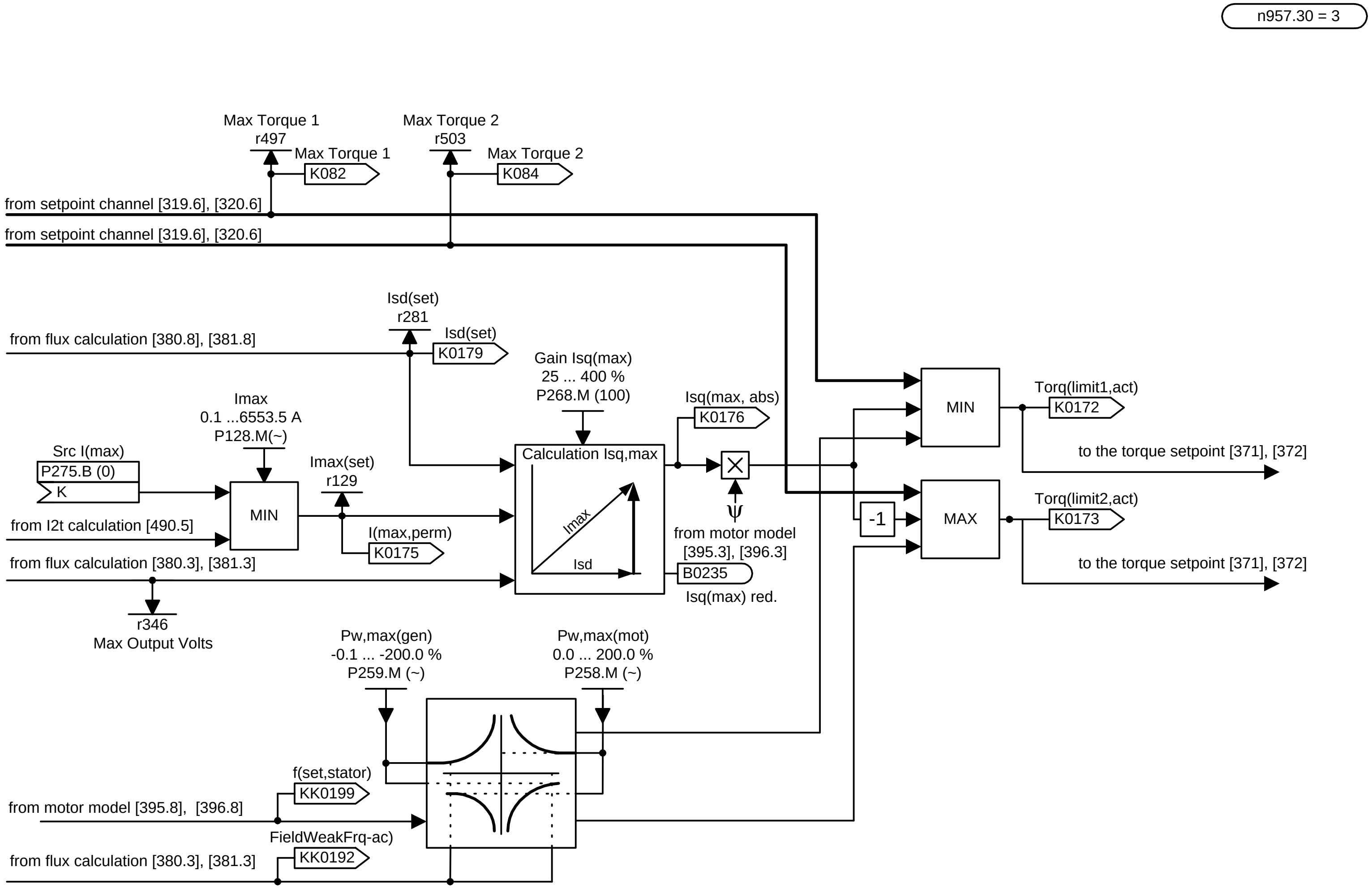
1	2	3	4	5	6	7	8

DT1 element	fp_vc_366_e.vsd	Function diagram	- 366 -
Torque control and speed control, slave drive	31.01.98	MASTERDRIVES VC	

n957.27 = 3

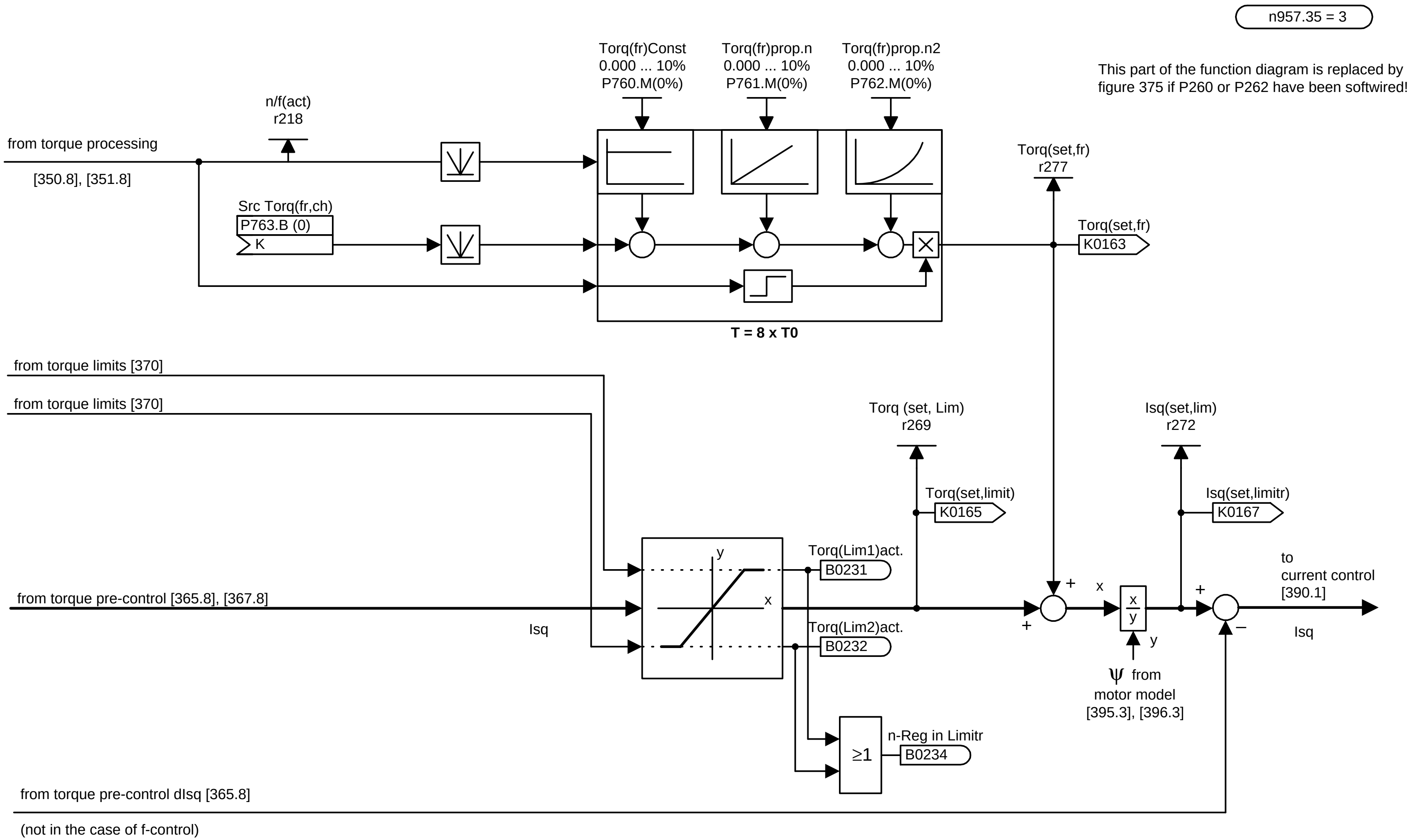


1	2	3	4	5	6	7	8



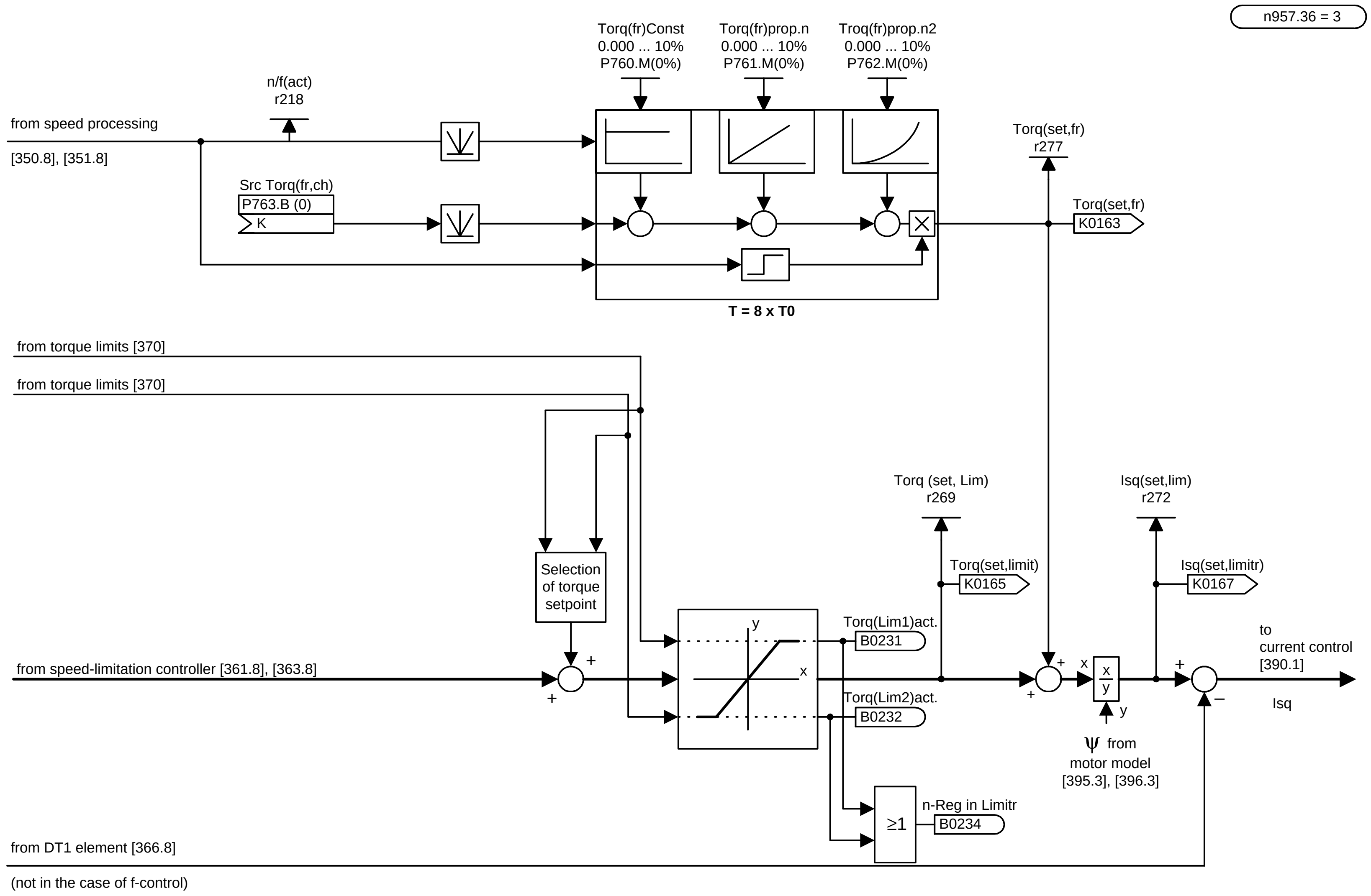
1	2	3	4	5	6	7	8

Torque/current limitation	fp_vc_370_e.vsd	Function diagram	- 370 -
n/f/T control, master/slave drive	31.01.98	MASTERDRIVES VC	



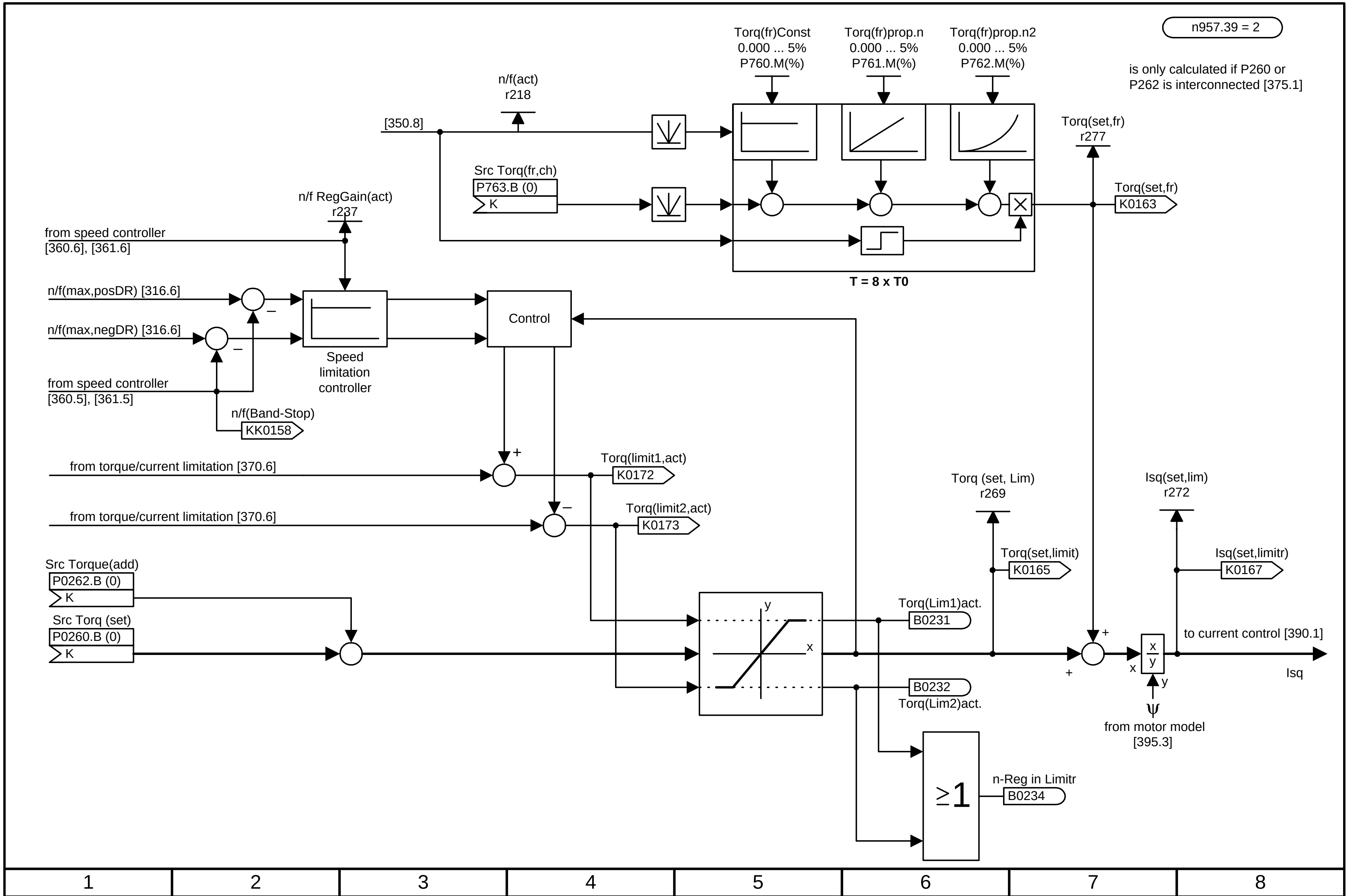
1	2	3	4	5	6	7	8

Torque setpoint	fp_vc_371_e.vsd	Function diagram	- 371 -
n/f-control, master drive	27.01.99	MASTERDRIVES VC	

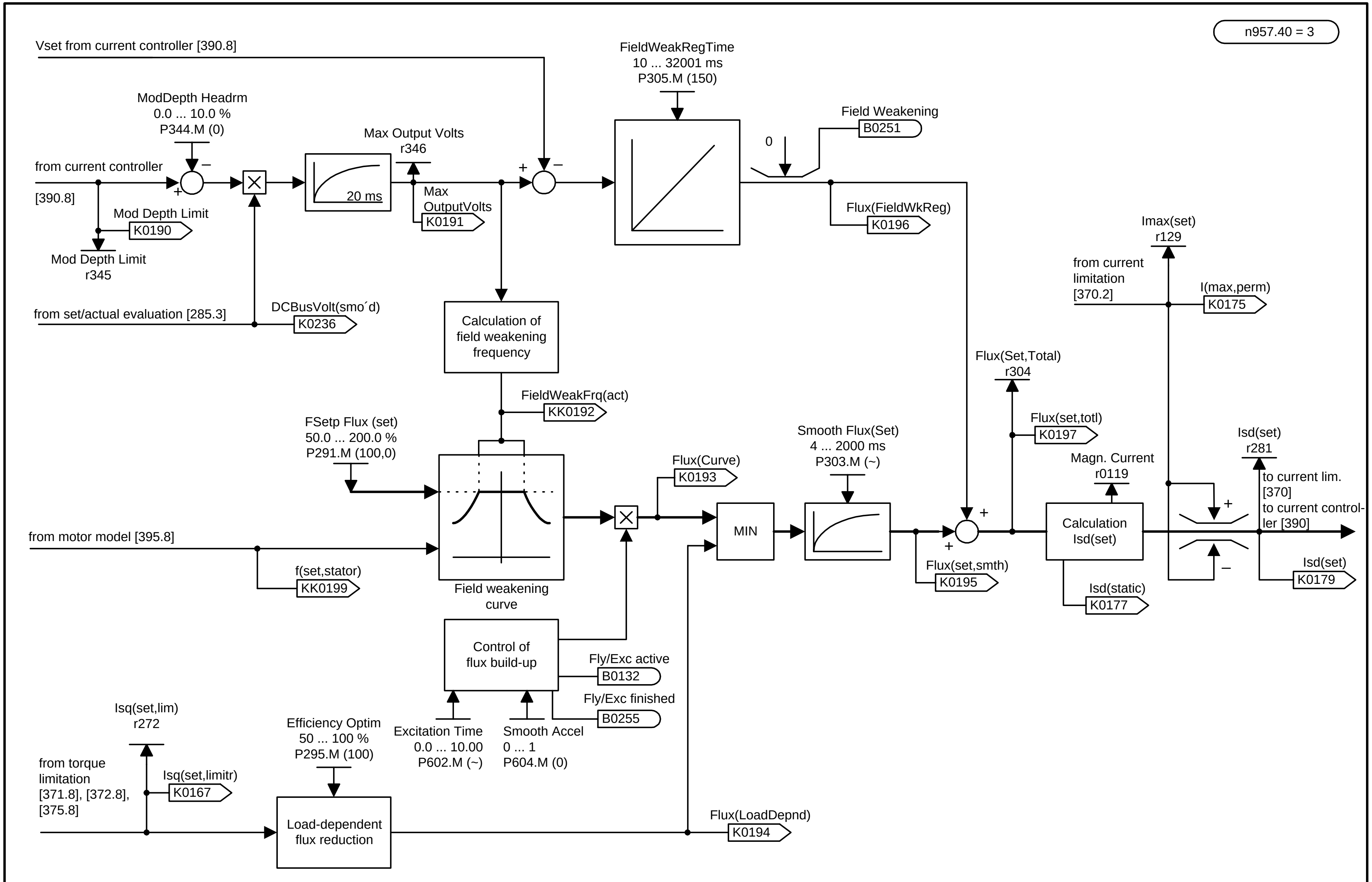


1	2	3	4	5	6	7	8

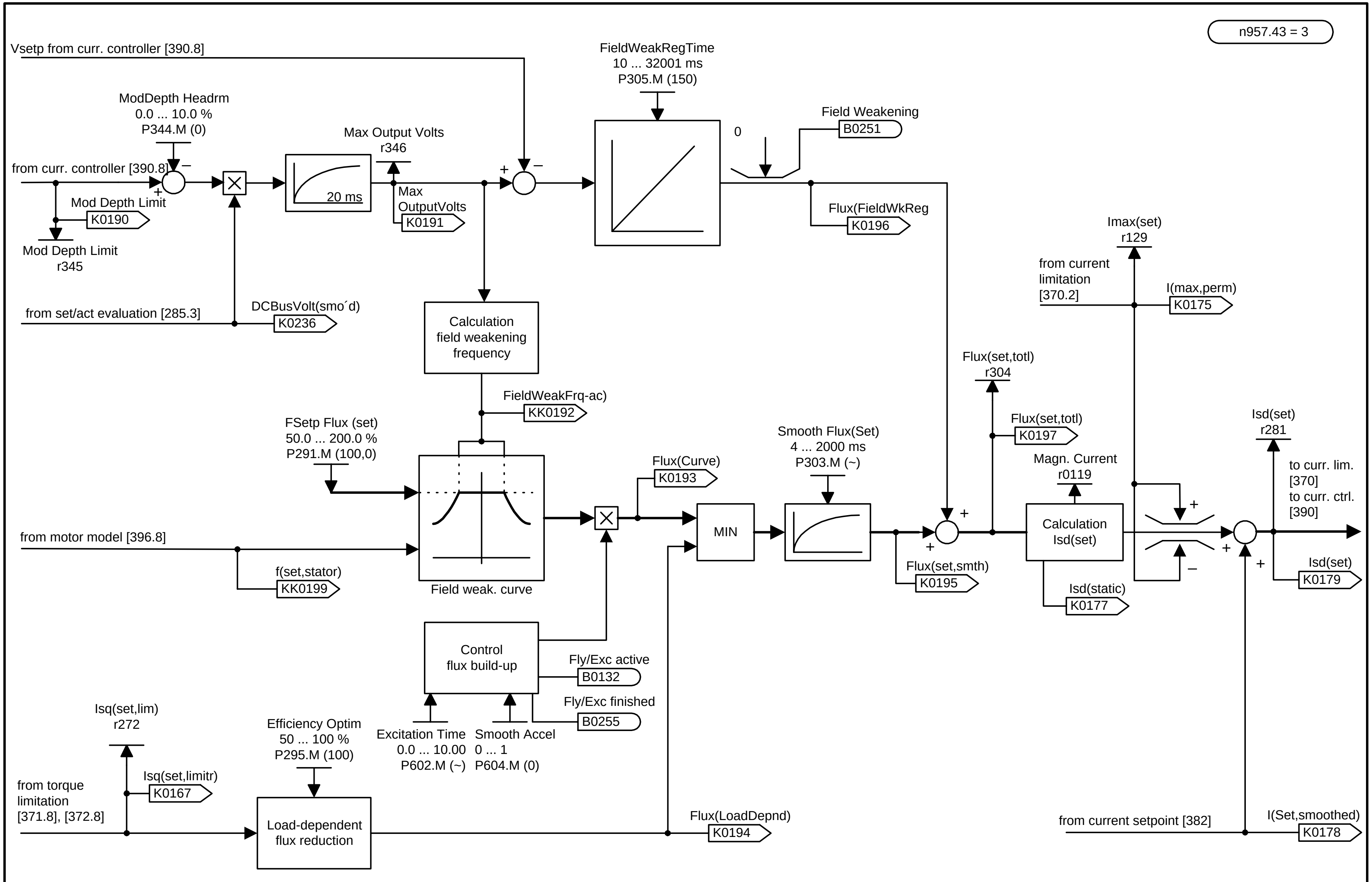
Torque setpoint	fp_vc_372_e.vsd	Function diagram	- 372 -
T control and n/f control, slave drive	22.09.98	MASTERDRIVES VC	



Fast torque setpoint	fp_vc_375_e.vsd	Function diagram	- 375 -
Speed control, master drive	31.01.98	MASTERDRIVES VC	

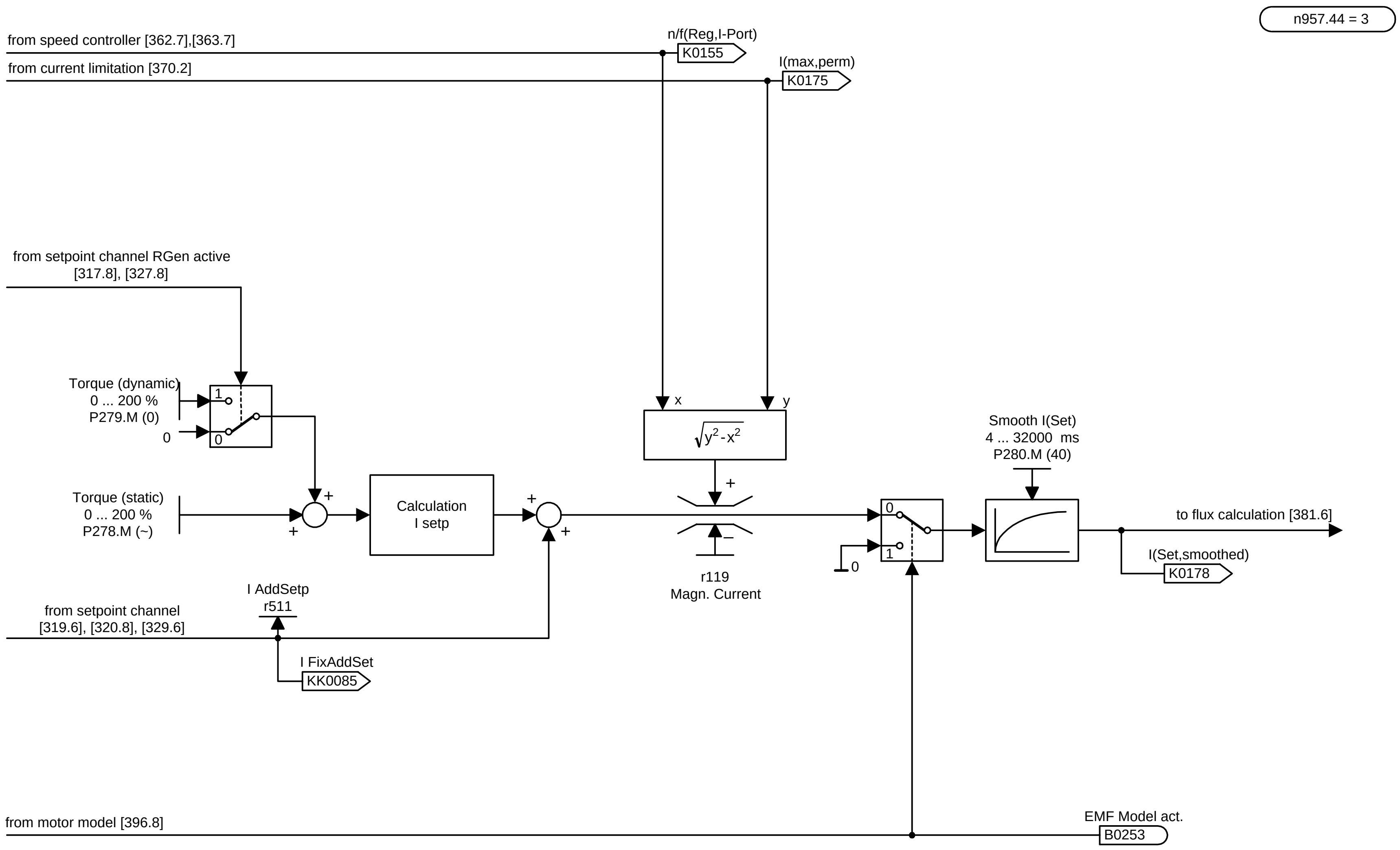


1	2	3	4	5	6	7	8
Flux calculation					fp_vc_380_e.vsd	Function diagram	- 380 -
n/T-control, master/slave drive					09.04.98	MASTERDRIVES VC	



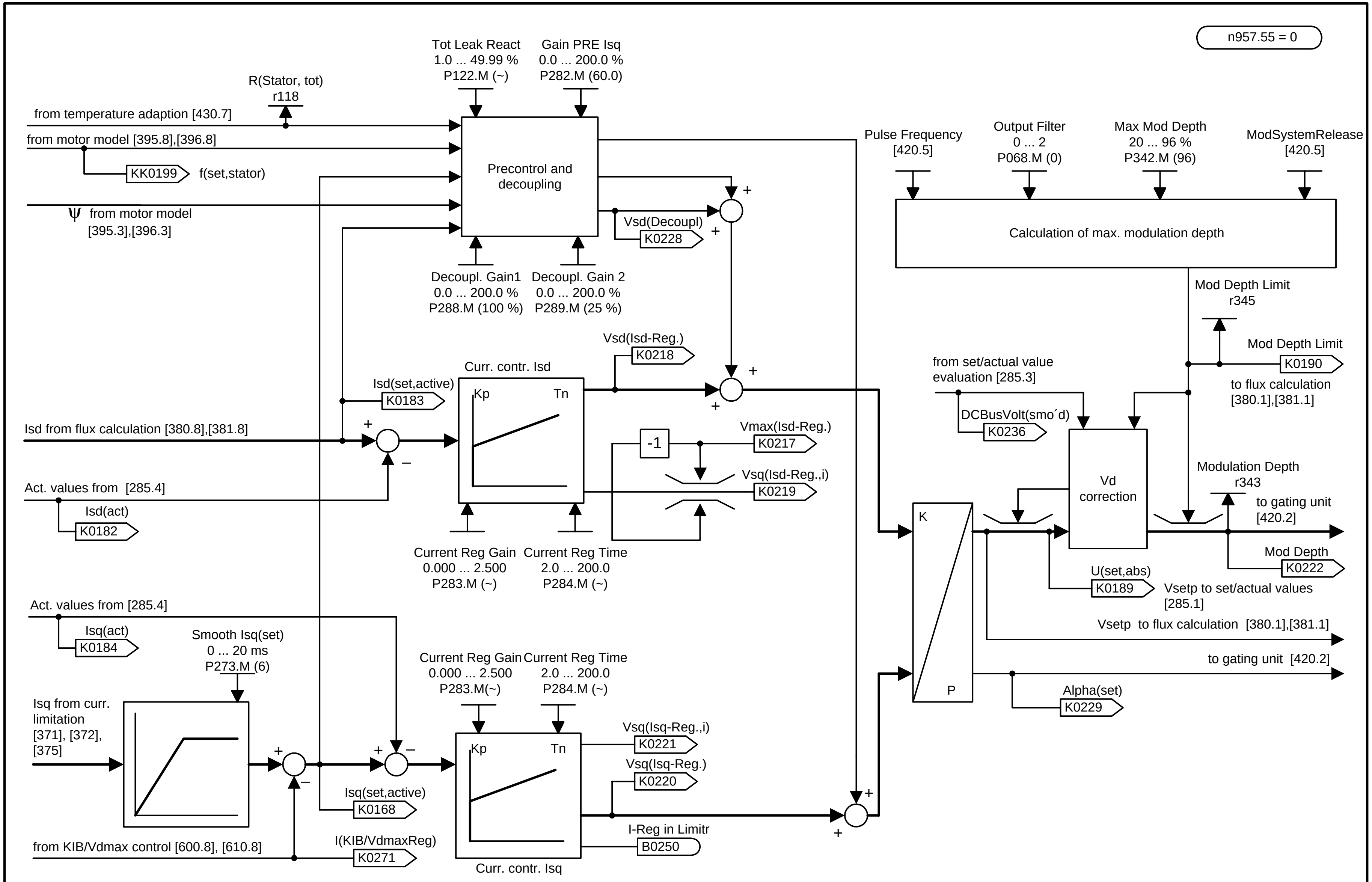
1	2	3	4	5	6	7	8

Flux calculation	fp_vc_381_e.vsd	Function diagram	- 381 -
Frequency control, master/slave drive	09.04.98	MASTERDRIVES VC	



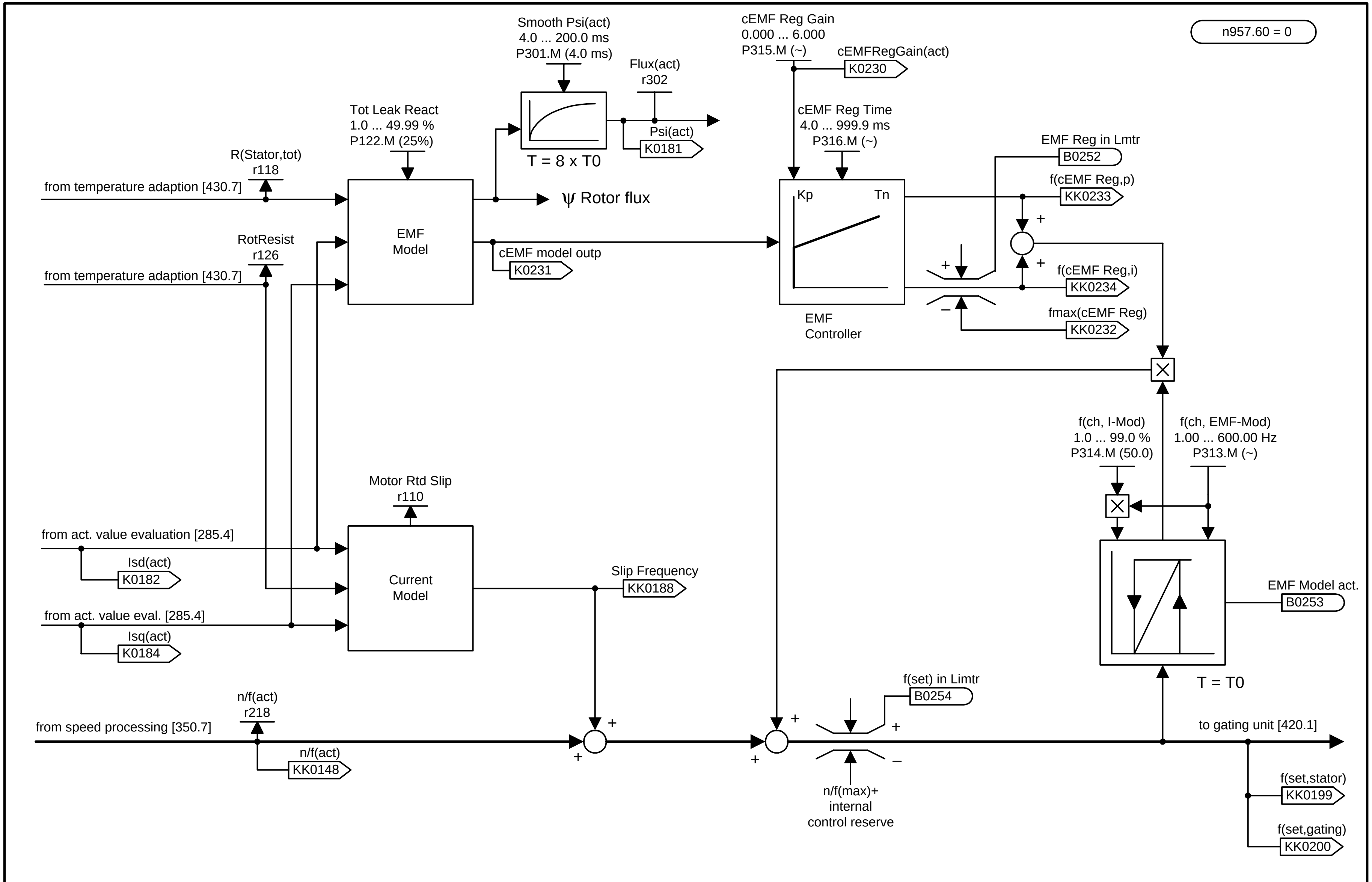
1	2	3	4	5	6	7	8

Current setpoint	fp_vc_382_e.vsd	Function diagram	- 382-
Frequency control, master/slave drive	16.02.98	MASTERDRIVES VC	

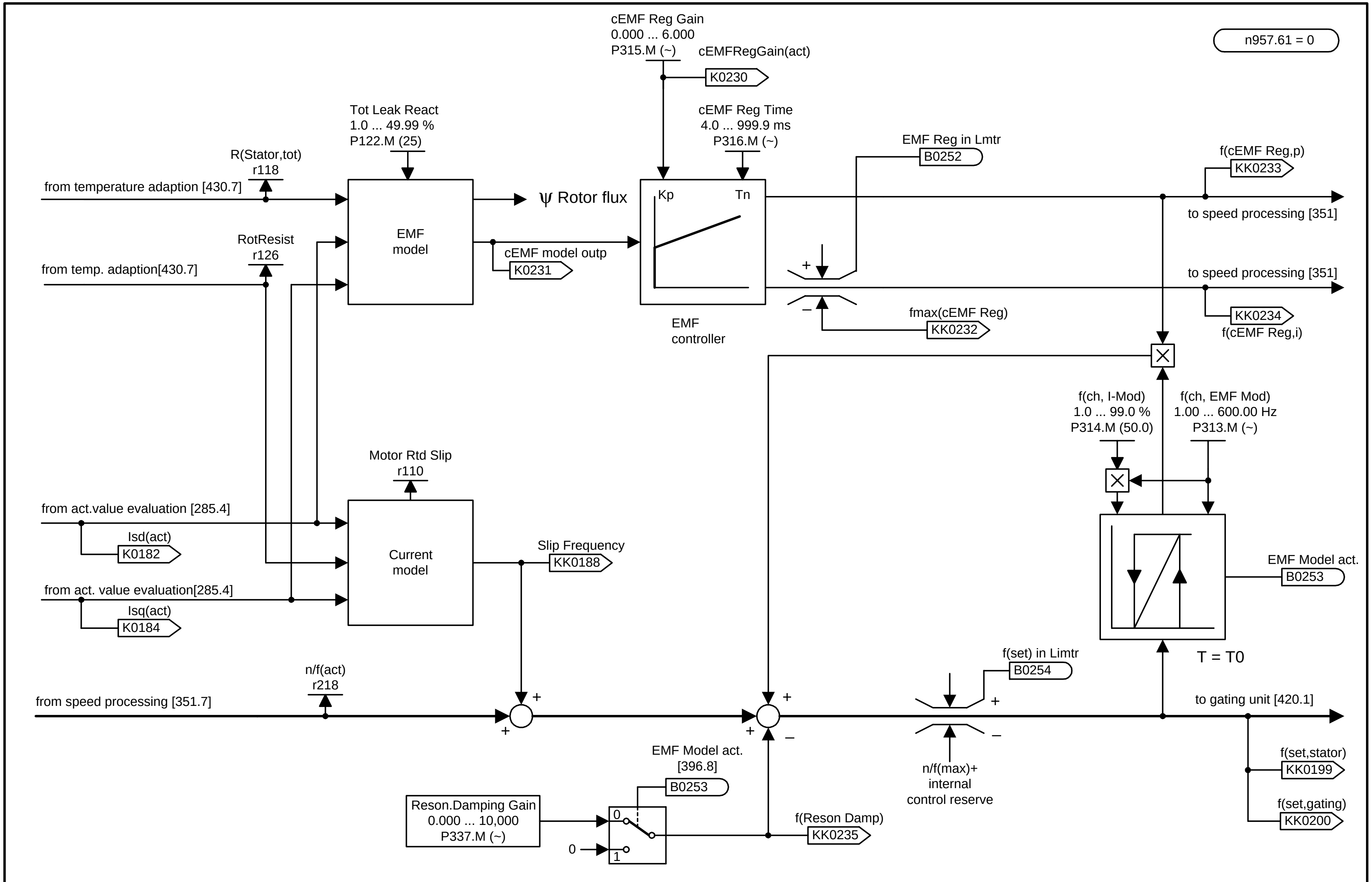


1	2	3	4	5	6	7	8

Current controller	fp_vc_390_e.vsd	Function diagram	- 390 -
n/f/T-control for master/slave drive	31.01.98	MASTERDRIVES VC	

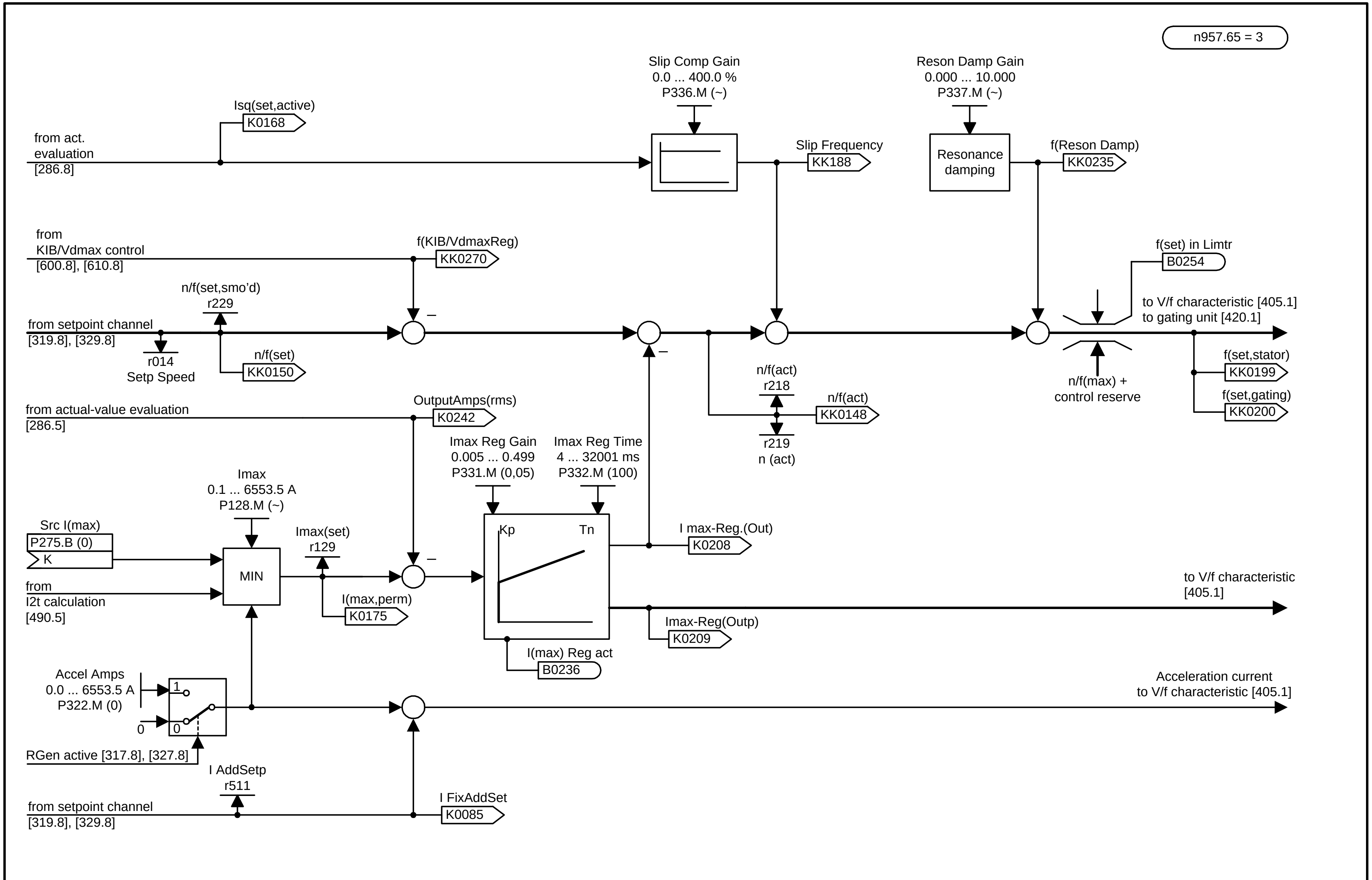


1	2	3	4	5	6	7	8
Motor model, frequency					fp_vc_395_e.vsd	Function diagram	- 395 -
Speed/torque control, master/slave drive					31.01.98	MASTERDRIVES VC	



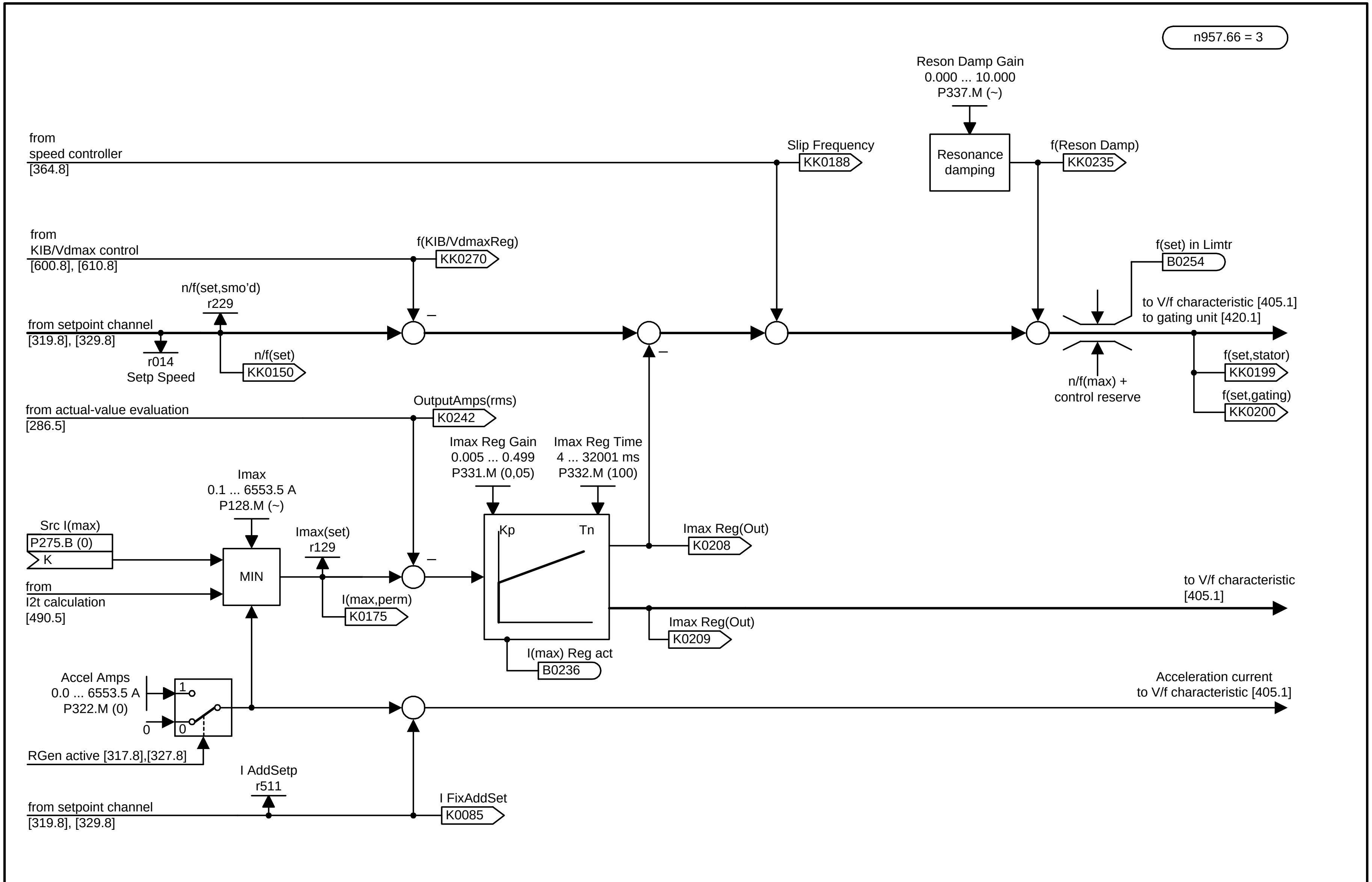
1	2	3	4	5	6	7	8

Motor model, frequency	fp_vc_396_e.vsd	Function diagram	- 396 -
Frequency control, master/slave drive	31.01.98	MASTERDRIVES VC	



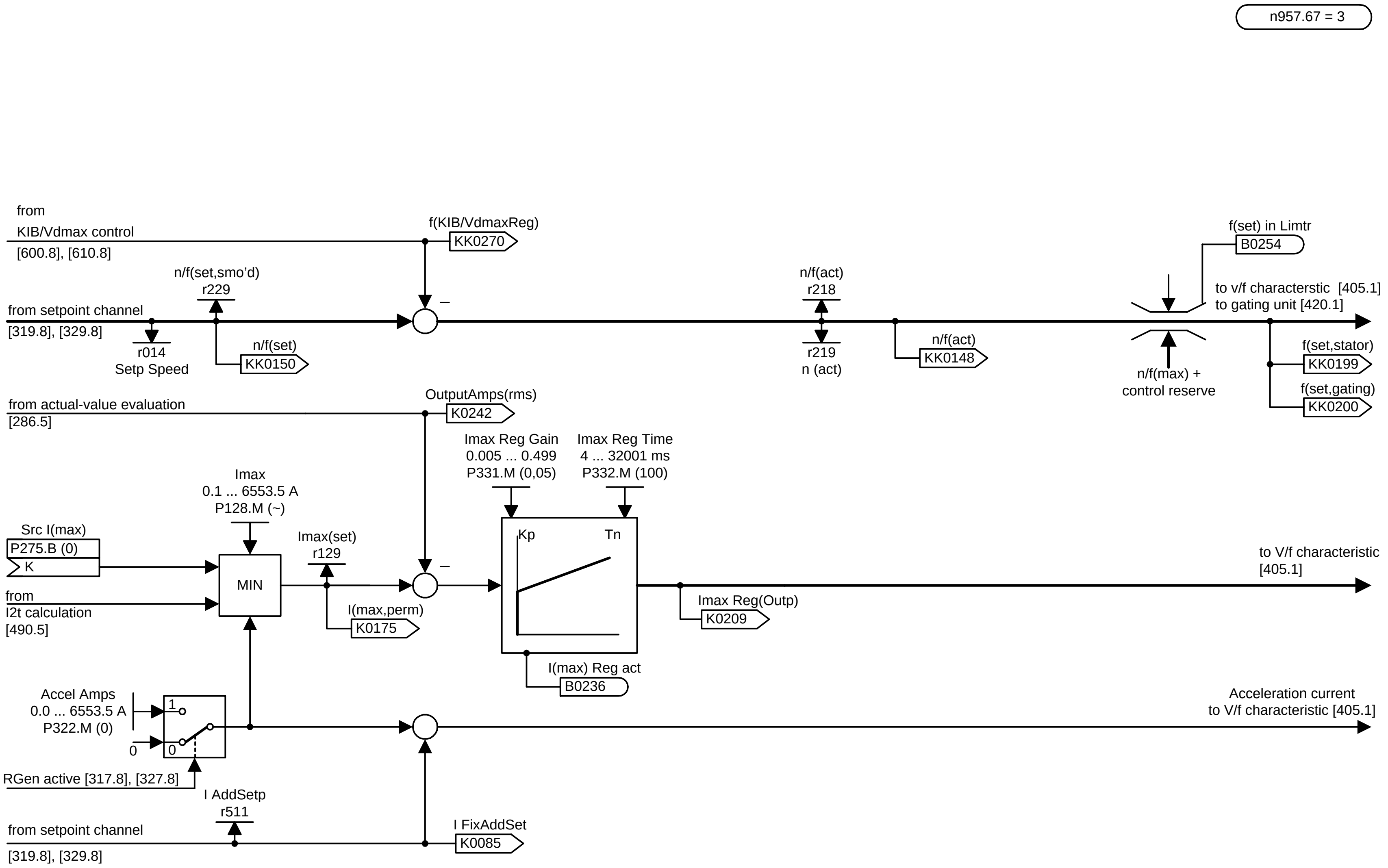
1	2	3	4	5	6	7	8

V/f open-loop control	fp_vc_400_e.vsd	Function diagram	- 400 -
Current limitation, V/f characteristic	31.01.98	MASTERDRIVES VC	



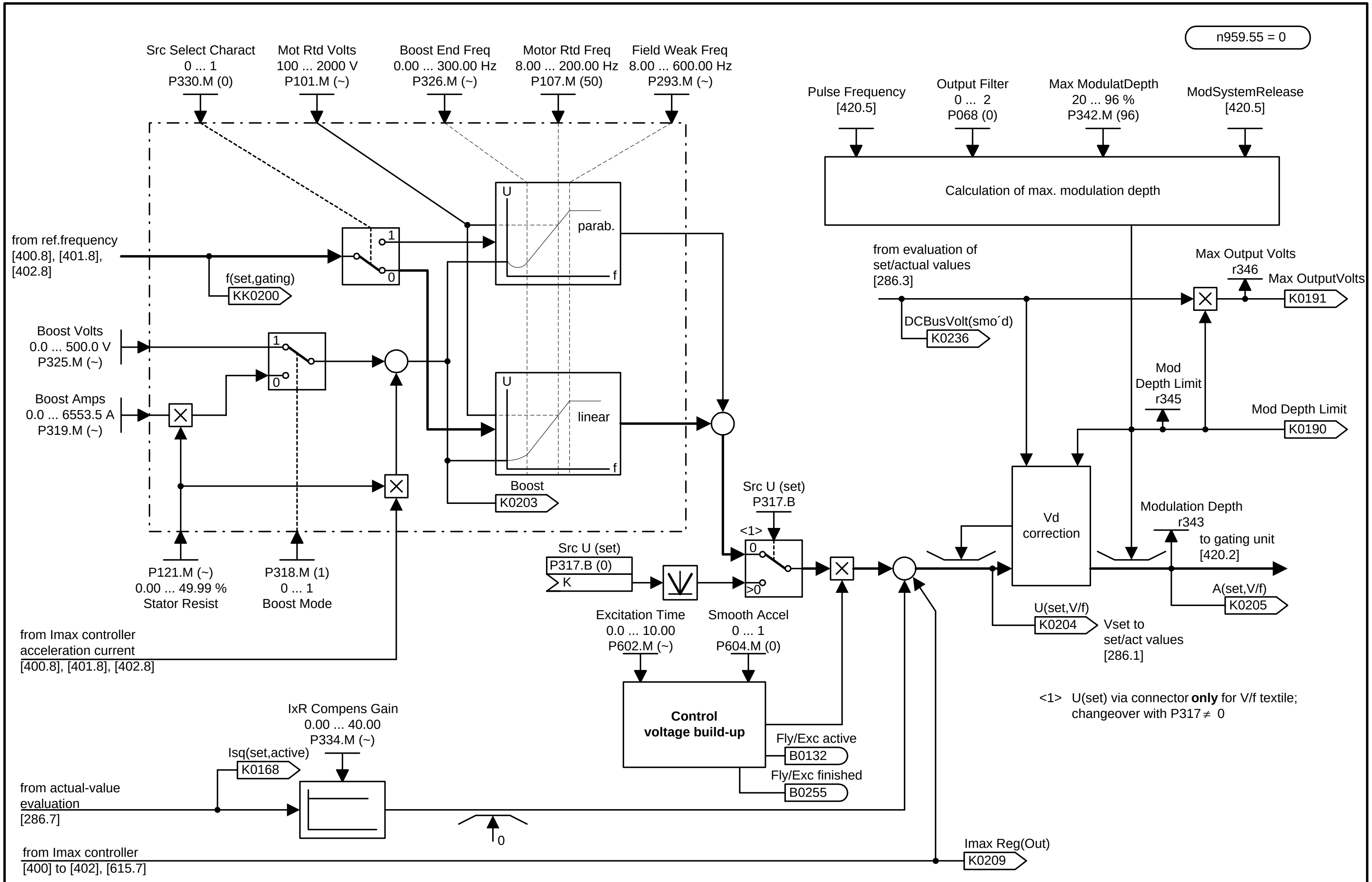
1	2	3	4	5	6	7	8

V/f open-loop control	fp_vc_401_e.vsd	Function diagram	- 401 -
Current limitation, V/f characteristic with speed controller	31.01.98	MASTERDRIVES VC	



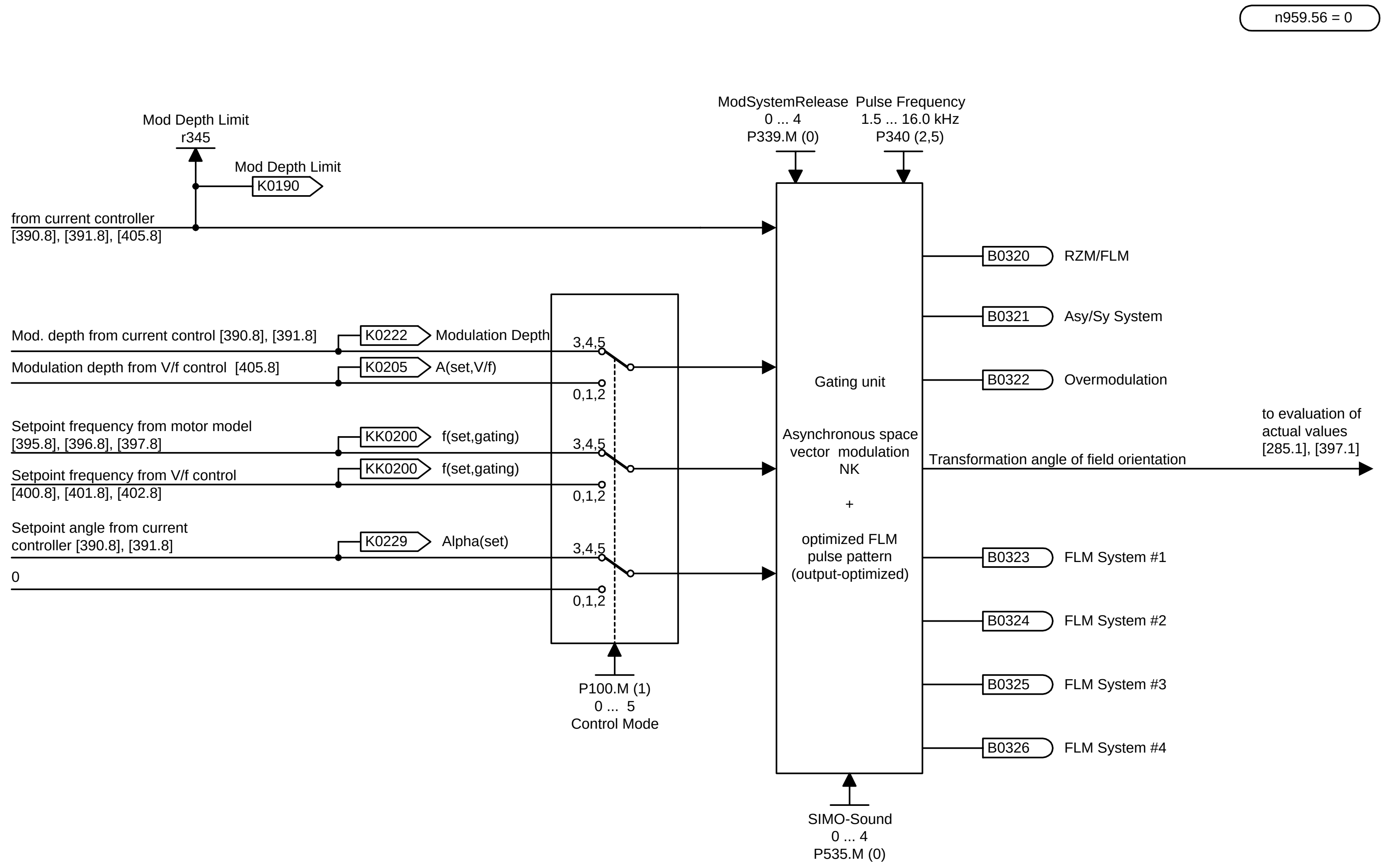
1	2	3	4	5	6	7	8

V/f open-loop control, textile	fp_vc_402_e.vsd	Function diagram	- 402 -
Setpoint frequency, current limiting controller	31.01.98	MASTERDRIVES VC	



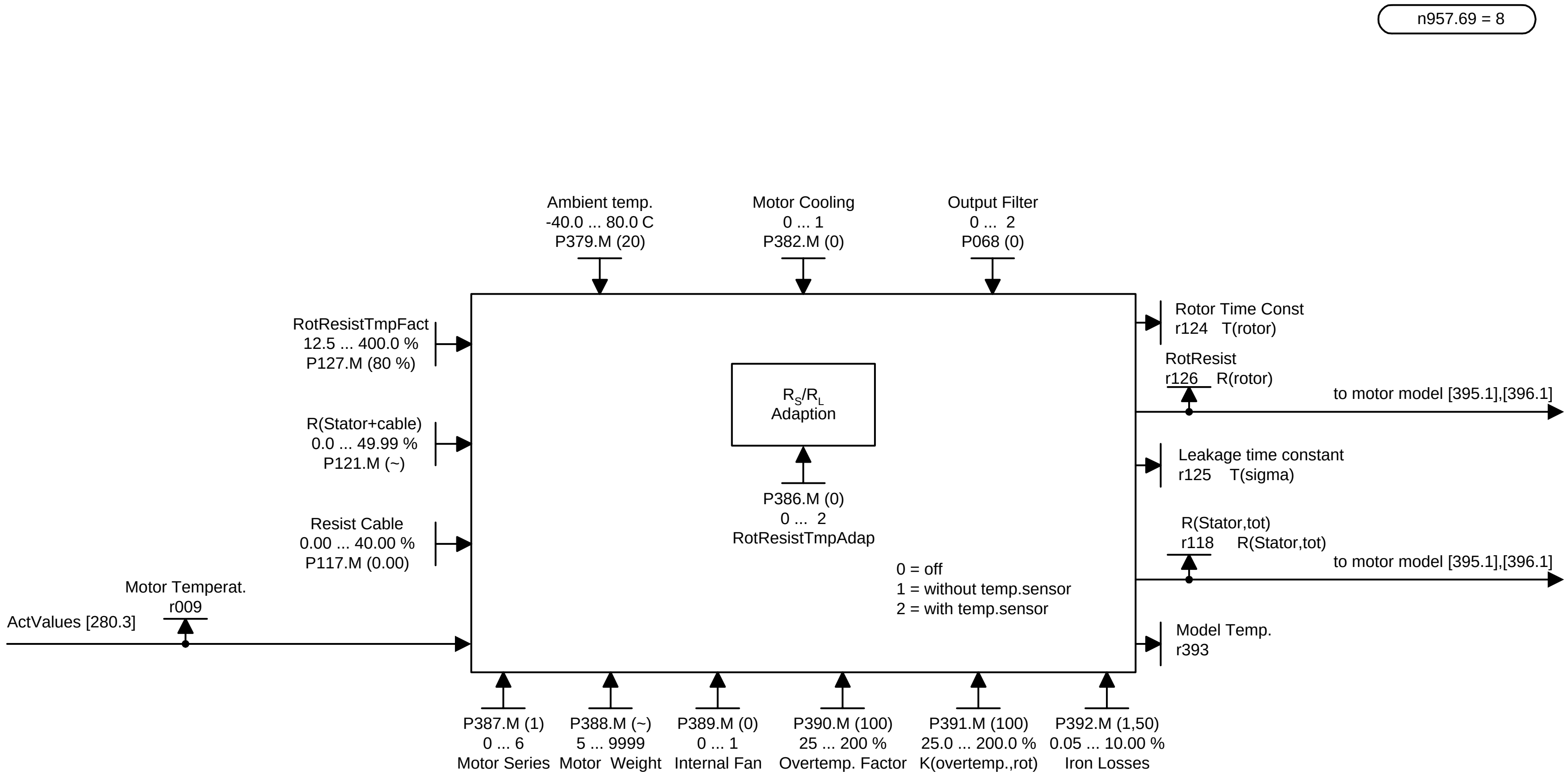
1	2	3	4	5	6	7	8

V/f open-loop control	fp_vc_405_e.vsd	Function diagram	- 405 -
V/f characteristic, Vd correction	09.04.98	MASTERDRIVES VC	

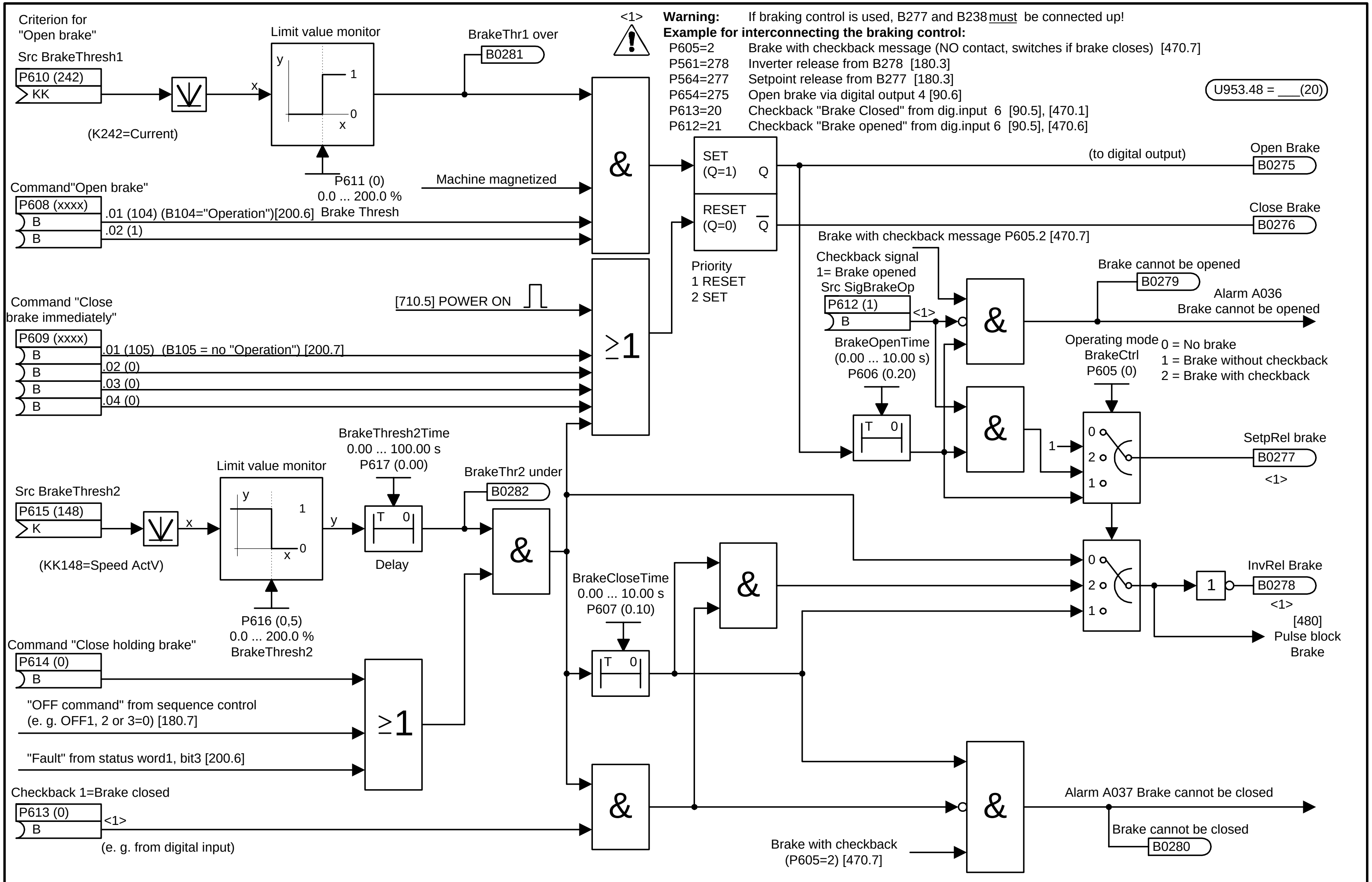


1	2	3	4	5	6	7	8

Gating unit	fp_vc_420_e.vsd	Function diagram	- 420 -
All open-loop and closed-loop control modes	31.01.98	MASTERDRIVES VC	


n957.69 = 8
Ambient temp.
-40.0 ... 80.0 C
P379.M (20)
Motor Cooling
0 ... 1
P382.M (0)
Output Filter
0 ... 2
P068 (0)
RotResistTmpFact
12.5 ... 400.0 %
P127.M (80 %)
R(Stator+cable)
0.0 ... 49.99 %
P121.M (~)
Resist Cable
0.00 ... 40.00 %
P117.M (0.00)
Motor Temperat.
r009
ActValues [280.3]
R_S/R_L
Adaption
P386.M (0)
0 ... 2
RotResistTmpAdap
0 = off
1 = without temp.sensor
2 = with temp.sensor
Rotor Time Const
r124 T(rotor)
RotResist
r126 R(rotor)
to motor model [395.1],[396.1]
Leakage time constant
r125 T(sigma)
R(Stator,tot)
r118 R(Stator,tot)
to motor model [395.1],[396.1]
Model Temp.
r393
P387.M (1)
0 ... 6
Motor Series
P388.M (~)
5 ... 9999
Motor Weight
P389.M (0)
0 ... 1
Internal Fan
P390.M (100)
25 ... 200 %
Overtemp. Factor
P391.M (100)
25.0 ... 200.0 %
K(overtemp.,rot)
P392.M (1,50)
0.05 ... 10.00 %
Iron Losses

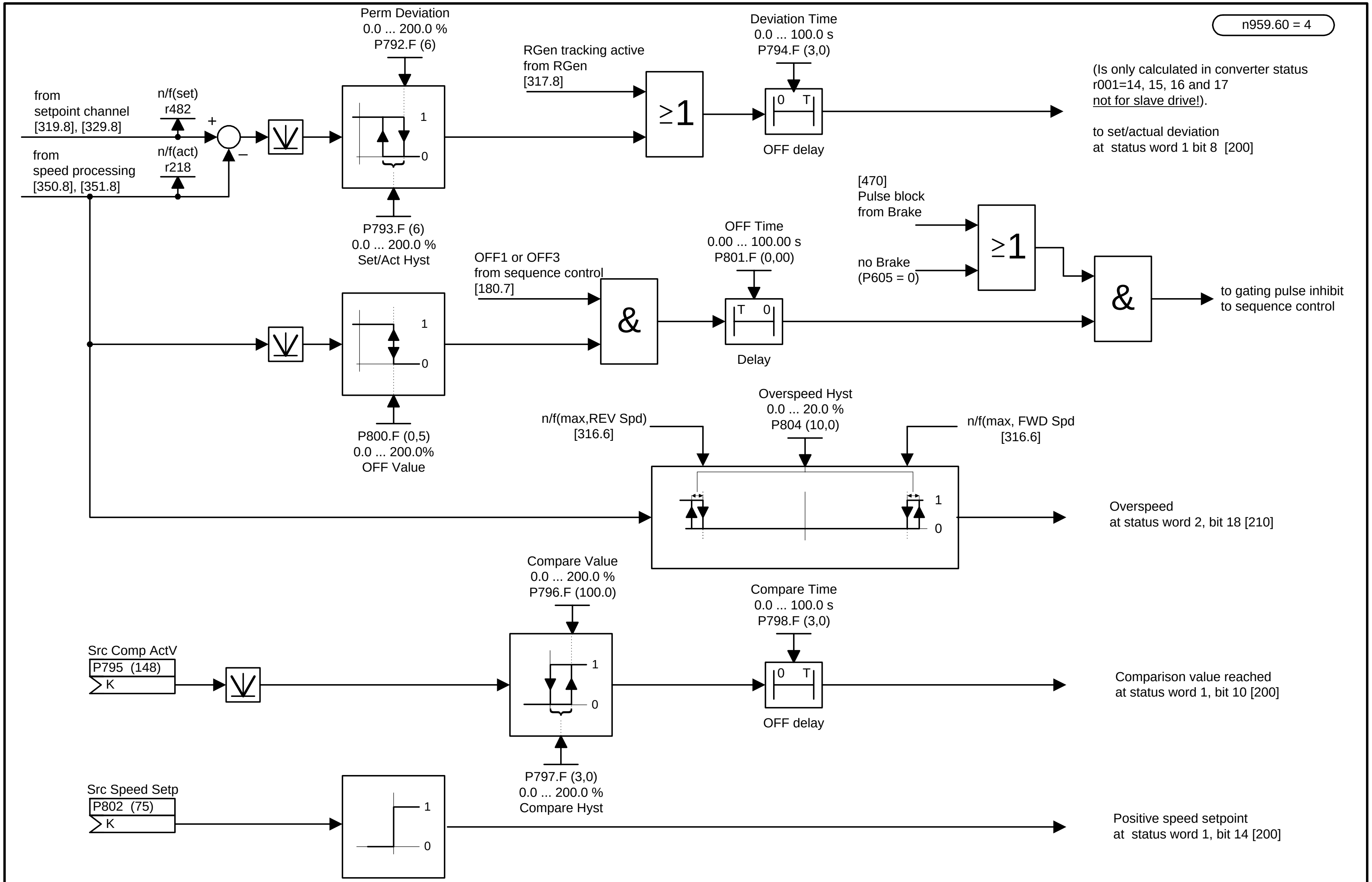
1	2	3	4	5	6	7	8



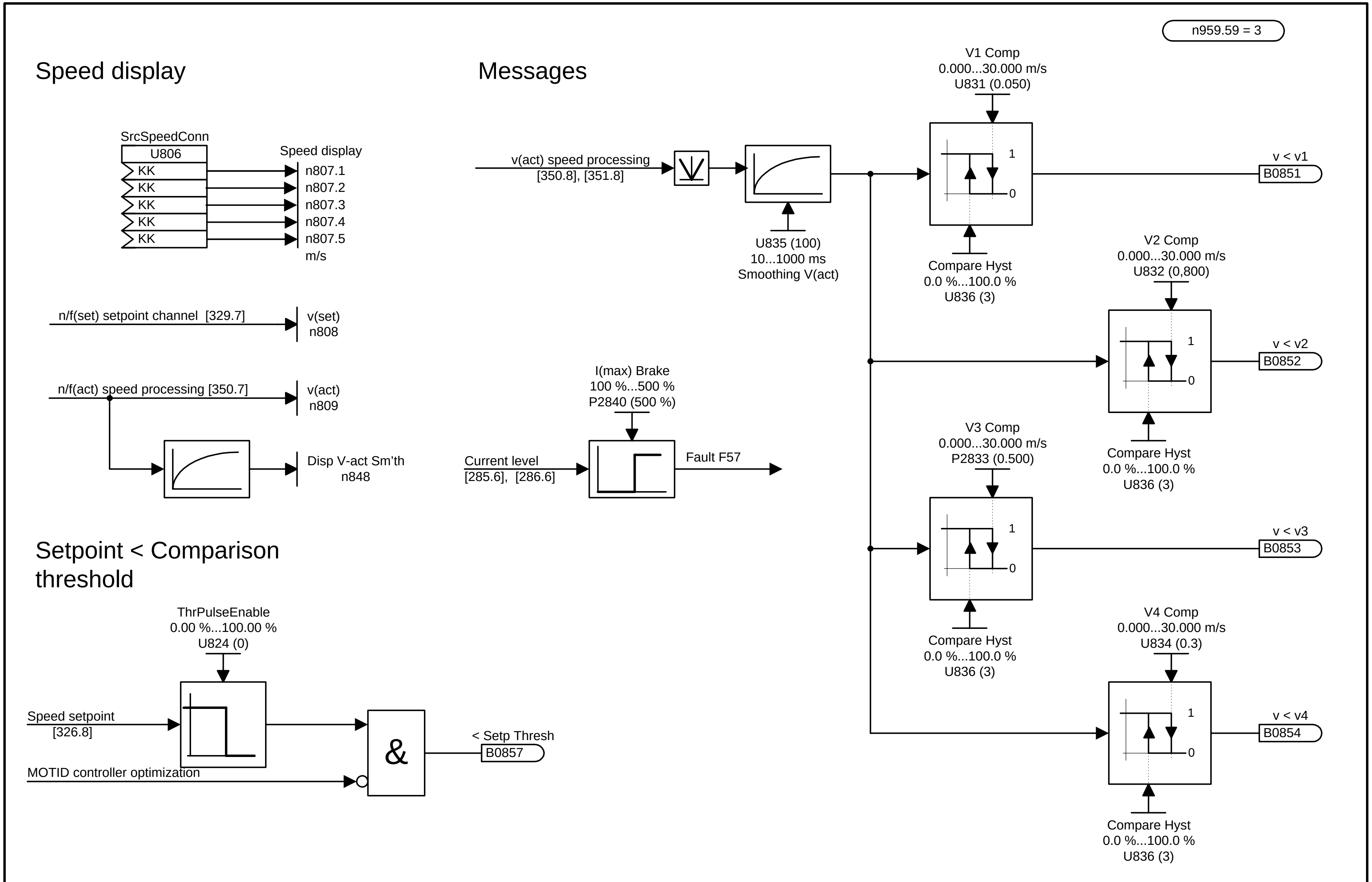
1	2	3	4	5	6	7	8

Braking control | fp_vc_470_e.vsd | Function diagram | - 470 -

03.07.00 | MASTERDRIVES VC

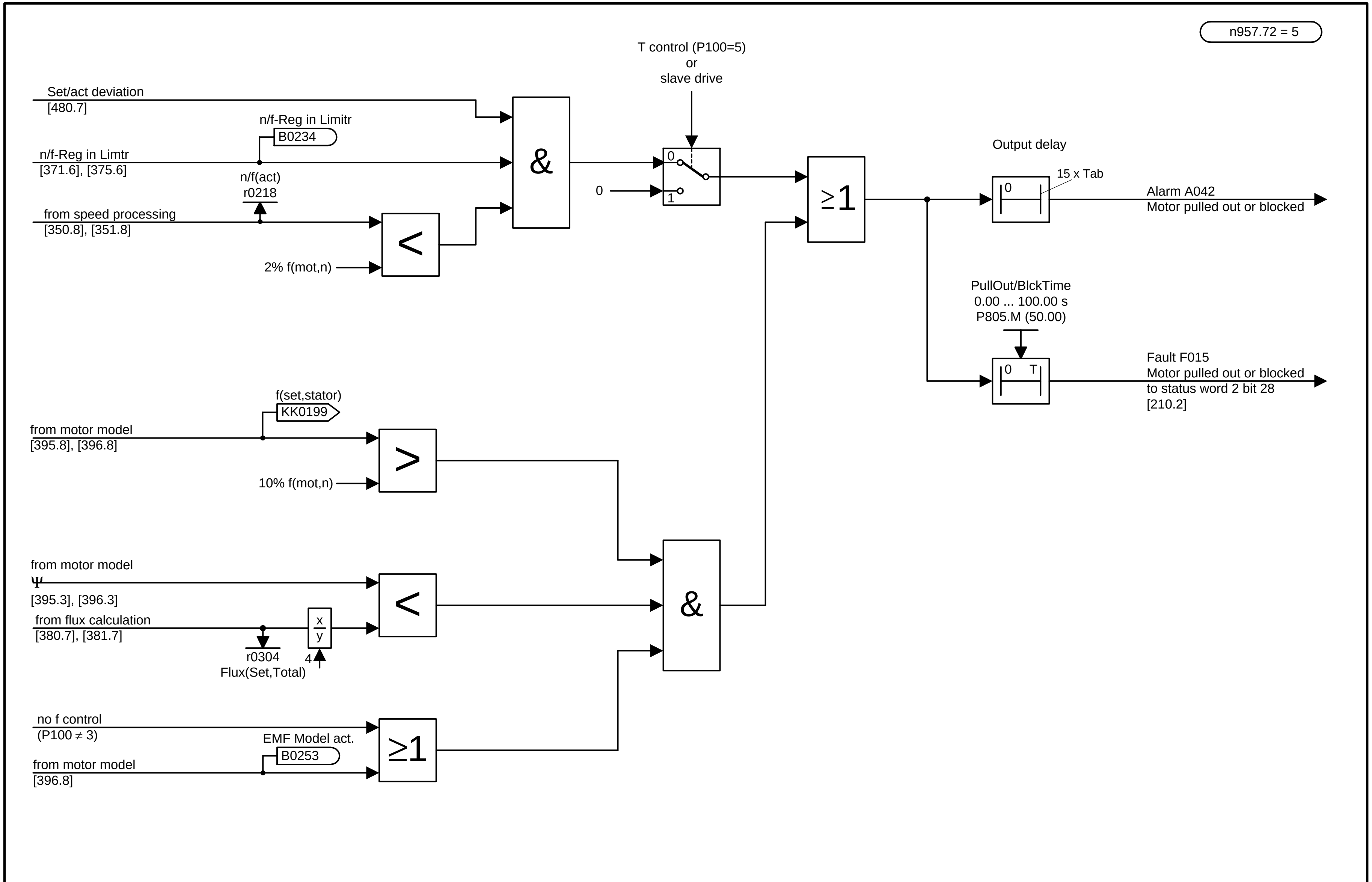

n959.60 = 4
Perm Deviation
0.0 ... 200.0 %
P792.F (6)
RGen tracking active
from RGen
[317.8]
Deviation Time
0.0 ... 100.0 s
P794.F (3,0)
(Is only calculated in converter status
r001=14, 15, 16 and 17
not for slave drive!).
to set/actual deviation
at status word 1 bit 8 [200]
from
setpoint channel
[319.8], [329.8]
n/f(set)
r482
from
speed processing
[350.8], [351.8]
n/f(act)
r218
+
−
1
0
≥1
0 T
OFF delay
P793.F (6)
0.0 ... 200.0 %
Set/Act Hyst
[470]
Pulse block
from Brake
no Brake
(P605 = 0)
OFF Time
0.00 ... 100.00 s
P801.F (0,00)
OFF1 or OFF3
from sequence control
[180.7]
&
T 0
Delay
to gating pulse inhibit
to sequence control
P800.F (0,5)
0.0 ... 200.0%
OFF Value
n/f(max,REV Spd)
[316.6]
Overspeed Hyst
0.0 ... 20.0 %
P804 (10,0)
n/f(max, FWD Spd
[316.6]
Overspeed
at status word 2, bit 18 [210]
Compare Value
0.0 ... 200.0 %
P796.F (100.0)
Compare Time
0.0 ... 100.0 s
P798.F (3,0)
Src Comp ActV
P795 (148)
K
Comparison value reached
at status word 1, bit 10 [200]
P797.F (3,0)
0.0 ... 200.0 %
Compare Hyst
Src Speed Setp
P802 (75)
K
Positive speed setpoint
at status word 1, bit 14 [200]

1	2	3	4	5	6	7	8



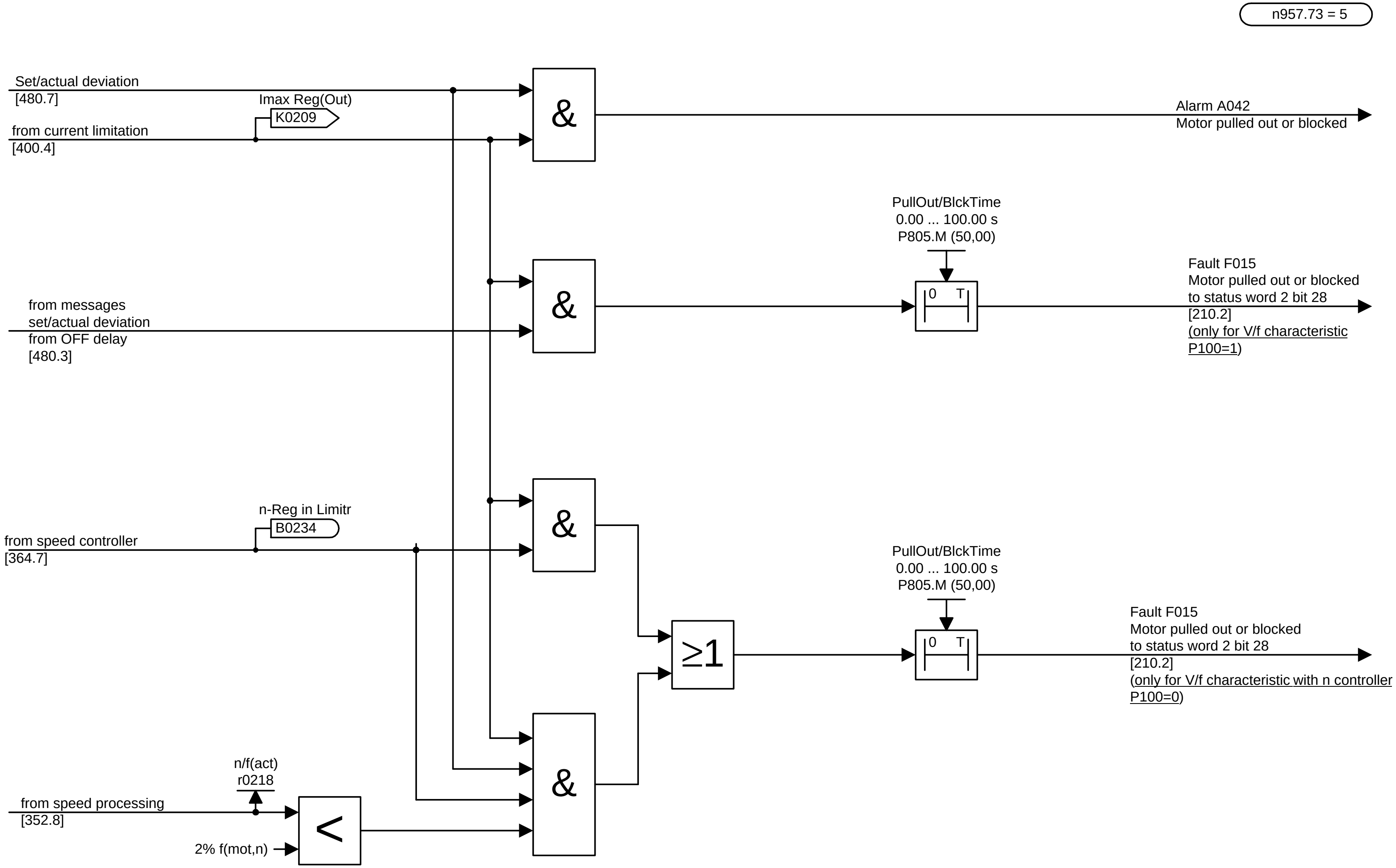
1	2	3	4	5	6	7	8

Messages 2	fp_vc_481_e.vsd	Function diagram	- 481 -
Lift and hoisting-gear applications (P2800=1)	14.10.98	MASTERDRIVES VC	



1	2	3	4	5	6	7	8

Blocking/pull-out diagnosis	fp_vc_485_e.vsd	Function diagram	- 485 -
n/f/T control, master/slave drive	31.01.98	MASTERDRIVES VC	



1	2	3	4	5	6	7	8

Blocking diagnosis

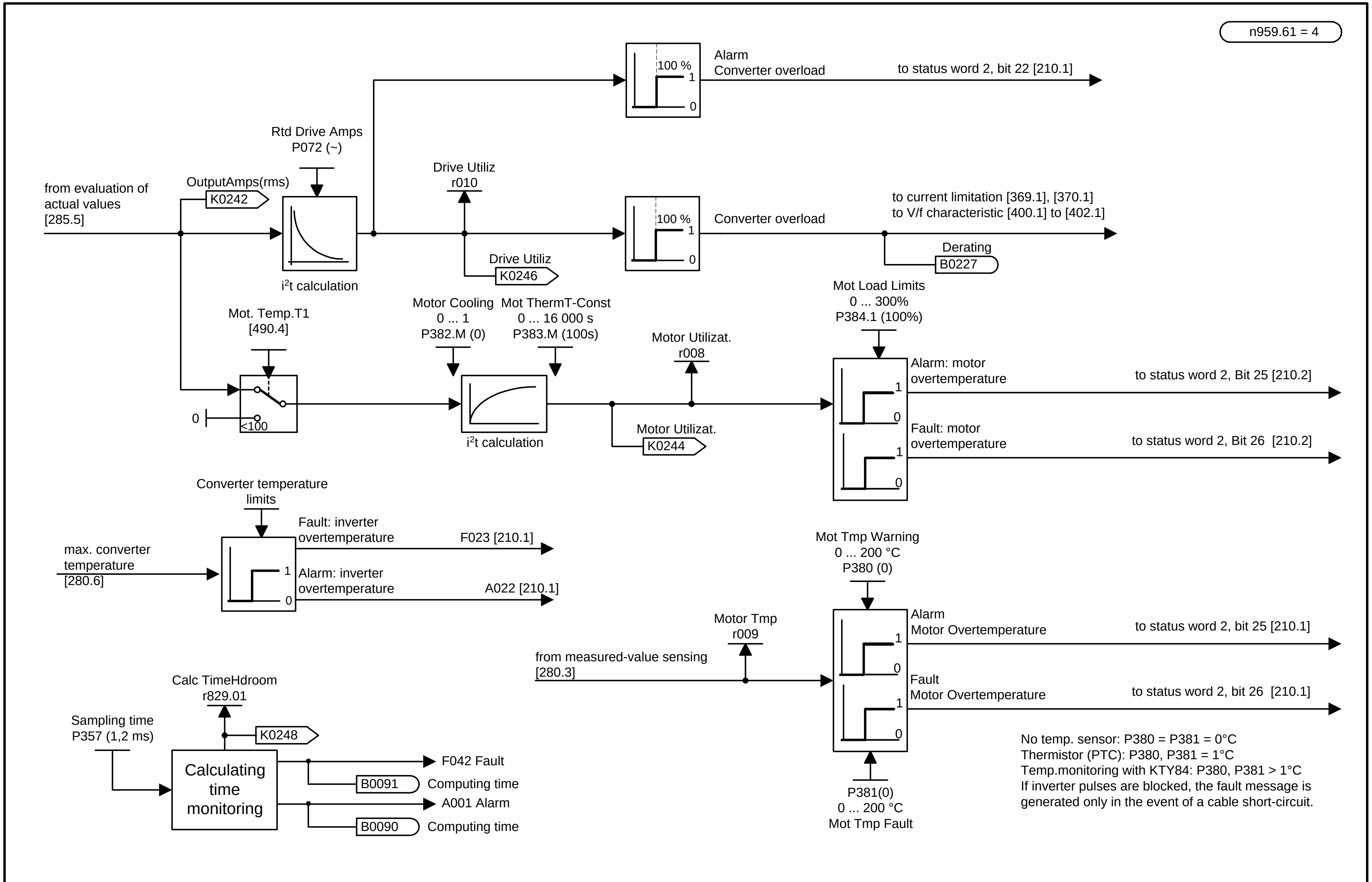
V/f characteristic and V/f characteristic with speed controller

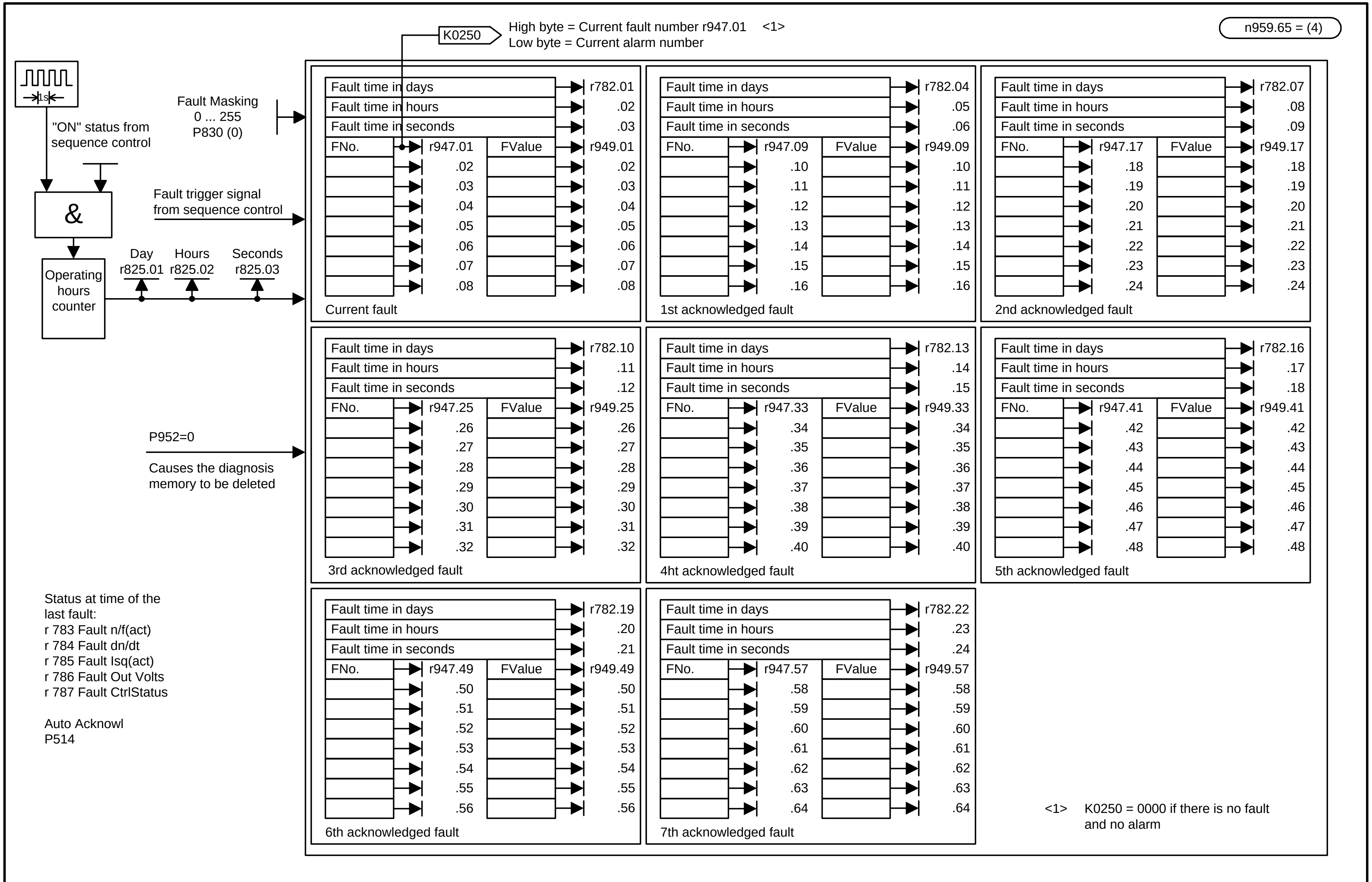
fp_vc_486_e.vsd

31.01.98

Function diagram

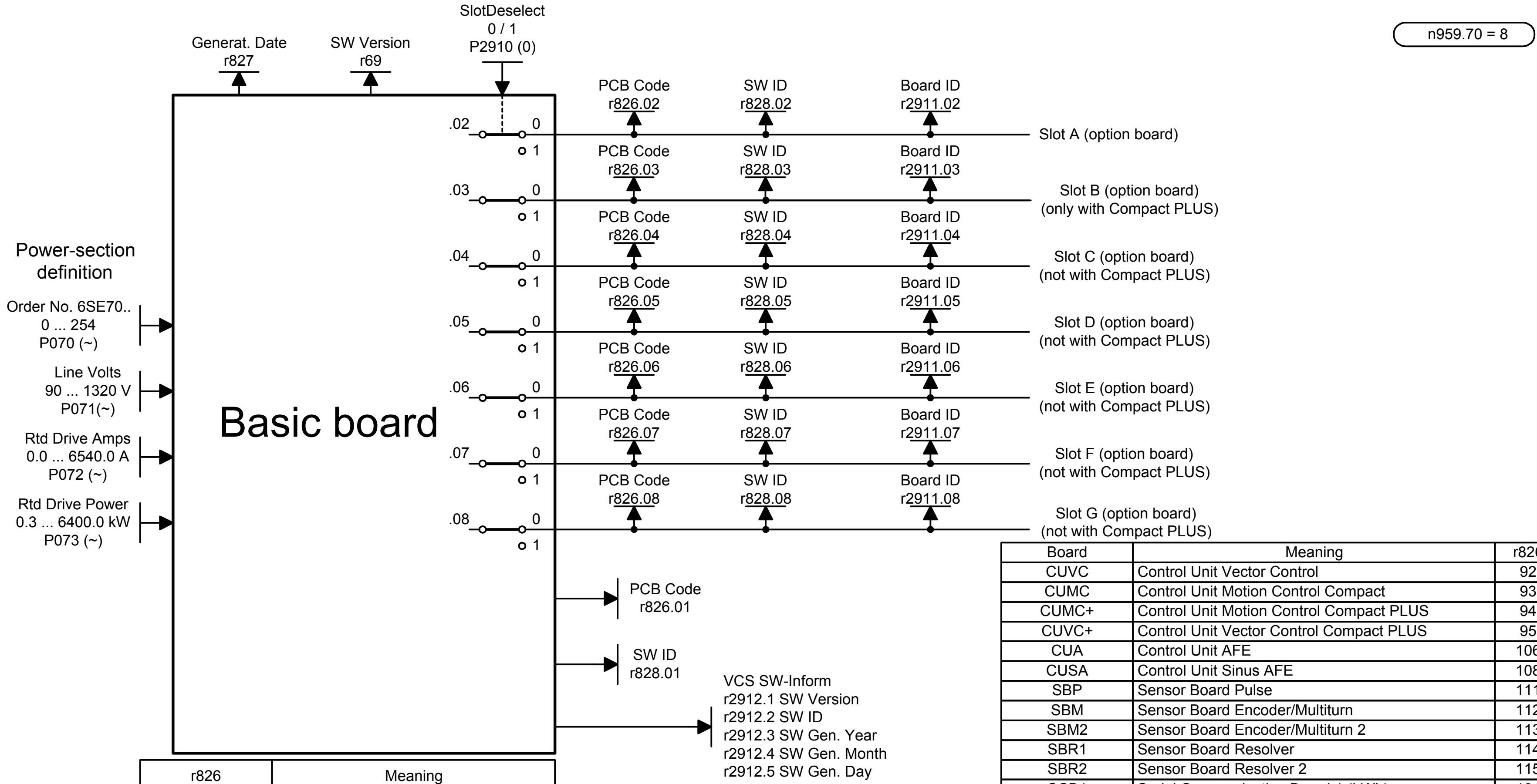
MASTERDRIVES VC


n959.61 = 4
Alarm
Converter overload
100 %
1
0
to status word 2, bit 22 [210.1]
Rtd Drive Amps
P072 (~)
Drive Utiliz
r010
from evaluation of
actual values
[285.5]
OutputAmps(rms)
K0242
i²t calculation
Drive Utiliz
K0246
Converter overload
to current limitation [369.1], [370.1]
to V/f characteristic [400.1] to [402.1]
Derating
B0227
Mot Load Limits
0 ... 300%
P384.1 (100%)
Mot. Temp.T1
[490.4]
Motor Cooling
0 ... 1
P382.M (0)
Mot ThermT-Const
0 ... 16 000 s
P383.M (100s)
Motor Utilizat.
r008
0
<100
i²t calculation
Motor Utilizat.
K0244
Alarm: motor
overtemperature
to status word 2, Bit 25 [210.2]
Fault: motor
overtemperature
to status word 2, Bit 26 [210.2]
Converter temperature
limits
Fault: inverter
overtemperature
F023 [210.1]
max. converter
temperature
[280.6]
Alarm: inverter
overtemperature
A022 [210.1]
Mot Tmp Warning
0 ... 200 °C
P380 (0)
Alarm
Motor Overtemperature
to status word 2, bit 25 [210.1]
Motor Tmp
r009
from measured-value sensing
[280.3]
Fault
Motor Overtemperature
to status word 2, bit 26 [210.1]
Calc TimeHdroom
r829.01
Sampling time
P357 (1,2 ms)
K0248
Calculating
time
monitoring
F042 Fault
B0091
Computing time
A001 Alarm
B0090
Computing time
P381(0)
0 ... 200 °C
Mot Tmp Fault
No temp. sensor: P380 = P381 = 0°C
Thermistor (PTC): P380, P381 = 1°C
Temp.monitoring with KTY84: P380, P381 > 1°C
If inverter pulses are blocked, the fault message is
generated only in the event of a cable short-circuit.



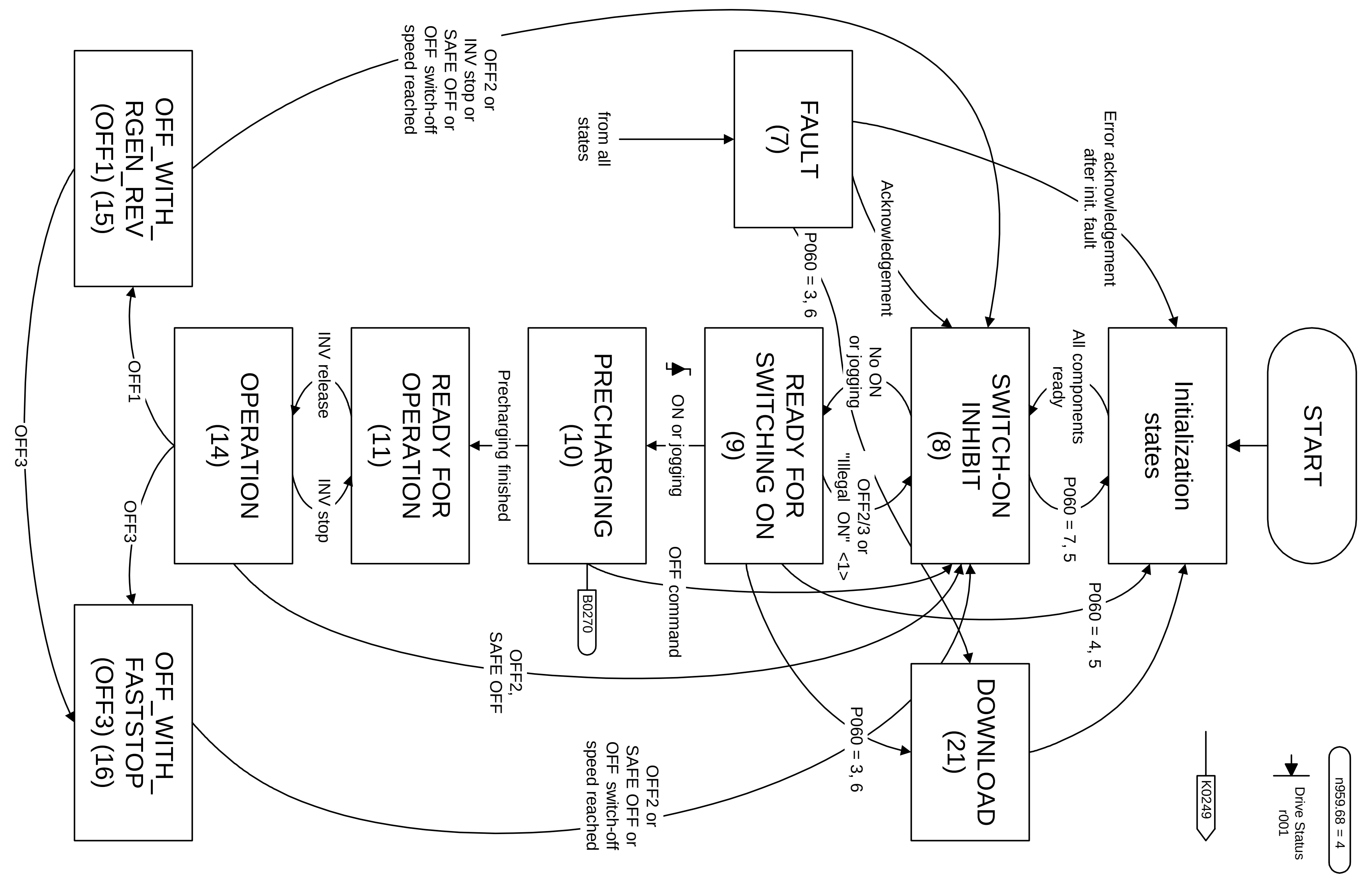
1	2	3	4	5	6	7	8

Fault memory	fp_vc_510_e.vsd	Function diagram	- 510 -
	31.01.98	MASTERDRIVES VC	



r826	Meaning
90 to109	Mainboards or Control Unit
110 to 119	Sensor Board (SBx)
120 to 129	Serial Communication Board (Scx)
130 to 139	Technology Board
140 to 149	Communication Board (Cbx)
150 to 169	Special boards (EBx, SLB)

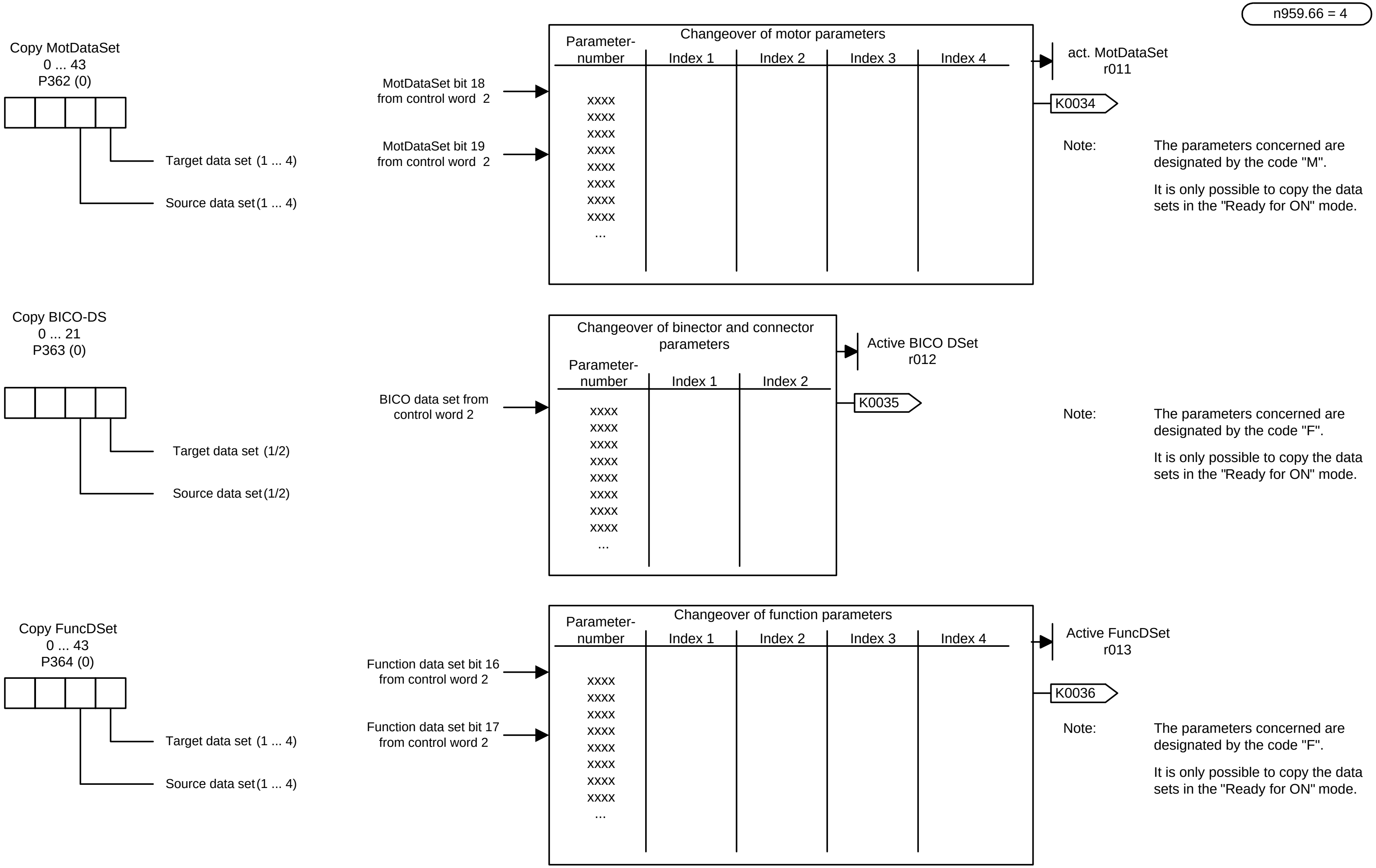
Board	Meaning	r826
CUVC	Control Unit Vector Control	92
CUMC	Control Unit Motion Control Compact	93
CUMC+	Control Unit Motion Control Compact PLUS	94
CUVC+	Control Unit Vector Control Compact PLUS	95
CUA	Control Unit AFE	106
CUSA	Control Unit Sinus AFE	108
SBP	Sensor Board Pulse	111
SBM	Sensor Board Encoder/Multiturn	112
SBM2	Sensor Board Encoder/Multiturn 2	113
SBR1	Sensor Board Resolver	114
SBR2	Sensor Board Resolver 2	115
SCB1	Serial Communication Board 1 (LWL)	121
SCB2	Serial Communication Board 2	122
T100	Technology Board	131
T300	Technology Board	131
T400	Technology Board	134
CBX	Communication Board	14x
CBP	Communication Board PROFIBUS	143
CBC	Communication Board CANBUS	146
CBP2	Communication Board PROFIBUS 2	148
EB1	Expansion Board 1	151
EB2	Expansion Board 2	152
SLB	SIMOLINK Bus Interface	161



<1> Switch-on with e.g. P554.B = 1 is not permissible!

1	2	3	4	5	6	7	8

Status diagram	fp_vc_520_e.vsd	Function diagram	- 520 -
	22.09.98	MASTERDRIVES VC	



A list of the respective data-set parameters can be found at the end of the complete list of parameter s.

Converter status			Drive setting (P60 = 5) r001 = 5	Ready for ON r001 = 9				
Function:			Automatic parameterization [8]	Automatic parameterization [8]	Measurement at standstill [6] [8] [9]	No-load measurement [6]	n/f-controller optim. P536 [6]	Ground fault test P375 [6] [8] [9]
Selection			P115 = 1 (2, 3)	P115 = 1 (2, 3)	P115 = 2 (3, 6)	P115 = 4 (3)	P115 = 5 (3)	auch bei P115 = 2 (3, 6)
Motor rating-plate data (P60 = 5)					Start with switch-on command (compare P554): Current measuring section r377			
P95 = 2 [1]	P95 = 10(IEC) [1]	P95 = 11 [1]	Reference values:					r376 = GrdFltTestResult
P97 =	P100 = Reg.Art	P100					P537 = n/f-RegDyn(act)	
Selection of	P101 = $U_{mot,n}$	P101	P351 = V_{ref} = P101				P538 = n/f Reg Osq Freq	
1PH7 (= 1PA6)	P102 = $I_{mot,n}$	P102	P350 = I_{ref} = P102		r539 = TestPulseResult			r539 = TestPulsesResult
1PL6	P103 = I_0 [2]	P103 [2]				r540 = TachTestResult [7]	r540 = TachTestResult [7]	
1PH4	P104 = $\cos\varphi_n$	——			r541=Mot ID R(Stator)→ P121			
	—— = $P_{mot,n}$	P105			r542=Mot ID R(Rotor)→ r126, → P127			
	—— = η	P106						
	P107 = $f_{mot,n}$	P107	P352 = f_{ref} = P107		r543=Mot ID VoltsDrop→ P347			
	P108 = $n_{mot,n}$	P108	P353 = n_{ref} = P107 * 60 / P109					
	P109 = zp [3]	P109 [3]			r545=Mot ID DeadTime→ P349			
	P113 = $M_{mot,n}$ [4]	P113 [4]	P354 = M_{ref} = P113		r546=MotID X(leakage)→ P122			
P114 [5]	P114 =Technol. Cond[5]	P114 [5]			P103 = Mot Magn Amps	P103 = Mot Magn Amps		
			r110 = Motor Rtd Slip	r110	r110	r110	r110	
							P116 = Start-up Time	
			P117 = Resist Cable	P117	P117	P117	P117	
			r118 = Resist Stator ++	r118	r118	r118	r118	
			r119 = Magn. Current	r119	r119	r119	r119	
			P120 = Main reactance	P120	P120	P120		
			P121 = Stator Resist	P121	P121			
			P122 = Tot Leak React	P122	P122			
			r124 = Rotor Time Const	r124	r124			
			r125 = T(sigma)	r125	r125			
			r126 = RotResist	r126	r126			
			P127 = RotResistTmpFact = 80%	P127 = 80%	P127 = 80%		P127 = 80%	
			P347 = ON VoltsCompens.	P347	P347			
			P348 = Dead Time Comp. = 0	P348 = 0	P348 = 0			
			P349 = T(DeadTimeComp.)	P349	P349			
			P471 = Scale Torq(PRE) =0%	P471 = 0%			P471 = 100%	

[1] For synchronous motors and V/f characteristic, select P95 = 10,11.

[2] With P103 = 0.0%, the magnetizing current is calculated (compare r119).

[3] Is re-calculated if P107 or P108 is altered (not in the case of download).

[4] All torque signals and displays relate to P354/ P113.

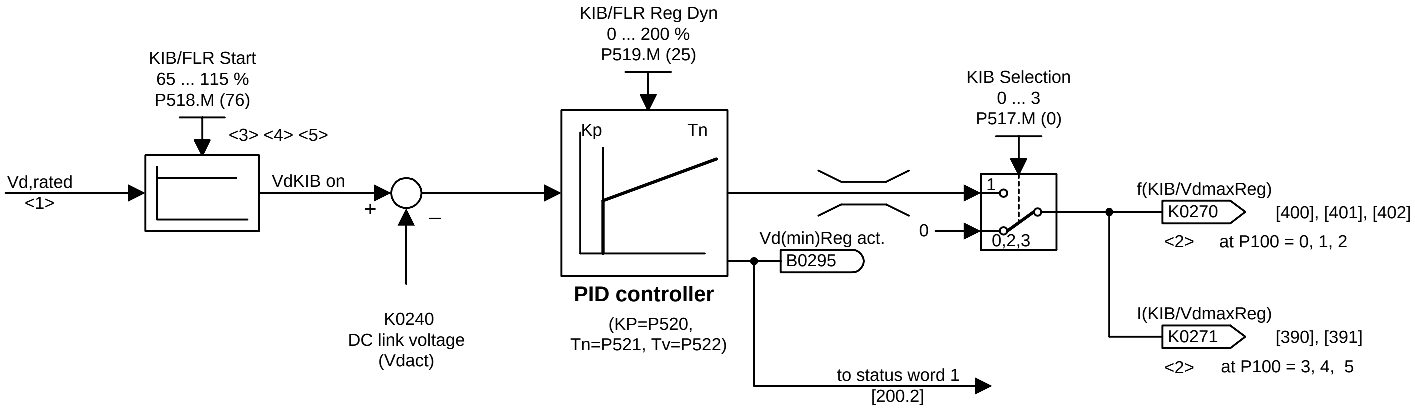
[5] With P114 = 0, a standard setting is made.

[6] With P115 = 3, motor identification is carried out completely. To do this, the converter/inverter must be switched on twice

[7] The tachometer test can also be selected with P115 = 7.

[8] Automatic parameterization is also carried out if measurement at a standstill is selected.

[9] With P115 = 6, the parameters determined are not adopted.



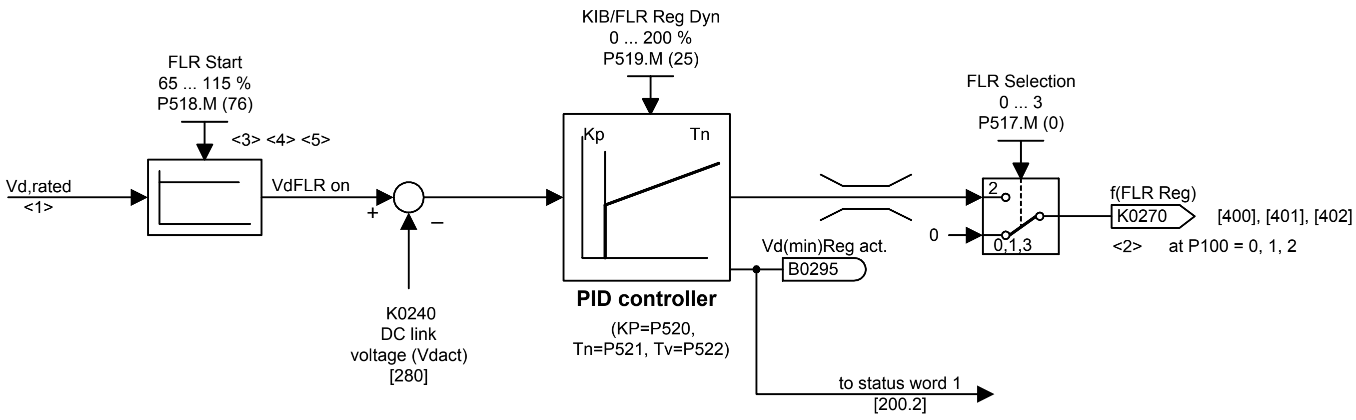
<1> Vd,rated = 1.315 x P071 (AC unit)
= P071 (DC unit

<2> K0270, K0271 are also used for the functions Vdmax control [610] and flexible response [605]!

<3> The KIB switch-off threshold VdKIB Off is 5% above the VdKIB On starting point.

<4> The fault message F008 "DC link undervoltage" comes at Vd<61% Vd,rated with released KIB.

<5> For P518 values >90% are only practical, if an Active Front End (AFE) is used as rectifier/regenerative unit.



<1> Vd,rated = 1.315 x P071 (AC unit)
= P071 (DC unit)

<2> K0270 is also used for the functions kinetic buffering [600] and Vdmax control [610] .

<3> The FLR switch-off threshold VdFLR off is 5% above the starting point of VdFLR on.

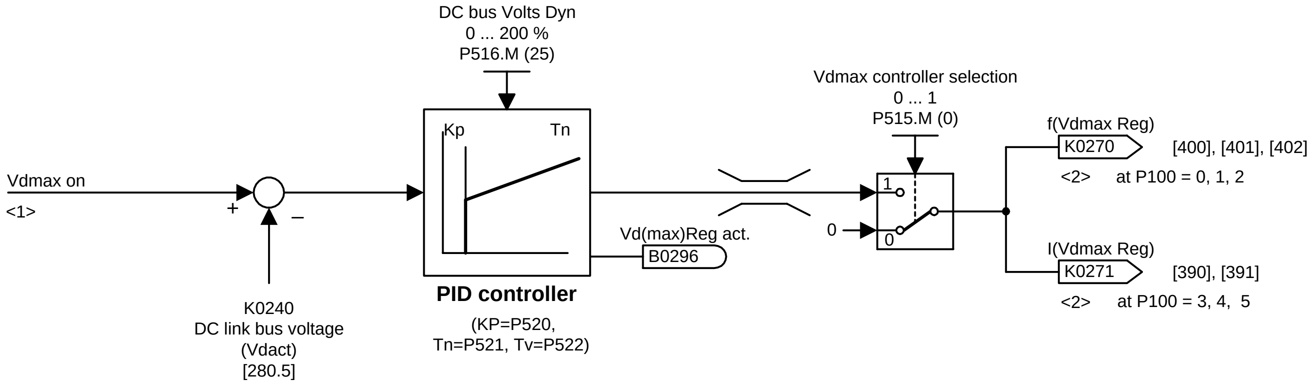
<4> The threshold for F008 "DC link undervoltage" can be reduced via P523 FLR Vdmin. It should be at least 10% below the FLR starting point.

FLN Ud(min)
50 ... 76%
P523.M (76%)

<5> For P518 values >90% are only practical if an Active Front End (AFE) is used as a rectifier/ regenerative unit.

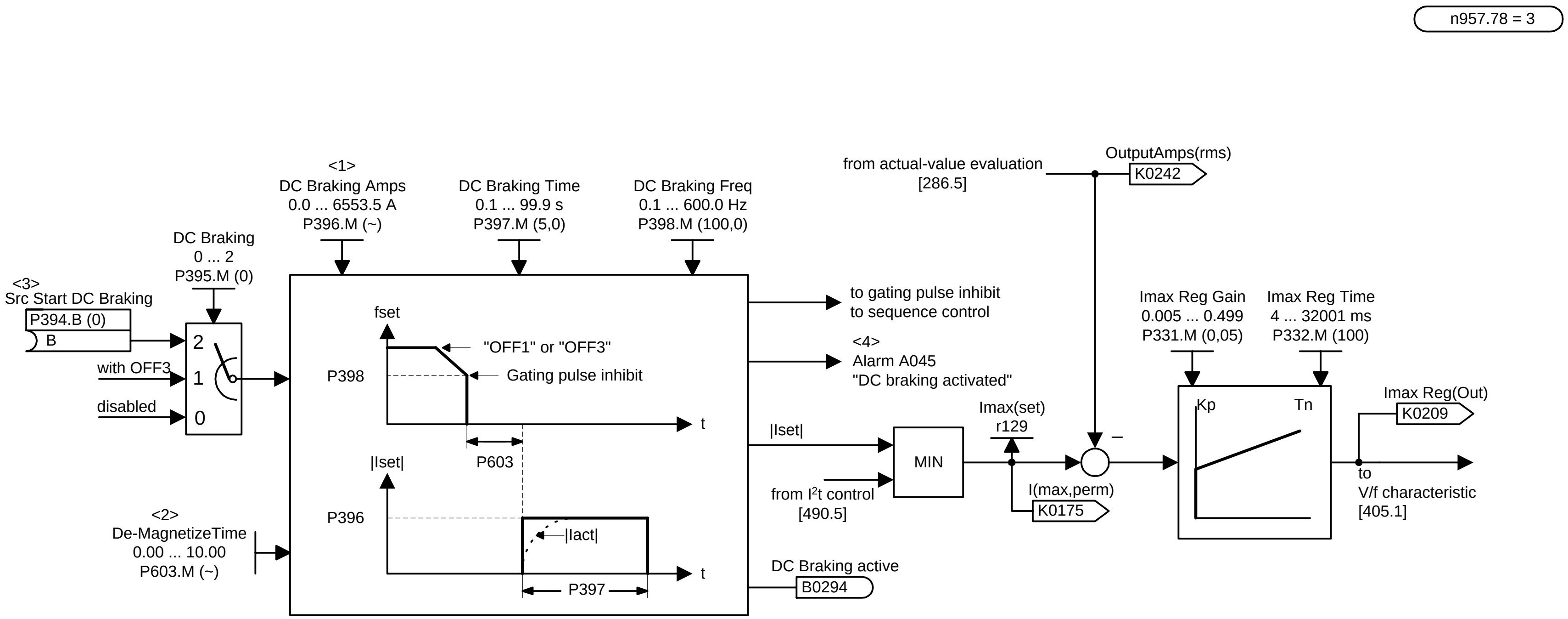
1	2	3	4	5	6	7	8

n957.77 = 0



<1> Vdmax on = 119% x P071 x 1.315 (AC unit)
= 1.19 x P071 (DC unit)

<2> K0270 and K0271 are also used for the functions kinetic buffering [600] and flexible response [610].



<1> The DC braking current is calculated during automatic parameterization (P115=1, 2, 3). It can be set at a maximum of 4 times the rated motor current.

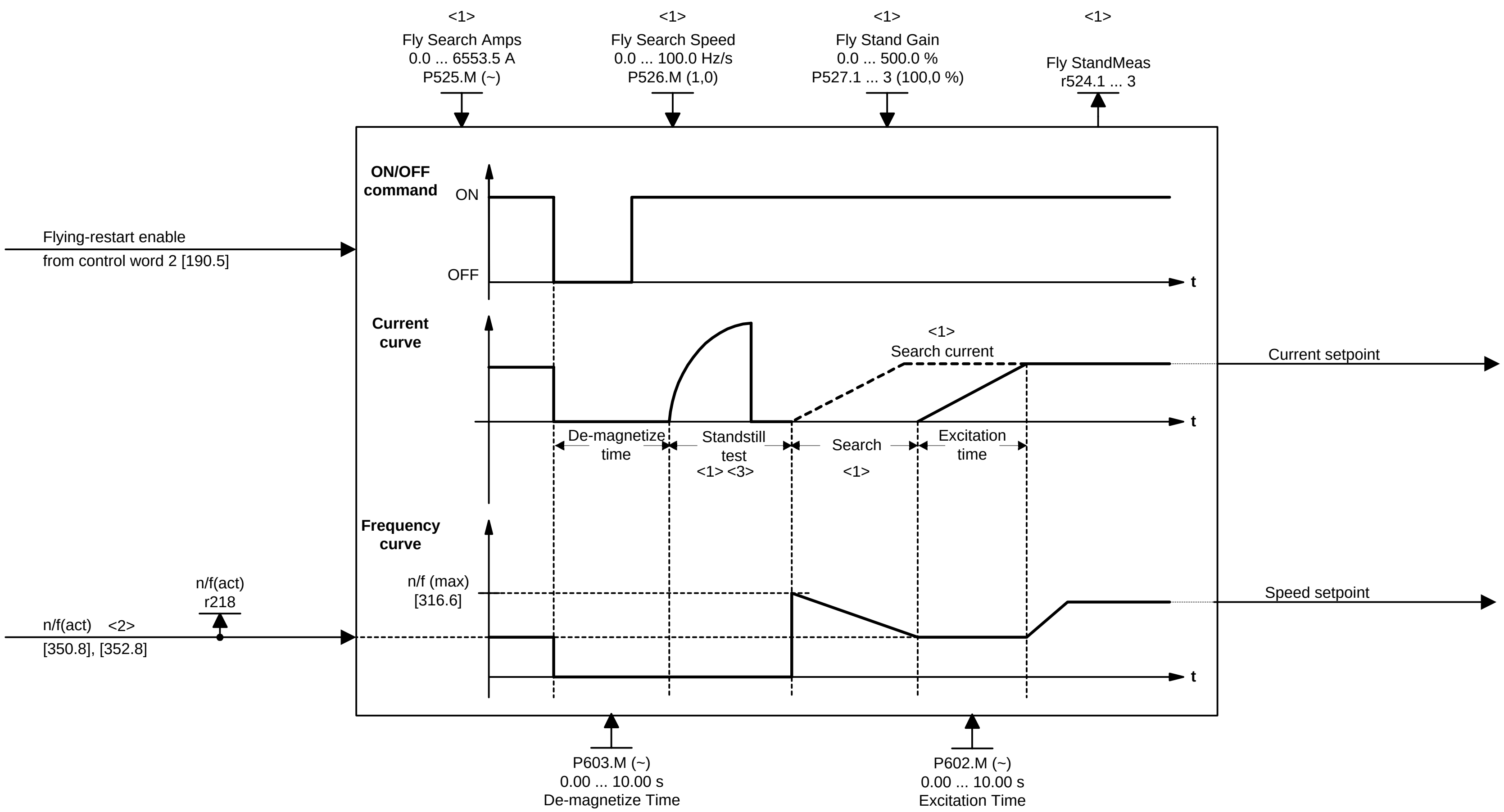
<2> The de-excitation time is calculated during automatic parameterization (P115=1, 2, 3).

<3> The "DC braking" function can be started via binector selection only from drive statuses (r001) "Operation", "OFF1" and "OFF3".

If the "DC braking" function is deselected again during DC braking time (P397) via binector selection, the "Flying restart" function is automatically activated!

<4> The alarm A045 appears if "DC braking" has been activated and the motor frequency is higher than the frequency at which DC braking starts.

n957.79 = 4

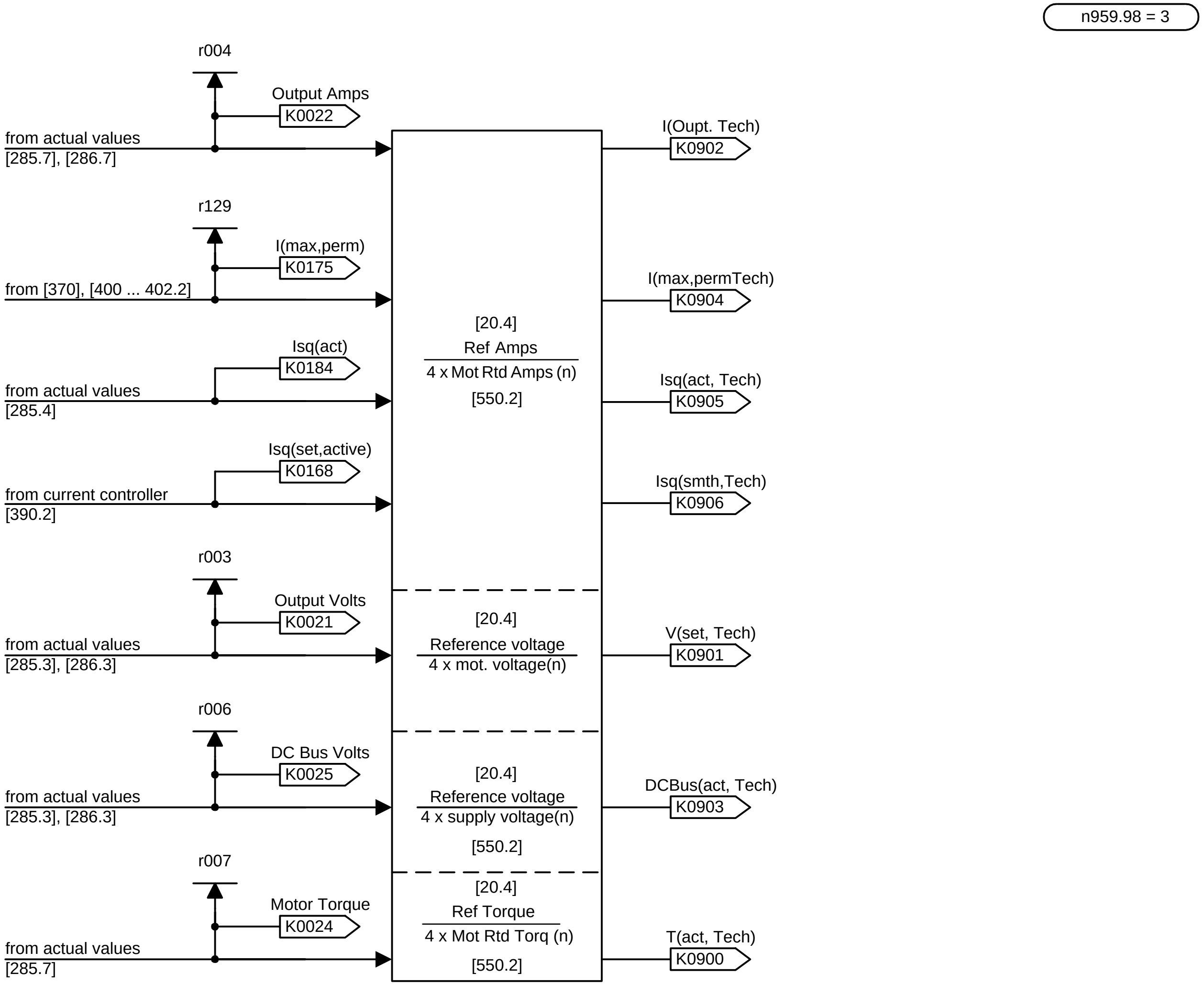


<1> Only in the case of flying restart without encoder signal (search).

<2> Only in the case of flying restart with encoder signal (indepent of control mode).

<3> No standstill test when P527.1 = 0,0 %.

1	2	3	4	5	6	7	8
Functions					fp_vc_620_e.vsd	Function diagram	- 620 -
Flying restart					11.12.98	MASTERDRIVES VC	


n959.98 = 3
r004
Output Amps
K0022
from actual values
[285.7], [286.7]
r129
I(max,perm)
K0175
from [370], [400 ... 402.2]
Isq(act)
K0184
from actual values
[285.4]
Isq(set,active)
K0168
from current controller
[390.2]
r003
Output Volts
K0021
from actual values
[285.3], [286.3]
r006
DC Bus Volts
K0025
from actual values
[285.3], [286.3]
r007
Motor Torque
K0024
from actual values
[285.7]
[20.4]
Ref Amps
4 x Mot Rtd Amps (n)
[550.2]
[20.4]
Reference voltage
4 x mot. voltage(n)
[20.4]
Reference voltage
4 x supply voltage(n)
[550.2]
[20.4]
Ref Torque
4 x Mot Rtd Torq (n)
[550.2]
I(Oupt. Tech)
K0902
I(max,permTech)
K0904
Isq(act, Tech)
K0905
Isq(smth,Tech)
K0906
V(set, Tech)
K0901
DCBus(act, Tech)
K0903
T(act, Tech)
K0900

1	2	3	4	5	6	7	8

MASTERDRIVES VC

"Free blocks" function diagram

Status: 26.10.01

Notes:

- A free block is only processed if it is specifically assigned to a sampling time via the allocated U95x parameter; see sheet [702]!
- Parameterization of the sampling sequence is also described on sheet [702].
- The approximate calculating time per block is indicated in {µs} for each type of block.

Sampling time
2 ... 20
U950 ... U953

Sampling sequence
2 ... 20
U960 ... U963

Function	Function block number	Parameter for setting the sampling time Parameter No. (factory setting)		Parameter for setting the sampling sequence Parameter No. (factory setting)	
Processing of input terminals and receive data from serial interfaces	001	U950.01	(20)	U960.01	(20)
	002	U950.02	(20)	U960.02	(20)
	...	...	...	...	...
	019	U950.19	(20)	U960.19	(20)
Processing of output terminals and transmit data to serial interfaces	020	U950.20	(20)	U960.20	(20)
	...	...	...	...	...
	029	U950.29	(20)	U960.29	(20)
Free function blocks	031	U950.31	(20)	U960.31	(20)
	032	U950.32	(20)	U960.32	(20)
	...	...	...	...	...
	099	U950.99	(20)	U960.99	(20)
	101	U951.01	(20)	U961.01	(20)
	102	U951.02	(20)	U961.02	(20)
	...	...		...	
	330	U953.30	(20)	U963.30	(20)
Angle synchronism and positioning	331	U953.31	(20)	U963.31	(20)
	...	...	...	...	...
	350	U953.50	(20)	U963.50	(20)
Internal sequence control and setpoint calculation	351	U953.51	(20)	U963.51	(20)
	...	...	...	...	...
	370	U953.70	(20)	U963.70	(20)
Reserve	371	U953.71	(20)	U963.71	(20)
	...	...	...	...	...
	399	U953.99	(20)	U963.99	(20)

Parameter for setting the sampling time
Value range: 2 ... 20
Factory setting: 20 (block is not calculated)

Parameter value	Sampling time 1) T0 = P357		Sampling time at P357 = 1.2 ms
2	T2 =	1 x T0	1.2 ms
3	T3 =	2 x T0	2.4 ms
4	T4 =	4 x T0	4.8 ms
5	T5 =	8 x T0	9.6 ms
6	T6 =	16 x T0	19.2 ms
7	T7 =	32 x T0	38.4 ms
8	T8 =	64 x T0	76.8 ms
9	T9 =	128 x T0	153.6 ms
10	T10 =	256 x T0	307.2 ms
11 ... 19	Reserved for future applications		
20	Block is not calculated		

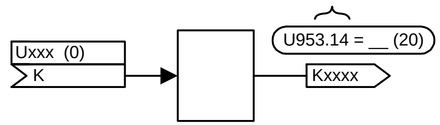
Parameter for setting the sampling sequence:
Value range: 0 ... 9999
Factory setting: Function block number x 10
i.e. in the factory setting the blocks are processed in the sequence of the block numbers
Exception: Function block number 10, 14, 15, 20 - 25, 371

1) WE: 1.2 ms

Setting and monitoring the sampling times and sampling sequence

Example of the sampling time and sampling sequence of a function block:

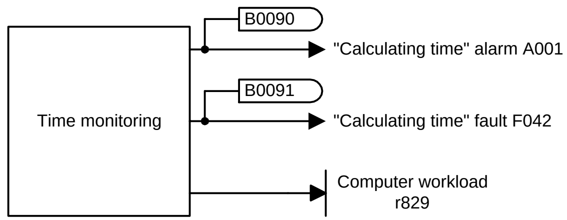
This function block has the function block number 314
It is deactivated in the factory setting (U953.14 = 20).

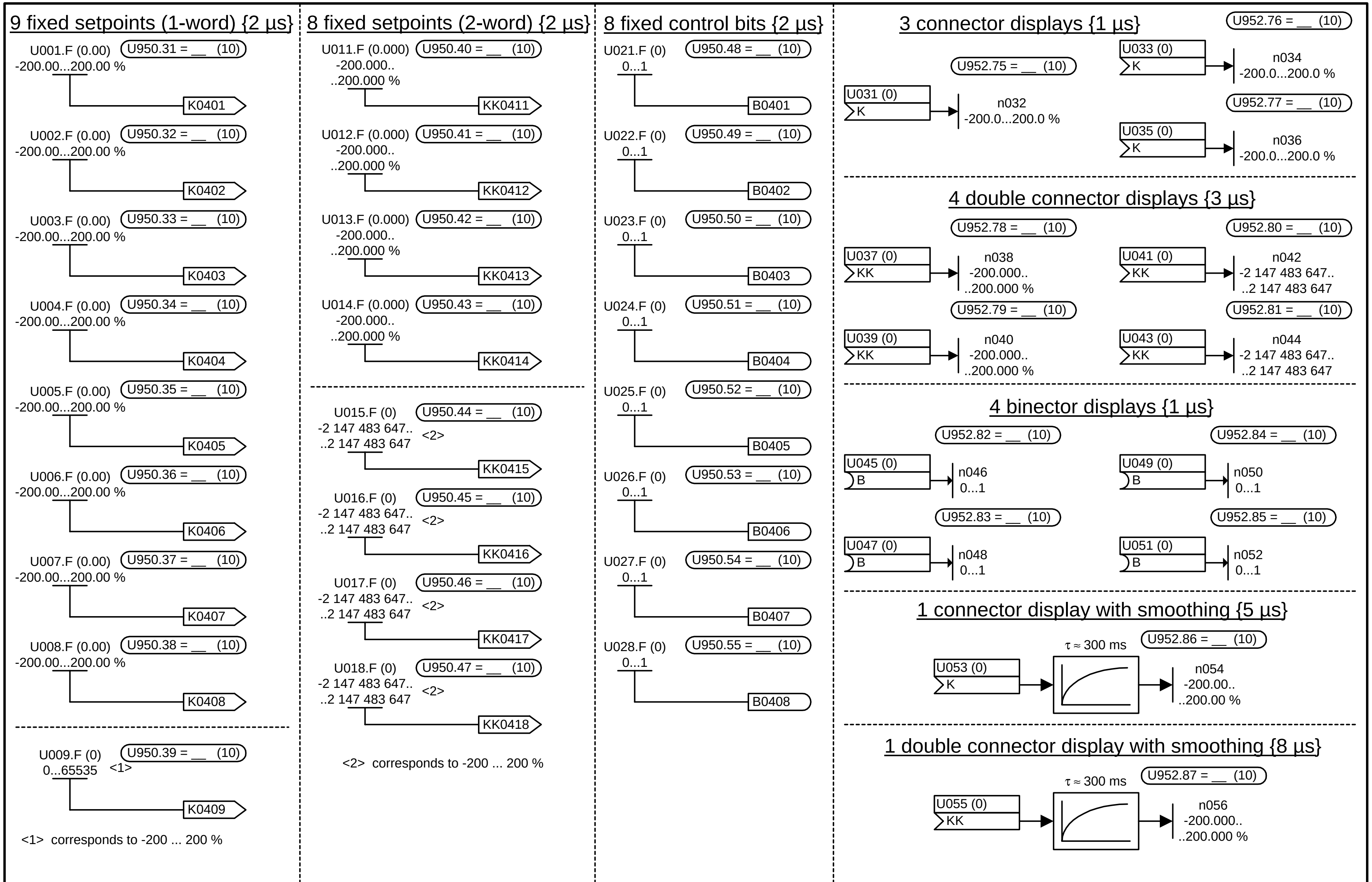


Via U953.14 = 4 the function block can be allocated to the sampling time T4 (= 4 x T0 = 4.8 ms).

The function block is processed in the factory setting at the 3140th position. By setting U963.14 to a value not equal to 3140, the block can be allocated to a different position in the sampling sequence.

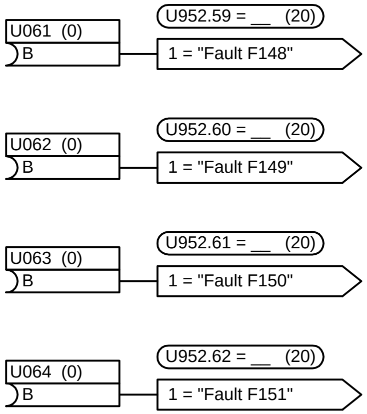
Monitoring of calculating time



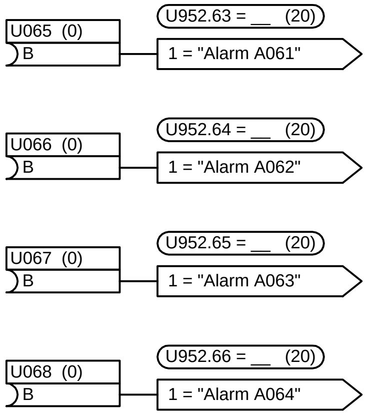

9 fixed setpoints (1-word) {2 µs}
U001.F (0.00) -200.00...200.00 % U950.31 = __ (10) K0401
U002.F (0.00) -200.00...200.00 % U950.32 = __ (10) K0402
U003.F (0.00) -200.00...200.00 % U950.33 = __ (10) K0403
U004.F (0.00) -200.00...200.00 % U950.34 = __ (10) K0404
U005.F (0.00) -200.00...200.00 % U950.35 = __ (10) K0405
U006.F (0.00) -200.00...200.00 % U950.36 = __ (10) K0406
U007.F (0.00) -200.00...200.00 % U950.37 = __ (10) K0407
U008.F (0.00) -200.00...200.00 % U950.38 = __ (10) K0408
U009.F (0) 0...65535 <1> U950.39 = __ (10) K0409
<1> corresponds to -200 ... 200 %
8 fixed setpoints (2-word) {2 µs}
U011.F (0.000) -200.000.. ..200.000 % U950.40 = __ (10) KK0411
U012.F (0.000) -200.000.. ..200.000 % U950.41 = __ (10) KK0412
U013.F (0.000) -200.000.. ..200.000 % U950.42 = __ (10) KK0413
U014.F (0.000) -200.000.. ..200.000 % U950.43 = __ (10) KK0414
U015.F (0) -2 147 483 647.. ..2 147 483 647 <2> U950.44 = __ (10) KK0415
U016.F (0) -2 147 483 647.. ..2 147 483 647 <2> U950.45 = __ (10) KK0416
U017.F (0) -2 147 483 647.. ..2 147 483 647 <2> U950.46 = __ (10) KK0417
U018.F (0) -2 147 483 647.. ..2 147 483 647 <2> U950.47 = __ (10) KK0418
<2> corresponds to -200 ... 200 %
8 fixed control bits {2 µs}
U021.F (0) 0...1 U950.48 = __ (10) B0401
U022.F (0) 0...1 U950.49 = __ (10) B0402
U023.F (0) 0...1 U950.50 = __ (10) B0403
U024.F (0) 0...1 U950.51 = __ (10) B0404
U025.F (0) 0...1 U950.52 = __ (10) B0405
U026.F (0) 0...1 U950.53 = __ (10) B0406
U027.F (0) 0...1 U950.54 = __ (10) B0407
U028.F (0) 0...1 U950.55 = __ (10) B0408
3 connector displays {1 µs}
U952.75 = __ (10) U031 (0) K n032 -200.0...200.0 %
U952.76 = __ (10) U033 (0) K n034 -200.0...200.0 %
U952.77 = __ (10) U035 (0) K n036 -200.0...200.0 %
4 double connector displays {3 µs}
U952.78 = __ (10) U037 (0) KK n038 -200.000.. ..200.000 %
U952.80 = __ (10) U041 (0) KK n042 -2 147 483 647.. ..2 147 483 647
U952.79 = __ (10) U039 (0) KK n040 -200.000.. ..200.000 %
U952.81 = __ (10) U043 (0) KK n044 -2 147 483 647.. ..2 147 483 647
4 binector displays {1 µs}
U952.82 = __ (10) U045 (0) B n046 0...1
U952.84 = __ (10) U049 (0) B n050 0...1
U952.83 = __ (10) U047 (0) B n048 0...1
U952.85 = __ (10) U051 (0) B n052 0...1
1 connector display with smoothing {5 µs}
τ ≈ 300 ms U952.86 = __ (10) U053 (0) K n054 -200.00.. ..200.00 %
1 double connector display with smoothing {8 µs}
τ ≈ 300 ms U952.87 = __ (10) U055 (0) KK n056 -200.000.. ..200.000 %

1	2	3	4	5	6	7	8

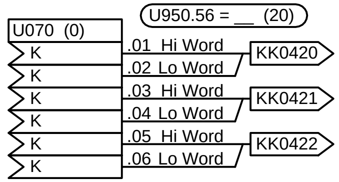
4 fault message trigger signals {2 µs}



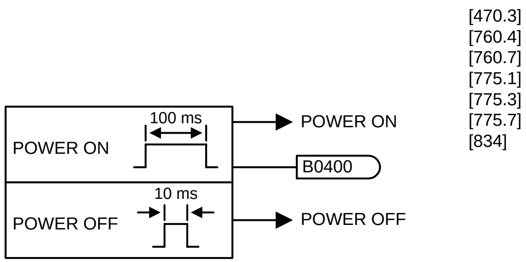
4 alarm message trigger signals {2 µs}



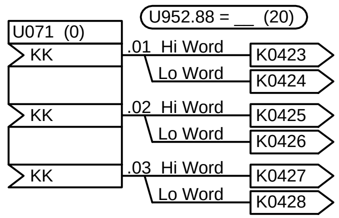
3 connector/double connector converters {9 µs}



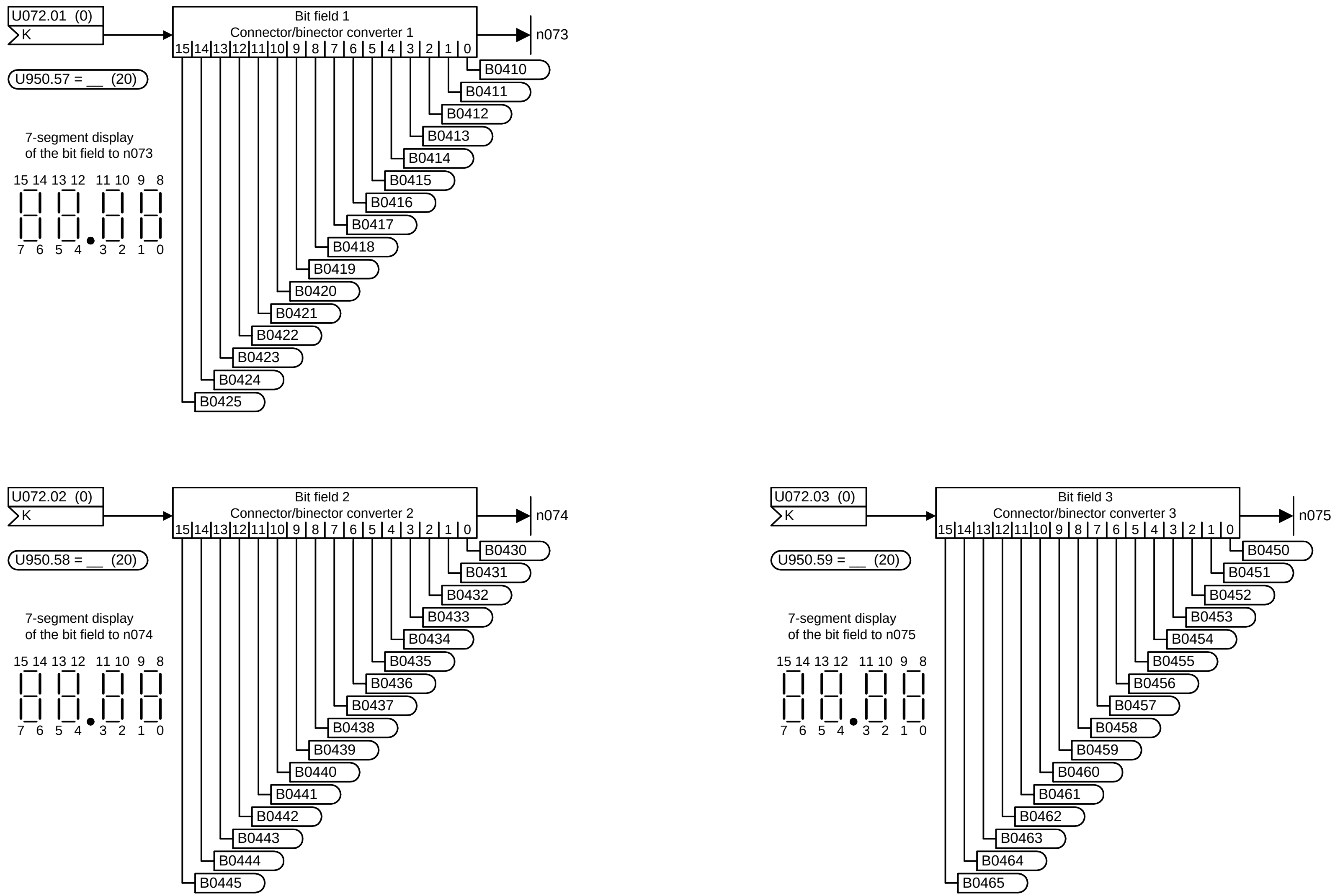
Voltage monitoring of electronics power supply



3 double connector/connector converters {11 µs}

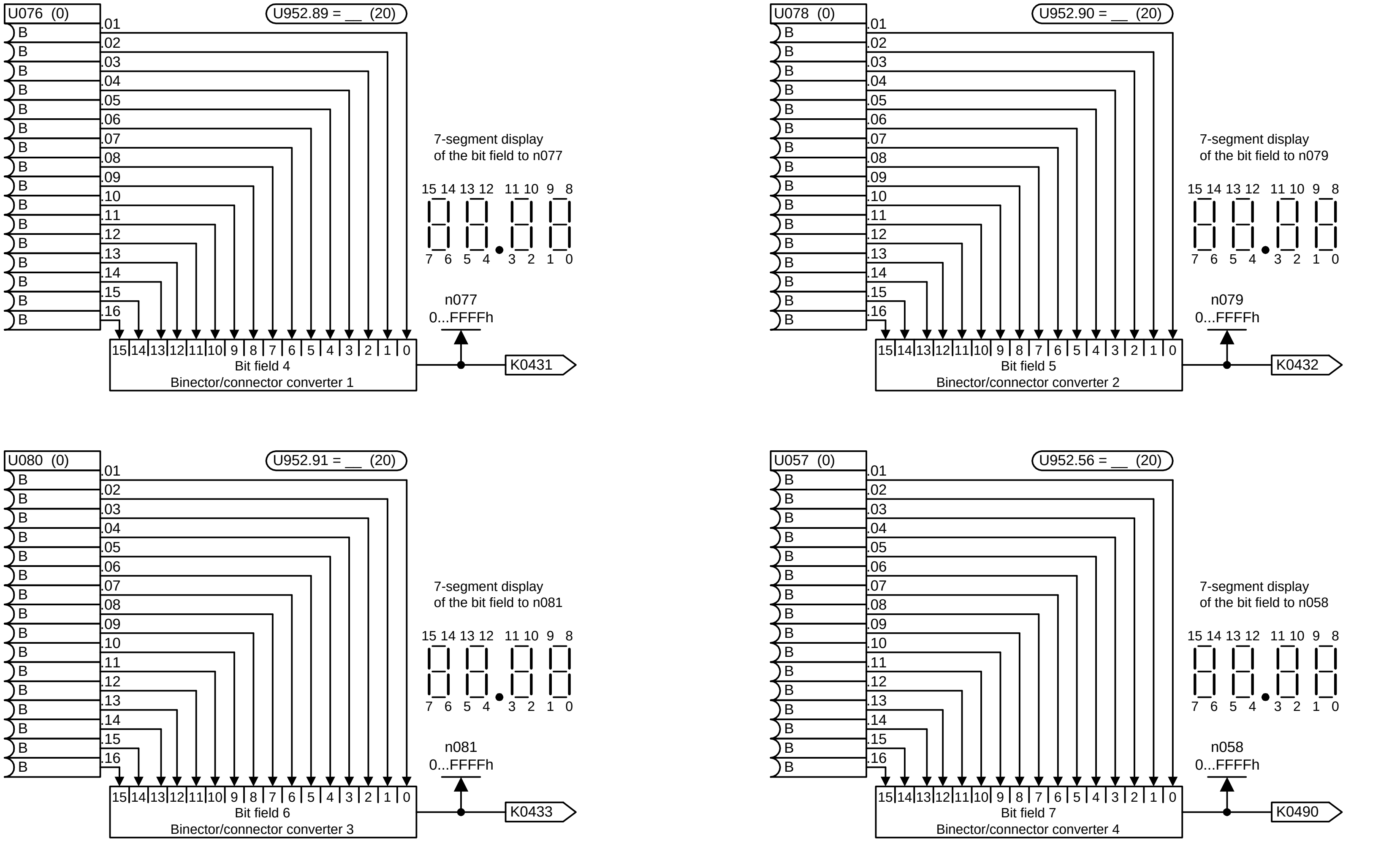


3 connector/binector converters {11 µs}

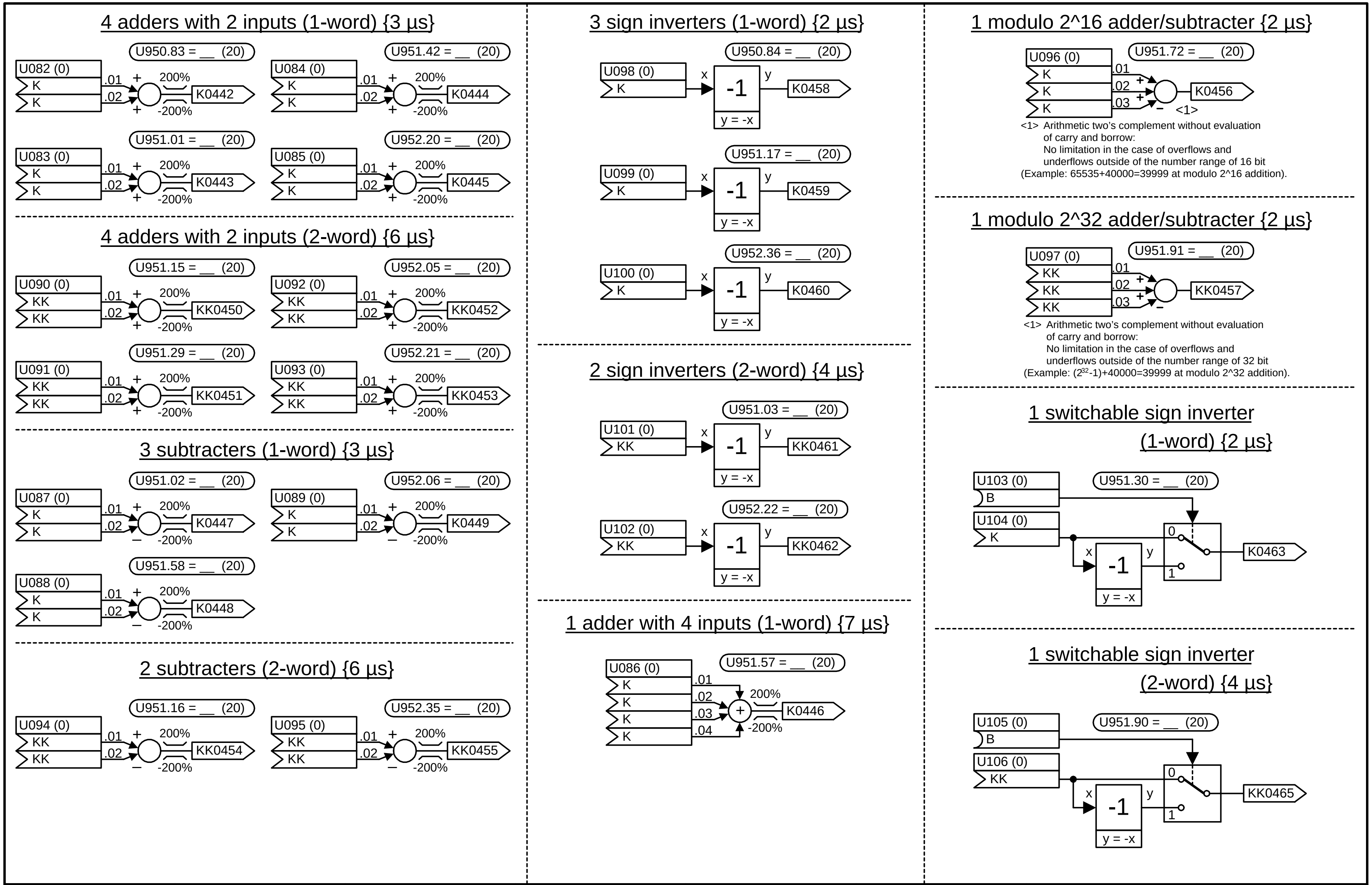


1	2	3	4	5	6	7	8

4 binector/connector converters {12 µs}



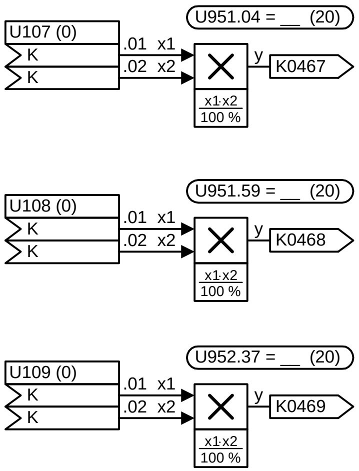
1	2	3	4	5	6	7	8



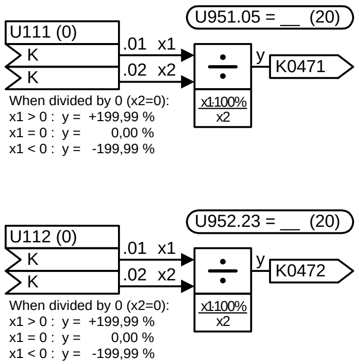
1	2	3	4	5	6	7	8

Free blocks	fp_vc_725_e.vsd	Function diagram	- 725 -
Adders, subtracters, sign inverters	21.08.00	MASTERDRIVES VC	

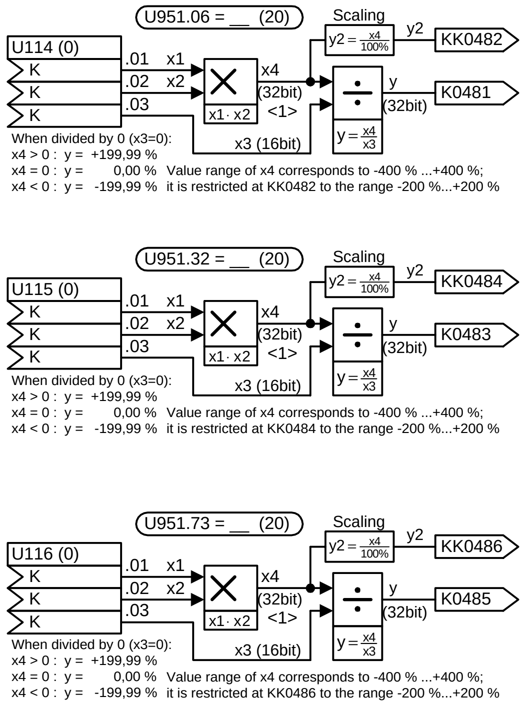
3 multipliers (1-word) {12 µs}



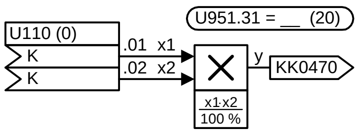
2 dividers (1-word) {15 µs}



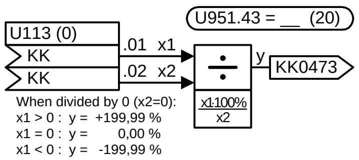
3 high-resolution multipliers/dividers (1-word) {18 µs}



1 multiplier (2-word) {33 µs}



1 divider (2-word) {70 µs}

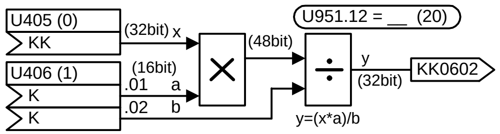


1	2	3	4	5	6	7	8

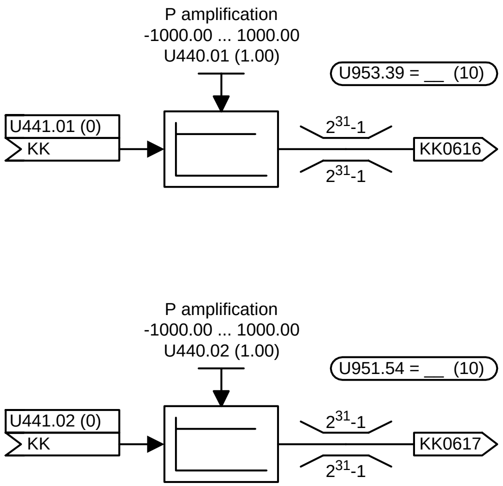
Free blocks	fp_vc_730_e.vsd	Function diagram	- 730 -
Multipiliers, dividers	02.11.98	MASTERDRIVES VC	

New Blocks (from V3.2 and higher)

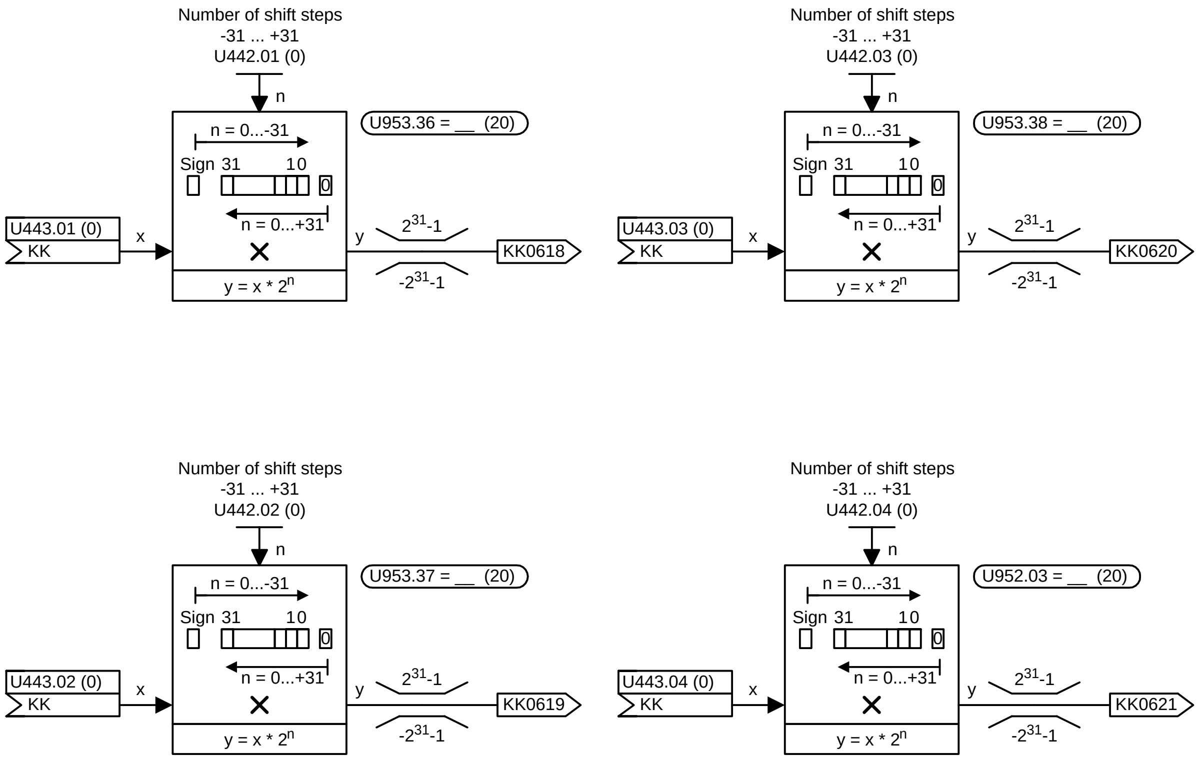
1 high-resolution multiplier/divider (2-word) {25 µs}



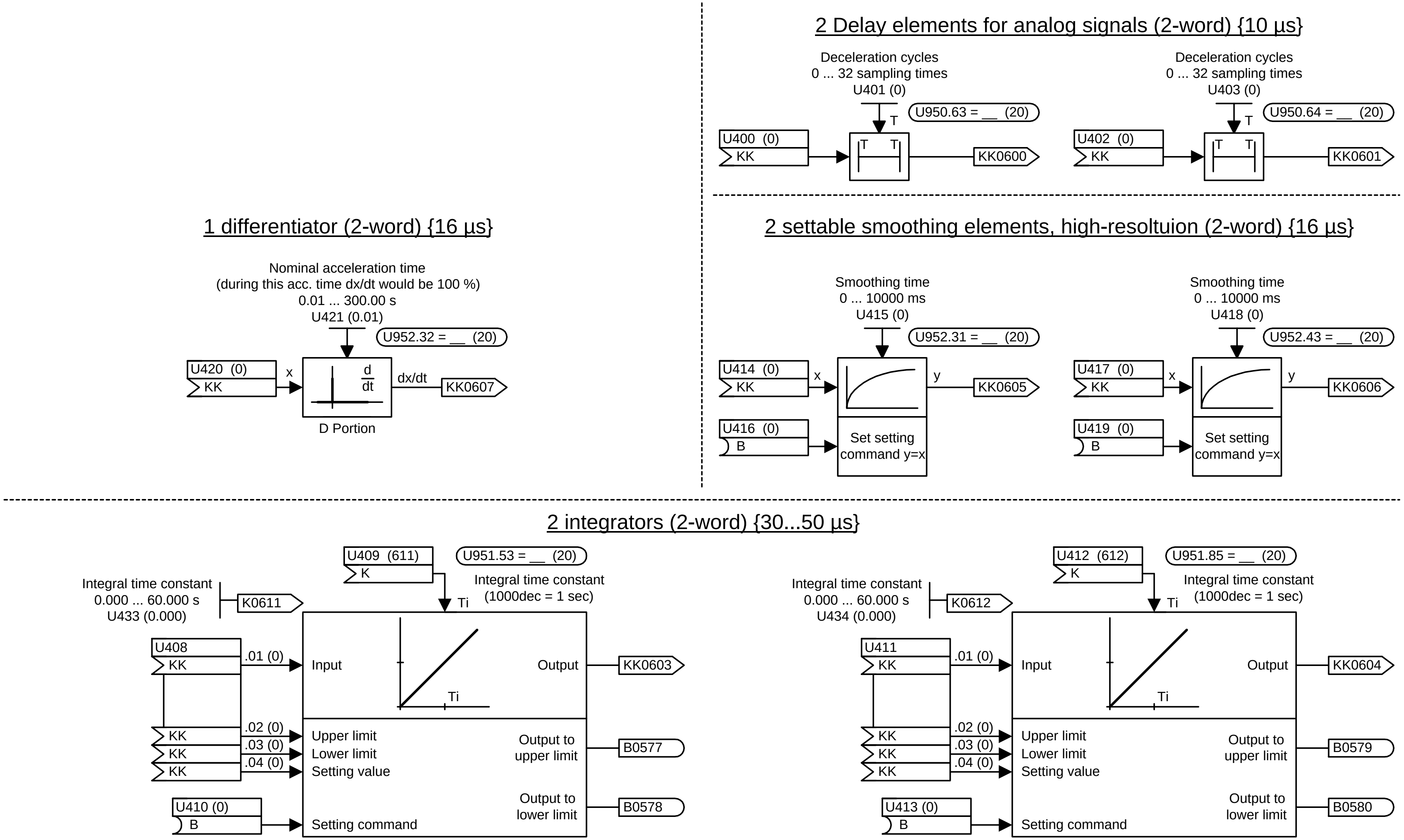
2 P-amplifiers/multipliers (2-word)



4 shift multipliers/dividers (2-word)

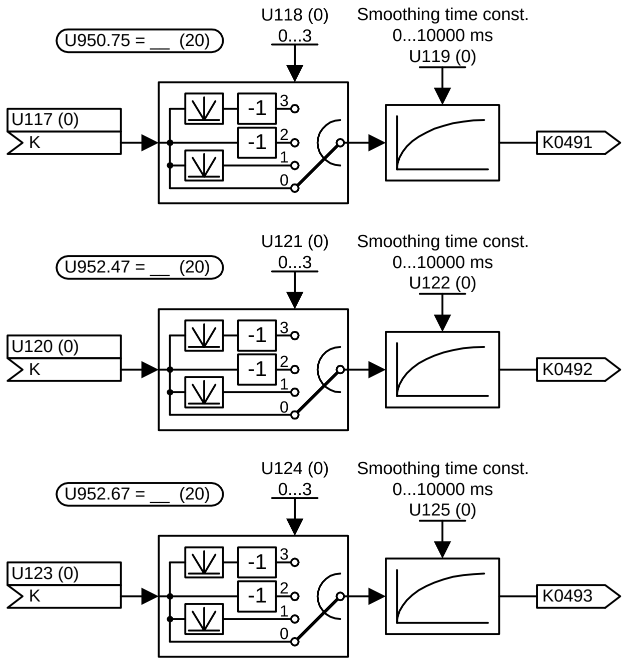


New Blocks (from V3.2 and higher)

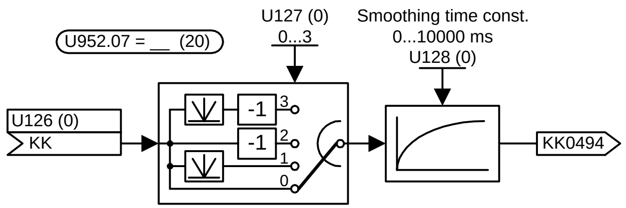


1	2	3	4	5	6	7	8

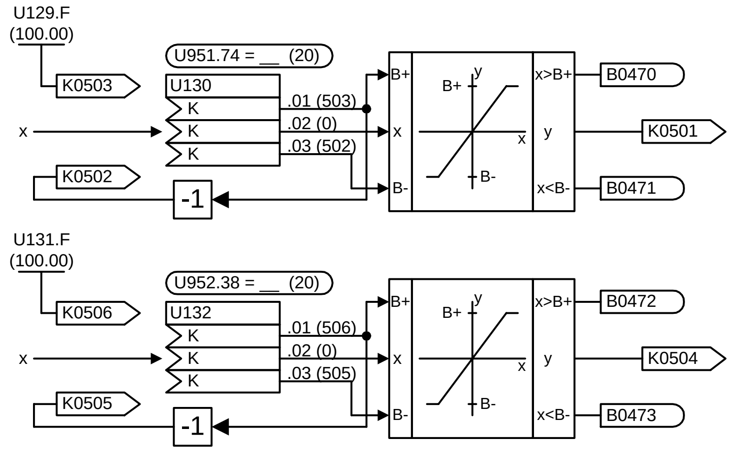
3 absolute-value generators with smoothing (1-word) {7 µs}



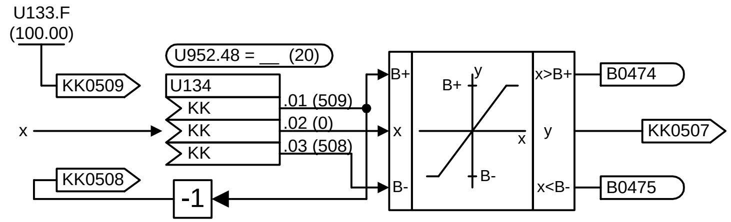
1 absolute-value generators with smoothing (2-word) {10 µs}



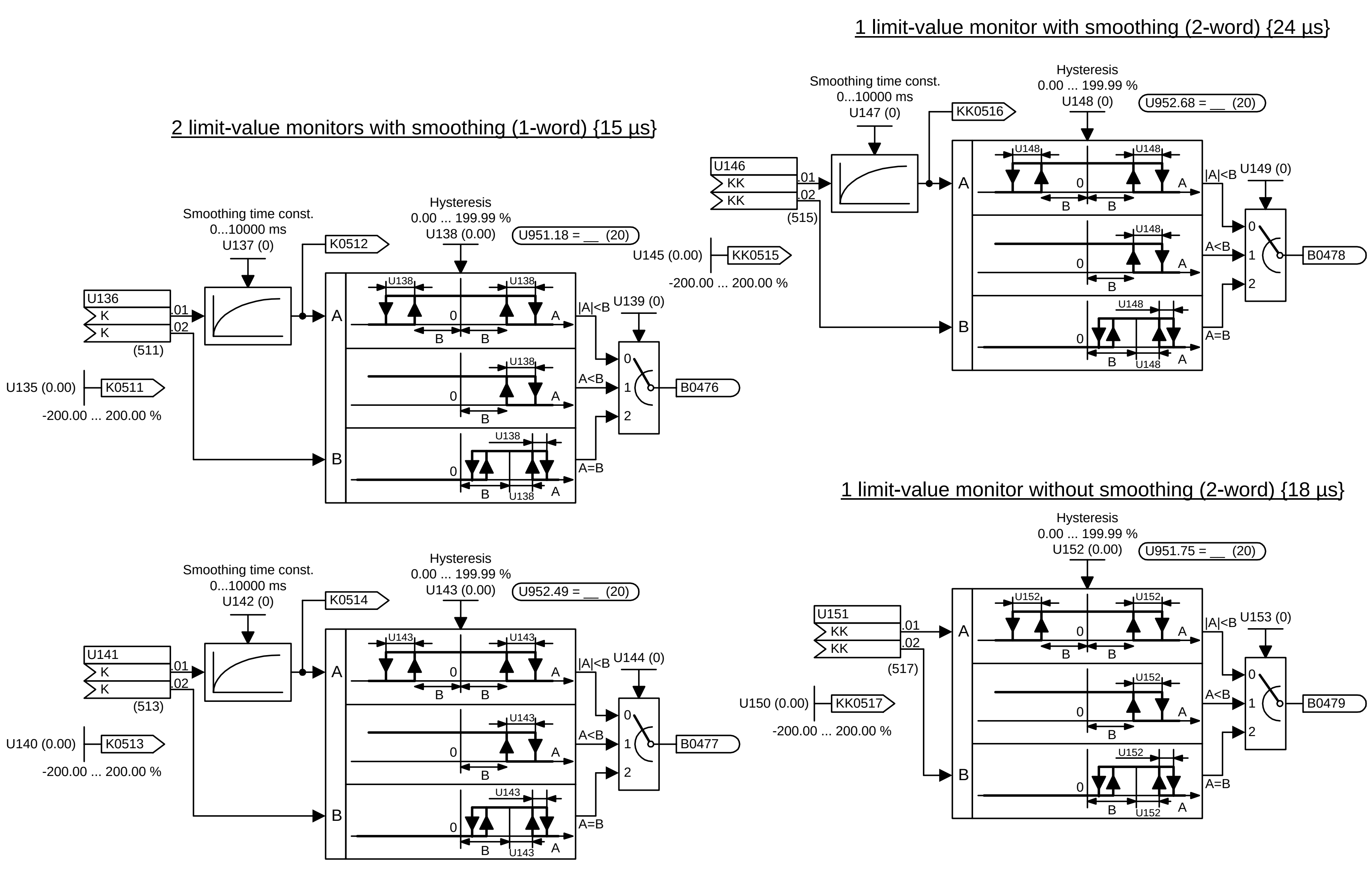
2 limiters (1-word) {5 µs}



1 limiter (2-word) {11 µs}

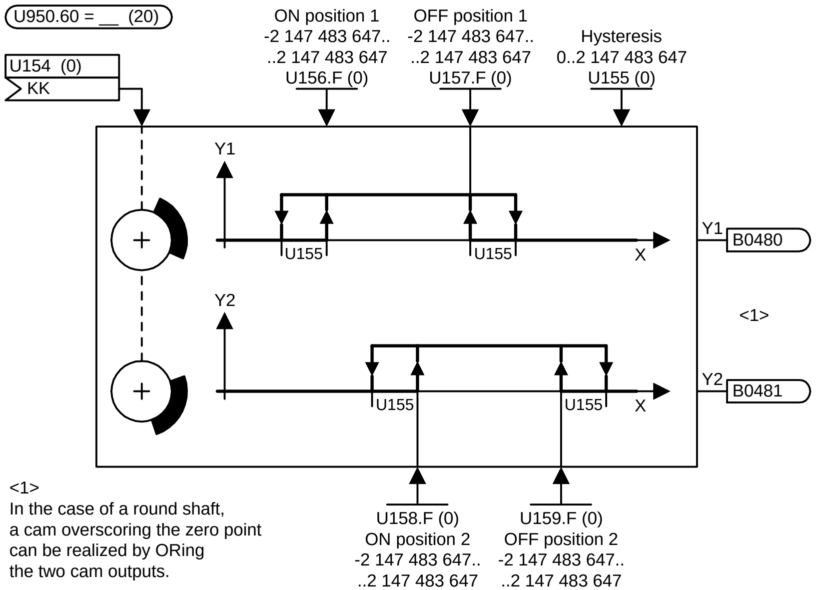


1	2	3	4	5	6	7	8
Free blocks					fp_vc_735_e.vsd	Function diagram	- 735 -
Absolute-value generators with smoothing, limiters					02.11.98	MASTERDRIVES VC	

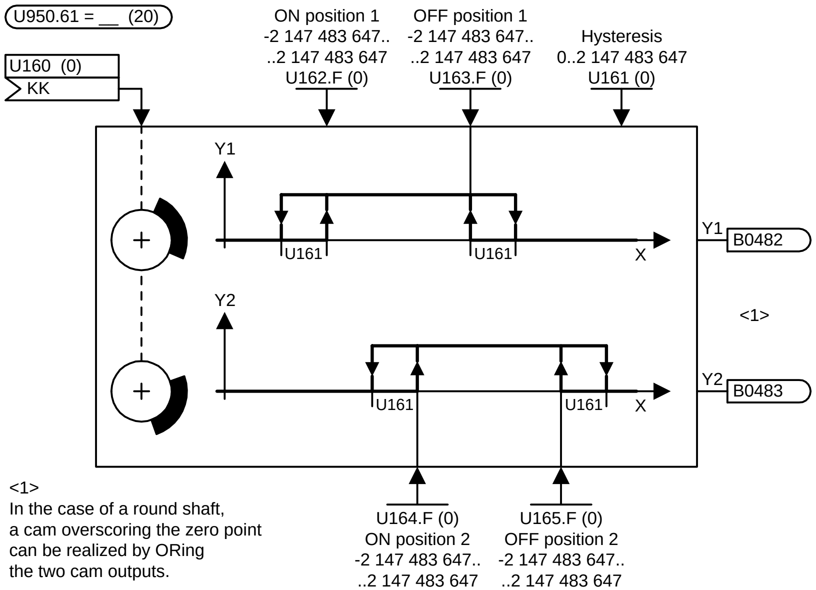


1	2	3	4	5	6	7	8
Free blocks					fp_vc_740_e.vsd	Function diagram	- 740 -
Limit-value monitors with and without smoothing					21.08.00	MASTERDRIVES VC	

2 cam-contactor groups each with 2 cams (2-word) {9 µs}

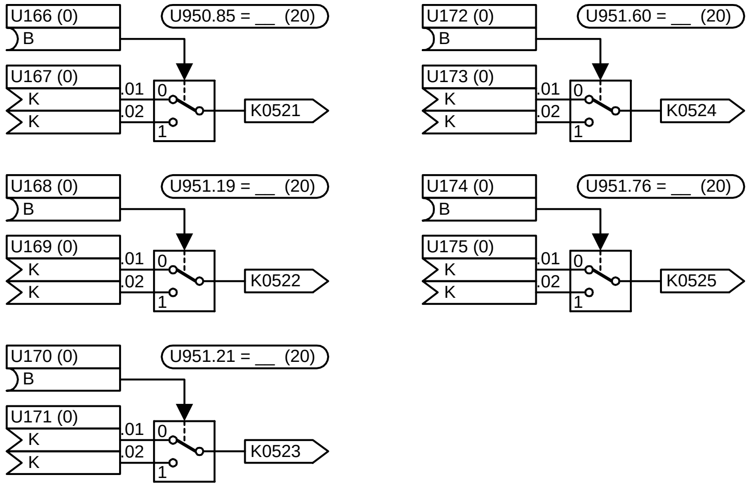


<1>
In the case of a round shaft,
a cam overscoring the zero point
can be realized by ORing
the two cam outputs.

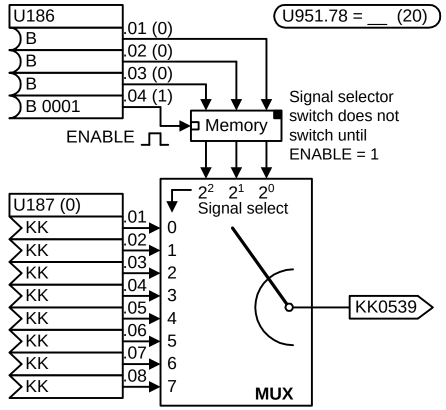


<1>
In the case of a round shaft,
a cam overscoring the zero point
can be realized by ORing
the two cam outputs.

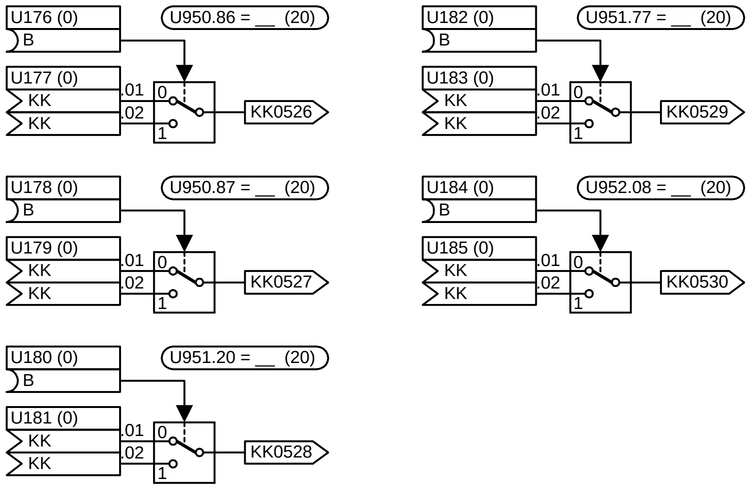
5 Analog signal switches (1-word) {2 µs}



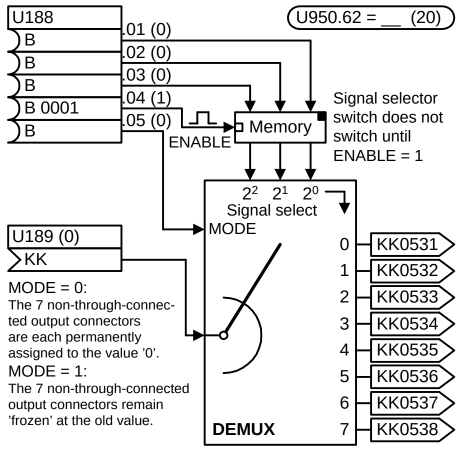
1 Analog signal multiplexer with 8 channels (2-word) {6 µs}



5 Analog signal switches (2-word) {4 µs}

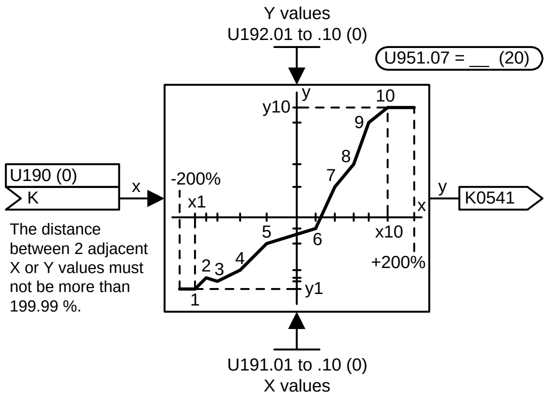


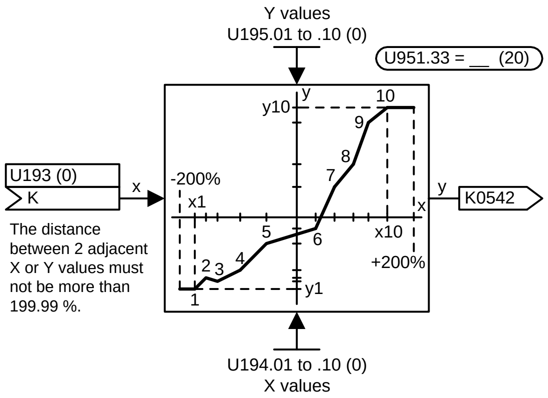
1 Analog signal demultiplexer with 8 channels (2-word) {8 µs}

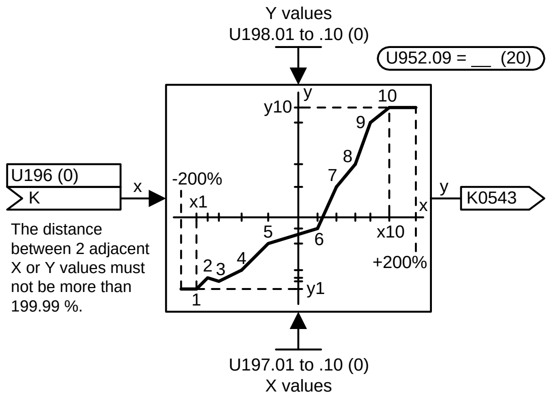


1	2	3	4	5	6	7	8
Free blocks					fp_vc_750_e.vsd	Function diagram	- 750 -
Analog signal switches/multiplexers/demultiplexers					02.11.98	MASTERDRIVES VC	

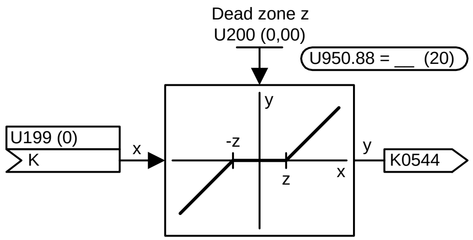
3 characteristic blocks with 10 support values (1-word) {15 µs}



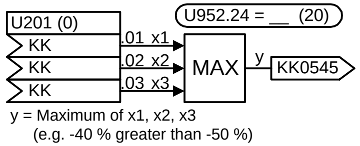




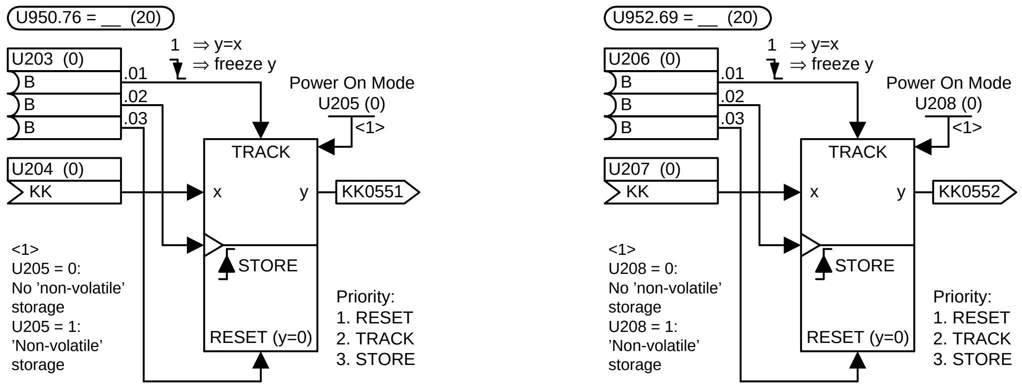
1 dead zone (1-word) {2 µs}



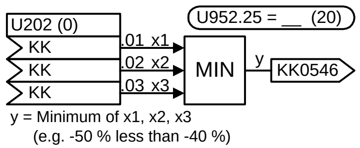
1 Maximum selection (2-word) {8 µs}



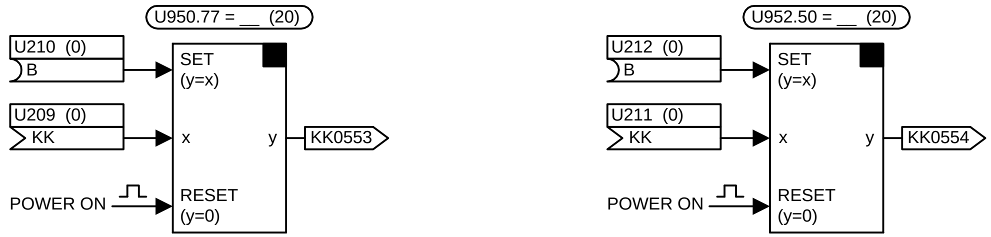
2 tracking / storage elements (2-word) {6 µs}



1 Minimum selection (2-word) {8 µs}

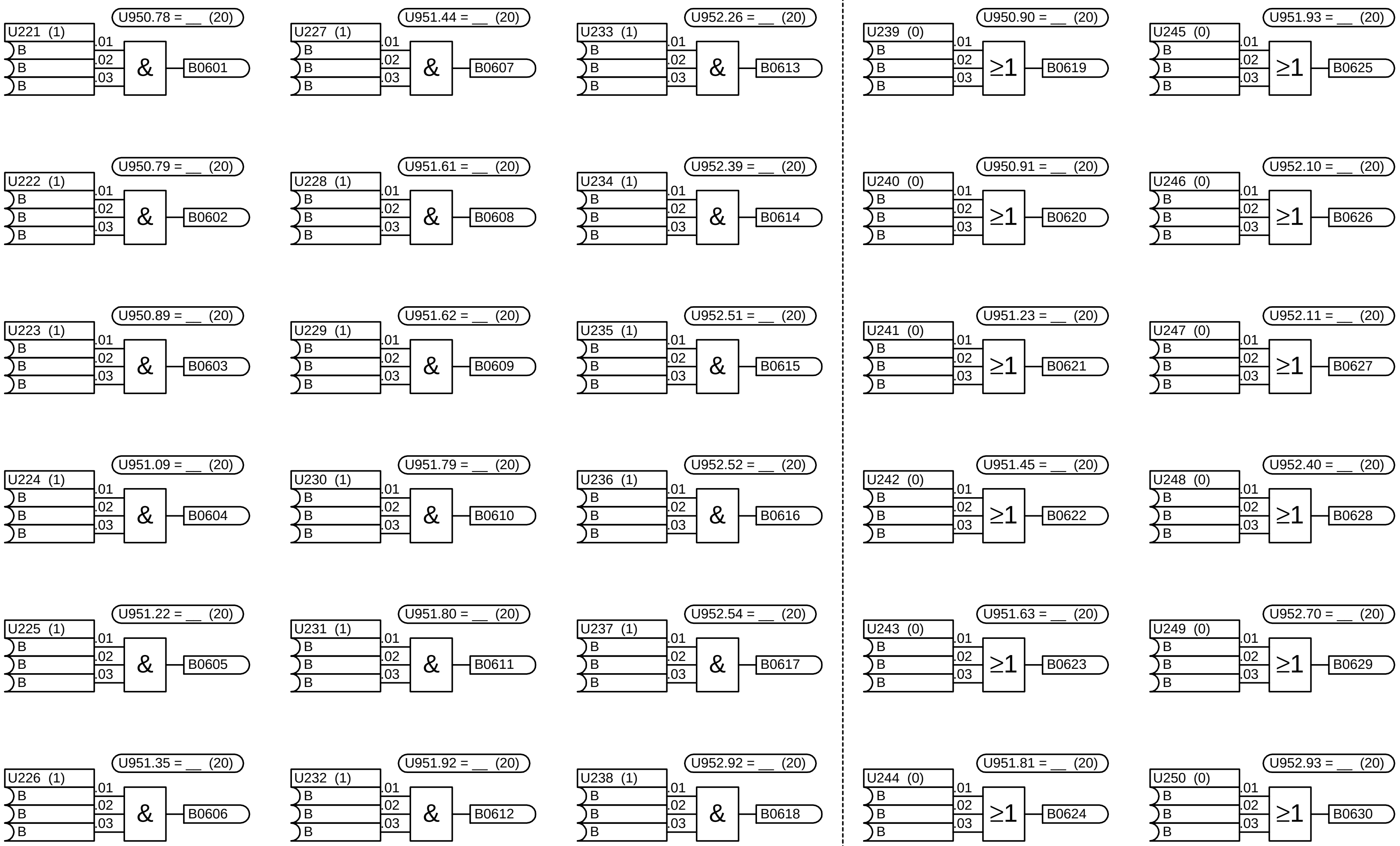


2 analog signal storages (2-word) {4 µs}



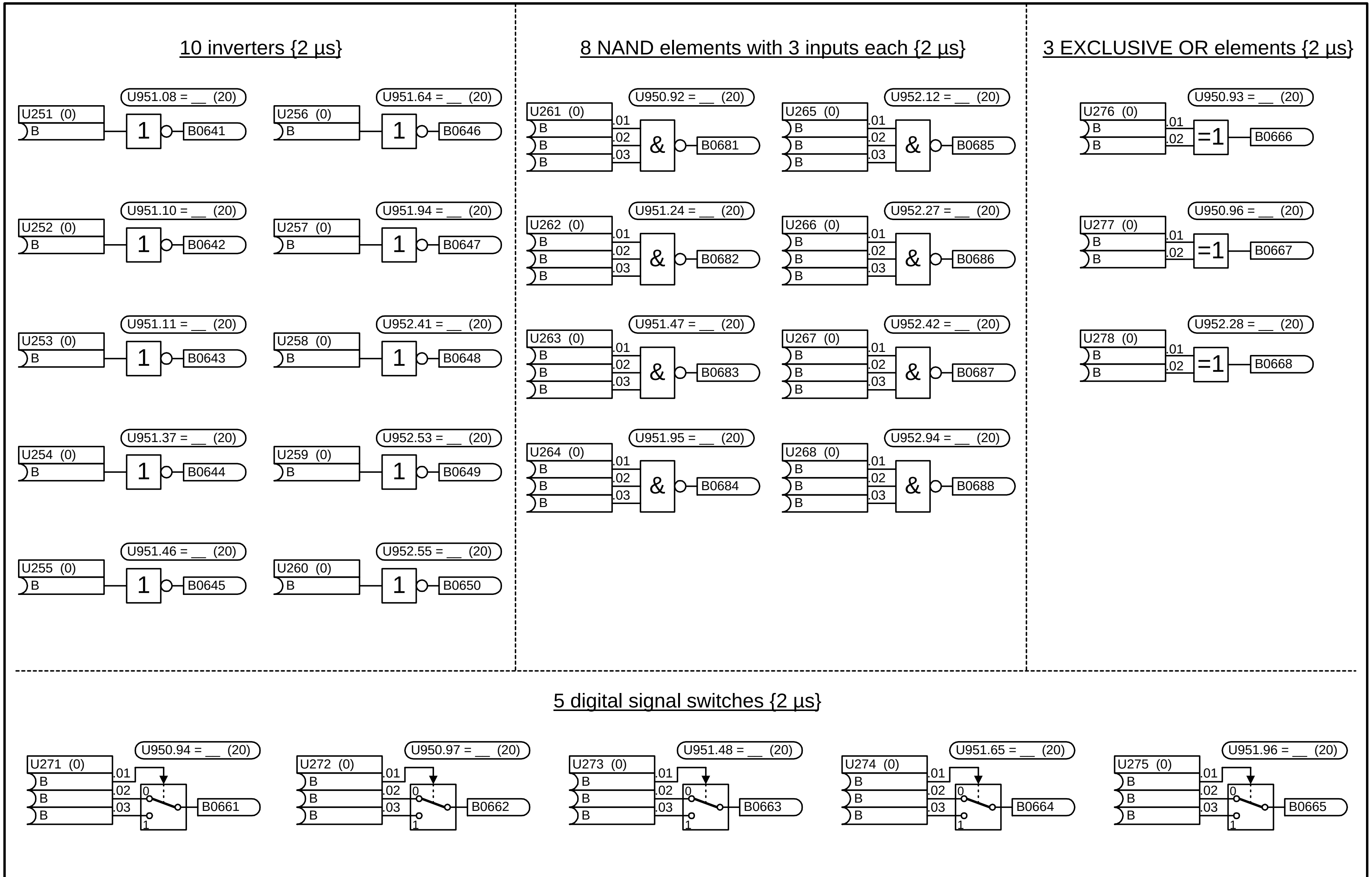
18 AND elements with 3 inputs each {3 µs}

12 OR elements with 3 inputs each {3 µs}



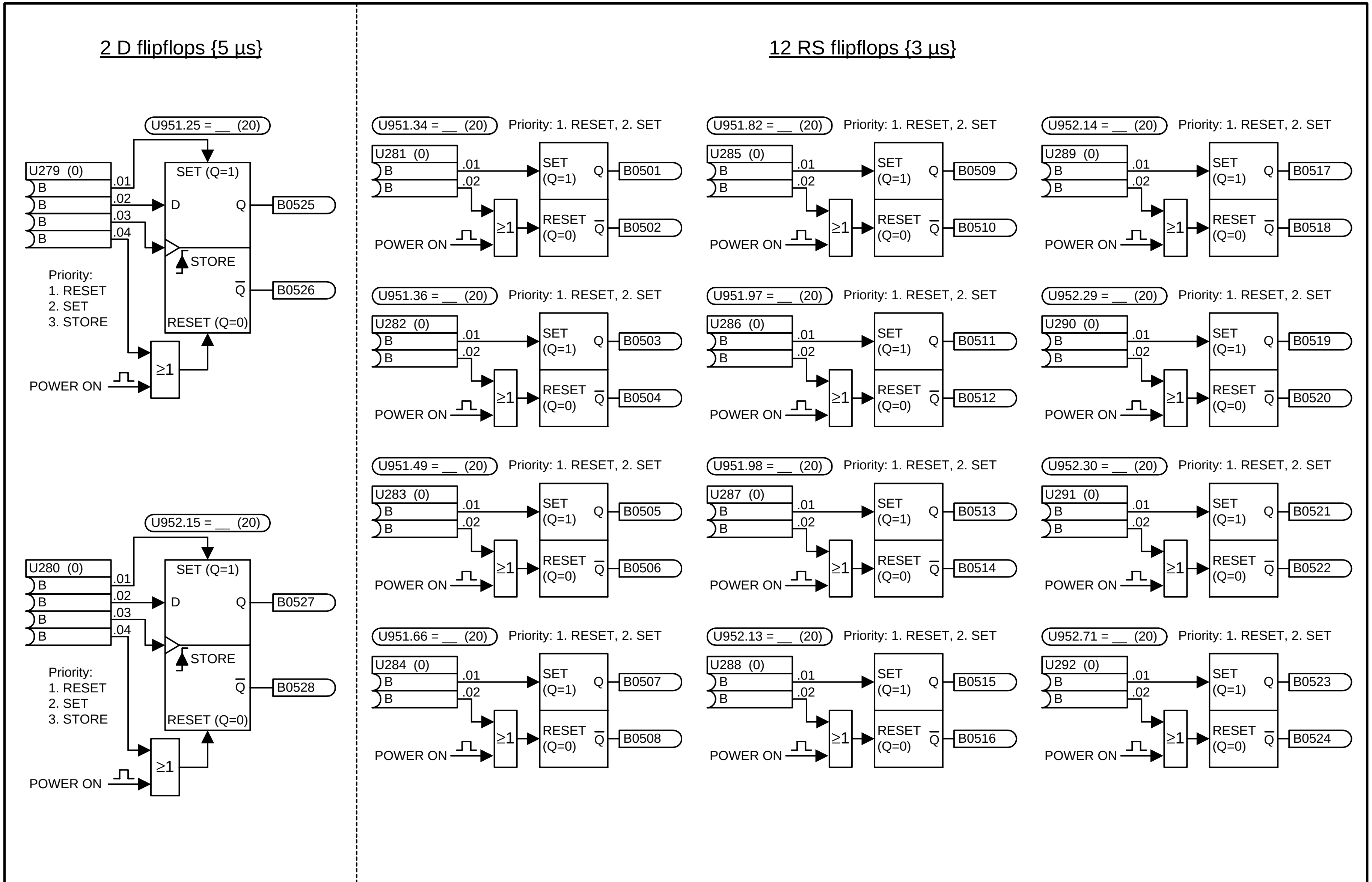
1	2	3	4	5	6	7	8

Free blocks	fp_vc_765_e.vsd	Function diagram	- 765 -
AND/OR elements	02.11.98	MASTERDRIVES VC	



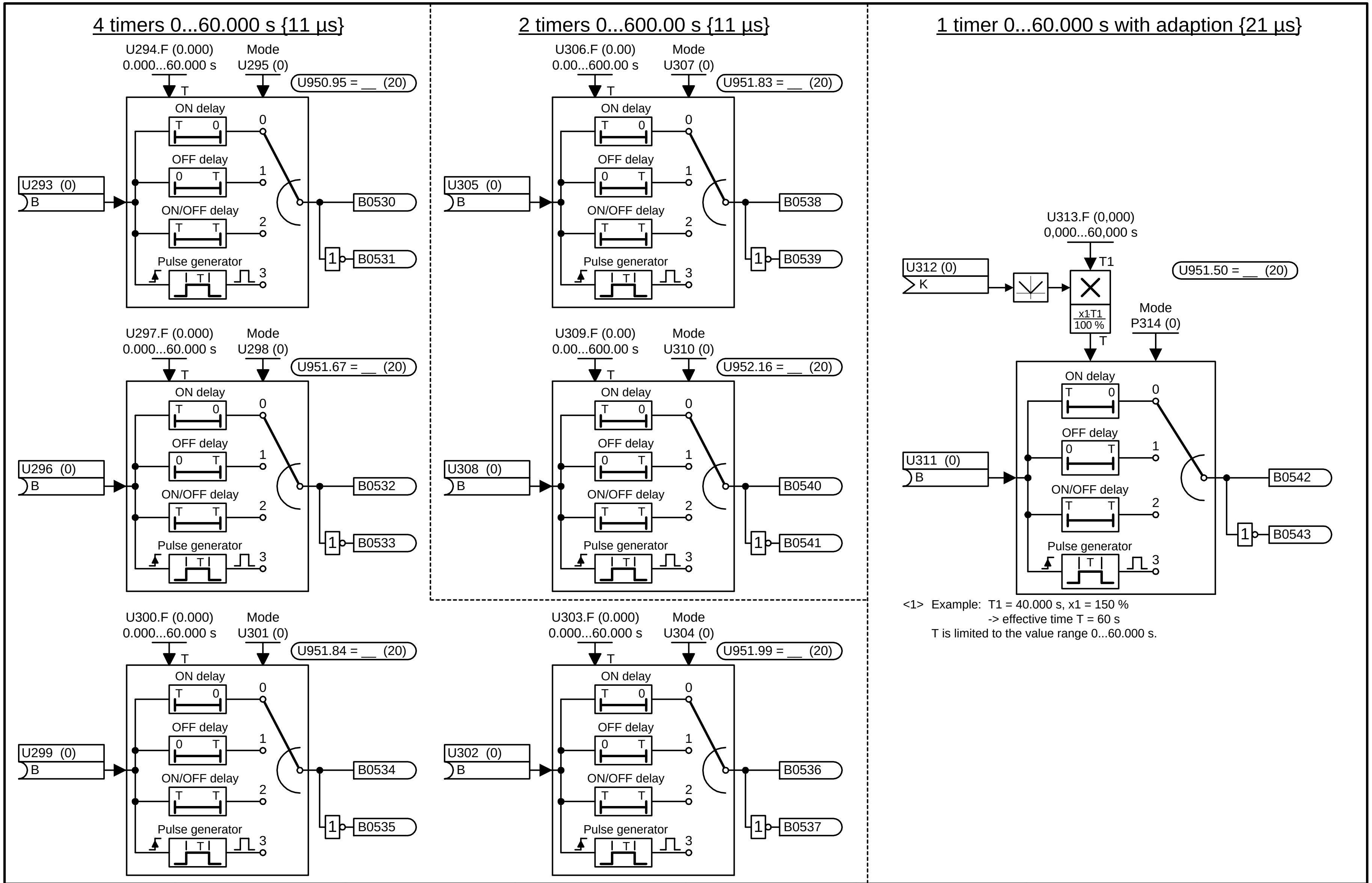
1	2	3	4	5	6	7	8

Free blocks	fp_vc_770_e.vsd	Function diagram	- 770 -
Inverters, NAND elements, EXCLUSIVE OR elements, digital signal switches	02.11.98	MASTERDRIVES VC	



1	2	3	4	5	6	7	8

Free blocks	fp_vc_775_e.vsd	Function diagram	- 775 -
D and RS flipflops	02.11.98	MASTERDRIVES VC	

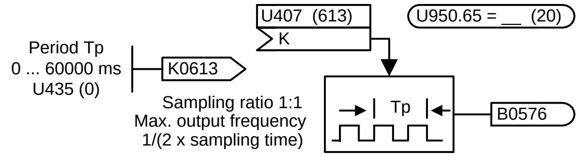


1	2	3	4	5	6	7	8

Free blocks	fp_vc_780_e.vsd	Function diagram	- 780 -
Timers	02.11.98	MASTERDRIVES VC	

New Blocks (from V3.2 and higher)

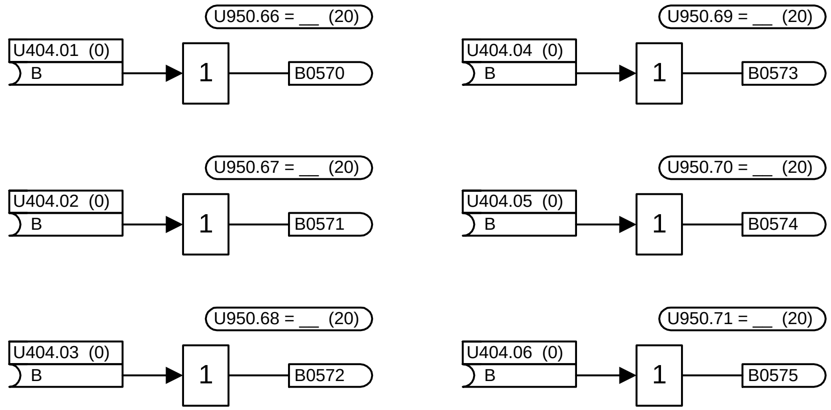
1 Pulse generator (flash encoder) {5 µs / 15 µs if Tp is changed}



Note: The implemented period Tp is always an integral multiple of (2 x sampling time).

Example: Tab = 3.2 ms
Tp = 10 ms
Implemented period = 6.4 ms

6 sampling time changers for control signals {1 µs}

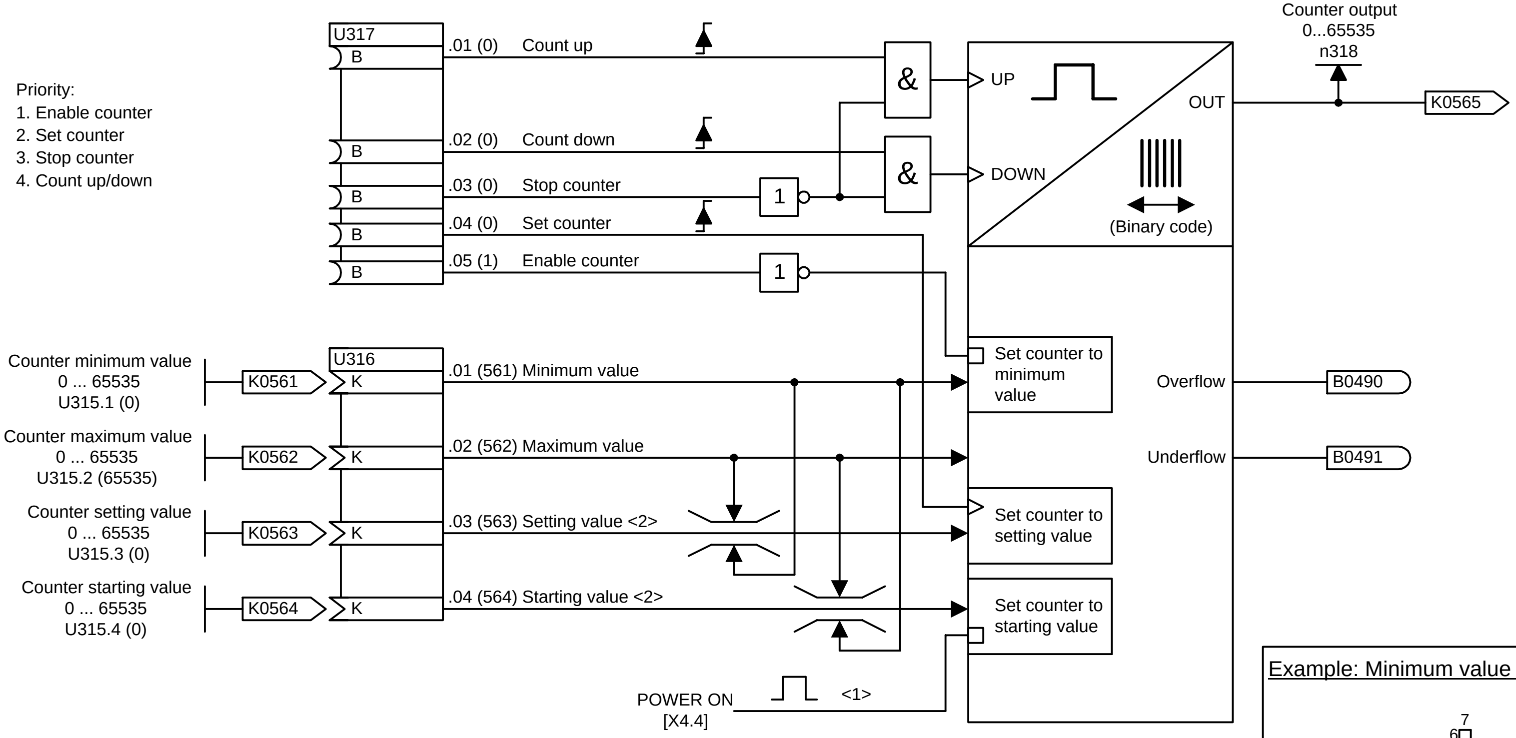


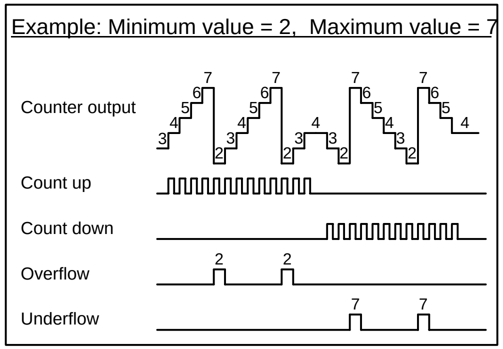
The block does not have any logic function.
It only transfers a digital signal consistently from a faster sampling time to a slower one.
The block ensures that the signal has the same value in the slow sampling time for all "consumers" (signal sinks).

U951.38 = ___(20)

Software counter 16 bit (maximum counting frequency: 1/sampling time) {8 µs}

<3>



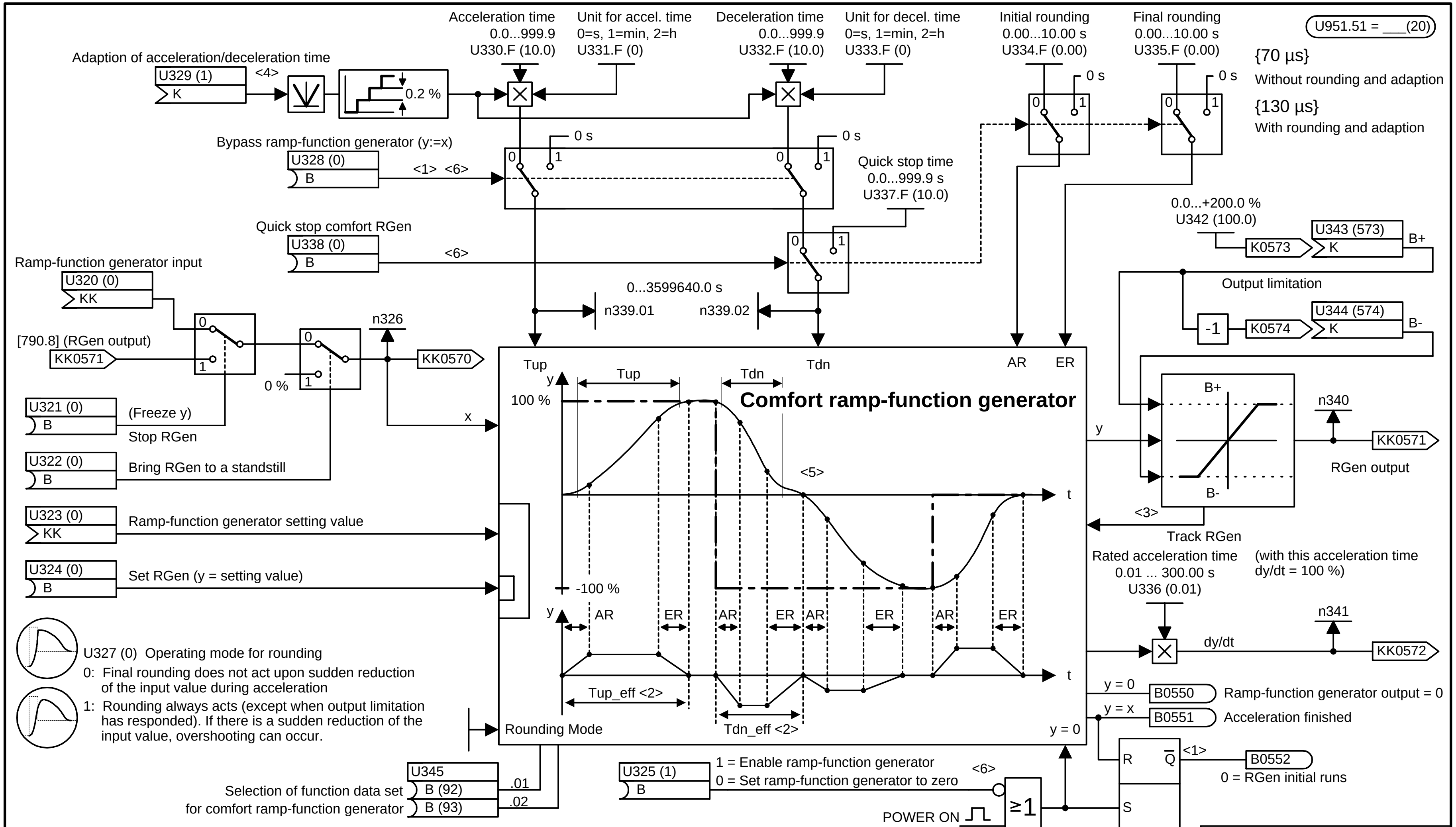


<1>After POWER ON the counter is set to the starting value.

<2>Starting value and setting value are limited to the range (minimum value... maximum value).

<3>Example: The counter is operating in the 3.2 ms time slot -> max. counting frequency 310 Hz.

Attention: The sampling time and sampling sequence of the upstream signal processing has to be taking into account!

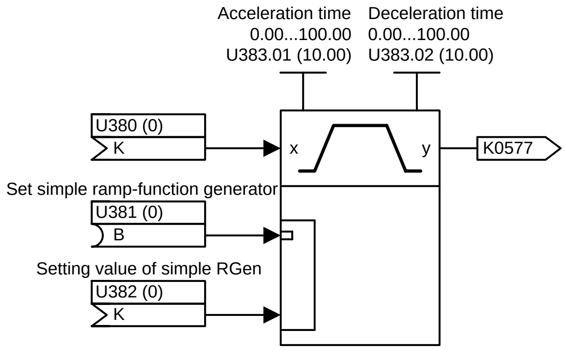


<1> At U328 = 552 the RGen only acts once in each case after enabling (^ edge)
<2> Effective accel.time: Tup_eff = Tup * adaption factor + (AR/2 + ER/2)/adaption factor
Effective decel.time: Tdn_eff = Tdn * adaption factor + (AR/2 + ER/2)/adaption factor
(If adaption is used, the jerk remains the same)
<3> Ramp-function generator is tracked when a limitation responds (y:=RGen output)
<4> Rounding and adaption do not act with the 'min' or 'h' unit for accel./decel. time
<5> Rounding also acts during a zero passage

<6> Priority of control commands:
1. Set RGen to zero
2. Quick stop comfort RGen
3. Set ramp-function generator
4. Bypass RGen (y:=x)
5. Bring RGen to a standstill
6. Stop ramp-function generator

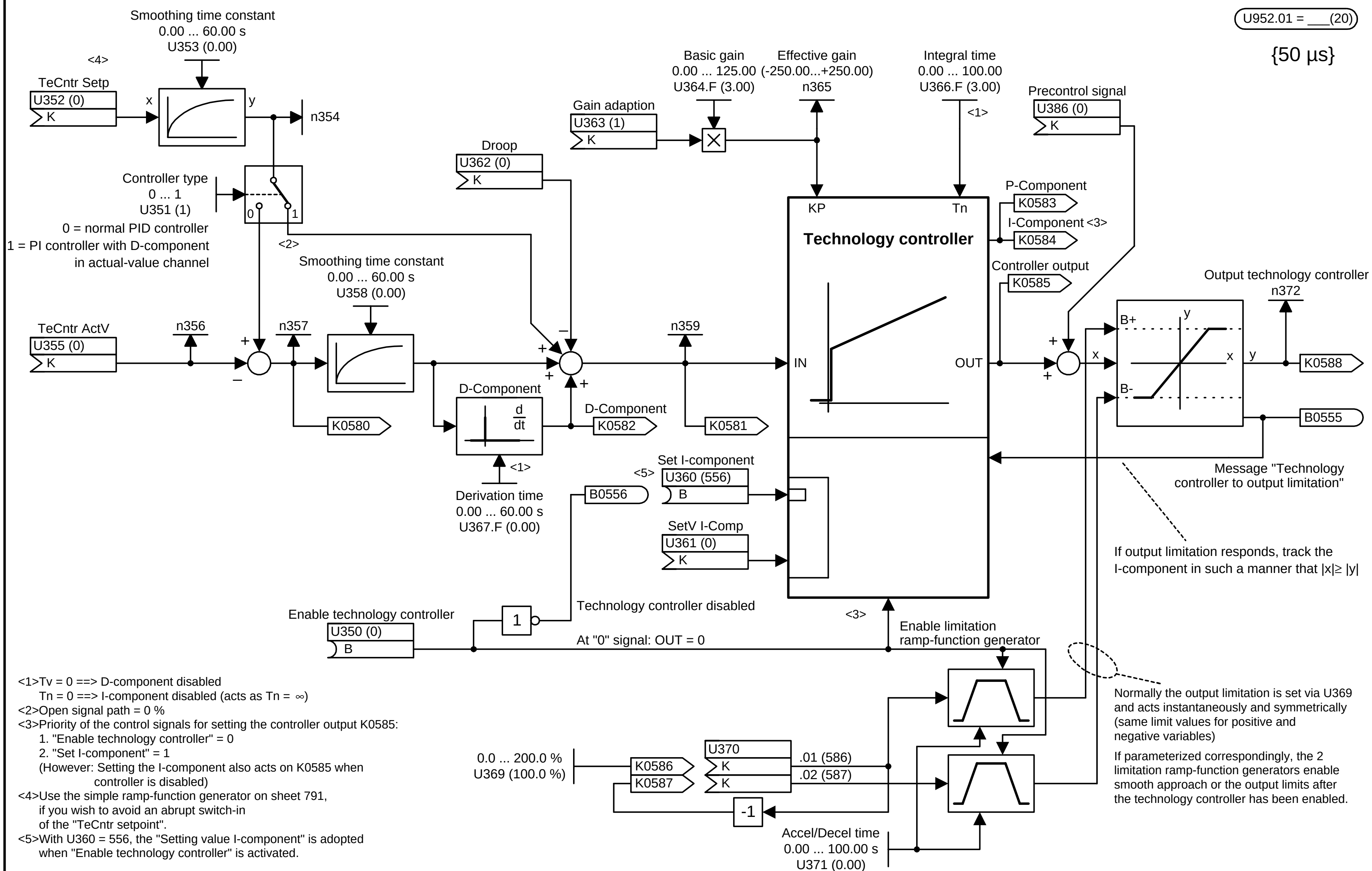
U951.87 = __ (20)

Simple ramp-function generator {12 µs}



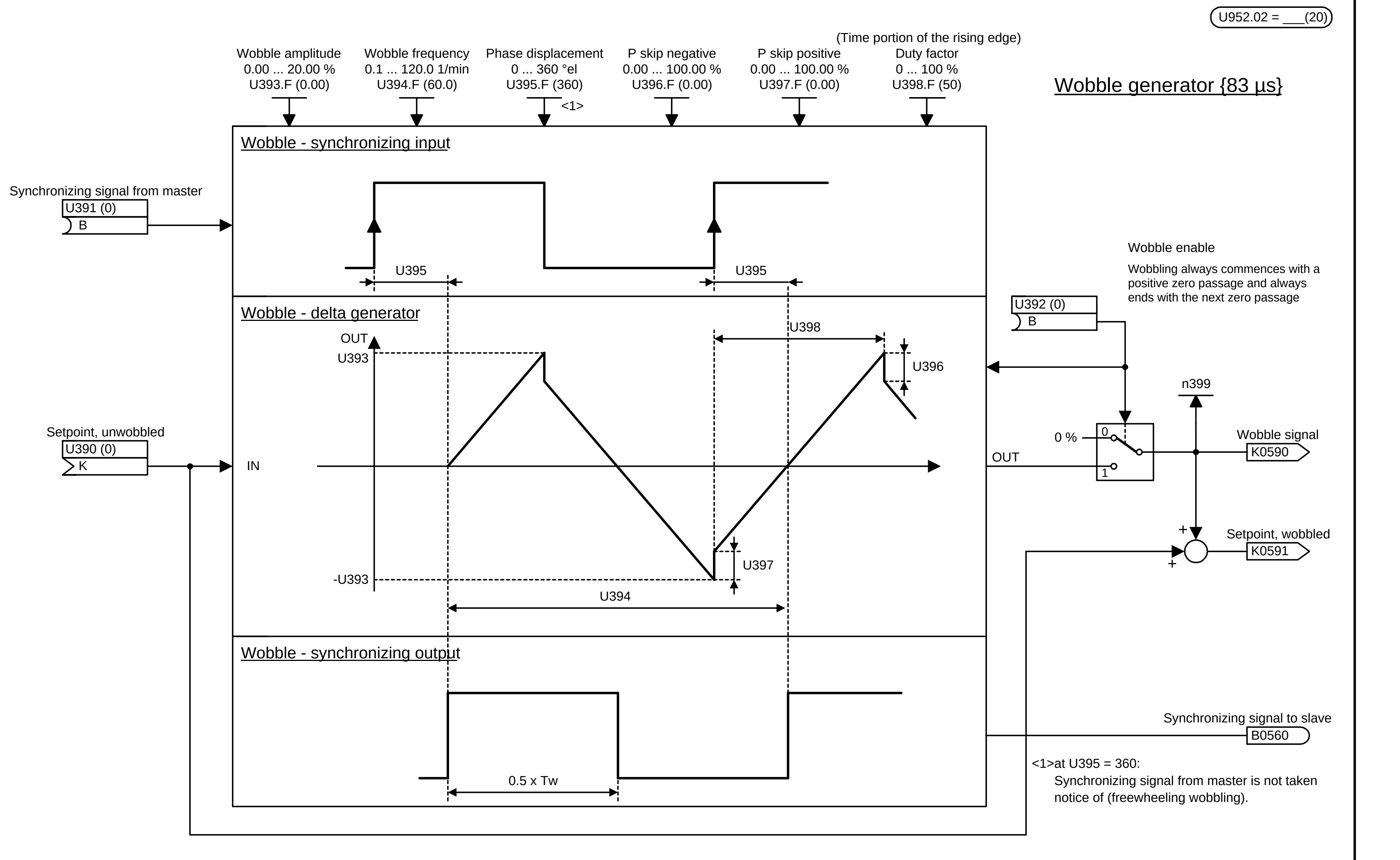
If you wish to use the simple ramp-function generator as a setpoint ramp function generator for the technology controller, the following signal connection can be recommended:

- Output of simple ramp-function generator	==> Setpoint input of technology controller	(U352 = 577) [792.1]
- Technology controller disabled	==> Set simple ramp-function generator	(U381 = 556) [792.3]
- Actual-value technology controller	==> Setting value of simple ramp-function generator	(U382 = value of U335) [792.1]



<1>Tv = 0 ==> D-component disabled
Tn = 0 ==> I-component disabled (acts as Tn = ∞)
<2>Open signal path = 0 %
<3>Priority of the control signals for setting the controller output K0585:
1. "Enable technology controller" = 0
2. "Set I-component" = 1
(However: Setting the I-component also acts on K0585 when controller is disabled)
<4>Use the simple ramp-function generator on sheet 791, if you wish to avoid an abrupt switch-in of the "TeCntr setpoint".
<5>With U360 = 556, the "Setting value I-component" is adopted when "Enable technology controller" is activated.

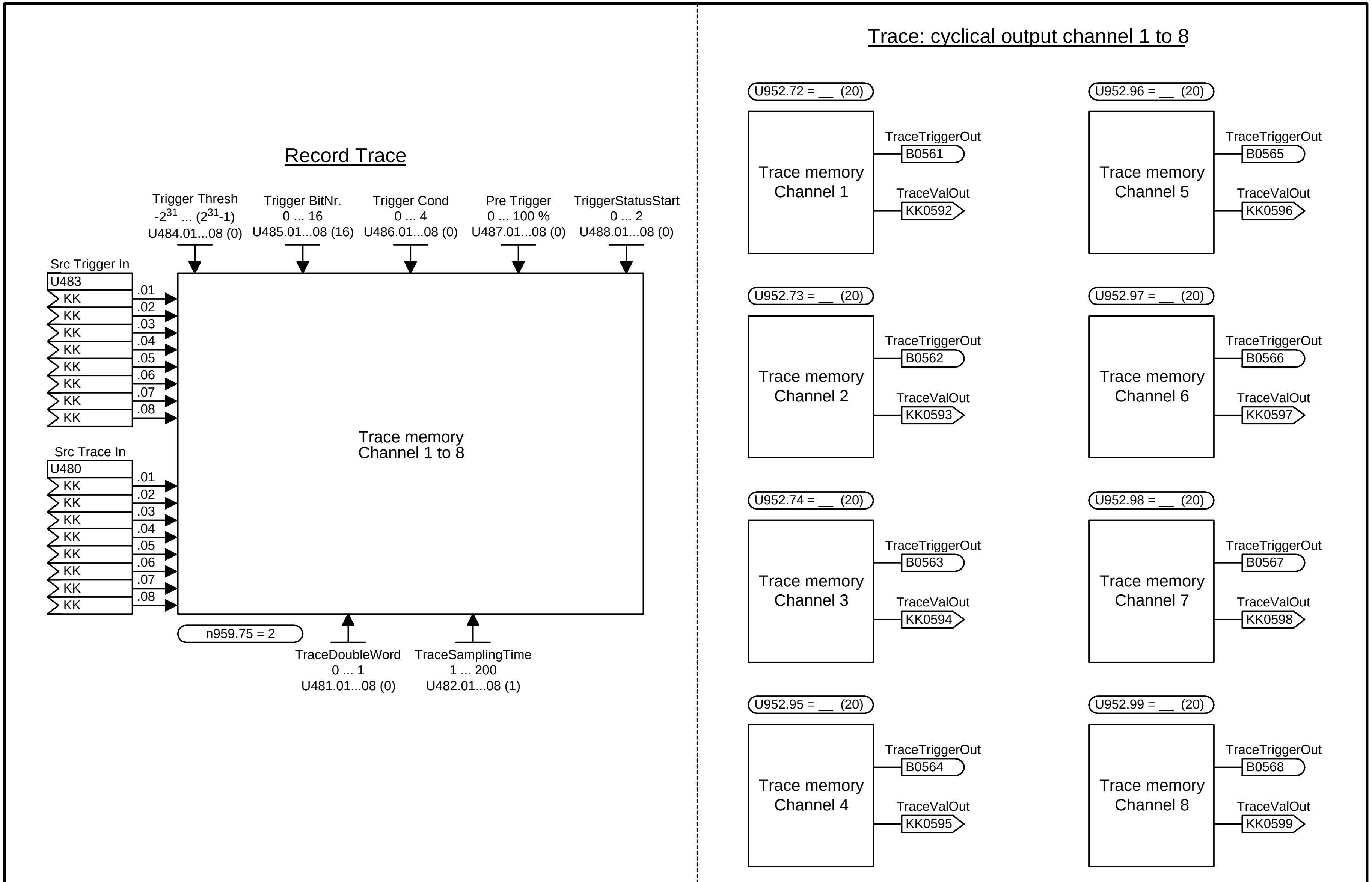
1	2	3	4	5	6	7	8



1	2	3	4	5	6	7	8

Free blocks | fp_vc_795_e.vsd | Function diagram

Wobble generator | 03.07.00 | MASTERDRIVES VC

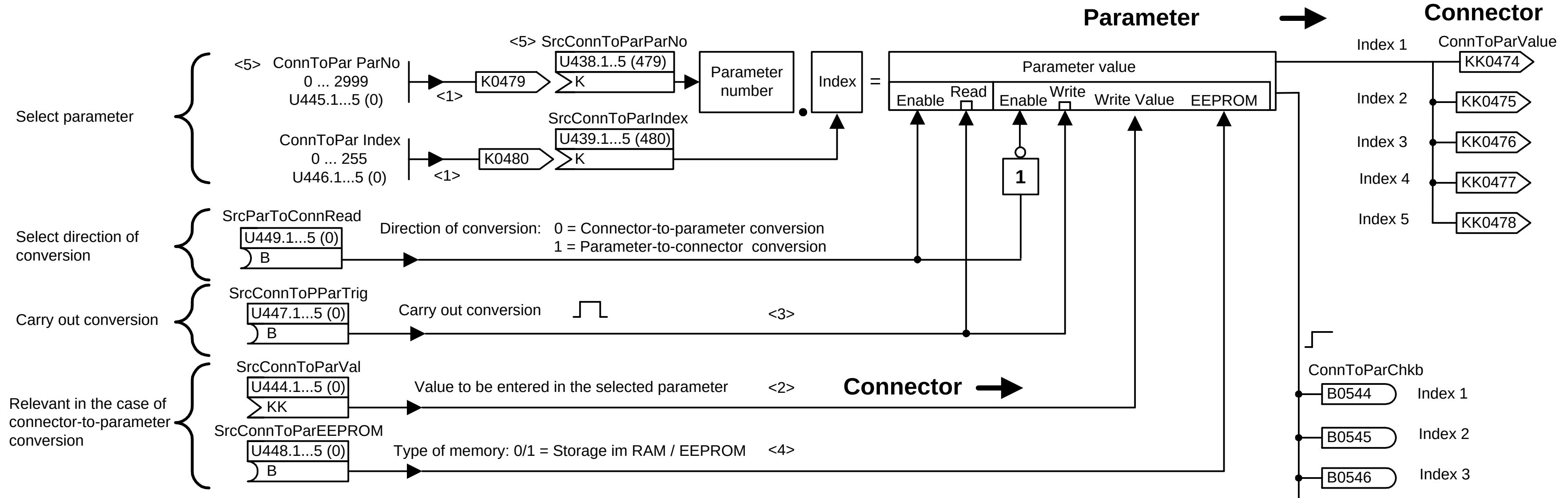

Record Trace
Trigger Thresh
-2^{31} ... $(2^{31}-1)$
U484.01...08 (0)
Trigger BitNr.
0 ... 16
U485.01...08 (16)
Trigger Cond
0 ... 4
U486.01...08 (0)
Pre Trigger
0 ... 100 %
U487.01...08 (0)
TriggerStatusStart
0 ... 2
U488.01...08 (0)
Src Trigger In
U483
KK .01
KK .02
KK .03
KK .04
KK .05
KK .06
KK .07
KK .08
Src Trace In
U480
KK .01
KK .02
KK .03
KK .04
KK .05
KK .06
KK .07
KK .08
Trace memory
Channel 1 to 8
n959.75 = 2
TraceDoubleWord
0 ... 1
U481.01...08 (0)
TraceSamplingTime
1 ... 200
U482.01...08 (1)
Trace: cyclical output channel 1 to 8
U952.72 = __ (20)
Trace memory Channel 1
TraceTriggerOut B0561
TraceValOut KK0592
U952.73 = __ (20)
Trace memory Channel 2
TraceTriggerOut B0562
TraceValOut KK0593
U952.74 = __ (20)
Trace memory Channel 3
TraceTriggerOut B0563
TraceValOut KK0594
U952.95 = __ (20)
Trace memory Channel 4
TraceTriggerOut B0564
TraceValOut KK0595
U952.96 = __ (20)
Trace memory Channel 5
TraceTriggerOut B0565
TraceValOut KK0596
U952.97 = __ (20)
Trace memory Channel 6
TraceTriggerOut B0566
TraceValOut KK0597
U952.98 = __ (20)
Trace memory Channel 7
TraceTriggerOut B0567
TraceValOut KK0598
U952.99 = __ (20)
Trace memory Channel 8
TraceTriggerOut B0568
TraceValOut KK0599

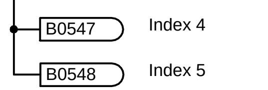
1	2	3	4	5	6	7	8

n959.76 = 6

5 Connector-to-parameter/ parameter-to-connector converters

Block is not calculated in T6!
Time of processing of block is not defined!



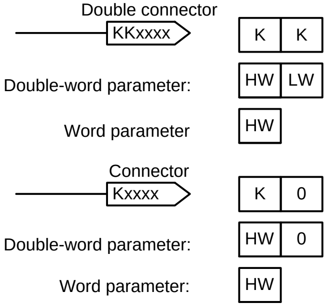


1 = Parameter transfer OK
0 = Parameter transfer not OK

<1> Internally, the parameter numbers or the indices of all five index places (1 to 5) are passed on via the connector. Only the value of the first index is displayed via the connector.
<2> Word parameter should be written via connectors, and double-word parameters via double connectors.
<3> Consult the parameter list in the Compendium to find out the operating states in which a parameter change can be made.
<4> In the case of dynamic signals, the RAM must be used for storage (a parameter can only be written 100 000 times in the EPROM)
<5> U and n parameters are addressed with Uxxx = 2xxx and nxxx=2xxx .

Important:
Parameters must be specified in decimal form (incl. decimal places) and are signalled back in decimal form as well (PKW normalization).

Value entered in parameter <2>:



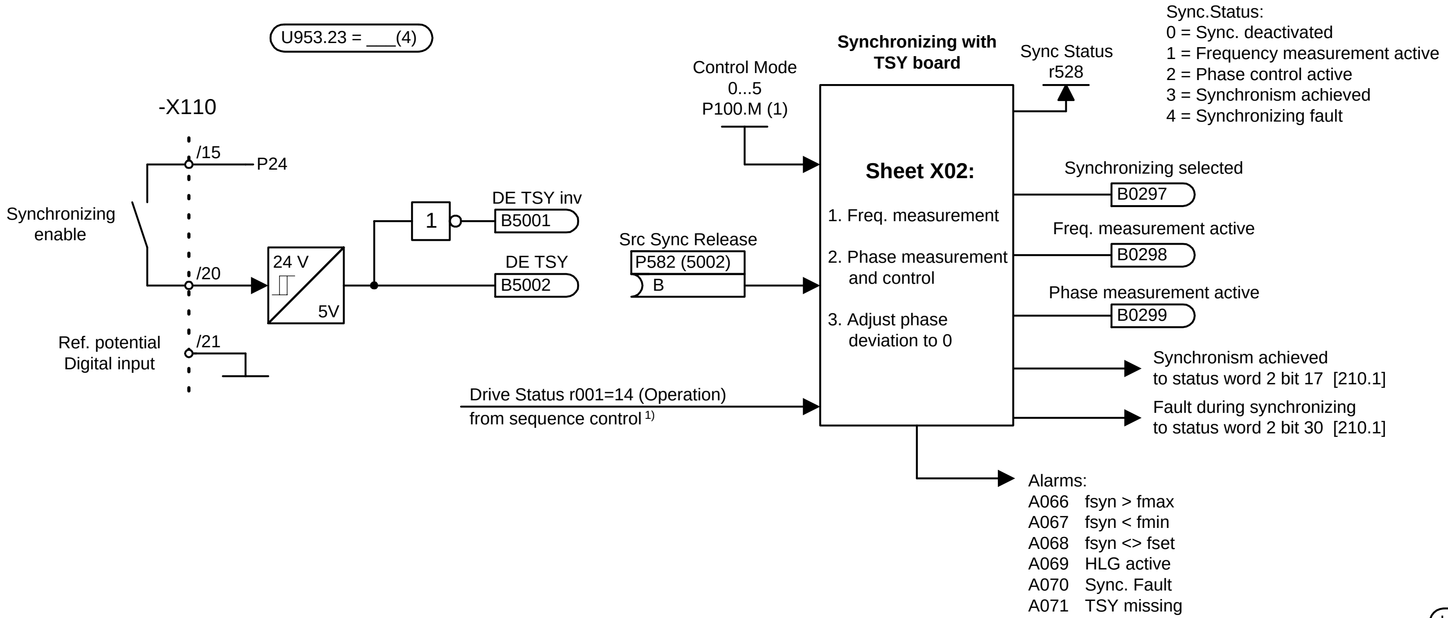
1 Example of connector-to-parameter conversion:
The value of connector K0409 should be fed to parameter U279.02. Alteration in the RAM ==>
- U445.1=2279 (parameter number)
- U446.1=2 (index)
- U449.1=0 (connector-parameter conversion)
- U447.1=1 (permanent transfer)
- U444.1=409 (source connector)
- U448.1=0 (write into the RAM)

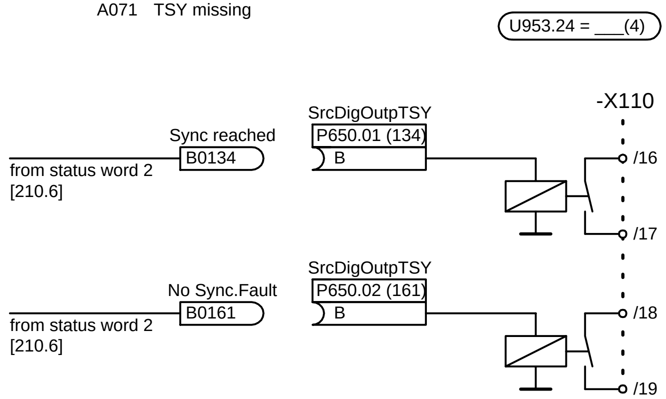
2 Another example of connector-to-parameter conversion:
The parameter "Source n/f (act)" is to be set to 94 (corresponds to SBP setpoint channel 1) ==>
- U445.1 = 222
- U446.1 = 1
- U449.1 = 0
- U447.1 = 1
- U444.1=409 (source connector)
- U448.1=0 (write into the RAM)
For this purpose, set U009 = 148 (= 94 Hex, as source connector) !

Please note that the values of "source" parameters are always hexadecimal values. Thus in U009 the converted decimal value has to be provided.

3 Example of parameter-to-connector conversion:
Parameter P103 is to be connected to connector KK0477 ==>
- U444.4 = 477
- U445.4=103 (parameter number)
- U446.4=0 (non-indexed parameter)
- U449.4=1 (parameter-connector conversion)
- U447.4=1 (permanent output)

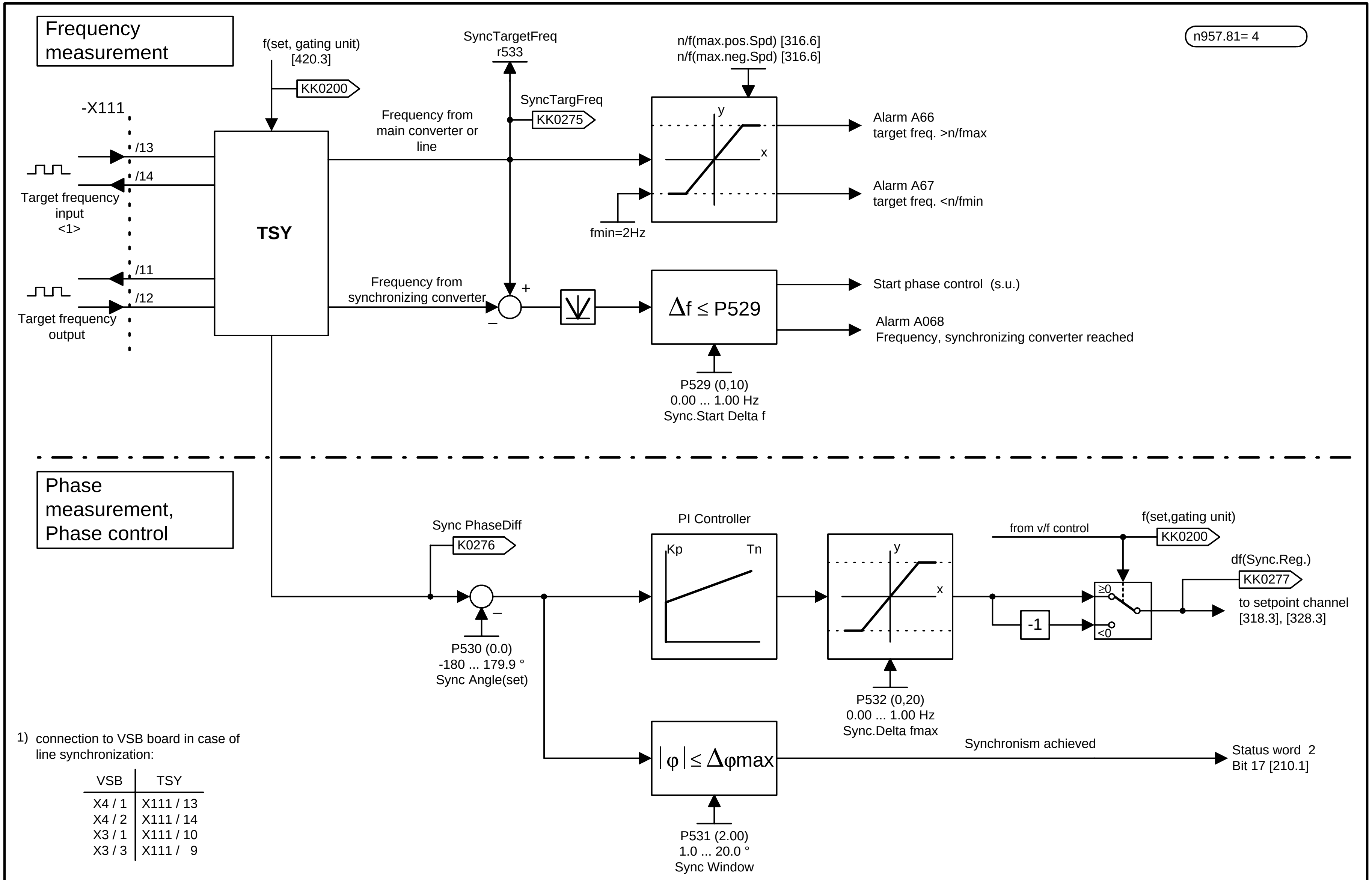
MASTERDRIVES VC function diagram - List of contents of the supplementary boards





Synchronizing:
- Converter (P534 = 1):
  The reference frequency of the synchronizing converter has to be run to the frequency of the main converter (target frequency).
- Line (P534 = 2):
  The synchronizing enable shall be granted after pulse enable in the case of the starting converter, before pulse enable in the case of the return converter.
  The direction of rotation enable is granted in P571 or P572.

1) The sequence control is the internal control (software) for implementing the drive status (r001).



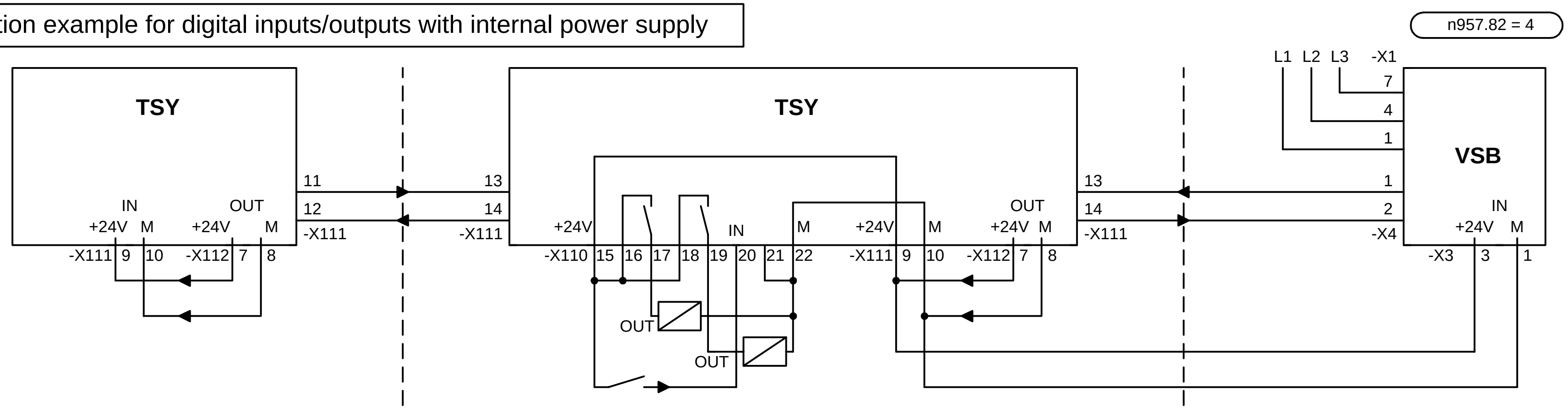
1) connection to VSB board in case of line synchronization:

VSB	TSY
X4 / 1	X111 / 13
X4 / 2	X111 / 14
X3 / 1	X111 / 10
X3 / 3	X111 / 9

1	2	3	4	5	6	7	8

TSY Board	Not with Compact PLUS!	fp_vc_X02_e.vsd	Function diagram	- X02 -
Synchronizing status: Phase control and frequency measurement		24.07.01	MASTERDRIVES VC	

Connection example for digital inputs/outputs with internal power supply

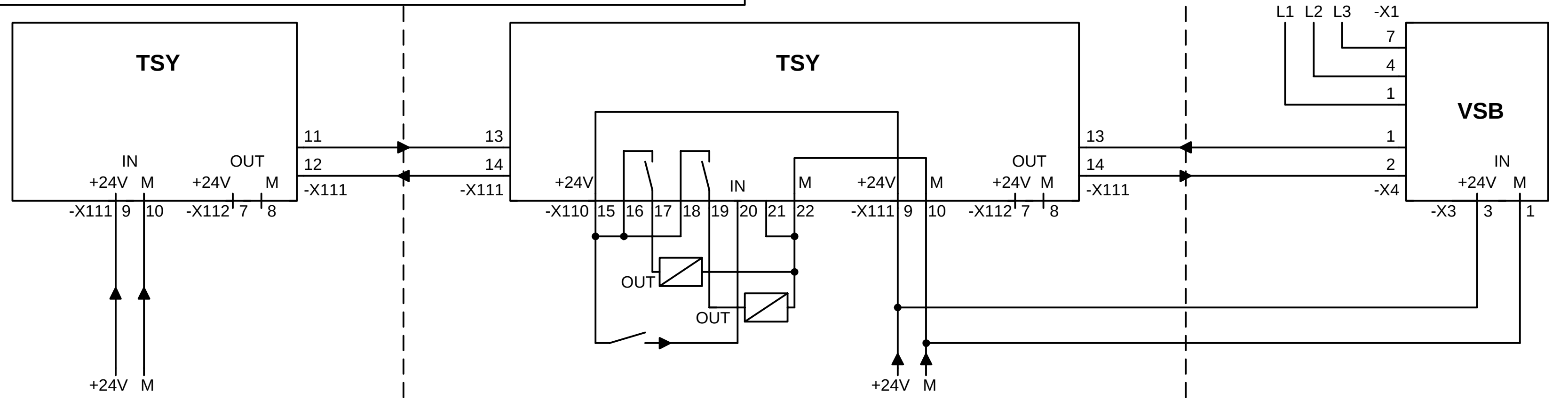


For converter synchronization (main converter)

Synchronizing converter (ramp-up or ramp-down converter)

For line synchronization (voltage sensing)

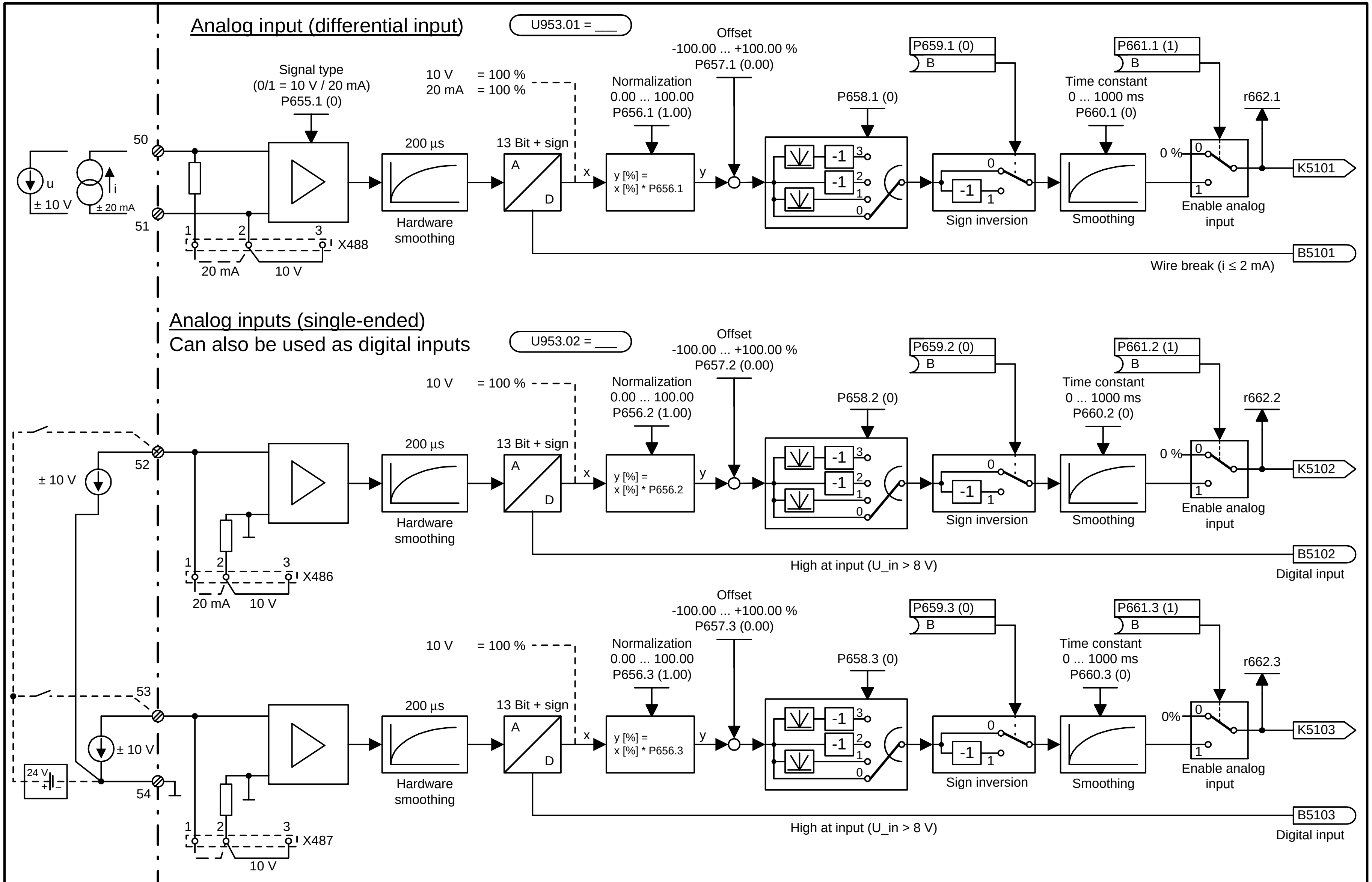
Connection example for digital inputs/outputs with external power supply



For converter synchronization (main converter)

Synchronizing converter (ramp-up or ramp-down converter)

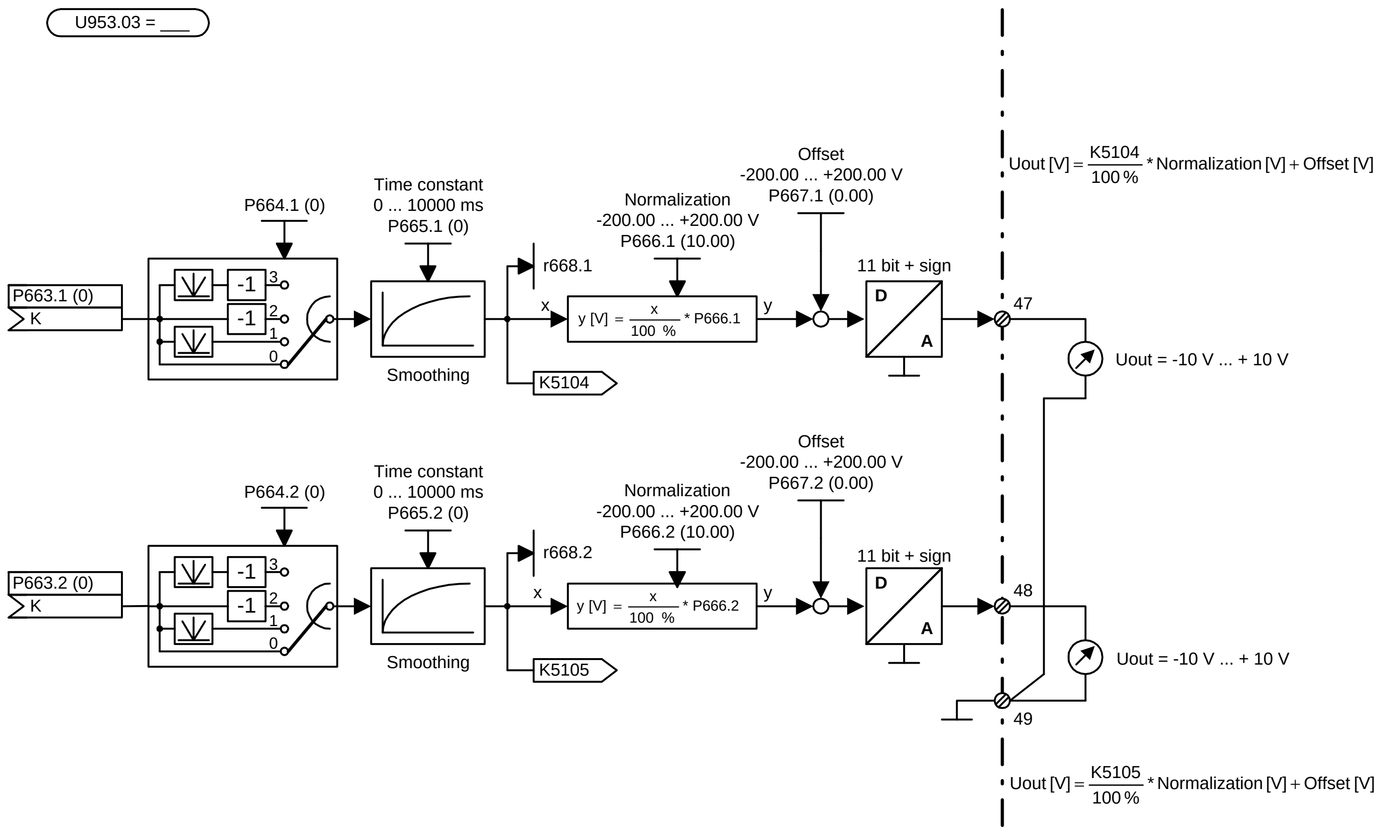
For line synchronization (voltage sensing)



1	2	3	4	5	6	7	8

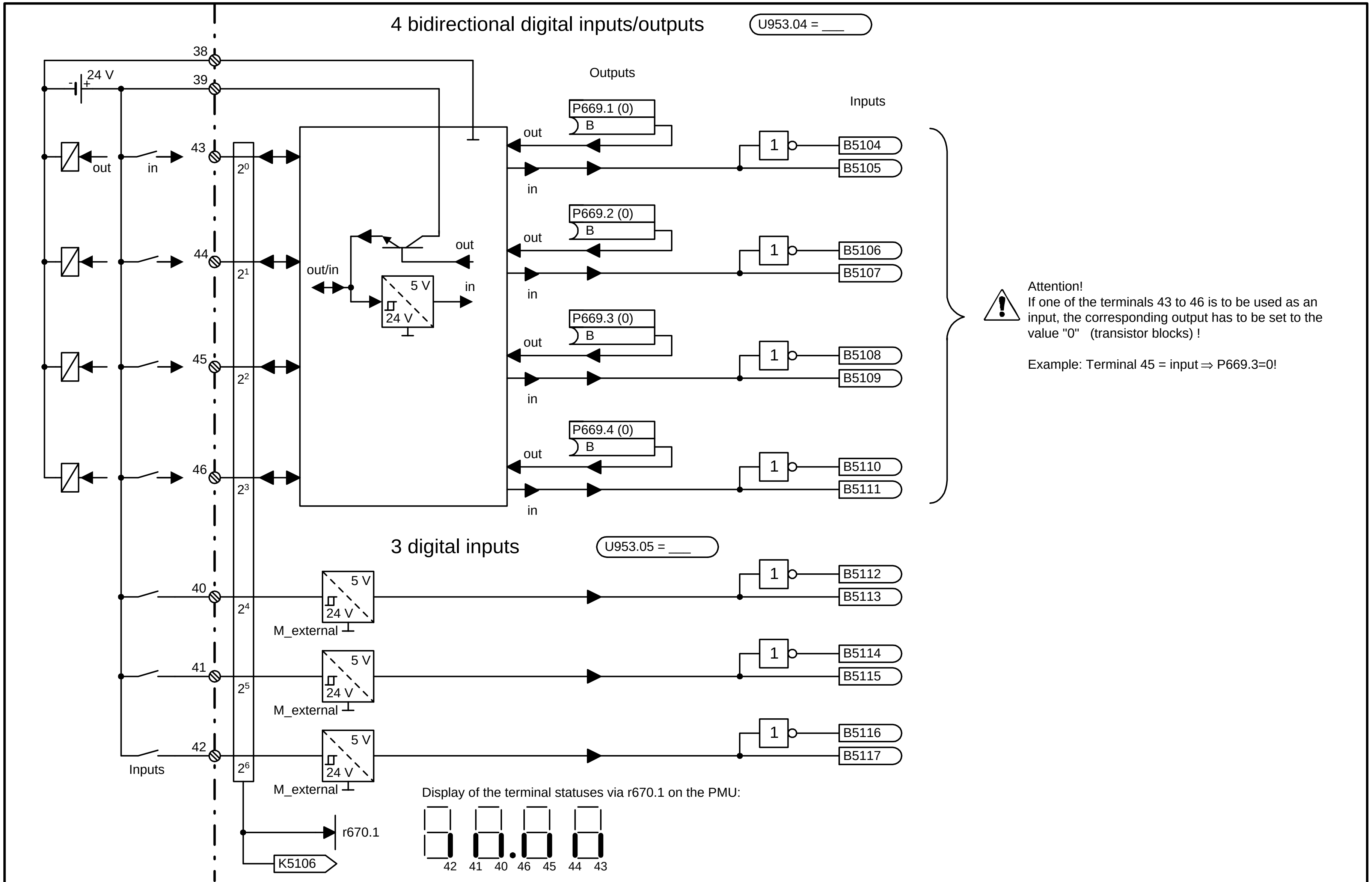
Terminal expansion EB1 No. 1	fp_vc_Y01_e.vsd	Function diagram	- Y01 -
Analog inputs, combined digital inputs	01.08.1998	MASTERDRIVES VC	

Analog outputs



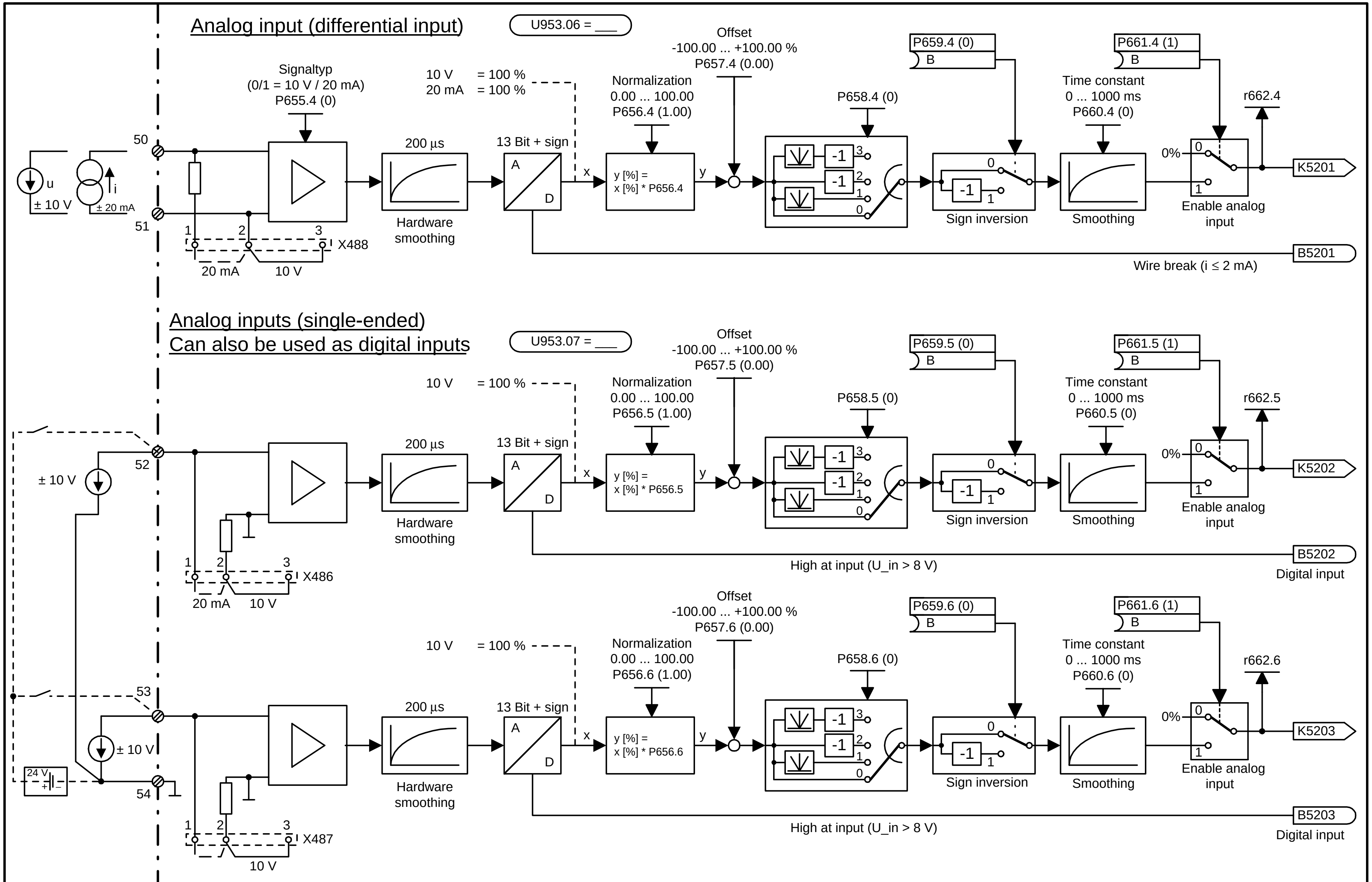
1	2	3	4	5	6	7	8

Terminal expansion EB1 No. 1	fp_vc_Y02_e.vsd	Function diagram	- Y02 -
Analog outputs	12.10.01	MASTERDRIVES VC	



1	2	3	4	5	6	7	8

Terminal expansion EB1 No. 1	fp_vc_Y03_e.vsd	Function diagram	- Y03 -
Digital inputs/outputs	01.08.1998	MASTERDRIVES VC	

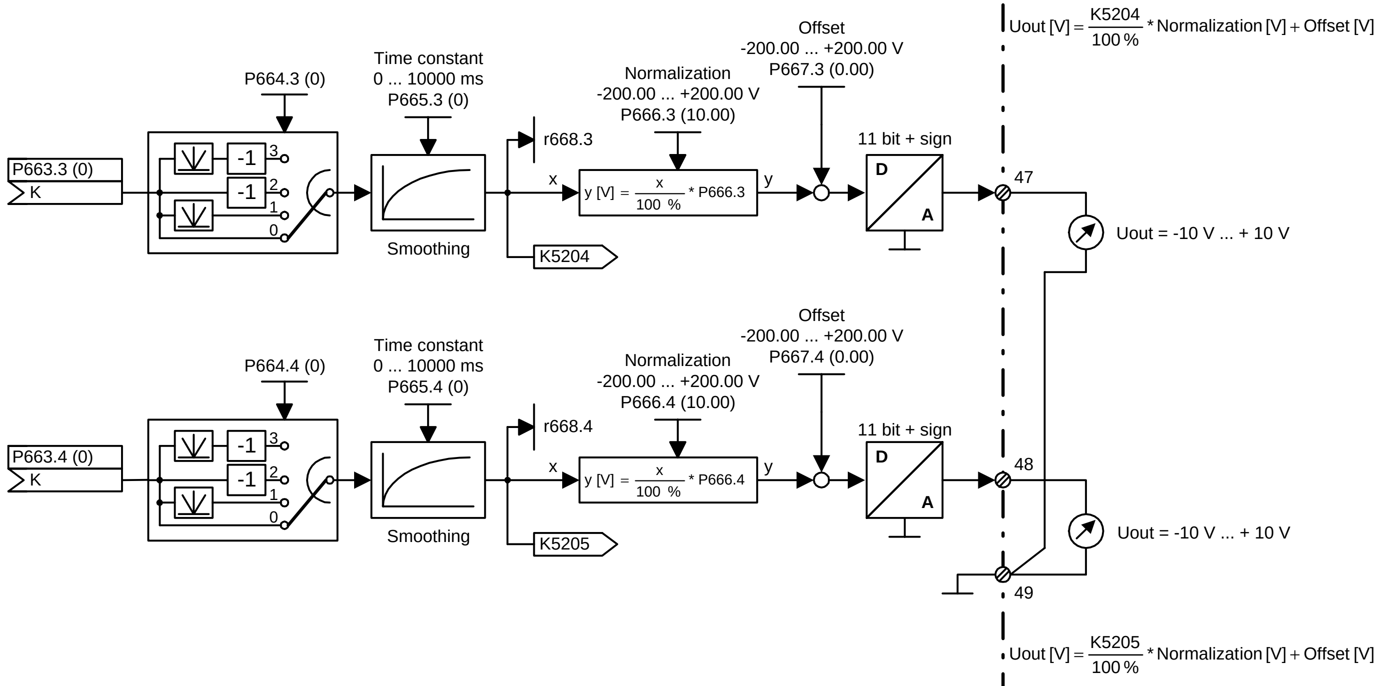


1	2	3	4	5	6	7	8

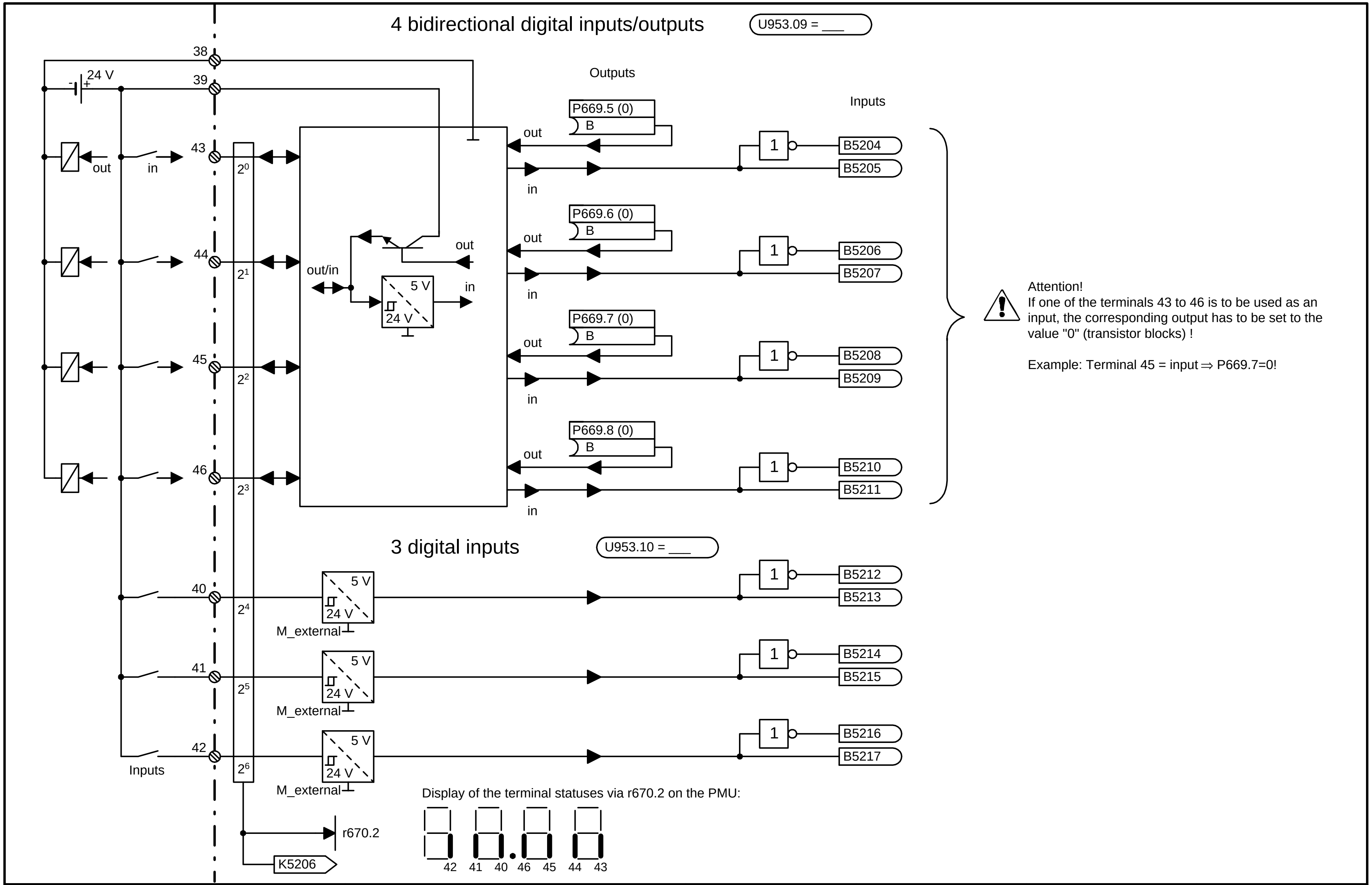
Terminal expansion EB1 No. 2	fp_vc_Y04_e.vsd	Function diagram	- Y04 -
Analog inputs, combined digital inputs	01.08.1998	MASTERDRIVES VC	

Analog outputs

U953.08 = ___

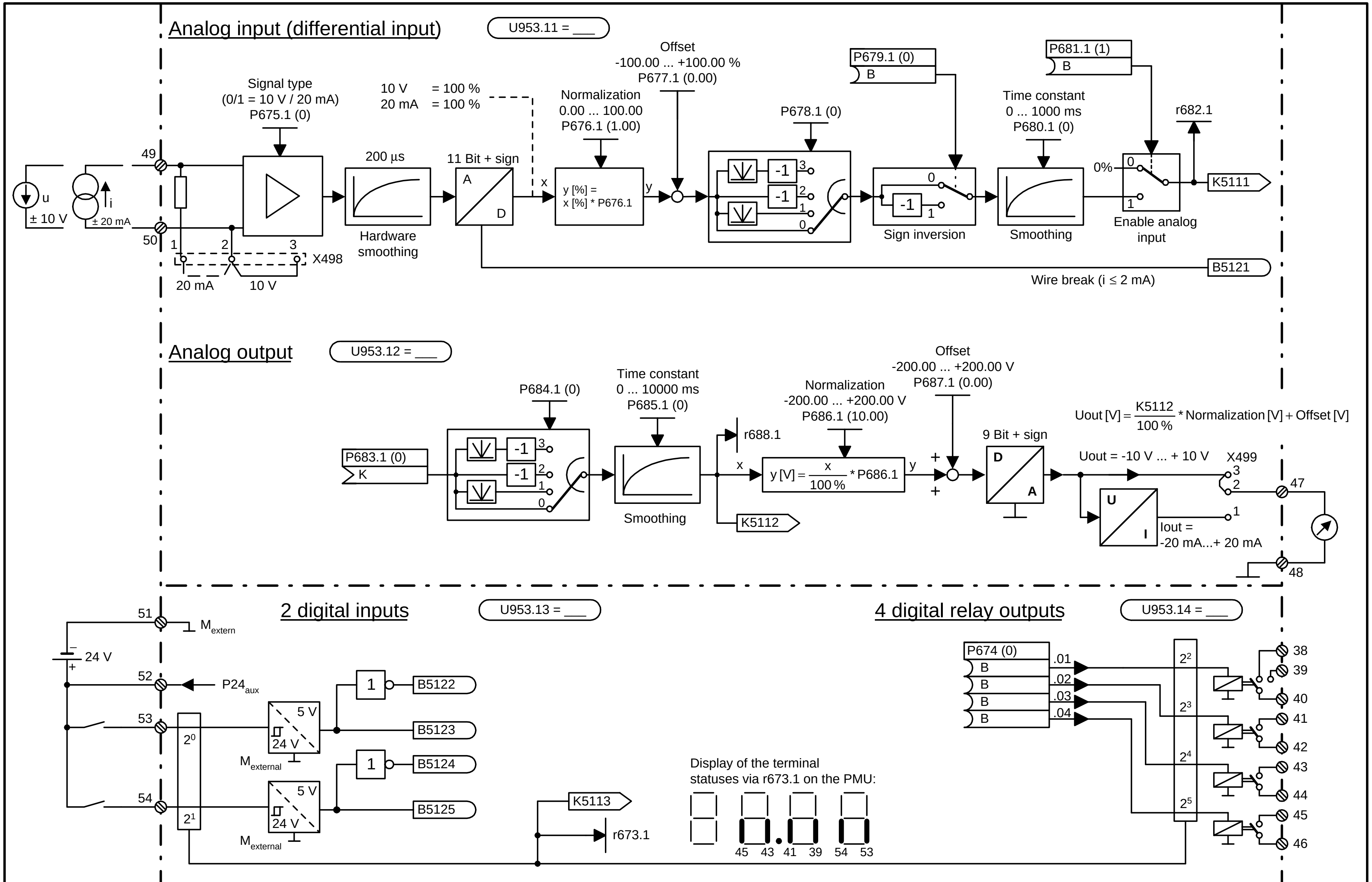


1	2	3	4	5	6	7	8
Terminal expansion EB1 No. 2					fp_vc_Y05_e.vsd	Function diagram	- Y05 -
Analog outputs					12.10.01	MASTERDRIVES VC	



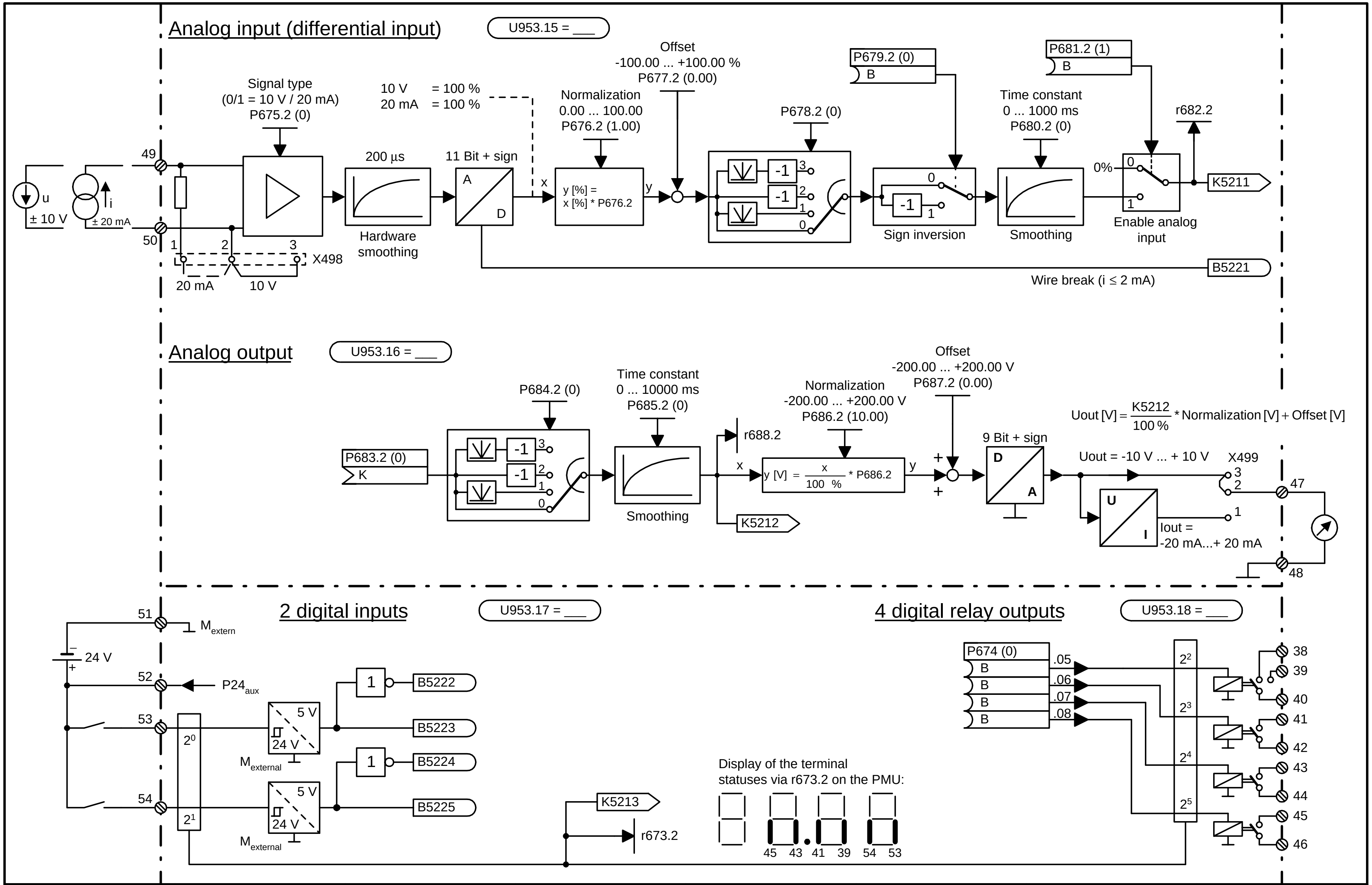
1	2	3	4	5	6	7	8

Terminal expansion EB1 No. 2	fp_vc_Y06_e.vsd	Function diagram	- Y06 -
Digital inputs/outputs	01.08.1998	MASTERDRIVES VC	



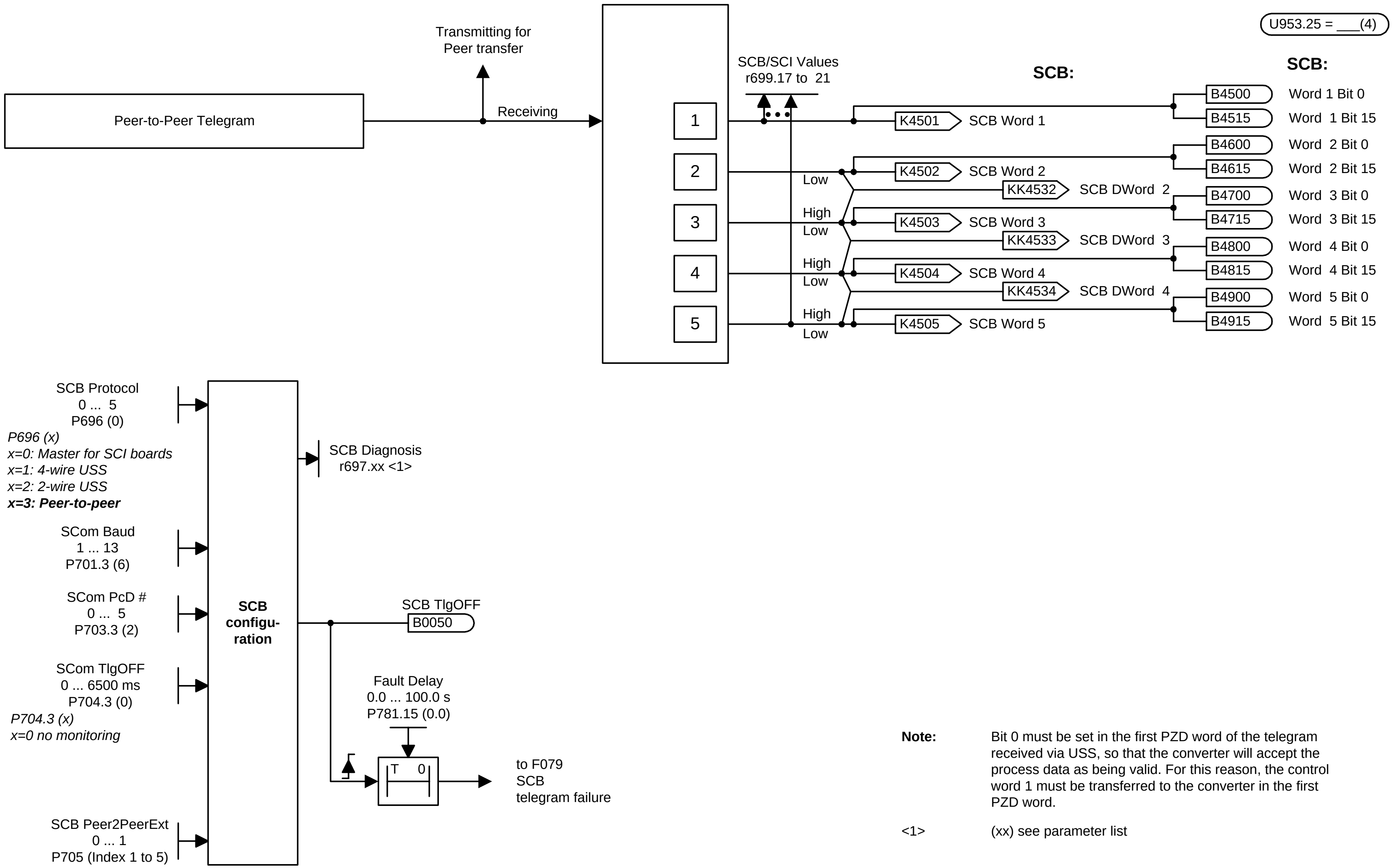
1	2	3	4	5	6	7	8

Terminal expansion EB2 No. 1	fp_vc_Y07_e.vsd	Function diagram	- Y07 -
analog and digital inputs/outputs	12.10.01	MASTERDRIVES VC	



1	2	3	4	5	6	7	8

Terminal expansion EB2 No. 2	fp_vc_Y08_e.vsd	Function diagram	- Y08 -
analog and digital inputs/outputs	12.10.01	MASTERDRIVES VC	

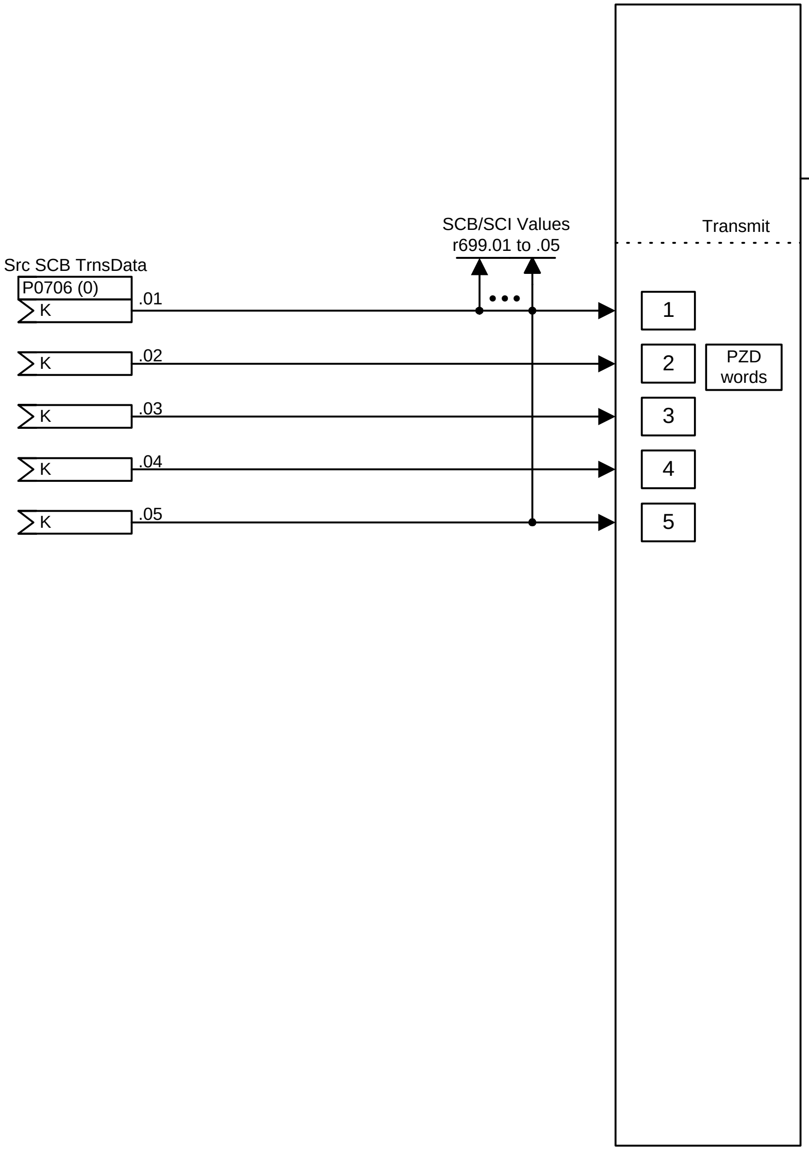


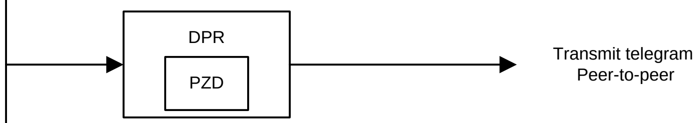
Note: Bit 0 must be set in the first PZD word of the telegram received via USS, so that the converter will accept the process data as being valid. For this reason, the control word 1 must be transferred to the converter in the first PZD word.

<1> (xx) see parameter list

1	2	3	4	5	6	7	8
SCB1/2					fp_vc_Z01_e.vsd	Function diagram	- Z01 -
Peer-to-peer receiving				Not with Compact PLUS!	16.05.01	MASTERDRIVES VC	

U953.26 = ___(4)

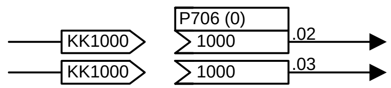




Transmitting 32 bit words:
If the same double-word connector is interconnected to two consecutive connector numbers, this is transferred as a 32-bit word.

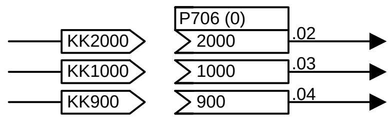
Examples:

1.



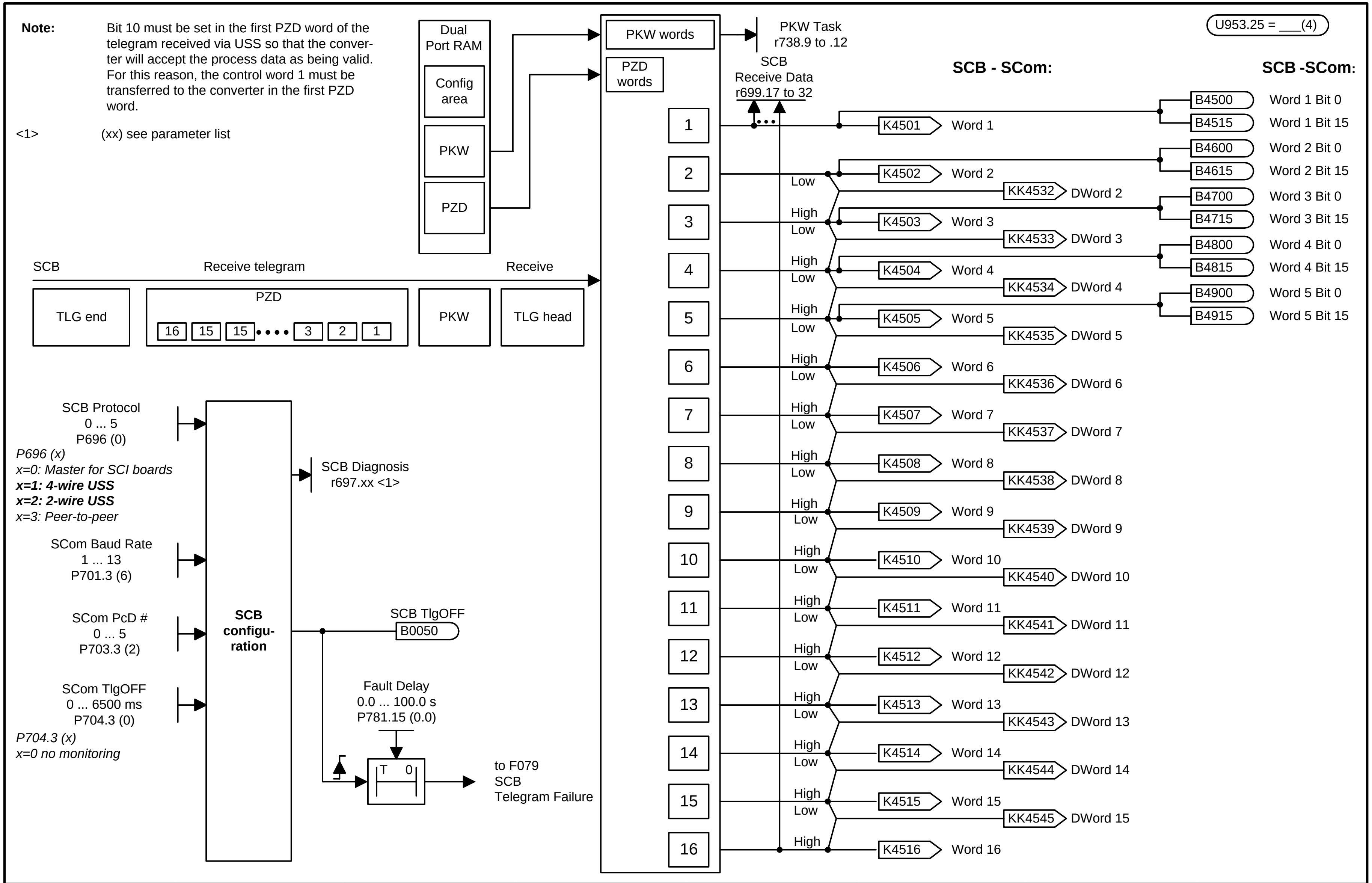
KK1000 is transferred as a 32-bit word

2.



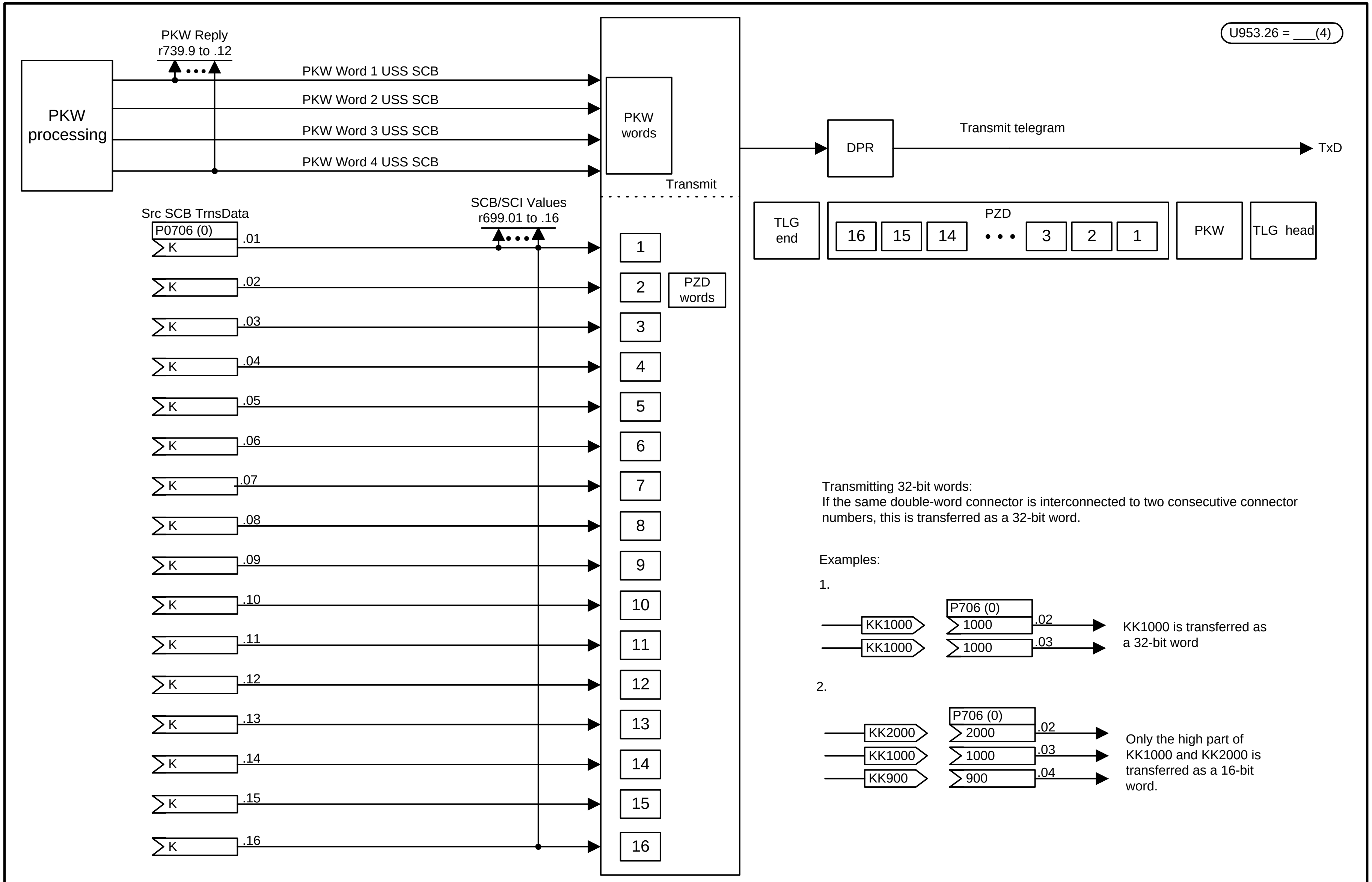
Only the high part of KK1000 and KK2000 is transferred as a 16-bit word

1	2	3	4	5	6	7	8

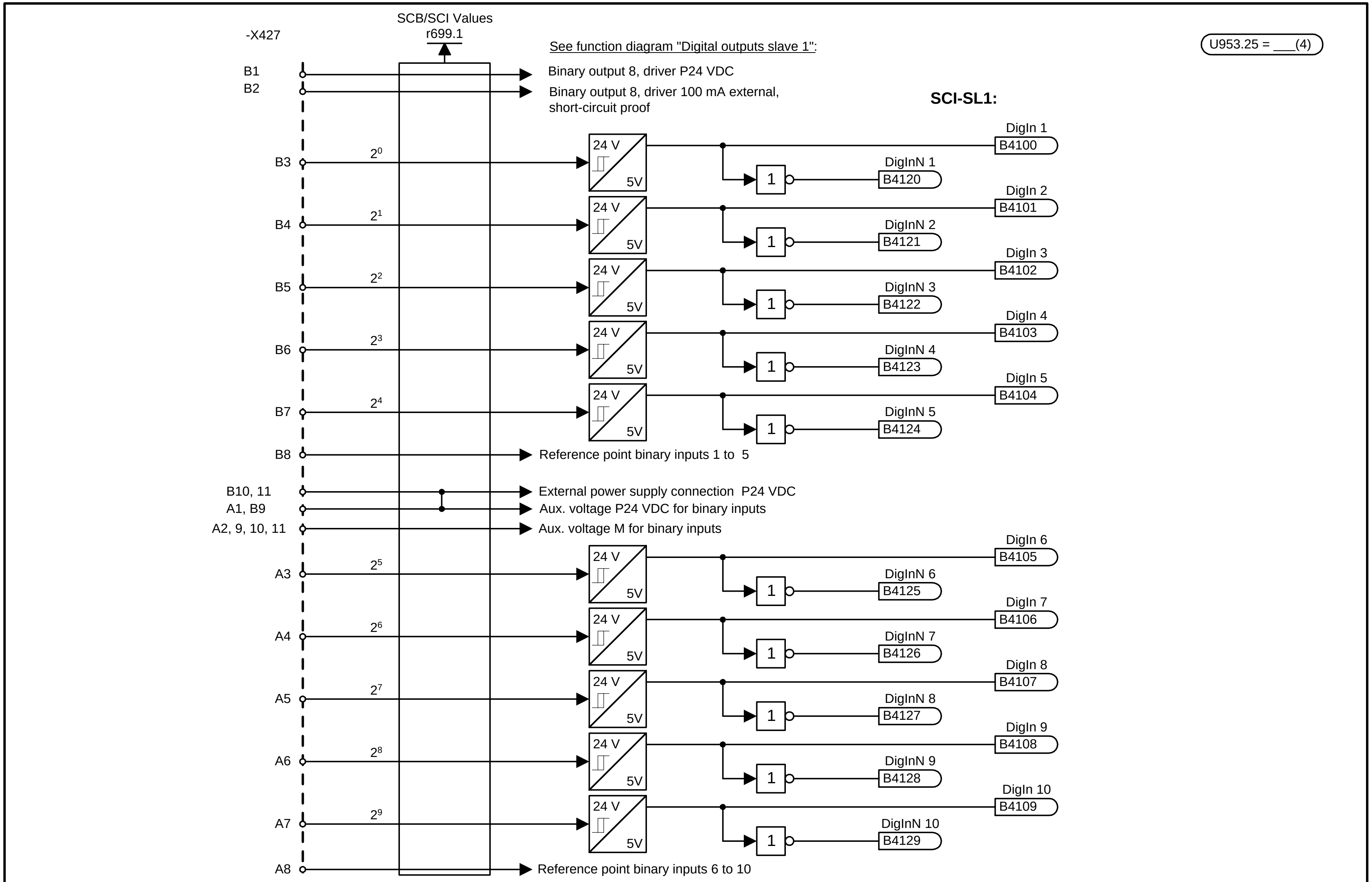


1	2	3	4	5	6	7	8

SCB2		fp_vc_Z05_e.vsd	Function diagram	- Z05 -
USS receiving	Not with Compact PLUS!	16.05.01	MASTERDRIVES VC	

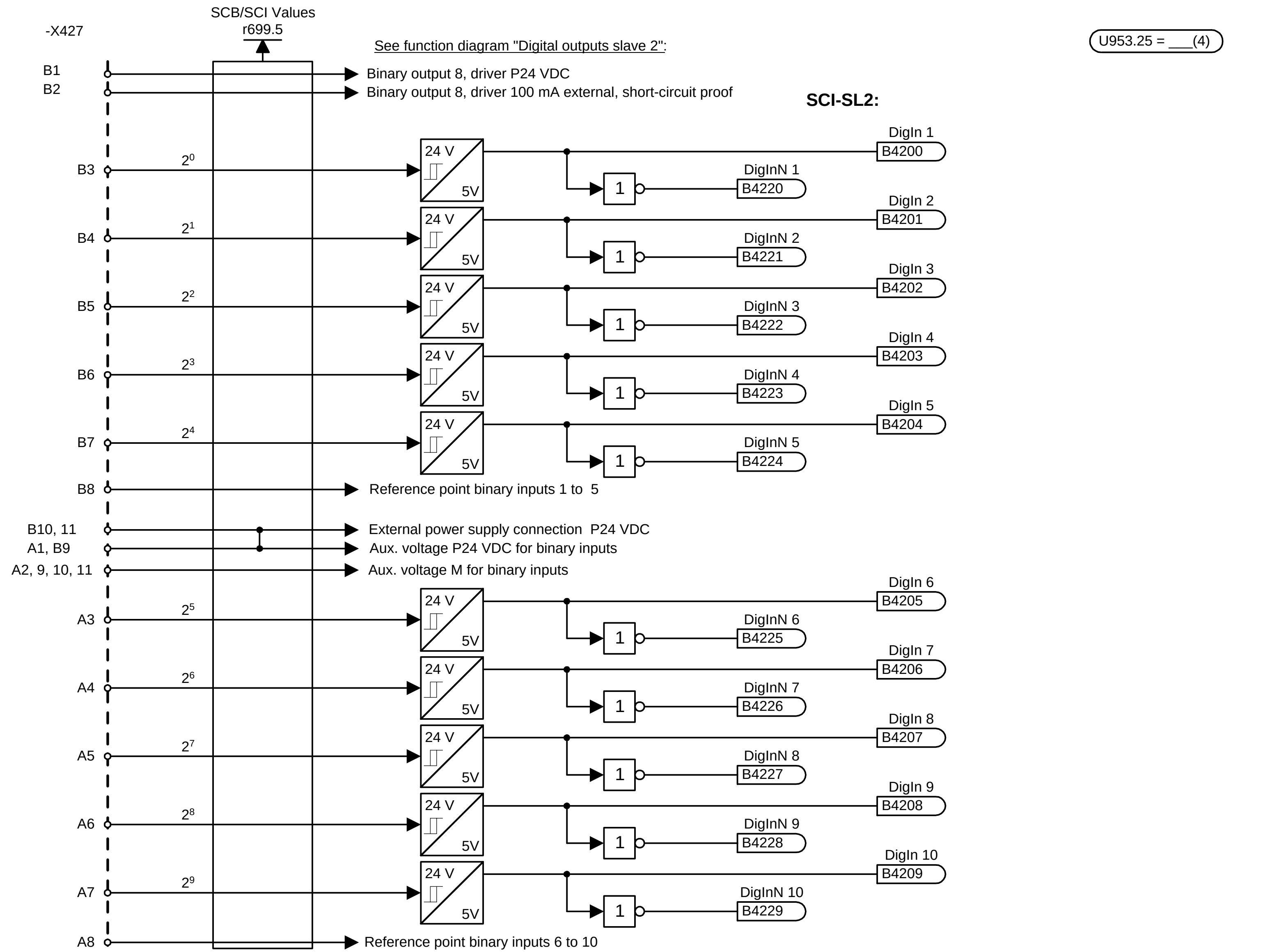


1	2	3	4	5	6	7	8
SCB2					fp_vc_Z06_e.vsd	Function diagram	- Z06 -
USS transmitting			Not with Compact PLUS!		16.05.01	MASTERDRIVES VC	



1	2	3	4	5	6	7	8

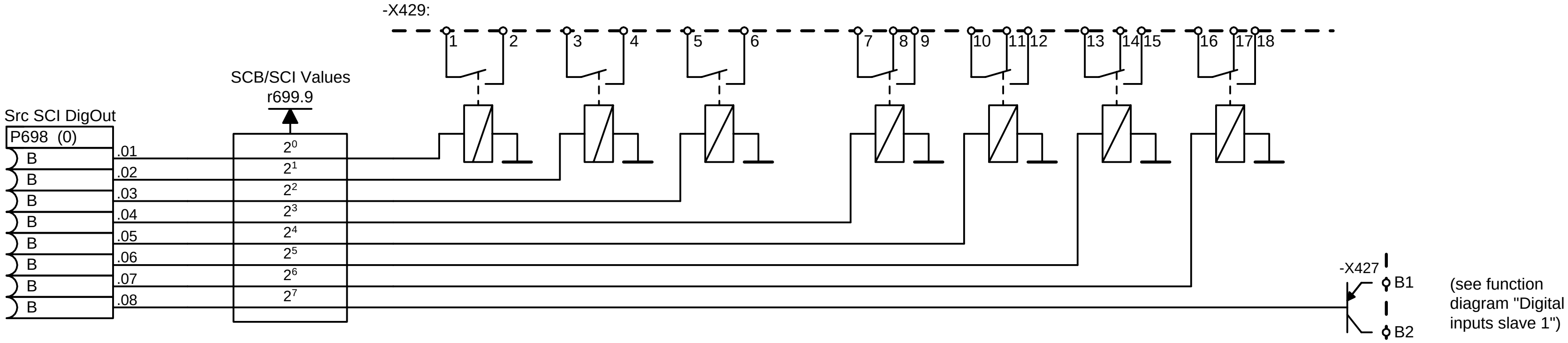
SCB1 with SCI1	fp_vc_Z10_e.vsd	Function diagram	- Z10 -
Digital inputs slave 1 — Not with Compact PLUS!	16.05.01	MASTERDRIVES VC	



1	2	3	4	5	6	7	8

SCB1 with SCI1	fp_vc_Z11_e.vsd	Function diagram	- Z11 -
Digital inputs slave 2 — Not with Compact PLUS!	16.05.01	MASTERDRIVES VC	

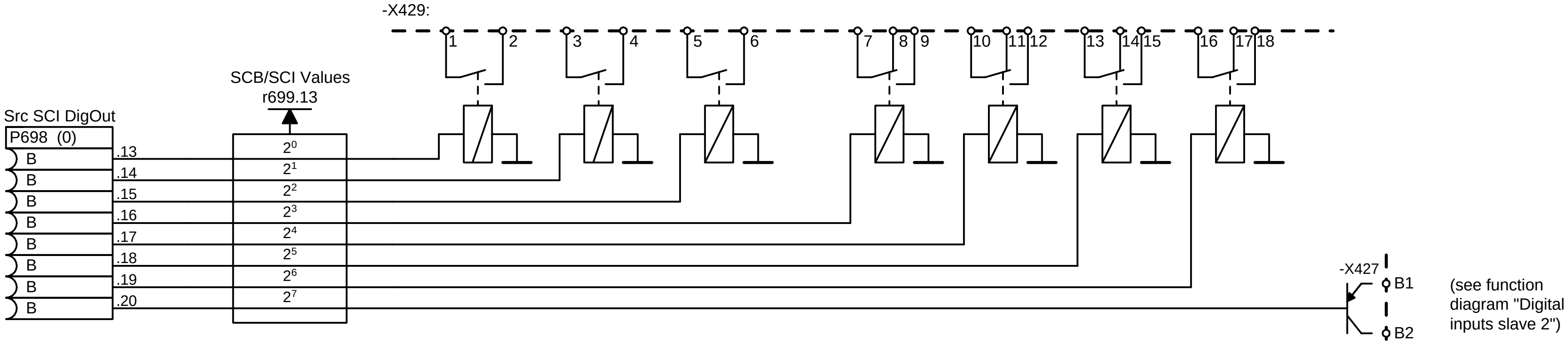
U953.26 = ___(4)



1	2	3	4	5	6	7	8

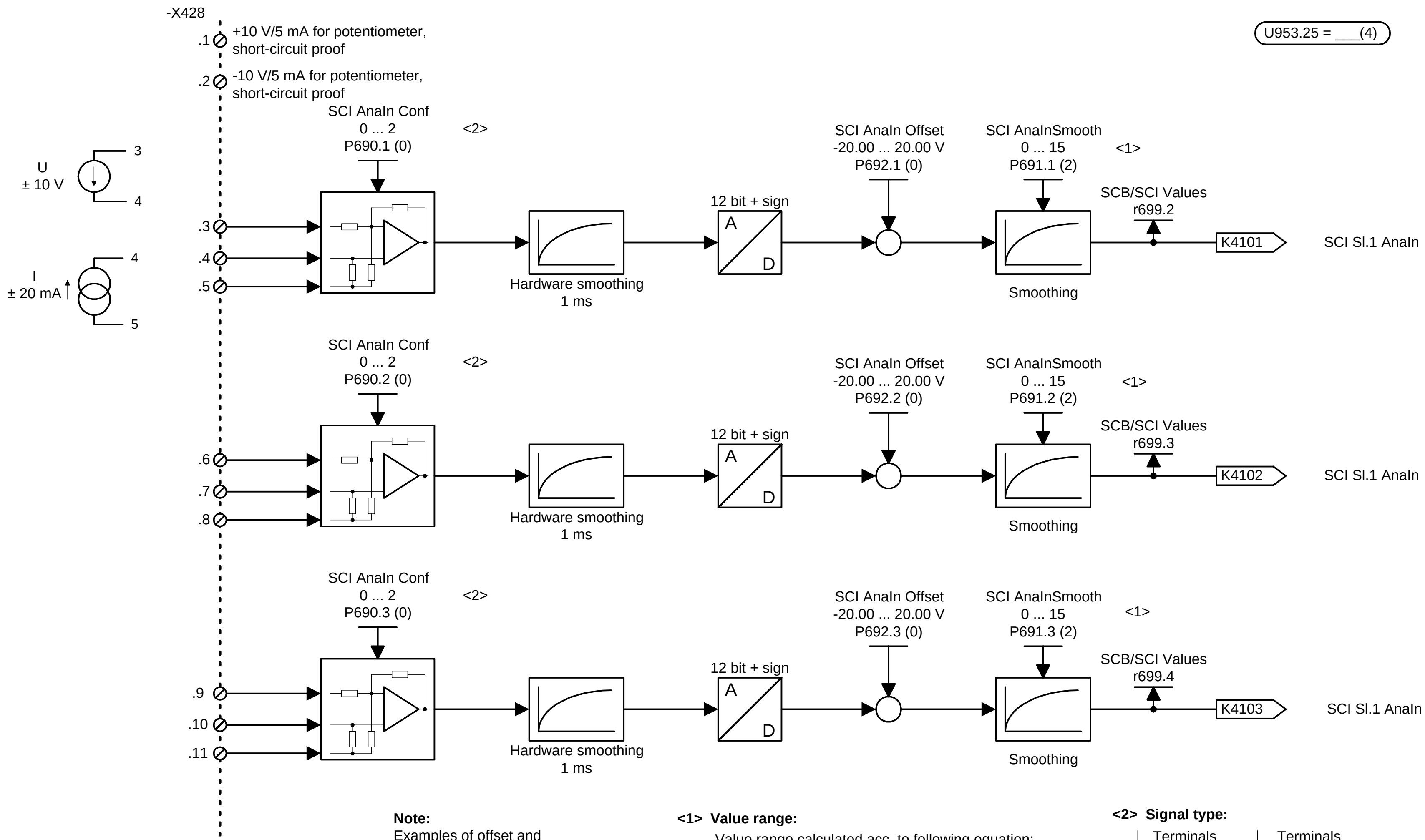
SCB1 with SCI1		fp_vc_Z15_e.vsd	Function diagram	- Z15-
Digital outputs slave 1	Not with Compact PLUS!	16.05.01	MASTERDRIVES VC	

U953.26 = ___(4)



1	2	3	4	5	6	7	8

SCB1 with SCI1		fp_vc_Z16_e.vsd	Function diagram	- Z16 -
Digital outputs slave 2	Not with Compact PLUS!	16.05.01	MASTERDRIVES VC	



(For further terminals, see function diagram "SCI1 - analog outputs slave1")

Note:
Examples of offset and gain in the case of frequency/ speed definitions are given in function diagrams [316], [326]

<1> Value range:
Value range calculated acc. to following equation:

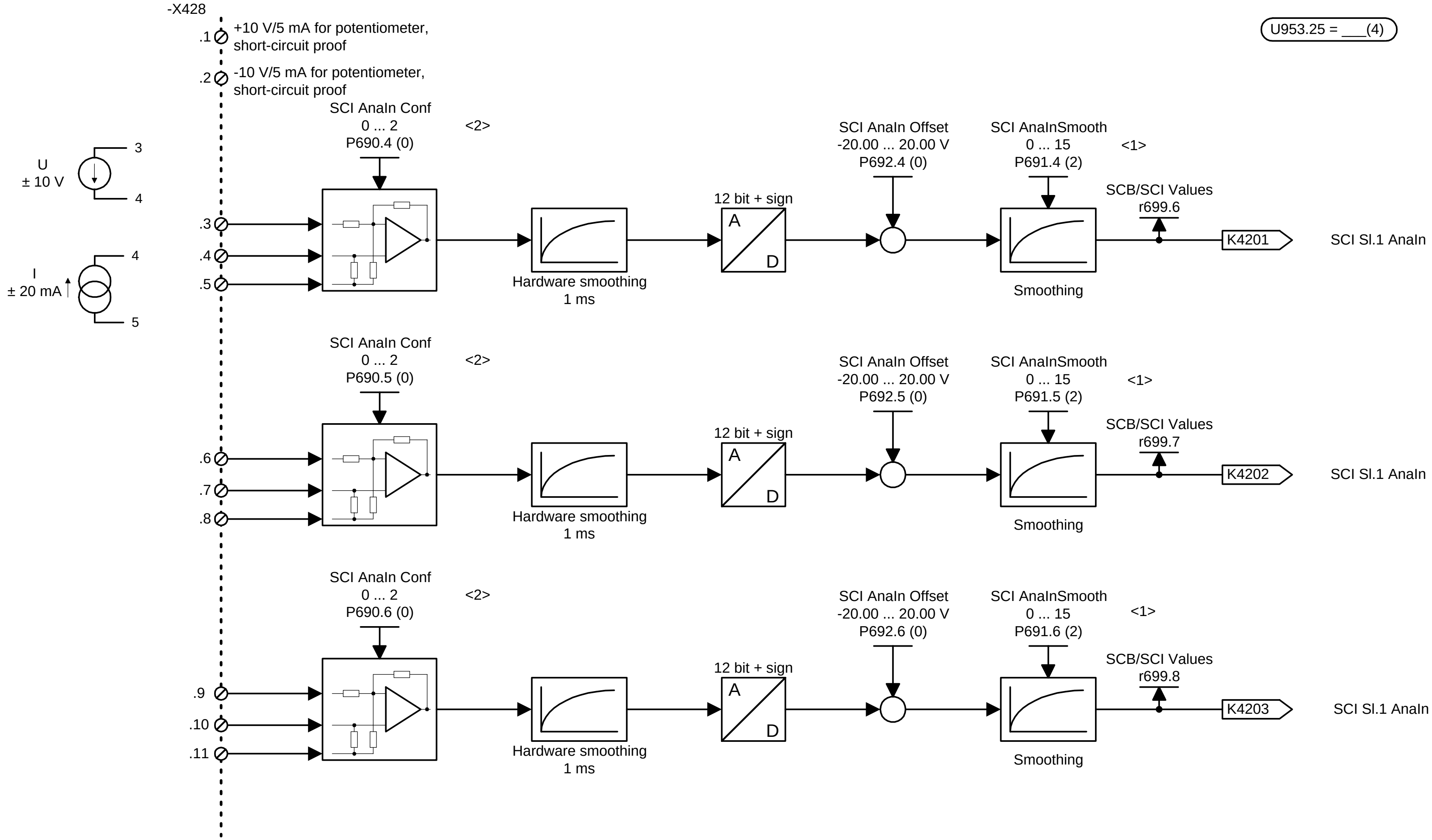
$$T = 2\ \text{ms} \cdot 2^{\mathbf{P691.x}}$$

<2> Signal type:

	Terminals X428.3, .6, .9	Terminals X428.5, .8, .11
0:	-10 ... 10 V	-20 ... 20 mA
1:	0 ... 10 V	0 ... 20 mA
2:	-	4 ... 20 mA

1	2	3	4	5	6	7	8

SCB1 with SCI1	fp_vc_Z20_e.vsd	Function diagram	- Z20 -
SCI1 - analog inputs slave 1 — Not with Compact PLUS!	16.05.01	MASTERDRIVES VC	



(For further terminals,
see function diagram
"SCI1 - analog outputs slave2")

Note:
Examples of offset and gain in the case of frequency/speed definitions are given in function diagrams [316], [326]

<1> Value range:
Value range calculated acc. to following equation:

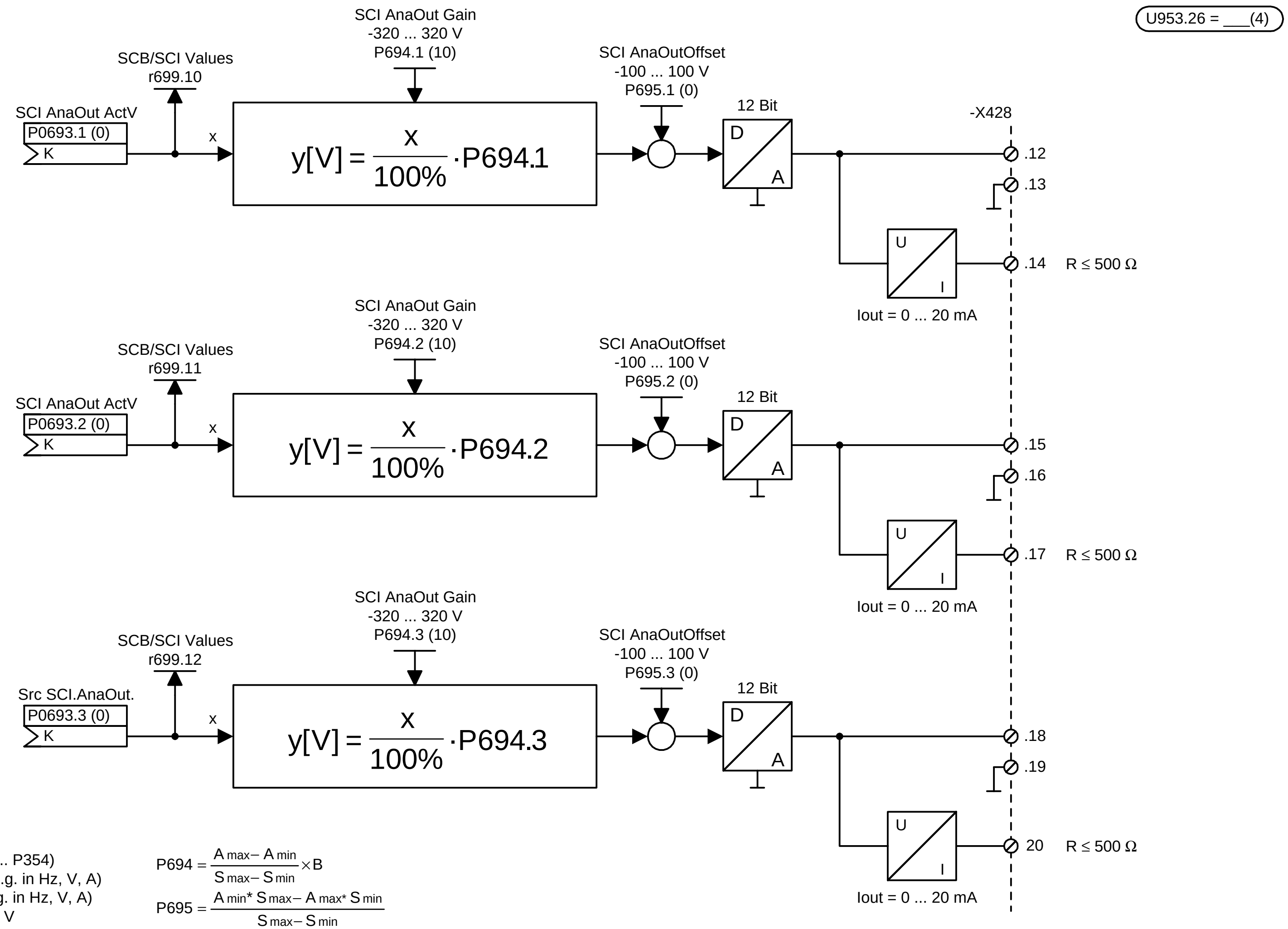
$$T = 2\ \text{ms} \cdot 2^{\text{P691.x}}$$

<2> Signal type:

	Terminals X428.3, .6, .9	Terminals X428.5, .8, .11
0:	-10 ... 10 V	0 ... 20 mA
2:		4 ... 20 mA

1	2	3	4	5	6	7	8

SCB1 with SCI1 | fp_vc_Z21_e.vsd | Function diagram | - Z21 -
SCI1 - analog inputs slave 2 | Not with Compact PLUS! | 16.05.01 | MASTERDRIVES VC



Note on Setting:
B = Reference value (cf P350 ... P354)
S_{min} = Smallest signal value (e.g. in Hz, V, A)
S_{max} = Largest signal value (e.g. in Hz, V, A)
A_{min} = Smallest output value in V
A_{max} = Largest output value in V

Output values in the case of current output:
4 mA ⇒ A_{min} = + 6 V
20 mA ⇒ A_{max} = - 10 V

$$P694 = \frac{A_{max} - A_{min}}{S_{max} - S_{min}} \times B$$

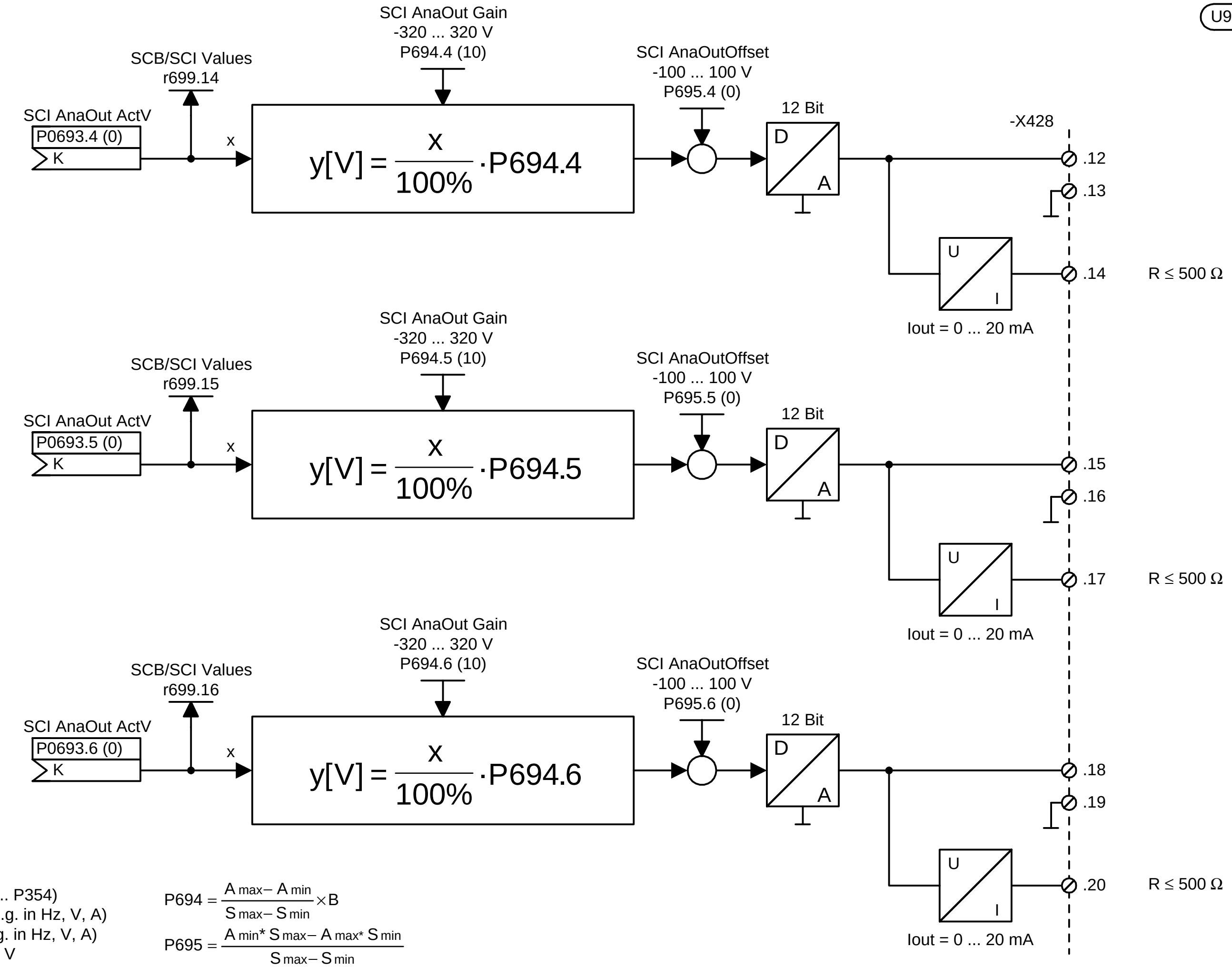
$$P695 = \frac{A_{min} * S_{max} - A_{max} * S_{min}}{S_{max} - S_{min}}$$

(For further terminals,
see function diagram
"SCI1 - analog inputs slave1")

1	2	3	4	5	6	7	8

SCB1 with SCI1	fp_vc_Z25_e.vsd	Function diagram	- Z25 -
SCI1 analog outputs slave 1 — Not with Compact PLUS!	16.05.01	MASTERDRIVES VC	

U953.26 = ___(4)



Note on Setting:
B = Reference value (cf P350 ... P354)
S_{min} = Smallest signal value (e.g. in Hz, V, A)
S_{max} = Largest signal value (e.g. in Hz, V, A)
A_{min} = Smallest output value in V
A_{max} = Largest output value in V

Output values in the case of current output:
4 mA ⇒ A_{min} = + 6 V
20 mA ⇒ A_{max} = - 10 V

$$P694 = \frac{A_{max} - A_{min}}{S_{max} - S_{min}} \times B$$

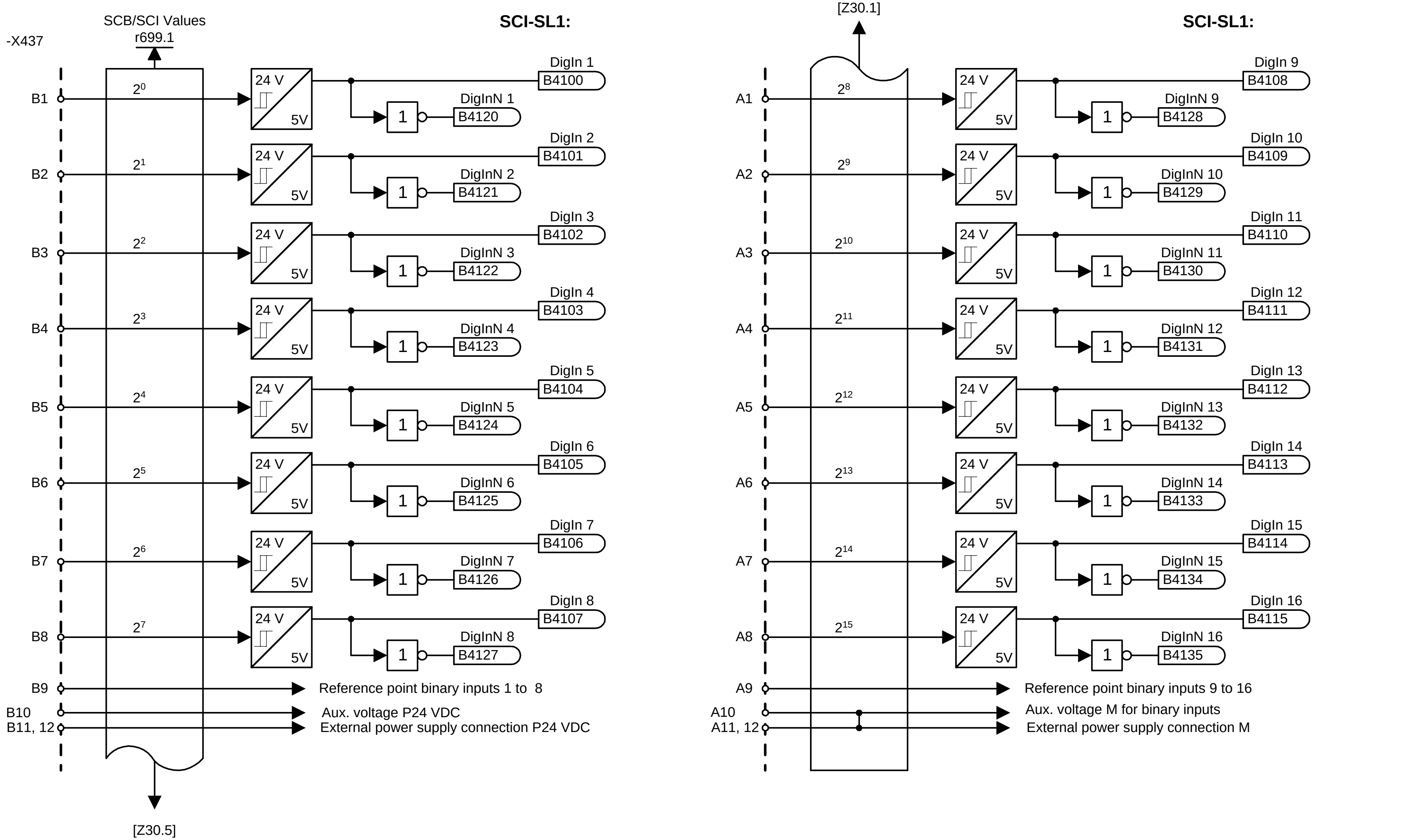
$$P695 = \frac{A_{min} * S_{max} - A_{max} * S_{min}}{S_{max} - S_{min}}$$

(For further terminals, see function diagram "SCI1 - analog inputs slave 2")

1	2	3	4	5	6	7	8

SCB1 with SCI1		fp_vc_Z26_e.vsd	Function diagram	- Z26 -
SCI1 analog outputs slave 2	Not with Compact PLUS!	16.05.01	MASTERDRIVES VC	

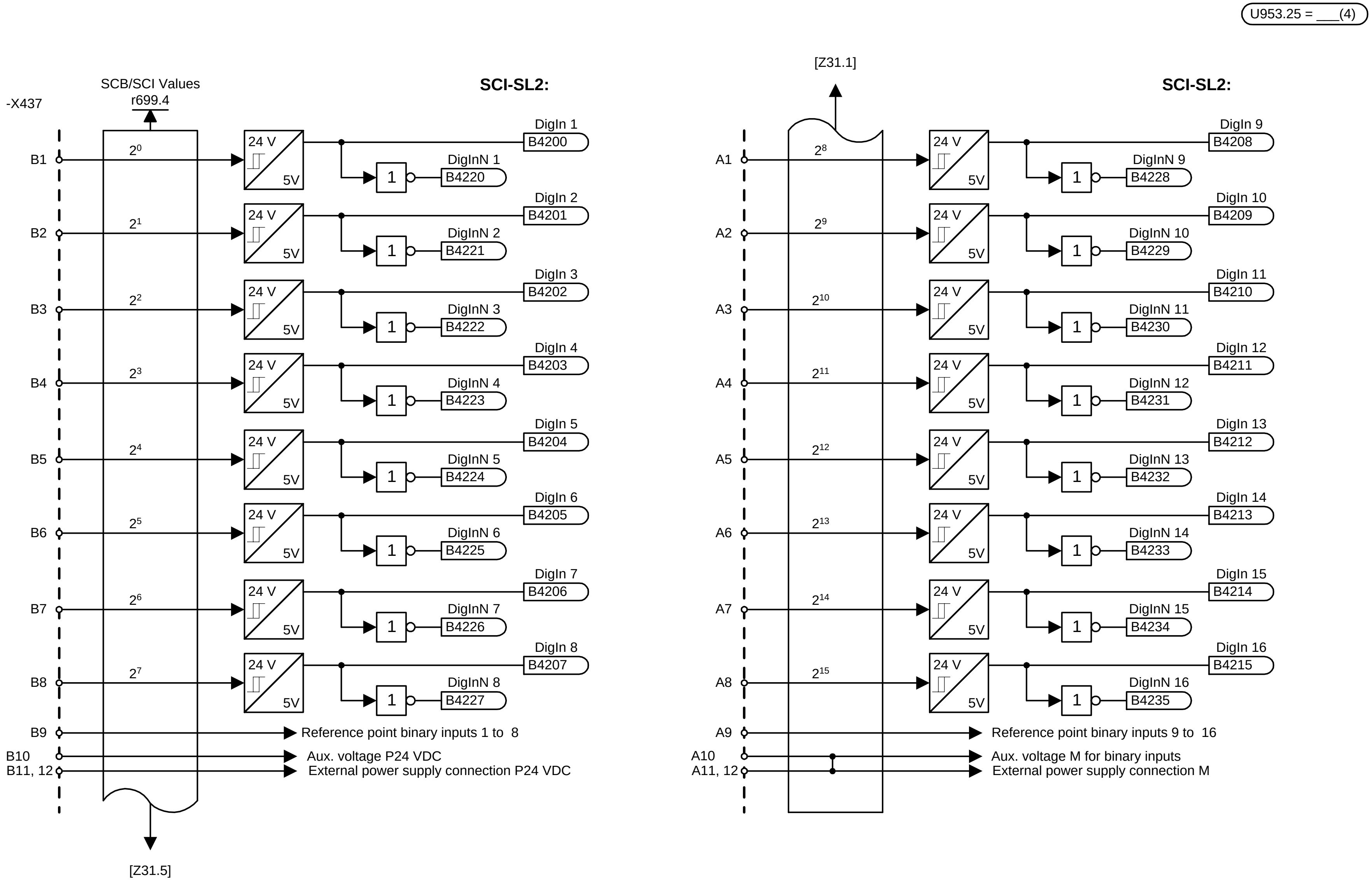
U953.25 = ___(4)



1	2	3	4	5	6	7	8

SCB1 with SCI2 | fp_vc_Z30_e.vsd | Function diagram | - Z30 -

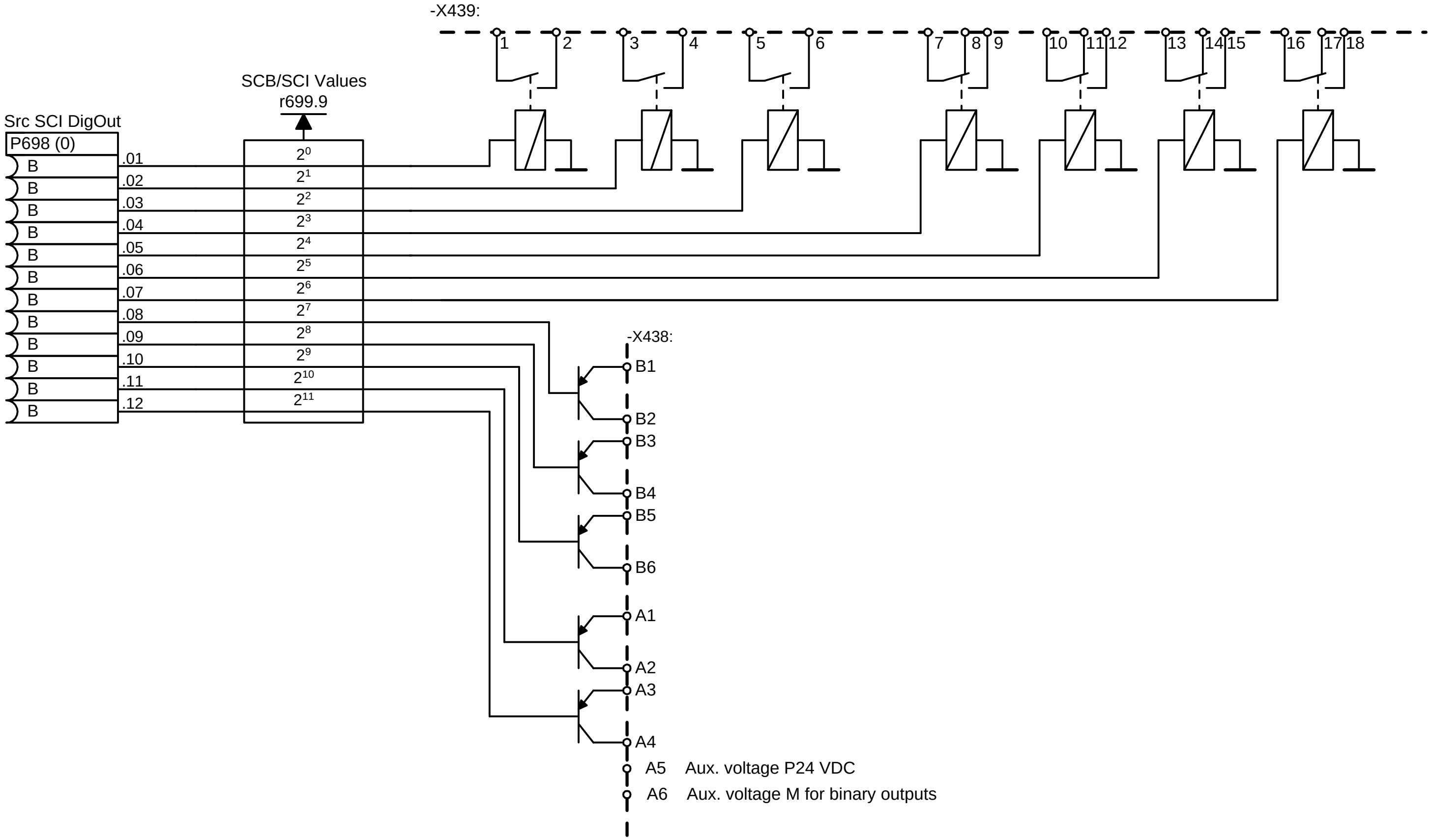
Digital inputs slave 1 | Not with Compact PLUS! | 16.05.01 | MASTERDRIVES VC



1	2	3	4	5	6	7	8

SCB1 with SCI2	fp_vc_Z31_e.vsd	Function diagram	- Z31 -
Digital inputs slave 2 — Not with Compact PLUS!	16.05.01	MASTERDRIVES VC	

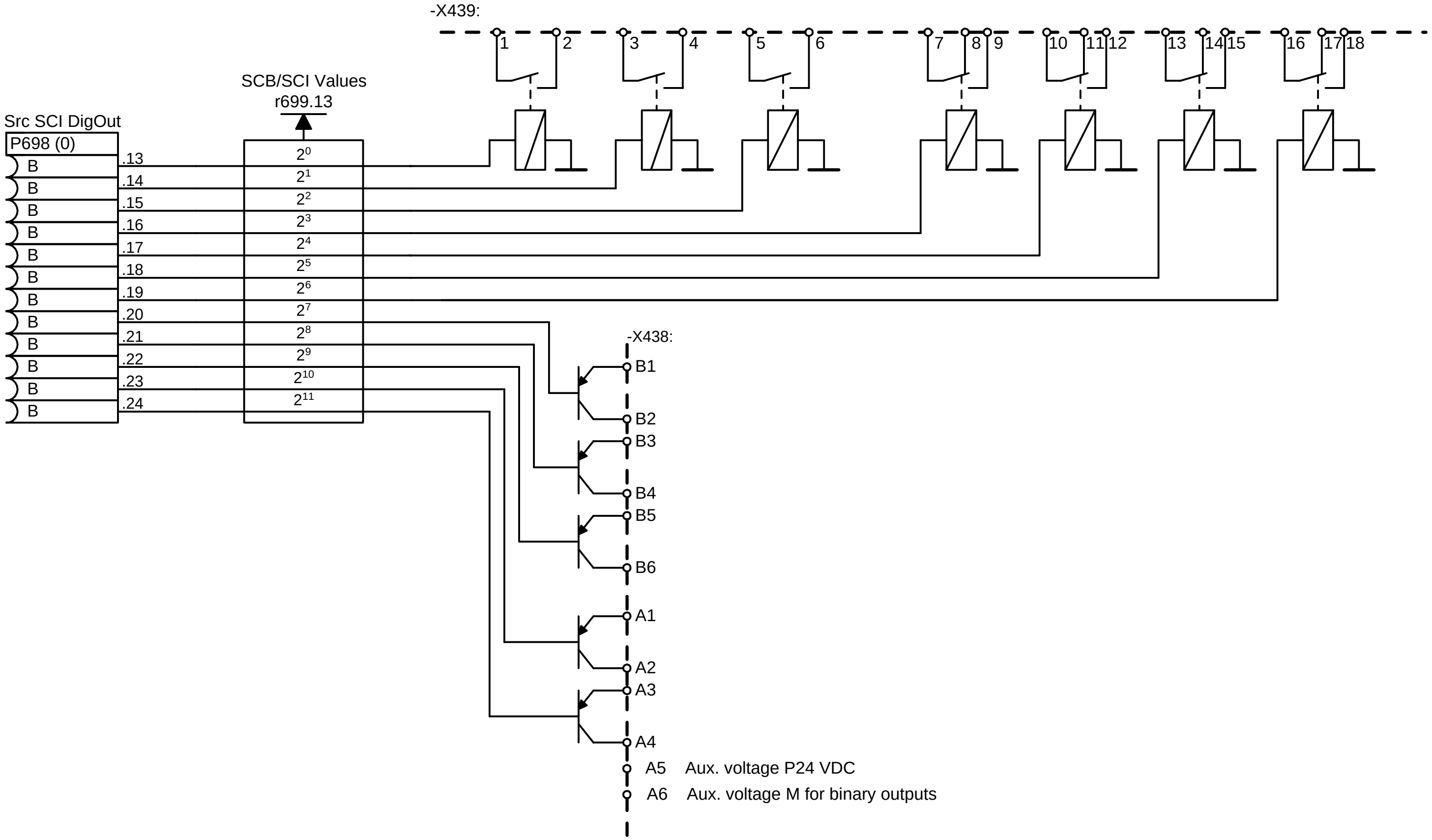
U953.26 = ___(4)



1	2	3	4	5	6	7	8

SCB1 with SCI2	fp_vc_Z35_e.vsd	Function diagram	- Z35 -
Digital outputs slave 1 — Not with Compact PLUS!	16.05.01	MASTERDRIVES VC	

U953.26 = ___(4)



1	2	3	4	5	6	7	8

SCB1 with SCI2 | fp_vc_Z36_e.vsd | Function diagram | - Z36 -

Digital outputs slave 2 | Not with Compact PLUS! | 16.05.01 | MASTERDRIVES VC

Parameter lists

General parameters	to 74	Sequence control	to 629
Motor and encoder data	to 154	Terminals	to 699
Closed-loop control / Gating unit	to 349	Communications	to 779
Functions 1	to 399	Diagnostics / Monitoring	to 830
Setpoint channel	to 514	Special parameters	to 849
Functions 2	to 549	Special parameters OP1S/SIMOVIS	to 899
Technology parameters	to 1999	Free function blocks	to 2449
Reserved	to 2479	Trace	2480 ... 2499
Reserved	2500 ... 2599	Reserved	2600 ... 2699
Reserved	2700 ... 2799	Lifts and hoisting gear	2800 ... 2859
OP1 Parameters	2860 ... 2869	Reserved	2870 ... 2899
Basic unit management	2900 ... 2920	Reserved	2921 ... 2949
Release and management parameters	2950 ... 2999	Technology parameters T400	to 3999

Explanations

Parameter	Description	Data	Read/Write
P999*[1)] Par. example [2)] 999 [3)]	"Description"	Factory: 0.0 [4.1)] Index 1: 0.0 [4.2)] Min: -200.0 [5)] Max: 200.0 [6)] Unit: % [7)] Indices:2, [8)] BDS [9)] Type: I2 [10)]	Menus: - Parameter menu [11)] + Communication + Motor data Changeable in: [12)] -ready -run

1) * means confirmation parameter: not active until after confirmation (press P key)

r xxx Visualization parameter	Parameter number <1000
P xxx Setting parameter	Parameter number < 1000
d xxx Visualization parameter	Parameter number ≥ 1000 and < 2000 for T100,T300,T400 (not in this list)
H xxx Setting parameter	Parameter number ≥ 1000 and < 2000 for T100,T300,T400 (not in this list)
n xxx Visualization parameter	Parameter number ≥ 2000 and < 3000
U xxx Setting parameter	Parameter number ≥ 2000 and < 3000
c xxx Visualization parameter	Parameter number ≥ 3000 for T400 (not in this list)
L xxx Setting parameter	Parameter number ≥ 3000 for T400 (not in this list)

The thousands digit of the parameter number is coded by means of letters so that it can also be shown on the PMU.

2) Parameter name in plaintext (e. g. for operator panel OP1S and SIMOVIS)
3) Parameter number with place for thousands (relevant for automation and serial interfaces)
4) 1st value of the factor setting in the case of non-indexed parameters.
   2nd value of the factory setting of the 1st index in the case of indexed parameters. The complete list of factory settings of the first 4 indices is at the end of the parameter list.
5) Minimum value which can be set. Is only given in the case of setting parameters. The value can be limited due to converter-dependent variables.
6) Maximum value which can be set. Is only given in the case of setting parameters. The value can be limited due to converter-dependent variables.
7) Unit of the parameter value. In the case of percentages, these refer to the pertinent reference values (P350 to P354, see also function diagram [20]).
8) Number of indices in the case of indexed parameters.
9) If the parameter is contained in a function data set (FDS) or BICO data set (BDS), this is indicated here. (See also function diagram [540] and [20])
10) Parameter type

O2	16-bit value without sign
I2	16-bit value with sign
I4	32-bit value with sign
L2	Nibble-coded variable
V2	Bit-coded variable
,B	Binector parameter (see also function diagram [15])
,K	Connector parameter (16-bit, see also function diagram [15])
,KK	Double-connector parameter (32-bit, see also function diagram [15])

11) Indicates the menus in which the parameter can be read. Menu selected by means of P60.
12) The parameter can be changed in the following converter statuses (see also function diagram [20]):

Examples: Status:	To be seen in r001=	
Power-section definition	0	Change with P060 = 8 into 'Power-section definition' status necessary
Board definition	4	Change with P060 = 4 into 'Board definition' status necessary
Drive setting	5	Change with P060 = 5 into 'Drive setting' status necessary
Ready	9	
Run	14	
Download	21	Change with P060 = 6 into 'Download' status necessary

Return to the 'Ready' status with P060 = 1

General Parameter lists

Parameter list Vector Control

22.10.01

Parameter	Description	Data	Read/write
r001 Drive Status 1	Visualization parameter for the current status of the converte or inverter. The converter status is, for example, determined by the control commands for the internal sequence control (see control word 1 and 2 r550,r551) and by menu selection P060. 0 = Power section definition 1 = Initialization of converter or inverter 2 = Hardware initialization 3 = Drive system initialization 4 = Board configuration 5 = Drive setting 6 = Selection of several drive test functions 7 = Störung 8 = Start inhibt 9 = Ready for ON 10 = Precharging of Dc link bus 11 =Ready for operation 12 = Ground fault test 13 = "Flying restart" is active 14 = Operation 15 = OFF1 is active 16 = OFF3 is active 17 = "DC braking" is active 18 = Motor data identification at standstill is active 19 = Optimization of speed controller 20 = "Synchronization" active 21 = Download	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu + General parameters + Motor/encoder + Encoder data + Control/gating unit + Position control + Diagnostics + Trace + Technology + Synchronism + Positioning - Fixed settings - Quick parameterization - Board configuration - Drive setting - Download - Upread/free access - Power section definition
r002 Rot Freq 2	Visualization parameter for the speed actual value in Hz (multiplied by the pole pair number P109 of the drive) Display quantity for the PMU parameterizing unit and the OP (see P049). In function diagram: 350.7, 351.7, 352.7	Dec.Plc.: 3 Unit: Hz Indices: - Type: I4	Menus: - Parameter menu + General parameters - Upread/free access
r003 Output Volts 3	Visualization parameter for the output voltage of the converter or inverter (fundamental rms) In function plan: 285.3, 286.3	Dec.Plc.: 1 Unit: V Indices: - Type: I2	Menus: - Parameter menu + General parameters - Upread/free access
r004 Output Amps 4	Visualization parameter for the output current of the converter or inverter (fundamental rms) In function diagram: 285.7, 286.7	Dec.Plc.: 1 Unit: A Indices: - Type: I4	Menus: - Parameter menu + General parameters - Upread/free access
r005 Output Power 5	Visualization parameter for the ouput active power. The display value is normalized to the reference power whic is derived from the product of reference frequency P352 and referencetorque P354. In function diagram: 285.7, 286.7	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + General parameters - Upread/free access

Parameter	Description	Data	Read/write
r006 DC Bus Volts 6	Visualization parameter for DC link voltage. Displayed quantity for the PMU parameterizing unit and the OP (r049). In function diagram: 285.3, 286.7	Dec.Plc.: 0 Unit: V Indices: - Type: I2	Menus: - Parameter menu + General parameters - Upread/free access
r007 Motor Torque 7	Visualization parameter for torque, related to the reference torque (P354)	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + General parameters - Upread/free access
r008 Motor Utilizat. 8	Visualization parameter for thermal motor utilization (calculated value). Precondition: P383 >= 100 s and no temperature sensor selected. ATTENTION. The overload protection derived from this parameter is only effective if sufficient cooling of the motor is ensured.	Dec.Plc.: 0 Unit: % Indices: - Type: O2	Menus: - Parameter menu - Upread/free access
r009 Motor Temperat. 9	Visualization parameter for the current motor temperature. A correct display is only possible if the motor temperature is measured with a KTY84 temperature sensor or BICO parameter P385 is softwired to a connector which provides the temperature signal in the normalization 1°=40 Hex. Precondition: P380 > 1 or P381 > 1 or P386 = 2 and P381 > 1 In function diagram: 280.3	Dec.Plc.: 0 Unit: °C Indices: - Type: I2	Menus: - Parameter menu + General parameters + Functions - Upread/free access
r010 Drive Utilizat. 10	Visualization parameter for the current thermal utilization of the converter or inverter. The utilization is determined byan i2t calculation of the outpu current. A value of 100 % is achieved in continuous operation with the rated current. If a 100 % utilization is exceeded, an alarm message (A024) is tripped and the output current is reduced to 89 % of the rated current..	Dec.Plc.: 0 Unit: % Indices: - Type: O2	Menus: - Parameter menu + General parameters - Upread/free access
r011 act. MotDataSet 11	Visualization parameter for the currently active motor data sets. 1 = Data set 1 2 = Data set 2 3 = Data set 3 4 = Data set 4 A motor data set is selected with control word bits 18 and 19 The relevant BICO parameters for linking the control word bits are P578 and P579. In function diagram: 20.5	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu + General parameters - Drive setting - Upread/free access

Parameter	Description	Data	Read/write
r012 Active BICO DSet 12	Visualization parameter for the currently active BICO data se 1 = Data set 1 2 = Data set 2 A BICO data set is selected with control word bit 30. The relevant BICO parameter for linking the control word bit is P590. In function diagram: 20.5	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu + General parameters - Upread/free access
r013 Active FuncDSet 13	Visualization parameter for the currently active function data set. 1 =Data set 1 2 = Data set 2 3 = Data set 3 4 = Data set 4 A function data set is selected with control word bits 16 and 17. The relevant BICO parameters for linking the control word bits are P576 and P577. In function diagram: 20.5	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu + General parameters - Upread/free access
r014 Setp Speed 14	Visualization parameter for the speed setpoint at the speed controller input or at the frequency input of the v/f control. In function diagram: 360.4, 361.4, 362.4, 363.4	Dec.Plc.: 1 Unit: 1/min Indices: - Type: I4	Menus: - Parameter menu + General parameters - Upread/free access
r015 n(act) 15	Visualization parameter for the speed actual value. In function diagram: 350.7, 351.7, 352.7	Dec.Plc.: 1 Unit: 1/min Indices: - Type: I4	Menus: - Parameter menu + General parameters - Upread/free access
P028* SrcDispPowerConn 28	BICO parameter for selecting connectors which contain a power and are to be displayed in visualization parameter r02 in (%). The connector numbers entered in the respective index are displayed in the same index of parameter r029. In function diagram: 30.7	index1: 0 Unit: - Indices: 5 Type: L2 ,K	Menus: - Parameter menu + General parameters - Upread/free access Changeable in: - Drive setting - Ready
r029 DispPowerConn 29	Visualization parameter for displaying connectors given in P028 in (%). The connectors displayed in the respective index have been selected in the same index of parameter P028. Normalization is determined in P352 and P354. In function diagram: 30.8	Dec.Plc.: 1 Unit: % Indices: 5 Type: I4	Menus: - Parameter menu + General parameters - Upread/free access
P030* Src Disp Binec 30	BICO parameter for selecting binectors which are to be shown in visualization parameter r031. The binector number entered in the respective index are displayed in the same index of parameter r031. In function diagram: 30.1	index1: 0 Unit: - Indices: 5 Type: L2 ,B	Menus: - Parameter menu + General parameters - Upread/free access Changeable in: - Drive setting - Ready
r031 Display Binector 31	Visualization parameter for displaying the binectors given in P030. The binectors displayed in the respective index have been selected in the same index of parameter P030. In function diagram: 30.2	Dec.Plc.: 0 Unit: - Indices: 5 Type: O2	Menus: - Parameter menu + General parameters - Upread/free access

Parameter	Description	Data	Read/write
P032* Src Disp Conn 32	BICO parameter for selecting connectors which are to be displayed in visualization parameter r033 in [%]. The connector numbers shown in the respective index are displayed in the same index of parameter r033. In function diagram: 30.1	index1: 0 Unit: - Indices: 5 Type: L2 ,K ,K	Menus: - Parameter menu + General parameters - Upread/free access Changeable in: - Drive setting - Ready
r033 Display Conn 33	Visualization parameter for displaying the connectors given i P032. The connnectors displayed in the respective index have been selected in the same index of parameter P032. A connector value of 4000 H or 4000 0000 H is shown at 100 %. In function diagram: 30.2	Dec.Plc.: 3 Unit: % Indices: 5 Type: I4	Menus: - Parameter menu + General parameters - Upread/free access
P034* SrcDispVoltsConn 34	BICO parameter for selecting connectors which contain a voltage and are to be displayed in visualization parameter r035 in [V]. The connector numbers entered in the respective index are displayed in the same index of parameter r035. In function diagram: 30.4	index1: 0 Unit: - Indices: 5 Type: L2 ,K	Menus: - Parameter menu + General parameters - Upread/free access Changeable in: - Drive setting - Ready
r035 Disp Volts Conn 35	Visualization parameter for displaying connectors given in P034 in [V]. The connectors displayed in the respective inde have been selected in the same index of parameter P034. The normalization is specified in P351. The following method of calculation must be used: r035 = P351 xConnector Value in [%]/100%. In function diagram: 30.5	Dec.Plc.: 1 Unit: V Indices: 5 Type: I4	Menus: - Parameter menu + General parameters - Upread/free access
P036* SrcDispAmpsConn 36	BICO parameter for selecting connectors which contain a current and are to be displayed in visualization parameter r037 in [A]. The connector numbers entered in the respective index are displayed in the same index of parameter r037. In function diagram: 30.4	index1: 0 Unit: - Indices: 5 Type: L2 ,K	Menus: - Parameter menu + General parameters - Upread/free access Changeable in: - Drive setting - Ready
r037 Disp Amps Conn 37	Visualization parameter for the display of connectors given in P036 in [A]. The connectors displayed in the respective inde have been selected in the same index of parameter P036. The normalization is specified in P350. The following method of calculation must be used: r037 = P350 xConnector Value in [%]/100%. In function diagram: 30.5	Dec.Plc.: 2 Unit: A Indices: 5 Type: I4	Menus: - Parameter menu + General parameters - Upread/free access
P038* Src DispTorqConn 38	BICO parameter for selecting connectors which contain a torque and are to be displayed in visualization parameter r039 in (%). The connector numbers entered in the respective index are displayed in the same index of parameter r039. In function diagram: 30.4	index1: 0 Unit: - Indices: 5 Type: L2 ,K	Menus: - Parameter menu + General parameters - Upread/free access Changeable in: - Drive setting - Ready
r039 Disp Torq Conn 39	Visualization parameter for the display of connectors given in P038 in (%). The connectors displayed in the respective index have been selected in the same index of parameter P038. Normalization is determined in P354. In function diagram: 30.5	Dec.Plc.: 1 Unit: % Indices: 5 Type: I4	Menus: - Parameter menu + General parameters - Upread/free access

Parameter	Description	Data	Read/write
P040* SrcDisp SpdConn 40	BICO parameter for selecting connectors which contain a speed and are to be displayed in visualization parameter r04 in [1/min]. The connector numbers entered in the respective index are displayed in the same index of parameter r041. In function diagram: 30.7	index1: 0 Unit: - Indices: 5 Type: L2 ,K ,K	Menus: - Parameter menu + General parameters - Upread/free access Changeable in: - Drive setting - Ready
r041 Disp Speed Conn 41	Visualization parameter for the display of connectors given in P040 in [1/min]. The connectors displayed in the respective index have been selected in the same index of parameter P040. The normalization is specified in P353. The following method of calculation must be used: r041 = P353 xConnector Value in [%]/100%. In function diagram: 30.8	Dec.Plc.: 1 Unit: 1/min Indices: 5 Type: I4	Menus: - Parameter menu + General parameters - Upread/free access
P042* SrcDispFreqConn 42	BICO parameter for selecting connectors which contain a frequency and are to be displayed in visualization parameter r043 in [Hz]. The connector numbers entered in the respective index are displayed in the same index of parameter r043. In function diagram: 30.7	index1: 0 Unit: - Indices: 5 Type: L2 ,K ,K	Menus: - Parameter menu + General parameters - Upread/free access Changeable in: - Drive setting - Ready
r043 Disp Freq Conn 43	Visualization parameter for the display of connectors given in P042 in [Hz]. The connectors displayed in the respective index have been selected in the same index of parameter P042. The normalization is specified in P352. The following method of calculation must be used: r043 = P352 x Connector Value in [%]/100%. In function diagram: 30.8	Dec.Plc.: 3 Unit: Hz Indices: 5 Type: I4	Menus: - Parameter menu + General parameters - Upread/free access
P044* SrcDisp DecConn 44	BICO parameter for selecting connectors which are to displayed in visualization parameter r045 as an integral decimal number preceded by a plus or minus sign. The connector numbers entered in the respective index are displayed in the same index of parameter r045. In function diagram: 30.1	index1: 0 Unit: - Indices: 5 Type: L2 ,K ,K	Menus: - Parameter menu + General parameters - Upread/free access Changeable in: - Drive setting - Ready
r045 Disp DecConn 45	Visualization parameter for the display of connectors given in P044 as an integral whole decimal number. The connectors displayed in the respective index have been selected in the same index of parameter P044. In function diagram: 30.2	Dec.Plc.: 0 Unit: - Indices: 5 Type: I4	Menus: - Parameter menu + General parameters - Upread/free access
P046* SrcDisp HexConn 46	BICO parameter for selecting connectors which are to be displayed in visualization parameter r047as an integral value (hexadecimal). The connector numbers entered in the respective index are displayed in the same index of parameter r047. In function diagram: 30.1	index1: 0 Unit: - Indices: 5 Type: L2 ,K ,K	Menus: - Parameter menu + General parameters - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write

r047
Disp Hex Conn
 	
47
	Visualization parameter for the display of connectors given in P046 as a hexadecimal number.
	If word connectors have been selected in P046, then
	Indices 1 to 5 = Value of the connector
	Indices 6 to 10 = 0
	If double word connectors have been selected in P046, then
	Indices 1 to 5 = Upper 16 bits of the connector
	Indices 6 to 10 = Corresponding lower 16 bits of the connector
	
	Example:
	KK0091 = 1234 5678
	P046.1= 91
	r047.1 = 1234
	r047.6 = 5678
	
	In function diagram:
	30.2
		Dec.Plc.: 0
		Unit: -
		Indices: 10
		Type: L2
			Menus:
			- Parameter menu
			+ General parameters
			- Upread/free access

P048* PMU OperDisp 48	Function parameter for selecting parameter whose value is t be indicated in the operating display of the PMU.	Init: 2 Min: 0 Max: 3999 Unit: - Indices: - Type: O2	Menus: - Parameter menu + General parameters - Upread/free access Changeable in: - Drive setting - Ready
P049* OP OperDisp 49	Function parameter for selecting parameters whose values are to be shown in the operating display of the optional OP1 user-friendly operator control panel. Index 1: 1st line left Index 2: 1st line right Index 3: 2nd line (actual value), only visualization parameter Index 4: 3rd line (setpoint) Index 5: 4th line In function diagram: For Compact/Chassis units: 60.1 For Compact PLUS units: 61.1	index1: 4 Min: 0 Max: 3999 Unit: - Indices: 5 Type: O2	Menus: - Parameter menu + General parameters - Upread/free access Changeable in: - Drive setting - Ready
P050* Language 50	Function parameter for setting the language in which texts are to be displayed on the optional OP1S user-friendly operator control panel. 0 = German 1 = English 2 = Spanish 3 = French 4 = Italian This parameter is not reset during factory setting !	Init: 0 Min: 0 Max: 4 Unit: - Indices: - Type: O2	Menus: - Parameter menu + General parameters - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P053* Parameter Access 53 not Compact PLUS	Function parameter for releasing interfaces for parameterization. 0 Hex = None 1 Hex = Cbx communication board 2 Hex = PMU operator control panel 4 Hex = Serial interface (SCom/SCom1), also OP1S and PC 8 Hex = SCB serial input/output modules 10 Hex = Txxx technology board 20 Hex = Serial interface 2 (SCom2) 40 Hex = Second CB board Each interface has a code number. When the number or the sum of different numbers assigned to the interfaces is/are entered, the interface(s) is/are released for use as a parameterizing interface. Example: The factory-setting value 6 is the sum of 2 and 4. This means that parameterization is allowed via the PMU and serial interface 1 and thus for the OP1S as well. The parameter can always be written from any interface. Thi also applies if this interface has not been released for parameterization purposes. During factory setting via CBx, SCB, TXXX, SCom2 or a second CB board, this parameter is not reset.	Init: 7 Min: 0 Max: 65535 Unit: - Indices: - Type: V2	Menus: All menus Changeable in: All states
P053* Parameter Access 53 Compact PLUS only	Function parameter for releasing interfaces for parameterization. 0 Hex = None 1 Hex = CBx communication board 2 Hex = PMU operator control panel 4 Hex = Serial interface (SST/SST1) 8 Hex = SCB serial input/output modules 10 Hex = Txxx technology board 20 Hex = Serial interface 2 (SST2), also OP1S and PC 40 Hex = Second CB board Each interface has a code number. When the number or the sum of different numbers assigned to the interfaces is/are entered, the interface(s) is/are released for use as a parameterizing interface. Example: The factory setting 27H is the sum of 1, 2, 4 and 20H. This means that parameterization is allowed via the PMU and serial interface 1 and for the OP1S via serial interface 2. The parameter can always be written from any interface. Thi also applies if this interface has not been released for parameterization purposes. During factory setting via the first CB, SCB, Txxx, SST2 or a second CB board this parameter is not reset.	Init: 39 Min: 0 Max: 65535 Unit: - Indices: - Type: V2	Menus: All menus Changeable in: All states

Parameter	Description	Data	Read/write
r054 Requester 54	This visualization parameter returns the origin of the read request. It can therefore be scanned to find out which interface is being used. The values correspond to those of P53.	Dec.Plc.: 0 Unit: - Indices: - Type: L2	Menus: - User parameters- Parameter menu + General parameters - Fixed settings - Quick parameterization - Board configuration - Drive setting - Download - Upread/free access - Power section definition
P060* Menu Select 60	Function parameter for selecting the current menu. 0 = User parameter (selection of the visible parameters in P360) 1 = Parameter menu 2 = Fixed settings (for factory settings) 3 = Quick parameterization (changes to "Drive Setting" state 4 = Board configuration (changes to "Board Configuration" state) 5 = Drive setting (changes to "Drive Setting" state) 6 = Download (changes to "Download" state) 7 = Upread/Free access 8 = Power section definition (changes to "Power section definition" state) If it is not possible to change to another state due to the currently valid state, the corresponding menu cannot be selected either. Example: "Operating" state, change to "Download" not possible. "Ready for switching on" state, change to "Download" not possible. With parameters P358 Key and P359 Lock, menus can be locked with the exception of the menus "User parameters" and "Fixed settings".	Init: 1 Min: 0 Max: 8 Unit: - Indices: - Type: O2	Menus: All menus Changeable in: All states
P068* Output Filter 68	Function parameter for entering the output filter. Parameter values 0 = without output filter 1 = with sinusoidal output filter 2 = with dv/dt output filter The parameter value 1 limits the implementable depth of modulation to the range of space vector modulation (see als P342 and r345, maximum depth of modulation). The pulse frequency P340 is adapted to the envisaged sinusoidal filter after exiting the drive setting (see P060 = 5). Notes: · For n/f/Torque control and for temperature adaption (P386 > 0), the sinusoidal filter envisaged for the converter is taken into account. ·The parameter value 2 limits the adjustable pulse frequency P340 to 3 kHz. · dv/dt output filters are not no-load proof In function diagram: 430.3, 390.7, 405.6	Init: 0 Min: 0 Max: 2 Unit: - Indices: - Type: O2	Menus: - Parameter menu + General parameters - Drive setting - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
r069 SW Version 69 not Compact PLUS	Visualization parameter for displaying the software versions of the basic board as well as the optional boards in slots A to G Index 1: Software version of basic board Index 2: Software version of optional board Slot A Index 3: Software version of optional board Slot B Index 4: Software version of optional board Slot C Index 5: Software version of optional board Slot D Index 6: Software version of optional board Slot E Index 7: Software version of optional board Slot F Index 8: Software version of optional board Slot G The slots D-G are not available in type COMPACT PLUS. For optional boards which contain no software, (e.g. SBR, SLB), the parameter value in the respective index is always 0.0.	Dec.Plc.: 1 Unit: - Indices: 8 Type: O2	Menus: - Parameter menu + General parameters - Fixed settings - Quick parameterization - Board configuration - Drive setting - Download - Upread/free access - Power section definition
r069 SW Version 69 Compact PLUS only	Visualization parameter to display software versions of basic board and option boards in slots A to B. Index 1: Software version of basic board Index 2: Software version of option board in slot A Index 3: Software version of option board in slot B For option boards that have no software (e.g. SBR, SLB), th parameter value in the corresponding index is always 0.0.	Dec.Plc.: 1 Unit: - Indices: 3 Type: O2	Menus: - Parameter menu + General parameters - Fixed settings - Quick parameterization - Board configuration - Drive setting - Download - Upread/free access - Power section definition
P070* Order No. 6SE70. 70 not Compact PLUS	Function parameter for entering the order numbers of converter or inverter modules. These numbers tell the CUMC control board which power section it works with. They are entered in the "Power section definition" status and are only necessary after the CU has been replaced. For parameter values, see annex "Compendium".	Init: 0 Min: 0 Max: 254 Unit: - Indices: - Type: O2	Menus: - Parameter menu + General parameters - Upread/free access - Power section definition Changeable in: - Power section definition
P070* Order No. 6SE70. 70 Compact PLUS only	Function parameter for entering the order numbers of converter or inverter modules. These numbers tell the contro board which power section it works with. For parameter values, see Compendium, chapter "Power section definition".	Init: 0 Min: 0 Max: 20 Unit: - Indices: - Type: O2	Menus: - Parameter menu + General parameters - Upread/free access - Power section definition Changeable in: - Power section definition
P071 Line Volts 71	Function parameter for entering the line voltage of the converter or inverter. Converter (AC/AC): rms value of the line AC voltage Inverter (DC/AC): input direct voltage The value is for calculating the rated DC link voltage as a basis for the voltage limits of the Vd(max) and Vd(min) [KIB) controller (e.g. undervoltage failure limit).	Init: ~ Min: 90 Max: 1320 Unit: V Indices: - Type: O2	Menus: - Parameter menu + General parameters - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting
P072 Rtd Drive Amps 72 Compact PLUS only	Parameter for displaying the rated current of the converter o inverter. The rated current is the current which can be outpu continuously. It must be identical to the current indicated on the rating plate of the converter. Note: This parameter must not be changed in the case of multi-parallel units as the converter rated current is determined in this case dynamically upon energizing the electronics power supply from the number of active slaves and the maximum converter rated current (in the EEPROM). If the parameter is changed this may overwrite the EEPROM value.	Init: 6,1 Min: 0,0 Max: 6540,0 Unit: A Indices: - Type: O4	Menus: - Parameter menu + General parameters - Drive setting - Upread/free access - Power section definition Changeable in: - Power section definition

Parameter	Description	Data	Read/write
P072 Rtd Drive Amps 72 not Compact PLUS	Parameter for displaying the rated current of the converter o inverter. The rated current is the current which can be outpu continuously. It must be identical to the current indicated on the rating plate of the converter. Note: This parameter must not be changed in the case of multi-parallel units as the converter rated current is determined in this case dynamically upon energizing the electronics power supply from the number of active slaves and the maximum converter rated current (in the EEPROM). If the parameter is changed this may overwrite the EEPROM value.	Init: ~ Min: 4,5 Max: 6540,0 Unit: A Indices: - Type: O4	Menus: - Parameter menu + General parameters - Drive setting - Upread/free access - Power section definition Changeable in: - Power section definition
P073 Rtd Drive Power 73	Parameter for displaying the rated power of the converter or inverter.	Init: ~ Min: 0,3 Max: 6400,0 Unit: kW Indices: - Type: O2	Menus: - Parameter menu + General parameters - Upread/free access - Power section definition Changeable in: - Power section definition
P075 X (magnet,d)tot 75	Function parameter for the motor magnetizing reactance (saturated) along the rotor axis (d axis) , referred to the rated motor impedance.	index1: 150,0 Min: 1,0 Max: 999,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready
P076 X (magnet,q)tot. 76	Function parameter for the motor magnetizing reactance (saturated) transverse to the rotor axis (q axis), referred to the rated motor impedance.	index1: 150,0 Min: 1,0 Max: 999,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready
P077 X (sigma,d) damp 77	Function parameter for motor leakage reactance of the damper winding along the rotor axis (d axis), referred to the rated motor impedance. Automatic parameterization (P115=1) should be executed after the parameter value is changed. Precondition: P095 = 12 (synchronous motor)	index1: 9,00 Min: 0,10 Max: 49,99 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready
P078 X (sigma,q) damp 78	Function parameter for motor leakage reactance of the damper winding transverse to the rotor axis (q axis) referred to the rated motor impedance. Automatic parameterization (P115=1) should be executed after the parameter value is changed. Precondition: P095 = 12 (synchronous motor)	index1: 9,00 Min: 0,10 Max: 49,99 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready
P079 R (damping,d) 79	Function parameter for motor resistance of damper winding along the rotor axis (d axis), referred to the rated motor impedance. Automatic parameterization (P115=1) should be executed after the parameter value is changed. Precondition: P095 = 12 (synchronous motor)	index1: 8,00 Min: 0,10 Max: 49,99 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P080 R (damping,q) 80	Function parameter for the motor resistance of the damper winding transverse to the rotor axis (q axis), referred to the rated motor impedance. Automatic parameterization (P115=1) has to be executed after the parameter value is changed. Precondition: P095 = 12 (synchronous motor)	index1: 8,00 Min: 0,10 Max: 49,99 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready
P081 Iexc(0)/Iexc(n) 81	Function parameter for the ratio between no-load and rated excitation current. The parameter corresponds to the transmission factor between the rotating-field system of the current model and the direct-current system of the excitation current control. Precondition: P095 = 12 (synchronous motor)	index1: 50,0 Min: 1,0 Max: 100,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready
P082 Psi(sat.char.,1) 82	Function parameter for entering the first (lowest) flux value o the saturation characteristic, referred to the rated rotor flux (rated EMF) of the motor. The value belongs to the first excitation current value P083. Precondition: P095 = 12 (synchronous motor)	index1: 60,0 Min: 10,0 Max: 200,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready
P083 Iexc(sat.char,1) 83	Function parameter for entering the first (lowest) current excitation value of the saturation characteristic, referred to the no-load excitation current of the motor. The value belongs to the first flux value P082. Precondition: P095 = 12 (synchronous motor)	index1: 30,0 Min: 5,0 Max: 799,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready
P084 Psi(sat.char.,2) 84	Function parameter for entering the second flux value of the saturation characteristic, referred to the rated rotor flux (rate EMF) of the motor. The value belongs to the second excitation current value P085. Precondition: P095 = 12 (synchronous motor)	index1: 80,0 Min: 10,0 Max: 200,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready
P085 Iexc(sat.char,2) 85	Function parameter for entering the second current excitatio value of the saturation characteristic, referred to the no-load excitation current of the motor. The value belongs to the second flux value P084. Precondition: P095 = 12 (synchronous motor)	index1: 45,0 Min: 5,0 Max: 799,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready
P086 Psi(sat.char.,3) 86	Function parameter for entering the third (highest) flux value of the saturation characteristic, referred to the rated rotor flux (rated EMF) of the motor. The value belongs to the third excitation current value P087. A value of 100 % corresponds to an induced terminal voltage amounting to the rated motor voltage (in no-load at synchronous speed). Precondition: P095 = 12 (synchronous motor)	index1: 90,0 Min: 10,0 Max: 200,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P087 Iexc(sat.char,3) 87	Function parameter for entering the third (highest) excitation current value of the saturation characteristic, referred to the no-load excitation current of the motor. The value belongs to the third flux value P086. A value of 100 % corresponds to the rating plate value of the excitation current which produces a terminal voltage amounting to the rated motor voltage in no-load at synchronous speed. Precondition: P095 = 12 (synchronous motor)	index1: 65,0 Min: 5,0 Max: 799,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready
P088 kT(n) 88	Function parameter for entering the torque constant (kTn (100 Kelvin)). The value corresponds to the current/motor torque proportionality constants. Precondition: P095 = 13 (synchronous motor, permanently excited)	index1: 0,00 Min: 0,00 Max: 655,35 Unit: Nm/A Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Drive setting - Upread/free access Changeable in: - Drive setting
P095* Type of Motor 95	Function parameter for entering the type of motor It is possible to choose a certain type of motor (P095 = 2) or a general selection of a motor data parameterization which i international (IEC) or US (NEMA) motor data parameterization. If NEMA is selected, the efficiency and the rated motor output instead of the power factor cos(phi) are displayed during motor parameterization. Parameter values: 2: 1PH7(=1PA6), 1PL6, 1PH4 10: IEC induction or synchronous motor 11: NEMA induction or synchronous motor 12: Synchronous motor (externally exited) 13: Synchronous motor perm. (vector control only) Note: For operation of permanently exited synchronous motors wit v/f characteristic P95 has to be set to 10 or 11. The selection of a synchronous motor (12, 13) is only considered for certain special applications (not for textile applications). Then the following functions are disabled: Sychronizing (P582), Flying restart (P583, P525, P526, P527), Automatic restart (P373), DC braking (P395), Motor identification (P115 = 2, 3, 4, 6), Control mode (P100 = 0, 1, 2, 3 for P95 = 12), Control mode (P100 = 0, 2, 4, 5 for P95 = 13). Synchronizing (P582) is used for P95 = 12 for resetting to the initial position if P172 is not connected.	index1: 10 Min: 0 Max: 13 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting
P097* Select 1PH7 97	Function parameter for selecting a 1PH7 (=1PA6), 1PL6 and 1PH4 induction motor from the internal list of motors. For parameter values, see annex "Compendium".	index1: 0 Min: 0 Max: 80 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P100* Control Mode 100	Function parameter for selecting the open/closed loop contro mode Parameter values: 0: v/f contol with superposed speed control (only for P095 = 2, 10, 11) 1: v/f control (only for P095 = 2, 10, 11, 13) 2: v/f control for textile applications; allows no frequency corrections (e.g. by the current limitation controller) (only for P095 = 2, 10, 11) 3: Frequency control (without tachometer) (only for P095 = 2, 10, 11, 13) 4: Speed control (only for P095 = 2, 10, 11, 12) 5: Torque control (only for P095 = 2, 10, 11, 12) In function diagram: 14 and 420	index1: 1 Min: 0 Max: 5 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting
P101* Mot Rtd Volts 101	Function parameter for entering the rated motor voltage. The rating plate value of the voltage for the current kind of connection (star/delta) and for line duty has to be entered. Note: Input for Siemosyn motors is the rated voltage at rated moto frequency. For P95=13 (motor type =sync.perm.), the motor rated voltage is only used as a normalization quantity for the rated motor impedance to which all resistances and reactances ar referred (e.g. P075). in function diagram: 405.3	index1: ~ Min: 100 Max: 2000 Unit: V Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting
P102* Motor Rtd Amps 102	Function parameter for entering the rated motor current for the connected synchronous or induction motor. The rating plate value for the current kind of connection (star/delta) has to be entered. Permissible values: 0.125 * P072 <= P102 < 1.36 * P072	index1: ~ Min: 0,6 Max: 6553,5 Unit: A Indices: 4 Type: O4	Menus: - Parameter menu + Motor/encoder + Motor data - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting
P103* Motor Magn Amps 103	Function parameter for entering the motor magnetizing current referred to the rated motor current. The correct input improves the calculation of motor parameters in automatic parameterization (P115=1). The value is determined during motor data identification (P115=2,3) and during the no-load test (P115=4). Synchronous motor (P95=12): Reactive current component at the motor rating point. Note: The value always has to be set to 0.0% so that the rated motor current is contributed completely to torque generation Precondition: P095 = 10,11,12 (Motor type = Induc.IEC, Induc.NEMA, synchronous motor)	index1: ~ Min: 0,0 Max: 95,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Drive setting - Upread/free access Changeable in: - Drive setting - Drive setting

Parameter	Description	Data	Read/write
P104* MotPwrFactor 104	Function parameter for entering hte power factor for the connected induction motor. The rating plate value has to be entered. Precondition: P95 = 10,12 (motor type: induc.IEC, synchronous motor)	index1: ~ Min: 0,500 Max: 1,000 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting
P105* Motor Rtd Power 105	Function parameter for entering the rated motor power in Hp (rating plate value). Precondition: P095 = 11 (motor type: NEMA induction motor)	index1: ~ Min: 0,1 Max: 2000,0 Unit: hp Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting
P106* Motor Rtd Effic. 106	Function parameter for entering the rated motor efficiency (rating plate value). Precondition: P095 = 11 (motor type: NEMA induction motor)	index1: ~ Min: 50,0 Max: 99,9 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting
P107* Motor Rtd Freq 107	Function parameter for entering the rated motor frequency (rating plate value). · P100 = 0, 1, 3, 4, 5: maximum value 200 Hz · P100 = 2: maximum value 600 Hz The pole pair number (P109) is automatically recalculated if parameters are changed.. For induction motors, a slip (r110) must exist to P108*P109/60 to enable the slip compensation to correctly operate. Note: Changing this parameter may also change the pulse frequency (P340). In function diagram: 405.4	index1: 50,00 Min: 8,00 Max: 500,00 Unit: Hz Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting
P108* Motor Rtd Speed 108	Function parameter for entering the rated motor speed (ratin plate value). Note: P100 = 0, 4, 5 (v/f control with speed controller, speed/torqu control) is only available with this information. The pole pair number (P109) is automatically recalculated if parameters are changed. For induction motors, a slip (r100) must exist to P107/P109*60 to enable slip compensation to correctly operate.	index1: 0,0 Min: 0,0 Max: 36000,0 Unit: 1/min Indices: 4 Type: I4	Menus: - Parameter menu + Motor/encoder + Motor data - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P109* Motor #PolePairs 109	Function parameter for entering the motor pole pair number for the connected synchronous/induction motor. The parameter is automatically calculated if the rated frequency (P107) and the rated speed (P108) are changed, and it can be checked and corrected if necessary. Note: - For applications with pulse encoder (130=11,12,15,16), a maximum pole pair number of P109=15 is possible. - P109 must be written into when downloading (P060=6). - For machines with rated data for regenerative duty, the automatically calculated pole pair number must be increased by 1. In function diagrams: 360.2, 361.2, 362.2, 363.2, 364.2	index1: 2 Min: 1 Max: 99 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting
r110 Motor Rtd Slip 110	Visualization parameter for the rated motor slip, referred to rated motor frequency (P107). Precondition: P095 = 10, 11 (motor type = induc. IEC; induc. NEMA) In function diagrams: 395.3	Dec.Plc.: 2 Unit: % Indices: - Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Drive setting - Upread/free access
P113* Mot Rtd Torque 113	Function parameter for entering the rated motor torque. The parameter is for normalizing torque quantities of the process data signals and visualization parameters and has no influence on the accuracy of the control system. If P113 and P354 (reference torque) are set identically, a signal is displayed to the amount of the rated motor torque a 100% (=4000 Hex). In function diagram: 20.6	index1: ~ Min: 0,01 Max: 900000,00 Unit: Nm Indices: 4 Type: O4	Menus: - Parameter menu + Motor/encoder + Motor data - Drive setting - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P114 Technol. Cond. 114	Function parameter for selecting various technology boundary conditions for starting up the control system. Depending on what is selected, the parameter influences some of the following parameters during automatic parameterization mode (P115=1) or during motor data identification (P115=2,3): P216,P217,P223,P235,P236,P240,P273,P279,P287, P291,P295,P303,P315,P339,P344,P536. 0 = standard drive (e.g. pumps, fans) normal default setting 1 = torsion, gear play and large moment of inertia (e.g. pape machines) 2 = acceleration drives with constant inertia (e.g. shears) 3 = high load impact requirements (with f control only possible after approx. 20%fmot,n) 4 = high smooth running characteristics at low speeds (at n control with high number of encoder pulses) 5 = efficiency optimization during partial load by reducing the flux (dynamically simple drives) 6 = high starting torques (heavy-duty starting) 7 = Torque dynamics in the field weakening area (e.g. motor test beds) The parameter settings are only to be regarded qualitatively and only serve to show the influence on the respective application. A start-up always refers to a concrete application and cannot be replaced by this support. The supplementary notes in the Operating Instructions or in the Compendium should be observed. CAUTION. Damage may arise as a result of incorrect settings!	index1: 0 Min: 0 Max: 7 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data + Functions - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P115* Calc MotModel 115	Function parameter for selecting various start-up sections and special functions. Parameter values: 1 = Automatic parameterization Calculation of parameters for the v/f open-loop control and closed-loop control from the rating plate data of the motor and the gating unit configuration (e.g. P340 Pulse frequency 2 = Motor data identification at standstill: Parameterization of closed-loop control from the measured motor data (without setting the n/f controller); contains the ground fault test and function 1. (only for P095 = 10, 11 induction motor) 3 = Complete motor data identification: (contains the functions 1, 2, 4, 5, 7) (only for P100 = 3, 4, 5 vector control types). (only for P095 = 10, 11 induction motor) Note: After alarm A078, the unit must be switched on and the measurement at standstill commences. After the measurement at standstill has been completed, the alarm message A080 appears and the unit has to be powered up again.Then the no-load measurement and the speed controller optimization begin. 4 = No-load measurement (only for P100 = 3, 4, 5 vector control types), (only for P095 = 10, 11 induction motor). 5 = n/f controller optimization (only for P100 = 3, 4, 5 vector control types) 6 = Self-test: (corresponds to the functions of 2, but no parameters are changed) (only for P095 = 10, 11 induction motor) 7 = Tachometer test: (only for P100 = 4, 5 n/m control) Note: If functions 1 to 3 are selected in the "Drive setting" converter status, the reference parameters P350 to P354 are pre-assigned to the rated motor data! On input of a minimum setpoint via P457, the drive goes, after motor identification (P115 = 4, 5), to this minimum setpoint and remains in the "Operation" state. To switch the drive off, an OFF command must be given (e.g. via PMU).	Init: 0 Min: 0 Max: 7 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data + Functions - Drive setting - Upread/free access Changeable in: - Drive setting - Drive setting
P116 Start-up Time 116	Function parameter for setting the start-up time of the drive. The start-up time is the time from standstill to rated motor speed at acceleration with rated motor torque. The paramete value thus corresponds to the moment of inertia and is allowed for in the calculation of the n/f controller pre-control (P471). Pre-assignment for automatic parameterization (P115=1,2) with 1.00 s or for n/f controller optimization (P115=3,5) with the measured value. Precondition: P100=3,4 (n/f control) Function diagrams: 317.7	index1: 1,00 Min: 0,10 Max: 327,67 Unit: s Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P117 Resist Cable 117	Function parameter for setting the cable resistance. The value corresponds to the ohmic resistance of the cable between the converter/inverter and the motor, referred to the rated impedance. The parameter value is always a part of th value in P121 (Total resistance) Rated motor impedance: Zmot,n = Vmot,n / 1,732 * Imot,n = P101 / 1,732 * P102 Note: The cable resistance must be entered before motor data identification (P115=2,3) so that it is allowed for in parameterization. Precondition: P100 = 3, 4, 5 (vector control types) P386 = 0 (no temperature adaptation) Function diagram: 430.7	index1: 0,00 Min: 0,00 Max: 40,00 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready
r118 Resist Stator ++ 118	Visualization parameter for the total stator resistance of the drive referred to the rated motor impedance. The value contains the stator resistance of the motor and the cable resistance. The value of this parameter is adapted with the motor temperature during active motor adaption (P386 > 0). Precondition: P100 = 3, 4, 5 (vector control types) Function diagrams: 430.7	Dec.Plc.: 2 Unit: % Indices: - Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access
r119 Magn. Current 119	Visualization parameter for the valid rated magnetizing current (see P103). P103 = 0.0 % r119 is calculated 0.0 % < P103 < 10.0 % r119 = 10 % * P102 P103 >= 10.0 % r119 = P103 * P102 Precondition: P095 = 10, 11 (induction motor)	Dec.Plc.: 1 Unit: A Indices: - Type: I4	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access
P120 Main Reactance 120	Function parameter for the main reactance of the motor referred to the rated impedance of the motor. The value is calculated during automatic parameterization (P115=1) or measured during motor data identification (P115=2,3,4) Precondition: P100 = 3,4,5 (vector control types) P095 = 10, 11 (induction motor)	index1: ~ Min: 1,0 Max: 999,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P121 Stator Resist 121	Function parameter for setting the stator and cable resistance referred to the rated motor impedance. The value is calculated during automatic parameterization (P115 = 1) or measured during motor data identification (P115 = 2, 3) (only if P95 = 10,11) Note: For P95 = 12, 13 (synchronous or sync. perm.), automatic parameterization has to be selected after parameter change are made. Precondition: P386 = 0 (temperature adaptation not active) Function diagrams: 430.3	index1: ~ Min: 0,00 Max: 49,99 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready
P122 Tot Leak React 122	Function parameter for setting the total stator-side leakage reactance of the motor referred to the rated motor impedanc Notes: P095=10, 11: (induction motor) The value is calculated during automatic parameterization (P115=1) or pre-assigned during motor data identification (P115=2,3). P095=12, 13: (Synchronous motors) After the parameter value has been changed, automatic parameterization (P115=1) has to be carried out (for setting the current controller). P095=13: (Synchronous motor, permanently excited) For calculating the synchronizing reactance in the d-/ axes, X(sigma) is added to X(main,d) (P075) or X(main,q) (P076). Precondition: P100 = 3, 4, 5 (vector control types) Function diagrams: 390.3, 395.3, 396.3	index1: ~ Min: 1,00 Max: 49,99 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready
r124 Rotor Time Const 124	Visualization parameter for the rotor time constant of the motor. For induction motors, the values for the d axis and the q axis are always identical. Synchronous motor: The parameter contains the damping time constants in rotor direction (Tdd) and vertical to the rotor axis (Tdq) with saturated main reactance (P075, P076). The time constants are used in the current model. Tdd can be evaluated in the model with factor P166, and Td with P167. Indices: i001 = d axis i002 = q axis Precondition: P095 = 10, 11, 12 (Motor type = Induc.IEC, Ind. NEMA, synchronous motor) Function plans: 430.7	Dec.Plc.: 0 Unit: ms Indices: 2 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access

Parameter	Description	Data	Read/write
r125 T(sigma) 125	Visualization parameter for the stator time constant of the motor (incl. cable) For induction motors, the values for the d and the q axis are always identical. For synchronous motors (P095=12), disymmetry can only result from the damping resistances and reactances P079 and P077 for the d axis and P080 and P078 for the q axis, and for permanently excited synchronous motors (P095=13) from the main reactances P075 and P076 Indices: i001 = d axis i002 = q axis Function diagrams: 430.7	Dec.Plc.: 0 Unit: ms Indices: 2 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access
r126 RotResist 126	Visualization parameter for the rotor resistance of the motor referred to the rated motor impedance. During active temperature adaptation (P366 > 0), this value follows the motor temperature Precondition: P100 = 3, 4 5 (vector control types) P095 = 10, 11 (induction motor) Function diagrams: 430.7	Dec.Plc.: 2 Unit: % Indices: - Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access
P127 RotResistTmpFact 127	Function parameter to allow for the influence of the rotor temperature on the rotor resistance. The value is pre-assigned during automatic parameterization (P115=1) for average motor temperatures or measured during motor data identification (P115=2,3). Precondition: P100 = 3, 4 5 (vector control types) P386 = 0 (temperature adaptation not active) P095 = 10,11 (induction motor) Function diagrams: 430.3	index1: ~ Min: 12,5 Max: 400,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Upread/free access Changeable in: - Drive setting - Ready
P128 Imax 128	Function parameter for setting the maximum curent (fundamental rms) This parameter sets the setpoint for current limitation to protect the motor and the drive (Imax controller for v/f contro modes or current controller for vector control modes). Setting range: 0.125 to 4,00 * Imot,n , but maximum 1.36 or 1.6 * Iconv,n (P72). depending on the type of converter. During automatic parameterization (P115 = 1) and motor data identification (P115 = 2, 3), the value is pre-set to 1.5 times the rated motor current (P102). Reaction (derating) may result from the pulse frequence parameter change (P340). Function diagrams: 370.2, 371.2, 372.2, 373.2	index1: ~ Min: 0,1 Max: 6553,5 Unit: A Indices: 4 Type: O4	Menus: - Parameter menu + Control/gating unit + Speed control + Current control + V/f open-loop control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
r129 Imax(set) 129	Visualization parameter of the realized maximum current for current limitation (see P128). It allows for the influence of the I²t calculation. v/f control modes (P100 = 0, 1, 2): Setpoint of the current limitation controller Vector control modes (P100 = 3, 4, 5): Limitation for the setpoints of the current controller Function diagrams: 370.2, 371.2, 372.2, 373.2	Dec.Plc.: 1 Unit: A Indices: - Type: I4	Menus: - Parameter menu + Control/gating unit + Speed control + Current control + V/f open-loop control - Upread/free access
P130* Select MotEncod 130	Function parameter for setting the kind and place of connection of the used tachometer 05 = External SBP board 10 = without tachometer 11 =pulse encoder 12 = pulse encoder with control track 13 = analog tachometer via analog input 1 14 = analog tachometer via analog input 2 15 = pulse encoder with zero pulse 16 = pulse encoder with zero pulse and control track Notes: P130 = 11, 12, 15, 16 (pulse encoder) · Only pulse encoders with a phase shift of 90° between the 2 tracks can be used. · At setting 12 or 16, a low level signal or disconnecting the terminal for the control track will cause the fault message F052. This is for reporting a broken wire in the tachometer cable. · P151 (pulse number of pulse encoder) Please refer to the relevant operating instructions for precise instructions on how to start up the tachometer you are using. P130 = 13, 14 (analog tachometer) · P138 (Analog tachometer scaling) The ATI board is necessary for tachometer voltages > 10 V P095 = 12 (synchronous motor): · P130 = 15 or 16 is necessary (due to zero pulse for position monitoring) Function diagrams: 250.6	index1: 10 Min: 0 Max: 16 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Encoder data + Control/gating unit + Position control - Drive setting - Upread/free access Changeable in: - Drive setting
P131* Select TmpSensor 131 Compact PLUS only	Select the type of temperature sensor on the SBP that will b used to monitor the motor temperature. Setting values: 0 = KTY84/PTC (evaluated by P380/P381) 3 = PT100 (can only be evaluated by SBP)	Init: 0 Min: 0 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Motor/encoder + Motor data - Drive setting - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P138 AnalogTachScale 138	Function parameter for setting the analog tachometer scaling The speed at which a tachometer voltage of 10 V can be measured is set. The ATI board is required to connect the analog tachometer to the drive if the tachometer voltage exceeds 10 V. The parameter value set here is at the same time the limit of the speed measurement range. Speed overshoots must be allowed for. The analog tachometer can be used up to converter output frequencies of 100 Hz. Setting instructions: If, for example, the speed of 3000 rpm including 10% overshoot needs to be shown 1. the parameter P138 has to be set to 3300 rpm 2. the motor has to be operated in the v/f control mode (P10 = 1) at a speed of 3300 rpm, 3. the output voltage of the ATI board, connected to the selected analog input terminal must be adjusted to 10V. Note: The parameter is determined during motor data identification (P115=3, 4) Precondition: P130 = 13,14 (Analog tachometer) Function diagrams: 250.3	index1: 3000 Min: 500 Max: 6000 Unit: 1/min Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Encoder data - Drive setting - Upread/free access Changeable in: - Drive setting - Drive setting - Ready
P139* ConfSetpEnc 139	Function parameter for configuration of the setpoint encoder on an SBP. The setpoint encoder can either process one digital setpoint from two independent rectangular-shaped frequency signals or, alternatively, form one setpoint from an external pulse encoder signal and a rectangular-shaped frequency signal. xxx0 = channel 1 / encoder input HTL unipolar xxx1 = channel 1 / encoder input TTL unipolar xxx2 = channel 1 / encoder input HTL differential input xxx3 = channel 1 / encoder input TTL/RS422 differential input xx0x = channel 2 HTL unipolar xx1x = channel 2 TTL unipolar xx2x = channel 2 HTL differential input xx3x = channel 2 TTL/RS422 differential input x0xx = encoder with 5 V voltage supply x1xx = encoder with 15 V voltage supply 0xxx = setpoint encoder deactivated 1xxx = Frequency counter mode (frequency evaluation) 2xxx = Encoder signal evaluation mode	Init: 0 Unit: - Indices: - Type: L2	Menus: - Parameter menu + Motor/encoder + Encoder data - Board configuration - Drive setting - Upread/free access Changeable in: - Board configuration
P140* SetpEnc Pulse# 140	Function parameter for the pulse number of the setpoint encoder. The parameter has to be set to the number of pulses of the setpoint encoder connected to an SBP board. If the first frequency channel of the setpoint encoder is in the "encoder signal evaluation" mode (P139=2xxx), the parameter value is used for normalizing the setpoint generation (together with the motor ref. frequency).	index1: 1024 Min: 60 Max: 20000 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Motor/encoder + Encoder data - Drive setting - Upread/free access Changeable in: - Drive setting - Drive setting

Parameter	Description	Data	Read/write
P141* SetpEncFreq 141	Function parameter for the reference frequency of the setpoint encoder. The parameter value determines which input frequency results in an output of 100% on the setpoint encoder. If the setpoint encoder is the "frequency counter" mode (P139=1xxx), the parameter values are used to normalize th output values.	index1: 10000 Min: 500 Max: 1000000 Unit: Hz Indices: 2 Type: O4	Menus: - Parameter menu + Motor/encoder + Encoder data - Drive setting - Upread/free access Changeable in: - Drive setting - Drive setting
P151* Encoder Pulse # 151	Function parameter for entering the number of pulses of the pulse encoder. Setting instructions · The product"pulse number * motor frequency" (P107) should not exceed 400000, as otherwise the speed computation will be inaccurate. Precondition: P130 = 11,12,15,16 (Pulse encoder) Function diagrams 250.3	index1: 1024 Min: 60 Max: 20000 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Motor/encoder + Encoder data + Control/gating unit + Position control - Drive setting - Upread/free access Changeable in: - Drive setting
P155* Src i(excit.) 155	BICO parameter for selecting the connector from which the excitation current actual-value is to be read in. Note: At a parameter value of 0, the actual-value (r156) is tracked with the setpoint (r160) and the mnimum excitation current monitoring (see P157, P158) is de-activated. Precondition: P095 = 12 (synchronous motor)	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting
r156 Iexc(act) 156	Visualization parameter for the excitation current actual-value, referred to the rated excitation current. Precondition: P095 = 12 (synchronous motor)	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access
P157 i(exc.)-Reg. Kp 157	Function parameter for setting the gain of the P-controller fo minimum excitation current monitoring. As soon as the measured excitation current is less than half the minimum excitation current (P158), the difference is evaluated with the value of this parameter and connected to the stator-current-side flux-generating current setpoint component. This support shall prevent the excitation current being zero. Precondition: P095 = 12 (synchronous motor)	index1: 0,500 Min: 0,000 Max: 8,000 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P158 i(exc.,min.) 158	Function parameter for setting the minimum excitation current for minimum current monitoring (see P157) referred to the rated excitation current. Above the minimum excitation current, the P controller for flux or voltage limitation control is connected to the flux-generating current setpoint component (see P163 to P165). This control is de-activated if the measured excitation curren actual-value (r156) is below the minimum excitation current (P158). The monitoring control (with P157 as gain) is switched on as soon as half the minimum excitation current is fallen short of. Precondition P095 = 12 (synchronous motor)	index1: 0,1 Min: 0,0 Max: 10,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P159 Smooth. dI(exc) 159	Function parameter for setting the smoothing time constant for smoothing the difference between excitation current setpoint and actual-value (r160, r156) Note: Smoothing is stopped with P159 = 32001 ms. Precondition: P095 = 12 (synchronous motor)	index1: 100 Min: 0 Max: 32001 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
r160 Iexc(set) 160	Excitation current setpoint referred to the rated excitation current. Precondition: P095 = 12 (synchronous motor)	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access
P161 i(min.curr.val.) 161	Function parameter for the stator-side minimum current amount in no-load mode of the synchronous motor. A minimum current can be specified for calmer control behaviour at low stresses. If no torque-generating current setpoint (r272) is present, the entire minimum current is connected as a flux-generating current component (r281). With increasing load, this flux-generating component is reduced to zero if r272 achieves th value of the minimum current. The minimum current is not influenced by the cos PHI control (P162). The value is pre-set during automatic parameterization (P115=1). Precondition: P095 = 12 (synchronous motor)	index1: ~ Min: -3276,7 Max: 3276,7 Unit: A Indices: 4 Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P162 df(changeCosPhi) 162	Function parameter for entering the frequency range below the frequency at which field weakening starts (base frequency KK0192) within which changeover is made between the inner and outer cos PHI control. If the parameter value is not zero, the flux-generating stator-side current setpoint component r281 above the base frequency is controlled in such a way that the stator voltage and current indicators are pointing more or less in the same direction (cos PHI = 1). Below the base frequency, minus this parameter value (P162), r281 is at zero (if no minimum current P161 is specified) and the entire converter current flows in the direction of the EMF (cos-PHI internal = 1). Within the settable frequency range, changeover is made linearily between these states. With P162=0.0%, control to the outer cos-PHI and the relevant flux control in the field weakening area are switched off. This is not recommended as the maximum output is considerably reduced as a result. Precondition: P095 = 12 (synchronous motor)	index1: 20,0 Min: 0,0 Max: 100,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P163 Flux Reg. Gain 163	Function parameter for entering the flux control gain (P controller). The P flux controller operates on the dynamic field-generating stator current component (behind r281). The controller should support the excitation current control rom the stator side during dynamic flux changes. The flux setpoint is supplied by the flux characteristic (r304 and the flux actual-value by the voltage model (r302). The controller is deactivated in the area of the current model (cutout ramp between P313 and P313*P314). In the range of field weakening, the controller is overridden by the Vmax controller (P164) or by the EMFmax controller (P165). Precondition: P095 = 12 (synchronous motor)	index1: 1,500 Min: 0,000 Max: 6,000 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P164 V(max) reg. Kp 164	Function parameter for entering the gain (P controller) of the field weakening controller. The Vmax controller operates on the dynamic field-generating stator current component (behind r281). The controller should support the excitation current control during dynamic processes at the voltage limit (e.g. acceleration/deceleration in field weakening). Outside of the field weakening, the controller is overridden b the flux controller (P163). Precondition: P095 = 12 (synchronous motor)	index1: 1,500 Min: 0,000 Max: 6,000 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P165 EMF(max) reg. Kp 165	Function parameter for setting the gain (P controller) for the EMF maximum value controller (setpoint P306). The EMFmax controller operates on the dynamic field-generating stator current component (behind r281). The controller is overridden by the flux controller (P163) or the field weakening controller (P164), if their set/actual value difference is less than that of the EMFmax controller. Precondition: P095 = 12 (synchronous motor)	index1: 1,500 Min: 0,000 Max: 6,000 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P166 Kp Tdd 166	Function parameter for evaluation of the damping time constant Tdd (saturated) in the current model. Tdd is the result of the ratio of the sum of saturated main inductance and damping leakage to damping resistance (along the rotor axis). Precondition: P095 = 12 (synchronous motor)	index1: 100,0 Min: 25,0 Max: 400,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
P167* Kp Tdq 167	Function parameter for evaluating the dampint time constant Tdq (saturated) in the current model. Tdq is the result of the ratio of the sum of saturated main inductance and damping leakage to the damping resistance (transverse to rotor axis). Precondition: P095 = 12 (synchronous motor)	index1: 100,0 Min: 25,0 Max: 400,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
r168 Load angle 168	Visualization parameter for the angle between flux and rotor axis in the current model of the externally excited synchronous machine. In no-load mode, the angle is approx 0°. Precondition: P095 = 12 (synchronous motor)	Dec.Plc.: 1 Unit: ° (alt) Indices: - Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access
P172* Src Pos SetV 172	BICO parameter for selecting the connector from which the initial position is to be read in. Only if the initial angle is changed, the rotor angle (r186) or the position angle (r185) is set to the new initial angle. If the initial angle remains the same, no setting is made for r185 and r186. If a 16-bit value is connected here, only r186 and the lower-value word of r185 are changed. The higher-value word of r185 (number of revolutions) then remains unchanged. If a 32-bit value is specified, r185 and r186 are completely changed. Note: With synchronous motors (P095=12), it is necessary for the rotor angle at standstill to be provided by an external evaluation (normalization as in r186, 0Hex = fault). Only when the position encoder is adjusted for the first time (reset), the parameter value has to be set to P172=0. The drive then rotates into the zero position as soon as the inverter pulses are released and a minimum current is set in P161. Precondition: P130 = 15,16 (rotary encoder with zero pulse) Function diagrams: 250.6	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,K ,K	Menus: - Parameter menu + Control/gating unit + Position control - Upread/free access Changeable in: - Drive setting - Ready
r185 Pos (act Mot) 185	Visualization parameter for the position actual-value over several revolutions of the rotor (r186) Representation of the angle: 0000 = 0°, 8000 Hex = 180°, FFFF Hex = 359.995° Precondition: P130 = 15,16 (rotary encoder with zero pulse) Function diagrams: 250.7	Dec.Plc.: 1 Unit: ° (alt) Indices: - Type: I4	Menus: - Parameter menu + Control/gating unit + Position control - Upread/free access
r186 Rotor angle 186	Visualization parameter for the rotary angle fo the rotor whic is detected by a tachometer (P130). Representation of the value: 0000 = 0°, 8000 Hex = 180°, FFFF Hex = 359.995° Precondition: P130 = 15,16 (rotary encoder with zero pulse) Function diagrams: 250.7	Dec.Plc.: 1 Unit: ° (alt) Indices: - Type: O2	Menus: - Parameter menu + Control/gating unit + Position control - Upread/free access

Parameter	Description	Data	Read/write
P187 T(dead,rot.ang.) 187	Function parameter for setting the dead time between measured and implemented rotor angle. The parameter is used for correcting slip failure of the position signal in the area of the current model. The corrected position signal is brought to the angle control (P315) together with the load angle (r168). Precondition: P095 = 12 (synchronous motor)	Init: 1,000 Min: 0,000 Max: 4,000 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + Control/gating unit + Position control - Upread/free access Changeable in: - Drive setting - Ready
P215 max. dn/dt 215	Function parameter for setting the maximum permissible change of the measured speed actual value within a control sampling time (P357). The function is for detecting interfering pulses or interruptions in the speed signal (e.g.resulting from faulty cable shields or tachometer coupling). ATTENTION: This function limits the change speed of the drive. If an alarm should be output during the acceleration process or load impacts, the parameter value may have to be increased. The value is pre-set during automatic parameterization (P11 = 1, 2, 3). Precondition: P130 > 10 (source speed actual value). Function diagrams: 350.2	index1: ~ Min: 0,00 Max: 600,00 Unit: Hz Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P216 Smooth n/f(FWD) 216	Function parameter for setting the smoothing time constant of the n/f actual-value precontrol. Note: A smoothing time of approx. 4ms for n/T control (P100=4,5) is recommended only on drives with gear play. If interference pulses occur in the encoder signal, the tachometer cable should be checked to make sure that it has a shield at both sides and over a large surface area. The value is pre-set during automatic parameterization (P11 = 1,2,3). Precondition: P100 = 3, 4, 5 (vector control types) Function diagrams: 350.3, 351.4	index1: ~ Min: 0,0 Max: 50,0 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P217 Slip fail corr'n 217	Function parameter for setting the slip failure correction for the n/f actual-value. Slip failure correction is only effective at speed control with encoder (P130 = 11, 12) and improves the torque accuracy during acceleration. Parameter values: 0 = not active 1 = correction with smoothing of approx. 32ms 2 = Correction with smoothing of approx. 16ms. Precondition: P100 = 4, 5 (n/T control) Function diagrams: 350.5	index1: 0 Min: 0 Max: 2 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
r218 n/f(act) 218	Visualization parameter for the speed frequency actual value P100 = 0, 3, 4, 5 and P100 = 1 and slip compensation (P336): Speed actual-value multiplied by the pole pair number (P109 of the motor. P100 = 1, 2 (v/f contol, v/f control for textile), no slip compensation (P336): stator frequency Function diagrams: 350.7, 351.7	Dec.Plc.: 3 Unit: Hz Indices: - Type: I4	Menus: - Parameter menu + Control/gating unit + Speed control + V/f open-loop control - Upread/free access
r219 n (act) 219	Visualization parameter for the speed actual-value P100 = 0, 3, 4, 5, and P100 = 1 (v/f control), slip compensation (P336): Speed actual-value of the motor P100 = 1,2 (v/f control, v/f control for textile), no slip compensation (P336): stator frequency in Hz divided by the pole pair number of the motor (P109) Function diagrams 360.2, 361.2, 362.2, 363.2	Dec.Plc.: 3 Unit: 1/min Indices: - Type: I4	Menus: - Parameter menu + Control/gating unit + Speed control + V/f open-loop control - Upread/free access
P221 smooth n/f(set) 221	Function parameter for setting the smoothing time constant for the n/f setpoint before the tachometer. The use is particularly recommended for preventing overshoot of the speed actual-value when the n/f controller precontrol (P471=0) is switched off and/or at ramp-function generator times of 0.0s. Precondition: P100 = 0, 3, 4, 5 (v/f contorl with n control, vector control types)	index1: 4 Min: 0 Max: 2000 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P222* Src n/f(act) 222	BICO parameter for selecting the connector from which the speed actual values are to be read in. Synchronous motor: The torque limits and the angle controller P315 have to be disabled for trial operation (P222<>0). The drive may only b operated in the range of the current model. Precondition: P100 = 3,4,5 (vector control types) Function diagrams: 350.1, 351.7	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,K ,K	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting
P223 Smooth n/f(act) 223	Function parameter for the smoothing time constant of the n actual value to the negative speed controller input. The value is pre-set during automatic parameterization (P11 = 1,2,3) or is determined during controller optimization (P115 = 5). Precondition: P100 = 0, 3, 4, 5 (v/f control with n control, vector control types) Function diagrams: 360.2, 361.2, 362.2, 363.2	index1: ~ Min: 0 Max: 2000 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
r229 n/f(set,smo'd) 229	Visualization parameter for the n/f setpoint at the speed controller input or at the frequency input of the v/f characteristic. Function diagrams: 360.4, 361.4, 362.4, 363.4.	Dec.Plc.: 3 Unit: Hz Indices: - Type: I4	Menus: - Parameter menu + Control/gating unit + Speed control + V/f open-loop control - Upread/free access
r230 n/f(act,smo'd) 230	Visualization parameter for the smoothed n/f actual value at the speed controller input. Precondition: P100 = 0, 3, 4, 5 (v/f control with n control, vector control types). Function diagrams: 360.3, 361.3, 362.3, 363.3	Dec.Plc.: 2 Unit: Hz Indices: - Type: I4	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access
P232* Src n/f RegAdapt 232	BICO parameter for selecting the connector from which the input signal for the gain adaption of the speed controller (P235) is to be read in. Precondition: P100 = 0, 3, 4, 5 (v/f control with n control, vector control types) Function diagrams: 360.3, 361.3, 362.3, 363.3	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P233 n/f Reg. Adpat.1 233	Function parameter for entering the lower transition point for gain adaption of the speed controller gain. Below this point, gain of the n/f controller is identical to P235 Between P233 and P234, evaluation is interpolated in a linea manner to P236. Precondition: P100 = 0, 3, 4, 5 (v/f control with n control, vector control types) Function diagrams: 360.5, 361.5, 362.5, 363.5, 364.5	index1: 0,0 Min: 0,0 Max: 200,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P234 n/f-Reg. Adapt.2 234	Function parameter for entering the upper corner point for gain adaption of the speed controller gain. Above this point, gain of the n/f controller is identical to P236 If P234 is less than P233, there is internal limitation to P233. Then the gain will jump from P235 to P236 if the threshold P233=P234 is exceeded. Precondition: P100 = 0, 3, 4, 5 (v/f control with n control, vector control types) Function diagrams: 360.6, 361.6, 362.6, 363.6	index1: 100,0 Min: 0,0 Max: 200,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P235 n/f-Reg Gain 1 235	Function parameter for entering the n/f controller gain. The value is pre-set during automatic parameterization (P11 = 1, 2) or is calculated from the measured during n/f controller optimization (P114 = 3, 5). Precondition: P100 = 0, 3, 4, 5 (v/f control with n control, vector control types) Function diagrams: 360.4, 361.4, 362.4, 363.4	index1: ~ Min: 0,0 Max: 2000,0 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P236 n/f-Reg. Gain2 236	Function parameter for entering the speed controller gain above the corner point P234 of the gain adaption. At speeds between P233 and P234, the gain is interpolated linearily from P235 to P236. Precondition: P100 = 0,3,4,5 (v/f control with n control, vector control types) Function diagrams: 360.4, 361.4, 362.4, 363.4	index1: ~ Min: 0,0 Max: 2000,0 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
r237 n/f RegGain(act) 237	Visualization parameter for the currently effective gain of the speed controller. Precondition: P100 = 0, 3, 4, 5 (v/f control with n control, vector control types) Function diagrams: 360.6, 361.6, 362.6, 363.	Dec.Plc.: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access
P238* Src n-Reg.Adapt 238	BICO parameter for selecting the connector from which the evaluation signal for the gain adaption of the speed controlle (P235) is to be read in. Precondition: P100 = 0, 3, 4, 5 (v/f control with n control, vector control types) In function diagram: 360.3, 361.3, 362.3, 363.3, 364.3	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P240* n/f Reg Time 240	Function parameter for entering the integral time of the spee controller. The value is pre-set during automatic parameterization (P11 = 1, 2) or is taken from the measurement during n/f controlle optimization (P115 = 3, 5). Note: With value 32001 ms, the I component is turned off (the speed controller operates as a P controller). Precondition: P100 = 0, 3, 4, 5 (v/f control with n control, vector control types) Function diagrams: 360.7, 361.7, 362.7, 363.7	index1: ~ Min: 25 Max: 32001 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P241* SrcSetV n/f-Reg1 241	BICO parameter for selecting the connector from which the setting value for the I component of the speed controller is to be read in. Note: - If the setting command is not interconnected (P242=0), a pending setting value is read in after pulse enable at the end of the excitation time (P602) and the integral component of the controller is set once. - If the connector 155 (n/f(Ref, I-Comp)) is interconnected, upon pulse enable, the integral component of the controller i set to the last value prior to pulse inhibit. CAUTION. - If the setting value P241 is interconnected, during speed control without an encoder, the integral component of the speed controller will not be moved to zero when the drive is stopped, but stays at the last value (from the range of the EMF model). This value corresponds to the static load if the acceleration torque has been correctly precontrolled. The current component is not reset until the pulse is disabled. In function diagrams: 360.5, 361.5, 362.5, 363.5, 364.5	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting
P242* Src Set n/f-Reg1 242	BICO parameter for selecting the binector from which the command for setting the I component of the speed controller is to be read in. Function diagrams: 360.5, 361.5, 362.5, 363.5	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting
P243* Src nf-Reg1 STOP 243	BICO parameter for selecting the binector from which the command to stop the I component of the speed controller is to be read in. If the value of the signal connected at the binector is logical "1", the I component of the speed controller is stopped. From then on, the speed controller only acts as a P controller. Function diagrams: 360.5, 361.5, 362.5, 363.5	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting
P245* Src Droop 245	BICO parameter for selecting the connector from which the input signal for the droop is to be read in. Connection of the I component of the speed controller (K0155) is preferred here. Function diagrams: P365.5, P367.2	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P246 Scale Droop 246	Function parameter for scaling the droop (selection see P245). Parameter values greater than 0 lead to a drop of the speed setpoint (r471) when the drive is loaded, and thus result in a speed deviation from the main setpoint. Setting instructions: Kp = 0.000 = droop inactive Kp > 0.000 and no external droop enable (see P584) = droop is calculated (KK0157), but is not processed in the setpoint channel. Kp > 0.000 and external droop enable (see P584) = droop active The second setting should be selected for the master drive i there is load equalization control between several motors. KK0157 can then, for example, be output via the analog interface, without the speed setpoint of the main drive being changed. Precondition: P100 = 3, 4 (n/f control) Function diagrams: 365.6, 367.3	index1: 0,0 Min: 0,0 Max: 49,9 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P249* DT1 Function T1 249	Function parameter for the smoothing time constant for damping compensation. If the smoothing time is set at 0.0ms, the differentiation only operates during master drive control with the speed setpoint (smoothed with P221) and can be used as precontrol for the speed controller. Precondition: P163 = 3, 4, 5 (vector control types) Function diagrams: 365.6, 366.5, 367.3	index1: 10,0 Min: 0,0 Max: 200,0 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P250 DT1 Function Td 250	Function parameter for the gain of the damping compensation of the speed actual value to the setpoint of the torque-generating current. For n/f control (as master drive) the damping operates with the n/f control error. The characteristics correspond to a smoothed D component of the n/f controller. If the smoothing time is P249=0.0ms, only the setpoint spee is differentiated (smoothing time constant P221). Precondition: P100 = 3, 4, 5 (vector control types) Function diagrams: 365.6, 366.5, 367.3	index1: 0,0 Min: 0,0 Max: 1000,0 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P251 Band-Stop Gain 251	Function parameter for entering the evaluation factor for the band-stop filter. At gain = 100 %, the band-stop filter (average frequency P254, band width P253) is switched on. A correction of the gain factor is only purposeful if speed deviations occur when stationary (r230 <> r229). This can occur if there are low resonance frequencies and large filter band widths. Note: If the filter is switched on, the damping compensation (P250 P249) always operates with the speed signal (r230) and not with the control deviation. ATTENTION. If the gain is set a lot less or more than 100%, the drive can be accelerated or decelerated very high. Precondition: P100 = 3, 4, 5 (Vector control types) Function diagrams: 360.4, 361.4, 362.4, 363.4	index1: 0,0 Min: 0,0 Max: 150,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P253 Filter bandwidth 253	Function parameter for entering the frequency band width (3dB) of the band-stop filter for the speed signal (r230). ATTENTION: With very low resonance frequencies (P254) and large filter band widths, the dynamic response of the speed controller must be reduced so that the speed control will not become unstable. Precondition: P100 = 3, 4, 5 (vector control types) Function diagrams: 360.4, 361.4, 362.4, 363.	index1: 0,5 Min: 0,5 Max: 20,0 Unit: Hz Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P254 ResonFreqBStop 254	Function parameter for entering the resonance frequency of the band-stop filter. The filter can be used to prevent mechanical resonances from upshooting over the speed control circuit. The parameter value describes the middle of the frequency disable area. It should be slightly below the resonance frequency. ATTENTION: At very low resonance frequencies and large filter band widths (P253), the dynamic response of the speed controller must be reduced in order that the speed control does not become unstable. Precondition: P100 = 3, 4, 5 (vector control types) Function diagrams: 360.4, 361.4, 362.4, 363.4	index1: 50,0 Min: 5,0 Max: 200,0 Unit: Hz Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
r255 T(set,reg. off) 255	Visualization parameter for the output signal of the n/f controller (torque setpoint) in front of the torque limitation referred to P354 (reference torque) Precondition: P100 = 3, 4, 5 (vector control types) Function diagrams: 360.8, 361.8, 362.8, 363.8	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access
P256* Src T(lim,reg1) 256	BICO parameter for selecting the connector from which the upper limit value for the torque at the speed controller outpu is to be read in. Function diagram: 360.8, 362.8	index1: 172 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting
P257* Src T(lim,reg2) 257	BICO parameter for selecting the connector from which the lower limit value for the torque at the speed controller output is to be read in. Function diagram: 360.8, 362.8	index1: 173 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting
P258 Max Gen Power 258	Function parameter for the maximum permissible motoring active power. Setting instruction: It is necessary to set an output limit for field weakening operation in order to enable cos PHI control (P162). The limit is automatically reduced internally if the converter supply voltage drops below the rated motor voltage. The value is pre-set during automatic parameterization (P115=1). Precondition: P095 = 12 (synchronous motor)	index1: ~ Min: 0,1 Max: 200,0 Unit: % Indices: 4 Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P259 Max Regen Power 259	Function parameter for maximum permissible regenerative active power. Setting instructions: On units without a braking resistor and without a regenerativ unit, the parameter value is set to support the Vdmax controller to values of approx. -10 %. The torque limits should not be used to limit the output. The value is pre-set during automatic parameterization (P115=1). Precondition: P100 = 3, 4, 5 (vector control types) Function diagrams: 370.2, 371.2, 372.2, 373.2	index1: ~ Min: -200,0 Max: -0,1 Unit: % Indices: 4 Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P260* Src Torq (set) 260	BICO parameter for selecting the connector from which the torque setpoint in the "Master drive" operating mode is to be read in. If this parameter is connected, the torque is not obtained from the output of the speed controller. Precondition: P100 = 4 (speed control) Function diagrams: P375.2	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting
P262* Src Torque(add) 262	BICO parameter for selecting the connector from which the additional setpoint for torque is to be read in. The additional setpoint is added to the setpoint of the torque (see P260). If this parameter is connected, the torque is not obtained from the output of the speed controller. Precondition: P100 = 4 (speed control) Function diagrams: P375.2	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting
P268 Kp Isq(max) 268	Function parameter for the correction factor when calculating the maximum torque-generating current component in the field-weakening area (Isqmax: K0176) This parameter is only intended for service personnel. Precondition: P100 = 3, 4, 5 (vector control types) P095 = 10, 11, 13 (induction motor, sync.perm.) Function diagrams: 370.3, 371.3, 372.3, 373.3	index1: 100,0 Min: 25,0 Max: 400,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
r269 Torq (set, Lim) 269	Visualization parameter for the limited torque setpoint at the output of the speed controller including additional torque. Precondition: P100 = 3, 4, 5 (vector control types) Function diagrams: 370.7, 371.7, 372.7, 373.7, 375.7	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access
r272 Isq(set,lim) 272	Visualization parameter for the setpoint of the torque-generating current Precondition: P100 = 3, 4, 5 (vector control types) Function diagrams: P370.8, P371.8, P372.8, P373.8, P375.7	Dec.Plc.: 1 Unit: A Indices: - Type: I4	Menus: - Parameter menu + Control/gating unit + Current control - Upread/free access

Parameter	Description	Data	Read/write
P273 Smooth Isq(set) 273	Function parameter for the smoothing time constant of the torque smoothing setpoint. This only operates in the field weakening area. The value is pre-set during automatic parameterization (P115=1) or during motor data identification (P115=2,3). Synchronous motor: Smoothing results from multiplication by the rise limitation. Precondition: P100 = 3, 4, 5 (vector control types) Function diagrams: 390.2	index1: ~ Min: 0 Max: 20 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Current control - Upread/free access Changeable in: - Drive setting - Ready
P274 Isq(set) grad. 274	Function parameter of the rise limitation for steady-state current setpoint component Isq (and Isd in the case of externally excited synchronous motors).	index1: ~ Min: 0,0 Max: 6553,5 Unit: A Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P275* Src I(max) 275	BICO parameter for selecting the connector from which an external setpoint is to be read in for maximum current. The read-in maximum current acts as a limitation of the internal value r129 which results from parameterization via P128. In function diagram: 370.1, 371.1, 372.1, 373.1	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Control/gating unit + Speed control + Current control + V/f open-loop control - Upread/free access Changeable in: - Drive setting
r277 T(set,friction) 277	Visualization parameter for the torque setpoint for making allowance for the friction. The friction torque is added after torque limitation. Negative values are displayed in the case o negative speeds. Precondition: P100 = 4, 5 (n/T control) In function diagram: 370.7, 371.7, 375.7	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access

Parameter	Description	Data	Read/write
P278 Torque (static) 278	Function parameter for the maximum required steady-state torque during encoder-less speed control (frequency control in the lower speed range. At frequency control (P100=3) and non-active EMF model (B0253 = 0), a constant current is impressed to the motor. Torque(static) represents the maximum torque occurring during constant setpoint frequency. For safety reasons, the parameter should allow for at least 10 % more than the expected load. Parameter values: 0 % = Rated magnetizing current is injected (r119) Setting instructions: During acceleration, the transition to the counter EMF mode (B0253 = 1) is significantly influenced by the setting of this parameter and by the protective mode of the ramp function generator (P467). The value is assigned during automatic parameterization (P115=1). Precondition: P100 = 3 (frequency control)	index1: ~ Min: 0,0 Max: 200,0 Unit: % Indices: 4 Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P279 Torque (dynamic) 279	Function parameter for the maximum additional dynamic torque during encoder-less speed control (frequency control in the lower speed range. An additional acceleration torque (P279) is added to the steady state torque (P278) during frequency acceleration an deceleration. The total current during acceleration is calculated from the settings of P278 and P279.During steady state operation only the current for P278 is impressed. Setting instructions: For the sole purpose of acceleration torques, the speed control precontrol (P471) can be used. The value is assigned during automatic parameterization (P115=1). Precondition: P100 = 3 (frequency control) In function diagram: 382.2	index1: ~ Min: 0,0 Max: 200,0 Unit: % Indices: 4 Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P280 Smooth I(Set) 280	Function parameter for setting the smoothing time constants of the current setpoint impressed via P278 and P279. Precondition: P100 = 3 (frequency control) In function diagram: 382.6	index1: 40 Min: 4 Max: 32000 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
r281 Isd(set) 281	Visualization parameter for the setpoint of the flux-generator current components. Synchronous motor (P095 = 12): visualization parameter for the steady-state setpoint of the stator-side flux-generating current component. Output signal of the rise limitation (P274) which is connected downstream of the cos-PHI control (P162) and the minimum current (P161). The flux-generating excitation current component is calculated in the current model.. Precondition: P100 = 3, 4, 5 (vector control types) In function plan: 380.8, 381.8	Dec.Plc.: 1 Unit: A Indices: - Type: I4	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access
P282 Gain PRE Isq 282	Function parameter for evaluation of the differential precontrol of the current controller. Precondition: P100 = 3,4,5 (vector control types) In function diagram: 390.4	index1: 60,0 Min: 0,0 Max: 200,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Current control - Upread/free access Changeable in: - Drive setting - Ready
P283 Current Reg Gain 283	Function parameter for adjusting the gain of the PI current controller in the range of the asynchronous modulation of the modulator. The adaption of this gain is automatically performed depending on the pulse frequency in the modulator. The value is preset during automatic parameterization (P115 = 1) or during motor data identification (P115 = 2, 3). Note: After the pulse frequency or motor parameter has been changed, automatic parameterization or motor identification should be repeated in order to precisely set the controller. Precondition: P100 = 3, 4, 5 (vector control types) In function diagram: 390.4	index1: ~ Min: 0,000 Max: 2,500 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Current control - Upread/free access Changeable in: - Drive setting - Ready
P284 Current Reg Time 284	Function parameter for setting the adjustment time of the PI current controller in the range of asynchronous modulation o the modulator. The value is pre-set during automatic parameterization (P11 = 1) or motor data identification (P115 = 2, 3). Precondition: P100 = 3, 4, 5 (vector control types) In function diagram: 390.4	index1: ~ Min: 2,0 Max: 200,0 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Current control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P287 SmoothDCBusVolts 287	Function parameter for setting the time constant for smoothing the DC link bus voltage as an input quantity of the Vd correction. The smoothing time constant is calculated as follows: T1 = Tpulse*2 exp(parameter value) Setting instructions: If high requirements are made on the dynamic response of the drive system and the thus related fast changes in DC link voltage, P287 has to be reduced to 0..3. Note: At P287 = 16, the DC link voltage calculated from the converter line voltage is displayed. In function diagram: 285.2	index1: 9 Min: 0 Max: 16 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Current control + V/f open-loop control - Upread/free access Changeable in: - Drive setting - Ready
P288 Decoupl. Gain1 288	Function parameter for the evaluation factor of decoupling switching-in during current control in the constant flux range of the motor. This parameter is only envisaged for service personnel. Precondition: P100 = 3, 4, 5 (vector control types) In function diagram: 390.3	index1: 100,0 Min: 0,0 Max: 200,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Current control - Upread/free access Changeable in: - Drive setting - Ready
P289 Decoupl. Gain 2 289	Function parameter for the evaluation factor of decoupling switching-in during current control in the field weakening range of the motor. This parameter is only envisaged for service personnel. Precondition: P100 = 3, 4, 5 (vector control types) In function diagram: 390.4	index1: 25,0 Min: 0,0 Max: 200,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Current control - Upread/free access Changeable in: - Drive setting - Ready
P291 FSetp Flux (set) 291	Function parameter for setting the flux setpoint, referred to the rated rotor flux of the motor. Note: At values below 100 %, the drive is operated under-magnetized, and at higher values it is operated over-magnetized. Precondition: P100 = 3, 4, 5 (vector control types) P095 = 10, 11, 12 (induction motor, synchronous motor) In function diagram: 380.2, 381.2	index1: 100,0 Min: 50,0 Max: 200,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P293 Field Weak Freq 293	Function parameter for setting the frequency limit above which the voltage of the v/f characteristic is kept constant. If the voltage limit is already reached below this value, field weakening starts at a lower frequency. Precondition: P100 = 0, 1, 2 (v/f modes) In function diagram: 405.1	index1: ~ Min: 8,00 Max: 600,00 Unit: Hz Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + V/f open-loop control - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P295 Efficiency Optim 295	Function parameter for setting the setpoint for the rotor flux under no-load conditions for load-adaptive magnetization. When the flux is reduced, the stator losses of the motor in the partial load range are reduced. The reference flux increases when loaded, so that the magnetization current corresponds to the torque-generating current (r272 . Parameter values: 100.0 %: No load-adaptive magnetization <100.0 %: Load-adaptive magnetization activated. Setting instructions: · An increase of the flux setpoint (P291) to approx. 110.0 % contributes towards further efficiency optimizing. · The load-adaptive magnetization in the partial load range restricts the dynamic performance of the drive. · The smoothing time constant of the flux setpoint (P303) must be selected to be that much higher the lower the load-dependent rotor flux is set (at least 100 ms for speed control or 500 ms for frequency control). · Upon activation of the efficiency optimization mode, the differentiation of the flux setpoint for forming the field-generating current component is switched off. Precondition: P100 = 3, 4, 5 (vector control types) P095 = 10, 11 (induction motor) In function diagram: 380.2, 381.2	index1: ~ Min: 50,0 Max: 100,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting
P297 Flux Reg. Gain 297	Function parameter for entering the flux controller gain (PI controller). The flux controller operates on the field-generating components of the excitation current setpoint. The flux actua value (r302) at the negative controller input is set to the setpoint in the case of low speeds (in the current model) with the result that the controller is ineffective in this area. The flux setpoint (r304) arises from the smoothed output of the flux characteristic. The integral-action time of the PI controller can be set in P298. The output signal can be visualized by means of K0212. As soon as the deviation between the maximum voltage (r346) and the reference voltage of vector control is less than the deviation between the setpoint and actual flux, the control transcends to a voltage limitation control. The gain of this Vmax control is 8 times less than that of flux control. The integral-reaction time can be set in P305. The same applies to the EMFmax control (see P307). Precondition: P095 = 12 (synchronous motor)	index1: 1,00 Min: 0,00 Max: 250,00 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P298 Flux Reg Time 298	Function parameter for adjusting the flux controller integral-action time. Setting instructions: The integral component is stopped with value 32001 ms (flux controller then operates as a P controller). Precondition: P095 = 12 (synchronous motor)	index1: 100 Min: 10 Max: 32001 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P301 Smooth Psi(act) 301	Function parameter for setting the smoothing time constant for the rotor flux actual value. Precondition: P100 = 3,4,5 (vector control types) P095 = 12 (synchronous motor)	index1: 4,0 Min: 0,0 Max: 200,0 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
r302 Flux(act) 302	Visualization parameter for the smoothed flux actual value o vector control, converted to the rated voltage of the motor. A a setpoint flux of r304=100.0%, a value corresponding to the rated EMF is set. The smoothed flux actual value is added to the flux control (see P297) and the unsmoothed actual value is used for stal detection (see P805). In the range of the current model (B0253=0), the parameter is guided to the setpoint flux. Precondition: P095 = 12 (synchronous motor)	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access
P303 Smooth Flux(Set) 303	Function parameter for setting the smoothing time constant for the flux setpoint. The value is pre-set during automatic parameterization (P115 = 1) or during motor data identification (P115 = 2, 3). Setting instructions: P303 > 100 ms: for load-adaptive magnetization with speed control P303 > 500 ms: for load-adaptive magnetization with frequency control Precondition:: P100 = 3, 4, 5 (vector control types) P095 = 10, 11, 12 (induction motor, synchronous motor) In function diagram: 380.5, 381.5	index1: ~ Min: 4 Max: 2000 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
r304 Flux(Set,Total) 304	Visualization parameter for the flux setpoint of vector control referred to the rated rotor flux of the motor. Precondition: P100 = 3, 4, 5 (vector control types) P095 = 10, 11, 12 (induction motor, synchronous motor) In function diagram: 380.6, 381.6	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access
P305 FieldWeakRegTime 305	Function parameter for the integral-actino time of the field-weakening or V(max) controller. Synchronous motor (P095 = 12): Integral-action time of the field-weakening controller (PI controller; Kp = P297/8).This overrides the flux controller (P297, P298) as soon as the voltage limit is reached. Precondition: P100 = 3, 4, 5 (vector control types) In function diagram: 380.4, 381.4	index1: 150 Min: 10 Max: 32001 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P306 EMF(max) 306	Function parameter for setting the maximum EMF The parameter is used as a positive input signal for EMF max control. The value is calculated during automatic parameterization (P115=1). Precondition: P095 = 12 (synchronous motor)	index1: ~ Min: 100 Max: 2000 Unit: V Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P307 EMF(max.)-Reg Ti 307	Function parameter for the integral-action time of the EMF max controller. The EMF max controller acts if the difference between P306 and the EMF actual value is less than the deviation from setpoint and actual value flux or from maximum and setpoint voltage. The PI contoller then operates with a gain of P297 / 8 on the flux-generating excitation current component of the current model and thus overridess the flux controller (P297,P298) or the field-weakening controller (P305). Setting instructions: The I component is stopped with value 32001 ms (the EMF max controller operates as a P controller). Precondition: P095 = 12 (synchronous motor)	index1: 150 Min: 10 Max: 32001 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
r308 Psi(set,I-mod.) 308	Visualization parameter for the flux setpoint, referred to the rated EMF. The flux setpoint is situated at the positive input of the PI flux controller of the current model of the externally excited synchronous machine with rotor-side damper winding. Precondition: P095 = 12 (motor type = synchronous motor)	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access
r309 Psi(act,I-mod.) 309	Visualization parameter for the flux actual value at the outpu of the current model (behind the saturation characteristic) of the externally excited synchronous machine referred to rated EMF. The signal is guided back to the negative input of the PI flux controller of the current model. Precondition: P095 = 12 (synchronous motor)	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access
P310 Psi(mod)-reg. Kp 310	Function parameter for the flux controller gain in the current model. The flux controller operates on the field-generating components of the magnetizing current setpoint in the current model of the externally excited synchronous machine The controller is precontrolled by the steady-state magnetization current of the no-load mode and therefore onl has to correct deviations resulting from dynamic processes (e.g. load change) and the asymmetry of the rotor. Precondition: P095 = 12 (synchronous motor)	index1: 4,000 Min: 0,000 Max: 6,000 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P311 Psi(mod)-reg. Tn 311	Function parameter for the flux controller integral-action time in the current model. Precondition: P095 = 12 (synchronous motor)	index1: 50 Min: 4 Max: 999 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P312 Kp L(sig,U mod.) 312	Function parameter for evaluation of the stator inductance in the dynamic portion of the voltage model. In addition to the stator leakage (P122), the damper leakage also enters transverse to the Rotor axis (P078). Precondition: P095 = 12 (synchronous motor)	index1: 100,0 Min: 0,0 Max: 200,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Current control - Upread/free access Changeable in: - Drive setting - Ready
P313 f(cEMF Mod) 313	Function parameter for the changeover from the current model to the counter EMF model. The value is pre-set during automatic parameterization (P115=1). Synchronous motor (P095=12): The parameter value represents the upper frequency limit of the changeover ramp between the current and the voltage model. Changeover is approximately at the following frequency: P313 * (0.85*P314 + 15%) Precondition: P100 = 3, 4, 5 (vector control types) In function diagram: 395.7, 396.7	index1: ~ Min: 0,00 Max: 600,00 Unit: Hz Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Current control - Upread/free access Changeable in: - Drive setting - Ready
P314 f(cEMF->AMP-mod) 314	Function parameter for the frequency limit for changing over from the counter EMF model to the current model, referred t f(cEMF Mod) (P313). Example: Frequency limit [Hz] = P313 * P314 Synchronous motor (P095=12): The parameter value represents the lower frequency limit of the changeover ramp between the current model and the voltage model in relation to the upper limit (P313). Precondition: P100 = 3, 4, 5 (vector control types) In function diagram: 395.7, 396.7	index1: 50,0 Min: 1,0 Max: 99,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Current control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P315 cEMF Reg Gain 315	Function parameter of the gain of the PI controller for the counter EMF model at rated motor voltage. At low voltage setpoints, the gain is increased. The value determined during automatic parameterization (P115 = 1) or during motor data identification (P115 = 2, 3). Note: The control circuit only operates in the current model if gain = 0. Synchronous motor: The parameter includes the P controller gain of the flux angl controller in the range of the current model. Note (only for P095=12): At Kp = 0, the angle control is switched off which means that considerable orientation errors may occur in the current mode!! Precondition: P100 = 3, 4, 5 (vector control types) In function diagram: 395.4, 396.4	index1: ~ Min: 0,000 Max: 6,000 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Current control - Upread/free access Changeable in: - Drive setting - Ready
P316 cEMF Reg Time 316	Function parameter for the integral-action time of the PI controller for the counter EMF model. The value is pre-set during automatic parameterization (P11 = 1) or during motor data identification (P115 = 2, 3). Precondition: P100 = 3, 4, 5 (vector control types) P095 = 10, 11, 13 (motor type= IEC, NEMA,Sync.Perm.) In function diagram: 395.4, 396.4	index1: ~ Min: 4,0 Max: 999,9 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Current control - Upread/free access Changeable in: - Drive setting - Ready
P317* Src U (set) 317	BICO parameter for selecting the connector from which an external setpoint for setpoint voltage is to be read in. The setpoint voltage replaces the output voltage of the v/f characteristic. Precondition: P100 = 2 (v/f control, textile) In function diagram: 405.4	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Control/gating unit + V/f open-loop control - Upread/free access Changeable in: - Drive setting
P318 Boost Mode 318	Function parameter for the boost mode at F = 0 Hz. 0: Current boost: A voltage boost is calculated by means of a starting current (P319) allowing for the measured stator resistance.. 1: Voltage boost: The voltage boost of the v/f characteristic is directly entered via P325. Precondition: P100 = 0, 1, 2 (v/f control modes) In function diagram: 405.2	index1: 1 Min: 0 Max: 1 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + V/f open-loop control - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P319 Boost Amps 319	Function parameter for entering the current boost. A voltage boost at f = 0 Hz is calculated from the boost current and the total measured resistance (motor + cable). The value is calculated during automatic parameterization (P115=1). Precondition: P100 = 0, 1, 2 (v/f control modes) P318 = 0 (current boost) In function diagram: 405.1	index1: ~ Min: 0,0 Max: 6553,5 Unit: A Indices: 4 Type: O4	Menus: - Parameter menu + Control/gating unit + V/f open-loop control - Upread/free access Changeable in: - Drive setting - Ready
P322 Accel Amps 322	Function parameter for an additional current setpoint enabling a higher acceleration torque at low frequencies. The acceleration current is only active during acceleration and up the end frequency (P326) of the voltage boost. It may be used to generate a break off torque The value is determined during automatic parameterization (P115=1). Precondition: P100 = 0, 1, 2 (v/f control modes)	index1: ~ Min: 0,0 Max: 6553,5 Unit: A Indices: 4 Type: O4	Menus: - Parameter menu + Control/gating unit + Current control + V/f open-loop control - Upread/free access Changeable in: - Drive setting - Ready
P325 Boost Volts 325	Function parameter for the voltage boost at f = 0 Hz. The value is calculated during automatic parameterization (P115 = 1, 2). Precondition: P100 = 0, 1, 2 (v/f control modes) P318 = 1 (voltage boost) In function diagram: 405.1	index1: ~ Min: 0,0 Max: 500,0 Unit: V Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + V/f open-loop control - Upread/free access Changeable in: - Drive setting - Ready
P326 Boost End Freq 326	Function parameter for the end frequency of the voltage boost. In the range from 0 Hz to end frequency, the voltage boost is reduced to 0. Special case: The input value 0 Hz causes the output voltage to stay constant until crossing the normal v/f curve ("horizontal" boost). The value is pre-set during automatic parameterization (P11 = 1) or during motor data identification (P115 = 2, 3). Precondition: P100 = 0,1,2 (v/f control modes) In function diagram: 405.3	index1: ~ Min: 0,00 Max: 300,00 Unit: Hz Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + V/f open-loop control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P330 V/Hz Mode 330	Function parameter for the v/f mode. Parameter values: 0: linear characteristic (for constant-torque drives) 1: parabolic characteristic (for pumps, fans, etc.) Precondition: P100 = 0, 1, 2 (v/f control modes) In function diagram: 405.2	index1: 0 Min: 0 Max: 1 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + V/f open-loop control - Drive setting - Upread/free access Changeable in: - Drive setting
P331 Imax Reg Gain 331	Function parameter for the gain of the PI controller for current limitation (Imax controller). The value is pre-set during automatic parameterization (P11 = 1) or during motor data identification (P115 = 2, 3). Precondition: P100 = 0, 1, 2 (v/f control modes) In function diagram:	index1: 0,050 Min: 0,005 Max: 0,499 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Current control + V/f open-loop control - Upread/free access Changeable in: - Drive setting - Ready
P332 Imax Reg Time 332	Function parameter for the integral-action time of the PI controller for current limitation (Imax controller). Precondition: P100 = 0, 1, 2 (v/f control modes) In function diagram:	index1: 100 Min: 4 Max: 32001 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Current control + V/f open-loop control - Upread/free access Changeable in: - Drive setting - Ready
P334 IxR Compens Gain 334	Function parameter for the compensation factor of voltage losses on the stator resistor or on long cables. The factor corresponds to the cable resistance referred to the rated motor impedance. The output voltage is increased depending on the actual torque-generating current. The value is pre-set during automatic parameterization (P115 = 1, 2,3) Precondition: P100 = 0, 1, 2 (v/f control modes) In function diagram: 405.3	index1: ~ Min: 0,00 Max: 40,00 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + V/f open-loop control - Upread/free access Changeable in: - Drive setting - Ready
P335 Smooth Isq 335	Function parameter for the smoothing time constant of the torque-generating current. The value is pre-set during automatic parameterization (P115 = 1) or during motor data identification (P115 = 2, 3). Precondition: P100 = 0, 1 (v/f control modes without textile) In function diagram: 286.6	index1: ~ Min: 0 Max: 3200 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + V/f open-loop control - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P336 Slip Comp Gain 336	Function parameter for the proportional gain of slip compensation (also taking the rotor temperature into account). The value is pre-set during automatic parameterization (P115 = 1, 2,3). Setting instructions: 0.0 %: Slip compensation off 50 % - 70 %: Full slip compensation at cold motor (partial load) 100 %: Full slip compensation at warm motor (full load) Note: Rating plate data for rated current (P102), rated speed (P108) and rated frequency (P107) must be entered correctl and fully. Precondition: P100 = 1 (v/f control) In function diagram:	index1: ~ Min: 0,0 Max: 400,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + V/f open-loop control - Upread/free access Changeable in: - Drive setting - Ready
P337 Reson Damp Gain 337	Function parameter for the gain of the resonance damping. v/f control modes, without v/f textile application (P100 = 0, 1) The resonant damping circuit is effective in a range from about 5 % to 70 % of the rated motor frequency. The value is pre-set during automatic parameterization (P115 = 1, 2,3). Note: The resonance damping circuit damps oscillations of the active current. These oscillations mainly occur during no-loa operation. The parameter cannot be used to optimize the response behaviour at P100 = 0 (v/f control with speed control). If the value is too high, this will cause instability (forward control effect). Frequency control (P100 = 3) The resonance damping circuit is used to damp oscillations in the low speed range. Precondition:: P100 = 0,1,3 (v/f control modes without textile applications, frequency control) In function diagram: 396.3	index1: ~ Min: -10,000 Max: 10,000 Unit: - Indices: 4 Type: I2	Menus: - Parameter menu + Control/gating unit + Current control + V/f open-loop control - Upread/free access Changeable in: - Drive setting - Ready
P338 Common Mode Comp 338	Function parameter for the compensation of the direct components of the inverter. In order to improve the smooth running characteristics, the edges of the control pulses of the individual inverter valves can be staggered in time such that pulse frequency-dependent direct components can be compensated. Indices: i001 = PHUN: Phase U negative switching edge i002 = PHUP: Phase U positive switching edge i003 = PHVN: Phase V negative switching edge i004 = PHVP: Phase V positive switching edge i005 = PHWN: Phase W negative switching edge i006 = PHWP: Phase W positive switching edge	index1: 3,00 Min: 0,00 Max: 25,55 Unit: µs Indices: 6 Type: O2	Menus: - Parameter menu + Gating unit - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P339 ModSystemRelease 339	Function parameter for release of the edge modulation systems Parameter values: 0: all systems 1: edge modulation systems above 60 Hz 2: edge moduation systems above 100 Hz 3: no edge modulation systems 4: overmodulated space vector modulation 5: overmodulated space vector modulation without pulse frequency switchover Note: During operation with overmodulated space vector modulation, the harmonic contents in the output current are increased. The drive can then be heated up more strongly. With P342, the modulation depth factor can be limited gradually again (result in r345). In function diagram: 390.8, 405.8	index1: 0 Min: 0 Max: 5 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Gating unit - Drive setting - Upread/free access Changeable in: - Drive setting
P340* Pulse Frequency 340	Function parameter for entering the pulse frequency for asynchronous space vector modulation. Note: The setting range of the pulse frequency depends on the type of unit and on the settings of the open/closed loop control. (e.g. by selecting an output filter (see P068)). If noise damping is active (P535>0), the pulse frequency is limited to a minimum value of 45*motor rated frequency (P107), otherwise to a minimum value of 30*P107 and at P107=83.3...104Hz to a minimum value of 2.5kHz. Caution: If the pulse frequency is increased, P128 (maximum current) can be reduced (derating). If the pulse frequency is then reduced again, the changed value in P128 remains! In function diagram: 390.6, 420.5, 405.5	index1: 2,5 Min: 1,5 Max: 16,0 Unit: kHz Indices: 4 Type: O2	Menus: - Parameter menu + Gating unit - Drive setting - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P342 Max ModulatDepth 342	Function parameter for the maximum modulation depth of th modulator. The parameter defines the maximum possible output voltage. At a maximum modulation depth of 96%, the line voltage can be reached as output voltage. Setting instructions: - High output voltages can be reached by using the edge modulation mode at a high modulation depth. Low paramete values prevent the change from space vector to edge modulation mode; the readable output voltage is lower. -The depth of modulation at the change from space vector to edge modulation depends on the type of the unit and the pulse frequency. - Typical values at 2.5 kHz: for a rated converter current <= 186 A: about 87 % at a rated converter current > 186 A: about 84 % - The change to an edge modulation system can be prevented with P339.. Note: If a sinusoidal filter (P068 = 1) is used, the maximum modulation depth is so far reduced that the modulator only operates in the space vector modulation mode.The effetive modulation depth limit is displayed in r345. In function diagram: 390.7, 405.7	index1: 96,0 Min: 20,0 Max: 96,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + V/f open-loop control + Gating unit - Upread/free access Changeable in: - Drive setting - Ready
r343 Modulation Depth 343	Visualization parameter for the current modulation depth of the modulator. In function plan: 390.8, 405.8	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Control/gating unit + Current control + V/f open-loop control + Gating unit - Upread/free access
P344 ModDepth Headrm 344	Function parameter for the headroom of the modulation depth. The parameter value reduces the maximum modulation dep (P342) during steady-state operation by reducing the setpoin voltage of the field weakening controller. During dynamic operation, this headroom remains essentially ineffective due to the reaction time of the controller. As a result, the maximum possible output voltage for torque and speed changes can be completely utilized. In function diagram: 380.2, 381.2	index1: 0,0 Min: 0,0 Max: 50,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Control/gating unit + Speed control + Gating unit - Upread/free access Changeable in: - Drive setting - Ready
r345 Mod Depth Limit 345	Visualization parameter for the maximum possible modulation depth. The limit is mainly influenced by the modulator and is always equal to or less than the value in P342 (e.g. if P069 = 1 sinusoidal filter has been selected or if P339 > 0 or when edge modulation is off). Note: The maximum possible modulation depth (approx. 93%) of the modulator at frequencies less than 28Hz is only taken into account in r346. In function diagram: 380.1, 381.1, 405.7	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control + Current control + V/f open-loop control + Gating unit - Upread/free access

Parameter	Description	Data	Read/write
r346 Max Output Volts 346	Visualization parameter for the maximum possible output voltage. It is calculated from the maximum modulation depth of the modulator (P342) and the current DC link voltage. Note: The headroom for the modulation depth (P344) is allowed fo in vector control modes. In function diagram: 380.3, 381.3, 405.7	Dec.Plc.: 1 Unit: V Indices: - Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control + V/f open-loop control + Gating unit - Upread/free access
P347 ON VoltsCompens. 347	Function parameter for the correction of the symmetrical valve voltage drops of the inverter IGBTs. The parameter value is pre-set during automatic parameterization (P115 = 1) or measured during motor data identification (P115 = 2, 3).	index1: ~ Min: 0,0 Max: 20,0 Unit: V Indices: 4 Type: O2	Menus: - Parameter menu + Gating unit - Upread/free access Changeable in: - Drive setting - Ready
P348* Dead Time Comp. 348	Function parameter for selection of the deadtime compensation in the gating unit The deadtime compensation eliminates the voltage error which is obtained as a result of the interlock times in the gating unit. Compensation is enabled/disabled during automatic parameterization (P115 = 1). Parameter values: 0: no deadtime compensation in the gating unit 1: deadtime compensation in the gating unit enabled Setting instructinos: For high pulse frequencies, for motors with low stator time constant (r125) (positioning drives) and for long cables, it may be practical to disable the compensation in order to improve the smooth running characteristics at low speeds. 2. For future use.	Init: 1 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Gating unit - Upread/free access Changeable in: - Drive setting - Ready
P349 T(DeadTimeComp.) 349	Function parameter for the compensation time of the gating unit interlock. In the case of induction motors, the value is pre-set during motor data indentification (P115 = 2, 3). Setting instructions: - For positioning drives or for the improvement of the smooth running characteristics at low frequencies, it may be practica to disable the compensation (P348 = 0). In this case, it is not permissible to reset P349, in order that the missing compensation voltage can be calculated.internally from it. (Only for P100=3,4,5) - To improve the smooth running characteristics for the v/f control (P100=0,1,2) the compensation of the interlock time can be changed. - At high pulse frequencies (abov approx. 6 kHz), it is not recommended to disable the compensation as the torque ripple would then increase again due to voltage areas in the range of the zero passages of the phase currents.	Init: ~ Min: 0,00 Max: 25,55 Unit: µs Indices: - Type: O2	Menus: - Parameter menu + Gating unit - Upread/free access Changeable in: - Drive setting - Ready
P350* Ref Amps 350	Function parameter for entering the reference current. The value entered is for normalizing all current quantities and corresponds to a connector value of 4000 H (100 %). The closed-loop control system can process up to twice the value entered. In function diagram: 20.5	Init: ~ Min: 0,1 Max: 6553,5 Unit: A Indices: - Type: O2	Menus: - Parameter menu + Functions - Drive setting - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P351* Ref Volts 351	Function parameter for entering the reference voltage. The value entered is for normalizing all voltage quantities and corresponds to a connector value of 4000 H (100 %). The closed-loop control system can process up to twice the value entered. In function diagram: 20.5	Init: ~ Min: 100 Max: 2000 Unit: V Indices: - Type: O2	Menus: - Parameter menu + Functions - Drive setting - Upread/free access Changeable in: - Drive setting
P352* Ref Frequency 352	Function parameter for entering the reference frequency. Th value entered is for normalizing all frequency quantities and corresponds to a connector value of 4000 0000 H (100 %). The closed-loop control system can process up to twice the value entered. Note: If the parameter is changed, P353 is automatically adjusted. Caution: By changing the parameter, the frequency limitations are changed as well. In function diagram: 20.5	Init: ~ Min: 4,00 Max: 600,00 Unit: Hz Indices: - Type: O2	Menus: - Parameter menu + Functions - Drive setting - Upread/free access Changeable in: - Drive setting
P353* Ref Speed 353	Function parameter for entering the reference speed. The value entered is for normalizing all the speed quantities and corresponds to a connector value of 4000 0000H (100 %). The closed-loop control system can process up to twice the value entered. Note: If the parameter is changed, P352 is automatically adjusted. Caution: By changing the parameter, the speed limitations are changed as well. In function diagram: 20.5	Init: ~ Min: 1 Max: 36000 Unit: 1/min Indices: - Type: O2	Menus: - Parameter menu + Functions - Drive setting - Upread/free access Changeable in: - Drive setting
P354* Ref Torque 354	Function parameter for entering the reference torque. The value entered is for normalizing all torque quantities and corresponds to a connector value of 4000 H (100 %). The closed-loop control system can process up to twice the value entered. Note: The reference power is the productof reference frequency and reference torque. Caution: By changing the parameter, the torque limitations are changed as well. In function diagram: 20.5	Init: ~ Min: 0,10 Max: 900000,00 Unit: Nm Indices: - Type: O4	Menus: - Parameter menu + Functions - Drive setting - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P357 Sampling Time 357	Function parameter for the base sampling time T0 of the n/f/T control and the v/f control. Setting instructions: - Before reducing the sampling time, the calculation time headroom should be checked (parameter r829) in the "Operating" state. A minimum headroom of 5 % should always be ensured to prevent the operation from programming a slow reaction. - If fault message F042 "Calculation time" occurs, the sampling time must be increased. In function diagram: 15.7	Init: 1,2 Min: 0,8 Max: 4,0 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + Functions - Drive setting - Upread/free access Changeable in: - Drive setting
P358* Key 358	Function parameter for entering the key. If the values in both indices tally with the values entered in Lock parameter P359 other menus can also be selected in P060 as well as the menu "User Parameters" and the menu "Fixed settings".	index1: 0 Unit: - Indices: 2 Type: L2	Menus: - User parameters- Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
P359* Lock 359	Function parameter for entering the password. If the same value is entered in both indices in the Key parameter, other menus can also be selected in P060 as well as the menu "User Parameters" and the menu "Fixed settings".	index1: 0 Unit: - Indices: 2 Type: L2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
P360* Select UserParam 360	Function parameter for selecting the parameters which are t be visible in the "User Parameters" menu. After selection of the "User Parameters" menu (P60 = 0), apart from parameters P53 and P60, only those parameters are visible whose numbers have been entered in indices 3 to 100.	index1: 60 Min: 0 Max: 2999 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P361* OP Backlight 361	Background lighting of the OP Paramter values: 0 = background lighting always active 1 = background lighting only active during operation.	Init: 1 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P362* Copy MDS 362	Function call "Copy motor data set". In the last two figures of the parameter value, which source data set (penultimate figure, value range 1 to 4) is to be copied to which target dat set (last figure, value range 1 to 4) is encoded. After the function has been performed, the parameter is automatically reset to "0". Function parameter at the start of function "Copy motor data set".This function enables the settings of a motor data set (index 1,2, 3 or 4) to be transferred to another data set. The start is carried out by a parameter setting not equal to 0. In the last two figures of the parameter value, which source data set (penultimate figure) is to be copied to which target data set (last figure) is encoded. After the function is performed, the parameter is automatically reset to 0. Examples: 0 = no activity 12 = copies Index 1 of MDS parameter in Index 2 31 = copies Index 3 of MDS parameter in Index 1 24 = kopiert Index 2 of MDS parameter in Index 4	Init: 0 Unit: - Indices: - Type: L2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P363* Copy BICO DSet 363	Function parameter for starting the "Copy BICO Data Set" function. With this function, the settings of one BICO data set (Index 1 or 2) are transferred to the other data set. Starting takes place with a parameter setting not equal to 0. The last two digits of the parameter value indicate which source data set (penultimate digit) is to be copied to which target data set (last digit). After the function has been performed, the parameter is automatically reset to 0. 0 = No activity 12 = Copies Index 1 of the BDS parameters to Index 2 21 = Copies Index 2 of the BDS parameters to Index 1	Init: 0 Unit: - Indices: - Type: L2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
P364* Copy FuncDSet 364	Function call for "Copy Function Data Set". The last two digits of the parameter value indicate which source data set (penultimate digit, value range 1 to 4) is to be copied to whic target data set (last digit, value range 1 to 4). After the function has been performed, the parameter is automatically reset to "0". Function parameter for starting the "Copy Function Data Set function. With this function, the settings of a function data set (Index 1, 2, 3 or 4) are transferred to another data set. Starting takes places with a parameter setting not equal to 0 The last two digits of the parameter value indicate which source data set (penultimate digit) is to be copied to which target data set (last digit). After the function has been performed, the parameter is automatically reset to 0. Examples 0 = No activity 12 = Copies Index 1 of the FDS parameters to Index 2 31 = Copies Index 3 of the FDS parameters to Index 1 24 = Copies Index 2 of the FDS parameters to Index 4	Init: 0 Unit: - Indices: - Type: L2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
P366* Select FactSet 366 Compact PLUS only	Function parameter for selecting a factory setting or fixed setting. After the parameter reset (P970) has been started, the parameters are set to the selected setting. Parameter values:	Init: 0 Min: 0 Max: 10 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Fixed settings - Upread/free access Changeable in: - Drive setting - Drive setting
P366* Select FactSet 366 not Compact PLUS	Function parameter for selecting a factory setting or fixed setting. After the parameter reset (P970) has been started, the parameters are set to the selected setting. Parameter values:	Init: 0 Min: 0 Max: 10 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Fixed settings - Upread/free access Changeable in: - Drive setting - Drive setting

Parameter	Description	Data	Read/write
P368* Select Setp Src 368 Compact PLUS only	Function parameter for selecting a setpoint/command source which is to be parameterized when a quick parameterization (P370) is carried out. 0 = - not used - 1 = Analog input and terminal strip 2 = Fixed setpoints and terminal strip 3 = Motor operated potentiometer and terminal strip 4 = USS 5 = - not used - 6 = PROFIBUS (CBP required) 7 = OP1S and fixed setpoints 8 = OP1S and motor operated potentiometer Notes: During converter initialization, a parameter error may be displayed if the parameter does not correspond with the factory setting P366: P366 P368 =0 =0...8 =1 =7 =2 =7 =3 =0 =4 =8 >4 =0...8 If the values do not correspond, P368 has to be adapted (in P60=3).	Init: 1 Min: 0 Max: 8 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Quick parameterization - Upread/free access Changeable in: - Drive setting
P368* Select Setp Src 368 not Compact PLUS	Function parameter for selecting a setpoint and command source which is to be parameterized when a quick parameterization (P370) is carried out. 0 = PMU 1 = Analog input and terminal strip 2 = Fixed setpoints and terminal strip 3 = Motor operated potentiometer and terminal strip 4 = USS 5 = SIMOLINK (cannot currently be implemented) 6 = PROFIBUS (CBP required) 7 = OP1S and fixed setpoints 8 = OP1S and motor operated potentiometer Notes: During converter initialization, a parameter error may be displayed if the parameter does not correspond with the factory setting P366: P366 P368 =0 =0...8 =1 =7 =2 =7 =3 =0 =4 =8 >4 =0...8 If the values do not correspond, P368 has to be adapted (in P60=3)	Init: 1 Min: 0 Max: 8 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Quick parameterization - Upread/free access Changeable in: - Drive setting
P370* Quick Param 370	Function parameter for starting quick parameterization. When quick parameterization is selected, the unit is parameterized according to the selected parameter modules 0 = No quick parameterization 1 = Start quick parameterization After quick parameterization has been completed, the parameter is reset to 0.	Init: 0 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Quick parameterization - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P371 Selectivity 371	In configurations where one drive is feeding a number of parrallel motors, in the case of a failure (short circuit, ground failut, motor blocked) one of these motors may be disconnected from the drive by blowing its fuses. This function can be selected with "Selectvitiy". IMPORTANT. If the selectivity function is selected, there is no protection available against a terminal short circuit, but the overcurrent protection is still active. Parameter values: 0: Selectivity OFF 1: Selectivity ON Precondition: P095 = 10, 11, 12 (induction motor, sync.perm.)	Init: 0 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
P372* Simulation Mode 372	Function parameter for selecting simulated operation. Simulated operation allows test operation of the drive withou DC link voltage. The unit must, therefore, have an external 2 V supply. Simulated operation can not be selected if the DC link voltage is more than 5 % of the rated DC link voltage. 0 = Simulated operation not active 1 = Simulated operation active	Init: 0 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
P373* Auto Restart 373	Parameter for enabling the auto restart after power outage. Parameter values: x0 = blocked x1 = only power outage fault reset x2 = when power returns, drive turns on again after the wait time (P374) x3 = immediately after power return, the drive turns on and performs the "flying restart" function. 11,12,13 = In addtion to F008, F006 is also acknowledged. Note:: Independently of the status of the control word bit "Flying restart", the "Flying restart function is always released at P373 = 3, 13, i.e. also at every ON command. If a permanently excited synchronous motor is connected, auto restart is only enabled if a speed controller is present. IMPORTANT. It must be ensured by external safety means that the drive cannot start unintentionally!	index1: 0 Min: 0 Max: 13 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
P374 AutoRestart Wait 374	Wait time between return of power and automatic driveresta if auto restart is on. Note: The wait time is not effective if the "Flying restart" function (via P373 = 3, 13 or P583 is active. The coasting time of the drive should be set.	index1: 0 Min: 0 Max: 650 Unit: s Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P375* Ground Flt Test 375	Function parameter for enabling the ground fault test. The ground fault test is carried out during enabling after the ON command and before the motor starts up. The motor cables are checked to see if they show any ground fault. 0 = no ground fault test 1 = ground fault test once only after the next ON command (Parameter is reset to 0 afterwards) 2 = ground fault test after every ON command 3 = no ground fault test, even not during motor data identification The ground fault test is not a protective function according to the VDE guidelines.	Init: 1 Min: 0 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
r376 GrdFltTestResult 376	Result of ground fault test Bit-coded display of the reason which has caused the test to be broken off. Parameter values: Bit 0 =1: VCE Phase W Bit 1 =1: VCE Phase V Bit 2 =1: VCE Phase U Bit 3 =1: Overcurrent Bit 8 =1: negative IW Bit 9 =1: positive IW Bit 10 =1: negative IU Bit 11 =1: positive IU Attention! Bits 12 to 14 or the highest value nibble on the OP1S code the semiconductor which was triggered where the fault occurred. Bits 12 to 14 all OFF: no semiconductor triggered.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Functions - Upread/free access

Parameter	Description	Data	Read/write
r377 Meas Sect 377	Display of the actual measuring step of the motor data identification, 0: not activated 1: delay time for fan The "100" digit displays the type of measurement: 1xx: ground fault test 2xx: test pulse measurement 3xx: leakage inductance measurement 4xx: DC current measurement 5xx: tachometer test 6xx: no-load measurement 7xx: optimization of n/f controller. For a ground fault test and test pulse measurement for converters switched in parallel, the "ones" position allows a differentiation to be made as to which partial inverter is currently executing the measurement. 1x1: ground fault test inverter 1 1x2: ground fault test inverter 2 2x1: test pulse meausrement inverter 1 2x2: test pulse measurement inverter 2 2x3: test pulse meausrement of both inverters. The "tens" digit separates the measurement into several steps. The detailed meaning depends on the "100" digit: 10x: ground fault test selected 11x: no transistor ON 12x: transistor V+ ON 13x: transistor V- ON 14x: transistor U+ ON 15x: transistor U- ON 16x: transistor W+ ON 17x: transistor W- ON 20x: test pulse measurement selected 21x: U+, V-, W- triggered 22x: U-, V+, W+ triggered 23x: U-, V-, W+ triggered 24x: U+, V+, W- triggered 25x: U+, V-, W+ triggered 26x: U-, V+, W- triggered 300: leakage measurement selected 310, 320: measurement in phase direction V 330, 340: measurement in phse direction W 350, 360: measurement in phse direction U 40x: DC measurement selected 41x: measurement in phase direction U 42x: measurement in phase direction V 43x: measurement in phase direction W 44x: performance of parameterization 50x, 60x, 70x: function selected 51x, 61x, 71x: drive is accelerating 52x, 62x, 72x: measurement at constant sepeed 53x, 63x, 73x: measurement at n/f setpoint 54x, 64x, 74x: oscillation test 55x, 65x, 75x: performance of parameterization. The "ones" digit displays more details of the steps: 4x0, 5x0, 6x0, 7x0: not active 4x1, 5x1, 6x1, 7x1: waiting 4x2, 5x2, 6x2, 7x2: data recording 4x3, 5x3, 6x3, 7x3: data evaluation 4x4, 5x4, 6x4, 7x4: setting parameter values	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Upread/free access

Parameter	Description	Data	Read/write
P379 ambient temp. 379	Function parameter for the ambient temperature of the moto at the time of motor data identification or at the setting point of the stator (P121) and rotor resistance (P127). Notes: - The ambient temperature has to be entered prior to motor data identification. - An accuracy of +/- 10°C is adequate.. - Identification should be carred out on a cold motor (ambien temperature = stator temperature = rotor temperature) - The highest accuracy at temperature adaption can be achieved with a connected KTY84 sensor (P386=2). Precondition: P386 > 0 (temperature adaption active) In function diagram: 430.4	index1: 20,00 Min: -40,00 Max: 80,00 Unit: °C Indices: 4 Type: I2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P380* Mot Tmp Warning 380	Function parameter for entering the temperature threshold a which the alarm message "Motor overtemperature" (A023) is tripped. Example: for isolation class B: <= 110 °C (60 K-value is at 1FK6/1FT6) for isolation class F: <= 145 °C (100 K-value is at 1FK6/1FT6) Description for settting: a parameter value > 0 activates this function	index1: 0 Min: 0 Max: 200 Unit: °C Indices: 4 Type: I2	Menus: - Parameter menu + Diagnostics + Faults/warnings + Functions - Drive setting - Upread/free access Changeable in: - Drive setting - Drive setting - Ready
P381* Mot Tmp Fault 381	Function parameter for entering the temperature threshold a which the fault message "Motor overtemperature" (F020) is tripped. Example: for isolation class B: <= 120 °C (60 K-value is at 1FK6/1FT6) for isolation class F: <= 155 °C (100 K-value is at 1FK6/1FT6) Setting instructions: The PTC evaluation is activated by setting P381=1. The PTC thermistor evaluation identifies an overtemperature condition if the PTC thermistor resaistance is > 1.5KOhm. The temperature sensing using a KTY84 sensor is activated for a setting vallue P381>1.	index1: 0 Min: 0 Max: 200 Unit: °C Indices: 4 Type: I2	Menus: - Parameter menu + Diagnostics + Faults/warnings + Functions - Drive setting - Upread/free access Changeable in: - Drive setting - Drive setting - Ready
P382* Motor Cooling 382	The type of motor cooling has an influence on the calculation of the permissible load cycle during the I2t monitoring for the motor. The parameter value 1 (= factory setting) has to be selected for all 1FT6 and 1FK6 motors. Parameter values: 0: self-cooled 1: force-cooled	index1: 0 Min: 0 Max: 1 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Diagnostics + Faults/warnings + Functions - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting - Drive setting - Ready

Parameter	Description	Data	Read/write
P383 Mot ThermT-Const 383	Thermal time constant of motor	index1: 100 Min: 0 Max: 16000 Unit: s Indices: 4 Type: O2	Menus: - Parameter menu + Diagnostics + Faults/warnings + Functions - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting - Drive setting - Ready

Setting instructions:
The i²t calculation is activated by a parameter value >= 100 seconds.

Example: for a 2-pole 1LA5063 motor, the value should be set to 8 min (from the table) *60s/min = 480s .

The thermal time constants for Siemens standard motors are indicated in the following table (in minutes)

Type	2-pole	4-pole	6-pole	8-pole	10-pole	12-pole
1LA5063	8	13	-	-	-	-
1LA5070	8	10	12	-	-	-
1LA5073	8	10	12	-	-	-
1LA5080	8	10	12	-	-	-
1LA5083	10	10	12	-	-	-
1LA5090	5	9	12	12	-	-
1LA5096	6	11	12	14	-	-
1LA5106	8	12	12	16	-	-
1LA5107	-	12	-	16	-	-
1LA5113	14	11	13	12	-	-
1LA5130	11	10	13	10	-	-
1LA5131	11	10	-	-	-	-
1LA5133	-	10	14	10	-	-
1LA5134	-	-	16	-	-	-
1LA5163	15	19	20	12	-	-
1LA5164	15	-	-	-	-	-
1LA5166	15	19	20	14	-	-
1LA5183	25	30	-	-	-	-
1LA5186	-	30	40	45	-	-
1LA5206	30	-	45	-	-	-
1LA5207	30	35	45	50	-	-
1LA6220	-	40	-	55	-	-
1LA6223	35	40	50	55	-	-
1LA6253	40	45	50	60	-	-
1LA6280	40	50	55	65	-	-
1LA6283	40	50	55	65	-	-
1LA6310	45	55	60	75	-	-
1LA6313	-	55	60	75	-	-
1LA6316	48	58	63	78	-	-
1LA6317	-	58	63	78	-	-
1LA6318	-	-	63	78	-	-
1LA831.	35	40	45	45	50	50
1LA835.	40	45	50	50	55	55
1LA840.	45	50	55	55	60	60
1LA845.	55	55	60	60	70	70
1LL831.	25	25	30	30	35	35
1LL835.	30	30	35	35	40	40
1LL840.	35	35	35	35	40	40
1LL845.	40	35	40	40	45	45
1LA135.	30	35	40	-	-	-
1LA140.	35	40	45	45	-	-
1LA145.	40	45	50	50	55	55
1LA150.	50	50	55	55	65	65
1LA156.	60	55	60	60	70	70
1LL135.	20	20	25	-	-	-
1LL140.	25	25	30	30	-	-
1LL145.	30	30	30	30	35	35
1LL150.	35	30	35	35	40	40
1LL156.	40	35	35	35	40	40

1LA7 motors: and 1LA5 motors

Type:	1PH610	1PH613	1PH616	1PH618	1PH620	1PH622
	25	30	35	40	40	40

Exceptions:

	1PH7(=1PA6): Shaft height: 100 132 160 180 225 T1 in min 25 30 35 40 40 1PL6: Shaft height: 180 225 T1 in min 30 30 1PH4: Shaft height: 100 132 160 T1 in min 25 30 35 If the utilization limit parameterized in P384 is exceeded, the diagnostic signal F021 is set. Precondition: P95 >=10 or P97=0		
P384* Mot Load Limits 384	Function parameter for the messages of the motor load cycle monitor. The parameter is valid for all motor data sets. Reference value is the rated motor power. Indices: i001: WARN When the entered load value is reached, a warning message is edited via B0150/B0151 i002: STOE When the entered load value is reached, a fault message is edited via B0152/B0153 Visualization parameter: r008 (Motora utilization) Setting instructions: 0: no evaluation	index1: 100 Min: 0 Max: 300 Unit: % Indices: 2 Type: O2	Menus: - Parameter menu + Diagnostics + Faults/warnings + Functions - Drive setting - Upread/free access Changeable in: - Drive setting - Drive setting - Ready
P385* Src motor temp. 385	BICO parameter for selecting the connector for the motor temperature. If the motor temperature is supplied by externa sensors (e.g. via serial communication SCom2), and not via the internal KTY84 sensor, the parameter has to be adjusted to the relevant source. Note: The temperature is shown in normalization 4000H=100% (100%=256°C). The temperature is displayed in r009. Parameter values: 0245: Temperature from KTY84 Further values: Connector softwiring Precondition: P380 > 1 or P381 > 1 or P386 = 2 (and not P380 = 1 or P381 = 1) Temperature adaption with KTY sensor and no PTC thermistor evaluation. Note: If the PTC thermistor evaluation is selected (P380=1 or P381 = 1), the motor temperature is not indicated. In function diagram: 280.4	index1: 245 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P386* RotResistTmpAdap 386	Function parameter for selecting the temperature adaption o the rotor and stator resistance. The adaption operates at loads above approx. 5 % - 10 % and in the range of the EMF model (B0253 = 1) with an electric motor model. As this model is dependent on very accurate speed measured values, it is only activated for speed/torque control (P100 = 4, 5) and when a pulse encoder is connected (P130=11,12). The adaption operates with a precise thermal motor simulation (3-mass model) outside of these conditions, e.g. for frequency control (P100 = 3) or in the current model range (B0253 = 0). The best adaption results can be achieved for speed/torque control with a pulse tachometer and stator temperature sensing (e.g.KTY84-sensor) (connector -X103). If the drive temperature has increased or fallen since the las motor identification, if the power supply has failed, if a motor data set was changed, parameters P386..P392 or the drive was re-commissioned (P60 = 5, 8) , the output temperatures of the 3-mass model and the resistance values are reset. Setting corresponding to the current motor temperature can be realized using a sensor. A new motor identification run is recommended if a sensor is not available. The stator resistance (r118) can also be adapted using the 3 mass model. In order to increase the accuracy of R(stator), before the identification run, the feeder resistance (P117) should be determined and entered. Parameter values: 0: not active 1: without temperature sensor (not for P095 >1) 2: with temperature sensor Notes: - All motor data (P095, P101 to P109) should be entered according to the motor rating plate. - After parameter P386 has been activated, the motor series (P387) should be selected. In this case, a possibly known feeder resistance is entered in P117, the cooling type (P382 and the ambient temperature (P379) selected and a motor identification run should be executed (P115 = 3 or 2, 4) in order to determine the actual values of rotor and stator resistance. - The adaption is automatically calculated, jsut the same as without KTY sensor, if the sensor feeder cable is open-circuit, is short-circuited or if the PTC thermistor is activated (P381 = 1)! - When the EMF model is switched out (P315 = 0 or P313 > f(max)), then only the 3-mass model operates for speed/torque control. These settings are not recommended, as the adaption accuracy is obtained from the combination with the electrical model. - A KTY sensor is also recommended for f- control (P100 = 3) or n/m control with analog tachometer, as this also corrects deviations of the ambient temperature from 20°C, inaccuracies for the rated motor speed (P108: rating plate possibly inaccurate) as well as deviations from the standard temperature rises (see P390) - The BICO parameter for the motor temperature (P385) must be correctly softwired for adaption with sensor (P386=2) (Normalization 40Hex=1°C). Precondition:	index1: 0 Min: 0 Max: 2 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
	P095 = 12, 13 (Synchronous motor, sync.perm.): Rs-adaption possible with temperature sensor. In function diagram: 430.5		
P387* Motor Series 387	Function parameter for selecting the motor series for the connected motor. When selecting one of the specified series P387 > 0), known motor characteristics are automatically transferred: e.g. type of internal fan (P389) Parameter values: 0: Foreign or unlisted motor 1: 1LA5/1LA7 series 2: 1LA6 series 3: 1LA8 series 4: 1LA1 series 5: 1PH6 series 6: 1PH7 series (identical to 1PA6 series) Setting notes: - If unlisted motors are selected, P388 to P392 can be individually adapted. Precondition: P386 > 0 (temperature adaption active) P095 = 10, 11 (induction motor) In function diagram: 430.3	index1: 1 Min: 0 Max: 7 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P388 Motor Weight 388	Function parameter for the total weight of the motor. The value can be taken from the motor catalog. The more accurately it is known, the easier it is to calculate the therma mass relationships. The value is pre-set during automatic parameterization (P11 = 1, 2, 3). Precondition: P386 > 0 (temperature adaption active) In function diagram: 430.4	index1: ~ Min: 5 Max: 9999 Unit: kg Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P389 Internal Fan 389	Function parameter for selection of an internal fan. Motors of series 1LA1 and 1LA8 have a special internal fan (not to be confused with the fan at the end of the motor shaft). This has to be entered here. Motor with internal fan -> P389 = 1 Motor without internal fan -> P389 = 0 At P387 <> 0, P389 is automatically pre-set; manual changes are not effective. Precondition: Unlisted motor (P387 = 0) In function diagram: 430.4	index1: 0 Min: 0 Max: 1 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P390 Overtemp. Factor 390	Function parameter for evaluating the internally assumed standard temperature rises for sinusoidal operation (line supply temperature rises). All the temperature rises of stator (80K), rotor (100 K) and iron (50 K) are evaluated simultaneously with this factor. If the rotor temperature rise of the motor is known, then the relationship to 100 K can be entered here. If only the temperature rise of the stator is known, the relationship to 80 K has to be entered. The temperature rises due to converter operation (modulatio losses) which are a function of both the pulse frequency (P340) and the output filter (P068 = 2) are automatically taken into account. Notes: - For 1PH6,1PH7/1PA6 motors (P387 = 5,6) a value of 130.0% is automatically assumed internally, i.e. the parameter has no effect. - For 1LA motors, the factor is 100 % Preconditions: Unliasted motor (P387 = 0) In function diagram: 430.5	index1: 100,0 Min: 25,0 Max: 200,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P391 K(overtemp.,rot) 391	Function parameter for an additional evaluation of the internally assumed standard termperature rise of the rotor from P390. Notes: - Total evaluation for the rotor is P390*P391*100K - As a result of the additional adjustment possibilties, any overtemperature ratios between the rotor and the stator can be realized. Precondition: Unlisted motor (P387 = 0) In function diagram: 430.6	index1: 100,0 Min: 25,0 Max: 200,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P392 Iron Losses 392	Function parameter for making allowance for the iron losses in the motor. The value is referred to the rated motor apparent power (1.732 * P101 * P102). The iron losses affect both the electrical and the 3-mass model of temperature adaption. The value is pre-set during automatic parameterization. (P115 = 1, 2, 3 . Precondition: Listed motor (P387 = 0) In function diagram: 430.6	index1: ~ Min: 0,05 Max: 10,00 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
r393 Model Temp. 393	Visualization parameter for the temperature values of the mass model for the adaption of rotor and stator resistance. For adaption with temperature sensorr (P386 = 2) the stator temperature of the model T(s) is controlled to the measured temperature (r009). Only in this case will the ambient temperature T(u) deviate from P379. The difference between the ambient temperature and the real value is, for example, explained by the fact that the internally assumed temperature rise (80 K) does not tally with of the motor. Moreover, the hot point, not the average temperature, is recorded in the windings. During loading and relieving processes, T(u) also fluctuates on account of control processes. The temperatures are adapted during parameter adjustment of P127 (e.g. during standstill measurement P115 = 2, 3). Inaccuracies of P127 and in the rated motor slip resulting from the rated motor speed P108 can lead to implausible temperatures. Note: If no temperature sensor is available, a motor identification should be carried out whenever leaving start-up (P060 = 5), after changing motor data set, after changing parameters P386 to P392 or after every switching off of the electronic boards, because the model temperatures are then calculated back to the values of the last setting of P127. This is not necessary if the setting of R(rotor) (P127, r126) are in accordance with the currenttemperature conditions (e.g. motor has ambient temperature).. Indices: i001 = T(l): rotor temperature i002 = T(s): stator temperature i003 = T(f): iron temperature i004 = T(u): ambient temperature Precondition: R(rotor) adaption selected (P386 > 0) In function diagram: 430.6	Dec.Plc.: 2 Unit: °C Indices: 4 Type: I2	Menus: - Parameter menu + Functions - Upread/free access
P394* SrcStartDCBrake 394	BICO parameter for selecting the binector from which the command for starting the DC braking function is to be read in. Precondition: P395 = 2 (DC braking with selection via binector) In function diagram: 615	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P395 DC Braking 395	Function parameter for the selection of DC braking of the motor for braking an induction motor without optional braking equipment. (Chopper, rectifier unit) ATTENTION: All loss energy concentrates in the motor, the danger of a local overheating of the motor exists! Note: The function is only suitable for induction motors. Overcurrent interventions (alarm A020) can occur for overdimensioned motors (P102 > P072) when starting the DC braking function. In this case, the de-excitation time (P603) must be increased. Parameter values: 0: Not selected 1: DC braking active with OFF3 command ("quick stop") 2: DC braking via binector (P394) activated. Precondition: P095 = 10, 11 (induction motor)	index1: 0 Min: 0 Max: 2 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
P396 DC Braking Amps 396	Setpoint of the DC injection braking current. The value is calculated during automatic parameterization (P115=1,2,3). Precondition: P395 = 1,2 (selection of DC injection braking)	index1: ~ Min: 0,0 Max: 6553,5 Unit: A Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P397 DC Braking Time 397	Duration of DC injectin braking Precondition: P395 = 1,2 (selection of DC injection braking)	index1: 5,0 Min: 0,1 Max: 99,9 Unit: s Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P398 DC Braking Freq 398	Start frequency for DC injection braking; after activating DC injection braking is performed below this frequency. Precondition: P395 = 1,2 (selection of DC injection braking)	index1: 100,0 Min: 0,1 Max: 600,0 Unit: Hz Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P399* Special Access 399	Function parameter for special access	Init: 0 Min: 0 Max: 65535 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Upread/free access - Power section definition Changeable in: - Power section definition - Board configuration - Drive setting - Drive setting - Ready
P401* Fixed setpoint 1 401	Function parameter for entering fixed setpoint 1. The fixed setpoint is activated by means of the source specified by P580 and P581 by setting the relevant control word bits (see r551).	index1: 0,000 Min: -200,000 Max: 200,000 Unit: % Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P402* Fixed setpoint 2 402	Function parameter for entering fixed setpoint 2. The fixed setpoint is activated by means of the source specified by P580 and P581 by setting the relevant control word bits (see r551).	index1: 0,000 Min: -200,000 Max: 200,000 Unit: % Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P403* Fixed setpoint 3 403	Function parameter for entering fixed setpoint 3. The fixed setpoint is activated by means of the source specified by P580 and P581 by setting the relevant control word bits (see r551).	index1: 0,000 Min: -200,000 Max: 200,000 Unit: % Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P404* Fixed setpoint 4 404	Function parameter for entering fixed setpoint 4. The fixed setpoint is activated by means of the source specified by P580 and P581 by setting the relevant control word bits (see r551).	index1: 0,000 Min: -200,000 Max: 200,000 Unit: % Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P405* Fixed Setp 5 405	Function parameter for entering fixed setpoint 5. The fixed setpoing is activated by means of the source specified by P580 and P581 by setting the relevant control word bit (see r551).	index1: 0,000 Min: -600,000 Max: 600,000 Unit: Hz Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P406* Fixed Setp 6 406	Function parameter for entering fixed setpoint 6. The fixed setpoint is activated by means of the source specified by P580 and P581 by setting the relevant control word bit (see r551).	index1: 0,000 Min: -600,000 Max: 600,000 Unit: Hz Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P407* Fixed Setp 7 407	Function parameter for entering fixed setpoint 7. The fixed setpoint is activated by means of the source specified by P580 and P581 by setting the relevant control word bit (see r551).	index1: 0,000 Min: -600,000 Max: 600,000 Unit: Hz Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P408* Fixed Setp 8 408	Function parameter for entering fixed setpoint 8. The fixed setpoint is activated by means of the source specified by P580 and P581 by setting the relevant control word bit (see r551).	index1: 0,000 Min: -600,000 Max: 600,000 Unit: Hz Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P409* Fixed Setp 9 409	Function parameter for entering fixed setpoint 9. The fixed setpoint is activated by means of the source specified by P580 and P581 by setting the relevant control word bit (see r551).	index1: 0,0 Min: -36000,0 Max: 36000,0 Unit: 1/min Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P410* Fixed Setp 10 410	Function parameter for entering fixed setpoint 10. The fixed setpoint is activated by means of the source specified by P580 and P581 by setting the relevant control word bit (see r551).	index1: 0,0 Min: -36000,0 Max: 36000,0 Unit: 1/min Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P411* Fixed Setp 11 411	Function parameter for entering fixed setpoint 11. The fixed setpoint is activated by means of the source specified by P580 and P581 by setting the relevant control word bit (see r551).	index1: 0,0 Min: -36000,0 Max: 36000,0 Unit: 1/min Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P412* Fixed Setp 12 412	Function parameter for entering fixed setpoint 12. The fixed setpoint is activated by means of the source specified by P580 and P581 by setting the relevant control word bit (see r551).	index1: 0,0 Min: -36000,0 Max: 36000,0 Unit: 1/min Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P417* Src FSetp Bit2 417	BICO parameter for selecting the binector from which bit 2 for selecting a fixed setpoint is to be read in. For selecting a fixed setpoint, the states of bit 0 (P580), bit 1 (P581), bit 3 (P418) are also of significance.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P418* Src FSetp Bit3 418	BICO parameter for selecting the binector from which bit 3 for selecting a fixed setpoint is to be read in. For selecting a fixed setpoint, the states of bit 0 (P580), bit 1 (P581), bit 2 (P417) are also of significance.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
r419 # Active FSetp 419	Visualization parameter for displaying the number of the fixe setpoint currently active.	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Setpoint channel - Upread/free access
r420 Active FSetp 420	Visualization parameter for displaying the value of the fixed setpoint currently active.	Dec.Plc.: 3 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access
P421* MOP (max) 421	Function parameter for entering the upper limit for the internal motor operated potentiometer. The value output by the motor operated potentiometer is limited to the entered limit in a positive direction.	Init: 100,0 Min: -200,0 Max: 200,0 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P422* MOP (min) 422	Function parameter for entering the lower limit for the interna motor operated potentiometer. The value output by the moto operated potentiometer is limited to the entered limit in a negative direction.	Init: 0,0 Min: -200,0 Max: 200,0 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P423* Src MOP inv. 423	BICO parameter for selecting the binector from which the signal for inverting the motor operated potentiometer is to be read in. If a change is made from inversion to non- inversion or vice versa, the output signal of the motor operated potentiometer does not alter abruptly but in the form of a ramp with the acceleration times and deceleration times entered in P431 and P432	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
r424 MOP (Out) 424	Visualization parameter for displaying the output value provided by the motor operated potentiometer for further processing.	Dec.Plc.: 2 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access
P425* Conf MOP 425	Function parameter for configuring the motor operated potentiometer. xxx0 = MOP output is not stored during OFF Starting point is stipulated by P426 after ON. xxx1 = MOP output is stored after OFF. After ON, the MOP is set to this value. xx0x = Ramp generator is not effective in automatic mode. xx1x = Ramp generator is always effective. x0xx = Acceleration without initial rounding x1xx = Acceleration with initial rounding	Init: 110 Unit: - Indices: - Type: L2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P426* StartValue MOP 426	Function parameter for entering the starting value for the motor operated potentiometer. With appropriate parameterization in P425, the output value of the motor operated potentiometer is set to this value after ON command.	Init: 0,0 Min: -200,0 Max: 200,0 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P427* Src Set MOP 427	BICO parameter for selecting the binector from which the command for setting the motor operated potentiometer is to be read in. When the edge of the signal rises, the set value i adopted.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P428* Src SetV MOP 428	BICO parameter for selecting the connector from which the set value for the motor operated potentiometer is to be read in.	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P429* Src Auto Setp 429	BICO parameter for selecting the connector from which the automatic setpoint for the motor operated potentiometer is to be read in.	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P430* Src Manual/Auto 430	BICO parameter for selecting the binector from which the command for switching the motor oper. potentiometer between manual and automatic is to be read in. In automatic operation (signal logical 1), an external setpoint is adopted b the ramp generator of the motor operated potentiometer. After switchover to manual operation (signal logical 0), the motor operated potentiometer can be moved, beginning from the last setpoint for automatic operation.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P431* MOP Accel Time 431	Function parameter for entering the acceleration time for the motor oper. potentiometer. The time is to be entered which the motor oper. potentiometer is to need for accelerating from zero to +/- 100 %. In the event of acceleration with initial rounding, the acceleration time increases. Rounding can be activated in P425.	Init: 10,0 Min: 0,0 Max: 1000,0 Unit: s Indices: - Type: O2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P432* MOP Decel Time 432	Function parameter for entering the deceleration time for the motor oper. potentiometer. The time is to be entered which the motor oper. potentiometer is to need for decelerating from +/- 100 % to zero. In the event of deceleration with initial rounding, the deceleration time increases. Rounding can be activated in P425.	Init: 10,0 Min: 0,0 Max: 1000,0 Unit: s Indices: - Type: O2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P433* Src AddSetpoint1 433	BICO parameter for selecting the connector from which additional setpoint 1 is to be read in. Additional setpoint 1 is added to the main setpoint in front of the ramp-function generator.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,K ,K	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P434 Scale Add Setp1 434	Function parameter for entering the scaling factor for additional setpoint 1.	index1: 100,0C Min: -300,00 Max: 300,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
r437 Add Setpoint 1 437	Current additional setpoint 1 (switching-in in front of the ramp-function generator)	Dec.Plc.: 3 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access
P438* Src AddSetpoint2 438	BICO parameter for selecting the connector from which additional setpoint 2 is to be read in. Additional setpoint 2 is added to the main setpoint after the ramp function generator Abrupt changes are directly passed on to the speed control.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,K ,K	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P439 Scale Add Setp2 439	Function parameter for entering the scaling factor for additional setpoint 2.	index1: 100,0C Min: -300,00 Max: 300,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
r441 Actual speed 441	Parameter is only necessary for the parameter model of PROFIdrive V3 standard. Parameter is only visible if PROFIdrive V3 is set.	Dec.Plc.: 0 Unit: - Indices: - Type: N4	Menus: - Parameter menu - Upread/free access
r442 Add Setpoint 2 442	Current additional setpoint 2 (switching-in behind the ramp-function generator)	Dec.Plc.: 3 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access
P443* Src MainSetpoint 443	BICO parameter for selecting the connector from which the main setpoint is to be read in.	index1: 58 Unit: - Indices: 2 ,BDS Type: L2 ,K ,K	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P444 Scale Main Setp 444	Function parameter for entering the scaling factor for the main setpoint.	index1: 100,0C Min: -300,00 Max: 300,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P445* Base Setpoint 445	Function parameter for entering the basic setpoint. The basi setpoint is added to the main setpoint.	index1: 0,0 Min: -200,0 Max: 200,0 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
r446 Main Setp (act) 446	Parameter is only necessary for the parameter model of PROFIdrive V3 standard. Parameter is only visible if PROFIdrive V3 is set.	Dec.Plc.: 0 Unit: - Indices: - Type: N4	Menus: - Parameter menu - Upread/free access
r447 Main Setp (act) 447	Current main setpoint	Dec.Plc.: 3 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access
P448 Jog Setp 1 448	Function parameter for entering jogging setpoint 1. Selection of the jogging setpoints and the transition to Jogging mode take place by means of the control word bits, Jogging bit 0 and Jogging bit 1 (P568, P569).	Init: 10,000 Min: -200,000 Max: 200,000 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P449 Jog Setp 2 449	Function parameter for entering jogging setpoint 2. Selection of the jogging setpoints and the transition to Jogging mode take place by means of the control word bits, Jogging bit 0 and Jogging bit 1 (P568, P569).	Init: 20,000 Min: -200,000 Max: 200,000 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
r451 n/f(set,total1) 451	Setpoint at the addition point in front of the ramp-function generator	Dec.Plc.: 3 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access
P452* n/f(max, FWD Spd 452	Maximum setpoint for clockwise rotating field. Limitation by: - 5 times the rated motor frequency - pulse frequency (P761)	index1: 110,0 Min: 0,0 Max: 200,0 Unit: % Indices: 4 Type: I4	Menus: - Parameter menu + Setpoint channel - Drive setting - Upread/free access Changeable in: - Drive setting
P453* n/f(max,REV Spd) 453	Maximum setpoint for counter-clockwise rotating field. Limitation by: - 5 times the rated motor frequency - pulse frequency (P761)	index1: -110,0 Min: -200,0 Max: 0,0 Unit: % Indices: 4 Type: I4	Menus: - Parameter menu + Setpoint channel - Drive setting - Upread/free access Changeable in: - Drive setting
P455 Skip Value 455	Skip value for the setpoint in front of the ramp-function generator. Steady-state operation is not possible in the range of the positive and negative values of the skip frequency. Note:The setpoint frequency skipping is off at parameter values between 0.00 und 0.5*P456.	index1: 0,0 Min: 0,0 Max: 200,0 Unit: % Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P456 Skip Freq Width 456	Width of the skip frequency band in the setpoint channel; see description of P455	index1: 5,0 Min: 0,0 Max: 200,0 Unit: % Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P457* Min Setp 457	Minimum setpoint Min (amount) of the drive; same as frequency skipping around 0 with band width 2 * Min; effective for the setpoint in front of the ramp-function generator. Only the amount is taken into account. Given setpoint: Set: realized setpoint · - Min < set (coming from the lower value) < Min - Min · - Min < set (coming from the higher value) < Min + Min · 0 <= set (after turning ON) < Min + Min · - Min < set (after turning ON) < 0 - Min · Set > Min Set · Set < -Min Set Notes: The bits for selecting clockwise rotating field or counter-clockwise rotating field (see P571, P572)are taken into account.	index1: 0,0 Min: -200,0 Max: 200,0 Unit: % Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
r460 n/f(set,Ramp IN) 460	Setpoint at the ramp-function generator input	Dec.Plc.: 3 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access
P462 Accel. Time 462	Acceleration time of the ramp-function generator for acceleration from 0 to 100%. Unit: as defined in P463 (acceleration time unit) Note: The value is only increased during motor identification (P115 = 3.5) if the set acceleration time is too low and the unit (P463, P465) for acceleration and deceleration times is in seconds. (The drive cannot realize the set acceleration time as the torque limit was reached earlier).	index1: 10,0 Min: 0,0 Max: 999,9 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P463 Accel. Time Unit 463	Unit of the ramp-function generator acceleration time Parameter values: 0 = seconds 1 = minutes 2 = hours	index1: 0 Min: 0 Max: 2 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P464 Decel. Time 464	Deceleration time of the ramp-function generator for deceleration from 100% to 0% Unit: as defined in P465 (unit of deceleration time) Note: The value is only increased during motor identification (P115 = 3.5) if the set time is too small and the unit (P463, P465) for acceleration and deceleration is indicated in seconds. (The drive cannot realize the set deceleration time as the torque limit was reached earlier).	index1: 10,0 Min: 0,0 Max: 999,9 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P465 Decel. Time Unit 465	Unit of the deceleration time of the ramp-function generator Parameter values: 0 = seconds 1 = minutes 2 = hours	index1: 0 Min: 0 Max: 2 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P466 Decel. Time OFF3 466	Deceleration time OFF3 (quick stop) for deceleration from 100% to standstill Index 1: OFF3-deceleration time Index 2: Initial rounding time Setting instructions: - The set value must be high enough to prevent the drive from shutting down with a DC link overvoltage fault during "OFF3" quick stop. - At P100 = 0, 1, 2, 3 (v/f characteristic, f-control), overcurrent shutdowns may occur if the deceleration time is too low. -If at P100 = 3, 4, 5 (vector control types), deceleration during OFF3 does not take place at the torque limit, P466 can be reduced.	index1: 5,0 Min: 0,0 Max: 999,9 Unit: s Indices: 2 Type: O2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P467 ProtRampGen Gain 467	Factor by which the acceleration time (P462) is extended (protective ramp-function generator) Notes V/f open-loop control types (P100 = 0, 1, 2): Protective ramp-function generator is active up to a frequency of 15 % of the rated motor frequency (P107). See Section "Ramp-function generator RFG" in operating instructions, part 2 f-control (P100 = 3): The protective ramp-function generator is active up to 1.1 times the changeover frequency to EMF model (P284). Acceleration is also influenced by the current settings (P202 P203, P204) with inactive EMF model (P284 = 0). During control of permanently excited synchronous motors (P100=3), the ¸ protective ramp-function generator (>=5) has to be set such that the drive does not stall during acceleration. Also at least 20% has to be input in P202. n/Torque control (P100 = 4, 5) The protective ramp-function generator is ineffective. The protective ramp-function generator is only active if the acceleration time (P463) is selected in seconds. During motor identification (P052 = 8, 10), the value is only increased if the set acceleration time is too low and the unit (P463, P465) for both acceleration and deceleration times is in seconds. Setting instruction: The parameter value 1.0 turns the protective ramp-function generator OFF. Precondition: P100 = 0, 1, 2, 3 (v/f open-loop control, f regulation.	index1: 1,0 Min: 1,0 Max: 100,0 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P468 RGen Round Type 468	Operating mode for rounding of the ramp-function generator 0 = rounding is not effective if there is sudden reduction of the input value during acceleration 1 = rounding is always effective. If there is a sudden reduction of the input value, overshooting may occur.	Init: 0 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P469 Ramp StartSmooth 469	Initital rounding time of the ramp-function generator During acceleration from 0 to 100%, the actual acceleration time is increased to P462 * (1 + P469 / 2 + P470 / 2) Precondition: P463 = 0, P466 = 0 (acceleration and deceleration times are in seconds)	index1: 0,50 Min: 0,00 Max: 10,00 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P470 Ramp End Smooth 470	Final rounding time of the ramp-function generator During acceleration from 0 to 100%, the actual acceleration time is increased to P462 * (1 + P469 / 2 + P470 / 2) Precondition: P463 = 0, P465 = 0 (acceleration and deceleration times are in seconds)	index1: 0,50 Min: 0,00 Max: 10,00 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P471 Scale Torq(PRE) 471	Function parameter for the gain of the n/f controller precontrol. The acceleration torque is calculated from the speed setpoin changes at the ramp-function generator output (r478) taking into consideration the moment of inertia (see P116). Accelerations due to additional setpoint 2 in the setpoint channel are not accounted for in the calculation. The value is pre-assigned with 0.0% during automatic parameterization (P115 = 1, 2) and with 100.0% during n/f controller optimization (P115 = 3, 5). Setting instructions: 0.00%: Precontrol inactive 100.0%: Precontrol of the n/f controller with rated motor torque at the time indicated in P116 Precondition: P100 = 3, 4 (n/f control) in function diagram: 317.7	index1: ~ Min: 0,0 Max: 200,0 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P473* SrcScaleT(FWD) 473	BICO parameter for selecting the connector from which the precontrol torque or moment of inertia is to be evaluated. If connected to connector K0156 (n/f-Reg.gain(act)), the precontrol torque is multiplied by the factor Gain/Gain1 = r237/P235. Precondition: P100=3,4 Function diagram: 317.7	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P475 Ramp Limitation 475	Ramp-function generator tracking function The output value of the ramp-function generator is tracked according to the maximum possible acceleration of the drive The reference value is the deviation at the speed controller input which is necessary in order to ensure acceleration at the torque limit of the motor. Setting instructions: The value 0.0 deactivates the ramp-function generator tracking. - The higher the parameter value, the greater is the permissible deviation between the n/f setpoint and the actua value. Precondition: P100 = 4 (n control)	Init: 0,0 Min: 0,0 Max: 50,0 Unit: % Indices: - Type: O2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P476 RampGen Act Hyst 476	Hysteresis for the message "Ramp-function generator active The "Ramp-function generator active" message is output if the deviation between ramp-function generator input and output	Init: 1,0 Min: 0,0 Max: 20,0 Unit: % Indices: - Type: O2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P477* Src Set Rgen 477	Parameter for selecting a binector with which the command to set the ramp-function generator is given. Setting value: P478 Acceptance upon positive edge. Note: internal setting processes of the ramp-function generator have priority.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P478* Src SetV Rgen 478	Parameter with which a connector can be selected from which the setting value for the ramp-function generator is read in. Acceptance of the setting value upon positive edge at P477.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,K ,K	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
r480 n/f(set,rampOUT) 480	Setpoint at the output of the ramp-function generator	Dec.Plc.: 3 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access
r481 n/f(set,total2) 481	Setpoint at the addition point behind the ramp-function generator	Dec.Plc.: 3 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access
r482 n/f(set) 482	Setpoint at the input of the v/f control or the n/f/T control	Dec.Plc.: 3 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Setpoint channel - Upread/free access
P483* Src n/f(max,pos) 483	BICO parameter for selecting the connector from which the positive maximum speed is to be read in. The connector value reduces the fixed maximum speed. Only positive values are processed. The frequency limit in the gating unit is not tracked. During controller optimization and no-load measurement, the fixed maximum speeds are used. Function diagram: 316.7	index1: 2 Unit: - Indices: 2 ,BDS Type: L2 ,K ,K	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P484* Src n/f/(max,reg 484	BICO parameter for selecting the connector from which the negative maximum speed is to be read in. The connector value increases the fixed minimum speed. Only positive values are processed and internally negated. The frequency limit in the gating unit is not tracked. During controller optimization and no-load measurement, the fixed maximum speeds are used. Function diagram: 316.7	index1: 2 Unit: - Indices: 2 ,BDS Type: L2 ,K ,K	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P486* Src Torque Setp 486	BICO parameter for selecting the connector from which the torque setpoint is to be read in. Precondition: P100=3,4,5	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P487 Scale Torq Sept 487	Function parameter for entering the scaling factor for the torque setpoint. Precondition: P100= 3,4,5	index1: 100,0C Min: -300,00 Max: 300,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
r490 Torque Setpoint 490	Current torque setpoint, referred to the rated motor torque. Precondition: P100 = 3,4,5 (vector control types) Only effective for f/n control if operated as a slave drive (control word 2 bit 27 = 1). During f control, a torque setpoint under 1% of the rated motor torque causes the drive to decelerate in the range of the I model.	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access
P492 FixTorque 1 Set 492	Fixed upper limit of the torque setpoint. To limit the regenerative output (in negative direction of rotation), P259 (Pw(gen, max)) has to be reduced and the Vdmax controller (P515) has to be activated. This is necessary if overvoltage shutdown occurs on converters without a rectifier unit and without a braking resistor. Precondition: P100 = 3, 4, 5 (vector control types)	index1: 100,0 Min: -200,0 Max: 200,0 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P493* Src FixTorque 1 493	BICO parameter for selecting the connector from which the upper torque limitation is to be read in. Precondition: P100=3,4,5	index1: 170 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P494 FixTorque 1 Gain 494	Function parameter for entering the scaling factor for the upper torque limitation. Precondition: P100=3,4,5	index1: 100,0C Min: -300,00 Max: 300,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
r496 Fix Torque 1 496	Maximum value of the upper torque limit Precondition: P100 = 3,4,5 (vector control types)	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access
r497 Max Torque 1 497	Actual upper torque limit This value only differs from r496 in the torque control. Note: This value may be reduced by the power limitation (P259) or the current limitation (P128). Precondition: P100 = 3,4,5 (vector control types)	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access
P498 FixTorq 2 Set 498	Fixed lower limit of the torque setpoint. To limit the regenerative output (in positive direction of rotation), P259 (Pw(gen, max) has to be reduced and the Vdmax controller P515 has to be activated. This is necessar if overvoltage shutdown occurs on converters without a regenerative unit and without a braking resistor. Precondition: P100 = 3,4,5 (vector control types)	index1: -100,0 Min: -200,0 Max: 200,0 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P499* Src FixTorq 2 499	BICO parameter for selecting the connector from which the lower torque limitation is to be read in. Precondition: P100=3,4,5 (vector control types)	index1: 171 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P500 Scale TorqLim2 500	Function parameter for entering the scaling factor for the lower torque limitation. Precondition: P100=3,4,5 (vector control types)	index1: 100,0C Min: -300,00 Max: 300,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
r502 Fix Torque 2 502	Maximum value of the lower torque limit Precondition: P100 = 3,4,5 (vector control types)	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access
r503 Max Torque 2 503	Actual lower torque limit. This value differs from r502 only in the torque control. Note: This value may be reduced by the power limitation (P259) or the current limitation (P126). Precondition: P100 = 3,4,5 (vector contol types)	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access
P504 I Add Fsetp 504	Function parameter for entering a fixed setpoint for the additional current setpoint	index1: 0,0 Min: -200,0 Max: 200,0 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P505 Torq AddFSetp 505	Function parameter for entering a fixed setpoint for the additional torque setpoint Precondition: P100 = 3, 4, 5 (vector control types)	index1: 0,0 Min: -200,0 Max: 200,0 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P506* Src Torq Add 506	BICO parameter for selecting the connector from which the additional torque setpoint is to be read in. Precondition: P100=3,4,5 (vector control types)	index1: 87 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P507 ScaleTorqAddSetp 507	Function parameter for entering the scaling factor for the additional torque setpoint. Precondition: P100=3,4,5 (vector control types)	index1: 100,0 Min: -300,00 Max: 300,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
P508* Src I Add 508	BICO parameter for selecting the connector from which the additional current setpoint is to be read in.	index1: 88 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting
P509 Scale I Add Setp 509	Function parameter for entering the scaling factor for the additional current setpoint.	index1: 100,0 Min: -300,00 Max: 300,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
r510 Torq AddSetp 510	Additional torque setpoint	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access
r511 I AddSetp 511	Additional current setpoint	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Setpoint channel - Upread/free access
P514 Auto Acknowl 514	Automatic acknowledgment of certain converter faults. If the same fault occurs more than twice in succession, the fault is no longer acknowledged. The following faults are not acknowledged: F038, F060, F061, F081, F090 to F115. Parameter values: 0: without automatic acknowledgement 1: with automatic acknowledgement	Init: 0 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P515 DC Bus Volts Reg 515	Function parameter for the limitation controller for DC link voltage; limits the DC link voltage during regenerative duty (e.g. fast reverse) to the maximum permissible value. Notes: - This function cannot replace a braking or rectifier unit during active regenerative loads! - If a braking unit or a rectifier unit is connected, the Vdmax controller should be disabled. Parameter values: 0: Disabled 1: Vdmax controller released With a Vdmax controller dynamic response of P516 = 0 %, the controller is switched off.	index1: 0 Min: 0 Max: 1 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
P516 DC bus Volts Dyn 516	Function parameter for dynamic response of the Vdmax controller At P516 = 0 % the Vdmax controller is switched off. Precondition: P515 = 1 (select Vdmax controller)	index1: 25 Min: 0 Max: 200 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P517 KIB/FLR 517	Function parameter for selecting the kinetic buffeing (KIB) or flexible response (FLR) Kinetic buffering: Operation may be continued during short power outages by regenerating energy from the load / motor to the converter. Loads with high inertia and high speed allow longer sustaining periods Flexible response. The flexible response function enables the converter to continue to operate in the case of line voltage drops. The available output power is then reduced according to the current line voltage and the nominal converter current. The implementable control factor is limited to the range of space vector modulation if function (P517=2,3) is enabled. FLR wit f=const. is only permissible with v/f operating modes (P100=0,1,2). Note: The electronics power supply must be supported during flexible response by an external auxiliary power supply. Parameter values: 0: blocked 1: KIB enabled 2: FLN enabled with U/f=const. 3: FLN enabled with f=const. (only for P100=0,1,2)	index1: 0 Min: 0 Max: 3 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
P518 KIB/FLR LowVolts 518	Function parameter for entering the application point of the KIB control or the FLR activation. Parameter contains the value of the DC link voltage at which when it is fallen short of, the KIB or the FLR is activated (base value: rated DC link voltage: for AC units P071*1.32, for DC units P071). Exception: At P517=2 and characteristic mode (P100=0,1,2), the frequency is reduced as soon as the maximum possible output voltage is less than the setpoint voltage of the v/f characteristic. Precondition: P517 = 1,2,3	index1: 76 Min: 65 Max: 115 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P519 KIB/FLR Reg Dyn 519	Function parameter for the dynamic response of the controller for kinetic buffering (P517=1) for all types of control, or flexible response (P517=2, v/f= const.) for v/f characteristic (P100=0,1,2) At 0%, the KIB function is switched off.	index1: 25 Min: 0 Max: 200 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P520 KIB/VdmaxRegGain 520	KIB / FLR / Vdmax controller gain. This parameter is only intended for service personnel.	Init: 25,0 Min: 0,0 Max: 999,9 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P521 KIB/Vdmax Reg TI 521	Integration time constant of the KIB/FLR/Vdmax controller. This parameter is only intended for service personnel.	Init: 1,6 Min: 0,1 Max: 999,9 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P522 KIB/Vdmax Reg TD 522	Differentiation time constant of the KIB/FLR/Vdmax controlle This parameter is only intended for service personnel.	Init: 40,0 Min: 0,0 Max: 999,9 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P523 FLR Vd min 523	Function parameter for the value of the DC link voltage at which, if it is fallen short of, shutdown occurs with the fault message "Undervoltage DC link" (base value: rated DC link voltage: on AC units P071*1.32, on DC units P071). Precondition: P517 = 2, 3 (FLR enabled)	index1: 76 Min: 50 Max: 76 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
r524 Fly StandMeas 524	Visualization parameter for the currently valid values for the search function set in P527. Indices: 1: T(ent) in 0.1ms 2: I(threshold,average) 4000h=4*P102 3: I(threshold, end) 4000h=4*P102	Dec.Plc.: 0 Unit: - Indices: 3 Type: I2	Menus: - Parameter menu + Functions - Upread/free access
P525 Fly Search Amps 525	Function parameter for current setpoint injected into the motor for flying restart if no tachometer is used. The flying restart function must be enabled via the control bi (source see P583) or via P373 = 3 (automatic restart (only for induction motors)). The value is calculated during hte automatic parameterizatio mode (P115 = 1,2,3). Setting instructions: At P100=3 (f-control) a maximum of two times the rated magnetizing current (r119) is used Preconditions: P100 = 1, 3 (v/f control, f-control)	index1: ~ Min: 0,0 Max: 6553,5 Unit: A Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P526 Fly Search Speed 526	Function parameter for entering the search speed Frequency range which is to be passed during flying restart within 1 sec. without a tachometer is set. Preconditions: as for P525 and P100=0,1 (induction motor)	index1: 1,0 Min: 0,0 Max: 100,0 Unit: Hz Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
P527* Fly Stand Kp 527	Function parameter for changing the duration and threshold vlalues for the standstill detection during flying restart withou a speed controller (search). The parameter is only envisaged for service personnel. Indices: 1: Evaluation of duration of de-magnetizing 2: Evaluation of average current value 3: Evaluation of final current value	index1: 100,0 Min: 0,0 Max: 500,0 Unit: % Indices: 3 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready
r528 Sync Status 528 not Compact PLUS	Visualization parameter of the synchonization process Parameter values: 0 = synchronizing switched off 1 = frequency measurement active 2 = phase control active 3 = synchronized 4 = synchronization error Precondition: TSY board is present P100 = 1,2,3 (v/f control without n-controller, f-control) in function diagram X01.5	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Upread/free access
P529 SyncStartDelta f 529 not Compact PLUS	Function parameter for entering the maximum permissible frequency deviation for start of synchronization. Synchronizing process will not start until target frequency - frequency of the synchronization converter < P529 Note: Upper limit is defined by synchronization controller limitation (P532) Precondition: TSY board is present P100 = 1,2,3 (v/f control without n-controller, f-control) in function diagram: X02.5	Init: 0,10 Min: 0,00 Max: 1,00 Unit: Hz Indices: - Type: I4	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P530 Sync Angle(set) 530 not Compact PLUS	Function parameter for entering the phase angle deviation setpoint for synchronization for adjusting the phase position of the synchronizing converter to that of the synchronizing signal of a target voltage system. A negative parameter value means that the voltage system o the synchronizing drive is delayed against the measured signal. Example: - A converter is to be synchronized to phase R of a voltage system - A measured synchronization signal is derived from the delt voltage V_R-S -> P530 is set to -30° (converter compares its own voltage V_R with the measured signal V_R-S which has a phase shift of 30° electr.) Precondition: TSY board P100 = 1,2,3 (V/f control without n-controller, f-control) in function diagram: X02.3	Init: 0,0 Min: -180,0 Max: 179,9 Unit: ° (alt) Indices: - Type: I2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
P531 Sync Window 531 not Compact PLUS	Function parameter for entering the phase deviation for the synchronization fault message. The parameter defines the phase angle deviation which generates a synchronization fault message after synchronization of the frequency. If the tolerance range is exceeded, a previously issued synchronization signal to binector B0134 will not be withrdrawn, but an alarm and the synchronization fault signal binector B0160 will be issued. Alarm, synchronization fault signal and synchronization signal can only be withdrawn by canceling the synchronization command (P582) or by an OFF command. Precondition:: TSY board is present P100 = 1,2,3 (v/f control without n-controller, f-control) in function diagram: X02.5	Init: 2,0 Min: 1,0 Max: 20,0 Unit: ° (alt) Indices: - Type: I2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
P532 Sync f-max 532 not Compact PLUS	Function parameter for the maximum operating range of the synchronization controller. The parameter describes the limitation of the synchronization controller to a frequency setting range. During synchronization, a frequency step of maximum the entered value is possible. The lower value of the setting range is limited by the value o the maximum permissible frequency deviation at the beginning of the synchronization (P529). Precondition: TSY board is present P100 = 1,2,3 (v/f control without n-controller, f-control) in function diagram: X02.6	Init: 0,20 Min: 0,00 Max: 1,00 Unit: Hz Indices: - Type: I4	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
r533 Sync Target Freq 533 not Compact PLUS	Visualization parameter for the measured target frequency during synchronization. Maximum value which can be displayed: 8 times rated motor frequency (P107). Precondition: TSY board is present P100 =1,2,3 (v/f control without n-controller, f-control) in function diagram: X02.3	Dec.Plc.: 3 Unit: Hz Indices: - Type: I4	Menus: - Parameter menu + Functions - Upread/free access
P534 Select Synchr 534 not Compact PLUS	Function parameter for selecting synchronization. During the synchronization of textile converters, the setpoint frequency has to be set the same for main and starting converters. During line synchronization, the setpoint frequency is automatically corrected to the line frequency. The sense of direction for synchronization can be determine via the polarity of the speed main setpoint or via the sense o direction selection (see P571, P572). Precondition: TSY board available P100 = 1,2,3 (v/f control without n controller, f control) In function diagram: X01.1, 316.2	Init: 1 Min: 0 Max: 2 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
P535 SIMO Sound 535	Function parameter for changing the noise spectrum of the machine; the parameter can result in reduction of noise with low pulse frequencies. Due to increased harmonics, it is necessary to set a minimum pulse frequency P340 of 45* rated motor frequenc when activating this function. Only then can SIMO Sound be switched on. Setting instruction: As the development of noise is essentiall determined by mechanical vibrations of the entire machine, the various settings must be tried out. Parameter values: 0: not activated 1: noise level 1 2: noise level 2 3: noise level 3 4: noise level 4	index1: 0 Min: 0 Max: 4 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Gating unit + Functions - Upread/free access Changeable in: - Drive setting - Ready
P536 n/f RegDyn(set) 536	Function parameter for setting the dynamic response of the speed control circuit. It is used as an optimization criterion for dimensioning the n/f controller (P115 = 3, 5). Note: A change will only become active if the n/f controller optimization is subsequently carried out (P115 = 3, 5) Setting instructions: - For drives with gear play and/or shafts with strong torsion, optimization should be commenced with low dynamic response values (from 10%). - For drives with high requirements on synchronism and dynamic response, 200% should be selected. - In the case of encoder-free speed control (f-control), maximum values of approx. 100% are to be selected. Precondition: P100 = 3,4,5 (Vector control modes);	index1: 50 Min: 10 Max: 200 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P537 n/f RegDyn(act) 537	Function parameter for the actual implemented dynamic response during n/f controller optimization Precondition: P100 = 3, 4, 5 (Vector control types)	index1: 0 Min: 0 Max: 200 Unit: % Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
P538 n/f Reg Osc Freq 538	Function parameter for oscillating frequency The parameter contains oscillating frequency measured by the oscillation moniotr of the n/f control circuit. The value 0 means that no oscillation was found. Precondition: P100 = 3, 4, 5 (Vector control modes)	index1: 0,0 Min: 0,0 Max: 100,0 Unit: Hz Indices: 4 Type: O2	Menus: - Parameter menu + Functions - Upread/free access Changeable in: - Drive setting
r539 TestPulsesResult 539	Visualization parameter for test pulse results The results of the measured test pulses can be called up in bit-coded form. The index indicates the number of the test pulse and thus the switching status. 1 always means that the described event has happened during the measurement. Bit00: UCE W (L3) Bit01: UCE V (L2) Bit02: UCE U (L1) Bit03: Overcurrent Bit04: UCE W (L3) inverter 2 (parallel circuit) Bit05: UCE V (L2) inverter 2 (parallel circuit) Bit06: UCE U (L1) inverter 2 (parallel circuit) Bit07: Results okay Bit08: Iw > 0 Bit09: Iw < 0 Bit10: Iu > 0 Bit11: Iu < 0 Bit12, 13, 14: Switching status of inverter branches W, V and U 1: output terminal is connected to positive DC link bus, 0: output terminal is connected to negative DC link bus bit15: not used Indices: i00n corresp. to Tp0n, n = 1 to 18	Dec.Plc.: 0 Unit: - Indices: 18 Type: V2	Menus: - Parameter menu + Functions - Upread/free access
r540 TachTest Result 540	Visualization parameter for the result of the tachometer test. The test is performed during the settings of the parameter P115 = 3, 4, 5, 7 At P115 = 5, 7 only individual parts of the tachometer test ar carried out (function selection). Parameter values: 0: Test is not active or not yet completed 1: Tachometer signal correct 2: Analog tachometer adjustment (P138) was automatically adapted (only P115 = 3, 4). 3: The calculated analog tachometer adjustment was limited to the permissible value range (only P115 = 3, 4) 4. No speed signal was received. 5: The polarity of the speed signal is incorrect 6: A track signal of the pulse encoder is missing 7: The current analog tachometer scaling is incorrect (P138). (P115 = 5, 7) Proposal: Carry out the no-load measurement (P115 =4) 8: The set number of pulses of the pulse encoder (P151) is incorrect. Precondition: P100 = 3, 4, 5 (Vector control modes)	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Upread/free access

Parameter	Description	Data	Read/write
r541 Mot ID R(Stator) 541	Visualization parameter for individual measurement results o the motor identification at standstill for the stator resistor + feeder resistances. Reference value is the rated motor impedance. Indices: i001 = Me U: result of measurement in phase direction U i002 = Me V: result of measurement in phase direction V i003 = Me W: result of measurement in phase direction W For future use with induction machines.	Dec.Plc.: 2 Unit: % Indices: 3 Type: O2	Menus: - Parameter menu + Functions - Upread/free access
r542 Mot ID R(Rotor) 542	Visualization parameter for individual measurement results o the motor identification at standstill for the rotor resistor, referred to the rated motor impedance. Indices: i001 = Me U: result of measurement in phase direction U i002 = Me V: result of measurement in phase direction V i003 = Me W: result of measurement in phase direction W	Dec.Plc.: 2 Unit: % Indices: 3 Type: O2	Menus: - Parameter menu + Functions - Upread/free access
r543 Mot ID VoltsDrop 543	Visualization parameter for individual measurement results o the motor identification at standstill for the valve voltages. Indices: i001 = Me U: result of measurement in phase direction U i002 = Me V: result of measurement in phase direction V i003 = Me W: result of measurement in phase direction W	Dec.Plc.: 2 Unit: V Indices: 3 Type: O2	Menus: - Parameter menu + Functions - Upread/free access
r544 Mot ID Quadvolts 544	Visualization parameter for individual measurement results o the motor identification at standstill for the voltages vertical t the used current direction. Indices: i001 = Me U: result of measurement in phase direction U i002 = Me V: result of measurement in phase direction V i003 = Me W: result of measurement in phase direction W	Dec.Plc.: 2 Unit: V Indices: 3 Type: I2	Menus: - Parameter menu + Functions - Upread/free access
r545 Mot ID Dead Time 545	Visualization parameter for individual measurement results o the motor identification at standstill for the deadtime compensation. Display is in multiples of 50 nsec. Indices: i001 = Me U: result of measurement in phase direction U i002 = Me V: result of measurement in phase direction V i003 = Me W: result of measurement in phase direction W	Dec.Plc.: 0 Unit: - Indices: 3 Type: O2	Menus: - Parameter menu + Functions - Upread/free access
r546 MotId X(leakage) 546	Visualization parameter for individual measurement results o the motor identification at standstill for referred total leakage reactance. For future use with induction machines.	Dec.Plc.: 1 Unit: % Indices: 12 Type: O2	Menus: - Parameter menu + Functions - Upread/free access
r547 Time Const Match 547	Visualization parameter for time constant of the compensation function during leakage measurement.	Dec.Plc.: 0 Unit: µs Indices: - Type: O2	Menus: - Parameter menu + Functions - Upread/free access
r550 Control Word 1 550	Visualization parameter for displaying control word 1. Bits 0 to 15 are displayed.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Control and status words - Upread/free access
r551 Control Word 2 551	Visualization parameter for displaying control word 2. Bits 16 to 31 are displayed.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Control and status words - Upread/free access
r552 Status Word 1 552	Visualization parameter for displaying status word 1. Bits 0 t 15 are displayed.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Control and status words - Upread/free access

Parameter	Description	Data	Read/write
r553 Status Word 2 553	Visualization parameter for displaying status word 2 Bits 16 to 31 are displayed.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Control and status words - Upread/free access
P554* Src ON/OFF1 554 Compact PLUS only	BICO parameter for selecting the binector from which the ON/OFF command (control word 1, bit 0) is to be read in.	index1: 22 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P554* Src ON/OFF1 554 not Compact PLUS	BICO parameter for selecting the binector from which the ON/OFF command (control word 1, bit 0) is to be read in.	index1: 5 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P555* Src1 OFF2(coast) 555	BICO parameter for selecting the 1st binector from which the OFF2 command (control word 1, bit 1) is to be read in. Further sources for the OFF2 command are selected in P556 and P557.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P556* Src2 OFF2(coast) 556	BICO parameter for selecting the 2nd binector from which the OFF2 command (control word 1, bit 1) is to be read in. Further sources for the OFF2 command are selected in P555 and P557.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P557* Src3 OFF2(coast) 557	BICO parameter for selecting the 3rd binector from which the OFF2 command (control word 1, bit 1) is to be read in. Further sources for the OFF2 command are selected in P555 and P556.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P558* Src1 OFF3(QStop) 558	BICO parameter for selecting the 1st binector from which the OFF3 command (control word 1, bit 2) is to be read in. Further sources for the OFF3 command are selected in P559 and P560.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P559* Src2 OFF3(QStop 559	BICO parameter for selecting the 2nd binector from which the OFF3 command (control word 1, bit 2) is to be read in. Further sources for the OFF3 command are selected in P558 and P560.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P560* Src3 OFF3(QStop) 560	BICO parameter for selecting the 3rd binector from which the OFF3 command (control word 1, bit 2) is to be read in. Further sources for the OFF3 command are selected in P558 and P559.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P561* Src InvRelease 561	BICO parameter for selecting the binector from which the command for releasing the inverter (control word 1, bit 3) is to be read in.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P562* Src RampGen Rel 562	BICO parameter for selecting the binector from which the command for releasing the ramp generator (control word 1, bit 4) is to be read in.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P563* Src RampGen Stop 563	BICO parameter for selecting the binector from which the command for starting the ramp generator (control word 1, bit 5) is to be read in.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P564* Src Setp Release 564	BICO parameter for selecting the binector from which the command for releasing the setpoint (control word 1, bit 6) is to be read in.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P565* Src1 Fault Reset 565	BICO parameter for selecting the 1st binector from which the command for acknowledging a fault (control word 1, bit 7) is to be read in. Further sources for the fault acknowledgemen are selected in P566 and P567.	index1: 2107 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P566* Src2 Fault Reset 566 Compact PLUS only	BICO parameter for selecting the 2nd binector from which the command for acknowledging a fault (control word 1, bit 7 is to be read in. Further sources for the fault acknowledgement are selected in P566 and P567.	index1: 6107 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P566* Src2 Fault Reset 566 not Compact PLUS	BICO parameter for selecting the 2nd binector from which the command for acknowledging a fault (control word 1, bit 7 is to be read in. Further sources for the fault acknowledgement are selected in P566 and P567.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P567* Src3 Fault Reset 567	BICO parameter for selecting the 3rd binector from which the command for acknowledging a fault (control word 1, bit 7) is to be read in. Further sources for the fault acknowledgemen are selected in P565 and P566.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P568* Src Jog Bit0 568	BICO parameter for selecting the binector from which bit 0 for selecting a jogging setpoint and the command for starting jogging operation (control word 1, bit 8) are to be read in. Fo selecting a jogging setpoint, the status of bit 1 (P569) is also important.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P569* Src Jog Bit1 569	BICO parameter for selecting the binector from which bit 0 for selecting a jogging setpoint and the command for starting jogging operation (control word 1, bit 9) are to be read in. Fo selecting a jogging setpoint, the status of bit 0 (P568) is also important.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P571* Src FWD Speed 571	BICO parameter for selecting the binector from which the command for releasing the positive direction of rotation (control word 1, bit 11) is to be read in.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P572* Src REV Speed 572	BICO parameter for selecting the binector from which the command for releasing the negative direction of rotation (control word 1, bit 12) is to be read in.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P573* Src MOP UP 573	BICO parameter for selecting the binector from which the command for increasing the motor operated potentiometer (control word 1, bit 13) is to be read in.	index1: 8 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P574* Src MOP Down 574	BICO parameter for selecting the binector from which the command for lowering the motor operated potentiometer (control word 1, bit 14) is to be read in.	index1: 9 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P575* Src No ExtFault1 575	BICO parameter for selecting the binector from which the command for tripping an external fault 1 (control word 1, bit 15) is to be read in.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P576* Src FuncDSetBit0 576	BICO parameter for selecting the binector from which bit 0 for selecting a function data set (control word 2, bit 16) is to be read in. For the selection of a function data set, the status of bit 1 (P577) is important.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P577* Src FuncDSetBit1 577	BICO parameter for selecting the binector from which bit 1 for selecting a function data set (control word 2, bit 17) is to be read in. For the selection of a function data set, the status of bit 0(P576) is important.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P578* Src MotDSet Bit0 578	BICO parameter for selecting the binector from which bit 0 for selecting a motor data set (control word 2, bit 18) is to be read in. For selection of a motor data set, the state of Bit 1 (P579) is also of significance.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P579* Src MotDSet Bit1 579	BICO parameter for selecting the binector from which bit 1 for selecting a motor data set (control word 2, bit 19) is to be read in. For selection of a motor data set, the state of Bit 0 (P578) is also of significance.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P580* Src FixSetp Bit0 580	BICO parameter for selecting the binector from which bit 0 for selecting a fixed setpoint (control word 2, bit 20) is to be read in. For the selection of a fixed setpoint, the statuses of bit 1 (P581), bit 2 (P417) and bit 3 (P418) are important.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P581* Src FixSetp Bit1 581	BICO parameter for selecting the binector from which bit 1 for selecting a fixed setpoint (control word 2, bit 21) is to be read in. For the selection of a fixed setpoint, the statuses of bit 0 (P580), bit 2 (P417) and bit 3 (P418) are important.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P582* Src Sync Release 582 not Compact PLUS	BICO parameter for selecting the binector from which the command to enable the "Synchronizing" function (control word 2, bit 22) is to be read in. Binector values: 0: Synchronizing not enabled 1: Synchronizing enabled Note: - For synchronizing, the TSY board is required, and the open loop/closed-loop control type v/f control for textile application (P100 = 2) has to be set. - For line synchronizations (see P534) the control modes f-control (P100=3) and v/f control (P100=1) are possible. With the synchronizing enable, for synchronous motors (P95=12), the initial position of the position encoder can be reset (see B0134, B0135), if the position signal is not softwired (P172=0). Precondition: TSY board P100 = 1,2,3 (v/f control without n-controller, f-control) P95 = 12 (separately excited synchronous motor) in function diagram: X01.4	index1: 5002 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P583* Src Fly Release 583	BICO parameter for selecting the binector from which the command to enable the Flying restart function (control word 2, bit 23) is to be read in. Precondition: No permanently-excited synchronous motor (P95 <> 13)	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P584* Src Droop Rel 584	BICO parameter for selecting the binector from which the command for releasing the droop (control word 2, bit 24) is t be read in.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P585* Src n/f-Reg Rel 585	BICO parameter for selecting the binector from which the command to enable the speed controller (control word 2, bit 25) is to be read in. Precondition: P100 = 0,4,5 (v/f control with speed controller, n/T control).	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P586* Src No ExtFault2 586	BICO parameter for selecting the binector from which the command for tripping an external fault 2 (control word 2, bit 26) is to be read in. A signal, logical 0, causes a shutdown o the unit on faults after a waiting time of 200 ms after completion of pre-charging (converter status in r001 is larger than 10). With external fault 2, an external braking unit, for example, can be monitored.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P587* Src Master/Slave 587	BICO parameter for selecting the binector from which the command to change over between master and slave drive (control word 2, bit 27) is to be read in. Parameter values: 0: The control works with speed and frequency setpoints (master drive) 1: The control operates with torque setpoints (slave drive). Note: During the excitation time (P602), the control always operates as a master drive, but the gain of the n/f controller is blocked. Precondition: P100=3,4 (n/f control)	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P588* Src No Ext Warn1 588	BICO parameter for selecting the binector from which the command for tripping an external warning 1 (control word 2, bit 28) is to be read in.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P589* Src No Ext Warn2 589	BICO parameter for selecting the binector from which the command for tripping an external warning 2 (control word 2, bit 29) is to be read in.	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P590* Src BICO DSet 590	BICO parameter for selecting the binector from which the bit for selecting a BICO data set (control word 2, bit 30) is to be read in.	Init: 14 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P591* Src ContactorMsg 591	BICO parameter for selecting the binector from which the check-back message of a main contactor (control word 2, bit 31) is to be read in. If a source for the check-back message of the main contactor is not parameterized (input value = 0), the check-back time parameterized in P600 is waited out after the ON command and then precharging is started. If a source for the check-back message of the main contactor is parameterized (input value not equal to 0), a transition to precharging only takes place when the check-back message is logical 1.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Control and status words - Upread/free access Changeable in: - Drive setting - Ready
P600* ContactorMsgTime 600	Function parameter for entering the checkback time for a main contactor. If no source has been parameterized for the main contactor checkback (P591 > 0), the parameterized checkback time has to elapse after the ON command and then precharging i commenced. If no checkback signal is given, error F001 is triggered. If no source has been parameterized for the main contactor checkback (P591 = 0), the parameterized checkback time has to elapse after the ON command and then precharging i commenced. During this time, the main contactor has to close. If a main contactor is available, a checkback time of a least 120 ms is recommended. The checkback time is applicable both for energizing and de energizing the contactor. If the line contactor is controlled from the converter (via X9.7 and X9.9), the main contactor checkback time should be set to at least 120ms. Function diagrams: 91, 92, 93, 94	Init: 120 Min: 0 Max: 6500 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + Sequence control - Upread/free access Changeable in: - Drive setting
P601* Src DigOutMCon 601 Compact PLUS only	BICO parameter for selecting the binector from which the command to control the main contactor (terminal -X102) is to be read.	index1: 124 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Terminals + Sequence control - Upread/free access Changeable in: - Drive setting
P601* Src DigOutMCon 601 not Compact PLUS	BICO parameter for selecting the binector from which the command for actuating the main contactor (terminal -X9) is to be read out.	index1: 124 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Terminals + Sequence control - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P602 Excitation Time 602	Function parameter for determining the excitation time of the motor. Waiting time between pulse enable and ramp function generator enable. Within this time, the magnetization of the induction motor is built up. The value is determined during automatic parameterization (P115=1) and motor data identification (P115=2, 3). Notes: P100 = 0, 1, 2 (v/f control types): The magnetization is built up at frequency of 0 Hz and relevant curve voltage see P319 and P325). If smooth acceleration mode (P604 = 1) os selected, the voltage increases ramp-like instead of step-like. P100 = 3, 4, 5 (vector control types): The magnetization is ramped up. If smooth acceleration (P604 = 1) is selected, the flux increases in a parabolic way. P095 = 12 (synchronous motor). Within the excitation tme, the rotor flux is built up via the excitation current r160. The external excitation current contro has to be able to follow the flux build-ujp. (Dynamic behaviour as high as possible), as otherwise the fault message F012 "Current too low" will occur. At P602=0.01s, the excitation current setpoint is already output before pulse enable (from converter state "Precharging"), but only if the motor rotates more slowly than 2 % of rated speed. P095 = 13 (Sync.Perm.): Within the excitation time, the drive can align itself before the no-encoder open-loop or closed-loop control accelerate (see.also P467). During the excitation phase, the status bit "Flying restart active" is set (see B0132, B0133). In function diagram: 380.3, 381.3, 405.4	index1: ~ Min: 0,01 Max: 10,00 Unit: s Indices: 4 Type: O2	Menus: - Parameter menu + Sequence control - Upread/free access Changeable in: - Drive setting - Ready
P603 De-MagnetizeTime 603	Function parameter for entering the de-excitation time for a connected induction motor. The de-excitation time is the wait time between switching off the drive and switching it on again. Within this time, there is a restart inhibit. During the de-excitation time, the induction motor de-magnetizes. If a synchronous motor is connected, the de-excitation time has to be set to 0. The value is determined during automatic parameterization (P115 = 1) and motor data identification (P115 = 2, 3). ATTENTION: After OFF1, OFF3 and JOG commands the de-excitation time is not active.	index1: ~ Min: 0,00 Max: 10,00 Unit: s Indices: 4 Type: O2	Menus: - Parameter menu + Sequence control - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P604 Smooth Accel 604	Function parameter for selecting the smooth starting function For smooth starting, the flux in the motor is established with some delay. This is to ensure that even with residual magnetization, the motor only rotates in the required directio of rotation. P100 = 0, 1, 2 (v/f control types): When activated, the output voltage during energizing increases ramp-like to the curve voltage within the excitation time (P602). P100 = 3, 4, 5 (Vector control types): When smooth starting is activated, during energizing, the value of the flux setpoints (P291) increases in a parabolic way within the excitation time (P602). Parameter values: 0 = not active 1 = active Precondition: P095 = 10, 11, 12 (Induction motor, synchronous motor) In function diagram: 380.4, 381.4, 405.5	index1: 0 Min: 0 Max: 1 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Sequence control - Upread/free access Changeable in: - Drive setting - Ready
P605 BrakeCtrl 605	Function parameter for selecting a brake control unit. 0 = Without brake 1 = Brake without check-back message 2 = Brake with check-back message	Init: 0 Min: 0 Max: 2 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Sequence control - Upread/free access Changeable in: - Drive setting
P606 BrakeOpenTime 606	Function parameter for entering the brake opening time. If there is a brake present (P605), the setpoint release is delayed by the set time. The brake can thus open safely before starting of the motor.	Init: 0,20 Min: 0,00 Max: 10,00 Unit: s Indices: - Type: O2	Menus: - Parameter menu + Sequence control + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting
P607 BrakeCloseTime 607	Function parameter for entering the brake closing time. If there is a brake present (P605), blocking of the firing pulses is additionally delayed by the set time after an OFF command. The brake can thus safely close before the motor is de-energised. In addition, the turn-off time set in P0801 must be greater than the sum of the set times in P617 and P607.	Init: 0,10 Min: 0,00 Max: 10,00 Unit: s Indices: - Type: O2	Menus: - Parameter menu + Sequence control + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting
P608* Src BrakeOpen 608	BICO parameter for selecting the binectors from which the command for opening the brake is to be read in.	index1: 104 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Sequence control - Upread/free access Changeable in: - Drive setting
P609* Src BrakeClose 609	BICO parameter for selecting the binectors from which the command for closing the brake is to be read in.	index1: 105 Unit: - Indices: 4 Type: L2 ,B	Menus: - Parameter menu + Sequence control - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P610* Src BrakeThresh1 610	BICO parameter for selecting the connector from which the actual value for comparison with brake threshold 1 is to be read in. If the current component (K0242) is used, magnetizing in the case of induction motors and voltage boost in the case of v/f control can be monitored. A torque-generating current component (K0184) only results after setpoint enable.	Init: 242 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Sequence control - Upread/free access Changeable in: - Drive setting
P611 Brake Thresh 611	Function parameter for entering brake threshold 1, whereby, if this threshold is exceeded, the brake is to open.	Init: 0,0 Min: 0,0 Max: 200,0 Unit: % Indices: - Type: O2	Menus: - Parameter menu + Sequence control - Upread/free access Changeable in: - Drive setting - Ready
P612* Src SigBrakeOp 612	BICO parameter for selecting the binector from which the check-back message "Brake opened" is to be read in.	Init: 1 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Sequence control - Upread/free access Changeable in: - Drive setting
P613* Src SigBrakeClos 613	BICO parameter for selecting the binector from which the check-back message "Brake closed" is to be read in.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Sequence control - Upread/free access Changeable in: - Drive setting
P614* Src PBrakeClos 614	BICO parameter for selecting the binector from which the command for closing a holding brake is to be read in.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Sequence control - Upread/free access Changeable in: - Drive setting
P615* Src BrakeThresh2 615	BICO parameter for selecting the connector from which the actual-value for comparison with brake threshold 2 should be read in.	Init: 148 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Sequence control - Upread/free access Changeable in: - Drive setting
P616 BrakeThresh2 616	Function parameter for entering brake threshold 2. If the actual value falls below this threshold after an OFF command, the brake is closed and a firing-pulse block is initiated by the brake control unit (B278). The value entered here should not be smaller than the turn-off value parameterized in P800.	Init: 0,5 Min: 0,0 Max: 200,0 Unit: % Indices: - Type: O2	Menus: - Parameter menu + Sequence control - Upread/free access Changeable in: - Drive setting - Ready
P617 BrakeThresh2Time 617	Function parameter for entering the time by which closing of the brakes is to be delayed after an OFF command. If the threshold value falls below brake threshold 2 after an OFF command, closing of the brake is delayed by the time entere	Init: 0,00 Min: 0,00 Max: 100,00 Unit: s Indices: - Type: O2	Menus: - Parameter menu + Sequence control + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting - Ready
P631* AnaIn Offset 631	Function parameters for entering the offset for the analog input on the terminal strip of the basic unit. The offset is added to the analog input signal. Indices: i001 = CU-1: Offset of the analog input 1 i002 = CU-2: offset of the analog input 2	index1: 0,00 Min: -20,00 Max: 20,00 Unit: V Indices: 2 Type: I2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P632* AnaIn Conf 632 Compact PLUS only	Configuration of analog inputs on the basic converter terminal strip. This determines which input signal values will be processed. Parameter value Input range 0 -10V...10V 1 0V...10V 2 -20mA... 20mA (not for AI1) 3 0mA... 20mA (not for AI1) 4 4mA... 20mA (not for AI1)	index1: 0 Min: 0 Max: 4 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting
P632* AnaIn Conf 632 not Compact PLUS	Function parameter for configuring the analog inputs on the terminal strip of the basic unit.The value range of the input signal to be processed is selected. Parameter value Input range 0 -10V...10V 1 0V...10V 2 -20mA... 20mA 3 0mA... 20mA 4 4mA... 20mA Indices : i001 = CU-1: Configuration of analog input 1 i002 = CU-2: Configuration of analog input 2.	index1: 0 Min: 0 Max: 4 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting
P634* AnaIn Smooth 634	Function parameter for entering the smoothing time constan for the analog inputs on the terminal strip of the basic unit. Indices: i001 = CU-1: Smoothing time constant of analog input 1 i002 = CU-2: smoothing time constant of analog input 2	index1: 4,0 Min: 0,0 Max: 1000,0 Unit: ms Indices: 2 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P636* Src AnaIn Rel 636	BICO parameter for selecting the binector from which the command for releasing the analog inputs on the terminal stri of the basic unit is to be read in. Without a release, the setpoints provided by the analog inputs is at 0. Indices: i001 = CU-1: Release of the analog input 1 i002 = CU-2: Release of the analog input 2	index1: 1 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting
r637 Analn Setp 637	Visualization parameter for displaying the setpoint provided by the analog input. i001 = CU-1: Setpoint of the analog input 1 i002 = CU-2: Setpoint of the analog input 2	Dec.Plc.: 1 Unit: % Indices: 2 Type: I2	Menus: - Parameter menu + Terminals - Upread/free access
P638* AI Monitor 638	Function parameter for selecting wire break monitoring for the analog inputs of the CU board. Monitoring is only active with the configuration P632.x = 2 (4-20mA). In the factory setting (P638.x=0), a fault message is generated when the permitted input value range is left. No fault message is generated with the setting P638.x=1, but the binectors B0031 and B0032 display that the permitted input value range has been left. i001 = CU-1: Wire break monitoring of analog input 1 i002 = CU-2: Wire break monitoring of analog input 2	index1: 0 Min: 0 Max: 1 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting
P640* Src AnaOut 640	BICO parameter for selecting the connectors whose values are to be output at the analog outputs of the terminal strip fo the basic unit. Indices: i001 = CU-1: Connector number to analog output 1 i002 = CU-2: connector number to analog output 2	index1: 148 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P643 CU AnalogOutGain 643	Proportional gain of the analog outputs on the CU Parameter values: P643.x = desired output voltage at connector value (PWE) = 100 % The output voltage is calculated according to the following equation: Uoff = PWE / 100 % * P643.x + P644.x Indices: i001=CU-1: calculated output voltage of channel 1 at PWE = 100 % i002=CU-2: calculated output voltage of channel 2 at PWE = 100 % Note: The output voltage at the analog output can be at the maximum ± 10 V	index1: 10,00 Min: -320,00 Max: 320,00 Unit: V Indices: 2 Type: I2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P644 CU- AnalogOutOff 644	Offset of analog outputs on the CU, see P643. Indices: i001 = CU-1: Offset of analog output 1 i002 = CU-2: Offset of analog output 2	index1: 0,00 Min: -100,00 Max: 100,00 Unit: V Indices: 2 Type: I2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
r646 Status DigIn 646	Visualization parameter for displaying the signal level at the digital inputs and outputs of the terminal strip for the basic unit.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Terminals - Upread/free access
P650* Src DigOutp TSY 650 not Compact PLUS	BICO parameter for selecting the binector whose value is to be output at terminal -X100 of the TSY board. Index 1: TSY relay output 1, -X110:16,17 Factory setting: B0134 relay closes when synchronization is reached. Index 2: TSY relay output 1, -X110:18,19 Factory setting: B0161 relay opens if there is a synchronization error.	index1: 134 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P651* Src DigOut1 651	BICO parameter for selecting the binector whose value is to be output at terminal -X101/3 of the terminal strip for the basic unit. In order to use terminal -X101/3 as a digital input, both indices must be set to 0.	index1: 107 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P652* Src DigOut2 652	BICO parameter for selecting the binector whose value is to be output at terminal -X101/4 of the terminal strip for the basic unit. In order to use terminal -X101/4 as a digital input, both indices must be set to 0.	index1: 104 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P653* Src DigOut3 653	BICO parameter for selecting the binector whose value is to be output at terminal -X101/5 of the terminal strip for the basic unit. In order to use terminal -X101/5 as a digital input, both indices must be set to 0.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P654* Src DigOut4 654	BICO parameter for selecting the binector whose value is to be output at terminal -X101/6 of the terminal strip for the basic unit. In order to use terminal -X101/6 as a digital input, both indices must be set to 0.	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P655* EB1 Signal Type 655	Parameter for selection of the signal type for analog input 1 on EB1. 0 = +/- 10 V 1 = 0 ... 20 mA Index 1: AI1 of the first inserted EB1 Index 4: AI1 of the second inserted EB1 Index 2, 3, 5 and 6: no significance	index1: 0 Min: 0 Max: 1 Unit: - Indices: 6 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting
P656* EB1 AnaInNorm 656	Parameter for normalization of the analog inputs on EB1. Incoming signals are multiplied by the entered parameter value. Index 1 to 3: AI1 to AI3 of the first inserted EB1 Index 4 to 6: AI1 to AI3 of the second inserted EB1	index1: 1,00 Min: 0,00 Max: 100,00 Unit: - Indices: 6 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P657 EB1 AnaIn Offset 657	Parameter for entering the offset for the analog inputs on EB1. The offset is added to the already scaled analog input signal. Index 1 to 3: AI1 to AI3 of the first inserted EB1 Index 4 to 6: AI1 to AI3 of the second inserted EB1	index1: 0,00 Min: -100,00 Max: 100,00 Unit: - Indices: 6 Type: I2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P658* EB1 AnaIn Conf 658	Parameter for configuring the analog inputs on EB1. Selection is made here of the sign with which the read-in analog value has to be provided. 0 = Do not change sign 1 = Always pass on value with positive sign 2 = Invert sign 3 = Always pass on value with negative sign Index 1 to 3: AI1 to AI3 of the first inserted EB1 Index 4 to 6: AI1 to AI3 of the second inserted EB1 The sign can be changed again by the "Invert analog input" command (P659)	index1: 0 Min: 0 Max: 3 Unit: - Indices: 6 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting
P659* EB1SrcAnaIn inv. 659	Parameter for selecting the binector from which the command to invert the analog input signal on EB1 has to be read in. Index 1 to 3: AI1 to AI3 of the first inserted EB1 Index 4 to 6: AI1 to AI3 of the second inserted EB1	index1: 0 Unit: - Indices: 6 Type: L2 ,B	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting
P660* EB1 AnaInSmooth2 660	Parameter for entering the smoothing time constants for the analog inputs on EB1. Index 1 to 3: AI1 to AI3 of the first inserted EB1 Index 4 to 6: AI1 to AI3 of the second inserted EB1	index1: 0 Min: 0 Max: 1000 Unit: ms Indices: 6 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P661* EB1 SrcAnaInRel 661	Parameter for selecting the binectors from which the commands to enable the analog inputs on EB1 have to be read in. Without an enable, the setpoint provided by the analog input is at 0. Index 1 to 3: AI1 to AI3 of the first inserted EB1 Index 4 to 6: AI1 to AI3 of the second inserted EB1	index1: 1 Unit: - Indices: 6 Type: L2 ,B	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
r662 EB1 AnaInSetp 662	Visualization parameter for displaying the setpoints which ar provided by the analog inputs of EB1. Index 1 to 3: AI1 to AI3 of the first inserted EB1 Index 4 to 6: AI1 to AI3 of the second inserted EB1	Dec.Plc.: 2 Unit: % Indices: 6 Type: I2	Menus: - Parameter menu + Terminals - Upread/free access
P663* EB1 SrcAnaOut 663	Parameter for selecting the connectors whose values have t be output at the analog outputs on EB1. Index 1 and 2: AO1 and AO2 of the first inserted EB1 Index 3 and 4: AO1 and AO2 of the second inserted EB1	index1: 0 Unit: - Indices: 4 Type: L2 ,K	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P664* EB1 AnaOut Conf 664	Parameter for configuring the analog outputs on EB1. Selection of the sign is made here with which the value of th connector selected in P663 has to be output at the analog output. 0 = Do not change sign 1 = Always output value with positive sign 2 = Invert sign 3 = Always output value with negative sign Index 1 and 2: AO1 and AO2 of the first inserted EB1 Index 3 and 4: AO1 and AO2 of the second inserted EB1	index1: 0 Min: 0 Max: 3 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P665* EB1 AnaOutSmooth 665	Parameter for entering the smoothing time constants for the analog outputs on EB1. Index 1 and 2: AO1 and AO2 of the first inserted EB1 Index 3 and 4: AO1 and AO2 of the second inserted EB1	index1: 0 Min: 0 Max: 10000 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P666* EB1AnaOutNorm 666	Parameter for scaling the analog outputs on EB1. With the help of the entered parameter value, the analog output voltage to which an internal signal value of 100% (4000 H) should correspond is determined. Index 1 and 2: AO1 and AO2 of the first inserted EB1 Index 3 and 4: AO1 and AO2 of the second inserted EB1	index1: 10,00 Min: -200,00 Max: 200,00 Unit: V Indices: 4 Type: I2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P667 EB1 AnaOutOffset 667	Parameter for entering the offset for the analog outputs on EB1. The offset is added to the already scaled analog outpu signal. Index 1 and 2: AO1 and AO2 of the first inserted EB1 Index 3 and 4: AO1 and AO2 of the second inserted EB1	index1: 0,00 Min: -200,00 Max: 200,00 Unit: V Indices: 4 Type: I2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
r668 EB1 AnaOut Value 668	Visualization parameter for displaying the actual values which are connected to the analog outputs of EB1. Index 1 and 2: AO1 and AO2 of the first inserted EB1 Index 3 and 4: AO1 and AO2 of the second inserted EB1	Dec.Plc.: 2 Unit: % Indices: 4 Type: I2	Menus: - Parameter menu + Terminals - Upread/free access
P669* EB1 Src DigOut 669	Parameter for selecting the binectors whose values have to be output at terminal -X480/43 to 46 of EB1. The relevant index of the binector has to be set to 0 in order to use terminal -X480/43 to 48 as digital inputs. Index 1 to 4: DO1 to DO4 of the first inserted EB1 Index 5 to 8: DO1 to DO4 of the second inserted EB1	index1: 0 Unit: - Indices: 8 Type: L2 ,B	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
r670 EB1 TerminalDisp 670	Visualization parameter for displaying the signal level of the digital inputs and outputs of EB1. Index 1: First inserted EB1 Index 2: Second inserted EB1	Dec.Plc.: 0 Unit: - Indices: 2 Type: V2	Menus: - Parameter menu + Terminals - Upread/free access

Parameter	Description	Data	Read/write
r673 EB2 Termin Disp 673	Visualization parameter for displaying the signal level of the digital inputs and outputs of EB2 Index 1: First inserted EB2 Index 2: Second inserted EB2	Dec.Plc.: 0 Unit: - Indices: 2 Type: V2	Menus: - Parameter menu + Terminals - Upread/free access
P674* EB2 Src RelayOut 674	Parameter for selecting the binectors for activation of the relay outputs on EB2. Index 1 to 4: Relay outputs of the first inserted EB2 Index 5 to 8: Relay outputs of the second inserted EB2	index1: 0 Unit: - Indices: 8 Type: L2 ,B	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P675* EB2 Signal Type 675	Parameter for selecting the signal type for the analog input on EB2. 0 = +/- 10 V 1 = 0 ... 20 mA Index 1: First inserted EB2 Index 2: Second inserted EB2	index1: 0 Min: 0 Max: 1 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting
P676* EB2 AnaInNorm 676	Parameter for normalizing the analog input on EB2. Incomin signals are multiplied by the entered parameter value. Index 1: First inserted EB2 Index 2: Second inserted EB2	index1: 1,00 Min: 0,00 Max: 100,00 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P677 EB2 AnaInOffset 677	Parameter for entering the offset for the analog input on EB2 The offset is added to the already scaled analog input signal Index 1: First inserted EB2 Index 2: Second inserted EB2	index1: 0,00 Min: -100,00 Max: 100,00 Unit: - Indices: 2 Type: I2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting
P678* EB2 AnaInConf 678	Function parameter for configuring the analog input on EB2. Selection is made here of the sign with which the read-in analog value has to be provided. 0 = Do not change sign 1 = Always pass on value with positive sign 2 = Invert sign 3 = Always pass on value with negative sign Index 1: First inserted EB2 Index 2: Second inserted EB2 The sign can be changed again by the "Invert analog input" command (P681).	index1: 0 Min: 0 Max: 3 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting
P679* EB2 Src AnaInInv 679	Parameter for selecting the binector from which the command to invert the analog input signal on EB2 has to be read in. Index 1: First inserted EB2 Index 2: Second inserted EB2	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting
P680* EB2 AnaInSmooth2 680	Parameter for entering the smoothing time constant for the analog input on EB2. Index 1: First inserted EB2 Index 2: Second inserted EB2	index1: 0 Min: 0 Max: 1000 Unit: ms Indices: 2 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P681* EB2 Src AnaInRel 681	Parameter for selecting the binector from which the command to enable the analog input on EB2 has to be read in. Without an enable, the setpoint provided by the analog input is at 0. Index 1: First inserted EB2 Index 2: Second inserted EB2	index1: 1 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting
r682 EB2 AnaIn Setp 682	Visualization parameter for displaying the setpoint which is provided by the analog input of EB2. Index 1: First inserted EB2 Index 2: Second inserted EB2	Dec.Plc.: 2 Unit: % Indices: 2 Type: I2	Menus: - Parameter menu + Terminals - Upread/free access
P683* EB2 Src AnaOut 683	Parameter for selecting the connector whose value has to be output at the analog output on EB2. Index 1: First inserted EB2 Index 2: Second inserted EB2	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P684* EB2 AnaOutConf 684	Parameter for configuring the analog output on EB2. The sign with which the value of the connector selected in P683 has to be output at the analog output is selected here. 0 = Do not change sign 1 = Always output value with positive sign 2 = Invert sign 3 = Always output value with negative sign Index 1: First inserted EB2 Index 2: Second inserted EB2	index1: 0 Min: 0 Max: 3 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P685* EB2AnaOutSmooth 685	Parameter for entering the smoothing time constant for the analog output on EB2. Index 1: First inserted EB2 Index 2: Second inserted EB2	index1: 0 Min: 0 Max: 10000 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P686* EB2 AnaOutNorm 686	Parameter for scaling the analog output on EB2. With the help of the entered parameter value, it is determined which analog output voltage an internal signal value of 100% (4000 H) should correspond to. Index 1: First inserted EB2 Index 2: Second inserted EB2	index1: 10,00 Min: -200,00 Max: 200,00 Unit: V Indices: 2 Type: I2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
P687 EB2 AnaOutOffset 687	Parameter for entering the offset for the analog output on EB2. The offset is added to the already scaled analog outpu signal. Index 1: First inserted EB2 Index 2: Second inserted EB2	index1: 0,00 Min: -200,00 Max: 200,00 Unit: V Indices: 2 Type: I2	Menus: - Parameter menu + Terminals - Upread/free access Changeable in: - Drive setting - Ready
r688 EB2 AnaOut Value 688	Visualization parameter for displaying the actual value which is connected to the analog output of EB2. Index 1: First inserted EB2 Index 2: Second inserted EB2	Dec.Plc.: 2 Unit: % Indices: 2 Type: I2	Menus: - Parameter menu + Terminals - Upread/free access

Parameter	Description	Data	Read/write
P690* SCI AnaIn Conf 690 not Compact PLUS	Configuration of the analog inputs of the SCI1 boards. It determines the type of input signals. Parameter values — Terminals X428/3, 6, 9 — Terminals X428/5, 8, 11 0: - 10 V ... + 10 V — - 20 mA ... + 20 mA 1: 0 V ... + 10 V — 0 mA ... + 20 mA 2: — 4 mA ... + 20 mA Notes: - Only one signal can be processed per input. Voltage or current signals can be evaluated alternatively. - Voltage and current signals must be connected at differen terminals. - The settings 1and 2 only permit unipolar signals, i.e. the internal process variables are also unipolar. - With setting 2 an input current< 2 mA results in a fault trip (wire-break monitoring). - The offset compensation of the analog inputs is carried out via parameter P692. Indices: i001: Slave 1, analog input 1 i002: Slave 1, analog input 2 i003: Slave 1, analog input 3 i004: Slave 2, analog input 1 i005: Slave 2, analog input 2 i006: Slave 2, analog input 3	index1: 0 Min: 0 Max: 2 Unit: - Indices: 6 Type: O2	Menus: - Parameter menu + Communication + SCB/SCI - Upread/free access Changeable in: - Drive setting - Ready
P691* SCI AnaInSmooth 691 not Compact PLUS	Smoothing time constant of the analog inputs of the SCI boards Formula: T=2 ms*2 power P691 Indices: see P690	index1: 2 Min: 0 Max: 14 Unit: - Indices: 6 Type: O2	Menus: - Parameter menu + Communication + SCB/SCI - Upread/free access Changeable in: - Drive setting - Ready
P692* SCI AnaIn Offset 692 not Compact PLUS	Zero balancing of the analog inputs of the SCI boards For setting notes see operating instructions for SCI Indices: see P690	index1: 0,00 Min: -20,00 Max: 20,00 Unit: V Indices: 6 Type: I2	Menus: - Parameter menu + Communication + SCB/SCI - Upread/free access Changeable in: - Drive setting - Ready
P693* SCI AnaOut ActV 693 not Compact PLUS	Actual-value output via analog outputs of the SCI boards Setting notes: Input of the parameter number of the variable whose value is to be output; for details see operating instructions for SCI Indices: i001: Slave 1, analog output 1 i002: Slave 1, analog output 2 i003: Slave 1, analog output 3 i004: Slave 2, analog output 1 i005: Slave 2, analog output 2 i006: Slave 2, analog output 3	index1: 0 Unit: - Indices: 6 Type: L2 ,K	Menus: - Parameter menu + Communication + SCB/SCI - Upread/free access Changeable in: - Drive setting - Ready
P694* SCI AnaOut Gain 694 not Compact PLUS	Gain for the analog outputs via the SCI slaves Setting instruction: see operating instructions for SCI For indices: see P690	index1: 10,00 Min: -320,00 Max: 320,00 Unit: V Indices: 6 Type: I2	Menus: - Parameter menu + Communication + SCB/SCI - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P695* SCI AnaOutOffset 695 not Compact PLUS	Offset of the analog outputs of the SCI boards Setting instruction: see operating instructions for SCI Indices: see P690	index1: 0,00 Min: -100,00 Max: 100,00 Unit: V Indices: 6 Type: I2	Menus: - Parameter menu + Communication + SCB/SCI - Upread/free access Changeable in: - Drive setting - Ready
P696* SCB Protocol 696 not Compact PLUS	SCB board can be operated as - master for the SCI boards or as - communications board (see SCB operating instructions). Parameter values: 0 = master for SCI boards 1 = 4-wire USS 2 = 2-wire USS 3 = Peer-to-Peer 4 = not connected 5 = not connected Please keep in mind that every change of parameter value leads to a new initialization of the SCB and the CUMC or CUVC. Therefore this parameter cannot be kept in a download file, since initialization has the effect that the parameters loaded on the converter are not accepted. In the case of a factory setting via SCB2, this parameter is not reset.	Init: 0 Min: 0 Max: 5 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Communication + SCB/SCI - Board configuration - Upread/free access Changeable in: - Board configuration

Parameter	Description	Data	Read/write
r697 SCB Diagnosis 697 not Compact PLUS	Diagnostic information SCB All values in hexadecimal display. Displayed numbers have an overflow at FF. The meaning of individual indices depends on the selected SCB protocol (P682) Indices: i001: Number of error-free telegrams i002: Number of error-free telegrams i003: USS: Number of Byte Frame errors SCI module: Number of voltage drops of the slaves i004: USS: Number of overrun errors SCI module: Number of fiber optic link interrupts 005: USS: Parity error SCI module: Number of missing answer telegrams i006: USS: STX-error SCI module: Number of search telegrams to accept a slave i007: ETX-error i008: USS: Block check-error SC module: Number of configuration telegrams i009: USS/Peer to Peer: incorrect telegram length SCI modules: required maximum number of terminals according to process data wiring (P 554 to P631) i010: USS: Timeout SCI modules: highest maximum number of analog inputs/outputs as per process data wiring of the setpoint channel and actual-value output via SCI (P664) . i011: Reserve i012: Reserve i013: SCB-DPR alarm word i014: Information whether slave No. 1 is needed and if yes, which type 0: no slave neededt 1: SCI1 2: SCI2 i015: Information if slave No. 2 is needed and if yes, which type 0: no slave needed 1: SCI1 2: SCI2 i016: SCI modules: initialization error i017: SCB generation of year i018: SCB generation of day and month i019: SCI Slave1 SW version i020: SCI Slave1 generation of year i021: SCI Slave1 generation of day and month i022: SCI Slave2 SW version i023: SCI Slave2 generation of year i024: SCI Slave2 generation of day and month	Dec.Plc.: 0 Unit: - Indices: 24 Type: L2	Menus: - Parameter menu + Communication + SCB/SCI - Upread/free access

Parameter	Description	Data	Read/write
P698* Src SCI DigOut 698 not Compact PLUS	BICO parameter for selecting the binectors which are to be displayed via the digital outputs of the SCI boards. Meaning of the indices: i001: Select binector for SCI slave1 binary output1 i002: Select binector for SCI slave1 binary output2 i003: Select binector for SCI slave1 binary output3 i004: Select binector for SCI slave1 binary output4 i005: Select binector for SCI slave1 binary output5 i006: Select binector for SCI slave1 binector output6 i007: Select binector for SCI slave1 binary output7 i008: Select binector for SCI slave1 binary output 8 i009: Select binector for SCI slave1 binary output9 i0010: Select binector for SCI slave1 binary output10 i0011: Select binector for SCI slave1 binary output11 i0012: Select binector for SCI slave1 binary output12 i0013: Select binector for SCI slave2 binary output1 i0014: Select binector for SCI slave2 binary output2 i0015: Select binector for SCI slave2 binary output3 i0016: Select binector for SCI slave2 binary output4 i0017: Select binector for SCI slave2 binary output5 i0018: Select binector for SCI slave 2 binary output6 i0019: Select binector for SCI slave2 binary output7 i0020: Select binector for SCI slave2 binary outpu 8 i0021: Select binector for SC slave2 binary output9 i0022: Select binector for SCI slave2 binary output10 i0023: Select binector for SCI slave2 binary output11 i0024: Select binector for SCI slave2 binary output12	index1: 0 Unit: - Indices: 24 Type: L2 ,B	Menus: - Parameter menu + Communication + SCB/SCI - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
r699 SCB/SCI Values 699 not Compact PLUS	Display parameter process data SCB All values in hexadecimal display The meaning of the individual indices depends on the selected SCB protocol (P696) Meaning for USS protocol and peer-to-peer: i001: Process data transmit word1 i002: Process data transmit word2 i003: Process data transmit word3 i004: Process data transmit word4 i005: Process data transmit word5 i006: Process data transmit word6 i007: Process data transmit word7 i008: Process data transmit word8 i009: Process data transmit word9 i0010: Process data transmit word10 i0011: Process data transmit word11 i0012: Process data transmit word12 i0013: Process data transmit word13 i0014: Process data transmit word14 i0015: Process data transmit word15 i0016: Process data transmit word16 i0017: Process data receive word1 i0018: Process data receive wordt2 i0019: Process data receive wordt3 i0020: Process data receive word4 i0021: Process data receive word5 i0022: Process data receive word6 i0023: Process data receive word7 i0024: Process data receive word8 i0025: Process data receive word9 i0026: Process data receive word10 i0027: Process data receive word11 i0028: Process data receive word12 i0029: Process data receive word13 i0030: Process data receive word14 i0031: Process data receive word15 i0032: Process data receive word16 Meaning for SCI modules: i001: SCI Slave1 digital inputs i002: SCI Slave1 analog input1 i003: SCI Slave1 analog input2 i004: SCI Slave1 analog input3 i005: SCI Slave2 digital outputs i006: SCI Slave2 analog input1 i007: SCI Slave2 analog input2 i008: SCI Slave2 analog input3 i009: SCI Slave1 digital outputs i0010: SCI Slave1 analog output1 i0011: SCI Slave1 analog output2 i0012: SCI Slave1 analog output3 i0013: SCI Slave2 digital outputs i0014: SCI Slave2 analog output1 i0015: SCI Slave2 analog output2 i0016: SCI Slave2 analog output3	Dec.Plc.: 0 Unit: - Indices: 32 Type: L2	Menus: - Parameter menu + Communication + SCB/SCI - Upread/free access
P700* SCom BusAddr 700	Bus address of the serial interfaces (see section "Serial interfaces" in operating instructions, Part 2) Indices: i001 = SCom1: bus address of the ser. interface 1(CU) i002 = SCom2: bus address of the ser. interface 2 (CU), i003 = SCB: bus address of the SCB, if P696 = 1, 2 In the case of a factory setting via SCom1, SCom2 or SCB2 this parameter is not reset.	index1: 0 Min: 0 Max: 31 Unit: - Indices: 3 Type: O2	Menus: - Parameter menu + Communication + SCom1/SCom2 + SCB/SCI - Quick parameterization - Drive setting - Upread/free access Changeable in: - Drive setting - Drive setting - Ready

Parameter	Description	Data	Read/write
P701* SCom Baud 701	Function parameter for entering the baud rates for the serial interfaces with USS protocol Index 1: serial interface 1 (Scom/SCom1) Index 2: serial interface 2 (SCom2) Index 3: SCB 1 = 300 Baud 2 = 600 Baud 3 = 1200 Baud 4 = 2400 Baud 5 = 4800 Baud 6 = 9600 Baud 7 = 19200 Baud 8 = 38400 Baud 9 = 57600 Baud only SCB 1/2 10 = 76800 Baud only SCB 1/2 11 = 93750 Baud only SCB 1/2 12 = 115200 Baud only SCB 1/2 13 = 187500 Baud only SCB 2 The settings in indices 2 and 3 have no significance for units of the Compact PLUS type. In the case of a factory setting via SCom1, SCom2 or SCB2 this parameter is not reset.	index1: 6 Min: 0 Max: 13 Unit: - Indices: 3 Type: O2	Menus: - Parameter menu + Communication + SCom1/SCom2 + SCB/SCI - Drive setting - Upread/free access Changeable in: - Drive setting - Drive setting - Ready
P702* SCom PKW # 702	Function parameter for entering the number of PKWs for the serial interfaces with USS protocol. The number of PKWs defines the number of words in the telegram which are to be used for transmitting parameter values. Index 1: Serial interface 1 (SCom(/SCom1) Index 2: Serial interface 2 (SCom2) Index 3: SCB 0 = No transmission of parameters 3 = 3 words for PKE, index and PWE 4 = 4 words for PKE, index, PWE1 and PWE2 127 = Variable length for transmitting parameter descriptions, texts and values of indicated parameters with one request. The settings in indices 2 and 3 have no significance for Compact PLUS units. In the case of a factory setting via SCom1, SCom2 or SCB2 this parameter is not reset.	index1: 127 Min: 0 Max: 127 Unit: - Indices: 3 Type: O2	Menus: - Parameter menu + Communication + SCom1/SCom2 + SCB/SCI - Upread/free access Changeable in: - Drive setting - Ready
P703* SCom PcD # 703	Function parameter for entering the number of PcDs for the serial interfaces with USS protocol. The number of PcDs defines the number of words in the telegram which are to be used for transmitting control words and setpoints or status words and actual values. Index 1: Serial interface 1 (SCom(/SCom1) Index 2: Serial interface 2 (SCom2) Index 3: SCB The settings in indices 2 and 3 have no significance for Compact PLUS units. In the case of a factory setting via SCom1, SCom2 or SCB2 this parameter is not reset.	index1: 2 Min: 0 Max: 16 Unit: - Indices: 3 Type: O2	Menus: - Parameter menu + Communication + SCom1/SCom2 + SCB/SCI - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P704* SCom TlgOFF 704	Function parameter for entering the telegram failure time for the serial interfaces with USS protocol.The telegram failure time defines the time within which a valid telegram has to be received. If no valid telegram is received within the specified time, the unit trips a fault. With the help of P781, tripping of the fault can be delayed and the drive shut down if necessary. If a parameter value of 0 is entered, there is no monitoring. This setting is to be selected for non-cyclical telegram transmission (e.g. for OP1S). Index 1: Serial interface 1 (SCom(/SCom1) Index 2: Serial interface 2 (SCom2) Index 3: SCB The settings in indices 2 and 3 have no significance for Compact PLUS units. In the case of a factory setting via SCom1, SCom2 or SCB2 this parameter is not reset.	index1: 0 Min: 0 Max: 6500 Unit: ms Indices: 3 Type: O2	Menus: - Parameter menu + Communication + SCom1/SCom2 + SCB/SCI - Upread/free access Changeable in: - Drive setting - Ready
P705* SCB Peer2PeerExt 705 not Compact PLUS	Direct transfer of peer-to-peer receive data of the SCB Identification of the words of the received peer-to-peer telegram which are to be transferred directly. Parameter values: 0: no direct transfer (only to CU) 1: direct transfer (and transfer to CU) Indices: i001 = Word1 in PZD part of the telegram i002 = Word2 in PZ part of the telegram ... i005 = Word5 in PZD part of the telegram. Precondition: P696 = 3 (Peer-to-Peer protocol)	index1: 0 Min: 0 Max: 1 Unit: - Indices: 5 Type: O2	Menus: - Parameter menu + Communication + SCB/SCI - Upread/free access Changeable in: - Drive setting - Ready
P706* Src SCB TrnsData 706 not Compact PLUS	BICO parameter for selecting the connectors which are to be transmitted from the serial interface on the SCB. In addition to the connectors themselves, their place in the transmit telegram will also be defined. Index 1: Word 1 in PZD part of the telegram Index 2: Word 2 in PZD part of the telegram ... Index 16: Word 16 in PZD part of the telegram The word 1 should be assigned with the status word 1 (K0032). With double-word connectors, the relevant connector numbe must be entered at 2 consecutive indices, as otherwise only the higher-value word will be transferred. The number of the words transferred in the PZD part of the telegram is set in P703, Index i003. IMPORTANT: With P696 = 3 (Peer-to- peer protocol) a maximum of 5 words can be transferred (i001 to i005).	index1: 0 Unit: - Indices: 16 Type: L2 ,K	Menus: - Parameter menu + Communication + SCB/SCI - Upread/free access Changeable in: - Drive setting - Ready
P707* SrcSCom1TrnsData 707	BICO parameter for selecting the connectors which are to be transmitted by serial interface 1 (SCom1). In addition to the connectors themselves, their place in the telegram is also defined. Index 1: Word 1 in the PZD part of the telegram Index 2: Word 2 in the PZD part of the telegram ... Index 16: Word 16 in the PZD part of the telegram Word 1 should be assigned status word 1 (K0032). With double-word connectors, the associated connector number must be entered in 2 successive indices because, otherwise only the higher-value word is transmitted. The number of words transmitted in the PZD part of the telegram is set in P703, Index i001.	index1: 32 Unit: - Indices: 16 Type: L2 ,K	Menus: - Parameter menu + Communication + SCom1/SCom2 - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P708* SrcSCom2TrnsData 708 not Compact PLUS	BICO parameter for selecting the connectors which are to be sent from the serial interface 2 (SCom2). Not only the connectors themselves but also their place in the transmit telegram are defined. Index 1: Word 1 in PZD part of telegram Index 2: Word 2 in PZD part of telegram ... Index 16: Word 16 in PZD part of telegram Word 1 should be assigned with status word 1 (K0032) . In the case of double word connectors, the relevant connector number must be entered at 2 consecutive indices otherwise only the higher-value word will be transferred. The number of the words transferred in the PZD part of the telegram is set in P703, Index i002.	index1: 0 Unit: - Indices: 16 Type: L2 ,K	Menus: - Parameter menu + Communication + SCom1/SCom2 - Upread/free access Changeable in: - Drive setting - Ready
P708* SrcSCom2TrnsData 708 Compact PLUS only	BICO parameter for selecting the connectors which are to be sent from the serial interface 2 (SCom2). Not only the connectors themselves but also their place in the transmit telegram are defined. Index 1: Word 1 in PZD part of telegram Index 2: Word 2 in PZD part of telegram ... Index 16: Word 16 in PZD part of telegram Word 1 should be assigned with status word 1 (K0032) . In the case of double word connectors, the relevant connector number must be entered at 2 consecutive indices otherwise only the higher-value word will be transferred. The number of the words transferred in the PZD part of the telegram is set in P703, Index i002.	index1: 32 Unit: - Indices: 16 Type: L2 ,K	Menus: - Parameter menu + Communication + SCom1/SCom2 - Upread/free access Changeable in: - Drive setting - Ready
r709 SCom1/2 RecvData 709	Display of the process data received via the interface SCom or SCom2. Index 1 - 16 : SCom1 process data Index 17 - 32: SCom2 process data	Dec.Plc.: 0 Unit: - Indices: 32 Type: L2	Menus: - Parameter menu + Communication + SCom1/SCom2 - Upread/free access
r710 SCom1/2 TrnsData 710	Display of the process data transmitted via the interface SCom1 or SCom2. Index 1 - 16 : SCom1 process data Index 17 - 32: SCom2 process data	Dec.Plc.: 0 Unit: - Indices: 32 Type: L2	Menus: - Parameter menu + Communication + SCom1/SCom2 - Upread/free access
P711* CB Parameter 1 711	Function parameter for entering the CB-specific parameter. The parameter is only relevant if there is a communication board (CBx). Its significance depends on the type of Cbx built in. If a set parameter value is outside the value range accepted by the built-in Cbx, the unit trips a fault. Index 1: 1st CB Index 2: 2nd CB In the case of a factory setting via 1st CB or 2nd CB, this parameter is not reset.	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Communication + Field bus interfaces - Board configuration - Drive setting - Upread/free access Changeable in: - Board configuration - Drive setting
P712* CB Parameter 2 712	See P711 for description	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Communication + Field bus interfaces - Board configuration - Drive setting - Upread/free access Changeable in: - Board configuration - Drive setting

Parameter	Description	Data	Read/write
P713* CB Parameter 3 713	See P711 for description	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Communication + Field bus interfaces - Board configuration - Drive setting - Upread/free access Changeable in: - Board configuration - Drive setting
P714* CB Parameter 4 714	See P711 for description	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Communication + Field bus interfaces - Board configuration - Drive setting - Upread/free access Changeable in: - Board configuration - Drive setting
P715* CB Parameter 5 715	See P711 for description	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Communication + Field bus interfaces - Board configuration - Drive setting - Upread/free access Changeable in: - Board configuration - Drive setting
P716* CB Parameter 6 716	See P711 for description	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Communication + Field bus interfaces - Board configuration - Drive setting - Upread/free access Changeable in: - Board configuration - Drive setting
P717* CB Parameter 7 717	See P711 for description	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Communication + Field bus interfaces - Board configuration - Drive setting - Upread/free access Changeable in: - Board configuration - Drive setting
P718* CB Parameter 8 718	See P711 for description	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Communication + Field bus interfaces - Board configuration - Drive setting - Upread/free access Changeable in: - Board configuration - Drive setting

Parameter	Description	Data	Read/write
P719* CB Parameter 9 719	See P711 for description	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Communication + Field bus interfaces - Board configuration - Drive setting - Upread/free access Changeable in: - Board configuration - Drive setting
P720* CB Parameter 10 720	See P711 for description	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Communication + Field bus interfaces - Board configuration - Drive setting - Upread/free access Changeable in: - Board configuration - Drive setting
P721* CB Parameter 11 721	Function parameter for entering the 11th CB-specific parameter. The parameter is only relevant if there is a communication board (CBx). Its meaning depends on the type of Cbx built in. If a set parameter value is outside the value range accepted by the built-in Cbx, the unit trips a faul Index 1-5: 1st CB Index 6-10: 2nd CB In the case of a factory setting via 1st CB or 2nd CB, this parameter is not reset.	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 10 Type: O2	Menus: - Parameter menu + Communication + Field bus interfaces - Board configuration - Drive setting - Upread/free access Changeable in: - Board configuration - Drive setting
P722* CB/TB TlgOFF 722	Function parameter for entering the telegram failure time for a built-in communication board (CBx) or technology board (TB). The telegram failure time defines the time within which a valid telegram has to be received. If no valid telegram is recieved the unit trips a fault. With the help of P781, fault tripping can be delayed and the drive shut down if necessary If a parameter value of 0 is entered, there is no monitoring. In the case of a factory setting via 1st CB or 2nd CB, this parameter is not reset.	index1: 10 Min: 0 Max: 6500 Unit: ms Indices: 2 Type: O2	Menus: - Parameter menu + Communication + Field bus interfaces - Upread/free access Changeable in: - Drive setting - Ready
P724* Select CB synch 724	Selection of the CB board (1st or 2nd) which is synchonized to reading basic unit setpoints (only one board can be synchronized in this way). 0 = 1st CB 1 = 2nd CB Important: Modifcation is required for special applications only (customer-specific CBC)	Init: Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting
r732 CB Diagnosis 732	Visualization parameter for displaying diagnostic information for a built-in communication board (CBx) or technology boar (TB). The meaning of the displayed values is specific to each particular board.	Dec.Plc.: 0 Unit: - Indices: 64 Type: L2	Menus: - Parameter menu + Communication + Field bus interfaces - Upread/free access
r733 CB/TB RecvData 733	Visualization parameter for displaying control words and setpoints (process data) which are received by a communication board (CBx) or a technology board (TB) and passed on to the basic unit.	Dec.Plc.: 0 Unit: - Indices: 32 Type: L2	Menus: - Parameter menu + Communication + Field bus interfaces - Upread/free access

Parameter	Description	Data	Read/write
P734* SrcCB/TBTrnsData 734	BICO parameter for selecting connectors which are to be transmitted by a communication board (CBx) or a technology board (TB). In addition to the connectors themselves, their place in the transmitted telegram is also defined. Index 1: Word 1 in the PZD part of the telegram Index 2: Word 2 in the PZD part of the telegram ... Index 16: Word 16 in the PZD part of the telegram Word 1 should be assigned status word 1 (K0032). For double-word connectors, the associated connector number must be entered in two successive indices because, otherwise, only the higher-value word is transmitted.	index1: 32 Unit: - Indices: 16 Type: L2 ,K	Menus: - Parameter menu + Communication + Field bus interfaces - Upread/free access Changeable in: - Drive setting - Ready
r735 CB/TB TrnsData 735	Display of the process data sent to the TB or the CB in hexadecimal form Index 1 .. 16 : Transmit data for TB/CB Index 17 .. 32: Transmit data for 2nd CB	Dec.Plc.: 0 Unit: - Indices: 32 Type: L2	Menus: - Parameter menu + Communication + Field bus interfaces - Upread/free access
P736* Src CB2 TrnsData 736	BICO parameter for selecting the connectors which are to be transmitted by the 2nd communication board (2nd CBX). Both the connectors themselves and their position in the transmit telegram are defined. Index 1: Word 1 in PcD part of telegram Index 2: Word 2 in PcD part of telegram ... Index 16: Word 16 in PcD part of telegram Word 1 should be assigned with status word 1 (K0032). In the case of double word connectors the relevant connecto number must be entered at 2 consecutive indices, otherwise only the higher-value word is transferred.	index1: 32 Unit: - Indices: 16 Type: L2 ,K	Menus: - Parameter menu + Communication + Field bus interfaces - Upread/free access Changeable in: - Drive setting - Ready
r738 PKW Order 738	Visualization parameter for displaying the parameter task (PKW) which is received by a communication board (CBx) o a technology board (TB) and passed on to the basic unit. Index 1: Task code and parameter number Index 2: Parameter index Index 3: 1st parameter value Index 4: 2nd parameter value Index 1 to 4: SCom1 Index 5 to 8: 1st CB Index 9 to 12: SCB Index 13 to 16: SCom2 Index 17 to 20: 2nd CB All values are shown as hexadecimals.	Dec.Plc.: 0 Unit: - Indices: 20 Type: L2	Menus: - Parameter menu + Communication + SCom1/SCom2 + Field bus interfaces + SCB/SCI - Upread/free access
r739 PKW Reply 739	Visualization parameter for displaying the parameter reply (PKW) which is passed on from the basic unit to a communication board (CBx) or a technology board (TB) and from there, is transmitted to the communication partner. Index 1: Task number and parameter number Index 2: Parameter index Index 3: 1st parameter value Index 4: 2nd parameter value Index 1 to 4: SCom1 Index 5 to 8: 1st CB Index 9 to 12: SCB Index 13 to 16: SCom2 Index 17 to 20: 2nd CB All values are shown as hexadecimals.	Dec.Plc.: 0 Unit: - Indices: 20 Type: L2	Menus: - Parameter menu + Communication + SCom1/SCom2 + Field bus interfaces + SCB/SCI - Upread/free access

Parameter	Description	Data	Read/write
P740* SLB NodeAddr 740	Function parameter for entering the node address for a built-in SIMOLINK board (SLB). The node address defines the telegrams to which the relevant unit is allowed writing access. Reading access is set in P749. The node address also defines whether a node also acts as the dispatcher. 0 = Dispatcher (generates telegram circulation) Not equal to 0 = Transceiver In the SIMOLINK ring, only one node is allowed to perform the dispatcher function. It is not permitted to allocate node address 0 if a higher-level automation unit (automation master) performs the dispatcher function.	index1: 1 Min: 0 Max: 200 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + SIMOLINK - Quick parameterization - Board configuration - Upread/free access Changeable in: - Board configuration - Drive setting
P741* SLB TlgOFF 741	Function parameter for entering the telegram failure time for a built-in SIMOLINK board (SLB). The telegram failure time defines the time within which a valid synchronizing telegram must be received. If no valid synchronizing telegram is received within the specified time, the unit trips a fault. With the help of P781, tripping of the fault can be delayed and the drive can be shut down if necessary.	Init: 0 Min: 0 Max: 6500 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + SIMOLINK - Board configuration - Upread/free access Changeable in: - Board configuration - Drive setting
P742* SLB Trns Power 742	Function parameter for setting the transmission power for a built-in SIMOLINK board (SLB). Operation with reduced transmission power increases the life of the transmitter and receiver components. 1 = 0 m to 15 m cable length 2 = 15 m to 25 m cable length 3 = 25 m to 40 m cable length	Init: 3 Min: 1 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu + SIMOLINK - Board configuration - Upread/free access Changeable in: - Board configuration - Drive setting
P743 SLB # Nodes 743	Function parameter for entering the number of nodes in the SIMOLINK ring. The entered value enables a built-in SIMOLINK board (SLB) to determine its position in the ring and to compensate for the bus transfer time. The total of all nodes (e.g. SLBs etc.) in the SIMOLINK ring is to be entered	index1: 0 Min: 0 Max: 255 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + SIMOLINK - Board configuration - Upread/free access Changeable in: - Board configuration - Drive setting
P744* Src SYNC Sel 744	no function	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + SIMOLINK - Upread/free access Changeable in: - Drive setting
P745* SLB Channel # 745	Function parameter for entering the channels which the dispatcher is to provide to each transceiver. The number of channels together with P746 determines the number of nodes which can be addressed. This parameter is only relevant for the dispatcher (P740=0).	index1: 2 Min: 1 Max: 8 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + SIMOLINK - Board configuration - Upread/free access Changeable in: - Board configuration - Drive setting
P746* SLB Cycle Time 746	Function parameter for entering the cycle time for SIMOLINK. The cycle time is the time which is needed for complete circulation of all telegrams in the SIMOLINK ring. I also determines the time reference in which the transceivers receive synchronizing telegrams. For synchronization of the transceivers to take place, the cycle time must amount to several times that of time slot T2 of the transceivers. The length of time slot T2 (T2 = 4/P340) is defined by the pulse frequency (P340). Together with P745, the time cycle determines the number o addressable nodes. The parameter is only relevant for the dispatcher (P740=0).	index1: 3,20 Min: 0,20 Max: 6,50 Unit: ms Indices: 2 Type: O2	Menus: - Parameter menu + SIMOLINK - Board configuration - Upread/free access Changeable in: - Board configuration - Drive setting

Parameter	Description	Data	Read/write
P747* SrcSLBAppl.Flags 747	BICO parameter for selecting the binectors which are to be sent as application flags by the SIMOLINK board (SLB). In addition to the binectors themselves, their place in the application part of the trasnsmitted telegram is defined. Index 1: 1st binector Index 2: 2nd binector Index 3: 3rd binector Index 4: 4th binector	index1: 0 Unit: - Indices: 4 Type: L2 ,B	Menus: - Parameter menu + SIMOLINK - Upread/free access Changeable in: - Drive setting
r748 SLB Diagnosis 748	Visualization parameter for displaying the diagnostic information for a built-in SIMOLINK board (SLB). Index 1: Number of error-free synchronizing telegrams Index 2: Number of CRC errors Index 3: Number of time-out errors Index 4: Last address actuated Index 5: Address of the node which transmits the special telegram, "Time out". Index 6: Active SYNC interrupt delay 1 = 273 ns Index 7: Position of the node in the ring Index 8: Number of nodes in the ring Index 9: Synchronism deviation (65535 synchronization not active) should fluctuate between 65515 and 20 Index 10: Corrected pulse period in units of 100 ns (65535 synchronization not active) Index 11: T0 counter (0 with active synchronization) Index 12: internal Index 13: internal Index 14: Time counter (0 with active synchronization) Index 15: implemented bus cycle time Index 16: internal Index 17: internal In function diagram 140.7	Dec.Plc.: 0 Unit: - Indices: 17 Type: O2	Menus: - Parameter menu + SIMOLINK - Upread/free access
P749* SLB Read Addr 749	Function parameter for entering the node addresses and channels from which a built-in SIMOLINK board (SLB) is to read out data. The places before the comma in the input value define the node address and the places after the comma define the channel. Example: 2.0 = node address 2, Channel 0 Writing access is set in P740.	index1: 0,0 Min: 0,0 Max: 200,7 Unit: - Indices: 8 Type: O2	Menus: - Parameter menu + SIMOLINK - Board configuration - Upread/free access Changeable in: - Board configuration - Drive setting
r750 SLB Rcv Data 750	Visualization parameter for the data received via SIMOLINK	Dec.Plc.: 0 Unit: - Indices: 16 Type: L2	Menus: - Parameter menu + SIMOLINK - Upread/free access
P751* SrcSLBTrnsData 751	BICO parameter for selecting the connectors which are to be transmitted by a SIMOLINK board (SLB). In addition to the connectors themselves, their place in the transmitted telegram is also defined. Index 1: Channel 1, low-word Index 2: Channel 1, high-word Index 3: Channel 2, low-word Index 4: Channel 2, high-word ... Index 15: Channel 8, low-word Index 16: Channel 8, high-word For double-word connectors, the relevant connector number must be entered in 2 successive indices because, otherwise only the higher-value word is transmitted.	index1: 0 Unit: - Indices: 16 Type: L2 ,K	Menus: - Parameter menu + SIMOLINK - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
r752 SLB TrnsData 752	Process data transmitted via SIMOLINK in hexadecimal display	Dec.Plc.: 0 Unit: - Indices: 16 Type: L2	Menus: - Parameter menu + SIMOLINK - Upread/free access
P755* SIMOLINK Conf 755	Function parameter for configuring various properties of SIMOLINK transfer. xxx0 No deadtime compensation xxx1: Compensation of the different deadtimes between transceiver-transceiver and transceiver-dispatcher-transceiver. xx0x: Switchover between 2 SLBs in operation disabled xx1x: Switchover between 2 SLBs in operation enabled x0xx: Bus cycle time is internally corrected to whole telegram number x1xx: Bus cycle time is implemented precisely	Init: 0 Unit: - Indices: - Type: L2	Menus: - Parameter menu + SIMOLINK - Upread/free access Changeable in: - Board configuration - Drive setting
P756* SrSLB_Specialdat 756	BICO parameter for selecting the parameters that are to be sent from a SIMOLINK board (SLB) as special data. Special data can be sent from an SLB master or dispatcher only. Index 1: Special telegram 1, low-word Index 2: Special telegram 1, high-word Index 3: Special telegram 2, low-word ... Index 7: Special telegram 4, low-word Index 8: Special telegram 4, high-word In the case of double word connectors the relevant connecto number must be entered at 2 successive indices as otherwise only the higher-value word will be transmitted.	index1: 0 Unit: - Indices: 8 Type: L2 ,K	Menus: - Parameter menu + SIMOLINK - Upread/free access Changeable in: - Drive setting - Ready
P760 T(friction) cons 760	Function parameter for the constant proportion of the friction torque. Note: The parameter value refers to the reference torque (P354) and is internally limited to 10% of the rated motor torque. Precondition: P100 = 3, 4, 5 (vector control) In function diagram: 370.7, 371.7, 375.7	index1: 0,000 Min: 0,000 Max: 10,000 Unit: % Indices: 4 Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P761 T(frict) prop.n. 761	Function parameter for the amount of friction torque proportional to speed. Note: The parameter value refers to the reference torque (P354) and is internally limited to 10% of the rated motor torque. Th parameter value is implemented at reference speed. Precondition: P100 = 3, 4, 5 (vector control) In function diagram: 370.7, 371.7, 375.7	index1: 0,000 Min: 0,000 Max: 10,000 Unit: % Indices: 4 Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P762 T(frict) prop.n2 762	Function parameter for the amount of friction torque in proportion with the squared speed. Note: The parameter value refers to the reference torque (P354) and is internally limited to 10% of the rated motor torque. Th parameter value is implemented at reference speed. Precondition: P100 = 3, 4, 5 (vector control) In function diagram: 370.7, 371.7, 375.7	index1: 0,000 Min: 0,000 Max: 10,000 Unit: % Indices: 4 Type: I2	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting - Ready
P763* SrcT(frict,char) 763	BICO parameter for selecting the connector from which the torque value of a friction characteristic is to be read in (see P2190...2198). Note: The parameter value refers to the reference torque (P354). Positive values are always processed (internal absolute-valu generation). The total of all friction torques (see P760...P763 is limited to 100% of the rated motor torque. If the speed is reversed, the total friction torque is also negated. Precondition: P100 = 4,5 (n/T control) In function diagram: P370.6, P371.6, P375.6	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu + Control/gating unit + Speed control - Upread/free access Changeable in: - Drive setting
P781* Fault Delay 781	Function parameter for setting a delay time for various faults Special case: Value 101.0 means that the fault is never triggered. Index 1: Ext. fault 1 Index 2: Ext. fault 2 Index 4: Index 5: Index 6: Index 7: Index 8: Index 9: Index 10: Index 11: SCom1 telegram failure Index 12: SCom2 telegram failure Index 13: CB/TB telegram failure Index 14: 2nd CB telegram failure Index 15: SCB telegram failure Index 16: SLB telegram failure Index 17: Index 18: Index 19: Index 20:	index1: 0,0 Min: 0,0 Max: 101,0 Unit: s Indices: 20 Type: O2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
r782 Trip Time 782	Visualization parameter for displaying the times at which the last 8 faults occurred. The current status of the operating-hours counter (r825) is displayed. Index 1: Day of the 1st (last) fault trip Index 2: Hour of the 1st fault trip Index 3: Second of the 1st fault trip Indices 4 to 6: 2nd fault trip Indices 7 to 9: 3rd fault trip Indices 10 to 12: 4th fault trip Indices 13 to 15: 5th fault trip Indices 16 to 18: 6th fault trip Indices 19 to 21: 7th fault trip Indices 22 to 24: 8th (oldest) fault trip Further details for describing the fault trips are contained in r947, r949, P952. The fault memory is deleted with the help of P952.	Dec.Plc.: 0 Unit: - Indices: 24 Type: O2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access
r783 Fault n/f(act) 783	Frequency/speed actual value (r218) at the time of tripping	Dec.Plc.: 3 Unit: Hz Indices: - Type: I4	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access
r784 Fault dn/dt 784	Frequency/speed change per second at the time of tripping	Dec.Plc.: 2 Unit: Hz Indices: - Type: I2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access
r785 Fault Isq(act) 785	Actual value of the torque-generating current component (K0184) at the time of tripping.	Dec.Plc.: 1 Unit: A Indices: - Type: I4	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access
r786 Fault Out Volts 786	Actual value of the converter output voltage (r003) at the tim of tripping	Dec.Plc.: 1 Unit: V Indices: - Type: I2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access
r787 Fault CtrlStatus 787	Control status at the time of tripping.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access
P792 Perm Deviation 792	Function parameter for entering the permissible deviation of the actual value from the setpoint. A deviation is indicated in status word 1, bit 8. In function diagram 480.3.	index1: 6,0 Min: 0,0 Max: 200,0 Unit: % Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting - Ready
P793 Set/Act Hyst 793	Function parameter for entering the hysteresis which is to be taken into account during determination of the actual-value/setpoint deviation. A deviation is indicated in status word 1, bit 8.	index1: 2,0 Min: 0,0 Max: 200,0 Unit: % Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P794 Deviation Time 794	Function parameter for entering the time by which the message indicating an actual-value/setpoint deviation is to b delayed. A deviation is indicated in status word 1, bit 8.	index1: 3,0 Min: 0,0 Max: 100,0 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting - Ready
P795* Src Comp ActV 795	BICO parameter for selecting a connector from which the actual value for generating the message "Comparison value reached" is to be read in. If the actual value reaches the comparison value (P796), this is indicated in status word 1, bit 10.	Init: 148 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting
P796 Compare Value 796	Function parameter for entering the comparison value. If the actual value reaches the comparison value entered, this is indicated in status word 1, bit 10.	index1: 100,0 Min: 0,0 Max: 200,0 Unit: % Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting - Ready
P797 Compare Hyst 797	Function parameter for entering the hysteresis which is to be taken into account during generation of the message "Comparison value reached". If the actual value reaches the comparison value, this is indicated in status word 1, bit 10.	index1: 3,0 Min: 0,0 Max: 200,0 Unit: % Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting - Ready
P798 Compare Time 798	Function parameter for entering the time by which the message "Comparison value reached" is to be lengthened if the actual value falls below the comparison value. If the actual value reaches the comparison value, this is indicated in status word 1, bit 10.	index1: 3,0 Min: 0,0 Max: 100,0 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting - Ready
P800 OFF Value 800	Function parameter for entering the turn-off value below which the firing-pulse block is to be generated. If the actual value falls below the turn-off value after an OFF command, the firing pulses are blocked. The firing-pulse block can be delayed by the time entered in P801. In function diagram 480.3	index1: 0,5 Min: 0,0 Max: 200,0 Unit: % Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting - Ready
P801 OFF Time 801	Function parameter for entering the time by which the firing-pulse block is to be delayed. If the actual value falls below the turn-off value after an OFF command, blocking of the firing pulses is delayed by the time entered. In function diagram: 480.5	index1: 0,00 Min: 0,00 Max: 100,00 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting - Ready
P802* Src Speed Setp 802	BICO parameter for selecting the connector from which the speed setpoint for detection of the direction of rotation is to be read in. The speed setpoint of the setpoint channel (KK0075) is used with preference. The message "Positive speed setpoint" is displayed instatus word 1, bit 14.	Init: 75 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P804 Overspeed Hyst 804	Function parameter for entering the hysterisis for the "Overspeed" message. An overspeed message is indicated in status word 2, bit 18.	Init: 10,0 Min: 0,0 Max: 20,0 Unit: % Indices: - Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting - Ready
P805 PullOut/BlckTime 805	Delay time between the message "Deviation" (status word 1 bit 8) during blocking or between detection of stalling in the rotor flux monitor and output of the fault message (r553). Bit28). Note: For synchronous motors (P095=12,13) a stall message is generated as soon as the maximum frequency is reached without waiting the delay time in P805. For externally excited synchronous motors (P095=12) the converter and excitation current is reduced before the fault message is issued. Dependent parameters: P792 (Frequency of set/actual deviation), P794 (Set/actual deviation time)	index1: 2,00 Min: 0,00 Max: 100,00 Unit: s Indices: 4 Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting - Ready
P806 Reac Tacho Fault 806	Function parameter for setting the reaction to tachometer faults. If the speed difference between two sampling intervals exceeds the four-fold parameter value in P215, the alarm A43 and after 20*T0 usually fault F53 are generated (P806=0). During speed control, it is possible to change ove to encoder-free vector control in the area of the EMF model. For this purpose, P806=1 has to be set. In the event of a fault, the alarm A43 is displayed up until the next pulse inhib and the binector B0256 is set. At the next pulse inhibit, fault F53 is generated with fault value 0. Caution: It is not advisable to change over to f control when a tachometer with zero track P130=15, 16 (for position sensing) has been parameterized. Fault message F51 may be generated if a zero track is parameterized. Note: It is only possible to change over to f control when the EMF controller is operating (P315>0 and frequency >P313). Changeover back to speed control is not effected until pulse block, and no longer during operation. Changeover is improved if the rotor resistance is correct (see P386). Speed control (P235, P240) must also be operating in a stable manner during f control. With binector B0256 (tacho fault), the gain of the speed controller can be changed over for this purpose (see P238). For torque control by overmodulation o the speed controller, the speed setpoint (smoothed with approx. 100ms) should be followed up with the speed actual value. Parameter values: 0 = fault 1 = changoever from n to f control Precondition: P100 = 4 (n control) In function diagram: 350.2	index1: 0 Min: 0 Max: 1 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
r825 Operat. Hours 825	Visualization parameter for displaying the operating- hours counter. Only that time is counted during which the unit is operated with released firing pulses (inverter release). Index 1: Days Index 2: Hours Index 3: Seconds	Dec.Plc.: 0 Unit: - Indices: 3 Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access
r826 PCB Code 826 Compact PLUS only	Visualization parameter for displaying the board code used t determine which electronic boards are installed. Index 1: Basic board Index 2: Option board in slot A Index 3: Option board in slot B Board codes: 90 to 109 = Main board or Control Unit (CUx) 92 = VC basic board 93 = MC Compact basic board 94 = MC CompactPLUS basic board 95 = VC CompactPLUS basic board 106 = AFE basic board 110 to 119 = Sensor Board (SBx) 111 = SBP evaluation of pulse encoder 112 = SBM evaluation of encoder/multiturn encoder 1 113 = SBM2 evaluation of encoder/multiturn encoder 2 114 = SBR1 Resolver evaluation 1 115 = SBR2 Resolver evaluation 2 120 to 129 = Serial Communication Board (SCB) 121 = not used 122 = not used 130 to 139 = Technology Board 131 = T100 Technology board 131 = T300 Technology board 134 = T400 Technology board 140 to 149 = Communication Board (CBx) 143 = CBP Profibus board 1 145 = CBD DeviceNet communications board 146 = CBC CAN-Bus board 147 = CC-Link communications board 148 = CBP2 Profibus board 2 150 to 169 = Special boards (EBx, SLB) 151 = EB1 Expansion board 1 152 = EB2 Expansion board 2 161 = SLB SIMOLINK board	Dec.Plc.: 0 Unit: - Indices: 3 Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Fixed settings - Quick parameterization - Board configuration - Drive setting - Download - Upread/free access - Power section definition

Parameter	Description	Data	Read/write
r826 PCB Code 826 not Compact PLUS	Visualization parameter for displaying the board codes. With the help of these codes the type of the built-in electronics boards can be determined. Index 1: Basic board Index 2: Optional board in slot A Index 3: Optional board in slot B Index 4: Optional board in slot C Index 5: Optional board in slot D Index 6: Optional board in slot E Index 7: Optional board in slot F Index 8: Optional board in slot G Slots D-G are not available in type Compact PLUS. Board codes: 90 to 109 = Main board or Control Unit (CUx) 110 to 119 = Sensor Board (SBx) 120 to 129 = Serial Communication Board (SCB) 130 to 139 = Technology Board 140 to 149 = Communication Board (CBx) 150 to 169 = Special boards (EBx, SLB)	Dec.Plc.: 0 Unit: - Indices: 8 Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Fixed settings - Quick parameterization - Board configuration - Drive setting - Download - Upread/free access - Power section definition
r827 Generat. Date 827	Visualization parameter for displaying the date on which the firmware of the basic unit was generated. Index 1: Year Index 2: Month Index 3: Day	Dec.Plc.: 0 Unit: - Indices: 3 Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Drive setting - Upread/free access - Power section definition
r828 SW ID 828 Compact PLUS only	Visualization parameter for displaying the software codes. With the help of these codes, the compatibility of the individual software versions can be checked. Index 1: Basic board Index 2: Option board in slot A Index 3: Option board in slot B Index 4: Basic board add-on On boards with no software (e.g. SBR, SLB), the corresponding index will always contain 0.0.	Dec.Plc.: 1 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Fixed settings - Quick parameterization - Board configuration - Drive setting - Download - Upread/free access - Power section definition
r828 SW ID 828 not Compact PLUS	Visualization parameter for displaying the software codes. With the help of these codes, the compatibility of the individual software versions can be checked. Index 1: Basic board Index 2: Optional board in slot A Index 3: Optional board in slot B Index 4: Optional board in slot C Index 5: Optional board in slot D Index 6: Optional board in slot E Index 7: Optional board in slot F Index 8: Optional board in slot G Index 9: Basic board add-on For boards without software (e.g. SBR, SLB), 0.0 is always shown in the corresponding index.	Dec.Plc.: 1 Unit: - Indices: 9 Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Fixed settings - Quick parameterization - Board configuration - Drive setting - Download - Upread/free access - Power section definition

Parameter	Description	Data	Read/write
r829 CalcTimeHdroom 829	Visualization parameter for displaying the free calculating time. The reserve of the microprocessor system in the basic unit is shown in relation to its total calculating capacity in index 1. The free calculating time is influenced by the set pulse frequency (P340) as well as the number and processing frequency of the activated function blocks. The failed time slots from T2 to T10 are counted in Index 2 t Index 10. Index 11 displays the minimum free number of words of the DSP stack. Caution! A value of 1 means that the stack has an overflow! Index 12 to Index 19 display the remaining calculating time o the 8 DSP residual time slots. The values refer to an empirical value of an empty residual time slot.	Dec.Plc.: 0 Unit: - Indices: 10 Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access
P830* Fault Mask 830	The faults entered in this parameter are suppressed. Setting note: - Despite suppression, a pulse disable occurs with some faults (UCE, overcurrent, overvoltage, etc.)	index1: 0 Min: 0 Max: 255 Unit: - Indices: 5 Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
r832 Phase Flow 832	Service parameter, only for Siemens service personnel "Non-linearized value" of phase currents from A/D converter The hexadecimal values range from 8000h (max. displayed negative current) to 7FF0h (max. displayed positive current) Index 1: Phase L1 (U) Index 2: Phase L3 (W) Converter output current: Phase U (Value at the moment)	Dec.Plc.: 1 Unit: A Indices: 2 Type: I4	Menus: - Parameter menu - Upread/free access
r833 Drive Temperat. 833 Compact PLUS only	Index 1: Inverter temperature Index 2: Rectifier temperature (model specific on AC units with rectifier temperature sensors)	Dec.Plc.: 0 Unit: °C Indices: 4 Type: I2	Menus: - Parameter menu - Upread/free access
r833 Drive Temperat. 833 not Compact PLUS	Inverter temperature Maximum temperature of all measuring points in the converter/inverter (heat sink and maybe air flow)	Dec.Plc.: 0 Unit: °C Indices: - Type: I2	Menus: - Parameter menu - Upread/free access
P834* OFF1 on Fault 834	Parameter for entering faults where the drive reacts with a ramp-function generator ramp-down (OFF1) prior to a fault trip in the "Operation" status. Only faults which do not necessitate an immediate trip can be entered here. The following faults are not permitted: F006, F008, F010, F011, F015, F017, F023, F025, F026, F027	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 5 Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
P835* CtrlBootOptPCB 835 not Compact PLUS	Service parameter, only for Siemens service personnel	index1: 0 Min: 0 Max: 2 Unit: - Indices: 7 Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting
P835* CtrlBootOptPCB 835 Compact PLUS only	Service parameter, only for Siemens service personnel	index1: 0 Min: 0 Max: 2 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
P836* DataOptPCBBoot 836	Service parameter, only for Siemens service personnel	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting
P837* state TEST 837	Service parameter, only for Siemens service personnel Selection of trial operation, only for manufacturer	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 3 Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting
r838 VCE/OC/SC Result 838	Service parameter, only for Siemens service personnel Coded results of the VCE/overcurrent/short-circuit test	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu - Upread/free access
P839* AdrConnector 839	Service parameter, only for Siemens service personnel Copies the contents of an addres into a connector value, thus enabling any random C16x variable (near, 16 bit address) to be interconnected. This means that any random (internal) variables can be traced. The address of the variables can be determined from the M66 file. The address (16 bit address) has to be entered in the index. Index 1-4 for near addresses Index 5-8 for DPR addresses (input of the 16-bit offset) Function number 258 -> P2952.58 Enter time slot Index -> connector number 1 -> K434 2 -> K435 3 -> K436 4 -> K437 5 -> K438 6 -> K439 7 -> K440 8 -> K441	index1: 0 Unit: - Indices: 8 Type: L2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting
P840* RAM Addr 840	Service parameter, only for Siemens service personnel Address for direct Random Access Memory (RAM) on board CU. Indices: i001: CS: Code Segment (64kbyte-segment) i002: Off: Offset The contents of the memory cell is displayed in P841. Setting instructions for P840: - In access stage 3, the parameter can only be read, wherea in access stage 4, it can also be written. - Access stage 3 prevents the indicated value in the background from always being written to the visualized address.	index1: 0 Unit: - Indices: 2 Type: L2	Menus: - Parameter menu - Download - Upread/free access - Power section definition Changeable in: - Power section definition - Board configuration - Drive setting - Drive setting - Ready

Parameter	Description	Data	Read/write
P841* RAM Value 841	Service parameter, only for Siemens service personnel Contents of a memory cell on the CU board.	Init: 0 Unit: - Indices: - Type: L2	Menus: - Parameter menu - Download - Upread/free access - Power section definition Changeable in: - Power section definition - Board configuration - Drive setting - Drive setting - Ready
P842* VCS RAM ADDR 842	Service parameter, only for Siemens service personnel Address for direct random memory access (RAM) on gating unit µc. Indices: i001: CS: Code segment (64kByte segment) i002: Off: Offset The contents of the memory cell is displayed in P843. Setting instructions for P843: - In access stage 3, the parameters can only be read, whereas they can also be written in access stage 4. - Access stage 3 prevents the displayed value in the background from always being written to the visualized address.	index1: 0 Unit: - Indices: 2 Type: L2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
P843* VCS RAM Val 843	Service parameter, only for Siemens service personnel Contents of a memory cell of the gating unit µC	Init: 0 Unit: - Indices: - Type: L2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
P844* SEB AnaOut 844	Service parameter, only for Siemens service personnel Parameterization of the SEB board Index 1 to 4 : Extract level address SEB analog output 1 to 4. For this, no connector should be indicated in P845 for the analog output (value=0) Index 5 to 8 : Reinforcement SEB analog output 1 to 4 in graduation 2^n, e.g. value 5: reinforcement = 2^5 = 32. Attention: Hexadecimal input 10=A Index 9 to 12 : Offset SEB analog output 1 to 4. The value is specified as hexadecimal. 4000h=100%=5V. Index 13 to 16: Segment for address in Index 1 to 4 for SEB analog output 1 to 4.	index1: 0 Unit: - Indices: 16 Type: L2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
P845* SEB AnaOut 845	Service parameter, only for Siemens service personnel Output of connectors to the analog outputs of the SEB Indices 1 - 4 correspond to analog outputs 1 - 4 on the SEB Note: If an address is to be output, the parameter value mus be zero before the address is entered in P844.	index1: 0 Unit: - Indices: 4 Type: L2 ,K	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
P847 Paralleling Mode 847	Service parameter, only for Siemens service personnel Setting of the operating mode on parallel connected units. For test purposes, the compensation control or one of the two partial inverters can be switched off. Parameter values: 0: both partial inverters released, compensation control acti 1: only partial inverter 1 released 2: only partial inverter 2 released 3: both partial inverters released, compensation control not active Note: The parameter may only be used for test purposes. Precondition: parallel connected unit	Init: 0 Min: 0 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting
P848* Test Multiparll. 848	Service parameter, only for Siemens service personnel Setting of the test moduses for the multi-parallel connected devices. Indices: i001: SlFr: Pulse release of the individual slaves (each bi corresponds to a slave) Bit 0 is for pulse release of the master, Bit 1 is for pulse release of slave1 etc. i002: OCLS: programmable shutdown threshold for overcurrent. The value range 0 to 7 corresponds to a shutdown threshold of 70 to 140% of the rated converter current. Onl the lowest 3 bits of these values are adopted. i003: OCTR: Overcurrent trip released. (Each bit corresponds to a slave). If the corresponding bit is set, the converter is switched off when the current limit set in Index i002 is exceeded. This bit has no effect on the hardware-related overcurrent trip. i004: RGEN: Current compensation control released (each bit corresponds to a slave). If the corresponding bit is set, th compensation control of the current of the corresponding slaves is releaed. Note: The parameter may only be used for test purposes. Precondition: Multi-parallel connected unit	index1: 255 Min: 0 Max: 255 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
r849 Status Multiparl 849	Service parameter, only for Siemens service personnel Display of the status of the individual slaves. Significance of the individual bits: Bit0 = Header Bit1-Bit2 = Hardware version Bit3 = Overvoltage Bit4 = Undervoltage Bit5-Bit7 = Number of inverters Bit8 = Overcurrent error Bit9-Bit11 = Overcurrent flags Bit12 = Hardware conflict Bit13-Bit15 = UCE error(R,S,T) Indices: i001: Slv1: Status slave 1 (master) i002: Slv2: Status slave 2 i003: Slv3: Status slave 3 i004: Slv4: Status slave 4 i005: Slv5: Status slave 5 i006: Slv6: Status slave 6 i007: Slv7: Status slave 7 i008: Slv8: Status slave 8 Precondition: multi-parallel connected unit	Dec.Plc.: 0 Unit: - Indices: 8 Type: V2	Menus: - Parameter menu - Upread/free access - Drive setting

Parameter	Description	Data	Read/write
r850 OP Special 1 850	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Dec.Plc.: 0 Unit: - Indices: 20 Type: O2	Menus: - Parameter menu - Upread/free access
r851 OP Special 2 851	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Dec.Plc.: 0 Unit: - Indices: 24 Type: O2	Menus: - Parameter menu - Upread/free access
P852* OP Special 3 852	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Init: 0 Min: - 2147483647 Max: 2147483647 Unit: - Indices: - Type: I4	Menus: - Parameter menu - Upread/free access Changeable in:
r853 OP Special 4 853	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access
r854 OP Special 5 854	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access
P855 OP Special 6 855	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	index1: 0 Min: 0 Max: 4294967293 Unit: - Indices: 8 Type: O4	Menus: - Parameter menu - Upread/free access Changeable in:
r856 OP Special 7 856	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access
r857 OP Special 8 857	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access
r858 OP Special 9 858	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access
P888* Quick Param 888	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Init: 0 Min: 0 Max: 19 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in:
P889* Fixed Settings 889	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Init: 0 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in:

Parameter	Description	Data	Read/write
P891* no function 891	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Init: 0 Min: 0 Max: 2 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in:
P892* Diagnostics 892	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Init: 0 Min: 0 Max: 2 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in:
P893* Reg/GateUnit 893	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Init: 0 Min: 0 Max: 4 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in:
P894* Mot/EncodData 894	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Init: 0 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in:
P895* Communication 895	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Init: 0 Min: 0 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in:
P896 Parameter Menu 896	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Init: 0 Min: 0 Max: 13 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in:
P897* Menu Select 897	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Init: 0 Min: 0 Max: 8 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in:
P898* VectorControl 898	Service parameter, only for Siemens service personnel. Parameter is not visible via the OP1S.	Init: 0 Min: 0 Max: 6 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in:
P918* CB Bus Address 918	Function parameter for entering the bus addresses for a buil in communications board (CBx). The significance of the bus address depends on the protocol. If a set value is not accepted by the communication board, the unit trips a fault. Note: This parameter is not overwritten on downloading via Profibus. Index 1: 1st CB Index 2: 2nd CB In the case of a factory setting via 1st CB or 2nd CB, this parameter is not reset.	index1: 3 Min: 0 Max: 200 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu + Communication + Field bus interfaces - Quick parameterization - Board configuration - Drive setting - Upread/free access Changeable in: - Board configuration - Drive setting

Parameter	Description	Data	Read/write
P922* Telegram Select 922	The parameter value shows the set telegram to PROFIdrive V3. Only visible if the unit is parameterized acc. to PROFIdrive 3 V3.	Init: 0 Min: 0 Max: 65535 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Communication + Field bus interfaces - Quick parameterization - Board configuration - Drive setting - Upread/free access Changeable in: - Board configuration - Drive setting - Drive setting
r923 Profibus StdSig 923	List of all parameters for standard signals Specific parameter for PROFIdrive V3.	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Communication + Field bus interfaces + Motor/encoder + Encoder data - Upread/free access
P927* Parameter Access 927	Function parameter to enable interfaces for parameterization For description, see parameter P053. Only visible if the unit is parameterized acc. to PROFIdrive V3.	Init: 7 Min: 0 Max: 65535 Unit: - Indices: - Type: V2	Menus: - User parameters-Parameter menu + General parameters - Fixed settings - Quick parameterization - Board configuration - Drive setting - Download - Upread/free access - Power section definition Changeable in: - Power section definition - Board configuration - Drive setting - Drive setting - Ready
r944 Fault Counter 944	The fault counter is incremented each time there is a change in the fault buffer (P947, P948, P782). This allows a check to be performed on whether data in the fault buffer is being extracted consistently.	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Drive setting - Upread/free access
r947 Fault Memory 947	Visualization parameter for displaying the last 8 fault trips. For each fault trip, up to 8 faults occurring at the same time can be stored. Only those faults are stored to which a fault number is assigned. Index 1 to 8: 1st (last) fault trip, faults 1 to 8 Index 9 to 16: 2nd fault trip, faults 1 to 8 Index 17 to 24: 3rd fault trip, faults 1 to 8 Index 25 to 32: 4th fault trip, faults 1 to 8 Index 33 to 40: 5th fault trip, faults 1 to 8 Index 41 to 48: 6th fault trip, faults 1 to 8 Index 49 to 56: 7th fault trip, faults 1 to 8 Index 57 to 64: 8th (oldest) fault trip, faults 1 to 8 The value 0 in index 1 means that no fault is active at the present time. Further information for describing fault trips is contained in r782, r949, P952. The fault memory is deleted with the help of P952.	Dec.Plc.: 0 Unit: - Indices: 64 Type: O2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Drive setting - Upread/free access

Parameter	Description	Data	Read/write
r949 Fault Value 949	Visualization parameter for displaying fault values. Fault values contain additional information on the faults which hav occurred and allow more exact diagnosis. The fault values are assigned to the faults and are stored in the same indices as the associated fault numbers in r947. Indices 1 to 8: 1st (last) fault trip, fault values 1 to 8 Indices 9 to 16: 2nd fault trip, fault values 1 to 8 Indices 17 to 24: 3rd fault trip, fault values 1 to 8 Indices 25 to 32: 4th fault trip, fault values 1 to 8 Indices 33 to 40: 5th fault trip, fault values 1 to 8 Indices 41 to 48: 6th fault trip, fault values 1 to 8 Indices 49 to 56: 7th fault trip, fault values 1 to 8 Indices 57 to 64: 8th (oldest) fault trip, fault values 1 to 8 Further information on describing fault trips is contained in in r782, r947, P952. The fault memory is deleted with the help of P952.	Dec.Plc.: 0 Unit: - Indices: 64 Type: O2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Drive setting - Upread/free access
r951 FaultTextList 951	List of fault texts. Each fault text is stored under the index corresponding to its fault.	Dec.Plc.: 0 Unit: - Indices: 254 Type: O2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access
P952* # of Faults 952	Function parameters for displaying the stored fault trips and for deletion of the fault memory. If 0 is entered, the whole fault memory consisting of r782, r947, r949 is deleted.	Init: 0 Min: 0 Max: 8 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access Changeable in: - Drive setting
r953 Warning Param 1 953	Visualization parameter for displaying which of warnings 1 to 16 are active.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access
r954 Warning Param 2 954	Visualization parameter for displaying which of warnings 17 to 32 are active.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access
r955 Warning Param 3 955	Visualization parameter for displaying which of warnings 33 to 48 are active.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access
r956 Warning Param 4 956	Visualization parameter for displaying which of warnings 49 to 64 are active.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access
r957 Warning Param 5 957	Visualization parameter for displaying which of warnings 65 to 80 are active.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access
r958 Warning Param 6 958	Visualization parameter for displaying which of warnings 81 to 96 are active. Warnings 81 to 96 are tripped by a built-in communication board (CBx).	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access

Parameter	Description	Data	Read/write
r959 Warning Param 7 959	Visualization parameter for displaying which of warnings 97 to 112 are active. Warnings 97 to 112 are tripped by a built-i technology board.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access
r960 Warning Param 8 960	Visualization parameter for displaying which of warnings 113 to 128 are active. Warnings 113 to 128 are tripped by a built in technology board.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Diagnostics + Faults/warnings - Upread/free access
r964 Drive ID 964	Function parameter for unit data identification. (see also PROFIDrive Profile Version 3). Index 1: Manufacturer value=42 Index 2: Unit type Index 3: Version (format xxyy) Index 4: Date of firmware (year) Index 5: Date of firmware (day/month) The value of the unit type is 3080 on MASTERDRIVES VC, 3085 on MASTERDRIVES VC Compact PLUS, 3090 on MASTERDRIVES MC, 3100 on MASTERDRIVES MC Compact PLUS. Only visible if the unit has been parameterized according to PROFIdrive V3	Dec.Plc.: 0 Unit: - Indices: 5 Type: O2	Menus: - Parameter menu - Upread/free access
r965 Profile # 965	Profibus-specific parameter Value depends on whether the unit has been parameterized according to PROFIdrive V3.	Dec.Plc.: 0 Unit: - Indices: - Type: OS	Menus: - Parameter menu - Upread/free access
r967 Control Word 1 967	Visualization parameter for displaying control word 1. Bits 0 to 15 are displayed.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu - Upread/free access
r968 Status Word 1 968	Visualization parameter for displaying status word 1. Bits 0 t 15 are displayed.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu - Upread/free access
P970* Factory Setting 970	Function parameter for starting the parameter reset to a factory or fixed setting. After completion of the factory setting, this parameter is also reset to its original value, 1. 0 = Start parameter reset 1 = No parameter reset Caution: A parameter reset causes the loss of all parameter changes. If the factory setting of the parameter is made via an interfac (SCom1, SCom2, SCB2, 1st CB, 2nd CB) to 0 = "Start parameter reset", the following parameters are not reset: SCom1, SCom2: P053, P700-704 SCB2: P053, P700-704, P696 1st CB, 2nd CB: P053, P711-722, P918 The following parameters are only reset to a certain extent: P050, P072	Init: 1 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Functions - Fixed settings - Upread/free access Changeable in: - Board configuration - Drive setting - Drive setting

Parameter	Description	Data	Read/write
P971* EEPROM Saving 971	Function parameter for starting saving of the parameters from the RAM to the EEPROM. Volatilely stored parameters can be transferred to the EEPROM by overwriting a parameter value of 0 with 1. The parameter values are then stored non-volatilely and are secured against mains failure. 0 = No saving 1 = One-time saving The parameter must be reset manually to 0.	Init: 0 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu + General parameters - Upread/free access Changeable in: - Drive setting - Ready
P972* Power On Reset 972	Power-On reset The Power-On reset works in the same way as Electronic voltage Off -> On. This initializes the control board and leads to a loss of communication. This value should therefore not normally be included in a download file.	Init: Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Board configuration - Drive setting - Upread/free access - Power section definition Changeable in: - Power section definition - Board configuration - Drive setting - Drive setting
r980 Par # List pt1 980	Visualization parameter for displaying the first 100 paramete numbers in the range 0 to 999. The parameter numbers are arranged in ascending order. The first 0 occuring in the inde signals that there are no further parameter numbers. If the number of indices is not sufficient to display all parameter numbers, index 101 contains the parameter numbers in which the list is continued.	Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
r981 Par # List pt2 981	Visualization parameter for displaying the second 100 parameter numbers in the range 0 to 999. The parameter numbers are arranged in ascending order. The first 0 occuring in the index signals that there are no further parameter numbers. If the number of indices is not sufficient to display all parameter numbers, index 101 contains the parameter numbers in which the list is continued.	Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
r982 Par # List pt3 982	Visualization parameter for displaying the third 100 parameter numbers in the range 0 to 999. The parameter numbers are arranged in ascending order. The first 0 occuring in the index signals that there are no further parameter numbers. If the number of indices is not sufficient to display all parameter numbers, index 101 contains the parameter numbers in which the list is continued.	Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
r983 Par # List pt4 983	Visualization parameter for displaying the fourth 100 parameter numbers in the range 0 to 999. The parameter numbers are arranged in ascending order. The first 0 occuring in the index signals that there are no further parameter numbers. If the number of indices is not sufficient to display all parameter numbers, index 101 contains the parameter numbers in which the list is continued.	Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
r984 Par # List pt5 984	Visualization parameter for displaying the fifth 100 paramete numbers in the range 0 to 999. The parameter numbers are arranged in ascending order. The first 0 occuring in the inde signals that there are no further parameter numbers. If the number of indices is not sufficient to display all parameter numbers, index 101 contains the parameter numbers in which the list is continued.	Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
r985 Par # List pt6 985	Visualization parameter for displaying the sixth 100 parameter numbers in the range 0 to 999. The parameter numbers are arranged in ascending order. The first 0 occuring in the index signals that there are no further parameter numbers. If the number of indices is not sufficient to display all parameter numbers, index 101 contains the parameter numbers in which the list is continued.	Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access

Parameter	Description	Data	Read/write
r986 Par # List pt7 986	Visualization parameter for displaying the seventh 100 parameter numbers in the range 0 to 999. The parameter numbers are arranged in ascending order. The first 0 occuring in the index signals that there are no further parameter numbers. If the number of indices is not sufficient to display all parameter numbers, index 101 contains the parameter numbers in which the list is continued.	Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
r987 Par # List pt8 987	Visualization parameter for displaying the eighth 100 parameter numbers in the range 0 to 999. The parameter numbers are arranged in ascending order. The first 0 occuring in the index signals that there are no further parameters. If the number of indices is not sufficient to display all parameter numbers, index 101 contains the parameter numbers in which the list is continued.	Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
r988 Par # List pt9 988	Visualization parameter for displaying the ninth 100 parameter numbers in the range 0 to 999. The. parameter numbers are arranged in ascending order. The first 0 occuring in the index signals that there are no further parameter numbers. If the number of indices is not sufficient to display all parameter numbers, index 101 contains the parameter numbers in which the list is continued.	Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
r989 Par # List pt10 989	Visualization parameter for displaying the tenth 100 parameter numbers in the range 0 to 999. The parameter numbers are arranged in ascending order. The first 0 occuring in the index signals that there are no further parameter numbers.	Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
r990 Par # List chg1 990	Visualization parameters for displaying the first 100 changed parameter numbers in the range 0 to 999. The parameter numbers are arranged in ascending order. The first 0 occuring in the index signals that there are no further parameters. If the number of indices is not sufficient to display all parameter numbers, index 101 contains the parameter numbers in which the list is continued.	Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
r991 Par # List chg2 991	Visualization parameters for displaying the second 100 changed parameter numbers in the range 0 to 999. The parameter numbers are arranged in ascending order. The first 0 occuring in the index signals that there are no further parameters. If the number of indices is not sufficient to display all parameter numbers, index 101 contains the parameter numbers in which the list is continued.	Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
r992 Par # List chg3 992	Visualization parameters for displaying the third 100 change parameter numbers in the range 0 to 999. The. parameter numbers are arranged in ascending order. The first 0 occuring in the index signals that there are no further parameters.	Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
U001 FixSetp 17 2001	Function parameter for entering fixed setpoint 17.	index1: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U002 FixSetp 18 2002	Function parameter for entering fixed setpoint 18.	index1: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U003 FixSetp 19 2003	Function parameter for entering fixed setpoint 19.	index1: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U004 FixSetp 20 2004	Function parameter for entering fixed setpoint 20.	index1: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U005 FixSetp 21 2005	Function parameter for entering fixed setpoint 21.	index1: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U006 FixSetp 22 2006	Function parameter for entering fixed setpoint 22.	index1: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U007 FixSetp 23 2007	Function parameter for entering fixed setpoint 23.	index1: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U008 FixSetp 24 2008	Function parameter for entering fixed setpoint 24.	index1: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U009 FixSetp 25 2009	Function parameter for entering fixed setpoint 25.	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U011 FixSetp 26 2011	Function parameter for entering fixed setpoint 26.	index1: 0,000 Min: -200,000 Max: 200,000 Unit: % Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U012 FixSetp 27 2012	Function parameter for entering fixed setpoint 27.	index1: 0,000 Min: -200,000 Max: 200,000 Unit: % Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U013 FixSetp 28 2013	Function parameter for entering fixed setpoint 28.	index1: 0,000 Min: -200,000 Max: 200,000 Unit: % Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U014 FixSetp 29 2014	Function parameter for entering fixed setpoint 29.	index1: 0,000 Min: -200,000 Max: 200,000 Unit: % Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U015 FixSetp 30 2015	Function parameter for entering fixed setpoint 30.	index1: 0 Min: - 2147483647 Max: 2147483647 Unit: - Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U016 FixSetp 31 2016	Function parameter for entering fixed setpoint 31.	index1: 0 Min: - 2147483647 Max: 2147483647 Unit: - Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U017 FixSetp 32 2017	Function parameter for entering fixed setpoint 32.	index1: 0 Min: - 2147483647 Max: 2147483647 Unit: - Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U018 FixSetp 33 2018	Function parameter for entering fixed setpoint 33.	index1: 0 Min: - 2147483647 Max: 2147483647 Unit: - Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U019* Src SH1 KK 2019	Sample&Hold element Input parameter for the double word connectors	index1: 0 Unit: - Indices: 4 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U020* Src SH1 K 2020	Sample&Hold element Input parameter for connectors	index1: 0 Unit: - Indices: 8 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U021 Fixed Bit 1 2021	Function parameter for entering fixed bit 1.	index1: 0 Min: 0 Max: 1 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U022 Fixed Bit 2 2022	Function parameter for entering fixed bit 2.	index1: 0 Min: 0 Max: 1 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U023 Fixed Bit 3 2023	Function parameter for entering fixed bit 3.	index1: 0 Min: 0 Max: 1 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U024 Fixed Bit 4 2024	Function parameter for entering fixed bit 4.	index1: 0 Min: 0 Max: 1 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U025 Fixed Bit 5 2025	Function parameter for entering fixed bit 5.	index1: 0 Min: 0 Max: 1 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U026 Fixed Bit 6 2026	Function parameter for entering fixed bit 6.	index1: 0 Min: 0 Max: 1 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U027 Fixed Bit 7 2027	Function parameter for entering fixed bit 7.	index1: 0 Min: 0 Max: 1 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U028 Fixed Bit 8 2028	Function parameter for entering fixed bit 8.	index1: 0 Min: 0 Max: 1 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U029* Src SH2 KK 2029	Sample&Hold element Input parameter for the double word connectors	index1: 0 Unit: - Indices: 4 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U030* Src SH2 K 2030	Sample&Hold element Input parameter for connectors	index1: 0 Unit: - Indices: 8 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U031* Src Conn Disp 1 2031	BICO parameter for selecting the connector for connector display 1.	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n032 Conn Disp 1 2032	Visualization parameter for connector display 1.	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access
U033* Src Conn Disp 2 2033	BICO parameter for selecting the connector for connector display 2.	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n034 Conn Disp 2 2034	Visualization parameter for connector display 2.	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access
U035* Src Conn Disp 3 2035	BICO parameter for selecting the connector for connector display 3.	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n036 Conn Disp 3 2036	Visualization parameter for connector display 3.	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access
U037* Src DConn Disp 1 2037	BICO parameter for selecting the connector for double-connector display 1.	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n038 DConn Disp 1 2038	Visualization parameter for double-connector display 1.	Dec.Plc.: 3 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access

Parameter	Description	Data	Read/write
U039* Src DConn Disp 2 2039	BICO parameter for selecting the connector for double-connector display 2.	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n040 DConn Disp 2 2040	Visualization parameter for double-connector display 2	Dec.Plc.: 3 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access
U041* Src DConn Disp 3 2041	BICO parameter for selecting the connector for double-connector display 3	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n042 DConn Disp 3 2042	Visualization parameter for double-connector display 3	Dec.Plc.: 0 Unit: - Indices: - Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access
U043* Src DConn Disp 4 2043	BICO parameter for selecting the connector for double-connector display 4	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n044 DConn Disp 4 2044	Visualization parameter for double-connector display 4	Dec.Plc.: 0 Unit: - Indices: - Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access
U045* Src Bin Disp 1 2045	BICO parameter for selecting the binector for binector display 1.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n046 Bin Disp 1 2046	Visualization parameter for binector display 1.	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access
U047* Src Bin Disp 2 2047	BICO parameter for selecting the binector for binector display 2.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n048 Bin Disp 2 2048	Visualization parameter of binector display 2	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access

Parameter	Description	Data	Read/write
U049* Src Bin Disp 3 2049	BICO parameter for selecting the binector for binector display 3	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n050 Bin Disp 3 2050	Visualization parameter of binector display 3	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access
U051* Src Bin Disp 4 2051	BICO parameter for selecting the binector for binector display 4	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n052 Bin Disp 4 2052	Visualization parameter of binector display 4	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access
U053* SrcConnDispSmth 2053	BICO parameter for selecting the connector for connector display with smoothing.	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n054 Conn Disp Smooth 2054	Visualization parameter of connector display with smoothing	Dec.Plc.: 2 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access
U055* SrcDConnDispSmth 2055	BICO parameter for selecting the connector for double-connector display with smoothing.	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n056 DConnDisp Smooth 2056	Visualization parameter of the double-connector display with smoothing.	Dec.Plc.: 3 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access
U057* SrcBin/Con Conv4 2057	BICO parameter for selecting the binectors for binector/connector converter 1.	index1: 0 Unit: - Indices: 16 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
n058 IndBin/Con Conv4 2058	Visualization parameter of binector/connector converter 1.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Free blocks - Upread/free access
U059* Src SH1 B 2059	Sample&Hold module Input parameter for binectors	index1: 0 Unit: - Indices: 8 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U060* SH1 Time Slot 2060	Sample&Hold element Parameter for entering the slower time slot	Init: 2 Min: 2 Max: 10 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U061* Src Fault F148 2061	BICO parameter for selecting the binector for fault trip 1 (F148).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U062* Src Fault F149 2062	BICO parameter for selecting the binector for fault trip 2 (F149).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U063* Src Fault F150 2063	BICO parameter for selecting the binector for fault trip 3 (F150).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U064* Src Fault F151 2064	BICO parameter for selecting the binector for fault trip 4 (F151).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U065* Src Warning A061 2065	BICO parameter for selecting the binector for warning trip 1 (A061).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U066* Src Warning A062 2066	BICO parameter for selecting the binector for warning trip 2 (A062).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U067* Src Warning A063 2067	BICO parameter for selecting the binector for warning trip 3 (A063).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U068* Src Warning A064 2068	BICO parameter for selecting the binector for warning trip 4 (A064).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U070* Src Conn/DConnC 2070	BICO parameter for selecting the connectors for the 3 connector/double-connector converter.	index1: 0 Unit: - Indices: 6 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U071* Src DConn/ConnC 2071	BICO parameter for selecting the connectors for the 3 double-connector/connector converters.	index1: 0 Unit: - Indices: 3 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U072* Src Conn/BinC 2072	BICO parameter for selecting the connectors for the 3 connector/binector converters.	index1: 0 Unit: - Indices: 3 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
n073 # Conn/BinC1 2073	Visualization parameter of connector/binector converter 1.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Free blocks - Upread/free access
n074 # Conn/BinC2 2074	Visualization parameter of connector/binector converter 2	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Free blocks - Upread/free access
n075 # Conn/BinC3 2075	Visualization parameter of connector/binector converter 3	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Free blocks - Upread/free access
U076* Src Bin/ConnC1 2076	BICO parameter for selecting the binectors for binector/connector converter 1.	index1: 0 Unit: - Indices: 16 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
n077 #Bin/ConnC1 2077	Visualization parameter of binector/connector converter 1.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Free blocks - Upread/free access
U078* Src Bin/ConnC2 2078	BICO parameter for selecting the binectors for binector/connector converter 2.	index1: 0 Unit: - Indices: 16 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
n079 # Bin/ConnC2 2079	Visualization parameter of binector/connector converter 2.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Free blocks - Upread/free access
U080* Src Bin/ConnC3 2080	BICO parameter for selecting the binectors for binector/connector converter 3.	index1: 0 Unit: - Indices: 16 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
n081 # Bin/ConnC3 2081	Visualization parameter of binector/connector converter 3.	Dec.Plc.: 0 Unit: - Indices: - Type: V2	Menus: - Parameter menu + Free blocks - Upread/free access
U082* Src Conn Add 1 2082	BICO parameter for selecting the connectors for adder 1 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U083* Src Conn Add 2 2083	BICO parameter for selecting the connectors for adder 2 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U084* Src Conn Add 3 2084	BICO parameter for selecting the connectors for adder 3 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U085* Src Conn Add 4 2085	BICO parameter for selecting the connectors for adder 4 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U086* Src Conn Add 5 2086	BICO parameter for selecting the connectors for adder 5 with four inputs (1 word).	index1: 0 Unit: - Indices: 4 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U087* Src ConnSub1 2087	BICO parameter for selecting the connectors for subtracter 1 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U088* Src ConnSub2 2088	BICO parameter for selecting the connectors for subtracter 2 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U089* Src ConnSub3 2089	BICO parameter for selecting the connectors for subtracter 3 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U090* Src DConnAdd 1 2090	BICO parameter for selecting the connectors for adder 1 (2 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U091* Src DConnAdd 2 2091	BICO parameter for selecting the connectors for adder 2 (2 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U092* Src DConnAdd 3 2092	BICO parameter for selecting the connectors for adder 3 (2 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U093* Src DConnAdd 4 2093	BICO parameter for selecting the connectors for adder 4 (2 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U094* Src DConnSub1 2094	BICO parameter for selecting the connectors for subtracter 1 (2 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U095* Src DConnSub2 2095	BICO parameter for selecting the connectors for subtracter 2 (2 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U096* Src ConnM A/S 2096	BICO parameter for selecting the connectors for modulo 2^16 adder / subtracter.	index1: 0 Unit: - Indices: 3 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U097* Src DConnM A/S 2097	BICO parameter for selecting the connectors for modulo 2^32 adder / subtracter.	index1: 0 Unit: - Indices: 3 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U098* Src Conn Inv1 2098	BICO parameter for selecting the connector for sign inverter 1 (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U099* Src Conn Inv2 2099	BICO parameter for selecting the connector for sign inverter 2 (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U100* Src Conn Inv3 2100	BICO parameter for selecting the connector for sign inverter 3 (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U101* Src DConn Inv 1 2101	BICO parameter for selecting the connector for sign inverter 1 (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U102* Src DConn Inv 2 2102	BICO parameter for selecting the connector for sign inverter 2 (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U103* Src1 Conn SwInv 2103	BICO parameter for selecting the binector for the switchable sign inverter (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U104* Src2 Conn SwInv 2104	BICO parameter for selecting the connector for the switchable sign inverter (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U105* Src1 DConnSwInv 2105	BICO parameter for selecting the binector for the switchable sign inverter (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U106* Src2 DConnSwInv 2106	BICO parameter for selecting the connector for the switchable sign inverter (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U107* Src Conn Mult1 2107	BICO parameter for selecting the connectors for multiplier 1 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U108* Src Conn Mult2 2108	BICO parameter for selecting the connectors for multiplier 2 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U109* Src Conn Mult3 2109	BICO parameter for selecting the connectors for multiplier 3 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U110* Src DConn Mult 2110	BICO parameter for selecting the connectors for multiplier 1 (2 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U111* Src Conn Div1 2111	BICO parameter for selecting the connectors for divider 1 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U112* Src Conn Div2 2112	BICO parameter for selecting the connectors for divider 2 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U113* SrcDConn Div 2113	BICO parameter for selecting the connectors for divider 1 (2 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U114* SrcConnMult/Div1 2114	BICO parameter for selecting the connectors for high-resolution multiplier/divider 1 (1 word).	index1: 0 Unit: - Indices: 3 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U115* SrcConnMult/Div2 2115	BICO parameter for selecting the connectors for high-resolution multiplier/divider 2 (1 word).	index1: 0 Unit: - Indices: 3 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U116* SrcConnMult/Div3 2116	BICO parameter for selecting the connectors for high-resolution multiplier/divider 3 (1 word).	index1: 0 Unit: - Indices: 3 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U117* Src ConnAbsV1 2117	BICO parameter for selecting the connector for the 1st absolute-value generator with smoothing (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U118* Mode ConnAbsV1 2118	Function parameter for selecting the mode of the 1st absolute-value generator with smoothing (1 word).	Init: 0 Min: 0 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U119 SmoothConAbsV1 2119	Function parameter for entering the smoothing time constan of the 1st absolute-value generator with smoothing (1 word).	Init: 0 Min: 0 Max: 10000 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U120* Src ConnAbsV2 2120	BICO parameter for selecting the connector for the 2nd absolute-value generator with smoothing (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U121* Mode ConnAbsV2 2121	Function parameter for selecting the mode of the 2nd absolute-value generator with smoothing (1 word).	Init: 0 Min: 0 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U122 SmoothConAbsV2 2122	Function parameter for entering the smoothing time constants of the 2nd absolute-value generator with smoothing (1 word).	Init: 0 Min: 0 Max: 10000 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U123* Src ConnAbsV3 2123	BICO parameter for selecting the connector for the 3rd absolute-value generator with smoothing (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U124* Mode ConnAbsV3 2124	Function parameter for selecting the mode of the 3rd absolute-value generator (1 word).	Init: 0 Min: 0 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U125 SmoothConAbsV3 2125	Function parameter for entering the time constants of the 3rd absolute-value generator with smoothing (1 word).	Init: 0 Min: 0 Max: 10000 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U126* SrcDConnAbsV 2126	BICO parameter for selecting the connector for the 1st absolute-value generator with smoothing (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U127* Mode DConnAbsV 2127	Function parameter for selecting the mode of the 1st absolute-value generator with smoothing (2 word).	Init: 0 Min: 0 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U128 SmoothDConnAbsV 2128	Function parameter for entering the smoothing time constants of the 1st absolute-value generator with smoothing (2 word).	Init: 0 Min: 0 Max: 10000 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U129 FSetpConnLimitr1 2129	Function parameter for entering the fixed setpoint for limiter (1 word).	index1: 100,0C Min: -200,00 Max: 200,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U130* Src ConnLimitr1 2130	BICO parameter for selecting the connector for limiter 1 (1 word).	index1: 503 Unit: - Indices: 3 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U131 FSetpConnLimitr2 2131	Function parameter for entering the fixed setpoint for limiter (1 word).	index1: 100,0C Min: -200,00 Max: 200,00 Unit: % Indices: 4 ,FDS Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U132* Src ConnLimitr2 2132	BICO parameter for selecting the connector for limiter 2 (1 word).	index1: 506 Unit: - Indices: 3 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U133 FSetp DConnLmt 2133	Function parameter for entering the fixed setpoint for limiter (2 word).	index1: 100,0C Min: -200,00 Max: 200,00 Unit: % Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U134* SrcDConnLimitr 2134	BICO parameter for selecting the connector for limiter 1 (2 word).	index1: 509 Unit: - Indices: 3 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U135 FSetpConnLmtMon1 2135	Function parameter for entering the fixed setpoint for the 1st limit-value monitor with smoothing (1 word).	Init: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U136* SrcConnLmtMon1 2136	BICO parameter for selecting the connector for the 1st limit-value monitor with smoothing (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U137 SmConnLmtMon1 2137	Function parameter for entering the smoothing time constants of the 1st limit-value monitor with smoothing (1 word).	Init: 0 Min: 0 Max: 10000 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U138 HysConnLmtMon1 2138	Function parameter for entering the hysteresis of the 1st limi value monitor with smoothing (1 word).	Init: 0,00 Min: 0,00 Max: 199,99 Unit: % Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U139* ModeConnLmtMon1 2139	Function parameters for entering the mode of the 1st limit-value monitors with smoothing (1 word).	Init: 0 Min: 0 Max: 2 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U140 FSetpConnLmtMon1 2140	Function parameter for entering the fixed setpoint for the 2nd limit-value monitor with smoothing (1 word).	Init: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U141* SrcConnLmtMon2 2141	BICO parameter for selecting the connector for the 2nd limit-value monitor with smoothing (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U142 SmConnLmtMon 2 2142	Function parameter for entering the smoothing time constants of the 2nd limit-value monitors with smoothing (1 word).	Init: 0 Min: 0 Max: 10000 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U143 HysConnLmtMon2 2143	Function parameter for entering the hysteresis of the 2nd limit-value monitors with smoothing (1 word).	Init: 0,00 Min: 0,00 Max: 199,99 Unit: % Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U144* ModeConnLmtMon2 2144	Function parameter for entering the mode of the 2nd limit-value monitors with smoothing (1 word).	Init: 0 Min: 0 Max: 2 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U145 FSDConnLmtMon1 2145	Function parameter for entering the fixed setpoint for the 1st limit-value monitor with smoothing (2 word).	Init: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U146* SrcDConnLmtMon1 2146	BICO parameter for selecting the connector for the 1st limit-value monitor with smoothing (2 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U147 HysLmtMon3 2147	Function parameter for entering the smooothing time constants of the 1st limit-value monitor with smoothing (2 word).	Init: 0 Min: 0 Max: 10000 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U148 HysDConnLmtMon1 2148	Function parameter for entering the hysteresis of the 1st limi value monitor with smoothing (2 word).	Init: 0,00 Min: 0,00 Max: 199,99 Unit: % Indices: - Type: O4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U149* ModeDConnLmtMon1 2149	Function parameter for entering the mode of the 1st limit-value monitors with smoothing (2 word).	Init: 0 Min: 0 Max: 2 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U150 FSDConnLmtMon2 2150	Function parameter for entering the fixed setpoint for the 2nd limit-value monitor without smoothing (2 word).	Init: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U151* SrcDConnLmtMon2 2151	BICO parameter for selecting the connector for the 2nd limit-value monitor without smoothing (2 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U152 HysDConnLmtMon2 2152	Function parameter for entering the hysteresis of the 2nd limit-value monitor without smoothing (2 word).	Init: 0,00 Min: 0,00 Max: 199,99 Unit: % Indices: - Type: O4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U153* ModeDConnLmtMon2 2153	Function parameters for entering the mode of the 2nd limit-value monitor without smoothing (2 word).	Init: 0 Min: 0 Max: 2 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U154* Src Cam 1/2 2154	BICO parameter for selecting the connector for the cam controller with cam 1 and cam 2.	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U155 Hys Cam 1/2 2155	Function parameter for entering the hysteresis of the cam controller with cam 1 and cam 2.	Init: 0 Min: 0 Max: 2147483647 Unit: - Indices: - Type: O4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U156 ON-Pos Cam1 2156	Function parameter for entering the ON-position of cam 1. The value of the ON position must be smaller than that of the OFF position.	index1: 0 Min: -2147483647 Max: 2147483647 Unit: - Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U157 OFF-Pos Cam1 2157	Function parameter for entering the OFF-position of cam 1.	index1: 0 Min: - 2147483647 Max: 2147483647 Unit: - Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U158 ON-Pos Cam2 2158	Function parameter for entering the ON-Position of cam 2.	index1: 0 Min: - 2147483647 Max: 2147483647 Unit: - Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U159 OFF-Pos Cam2 2159	Function parameter for entering the OFF-position of cam 2.	index1: 0 Min: - 2147483647 Max: 2147483647 Unit: - Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U160* Src Cam 3/4 2160	BICO parameter for selecting the connector for the cam controller with cam 3 and cam 4.	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U161 Hys Cam 3/4 2161	Function parameter for entering the hysteresis of the cam controller with cam 3 and cam 4.	Init: 0 Min: 0 Max: 2147483647 Unit: - Indices: - Type: O4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U162 ON-Pos Cam3 2162	Function parameter for entering the ON-position of cam 3.	index1: 0 Min: - 2147483647 Max: 2147483647 Unit: - Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U163 OFF-Pos Cam3 2163	Function parameter for entering the OFF-position of cam 3.	index1: 0 Min: - 2147483647 Max: 2147483647 Unit: - Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U164 ON-Pos Cam4 2164	Function parameters for entering the ON-position of cam 4.	index1: 0 Min: - 2147483647 Max: 2147483647 Unit: - Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U165 OFF-Pos Cam4 2165	Function parameters for entering the OFF-position of cam 4.	index1: 0 Min: - 2147483647 Max: 2147483647 Unit: - Indices: 4 ,FDS Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U166* Src1 ConnCh1 2166	BICO parameter for selecting the binector for the analog-signal changeover switch 1 (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U167* Src2 ConnCh1 2167	BICO parameter for selecting the connectors for analog-signal changeover switch 1 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U168* Src1 ConnCh2 2168	BICO parameter for selecting the binector for analog-signal changeover switch 2 (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U169* Src2 ConnCh2 2169	BICO parameter for selecting the connectors for analog-signal changeover switch 2 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U170* Src1 ConnCh3 2170	BICO parameter for selecting the binector for analog-signal changeover switch 3 (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U171* Src2 ConnCh3 2171	BICO parameter for selecting the connectors for analog-signal changeover switch 3 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U172* Src1 ConnCh4 2172	BICO parameter for selecting the binector for analog-signal changeover switch 4 (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U173* Src2 ConnCh4 2173	BICO parameter for selecting the connectors for analog-signal changeover switch 4 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U174* Src1 ConnCh5 2174	BICO parameter for selecting the binector for analog-signal changeover switch 5 (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U175* Src2 ConnCh5 2175	BICO parameter for selecting the connectors for analog-signal changeover switch 5 (1 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U176* Src1DconnCh1 2176	BICO parameter for selecting the binector for analog-signal changeover switch 1 (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U177* Src2DConnCh1 2177	BICO parameter for selecting the connectors for analog-signal changeover switch 1 (2 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks + Technology + Positioning - Upread/free access Changeable in: - Drive setting
U178* Src1DConnCh2 2178	BICO parameter for selecting the binector for analog-signal changeover switch 2 (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U179* Src2DConnCh2 2179	BICO parameter for selecting the connectors for analog-signal changeover switch 2 (2 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U180* Src1DConnCh3 2180	BICO parameter for selecting the binector for analog-signal changeover switch 3 (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U181* Src2DConnCh3 2181	BICO parameter for selecting the connectors for analog-signal changeover switch 3 (2 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U182* Src1DConnCh4 2182	BICO parameter for selecting the binector for analog-signal changeover switch 4 (2 word).	Init: Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U183* Src2DConnCh4 2183	BICO parameter for selecting the connectors for analog-signal changeover switch 4 (2 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U184* Src1DConnCh5 2184	BICO parameter for selecting the binector for analog-signal changeover switch 5 (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U185* Src2DConnCh5 2185	BICO parameter for selecting the connectors for analog-signal changeover switch 5 (2 word).	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U186* Src1 Multiplex 2186	Source for the binectors of the multiplexer with 8 channels: Index 1 : Signal selection Bit 0 Index 2 : Signal selection Bit 1 Index 3 : Signal selection Bit 2 Index 4 : Enable signal selection	index1: 0 Unit: - Indices: 4 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U187* Src 2 Multiplex 2187	The parameter defines the connector inputs of the multiplexer with 8 channels: Index 1 : Input 1 to Index 8 : Input 8	index1: 0 Unit: - Indices: 8 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U188* Src1 Demultiplex 2188	BICO for selecting the binectors for the demultiplexer with 8 channels (2 word).	index1: 0 Unit: - Indices: 5 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U189* Src2 Demultiplex 2189	BICO parameter for selecting the connectors for the demultiplexer with 8 channels (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U190* Src Char1 2190	BICO parameter for selecting the connectors for characteristic block 1 (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U191 X-Vals Char1 2191	Function parameters for entering the X-values for characteristic block 1 (1 word).	index1: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: 10 Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U192 Y-Vals Char1 2192	Function parameters for entering the Y-values for characteristic block 1 (1 word).	index1: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: 10 Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U193* Src Char2 2193	BICO parameter for selecting the connectors for characteristic block 2 (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U194 X-Vals Char2 2194	Function parameters for entering the X-values for characteristic block 2 (1 word).	index1: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: 10 Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U195 Y-Vals Char2 2195	Function parameters for entering the Y-values for characteristic block 2 (1 word).	index1: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: 10 Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U196* Src Char3 2196	BICO parameter for selecting the connectors for the characteristic block 3 (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U197 X-Vals Char3 2197	Function parameters for entering the X-values for characteristic block 2 (1 word).	index1: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: 10 Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U198 Y-Vals Char3 2198	Function parameters for entering the Y-values for characteristic block 3 (1 word).	index1: 0,00 Min: -200,00 Max: 200,00 Unit: % Indices: 10 Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U199* Src DeadZone 2199	BICO parameter for selecting the connectors for the dead zone (1 word).	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U200 Neutral Zone 2200	Function parameter for entering the neutral zone for the dea zone (1 word).	Init: 0,00 Min: 0,00 Max: 100,00 Unit: % Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U201* SrcMaxSel 2201	BICO parameter for selecting the connectors for maximum selection (2 word).	index1: 0 Unit: - Indices: 3 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U202* SrcMinSel 2202	BICO parameter for selecting the connectors for minimum selection (2 word).	index1: 0 Unit: - Indices: 3 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U203* Src1 Tra/Stor1 2203	BICO parameter for selecting the binectors for the control inputs of the tracking/storage element. Index 1: Track Index 2: Store Index 3: Reset	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U204* Src2 Tra/Stor1 2204	BICO parameter for selecting the connector for tracking/storage element 1 (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U205* Mode Tra/Stor1 2205	Function parameter for selecting the mode of the tracking/storage element (2 word). Parameter value 0 = non-volatile memory off 1 = non-volatile memory on	Init: 0 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U206* Src1 Tra/Stor2 2206	BICO parameter for selecting the binectors for the control inputs of the tracking/storage element. Index 1: Track Index 2: Store Index 3: Reset	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U207* Src2 Tra/Stor2 2207	BICO parameter for selecting the connectors for tracking/storage element 2 (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U208* Mode Tra/Stor2 2208	Function parameter for selecting the mode of the tracking/storage element (2 word). Parameter value 0 = non-volatile memory off 1 = non-volatile memory on	Init: 0 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U209* Src1 Store 1 2209	BICO parameter for selecting the connectors for analog-signal storage 1 (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U210* Src2 Store 1 2210	BICO parameter for selecting the binector for analog-signal storage 1 (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U211* Src1 Store 2 2211	BICO parameter for selecting the connectors for analog-signal storage 2 (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U212* Src2 Store 2 2212	BICO parameter for selecting the binector for analog-signal storage 2 (2 word).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U221* Src AND1 2221	BICO parameter for selecting the binectors for AND element 1 (Output = B601).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U222* Src AND2 2222	BICO parameter for selecting the binectors for AND element 2 (Output = B602).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U223* Src AND3 2223	BICO parameter for selecting the binectors for AND element 3 (Output = B603).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U224* Src AND4 2224	BICO parameter for selecting the binectors for AND element 4 (Output = B604).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U225* Src AND5 2225	BICO parameter for selecting the binectors for AND element 5 (Output = B605).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U226* Src AND6 2226	BICO parameter for selecting the binectors for AND element 6 (Output = B606).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U227* Src AND7 2227	BICO parameter for selecting the binectors for AND element 7 (Output = B607).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U228* Src AND8 2228	BICO parameter for selecting the binectors for AND element 8 (Output = B608).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U229* Src AND9 2229	BICO parameter for selecting the binectors for AND element 9 (Output = B609).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U230* Src AND10 2230	BICO parameter for selecting the binectors for AND element 10 (Output = B610).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U231* Src AND11 2231	BICO parameter for selecting the binectors for AND element 11 (Output = B611).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U232* Src AND12 2232	BICO parameter for selecting the binectors for AND element 12 (Output = B612).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U233* Src AND13 2233	BICO parameter for selecting the binectors for AND element 13 (Output = B613).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U234* Src AND14 2234	BICO parameter for selecting the binectors for AND element 14 (Output = B614).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U235* Src AND15 2235	BICO parameter for selecting the binectors for AND element 15 (Output = B615).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U236* Src AND16 2236	BICO parameter for selecting the binectors for AND element 16 (Output = B616).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U237* Src AND17 2237	BICO parameter for selecting the binectors for AND element 17 (Output = B617).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U238* Src AND18 2238	BICO parameter for selecting the binectors for AND element 18 (Output = B618).	index1: 1 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U239* Src OR1 2239	BICO parameter for selecting the binectors for OR element 1 (Output = B619).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U240* Src OR2 2240	BICO parameter for selecting the binectors for OR element 2 (Output = B620).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U241* Src OR3 2241	BICO parameter for selecting the binectors for OR element 3 (Output = B621).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U242* Src OR4 2242	BICO parameter for selecting the binectors for OR element 4 (Output = B622).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U243* Src OR5 2243	BICO parameter for selecting the binectors for OR element 5 (Output = B623).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U244* Src OR6 2244	BICO parameter for selecting the binectors for OR element 6 (Output = B624).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U245* Src OR7 2245	BICO parameter for selecting the binectors for OR element 7 (Output = B625).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U246* Src OR8 2246	BICO parameter for selecting the binectors for OR element 8 (Output = B626).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U247* Src OR9 2247	BICO parameter for selecting the binectors for OR element 9 (Output = B627).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U248* Src OR10 2248	BICO parameter for selecting the binectors for OR element 10 (Output = B628).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U249* Src OR11 2249	BICO parameter for selecting the binectors for OR element 11 (Output = B629).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U250* Src OR12 2250	BICO parameter for selecting the binectors for OR element 12 (Output = B630).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U251* Src BinInv1 2251	BICO parameter for selecting the binector for inverter 1 (Output = B641).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U252* Src BinInv2 2252	BICO parameter for selecting the binector for inverter 2 (Output = B642).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U253* Src BinInv3 2253	BICO parameter for selecting the binector for inverter 3 (Output = B643).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U254* Src BinInv4 2254	BICO parameter for selecting the binector for inverter 4 (Output = B644).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U255* Src BinInv5 2255	BICO parameter for selecting the binector for inverter 5 (Output = B645).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U256* Src BinInv6 2256	BICO parameter for selecting the binector for inverter 6 (Output = B646).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U257* Src BinInv7 2257	BICO parameter for selecting the binector for inverter 7 (Output = B647).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U258* Src BinInv8 2258	BICO parameter for selecting the binector for inverter 8 (Output = B648).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U259* Src BinInv9 2259	BICO parameter for selecting the binector for inverter 9 (Output = B649).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U260* Src BinInv10 2260	BICO parameter for selecting the binector for inverter 10 (Output = B650).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U261* Src NAND1 2261	BICO parameter for selecting the binectors for NAND element 1 (Output = B681).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U262* Src NAND2 2262	BICO parameter for selecting the binectors for NAND element 2 (Output = B682).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U263* Src NAND3 2263	BICO parameter for selecting the binectors for NAND element 3 (Output = B683).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U264* Src NAND4 2264	BICO parameter for selecting the binectors for NAND element 4 (Output = B684).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U265* Src NAND5 2265	BICO parameter for selecting the binectors for NAND element 5 (Output = B685).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U266* Src NAND6 2266	BICO parameter for selecting the binectors for NAND element 6 (Output = B686).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U267* Src NAND7 2267	BICO parameter for selecting the binectors for NAND element 7 (Output = B687).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U268* Src NAND8 2268	BICO parameter for selecting the binectors for NAND element 8 (Output = B688).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U269* Src SH2 B 2269	Sample&Hold module Input parameter for binectors	index1: 0 Unit: - Indices: 8 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U270* SH2 Time Slot 2270	Sample&Hold element Parameter for entering the slower time slot	Init: 2 Min: 2 Max: 10 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U271* Src BinCh1 2271	BICO parameter for selecting the binectors for binary-signal changeover switch 1 (Output= B661).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U272* Src BinCh2 2272	BICO parameter for selecting the binectors for binary-signal changeover switch 2 (Output= B662).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U273* Src BinCh3 2273	BICO parameter for selecting the binectors for binary-signal changeover switch 3 (Output= B663).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U274* Src BinCh4 2274	BICO parameter for selecting the binectors for binary-signal changeover switch 4 (Output= B664).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U275* Src BinCh5 2275	BICO parameter for selecting the binectors for binary-signal changeover switch 5 (Output= B665).	index1: 0 Unit: - Indices: 3 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U276* Src EXOR1 2276	BICO parameter for selecting the binectors for EXOR (exclusive or) element 1 (Output = B666).	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U277* Src EXOR2 2277	BICO parameter for selecting the binectors for EXOR element 2 (Output = B667).	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U278* Src EXOR3 2278	BICO parameter for selecting the binectors for EXOR element 3 (Output = B668).	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U279* Src D-FlipFlop1 2279	BICO parameter for selecting the binectors for D flipflop element 1 (Outputs: Q = B525, $\overline{Q}$ = B526).	index1: 0 Unit: - Indices: 4 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U280* Src D-FlipFlop2 2280	BICO parameter for selecting the binectors for D flipflop 2 (Outputs: Q = B527, $\overline{Q}$ = B528).	index1: 0 Unit: - Indices: 4 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U281* Src RS-FlipFlop1 2281	BICO parameter for selecting the binectors for RS flipflop 1 (Outputs: Q = B501, $\overline{Q}$ = B502).	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U282* Src RS-FlipFlop2 2282	BICO parameter for selecting the binectors for RS flipflop 2 (Outputs: Q = B503, $\overline{Q}$ = B504).	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U283* Src RS-FlipFlop3 2283	BICO parameter for selecting the binectors for RS flipflop 3 (Outputs: Q = B505, $\overline{Q}$ = B506).	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U284* Src RS-FlipFlop4 2284	BICO parameter for selecting the binectors for RS flipflop 4 (Outputs: Q = B507, $\overline{Q}$ = B508).	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U285* Src RS-FlipFlop5 2285	BICO parameter for selecting the binectors for RS flipflop 5 (Outputs: Q = B509, $\overline{Q}$ = B510).	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U286* Src RS-FlipFlop6 2286	BICO parameter for selecting the binectors for RS flipflop 6 (Outputs: Q = B511, $\overline{Q}$ = B512).	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U287* Src RS-FlipFlop7 2287	BICO parameter for selecting the binectors for RS flipflop 7 (Outputs: Q = B513, $\overline{Q}$ = B514).	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U288* Src RS-FlipFlop8 2288	BICO parameter for selecting the binectors for RS flipflop 8 (Outputs: Q = B515, $\overline{Q}$ = B516).	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U289* Src RS-FlipFlop9 2289	BICO parameter for selecting the binectors for RS flipflop 9 (Outputs: Q = B517, $\overline{Q}$ = B518).	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U290* SrcRS-FlipFlop10 2290	BICO parameter for selecting the binectors for RS flipflop 10 (Outputs: Q = B519, $\overline{Q}$ = B520).	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U291* SrcRS-FlipFlop11 2291	BICO parameter for selecting the binectors for RS flipflop 11 (Outputs: Q = B521, $\overline{Q}$ = B522).	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U292* SrcRS-FlipFlop12 2292	BICO parameter for selecting the binectors for RS flipflop 12 (Outputs: Q = B523, $\overline{Q}$ = B524).	index1: 0 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U293* Src Timer1 2293	BICO parameter for selecting the binector for the 1st timer (0 to 60,000 s).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U294 Time Timer1 2294	Function parameter for entering the time for the 1st timer (1 to 60,000 s).	index1: 0,000 Min: 0,000 Max: 60,000 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U295* Mode Timer1 2295	Function parameter for entering the mode for the 1st timer (1 to 60,000 s).	Init: 0 Min: 0 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U296* Src Timer2 2296	BICO parameter for selecting the binector for the 2nd timer (1 to 60,000 s).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U297 Time Timer2 2297	Function parameter for entering the time for the 2nd timer (1 to 60,000 s). FDS	index1: 0,000 Min: 0,000 Max: 60,000 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U298* Mode Timer2 2298	Function parameter for entering the mode for the 2nd timer(1 to 60,000 s).	Init: 0 Min: 0 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U299* Src Timer3 2299	BICO parameter for selecting the binector for the 3rd timer (1 to 60,000 s).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U300 Time Timer3 2300	Function parameter for entering the time for the 3rd timer 1 t 60,000 s). FDS	index1: 0,000 Min: 0,000 Max: 60,000 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U301* Mode Timer3 2301	Function parameter for entering the mode for the 3rd timer (1 to 60,000 s).	Init: 0 Min: 0 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U302* Src Timer4 2302	BICO parameter for selecting the binector for the 4th timer (1 to 60,000 s).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U303 Time Timer4 2303	Function parameter for entering the time for the 4th timer (1 to 60,000 s). FDS	index1: 0,000 Min: 0,000 Max: 60,000 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U304* Mode Timer4 2304	Function parameter for entering the mode for the 4th timer (1 to 600,000 s).	Init: 0 Min: 0 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U305* Src Timer5 2305	BICO parameter for selecting the binector for the 5th timer (0 to 600,000 s).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U306 Time Timer5 2306	Function parameter for entering the time for the 5th timer (0 to 600,000s). FDS	index1: 0,00 Min: 0,00 Max: 600,00 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U307* Mode Timer5 2307	Function parameter for entering the mode for the 5th timer(0 to 600,000s).	Init: 0 Min: 0 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U308* Src Timer6 2308	BICO parameter for selecting the binector for the 6th timer (0 to 600,000s).	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U309 Time Timer6 2309	Function parameter for entering the time for the 6th timer (0 to 600,000s). FDS	index1: 0,00 Min: 0,00 Max: 600,00 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U310* Mode Timer6 2310	Function parameter for entering the mode for the 6th timer (0 to 600,00s).	Init: 0 Min: 0 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U311* Src1 Timer7 2311	BICO parameter for selecting the binector for the 7th timer (1 to 60 000 s) with adaptation.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U312* Src2 Timer7 2312	BICO parameter for selecting the connectors for the 7th timer (1 to 60 000 s) with adaptation.	Init: 1 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U313 Time Timer7 2313	Function parameter for entering the time for the 7th timer (1 to 60 000 s) with adaptation.	index1: 0,000 Min: 0,000 Max: 60,000 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U314* Mode Timer7 2314	Function parameter for entering the mode for the 7th timer (1 to 60 000 s) with adaptation.	Init: 0 Min: 0 Max: 3 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U315 Param Counter 2315	Function parameter for entering the fixed setpoints for the 16 bit software counter.	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 4 Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U316* Src ParamCounter 2316	BICO parameter for selecting the connectors for the 16 bit software counter.	index1: 561 Unit: - Indices: 4 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U317* Src Bin Counter 2317	BICO parameter for selecting the binectors for the 16 bit software counter.	index1: 0 Unit: - Indices: 5 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
n318 Counter Output 2318	Visualization parameter for counter output of the 16 bit software counter.	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access
U320* SrcComfRGen In 2320	BICO parameter for selecting the connector for the input of the comfort ramp-function generator.	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U321* SrcComfRGen Stop 2321	BICO parameter for selecting the binector for stopping of the comfort ramp-function generator.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U322* SrcComfRGen SD 2322	BICO parameter for selecting the binector for shutdown of the comfort ramp-function generator.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U323* SrcComfRGenSetV 2323	BICO parameter for selecting the connector for the setting value of the comfort ramp-function generator.	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U324* Src Set ComfRGen 2324	BICO parameter for selecting the binector for setting the comfort ramp-function generator.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U325* Src Rel ComfRGen 2325	BICO parameter for selecting the binector for releasing the comfort ramp-function generator.	Init: 1 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
n326 ComfRGen Input 2326	Visualization parameter input of comfort ramp-function generator.	Dec.Plc.: 2 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access

Parameter	Description	Data	Read/write
U327 ComfRGen Round 2327	Operating mode for rounding of the comfort ramp-function generator. 0 = Rounding does not act upon sudden reduction of input value during acceleration process 1 = Rounding acts at all times. At a sudden reduction of the input value, overshoot can occur.	Init: 0 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U328* SrcComfRGenBridg 2328	BICO parameter for selecting the binector for bridging the comfort ramp-function generator.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U329* SrcComfRGenAdap 2329	BICO parameter for selecting the connector for adaptation o the comfort ramp-function generator.	Init: 1 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U330 ComfRGenAccelT 2330	Function parameter for input of the acceleration time of the comfort ramp-function generator. The unit of the acceleration time is set in U331.	index1: 10,0 Min: 0,0 Max: 999,9 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U331 ComfRGenUnitAT 2331	Function parameter for entering the unit of the acceleration time of the comfort ramp-function generator. 0 = seconds 1 = minutes 2 = hours	index1: 0 Min: 0 Max: 2 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U332 ComfRGenDecelT 2332	Function parameter for entering the deceleration time of the comfort ramp-function generator. The unit of the deceleration time is set in U333.	index1: 10,0 Min: 0,0 Max: 999,9 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U333 ComfRGenUnitDT 2333	Function parameter for entering the unit of the deceleration time of the comfort ramp-function generator. 0 = seconds 1 = minutes 2 = hours	index1: 0 Min: 0 Max: 2 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U334 ComfRGenInitRd 2334	Function parameter for input of the initial rounding time of th comfort ramp-function generator.	index1: 0,00 Min: 0,00 Max: 10,00 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U335 ComfRGenEndRd 2335	Function parameter for input of the final rounding time of the comfort ramp-function generator.	index1: 0,00 Min: 0,00 Max: 10,00 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U336 ComfRGenRtdAT 2336	Parameter for entering the rated acceleration time of the comfort ramp-function generator. The following applies: Acceleration time = rated acceleration time -> dy/dt = 100%	Init: 0,01 Min: 0,01 Max: 300,00 Unit: s Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U337 ComfRGenQSTime 2337	Parameter for entering the quick stop time of the comfort ramp-function generator.	Init: 10,0 Min: 0,0 Max: 999,9 Unit: s Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U338* SrcComfRGen QS 2338	BICO parameter for selecting the binector for quick stop of the comfort ramp-function generator.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
n339 ComfRGen EffTime 2339	Visualization parameter for the effective acceleration/deceleration time of the comfort ramp-function generator: Index 0: effective acceleration time Index 1: effective deceleration time	Dec.Plc.: 1 Unit: s Indices: 2 Type: O4	Menus: - Parameter menu + Free blocks - Upread/free access
n340 ComfRGen Output 2340	Visualization parameter for output of the comfort ramp-function generator.	Dec.Plc.: 2 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access
n341 ComfRGen dy/dt 2341	Visualization parameter dy/dt of the comfort ramp-function generator.	Dec.Plc.: 2 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access
U342 ComfRGen IntLmt 2342	Parameter for input of the internal limitation of the comfort ramp-function generator.	Init: 100,00 Min: 0,00 Max: 200,00 Unit: % Indices: - Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U343* SrcComfRGenPosL 2343	BICO parameter for selecting the connector for the positive internal limitation of the comfort ramp-function generator.	Init: 573 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U344* SrcComfRGenNegL 2344	BICO parameter for selecting the connector for the negative internal limitation of the comfort ramp-function generator.	Init: 574 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U345* Src FDS.CoRFG 2345	The parameter makes it possible to disconnect function dataset switchover for the comfort ramp function generator. This permits independent changeover of the ramp generator parameter.	index1: 92 Unit: - Indices: 2 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U346* Src SH3 KK 2346	Sample&Hold element Input parameter for the double word connectors	index1: 0 Unit: - Indices: 4 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U347* Src SH3 K 2347	Sample&Hold element Input parameter for connectors	index1: 0 Unit: - Indices: 8 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U348* Src SH3 B 2348	Sample&Hold module Input parameter for binectors	index1: 0 Unit: - Indices: 8 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U349* SH3 Time Slot 2349	Sample&Hold element Parameter for entering the slower time slot	Init: 2 Min: 2 Max: 10 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U350* Src TeCntr Rel 2350	BICO parameter for selecting the binector for enabling the technology controller.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U351 TeCntr RegType 2351	Parameter for entering the controller type of the technology controller. 0 = Normal PID controller 1 = PI controller with D component in actual-value channel	Init: 1 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U352* Src TeCntr Setp 2352	BICO parameter for selecting the connector for the setpoint of the technology controller.	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U353 TeCntr SetpSmth 2353	Parameter for entering the setpoint smoothing time constant of the technology controller.	Init: 0,00 Min: 0,00 Max: 60,00 Unit: s Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n354 TeCntr Setp 2354	Visualization parameter, smoothed setpoint of the technolog controller.	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access
U355* Src TeCntr ActV 2355	BICO parameter for selecting the connector for the actual value of the technology contoller.	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
n356 TeCntr ActV 2356	Visualization parameter, actual-value of the technology controller.	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access
n357 TeCntr Deviation 2357	Visualization parameter, set/actual value deviation of the technology controller with the "PID controller" type. The inverted actual value is displayed on the "PI controller with D component in actual-value channel" controller type.	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access
U358 TeCntr ActVSmth 2358	Parameter for entering the actual-value smoothing time constants of the technology controller.	Init: 0,00 Min: 0,00 Max: 60,00 Unit: s Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n359 TeCntr Input 2359	Visualization parameter, input of the technology controller.	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access
U360* SrcTeCntr I Set 2360	BICO parameter for selecting the binector for setting the I component of the technology controller.	Init: 556 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U361* Src TeCntr ISetV 2361	BICO parameter for selecting the connector for the setting value of the technology controller's I component.	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U362* Src TeCntr Droop 2362	BICO parameter for selecting the connector for the droop of the technology controller.	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U363* Src TeCntrGainAd 2363	BICO parameter for selecting the connector for the gain adaption of the technology controller.	Init: 1 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U364 TeCntr BasicGain 2364	Function parameter for entering the basic gain of the technology controller.	index1: 3,00 Min: 0,00 Max: 125,00 Unit: - Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n365 TeCntr Eff.Gain 2365	Visualization parameter, effective gain of the technology controller.	Dec.Plc.: 2 Unit: - Indices: - Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access

Parameter	Description	Data	Read/write
U366 TeCntr Time 2366	Function parameter for entering the integral time of the technology controller.	index1: 3,00 Min: 0,00 Max: 100,00 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U367 TeCntrDerivation 2367	Function parameter for entering the derivative time of the technology controller.	index1: 0,00 Min: 0,00 Max: 60,00 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U368* Src TeCntr PRE 2368	BICO parameter for selecting the connector for the pre-control signal of the technology controller.	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U369 TeCntrFStpOutLim 2369	Parameter for entering a fixed setpoint value for the output limitation ramp-function generator of the technology controlle	Init: 100,0 Min: 0,0 Max: 200,0 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U370* Src TeCntrOutLim 2370	BICO parameter for selecting the connectors for the output limitation of the technology controller. Index 1: Connector for upper output limitation (B+) Index 2: Connector for lower output limitation (B-)	index1: 586 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U371 TeCntrOutLimTime 2371	Parameter for entering the acceleration/deceleration time for the output limitation of the technology controller.	Init: 0,00 Min: 0,00 Max: 100,00 Unit: s Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n372 TeCntr Output 2372	Visualization parameter, output of the technology controller after output limitation.	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access
U380* Src SimpRGen In 2380	BICO parameter for selecting the connector for the input of the simple ramp-function generator.	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U381* Src Set SimpRGen 2381	BICO parameter for selecting the binector for setting the simple ramp-function generator.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U382* Src SetVSimpRGen 2382	BICO parameter for selecting the connector for the setting value of the simple ramp-function generator.	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U383 SimpRG Ac/DcTime 2383	Parameter for entering the acceleration and deceleration tim of the simple ramp-function generator. Index 1: Acceleration time Index 2: Deceleration time	index1: 10,00 Min: 0,00 Max: 100,00 Unit: s Indices: 2 Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U390* SrcWobbSetp Unwo 2390	BICO parameter for selecting the connector for the input of the wobble generator	Init: 0 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U391* Src Wobb SyncInp 2391	BICO parameter for selecting the binector for the master synchronizing signal of the wobble generator	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U392* Src Wobb Rel 2392	BICO parameter for selecting the binector for wobble release	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting
U393 Wobb Amplitude 2393	Function parameter for entering the wobble amplitude as a relation to the input signal amount (setpoint)	index1: 0,00 Min: 0,00 Max: 20,00 Unit: % Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U394 Wobb Freq 2394	Function parameter for entering the frequency of the wobble signal	index1: 60,0 Min: 0,1 Max: 120,0 Unit: 1/min Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U395 Wobb Phase Shift 2395	Function parameter for entering the phase shift of the wobbl signal compared to the master synchronizing signal. At a value of 360°, the synchronizing signal is not observed; coasting wobbling takes place.	index1: 360 Min: 0 Max: 360 Unit: ° (alt) Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U396 Wobb P-Step 2396	Function parameter for entering the amount of the negative P step as a percentage of the wobble amplitude	index1: 0,00 Min: 0,00 Max: 100,00 Unit: % Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U397 Wobb P-Step 2397	Function parameter for entering the amount of the positive P step as a percentage of the wobble amplitude.	index1: 0,00 Min: 0,00 Max: 100,00 Unit: % Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U398 Wobb Sampl Ratio 2398	Function parameter for entering the time portion of the increasing edge of the wobble signal	index1: 50 Min: 0 Max: 100 Unit: % Indices: 4 ,FDS Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
n399 Wobb Gen Outp 2399	Visualization parameter for displaying the wobble signal.	Dec.Plc.: 1 Unit: % Indices: - Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access
U400* SrcConnAnaDel_1 2400	Parameter for selecting the double word connector for the 1s analog delay element.	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U401* AnaDelayEl_1_T 2401	Parameter for entering the delay cycles of the 1st analog delay element	Init: 0 Min: 0 Max: 32 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U402* SrcConnAnaDE_2 2402	Parameter for selecting the double word connector for the 2nd analog delay element	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U403* AnaDE_2_T 2403	Parameter for entering the delay cycles of the 2nd analog delay element	Init: 0 Min: 0 Max: 32 Unit: - Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U404* SrcSampTChange 2404	Parameter array for selecting the binectors for the 6 sampling time changeover contacts	index1: 0 Unit: - Indices: 6 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U405* SrcMulDiv32_1_32 2405	Parameter for selecting the 32-bit connector for the high-resolution multiplier/divider 1 (2-word)	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U406* SrcMulDiv32_1_16 2406	Parameter for selecting the 16-bit connectors for the high-resolution multiplier/divider 1 (2-word)	index1: 0 Unit: - Indices: 2 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U407* SrcPulsGen Tp 2407	Parameter for selecting a connector as input for determination of the period of the 1st pulse generator	Init: 613 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U408* Src Integr32_1 2408	Parameter array for selecting the double-word connectors fo the 1st 32-bit integrator: Index 1: Current input value Index 2: Upper limit Index 3: Lower limit Index 4: Set value	index1: 0 Unit: - Indices: 4 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U409* Src Integr32_1_t 2409	Parameter for selecting the integral time constant for the 1st 32-bit integrator.	Init: 611 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U410* Src Integr32_1_s 2410	Parameter for selecting a binector as setting command for the 1st 32-bit integrator.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U411* Src Integr32_2 2411	Parameter arry for selecting the double-word connectors for the 2nd 32-bit integrator. Index 1: Current input value Index 2: Upper limit Index 3: Lower limit Index 4: Set value	index1: 0 Unit: - Indices: 4 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U412* Src Integr32_2_t 2412	Parameter for selecting the integral time constant for the 2nd 32-bit integrator	Init: 612 Unit: - Indices: - Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U413* Src Integr32_2_s 2413	Parameter for selecting a binector as setting command for the 2nd 32-bit integrator.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U414* Src PT1Gl32_1 2414	Parameter for selecting a double-word connector as input value for the 1st 32-bit PT1 element.	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U415* PT1Element32_1_t 2415	Parameter for entering the filtering time for the 1st 32-bit PT1 element.	Init: 0 Min: 0 Max: 10000 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U416* SrcPT1Elem32_1_s 2416	Parameter for selecting a binector as setting comand for the 1st 32-bit PT1 element.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U417* Src PT1Elem32_2 2417	Parameter for selecting a double-word connector as input value for the 2nd 32-bit PT1 element	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U418* PT1Elem32_2_t 2418	Parameter for entering the filtering time for the 2nd 32-bit PT1 element.	Init: 0 Min: 0 Max: 10000 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U419* Src PT1El32_2_s 2419	Parameter for selecting a binector as the setting command for the 2nd 32-bit PT1 element.	Init: 0 Unit: - Indices: - Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U420* Src DElem32_1 2420	Parameter for selecting a double-word connector as input value for the 1st 32-bit D element.	Init: 0 Unit: - Indices: - Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U421* Src DElem32_1_t 2421	Parameter for entering the time constant for the 1st 32-bit D element	Init: 0,01 Min: 0,01 Max: 300,00 Unit: s Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U433* Integr32_1_Ti 2433	Parameter for entering the integral time constant of the 1st 32-bit integrator.	Init: 0,000 Min: 0,000 Max: 60,000 Unit: s Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U434* Integr32_2_Ti 2434	Parameter for entering the integral time constant of the 2nd 32-bit integrator.	Init: 0,000 Min: 0,000 Max: 60,000 Unit: s Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U435* ImpGen_1_Tp 2435	Parameter for entering the period of the 1st pulse generator.	Init: 0 Min: 0 Max: 60000 Unit: ms Indices: - Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U438* Src ConnToPar # 2438	BICO parameter for selecting the connector whose value supplies the parameter number for the connector-to-parameter converter.	index1: 479 Unit: - Indices: 5 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U439* SrcConnToPar Ind 2439	BICO parameter for selecting the connector whose value supplies the parameter index for the connector-to-parameter converter.	index1: 480 Unit: - Indices: 5 Type: L2 ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U440* P-Ampf Gain 2440	Kp for the P amplifier/multiplier (2-word) Figure range: -999.99 bis 999.99 Index 1: for 1st P amplifer/multiplier Index 2: for 2nd P amplifer/multiplier	index1: 1,00 Min: -1000,00 Max: 1000,00 Unit: - Indices: 2 Type: I4	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U441* Src P-Amplifier 2441	Parameter for selecting 32-bit connectors for the P amplifier/multiplier (2-word) Index 1: 1st P amplifier/multiplier Index 2: 2nd P amplifier/multiplier	index1: 0 Unit: - Indices: 2 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U442* Shift 32_number 2442	Number of shift steps for the shift multiplier/divider. Figure range: -31 to 31 Index 1: for 1st shift multiplier/divider Index 2: for 2nd shift multiplier/divider Index 3: for 3rd shift multiplier/divider Index 4: for 4th shift multiplier/divider	index1: 0 Min: -31 Max: 31 Unit: - Indices: 4 Type: I2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U443* Src Shift32 2443	Parameter for selecting 32-bit connectors for the shift multipliers/dividers (2-word) Index 1: 1st shift multiplier/divider Index 2: 2nd shift multiplier/divider Index 3: 3rd shift multiplier/divider Index 4: 4th shift multiplier/divider	index1: 0 Unit: - Indices: 4 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U444* Src ConnToPar V 2444	BICO parameter for selecting the connector whose value is to be stored on the parameter. IMPORTANT. If there is a change of softwiring during the "Operation" drive status, the trigger condition must always be softwired and be at 0, as otherwise unintentional parameter changes may occur.	index1: 0 Unit: - Indices: 5 Type: L2 ,K ,K	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U445* ConnToPar Par# 2445	Function parameter whose value contains the parameter number for the connector-to- parameter converter. 0 = no parameter selected.	index1: 0 Min: 0 Max: 2999 Unit: - Indices: 5 Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U446* ConnToPar Index 2446	Function parameter whose value contains the index of the parameter for the connector-to- parameter converter. 0 = no index parameter.	index1: 0 Min: 0 Max: 255 Unit: - Indices: 5 Type: O2	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U447* SrcConnToPar Trg 2447	BICO parameter for selecting the binector for the trigger signal which results in storage of the connector value on the parameter. IMPORTANT: If the softwiring is changed during the "Operation" drive status, the trigger condition must always be softwired and be at 0, as otherwise unintentional parameter changes may occur.	index1: 0 Unit: - Indices: 5 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U448* SrcConnToParEEPR 2448	BICO parameter for selecting the binector which determines the memory area for the connector-to-parameter conversion 0 = RAM 1 = EEPROM IMPORTANT. If the EEPROM is continually written with different values, this will reduce the service life of the component.	index1: 0 Unit: - Indices: 5 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U449* SrcParToConnRd 2449	BICO parameter for selecting the binector which determines the type of access for the connector-to-parameter conversio 0 = write 1 = read	index1: 0 Unit: - Indices: 5 Type: L2 ,B	Menus: - Parameter menu + Free blocks - Upread/free access Changeable in: - Drive setting - Ready
U480* SrcTraceInput 2480	BICO parameter for selecting the connectors to be recorded by the trace function. Indices: Index = channel number	index1: 0 Unit: - Indices: 8 Type: L2 ,K ,K	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U481* Trace DoubleWord 2481	Function parameter for entering the word length of the connector indicated in U2480 to be recorded by the trace function. It is only possible to change the parameter if the trace function is not active (U488 = 0). If the parameter is changed, an output of previously recorded values for concerned channels is no longer possible. Parameter values: 0 = Word (16 bit) 1 = Double word (32 bit) Indices: Index = channel number	index1: 0 Min: 0 Max: 1 Unit: - Indices: 8 Type: O2	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access Changeable in: - Drive setting - Ready
U482* TraceSampleTime 2482	Function parameter for entering the sampling time with whic the trace values are to be recorded in integral multiples of th basic sampling time of the trace function. Indices: Index = channel number	index1: 1 Min: 1 Max: 200 Unit: - Indices: 8 Type: O2	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access Changeable in: - Drive setting - Ready
U483* SrcTriggerInput 2483	BICO parameter for selecting the connector to be used by the trace function as a trigger Indices: Index = channel number	index1: 0 Unit: - Indices: 8 Type: L2 ,K ,K	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access Changeable in: - Drive setting - Ready
U484 TriggerThresh 2484	Function parameter for entering the trigger threshold. The parameter value has to be entered in the format of a double-word connector. If bit trigger (U485 <> 16) is set, only the parameter values 0 and 1 are permissible. Indices: Index = channel number	index1: 0 Min: -2147483647 Max: 2147483647 Unit: - Indices: 8 Type: I4	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access Changeable in: - Drive setting - Ready
U485* TriggerBitNo. 2485	Function parameter for entering the position of the bit to be triggered (in the case of bit trigger). A bit trigger can only be set if the trigger threshold (U484) has the values 0 or 1. If a bit trigger is set, the trigger condition (U486) is automatically adjusted to 1 (trigger if trigger input = trigger threshold). Parameter values: 0 to 15: Position of the bit (bit trigger) 16: No bit trigger Indices: Index = channel number	index1: 16 Min: 0 Max: 16 Unit: - Indices: 8 Type: O2	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U486* TriggerCondition 2486	Function parameter for entering the trigger condition If a bit trigger (U485) is set, only parameter value 1 is permissible. If parameter values 3, 5 and 6 are set, parameters U483, U484 are not significant. In the case of parameter values 5 and 6, parameter U489 is used for the trigger condition. Parameter value 0 = Trigger if trigger input < trigger threshold 1 = Trigger if trigger input = trigger threshold 2 = Trigger if trigger input > trigger threshold 3 = Trigger if fault 4 = Trigger if trigger input <> trigger threshold 5 = Trigger if binector trigger input = 1 6 = Trigger if binector trigger input = 0 Indices: Index = channel number	index1: 0 Min: 0 Max: 6 Unit: - Indices: 8 Type: O2	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access Changeable in: - Drive setting - Ready
U487* PreTrigger 2487	Function parameter for entering the size of the pretrigger. Parameter value: Relation of the number of data recorded before the trigger event to the total number as a percentage. Example: 40 % means that 40% of the data in the trace buffer were recorded before the trigger event and 60% after the trigger event. Indices: Index = channel number	index1: 0 Min: 0 Max: 100 Unit: % Indices: 8 Type: O2	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access Changeable in: - Drive setting - Drive setting - Ready
U488* TraceStatusStart 2488	Function/visualization parameter of the trace status. The trace consists of a maximum of 8 channels corresponding to Indices 1 to 8.The trace memory is dynamically distributed according to the number of channels activated. Only parameter values 0 and 1 can be set. If the parameter value is set from 0 to 1, all recorded data of all channels are lost (because the whole trace memory is erased) and the trace is activated for this channel. If the trigger condition is satisfied and another channel is in the process of recording (parameter value 2), no further channe can be activated (parameter value 1). Parameter values: 0 = Trace not active/recording finished 1 = Trace active/trace is waiting for trigger event 2 = Trace is recording Indices: Index = channel number	index1: 0 Min: 0 Max: 2 Unit: - Indices: 8 Type: O2	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access Changeable in: - Drive setting - Ready
U489* SrcBTriggerInput 2489	BICO parameter for selection of trace as trigger to binectors used. Indices: Index = channel number	index1: 0 Unit: - Indices: 8 Type: L2 ,B	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access Changeable in: - Drive setting - Ready
U490 Trace D-BlockNo. 2490	Function parameter for entering the number of the trace data block for each trace channel. The trace data block can be read out via visualization parameters n491 to n498. Parameter value: 0 - 254: Output of corresponding data block 255: Output of trigger index Indices: Index = channel number	index1: 0 Min: 0 Max: 255 Unit: - Indices: 8 Type: O2	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
n491 TraceData Ch1 2491	Visualization parameter for displaying a data block of the trace data of channel 1. The block number of the trace data is set in parameter U490.01. If all values of the array are requested with one task via an automation interface (SCom1 SCom2, SCP, DPR), the parameter U490.01 is automatically increased by 1 when output in order to enable optimum read out of the trace data. Indices: 1: Block ID High byte: Data block number (U490) Low byte: Number of trace data in data block 2-.100: Trace data When recording double-word connectors first the high word appears and then the low word.	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access
n492 TraceData Ch2 2492	Description see n491	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access
n493 TraceData Ch3 2493	Description see n491	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access
n494 TraceData Ch4 2494	Description see n491	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access
n495 TraceData Ch5 2495	Description see n491	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access
n496 TraceData Ch6 2496	Description see n491	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access
n497 TraceData Ch7 2497	Description see n491	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access
n498 TraceData Ch8 2498	Description see n491	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Diagnostics + Trace - Upread/free access
U800* Application 2800	Selection parameter for sector-specific applications. Parameter values: 0: Standard 1: Lifts Note: activates parameter P2801...P2848	Init: 0 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Drive setting - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U801* Ref Speed 2801	System reference speed in m/s. Setting of the reference quantity of the speed setpoints whic are preset via the permissible sources of the process data connection. Accordingly, this reference quantity is also applicable for speed actual-values. If a speed setpoint of 4000H is set via the automation, the lift travels with the value set here. Note: Only relevant for P2800 = 1	Init: 1,000 Min: 0,010 Max: 15,000 Unit: m/s Indices: - Type: O2	Menus: - Parameter menu - Drive setting - Upread/free access Changeable in: - Drive setting
U802* Gear Ratio 2802	Gear transmission ratio: Example: 40 : 1 Index 1 = 40 (motor-side) Index 2 = 1 (elevator side) Notes: The value in Index 1 must be greater than the value in Index 2. Only relevant if setpoints are indicated in m/s (P2810... P2817).	index1: 30 Min: 1 Max: 1000 Unit: - Indices: 2 Type: O2	Menus: - Parameter menu - Drive setting - Upread/free access Changeable in: - Drive setting
U803* RopePulleyDia 2803	Rope pulley diameter in mm: from 100 mm to 3000 mm Note: Only relevant if setpoints are indicated in m/s (P2810 ... P2817).	Init: 500 Min: 100 Max: 3000 Unit: mm Indices: - Type: O2	Menus: - Parameter menu - Drive setting - Upread/free access Changeable in: - Drive setting
U804* Suspension 2804	Suspension of the lift cage: 0 = 1:1 Suspension 1 = 1:1 Suspension 2 = 2:1 Suspension i.e.with one deflection roll 3 = 3:1 Suspension, i.e. with two deflection rolls 4 = 4:1 Suspension, i.e. with three deflection rolls ... etc. max: 16:1 Note: Only relevant if setpoints are indicated in m/s (P2810.. P2817).	Init: 1 Min: 0 Max: 16 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Drive setting - Upread/free access Changeable in: - Drive setting
U805* Max Speed 2805	Maximum speed for clockwise rotation and counter-clockwise rotation. Limitation of the setpoint. Note: Only active for P2800 = 1, otherwise parameters P452 and P453 apply	Init: 1500 Min: 0 Max: 6000 Unit: 1/min Indices: - Type: O2	Menus: - Parameter menu - Drive setting - Upread/free access Changeable in: - Drive setting - Drive setting
U806* SrcSpeedConn 2806	BICO parameter for selecting a double connector (e.g. of the setpoint channel) which is displayed in m/s in parameter r2807.	index1: 0 Unit: - Indices: 5 Type: L2 ,K ,K	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting
n807 Disp Speed 2807	Display of the connector indicated in P2806 in m/s	Dec.Plc.: 3 Unit: m/s Indices: 5 Type: I2	Menus: - Parameter menu - Upread/free access
n808 v(set) 2808	Speed setpoint for closed-loop control in m/s	Dec.Plc.: 3 Unit: m/s Indices: - Type: I2	Menus: - Parameter menu - Upread/free access
n809 v(act) 2809	Speed actual-value in m/s. Note: Use for display in the case of a noise-corrupted actual signal P2848 (smoothed variable)	Dec.Plc.: 3 Unit: m/s Indices: - Type: I2	Menus: - Parameter menu - Upread/free access

Parameter	Description	Data	Read/write
U810* FSetp 1 2810	Speed fixed setpoint 1. Fixed setpoint in m/s, which is selected as indicated in P2822. Note: Must not be greater than double the value of the system reference speed (P2801). Precondition: Lift operation (P2800 = 1)	index1: 0,000 Min: 0,000 Max: 0,500 Unit: m/s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U811* FSetp 2 2811	Speed fixed setpoint 2 Fixed setpoint in m/s which is selected as indicated in P2822 Note: Must not be greater than double the value of the system reference speed (P2801). Precondition: Lift operation (P2800 = 1)	index1: 0,000 Min: 0,000 Max: 30,000 Unit: m/s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U812* FSetp 3 2812	Speed fixed setpoint 3 Fixed setpoint in m/s which is selected as indicated in P2822 Note: Must not be greater than double the value of the system reference speed (P2801). Precondition: Lift operation (P2800 = 1)	index1: 0,000 Min: 0,000 Max: 30,000 Unit: m/s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U813* FSetp 4 2813	Speed fixed setpoint 4 Fixed setpoint in m/s which is selected as indicated in P2822 Note: Must not be greater than double the value of the system reference speed (P2801). Precondition: Lift operation (P2800 = 1)	index1: 0,000 Min: 0,000 Max: 30,000 Unit: m/s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U814* FSetp 5 2814	Speed fixed setpoint 5 Fixed setpoint in m/s which is selected as indicated in P2822 Note: Must not be greater than double the value of the system reference speed (P2801). Precondition: Lift operation (P2800 = 1)	index1: 0,000 Min: 0,000 Max: 30,000 Unit: m/s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U815* FSetp 6 2815	Speed fixed setpoint 6 Fixed setpoint in m/s which is selected as indicated in P2822 Note: Must not be greater than double the value of the system reference speed (P2801). Precondition: Lift operation (P2800 = 1)	index1: 0,000 Min: 0,000 Max: 30,000 Unit: m/s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U816* FSetp 7 2816	Speed fixed setpoint 7 Fixed setpoint in m/s which is selected as indicated in P2822 Note: Must not be greater than double the value of the system reference speed (P2801). Precondition: Lift operation (P2800 = 1)	index1: 0,000 Min: 0,000 Max: 30,000 Unit: m/s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U817* FSetp 8 2817	Speed fixed setpoint 8 Fixed setpoint in m/s which is selected as indicated in P2822 Note: Must not be greater than double the value of the system reference speed (P2801). Precondition: Lift operation (P2800 = 1)	index1: 0,000 Min: 0,000 Max: 30,000 Unit: m/s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U818* Src FSetp Bit4 2818	BICO parameter for selecting the binector from which bit 4 for selecting (1 out of n) fixed setpoint 6 is to be read in. Dependence: P2822	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
U819* Src FSetp Bit5 2819	BICO parameter for selecting the binector from which bit 5 for selecting (1 out of n) fixed setpoint 7 is to be read in. Dependence: P2822	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
U820* Src FSetp Bit6 2820	BICO parameter for selecting the binector from which bit 6 for selecting (1 out of n) fixed setpoint 8 is to be read in. Dependence: P2822	index1: 0 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
U821* Src BCD Trigger 2821	BICO parameter for selecting a binector from which the trigger signal for acceptance of the fixed setpoint is to be read in. Dependence: P2822 = 2	index1: 1 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
U822* FSetp Select 2822	Selection of the fixed setpoints. The fixed setpoints can be selected '1 out of n' or bit-coded (BCD). In the setting "BCD with trigger", the fixed setpoint is only transferred for a positive edge (trigger) via BICO source P2821. Parameter values: 0: '1 out of n' Selection via (P580,P581,P417,P418,P2818, P2819, P2820 1: 'BCD' Selection via (P580,P581,P417). 2: 'BCD with trigger' Selection via (P580,P581,P417, trigger = P2821).	Init: 1 Min: 0 Max: 2 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting
n823 Travel Command 2823	The travel command (FK) is calculated from the selected fixed setpoints. Parameter values: 0: For selection of FSetp1 (power down) 1: For selection of FSetp 2 to FSetp3, FSetp7 and Fsetp8 (standard travel) 2: For selection of FSetp5 (approach) 3: For selection of FSetp6 (correction)	Dec.Plc.: 0 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access
U824* ThrPulseEnable 2824	Threshold which, when surpassed by the setpoint of binecto B857, is set to 0. Value in % reference speed (P2801). e.g. for automatic pulse enable via braking control.	Init: 0,00 Min: 0,00 Max: 100,00 Unit: % Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U825* Funct AddSetp1 2825	Function of additional setpoint 1. The additional setpoint 1 (r437) can alternatively be added to the main setpoint (r447) or also can limit the main setpoint. Parameter values: 0: Additional setpoint 1 is added to main setpoint. 1: Additional setpoint 1 acts as a limitation for the main setpoint. Precondition: only active during lift operation (P2800 = 1)	Init: 0 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
U826* Sel FDS Rgen 2826	Selection of the ramp-function generator function data set. The function data set can be selected for the ramp-function generator parameters via the present travel command (r2823). The FDS control word bits (P576, P577) are then not effective for the ramp-function generator parameters. Parameter values: 0: Selection as for FDS control word bits (P576, P577) 1: FDS1 for RGen parameter at r2823 = 0 FDS2 for RGen parameter at r2823 = 1 FDS3 for RGen parameter at r2823 = 2 FDS4 is not selected	Init: 0 Min: 0 Max: 1 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U827* Acceleration 2827	Acceleration of the ramp-function generator during ramp-up. FDS(4) parameter. Values: 0.1 m/s² to 10 m/s² Note: the value 10 m/s² bypasses the ramp-function generator	index1: 1,000 Min: 0,010 Max: 10,000 Unit: m/s² Indices: 4 ,FDS Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U828* Deceleration 2828	Deceleration of the ramp-function generator during ramp-down. FDS(4) parameter. Values: 0.1m/s² to 10 m/s² Note: the value 10 m/s² bypasses the ramp-function generator	index1: 1,000 Min: 0,010 Max: 10,000 Unit: m/s² Indices: 4 ,FDS Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U829* Init Jerk 2829	Initial jerk of the ramp-function generator during acceleration and deceleration. FDS(4) parameter. Values: 0.1m/s² to 10 m/s² Note: the value 10 m/s² de-energizes the jerk limitation of the ramp-function generator (endless jerk)	index1: 0,800 Min: 0,010 Max: 10,000 Unit: m/s³ Indices: 4 ,FDS Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U830* Final Jerk 2830	Final jerk of the ramp-function generator during acceleration and deceleration. FDS(4) parameter. Values: 0.1m/s² to 10 m/s² Note: the value 10 m/s² de-energizes the jerk limitation of the ramp-function generator (endless jerk)	index1: 0,800 Min: 0,010 Max: 10,000 Unit: m/s³ Indices: 4 ,FDS Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U831* V1 Comp 2831	Comparison speed 1. Threshold for the message 'V < V1' (binector B851) Dependences: P2835 smoothing V(act), P2836 Hysteresis maximum possible value: 2 * P2801 (system-V m/s)	Init: 0,000 Min: 0,000 Max: 30,000 Unit: m/s Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U832* V2 Comp 2832	Comparison speed 2: Threshold for the message 'V < V2' (binector B852) Dependences: P2835 smoothing V(act), P2836 Hysteresis maximum possible value: 2 * P2801 (system-V m/s)	Init: 0,000 Min: 0,000 Max: 30,000 Unit: m/s Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U833* V3 Comp 2833	Comparison speed 3. Threshold for the message 'V < V3' (binector B853) Dependences: P2835 smoothing V(act), P2836 Hysteresis maximum possible value: 2 * P2801 (system-V m/s)	Init: 0,000 Min: 0,000 Max: 30,000 Unit: m/s Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U834* V4 Comp 2834	Comparison speed 4. Threshold for the message 'V < V4' (binector B854) Dependences: P2835 smoothing V(act), P2836 Hysteresis maximum possible value: 2 * P2801 (system-V m/s)	Init: 0,000 Min: 0,000 Max: 30,000 Unit: m/s Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U835* Smoothing V(act) 2835	Smoothing time constant (PT1) in ms for the speed actual-value during calculation of the speed comparison messages (B851 to B854). Correlation: P2831, P2832, P2833, P2834 (comparison speeds)	Init: 100 Min: 10 Max: 1000 Unit: ms Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting
U836* Compare Hyst 2836	Hysteresis for the comparison speed messages. Indicated in % (referred to the respective comparison speed actual-value). Applicable for all 4 comparison speeds. Correlation: P2831, P2832, P2833, P2834	Init: 3,0 Min: 0,0 Max: 100,0 Unit: % Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U837* EmergOper Vd 2837	DC link voltage range Vd under emergency operating conditions (power failure). If the DC link voltage lies between the minimum and maximum emergency operating voltage at the end of pre-charging (= battery voltage), the system internally changes over to emergency operation. The fault message F002 (pre-charging) is suppressed for this voltage range. If the DC link voltage is less than the value parameterized in Index 2, binector B856 High is set. Index 1 = minimum Vd in emergency operation Index 2 = maximum Vd in emergency operation. The value in Index 2 must always be greater than or equal to the value in Index 1. Emergency operation function only at U800 =1	index1: 380 Min: 10 Max: 400 Unit: V Indices: 2 Type: O2	Menus: - Parameter menu - Drive setting - Upread/free access Changeable in: - Drive setting
U838* EmergOperMDS 2838	Motor data set for emergency operation (power failure). If the control mode is to be changed automatically during emergency operation (e.g. to V/f characteristic due to low DC link voltage), the motor data set can then be specified here i which the control mode has been set. All parameters of this motor data set must be set accordingly.	Init: 1 Min: 1 Max: 4 Unit: - Indices: - Type: O2	Menus: - Parameter menu - Drive setting - Upread/free access Changeable in: - Drive setting
U839* EmergOper V 2839	Speed setpoint for emergency operation (power failure). The emergency speed setpoint is approached in emergency operation instead of fixed setpoints 2 to 8.	Init: 0,200 Min: 0,010 Max: 2,000 Unit: m/s Indices: - Type: O2	Menus: - Parameter menu - Drive setting - Upread/free access Changeable in: - Drive setting - Drive setting - Ready
U840* I(max) Brake 2840	Threshold for the maximum absolute current value to monito the brake. If the absolute output current of the converter exceeds this threshold for longer than one second, then the fault message F0957 "Brake not open" is output. The rated motor current is the reference quantity (P102). The threshold must lie a minimum of 10% above the maximum possible acceleration current (e.g. current at overload). Values: 100% to 500%	Init: 500 Min: 100 Max: 500 Unit: % Indices: - Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U841* Smooth AddSetp2 2841	Smoothing time constant (PT1) for the additional setpoint 2. 4 ms to 100 ms. Precondition: Smoothing only active when P2800 = 1	index1: 50 Min: 4 Max: 1000 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready

Parameter	Description	Data	Read/write
U842* Start Pulse 2842	Setting value for the start pulse (gearbox pulse) in %. The start pulse is added to the speed setpoint after the ramp-function generator. This brief additional setpoint is injected into the speed controller. This thus prevents the load briefly sagging (dropping). The nominal system speed (P2801) is the reference quantity. Correlation: P2843 (Smooth Start Pulse) P2844 (Source Start Pulse) Precondition: P2800 = 1	index1: 0,0 Min: -100,0 Max: 100,0 Unit: % Indices: 4 Type: I2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U843* SmoothStartPulse 2843	Smoothing time constant (PT1) for the start pulse (gearbox pulse) 50 ms to 100 ms Correlation: P2842 (start pulse)	index1: 100 Min: 50 Max: 1000 Unit: ms Indices: 4 Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U844* Src StartPulse 2844	BICO parameter for selecting the source for the start pulse trip Precondition: Trip only after inverter disable and for lift operation (P2800 = 1)	index1: 275 Unit: - Indices: 2 ,BDS Type: L2 ,B	Menus: - Parameter menu + Setpoint channel - Upread/free access Changeable in: - Drive setting - Ready
U845* Approach Delay 2845	Time for to delay the 1st approach point. Change over to the approach setpoint (FSetp5, P2814) is delayed by this time. This prevents the need to modify the limit switches. Values: 0 s .... 10 s	index1: 0,00 Min: 0,00 Max: 10,00 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U846* Time Short Run 2846	Delay time for the short run calculation. The acceleration phase is extended by this time if the ramp-function generator has not stabilized but has already run through the brake point (select FSetp5, P2823) Values: 0 s ... 10 s	index1: 0,00 Min: 0,00 Max: 10,00 Unit: s Indices: 4 ,FDS Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U847* Src t-short run 2847	BICO parameter from which the time of the short run is to be read in. Normalization: T(short run) = T(sample) * connector value	index1: 650 Unit: - Indices: 2 ,BDS Type: L2 ,K	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting
n848 Disp V-act Sm'th 2848	Speed actual-value in m/s (as 2809, but smoothed)	Dec.Plc.: 3 Unit: m/s Indices: - Type: I2	Menus: - Parameter menu - Upread/free access - Drive setting
n900 ObjectData 2900	Service parameter, only for Siemens personnel Visualization parameter for interconnecting connectors and binectors according to the setting in P2905. The connector and binector parameters and the respective index are listed with which the connector or binector is linked in P2905.2. Index 1 Function number of the first interconnection Index 2 Parameter number Index 3 Index Index 4 Function number of the second interconnection Index 5 Parameter number Index 6 Index	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu - Upread/free access

Parameter	Description	Data	Read/write
n901 ObjectData 2901	Service parameter, only for Siemens service personnel	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu - Upread/free access
U905* ObjectDataBeg 2905	Service parameter, only for Siemens service personnel Parameter for interrogating a connector or binector interconnection. The result can be read out in r2900. Index 1 =2 (read connector); =3 (read binector) Index 2 Connector/binector number (decimal) Index 3 No meaning Index 4 No meaning Index 5 No meaning Note: All connector or binector numbers are hexadecimal values. These have to be converted into decimal values for interrogation.	index1: 0 Min: 0 Max: 65535 Unit: - Indices: 5 Type: O2	Menus: - Parameter menu - Upread/free access Changeable in: - Drive setting - Ready
U910* SlotDeselect 2910 Compact PLUS only	Parameter to deselect option boards in the slots Index 1: Basic board Index 2: Deselect slot A Index 3: Deselect slot B	index1: 0 Min: 0 Max: 1 Unit: - Indices: 3 Type: O2	Menus: - Parameter menu - Board configuration - Upread/free access Changeable in: - Board configuration
U910* SlotDeselect 2910 not Compact PLUS	Parameter for deselecting the optional boards in the slots Index 1: Basic board Index 2: Deselection of slot A Index 3: Deselection of slot B Index 4: Deselection of slot C Index 5: Deselection of slot D Index 6: Deselection of slot E Index 7: Deselection of slot F Index 8: Deselection of slot G	index1: 0 Min: 0 Max: 1 Unit: - Indices: 8 Type: O2	Menus: - Parameter menu - Board configuration - Upread/free access Changeable in: - Board configuration
n911 Board ID 2911 not Compact PLUS	Visualization parameter for displaying the board ID. This ID enables various hardware statuses of the installed electronic boards to be determined. Index 1: Basic board Index 2: Optional board on slot A Index 3: Optional board on slot B Index 4: Optional board on slot C Index 5: Optional board on slot D Index 6: Optional board on slot E Index 7: Optional board on slot F Index 8: Optional board on slot G	Dec.Plc.: 0 Unit: - Indices: 8 Type: O2	Menus: - Parameter menu - Fixed settings - Quick parameterization - Board configuration - Drive setting - Download - Upread/free access - Power section definition
n911 Board ID 2911 Compact PLUS only	Visualization parameter for displaying the board code. This code enables the hardware status of the installed electronic boards to be determined. Index 1: Basic board Index 2: Optional board in slot A Index 3: Optional board in slot B	Dec.Plc.: 0 Unit: - Indices: 3 Type: O2	Menus: - Parameter menu + Diagnostics + Messages/displays - Upread/free access
n912 VCS SW Inform 2912	Information on the software version of the gating unit processor Index 1: Software version Index 2: Software ID Index 3: Generation date year Index 4: Generation date month Index 5: Generation date day	Dec.Plc.: 0 Unit: - Indices: 5 Type: O2	Menus: - Parameter menu - Fixed settings - Quick parameterization - Board configuration - Drive setting - Download - Upread/free access - Power section definition

Parameter	Description	Data	Read/write
U950* Sampling Times1 2950	Parameter for setting the sampling time of the functions with function numbers 1 to 100.	index1: 20 Min: 2 Max: 20 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Releases - Upread/free access Changeable in: - Drive setting
U951* Sampling Times2 2951	Parameter for setting the sampling time of the functions with function numbers 101 to 200.	index1: 20 Min: 2 Max: 20 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Releases - Upread/free access Changeable in: - Drive setting
U952* Sampling Times3 2952	Parameter for setting the sampling time of the function with function numbers 201 to 300.	index1: 20 Min: 2 Max: 20 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Releases - Upread/free access Changeable in: - Drive setting
U953* Sampling Times4 2953	Parameter for setting the sampling time of the functions with function numbers 301 to 400.	index1: 20 Min: 2 Max: 20 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Releases - Upread/free access Changeable in: - Drive setting
n957 Sampling Times 7 2957	Parameter for visualizing the sampling time of the internal functions with function numbers 701 ... 800	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Releases - Upread/free access
n958 AutomaticRecord 2958	Parameter for visualization of the sampling time of internal functions with function numbers 801 ... 900	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Releases - Upread/free access
n959 SamplingTimes9 2959	Parameter for visualization of the sampling time of internal functions with function numbers 901 ...1000	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Releases - Upread/free access
U960* Func Sequence 2960	Parameterizing of the processing sequence for functions 1 to 100.	index1: 10 Min: 0 Max: 9999 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Releases - Upread/free access Changeable in: - Drive setting
U961 Func Sequence 2961	Parameterizing of the processing sequence for functions 101 to 200.	index1: 1010 Min: 0 Max: 9999 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Releases - Upread/free access Changeable in: - Drive setting
U962* Func Sequence 2962	Parameterizing of the processing sequence for functions 201 to 300.	index1: 2010 Min: 0 Max: 9999 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Releases - Upread/free access Changeable in: - Drive setting
U963* Func Sequence 2963	Parameterizing of the processing sequence for functions 301 to 400.	index1: 3010 Min: 0 Max: 9999 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Releases - Upread/free access Changeable in: - Drive setting

Parameter	Description	Data	Read/write
n967 Function Seq 7 2967	Parameter for visualizing the processing sequence of the internal functions with function numbers 701 ... 800	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Releases - Upread/free access
n968 Function Seq 8 2968	Parameter for visualizing the processing sequence of the internal functions with function numbers 801 ... 900	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Releases - Upread/free access
n969 Function Seq 9 2969	Parameter for visualizing the processing sequence of the internal functions with function number 901 .. 1000	Dec.Plc.: 0 Unit: - Indices: 100 Type: O2	Menus: - Parameter menu + Releases - Upread/free access
n979 PWE Checksum 2979	Checksum of the value of all setting parameters The following parameters are ignored: U720 to U769, U976, U977	Dec.Plc.: 0 Unit: - Indices: - Type: O4	Menus: - Parameter menu - Upread/free access
n980 Par # List pt11 2980		Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
n981 Par # List pt12 2981		Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
n982 Par # List pt13 2982		Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
n983 Par # List pt14 2983		Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
n984 Par # List pt15 2984		Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
n985 Par # List pt16 2985		Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
n986 Par # List pt17 2986		Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
n987 Par # List pt18 2987		Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
n988 Par # List pt19 2988		Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
n989 Par # List pt20 2989		Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access

Parameter	Description	Data	Read/write
n990 Par # List chg4 2990		Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
n991 Par # List chg5 2991		Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access
n992 Par # List chg6 2992		Dec.Plc.: 0 Unit: - Indices: 101 Type: O2	Menus: - Parameter menu - Upread/free access

Connector List

Connector list Vector Control

22.10.01

Connector number	Connector name	Description	Double word
K0000	FixConn 0%	Fixed connector 0 In function diagram: 15.4, 290.2	no
K0001	FixConn 100%	Fixed connector 100 % In function diagram: 15.4, 290.2	no
KK0002	FixConn 200%	Fixed connector 200 % In function diagram: 15.4, 290.2	yes
K0003	FixConn -100%	Fixed connector -100% In function diagram: 15.4, 290.2	no
KK0004	FixConn -200%	Fixed connector -200% In function diagram: 15.4, 290.2	yes
K0005	FixConn 50%	Fixed connector 50% In function diagram: 290.2	no
K0006	FixConn 150%	Fixed connector 150% In function diagram 290.2	no
K0007	FixConn -50%	Fixed connector -50% In function diagram 290.2	no
K0008	FixConn -150%	Fixed connector -150% In function diagram: 290.2	no
K0011	AI1 Setpoint	Analog input 1 normalized in function diagram: 80.7	no
K0013	AI2 Setpoint	Analog input 2 normalized in function diagram: 80.7	no
K0015	AO1 ActV	Actual value analog output 1 (after smoothing, before scaling and offset) In function diagram: 80.3	no
K0016	AO2 ActV	Analog output 2 actual value (after smoothing, before scaling and offset) in function diagram: 81.2	no
KK0020	Speed smooth	Speed (smoothed) in function diagram: 350.7, 351.7, 352.7	yes
K0021	Output Volts	Output voltage (smoothed) in functin diagram: 285.3, 286.3	no
K0022	Output Amps	Output current component (smoothed) in function diagram: 285.8, 286.8	no
K0023	Output Power	Output power (smoothed) in function diagram: 285.8, 286.8	no
K0024	Motor Torque	Torque (smoothed) in function diagram: 285.8	no
K0025	DC Bus Volts	DC link voltage (smoothed) in function diagram: 285.3, 286.3	no
K0030	Control Word 1	Control word 1 in function diagram: 180.7	no
K0031	Control Word 2	Control word 2 (bits 16-31) in function diagram: 190.5	no
K0032	Status Word 1	Status word 1 in function diagram: 200.5	no
K0033	Status Word 2	Status word 2 (bits 16 to 31) in function diagram: 210.5	no
K0034	act. MotDataSet	Aktive motor data set in function diagram: 20.5, 540.1	no

Connector number	Connector name	Description	Double word
K0035	ActiveBICO DSet	Active BICO data set in function diagram: 20.5, 540.1	no
K0036	Active FuncDSet	Active function data set in function diagram: 20.5, 540.1	no
KK0040	Curr FixSetp	Connector with currently valid fixed setpoint (selectable by function data set and fixed setpoint bits) in function diagram: 290.6	yes
KK0041 ... KK0052	FixSetpoint	16 fixed setpoints of currently selected function data set in function diagram: 290.4	yes
KK0057	MOP (Input)	Input of motor-operated potentiometer in function diagram: 300.5	yes
KK0058	MOP (Output)	Output value of motor-operated potentiometer in function diagram: 300.8	yes
KK0067	Add Setpoint 1	Additional setpoint 1; is added to the main setpoint before the ramp-function generator in function diagram: 316.2	yes
KK0068	Add Setpoint 2	Additional setpoint 2: is added to the main setpoint behind the ramp-function generator in function diagram: 318.4	yes
KK0069	Main Setp.(act)	Main setpoint in function diagram: 316.2	yes
KK0070	n(set, sum1)	Setpoint after summation point 1 in function diagram: 316.4	yes
KK0071	n(set, spd sel)	Setpoint after summation point 2 in function diagram: 316.6	yes
KK0072	n(set, RgenIn)	Setpoint at ramp-function generator input in function diagram: 317.2	yes
KK0073	n(set, RgenOut)	Setpoint at ramp-function generator output in function diagram: 317.7	yes
KK0074	n(set,sum2)	Setpoint after summation point 3 in function diagram: 318.4	yes
KK0075	n/f (set)	Setpoint after limitation to n/f(max) pos/neg direction of rotation in function diagram: 318.7, 320.7	yes
K0077	T(Accel)	Pre-control torque (inertia compensation) in function diagram: 320.5	no
KK0078	n/f(max,FWDSpd)	Speed setpoint limitation in positive direction of rotation in function diagram: 316.6	yes
KK0079	n/f(max,REVSpd)	Speed setpoint limitation in negative sense of rotation in function diagram: 316.6	yes
K0080	T(Setpoint)	Torque setpoint for slave drive in function diagram: 320.3	no
K0081	Fix Torque 1	Maximum value of the upper torque limit in function diagram: 320.4	no
K0082	Max Torque 1	Upper torque limit in function diagram: 319.6, 320.7	no
K0083	Fix Torque 2	Maximum value of the lower torque limit in function diagram: 320.4	no
K0084	Max Torque 2	Upper torque limit in function diagram: 319.6, 320.7	no
K0085	I FixAddSet	Additional current setpoint in function diagram: 319.6, 320.7	no

Connector number	Connector name	Description	Double word
K0086	Torq FixAddSet	Additional torque setpoint in function diagram: 319.6, 320.3	no
K0087	Torq Add Fsetp	Fixed setpoint for additional torque setpoint in function diagram: 319.2, 320.1	no
K0088	I Add Fsetp	Deviation of the position of the external encoder from the zero position as defined by the zero pulse If an external encoder is used for motor position measurement (P0182=104), the position-feedback scaling factor and the resolution of the motor encoder apply. Otherwise, the position-feedback scaling factor and the resolution of the external encoder are used. In function diagram: FP242	no
K0090	Rotor angle	Mechanical angle in function diagrams: 230.6, 240.6, 250.7, 260.6, 500.3 The actual position variable KK0090 shows a mechanical rotor position without regarding the adjusted angle offset in P132.	no
KK0091	Meas´dRot.Speed	Actual speed in function diagram: 250.7	yes
K0092	Flux angle diff	Flux angle difference	no
K0093	Load angle	Load angle in function diagram: 384.6	no
KK0094	SBP SetpCh1	First output connector for the setpoint encoder normalized with P140.1 (P139=2xxx) or P141.1 (P139=1xxx). in function diagram: 256.8	yes
KK0095	SBP SetpCh2	Second output connector of setpoint encoder normalized with P140.2 (P139=2xxx) or P141.2 (P139=1xxx). in function diagram: 256.8	yes
KK0120	Pos. angle	Position actual value of motor encoder in linear units In function diagram: 330.8	yes
KK0148	n/f(act)	Speed/frequency actual value in function diagram: 350.7, 351.7, 352.7	yes
KK0149	n/f(FWD Ctrl)	Unsmoothed n/f actual value of the precontrol in function diagram: 351.6	yes
KK0150	n/f(set)	Smoothed speed setpoint prior to setpoint/actual value comparison of speed controller In function diagram: 360.4	yes
KK0151	n/f(act,smo´d)	Smoothed speed actual value prior to setpoint/actual value comparison of speed controller In function diagram: 360.4	yes
KK0152	n/f Deviation	Setpoint/actual value deviation at speed controller input in function diagram: 360.5	yes
K0153	T(set, n/f Reg)	Speed controller output in function diagram: 360.8	no
K0154	n/f (Reg,P)	P component of speed controller in function diagram: 360.8	no
K0155	n/f(Reg,I-Port)	I component of speed controller In function diagram: 360.8	no

Connector number	Connector name	Description	Double word
K0156	n/fRegGain(act)	Current gain for the speed controller	no
KK0157	n/f(Droop)	Speed difference from droop In function diagram: 360.3	yes
KK0158	n/f(Band-Stop)	Speed actual value after filtering through band-stop in function diagram: 360.3	yes
K0159	Output DT1 Elem	Output of the DT1 function on speed controller in function diagram: 360.4	no
K0161	Mmax1 (reg,act)	Upper torque limit at the speed controller output in function diagram: 360.8, 362.8	no
K0162	Mmax2 (reg,act)	Lower torque llimit at the speed controller outpu in function diagram: 360.8, 362.8	no
K0163	M(set,friction)	Output connector friction torque in function diagram: 370.7 to 373.7, 375.7	no
K0164	T(set,precon)	Additional torque switched-in at the output of the n/f controller in function diagram: 365.8, 367.5	no
K0165	Torq(set,limit)	Output connector torque limitation In function diagram: 370.4	no
K0167	Isq(set,limitr)	Setpoint torque forming current ccomponent after torque and current limitation in function diagram: 370.7	no
K0168	Isq(set,active)	Setpoint torque forming current component from torque limitation to current controller In function diagram: 370.8, 390.3	no
K0170	Torq(limit1,set	Output of fixed setpoint for Torq(limit,1) in function diagram: 370.1	no
K0171	Torq(limit2,set	Output of fixed setpoint for Torq(limit, 2) in function diagram: 370.1	no
K0172	Torq(limit1,act	Upper torque limit of speed limitation controller in function diagram: 370.2	no
K0173	Torq(limit2,act	Lower torque limit of speed limitation controller in function diagram: 370.2	no
K0175	I(max,perm)	Currently valid value of maximum current in function diagram: 370.5	no
K0176	Isq(max, abs)	Amount of torque forming current component to which limitation takes place in current limitation. The maximum current and the magnetizing current are included in calculation. In function diagram: 370.6	no
K0177	Isd(static)	Flux-generating component of the current setpoint (steady-state portion) in function diagram: 380.7, 381.7	no
K0178	I(Set,smoothed)	Smoothed current setpoint at low frequencies at no-load of motor in function diagram: 382.7	no
K0179	Isd(set)	Setpoint of flux-generating current component in function diagram: 380.8, 381.8	no
K0180	Psi(set)	Fixed setpoint for setpoint flux in function diagram: 390.1	no
K0181	Psi(act)	Actual value of flux calculated from the flux model in function diagram: 390.7	no
K0182	Isd(act)	Actual value of flux forming current component in function diagram: 390.4	no

Connector number	Connector name	Description	Double word
K0183	Isd(set,active)	Setpoint flux forming current (from flux controller) In function diagram: 390.4	no
K0184	Isq(act)	Actual value of torque forming current component in function diagram: 390.4	no
KK0188	Slip Frequency	Slip speed in function diagram: 390.7	yes
K0189	U(set,abs)	Setpoint voltage amount from current controller. Phase-to-phase voltage, rms value of the fundamental. The voltage applied to the motor is reduced by the valve voltage. In function diagram: 390.7	no
K0190	Mod Depth Limit	Modulation limit in function diagram: 405.8	no
K0191	Max OutputVolts	Maximum possible output voltage in function diagram: 405.8, 380.3, 381.3	no
KK0192	FieldWeakFrq-ac	Actual frequency at which field weakening starts, takes into account the available voltage reserves in function diagram: 380.4, 381.4, 384.2	yes
K0193	Flux(Curve)	Flux setpoint at output of flux characteristic in function diagram: 380.4, 381.4	no
K0194	Flux(LoadDepnd)	Flux setpoint of the load-dependent flux characteristic in function diagram: 380.5, 381.5	no
K0195	Flux(set,smth)	Smoothed flux setpoint in function diagram: 380.6, 381.6	no
K0196	Flux(FieldWkReg	Output of the field-weakening controller in function diagram: 380.6, 381.6	no
K0197	Flux(set,totl)	Resulting flux setpoint of vector control in function diagram: 380.7, 381.7. 384.2	no
KK0199	f(set,stator)	Stator frequency setpoint in function diagram: 384.2, 395.8, 396.8	yes
KK0200	f(set,gating)	Setpoint frequency v/f characteristic in function diagram: 400.5	yes
K0203	Boost	Voltage boost for v/f characteristic. in function diagram: 400.4	no
K0204	U(set,V/f)	Setpoint voltage for v/f characteristic in function diagram: 400.7	no
K0205	A(set,V/f)	Setpoint modulation depth, v/f characteristic in function diagram: 400.8	no
KK0208	I max-Reg.(Out)	Output I(max) controller for v/f characteristic. in function diagram: 400.3	yes
K0209	Imax-Reg(Outp)	Output voltage of the I(max) controller for reducing the setpoint voltage of the drive	no
K0210	Iexc(set)	Setpoint of the excitation current (only separately excited synchronous machine) 8000h = 4*Ierr,n in function diagram: 384.7	no
K0211	Iexc(act)	Actual value of the excitation current (only separately excited synchronous machine) 8000h = 4*Ierr,n in function diagram: 384.6	no
K0212	Diexc(sd)	Dynamic component of excitation current in function diagram: 384.2	no

Connector number	Connector name	Description	Double word
K0213	Iµp(I Mod Reg)	Magnetizing current in the d axis of the I model in function diagram: 384.3	no
K0214	Iµd(I Mod Reg)	Integral component of magnetizing current in the d axis of the I model in function diagram: 384.3	no
K0215	Iµd(set,I-mod.)	Setpoint of the magnetizing current in the d axis of the I model in function diagram: 384.3	no
K0216	Iµq(set,I-mod.)	Setpoint of the magnetization current in the q axis of the I model in function diagram: 384.3	no
K0217	Vmax(Isd-Reg.)	Maximum output voltage of the Isd controller in function diagram: 390.5	no
K0218	Vsd(Isd-Reg.)	Output voltage of the Isd controller in function diagram: 390.4	no
K0219	Vsq(Isd-Reg.,i)	Integral component of output voltage of the Isd controller in function diagram: 390.5	no
K0220	Vsq(Isq-Reg.)	Output voltage of the Isq controller in function diagram: 390.4	no
K0221	Vsq(Isq-Reg.,i)	Integral component of output voltage of the Isq controller in function diagram: 390.4	no
K0222	Modulation Dept	Amount of modulation depth in function diagram: 390.8, 420.7	no
K0227	dIsd(set,PReg)	Dynamic component of Isd setpoint in function diagram: 384.7	no
K0228	Vsd(Decoupl)	Vsd at output of decoupling network in function diagram: 390.4	no
K0229	Alpha(set)	Setpoint of angle Alpha in function diagram: 390.7	no
K0230	cEMFRegGain(act	Actual value of EMF controller scaling in function diagram: 395.4, 396.4	no
K0231	cEMF model outp	Component of EMF in the d axis in function diagram: 395.3, 396.3	no
KK0232	fmax(cEMF Reg)	Maximum frequency of the EMF controller in function diagram: 395.6, 396.6	yes
KK0233	f(cEMF Reg,p)	Output frequency of the EMF controller (P component) in function diagram: 395.6, 396.8	yes
KK0234	f(cEMF Reg,i)	Output frequency of EMF controller (I component) in function diagram: 395.6, 393.8	yes
KK0235	f(Reson Damp)	Output frequency of resonance damping in function diagram: 396.5	yes
K0236	DCBusVolt(smo´d	Smoothed DC link bus voltage actual value in function diagram: 386.3	no
K0238	Phase 1 Amps	Momentary value of the converter output curren in Phase U in function plan: 280.4, 286.2	no
K0239	Phase 3 Amps	Momentary value of converter output current in phase W in function diagram: 280.4, 286.2	no
K0240	DC BusVolts act	DC link voltage in function diagram: 500.8	no

Connector number	Connector name	Description	Double word
K0241	Torque(act)	Torque actual value In function diagram 360.2	no
K0242	OutputAmps(rms9	Fundamental frequency rms value of output current in function diagram: 285.5, 286.5	no
K0244	Motor Utilizat.	Thermal motor utilization (calculated value)	no
K0245	MotTemp	Motor temperature with connected KTY sensor Normalization: 256°C = 4000Hex in function diagram: 491.4	no
K0246	Drive Utiliz	Drive utilization (output of the i2t calculation). in function diagram: 490.3	no
K0247	DriveTemperat.	Maximum value of measured converter temperatures	no
K0248	CalcTimeHdroom	Free calculating time. In function diagram: 490.7	no
K0249	Drive Status	Current converter status In function diagram: 20.3, 520.8	no
K0250	Flt/Warn #	Connector for current alarm number and curren fault number. Upper byte: fault number Lower byte: alarm number. The value 0 means that no alarm or fault is present. Attention: The alarm number and the fault number are not updated at the same time as the fault or warning bit in the status word; they are staggered a few sampling periods. In function diagram: 510.3	no
K0252 Compact PLUS only	MotTemp (SBP)	The motor temperature is provided from an external source (SBP board). P131 defines the type of temperature sensor. P131 = 0 if KTY or PTC sensor connected. P131 = 3 if PT100 sensor connected. The temperature is to be displayed normalized as 4000Hex = 100% (100%=256°C). The connector wiring is defined using P385 "Src Motor Temp". in function diagram: 280.4	no
KK0270	f(KIB/VdmaxReg)	Output of the KIB/Vdmax controller for v/f control. Affects the frequency setpoint.	yes
K0271	I(KIB/VdmaxReg)	Output of the KIB/Vdmax controller for vector control. Affects the torque-generating current component.	no
KK0275 not Compact PLUS	Sync TargFreq	Measured target frequency during synchronizing. Maximum value is 8 times the rated motor frequency (P107) in function diagram: X02.3, 316.4	yes
K0276 not Compact PLUS	Sync PhaseDiff	Connector actual phase shift between phase U of the synchronizing converter and measured synchronizing signal of the target voltage system. Analog output: 100% at 90.0°el in function diagram: X02.3	no
KK0277 not Compact PLUS	df (SyncReg)	Output frequency of the synchronizing controller in function diagram: X02.8, 318.3	yes
K0401	FIXSETP K U001	FB: 1st fixed setpoint 16-bit In function diagram: 705.2	no

Connector number	Connector name	Description	Double word
K0402	FIXSETP K U002	FB 2nd fixed setpoint 16-bit in function diagram: 705.2	no
K0403	FIXSETP K U003	FB. 3rd fixed setpoint 16-bit in function diagram: 705.2	no
K0404	FIXSETP K U004	FB: 4th fixed setpoint 16-bit in function diagram: 705.2	no
K0405	FIXSETP K U005	FB: 5th fixed setpoint 16-bit in function diagram: 705.2	no
K0406	FIXSETP K U006	FB: 6th fixed setpoint 16-bit in function diagram: 705.2	no
K0407	FIXSETP K U007	FB: 7th fixed setpoint 16-bit in function diagram: 705.2	no
K0408	FIXSETP K U008	FB: 8th fixed setpoint 16-bit in function diagram: 705.2	no
K0409	FIXSETP K U009	FB: 9th fixed sestpoint 16-bit (unsigned). in function diagram: 705.2	no
KK0411	FIXSETP KK U011	FB: 1st fixed setpoint 32-bit. in function diagram: 705.3	yes
KK0412	FIXSETP KK U012	FB: 2nd fixed setpoint 32-bit in function diagram: 705.3	yes
KK0413	FIXSETP KK U013	FB: 3rd fixed setpoint 32-bit in function diagram: 705.3	yes
KK0414	FIXSETP KK U014	FB: 4th fixed setpoint 32-bit in function diagram: 705.3	yes
KK0415	FIXSETP KK U015	FB: 5th fixed setpoint 32-bit in function diagram: 705.3	yes
KK0416	FIXSETP KK U016	FB: 6th fixed setpoint 32-bit in function diagram: 705.3	yes
KK0417	FIXSETP KK U017	FB: 7th fixed setpoint 32-bit in function diagram: 705.3	yes
KK0418	FIXSETP KK U018	FB: 8th fixed setpoint 32-bit in function diagramm: 705.3	yes
KK0420 ... KK0422	K-> KK CONV	3 outputs of the K -> KK converter in function diagram: 710.7	yes
K0423 ... K0428	KK-> K CONV	6 outputs of the KK -> K converter. in function diagram: 710.7	no
K0431	B ® K CONV U076	Output of the 1st binector -> connector. in function diagram: 720.4	no
K0432	B ® K CONV U078	Output of the 2nd binector -> connector. in function diagram 720.4	no
K0433	B ® K CONV U080	Output of the 3rd binector -> connector in function diagram: 720.8	no
K0434 ... K0441	AdrCon	Service connectors, only for Siemens service personnel	no
K0442	ADD K 0.83	Output of the 1st 16-bit adder. in function diagram: 725.2	no
K0443	ADD K 1.01	Output of the 2nd 16-bit adder in function diagram: 725.2	no
K0444	ADD K 1.42	Output of the 3rd 16-bit adder in function diagram: 725.3	no
K0445	ADD K 2.20	Output of the 4th 16-bit adder. in function diagram: 725.3	no
K0446	ADD 4K 1.57	Output of the 16t-bit adder with 4 inputs. in function diagram: 725.5	no

Connector number	Connector name	Description	Double word
K0447	SUB K 1.02	Output of the 1st 16-bit subtracter. in function diagram: 725.2	no
K0448	SUB K 1.58	Output of the 2nd 16-bit subtracter in function diagram: 725.2	no
K0449	SUB K 2.06	Output of the 3rd 16-bit subtracter in function diagram: 725.3	no
KK0450	ADD KK 1.15	Output of the 1st 32-bit adder. in function diagram: 725.2	yes
KK0451	ADD KK 1.29	Output of the 2nd 32-bit adder in function diagram: 725.2	yes
KK0452	ADD KK 2.05	Output of the 3rd 32-bit adder in function diagram: 725.3	yes
KK0453	ADD KK 2.21	Output of the 4th 32-bit adder in function diagram: 725.3	yes
KK0454	SUB KK 1.16	Output of the 1st 32-bit subtracter. in function diagram: 725.2	yes
KK0455	SUB KK 2.35	Output of the 2nd 32-bit subtracter in function diagram: 725.2	yes
K0456	MOD ADD K 1.72	Output of the 16-bit adder modulo. in function diagram: 725.8	no
KK0457	MOD ADD KK 1.91	Output of the 32-bit adder modulo in function diagram: 725.8	yes
K0458	VZ INV K 0.84	Output of the 1st 16-bit inverter. in function diagram: 725.5	no
K0459	VZ INV K 1.17	Output of the 2nd 16-bit inverter in function diagram: 725.5	no
K0460	VZ INV K 2.36	Output of the 3rd 16-bit inverter in function diagram: 725.5	no
KK0461	VZ INV KK 1.03	Output of the 1st 32-bit inverter. in function diagram: 725.5	yes
KK0462	VZ INV KK 2.22	Output of the 2nd 32-bit inverter in function daigram: 725.5	yes
K0463	SVZ INV K 1.30	Output of the 16-bit switchable inverter in function diagram: 725.8	no
KK0465	SVZ INV KK 1.90	Output of the 32-bit switchable inverter. in function diagram: 725.8	yes
K0467	MUL K 1.04	Output of the 1st 16-bit multiplier in function diagram: 730.2	no
K0468	MUL K 1.59	Output of the 2nd 16-bit multiplier in function diagram: 730.2	no
K0469	MUL K 2.37	Output of the 3rd 16-bit multiplier in function diagram: 730.2	no
KK0470	MUL KK 1.31	Output of the 32-bit multiplier in function diagram: 730.2	yes
K0471	DIV K 1.05	Output of the 1st 16-bit divider in function diagram: 730.4	no
K0472	DIV K 2.23	Output of the 2nd 16-bit divider in function diagram: 730.4	no
KK0473	DIV KK 1.43	Output of the 1st 32-bit divider in function diagram: 730.4	yes
KK0474 ... KK0478	ConnToPar Value	Return value for connector-to-parameter converter in function diagram: 798.8	yes

Connector number	Connector name	Description	Double word
K0479	ConnToPar ParNo	First parameter number for connector-to-parameter conversion. The connector supplies internally all possible parameter numbers if the respective index is softwired and externally only the parameter number of the first index is shown. In function diagram: 798.3	no
K0480	ConnToPar Index	First index number for connector-to-parameter conversion. The connector supplies internally all possible index numbers if the respective index is softwired and externally only the index number of the first index is shown. In function diagram 798.3	no
K0481	MULDIV K 1.06	Output of the 1st 16-bit multiplier/divider in function diagram: 730.8	no
KK0482	MULDIV KK 1.06	Output of the 1st multiplier/divider (32-bit intermediate result) in function diagram: 730.8	yes
K0483	MULDIV K 1.32	Output of the 2nd 16-bit multiplier/divider in function diagram: 730.8	no
KK0484	MULDIV KK 1.32	Output of the 2nd multiplier/divider (32-bit intermediate result) in function diagram: 730.8	yes
K0485	MULDIV K 1.73	Output of the 3rd 16-bit multiplier/divider in function diagram: 730.8	no
KK0486	MULDIV KK 1.73	Output of the 3rd multiplier/divider (32-bit intermediate result) in function diagram: 730.8	yes
K0490	B->K CONV U057	Output of 4th binector -> connector converter Function diagram: 720.8	no
K0491	ABSVGEN K 0.75	Output of the 1st 16-bit absolute-value generato in function daigram: 735.3	no
K0492	ABSVGEN K 2,47	Output of the 2nd 16-bit absolute-value generator in function diagram: 735.3	no
K0493	ABSVGEN K 2.67	Output of the 3rd 16-bit absolute-value generato in function diagram: 735.3	no
KK0494	ABSVGEN KK 2.07	Output of the 1st 32-bit absolute-value generato in function diagram: 735.3	yes
K0501 ... K0503	LIMITR K 1.74	1st 16-bit limiter in function diagram: 735.7	no
K0504 ... K0506	LIMITR K 2.38	2nd 16-bit limiter in function diagram: 735.7	no
KK0507 ... KK0509	LIMITR KK 2.48	1st 32-bit limiter in function diagram: 735.7	yes
K0511 ... K0512	LMTMON K 1.18	1st limit-value monitor, 16-bit: fixed setpoint and output, smooothing element in function diagram: 740.2	no
K0513 ... K0514	LMTMON K 2.49	2nd limit-value monitor, 16-bit: fixed setpoint and output, smoothing element in function diagram: 740.2	no
KK0515 ... KK0516	LMTMON KK 2.68	3rd limit-value monitor, 32-bit: fixed setpoint and output, smoothing element in function diagram: 740.6	yes
KK0517	LMTMON KK 1.75	4th limit-value monitor, 32-bit: fixed setpoint in function diagram: 740.6	yes

Connector number	Connector name	Description	Double word
K0521	SWITCH K 0.85	1st 16-bit analog switch in function diagram: 750.2	no
K0522	SWITCH K 1.19	2nd 16-bit analog switch in function diagram: 750.2	no
K0523	SWITCH K 1.21	3rd 16-bit analog switch in function diagram: 750.2	no
K0524	SWITCH K 1.60	4th 16-bit analog switch in function diagram: 750.4	no
K0525	SWITCH K 1.76	5th 16-bit analog switch in function diagram: 750.4	no
KK0526	SWITCH KK 0.86	1st 32-bit analog switch in function diagram: 750.2	yes
KK0527	SWITCH KK 0.87	2nd 32-bit analog switch in function diagram: 750.2	yes
KK0528	SWITCH KK 1.20	3rd 32-bit analog switch in function diagram: 750.2	yes
KK0529	SWITCH KK 1.77	4th 32-bit analog switch in function diagram: 750.4	yes
KK0530	SWITCH KK 2.08	5th 32-bit analog switch in function diagram: 750.4	yes
KK0531 ... KK0538	DEMUX KK 0.62	8 outputs of the 32-bit 8-fold demultiplexer in function diagram: 750.7	yes
KK0539	OutpMultiplex 1	Output of the 32-bit 8-fold multiplexer In function diagram: 750.7	yes
K0541	CURVE K 1.07	1st 16-bit characteristic curve in function diagram: 755.3	no
K0542	CURVE K 1.33	2nd 16-bit characteristic curve in function diagram: 755.5	no
K0543	CURVE K 2.09	3rd 16-bit characteristic curve in function diagram: 755.8	no
K0544	DEADZONE K 0.88	Dead zone output 1 in function diagram: 755.5	no
KK0545	MAX KK 2.24	Output maximum selection 32-bit in function diagram: 760.2	yes
KK0546	MIN KK 2.25	Output minimum selection 32-bit in function diagram: 760.2	yes
KK0551	TRA/STOR KK 0.7	1st 32-bit tracking/storage element in function diagram: 760.5	yes
KK0552	TRA/STOR KK 2.6	2nd 32-bit tracking/storage element in function diagram: 760.8	yes
KK0553	STORE KK 0.77	1st 32-bit analog memory in function diagram: 760.5	yes
KK0554	STORE KK 2.50	2nd 32-bit analog memory in function diagram: 760.8	yes
K0561	COUNT MIN K U31	Fixed setpoint minimum 16-bit counter in function diagram: 785.2	no
K0562	COUNT MAX K U31	Fixed setpoint maximum 16-bit counter in function diagram: 785.2	no
K0563	COUNT SET K U31	Fixed setpoint setting value 16-bit counter in function diagram: 785.2	no
K0564	COUNT STA K U31	Fixed setpoint starting value 16-bit counter in function diagram: 785.2	no
K0565	COUNTER K 1.38	Output of the 16-bit counter in function diagram: 785.7	no

Connector number	Connector name	Description	Double word
KK0570	ComfRGen Input	Input of the comfort ramp-function generator in function diagram: 790.3	yes
KK0571	ComfRGen Output	Output of the comfort ramp-function generator in function diagram: 790.8	yes
KK0572	ComfRGen dy/dt	dy/dt of the comfort ramp-function generator in function diagram: 790.8	yes
KK0573	ComfRGen PosDir	Upper limit value of the comfort ramp-function generator In function diagram: 790.7	yes
KK0574	ComfRGen NegDir	Lower limit value of the comfort ramp-function generator. In function diagram: 790.7	yes
K0577	SimpRGen Output	Output of the simple ramp-function generator in function diagram: 791.5	no
K0580	TeCntr Set/ActV	Setpoint/actual value deviation of the technolog controller with controller type "PID controller". With controller type "PI controller with D portion in the actual value channel", the negated actual value is displayed. in function diagram: 792.3	no
K0581	TeCntr Input	Input of the technology controller in function diagram: 792.5	no
K0582	TeCntr D-Comp	D component of the technology controller in function diagram: 792.4	no
K0583	TeCntr P-Comp	P component of the technology controller in function diagram: 792.6	no
K0584	TeCntr I-Comp	I component of the technology controller in function diagram: 792.6	no
K0585	TeCntr CntrOut	Technology controller output before output limitation in function diagram: 792.6	no
K0586	TeCntr UpperLim	Fixed setpoint for the upper limitation of the technology controller in function diagram: 792.4	no
K0587	TeCntr LowerLim	Inverted value of the upper limitation of the technology controller in function diagram: 792.4	no
K0588	TeCntr Output	Output of the technology controller after output limitation in function diagram: 792.8	no
K0590	WobbleSignal	Output signal of wobble generator in function diagram: 795.8	no
K0591	Setp, Wobbled	Wobbled setpoint in function diagram: 795.8	no
KK0592 ... KK0599	TraceValueOutp	Output connector for the trace values in function diagram: 797.6	yes
KK0600	AnaDelayEl 1 KK	Analog output value of the 1st analog delay element in function diagram: 734.6	yes
KK0601	AnaDelayEl 2 KK	Analog output value of the 2nd analog delay element in function diagram: 734.8	yes
KK0602	MulDiv KK 1.12	32-bit result of the 1st high-resolution multiplier/divider in function diagram: 732.2	yes
KK0603	I32 KK 1.53	32-bit output value of the 1st integrator in function diagram: 734.4	yes

Connector number	Connector name	Description	Double word
KK0604	I32 KK 1.85	32-bit output value of the 2nd integrator in function diagram: 734.8	yes
KK0605	PT1Gl KK 2.31	32-bit output value of the 1st PT1 element in function diagram: 734.6	yes
KK0606	PT1Gl KK 2.43	32-bit output value of the 2nd PT1 element in function diagram: 734.8	yes
KK0607	D Elem KK 2.32	32-bit output of the 1st D element in function diagram: 734.3	yes
K0611	Integr32_1 Ti	16-bit fixed connector output for integral-time constant of the 1st 32-bit integrator. In function diagram: 734.2	no
K0612	Integr32_2 Ti	16-bit fixed connector output for integral-time constant of the 2nd 32-bit integrator. In function diagram: 734.6	no
K0613	PulseGen_1 Tp	16-bit fixed connector output for period off the 1st pulse generator in function diagram: 782.2	no
KK0616	PAmpl.32_1 KK	32-bit result of the 1st P amplifier/multiplier (2-word) in function diagram: 732.2	yes
KK0617	PAmpf.32_2 KK	32-bit result of the 2nd P amplifier/multiplier (2-word) in function diagram: 732.2	yes
KK0618	Shift32_1 KK	32-bit result of the 1st shift multiplier/divider in function diagram: 732.5	yes
KK0619	Shift32_2 KK	32-bit result of the 2nd shift multiplier/divider in function diagram: 732.5	yes
KK0620	Shift32_3 KK	32-bit result of the 3rd shift multiplier/divider in function diagram: 732.8	yes
KK0621	Shift32_4 KK	32-bit result of the 4th shift multiplier/divider in function diagram: 732.8	yes
KK0640 ... KK0643	SH 1.68 KK	Double word connectors of first S&H board	yes
K0644 ... K0651	SH 1.68 K	Connectors of first S&H element	no
K0650	Short Run Time	Time for the short run calculation in sampling increments of the setpoint channel (absolute value connector)	no
KK0652 ... KK0655	SH 1.69 KK	Double word connectors of second S&H board	yes
K0656 ... K0663	SH 1.69 K	Connectors of second S&H element	no
KK0664 ... KK0667	SH 1.70 KK	Double word connectors of third S&H board	yes
K0668 ... K0675	SH 1.70 K	Connectors of third S&H element	no
K0900	T(act, Tech)	Torque (smoothed) in normalization 1000H=T_Ref (P354) for applications with T100/T300	no
K0901	V(set, Tech)	Output voltage (smoothed) in normalization 1000H = U_Ref (P351) for applications with T100/T300	no
K0902	I(Outp, Tech)	Output current (smoothed) in normalization 1000H = I_Ref (P350) for applications with T100/T300	no
K0903	DCBus(act,Tech)	DC link bus voltage (smoothed) in normalization 1000H = U_Ref (P351) for applications with T100/T300	no

Connector number	Connector name	Description	Double word
K0904	I(max.permTech)	Currently applicable value of maximum current in normalization 1000H = I_Ref (P350) for applications with T100/T300	no
K0905	Isq(act, Tech)	Actual value of the torque-generating current in normalization 1000H = I_ref (P350) for applications with T100/T300	no
K0906	Isq(smth,Tech)	Setpoint of the torque-generating current in normalization 1000H = I_Ref for applications with T100/T300	no
K2001 ... K2016	SCom1 Word	Received process data from SCom1 (16-bit)	no
KK2031 ... KK2045	SCom1 DWord	Received process data from SCom1 (32-bit)	yes
K3001 ... K3016	CB/TB Word	Received process data from CB/TB In function diagram: 120.5	no
KK3031 ... KK3045	CB/TB DWord	Received process data from CB/TB In function diagram: 120.6	yes
K4101 ... K4103 not Compact PLUS	SCI Sl.1 AnaIn	SCI1 Analog inputs Slave 1 In function diagram: Z20.7	no
K4201 ... K4203 not Compact PLUS	SCI Sl.2 AnaIn	SCI slave 2 Analog inputs In function diagram: Z21.8	no
K4501 ... K4516 not Compact PLUS	SCB Word	SCB 16-bit setpoints In function diagram: Z01.6, Z05.6	no
KK4531 ... KK4545 not Compact PLUS	SCB DWord	SCB 32-bit setpoints In function diagram: Z05.7	yes
K5101	1st EB1 AnaIn1	Analog input 1 of the first inserted EB1 In function diagram: Y01.8	no
K5102	1st EB1 AnaIn2	Analog input 2 of the first inserted EB1 In function diagram: Y01.8	no
K5103	1st EB1 AnaIn3	Analog input 3 of the first inserted EB1 In function diagram: Y01.8	no
K5104	1st EB1 AnaOut1	Setpoint, analog ouptut 1 of the first inserted EB1 In function diagram: Y02.5	no
K5105	1st EB1 AnaOut2	Setpoint, analog output 2 of the first inserted EB1 In function diagram: Y02.5	no
K5106	1EB1stat.DI/DO	Display of status of the terminals (status of digital inputs/outputs) of the first inserted EB1 In function diagram: Y03.2	no
K5111	AnaIn 1st EB2	Analog input of the first inserted EB2 In function diagram: Y07.8	no
K5112	AnaIn 1st EB2	Setpoint, analog output of the first inserted EB2 In function diagram: Y07.5	no
K5113	Stat.DI/DO 1EB2	Display of status of the terminals (status of digital inputs/outputs) of the first inserted EB2 In function diagram: Y07.3	no
K5201	2nd EB1 AnaIn1	Analog input 1 of the second inserted EB1 In function diagram: Y04.8	no
K5202	2nd EB1 AnaIn2	Analog input 2 of the second inserted EB1 In function diagram: Y04.8	no
K5203	2nd EB1 AnaIn3	Analog input 3 of the second inserted EB1 In function diagram: Y04.8	no
K5204	2nd EB1 AnaOut1	Setpoint, analog output 1 of the second inserted EB2 In function diagram: Y05.5	no

Connector number	Connector name	Description	Double word
K5205	2nd EB1 AnaOut2	Setpoint, analog output 2 of the second inserted EB1 In function diagram: Y05.5	no
K5206	2EB1stat.DI/DO	Display of status of the terminals (status of digital inputs/outputs) of the second inserted EB1 In function diagram: Y06.2	no
K5211	AnaIn 2nd EB2	Analog input of the second inserted EB2 In function diagram: Y08.8	no
K5212	AnaIn 2nd EB2	Setpoint, analog output of the second inserted EB2 In function diagram: Y08.5	no
K5213	Stat.DI/DO 2EB2	Display of status of the terminals (status of digital inputs/outputs) of the second inserted EB2 In function diagram: Y08.3	no
K6001 ... K6016	SCom2 Word	Interface SCom2	no
KK6031 ... KK6045	SCom2 DWord	Interface 2	yes
K7001 ... K7016	SLB Word	Setpoints SIMOLINK	no
KK7031 ... KK7045	SLB DWord	Setpoints SIMOLINK	yes
K7081	Ind.Sync-Tgr	Number of error-free synchronization telegrams corresponding to P748.1 In function diagram 140.8	no
K7082	Ind.CRC Error	Number of CRC errors, corresponding to P748.2 in function diagram 140.8	no
K7083	Ind.Timeout	Number of timeout errors, corresponding to P748.3 in function diagram 140.8	no
K7085	NodeAddrTimeout	Address of the node that sends the "Time out" special telegram, corresponding to P748.5 in function diagram 140.8	no
K7101 ... K7108	SIMOLINK SpecD	Special data from SIMOLINK	no
KK7131 ... KK7137	SIMOLINK SpecD	Special data from SIMOLINK	yes
K8001 ... K8016	2 CB Word	Setpoints for 2nd CB In function diagram: 130.5	no
KK8031 ... KK8045	2 CB DWord	Additional CB double-words In function diagram: 130.6	yes

Binector List

Binector list Vector Control

22.10.01

Binector number	Binector name	Description
B0000	FixBinector 0	Fixed binector 0 In function diagram 15.2, 15.4
B0001	FixBinector 1	Fixed binector 1 In function diagram 15.4
B0005 not Compact PLUS	PMU ON/OFF	Binector for input/output command via PMU
B0006 not Compact PLUS	PMU Pos Dir	Binector for positive rotation direction via PMU
B0007 not Compact PLUS	PMU Neg Dir	Binector for negative rotation direction via PMU
B0008	PMU MOP UP	Binector for "Raise mot. potentiometer" via PMU
B0009	PMU MOP DOWN	Binector for "Lower mot. potentiometer" via PMU
B0010	DigIn 1	Binary input (digital input) 1 In function diagram: 90.5
B0011	DigIn 1 inv.	Binary input (digital input) 1 inverted In function diagram: 90.5
B0012	DigIn 2	Binary input (digital input) 2 In function diagram: 90.5
B0013	DigIn 2 inv.	Binary input (digital input) 2 inverted In function diagram: 90.5
B0014	DigIn 3	Binary input (digital input) 3 In function diagram: 90.5
B0015	DigIn 3 inv.	Binary input (digital input) 3 inverted In function diagram: 90.5
B0016	DigIn 4	Binary input (digital input) 4 In function diagram: 90.5
B0017	DigIn 4 inv.	Binary input (digital input) 4 inverted In function diagram: 90.5
B0018	DigIn 5	Binary input (digital input) 5
B0019	DigIn 5 inv.	Binary input (digital input) 5 inverted
B0020	DigIn 6	Binary input (digital input) 6
B0021	DigIn 6 inv.	Binary input (digital input) 6 inverted
B0022	DigIn 7	Binary input (digital input) 7
B0023	DigIn 7 inv.	Binary input (digital input) 7 inverted
B0025	DigOut 1	Digital output 1 In function diagram: 90.6
B0026	DigOut 2	Digital output 2 In function diagram: 90.6
B0027	DigOut 3	Digital output 3 In function diagram: 90.6
B0028	DigOut 4	Digital output 4 In function diagram: 90.6
B0030	SCom1 TlgOFF	Telegram failure at serial interface 1 (SCom1)
B0031	AO1 Monitor	Analog input 1 wire break monitoring
B0032	AO2 Monitor	Analog input 2 wire break monitoring
B0035	CB/TB TlgOFF	TB/CB telegram failure

Binector number	Binector name	Description
B0040	SLB TlgOFF	SIMOLINK telegram failure
B0041	SIMOLINKTimeout	This binector is set if timeout occurs on the SIMOLINK ring. When communication functions again, the binector is reset.
B0042	SIMOLINK Start	This binector is set if no connection is realized on the SIMOLINK ring. This usually means that the cable is interrupted or a node is without supply voltage.
B0045	2.CB TlgOFF	Telegram failure additional CB
B0050 not Compact PLUS	SCB TlgOFF	SCB telegram failure
B0055	SCom2 TlgOFF	SCom2 telegram failure
B0060	Control Track	SBP control track
B0090	CalcTimeWarn	Calculating time overload alarm
B0091	FaultCalcTime	Calculating tme overflow fault
B0092	FDS Bit0	Function dataset bit 0
B0093	FDS Bit1	Function dataset bit 1
B0094	Fault ACK	Corresponds to Control Word 1 Bit 7 function diagram 180.8
B0099	No n-Reg Enable	Binector no speed controller enable
B0100	Rdy for ON	"Ready for switching on" binector
B0101	Not Rdy for ON	"NOT ready for switching on" binector
B0102	Rdy for Oper	"Ready for operation" binector
B0103	NotRdy for Oper	"NOT ready for operation" binector
B0104	Operation	"Operation" binector
B0105	Not operating	"Not operating" binector
B0106	Fault	"Fault" binector
B0107	No fault	"NO fault" binector
B0108	No OFF2	"NO OFF2" binector (low active!)
B0109	OFF2	"OFF2" binector (low active!)
B0110	No OFF3	"NO OFF3" binector (low active!)
B0111	OFF3	"OFF3" binector (low active!)
B0112	Blocked	"Switch-on inhibit" binector
B0113	Not Blocked	"NO switch-on inhibit" binector
B0114	Warning	"Alarm active" binector
B0115	No Warning	"NO alarm active" binector
B0116	No Deviation	"No setpoint/actual value deviation" binector
B0117	Deviation	"Setpoint/actual value deviation" binector
B0120	CompV OK	"Comparison setpoint value achieved" binector
B0121	CompV not OK	"Comparison setpoint value NOT achieved" binector
B0122	Low Voltage	"Undervoltage" binector
B0123	No Low Voltage	"NO undervoltage" binector

Binector number	Binector name	Description
B0124	Energize MCon	"Demand to energize main contactor" binector
B0125	N.Energ.MCon	"Demand NOT to energize main contactor" binector
B0126	RampGen active	"Ramp-function generator active" binector
B0127	RampGen n.act.	"Ramp-function generator NOT active" binector
B0128	Speed Setp FWD	"Positive speed setpoint" binector
B0129	Speed Setp REV	"Negative speed setpoint" binector
B0130	KIB/FLR active	"KIB / FLN active" binector
B0131	KIB/FLR n.activ	"KIB / FLN not active" binector
B0132	Fly/Exc active	"Flying restart or excitation active" binector
B0133	Fly/Exc n.act.	"Flying restart or excitation NOT active" binector
B0134 not Compact PLUS	Sync reached	"Synchronism reached" binector
B0135 not Compact PLUS	Sync n.reached	"Synchronism NOT reached" binector
B0136	Overspeed	"Overspeed" binector
B0137	No Overspeed	"NO overspeed" binector
B0138	Ext Fault 1	"External fault 1" binector
B0139	No Ext Fault 1	"NO external fault 1" binector
B0140	Ext Fault 2	"External fault 2" binector
B0141	No Ext Fault 2	"NO external fault 2" binector
B0142	Ext Warning	"External alarm" binector
B0143	No Ext Warning	"NO external alarm" binector
B0144	Ovld Warn Drive	"Converter overload alarm" binector
B0145	No OvldWarn Drv	"NO converter overload alarm" binector
B0146	Tmp Flt Drive	"Converter overtemperature fault active" binector
B0147	No Tmp Flt Drv	"NO converter overtemperature fault active" binector
B0148	TmpWarn Drive	"Converter overtemperature alarm active" binector
B0149	No TmpWarn Drv	"NO converter overtemperature alarm active" binector
B0150	TmpWarnMotor	"Motor overtemperature alarm active" binector
B0151	No TmpWarnMotor	"NO motor overtemperature alarm active" binector
B0152	TmpFltMotor	"Motor overtemperature fault active" binector
B0153	No TmpFltMotor	"NO motor overtemperature fault active" binector
B0156	Motor PullOut	"Motor pulled out" binector
B0157	No MotorPullOut	"Motor NOT pulled out" binector
B0158	ChrgRelay close	"Bypass contactor energized" binector
B0159	ChrgRelay open	"Bypass contactor NOT energized" binector
B0160 not Compact PLUS	Sync Fault	"Synchronization fault alarm" binector
B0161 not Compact PLUS	No Sync Fault	"NO synchronization fault alamr" binector

Binector number	Binector name	Description
B0162	Prechrg active	"Precharging active" binector
B0163	Prechrg n.act.	"Precharging NOT active" binector
B0200	No SpdDir Sel	No direction of rotation selected
B0201	Accel active	Acceleration active
B0202	Decel active	Deceleration active
B0203	Limitr FWD act.	Speed limitation positive rotation direction reached
B0204	Limitr REV act.	Speed limitation negative rotation direction reached
B0205	RGen blocked	Ramp-function generator disabled
B0206	RGen released	Ramp-function generator released
B0207	RGen stopped	Ramp-function generator stopped
B0208	RGen set	Ramp-function generator set
B0209	RGen tracked	Ramp-function generated tracked
B0227	Derating	Binector showing the reduction of the maximum current to 91 % when load cycle is exceeded. In function diagram 490.6
B0228	n/f Reg Disable	The speed (frequency) controller is disabled.
B0229	Set I Comp act.	Fixed binector 0 In function diagram 15.2, 15.4
B0231	Torq(Lim1)act.	Upper torque limitation achieved
B0232	Torq(Lim2)act.	Lower torque limitation achieved
B0234	n-Reg in Limitr	Limitation active at speed controller
B0235	Isq(max) red.	Isq(max) has been reduced In function diagram: 384.8
B0236	I(max) Reg act	I(max) controller active
B0237	Set Rgen	Ramp-function generator is set
B0238	RGen AccBlock	Ramp-function generator: acceleration disabled
B0239	RGen DecBlock	Ramp-function generator: deceleration disabled
B0240	ProtRGen act.	Protective ramp-function generator active
B0250	I-Reg in Limitr	Current controller in limitation (voltage limit achieved)
B0251	Field Weakening	Field weakening active
B0252	EMF Reg in Lmtr	Limitation active at EMF controller
B0253	EMF Model act.	The EMF model is active
B0254	f(set) in Limtr	The frequency setpoint for the gating unit is limited. The limitation depends on the maximum speed (in Hz) (P452 P453) and the rated slip of the motor. Limitation is at least 15% of the rated motor frequency above the maximum speed.
B0255	Excitation End	The excitation time of the motor has expired.
B0256	Tacho Error	Switchover to encoder-free vector control (frequency control) due to a tachometer fault.
B0270	Energize MCon	Energize main contactor. Same significance as binector 124.
B0275	Open Brake	"Open brake" binector (high)

Binector number	Binector name	Description
B0276	Close Brake	"Close brake" binector (high)
B0277	SetpRel brake	Setpoint release of braking control
B0278	InvRel Brake	Inverter release of braking control
B0279	Chkbk BrakeCl	"Brake cannot be opened" alarm. After brake is opened and after brake opening time has expired, the brake checkback still indicates "Brake closed"
B0280	Chkbk BrakeOp	"Brake cannot be closed" alarm. After brake is closed and the brake closing time has expired, brake checkback still indicates "Brake open"
B0281	BrakeThr1 over	The (current) actual value has exceeded brake threshold 1.
B0282	BrakeThr2 under	The (speed) actual value has fallen short of brake threshold 2
B0294	DC Brake active	DC braking function is active
B0295	Vd(min)Reg act.	The Vd(min) controller is active
B0296	Vd(max)Reg act.	The Vd(max controller is active
B0297 not Compact PLUS	Sync Select	1: Synchronization energized 0: Synchronization not energized In function diagram: X01.6
B0298 not Compact PLUS	SyncFreqMeas	1: Synchronization state Frequency measurement is active 0: Synchronization state Frequency measurement is not active In function diagram: X01.6
B0299 not Compact PLUS	SyncPhaseAmps	1: Synchronization state Phase control is active 0: Synchronization state Phase control is not active In function diagram: X01.6
B0320	RZM/FLM	0: Space vector modulation active 1: Edge modulation active
B0321	Asy/Sy System	0: Asynchronous modulation systems active 1: Synchronous modulation systems active
B0322	Overmodulation	0: Operation in linear modulation range 1: Operation in overmodulation range
B0323	FLM System #1	Bit0 of system number in the edge modulation, only valid if B0320=1
B0324	FLM System #2	Bit1 of system number in the edge modulation, only valid if B0320=1
B0325	FLM System #3	Bit2 of system number in the edge modulation, only valid if B0320=1
B0326	FLM System #4	Bit3 of system number in the edge modulation, only valid if B0320=1
B0330	Simulation	Binector simulation
B0400	POWER ON	POWER ON signal
B0401	FixBit U021	FB: 1st fixed bit
B0402	FixBit U022	FB: 2nd fixed bit
B0403	FixBit U023	FB: 3rd fixed bit
B0404	FixBit U024	FB: 4th fixed bit
B0405	FixBit U025	FB: 5th fixed bit
B0406	FixBit U026	FB: 6th fixed bit

Binector number	Binector name	Description
B0407	FixBit U027	FB: 7th fixed bit
B0408	FixBit U028	FB: 8th fixed bit
B0409	OFF&ActV	OFF and shutdown threshold Function diagram 480
B0410 ... B0425	K->B CONV1	16 binectors of the 1st connector -> binector converter
B0430 ... B0445	K->B CONV2	16 binectors of the 2nd connector -> binector converter
B0450 ... B0465	K->B CONV3	16 binectors of the 3rd connector -> binector converter
B0470 ... B0471	LIMITR B 1.74	1st limiter 16-bit
B0472 ... B0473	LIMITR B 2.38	2nd limiter 16-bit
B0474 ... B0475	LIMITR B 2.48	1st limiter 32-bit
B0476	LMTMON B 1.18	1st limit-value monitor: 16-bit
B0477	LMTMON B 2.49	2nd limit-value monitor: 16-bit
B0478	LMTMON B 2.68	3rd limit-value monitor: 32-bit
B0479	LMTMON B 1.75	4th limit-value monitor: 32-bit
B0480 ... B0481	CAMCON 0.60	Cam controller 1
B0482 ... B0483	CAMCON 0.61	Cam controller 2
B0490 ... B0491	COUNTER 1.36 B	16-bit counter: positive overflow and negative overflow
B0501 ... B0502	RS-FF 1.34	1st RS flipflop 1: Q and Q_transv
B0503 ... B0504	RS-FF 1.36	2nd RS flipflop
B0505 ... B0506	RS-FF 1.49	3rd RS flipflop
B0507 ... B0508	RS-FF 1.66	4th RS flipflop
B0509 ... B0510	RS-FF 1.82	5th RS flipflop
B0511 ... B0512	RS-FF 1.97	6th RS flipflop
B0513 ... B0514	RS-FF 1.98	7th RS flipflop
B0515 ... B0516	RS-FF 2.13	8th RS flipflop
B0517 ... B0518	RS-FF 2.14	9th RS flipflop
B0519 ... B0520	RS-FF 2.29	10th RS flipflop
B0521 ... B0522	RS-FF 2.30	11th RS flipflop
B0523 ... B0524	RS-FF 2.71	12th RS flipflop
B0525 ... B0526	D-FF 1.25	1st D FF
B0527 ... B0528	D-FF 2.15	2nd D FF
B0530 ... B0531	TIMER 0.95	1st timer
B0532 ... B0533	TIMER 1.67	2nd timer
B0534 ... B0535	TIMER 1.84	3rd timer
B0536 ... B0537	TIMER 1.99	4th timer
B0538 ... B0539	TIMER 1.83	5th timer
B0540 ... B0541	TIMER 2.16	6th timer
B0542 ... B0543	TIMER 1.50	7th timer

Binector number	Binector name	Description
B0544 ... B0548	ConnToParChkbk	Checkback for connector-parameter converter 0=No memory access 1=Memory access necessary
B0550	ComfRGen Out=0	Output of the comfort ramp-function generator is zero
B0551	ComfRGen (y=x)	Acceleration/deceleration of the comfort ramp-function generator is finished (y=x)
B0552	ComfRGen First	Initial acceleration of comfort ramp-function generator (low active)
B0555	TechCtrl lim	Technology controller at output limitation
B0556	TechCtrl lock	Technology controller inhibited
B0560	WobbSlaveSync	Synchronizing signal for slave
B0561 ... B0568	TraceTriggerOut	Fixed binector 0 In function diagram 15.2, 15.4
B0570	SampTimeChB0.66	Binary output signal of the 1st sampling time changer
B0571	SampTimeChB0.67	Binary output signal of the 2nd sampling time changer
B0572	SampTimeChB0.68	Binary output signal of the 3rd sampling time changer
B0573	SampTimeChB0.69	Binary output signal of the 4th sampling time changer
B0574	SampTimeChB0.70	Binary output signal of the 5th sampling time changer
B0575	SampTimeChB0.71	Binary output signal of the 6th sampling time changer
B0576	PulsGen1 B 0.65	Binary output signal of the 1st pulse generator
B0577	I32 OG B 1.53	Flag for output value at upper limit of the 1st integrator
B0578	I32 UG B 1.53	Flag for output value at lower limit of the 1st integrator
B0579	I32 OG B 1.85	Flag for output value at upper limit of the 2nd integrator
B0580	I32 UG B 1.85	Flag for output value at lower limit of the 2nd integrator
B0601	AND 0.78	1st AND element
B0602	AND 0.79	2nd AND element
B0603	AND 0.89	3rd AND element
B0604	AND 1.09	4th AND element
B0605	AND 1.22	5th AND element
B0606	AND 1.35	6th AND element
B0607	AND 1.44	7th AND element
B0608	AND 1.61	8th AND element
B0609	AND 1.62	9th AND element
B0610	AND 1.79	10th AND element
B0611	AND 1.80	11th AND element
B0612	AND 1.92	12th AND element
B0613	AND 2.26	13th AND element
B0614	AND 2.39	14th AND element
B0615	AND 2.51	15th AND element
B0616	AND 2.52	16th AND element
B0617	AND 2.54	17th AND element

Binector number	Binector name	Description
B0618	AND 2.92	18th AND element
B0619	OR 0.90	1st OR element
B0620	OR 0.91	2nd OR element
B0621	OR 1.23	3rd OR element
B0622	OR 1.45	4th OR element
B0623	OR 1.63	5th OR element
B0624	OR 1.81	6th OR element
B0625	OR 1.93	7th OR element
B0626	OR 2.10	8th OR element
B0627	OR 2.11	9th OR element
B0628	OR 2.40	10th OR element
B0629	OR 2.70	11th OR element
B0630	OR 2.93	12th OR element
B0631 ... B0638	SH 1.68 B	Binectors of 1st S&H Block
B0641	INVERTER 1.08	1st inverter
B0642	INVERTER 1.10	2nd inverter
B0643	INVERTER 1.11	3rd inverter
B0644	INVERTER 1.37	4th inverter
B0645	INVERTER 1.46	5th inverter
B0646	INVERTER 1.64	6th inverter
B0647	INVERTER 1.94	7th inverter
B0648	INVERTER 2.41	8th inverter
B0649	INVERTER 2.53	9th inverter
B0650	INVERTER 2.55	10th inverter
B0651 ... B0658	SH 1.69 B	Binectors of 2nd S&H Block
B0661	SWITCH B 0.94	1st digital switch
B0662	SWITCH B 0.97	2nd digital switch
B0663	SWITCH B 1.48	3rd digital switch
B0664	SWITCH B 1.65	4th digital switch
B0665	SWITCH B 1.96	5th digital switch
B0666	EXOR 0.93	1st EXOR element
B0667	EXOR 0.96	2nd EXOR element
B0668	EXOR 2.28	3rd EXOR element
B0669 ... B0676	SH 1.70 B	Binectors of 3rd S&H Block
B0681	NAND 0.92	1st NAND element
B0682	NAND 1.24	2nd NAND element
B0683	NAND 1.47	3rd NAND element
B0684	NAND 1.95	4th NAND element

Binector number	Binector name	Description
B0685	NAND 2.12	5th NAND element
B0686	NAND 2.27	6th NAND element
B0687	NAND 2.42	7th NAND element
B0688	NAND 2.94	8th NAND element
B0851	v < v1	Fixed binector 0 In function diagram 15.2, 15.4
B0852	v < v2	Fixed binector 0 In function diagram 15.2, 15.4
B0853	v < v3	Fixed binector 0 In function diagram 15.2, 15.4
B0854	v < v4	Fixed binector 0 In function diagram 15.2, 15.4
B0855	Short Run	Fixed binector 0 In function diagram 15.2, 15.4
B0856	Emerg/lowering	Fixed binector 0 In function diagram 15.2, 15.4
B0857	< Setp Thresh	Fixed binector 0 In function diagram 15.2, 15.4
B2100 ... B2115	SCom1Word1Bit	USS Scom1 1st word In function diagram: 60.1
B2200 ... B2215	SCom1Word2Bit	USS Scom1 2nd word
B2300 ... B2315	SCom1Word3Bit	USS Scom1 3rd word
B2400 ... B2415	SCom1Word4Bit	USS Scom1 4th word
B2500 ... B2515	SCom1Word5Bit	USS Scom1 5th word
B2600 ... B2615	SCom1Word6Bit	USS Scom1 6th word
B2700 ... B2715	SCom1Word7Bit	USS Scom1 7th word
B2800 ... B2815	SCom1Word8Bit	USS Scom1 8th word
B2900 ... B2915	SCom1Word9Bit	USS Scom1 9th word
B3100 ... B3115	CB/TBWord1Bit	TB/CB 1st word
B3200 ... B3215	CB/TBWord2Bit	TB/CB 2nd word
B3300 ... B3315	CB/TBWord3Bit	TB/CB 3rd word
B3400 ... B3415	CB/TBWord4Bit	TB/CB 4th word
B3500 ... B3515	CB/TBWord5Bit	TB/CB 5th word
B3600 ... B3615	CB/TBWord6Bit	TB/CB 6th word
B3700 ... B3715	CB/TBWord7Bit	TB/CB 7th word
B3800 ... B3815	CB/TBWord8Bit	TB/CB 8th word
B3900 ... B3915	CB/TBWord9Bit	TB/CB 9th word
B4100 ... B4115 not Compact PLUS	SCI Sl1DigIn	Digital inputs SC1 slave 1
B4120 ... B4135 not Compact PLUS	SCI Sl1DigInN	Binary inputs inverted SC1 Slave 1
B4200 ... B4215 not Compact PLUS	SCI Sl2DigIn	Digital inputs SC1 slave 2
B4220 ... B4235 not Compact PLUS	SCI Sl2DigInN	Binary inputs inverted SC1 Slave 2

Binector number	Binector name	Description
B4500 ... B4515 not Compact PLUS	SCB Word1 Bit	SCB 1st word
B4600 ... B4615 not Compact PLUS	SCB Word2 Bit	SCB 2nd word
B4700 ... B4715 not Compact PLUS	SCB Word3 Bit	SCB 3rd word
B4800 ... B4815 not Compact PLUS	SCB Word4 Bit	SCB 4th word
B4900 ... B4915 not Compact PLUS	SCB Word5 Bit	SCB 5th word
B5001 not Compact PLUS	DI TSY inv.	Inverted binary input TSY board Terminal -X100:20,21 in function diagram: X01.3
B5002 not Compact PLUS	DI TSY	Binary input TSY board Terminal -X100:20,21 in function diagram: X01.3
B5101	1EB1WireAnaIn1	Signal for wire break at analog input 1 with the first inserted EB1
B5102	1EB1 U>8VAnaIn2	Signal for high at input (U_in > 8V) at analog input 2 with the first inserted EB1
B5103	1EB1 U>8VAnaIn3	Signal for high at input (U_in > 8V) at analog input 3 with the first inserted EB1
B5104	1stEB1 DI1 inv.	Digital input 1 inverted on the first inserted EB1
B5105	1stEB1 DI1	Digital input 1 on the first inserted EB1
B5106	1stEB1 DI2 inv.	Digital input 2 inverted on the first inserted EB1
B5107	1stEB1 DI2	Digital input 2 on the first inserted EB1
B5108	1stEB1 DI3 inv.	Digital input 3 inverted on the first inserted EB1
B5109	1stEB1 DI3	Digital input 3 on the first inserted EB1
B5110	1stEB1 DI4 inv.	Digital input 4 inverted on the first inserted EB1
B5111	1stEB1 DI4	Digital input 4 on the first inserted EB1
B5112	1stEB1 DI5 inv.	Digital input 5 inverted on the first inserted EB1
B5113	1stEB1 DI5	Digital input 5 on the first inserted EB1
B5114	1stEB1 DI6 inv.	Digital input 6 inverted on the first inserted EB1
B5115	1stEB1 DI6	Digital input 6 on the first inserted EB1
B5116	1stEB1 DI7 inv.	Digital input 7 inverted on the first inserted EB1
B5117	1stEB1 DI7	Digital input 7 on the first inserted EB1
B5121	WireBreak1stEB2	Signal for wire break on the first inserted EB2
B5122	BI1 inv.1stEB2	Digital input 1 inverted on the first inserted EB2
B5123	BI1 1st EB2	Digital input 1 on the first inserted EB2
B5124	BI2 inv. 1stEB2	Digital input 2 inverted on the first inserted EB2
B5125	BI 2 1st EB2	Digital input 2 on the first inserted EB2
B5201	2EB1WireAnaIn1	Signal for wire break at analog input 1 on the second inserted EB1
B5202	2EB1 U>8VAnaIn2	Signal for high at input (U_in > 8V) at analog input 2 on the second EB1
B5203	2EB1 U>8VAnaIn3	Signal for high at input (U_in > 8V) at analog input 3 on the second inserted EB1

Binector number	Binector name	Description
B5204	2ndEB1 DI1 inv.	Digital input 1 inverted on the second inserted EB1
B5205	2ndEB1 DI1	Digital input 1 on the second inserted EB1
B5206	2ndEB1 DI2 inv.	Digital input 2 inverted on the second inserted EB1
B5207	2ndEB1 DI2	Digital input 2 on the second inserted EB1
B5208	2ndEB1 DI3 inv.	Digital input 3 inverted on the second EB1
B5209	2ndEB1 DI3	Digital input 3 on the second inserted EB1
B5210	2ndEB1 DI4 inv.	Digital input 4 inverted on the second inserted EB1
B5211	2ndEB1 DI4	Digital input 4 on the second inserted EB1
B5212	2ndEB1 DI5 inv.	Digital input 5 inverted on the second inserted EB1
B5213	2ndEB1 DI5	Digtial input 5 on the second inserted EB1
B5214	2ndEB1 DI6 inv	Digital input 6 inverted on the second inserted EB1
B5215	2ndEB1 DI6	Digital input 6 on the second inserted EB1
B5216	2ndEB1 DI7 inv.	Digital input 7 inverted on the second inserted EB1
B5217	2ndEB1 DI7	Digital input 7 on the second inserted EB1
B5221	WireBreak2ndEB2	Signal for wire break on the second inserted EB2
B5222	BI1 inv. 2ndEB2	Digital input 1 inverted on the second inserted EB2
B5223	BI 1 2nd EB2	Digital input 1 on the second inserted EB2
B5224	BI2 inv. 2ndEB2	Binary input 2 inverted on the second inserted EB2
B5225	BI 2 2nd EB2	Binary input 2 on the second inserted EB2
B6100 ... B6115	SCom2Word1Bit	SCom2 1st word
B6200 ... B6215	SCom2Word2Bit	SCom2 2nd word
B6300 ... B6315	SCom2Word3Bit	SCom2 3rd word
B6400 ... B6415	SCom2Word4Bit	SCom2 4th word
B6500 ... B6515	SCom2Word5Bit	SCom2 5th word
B6600 ... B6615	SCom2Word6Bit	SCom2 6th word
B6700 ... B6715	SCom2Word7Bit	SCom2 7th word
B6800 ... B6815	SCom2Word8Bit	SCom2 8th word
B6900 ... B6915	SCom2Word9Bit	SCom2 9th word
B7010	SLB Appl.Flag 0	SIMOLINK application flag 1
B7011	SLB Appl.Flag 1	SIMOLINK application flag 2
B7012	SLB Appl.Flag 2	SIMOLINK application flag 3
B7013	SLB Appl.Flag 3	SIMOLINK application flag 4
B7100 ... B7115	SLB Word1 Bit	SIMOLINK 1st word
B7200 ... B7215	SLB Word2 Bit	SIMOLINK 2nd word
B7300 ... B7315	SLB Word3 Bit	SIMOLINK 3rd word
B7400 ... B7415	SLB Word4 Bit	SIMOLINK 4th word
B7500 ... B7515	SLB Word5 Bit	SIMOLINK 5th word
B7600 ... B7615	SLB Word6 Bit	SIMOLINK 6th word

Binector number	Binector name	Description
B7700 ... B7715	SLB Word7 Bit	SIMOLINK 7th word
B7800 ... B7815	SLB Word8 Bit	SIMOLINK 8th word
B7900 ... B7915	SLB Word9 Bit	SIMOLINK 9th word
B8100 ... B8115	2ndCBWord1Bit	2nd CB 1st word
B8200 ... B8215	2ndCBWord1Bit	2nd CB 2nd word
B8300 ... B8315	2ndCBWord1Bit	2nd CB 3rd word
B8400 ... B8415	2ndCBWord1Bit	2nd CB 4th word
B8500 ... B8515	2ndCBWord1Bit	2nd CB 5th word
B8600 ... B8615	2ndCBWord1Bit	2nd CB 6th word
B8700 ... B8715	2ndCBWord1Bit	2nd CB 7th word
B8800 ... B8815	2ndCBWord1Bit	2nd CB 8th word
B8900 ... B8915	2ndCBWord1Bit	2nd CB 9th word

List of Motor Data Set parameters

List of motor data set parameters Vector Control (MDS list)

22.10.01

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
P075	X (magnet,d)tot	150	150	150	150
P076	X (magnet,q)tot.	150	150	150	150
P077	X (sigma,d) damp	9	9	9	9
P078	X (sigma,q) damp	9	9	9	9
P079	R (damping,d)	8	8	8	8
P080	R (damping,q)	8	8	8	8
P081	Iexc(0)/Iexc(n)	50	50	50	50
P082	Psi(sat.char.,1)	60	60	60	60
P083	Iexc(sat.char,1)	30	30	30	30
P084	Psi(sat.char.,2)	80	80	80	80
P085	Iexc(sat.char,2)	45	45	45	45
P086	Psi(sat.char.,3)	90	90	90	90
P087	Iexc(sat.char,3)	65	65	65	65
P088	kT(n)	0	0	0	0
P095	Type of Motor	10	10	10	10
P097	Select 1PH7	0	0	0	0
P100	Control Mode	1	1	1	1
P101	Mot Rtd Volts	400	400	400	400
P102	Motor Rtd Amps	6,1	6,1	6,1	6,1
P103	Motor Magn Amps	0	0	0	0
P104	MotPwrFactor	0,8	0,8	0,8	0,8
P105	Motor Rtd Power	2	2	2	2
P106	Motor Rtd Effic.	95	95	95	95
P107	Motor Rtd Freq	50	50	50	50
P108	Motor Rtd Speed	0	0	0	0
P109	Motor #PolePairs	2	2	2	2
P113	Mot Rtd Torque	1	1	1	1
P114	Technol. Cond.	0	0	0	0
P116	Start-up Time	1	1	1	1
P117	Resist Cable	0	0	0	0
P120	Main Reactance	210	210	210	210
P121	Stator Resist	3	3	3	3
P122	Tot Leak React	25	25	25	25
P127	RotResistTmpFact	80	80	80	80
P128	Imax	4,5	4,5	4,5	4,5
P130	Select MotEncod	10	10	10	10
P138	AnalogTachScale	3000	3000	3000	3000
P151	Encoder Pulse #	1024	1024	1024	1024
P157	i(exc.)-Reg. Kp	0,5	0,5	0,5	0,5
P158	i(exc.,min.)	0,1	0,1	0,1	0,1

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
P159	Smooth. dI(exc)	100	100	100	100
P161	i(min.curr.val.)	0	0	0	0
P162	df(changeCosPhi)	20	20	20	20
P163	Flux Reg. Gain	1,5	1,5	1,5	1,5
P164	V(max) reg. Kp	1,5	1,5	1,5	1,5
P165	EMF(max) reg. Kp	1,5	1,5	1,5	1,5
P166	Kp Tdd	100	100	100	100
P167	Kp Tdq	100	100	100	100
P215	max. dn/dt	5	5	5	5
P216	Smooth n/f(FWD)	0	0	0	0
P217	Slip fail corr’n	0	0	0	0
P221	smooth n/f(set)	4	4	4	4
P223	Smooth n/f(act)	4	4	4	4
P233	n/f Reg. Adpat.1	0	0	0	0
P234	n/f-Reg. Adapt.2	100	100	100	100
P235	n/f-Reg Gain 1	10	10	10	10
P236	n/f-Reg. Gain2	10	10	10	10
P240	n/f Reg Time	400	400	400	400
P246	Scale Droop	0	0	0	0
P249	DT1 Function T1	10	10	10	10
P250	DT1 Function Td	0	0	0	0
P251	Band-Stop Gain	0	0	0	0
P253	Filter bandwidth	0,5	0,5	0,5	0,5
P254	ResonFreqBStop	50	50	50	50
P258	Max Gen Power	200	200	200	200
P259	Max Regen Power	-200	-200	-200	-200
P268	Kp Isq(max)	100	100	100	100
P273	Smooth Isq(set)	6	6	6	6
P274	Isq(set) grad.	6540	6540	6540	6540
P278	Torque (static)	80	80	80	80
P279	Torque (dynamic)	20	20	20	20
P280	Smooth I(Set)	40	40	40	40
P282	Gain PRE Isq	60	60	60	60
P283	Current Reg Gain	1,5	1,5	1,5	1,5
P284	Current Reg Time	10	10	10	10
P287	SmoothDCBusVolts	9	9	9	9
P288	Decoupl. Gain1	100	100	100	100
P289	Decoupl. Gain 2	25	25	25	25
P291	FSetp Flux (set)	100	100	100	100
P293	Field Weak Freq	50	50	50	50
P295	Efficiency Optim	100	100	100	100
P297	Flux Reg. Gain	1	1	1	1
P298	Flux Reg Time	100	100	100	100

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
P301	Smooth Psi(act)	4	4	4	4
P303	Smooth Flux(Set)	15	15	15	15
P305	FieldWeakRegTime	150	150	150	150
P306	EMF(max)	750	750	750	750
P307	EMF(max.)-Reg Ti	150	150	150	150
P310	Psi(mod)-reg. Kp	4	4	4	4
P311	Psi(mod)-reg. Tn	50	50	50	50
P312	Kp L(sig,U mod.)	100	100	100	100
P313	f(cEMF Mod)	5	5	5	5
P314	f(cEMF->AMP-mod)	50	50	50	50
P315	cEMF Reg Gain	0,25	0,25	0,25	0,25
P316	cEMF Reg Time	50	50	50	50
P318	Boost Mode	1	1	1	1
P319	Boost Amps	0	0	0	0
P322	Accel Amps	0	0	0	0
P325	Boost Volts	2	2	2	2
P326	Boost End Freq	10	10	10	10
P330	V/Hz Mode	0	0	0	0
P331	Imax Reg Gain	0,05	0,05	0,05	0,05
P332	Imax Reg Time	100	100	100	100
P334	IxR Compens Gain	0	0	0	0
P335	Smooth Isq	2000	2000	2000	2000
P336	Slip Comp Gain	0	0	0	0
P337	Reson Damp Gain	0	0	0	0
P339	ModSystemRelease	0	0	0	0
P340	Pulse Frequency	2,5	2,5	2,5	2,5
P342	Max ModulatDepth	96	96	96	96
P344	ModDepth Headrm	0	0	0	0
P347	ON VoltsCompens.	1,4	1,4	1,4	1,4
P373	Auto Restart	0	0	0	0
P374	AutoRestart Wait	0	0	0	0
P379	ambient temp.	20	20	20	20
P380	Mot Tmp Warning	0	0	0	0
P381	Mot Tmp Fault	0	0	0	0
P382	Motor Cooling	0	0	0	0
P383	Mot ThermT-Const	100	100	100	100
P386	RotResistTmpAdap	0	0	0	0
P387	Motor Series	1	1	1	1
P388	Motor Weight	40	40	40	40
P389	Internal Fan	0	0	0	0
P390	Overtemp. Factor	100	100	100	100
P391	K(overtemp.,rot)	100	100	100	100
P392	Iron Losses	1,5	1,5	1,5	1,5

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
P395	DC Braking	0	0	0	0
P396	DC Braking Amps	0	0	0	0
P397	DC Braking Time	5	5	5	5
P398	DC Braking Freq	100	100	100	100
P452	n/f(max, FWD Spd	110	110	110	110
P453	n/f(max,REV Spd)	-110	-110	-110	-110
P471	Scale Torq(PRE)	0	0	0	0
P515	DC Bus Volts Reg	0	0	0	0
P516	DC bus Volts Dyn	25	25	25	25
P517	KIB/FLR	0	0	0	0
P518	KIB/FLR LowVolts	76	76	76	76
P519	KIB/FLR Reg Dyn	25	25	25	25
P523	FLR Vd min	76	76	76	76
P525	Fly Search Amps	0	0	0	0
P526	Fly Search Speed	1	1	1	1
P535	SIMO Sound	0	0	0	0
P536	n/f RegDyn(set)	50	50	50	50
P537	n/f RegDyn(act)	0	0	0	0
P538	n/f Reg Osc Freq	0	0	0	0
P602	Excitation Time	1	1	1	1
P603	De-MagnetizeTime	1	1	1	1
P604	Smooth Accel	0	0	0	0
P760	T(friction) cons	0	0	0	0
P761	T(frict) prop.n.	0	0	0	0
P762	T(frict) prop.n2	0	0	0	0
P805	PullOut/BlckTime	2	2	2	2
P806	Reac Tacho Fault	0	0	0	0
U841	Smooth AddSetp2	50	50	50	50
U842	Start Pulse	0	0	0	0
U843	SmoothStartPulse	100	100	100	100

List of Function Data Set parameters

List of function data set parameters Vector Control (FDS list)

22.10.01

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
P401	Fixed setpoint 1	0	0	0	0
P402	Fixed setpoint 2	0	0	0	0
P403	Fixed setpoint 3	0	0	0	0
P404	Fixed setpoint 4	0	0	0	0
P405	Fixed Setp 5	0	0	0	0
P406	Fixed Setp 6	0	0	0	0
P407	Fixed Setp 7	0	0	0	0
P408	Fixed Setp 8	0	0	0	0
P409	Fixed Setp 9	0	0	0	0
P410	Fixed Setp 10	0	0	0	0
P411	Fixed Setp 11	0	0	0	0
P412	Fixed Setp 12	0	0	0	0
P434	Scale Add Setp1	100	100	100	100
P439	Scale Add Setp2	100	100	100	100
P444	Scale Main Setp	100	100	100	100
P445	Base Setpoint	0	0	0	0
P455	Skip Value	0	0	0	0
P456	Skip Freq Width	5	5	5	5
P457	Min Setp	0	0	0	0
P462	Accel. Time	10	10	10	10
P463	Accel. Time Unit	0	0	0	0
P464	Decel. Time	10	10	10	10
P465	Decel. Time Unit	0	0	0	0
P467	ProtRampGen Gain	1	1	1	1
P469	Ramp StartSmooth	0,5	0,5	0,5	0,5
P470	Ramp End Smooth	0,5	0,5	0,5	0,5
P487	Scale Torq Sept	100	100	100	100
P492	FixTorque 1 Set	100	100	100	100
P494	FixTorque 1 Gain	100	100	100	100
P498	FixTorq 2 Set	-100	-100	-100	-100
P500	Scale TorqLim2	100	100	100	100
P504	I Add Fsetp	0	0	0	0
P505	Torq AddFSetp	0	0	0	0
P507	ScaleTorqAddSetp	100	100	100	100
P509	Scale I Add Setp	100	100	100	100
P792	Perm Deviation	6	6	6	6
P793	Set/Act Hyst	2	2	2	2
P794	Deviation Time	3	3	3	3
P796	Compare Value	100	100	100	100
P797	Compare Hyst	3	3	3	3

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
P798	Compare Time	3	3	3	3
P800	OFF Value	0,5	0,5	0,5	0,5
P801	OFF Time	0	0	0	0
U001	FixSetp 17	0	0	0	0
U002	FixSetp 18	0	0	0	0
U003	FixSetp 19	0	0	0	0
U004	FixSetp 20	0	0	0	0
U005	FixSetp 21	0	0	0	0
U006	FixSetp 22	0	0	0	0
U007	FixSetp 23	0	0	0	0
U008	FixSetp 24	0	0	0	0
U009	FixSetp 25	0	0	0	0
U011	FixSetp 26	0	0	0	0
U012	FixSetp 27	0	0	0	0
U013	FixSetp 28	0	0	0	0
U014	FixSetp 29	0	0	0	0
U015	FixSetp 30	0	0	0	0
U016	FixSetp 31	0	0	0	0
U017	FixSetp 32	0	0	0	0
U018	FixSetp 33	0	0	0	0
U021	Fixed Bit 1	0	0	0	0
U022	Fixed Bit 2	0	0	0	0
U023	Fixed Bit 3	0	0	0	0
U024	Fixed Bit 4	0	0	0	0
U025	Fixed Bit 5	0	0	0	0
U026	Fixed Bit 6	0	0	0	0
U027	Fixed Bit 7	0	0	0	0
U028	Fixed Bit 8	0	0	0	0
U129	FSetpConnLimitr1	100	100	100	100
U131	FSetpConnLimitr2	100	100	100	100
U133	FSetp DConnLmt	100	100	100	100
U156	ON-Pos Cam1	0	0	0	0
U157	OFF-Pos Cam1	0	0	0	0
U158	ON-Pos Cam2	0	0	0	0
U159	OFF-Pos Cam2	0	0	0	0
U162	ON-Pos Cam3	0	0	0	0
U163	OFF-Pos Cam3	0	0	0	0
U164	ON-Pos Cam4	0	0	0	0
U165	OFF-Pos Cam4	0	0	0	0
U294	Time Timer1	0	0	0	0
U297	Time Timer2	0	0	0	0
U300	Time Timer3	0	0	0	0
U303	Time Timer4	0	0	0	0

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
U306	Time Timer5	0	0	0	0
U309	Time Timer6	0	0	0	0
U313	Time Timer7	0	0	0	0
U330	ComfRGenAccelT	10	10	10	10
U331	ComfRGenUnitAT	0	0	0	0
U332	ComfRGenDecelT	10	10	10	10
U333	ComfRGenUnitDT	0	0	0	0
U334	ComfRGenInitRd	0	0	0	0
U335	ComfRGenEndRd	0	0	0	0
U364	TeCntr BasicGain	3	3	3	3
U366	TeCntr Time	3	3	3	3
U367	TeCntrDerivation	0	0	0	0
U393	Wobb Amplitude	0	0	0	0
U394	Wobb Freq	60	60	60	60
U395	Wobb Phase Shift	360	360	360	360
U396	Wobb P-Step	0	0	0	0
U397	Wobb P-Step	0	0	0	0
U398	Wobb Sampl Ratio	50	50	50	50
U810	FSetp 1	0	0	0	0
U811	FSetp 2	0	0	0	0
U812	FSetp 3	0	0	0	0
U813	FSetp 4	0	0	0	0
U814	FSetp 5	0	0	0	0
U815	FSetp 6	0	0	0	0
U816	FSetp 7	0	0	0	0
U817	FSetp 8	0	0	0	0
U827	Acceleration	1	1	1	1
U828	Deceleration	1	1	1	1
U829	Init Jerk	0,8	0,8	0,8	0,8
U830	Final Jerk	0,8	0,8	0,8	0,8
U845	Approach Delay	0	0	0	0
U846	Time Short Run	0	0	0	0

List of Binector Data Set parameters

List of BICO data set parameters Vector Control (BDS list)

22.10.01

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
P155	Src i(excit.)	0	0		
P172	Src Pos SetV	0	0		
P222	Src n/f(act)	0	0		
P232	Src n/f RegAdapt	0	0		
P238	Src n-Reg.Adapt	1	1		
P241	SrcSetV n/f-Reg1	0	0		
P242	Src Set n/f-Reg1	0	0		
P243	Src nf-Reg1 STOP	0	0		
P245	Src Droop	0	0		
P256	Src T(lim,reg1)	172	172		
P257	Src T(lim,reg2)	173	173		
P260	Src Torq (set)	0	0		
P262	Src Torque(add)	0	0		
P275	Src I(max)	0	0		
P317	Src U (set)	0	0		
P385	Src motor temp.	245	245		
P394	SrcStartDCBrake	0	0		
P417	Src FSetp Bit2	1	1		
P418	Src FSetp Bit3	0	0		
P433	Src AddSetpoint1	0	0		
P438	Src AddSetpoint2	0	0		
P443	Src MainSetpoint	58	40		
P473	SrcScaleT(FWD)	1	1		
P477	Src Set Rgen	0	0		
P478	Src SetV Rgen	0	0		
P483	Src n/f(max,pos)	2	2		
P484	Src n/f/(max,reg	2	2		
P486	Src Torque Setp	0	0		
P493	Src FixTorque 1	170	170		
P499	Src FixTorq 2	171	171		
P506	Src Torq Add	87	87		
P508	Src I Add	88	88		
P554 Compact PLUS only	Src ON/OFF1	22	22		
P554 not Compact PLUS	Src ON/OFF1	5	22		
P555	Src1 OFF2(coast)	1	20		
P556	Src2 OFF2(coast)	1	1		
P557	Src3 OFF2(coast)	1	1		
P558	Src1 OFF3(QStop)	1	1		
P559	Src2 OFF3(QStop	1	1		

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
P560	Src3 OFF3(QStop)	1	1		
P561	Src InvRelease	1	1		
P562	Src RampGen Rel	1	1		
P563	Src RampGen Stop	1	1		
P564	Src Setp Release	1	1		
P565	Src1 Fault Reset	2107	2107		
P566 not Compact PLUS	Src2 Fault Reset	0	0		
P566 Compact PLUS only	Src2 Fault Reset	6107	6107		
P567	Src3 Fault Reset	0	18		
P568	Src Jog Bit0	0	0		
P569	Src Jog Bit1	0	0		
P571	Src FWD Speed	1	1		
P572	Src REV Speed	1	1		
P573	Src MOP UP	8	0		
P574	Src MOP Down	9	0		
P575	Src No ExtFault1	1	1		
P576	Src FuncDSetBit0	0	0		
P577	Src FuncDSetBit1	0	0		
P578	Src MotDSet Bit0	0	0		
P579	Src MotDSet Bit1	0	0		
P580	Src FixSetp Bit0	0	16		
P581	Src FixSetp Bit1	0	0		
P582 not Compact PLUS	Src Sync Release	5002	5002		
P583	Src Fly Release	0	0		
P584	Src Droop Rel	0	0		
P585	Src n/f-Reg Rel	1	1		
P586	Src No ExtFault2	1	1		
P587	Src Master/Slave	0	0		
P588	Src No Ext Warn1	1	1		
P589	Src No Ext Warn2	1	1		
P591	Src ContactorMsg	0			
P601 Compact PLUS only	Src DigOutMCon	124	124		
P601 not Compact PLUS	Src DigOutMCon	124	124		
P651	Src DigOut1	107	107		
P652	Src DigOut2	104	104		
P653	Src DigOut3	0	0		
P654	Src DigOut4	0	0		
P763	SrcT(frict,char)	0	0		
U818	Src FSetp Bit4	0	0		
U819	Src FSetp Bit5	0	0		
U820	Src FSetp Bit6	0	0		

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
U821	Src BCD Trigger	1	1		
U844	Src StartPulse	275	275		
U847	Src t-short run	650	650		

List of Binector and Connector parameters

List of binector and connector parameters
Vector Control

22.10.01

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
P028	SrcDispPowerConn	0	0	0	0
P030	Src Disp Binec	0	0	0	0
P032	Src Disp Conn	0	0	0	0
P034	SrcDispVoltsConn	0	0	0	0
P036	SrcDispAmpsConn	0	0	0	0
P038	Src DispTorqConn	0	0	0	0
P040	SrcDisp SpdConn	0	0	0	0
P042	SrcDispFreqConn	0	0	0	0
P044	SrcDisp DecConn	0	0	0	0
P046	SrcDisp HexConn	0	0	0	0
P139	ConfSetpEnc	0			
P358	Key	0	0		
P359	Lock	0	0		
P362	Copy MDS	0			
P363	Copy BICO DSet	0			
P364	Copy FuncDSet	0			
P423	Src MOP inv.	0			
P425	Conf MOP	110			
P427	Src Set MOP	0			
P428	Src SetV MOP	0			
P429	Src Auto Setp	0			
P430	Src Manual/Auto	0			
P590	Src BICO DSet	14			
P608	Src BrakeOpen	104	1		
P609	Src BrakeClose	105	0	0	0
P610	Src BrakeThresh1	242			
P612	Src SigBrakeOp	1			
P613	Src SigBrakeClos	0			
P614	Src PBrakeClos	0			
P615	Src BrakeThresh2	148			
P636	Src AnaIn Rel	1	1		
P640	Src AnaOut	148	22		
P650 not Compact PLUS	Src DigOutp TSY	134	161		
P659	EB1SrcAnaIn inv.	0	0	0	0
P661	EB1 SrcAnaInRel	1	1	1	1
P663	EB1 SrcAnaOut	0	0	0	0
P669	EB1 Src DigOut	0	0	0	0
P674	EB2 Src RelayOut	0	0	0	0
P679	EB2 Src AnaInInv	0	0		

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
P681	EB2 Src AnaInRel	1	1		
P683	EB2 Src AnaOut	0	0		
P693 not Compact PLUS	SCI AnaOut ActV	0	0	0	0
P698 not Compact PLUS	Src SCI DigOut	0	0	0	0
P706 not Compact PLUS	Src SCB TrnsData	0	0	0	0
P707	SrcSCom1TrnsData	32	0	0	0
P708 not Compact PLUS	SrcSCom2TrnsData	0	0	0	0
P708 Compact PLUS only	SrcSCom2TrnsData	32	0	0	0
P734	SrcCB/TBTrnsData	32	0	0	0
P736	Src CB2 TrnsData	32	0	0	0
P744	Src SYNC Sel	0	0		
P747	SrcSLBAppl.Flags	0	0	0	0
P751	SrcSLBTrnsData	0	0	0	0
P755	SIMOLINK Conf	0			
P756	SrSLB_Specialdat	0	0	0	0
P795	Src Comp ActV	148			
P802	Src Speed Setp	75			
P839	AdrConnector	0	0	0	0
U019	Src SH1 KK	0	0	0	0
U020	Src SH1 K	0	0	0	0
U029	Src SH2 KK	0	0	0	0
U030	Src SH2 K	0	0	0	0
U031	Src Conn Disp 1	0			
U033	Src Conn Disp 2	0			
U035	Src Conn Disp 3	0			
U037	Src DConn Disp 1	0			
U039	Src DConn Disp 2	0			
U041	Src DConn Disp 3	0			
U043	Src DConn Disp 4	0			
U045	Src Bin Disp 1	0			
U047	Src Bin Disp 2	0			
U049	Src Bin Disp 3	0			
U051	Src Bin Disp 4	0			
U053	SrcConnDispSmth	0			
U055	SrcDConnDispSmth	0			
U057	SrcBin/Con Conv4	0	0	0	0
U059	Src SH1 B	0	0	0	0
U061	Src Fault F148	0			
U062	Src Fault F149	0			
U063	Src Fault F150	0			
U064	Src Fault F151	0			

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
U065	Src Warning A061	0			
U066	Src Warning A062	0			
U067	Src Warning A063	0			
U068	Src Warning A064	0			
U070	Src Conn/DConnC	0	0	0	0
U071	Src DConn/ConnC	0	0	0	
U072	Src Conn/BinC	0	0	0	
U076	Src Bin/ConnC1	0	0	0	0
U078	Src Bin/ConnC2	0	0	0	0
U080	Src Bin/ConnC3	0	0	0	0
U082	Src Conn Add 1	0	0		
U083	Src Conn Add 2	0	0		
U084	Src Conn Add 3	0	0		
U085	Src Conn Add 4	0	0		
U086	Src Conn Add 5	0	0	0	0
U087	Src ConnSub1	0	0		
U088	Src ConnSub2	0	0		
U089	Src ConnSub3	0	0		
U090	Src DConnAdd 1	0	0		
U091	Src DConnAdd 2	0	0		
U092	Src DConnAdd 3	0	0		
U093	Src DConnAdd 4	0	0		
U094	Src DConnSub1	0	0		
U095	Src DConnSub2	0	0		
U096	Src ConnM A/S	0	0	0	
U097	Src DConnM A/S	0	0	0	
U098	Src Conn Inv1	0			
U099	Src Conn Inv2	0			
U100	Src Conn Inv3	0			
U101	Src DConn Inv 1	0			
U102	Src DConn Inv 2	0			
U103	Src1 Conn SwInv	0			
U104	Src2 Conn SwInv	0			
U105	Src1 DConnSwInv	0			
U106	Src2 DConnSwInv	0			
U107	Src Conn Mult1	0	0		
U108	Src Conn Mult2	0	0		
U109	Src Conn Mult3	0	0		
U110	Src DConn Mult	0	0		
U111	Src Conn Div1	0	0		
U112	Src Conn Div2	0	0		
U113	SrcDConn Div	0	0		
U114	SrcConnMult/Div1	0	0	0	

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
U115	SrcConnMult/Div2	0	0	0	
U116	SrcConnMult/Div3	0	0	0	
U117	Src ConnAbsV1	0			
U120	Src ConnAbsV2	0			
U123	Src ConnAbsV3	0			
U126	SrcDConnAbsV	0			
U130	Src ConnLimitr1	503	0	502	
U132	Src ConnLimitr2	506	0	505	
U134	SrcDConnLimitr	509	0	508	
U136	SrcConnLmtMon1	0	511		
U141	SrcConnLmtMon2	0	513		
U146	SrcDConnLmtMon1	0	515		
U151	SrcDConnLmtMon2	0	517		
U154	Src Cam 1/2	0			
U160	Src Cam 3/4	0			
U166	Src1 ConnCh1	0			
U167	Src2 ConnCh1	0	0		
U168	Src1 ConnCh2	0			
U169	Src2 ConnCh2	0	0		
U170	Src1 ConnCh3	0			
U171	Src2 ConnCh3	0	0		
U172	Src1 ConnCh4	0			
U173	Src2 ConnCh4	0	0		
U174	Src1 ConnCh5	0			
U175	Src2 ConnCh5	0	0		
U176	Src1DconnCh1	0			
U177	Src2DConnCh1	0	0		
U178	Src1DConnCh2	0			
U179	Src2DConnCh2	0	0		
U180	Src1DConnCh3	0			
U181	Src2DConnCh3	0	0		
U182	Src1DConnCh4				
U183	Src2DConnCh4	0	0		
U184	Src1DConnCh5	0			
U185	Src2DConnCh5	0	0		
U186	Src1 Multiplex	0	0	0	1
U187	Src 2 Multiplex	0	0	0	0
U188	Src1 Demultiplex	0	0	0	1
U189	Src2 Demultiplex	0			
U190	Src Char1	0			
U193	Src Char2	0			
U196	Src Char3	0			
U199	Src DeadZone	0			

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
U201	SrcMaxSel	0	0	0	
U202	SrcMinSel	0	0	0	
U203	Src1 Tra/Stor1	0	0	0	
U204	Src2 Tra/Stor1	0			
U206	Src1 Tra/Stor2	0	0	0	
U207	Src2 Tra/Stor2	0			
U209	Src1 Store 1	0			
U210	Src2 Store 1	0			
U211	Src1 Store 2	0			
U212	Src2 Store 2	0			
U221	Src AND1	1	1	1	
U222	Src AND2	1	1	1	
U223	Src AND3	1	1	1	
U224	Src AND4	1	1	1	
U225	Src AND5	1	1	1	
U226	Src AND6	1	1	1	
U227	Src AND7	1	1	1	
U228	Src AND8	1	1	1	
U229	Src AND9	1	1	1	
U230	Src AND10	1	1	1	
U231	Src AND11	1	1	1	
U232	Src AND12	1	1	1	
U233	Src AND13	1	1	1	
U234	Src AND14	1	1	1	
U235	Src AND15	1	1	1	
U236	Src AND16	1	1	1	
U237	Src AND17	1	1	1	
U238	Src AND18	1	1	1	
U239	Src OR1	0	0	0	
U240	Src OR2	0	0	0	
U241	Src OR3	0	0	0	
U242	Src OR4	0	0	0	
U243	Src OR5	0	0	0	
U244	Src OR6	0	0	0	
U245	Src OR7	0	0	0	
U246	Src OR8	0	0	0	
U247	Src OR9	0	0	0	
U248	Src OR10	0	0	0	
U249	Src OR11	0	0	0	
U250	Src OR12	0	0	0	
U251	Src BinInv1	0			
U252	Src BinInv2	0			
U253	Src BinInv3	0			

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
U254	Src BinInv4	0			
U255	Src BinInv5	0			
U256	Src BinInv6	0			
U257	Src BinInv7	0			
U258	Src BinInv8	0			
U259	Src BinInv9	0			
U260	Src BinInv10	0			
U261	Src NAND1	0	0	0	
U262	Src NAND2	0	0	0	
U263	Src NAND3	0	0	0	
U264	Src NAND4	0	0	0	
U265	Src NAND5	0	0	0	
U266	Src NAND6	0	0	0	
U267	Src NAND7	0	0	0	
U268	Src NAND8	0	0	0	
U269	Src SH2 B	0	0	0	0
U271	Src BinCh1	0	0	0	
U272	Src BinCh2	0	0	0	
U273	Src BinCh3	0	0	0	
U274	Src BinCh4	0	0	0	
U275	Src BinCh5	0	0	0	
U276	Src EXOR1	0	0		
U277	Src EXOR2	0	0		
U278	Src EXOR3	0	0		
U279	Src D-FlipFlop1	0	0	0	0
U280	Src D-FlipFlop2	0	0	0	0
U281	Src RS-FlipFlop1	0	0		
U282	Src RS-FlipFlop2	0	0		
U283	Src RS-FlipFlop3	0	0		
U284	Src RS-FlipFlop4	0	0		
U285	Src RS-FlipFlop5	0	0		
U286	Src RS-FlipFlop6	0	0		
U287	Src RS-FlipFlop7	0	0		
U288	Src RS-FlipFlop8	0	0		
U289	Src RS-FlipFlop9	0	0		
U290	SrcRS-FlipFlop10	0	0		
U291	SrcRS-FlipFlop11	0	0		
U292	SrcRS-FlipFlop12	0	0		
U293	Src Timer1	0			
U296	Src Timer2	0			
U299	Src Timer3	0			
U302	Src Timer4	0			
U305	Src Timer5	0			

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
U308	Src Timer6	0			
U311	Src1 Timer7	0			
U312	Src2 Timer7	1			
U316	Src ParamCounter	561	562	563	564
U317	Src Bin Counter	0	0	0	0
U320	SrcComfRGen In	0			
U321	SrcComfRGen Stop	0			
U322	SrcComfRGen SD	0			
U323	SrcComfRGenSetV	0			
U324	Src Set ComfRGen	0			
U325	Src Rel ComfRGen	1			
U328	SrcComfRGenBridg	0			
U329	SrcComfRGenAdap	1			
U338	SrcComfRGen QS	0			
U343	SrcComfRGenPosL	573			
U344	SrcComfRGenNegL	574			
U345	Src FDS.CoRFG	92	93		
U346	Src SH3 KK	0	0	0	0
U347	Src SH3 K	0	0	0	0
U348	Src SH3 B	0	0	0	0
U350	Src TeCntr Rel	0			
U352	Src TeCntr Setp	0			
U355	Src TeCntr ActV	0			
U360	SrcTeCntr I Set	556			
U361	Src TeCntr ISetV	0			
U362	Src TeCntr Droop	0			
U363	Src TeCntrGainAd	1			
U368	Src TeCntr PRE	0			
U370	Src TeCntrOutLim	586	587		
U380	Src SimpRGen In	0			
U381	Src Set SimpRGen	0			
U382	Src SetVSimpRGen	0			
U390	SrcWobbSetp Unwo	0			
U391	Src Wobb SyncInp	0			
U392	Src Wobb Rel	0			
U400	SrcConnAnaDel_1	0			
U402	SrcConnAnaDE_2	0			
U404	SrcSampTChange	0	0	0	0
U405	SrcMulDiv32_1_32	0			
U406	SrcMulDiv32_1_16	0	0		
U407	SrcPulsGen Tp	613			
U408	Src Integr32_1	0	0	0	0
U409	Src Integr32_1_t	611			

Parameter number	Parameter name	Index 1	Index 2	Index 3	Index 4
U410	Src Integr32_1_s	0			
U411	Src Integr32_2	0	0	0	0
U412	Src Integr32_2_t	612			
U413	Src Integr32_2_s	0			
U414	Src PT1Gl32_1	0			
U416	SrcPT1Elem32_1_s	0			
U417	Src PT1Elem32_2	0			
U419	Src PT1El32_2_s	0			
U420	Src DElem32_1	0			
U438	Src ConnToPar #	479	479	479	479
U439	SrcConnToPar Ind	480	480	480	480
U441	Src P-Amplifier	0	0		
U443	Src Shift32	0	0	0	0
U444	Src ConnToPar V	0	0	0	0
U447	SrcConnToPar Trg	0	0	0	0
U448	SrcConnToParEEPR	0	0	0	0
U449	SrcParToConnRd	0	0	0	0
U480	SrcTraceInput	0	0	0	0
U483	SrcTriggerInput	0	0	0	0
U489	SrcBTriggerInput	0	0	0	0
U806	SrcSpeedConn	0	0	0	0

Faults and Alarms

Faults

General information regarding faults

For each fault, the following information is available:

Parameter	r947	Fault number
	r949	Fault value
	r951	Fault list
	P952	Number of faults
	r782	Fault time

If a fault message is not reset before the electronic supply voltage is switched off, then the fault message will be present again when the electronic supply is switched on again. The unit cannot be operated without resetting the fault message. (Exception: Automatic restart has been selected, see P373).

Number / Fault	Cause	Counter-measure
F001 Main contactor checkback	If a main contactor checkback is configured, no checkback occurs within the time set in P600 after the power-up command. In the case of externally excited synchronous motors (P095 = 12), there is no checkback for the excitation current unit.	P591 Src Contactor Msg Parameter value must be in conformance with the connection of the main contactor checkback. Check the checkback loop of the main contactor (or the checkback of the excitation current unit in the case of synchronous motors).
F002 Pre-charging	When pre-charging, the minimum DC link voltage (P071 Line Volts x 1.34) of 80 % has not been reached. The maximum pre-charging time of 3 seconds has been exceeded.	Check the supply voltage, Compare witth P071 Line Volts (Compare P071 with the DC link voltage on DC units). Check the rectifier/regenerative unit on DC units. The rectifier/regenerative unit must be switched on before the inverter is switched on.
F006 DC link overvoltage	Shutdown has occurred due to excessive DC link voltage. Line voltageI DC voltage range I Shutdown value -- 200 V - 230 V I 270 V - 310 V I appr. 410 V 380 V - 480 V I 510 V - 650 V I appr. 820 V 500 V - 600 V I 675 V - 810 V I appr. 1020 V 660 V - 690 V I 890 V - 930 V I appr. 1220 V For parallel-connected converters (BF L) r949 = 1: Overvoltage in the DC link of the master r949 = 2: Overvoltage in the DC link of the slave.	Check the supply voltage or input DC voltage. Converter is operating in regenerative mode without feedback possibility. If the converter supply voltage is at the upper tolerance limit and it is operating at full load, F006 can also be caused by a line phase failure. Possibly - Increaase P464 Decel Time, - Activate P515 DC Bus Volts Reg (check P071 beforehand) - Reduce P526 Fly Search Speed. - Reduce P259 Max Regen Power (only for P100 = 3, 4 or 5)

Number / Fault	Cause	Counter-measure
F008 DC link undervoltage	The lower limit value of 76 % of the DC link voltage (P071 Line Volts), or of 61 % when kinetic buffering has been enabled, has been fallen short of. Undervoltage in the DC link in 'normal' operation (i.e. no SIMULATION). Undervoltage in the DC link with active kinetic buffering and speed less than 10 % of the rated motor speed. It was a 'brief power failure' which was not detected until system recovery (auto restart flag).	Check - Input DC voltage - DC link
F010 DC link overvoltage	Due to excessive DC link voltage, shutdown has taken place: Line voltage DC link range Shutdown value 380 V - 480 V 510 V - 650 V 740 V Note: Only at U800 = 1 and f(Pulse) > f(derating) Lower threshold value than F006 !	Check the supply voltage Check the braking resistor Converter operates regeneratively without a feedback possibility. Braking unit must be set to the lower response threshold (673 V)
F011 Overcurrent	Overcurrent shutdown has occurred. The shutdown threshold has been exceeded.	- Check the converter output for short-circuit or earth fault - Check the load for an overload condition - Check whether motor and converter are correctly matched - Check whether the dynamic requirements are too high
F012 I too low	During excitation of the induction motor, the current did not rise above 12.5 % of the setpoint magnetizing current for no-load operation.	Only for closed loop n/f/T control (P100 = 3, 4 or 5) If no motor is connected, go into the simulation mode P372. Check current detection, check power section.
F014 I too low	During excitation of the motor, the current component is less than 25 % of the motor no-load current. Note: Only for U800 = 1 Irrespective of the type of control (Difference to F012)	Check the output contactor Check the motor cable

Number / Fault	Cause	Counter-measure
F015 Motor stall	Motor has stalled or is locked: - if the static load is too high - if the acceleration or deceleration time is too fast, or if load change is too fast and too great, - due to incorrect parameterization of the pulse encoder pulse number P151 or of the analog tachometer scaling P138 - due to disturbed speed signals (tachometer shield not connected) The fault is only generated after the time set in P805. The binector B0156 is set in the status word 2 r553 Bit 28. To detect whether the drive is blocked, see P792 (Perm Deviation) and P794. With n/f control, this fault is tripped if the torque limits have been reached (B0234). With speed control (P100 = 4) and master drive (see P587), the fault can also point to an interruption in the encoder cable. This case has the same significance as if the drive is locked. With v/f control, the I(max) controller has to be activated (P331). The monitor does not operate with v/f textile applications (P100 = 2). Motor has stalled or is locked: In the case of synchronous motors (P095 = 12, 13): by reaching the maximum frequency In the case of externally excited synchronous motors (P095 = 12): as a result of missing or excessively high excitation current (flux is too small or too great). When the maximum frequency (including control reserves) (B0254) has been reached on synchronous motors, the fault is generated immediately. If the deviations in the rotor flux are too great, first of all, the converter current is switched to zero, the excitation current is reduced and, after some time, the fault message is tripped at the level of the double damping time constant (2*r124.1). During this wait time, the status word bit B0156 (r553.28) is set already.	- Reduce load - Release brake - Increase current limits - Increase P805 PullOut/BlckTime - Increase P792 response threshold for set/actual deviation Only for f/n/T control (P100 = 3, 4, 5) - Increase torque limits or torque setpoint Only n/T control or v/f control with speed controller: (P100 = 0, 4, 5) - Check tachometer cable break - Check pulse encoder pulse number -Check analog tachometer scaling - Connect shield of tachometer cable on motor side and converter side - Reduce smoothing of speed pre-control P216 (only n/T control) only frequency control:(P100 = 3) - Slow down acceleration time (see also P467 ProtRampGen Gain). Increase current in the lower frequency range (P278, P279, P280) - Switch in speed controller pre-control (P471>0). Set EMF controller more dynamically (315) to max. approx. 2 - Increase changeover frequency for the EMF model (P313). Replace by speed control with pulse encoder in the case of overmodulated n/f controller - Track speed setpoint with the speed actual value so that the set/actual deviation is always less than that set in P792. Only for synchronous motor: (P095 = 12) - Check current limits of the excitation unit. - Check excitation current setpoint and actual value (incl. wiring) - Check voltage limits of the excitation unit during dynamic current changes. - Check drive system for resonance oscillations.
F017 SAFE STOP Compact PLUS only	SAFE STOP operating or failure of the 24 V power supply during operation (only for Compact PLUS units)	Jumper applied for SAFE STOP? SAFE STOP checkback connected? On Compact PLUS units: check 24 V supply

Number / Fault	Cause	Counter-measure
F018 F set fly	The found set frequency could not be implemented. Reasons: - Additional setpoint 2 too high - Speed actual-value at standstill negative (signal ripple) and negative direction of rotation locked.	- Check additional setpoint 2 - Release negative directions of rotation with low maximum speed.
F019 Motor not found	During flying restart without tachometer: Search in both directions of rotation not possible (one direction blocked) and motor has not been found.	Power up after coasting. Possibly increase P525 Fly Search Amps. Enable both directions of rotation (P571, P572)
F020 Motor temperature	The motor temperature limit value has been exceeded. r949 = 1 limit value of motor temperature exceeded r949 = 2 short-circuit in the cable to the motor temperature sensor or sensor defective r949 = 4 wire break in the cable to the motor temperature sensor or sensor defective r949 = 5 wire break and limit value exceeded	Check the motor (load, ventilation, etc.). The actual motor temperature can be read in r009 Motor Temperature. Check P381 Mot Tmp Fault - check the KTY84 input at connector -X103:29,30, or X104:29,30 (Compact PLUS) for short-circuit.
F021 Motor I2t	Parameterized limit value of the I2t monitoring for the motor has been exceeded.	Check: P383 Mot Tmp T1
F023 Inverter temperature	The limit value of the inverter temperature has been exceeded. Alarm: (r949): Bit0 Inverter overtemperature Bit1 Wire break of cable to temperature sensor Bit4 Number of the temperature sensor Bit5 Bit6 Bit8 Multiparallel circuit: Slave number Bit9 Bit10 Examples: r949 = 1: Limit value of inverter temperature has been exceeded. r949 = 2: Sensor 1: wire break of sensor cable or sensor defective r949 = 18: Sensor 2: wire break of sensor cable or sensor defective r949 = 34: Sensor 3: wire break of sensor cable or sensor defective r949 = 50: Sensor 4: wire break of sensor cable or sensor defective.	- Measure the air intake and ambient temperature. - Observe the derating curves at theta >50°C (Compact PLUS) or 40°C. Check: - whether the fan -E1 is connected and is rotating in the correct direction - that the air entry and discharge openings are not restricted - temperature sensor at -X30.
F025 UCE Ph. L1	UCE upper switch (Compact PLUS) / or UCE has tripped in phase L1	Check: - phase L1 for short-circuit or ground fault (-X2:U2 - including motor) - that CU is correctly inserted - that the switch for "SAFE STOP" (X9/5-6) is open (only for units with order No. ...-11, ...-21,...-31, ...-61).

Number / Fault	Cause	Counter-measure
F026 UCE Ph. L2	UCE lower switch (Compact PLUS) / or UCE has tripped in phase L2	Check: - phase L2 for short-circuit or ground fault (-X2:V2 - including motor) - that CU is correctly inserted - that the switch for 'SAFE STOP' (X9/5-6) is open (only for units with order Nos....-11, ...-21,...-31, ...-61)
F027 UCE Ph. L3	Fault pulse resistor (Compact PLUS) / or UCE has tripped in phase L3	Check: - phase L3 for short-circuit or ground fault (-X2:W2 - including motor) - that CU is correctly inserted - that the switch for 'SAFE STOP' (X9/5-6) is open (only for units with order Nos....-11, ...-21,...-31, ...-61)
F028 Supply phase	The frequency and the amplitude of the DC link ripple indicate a single-phase power failure.	Check the supply voltage.
F029 Meas. value sensing	A fault has occurred in the measured value sensing system: - (r949 = 1) Offset adjustment in phase L1 not possible - (r949 = 2) Offset adjustment in phase L3 not possible. - (r949 = 3) Offset adjustment in phases L1 and L3 not possible. - (r949=65) Autom. adjustment of the analog inputs is not possible	Fault in measured value sensing Fault in power section (valve cannot block) Fault on CU
F035 Ext. Fault 1	Parameterizable external fault input 1 has been activated	Check: - whether there is an external fault - whether the cable to the appropriate digital input has been interrupted - P575 Src No ExtFault1
F036 Ext. Fault 2	Parameterizable external fault input 2 has been activated	Check: - whether there is an external fault - whether the cable to the appropriate digital input has been interrupted - P585 Src No ExtFault2
F037 Analog input	An analog input is taking place in operating mode 4..20mA and a wire break has occurred. The number of the analog input concerned is shown in fault value (r949).	Check the connection to - Analog input 1 -X102:15, 16, or -X101:9,10 (Compact PLUS). - Analog input 2 -X102: 17, 18. Check parameters - P632 CU AnaIn Conf - P634 CU AnaIn Smooth - P631 CU AnaIn Offset
F038 Voltage OFF during parameter storage	During a parameter task, a voltage failure has occurred on the board.	Re-enter the parameter. The number of the parameter concerned can be seen in fault value r949.

Number / Fault	Cause	Counter-measure
F040 AS internal	Incorrect operating status	Replace CU (-A10), or replace the unit (Compact PLUS)
F041 EEPROM fault	A fault has occurred when storing the values in the EEPROM.	Replace CU (-A10), or replace the unit (Compact PLUS)
F042 Calculating time	Calculating time problems	Reduce the calculating time load: - Increase P357 Sampling Time - Calculate individual blocks in a slower sampling time Observe r829 CalcTimeHdroom.
F044 BICO manager fault	A fault has occurred during the softwiring of binectors and connectors.	Störwert r949: >1000 : Fault during softwiring of connectors >2000 : Fault during softwiring of binectors - Voltage OFF and ON - Factory setting and new parameterization - Replace the board
F045 Opt. Board HW	A hardware fault has occurred when accessing an optional board	- Replace CU, or replace the unit (Compact PLUS) - Check connection of the board subrack to the optional boards and replace if necessary.
F046 Par. Task	A fault has occurred during the transfer of parameters to the gating unit processor.	Power the unit down and up again. Replace CU (-A10), or replace the unit (Compact PLUS)
F047 Gating Calc Time	The calculating time in the gating unit computer is not sufficient	Replace CU (-A10), or replace the unit (Compact PLUS) In case of synchronous motors (P095 = 12): Pulse frequency set too high (P340 > 2 kHz).
F048 Gating Pulse Freq	The pulse frequency set in P340 is not permissible.	Change P340 Pulse Frequency.
F049 SW version	The firmware versions on the CU have different firmware release.	Use uniform firmware
F050 TSY Init. not Compact PLUS	Error when initializing the TSY board	Check: - Whether the TSY is correctly inserted
F051 Speed encoder	Digital tachometer or analog tachometer sensing are faulty	Check the parameters: - P130 Src SpdActV - P151 Pulse # - P138 AnalogTachScale - P109 Motor #PolePairs The product of P109 and P138 must be smaller than 19200. Check or replace tachometer. Check connection to tachometer. - Replace CU, or replace the unit (Compact PLUS)

Number / Fault	Cause	Counter-measure
F052 n-Cntr.Input	Control track input (-X103/27, or -X104/27 Compact PLUS) is not high: - Tachometer line broken - Tachometer fault The fault input on the TSY was activated.	Unselect tachometer with control track (P130 select motor encoder) Check control track connection (-X103/27, or X104/27 Compact PLUS) Exchange TSY
F053 Tachometer dn/dt	The permissible change value of the speed encoder signal P215 dn(act,perm) has been doubly exceeded.	Check tachometer cables for interruptions. Check earthing of tachometer shield. - The shield must be connected both at the motor and the converter side. - The encoder cable must not be interrupted. - The encoder cable must not be laid together with the power cables. - Only recommended encoders should be used. - In the case of a signal fault, the DT1 board may have to be used. If necessary, change P215 - With P806 (observe parameter description) it is possible during operation to switch over to encoder-free operation.
F054 Sensor board initialization fault	A fault has occurred during initialization of the encoder board.	Fault value r949 1. Board code incorrect 2. TSY not compatible 3. SBP not compatible 7. Board double 20: TSY board double 60: Internal error
F056 SIMOLINK telegram failure	Communication on the SIMOLINK ring is disturbed.	- Check the fiber-optic cable ring - Check whether an SLB in the ring is without voltage - Check whether an SLB in the ring is faulty - Check P741 (SLB TlgOFF)
F057 Brake does not open	The brake has not opened, the output current of the converter has exceeded the parameterized current threshold (U840) for longer than one second (with the rotor locked) Note: Only with U800 = 1	Check brake Check I(max) brake (U840). The set threshold must be at least 10% above the maximum possible acceleration current.
F058 Parameter fault Parameter task	A fault has occurred during the processing of a parameter task.	No remedy
F059 Parameter fault after factory setting/init.	A fault has occurred in the initialization phase during the calculation of a parameter.	The number of the inconsistent parameter is indicated in fault value r949. Correct this parameter (ALL indices) and switch voltage off and on again. Several parameters may be affected, i.e. repeat process.

Number / Fault	Cause	Counter-measure
F060 MLFB is missing	This is set if the MLFB = 0 after exiting INITIALIZATION (0.0 kW). MLFB = order number.	After acknowledgement, in INITIALIZATION enter a suitable MLFB in parameter P070 MLFB (6SE70..). (Only possible with the corresponding access stages to both access parameters).
F061 Incorrect parameterization	A parameter entered during drive setting (e.g. P107 Mot Rtd Freq, P108 Mot Rtd Speed, P340 Pulse Frequency) is not in a permissible range (depending on control type)	Acknowledge the fault and change the corresponding parameter value. The missing parameter is indicated in r949 as a fault value.
F062 Multi-parallel circuit not Compact PLUS	Fault in connection with the multi-parallel circuit or board ImP1 has been detected.	r949 = 10: Communications card does not reply. When writing the control word, BUSY is not active if CSOUT is inactive. Communications card is probably not inserted. R949 = 11,12: Timeout during BUSY during initialization. BUSY does not become active within 1 sec. R949 = 15: Timeout during BUSY during normal communication. BUSY does not become active within 1 sec. R949 = 18: Timeout when reading out the fault information from the ImPIs. Within one second after activation of FAULT no fault cause can be supplied by the IMP1. R949 = 20+i: HW conflict. This is set if bit HWCONF is set in status word of slave i. (Fault in the configuration of the multi-parallel circuit) r949 = 30+i: HW version of ImPI isnot compatible. The relevant slave number is contained in i. R949 = 40: Number of slaves does not tally with the setpoint number of slaves of the unit. R949 = 50+i Inconsistency in the number of slaves. The number of slaves notified by the ImPI is not in conformance with the number of status words or with the setpoint number of slaves of the MLFB. Counter-measure: - Check ImPI or communications card and replace, if necessary. - Check configuration of multi-parallel circuit. - Check parameterization. - Replace CU - Replace ImPI.

Number / Fault	Cause	Counter-measure
F065 Scom Telegram	No telegram was received at an Scom interface (Scom/USS protocol) within the telegram failure time.	Fault value r949: 1 = interface 1 (SCom1) 2 = interface 2 (SCom2) - Check the connection CU -X100:1 to 5 and check the connection PMU -X300. - Check the connection CU -X103, or X100/ 35,36 (Compact PLUS) - Check "SCom/SCB TLG OFF" P704.01 (SCom1) and P704.02 (SCom2) - Replace CU (-A10), or replace the unit (Compact PLUS)
F070 SCB initialization fault not Compact PLUS	A fault has occurred during initialization of the SCB board.	Fault value r949: 1: Board code incorrect 2: SCB board not compatible 5: Error in configuration data 6: Initialization timeout 7: SCB board double 10: Channel error
F072 EB initialization fault	A fault has occurred during initialization of the EB board.	Fault value r949: 2: 1st EB1 not compatible 3: 2nd EB1 not compatible 4: 1st EB2 not compatible 5: 2nd EB2 not compatible 21: Three EB1 boards 22: Three EB2 boards 110: Fault on 1st EB1 120: Fault on 2nd EB1 210: Fault on 1st EB2 220: Fault on 2nd EB2
F073 AnInp1SL1 not Compact PLUS	4 mA at analog input 1, slave 1 fallen short of	Check the connection of the signal source to the SCI1 (slave 1) -X428: 4, 5.
F074 AnInp2 SL1 not Compact PLUS	4 mA at analog input 2, slave 1 fallen short of	Check the connection of the signal source to the SCI1 (slave 1) -X428: 7, 8.
F075 AnInp3 SL1 not Compact PLUS	4 mA at analog input 3, slave 1 fallen short of	Check the connection of the signal source to the SCI1 (slave 1) -X428: 10, 11.
F076 AnInp1 SL2 not Compact PLUS	4 mA at analog input 1, slave 2 fallen short of	Check the connection of the signal source to the SCI1 (slave 2) -X428: 4, 5.
F077 AnInp2 SL2 not Compact PLUS	4 mA at analog input 2, slave 2 fallen short of	Check the connection of the signal source to the SCI1 (slave 2) -X428: 7, 8.
F078 AnInp3 SL2 not Compact PLUS	4 mA at analog input 3, slave 2 fallen short of	Check the connection of the signal source to the SCI1 (slave 2) -X428: 10, 11.

Number / Fault	Cause	Counter-measure
F079 SCB telegram failure not Compact PLUS	No telegram has been received by the SCB (USS, peer-to-peer, SCI) within the telegram failure time.	- Check the connections of the SCB1(2). - Check P704.03"SCom/SCB Tlg OFF" - Replce SCB1(2) - Replace CU (-A10)
F080 TB/CB initialization fault	Fault during initialization of the board at the DPR interface	Fault value r949: 1: Board code incorrect 2: TB/CB board not compatible 3: CB board not compatible 5: Error in configuration data 6: Initialization timeout 7: TB/CB board double 10: Channel error Check the T300/CB board for correct contacting, check the PSU power supply, check the CU / CB / T boards and check the CB initialization parameters: - P918.01 CB Bus Address, - P711.01 to P721.01 CB parameters 1 to 11
F081 OptBrdHeartbeat-Counter	Heartbeat-counter of the optional board is no longer being processed	Fault value r949: 0: TB/CB heatbeat-counter 1: SCB heartbeat-counter 2: Additional CB heartbeat-counter - Acknowledge the fault (whereby automatic reset is carried out) - If the fault re-occurs, replace the board concerned (see fault value) - Replace ADB - Check the connection between the subrack and the optional boards (LBA) and replace, if necessary
F082 TB/CB telegram failure	No new process data have been received by the TB or the CB within the telegram failure time.	Fault value r949: 1 = TB/CB 2 = additional CB - Check the connection to TB/CB - Check P722 (CB/TB TlgOFF) - Replace CB or TB
F085 Add. CB initialization fault	A fault has occurred during initialization of the CB board.	Fault value r949: 1: Board code incorrect 2: TB/CB board not compatible 3: CB board not compatible 5: Error in configuration data 6: Initialization timeout 7: TB/CB board double 10: Channel error Check the T300 / CB board for correct contacting and check the CB initialization parameters: - P918.02 CB Bus Address, - P711.02 to P721.02 CB Parameters 1 to 11
F087 SIMOLINK initialization fault	A fault has occurred during initialization of the SLB board.	- Replace CU, or replace the unit (Compact PLUS) - Replace SLB
F090 Mld Param.	An error occurred when attempting to change a parameter from the standstill measurement or the rotating measurement (Mot ID).	Power down and power up again. If it reoccurs, replace CU, or replace the unit (Compact PLUS)

Number / Fault	Cause	Counter-measure
F091 Mld Time	The rotating measurement takes longer than programmed in a measured status. Possible causes: Load torque too high Load torque not uniform Ramp-function generator disabled	Eliminate the cause and re-start the measurement (power up the converter again). If it re-occurs, replace CU, or replace the unit (Compact PLUS).
F095 Mld n(set)	Due to entries for - Permissible phase sequence - Maximum frequency, - Minimum speed, - Changeover frequency between V and I model, - Start of field-weakening frequency, - Frequency suppression bandwidth it was not possible to determine a permissible frequency range for the rotating measurement.	There must be a 10% frequency range which lies above 1.1 times the changeover frequency and below 0.9 times the start of field-weakening frequency. Possible counter-measures - Permit both phase sequences - Increase maximum frequency - Reduce minimum speed, - Reduce changeover frequency between the V and I model. - Reduce or remove the frequency suppression bandwidth.
F096 Mld abort	The rotating measurement was aborted due to the inadmissible external intervention.	The fault value in r949 defines the type of intervention: 4 Setpoint inhibit 5 Changeover, setpoint channel 8 Unexpected change in the converter status 12 Motor data set changeover (for function selection "Compl. Mot ID") 13 Changeover to slave drive 14 Motor data set changeover to data set with v/f_charac 15 Controller inhibit is set 16 Ramp-function generator is disabled 17 Selection "Tacho test" for F controller 18 Ramp-function generator stopped Eliminate cause 22 Inverter inhibit: Check inverter release (P561)
F097 Mld meausred value	The measured values for the nominal ramp-up time when optimizing the controller deviate too greatly. Cause: very unsteady load torque	If necessary, increase the torque limit values to 100 percent
F098 Mld Tachof	The rotating measurement has detected a fault in the speed actual value signal. The fault value defines the type of fault. The fault measurement may have been erroneously generated if the drive speed is externally forced (e.g. completely locked drive generates the "no signal" message)	The fault value in r949 defines the type of intervention 4 No speed signal present 5 Sign of the signal is incorrect 6 A track signal is missing 7 Incorrect gain 8 Incorrect pulse number Checking the measurement cables. Checking the parameters - P130 Src Speed ActV - P1151 Encoder Pulse #

Number / Fault	Cause	Counter-measure
F100 GRND Init	During the ground fault test, a current not equal to zero has been measured, or an UCE or overcurrent monitoring has responded, although no value has yet been triggered.	The cause of the fault can be read out from r376 "GrdFltTestResult". Check the converter output for short-circuit or ground fault (-X2:U2, V2, W2 - including motor). Check that the CU is inserted correctly. Sizes 1 and 2: - Check the transistor modules on the PEU board -A23 for short-circuit. Size 3 and 4: - Check the transistor modules -A100, -A200, -A300 for short-circuit
F101 GRND UCE	During the ground fault test, the UCE monitoring has responded in a phase in which no valve has been triggered.	Check valves in the power section for short-circuit, and on converters with fiber-optic gating, check the gating unit wiring and the UCE checkbacks for correct assignment. R376 can be interrogated to indicate which UCE monitoring has responded.
F102 GRND Phase	During the ground fault test, a current flows in a phase in which no valve has been triggered or the UCE monitoring has responded in the phase in which the valve has been triggered.	The fault value can be read out from r949. The digit of the xth position indicates the valve where the fault occurred at power-up. X O O O x = 1 = V+ x = 2 = V- x = 3 = U+ x = 4 = U- x = 5 = W+ x = 6 = W- The figure of the xth digit indicates the phase in which I is 0 and thus a valve must be defective (always conductive). O O O X x = 1 Phase 1 (U) x = 3 = Phase 3 (W) x = 4 = Phase 1 (U) or 3 (W) Examine phase for defective valves (always conductive).
F103 Ground fault	There is a ground fault or a fault in the power section. During the ground fault test, a current flows from the phase in which a valve has been triggered, the overcurrent comparator has responded, or a UCE monitoring has responded in a phase in which a valve has been triggered.	Read out fault value from r949. The digit of the xth position indicates the valve where the fault occurred at power-up. X O O O x = 1 = V+ x = 2 = V- x = 3 =U+ X O O O x = 4 = U- x = 5 = W+ x = 6 = W- Check the motor including the feeder cable for short-circuit. If no ground fault is present, check the power section for defective valves (always conductive). The digit of the xth position indicates the phase in which I is 0 and therefore a valve must be defective (always conductive). O O O X 1 = Current in phase 1 (U) 2 = UCE in phase 2 (V) 3 = Current in phase 3 (W) 4 = Only overcurrent occurred The speed of the motor shaft during the ground-fault test should be less than 10 % of the rated speed! 1) In phase V there is a ground fault or a defective valve (always conductive) or the "SAFE STOP" switch (X9/5-6) is open (only for units with Order No. ...-11, ...-21, ...-31).

Number / Fault	Cause	Counter-measure
F107 MLd = 0	A fault has occurred during the test pulse measurement	Read out fault value from r949. The figures of the grey shaded areas indicate which fault has occurred. O O X X xx = 01: Both current actual values remain 0 xx = 02: Motor-converter cable phase U interrupted xx = 03: Motor converter phase V interrupted xx = 04: Motor-converter phase W interrupted xx = 05: Current actual value I1 remains 0 xx = 06: Current actual value I3 remains 0 xx = 07: Valve U+ does not trigger xx = 08: Valve U- does not trigger xx = 09: Valve V+ does not trigger xx = 10: Valve V- does not trigger xx = 11: Valve W+ does not trigger xx = 12: Valve W- does not trigger xx = 13: Sign I1 incorrect xx = 14: Sign I3 incorrect xx = 15: Sign I1 and I3 incorrect xx = 16: Sign I1 confused with I3 xx = 17: I1 confused with I3 and both currents have an incorrect sign The digit of the xth digit indicates where the fault has occurred. X O O O x = 0 = Single converter x = 1 = Inverter 1 x = 2 = Inverter 2 x = 3 = Inverters 1 and 2 Check that all 3 motor feeder cables and the motor windings do not have any interruption. Check the connection between the current converter and the electronics and check the current converter itself. Check the correct input of the rating plate data for the motor data set valid during the measurement.
F108 Mld Unsym	During the DC measurement, the measurement results for the individual phases differ significantly. The fault value indicates which quantity(ies) is (are) concerned and in which phase the greatest deviation occurred.	Read out fault value from r949. The digit of the xth position indicates; O O O X Transverse voltage too high x = 1 = phase R x = 2 = phase S x = 3 = phase T O O X O Dev. stator resistance (1, 2, 3 as above) O X O O Dev. Rotor resistance (1, 2, 3 as above) X O O O Dev. Dead-time compensation (1, 2, 3 as above) X O O O O Dev. Valve voltage (1, 2, 3 as above) The motor, power section or actual-value sensing are significantly non-symmetrical.

Number / Fault	Cause	Counter-measure
F109 Mld R(L)	The rotor resistance determined during DC measurement deviates too significantly from the value which was calculated by the automatic parameterization from the rated slip.	- Incorrect input of rated speed or rated frequency - Pole pair number incorrect
F110 Mld di/dt	During test pulse measurement, the current has increased significantly faster than was expected. Thus for the 1st test pulse, an overcurrent condition occurred within the first half of the minimum switch-on time	- There may be a short-circuit between two converter outputs. - The motor rating plate data have not been correctly parameterized. - The motor leakage is too low.
F111 Fault e_Func	A fault has occurred while calculating the equalization function.	
F112 Unsym I_sigma	The individual leakage test results deviate too significantly.	
F114 MId OFF	The converter has automatically stopped the automatic measurement due to the time limit up to power-up having been exceeded or due to an OFF command during the measurement, and has reset the function selection in P115.	Re-start with P115 function selection = 2 "Motor identification at standstill".The ON command must be given within 20 sec. after the alarm message A078 = standstill measurement has appeared. Cancel the OFF command and re-start measurement.
F115 KF internal	A fault has occurred during calculations in the context of the MotID.	Power-down the converter and electronics and power-up again.
F116 Technology board fault not Compact PLUS	See TB documentation	
F117 Technology board fault not Compact PLUS	See TB documentation	
F118 Technology board fault not Compact PLUS	See TB documentation	
F119 Technology board fault not Compact PLUS	See TB documentation	
F120 Technology board fault not Compact PLUS	See TB documentation	
F121 Technology board fault not Compact PLUS	See TB documentation	
F122 Technology board fault not Compact PLUS	See TB documentation	

Number / Fault	Cause	Counter-measure
F123 Technology board fault not Compact PLUS	See TB documentation	
F124 Technology board fault not Compact PLUS	See TB documentation	
F125 Technology board fault not Compact PLUS	See TB documentation	
F126 Technology board fault not Compact PLUS	See TB documentation	
F127 Technology board fault not Compact PLUS	See TB documentation	
F128 Technology board fault not Compact PLUS	See TB documentation	
F129 Technology board fault not Compact PLUS	See TB documentation	
F130 Technology board fault not Compact PLUS	See TB documentation	
F131 Technology board fault not Compact PLUS	See TB documentation	
F132 Technology board fault not Compact PLUS	See TB documentation	
F133 Technology board fault not Compact PLUS	See TB documentation	

Number / Fault	Cause	Counter-measure
F134 Technology board fault not Compact PLUS	See TB documentation	
F135 Technology board fault not Compact PLUS	See TB documentation	
F136 Technology board fault not Compact PLUS	See TB documentation	
F137 Technology board fault not Compact PLUS	See TB documentation	
F138 Technology board fault not Compact PLUS	See TB documentation	
F139 Technology board fault not Compact PLUS	See TB documentation	
F140 Technology board fault not Compact PLUS	See TB documentation	
F141 Technology board fault not Compact PLUS	See TB documentation	
F142 Technology board fault not Compact PLUS	See TB documentation	
F143 Technology board fault not Compact PLUS	See TB documentation	
F144 Technology board fault not Compact PLUS	See TB documentation	

Number / Fault	Cause	Counter-measure
F145 Technology board fault not Compact PLUS	See TB documentation	
F146 Technology board fault not Compact PLUS	See TB documentation	
F147 Technology board fault not Compact PLUS	See TB documentation	
F148 Fault 1 Function blocks	An active signal is present at binector U061 (1).	Examine cause of fault, see function diagram 710
F149 Fault 2 Function blocks	An active signal is present at binector U062 (1).	Examine cause of fault, see function diagram 710
F150 Fault 3 Function blocks	An active signal is present at binector U063 (1).	Examine cause of fault, see function diagram 710
F151 Fault 4 Function blocks	An active signal is present at binector U064 (1).	Examine cause of fault, see function diagram 710
F152 Signs of life repeatedly invalid.	After an appropriate number of invalid signs of life, the sign of life monitoring block has gone into fault status.	Check cause of fault, see function diagram 170
F243 Link int.	Fault in internal linking. One of the two linked partners does not reply.	Replace CU (-A10), or replace the unit (Compact PLUS)
F244 ParaLink int.	Fault in the internal parameter linking	Release comparison of gating unit software and operating software regarding the transfer parameters. Replace CU (-A10), or replace the unit (Compact PLUS)
F255 Fault in EEPROM	A fault has occurred in the EEPROM.	Switch off the unit and switch it on again. If the fault re-occurs, replace CU, or replace the unit (Compact PLUS)

Table 1 Fault numbers, causes and their counter-measures

Alarms

The alarm message is periodically displayed on the PMU by A = alarm/ alarm message and a 3-digit number. An alarm cannot be acknowledged. It is automatically deleted once the cause has been eliminated. Several alarms can be present. The alarms are then displayed one after the other.

When the converter is operated with the OP1S operator control panel, the alarm is indicated in the lowest operating display line. The red LED additionally flashes (refer to the OP1S operating instructions).

Number / Alarm	Cause	Counter-measure
A001 Calculating time	The calculating time utilization of the CUVC board is too high	- Observe r829 CalcTimeHdroom - Increase P357 Sampling Time or - Reduce P340 Pulse Frequency
A002 SIMOLINK start alarm	Start of the SIMOLINK ring is not functioning.	- Check the fiber-optic cable ring for interruptions - Check whether there is an SLB without voltage in the ring - Check whether there is a faulty SLB in the ring
A014 Simulation active alarm	The DC link voltage is not equal to 0 when the simulation mode is selected (P372 = 1).	- Set P372 to 0. - Reduce DC link voltage (disconnect the converter from the supply)
A015 External alarm 1	Parameterizable external alarm input 1 has been activated.	Check - whether the cable to the corresponding digital input has been interrupted. - parameter P588 Src No Ext Warn1
A016 External alarm 2	Parameterizable external alarm input 2 has been activated.	Check - whether the cable to the corresponding digital input has been interrupted. - parameter P589 Src No Ext Warn2
A017 SAFE OFF alarm active	The switch for blocking the inverter pulses (X9 terminal 5-6) has been opened (only for units with Order No. ...-11, ...-21, ...-31, ...-61)	Close switch X9 5-6 and thus release the inverter pulses.
A020 Overcurrent	An overcurrent condition has occurred.	Check the driven load for an overload condition. - Are the motor and the converter matched? - Have the dynamic performance requirements been exceeded.
A021 Overvoltage	An overvoltage condition has occurred.	Check the supply voltage. The converter regenerates without regeneration possibility.
A022 Inverter temperature	The threshold for initiating an alarm has been exceeded.	- Measure intake air or ambient temperature. - Observe the derating curves at theta >50°C (Compact PLUS) or 40°C. Check - Whether the fan -E1 is connected and is rotating in the correct direction. -The air intake and discharge openings for blockage. - The temperature sensor at -X30. - r833 indicates the maximum converter temperature of all existing measuring points.

Number / Alarm	Cause	Counter-measure
A023 Motor temperature	The parameterizable threshold for initiating an alarm has been exceeded.	Check the motor (load, ventilation, etc.). The current temperature can be read in r009 Motor Tmp. Check the KTY84 input at connector -X103:29,30, or -X104:29,30 (Compact PLUS) for short-circuit.
A024 Motor movement	The motor has moved during motor data identification.	Lock the motor.
A025 I2t Inverter	If the instantaneous load condition is maintained, then the inverter will be thermally overloaded.	Check: - P72 Rtd Drive Amps - MLFB P70 - P128 Imax - r010 Drive Utilizat
A026 Ud too high	Ud is above the continuously permissible DC link voltage for more than 30sec in a time interval of 90sec	
A029 I2t motor	The parameterized limit value for the I2t monitoring of the motor has been exceeded.	Motor load cycle is exceeded! Check the parameters: P382 Motor Cooling P383 Mot Tmp T1 P384 Mot Load Limits
A033 Overspeed	Bit 3 in r553 status word 2 of the septoint channel. The speed actual value has exceeded the value of maximum speed plus the set hysteresis.	P804 Overspeed Hys plus P452 n/f(max, FWD Spd) or P453 n/f(max, REV Spd) has been exceeded Increase the parameter for the maximum frequencies or reduce the regenerative load.
A034 Setpoint/actual value deviation	Bit 8 in r552 status word 1 of the setpoint channel. The difference between freqeuncy setpoint/actual value is greater than the parameterized value and the control monitoring time has elapsed.	Check - whether an excessive torque requirement is present - whether the motor has been dimensioned too small. Increase values P792 Perm Deviation Frq/ set/actual DevSpeed and P794 Deviation Time
A035 Wire break	The clockwise and/or the counter-clockwise rotating field is not enabled, or a wire breakage is present in the terminal wiring (both control word bits are zero)	Check whether cable(s) to the corresponding digital input(s) P572 Src FWD Spd / P571 Src REV Spd is (are) interrupted or released
A036 Brake checkback "Brake still closed"	The brake checkback indicates the "Brake still closed" state.	Check brake checkback (see FD 470)
A037 Brake checkback "Brake still open"	The brake checkback indicates the "Brake still open" state.	Check brake checkback (see FD 470)
A041 Vdmax controller inhibit	The line voltage is too high or the drive line voltage (P071) is incorrectly parameterized. The Vdmax controller is disabled despite parameter access (P515), as otherwise the motor would accelerate immediately in operation to the maximum frequency.	Check - the line voltage - P071 Line Volts

Number / Alarm	Cause	Counter-measure
A042 Motor stall/lock	Motor is stalled or blocked. The alarm cannot be influenced by P805 "PullOut/BlckTime", but by P794 "Deviation Time"	Check - whether the drive is locked - whether the encoder cable is interruped during speed control and whether the shield is connected. - Whether the drive has stalled - For synchronous motors (P095=12): excitation current injection
A043 n-act jump	The permissible change value of the speed encoder signal (P215) has been exceeded. Additionally for synchronous motors (P095=12): The motor rotates with more than 2% of the rated speed at the time of inverter release. The inverter status "Ready for operation" is not exited.	Check the tachometer cables for interruptions. Check the earthing of the tachometer shield. - The shield must be connected both on the motor and on the converter side. - The encoder cable must not be interrupted. The encoder cable must not be laid with the power cables. - Only the recommended encoders should be used. - If there is a signal fault, use the DTI board if necessary. If required, change P215. - Additionally for synchronous motors (P095=12): Do not grant inverter release until the motor is at standstill
A044 I too low	Only for synchronous motors (P095=12) in operation: The difference smoothed with P159 between excitation current setpoint and actual value (r160 - r156) deviates from zero by more than 25% of the rated magnetizing current.	Only for synchronous motors P095=12) Check: - whether the current limitation of the excitation current control is too small, - whether the dynamic performance of the excitation current injection is too low, - whether the excitation current injection function is operating, - whether the wiring of excitation current actual-value P155 is correct, - whether the wiring of excitation current setpoint r160 is correct, - whether there is a wire break between MASTERDRIVES and the excitation device, - whether the voltage limitation is too low for dynamic excitation current control, - whether the analog output for r160 takes place without isolating amplifiers (despite cable length > 4 m)
A045 DC braking activated	The DC braking function has been activated and the motor frequency is still above the frequency at which DC braking begins (P398).	- Increase frequency at which DC braking begins
A049 No slave not Compact PLUS	At serial I/O (SCB1 with SCI1/2), no slave is connected or fiber-optic cable is interrupted or slaves are without voltage.	P690 SSCI AnaIn Conf - Check slave. - Check cable.

Number / Alarm	Cause	Counter-measure
A050 Slave incorrect not Compact PLUS	At ser. I/O the slaves required according to a parameterized configuration are not present (slave number or slave type): Analog inputs or outputs or digital inputs or outputs have been parameterized which are not physically present.	Check parameter P693 (analog outputs), P698 (digital outputs). Check connectors K4101...K4103, K4201...K4203 (analog inputs) and binectors B4100...B4115, B4120...B4135, B4200...B4215, B4220...B4235 (digital inputs) for connecting.
A051 Peer baud rate not Compact PLUS	In a peer-to-peer connection a baud rate has been selected which is too high or too different.	Adjust the baud rate in conjunction with the SCB boards P701 SCom/SCB Baud Rate
A052 Peer PcD L not Compact PLUS	In a peer-to-peer connection, a PcD length has been set which is too high (>5).	Reduce number of words P703 SCom/SCB PcD #
A053 Peer Lng f. not Compact PLUS	In a peer-to-peer connection, the pcD length of transmitter and receiver do not match.	Adjust the word length for transmitter and receiver P703 SCom/SCB PcD #
A057 TB Param not Compact PLUS	Occurs when a TB is logged on and present, but parameter tasks from the PMU, SCom1 or SCom2 have not been answered by the TB within 6 seconds.	Replace TB configuration (software)
A061 Alarm 1 Function blocks	An active signal is present at binector U065 (1).	Check cause of alarm (see FD 710)
A062 Alarm 2 Function blocks	An active signal is present at binector U066 (1).	Check cause of alarm (see FD 710)
A063 Alarm 3 Function blocks	An active signal is present at binector U067 (1).	Check cause of alarm (see FD 710)
A064 Alarm 4 Function blocks	An active signal is present at binector U068 (1).	Check cause of alarm (see FD 710)
A065 Auto restart active	The auto restart option (P373) restarts the drive. A possibly parameterized power-up delay time (P374) expires if flying restart is not selected. During pre-charging of the DC link, there is no time monitoring i.e. with an external electronics power supply, it is also switched-in again.	Caution! Personnel could be in danger when the drive automatically restarts. Check whether the auto restart function is really required!
A066 fsyn > fmax	The measured target frequency of the external converter (or supply) is greater than the parameterized maximum frequency of the synchronizing converter.	Check: - P452 n/f(max, FWD Spd)/ P453 n/f(max,REV Spd) are correct and - correct motor data set P578 Src MotDSet Bit0 are selected
A067 fsyn < fmin	The measured target frequency of the external converter (or supply) is less than the minimum frequency required for synchronizing.	Check: - r533 Sync Target Freq - Synchronizing cable.
A068 fsyn<>fsoll	The setpoint frequency of the synchronizing converter deviates too significantly from the measured target frequency of the external converter (or supply). The permissible deviation can be set in P529.	Adjust total setpoint (main and additional setpoints) to the target frequency displayed in visualization parameter r533.

Number / Alarm	Cause	Counter-measure
A069 RGen active	Synchronizing is not started as long as the ramp-function generator in the synchronizing converter setpoint channel is active. This alarm is only output if synchronizing is selected.	Wait until acceleration has been completed. Check whether - P462 Accel Time - P463 Accel Time Unit have been correctly set.
A070 Sync error	This alarm is output if the phase difference goes outside the synchronizing window (P531) after successful synchronization.	The alarm can only be deleted after synchronization has been exited.
A071 tSY missing	An attempt has been made to start synchronization with either the synchronizing board not inserted or not parameterized.	Insert the TSY board in the subrack
A075 Ls, Rr Dev.	The measured values of the leakage measurement or of rotor resistance deviate significantly.	Usually the leakage reactance P122 is the average value resulting from the measured values in r546.1...12, and the rotor resistance r126 from the values in r542.1..3. If individual measured values significantly deviate from the average values, they are automatically not taken into account for the calculation (for RI) or the value of the automatic parameterization remains (for Ls). It is only necessary to check the results for their plausibility in the case of drives with high requirements on torque or speed accuracy.
A076 t-comp lim	The determined compensation time was limited to the value range of 0.5 µs - 1.5 µs.	Converter output and motor output are too different. Check motor data input P095 to P109.
A077 r-g limit	The measured resistance has been limited to the maximum value of 49%.	Converter output and motor output are too different. Check motor data input P095 to P109.
A078 Stands. Meas	The standstill measurement is executed when the converter is powered up. The motor can align itself several times in a certain direction with this measurement.	If the standstill measurement can be executed without any danger: - Power up the converter.
A079 Mld Inv Stop	The rotating measurement has been aborted or cannot commence because an inverter stop command is present.	P561 Src InvRelese - Release the inverter If necessary, re-start the measurement by powering-up the converter.
A080 MotId:Dr.M	When the converter is powered up, the rotating measurement automatically accelerates the drive. The drive can then only be externally controlled in a restricted fashion.	If the rotating measurement can be executed without any danger: - Power up the converter.
A081 CB alarm	The following description refers to the 1st CBP. For other CBs or the TB see operating instructions for CB board. The ID byte combinations which are being sent from the DP master in the configuration telegram are not in conformance with the permissible ID byte combinations. (See also Compendium, Chapter 8, Table 8.2-12). Consequence: No connection is made with the PROFIBUS master.	New configuration necessary

Number / Alarm	Cause	Counter-measure
A082 CB alarm	The following description refers to the CBP. For other CBs or the TB see the operating instructions for the CB board. No valid PPO type can be identified from the configuration telegram of the DP master. Consequence: No connection is made with the PROFIBUS master.	New configuration necessary.
A083 CB alarm	The following description refers to the 1st CBP. For other CBs or the TB see the operating instructions for the CB board. No net data or invalid net data (e.g. complete control word STW1=0) are being received from the DP master. Consequence: The process data are not passed on to the dual port RAM. If P722 (P695) is not equal to zero, this will cause the fault message F082 to be tripped.	
A084 CB alarm	The following description refers to the 1st CBP. For other CBs or the TB see the operating instructions for the CB board. The telegram traffic between the DP master and the CBP has been interrupted (e.g. cable break, bus cable pulled out or DP master powered down). Consequence: If P722 (P695) is not equal to zero, this will cause the fault message F082 to be tripped.	
A085 CB alarm	The following description refers to the 1st CBP. For other CBs or the TB see the operating instructions for the CB board. The CBP does not generate this alarm!	
A086 CB alarm	The following description refers to the 1st CBP. For other CBs or the TB see the operating instructions for the CB board. Failure of the heartbeat counter on the basic unit. The heartbeat counter on the basic unit is no longer being incremented. The communication between the CBP and the basic board is disturbed.	
A087 CB alarm	The following description refers to the 1st CBP. For other CBs or the TB see the operating instructions for the CB board. Fault in the DPS manager software of the CBP.	
A088 CB alarm	See user manual for CB board	
A089 CB alarm	See user manual for CB board Alarm of the 2nd CB board corresponds to A81 of the 1st CB board	
A090 CB alarm	See user manual for CB board Alarm of the 2nd CB board corresponds to A82 of the 1st CB board	
A091 CB alarm	See user manual for CB board Alarm of the 2nd CB board corresponds to A83 of the 1st CB board	
A092 CB alarm	See user manual for CB board Alarm of the 2nd CB board corresponds to A84 of the 1st CB board	

Number / Alarm	Cause	Counter-measure
A093 CB alarm	See user manual for CB board Alarm of the 2nd CB board corresponds to A85 of the 1st CB board	
A094 CB alarm	See user manual for CB board Alarm of the 2nd CB board corresponds to A86 of the 1st CB board	
A095 CB alarm	Alarm of the 2nd CB board. Corresponds to A87 of the 1st CB board See user manual for CB board	
A096 CB alarm	See user manual for CB board Alarm of the 2nd CB board corresponds to A88 of the 1st CB board	
A097 TB alarm 1 not Compact PLUS	See user manual for TB board	
A098 TB alarm 1 not Compact PLUS	See user manual for TB board	
A099 TB alarm 1 not Compact PLUS	See user manual for TB board	
A100 TB alarm 1 not Compact PLUS	See user manual for TB board	
A101 TB alarm 1 not Compact PLUS	See user manual for TB board	
A102 TB alarm 1 not Compact PLUS	See user manual for TB board	
A103 TB alarm 1 not Compact PLUS	See user manual for TB board	
A104 TB alarm 1 not Compact PLUS	See user manual for TB board	
A105 TB alarm 1 not Compact PLUS	See user manual for TB board	
A106 TB alarm 1 not Compact PLUS	See user manual for TB board	
A107 TB alarm 1 not Compact PLUS	See user manual for TB board	

Number / Alarm	Cause	Counter-measure
A108 TB alarm 1 not Compact PLUS	See user manual for TB board	
A109 TB alarm 1 not Compact PLUS	See user manual for TB board	
A110 TB alarm 1 not Compact PLUS	See user manual for TB board	
A111 TB alarm 1 not Compact PLUS	See user manual for TB board	
A112 TB alarm 1 not Compact PLUS	See user manual for TB board	
A113 TB alarm 2 not Compact PLUS	See user manual for TB board	
A114 TB alarm 2 not Compact PLUS	See user manual for TB board	
A115 TB alarm 2 not Compact PLUS	See user manual for TB board	
A116 TB alarm 2 not Compact PLUS	See user manual for TB board	
A117 TB alarm 2 not Compact PLUS	See user manual for TB board	
A118 TB alarm 2 not Compact PLUS	See user manual for TB board	
A119 TB alarm 2 not Compact PLUS	See user manual for TB board	
A120 TB alarm 2 not Compact PLUS	See user manual for TB board	

Number / Alarm	Cause	Counter-measure
A121 TB alarm 2 not Compact PLUS	See user manual for TB board	
A122 TB alarm 2 not Compact PLUS	See user manual for TB board	
A123 TB alarm 2 not Compact PLUS	See user manual for TB board	
A124 TB alarm 2 not Compact PLUS	See user manual for TB board	
A125 TB alarm 2 not Compact PLUS	See user manual for TB board	
A126 TB alarm 2 not Compact PLUS	See user manual for TB board	
A127 TB alarm 2 not Compact PLUS	See user manual for TB board	
A128 TB alarm 2 not Compact PLUS	See user manual for TB board	

Table 2 Alarm numbers, causes and their counter-measures

Fatal errors (FF)

Fatal errors are serious hardware or software errors which no longer permit normal operation of the unit. They only appear on the PMU in the form "FF<No>". The software is re-booted by actuating any key on the PMU.

Number / Fault	Cause	Counter-measure
FF01 Time slot overflow	A time slot overflow which cannot be corrected has been detected in the higher-priority time slots.	- Increase sampling time (P357 or reduce pulse frequency (P340) - Replace CU, or replace the unit (Compact PLUS)
FF03 Access fault Optional board	Serious faults have occurred while making access to external optional boards (CB, TB, SCB, TSY ..).	- Replace CU, or replace the unit (Compact PLUS) - Replace the LBA - Replace the optional board
FF04 RAM	A fault has occurred during the test of the RAM.	- Replace CU, or replace the unit (Compact PLUS)
FF05 EPROM fault	A fault has occurred during the test of the EPROM.	- Replace CU, or replace the unit (Compact PLUS)
FF06 Stack overflow	Stack has overflowed	For VC: Increase sampling time (P357) For MC: Reduce pulse frequency (P340) - Replace CU, or replace the unit (Compact PLUS)
FF07	Stack underflow	* Replace CU, or replace the unit (Compact PLUS) * Replace firmware
FF08	Invalid processor command should be processed	* Replace CU, or replace the unit (Compact PLUS) * Replace firmware
FF09	Invalid format in a protected processor command	* Replace CU, or replace the unit (Compact PLUS) * Replace firmware
FF10	Word access on uneven address	* Replace CU, or replace the unit (Compact PLUS) * Replace firmware
FF11	Jump command to uneven address	* Replace CU, or replace the unit (Compact PLUS) * Replace firmware
FF13 Wrong firmware version	A version conflict between the firmware and the hardware has occurred.	- Replace firmware - Replace CU, or replace the unit (Compact PLUS)
FF14 FF processing	Unexpected fatal error (During processing of the fatal errors, a fault number has occurred which is unknown to date).	Replace the board
FF15 CSTACK_OVERFLOW	Stack overflow (C-Compiler Stack)	Replace the board

Table 3 Fatal errors

Lists of stored motors

Asynchronous motors 1PH7(=PA6) / 1PL6 / 1PH4

Input in P097	Motor order number (MPRD)	Rated speed n_n [rpm]	Frequency f_n [Hz]	Current I_n [A]	Voltage U_n [V]	Torque M_n [Nm]	cos φ	i_μ [%]
1	1PH7101-2HF	1750	60.0	9.7	398	23.5	0.748	58.3
2	1PH7103-2HD	1150	40.6	9.6	391	35.7	0.809	51.8
3	1PH7103-2HF	1750	60.95	12.8	398	34	0.835	41.3
4	1PH7103-2HG	2300	78.8	16.3	388	31	0.791	50.4
5	1PH7105-2HF	1750	60.0	17.1	398	43.7	0.773	54.1
6	1PH7107-2HD	1150	40.3	17.0	360	59.8	0.807	51.4
7	1PH7107-2HF	1750	60.3	21.7	381	54.6	0.802	48.8
8	1PH7131-2HF	1750	59.65	23.7	398	71	0.883	34.2
9	1PH7133-2HD	1150	39.7	27.5	381	112	0.853	46.2
10	1PH7133-2HF	1750	59.65	33.1	398	95.5	0.854	41.1
11	1PH7133-2HG	2300	78.0	42.3	398	93	0.858	40.4
12	1PH7135-2HF	1750	59.45	40.0	398	117	0.862	40.3
13	1PH7137-2HD	1150	39.6	40.6	367	162	0.855	45.8
14	1PH7137-2HF	1750	59.5	53.0	357	136	0.848	43.0
15	1PH7137-2HG	2300	77.8	53.9	398	120	0.866	39.3
16	1PH7163-2HB	400	14.3	28.2	274	227	0.877	40.4
17	1PH7163-2HD	1150	39.15	52.1	364	208	0.841	48.7
18	1PH7163-2HF	1750	59.2	69.0	364	185	0.855	41.2
19	1PH7163-2HG	2300	77.3	78.5	398	158	0.781	55.3
20	1PH7167-2HB	400	14.3	35.6	294	310	0.881	39.0
21	1PH7167-2HD	1150	39.1	66.4	357	257	0.831	50.9
22	1PH7167-2HF	1750	59.15	75.2	398	224	0.860	40.3
23	1PH7184-2HB	400	14.2	49.5	271	390	0.840	52.5
24	1PH7184-2HD	1150	39.1	87.5	383	366	0.820	48.0
25	1PH7184-2HF	1750	59.0	121.0	388	327	0.780	52.9
26	1PH7184-2HL	2900	97.4	158.0	395	265	0.800	48.7
27	1PH7186-2HB	400	14.0	66.0	268	506	0.810	58.3
28	1PH7186-2HD	1150	39.0	115.0	390	482	0.800	50.4
29	1PH7186-2HF	1750	59.0	168.0	385	465	0.800	50.0
30	1PH7186-2HL	2900	97.3	206.0	385	333	0.780	52.0
31	1PH7224-2HB	400	14.0	88.0	268	725	0.870	41.5
32	1PH7224-2HD	1150	38.9	160.0	385	670	0.810	49.4
33	1PH7224-2HF	1750	58.9	203.0	395	600	0.840	43.4
34	1PH7224-2HL	2900	97.3	274.0	395	490	0.840	42.0

Input in P097	Motor order number (MPRD)	Rated speed n_n [rpm]	Frequency f_n [Hz]	Current I_n [A]	Voltage U_n [V]	Torque M_n [Nm]	cos φ	i_u [%]
35	1PH7226-2HB	400	14.0	113.0	264	935	0.860	43.4
36	1PH7226-2HD	1150	38.9	197.0	390	870	0.840	44.4
37	1PH7226-2HF	1750	58.9	253.0	395	737	0.820	47.4
38	1PH7226-2HL	2900	97.2	347.0	390	610	0.830	44.4
39	1PH7228-2HB	400	13.9	134.0	272	1145	0.850	45.2
40	1PH7228-2HD	1150	38.9	237.0	390	1070	0.850	41.4
41	1PH7228-2HF	1750	58.8	341.0	395	975	0.810	49.6
42	1PH7228-2HL	2900	97.2	401.0	395	710	0.820	46.4
43	1PL6184-4HB	400	14.4	69.0	300	585	0.860	47.8
44	1PL6184-4HD	1150	39.4	121.0	400	540	0.860	46.3
45	1PL6184-4HF	1750	59.3	166.0	400	486	0.840	41.0
46	1PL6184-4HL	2900	97.6	209.0	400	372	0.850	37.8
47	1PL6186-4HB	400	14.3	90.0	290	752	0.850	52.2
48	1PL6186-4HD	1150	39.4	158.0	400	706	0.860	39.3
49	1PL6186-4HF	1750	59.3	231.0	400	682	0.840	39.8
50	1PL6186-4HL	2900	97.5	284.0	390	494	0.840	38.7
51	1PL6224-4HB	400	14.2	117.0	300	1074	0.870	38.5
52	1PL6224-4HD	1150	39.1	218.0	400	997	0.850	39.5
53	1PL6224-4HF	1750	59.2	292.0	400	900	0.870	30.8
54	1PL6224-4HL	2900	97.5	365.0	400	675	0.870	32.3
55	1PL6226-4HB	400	14.0	145.0	305	1361	0.850	46.2
56	1PL6226-4HD	1150	39.2	275.0	400	1287	0.870	33.5
57	1PL6226-4HF	1750	59.1	355.0	400	1091	0.870	34.4
58	1PL6226-4HL	2900	97.4	485.0	395	889	0.870	32.4
59	1PL6228-4HB	400	14.0	181.0	305	1719	0.860	42.5
60	1PL6228-4HD	1150	39.2	334.0	400	1578	0.880	30.5
61	1PL6228-4HF	1750	59.0	473.0	400	1448	0.860	36.8
62	1PL6228-4HL	2900	97.3	534.0	400	988	0.870	35.0
63	1PH4103-4HF	1750	61.2	20.5	400	48	0.75	56.1
64	1PH4105-4HF	1750	61.3	28.0	400	70	0.78	48.2
65	1PH4107-4HF	1750	61.0	36.0	400	89	0.78	50.0
66	1PH4133-4HF	1750	60.2	36.0	400	96	0.82	33.3
67	1PH4135-4HF	1750	59.8	52.0	400	139	0.79	42.3
68	1PH4137-4HF	1750	59.9	63.0	400	172	0.81	36.5
69	1PH4163-4HF	1750	59.3	88.0	400	235	0.78	47.7
70	1PH4167-4HF	1750	59.4	107.0	400	295	0.80	41.1
71	1PH4168-4HF	1750	59.4	117.0	400	333	0.82	36.8

Table 4 Motor list 1PH7 (=1PA6) / 1PL6 / 1PH4

Dimension Drawings

Type		**A**	475 221.9000.00 MB
		B	475 241.9000.00 MB
		C	475 242.9000.00 MB
		D	475 244.9000.00 MB

Type		**E**	476 245.9000.00 MB
		F	476 254.9000.00 MB
		G	476 256.9000.00 MB
		H	476 257.9000.00 MB

Type		**J**	476 233.9100.00 MB
	AC	**K**	476 233.9000.00 MB
	DC	**K**	476 235.9100.00 MB
		L	476 236.9100.00 MB

The following editions have been published so far:

Edition	Internal Item Number
AA	475 600 4050 76 J AA-76
AB	475 600 4050 76 J AB-76
AC	475 600 4050 76 J AC-76
AD	475 600 4050 76 J AD-76
AE	475 600 4050 76 J AE-76

Version AE consists of the following chapters:

Chapter		Changes	Pages	Version date
1	System Description	reviewed edition	4	10.2001
2	Configuration and Connection Examples	reviewed edition	23	10.2001
3	Instructions for Design of Drives in Conformance with EMC Regulations	reviewed edition	24	11.2000
4	Function blocks and parameters	reviewed edition	10	11.2000
5	Parameterization	reviewed edition	73	10.2001
6	Parameterizing steps	reviewed edition	76	10.2001
7	Functions	reviewed edition	47	10.2001
8	Communication	reviewed edition	1	10.2001
8.1	Universal Serial Interface (USS)	reviewed edition	43	10.2001
8.2	PROFIBUS	reviewed edition	104	10.2001
8.3	SIMOLINK	reviewed edition	27	10.2001
8.4	CBC Communications Board	reviewed edition	60	10.2001
9	Control word and status word	reviewed edition	14	04.99
	Function Diagrams	reviewed edition	150	10.2001
	Parameter Lists	reviewed edition	240	10.2001
	Faults und Alarms	reviewed edition	27	10.2001
	Lists of stored motors	reviewed edition	2	04.99
	Dimension Drawings	reviewed edition	13	04.99

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