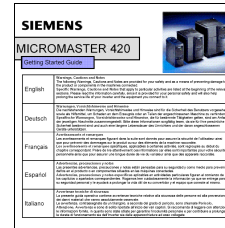# SIEMENS

MICROMASTER 420

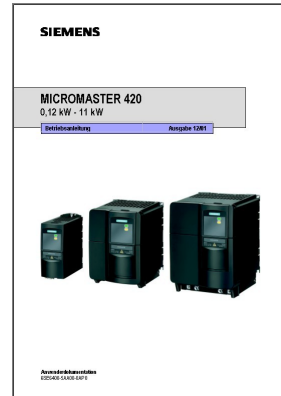**Parameter List**   **Issue04/02**

Getting Started Guide

Is for quick commissioning with SDP and BOP.

Operating Instructions

Gives information about features of the MICROMASTER420, Installation, Commissioning, Control modes, System Parameter structure, Troubleshooting, Specifications and available options of the MICROMASTER420.

Parameter List

The Parameterlist contains the description of all Parameters structured in functional order and a detailed description. The Parameter list also includes a series of function plans.

Catalogues

In the catalogue you will find all needs to select a certain inverter, as well as filters chokes, operator panels or communications options.

SIEMENS

MICROMASTER 420

Parameter List
User Documentation

Valid for

Issue 04/02

Converter Type
MICROMASTER 420

Software Version
V1.0

Issue 04/02

Parameter List	1
Function Diagrams	2
Alarms and Warnings	3

Warning

Please refer to all Definitiones and Warnings contained in the Operating Instructions. You will find the Operating Instructions on the Docu CD delivered with your inverter. If the CD is lost, it can be ordered via your local Siemens department under the Order No. 6SE6400-5AB00-1AP0.

Further information can be obtained from Internet website:
http://www.siemens.de/micromaster

Approved Siemens Quality for Software and Training
is to DIN ISO 9001, Reg. No. 2160-01

Other functions not described in this document may be available. However, this fact shall not constitute an obligation to supply such functions with a new control, or when servicing.

We have checked that the contents of this document correspond to the hardware and software described. There may be discrepancies nevertheless, and no guarantee can be given that they are completely identical. The information contained in this document is reviewed regularly and any necessary changes will be included in the next edition. We welcome suggestions for improvement.

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Document subject to change without prior notice.

Parameters MICROMASTER 420

This Parameter List must only be used together with the Operating Instructions or the Reference Manual of the MICROMASTER 420. Please pay special attention to the Warnings, Cautions, Notices and Notes contained in these manuals.

Table of Contents

1 Parameters

1.1 Introduction to MICROMASTER 420 System Parameters

The layout of the parameter description is as follows.

1 Par number [index]	2 Parameter name 3 CStat: 4 P-Group:	5 Datatype 6 active:	7 Unit: 8 Quick Comm:	9 Min: 10 Def: 11 Max:	12 Level: **2**
	13	Description:			
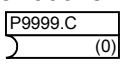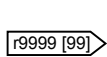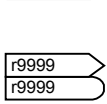
1. **Parameter number**
   Indicates the relevant parameter number. The numbers used are 4-digit numbers in the range 0000 to 9999. Numbers prefixed with an "r" indicate that the parameter is a "read-only" parameter, which displays a particular value but cannot be changed directly by specifying a different value via this parameter number (in such cases, dashes "-" are entered at the points "Unit", "Min", "Def" and "Max" in the header of the parameter description).
   All other parameters are prefixed with a "P". The values of these parameters can be changed directly in the range indicated by the "Min" and "Max" settings in the header.

   [index] indicates that the parameter is an indexed parameter and specifies the number of indices available.

2. **Parameter name**
   Indicates the name of the relevant parameter. Certain parameter names include the following abbreviated prefixes: BI, BO, CI, and CO followed by a colon. These abbreviations have the following meanings:

   BI = P9999.C (0)   Binector input, i.e. parameter selects the source of a binary signal

   BO = r9999   Binector output, i.e. parameter connects as a binary signal

   CI = P9999.D (999:9)   Connector input, i.e. parameter selects the source of an analog signal

   CO = r9999 [99]   Connector output, i.e. parameter connects as an analog signal

   CO/BO = r9999 / r9999   Connector/Binector output, i.e. parameter connects as an analog signal and/or as a binary signal

   To make use of BiCo you will need access to the full parameter list. At this level many new parameter settings are possible, including BiCo functionality. BiCo functionality is a different, more flexible way of setting and combining input and output functions. It can be used in most cases in conjunction with the simple, level 2 settings.
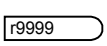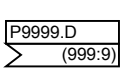   The BiCo system allows complex functions to be programmed. Boolean and mathematical relationships can be set up between inputs (digital, analog, serial etc.) and outputs (inverter current, frequency, analog output, relays, etc.).

3. **CStat**
   Commissioning status of the parameter. Three states are possible:
   Commissioning   C
   Run   U
   Ready to Run   T
   This indicates when the parameter can be changed. One, two or all three states may be specified. If all three states are specified, this means that it is possible to change this parameter setting in all three inverter states

4. **P-Group**
   Indicates the functional group of the particular.

   > **Note**
   > Parameter P0004 (parameter filter) acts as a filter and focuses access to parameters according to the functional group selected.

5. **Datatype**
   The data types available are shown in the table below.

Notation	Meaning
U16	16-bit unsigned
U32	32-bit unsigned
I16	16-bit integer
I32	32-bit integer
Float	Floating point

6. **Active**
   Indicates whether
   - Immediately changes to the parameter values take effective immediately after they have been entered, or
   - Confirm the "P" button on the operator panel (BOP or AOP) must be pressed before the changes take effect.

7. **Unit**
   Indicates the unit of measure applicable to the parameter values

8. **QuickComm**
   Indicates whether or not (Yes or No) a parameter can only be changed during quick commissioning, i.e. when P0010 (parameter groups for commissioning) is set to 1 (quick commissioning).

9. **Min**
   Indicates the minimum value to which the parameter can be set.

10. **Def**
    Indicates the default value, i.e. the value which applies if the user does not specify a particular value for the parameter.

11. **Max**
    Indicates the maximum value to which the parameter can be set.

12. **Level**
    Indicates the level of user access. There are four access levels: Standard, Extended, Expert and Service. The number of parameters that appear in each functional group depends on the access level set in P0003 (user access level).

13. **Description**
    The parameter description consists of the sections and contents listed below. Some of these sections and contents are optional and will be omitted on a case-to-case basis if not applicable.

Description:	Brief explanation of the parameter function.
Diagram:	Where applicable, diagram to illustrate the effects of parameters on a characteristic curve, for example
Settings:	List of applicable settings. These include Possible settings, Most common settings, Index and Bitfields
Example:	Optional example of the effects of a particular parameter setting.
Dependency:	Any conditions that must be satisfied in connection with this parameter. Also any particular effects, which this parameter has on other parameter(s) or which other parameters have on this one.
Warning / Caution / Notice / Note:	
	Important information which must be heeded to prevent personal injury or damage to equipment / specific information which should be heeded in order to avoid problems / information which may be helpful to the user
More details:	Any sources of more detailed information concerning the particular parameter.

1.2 Quick commissioning (P0010=1)

The following parameters are necesarry for quick commissioning (P0010=1).

No	Name	Access level	Cstat
P0100	Europe / North America	1	C
P0300	Select motor type	2	C
P0304	Motor voltage rating	1	C
P0305	Motor current rating	1	C
P0307	Motor power rating	1	C
P0308	Motor cosPhi rating	2	C
P0309	Motor efficiency rating	2	C
P0310	Motor frequency rating	1	C
P0311	Motor speed rating	1	C
P0320	Motor magnetizing current	3	CT
P0335	Motor cooling	2	CT
P0640	Motor overload factor [%]	2	CUT
P0700	Selection of command source	1	CT
P1000	Selection of frequency setpoint	1	CT
P1080	Min. speed	1	CUT
P1082	Max. speed	1	CT
P1120	Ramp-up time	1	CUT
P1121	Ramp-down time	1	CUT
P1135	OFF3 ramp-down time	2	CUT
P1300	Control mode	2	CT
P1910	Select motor data identification	2	CT
P3900	End of quick commissioning	1	C

When P0010=1 is chosen, P0003 (user access level) can be used to select the parameters to be accessed. This parameter also allows selection of a user-defined parameter list for quick commissioning.

At the end of the quick commissioning sequence, set P3900 = 1 to carry out the necessary motor calculations and clear all other parameters (not included in P0010=1) to their default settings.

Note
This applies only in Quick Commissioning mode.

Reset to Factory default

To reset all parameters to the factory default settings; the following parameters should be set as follows:

Set P0010=30.

Set P0970=1.

Note
The reset process takes approximately 10 seconds to complete. Reset to Factory default

Seven-segment display

The seven-segment display is structured as follows:

Segment Bit   **15 14   13 12   11 10   9   8**

Segment Bit   **7   6   5   4   3   2   1   0**
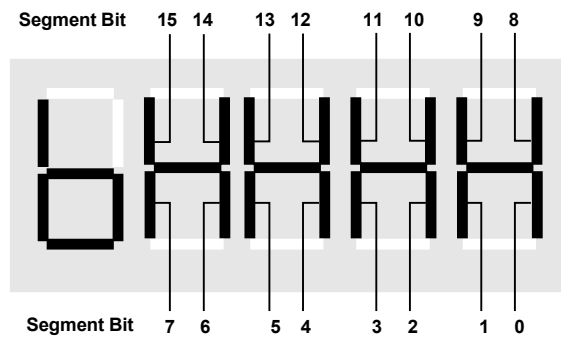
The significance of the relevant bits in the display is described in the status and control word parameters.

1.3 Parameter Description

Note:

Level 4 Parameters are not visible with BOP or AOP.

r0000	Drive display			Min:	-	Level:
		Datatype: U16	**Unit:** -	**Def:**	-	**1**
	P-Group: ALWAYS			**Max:**	-	

Displays the user selected output as defined in P0005.

Note:

Pressing the "Fn" button for 2 seconds allows the user to view the values of DC link voltage, output frequency, output voltage, output current, and chosen r0000 setting (defined in P0005).

r0002	Drive state			Min:	-	Level:
		Datatype: U16	**Unit:** -	**Def:**	-	**2**
	P-Group: COMMANDS			**Max:**	-	

Displays actual drive state.
Possible Settings:

0   Commissioning mode (P0010 != 0)

1   Drive ready

2   Drive fault active

3   Drive starting (DC-link precharging)

4   Drive running

5   Stopping (ramping down)
Dependency:

State 3 visible only while precharging DC link, and when externally powered communications board is fitted.

P0003	User access level			Min:	0	Level:
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:**	1	**1**
	P-Group: ALWAYS	**Active:** first confirm	**QuickComm.** No	**Max:**	4	

Defines user access level to parameter sets. The default setting (standard) is sufficient for most simple applications.
Possible Settings:

0   User defined parameter list - see P0013 for details on use

1   Standard: Allows access into most frequently used parameters.

2   Extended: Allows extended access e.g. to inverter I/O functions.

3   Expert: For expert use only.

4   Service: Only for use by authorized service personal - password protected.

P0004	Parameter filter			Min:	0	Level:
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:**	0	**1**
	P-Group: ALWAYS	**Active:** first confirm	**QuickComm.** No	**Max:**	22	

Filters available parameters according to functionality to enable a more focussed approach to commissioning.
Possible Settings:

0   All parameters

2   Inverter

3   Motor

7   Commands, binary I/O

8   ADC and DAC

10   Setpoint channel / RFG

12   Drive features

13   Motor control

20   Communication

21   Alarms / warnings / monitoring

22   Technology controller (e.g. PID)
Example:

P0004 = 22 specifies that only PID parameters will be visible.
Dependency:

Parameters marked "Quick Comm: Yes" in the parameter header can only be set when P0010 = 1 (Quick Commissioning).

P0005	**Display selection**			Min:	0	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** -	**Def:**	21	**2**
P-Group:	FUNC	**Active:** first confirm	**QuickComm.** No	**Max:**	4000	

Selects display for parameter r0000 (drive display).

Common Settings:
21 Actual frequency
25 Output voltage
26 DC link voltage
27 Output current

Notice:
These settings refer to read only parameter numbers ("rxxxx").

Details:
See relevant "rxxxx" parameter descriptions.

P0006	**Display mode**			Min:	0	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** -	**Def:**	2	**3**
P-Group:	FUNC	**Active:** first confirm	**QuickComm.** No	**Max:**	4	

Defines mode of display for r0000 (drive display).

Possible Settings:
0   In Ready state alternate between setpoint and output frequency. In run display output frequency
1   In Ready state display setpoint. In run display output frequency.
2   In Ready state alternate between P0005 value and r0020 value. In run display P0005 value
3   In Ready state alternate between r0002 value and r0020 value. In run display r0002 value
4   In all states just display P0005

Note:
When inverter is not running, the display alternates between the values for "Not Running" and "Running".

Per default, the setpoint and actual frequency values are displayed alternately.

P0007	**Backlight delay time**			Min:	0	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
P-Group:	FUNC	**Active:** first confirm	**QuickComm.** No	**Max:**	2000	

Defines time period after which the backlight display turns off if no operator keys have been pressed.

Value:
P0007 = 0:
Backlight always on (default state).

P0007 = 1 - 2000:
Number of seconds after which the backlight will turn off.

P0010	**Commissioning parameter**			Min:	0	Level:
CStat:	CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**1**
P-Group:	ALWAYS	**Active:** first confirm	**QuickComm.** No	**Max:**	30	

Filters parameters so that only those related to a particular functional group are selected.

Possible Settings:
0   Ready
1   Quick commissioning
2   Inverter
29   Download
30   Factory setting

Dependency:
Reset to 0 for inverter to run.

P0003 (user access level) also determines access to parameters.

Note:
P0010 = 1
The inverter can be commissioned very quickly and easily by setting P0010 = 1. After that only the important parameters (e.g.: P0304, P0305, etc.) are visible. The value of these parameters must be entered one after the other. The end of quick commissioning and the start of internal calculation will be done by setting P3900 = 1 - 3. Afterward parameter P0010 will be reset to zero automatically.

P0010 = 2
For service purposes only.

P0010 = 29
To transfer a parameter file via PC tool (e.g.: DriveMonitor, STARTER) parameter P0010 will be set to 29 by the PC tool. When download has been finished PC tool resets parameter P0010 to zero.

P0010 = 30
When resetting the parameters of inverter P0010 must be set to 30. Resetting of the parameters will be started by setting parameter P0970 = 1. The inverter will automatically reset all its parameters to their default settings. This can prove beneficial if you experience problems during parameter setup and wish to start again. Duration of factory setting will take about 60 s.

If P3900 is not 0 (0 is the default value), this parameter is automatically reset to 0.

P0011	Lock for user defined parameter			Min:	0	Level:
CStat: CUT	Datatype: U16	Unit: -	Def:	0	**3**
P-Group: FUNC	Active: first confirm	QuickComm. No	Max:	65535	

Details:

See parameter P0013 (user defined parameter)

P0012	Key for user defined parameter			Min:	0	Level:
CStat: CUT	Datatype: U16	Unit: -	Def:	0	**3**
P-Group: FUNC	Active: first confirm	QuickComm. No	Max:	65535	

Details:

See parameter P0013 (user defined parameter).

P0013[20]	User defined parameter			Min:	0	Level:
CStat: CUT	Datatype: U16	Unit: -	Def:	0	**3**
P-Group: FUNC	Active: first confirm	QuickComm. No	Max:	65535	

Defines a limited set of parameters to which the end user will have access.

Instructions for use:
Step 1: Set P0003 = 3 (expert user)
Step 2: Go to P0013 indices 0 to 16 (user list)
Step 3: Enter into P0013 index 0 to 16 the parameters required to be visible in the user-defined list.
The following values are fixed and cannot be changed:
- P0013 index 19 = 12 (key for user defined parameter)
- P0013 index 18 = 10 (commissioning parameter filter)
- P0013 index 17 = 3 (user access level)
Step 4: Set P0003 = 0 to activate the user defined parameter.

Index:

P0013[0] :   1st user parameter
P0013[1] :   2nd user parameter
P0013[2] :   3rd user parameter
P0013[3] :   4th user parameter
P0013[4] :   5th user parameter
P0013[5] :   6th user parameter
P0013[6] :   7th user parameter
P0013[7] :   8th user parameter
P0013[8] :   9th user parameter
P0013[9] :   10th user parameter
P0013[10] : 11th user parameter
P0013[11] : 12th user parameter
P0013[12] : 13th user parameter
P0013[13] : 14th user parameter
P0013[14] : 15th user parameter
P0013[15] : 16th user parameter
P0013[16] : 17th user parameter
P0013[17] : 18th user parameter
P0013[18] : 19th user parameter
P0013[19] : 20th user parameter

Dependency:

First, set P0011 ("lock") to a different value than P0012 ("key") to prevent changes to user-defined parameter. Then, set P0003 to 0 to activate the user-defined list.

When locked and the user-defined parameter is activated, the only way to exit the user-defined parameter (and view other parameters) is to set P0012 ("key") to the value in P0011 ("lock").

Note:

Alternatively, set P0010 = 30 (commissioning parameter filter = factory setting) and P0970 = 1 (factory reset) to perform a complete factory reset.

The default values of P0011 ("lock") and P0012 ("key") are the same.

r0018	Firmware version			Min:	-	Level:
	Datatype: Float	Unit: -	Def:	-	**1**
P-Group: INVERTER			Max:	-	

Displays version number of installed firmware.

r0019	**CO/BO: BOP control word**			**Min:** -	Level:
		Datatype: U16	**Unit:** -	**Def:** -	**3**
	P-Group: COMMANDS			**Max:** -	

Displays status of operator panel commands.

The settings below are used as the "source" codes for keypad control when connecting to BICO input parameters.

Bitfields:

```
Bit00   ON/OFF1                              0   NO
                                             1   YES
Bit01   OFF2: Electrical stop                0   YES
                                             1   NO
Bit08   JOG right                            0   NO
                                             1   YES
Bit11   Reverse (setpoint inversion)         0   NO
                                             1   YES
Bit13   Motor potentiometer MOP up           0   NO
                                             1   YES
Bit14   Motor potentiometer MOP down         0   NO
                                             1   YES
```

Note:

When BICO technology is used to allocate functions to panel buttons, this parameter displays the actual status of the relevant command.

The following functions can be "connected" to individual buttons:
- ON/OFF1,
- OFF2,
- JOG,
- REVERSE,
- INCREASE,
- DECREASE

r0020	**CO: Freq. setpoint before RFG**			**Min:** -	Level:
		Datatype: Float	**Unit:** Hz	**Def:** -	**3**
	P-Group: CONTROL			**Max:** -	

Displays actual frequency setpoint (output from ramp function generator).

r0021	**CO: Act. frequency**			**Min:** -	Level:
		Datatype: Float	**Unit:** Hz	**Def:** -	**2**
	P-Group: CONTROL			**Max:** -	

Displays actual inverter output frequency (r0024) excluding slip compensation, resonance damping and frequency limitation.

r0022	**Act. filtered rotor speed**			**Min:** -	Level:
		Datatype: Float	**Unit:** 1/min	**Def:** -	**3**
	P-Group: CONTROL			**Max:** -	

Displays calculated rotor speed based on inverter output frequency [Hz] x 120 / number of poles.

Note:

This calculation makes no allowance for load-dependent slip.

r0024	**CO: Act. output frequency**			**Min:** -	Level:
		Datatype: Float	**Unit:** Hz	**Def:** -	**3**
	P-Group: CONTROL			**Max:** -	

Displays actual output frequency (slip compensation, resonance damping and frequency limitation are included).

r0025	**CO: Act. output voltage**			**Min:** -	Level:
		Datatype: Float	**Unit:** V	**Def:** -	**2**
	P-Group: CONTROL			**Max:** -	

Displays [rms] voltage applied to motor.

r0026	**CO: Act. filtered DC-link volt.**			**Min:** -	Level:
		Datatype: Float	**Unit:** V	**Def:** -	**2**
	P-Group: INVERTER			**Max:** -	

Displays DC-link voltage.

r0027	**CO: Act. output current**			**Min:** -	Level:
		Datatype: Float	**Unit:** A	**Def:** -	**2**
	P-Group: CONTROL			**Max:** -	

Displays [rms] value of motor current [A].

r0034	CO: Motor temperature (i2t)			Min:	-	Level:
	Datatype: Float	**Unit:** %		**Def:**	-	**2**
	P-Group: MOTOR			**Max:**	-	

Displays calculated motor temperature (I2t model) as [%] of the maximum permissible value.

Note:

A value of 100 % means that the motor has reached its maximum permissible operating temperature. In this case, the motor will attempt to reduce the motor loading as defined in P0610 (motor I2t temperature reaction).

r0036	CO:Inverter overload utilization			Min:	-	Level:
	Datatype: Float	**Unit:** %		**Def:**	-	**4**
	P-Group: INVERTER			**Max:**	-	

Displays inverter overload utilization calculated via I2t model.

The actual I2t value relative to the max. possible I2t value supplies utilization in [%].

If the nominal current of the inverter is not exceed, 0 % utilization will be displayed.

If the current exceeds the threshold for P0294 (inverter I2t overload warning), alarm A0504 (inverter overtemperature) is generated and the output current of the inverter reduced via P0290 (inverter overload reaction).

If 100 % utilization is exceeded, alarm F0005 (inverter I2T) is tripped.

r0037	CO: Inverter temperature [°C]			Min:	-	Level:
	Datatype: Float	**Unit:** °C		**Def:**	-	**3**
	P-Group: INVERTER			**Max:**	-	

Displays internal inverter heatsink temperature.

r0039	CO: Energy consumpt. meter [kWh]			Min:	-	Level:
	Datatype: Float	**Unit:** kWh		**Def:**	-	**2**
	P-Group: INVERTER			**Max:**	-	

Displays electrical energy used by inverter since display was last reset (see P0040 - reset energy consumption meter).

Dependency:

Value is reset when
P0040 = 1 reset energy consumption meter.

P0040	Reset energy consumption meter			Min:	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**2**
	P-Group: INVERTER	**Active:** first confirm	**QuickComm.** No	**Max:**	1	

Resets value of parameter r0039 (energy consumption meter) to zero.

Possible Settings:

0	No reset
1	Reset r0039 to 0

Dependency:

No reset until "P" is pressed.

r0052	**CO/BO: Act. status word 1**			**Min:**	-	Level:
	Datatype: U16	**Unit:** -		**Def:**	-	**2**
	P-Group: COMMANDS			**Max:**	-	

Displays first active status word of inverter (bit format) and can be used to diagnose inverter status. The display segments for the status word are shown in the "Introduction to MICROMASTER System Parameters".

Bitfields:

Bit00	Drive ready	0	NO
		1	YES
Bit01	Drive ready to run	0	NO
		1	YES
Bit02	Drive running	0	NO
		1	YES
Bit03	Drive fault active	0	NO
		1	YES
Bit04	OFF2 active	0	YES
		1	NO
Bit05	OFF3 active	0	YES
		1	NO
Bit06	ON inhibit active	0	NO
		1	YES
Bit07	Drive warning active	0	NO
		1	YES
Bit08	Deviation setpoint / act. value	0	YES
		1	NO
Bit09	PZD control	0	NO
		1	YES
Bit10	Maximum frequency reached	0	NO
		1	YES
Bit11	Warning: Motor current limit	0	YES
		1	NO
Bit12	Motor holding brake active	0	NO
		1	YES
Bit13	Motor overload	0	YES
		1	NO
Bit14	Motor runs right	0	NO
		1	YES
Bit15	Inverter overload	0	YES
		1	NO

Note:

Output of Bit3 (Fault) will be inverted on digital output (Low = Fault, High = No Fault).

r0053	CO/BO: Act. status word 2		Min:	-	Level:
	Datatype: U16	**Unit:** -	**Def:**	-	**2**
	P-Group: COMMANDS		**Max:**	-	

Displays second status word of inverter (in bit format).

Bitfields:

Bit00	DC brake active	0	NO
		1	YES
Bit01	f_act > P2167 (f_off)	0	NO
		1	YES
Bit02	f_act > P1080 (f_min)	0	NO
		1	YES
Bit03	Act. current r0027 >= P2170	0	NO
		1	YES
Bit04	f_act > P2155 (f_1)	0	NO
		1	YES
Bit05	f_act <= P2155 (f_1)	0	NO
		1	YES
Bit06	f_act>= setpoint	0	NO
		1	YES
Bit07	Act. Vdc r0026 < P2172	0	NO
		1	YES
Bit08	Act. Vdc r0026 > P2172	0	NO
		1	YES
Bit09	Ramping finished	0	NO
		1	YES
Bit10	PID output r2294 == P2292 (PID_min)	0	NO
		1	YES
Bit11	PID output r2294 == P2291 (PID_max)	0	NO
		1	YES
Bit14	Download data set 0 from AOP	0	NO
		1	YES
Bit15	Download data set 1 from AOP	0	NO
		1	YES

Details:

See description of seven-segment display given in the "Introduction to MICROMASTER System Parameters" in this manual.

r0054	CO/BO: Act. control word 1		Min:	-	Level:
	Datatype: U16	**Unit:** -	**Def:**	-	**3**
	P-Group: COMMANDS		**Max:**	-	

Displays first control word of inverter and can be used to diagnose which commands are active.

Bitfields:

Bit00	ON/OFF1	0	NO
		1	YES
Bit01	OFF2: Electrical stop	0	YES
		1	NO
Bit02	OFF3: Fast stop	0	YES
		1	NO
Bit03	Pulse enable	0	NO
		1	YES
Bit04	RFG enable	0	NO
		1	YES
Bit05	RFG start	0	NO
		1	YES
Bit06	Setpoint enable	0	NO
		1	YES
Bit07	Fault acknowledge	0	NO
		1	YES
Bit08	JOG right	0	NO
		1	YES
Bit09	JOG left	0	NO
		1	YES
Bit10	Control from PLC	0	NO
		1	YES
Bit11	Reverse (setpoint inversion)	0	NO
		1	YES
Bit13	Motor potentiometer MOP up	0	NO
		1	YES
Bit14	Motor potentiometer MOP down	0	NO
		1	YES
Bit15	Local / Remote	0	NO
		1	YES

Details:

See description of seven-segment display given in the "Introduction to MICROMASTER System Parameters" in this manual.

r0055	**CO/BO: Act. control word 2**		**Min:** -	Level:
	Datatype: U16	**Unit:** -	**Def:** -	**3**
	P-Group: COMMANDS		**Max:** -	

Displays additional control word of inverter and can be used to diagnose which commands are active.

Bitfields:

Bit00	Fixed frequency Bit 0		0	NO
			1	YES
Bit01	Fixed frequency Bit 1		0	NO
			1	YES
Bit02	Fixed frequency Bit 2		0	NO
			1	YES
Bit08	PID enabled		0	NO
			1	YES
Bit09	DC brake enabled		0	NO
			1	YES
Bit13	External fault 1		0	YES
			1	NO

Details:

See description of seven-segment display given in the "Introduction to MICROMASTER System Parameters" in this handbook.

r0056	**CO/BO: Status of motor control**		**Min:** -	Level:
	Datatype: U16	**Unit:** -	**Def:** -	**3**
	P-Group: CONTROL		**Max:** -	

Displays status of motor control (MM420: V/f status), which can be used to diagnose inverter status.

Bitfields:

Bit00	Init. control finished		0	NO
			1	YES
Bit01	Motor demagnetizing finished		0	NO
			1	YES
Bit02	Pulses enabled		0	NO
			1	YES
Bit03	Voltage soft start select		0	NO
			1	YES
Bit04	Motor excitation finished		0	NO
			1	YES
Bit05	Starting boost active		0	NO
			1	YES
Bit06	Acceleration boost active		0	NO
			1	YES
Bit07	Frequency is negative		0	NO
			1	YES
Bit08	Field weakening active		0	NO
			1	YES
Bit09	Volts setpoint limited		0	NO
			1	YES
Bit10	Slip frequency limited		0	NO
			1	YES
Bit11	F_out > F_max Freq. limited		0	NO
			1	YES
Bit12	Phase reversal selected		0	NO
			1	YES
Bit13	I-max controller active		0	NO
			1	YES
Bit14	Vdc-max controller active		0	NO
			1	YES
Bit15	KIB (Vdc-min control) active		0	NO
			1	YES

Details:

See description of seven-segment display given in the introduction.

r0067	**CO: Act. output current limit**		**Min:** -	Level:
	Datatype: Float	**Unit:** A	**Def:** -	**3**
	P-Group: CONTROL		**Max:** -	

Displays valid maximum output current of inverter.

This value is influenced by P0640 (max. output current), the derating characteristics and the thermal motor and inverter protection.

Dependency:

P0610 (motor I2t temperature reaction) defines reaction when limit is reached.

Note:

Normally, current limit = rated motor current (P0305) x motor current limit (P0640). It is less than or equal to maximum inverter current.

The current limit may be reduced if the motor thermal model calculation indicates that overheating will occur.

r0071	CO: Max. output voltage			Min:	-	Level:
		Datatype: Float	**Unit:** V	**Def:**	-	**3**
	P-Group: CONTROL			**Max:**	-	

Displays maximum output voltage.
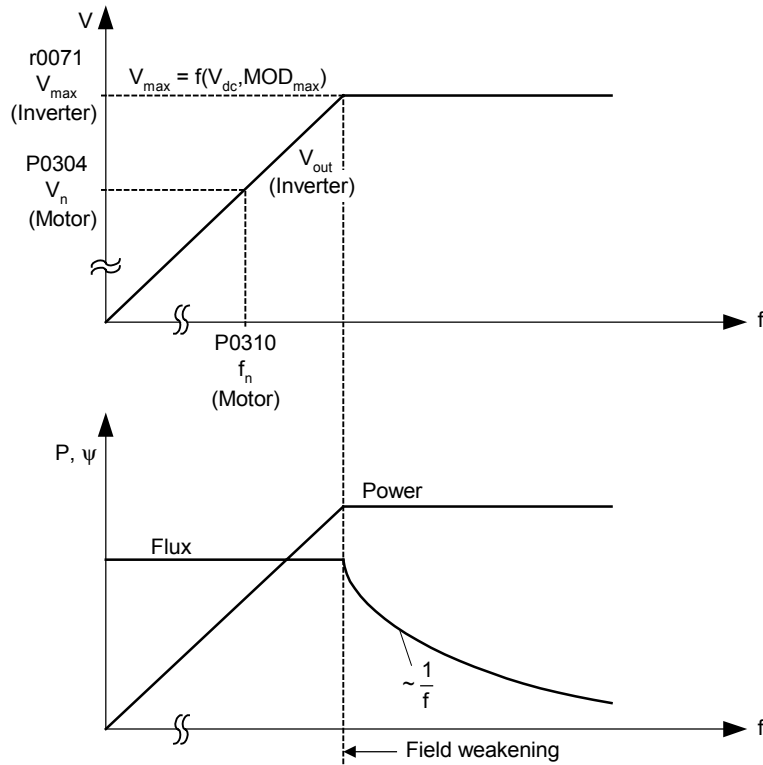
Dependency:
Actual maximum output voltage depends on the actual input supply voltage.

r0078	CO: Act. current Isq			Min:	-	Level:
		Datatype: Float	**Unit:** A	**Def:**	-	**4**
	P-Group: CONTROL			**Max:**	-	

Displays component of torque generating current.

r0084	CO: Act. air gap flux			Min:	-	Level:
		Datatype: Float	**Unit:** %	**Def:**	-	**4**
	P-Group: CONTROL			**Max:**	-	

Displays air gap flux in [%] relative to the rated motor flux.

r0086	CO: Act. active current			Min:	-	Level:
		Datatype: Float	**Unit:** A	**Def:**	-	**3**
	P-Group: CONTROL			**Max:**	-	

Displays active (real part) of motor current.
Dependency:
Applies when V/f control is selected in P1300 (control mode); otherwise, the display shows the value zero.

P0100	**Europe / North America**			Min:	0	Level:
	CStat: C	**Datatype:** U16	**Unit:** -	Def:	0	**1**
	P-Group: QUICK	**Active:** first confirm	**QuickComm.** Yes	Max:	2	

Determines whether power settings (e.g. nominal rating plate power - P0307) are expressed in [kW] or [hp].

The default settings for the nominal rating plate frequency (P0310) and maximum motor frequency (P1082) are also set automatically here, in addition to reference frequency (P2000).

Possible Settings:

    0   Europe [kW],   frequency default 50 Hz
    1   North America [hp], frequency default 60 Hz
    2   North America [kW], frequency default 60 Hz

Dependency:

The setting of DIP switch 2 determines the validity of settings 0 and 1 for P0100 according to the diagram below:
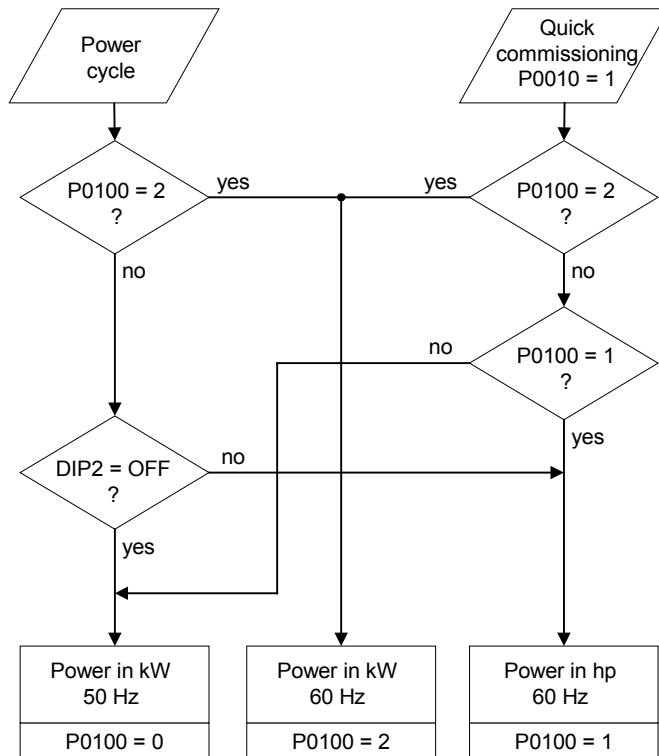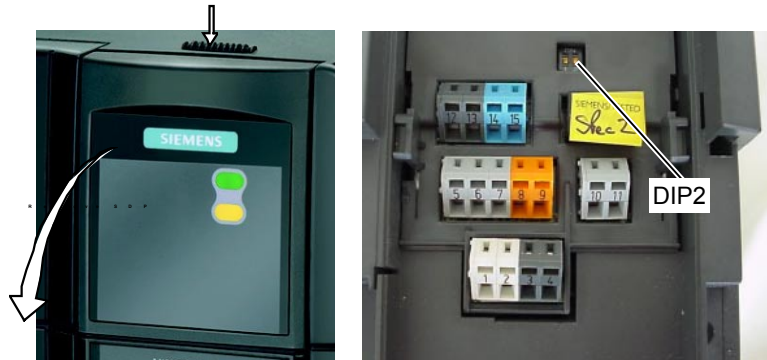
Stop drive first (i.e. disable all pulses) before you change this parameter.

P0010 = 1 (commissioning mode) enables changes to be made.

Changing P0100 resets all rated motor parameters as well as other parameters that depend on the rated motor parameters (see P0340 - calculation of motor parameters).

Notice:

P0100 setting 2 (==> [kW], frequency default 60 [Hz]) is not overwritten by the setting of DIP switch 2 (see diagram above).

r0200	**Act. power stack code number**			**Min:** -	Level:
	Datatype: U32	**Unit:** -	**Def:** -	**3**
P-Group: INVERTER			**Max:** -	

Identifies hardware variant as shown in table below.

Code-No.	MM420 MLFB	Input Voltage & Frequency	CT Power kW	Internal Filter	Frame Size
1	6SE6420-2UC11-2AAx	1/3AC200-240V +10% -10% 47-63Hz	0,12	no	A
2	6SE6420-2UC12-5AAx	1/3AC200-240V +10% -10% 47-63Hz	0,25	no	A
3	6SE6420-2UC13-7AAx	1/3AC200-240V +10% -10% 47-63Hz	0,37	no	A
4	6SE6420-2UC15-5AAx	1/3AC200-240V +10% -10% 47-63Hz	0,55	no	A
5	6SE6420-2UC17-5AAx	1/3AC200-240V +10% -10% 47-63Hz	0,75	no	A
6	6SE6420-2UC21-1BAx	1/3AC200-240V +10% -10% 47-63Hz	1,1	no	B
7	6SE6420-2UC21-5BAx	1/3AC200-240V +10% -10% 47-63Hz	1,5	no	B
8	6SE6420-2UC22-2BAx	1/3AC200-240V +10% -10% 47-63Hz	2,2	no	B
9	6SE6420-2UC23-0CAx	1/3AC200-240V +10% -10% 47-63Hz	3	no	C
10	6SE6420-2UC24-0CAx	3AC200-240V +10% -10% 47-63Hz	4	no	C
11	6SE6420-2UC25-5CAx	3AC200-240V +10% -10% 47-63Hz	5,5	no	C
12	6SE6420-2AB11-2AAx	1AC200-240V +10% -10% 47-63Hz	0,12	Cl. A	A
13	6SE6420-2AB12-5AAx	1AC200-240V +10% -10% 47-63Hz	0,25	Cl. A	A
14	6SE6420-2AB13-7AAx	1AC200-240V +10% -10% 47-63Hz	0,37	Cl. A	A
15	6SE6420-2AB15-5AAx	1AC200-240V +10% -10% 47-63Hz	0,55	Cl. A	A
16	6SE6420-2AB17-5AAx	1AC200-240V +10% -10% 47-63Hz	0,75	Cl. A	A
17	6SE6420-2AB21-1BAx	1AC200-240V +10% -10% 47-63Hz	1,1	Cl. A	B
18	6SE6420-2AB21-5BAx	1AC200-240V +10% -10% 47-63Hz	1,5	Cl. A	B
19	6SE6420-2AB22-2BAx	1AC200-240V +10% -10% 47-63Hz	2,2	Cl. A	B
20	6SE6420-2AB23-0CAx	1AC200-240V +10% -10% 47-63Hz	3	Cl. A	C
21	6SE6420-2AB23-1CAx	3AC200-240V +10% -10% 47-63Hz	3	Cl. A	C
22	6SE6420-2AB24-0CAx	3AC200-240V +10% -10% 47-63Hz	4	Cl. A	C
23	6SE6420-2AB25-0CAx	3AC200-240V +10% -10% 47-63Hz	5,5	Cl. A	C
24	6SE6420-2UD13-7AAx	3AC380-480V +10% -10% 47-63Hz	0,37	no	A
25	6SE6420-2UD15-5AAx	3AC380-480V +10% -10% 47-63Hz	0,55	no	A
26	6SE6420-2UD17-5AAx	3AC380-480V +10% -10% 47-63Hz	0,75	no	A
27	6SE6420-2UD21-1AAx	3AC380-480V +10% -10% 47-63Hz	1,1	no	A
28	6SE6420-2UD21-5AAx	3AC380-480V +10% -10% 47-63Hz	1,5	no	A
29	6SE6420-2UD22-2BAx	3AC380-480V +10% -10% 47-63Hz	2,2	no	B
30	6SE6420-2UD23-0BAx	3AC380-480V +10% -10% 47-63Hz	3	no	B
31	6SE6420-2UD24-0BAx	3AC380-480V +10% -10% 47-63Hz	4	no	B
32	6SE6420-2UD25-5CAx	3AC380-480V +10% -10% 47-63Hz	5,5	no	C
33	6SE6420-2UD27-5CAx	3AC380-480V +10% -10% 47-63Hz	7,5	no	C
34	6SE6420-2UD31-1CAx	3AC380-480V +10% -10% 47-63Hz	11	no	C
35	6SE6420-2AD22-2BAx	3AC380-480V +10% -10% 47-63Hz	2,2	Cl. A	B
36	6SE6420-2AD23-0BAx	3AC380-480V +10% -10% 47-63Hz	3	Cl. A	B
37	6SE6420-2AD24-0BAx	3AC380-480V +10% -10% 47-63Hz	4	Cl. A	B
38	6SE6420-2AD25-5CAx	3AC380-480V +10% -10% 47-63Hz	5,5	Cl. A	C
39	6SE6420-2AD27-5CAx	3AC380-480V +10% -10% 47-63Hz	7,5	Cl. A	C
40	6SE6420-2AD31-1CAx	3AC380-480V +10% -10% 47-63Hz	11	Cl. A	C

Notice:

Parameter r0200 = 0 indicates that no power stack has been identified.

P0201	**Power stack code number**			**Min:** 0	Level:
CStat: C	**Datatype:** U16	**Unit:** -	**Def:** 0	**3**
P-Group: INVERTER	**Active:** first confirm	**QuickComm.** No	**Max:** 65535	

Confirms actual power stack identified.

r0203	Act. inverter type			Min:	-	Level:
		Datatype: U16	Unit: -	Def:	-	3
	P-Group: INVERTER			Max:	-	

Type number of actual inverter identified.

Possible Settings:

1	MICROMASTER 420
2	MICROMASTER 440
3	MICRO- / COMBIMASTER 411
4	MICROMASTER 410
5	Reserved
6	MICROMASTER 440 PX
7	MICROMASTER 430

r0204	Power stack features			Min:	-	Level:
		Datatype: U32	Unit: -	Def:	-	3
	P-Group: INVERTER			Max:	-	

Displays hardware features of power stack.

Bitfields:

```
Bit00   DC input voltage                    0    NO
                                            1    YES
Bit01   RFI filter                          0    NO
                                            1    YES
```

Note:

Parameter r0204 = 0 indicates that no power stack has been identified.

r0206	Rated inverter power [kW] / [hp]			Min:	-	Level:
		Datatype: Float	Unit: -	Def:	-	2
	P-Group: INVERTER			Max:	-	

Displays nominal rated motor power from inverter.

Dependency:

Value is displayed in [kW] or [hp] depending on setting for P0100 (operation for Europe / North America).

r0207	Rated inverter current			Min:	-	Level:
		Datatype: Float	Unit: A	Def:	-	2
	P-Group: INVERTER			Max:	-	

Displays maximum continuous output current of inverter.

r0208	Rated inverter voltage			Min:	-	Level:
		Datatype: U32	Unit: V	Def:	-	2
	P-Group: INVERTER			Max:	-	

Displays nominal AC supply voltage of inverter.

Value:

r0208 = 230 : 200 - 240 V +/- 10 %
r0208 = 400 : 380 - 480 V +/- 10 %
r0208 = 575 : 500 - 600 V +/- 10 %

P0210	Supply voltage			Min:	0	Level:
	CStat: CT	Datatype: U16	Unit: V	Def:	230	3
	P-Group: INVERTER	Active: Immediately	QuickComm. No	Max:	1000	

Optimizes Vdc controller, which extends the ramp-down time if regenerative energy from motor would otherwise cause DC link overvoltage trips.

Reducing the value enables controller to cut in earlier and reduce the risk of overvoltage.

Dependency:

Set P1254 ("Auto detect Vdc switch-on levels") = 0. Cut-in levels for Vdc-controller and compound braking are then derived directly from P0210 (supply voltage).

Vdc_max switch-on level	$= 1.15 \cdot \sqrt{2} \cdot \text{P0210}$
Compound braking switch-on level	$= 1.13 \cdot \sqrt{2} \cdot \text{P0210}$

Note:

If mains voltage is higher than value entered, automatic deactivation of the Vdc controller may occur to avoid acceleration of the motor. An alarm will be issued in this case (A0910).

Default value is dependant on inverter rated power.

r0231[2]	Max. cable length			Min:	-	Level:
		Datatype: U16	Unit: m	Def:	-	**3**
	P-Group: INVERTER			Max:	-	

Index:

Indexed parameter to display maximum allowable cable length between inverter and motor.

r0231[0] : Max. allowed unscreened cable length
r0231[1] : Max. allowed screened cable length

Notice:

For full EMC compliance, the screened cable must not exceed 25 m in length when an EMC filter is fitted.

P0290	Inverter overload reaction			Min:	0	Level:
	CStat: CT	Datatype: U16	Unit: -	Def:	2	**3**
	P-Group: INVERTER	Active: first confirm	QuickComm. No	Max:	3	

Selects reaction of inverter to an internal over-temperature.

Following physical values influence the inverter overload protection (see diagram):

- heat sink temperature
- inverter I²t

Inverter overload reaction
P0290
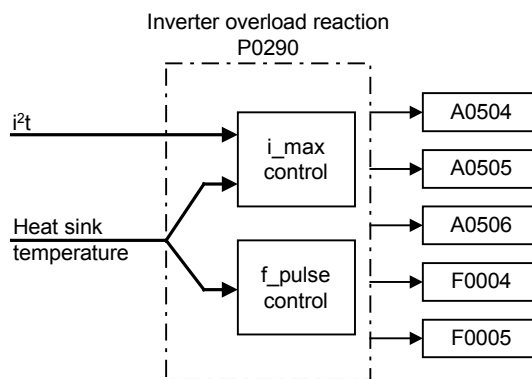
Possible Settings:

0	Reduce output frequency
1	Trip (F0004)
2	Reduce pulse frequency and output frequency
3	Reduce pulse frequency then trip (F0004)

Notice:

P0290 = 0:
Reduction of output frequency is usually only effective if the load is also reduced. This is for example valid for variable torque applications with a quadratic torque characteristic as pumps or fans.

A trip will always result eventually, if the action taken does not sufficiently reduce internal temperature.

The pulse frequency is normally reduced only if higher than 2 kHz (see P0291 - configuration of inverter protection).

P0291	Inverter protection			Min:	0	Level:
	CStat: CT	Datatype: U16	Unit: -	Def:	1	**3**
	P-Group: INVERTER	Active: Immediately	QuickComm. No	Max:	1	

Control bit 0 for enabling/disabling automatic pulse frequency reduction at output frequencies below 2 Hz.

Bitfields:

```
Bit00   Pulse frequency reduced below 2Hz        0     NO
                                                 1     YES
```

Details:

See P0290 (inverter overload reaction)

P0292	Inverter overload warning			Min:	0	Level:
	CStat: CUT	Datatype: U16	Unit: °C	Def:	15	**3**
	P-Group: INVERTER	Active: first confirm	QuickComm. No	Max:	25	

Defines temperature difference (in [°C]) between inverter over-temperature trip and warning thresholds.

P0294	**Inverter I2t overload warning**			**Min:**	10.0	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Def:**	95.0	**4**
P-Group:	INVERTER	**Active:** first confirm	**QuickComm.** No	**Max:**	100.0	

Defines the [%] value at which alarm A0504 (inverter overtemperature) is generated.

Inverter I2t calculation is used to estimate a maximum tolerable period for inverter overload. The I2t calculation value is deemed = 100 % when this maximum tolerable period is reached.

Dependency:

Motor overload factor (P0640) reduced to 100 % at this point.

Note:

P0294 = 100 % corresponds to stationary nominal load.

P0300	**Select motor type**			**Min:**	1	Level:
CStat:	C	**Datatype:** U16	**Unit:** -	**Def:**	1	**2**
P-Group:	MOTOR	**Active:** first confirm	**QuickComm.** Yes	**Max:**	2	

Selects motor type.

This parameter is required during commissioning to select motor type and optimize inverter performance. Most motors are asynchronous; if in doubt, use the formula below.
(rated motor frequency (P0310) * 60) / rated motor speed (P0311)

If the result is a whole number, the motor is synchronous.

Possible Settings:

1   Asynchronous motor
2   Synchronous motor

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

If synchronous motor is selected, the following functions are not available:
P0308 Power factor
P0309 Motor efficiency
P0346 Magnetization time
P0347 Demagnetization time
P1335 Slip compensation
P1336 Slip limit
P0320 Motor magnetizing current
P0330 Rated motor slip
P0331 Rated magnetization current
P0332 Rated power factor
P0384 Rotor time constant
P1200, P1202, P1203 Flying start
P1230, P1232, P1233 DC braking

P0304	**Rated motor voltage**			**Min:**	10	Level:
	CStat: C	**Datatype:** U16	**Unit:** V	**Def:**	230	**1**
	P-Group: MOTOR	**Active:** first confirm	**QuickComm.** Yes	**Max:**	2000	

Nominal motor voltage [V] from rating plate. Following diagram shows a typical rating plate with the locations of the relevant motor data.
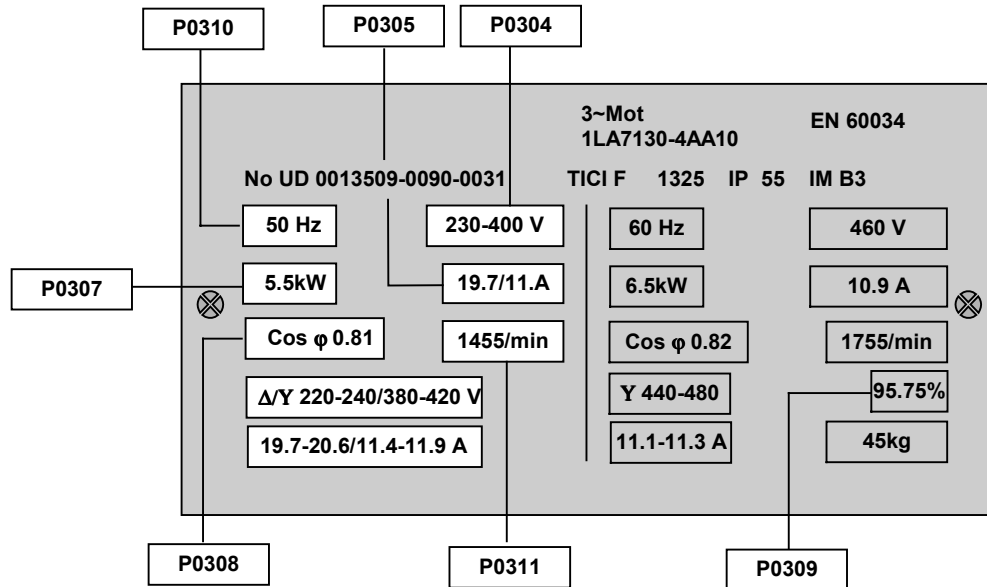
```
        P0310           P0305      P0304

                                        3~Mot              EN 60034
                                        1LA7130-4AA10

                     No UD 0013509-0090-0031    TICl F    1325   IP 55   IM B3

                    50 Hz         230-400 V      60 Hz           460 V

    P0307           5.5kW         19.7/11.A      6.5kW           10.9 A

                    Cos φ 0.81    1455/min       Cos φ 0.82      1755/min

                    Δ/Y 220-240/380-420 V        Y 440-480       95.75%

                    19.7-20.6/11.4-11.9 A        11.1-11.3 A     45kg


        P0308                    P0311                   P0309
```

Dependency:
Changeable only when P0010 = 1 (quick commissioning).

Note:
Default value is dependant on inverter rated power.

P0305	**Rated motor current**			**Min:**	0.01	Level:
	CStat: C	**Datatype:** Float	**Unit:** A	**Def:**	3.25	**1**
	P-Group: MOTOR	**Active:** first confirm	**QuickComm.** Yes	**Max:**	10000.00	

Nominal motor current [A] from rating plate - see diagram in P0304.

Dependency:
Changeable only when P0010 = 1 (quick commissioning).

Depends also on P0320 (motor magnetization current).

Note:
For asynchronous motors, the maximum value is defined as the maximum inverter current.

For synchronous motors, the maximum value is defined as twice the maximum inverter current.

The minimum value is defined as 1/32 times inverter rated current (r0207).

When the relation of the nominal motor current p0305 and half of the maximal inverter current exceeds 1,5 an additional current derating is applied. This is necessary to protect the inverter from harmonic current waves.

Default value is dependant on inverter rated power.

P0307	**Rated motor power**			**Min:**	0.01	Level:
	CStat: C	**Datatype:** Float	**Unit:** -	**Def:**	0.75	**1**
	P-Group: MOTOR	**Active:** first confirm	**QuickComm.** Yes	**Max:**	2000.00	

Nominal motor power [kW/hp] from rating plate.

Dependency:
If P0100 = 1, values will be in [hp] - see diagram P0304 (rating plate).

Changeable only when P0010 = 1 (quick commissioning).

Note:
Default value is dependant on inverter rated power.

P0308	**Rated motor cosPhi**			**Min:**	0.000	Level:
CStat: C		**Datatype:** Float	**Unit:** -	**Def:**	0.000	**2**
P-Group: MOTOR		**Active:** first confirm	**QuickComm.** Yes	**Max:**	1.000	

Nominal motor power factor (cosPhi) from rating plate - see diagram P0304.

Dependency:
Changeable only when P0010 = 1 (quick commissioning).

Visible only when P0100 = 0 or 2, (motor power entered in [kW]).

Setting 0 causes internal calculation of value (see r0332).

P0309	**Rated motor efficiency**			**Min:**	0.0	Level:
CStat: C		**Datatype:** Float	**Unit:** %	**Def:**	0.0	**2**
P-Group: MOTOR		**Active:** first confirm	**QuickComm.** Yes	**Max:**	99.9	

Nominal motor efficiency in [%] from rating plate.

Dependency:
Changeable only when P0010 = 1 (quick commissioning).

Visible only when P0100 = 1, (i.e. motor power entered in [hp]).

Setting 0 causes internal calculation of value (see r0332).

Note:
P0309 = 100 % corresponds to superconducting.

Details:
See diagram in P0304 (rating plate).

P0310	**Rated motor frequency**			**Min:**	12.00	Level:
CStat: C		**Datatype:** Float	**Unit:** Hz	**Def:**	50.00	**1**
P-Group: MOTOR		**Active:** first confirm	**QuickComm.** Yes	**Max:**	650.00	

Nominal motor frequency [Hz] from rating plate.

Dependency:
Changeable only when P0010 = 1 (quick commissioning).

Pole pair number recalculated automatically if parameter is changed.

Details:
See diagram in P0304 (rating plate)

P0311	**Rated motor speed**			**Min:**	0	Level:
CStat: C		**Datatype:** U16	**Unit:** 1/min	**Def:**	0	**1**
P-Group: MOTOR		**Active:** first confirm	**QuickComm.** Yes	**Max:**	40000	

Nominal motor speed [rpm] from rating plate.

Dependency:
Changeable only when P0010 = 1 (quick commissioning).

Setting 0 causes internal calculation of value.

Required for vector control and V/f control with speed controller.

Slip compensation in V/f control requires rated motor speed for correct operation.

Pole pair number recalculated automatically if parameter is changed.

Note:
Default value is dependant on inverter rated power.

Details:
See diagram in P0304 (rating plate)

r0313	**Motor pole pairs**			**Min:**	-	Level:
		Datatype: U16	**Unit:** -	**Def:**	-	**3**
P-Group: MOTOR				**Max:**	-	

Displays number of motor pole pairs that the inverter is currently using for internal calculations.

Value:
r0313 = 1 : 2-pole motor
r0313 = 2 : 4-pole motor
etc.

Dependency:
Recalculated automatically when P0310 (rated motor frequency) or P0311 (rated motor speed) is changed.

P0320	Motor magnetizing current			Min:	0.0	Level:
CStat:	CT	Datatype: Float	Unit: %	Def:	0.0	**3**
P-Group:	MOTOR	Active: Immediately	QuickComm. Yes	Max:	99.0	

Defines motor magnetization current in [%] relative to P0305 (rated motor current).

Dependency:

P0320 = 0:

Setting 0 causes calculation by P0340 = 1 (data entered from rating plate) or by P3900 = 1 - 3 (end of quick commissioning). The calculated value is displayed in parameter r0331.

r0330	Rated motor slip			Min:	-	Level:
		Datatype: Float	Unit: %	Def:	-	**3**
P-Group:	MOTOR			Max:	-	

Displays nominal motor slip in [%] relative to P0310 (rated motor frequency) and P0311 (rated motor speed).

$$r0330\,[\%] = \frac{P0310 - \dfrac{P0311}{60} \cdot r0313}{P0310} \cdot 100\,\%$$

r0331	Rated magnetization current			Min:	-	Level:
		Datatype: Float	Unit: A	Def:	-	**3**
P-Group:	MOTOR			Max:	-	

Displays calculated magnetizing current of motor in [A].

r0332	Rated power factor			Min:	-	Level:
		Datatype: Float	Unit: -	Def:	-	**3**
P-Group:	MOTOR			Max:	-	

Displays power factor for motor

Dependency:

Value is calculated internally if P0308 (rated motor cosPhi) set to 0; otherwise, value entered in P0308 is displayed.

P0335	Motor cooling			Min:	0	Level:
CStat:	CT	Datatype: U16	Unit: -	Def:	0	**2**
P-Group:	MOTOR	Active: first confirm	QuickComm. Yes	Max:	1	

Selects motor cooling system used.

Possible Settings:

0   Self-cooled: Using shaft mounted fan attached to motor
1   Force-cooled: Using separately powered cooling fan

Notice:

Motors of series 1LA1 and 1LA8 have an internal fan. This internal motor fan must not be confused with the fan at the end of the motor shaft.

P0340	Calculation of motor parameters			Min:	0	Level:
CStat:	CT	Datatype: U16	Unit: -	Def:	0	**2**
P-Group:	MOTOR	Active: first confirm	QuickComm. No	Max:	1	

Calculates various motor parameters, including:

P0344   Motor weight
P0346   Magnetization time
P0347   Demagnetization time
P0350   Stator resistance
P0611   Motor I2t time constant
P1253   Vdc-controller output limitation
P1316   Boost end frequency
P2000   Reference frequency
P2002   Reference current

Possible Settings:

0   No calculation
1   Complete parameterization

Note:

This parameter is required during commissioning to optimize inverter performance.

P0344	Motor weight			Min:	1.0	Level:
CStat:	CUT	Datatype: Float	Unit: kg	Def:	9.4	**3**
P-Group:	MOTOR	Active: Immediately	QuickComm. No	Max:	6500.0	

Specifies motor weight [kg].

Note:

This value is used in the motor thermal model.

It is normally calculated automatically from P0340 (motor parameters) but can also be entered manually.

Default value is dependant on inverter rated power.

P0346	**Magnetization time**			**Min:**	0.000	Level:
CStat: CUT	**Datatype:** Float	**Unit:** s	**Def:**	1.000	**3**
P-Group: MOTOR	**Active:** Immediately	**QuickComm.** No	**Max:**	20.000	

Sets magnetization time [s], i.e. waiting time between pulse enable and start of ramp-up. Motor magnetization builds up during this time.

Magnetization time is normally calculated automatically from the motor data and corresponds to the rotor time constant (r0384).

Note:

If boost settings are higher than 100 %, magnetization may be reduced.

Default value is dependant on inverter rated power.

Notice:

An excessive reduction of this time can result in insufficient motor magnetization.

P0347	**Demagnetization time**			**Min:**	0.000	Level:
CStat: CUT	**Datatype:** Float	**Unit:** s	**Def:**	1.000	**3**
P-Group: MOTOR	**Active:** Immediately	**QuickComm.** No	**Max:**	20.000	

Changes time allowed after OFF2 / fault condition, before pulses can be re-enabled.

Note:

The demagnetization time is approximately 2.5 x rotor time constant (r0384) in seconds.

Default value is dependant on inverter rated power.

Notice:

Not active following a normally completed ramp-down, e.g. after OFF1, OFF3 or JOG.

Overcurrent trips will occur if the time is decreased excessively.

P0350	**Stator resistance (line-to-line)**			**Min:**	0.00001	Level:
CStat: CUT	**Datatype:** Float	**Unit:** Ohm	**Def:**	4.0	**2**
P-Group: MOTOR	**Active:** Immediately	**QuickComm.** No	**Max:**	400.0	

Stator resistance value in [Ohms] for connected motor (from line-to-line). The parameter value includes the cable resistance.

There are three ways to determine the value for this parameter:
1. Calculate using
P0340 = 1 (data entered from rating plate) or
P0010 = 1, P3900 = 1,2 or 3 (end of quick commissioning).
2. Measure using P1910 = 1 (motor data identification - value for stator resistance is overwritten).
3. Measure manually using an Ohmmeter.

Note:

Since measured line-to-line, this value may appear to be higher (up to 2 times higher) than expected.

The value entered in P0350 (stator resistance) is the one obtained by the method last used.

Default value is dependant on inverter rated power.

r0370	**Stator resistance [%]**			**Min:**	-	Level:
	Datatype: Float	**Unit:** %	**Def:**	-	**4**
P-Group: MOTOR			**Max:**	-	

Displays standardized stator resistance of motor equivalent circuit (phase value) in [%].

Note:

$$100 \text{ \% means}: Z_{ratedmot} \cdot \frac{P0304}{P0305}$$

r0372	**Cable resistance [%]**			**Min:**	-	Level:
	Datatype: Float	**Unit:** %	**Def:**	-	**4**
P-Group: MOTOR			**Max:**	-	

Displays standardized cable resistance of motor equivalent circuit (phase value)in [%]. It is estimated to be 20 % of the stator resistance.

Note:

$$100 \text{ \% means}: Z_{ratedmot} \cdot \frac{P0304}{P0305}$$

r0373	**Rated stator resistance [%]**			**Min:**	-	Level:
	Datatype: Float	**Unit:** %	**Def:**	-	**4**
P-Group: MOTOR			**Max:**	-	

Displays rated stator resistance of the motor equivalent circuit (phase value) in [%].

Note:

$$100 \text{ \% means}: Z_{ratedmot} \cdot \frac{P0304}{P0305}$$

r0374	Rotor resistance [%]			Min:	-	Level:
	Datatype: Float	**Unit:** %		Def:	-	**4**
	P-Group: MOTOR			Max:	-	

Displays standardized rotor resistance of the motor equivalent circuit (phase value) in [%].

Note:

$$100 \text{ \% means} : Z_{ratedmot} \cdot \frac{P0304}{P0305}$$

r0376	Rated rotor resistance [%]			Min:	-	Level:
	Datatype: Float	**Unit:** %		Def:	-	**4**
	P-Group: MOTOR			Max:	-	

Displays rated rotor resistance of the motor equivalent circuit (phase value) in [%].

Note:

$$100 \text{ \% means} : Z_{ratedmot} \cdot \frac{P0304}{P0305}$$

r0377	Total leakage reactance [%]			Min:	-	Level:
	Datatype: Float	**Unit:** %		Def:	-	**4**
	P-Group: MOTOR			Max:	-	

Displays standardized total leakage reactance of the motor equivalent circuit (phase value) in [%].

Note:

$$100 \text{ \% means} : Z_{ratedmot} \cdot \frac{P0304}{P0305}$$

r0382	Main reactance [%]			Min:	-	Level:
	Datatype: Float	**Unit:** %		Def:	-	**4**
	P-Group: MOTOR			Max:	-	

Displays standardized main reactance of the motor equivalent circuit (phase value) in [%].

Note:

$$100 \text{ \% means} : Z_{ratedmot} \cdot \frac{P0304}{P0305}$$

r0384	Rotor time constant			Min:	-	Level:
	Datatype: Float	**Unit:** ms		Def:	-	**3**
	P-Group: MOTOR			Max:	-	

Displays calculated rotor time constant [ms].

r0386	Total leakage time constant			Min:	-	Level:
	Datatype: Float	**Unit:** ms		Def:	-	**4**
	P-Group: MOTOR			Max:	-	

Displays total leakage time constant of motor.

r0395	CO: Total stator resistance [%]			Min:	-	Level:
	Datatype: Float	**Unit:** %		Def:	-	**3**
	P-Group: MOTOR			Max:	-	

Displays stator resistance of motor as [%] of combined stator/cable resistance.

Note:

$$100 \text{ \% means} : Z_{ratedmot} \cdot \frac{P0304}{P0305}$$

P0610	Motor I2t temperature reaction			Min:	0	Level:
CStat:	CT	Datatype: U16	Unit: -	Def:	2	**3**
P-Group:	MOTOR	Active: first confirm	QuickComm. No	Max:	2	

Defines reaction when motor I2t reaches warning threshold.

Possible Settings:

0	No reaction, warning only
1	Warning and Imax reduction (results in reduced output frequency)
2	Warning and trip (F0011)

Dependency:

Trip level = P0614 (motor I2t overload warning level) * 110 %

Note:

The purpose of motor I²t is to calculate or measure the motor temperature and disable the inverter if the motor is in danger of overheating.

The motor temperature will be dependent on many factors, including the size of the motor, the ambient temperature, the previous history of the loading of the motor, and of course, the load current. (The square of the current actually determines the heating of the motor and the temperature rises with time - hence I²t).

Because most motors are cooled by built in fans running at motor speed, the speed of the motor is also important. Clearly a motor running at high current (maybe due to boost) and a low speed, will overheat more quickly than one running at 50 or 60 Hz, full load. The MM4 take account of these factors.

The drives also include inverter I²t protection (i.e. overheating protection, see P0290) in order to protect the units themselves. This operates independently of the motor I²t, and is not described here.

I²t operation:
The measured motor current (r0027) is compared with the rated motor current (P0305), and other motor parameters (P0304, P0307, etc.), and the temperature of the motor calculated, a calculation which also includes the output frequency (motor speed) to account for fan cooling. If parameter P0335 is changed to indicate a forced cooled motor, the calculation is modified accordingly.

Where parameters are not entered by the user, such as P0344 (motor weight), a calculated value will be used based on a Siemens motor. If required, the motor time constant can be adjusted using P0611, in effect overwriting the calculated value.

The resulting temperature is displayed in % of maximum temperature in r0034. When this value reaches the value set in P0614 (default 100%), a warning A0511 occurs. If no action is taken and the temperature reaches 110%, then the inverter trips, showing F0011. The reaction to the warning can be changed from this default using P0610; for example, the drive can react as though a current limit has occurred, or a fault forced immediately. The warning level of P0614 can also be adjusted to raise and lower the warning or trip level as required.

Parameter r0034 is particularly useful to monitor if the calculated motor temperature is rising excessively.

P0611	Motor I2t time constant			Min:	0	Level:
CStat:	CT	Datatype: U16	Unit: s	Def:	100	**2**
P-Group:	MOTOR	Active: Immediately	QuickComm. No	Max:	16000	

Defines motor thermal time constant and is calculated automatically from the motor data (see P0340).

Notice:

A larger number increases the time taken for the calculated motor temperature to change.

Default value is dependant on inverter rated power.

P0614	Motor I2t overload warning level			Min:	0.0	Level:
CStat:	CUT	Datatype: Float	Unit: %	Def:	100.0	**2**
P-Group:	MOTOR	Active: first confirm	QuickComm. No	Max:	400.0	

Defines the [%] value at which alarm A0511 (motor overtemperature) is generated.

Motor I2t calculation is used to estimate a maximum tolerable period (i.e. without overheating) for motor overload. The I2t calculation value is deemed = 100 % when this maximum tolerable period is reached (see r0034).

Dependency:

A motor over-temperature trip (F0011) is produced at 110 % of this level.

P0640	Motor overload factor [%]			Min:	10.0	Level:
CStat:	CUT	Datatype: Float	Unit: %	Def:	150.0	**2**
P-Group:	MOTOR	Active: Immediately	QuickComm. Yes	Max:	400.0	

Defines motor overload current limit in [%] relative to P0305 (rated motor current).

Dependency:

Limited to maximum inverter current or to 400 % of rated motor current (P0305), whichever is the lower.

Details:

See function diagram for current limitation.

P0700	**Selection of command source**				Min:	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -		**Def:**	2	**1**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** Yes		**Max:**	6	

Selects digital command source.

Possible Settings:

0	Factory default setting
1	BOP (keypad)
2	Terminal
4	USS on BOP link
5	USS on COM link
6	CB on COM link

Note:

Changing this parameter resets (to default) all settings on item selected.

For example:
Changing form 1 to 2 resets all digital inputs to default settings.

P0701	**Function of digital input 1**				Min:	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -		**Def:**	1	**2**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** No		**Max:**	99	

Selects function of digital input 1.

Possible Settings:

0	Digital input disabled
1	ON/OFF1
2	ON reverse /OFF1
3	OFF2 - coast to standstill
4	OFF3 - quick ramp-down
9	Fault acknowledge
10	JOG right
11	JOG left
12	Reverse
13	MOP up (increase frequency)
14	MOP down (decrease frequency)
15	Fixed setpoint (Direct selection)
16	Fixed setpoint (Direct selection + ON)
17	Fixed setpoint (Binary coded selection + ON)
21	Local/remote
25	DC brake enable
29	External trip
33	Disable additional freq setpoint
99	Enable BICO parameterization

Dependency:

Setting 99 (enable BICO parameterization) requires
- P0700 command source or
- P0010 = 1, P3900 = 1, 2 or 3 quick commissioning or
- P0010 = 30, P0970 = 1 factory reset in order to reset.

Notice:

Setting 99 (BICO) for expert use only.

P0702	**Function of digital input 2**				Min:	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -		**Def:**	12	**2**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** No		**Max:**	99	

Selects function of digital input 2.

Possible Settings:

0	Digital input disabled
1	ON/OFF1
2	ON reverse /OFF1
3	OFF2 - coast to standstill
4	OFF3 - quick ramp-down
9	Fault acknowledge
10	JOG right
11	JOG left
12	Reverse
13	MOP up (increase frequency)
14	MOP down (decrease frequency)
15	Fixed setpoint (Direct selection)
16	Fixed setpoint (Direct selection + ON)
17	Fixed setpoint (Binary coded selection + ON)
21	Local/remote
25	DC brake enable
29	External trip
33	Disable additional freq setpoint
99	Enable BICO parameterization

Details:

See P0701 (function of digital input1).

P0703	**Function of digital input 3**			Min:	0	Level:
	CStat: CT	Datatype: U16	Unit: -	Def:	9	**2**
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max:	99	

Selects function of digital input 3.

Possible Settings:

0	Digital input disabled
1	ON/OFF1
2	ON reverse /OFF1
3	OFF2 - coast to standstill
4	OFF3 - quick ramp-down
9	Fault acknowledge
10	JOG right
11	JOG left
12	Reverse
13	MOP up (increase frequency)
14	MOP down (decrease frequency)
15	Fixed setpoint (Direct selection)
16	Fixed setpoint (Direct selection + ON)
17	Fixed setpoint (Binary coded selection + ON)
21	Local/remote
25	DC brake enable
29	External trip
33	Disable additional freq setpoint
99	Enable BICO parameterization

Details:

See P0701 (function of digital input 1).

P0704	**Function of digital input 4**			Min:	0	Level:
	CStat: CT	Datatype: U16	Unit: -	Def:	0	**2**
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max:	99	

Selects function of digital input 4 (via analog input).

Possible Settings:

0	Digital input disabled
1	ON/OFF1
2	ON reverse /OFF1
3	OFF2 - coast to standstill
4	OFF3 - quick ramp-down
9	Fault acknowledge
10	JOG right
11	JOG left
12	Reverse
13	MOP up (increase freq.)
14	MOP down (decrease freq.)
21	Local/remote
25	DC brake enable
29	External trip
33	Disable additional freq setpoint
99	Enable BICO parameterization

Details:

See P0701 (function of digital input 1).

P0719	**Selection of cmd. & freq. setp.**			**Min:**	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	66	

Central switch to select control command source for inverter.

Switches command and setpoint source between freely programmable BICO parameters and fixed command/setpoint profiles. Command and setpoint sources can be changed independently.

The tens digit chooses the command source and the units digit chooses the setpoint source.

The two indices of this parameter are used for local/remote switching. The local/remote signal switches between these settings.

The default setting is 0 for the first index (i.e. normal parameterization is active).
The second index is for control via BOP (i.e. activating the local/remote signal will then switch to BOP).

Possible Settings:

0	Cmd = BICO parameter	Setpoint = BICO parameter
1	Cmd = BICO parameter	Setpoint = MOP setpoint
2	Cmd = BICO parameter	Setpoint = Analog setpoint
3	Cmd = BICO parameter	Setpoint = Fixed frequency
4	Cmd = BICO parameter	Setpoint = USS on BOP link
5	Cmd = BICO parameter	Setpoint = USS on COM link
6	Cmd = BICO parameter	Setpoint = CB on COM link
10	Cmd = BOP	Setpoint = BICO parameter
11	Cmd = BOP	Setpoint = MOP setpoint
12	Cmd = BOP	Setpoint = Analog setpoint
13	Cmd = BOP	Setpoint = Fixed frequency
15	Cmd = BOP	Setpoint = USS on COM link
16	Cmd = BOP	Setpoint = CB on COM link
40	Cmd = USS on BOP link	Setpoint = BICO parameter
41	Cmd = USS on BOP link	Setpoint = MOP setpoint
42	Cmd = USS on BOP link	Setpoint = Analog setpoint
43	Cmd = USS on BOP link	Setpoint = Fixed frequency
44	Cmd = USS on BOP link	Setpoint = USS on BOP link
45	Cmd = USS on BOP link	Setpoint = USS on COM link
46	Cmd = USS on BOP link	Setpoint = CB on COM link
50	Cmd = USS on COM link	Setpoint = BICO parameter
51	Cmd = USS on COM link	Setpoint = MOP setpoint
52	Cmd = USS on COM link	Setpoint = Analog setpoint
53	Cmd = USS on COM link	Setpoint = Fixed frequency
54	Cmd = USS on COM link	Setpoint = USS on BOP link
55	Cmd = USS on COM link	Setpoint = USS on COM link
60	Cmd = CB on COM link	Setpoint = BICO parameter
61	Cmd = CB on COM link	Setpoint = MOP setpoint
62	Cmd = CB on COM link	Setpoint = Analog setpoint
63	Cmd = CB on COM link	Setpoint = Fixed frequency
64	Cmd = CB on COM link	Setpoint = USS on BOP link
66	Cmd = CB on COM link	Setpoint = CB on COM link

Index:

P0719[0] : 1st Control source (Remote)
P0719[1] : 2nd Control source (Local)

Note:

If set to a value other than 0 (i.e. BICO parameter is not the setpoint source), P0844 / P0848 (first source of OFF2 / OFF3) are not effective; instead, P0845 / P0849 (second source of OFF2 / OFF3) apply and the OFF commands are obtained via the particular source defined.

BICO connections made previously remain unchanged.

r0720	**Number of digital inputs**			**Min:**	-	Level:
		Datatype: U16	**Unit:** -	**Def:**	-	**3**
	P-Group: COMMANDS			**Max:**	-	

Displays number of digital inputs.

r0722	**CO/BO: Binary input values**			**Min:**	-	Level:
		Datatype: U16	**Unit:** -	**Def:**	-	**2**
	P-Group: COMMANDS			**Max:**	-	

Displays status of digital inputs.

Bitfields:

Bit00	Digital input 1		0	OFF
			1	ON
Bit01	Digital input 2		0	OFF
			1	ON
Bit02	Digital input 3		0	OFF
			1	ON
Bit03	Digital input 4 (via ADC)		0	OFF
			1	ON

Note:

Segment is lit when signal is active.

P0724	**Debounce time for digital inputs**			**Min:**	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	3	**3**
	P-Group: COMMANDS	**Active:** Immediately	**QuickComm.** No	**Max:**	3	

Defines debounce time (filtering time) used for digital inputs.

Possible Settings:

0	No debounce time
1	2.5 ms debounce time
2	8.2 ms debounce time
3	12.3 ms debounce time

P0725	**PNP / NPN digital inputs**			**Min:**	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	1	**3**
	P-Group: COMMANDS	**Active:** Immediately	**QuickComm.** No	**Max:**	1	

Switches between active high (PNP) and active low (NPN). This is valid for all digital inputs simultaneously.

The following is valid by using the internal supply:

Possible Settings:

0	NPN mode ==> low active
1	PNP mode ==> high active

Value:

NPN: Terminals 5/6/7 must be connected via terminal 9 (0 V).
PNP: Terminals 5/6/7 must be connected via terminal 8 (24 V).

r0730	**Number of digital outputs**			**Min:**	-	Level:
		Datatype: U16	**Unit:** -	**Def:**	-	**3**
	P-Group: COMMANDS			**Max:**	-	

Displays number of digital outputs (relays).

P0731	**BI: Function of digital output 1**				**Min:**	0:0	Level:
	CStat:	CUT	**Datatype:** U32	**Unit:** -	**Def:**	52:3	**2**
	P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines source of digital output 1.

Common Settings:

52.0	Drive ready	0	Closed
52.1	Drive ready to run	0	Closed
52.2	Drive running	0	Closed
52.3	Drive fault active	0	Closed
52.4	OFF2 active	1	Closed
52.5	OFF3 active	1	Closed
52.6	Switch on inhibit active	0	Closed
52.7	Drive warning active	0	Closed
52.8	Deviation setpoint/actual value	1	Closed
52.9	PZD control (Process Data Control)	0	Closed
52.A	Maximum frequency reached	0	Closed
52.B	Warning: Motor current limit	1	Closed
52.C	Motor holding brake (MHB) active	0	Closed
52.D	Motor overload	1	Closed
52.E	Motor running direction right	0	Closed
52.F	Inverter overload	1	Closed
53.0	DC brake active	0	Closed
53.1	Act. freq. f_act > P2167 (f_off)	0	Closed
53.2	Act. freq. f_act > P1080 (f_min)	0	Closed
53.3	Act. current r0027 >= P2170	0	Closed
53.4	Act. freq. f_act > P2155 (f_1)	0	Closed
53.5	Act. freq. f_act <= P2155 (f_1)	0	Closed
53.6	Act. freq. f_act >= setpoint	0	Closed
53.7	Act. Vdc r0026 < P2172	0	Closed
53.8	Act. Vdc r0026 > P2172	0	Closed
53.A	PID output r2294 == P2292 (PID_min)	0	Closed
53.B	PID output r2294 == P2291 (PID_max)	0	Closed

r0747	**CO/BO: State of digital outputs**			**Min:**	-	Level:
		Datatype: U16	**Unit:** -	**Def:**	-	**3**
	P-Group: COMMANDS			**Max:**	-	

Displays status of digital outputs (also includes inversion of digital outputs via P0748).

Bitfields:

```
Bit00   Digital output 1 energized              0    NO
                                                1    YES
```

Dependency:

Bit 0 = 0 :
Relay de-energized / contacts open

Bit 0 = 1 :
Relay energized / contacts closed

P0748	**Invert digital outputs**				**Min:**	0	Level:
	CStat:	CUT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
	P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	1	

Defines high and low states of relay for a given function.

Bitfields:

```
Bit00   Invert digital output 1                 0    NO
                                                1    YES
```

r0750	**Number of ADCs**			**Min:**	-	Level:
		Datatype: U16	**Unit:** -	**Def:**	-	**3**
	P-Group: TERMINAL			**Max:**	-	

Displays number of analog inputs available.

r0751	**BO: Status word of ADC**			**Min:**	-	Level:
		Datatype: U16	**Unit:** -	**Def:**	-	**4**
	P-Group: TERMINAL			**Max:**	-	

Displays status of analog input.

Bitfields:

```
Bit00   Signal lost on ADC 1                    0    NO
                                                1    YES
```

r0752	**Act. input of ADC [V]**			**Min:**	-	Level:
		Datatype: Float	**Unit:** -	**Def:**	-	**2**
	P-Group: TERMINAL			**Max:**	-	

Displays smoothed analog input value in volts before the characteristic block.

P0753	Smooth time ADC			Min:	0	Level:
CStat: CUT		**Datatype:** U16	**Unit:** ms	**Def:**	3	**3**
P-Group: TERMINAL		**Active:** first confirm	**QuickComm.** No	**Max:**	10000	

Defines filter time (PT1 filter) in [ms] for analog input.

Note:

Increasing this time (smooth) reduces jitter but slows down response to the analog input.

P0753 = 0 : No filtering

r0754	Act. ADC value after scaling [%]			Min:	-	Level:
		Datatype: Float	**Unit:** %	**Def:**	-	**2**
P-Group: TERMINAL				**Max:**	-	

Shows smoothed value of analog input in [%] after scaling block.

Dependency:

P0757 to P0760 define range (ADC scaling).

r0755	CO: Act. ADC after scal. [4000h]			Min:	-	Level:
		Datatype: I16	**Unit:** -	**Def:**	-	**2**
P-Group: TERMINAL				**Max:**	-	

Displays analog input, scaled using ASPmin and ASPmax.

Analog setpoint (ASP) from the analog scaling block can vary from min. analog setpoint (ASPmin) to a max. analog setpoint (ASPmax) as shown in P0757 (ADC scaling).

The largest magnitude (value without sign) of ASPmin and ASPmax defines the scaling of 16384.

Example:

ASPmin = 300 %, ASPmax = 100 % then 16384 represents 300 %.
This parameter will vary from 5461 to 16384

ASPmin = -200 %, ASPmax = 100 % then 16384 represents 200 %.
This parameter will vary from -16384 to +8192

Note:

This value is used as an input to analog BICO connectors.

ASPmax represents the highest analog setpoint (this may be at 10 V).

ASPmin represents the lowest analog setpoint (this may be at 0 V).

Details:

See parameters P0757 to P0760 (ADC scaling)

P0756	Type of ADC			Min:	0	Level:
CStat: CT		**Datatype:** U16	**Unit:** -	**Def:**	0	**2**
P-Group: TERMINAL		**Active:** first confirm	**QuickComm.** No	**Max:**	1	

Defines type of analog input and also enables analog input monitoring.

Possible Settings:

0   Unipolar voltage input (0 to +10 V)
1   Unipolar voltage input with monitoring (0 to 10 V)

Dependency:

Function disabled if analog scaling block programmed to output negative setpoints (see P0757 to P0760).

Notice:

When monitoring is enabled and a deadband defined (P0761), a fault condition will be generated (F0080) if the analog input voltage falls below 50 % of the deadband voltage.
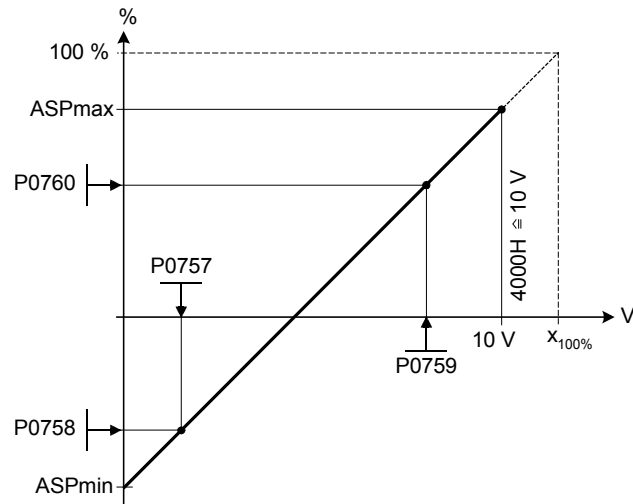
Details:

See P0757 to P0760 (ADC scaling).

P0757	Value x1 of ADC scaling [V]				Min:	0	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** V		**Def:**	0	**2**
	P-Group: TERMINAL	**Active:** first confirm	**QuickComm.** No		**Max:**	10	

Parameters P0757 - P0760 configure the input scaling as shown in the diagram:

P0761 = 0

Where:
Analog setpoints represent a [%] of the normalized frequency in P2000.
Analog setpoints may be larger than 100 %.
ASPmax represents highest analog setpoint (this may be at 10 V).
ASPmin represents lowest analog setpoint (this may be at 0 V).
Default values provide a scaling of 0 V = 0 %, and 10 V = 100 %.

Notice:
The value x2 of ADC scaling P0759 must be greater than the value x1 of ADC scaling P0757.

P0758	Value y1 of ADC scaling				Min:	-99999.9	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** %		**Def:**	0.0	**2**
	P-Group: TERMINAL	**Active:** first confirm	**QuickComm.** No		**Max:**	99999.9	

Sets value of Y1 in [%] as described in P0757 (ADC scaling)
Dependency:
Affects P2000 to P2003 (reference frequency, voltage, current or torque) depending on which setpoint is to be generated.

P0759	Value x2 of ADC scaling [V]				Min:	0	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** V		**Def:**	10	**2**
	P-Group: TERMINAL	**Active:** first confirm	**QuickComm.** No		**Max:**	10	

Sets value of X2 as described in P0757 (ADC scaling).

Notice:
The value x2 of ADC scaling P0759 must be greater than the value x1 of ADC scaling P0757.

P0760	Value y2 of ADC scaling				Min:	-99999.9	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** %		**Def:**	100.0	**2**
	P-Group: TERMINAL	**Active:** first confirm	**QuickComm.** No		**Max:**	99999.9	

Sets value of Y2 in [%] as described in P0757 (ADC scaling).
Dependency:
Affects P2000 to P2003 (reference frequency, voltage, current or torque) depending on which setpoint is to be generated.

P0761	**Width of ADC deadband [V]**			**Min:**	0	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** V	**Def:**	0	**2**
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.** No	**Max:**	10	

Defines width of deadband on analog input. The diagrams below explain its use.

Example:

ADC value 2 to 10 V (0 to 50 Hz)
The below example produces a 2 to 10 V analog input (0 to 50 Hz):
P2000 = 50 Hz
P0759 = 8 V   P0760 = 75 %
P0757 = 2 V   P0758 = 0 %
P0761 = 2 V

P0756 = 0 or 1

P0761 > 0

0 < P0758 < P0760 || 0 > P0758 > P0760
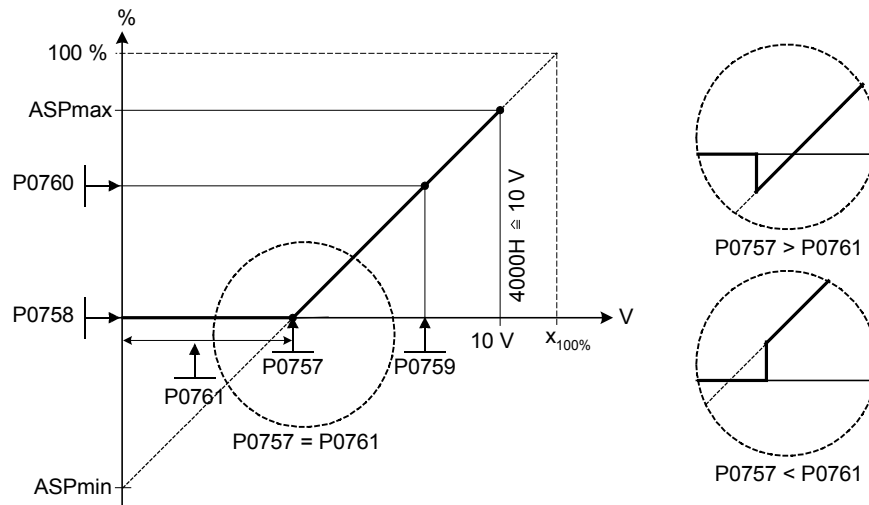
ADC value 0 to 10 V (-50 to +50 Hz):
The below example produces a 0 to 10 V analog input (-50 to +50 Hz) with center zero and a "holding point" 0.2 V wide (0.1 V to each side of center).
P2000 = 50 Hz
P0759 = 8 V   P0760 = 75 %
P0757 = 2 V   P0758 = -75 %
P0761 = 0.1 V

P0756 = 0 or 1

P0761 > 0
P0758 < 0 < P0760
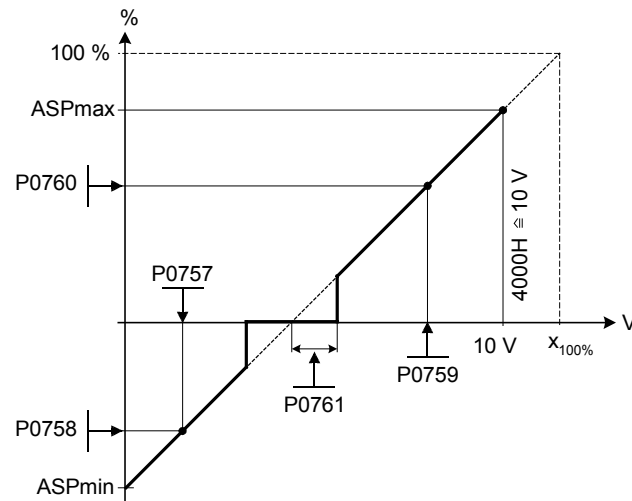
Note:
> P0761[x] = 0 : No deadband active.

Notice:

Deadband starts from 0 V to value of P0761, if both values of P0758 and P0760 (y coordinates of ADC scaling) are positive or negative respectively. However, deadband is active in both directions from point of intersection (x axis with ADC scaling curve), if sign of P0758 and P0760 are opposite.

Min. frequency P1080 should be zero when using center zero setup. There is no hysteresis at the end of the deadband.

P0762	Delay for loss of signal action			Min:	0	Level:
	CStat: CUT	Datatype: U16	Unit: ms	Def:	10	**3**
	P-Group: TERMINAL	Active: Immediately	QuickComm. No	Max:	10000	

Defines time delay between loss of analog setpoint and appearance of fault code F0080.

Note:

Expert users can choose the desired reaction to F0080 (default is OFF2).

r0770	Number of DACs			Min:	-	Level:
		Datatype: U16	Unit: -	Def:	-	**3**
	P-Group: TERMINAL			Max:	-	

Displays number of analog outputs available.

P0771	CI: DAC			Min:	0:0	Level:
	CStat: CUT	Datatype: U32	Unit: -	Def:	21:0	**2**
	P-Group: TERMINAL	Active: first confirm	QuickComm. No	Max:	4000:0	

Defines function of the 0 - 20 mA analog output.

Common Settings:
- 21 CO: Act. frequency   (scaled to P2000)
- 24 CO: Act. output frequency   (scaled to P2000)
- 25 CO: Act. output voltage (scaled to P2001)
- 26 CO: Act. DC-link voltage   (scaled to P2001)
- 27 CO: Act. output current (scaled to P2002)

P0773	Smooth time DAC			Min:	0	Level:
	CStat: CUT	Datatype: U16	Unit: ms	Def:	2	**3**
	P-Group: TERMINAL	Active: first confirm	QuickComm. No	Max:	1000	

Defines smoothing time [ms] for analog output signal. This parameter enables smoothing for DAC using a PT1 filter.

Dependency:

P0773 = 0: Deactivates filter.

r0774	Act. DAC value [mA]			Min:	-	Level:
		Datatype: Float	Unit: -	Def:	-	**2**
	P-Group: TERMINAL			Max:	-	

Shows value of analog output in [mA] after filtering and scaling.

P0776	Type of DAC			Min:	0	Level:
	CStat: CT	Datatype: U16	Unit: -	Def:	0	**3**
	P-Group: TERMINAL	Active: first confirm	QuickComm. No	Max:	0	

Defines type of analog output.

Possible Settings:
- 0   Current output

Note:

The analog output is designed as a current output with a range of 0...20 mA.

For a voltage output with a range of 0...10 V an external resistor of 500 Ohms has to be connected at the terminals (12/13).

P0777	Value x1 of DAC scaling			Min:	-99999.0	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Def:**	0.0	**2**
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.** No	**Max:**	99999.0	

Defines x1 output characteristic in [%]. Scaling block is responsible for adjustment of output value defined in P0771 (DAC connector input).

Parameters of DAC scaling block (P0777 ... P0781) work as follows:
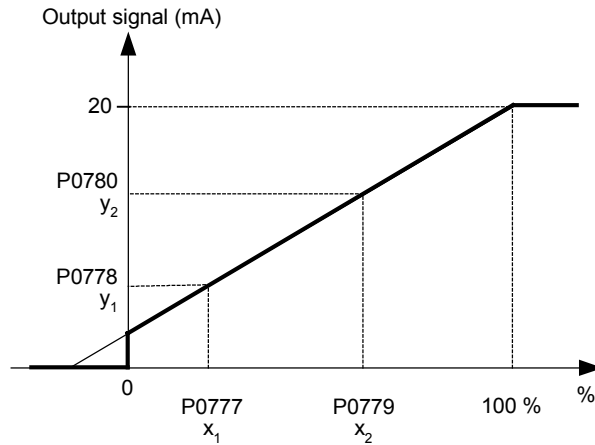
Where:
Points P1 (x1, y1) and P2 (x2, y2) can be chosen freely.
Example:
The default values of the scaling block provides a scaling of:
P1: 0.0 % = 0 mA
P2: 100.0 % = 20 mA
Dependency:
Affects P2000 to P2003 (referency frequency, voltage, current or torque) depending on which setpoint is to be generated.

P0778	Value y1 of DAC scaling			Min:	0	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** -	**Def:**	0	**2**
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.** No	**Max:**	20	

Defines y1 of output characteristic.

P0779	Value x2 of DAC scaling			Min:	-99999.0	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Def:**	100.0	**2**
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.** No	**Max:**	99999.0	

Defines x2 of output characteristic in [%].
Dependency:
Affects P2000 to P2003 (referency frequency, voltage, current or torque) depending on which setpoint is to be generated.

P0780	Value y2 of DAC scaling			Min:	0	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** -	**Def:**	20	**2**
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.** No	**Max:**	20	

Defines y2 of output characteristic.

P0781	**Width of DAC deadband**			**Min:**	0	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** -	**Def:**	0	**2**
P-Group:	TERMINAL	**Active:** first confirm	**QuickComm.** No	**Max:**	20	

Sets width of dead-band in [mA] for analog output.

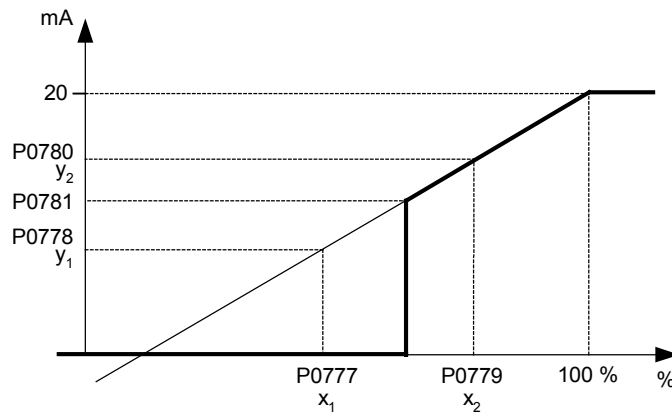| **P0800**	**BI: Download parameter set 0**			**Min:**	0:0	Level:
CStat:	CT	**Datatype:** U32	**Unit:** -	**Def:**	0:0	**3**
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines source of command to start download of parameter set 0 from attached AOP. The first three digits describe the parameter number of the command source, the last digit refers to the bit setting for that parameter.
Common Settings:
722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)

Note:
Signal of digital input:
0 = No download
1 = Start download parameter set 0 from AOP.

P0801	**BI: Download parameter set 1**			**Min:**	0:0	Level:
CStat:	CT	**Datatype:** U32	**Unit:** -	**Def:**	0:0	**3**
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines sources of command to start download of parameter set 1 from attached AOP. The first three digits describe the parameter number of the command source, the last digit refers to the bit setting for that parameter.
Common Settings:
722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)

Note:
Signal of digital input:
0 = No download
1 = Start download parameter set 1 from AOP.

P0840	**BI: ON/OFF1**			**Min:**	0:0	Level:
CStat:	CT	**Datatype:** U32	**Unit:** -	**Def:**	722:0	**3**
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Allows ON/OFF1 command source to be selected using BICO. The first three digits describe the parameter number of the command source; the last digit denotes the bit setting for that parameter.
Common Settings:
722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (via analog input, requires P0704 to be set to 99)

19.0 = ON/OFF1 via BOP
Dependency:
Active only when P0719 = 0 (remote selection of command/setpoint source).

BICO requires P0700 set to 2 (enable BICO).

The default setting (ON right) is digital input 1 (722.0). Alternative source possible only when function of digital input 1 is changed (via P0701) before changing value of P0840.

P0842	**BI: ON reverse/OFF1**			**Min:**	0:0	Level:
	CStat: CT	**Datatype:** U32	**Unit:** -	**Def:**	0:0	**3**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Allows ON/OFF1 reverse command source to be selected using BICO. The first three digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

Common Settings:
    722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
    722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
    722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
    722.3 = Digital input 4 (via analog input, requires P0704 to be set to 99)

    19.0 = ON/OFF1 via BOP

Dependency:
    Active only when P0719 = 0 (remote selection of command/setpoint source).

P0844	**BI: 1. OFF2**			**Min:**	0:0	Level:
	CStat: CT	**Datatype:** U32	**Unit:** -	**Def:**	1:0	**3**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines first source of OFF2 when P0719 = 0 (BICO). The first three digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

Common Settings:
    722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
    722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
    722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
    722.3 = Digital input 4 (via analog input, requires P0704 to be set to 99)

    19.0 = ON/OFF1 via BOP
    19.1 = OFF2: Electrical stop via BOP

Dependency:
    Active only when P0719 = 0 (remote selection of command/setpoint source).

    If one of the digital inputs is selected for OFF2, the inverter will not run unless the digital input is active.

Note:
    OFF2 means immediate pulse-disabling; the motor is coasting.

    OFF2 is low-active, i.e. :
    0 = Pulse disabling.
    1 = Operating condition.

P0845	**BI: 2. OFF2**			**Min:**	0:0	Level:
	CStat: CT	**Datatype:** U32	**Unit:** -	**Def:**	19:1	**3**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines second source of OFF2. The first three digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

Common Settings:
    722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
    722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
    722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
    722.3 = Digital input 4 (via analog input, requires P0704 to be set to 99)

    19.0 = ON/OFF1 via BOP

Dependency:
    In contrast to P0844 (first source of OFF2), this parameter is always active, independent of P0719 (selection of command and frequency setpoint).

    If one of the digital inputs is selected for OFF2, the inverter will not run unless the digital input is active.

Note:
    OFF2 means immediate pulse-disabling; the motor is coasting.

    OFF2 is low-active, i.e. :
    0 = Pulse disabling.
    1 = Operating condition.

P0848	BI: 1. OFF3				Min:	0:0	Level:
	CStat: CT	Datatype: U32	Unit: -		Def:	1:0	**3**
	P-Group: COMMANDS	Active: first confirm	QuickComm. No		Max:	4000:0	

Defines first source of OFF3 when P0719 = 0 (BICO). The first three digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

Common Settings:

    722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
    722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
    722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
    722.3 = Digital input 4 (via analog input, requires P0704 to be set to 99)

    19.0 = ON/OFF1 via BOP

Dependency:

Active only when P0719 = 0 (remote selection of command/setpoint source).

If one of the digital inputs is selected for OFF3, the inverter will not run unless the digital input is active.

Note:

OFF3 means fast ramp-down to 0.

OFF3 is low-active, i.e.
0 = Ramp-down.
1 = Operating condition.

P0849	BI: 2. OFF3				Min:	0:0	Level:
	CStat: CT	Datatype: U32	Unit: -		Def:	1:0	**3**
	P-Group: COMMANDS	Active: first confirm	QuickComm. No		Max:	4000:0	

Defines second source of OFF3. The first three digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

Common Settings:

    722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
    722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
    722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
    722.3 = Digital input 4 (via analog input, requires P0704 to be set to 99)

    19.0 = ON/OFF1 via BOP

Dependency:

In contrast to P0848 (first source of OFF3), this parameter is always active, independent of P0719 (selection of command and frequency setpoint).

If one of the digital inputs is selected for OFF3, the inverter will not run unless the digital input is active.

Note:

OFF3 means fast ramp-down to 0.

OFF3 is low-active, i.e.
0 = Ramp-down.
1 = Operating condition.

P0852	BI: Pulse enable				Min:	0:0	Level:
	CStat: CT	Datatype: U32	Unit: -		Def:	1:0	**3**
	P-Group: COMMANDS	Active: first confirm	QuickComm. No		Max:	4000:0	

Defines source of pulse enable/disable signal.

Common Settings:

    722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
    722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
    722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
    722.3 = Digital input 4 (via analog input, requires P0704 to be set to 99)

Dependency:

Active only when P0719 = 0 (remote selection of command/setpoint source).

P0918	CB address				Min:	0	Level:
	CStat: CT	Datatype: U16	Unit: -		Def:	3	**2**
	P-Group: COMM	Active: first confirm	QuickComm. No		Max:	65535	

Defines address of CB (communication board) or address of the other option modules.

There are two ways to set the bus address:
1 via DIP switches on the PROFIBUS module
2 via a user-entered value

Note:

Possible PROFIBUS settings:
1 ... 125
0, 126, 127 are not allowed

The following applies when a PROFIBUS module is used:
DIP switch = 0   Address defined in P0918 (CB address) is valid
DIP switch not = 0   DIP switch setting has priority and P0918 indicates DIP switch setting.

P0927	Parameter changeable via			Min:	0	Level:
	CStat: CUT	Datatype: U16	Unit: -	Def:	15	**2**
	P-Group: COMM	Active: first confirm	QuickComm. No	Max:	15	

Specifies the interfaces which can be used to change parameters.

Bitfields:

```
Bit00   PROFIBUS / CB                        0    NO
                                             1    YES
Bit01   BOP                                  0    NO
                                             1    YES
Bit02   USS on BOP link                      0    NO
                                             1    YES
Bit03   USS on COM link                      0    NO
                                             1    YES
```

Example:

"b - - n n" (bits 0, 1, 2 and 3 set) in the default setting means that parameters can be changed via any interface.

"b - - r n" (bits 0, 1 and 3 set) would specify that parameters can be changed via PROFIBUS/CB, BOP and USS on COM link (RS485 USS) but not via USS on BOP link (RS232).

Details:

The seven-segment display is explained in the "Introduction to MICROMASTER System Parameters" in this handbook.

r0947[8]	Last fault code			Min:	-	Level:
		Datatype: U16	Unit: -	Def:	-	**2**
	P-Group: ALARMS			Max:	-	

Displays fault history according to the diagram below

where:
"F1" is the first active fault (not yet acknowledged).
"F2" is the second active fault (not yet acknowledged).
"F1e" is the occurrence of the fault acknowledgement for F1 & F2.

This moves the value in the 2 indices down to the next pair of indices, where they are stored. Indices 0 & 1 contain the active faults. When faults are acknowledged, indices 0 & 1 are reset to 0.
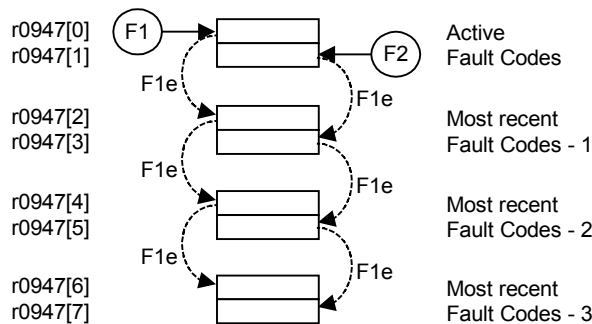
Index:

r0947[0] : Recent fault trip --, fault 1
r0947[1] : Recent fault trip --, fault 2
r0947[2] : Recent fault trip -1, fault 3
r0947[3] : Recent fault trip -1, fault 4
r0947[4] : Recent fault trip -2, fault 5
r0947[5] : Recent fault trip -2, fault 6
r0947[6] : Recent fault trip -3, fault 7
r0947[7] : Recent fault trip -3, fault 8

Example:

If the inverter trips on undervoltage and then receives an external trip before the undervoltage is acknowledged, you will obtain:
r0947[0] = 3   Undervoltage (F0003)
r0947[1] = 85   External trip (F0085)

Whenever a fault in index 0 is acknowledged (F1e), the fault history shifts as indicated in the diagram above.

Dependency:

Index 1 used only if second fault occurs before first fault is acknowledged.

Details:

See "Faults and Warnings"

r0948[12]	**Fault time**			**Min:** -	Level:
	Datatype: U16	**Unit:** -		**Def:** -	**3**
	P-Group: ALARMS			**Max:** -	

Time stamp to indicate when the fault has occurred. P2114 (run-time counter) or P2115 (real time clock) are the possible sources of the time stamp.

Index:

r0948[0] : Recent fault trip --, fault time seconds+minutes
r0948[1] : Recent fault trip --, fault time hours+days
r0948[2] : Recent fault trip --, fault time month+year
r0948[3] : Recent fault trip -1, fault time seconds+minutes
r0948[4] : Recent fault trip -1, fault time hours+days
r0948[5] : Recent fault trip -1, fault time month+year
r0948[6] : Recent fault trip -2, fault time seconds+minutes
r0948[7] : Recent fault trip -2, fault time hours+days
r0948[8] : Recent fault trip -2, fault time month+year
r0948[9] : Recent fault trip -3, fault time seconds+minutes
r0948[10] : Recent fault trip -3, fault time hours+days
r0948[11] : Recent fault trip -3, fault time month+year

Example:

The time is taken from P2115 if this parameter has been updated with the real time. If not, P2114 is used.

Note:

P2115 can be updated via AOP, Starter, DriveMonitor, etc.

r0949[8]	**Fault value**			**Min:** -	Level:
	Datatype: U16	**Unit:** -		**Def:** -	**4**
	P-Group: ALARMS			**Max:** -	

Displays drive fault values. It is for service purposes and indicate the type of fault reported. The values are not documented. They are listed in the code where faults are reported.

Index:

r0949[0] : Recent fault trip --, fault value 1
r0949[1] : Recent fault trip --, fault value 2
r0949[2] : Recent fault trip -1, fault value 3
r0949[3] : Recent fault trip -1, fault value 4
r0949[4] : Recent fault trip -2, fault value 5
r0949[5] : Recent fault trip -2, fault value 6
r0949[6] : Recent fault trip -3, fault value 7
r0949[7] : Recent fault trip -3, fault value 8

P0952	**Total number of faults**			**Min:** 0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:** 0	**3**
	P-Group: ALARMS	**Active:** first confirm	**QuickComm.** No	**Max:** 8	

Displays number of faults stored in P0947 (last fault code).

Dependency:

Setting 0 resets fault history. (changing to 0 also resets parameter r0948 - fault time).

r0964[5]	**Firmware version data**			**Min:** -	Level:
	Datatype: U16	**Unit:** -		**Def:** -	**3**
	P-Group: COMM			**Max:** -	

Firmware version data.

Index:

r0964[0] : Company (Siemens = 42)
r0964[1] : Product type
r0964[2] : Firmware version
r0964[3] : Firmware date (year)
r0964[4] : Firmware date (day/month)

Example:

No.	Value	Meaning
r0964[0]	42	SIEMENS
r0964[1]	1001	MICROMASTER 420
	1002	MICROMASTER 440
	1003	MICRO- / COMBIMASTER 411
	1004	MICROMASTER 410
	1005	reserved
	1006	MICROMASTER 440 PX
	1007	MICROMASTER 430
r0964[2]	105	Firmware V1.05
r0964[3]	2001	27.10.2001
r0964[4]	2710	

r0967	**Control word 1**			**Min:**	-	Level:
	Datatype: U16	**Unit:** -		**Def:**	-	**3**
	P-Group: COMM			**Max:**	-	

Displays control word 1.

Bitfields:

Bit00	ON/OFF1		0	NO
			1	YES
Bit01	OFF2: Electrical stop		0	YES
			1	NO
Bit02	OFF3: Fast stop		0	YES
			1	NO
Bit03	Pulse enable		0	NO
			1	YES
Bit04	RFG enable		0	NO
			1	YES
Bit05	RFG start		0	NO
			1	YES
Bit06	Setpoint enable		0	NO
			1	YES
Bit07	Fault acknowledge		0	NO
			1	YES
Bit08	JOG right		0	NO
			1	YES
Bit09	JOG left		0	NO
			1	YES
Bit10	Control from PLC		0	NO
			1	YES
Bit11	Reverse (setpoint inversion)		0	NO
			1	YES
Bit13	Motor potentiometer MOP up		0	NO
			1	YES
Bit14	Motor potentiometer MOP down		0	NO
			1	YES
Bit15	Local / Remote		0	NO
			1	YES

r0968	**Status word 1**			**Min:**	-	Level:
	Datatype: U16	**Unit:** -		**Def:**	-	**3**
	P-Group: COMM			**Max:**	-	

Displays active status word of inverter (in binary) and can be used to diagnose which commands are active.

Bitfields:

Bit00	Drive ready		0	NO
			1	YES
Bit01	Drive ready to run		0	NO
			1	YES
Bit02	Drive running		0	NO
			1	YES
Bit03	Drive fault active		0	NO
			1	YES
Bit04	OFF2 active		0	YES
			1	NO
Bit05	OFF3 active		0	YES
			1	NO
Bit06	ON inhibit active		0	NO
			1	YES
Bit07	Drive warning active		0	NO
			1	YES
Bit08	Deviation setpoint / act. value		0	YES
			1	NO
Bit09	PZD control		0	NO
			1	YES
Bit10	Maximum frequency reached		0	NO
			1	YES
Bit11	Warning: Motor current limit		0	YES
			1	NO
Bit12	Motor holding brake active		0	NO
			1	YES
Bit13	Motor overload		0	YES
			1	NO
Bit14	Motor runs right		0	NO
			1	YES
Bit15	Inverter overload		0	YES
			1	NO

P0970	**Factory reset**			**Min:**	0	Level:
	CStat: C	**Datatype:** U16	**Unit:** -	**Def:**	0	**1**
	P-Group: PAR_RESET	**Active:** first confirm	**QuickComm.** No	**Max:**	1	

P0970 = 1 resets all parameters to their default values.
Possible Settings:
0   Disabled
1   Parameter reset
Dependency:
First set P0010 = 30 (factory settings).

Stop drive (i.e. disable all pulses) before you can reset parameters to default values.

Note:
The following parameters retain their values after a factory reset:

P0014 Store mode

r0039 CO: Energy consumption meter [kWh]
P0100 Europe / North America
P0918 CB address
P2010 USS baud rate
P2011 USS address

P0971	**Transfer data from RAM to EEPROM**			**Min:**	0	Level:
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
	P-Group: COMM	**Active:** first confirm	**QuickComm.** No	**Max:**	1	

Transfers values from RAM to EEPROM when set to 1.
Possible Settings:
0   Disabled
1   Start transfer
Note:
All values in RAM are transferred to EEPROM.

Parameter is automatically reset to 0 (default) after successful transfer.

P1000	Selection of frequency setpoint			Min:	0	Level:
	CStat: CT	Datatype: U16	Unit: -	Def:	2	**1**
	P-Group: SETPOINT	Active: first confirm	QuickComm. Yes	Max:	66	

Selects frequency setpoint source. In the table of possible settings below, the main setpoint is selected from the least significant digit (i.e., 0 to 6) and any additional setpoint from the most significant digit (i.e., x0 through to x6).

Possible Settings:

0	No main setpoint	
1	MOP setpoint	
2	Analog setpoint	
3	Fixed frequency	
4	USS on BOP link	
5	USS on COM link	
6	CB on COM link	
10	No main setpoint	+ MOP setpoint
11	MOP setpoint	+ MOP setpoint
12	Analog setpoint	+ MOP setpoint
13	Fixed frequency	+ MOP setpoint
14	USS on BOP link	+ MOP setpoint
15	USS on COM link	+ MOP setpoint
16	CB on COM link	+ MOP setpoint
20	No main setpoint	+ Analog setpoint
21	MOP setpoint	+ Analog setpoint
22	Analog setpoint	+ Analog setpoint
23	Fixed frequency	+ Analog setpoint
24	USS on BOP link	+ Analog setpoint
25	USS on COM link	+ Analog setpoint
26	CB on COM link	+ Analog setpoint
30	No main setpoint	+ Fixed frequency
31	MOP setpoint	+ Fixed frequency
32	Analog setpoint	+ Fixed frequency
33	Fixed frequency	+ Fixed frequency
34	USS on BOP link	+ Fixed frequency
35	USS on COM link	+ Fixed frequency
36	CB on COM link	+ Fixed frequency
40	No main setpoint	+ USS on BOP link
41	MOP setpoint	+ USS on BOP link
42	Analog setpoint	+ USS on BOP link
43	Fixed frequency	+ USS on BOP link
44	USS on BOP link	+ USS on BOP link
45	USS on COM link	+ USS on BOP link
46	CB on COM link	+ USS on BOP link
50	No main setpoint	+ USS on COM link
51	MOP setpoint	+ USS on COM link
52	Analog setpoint	+ USS on COM link
53	Fixed frequency	+ USS on COM link
54	USS on BOP link	+ USS on COM link
55	USS on COM link	+ USS on COM link
60	No main setpoint	+ CB on COM link
61	MOP setpoint	+ CB on COM link
62	Analog setpoint	+ CB on COM link
63	Fixed frequency	+ CB on COM link
64	USS on BOP link	+ CB on COM link
66	CB on COM link	+ CB on COM link

Example:

Setting 12 selects main setpoint (2) derived from analog input with additional setpoint (1) taken from the motor potentiometer.

Example P1000 = 12 :

P1000 = **1**2 ⇒ P1070 = 755	P1070 CI: Main setpoint	
	r0755 CO: Act. ADC after scal. [4000h]	
P1000 = 1**2** ⇒ P1075 = 1050	P1075 CI: Additional setpoint	
	r1050 CO: Act. Output freq. of the MOP	
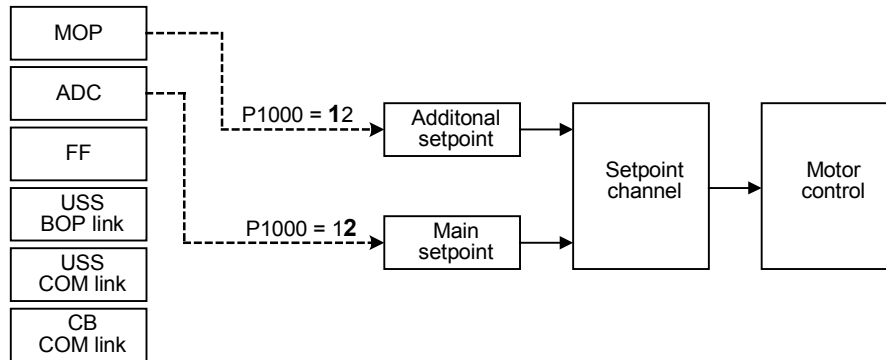
Note:
Single digits denote main setpoints that have no additional setpoint.

P1001	**Fixed frequency 1**			**Min:** -650.00	Level:
CStat: CUT	**Datatype:** Float	**Unit:** Hz	**Def:** 0.00	**2**
P-Group: SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:** 650.00	

Defines fixed frequency setpoint 1.

There are 3 types of fixed frequencies:
1. Direct selection
2. Direct selection + ON command
3. Binary coded selection + ON command

1. Direct selection (P0701 - P0703 = 15):
In this mode of operation 1 digital input selects 1 fixed frequency.
If several inputs are active together, the selected frequencies are summed.
E.g.: FF1 + FF2 + FF3.

2. Direct selection + ON command (P0701 - P0703 = 16):
The fixed frequency selection combines the fixed frequencies with an ON command.
In this mode of operation 1 digital input selects 1 fixed frequency.
If several inputs are active together, the selected frequencies are summed.
E.g.: FF1 + FF2 + FF3.

3. Binary coded selection + ON command (P0701 - P0703 = 17):
Up to 7 fixed frequencies can be selected using this method.
The fixed frequencies are selected according to the following table:

Example:

		DIN3	**DIN2**	**DIN1**
	OFF	Inactive	Inactive	Inactive
P1001	FF1	Inactive	Inactive	**Active**
P1002	FF2	Inactive	**Active**	Inactive
P1003	FF3	Inactive	**Active**	**Active**
P1004	FF4	**Active**	Inactive	Inactive
P1005	FF5	**Active**	Inactive	**Active**
P1006	FF6	**Active**	**Active**	Inactive
P1007	FF7	**Active**	**Active**	**Active**

Dependency:
Select fixed frequency operation (using P1000).

Inverter requires ON command to start in the case of direct selection (P0701 - P0706 = 15).

Note:
Fixed frequencies can be selected using the digital inputs, and can also be combined with an ON command.

P1002	**Fixed frequency 2**			**Min:** -650.00	Level:
CStat: CUT	**Datatype:** Float	**Unit:** Hz	**Def:** 5.00	**2**
P-Group: SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:** 650.00	

Defines fixed frequency setpoint 2.
Details:
See parameter P1001 (fixed frequency 1).

P1003	**Fixed frequency 3**			**Min:** -650.00	Level:
CStat: CUT	**Datatype:** Float	**Unit:** Hz	**Def:** 10.00	**2**
P-Group: SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:** 650.00	

Defines fixed frequency setpoint 3.
Details:
See parameter P1001 (fixed frequency 1).

P1004	**Fixed frequency 4**				**Min:**	-650.00	Level:
	CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Def:**	15.00	**2**
	P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

Defines fixed frequency setpoint 4.

Details:
See parameter P1001 (fixed frequency 1).

P1005	**Fixed frequency 5**				**Min:**	-650.00	Level:
	CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Def:**	20.00	**2**
	P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

Defines fixed frequency setpoint 5.

Details:
See parameter P1001 (fixed frequency 1).

P1006	**Fixed frequency 6**				**Min:**	-650.00	Level:
	CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Def:**	25.00	**2**
	P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

Defines fixed frequency setpoint 6.

Details:
See parameter P1001 (fixed frequency 1).

P1007	**Fixed frequency 7**				**Min:**	-650.00	Level:
	CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Def:**	30.00	**2**
	P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

Defines fixed frequency setpoint 7.

Details:
See parameter P1001 (fixed frequency 1).

P1016	**Fixed frequency mode - Bit 0**				**Min:**	1	Level:
	CStat:	CT	**Datatype:** U16	**Unit:** -	**Def:**	1	**3**
	P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** No	**Max:**	3	

Fixed frequencies can be selected in three different modes. Parameter P1016 defines the mode of selection Bit 0.

Possible Settings:

1	Direct selection
2	Direct selection + ON command
3	Binary coded selection + ON command

Details:
See table in P1001 (fixed frequency 1) for description of how to use fixed frequencies.

P1017	**Fixed frequency mode - Bit 1**				**Min:**	1	Level:
	CStat:	CT	**Datatype:** U16	**Unit:** -	**Def:**	1	**3**
	P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** No	**Max:**	3	

Fixed frequencies can be selected in three different modes. Parameter P1017 defines the mode of selection Bit 1.

Possible Settings:

1	Direct selection
2	Direct selection + ON command
3	Binary coded selection + ON command

Details:
See table in P1001 (fixed frequency 1) for description of how to use fixed frequencies.

P1018	**Fixed frequency mode - Bit 2**				**Min:**	1	Level:
	CStat:	CT	**Datatype:** U16	**Unit:** -	**Def:**	1	**3**
	P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** No	**Max:**	3	

Fixed frequencies can be selected in three different modes. Parameter P1018 defines the mode of selection Bit 2.

Possible Settings:

1	Direct selection
2	Direct selection + ON command
3	Binary coded selection + ON command

Details:
See table in P1001 (fixed frequency 1) for description of how to use fixed frequencies.

P1020	BI: Fixed freq. selection Bit 0			Min:	0:0	Level:
	CStat: CT	Datatype: U32	Unit: -	Def:	0:0	3
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max:	4000:0	

Defines origin of fixed frequency selection.
Common Settings:
    P1020 = 722.0 ==> Digital input 1
    P1021 = 722.1 ==> Digital input 2
    P1022 = 722.2 ==> Digital input 3
Dependency:
    Accessible only if P0701 - P0703 = 99 (function of digital inputs = BICO)

P1021	BI: Fixed freq. selection Bit 1			Min:	0:0	Level:
	CStat: CT	Datatype: U32	Unit: -	Def:	0:0	3
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max:	4000:0	

Defines origin of fixed frequency selection.
Dependency:
    Accessible only if P0701 - P0703 = 99 (function of digital inputs = BICO)
Details:
    See P1020 (fixed frequency selection Bit 0) for most common settings

P1022	BI: Fixed freq. selection Bit 2			Min:	0:0	Level:
	CStat: CT	Datatype: U32	Unit: -	Def:	0:0	3
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max:	4000:0	

Defines origin of fixed frequency selection.
Dependency:
    Accessible only if P0701 - P0703 = 99 (function of digital inputs = BICO)
Details:
    See P1020 (fixed frequency selection Bit 0) for most common settings

r1024	CO: Act. fixed frequency			Min:	-	Level:
		Datatype: Float	Unit: Hz	Def:	-	3
	P-Group: SETPOINT			Max:	-	

Displays sum total of selected fixed frequencies.

P1031	Setpoint memory of the MOP			Min:	0	Level:
	CStat: CUT	Datatype: U16	Unit: -	Def:	0	2
	P-Group: SETPOINT	Active: Immediately	QuickComm. No	Max:	1	

Saves last motor potentiometer setpoint (MOP) that was active before OFF command or power down.
Possible Settings:
    0   MOP setpoint will not be stored
    1   MOP setpoint will be stored (P1040 is updated)
Note:
    On next ON command, motor potentiometer setpoint will be the saved value in parameter P1040 (setpoint of the MOP).

P1032	Inhibit reverse direction of MOP			Min:	0	Level:
	CStat: CT	Datatype: U16	Unit: -	Def:	1	2
	P-Group: SETPOINT	Active: first confirm	QuickComm. No	Max:	1	

Inhibits reverse setpoint selection
Possible Settings:
    0   Reverse direction is allowed
    1   Reverse direction inhibited
Dependency:
    Motor potentiometer (P1040) must be chosen as main setpoint or additional setpoint (using P1000).
Note:
    It is possible to change motor direction using the motor potentiometer setpoint (increase / decrease frequency either by using digital inputs or BOP/AOP keypad up / down).

P1035	BI: Enable MOP (UP-command)			Min:	0:0	Level:
	CStat: CT	Datatype: U32	Unit: -	Def:	19:13	3
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max:	4000:0	

Defines source for motor potentiometer setpoint increase frequency.
Common Settings:
    722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
    722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
    722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
    722.3 = Digital input 4 (via analog input, requires P0704 to be set to 99)

    19.D = MOP up via BOP

P1036	**BI: Enable MOP (DOWN-command)**			**Min:**	0:0	Level:
	CStat: CT	**Datatype:** U32	**Unit:** -	**Def:**	19:14	**3**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines source for motor potentiometer setpoint decrease frequency.

Common Settings:
722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (via analog input, requires P0704 to be set to 99)

19.E = MOP down via BOP

P1040	**Setpoint of the MOP**			**Min:**	-650.00	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** Hz	**Def:**	5.00	**2**
	P-Group: SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

Determines setpoint for motor potentiometer control (P1000 = 1).

Note:

If motor potentiometer setpoint is selected either as main setpoint or additional setpoint, the reverse direction will be inhibited by default of P1032 (inhibit reverse direction of MOP).

To re-enable reverse direction, set P1032 = 0.

r1050	**CO: Act. Output freq. of the MOP**			**Min:**	-	Level:
		Datatype: Float	**Unit:** Hz	**Def:**	-	**3**
	P-Group: SETPOINT			**Max:**	-	

Displays output frequency of motor potentiometer setpoint ([Hz]).
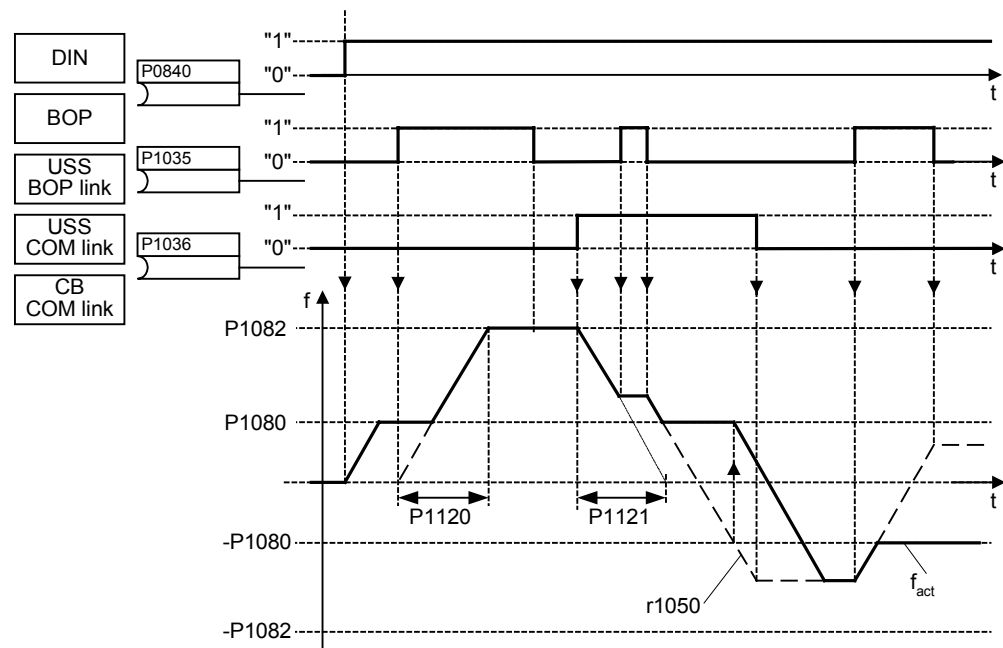
P1055	**BI: Enable JOG right**			**Min:**	0:0	Level:
	CStat: CT	**Datatype:** U32	**Unit:** -	**Def:**	0:0	**3**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines source of JOG right when P0719 = 0 (remote selection of command/setpoint source).

Common Settings:
722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (via analog input, requires P0704 to be set to 99)

19.8 = JOG right via BOP

P1056	**BI: Enable JOG left**			**Min:**	0:0	Level:
CStat:	CT	**Datatype:** U32	**Unit:** -	**Def:**	0:0	**3**
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines source of JOG left when P0719 = 0 (remote selection of command/setpoint source).

Common Settings:
- 722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
- 722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
- 722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
- 722.3 = Digital input 4 (via analog input, requires P0704 to be set to 99)

- 19.9 = JOG left via BOP

P1058	**JOG frequency right**			**Min:**	0.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Def:**	5.00	**2**
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

Jogging increases the motor speed by small amounts. The JOG buttons uses a non-latching switch on one of the digital inputs to control the motor speed.

While JOG right is selected, this parameter determines the frequency at which the inverter will run.
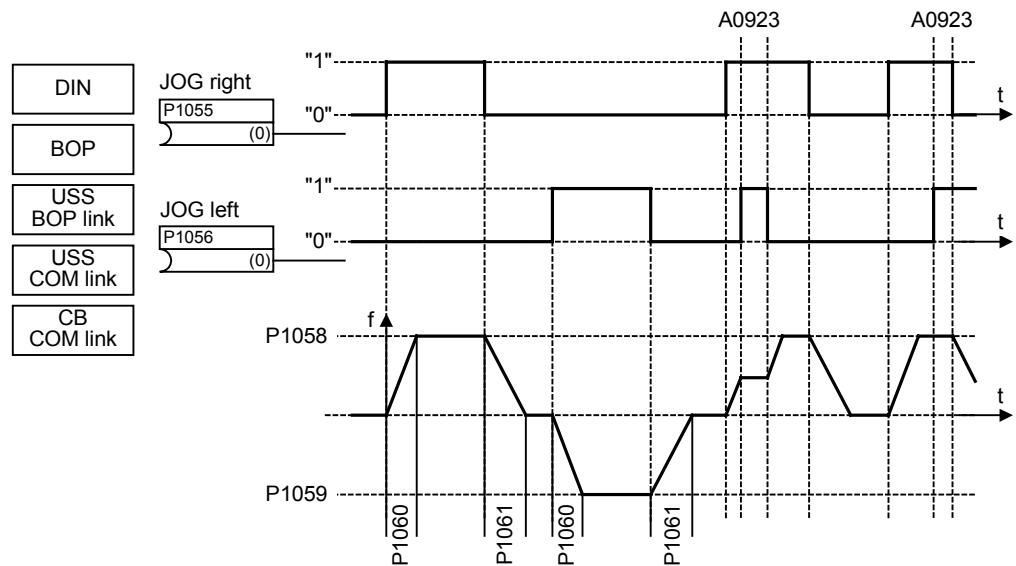
Dependency:
P1060 and P1061 set up and down ramp times respectively for jogging.

P1059	**JOG frequency left**			**Min:**	0.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** Hz	**Def:**	5.00	**2**
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

While JOG left is selected, this parameter determines the frequency at which the inverter will run.

Dependency:
P1060 and P1061 set up and down ramp times respectively for jogging.

P1060	JOG ramp-up time			Min:	0.00	Level:
CStat:	CUT	Datatype: Float	Unit: s	Def:	10.00	**2**
P-Group:	SETPOINT	Active: first confirm	QuickComm. No	Max:	650.00	

Sets jog ramp-up time. This is the time used while jogging is active.
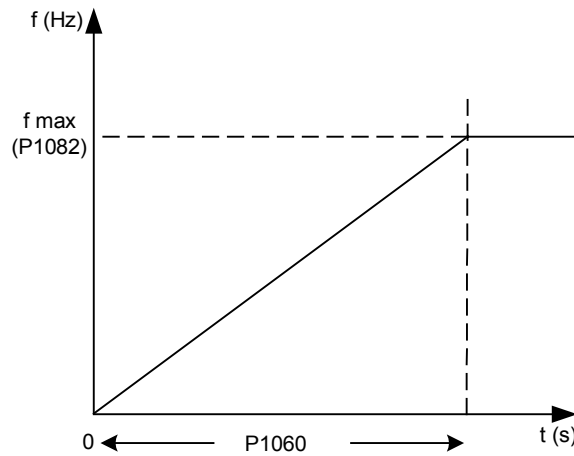
Notice:

Ramp times will be used as follows:
P1060 / P1061 : JOG mode is active
P1120 / P1121 : Normal mode (ON/OFF) is active
P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

P1061	JOG ramp-down time			Min:	0.00	Level:
CStat:	CUT	Datatype: Float	Unit: s	Def:	10.00	**2**
P-Group:	SETPOINT	Active: first confirm	QuickComm. No	Max:	650.00	

Sets ramp-down time. This is the time used while jogging is active.
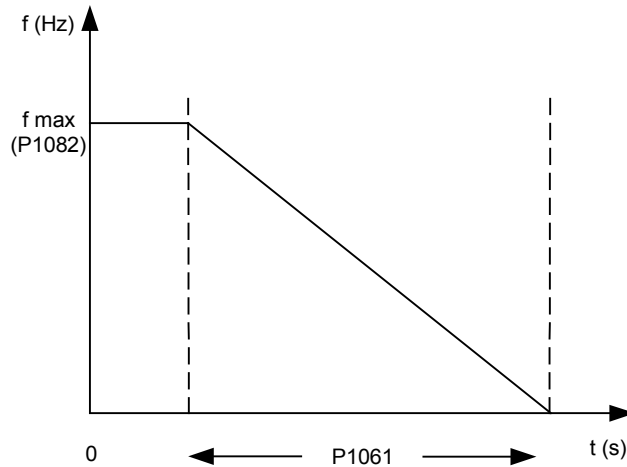
Notice:

Ramp times will be used as follows:
P1060 / P1061 : JOG mode is active
P1120 / P1121 : Normal mode (ON/OFF) is active
P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

P1070	CI: Main setpoint			Min:	0:0	Level:
CStat:	CT	Datatype: U32	Unit: -	Def:	755:0	**3**
P-Group:	SETPOINT	Active: first confirm	QuickComm. No	Max:	4000:0	

Defines source of main setpoint.
Common Settings:
   755   =   Analog input 1 setpoint
  1024   =   Fixed frequency setpoint
  1050   =   Motor potentiometer (MOP) setpoint

P1071	CI: Main setpoint scaling			Min:	0:0	Level:
CStat:	CT	Datatype: U32	Unit: -	Def:	1:0	3
P-Group:	SETPOINT	Active: first confirm	QuickComm. No	Max:	4000:0	

Defines source of the main setpoint scaling.

Common Settings:

755 = Analog input 1 setpoint
1024 = Fixed frequency setpoint
1050 = Motor potentiometer (MOP) setpoint

| P1074	BI: Disable additional setpoint			Min:	0:0	Level:
CStat:	CUT	Datatype: U32	Unit: -	Def:	0:0	3
P-Group:	COMMANDS	Active: first confirm	QuickComm. No	Max:	4000:0	

Disables additional setpoint

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
722.3 = Digital input 4 (via analog input, requires P0704 to be set to 99)

P1075	CI: Additional setpoint			Min:	0:0	Level:
CStat:	CT	Datatype: U32	Unit: -	Def:	0:0	3
P-Group:	SETPOINT	Active: first confirm	QuickComm. No	Max:	4000:0	

Defines source of the additional setpoint (to be added to main setpoint).

Common Settings:

755 = Analog input 1 setpoint
1024 = Fixed frequency setpoint
1050 = Motor potentiometer (MOP) setpoint

P1076	CI: Additional setpoint scaling			Min:	0:0	Level:
CStat:	CT	Datatype: U32	Unit: -	Def:	1:0	3
P-Group:	SETPOINT	Active: first confirm	QuickComm. No	Max:	4000:0	

Defines source of scaling for additional setpoint (to be added to main setpoint).

Common Settings:

1 = Scaling of 1.0 (100%)
755 = Analog input 1 Setpoint
1024 = Fixed Frequency Setpoint
1050 = MOP Setpoint

r1078	CO: Total frequency setpoint			Min:	-	Level:
		Datatype: Float	Unit: Hz	Def:	-	3
	P-Group: SETPOINT			Max:	-	

Displays sum of main and additional setpoints in [Hz].

r1079	CO: Selected frequency setpoint			Min:	-	Level:
		Datatype: Float	Unit: Hz	Def:	-	3
	P-Group: SETPOINT			Max:	-	

Displays selected frequency setpoint.

Following frequency setpoints are displayed:
r1078 Total frequency setpoint
P1058 JOG frequency right
P1059 JOG frequency left

Dependency:

P1055 (BI: Enable JOG right) or P1056 (BI: Enable JOG left) define command source of JOG right or JOG left respectively.

Note:

P1055 = 0 and P1056 = 0 ==> Total frequency setpoint is selected.

P1080	Min. frequency				Min:	0.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** Hz		**Def:**	0.00	**1**
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** Yes		**Max:**	650.00	

Sets minimum motor frequency [Hz] at which motor will run irrespective of frequency setpoint.

The minimum frequency P1080 represents a masking frequency of 0 Hz for all frequency target value sources (e.g. ADC, MOP, FF, USS), with the exception of the JOG target value source (analogous to P1091). Thus the frequency band +/- P1080 is run through in optimum time by means of the acceleration/deceleration ramps. Dwelling in the frequency band is not possible (see example).

Furthermore, an undershoot of the actual frequency f_act below min. frequency P1080 is output by the following signal function.
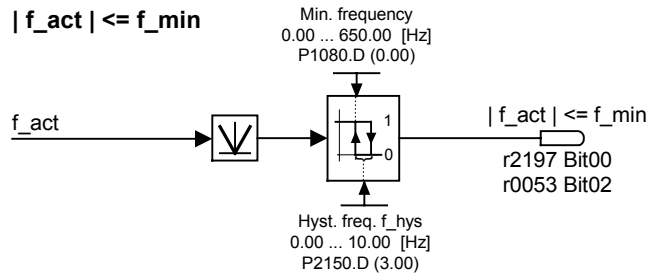
Example:
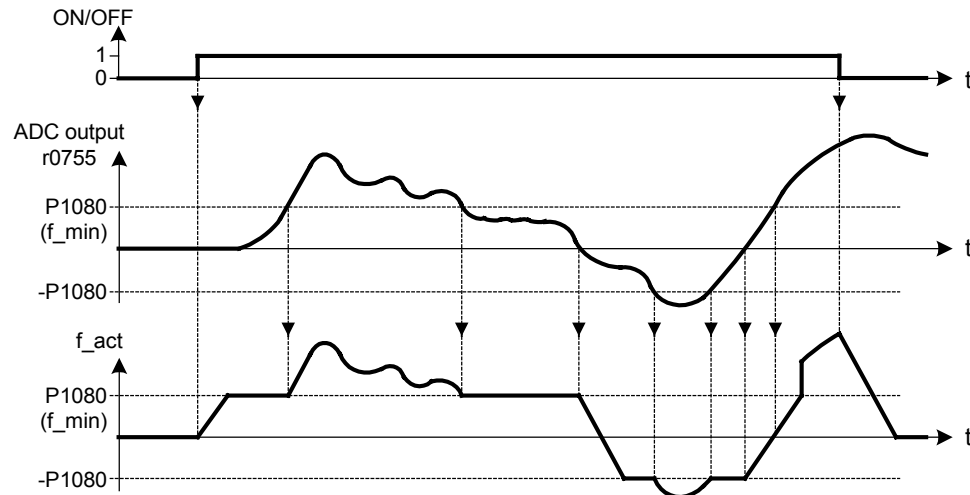
Note:

Value set here is valid both for clockwise and for anticlockwise rotation.

Under certain conditions (e.g. ramping, current limiting), motor can run below minimum frequency.

P1082	Max. frequency			Min:	0.00	Level:
CStat:	CT	Datatype: Float	Unit: Hz	Def:	50.00	**1**
P-Group:	SETPOINT	Active: first confirm	QuickComm. Yes	Max:	650.00	

Sets maximum motor frequency [Hz] at which motor will run irrespective of the frequency setpoint.

Dependency:

The maximal value of motor frequency P1082 is limited to pulse frequency P1800. P1082 is dependent on the derating characteristic as followed:

$$f_{max} = P1082 \leq \frac{f_{pulse}}{15} = \frac{P1800}{15}$$
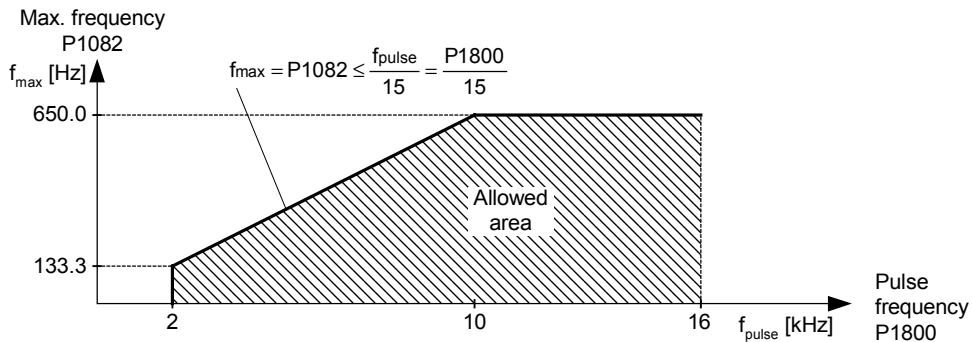
When P1300 < 20 (control mode = VF or FCC modes) then max output frequency is limited to smallest of 650 Hz or (maximum pulse frequency / 15)

Note:

The value set here is valid for both clockwise and anticlockwise rotation.

The maximum output frequency of inverter can be exceeded if one of the following is active:

Slip compensation $= f_{max} + f_{slipcomp\,max}$
or
Flying restart $= f_{max} + f_{slipnom}$

Notice:

Maximum motor speed is subject to mechanical limitations.

P1091	**Skip frequency 1**			**Min:**	0.00	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** Hz	**Def:**	0.00	**3**
	P-Group: SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

Defines skip frequency 1 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).
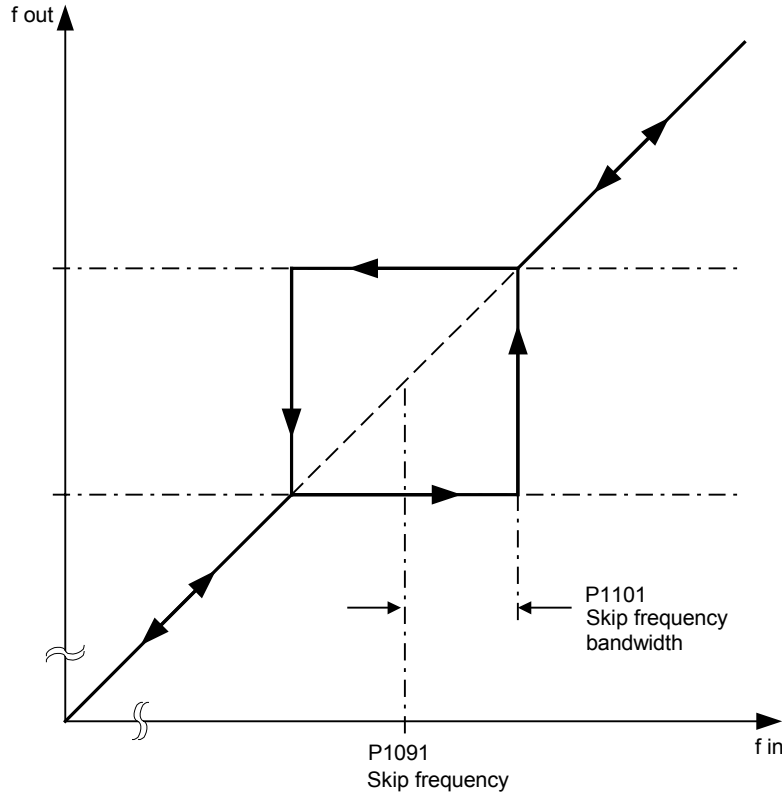
Notice:

Stationary operation is not possible within the suppressed frequency range; the range is merely passed through (on the ramp).

For example, if P1091 = 10 Hz and P1101 = 2 Hz, it is not possible to operate continuously between 10 Hz +/- 2 Hz (i.e. between 8 and 12 Hz).

P1092	**Skip frequency 2**			**Min:**	0.00	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** Hz	**Def:**	0.00	**3**
	P-Group: SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

Defines skip frequency 2 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).

Details:

See P1091 (skip frequency 1).

P1093	**Skip frequency 3**			**Min:**	0.00	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** Hz	**Def:**	0.00	**3**
	P-Group: SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

Defines skip frequency 3 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).

Details:

See P1091 (skip frequency 1).

P1094	**Skip frequency 4**			**Min:**	0.00	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** Hz	**Def:**	0.00	**3**
	P-Group: SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

Defines skip frequency 4 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).

Details:

See P1091 (skip frequency 1).

P1101	Skip frequency bandwidth			Min:	0.00	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** Hz	**Def:**	2.00	**3**
	P-Group: SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:**	10.00	

Delivers frequency bandwidth to be applied to skip frequencies (in [Hz]).
Details:
See P1091 (skip frequency 1).

P1110	BI: Inhibit neg. freq. setpoint			Min:	0:0	Level:
	CStat: CT	**Datatype:** U32	**Unit:** -	**Def:**	0:0	**3**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Inhibits direction reversal, thus preventing a negative setpoint from causing motor from running in reverse.
Instead, it will run at minimum frequency (P1080) in the normal direction.
Common Settings:
0 = Disabled
1 = Enabled
Note:
It is possible to disable all reverse commands (i.e. the command is ignored). To do this, set P0719 = 0
(remote selection of command/setpoint source) and define the command sources (P1113) individually.
Notice:
This function does not disable the "reverse" command function; rather, a reverse command causes motor to
run in the normal direction as described above.

P1113	BI: Reverse			Min:	0:0	Level:
	CStat: CT	**Datatype:** U32	**Unit:** -	**Def:**	722:1	**3**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines source of reverse command used when P0719 = 0 (remote selection of command/setpoint source).
Common Settings:
722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)

19.B = Reverse via BOP

r1114	CO: Freq. setp. after dir. ctrl.			Min:	-	Level:
		Datatype: Float	**Unit:** Hz	**Def:**	-	**3**
	P-Group: SETPOINT			**Max:**	-	

Displays setpoint frequency after change of direction.

r1119	CO: Freq. setpoint before RFG			Min:	-	Level:
		Datatype: Float	**Unit:** Hz	**Def:**	-	**3**
	P-Group: SETPOINT			**Max:**	-	

Displays output frequency after modification by other functions, e.g.:
* P1110 BI: Inhibit neg. freq. setpoint,
* P1091 - P1094 skip frequencies,
* P1080 Min. frequency,
* P1082 Max. frequency,
* limitations,
* etc.

P1120	**Ramp-up time**			**Min:**	0.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** s	**Def:**	10.00	**1**
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** Yes	**Max:**	650.00	

Time taken for motor to accelerate from standstill up to maximum motor frequency (P1082) when no rounding is used.
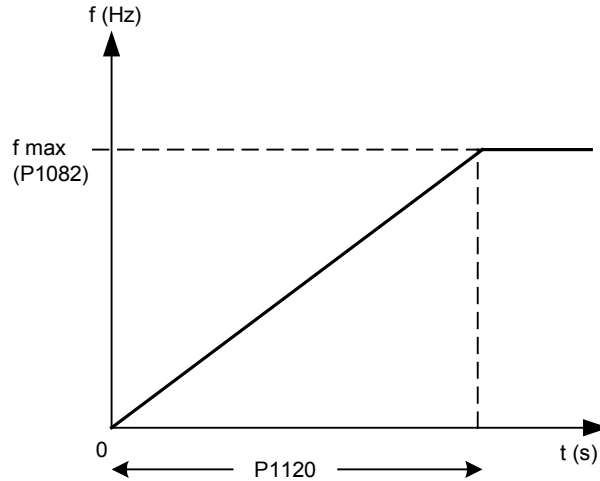
Setting the ramp-up time too short can cause the inverter to trip (overcurrent).

Note:

If an external frequency setpoint with set ramp rates is used (e.g. from a PLC). The best way to achieve optimum drive performance is to set ramp times in P1120 and P1121 slightly shorter than those of the PLC.

Notice:

Ramp times will be used as follows:
P1060 / P1061 : JOG mode is active
P1120 / P1121 : Normal mode (ON/OFF) is active
P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

P1121	**Ramp-down time**			**Min:**	0.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** s	**Def:**	10.00	**1**
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** Yes	**Max:**	650.00	

Time taken for motor to decelerate from maximum motor frequency (P1082) down to standstill when no rounding is used.
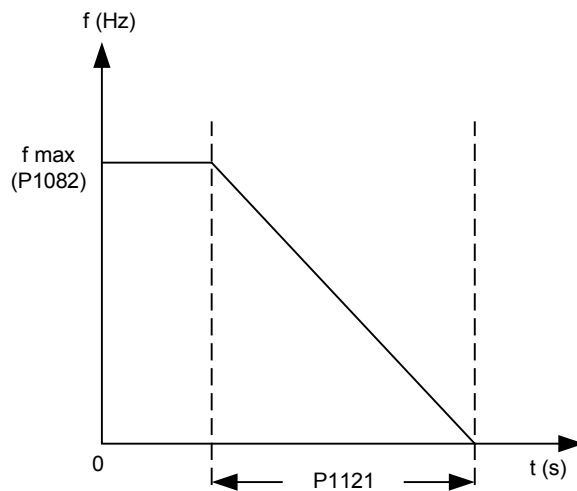
Notice:

Setting the ramp-down time too short can cause the inverter to trip (overcurrent (F0001) / overvoltage (F0002)).

Ramp times will be used as follows:
P1060 / P1061 : JOG mode is active
P1120 / P1121 : Normal mode (ON/OFF) is active
P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

P1124	BI: Enable JOG ramp times			Min:	0:0	Level:
	CStat: CT	Datatype: U32	Unit: -	Def:	0:0	**3**
	P-Group: COMMANDS	Active: first confirm	QuickComm. No	Max:	4000:0	

Defines source for switching between jog ramp times (P1060, P1061) and normal ramp times (P1120, P1121) as applied to the RFG. This parameter is valid for normal mode (ON/OFF) only.

Common Settings:

722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)

Notice:

P1124 does not have any impact when JOG mode is selected. In this case, jog ramp times (P1060, P1061) will be used all the time.

Ramp times will be used as follows:
P1060 / P1061 : JOG mode is active
P1120 / P1121 : Normal mode (ON/OFF) is active
P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

P1130	Ramp-up initial rounding time			Min:	0.00	Level:
	CStat: CUT	Datatype: Float	Unit: s	Def:	0.00	**2**
	P-Group: SETPOINT	Active: first confirm	QuickComm. No	Max:	40.00	

Defines initial rounding time in seconds as shown on the diagram below.
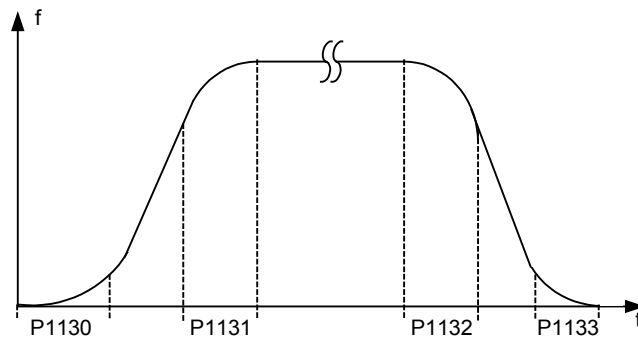
where:

$$T_{up\ total} = \frac{1}{2}P1130 + X \cdot P1120 + \frac{1}{2}P1131$$

$$T_{down\ total} = \frac{1}{2}P1130 + X \cdot P1121 + \frac{1}{2}P1133$$

X is defined as: $X = \Delta f / f_{max}$

i.e. X is the ratio between the frequency step and fmax

Note:

Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

Notice:

Rounding times are not recommended when analog inputs are used, since they would result in overshoot/undershoot in the inverter response.

P1131	Ramp-up final rounding time			Min:	0.00	Level:
	CStat: CUT	Datatype: Float	Unit: s	Def:	0.00	**2**
	P-Group: SETPOINT	Active: first confirm	QuickComm. No	Max:	40.00	

Defines rounding time at end of ramp-up as shown in P1130 (ramp-up initial rounding time).

Note:

Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

Notice:

Rounding times are not recommended when analog inputs are used, since they would result in overshoot/undershoot in the inverter response.

P1132	**Ramp-down initial rounding time**			**Min:**	0.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** s	**Def:**	0.00	**2**
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** No	**Max:**	40.00	

Defines rounding time at start of ramp-down as shown in P1130 (ramp-up initial rounding time).

Note:

Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

Notice:

Rounding times are not recommended when analog inputs are used, since they would result in overshoot/undershoot in the inverter response.

P1133	**Ramp-down final rounding time**			**Min:**	0.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** s	**Def:**	0.00	**2**
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** No	**Max:**	40.00	

Defines rounding time at end of ramp-down as shown in P1130 (ramp-up initial rounding time).

Note:

Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

Notice:

Rounding times are not recommended when analog inputs are used, since they would result in overshoot/undershoot in the inverter response.

P1134	**Rounding type**			**Min:**	0	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** -	**Def:**	0	**2**
P-Group:	SETPOINT	**Active:** Immediately	**QuickComm.** No	**Max:**	1	

Defines smoothing response to OFF1 command or setpoint reduction.

If parameter P1134 = 0 it aviods sudden changes in setpoint frequency. Moreover, it gives smoother torque (no jerk).
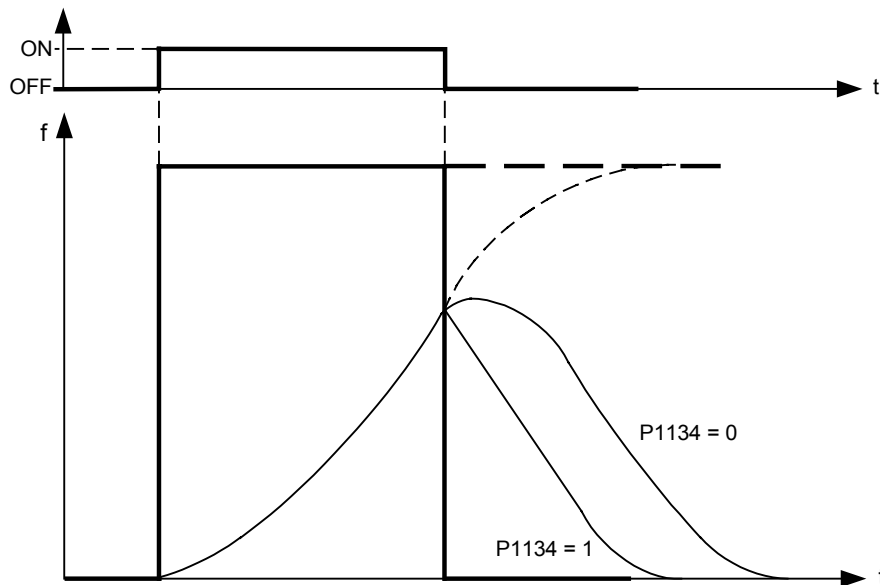
Possible Settings:

    0   Continuous smoothing
    1   Discontinuous smoothing

Dependency:

No effect until total rounding time (P1130) > 0 s.

Notice:

P1134 = 0:
Rounding acts at all times. At a sudden reduction of the input value, overshoot can occur.

P1134 = 1:
Rounding does not act upon sudden reduction of input value during acceleration process.

Rounding times are not recommended when analog inputs are used. They would result in overshoot/undershoot in the inverter response.

P1135	**OFF3 ramp-down time**			**Min:**	0.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** s	**Def:**	5.00	**2**
P-Group:	SETPOINT	**Active:** first confirm	**QuickComm.** Yes	**Max:**	650.00	

Defines ramp-down time from maximum frequency to standstill for OFF3 command.

Note:

This time may be exceeded if the VDC_max. level is reached.

P1140	**BI: RFG enable**			**Min:**	0:0	Level:
CStat:	CT	**Datatype:** U32	**Unit:** -	**Def:**	1:0	**4**
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines command source of RFG enable command (RFG: ramp function generator). If binary input is equal to zero than the RFG output will be set immediately to 0.

P1141	**BI: RFG start**			**Min:**	0:0	Level:
CStat:	CT	**Datatype:** U32	**Unit:** -	**Def:**	1:0	**4**
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines command source of RFG start command (RFG: ramp function generator). If binary input is equal to zero than the RFG output is held at it present value.

P1142	**BI: RFG enable setpoint**			**Min:**	0:0	Level:
CStat:	CT	**Datatype:** U32	**Unit:** -	**Def:**	1:0	**4**
P-Group:	COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines command source of RFG enable setpoint command (RFG: ramp function generator). If binary input is equal to zero than the RFG input will be set to zero and the RFG output will be ramp-down to zero.

r1170	**CO: Frequency setpoint after RFG**			**Min:**	-	Level:
		Datatype: Float	**Unit:** Hz	**Def:**	-	**3**
P-Group:	SETPOINT			**Max:**	-	

Displays overall frequency setpoint after ramp generator.

P1200	**Flying start**			Min:	0	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** -	**Def:**	0	**2**
P-Group:	FUNC	**Active:** first confirm	**QuickComm.** No	**Max:**	6	

Starts inverter onto a spinning motor by rapidly changing the output frequency of the inverter until the actual motor speed has been found. Then, the motor runs up to setpoint using the normal ramp time.
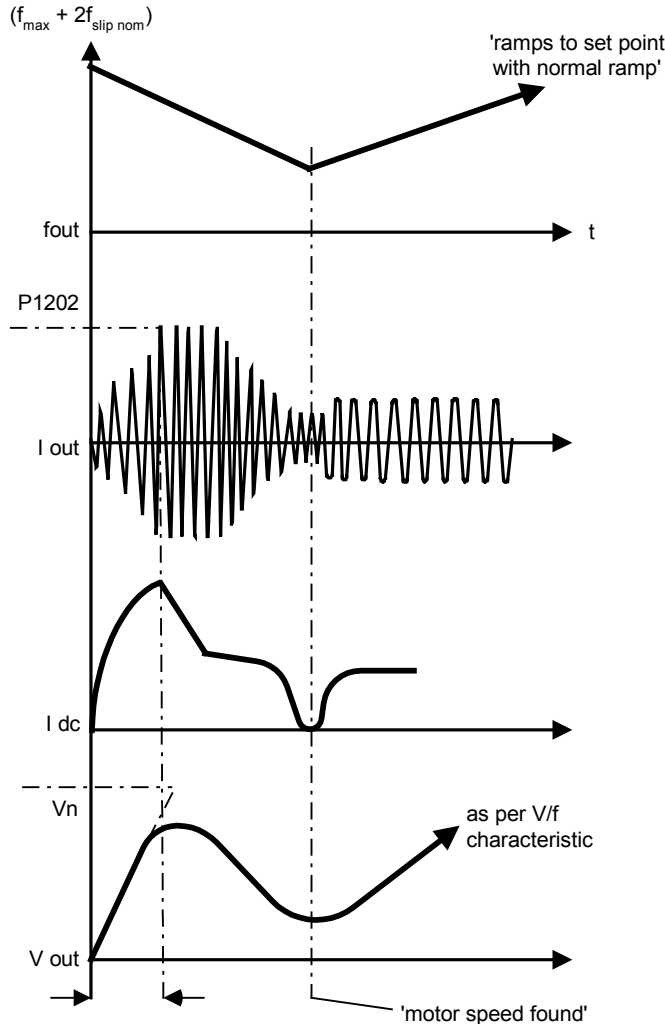
Possible Settings:

0	Flying start disabled
1	Flying start is always active, start in direction of setpoint
2	Flying start is active if power on, fault, OFF2, start in direction of setpoint
3	Flying start is active if fault, OFF2, start in direction of setpoint
4	Flying start is always active, only in direction of setpoint
5	Flying start is active if power on, fault, OFF2, only in direction of setpoint
6	Flying start is active if fault, OFF2, only in direction of setpoint

Note:

Useful for motors with high inertia loads.

Settings 1 to 3 search in both directions.
Settings 4 to 6 search only in direction of setpoint.

Notice:

Flying start must be used in cases where the motor may still be turning (e.g. after a short mains break) or can be driven by the load. Otherwise, overcurrent trips will occur.

P1202	**Motor-current: Flying start**			Min:	50	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** %	**Def:**	100	**3**
P-Group:	FUNC	**Active:** first confirm	**QuickComm.** No	**Max:**	200	

Defines search current used for flying start.

Value is in [%] based on rated motor current (P0305).

Note:

Reducing the search current may improve performance for flying start if the inertia of the system is not very high.

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P1203	Search rate: Flying start			Min:	50	Level:
CStat:	CUT	Datatype: U16	Unit: %	Def:	100	
P-Group:	FUNC	Active: first confirm	QuickComm. No	Max:	200	**3**

Sets factor by which the output frequency changes during flying start to synchronize with turning motor. This value is entered in [%] defines the reciprocal initial gradient in the search sequence (see curve below). Parameter P1203 influences the time taken to search for the motor frequency.

$$f_{max} + 2\,f_{slip,nom} = P1082 + 2 \cdot \frac{r0330}{100} \cdot P0310$$
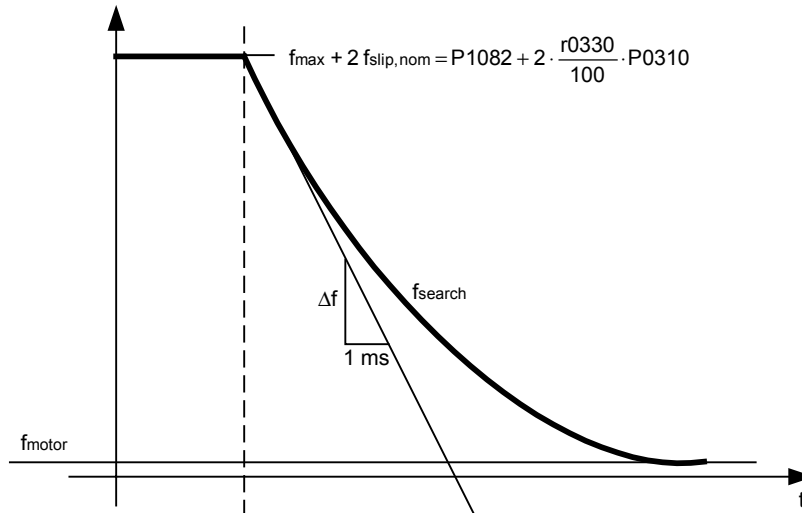
$$P1203\,[\%] = \frac{\Delta t\,[ms]}{\Delta f\,[Hz]} \cdot \frac{f_{slip,nom}\,[Hz]}{1\,[ms]} \cdot 2\,[\%] \quad \Rightarrow \quad \Delta f = \frac{2\,[\%]}{P1203\,[\%]} \cdot \frac{r0330}{100} \cdot P0310$$

The search time is the time taken to search through all frequencies between max. frequency P1082 + 2 x f_slip to 0 Hz.

P1203 = 100 % is defined as giving a rate of 2 % of f_slip,nom / [ms].
P1203 = 200 % would result in a rate of frequency change of 1 % of f_slip,nom / [ms].

Example:

For a motor with 50 Hz, 1350 rpm, 100 % would produce a maximum search time of 600 ms. If the motor is turning, the motor frequency is found in a shorter time.

Note:

A higher value produces a flatter gradient and thus a longer search time.
A lower value has the opposite effect.

r1204	Status word: Flying start V/f			Min:	-	Level:
		Datatype: U16	Unit: -	Def:	-	**4**
	P-Group: FUNC			Max:	-	

Bit parameter for checking and monitoring states during search, if V/f control mode is selected (see P1300).

Bitfields:

```
Bit00   Current applied                       0    NO
                                              1    YES
Bit01   Current could not be applied          0    NO
                                              1    YES
Bit02   Voltage reduced                       0    NO
                                              1    YES
Bit03   Slope-filter started                  0    NO
                                              1    YES
Bit04   Current less threshold                0    NO
                                              1    YES
Bit05   Current-minimum                       0    NO
                                              1    YES
Bit07   Speed could not be found              0    NO
                                              1    YES
```

P1210	**Automatic restart**				Min:	0	Level:
	CStat: CUT	**Datatype:** U16	**Unit:** -		**Def:**	1	**2**
	P-Group: FUNC	**Active:** first confirm	**QuickComm.** No		**Max:**	5	

Configures automatic restart function

Possible Settings:

0	Disabled
1	Trip reset after power on, P1211 disabled
2	Restart after mains blackout, P1211 disabled
3	Restart after mains brownout or fault, P1211 enabled
4	Restart after mains brownout, P1211 enabled
5	Restart after mains blackout and fault, P1211 disabled

Dependency:

Automatic restart requires constant ON command via a digital input wire link.

Caution:

P1210 > 2 can cause the motor to restart automatically without toggling the ON command !

Notice:

A "mains brownout" is where the power in interrupted and re-applied before the display on the BOP (if one is fitted to the inverter) has gone dark (a very short mains break where the DC link has not fully collapsed).

A "mains blackout" is where the display has gone dark (a long mains break where the DC link has fully collapsed) before the power is re-applied.

P1210 = 0:
Automatic restart is disabled.

P1210 = 1:
The inverter will acknowledge (reset) faults i.e. it will reset a fault when the is re-applied. This means the inverter must be fully powered down, a brownout is not sufficed. The inverter will not run until the ON command has been toggled.

P1210 = 2:
The inverter will acknowledge the fault F0003 at power on after blackout and restarts the drive. It is necessary that the ON command is wired via digital input (DIN).

P1210 = 3:
For these settings it is fundamental that the drive only restarts if it has been in a RUN state at the time of the faults (F0003, etc.). The inverter will acknowledge the fault and restarts the drive after a blackout or bronwout. It is necessary that the ON command is wired via digital input (DIN).

P1210 = 4:
For these settings it is fundamental that the drive only restarts if it has been in a RUN state at the time of the fault (F0003). The inverter will acknowledge the fault and restarts the drive after a blackout or bronwout. It is necessary that the ON command is wired via digital input (DIN).

P1210 = 5:
The inverter will acknowledge the faults F0003 etc. at power on after blackout and restarts the drive. It is necessary that the ON command is wired via digital input (DIN).

Following table presents an overview of parameter P1210 and its functionality.

P1210	Blackout F0003	Brownout F0003	All other faults without power cycle	All other faults with power cycle	ON command enabled during Power OFF
0	–	–	–	–	–
1	Fault acknowledge	–	–	–	Fault acknowledge
2	Fault acknowledge + restart	–	–	–	Fault acknowledge + restart
3	Fault acknowledge + restart	Fault acknowledge + restart	Fault acknowledge + restart	Fault acknowledge + restart	–
4	Fault acknowledge + restart	Fault acknowledge + restart	–	–	–
5	Fault acknowledge + restart	**–**	**–**	Fault acknowledge + restart	Fault acknowledge + restart

Flying start must be used in cases where the motor may still be turning (e.g. after a short mains break) or can be driven by the load (P1200).

P1211	**Number of restart attempts**			**Min:** 0	Level:
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:** 3	**3**
	P-Group: FUNC	**Active:** first confirm	**QuickComm.** No	**Max:** 10	

Specifies number of times inverter will attempt to restart if automatic restart P1210 is activated.

P1215	**Holding brake enable**			**Min:** 0	Level:
	CStat: T	**Datatype:** U16	**Unit:** -	**Def:** 0	**2**
	P-Group: FUNC	**Active:** first confirm	**QuickComm.** No	**Max:** 1	

Enables/disables holding brake function. This function applies the following profile to the inverter:

Relay switching is also possible at point 1 and point 2 (if programmed in P0731 = 52.C) to control a brake.

ON / OFF1/OFF3:
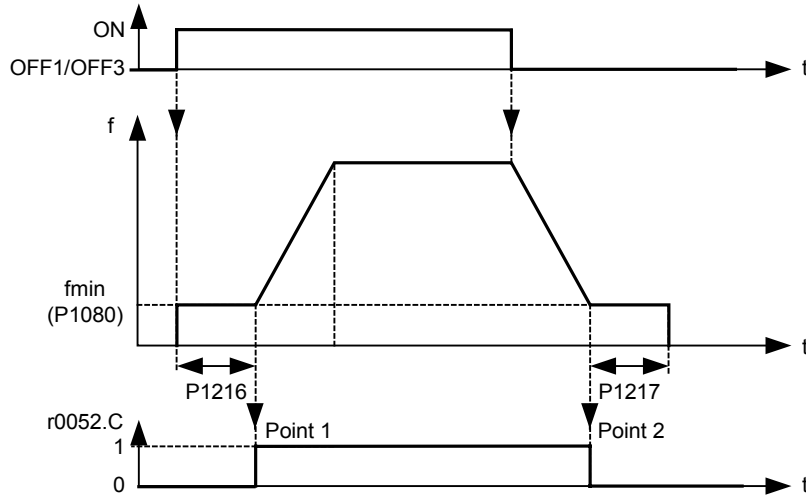
ON / OFF2:
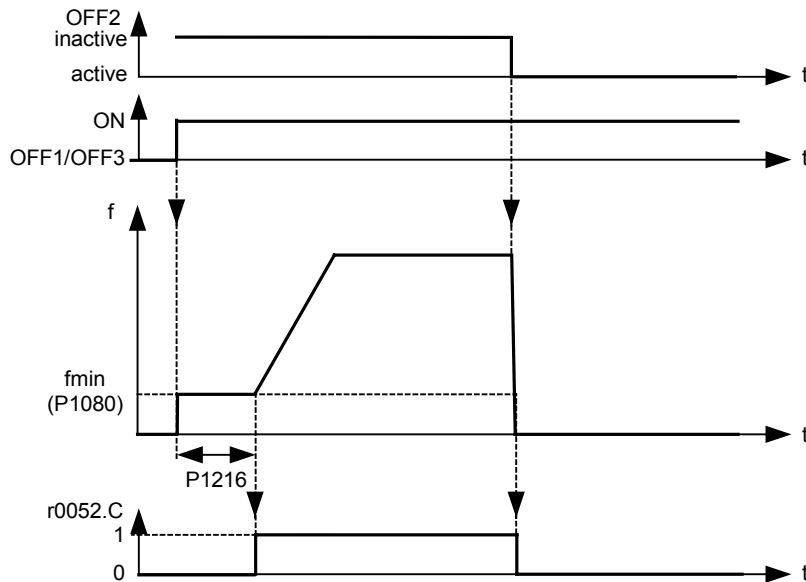
Possible Settings:

0	Motor holding brake disabled
1	Motor holding brake enabled

Note:

The brake relay opens at point 1, if enabled using P0731 (function of digital output), and closes at point 2.

P1216	**Holding brake release delay**			**Min:**	0.0	Level:
	CStat: T	**Datatype:** Float	**Unit:** s	**Def:**	1.0	**2**
	P-Group: FUNC	**Active:** first confirm	**QuickComm.** No	**Max:**	20.0	

Defines period during which inverter runs at min. frequency P1080 before ramping up at point 1 (as shown in P1215 - holding brake enable). Inverter starts at min. frequency P1080 on this profile, i.e. it does not use a ramp.

Note:

A typical value of min. frequency P1080 for this type of application is the slip frequency of the motor.

You can calculate the rated slip frequency by using the following formula:

$$f_{Slip}[Hz] = \frac{r0330}{100} \cdot P0310 = \frac{n_{syn} - n_n}{n_{syn}} \cdot f_n$$

Notice:

If used to hold the motor at a certain frequency against a mechanical brake (i.e. you are using a relay to control mechanical brake), it is important that min. frequency P1080 < 5 Hz; otherwise, the current drawn may be too high and the relay may not open.

P1217	**Holding time after ramp down**			**Min:**	0.0	Level:
	CStat: T	**Datatype:** Float	**Unit:** s	**Def:**	1.0	**2**
	P-Group: FUNC	**Active:** first confirm	**QuickComm.** No	**Max:**	20.0	

Defines time for which inverter runs at minimum frequency (P1080) after ramping down at point 2.

Details:

See diagram P1215 (holding brake enable).

P1230	BI: Enable DC braking			Min:	0:0	Level:
CStat:	CUT	Datatype: U32	Unit: -	Def:	0:0	**3**
P-Group:	COMMANDS	Active: first confirm	QuickComm. No	Max:	4000:0	

Enables DC braking via a signal applied from an external source. Function remains active while external input signal is active.

DC braking causes the motor to stop rapidly by applying a DC braking current (current applied also holds shaft stationary).

When the DC braking signal is applied, the inverter output pulses are blocked and the DC current is not applied until the motor has been sufficiently demagnetized.
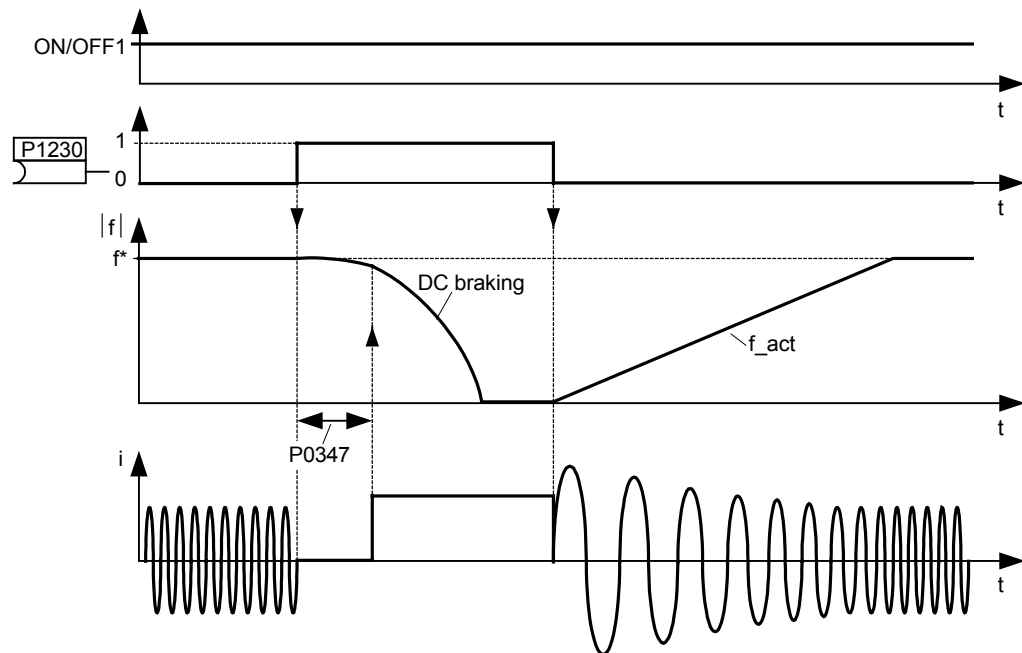
The level of DC braking is set in P1232 (DC braking current - relative to the rated motor current) which is set to 100 % by default.

Common Settings:

722.0	=	Digital input 1 (requires P0701 to be set to 99, BICO)
722.1	=	Digital input 2 (requires P0702 to be set to 99, BICO)
722.2	=	Digital input 3 (requires P0703 to be set to 99, BICO)
722.3	=	Digital input 4 (via analog input, requires P0704 to be set to 99)

Caution:

Frequent use of long periods of DC braking can cause the motor to overheat.

Notice:

This delay time is set in P0347 (demagnetization time). If this delay is too short, overcurrent trips can occur.

DC braking is not possible when using a synchronous motor (i.e. P0300 = 2).

P1232	DC braking current			Min:	0	Level:
CStat:	CUT	Datatype: U16	Unit: %	Def:	100	**2**
P-Group:	FUNC	Active: Immediately	QuickComm. No	Max:	250	

Defines level of DC current in [%] relative to rated motor current (P0305).

P1233	**Duration of DC braking**			Min:	0	Level:
CStat: CUT	**Datatype:** U16	**Unit:** s	**Def:** 0			**2**
P-Group: FUNC	**Active:** Immediately	**QuickComm.** No	**Max:** 250			

Defines duration for which DC injection braking is to be active following an OFF1 or OFF3, command. Setting this parameter between 1 and 250 sets the time duration (in seconds) of the DC injection starting with the OFF1 or OFF3 command.
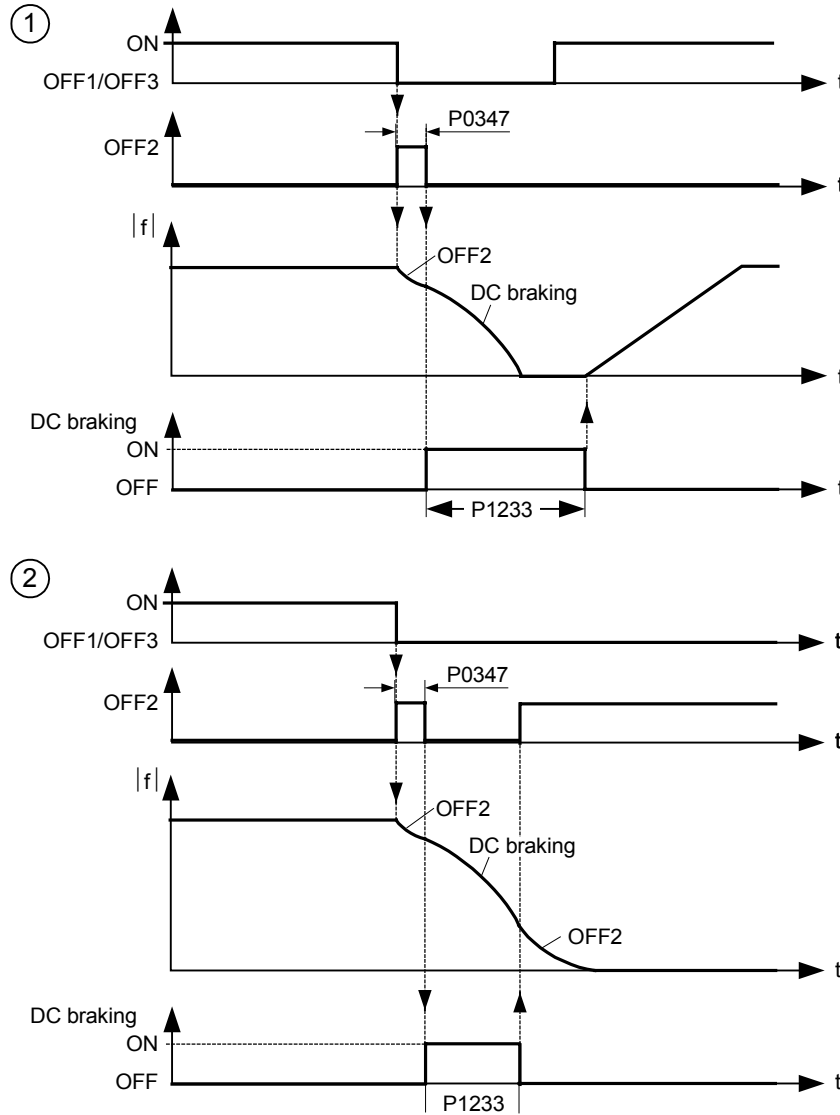
Parameter P1232 still controls the level of DC injection.

Value:

P1233 = 0 :
Not active following OFF1 / OFF3.

P1233 = 1 - 250 :
Active for the specified duration.

Caution:

Frequent use of long periods of DC braking can cause the motor to overheat.

Notice:

The DC braking function causes the motor to stop rapidly by applying a DC braking current (the current applied also holds the shaft stationary). When the DC braking signal is applied, the inverter output pulses are blocked and the DC current not applied until the motor has been sufficiently demagnetized (demagnetization time is calculated automatically from motor data).

The inverter will not restart if an ON-command is given during this period.

DC braking is not possible when using a synchronous motor (i.e. P0300 = 2).

P1236	**Compound braking current**			Min:	0	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** %	**Def:**	0	**2**
P-Group:	FUNC	**Active:** Immediately	**QuickComm.** No	**Max:**	250	

Defines DC level superimposed on AC waveform after OFF1 / OFF3 command. The value is entered in [%] relative to rated motor current (P0305).

If P1254 = 0 :

Compound braking switch-on level $= 1.13 \cdot \sqrt{2} \cdot V_{mains} = 1.13 \cdot \sqrt{2} \cdot P0210$

otherwise :

Compound braking switch-on level $= 0.98 \cdot r1242$

Value:

P1236 = 0 :
Compound braking disabled.

P1236 = 1 - 250 :
Level of DC braking current defined as a [%] of rated motor current (P0305).

Dependency:

Compound braking depends on the DC link voltage only (see threshold above). This will happen on OFF1, OFF3 and any regenerative condition.

It is disabled, when:
- DC braking is active
- Flying start is active

Notice:

Increasing the value will generally improve braking performance; however, if you set the value too high, an overcurrent trip may result.

If used with dynamic brake enabled as well compound braking will take priority.

If used with the Vdc max controller enabled the drive behaviour whilst braking may be worsened paticularly with high values of compound braking.

P1240	**Configuration of Vdc controller**			Min:	0	Level:
CStat:	CT	**Datatype:** U16	**Unit:** -	**Def:**	1	**3**
P-Group:	FUNC	**Active:** Immediately	**QuickComm.** No	**Max:**	1	

Enables / disables Vdc controller.

The Vdc controller dynamically controls the DC link voltage to prevent overvoltage trips on high inertia systems.

Possible Settings:

0   Vdc controller disabled
1   Vdc-max controller enabled

Note:

Vdc max controller automatically increases ramp-down times to keep the DC-link voltage (r0026) within limits (P2172).

r1242	**CO: Switch-on level of Vdc-max**			Min:	-	Level:
		Datatype: Float	**Unit:** V	**Def:**	-	**3**
P-Group:	FUNC			**Max:**	-	

Displays switch-on level of Vdc max controller. The formula is only valid if auto detection is not activated (P1254=0).

Following equation is only valid, if P1254 = 0 :

$r1242 = 1.15 \cdot \sqrt{2} \cdot V_{mains} = 1.15 \cdot \sqrt{2} \cdot P0210$

P1243	**Dynamic factor of Vdc-max**			Min:	10	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** %	**Def:**	100	**3**
P-Group:	FUNC	**Active:** Immediately	**QuickComm.** No	**Max:**	200	

Defines dynamic factor for DC link controller in [%].

Dependency:

P1243 = 100 % means parameters P1250, P1251 and P1252 (gain, integration time and differential time) are used as set. Otherwise, these are multiplied by P1243 (dynamic factor of Vdc-max).

Note:

Vdc controller adjustment is calculated automatically from motor and inverter data.

P1250	**Gain of Vdc-controller**			Min:	0.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** -	**Def:**	1.00	**4**
P-Group:	FUNC	**Active:** Immediately	**QuickComm.** No	**Max:**	10.00	

Enters gain for Vdc controller.

P1251	**Integration time Vdc-controller**			**Min:**	0.1	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** ms	**Def:**	40.0	**4**
	P-Group: FUNC	**Active:** Immediately	**QuickComm.** No	**Max:**	1000.0	

Enters integral time constant for Vdc controller.

P1252	**Differential time Vdc-controller**			**Min:**	0.0	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** ms	**Def:**	1.0	**4**
	P-Group: FUNC	**Active:** Immediately	**QuickComm.** No	**Max:**	1000.0	

Enters differential time constant for Vdc controller.

P1253	**Vdc-controller output limitation**			**Min:**	0	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** Hz	**Def:**	10	**3**
	P-Group: FUNC	**Active:** Immediately	**QuickComm.** No	**Max:**	600	

Limits maximum effect of Vdc max controller.

P1254	**Auto detect Vdc switch-on levels**			**Min:**	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	1	**3**
	P-Group: FUNC	**Active:** Immediately	**QuickComm.** No	**Max:**	1	

Enables/disables auto-detection of switch-on levels for Vdc max controller.

Possible Settings:

    0   Disabled
    1   Enabled

P1300	**Control mode**			**Min:** 0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:** 0	**2**
	P-Group: CONTROL	**Active:** first confirm	**QuickComm.** Yes	**Max:** 3	

Controls relationship between speed of motor and voltage supplied by inverter as illustrated in the diagram below.
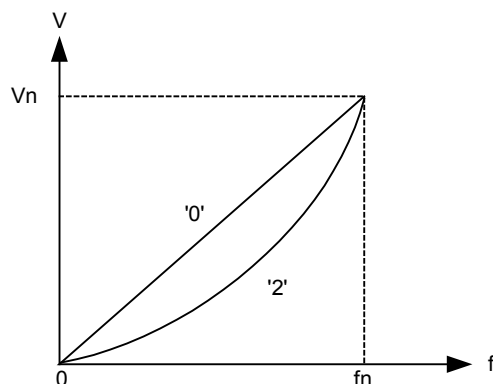
Possible Settings:

0	V/f with linear characteristic
1	V/f with FCC
2	V/f with parabolic characteristic
3	V/f with programmable characteristic

Note:

V/f mode:
P1300 = 1 : V/f with FCC (flux current control)
* Maintains motor flux current for improved efficiency.
* If FCC is chosen, linear V/f is active at low frequencies.

P1300 = 2 : V/f with a quadratic curve
* Suitable for centrifugal fans / pumps

The following table presents an overview of control parameters (V/f) that can be modify in relationship to P1300 dependencies:

ParNo.	ParText	Level	U/f			
	P1300 =		0	1	2	3
P1300	Control mode	2	x	x	x	x
P1310	Continuous boost	2	x	x	x	x
P1311	Acceleration boost	2	x	x	x	x
P1312	Starting boost	2	x	x	x	x
P1316	Boost end frequency	3	x	x	x	x
P1320	Programmable V/f freq. coord. 1	3	–	–	–	x
P1321	Programmable V/f volt. coord. 1	3	–	–	–	x
P1322	Programmable V/f freq. coord. 2	3	–	–	–	x
P1323	Programmable V/f volt. coord. 2	3	–	–	–	x
P1324	Programmable V/f freq. coord. 3	3	–	–	–	x
P1325	Programmable V/f volt. coord. 3	3	–	–	–	x
P1333	Start frequency for FCC	3	–	x	–	–
P1335	Slip compensation	2	x	x	x	x
P1336	Slip limit	2	x	x	x	x
P1338	Resonance damping gain V/f	3	x	x	x	x
P1340	Imax controller prop. gain	3	x	x	x	x
P1341	Imax controller integral time	3	x	x	x	x
P1345	Imax controller prop. gain	3	x	x	x	x
P1346	Imax controller integral time	3	x	x	x	x
P1350	Voltage soft start	3	x	x	x	x

P1310	**Continuous boost**			Min:	0.0	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:**	50.0	**2**
	P-Group: CONTROL	**Active:** Immediately	**QuickComm.** No	**Max:**	250.0	

At low output frequencies the output voltage is low to keep the flux level constant. However, the output voltage may be too low
- for magnetisation the asynchronous motor
- to hold the load
- to overcome losses in the system. The output voltage can be increased using parameter P1310.

Defines boost level in [%] relative to P0305 (rated motor current) applicable to both linear and quadratic V/f curves according to the diagram below:
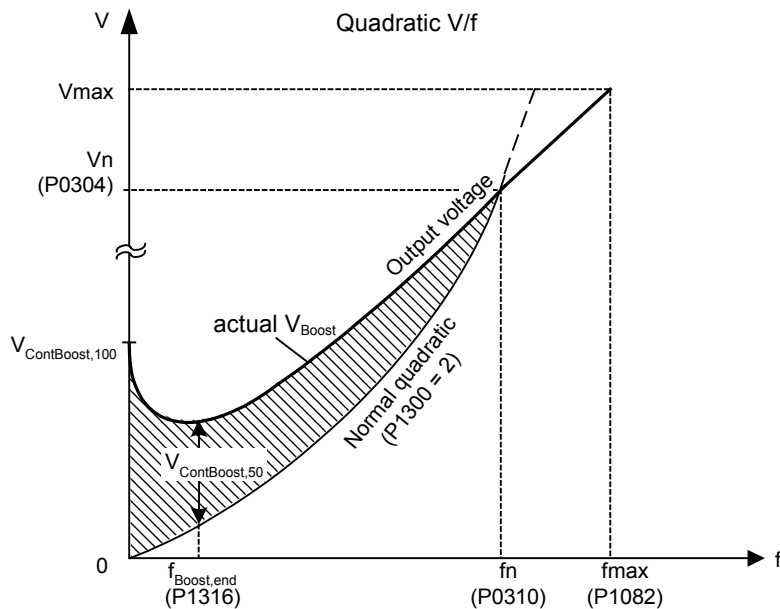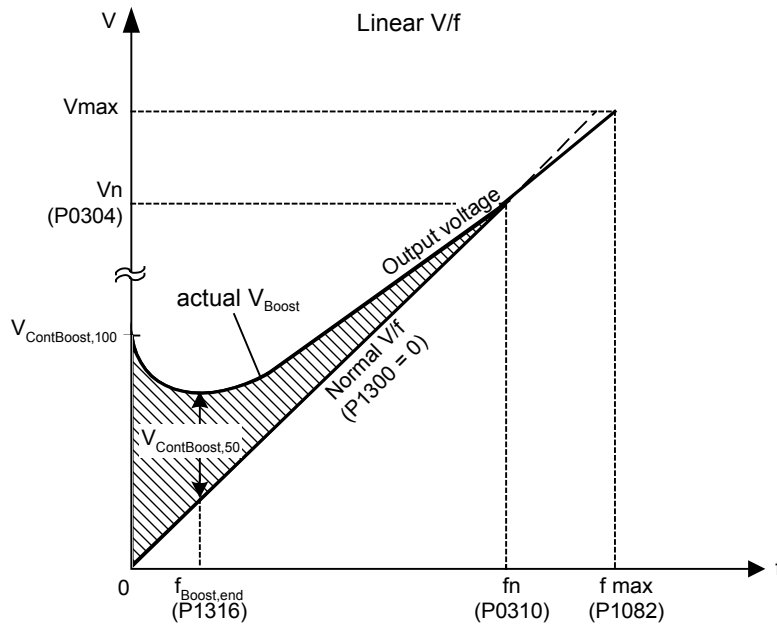
where voltage values are given

V_ConBoost,100 = rated motor current (P0305) * Stator resistance (P0350) * Continous boost (P1310)
V_ConBoost,50 = V_ConBoost,100 / 2

Dependency:

Setting in P0640 (motor overload factor [%]) limits the boost.

Note:

The boost values are combined when continuous boost (P1310) used in conjunction with other boost parameters (acceleration boost P1311 and starting boost P1312).

However priorities are allocated to these parameters as follows:
P1310 > P1311 > P1312

Notice:

Increasing the boost levels increases motor heating (especially at standstill).

$$\sum Boosts \leq 300 \cdot Rs \cdot Imot$$

P1311	**Acceleration boost**			Min:	0.0	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:**	0.0	**2**
	P-Group: CONTROL	**Active:** Immediately	**QuickComm.** No	**Max:**	250.0	

P1311 will only produce boost during ramping, and is therefore useful for additional torque during acceleration and deceleration.

Applies boost in [%] relative to P0305 (rated motor current) following a positive setpoint change and drops back out once the setpoint is reached.
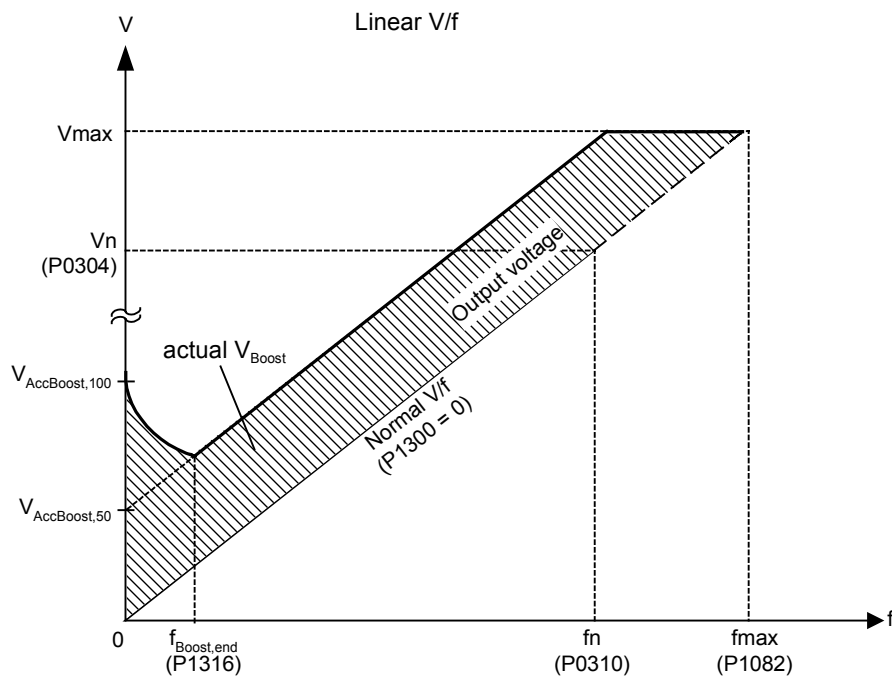
where voltage values are given

V_AccBoost,100 = rated motor current (P0305) * Stator resistance (P0350) * Acceleration boost (P1311)
V_AccBoost,50 = V_AccBoost,100 / 2

Dependency:

Setting in P0640 (motor overload factor [%]) limits boost.

Note:

Acceleration boost can help to improve response to small positive setpoint changes.

$$\sum Boosts \leq 300 \cdot Rs \cdot Imot$$

Notice:

Increasing the boost level increases motor heating.

Details:

See note in P1310 for boost priorities.

P1312	**Starting boost**			**Min:**	0.0	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Def:**	0.0	**2**
P-Group:	CONTROL	**Active:** Immediately	**QuickComm.** No	**Max:**	250.0	

Applies a constant linear offset (in [%] relative to P0305 (rated motor current)) to active V/f curve (either linear or quadratic) after an ON command and is active until
1) ramp output reaches setpoint for the first time respectively
2) setpoint is reduced to less than present ramp output

This is useful for starting loads with high inertia.

Setting the starting boost (P1312) too high will cause the inverter to limit the current, which will in turn restrict the output frequency to below the setpoint frequency.
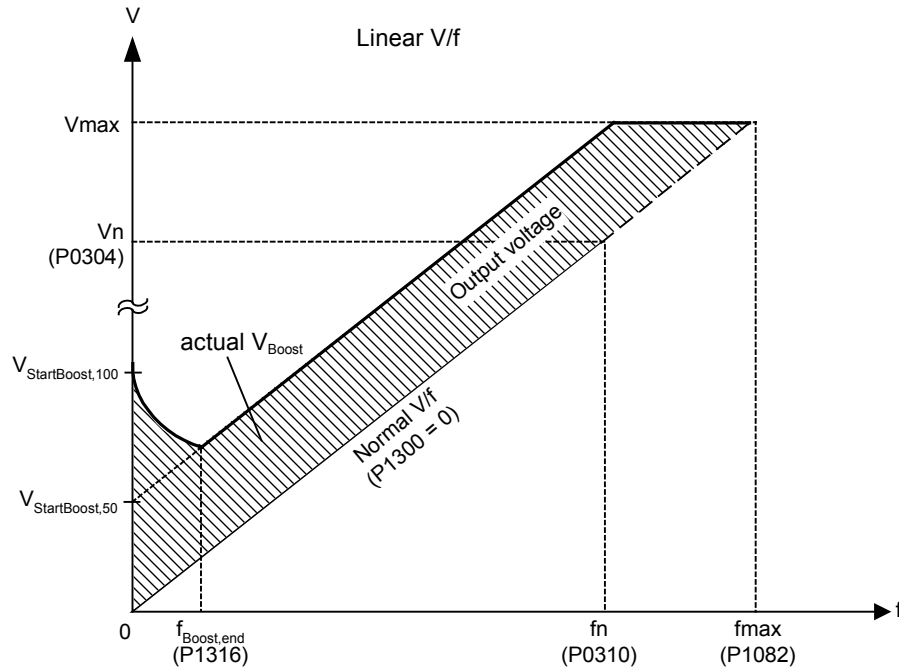
where voltage values are given

V_StartBoost,100 = rated motor current (P0305) * Stator resistance (P0350) * Starting boost (P1312)
V_StartBoost,50 = V_StartBoost,100 / 2

Example:

Setpoint = 50Hz. Ramping up with starting boost. During ramp up, setpoint changed to 20Hz. As soon as setpoint changed, starting boost removed because setpoint smaller than present ramp output.

Dependency:

Setting in P0640 (motor overload factor [%]) limits boost.

Notice:

Increasing the boost levels increases motor heating.

$$\sum Boosts \leq 300 \cdot Rs \cdot Imot$$

Details:

See note in P1310 for boost priorities.

r1315	**CO: Total boost voltage**			**Min:**	-	Level:
		Datatype: Float	**Unit:** V	**Def:**	-	**4**
	P-Group: CONTROL			**Max:**	-	

Displays total value of voltage boost (in volts).

P1316	**Boost end frequency**			**Min:**	0.0	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:**	20.0	**3**
	P-Group: CONTROL	**Active:** Immediately	**QuickComm.** No	**Max:**	100.0	

Defines point at which programmed boost reaches 50 % of its value.

This value is expressed in [%] relative to P0310 (rated motor frequency).

The default frequency is defined as follows:

$$f_{Boost\ min} = 2 \cdot \left(\frac{153}{\sqrt{P_{motor}}} + 3 \right)$$

Note:

The expert user may change this value to alter the shape of the curve, e.g. to increase torque at a particular frequency.

Default value is dependant on inverter rated power.

Details:

See diagram in P1310 (continuous boost).

P1320	**Programmable V/f freq. coord. 1**			**Min:**	0.00	Level:
	CStat: CT	**Datatype:** Float	**Unit:** Hz	**Def:**	0.00	**3**
	P-Group: CONTROL	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

Sets V/f coordinates (P1320/1321 to P1324/1325) to define V/f characteristic.
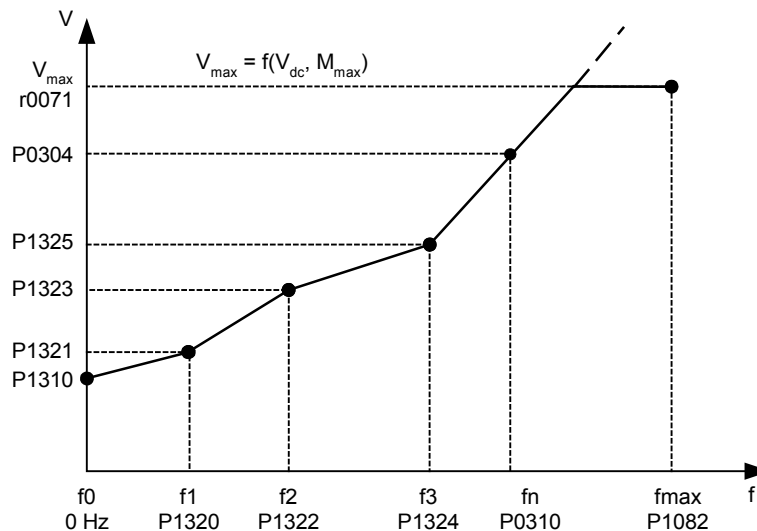
$$P1310[V] = \frac{P1310[\%]}{100[\%]} \cdot \frac{r0395[\%]}{100[\%]} \cdot P0304[V]$$

Example:

This parameter can be used to provide correct torque at correct frequency and is useful when used with synchronous motors.

Dependency:

To set parameter, select P1300 = 3 (V/f with programmable characteristic).

Note:

Linear interpolation will be applied between the individual data points.

V/f with programmable characteristic (P1300 = 3) has 3 programmable points. The two non-programmable points are:
- Continuous boost P1310 at zero 0 Hz
- Rated motor voltage P0304 at rated motor frequency P0310

The acceleration boost and starting boost defined in P1311 and P1312 are applied to V/f with programmable characteristic.

P1321	**Programmable V/f volt. coord. 1**			**Min:**	0.0	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** V	**Def:**	0.0	**3**
	P-Group: CONTROL	**Active:** Immediately	**QuickComm.** No	**Max:**	3000.0	

See P1320 (programmable V/f freq. coord. 1).

P1322	**Programmable V/f freq. coord. 2**			**Min:**	0.00	Level:
	CStat: CT	**Datatype:** Float	**Unit:** Hz	**Def:**	0.00	**3**
	P-Group: CONTROL	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

See P1320 (programmable V/f freq. coord. 1).

P1323	**Programmable V/f volt. coord. 2**			**Min:**	0.0	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** V	**Def:**	0.0	**3**
	P-Group: CONTROL	**Active:** Immediately	**QuickComm.** No	**Max:**	3000.0	

See P1320 (programmable V/f freq. coord. 1).

P1324	**Programmable V/f freq. coord. 3**			**Min:**	0.00	Level:
	CStat: CT	**Datatype:** Float	**Unit:** Hz	**Def:**	0.00	**3**
	P-Group: CONTROL	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

See P1320 (programmable V/f freq. coord. 1).

P1325	**Programmable V/f volt. coord. 3**			**Min:**	0.0	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** V	**Def:**	0.0	**3**
	P-Group: CONTROL	**Active:** Immediately	**QuickComm.** No	**Max:**	3000.0	

See P1320 (programmable V/f freq. coord. 1).

P1333	**Start frequency for FCC**			**Min:**	0.0	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:**	10.0	**3**
	P-Group: CONTROL	**Active:** Immediately	**QuickComm.** No	**Max:**	100.0	

Defines start frequency at which FCC (flux current control) is enabled as [%] of rated motor frequency (P0310).

Notice:

If this value is too low, the system may become unstable.

P1335	**Slip compensation**			**Min:**	0.0	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:**	0.0	**2**
	P-Group: CONTROL	**Active:** Immediately	**QuickComm.** No	**Max:**	600.0	

Dynamically adjusts output frequency of inverter so that motor speed is kept constant independent of motor load.

Increasing the load from md1 to md2 (see diagram) will decrease the motor speed from f1 to f2, due to the slip. The inverter can compensate for this by increasing the output frequency slightly as the load increases. The inverter measures the current and increases the output frequency to compensate for the expected slip.
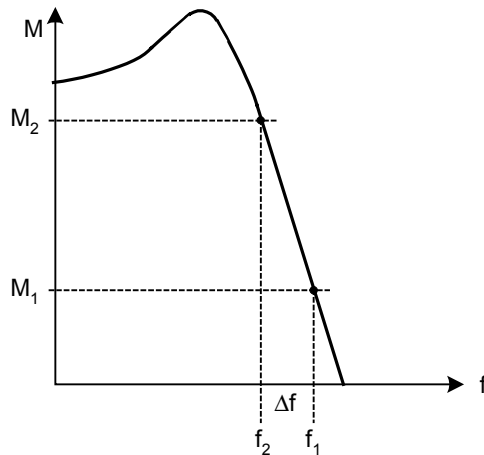
Value:

P1335 = 0 % :
Slip compensation disabled.

P1335 = 50 % - 70 % :
Full slip compensation at cold motor (partial load).

P1335 = 100 % :
Full slip compensation at warm motor (full load).

Note:

Gain adjustment enables fine-tuning of the actual motor speed (see P1460 - gain speed control).

100% = standard setting for warm stator.

P1336	Slip limit				Min:	0	Level:
	CStat:	CUT	Datatype: U16	Unit: %	Def:	250	2
	P-Group:	CONTROL	Active: Immediately	QuickComm. No	Max:	600	

Compensation slip limit in [%] relative to r0330 (rated motor slip), which is added to frequency setpoint.

Dependency:
Slip compensation (P1335) active.

r1337	CO: V/f slip frequency			Min:	-	Level:
		Datatype: Float	Unit: %	Def:	-	3
	P-Group: CONTROL			Max:	-	

Displays actual compensated motor slip as [%]

Dependency:
Slip compensation (P1335) active.

P1338	Resonance damping gain V/f				Min:	0.00	Level:
	CStat:	CUT	Datatype: Float	Unit: -	Def:	0.00	3
	P-Group:	CONTROL	Active: Immediately	QuickComm. No	Max:	10.00	

Defines resonance damping gain for V/f. Here, di/dt of the acitve current will be scaled by P1338 (see diagram below). If di/dt increases the resonance damping circuit decreases the inverter output frequency.
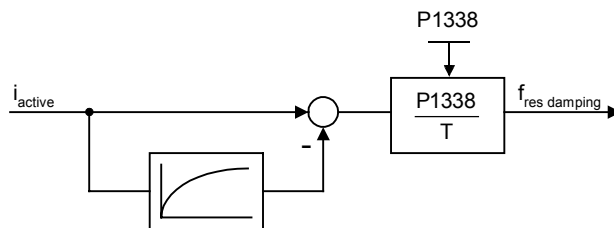
Note:
The resonance circuit damps oscillations of the active current which frequently occur during no-load operation.

In V/f modes (see P1300), the resonance damping circuit is active in a range from approx. 6 % to 80 % of rated motor frequency (P0310).

If the value of P1338 is too high, this will cause instability (forward control effect).

P1340	Imax controller prop. gain				Min:	0.000	Level:
	CStat:	CUT	Datatype: Float	Unit: -	Def:	0.000	3
	P-Group:	CONTROL	Active: Immediately	QuickComm. No	Max:	0.499	

Proportional gain of the I_max controller.

Dynamically controls the inverter if the output current exceeds the maximum motor current (r0067). It does this by first limiting the inverter output frequency (to a possible minimum of the nominal slip frequency). If this action does not successfully remove the overcurrent condition, the inverter output voltage is reduced. When the overcurrent condition has been removed successfully, frequency limiting is removed using the ramp-up time set in P1120.

P1341	Imax controller integral time				Min:	0.000	Level:
	CStat:	CUT	Datatype: Float	Unit: s	Def:	0.300	3
	P-Group:	CONTROL	Active: Immediately	QuickComm. No	Max:	32.000	

Integral time constant of the I_max controller.

P1341 = 0 :
I_max controller disabled

P1340 = 0 and P1341 > 0 :
enhanced integral

P1340 > 0 and P1341 > 0 :
normal PI control

See description in parameter P1340 for further information.

r1343	CO: Imax controller freq. output			Min:	-	Level:
		Datatype: Float	Unit: Hz	Def:	-	3
	P-Group: CONTROL			Max:	-	

Displays effective frequency limitation.

Dependency:
If I_max controller not in operation, parameter normally shows max. frequency P1082.

r1344	CO: Imax controller volt. output			Min:	-	Level:
		Datatype: Float	**Unit:** V	**Def:**	-	**3**
	P-Group: CONTROL			**Max:**	-	

Displays amount by which the I_max controller is reducing the inverter output voltage.

P1350	Voltage soft start			Min:	0	Level:
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
	P-Group: CONTROL	**Active:** first confirm	**QuickComm.** No	**Max:**	1	

Sets whether voltage is built up smoothly during magnetization time (ON) or whether it simply jumps to boost voltage (OFF).
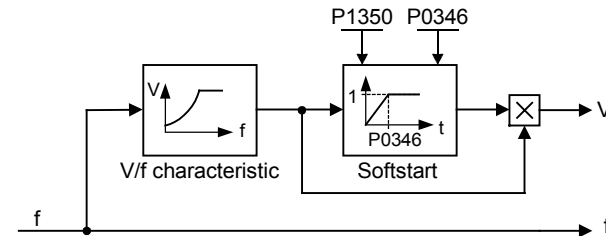
Possible Settings:

0	OFF
1	ON

Note:

The settings for this parameter bring benefits and drawbacks:

P1350 = 0: OFF (jump to boost voltage)
Benefit: flux is built up quickly
Drawback: motor may move

P1350 = 1: ON (smooth voltage build-up)
Benefit: motor less likely to move
Drawback: flux build-up takes longer

P1800	Pulse frequency			Min:	2	Level:
	CStat: CUT	**Datatype:** U16	**Unit:** kHz	**Def:**	4	**2**
	P-Group: INVERTER	**Active:** Immediately	**QuickComm.** No	**Max:**	16	

Sets pulse frequency of power switches in inverter. The frequency can be changed in steps of 2 kHz.

Pulse frequencies > 4 kHz selected on 380-480 V units reduce the maximum continuous motor current.

Dependency:

Minimum pulse frequency depends on P1082 (maximum frequency) and P0310 (rated motor frequency).

The maximal value of motor frequency P1082 is limited to pulse frequency P1800 (see P1082).

Note:

At 4 kHz, full output current is obtained up to 50 degrees C (CT mode); over 50 degrees C, full output may be obtained at 8 kHz. #elseif defined CCB At 4 kHz, full output current is obtained up to 40 degrees C (CT mode); over 40 degrees C, full output may be obtained at 8 kHz.

If silent operation is not absolutely necessary, lower pulse frequencies may be selected to reduce inverter losses and radio-frequency emissions.

Under certain circumstances, the inverter may reduce the switching frequency to provide protection against over-temperature (see P0290).

r1801	CO: Act. pulse frequency			Min:	-	Level:
		Datatype: U16	**Unit:** kHz	**Def:**	-	**3**
	P-Group: INVERTER			**Max:**	-	

Actual pulse frequency of power switches in inverter.

Notice:

Under certain conditions (inverter overtemperature, see P0290), this can differ from the values selected in P1800 (pulse frequency).

P1802	Modulator mode			Min:	0	Level:
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
	P-Group: INVERTER	**Active:** first confirm	**QuickComm.** No	**Max:**	3	

Selects inverter modulator mode.

Possible Settings:
- 0   SVM/ASVM automatic mode
- 1   Asymmetric SVM
- 2   Space vector modulation

Notice:

Asymmetric space vector modulation (ASVM) produces lower switching losses than space vector modulation (SVM), but may cause irregular rotation at very low speeds.

Space vector modulation (SVM) with over-modulation may produce current waveform distortion at high output voltages.

Space vector modulation (SVM) without over-modulation will reduce maximum output voltage available to motor.

P1803	Max. modulation			Min:	20.0	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:**	106.0	**4**
	P-Group: INVERTER	**Active:** Immediately	**QuickComm.** No	**Max:**	150.0	

Sets maximum modulation index.

Note:

P1803 = 100 % : Limit for over-control (for ideal inverter without switching delay). For vector control the modulation limit will be reduced automatically with 4 %.

P1820	Reverse output phase sequence			Min:	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**2**
	P-Group: INVERTER	**Active:** first confirm	**QuickComm.** No	**Max:**	1	

Changes direction of motor rotation without changing setpoint polarity.

Possible Settings:
- 0   OFF
- 1   ON

Dependency:

If positive and negative revolution is enabled, frequency setpoint is directly used.

If both positive and negative revolution are disabled, reference value is set to zero.

Details:

See P1000 (select frequency setpoint)

P1910	Select motor data identification			Min:	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**2**
	P-Group: MOTOR	**Active:** first confirm	**QuickComm.** Yes	**Max:**	2	

Performs a motor data identification.

Performs stator resistance measuring.

Possible Settings:
- 0   Disabled
- 1   Identification of Rs with parameter change
- 2   Identification of Rs without parameter change

Dependency:

No measurement if motor data incorrect.

P1910 = 1 : Calculated value for stator resistance (see P0350) is overwritten.

P1910 = 2 : Values already calculated are not overwritten.

Note:

Before selecting motor data identification, "Quick commissioning" has to be performed in advance.

Once enabled (P1910 = 1), A0541 generates a warning that the next ON command will initiate measurement of motor parameters.

Notice:

When choosing the setting for measurement, observe the following:

1. "with parameter change"
means that the value is actually adopted as P0350 parameter setting and applied to the control as well as being shown in the read-only parameters below.

2. "without parameter change"
means that the value is only displayed, i.e. shown for checking purposes in the read-only parameter r1912 (identified stator resistance). The value is not applied to the control.

r1912	**Identified stator resistance**			**Min:** -	Level:
	Datatype: Float	**Unit:** Ohm		**Def:** -	**2**
	P-Group: MOTOR			**Max:** -	

Displays measured stator resistance value (line-to-line) in [Ohms]

Note:

This value is measured using P1910 = 1 or 2 , i.e., identification of all parameters with/without change.

P2000	**Reference frequency**			**Min:** 1.00	Level:
	CStat: CT	**Datatype:** Float	**Unit:** Hz	**Def:** 50.00	**2**
	P-Group: COMM	**Active:** first confirm	**QuickComm.** No	**Max:** 650.00	

Full-scale frequency setting used by serial link (corresponds to 4000H), analog I/O and P/D controller.

Example:

If a BICO connection is made between two parameters or alternatively using P0719 or P1000, the 'unit' of the parameters (standardized (Hex) or physical (i.e. Hz) values) may differ. MICROMASTER implicitly makes an automatic conversion to the target value.

$$y[Hex] = \frac{r0021[Hz]}{P2000[Hz]} \cdot 4000[Hex]$$

$$y[Hz] = \frac{r2015[1]}{4000} \cdot P2000$$
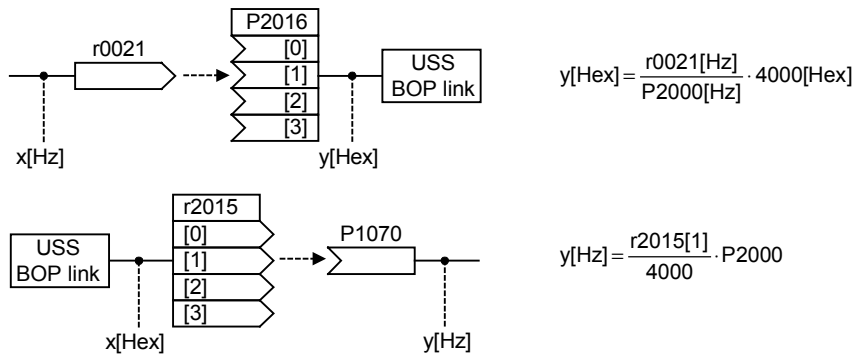
Notice:

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 precentage. A value of 100 % correspondes to a process data value of 4000H, or 4000 0000H in the case of double values.

In this respect, the following parameters are available:

P2000	Reference frequency	Hz
P2001	Reference voltage	V
P2002	Reference current	A

P2001	**Reference voltage**			**Min:** 10	Level:
	CStat: CT	**Datatype:** U16	**Unit:** V	**Def:** 1000	**3**
	P-Group: COMM	**Active:** first confirm	**QuickComm.** No	**Max:** 2000	

Full-scale output voltage (i.e. 100 %) used over serial link (corresponds to 4000H).

Example:

P2001 = 230 specifies that 4000H received via USS denotes 230 V.

If a BICO connection is made between two parameters, the 'unit' of the parameters (standardized (Hex) or physical (i.e. V) values) may differ. MICROMASTER implicitly makes an automatic conversion to the target value.

$$y[Hex] = \frac{r0026[V]}{P2001[V]} \cdot 4000[Hex]$$
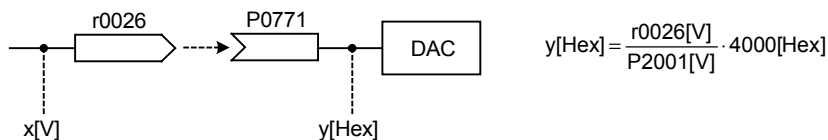
P2002	Reference current			Min:	0.10	Level:
CStat:	CT	**Datatype:** Float	**Unit:** A	**Def:**	0.10	**3**
P-Group:	COMM	**Active:** first confirm	**QuickComm.** No	**Max:**	10000.00	

Full-scale output current used over serial link (corresponds to 4000H).

Example:

If a BICO connection is made between two parameters, the 'unit' of the parameters (standardized (Hex) or physical (i.e. A) values) may differ. MICROMASTER implicitly makes an automatic conversion to the target value.

$$y[Hex] = \frac{r0027[A]}{P2002[A]} \cdot 4000[Hex]$$
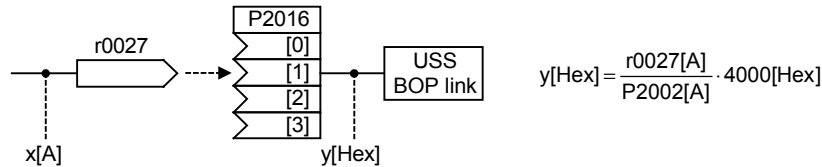
P2009[2]	USS normalization			Min:	0	Level:
CStat:	CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
P-Group:	COMM	**Active:** first confirm	**QuickComm.** No	**Max:**	1	

Enables special normalization for USS.

Possible Settings:

0   Disabled
1   Enabled

Index:

P2009[0] : Serial interface COM link
P2009[1] : Serial interface BOP link

Note:

If enabled, the main setpoint (word 2 in PZD) is not interpreted as 100 % = 4000H, but as "absolute" instead (e.g. 4000H = 16384 means 163.84 Hz).

P2010[2]	USS baudrate			Min:	3	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** -	**Def:**	6	**2**
P-Group:	COMM	**Active:** first confirm	**QuickComm.** No	**Max:**	9	

Sets baud rate for USS communication.

Possible Settings:

3   1200 baud
4   2400 baud
5   4800 baud
6   9600 baud
7   19200 baud
8   38400 baud
9   57600 baud

Index:

P2010[0] : Serial interface COM link
P2010[1] : Serial interface BOP link

P2011[2]	USS address			Min:	0	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** -	**Def:**	0	**2**
P-Group:	COMM	**Active:** first confirm	**QuickComm.** No	**Max:**	31	

Sets unique address for inverter.

Index:

P2011[0] : Serial interface COM link
P2011[1] : Serial interface BOP link

Note:

You can connect up to a further 30 inverters via the serial link (i.e. 31 inverters in total) and control them with the USS serial bus protocol.

P2012[2]	**USS PZD length**			**Min:** 0	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** -	**Def:** 2	**3**
P-Group:	COMM	**Active:** first confirm	**QuickComm.** No	**Max:** 4	

Defines the number of 16-bit words in PZD part of USS telegram. In this area, process data (PZD) are continually exchanged between the master and slaves. The PZD part of the USS telegram is used for the main setpoint, and to control the inverter.

Index:

P2012[0] : Serial interface COM link
P2012[1] : Serial interface BOP link

Notice:

USS protocol consists of PZD and PKW which can be changed by the user via parameters P2012 and P2013 respectively.
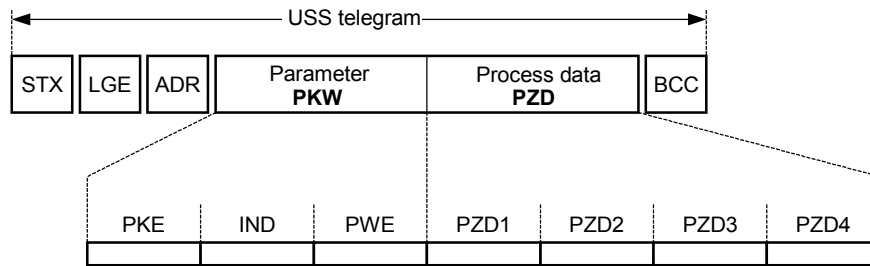
STX	Start of text	PKE	Parameter ID
LGE	Length	IND	Sub-index
ADR	Address	PWE	Parameter value
PKW	Parameter ID value		
PZD	Process data		
BCC	Block check character		

PZD transmits a control word and setpoint or status word and actual values. The number of PZD-words in a USS-telegram are determined by parameter P2012, where the first two words (P2012 >= 2) are either:

a) control word and main setpoint or
b) status word and actual value.

When P2012 is greater or equal to 4 the additional control word is transferred as the 4th PZD-word (default setting).
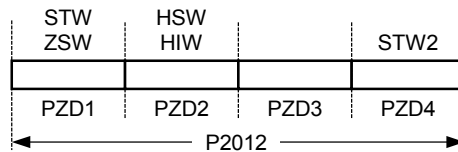
STW	Control word	HSW	Main setpoint
ZSW	Status word	HIW	Main actual value
PZD	Process data		

P2013[2]	**USS PKW length**			Min:	0	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** -	**Def:**	127	**3**
P-Group:	COMM	**Active:** first confirm	**QuickComm.** No	**Max:**	127	

Defines the number of 16-bit words in PKW part of USS telegram. The PKW area can be varied. Depending on the particular requirement, 3-word, 4-word or variable word lengths can be parameterized. The PKW part of the USS telegram is used to read and write individual parameter values.

Possible Settings:

0	No words
3	3 words
4	4 words
127	Variable

Index:

P2013[0] : Serial interface COM link
P2013[1] : Serial interface BOP link

Example:

	Data type		
	U16 (16 Bit)	U32 (32 Bit)	Float (32 Bit)
P2013 = 3	✔	Parameter access fault	Parameter access fault
P2013 = 4	✔	✔	✔
P2013 = 127	✔	✔	✔

Notice:

USS protocol consists of PZD and PKW which can be changed by the user via parameters P2012 and P2013 respectively.

Parameter P2013 determines the number of PKW-words in a USS-telegram. Setting P2013 = 3 or 4 will determine the number of PZD-words which are fixed during P2013 = 127, the length will be changed automatically.

PKE	Parameter ID
IND	Sub-index
PWE	Parameter value
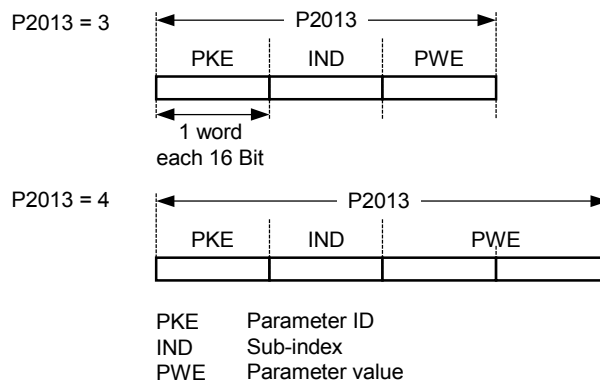
P2013 = 3, fixes PKW length, but does not allow access to many parameter values. A parameter fault is generated when an out-of-range value is used, the value will not be accepted but the inverter state will not be affected. Useful for applications where parameters are not changed, but MM3s are also used. Broadcast mode is not possible with this setting.

P2013 = 4, fixes PKW length. Allows access to all parameters, but indexed parameters can only be read one index at a time. Word order for single word values are different to setting 3 or 127, see example below.

P2013 = 127, most useful setting. PKW reply length varies depending on the amount of information needed. Can read fault information and all indices of a parameter with a single telegram with this setting.

Example:
Set P0700 to value 5 (0700 = 2BC (hex))

	P2013 = 3	P2013 = 4	P2013 = 127
Master → MM4	22BC 0000 0005	22BC 0000 0000 0005	22BC 0000 0005 0000
MM4 → Master	12BC 0000 0005	12BC 0000 0000 0005	12BC 0000 0005

P2014[2]	USS telegram off time			Min:	0	Level:
CStat:	CT	Datatype: U16	Unit: ms	Def:	0	**3**
P-Group:	COMM	Active: Immediately	QuickComm. No	Max:	65535	

Defines a time T_off after which a fault will be generated (F0070) if no telegram is received via the USS channels.

Index:

P2014[0] : Serial interface COM link
P2014[1] : Serial interface BOP link

Notice:

By default (time set to 0), no fault is generated (i.e. watchdog disabled).

r2015[4]	CO: PZD from BOP link (USS)		Min:	-	Level:
		Datatype: U16	Unit: -	Def:	-	**3**
	P-Group: COMM			Max:	-	

Displays process data received via USS on BOP link (RS232 USS).
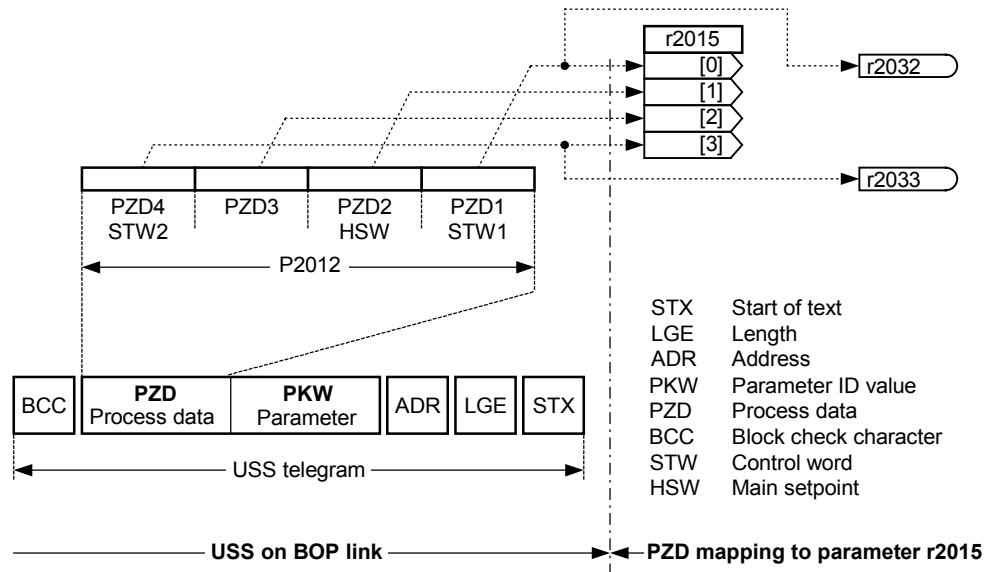
Index:

r2015[0] : Received word 0
r2015[1] : Received word 1
r2015[2] : Received word 2
r2015[3] : Received word 3

Note:

The control words can be viewed as bit parameters r2032 and r2033.

P2016[4]	CI: PZD to BOP link (USS)			Min:	0:0	Level:
CStat:	CT	Datatype: U32	Unit: -	Def:	52:0	**3**
P-Group:	COMM	Active: Immediately	QuickComm. No	Max:	4000:0	

Selects signals to be transmitted to serial interface via BOP link.

STX   Start of text
LGE   Length
ADR   Address
PKW   Parameter ID value
PZD   Process data
BCC   Block check character
ZSW   Status word
HIW   Main actual value

PZD mapping from parameter P2016 ▶ ◀ ─────── **USS on BOP link** ───────

Index:
P2016[0] : Transmitted word 0
P2016[1] : Transmitted word 1
P2016[2] : Transmitted word 2
P2016[3] : Transmitted word 3

Example:
P2016[0] = 52.0 (default). In this case, the value of r0052[0] (CO/BO: Status word) is transmitted as 1st PZD to the BOP link.

Note:
If r0052 not indexed, display does not show an index (".0").

r2018[4]	CO: PZD from COM link (USS)			Min:	-	Level:
		Datatype: U16	Unit: -	Def:	-	**3**
P-Group:	COMM			Max:	-	

Displays process data received via USS on COM link.

STX   Start of text
LGE   Length
ADR   Address
PKW   Parameter ID value
PZD   Process data
BCC   Block check character
STW   Control word
HSW   Main setpoint

──────── **USS on COM link** ──────── ▶ ◀ **PZD mapping to parameter r2018**

Index:
r2018[0] : Received word 0
r2018[1] : Received word 1
r2018[2] : Received word 2
r2018[3] : Received word 3

Note:
The control words can be viewed as bit parameters r2036 and r2037.

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P2019[4]	**CI: PZD to COM link (USS)**				**Min:**	0:0	Level:
	CStat: CT	**Datatype:** U32	**Unit:** -		**Def:**	52:0	**3**
	P-Group: COMM	**Active:** Immediately	**QuickComm.** No		**Max:**	4000:0	

Displays process data received via USS on COM link.

STX   Start of text
LGE   Length
ADR   Address
PKW   Parameter ID value
PZD   Process data
BCC   Block check character
ZSW   Status word
HIW   Main actual value

PZD mapping from parameter P2019 ◄ ─ **USS on COM link** ─

Index:
P2019[0] : Transmitted word 0
P2019[1] : Transmitted word 1
P2019[2] : Transmitted word 2
P2019[3] : Transmitted word 3
Details:
See P2016 (PZD to BOP link)

r2024[2]	**USS error-free telegrams**			**Min:**	-	Level:
		Datatype: U16	**Unit:** -	**Def:**	-	**3**
	P-Group: COMM			**Max:**	-	

Displays number of error-free USS telegrams received.

Index:
r2024[0] : Serial interface COM link
r2024[1] : Serial interface BOP link

r2025[2]	**USS rejected telegrams**			**Min:**	-	Level:
		Datatype: U16	**Unit:** -	**Def:**	-	**3**
	P-Group: COMM			**Max:**	-	

Displays number of USS telegrams rejected.

Index:
r2025[0] : Serial interface COM link
r2025[1] : Serial interface BOP link

r2026[2]	**USS character frame error**			**Min:**	-	Level:
		Datatype: U16	**Unit:** -	**Def:**	-	**3**
	P-Group: COMM			**Max:**	-	

Displays number of USS character frame errors.

Index:
r2026[0] : Serial interface COM link
r2026[1] : Serial interface BOP link

r2027[2]	**USS overrun error**			**Min:**	-	Level:
		Datatype: U16	**Unit:** -	**Def:**	-	**3**
	P-Group: COMM			**Max:**	-	

Displays number of USS telegrams with overrun error.

Index:
r2027[0] : Serial interface COM link
r2027[1] : Serial interface BOP link

r2028[2]	**USS parity error**			**Min:** -	Level:
		Datatype: U16	**Unit:** -	**Def:** -	**3**
	P-Group: COMM			**Max:** -	

Displays number of USS telegrams with parity error.

Index:

r2028[0] : Serial interface COM link
r2028[1] : Serial interface BOP link

r2029[2]	**USS start not identified**			**Min:** -	Level:
		Datatype: U16	**Unit:** -	**Def:** -	**3**
	P-Group: COMM			**Max:** -	

Displays number of USS telegrams with unidentified start.

Index:

r2029[0] : Serial interface COM link
r2029[1] : Serial interface BOP link

r2030[2]	**USS BCC error**			**Min:** -	Level:
		Datatype: U16	**Unit:** -	**Def:** -	**3**
	P-Group: COMM			**Max:** -	

Displays number of USS telegrams with BCC error.

Index:

r2030[0] : Serial interface COM link
r2030[1] : Serial interface BOP link

r2031[2]	**USS length error**			**Min:** -	Level:
		Datatype: U16	**Unit:** -	**Def:** -	**3**
	P-Group: COMM			**Max:** -	

Displays number of USS telegrams with incorrect length.

Index:

r2031[0] : Serial interface COM link
r2031[1] : Serial interface BOP link

r2032	**BO: CtrlWrd1 from BOP link (USS)**			**Min:** -	Level:
		Datatype: U16	**Unit:** -	**Def:** -	**3**
	P-Group: COMM			**Max:** -	

Displays control word 1 from BOP link (word 1 within USS).

Bitfields:

```
Bit00   ON/OFF1                             0    NO
                                            1    YES
Bit01   OFF2: Electrical stop               0    YES
                                            1    NO
Bit02   OFF3: Fast stop                     0    YES
                                            1    NO
Bit03   Pulse enable                        0    NO
                                            1    YES
Bit04   RFG enable                          0    NO
                                            1    YES
Bit05   RFG start                           0    NO
                                            1    YES
Bit06   Setpoint enable                     0    NO
                                            1    YES
Bit07   Fault acknowledge                   0    NO
                                            1    YES
Bit08   JOG right                           0    NO
                                            1    YES
Bit09   JOG left                            0    NO
                                            1    YES
Bit10   Control from PLC                    0    NO
                                            1    YES
Bit11   Reverse (setpoint inversion)        0    NO
                                            1    YES
Bit13   Motor potentiometer MOP up          0    NO
                                            1    YES
Bit14   Motor potentiometer MOP down        0    NO
                                            1    YES
Bit15   Local / Remote                      0    NO
                                            1    YES
```

r2033	**BO: CtrlWrd2 from BOP link (USS)**		**Min:**	-	Level:
	Datatype: U16	**Unit:** -	**Def:**	-	**3**
	P-Group: COMM		**Max:**	-	

Displays control word 2 from BOP link (i.e. word 4 within USS).

Bitfields:

Bit00	Fixed frequency Bit 0		0	NO
			1	YES
Bit01	Fixed frequency Bit 1		0	NO
			1	YES
Bit02	Fixed frequency Bit 2		0	NO
			1	YES
Bit08	PID enabled		0	NO
			1	YES
Bit09	DC brake enabled		0	NO
			1	YES
Bit13	External fault 1		0	YES
			1	NO

Dependency:
P0700 = 4 (USS on BOP link) and P0719 = 0 (Cmd / Setpoint = BICO parameter).

r2036	**BO: CtrlWrd1 from COM link (USS)**		**Min:**	-	Level:
	Datatype: U16	**Unit:** -	**Def:**	-	**3**
	P-Group: COMM		**Max:**	-	

Displays control word 1 from COM link (i.e. word 1 within USS).

Bitfields:

Bit00	ON/OFF1		0	NO
			1	YES
Bit01	OFF2: Electrical stop		0	YES
			1	NO
Bit02	OFF3: Fast stop		0	YES
			1	NO
Bit03	Pulse enable		0	NO
			1	YES
Bit04	RFG enable		0	NO
			1	YES
Bit05	RFG start		0	NO
			1	YES
Bit06	Setpoint enable		0	NO
			1	YES
Bit07	Fault acknowledge		0	NO
			1	YES
Bit08	JOG right		0	NO
			1	YES
Bit09	JOG left		0	NO
			1	YES
Bit10	Control from PLC		0	NO
			1	YES
Bit11	Reverse (setpoint inversion)		0	NO
			1	YES
Bit13	Motor potentiometer MOP up		0	NO
			1	YES
Bit14	Motor potentiometer MOP down		0	NO
			1	YES
Bit15	Local / Remote		0	NO
			1	YES

Details:
See r2033 (control word 2 from BOP link).

r2037	BO: CtrlWrd2 from COM link (USS)			Min:	-	Level:
	Datatype: U16	**Unit:** -		**Def:**	-	**3**
	P-Group: COMM			**Max:**	-	

Displays control word 2 from COM link (i.e. word 4 within USS).

Bitfields:

```
Bit00   Fixed frequency Bit 0                0    NO
                                             1    YES
Bit01   Fixed frequency Bit 1                0    NO
                                             1    YES
Bit02   Fixed frequency Bit 2                0    NO
                                             1    YES
Bit08   PID enabled                          0    NO
                                             1    YES
Bit09   DC brake enabled                     0    NO
                                             1    YES
Bit13   External fault 1                     0    YES
                                             1    NO
```

Details:

See r2033 (control word 2 from BOP link).

P2040	CB telegram off time			Min:	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** ms	**Def:**	0	**3**
	P-Group: COMM	**Active:** Immediately	**QuickComm.** No	**Max:**	65535	

Defines time after which a fault will be generated (F0070) if no telegram is received via the link.

Dependency:

Setting 0 = watchdog disabled

P2041[5]	CB parameter			Min:	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
	P-Group: COMM	**Active:** first confirm	**QuickComm.** No	**Max:**	65535	

Configures a communication board (CB).

Index:

P2041[0] : CB parameter 0
P2041[1] : CB parameter 1
P2041[2] : CB parameter 2
P2041[3] : CB parameter 3
P2041[4] : CB parameter 4

Details:

See relevant communication board manual for protocol definition and appropriate settings.

r2050[4]	CO: PZD from CB			Min:	-	Level:
		Datatype: U16	Unit: -	Def:	-	**3**
	P-Group: COMM			Max:	-	

Displays PZD received from communication board (CB).

PKW   Parameter ID value
PZD   Process data
STW   Control word
HSW   Main setpoint

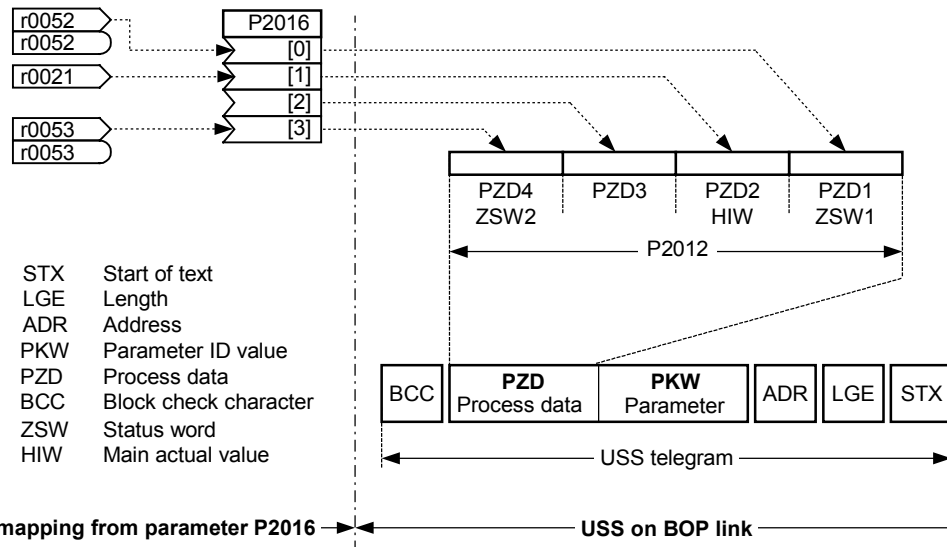**CB on COM link** ←──────→ **PZD mapping to parameter r2050**
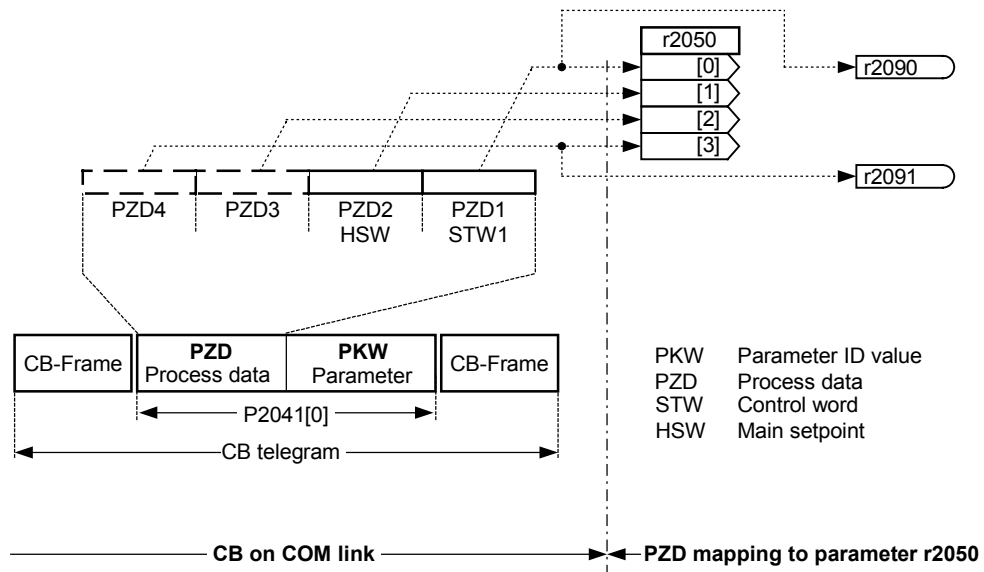
Index:
r2050[0] : Received word 0
r2050[1] : Received word 1
r2050[2] : Received word 2
r2050[3] : Received word 3

Note:
The control words can be viewed as bit parameters r2090 and r2091.

P2051[4]	CI: PZD to CB				Min:	0:0	Level:
	CStat:	CT	Datatype: U32	Unit: -	Def:	52:0	**3**
	P-Group:	COMM	Active: Immediately	QuickComm. No	Max:	4000:0	

Connects PZD to CB.

This parameter allows the user to define the source of status words and actual values for the reply PZD.

PKW	Parameter ID value
PZD	Process data
ZSW	Status word
HIW	Main actual value
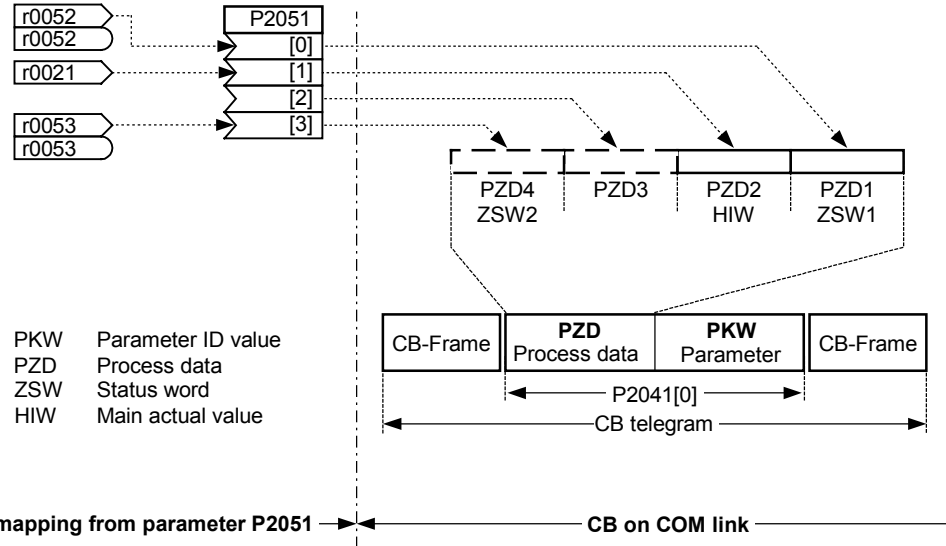
Index:
    P2051[0] : Transmitted word 0
    P2051[1] : Transmitted word 1
    P2051[2] : Transmitted word 2
    P2051[3] : Transmitted word 3
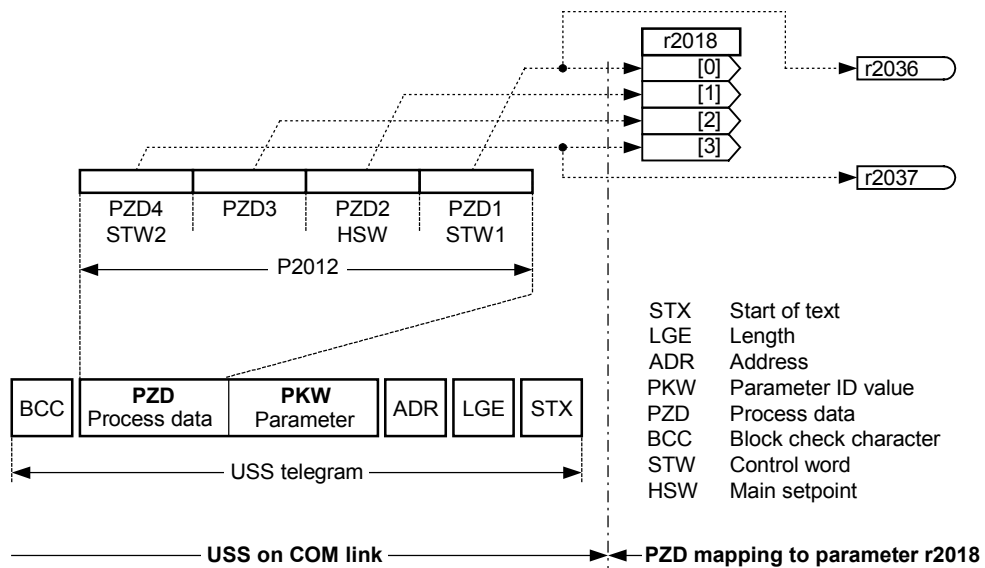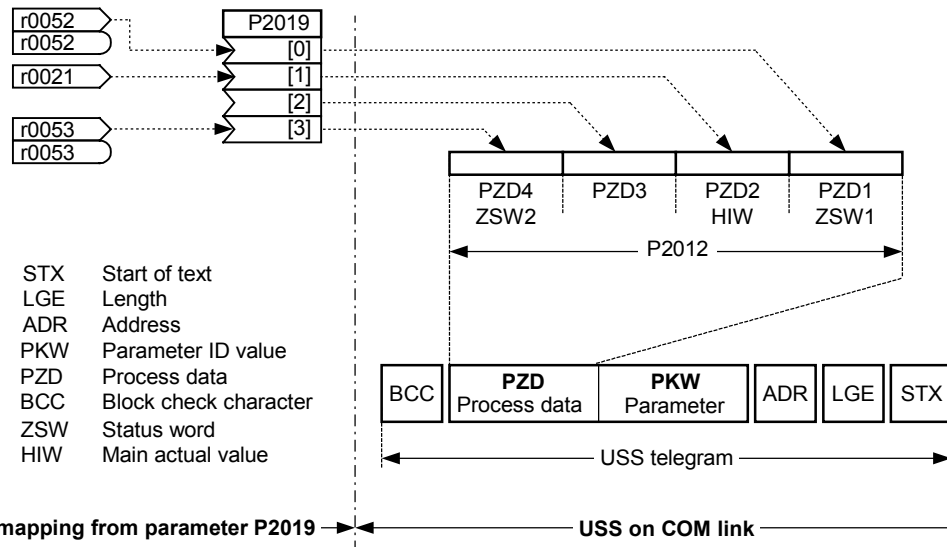**Common Settings:**
    Status word 1 = 52 CO/BO: Act. status word 1 (see r0052)
    Actual value 1 = 21 inverter output frequency (see r0021)

    Other BICO settings are possible

r2053[5]	CB identification			Min:	-	Level:
		Datatype: U16	Unit: -	Def:	-	**3**
	P-Group: COMM			Max:	-	

Displays identification data of the communication board (CB). The different CB types (r2053[0]) are given in the Enum declaration.
Possible Settings:
    0   No CB option board
    1   PROFIBUS DP
    2   DeviceNet
    256   not defined
Index:
    r2053[0] : CB type (PROFIBUS = 1)
    r2053[1] : Firmware version
    r2053[2] : Firmware version detail
    r2053[3] : Firmware date (year)
    r2053[4] : Firmware date (day/month)

r2054[7]	CB diagnosis			Min:	-	Level:
		Datatype: U16	Unit: -	Def:	-	**3**
	P-Group: COMM			Max:	-	

Displays diagnostic information of communication board (CB).
Index:
    r2054[0] : CB diagnosis 0
    r2054[1] : CB diagnosis 1
    r2054[2] : CB diagnosis 2
    r2054[3] : CB diagnosis 3
    r2054[4] : CB diagnosis 4
    r2054[5] : CB diagnosis 5
    r2054[6] : CB diagnosis 6
Details:
    See relevant communications board manual.

r2090	**BO: Control word 1 from CB**			**Min:**	-	Level:
	Datatype: U16	**Unit:** -		**Def:**	-	**3**
	P-Group: COMM			**Max:**	-	

Displays control word 1 received from communication board (CB).

Bitfields:

Bit00	ON/OFF1		0	NO
			1	YES
Bit01	OFF2: Electrical stop		0	YES
			1	NO
Bit02	OFF3: Fast stop		0	YES
			1	NO
Bit03	Pulse enable		0	NO
			1	YES
Bit04	RFG enable		0	NO
			1	YES
Bit05	RFG start		0	NO
			1	YES
Bit06	Setpoint enable		0	NO
			1	YES
Bit07	Fault acknowledge		0	NO
			1	YES
Bit08	JOG right		0	NO
			1	YES
Bit09	JOG left		0	NO
			1	YES
Bit10	Control from PLC		0	NO
			1	YES
Bit11	Reverse (setpoint inversion)		0	NO
			1	YES
Bit13	Motor potentiometer MOP up		0	NO
			1	YES
Bit14	Motor potentiometer MOP down		0	NO
			1	YES
Bit15	Local / Remote		0	NO
			1	YES

Note:

If P700 = 6 (Profibus) then P810 must be set to 2090.15 for correct operation. This will not be cleared automatically when P700 is no longer equal to 6.

Details:

See relevant communication board manual for protocol definition and appropriate settings.

r2091	**BO: Control word 2 from CB**			**Min:**	-	Level:
	Datatype: U16	**Unit:** -		**Def:**	-	**3**
	P-Group: COMM			**Max:**	-	

Displays control word 2 received from communication board (CB).

Bitfields:

Bit00	Fixed frequency Bit 0		0	NO
			1	YES
Bit01	Fixed frequency Bit 1		0	NO
			1	YES
Bit02	Fixed frequency Bit 2		0	NO
			1	YES
Bit08	PID enabled		0	NO
			1	YES
Bit09	DC brake enabled		0	NO
			1	YES
Bit13	External fault 1		0	YES
			1	NO

Details:

See relevant communication board manual for protocol definition and appropriate settings.

P2100[3]	**Alarm number selection**			**Min:**	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
	P-Group: ALARMS	**Active:** first confirm	**QuickComm.** No	**Max:**	65535	

Selects up to 3 faults or warnings for non-default reactions.

Index:

P2100[0] : Fault Number 1
P2100[1] : Fault Number 2
P2100[2] : Fault Number 3

Example:

If you want F0005 to perform an OFF3 instead of an OFF2, set P2100[0] = 5, then select the desired reaction in P2101[0] (in this case, set P2101[0] = 3).

Note:

All fault codes have a default reaction to OFF2. Some fault codes caused by hardware trips (e.g. overcurrent) cannot be changed from the default reactions.

P2101[3]	Stop reaction value			Min:	0	Level:
CStat:	CT	Datatype: U16	Unit: -	Def:	0	3
P-Group:	ALARMS	Active: first confirm	QuickComm. No	Max:	4	

Sets drive stop reaction values for fault selected by P2100 (alarm number stop reaction).

This indexed parameter specifies the special reaction to the faults/warnings defined in P2100 indices 0 to 2.

Possible Settings:

0	No reaction, no display
1	OFF1 stop reaction
2	OFF2 stop reaction
3	OFF3 stop reaction
4	No reaction warning only

Index:

P2101[0] : Stop reaction value 1
P2101[1] : Stop reaction value 2
P2101[2] : Stop reaction value 3

Note:

Settings 0 - 3 only are available for fault codes.

Settings 0 and 4 only are available for warnings.

Index 0 (P2101) refers to fault/warning in index 0 (P2100).

P2103	BI: 1. Faults acknowledgement			Min:	0:0	Level:
CStat:	CT	Datatype: U32	Unit: -	Def:	722:2	3
P-Group:	COMMANDS	Active: first confirm	QuickComm. No	Max:	4000:0	

Defines first source of fault acknowledgement, e.g. keypad/DIN, etc. (depending on setting).

Common Settings:

722.0	=	Digital input 1 (requires P0701 to be set to 99, BICO)
722.1	=	Digital input 2 (requires P0702 to be set to 99, BICO)
722.2	=	Digital input 3 (requires P0703 to be set to 99, BICO)
722.3	=	Digital input 4 (via analog input, requires P0704 to be set to 99)

P2104	BI: 2. Faults acknowledgement			Min:	0:0	Level:
CStat:	CT	Datatype: U32	Unit: -	Def:	0:0	3
P-Group:	COMMANDS	Active: first confirm	QuickComm. No	Max:	4000:0	

Selects second source of fault acknowledgement.

Common Settings:

722.0	=	Digital input 1 (requires P0701 to be set to 99, BICO)
722.1	=	Digital input 2 (requires P0702 to be set to 99, BICO)
722.2	=	Digital input 3 (requires P0703 to be set to 99, BICO)
722.3	=	Digital input 4 (via analog input, requires P0704 to be set to 99)

P2106	BI: External fault			Min:	0:0	Level:
CStat:	CT	Datatype: U32	Unit: -	Def:	1:0	3
P-Group:	COMMANDS	Active: first confirm	QuickComm. No	Max:	4000:0	

Selects source of external faults.

Common Settings:

722.0	=	Digital input 1 (requires P0701 to be set to 99, BICO)
722.1	=	Digital input 2 (requires P0702 to be set to 99, BICO)
722.2	=	Digital input 3 (requires P0703 to be set to 99, BICO)
722.3	=	Digital input 4 (via analog input, requires P0704 to be set to 99)

r2110[4]	Warning number			Min:	-	Level:
		Datatype: U16	Unit: -	Def:	-	2
P-Group:	ALARMS			Max:	-	

Displays warning information.

A maximum of 2 active warnings (indices 0 and 1) and 2 historical warnings (indices 2 and 3) may be viewed.

Index:

r2110[0] : Recent Warnings --, warning 1
r2110[1] : Recent Warnings --, warning 2
r2110[2] : Recent Warnings -1, warning 3
r2110[3] : Recent Warnings -1, warning 4

Note:

The keypad will flash while a warning is active. The LEDs indicate the warning status in this case.

If an AOP is in use, the display will show number and text of the active warning.

Notice:

Indices 0 and 1 are not stored.

P2111	Total number of warnings			Min:	0	Level:
CStat:	CT	Datatype: U16	Unit: -	Def:	0	**3**
P-Group:	ALARMS	Active: first confirm	QuickComm. No	Max:	4	

Displays number of warning (up to 4) since last reset. Set to 0 to reset the warning history.

r2114[2]	Run time counter			Min:	-	Level:
		Datatype: U16	Unit: -	Def:	-	**3**
P-Group:	ALARMS			Max:	-	

Displays run time counter. It is the total time the drive has been powered up. When power goes value is saved, then restored on powerup. The run time counter r2114 will be calculate as followed:
Multiply the value in r2114[0], by 65536 and then add it to the value in r2114[1]. The resultant answer will be in seconds. This means that r2114[0] is not days.

Total powerup time= 65536*r2114[0]+r2114[1] Secs.

When AOP is not connected, the time in this parameter is used by r0948 to indicate when a fault has occured.

Index:

r2114[0] : System Time, Seconds, Upper Word
r2114[1] : System Time, Seconds, Lower Word

Example:

If r2114[0] = 1 & r2114[1] = 20864
We get 1 * 65536 + 20864 = 86400 seconds which equals 1 day.

Details:

See r0948 (fault time)

P2115[3]	AOP real time clock			Min:	0	Level:
CStat:	CT	Datatype: U16	Unit: -	Def:	0	**3**
P-Group:	ALARMS	Active: Immediately	QuickComm. No	Max:	65535	

Displays AOP real time.

Index:

P2115[0] : Real Time, Seconds+Minutes
P2115[1] : Real Time, Hours+Days
P2115[2] : Real Time, Month+Year

Details:

See r0948 (fault time).

P2120	Indication counter			Min:	0	Level:
CStat:	CUT	Datatype: U16	Unit: -	Def:	0	**4**
P-Group:	ALARMS	Active: Immediately	QuickComm. No	Max:	65535	

Indicates total number of alarm events. This parameter is incremented whenever an alarm event occurs. It also gets incremented when a warning is cleared or faults are cleared.

This parameter is used by the PC tools.

P2150	Hysteresis frequency f_hys			Min:	0.00	Level:
CStat:	CUT	Datatype: Float	Unit: Hz	Def:	3.00	**3**
P-Group:	ALARMS	Active: Immediately	QuickComm. No	Max:	10.00	

Defines hysteresis level applied for comparing frequency and speed to threshold as illustrated in the diagram below.
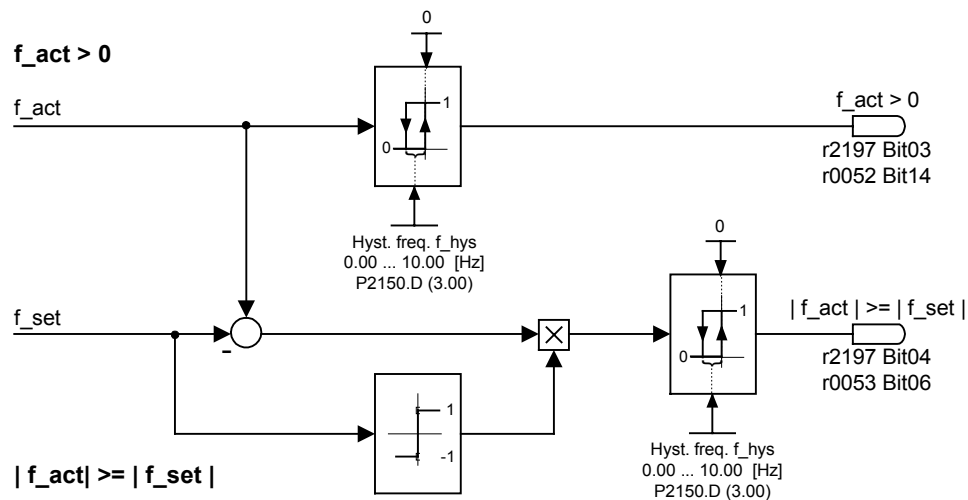
P2155	Threshold frequency f_1			Min:	0.00	Level:
CStat:	CUT	Datatype: Float	Unit: Hz	Def:	30.00	3
P-Group:	ALARMS	Active: Immediately	QuickComm. No	Max:	650.00	

Sets a threshold for comparing actual speed or frequency to threshold values f_1. This threshold controls status bits 4 and 5 in status word 2 (r0053).
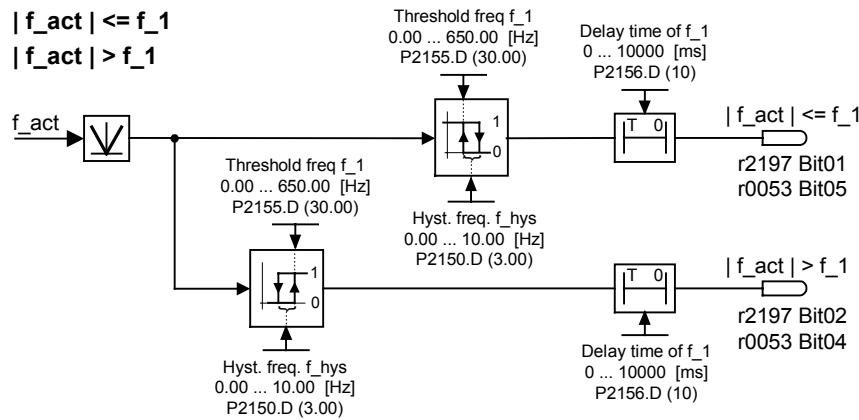
P2156	Delay time of threshold freq f_1			Min:	0	Level:
CStat:	CUT	Datatype: U16	Unit: ms	Def:	10	3
P-Group:	ALARMS	Active: Immediately	QuickComm. No	Max:	10000	

Sets delay time prior to threshold frequency f_1 comparison (P2155).

Details:
See diagram in P2155 (threshold frequency f_1)

P2164	Hysteresis frequency deviation			Min:	0.00	Level:
CStat:	CUT	Datatype: Float	Unit: Hz	Def:	3.00	3
P-Group:	ALARMS	Active: Immediately	QuickComm. No	Max:	10.00	

Hysteresis frequency for detecting permitted deviation (from setpoint) or frequency or speed. This frequency controls bit 8 in status word 1 (r0052) and bit 6 in status word 2 (r0053).
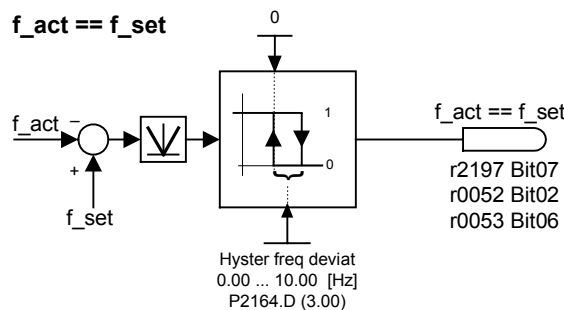
P2167	Switch-off frequency f_off			Min:	0.00	Level:
CStat:	CUT	Datatype: Float	Unit: Hz	Def:	1.00	3
P-Group:	ALARMS	Active: Immediately	QuickComm. No	Max:	10.00	

Sets frequency threshold below which inverter switches off.

If the frequency falls below this threshold, bit 1 in status word 2 (r0053)is set.
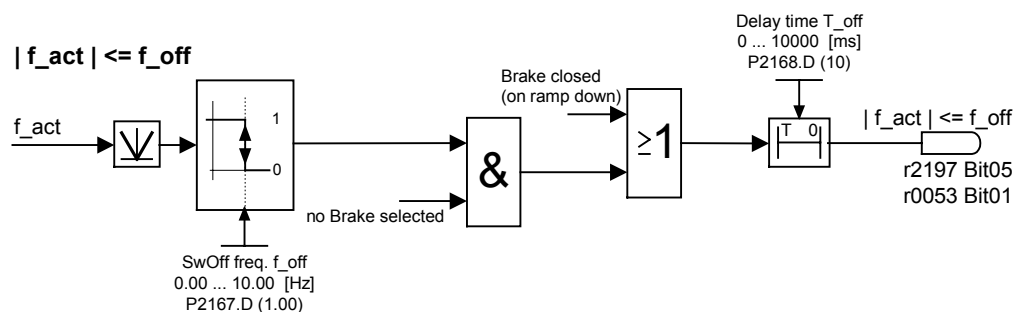
Dependency:
Switched off only if OFF1 or OFF3 active.

P2168	**Delay time T_off**			**Min:**	0	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Def:**	10	**3**
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Max:**	10000	

Defines time for which the inverter may operate below switch-off frequency (P2167) before switch off occurs.

Dependency:

Active if holding brake (P1215) not parameterized.

Details:

See diagram in P2167 (switch-off frequency)

P2170	**Threshold current I_thresh**			**Min:**	0.0	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Def:**	100.0	**3**
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Max:**	400.0	

Defines threshold current in [%] relative to P0305 (rated motor current) to be used in comparisons of I_act and I_Thresh as illustrated in the diagram below.

|I_act| > I_thresh
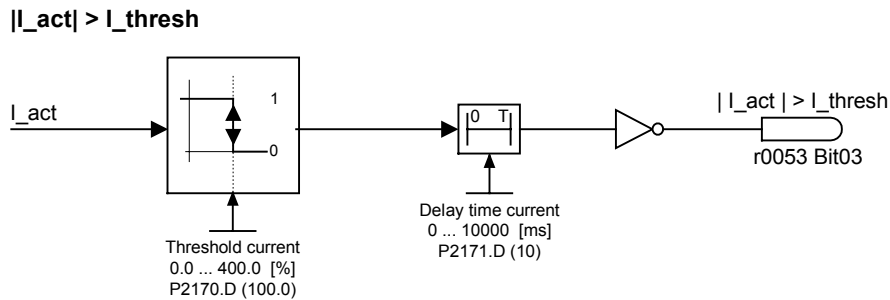
Note:

This threshold controls bit 3 in status word 3 (r0053).

P2171	**Delay time current**			**Min:**	0	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Def:**	10	**3**
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Max:**	10000	

Defines delay time prior to activation of current comparison.

Details:

See diagram in P2170 (threshold current I_thresh)

P2172	**Threshold DC-link voltage**			**Min:**	0	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** V	**Def:**	800	**3**
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Max:**	2000	

Defines DC link voltage to be compared to actual voltage as illustrated in the diagram below.
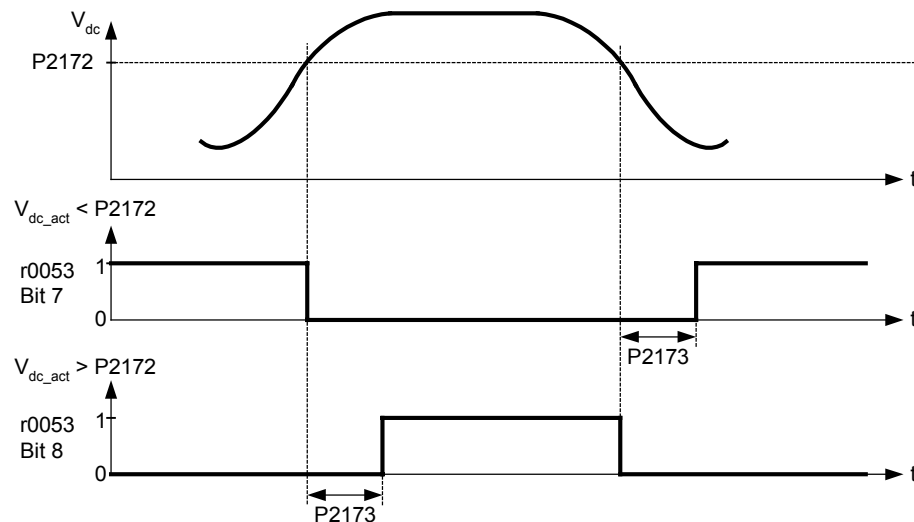
Note:

This voltage controls bits 7 and 8 in status word 3 (r0053).

P2173	**Delay time DC-link voltage**			**Min:**	0	Level:
CStat:	CUT	**Datatype:** U16	**Unit:** ms	**Def:**	10	**3**
P-Group:	ALARMS	**Active:** Immediately	**QuickComm.** No	**Max:**	10000	

Defines delay time prior to activation of threshold comparison.

Details:

See diagram in P2172 (threshold DC-link voltage)

P2179	Current limit for no load ident.			Min:	0.0	Level:
CStat:	CUT	Datatype: Float	Unit: %	Def:	3.0	**3**
P-Group:	ALARMS	Active: Immediately	QuickComm. No	Max:	10.0	

Threshold current for A0922 (load missing) in [%] relative to P0305 (rated motor current) as illustrated in the diagram below.

Load missing
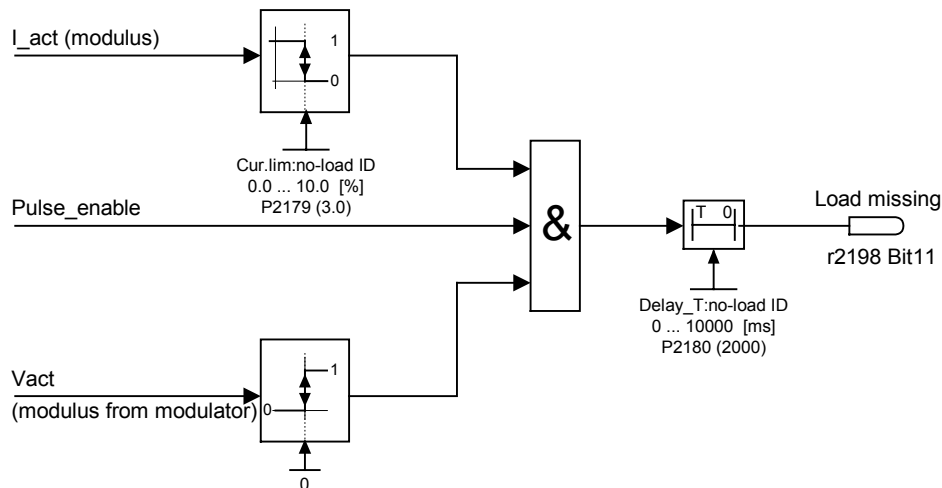
Note:

It may be that the motor is not connected (load missing) or a phase could be missing.

Notice:

If a motor setpoint cannot be entered and the current limit (P2179) is not exceeded, Alarm A0922 (no load applied) is issued when delay time (P2180) expires.

P2180	Delay time for load missing			Min:	0	Level:
CStat:	CUT	Datatype: U16	Unit: ms	Def:	2000	**3**
P-Group:	ALARMS	Active: Immediately	QuickComm. No	Max:	10000	

Delay time load missing

Note:

It may be that the motor is not connected (load missing) or a phase could be missing.

Notice:

If a motor setpoint cannot be entered and the current limit (P2179) is not exceeded, alarm A0922 (no load applied) is issued when delay time (P2180) expires.

Details:

See diagram in P2179 (current limit for no load identification).

r2197	CO/BO: Monitoring word 1			Min:	-	Level:
	Datatype: U16	Unit: -		Def:	-	**2**
	P-Group: ALARMS			Max:	-	

Monitoring word 1 which indicates the state of monitor functions. Each bit represents one monitor function.

Bitfields:

```
Bit00   f_act <=  P1080 (f_min)                  0     NO
                                                 1     YES
Bit01   f_act <=  P2155 (f_1)                    0     NO
                                                 1     YES
Bit02   f_act >   P2155 (f_1)                    0     NO
                                                 1     YES
Bit03   f_act >   zero                           0     NO
                                                 1     YES
Bit04   f_act >=  setp. (f_set)                  0     NO
                                                 1     YES
Bit05   f_act <=  P2167 (f_off)                  0     NO
                                                 1     YES
Bit06   f_act >   P1082 (f_max)                  0     NO
                                                 1     YES
Bit07   f_act ==  setp. (f_set)                  0     NO
                                                 1     YES
Bit08   Act. current r0027 >= P2170              0     NO
                                                 1     YES
Bit09   Act. unfilt. Vdc  <  P2172               0     NO
                                                 1     YES
Bit10   Act. unfilt. Vdc  >  P2172               0     NO
                                                 1     YES
Bit11   No load condition                        0     NO
                                                 1     YES
```

P2200	BI: Enable PID controller			Min:	0:0	Level:
CStat:	CUT	Datatype: U32	Unit: -	Def:	0:0	**2**
P-Group:	TECH	Active: first confirm	QuickComm. No	Max:	4000:0	

PID mode Allows user to enable/disable the PID controller. Setting to 1 enables the PID closed-loop controller.

Dependency:

Setting 1 automatically disables normal ramp times set in P1120 and P1121 and the normal frequency setpoints.

Following an OFF1 or OFF3 command, however, the inverter frequency will ramp down to zero using the ramp time set in P1121 (P1135 for OFF3).

Note:

The PID setpoint source is selected using P2253. The PID setpoint and the PID feedback signal are interpreted as [%] values (not [Hz]). The output of the PID controller is displayed as [%] and then normalized into [Hz] through P2000 (reference frequency) when PID is enabled.

In level 3, the PID controller source enable can also come from the digital inputs in settings 722.0 to 722.2 for DIN1 to DIN3 or from any other BiCo source.

The reverse command is not active whilst PID is active.

Notice:

The minimum and maximum motor frequencies (P1080 and P1082) as well as the skip frequencies (P1091 to P1094) remain active on the inverter output. However, enabling skip frequencies with PID control can produce instabilities.

P2201	**Fixed PID setpoint 1**			**Min:** -130.00	Level:
CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:** 0.00	**2**
P-Group: TECH	**Active:** Immediately	**QuickComm.** No	**Max:** 130.00	

Defines Fixed PID Setpoint 1

In addition, you can set any of the digital input parameters to fixed PID setpoint (FF-PID) via the digital inputs (P0701 - P0703).

There are three selection modes for the PID fixed setpoint:
1 Direct selection (P0701 = 15 or P0702 = 15, etc):
In this mode of operation, 1 digital input selects one PID fixed setpoint.

2 Direct selection with ON command (P0701 = 16 or P0702 = 16, etc.):
Description as for 1), except that this type of selection issues an ON command concurrent with any setpoint selection.

3 Binary Coded Decimal selection (P0701 - P0703 = 17):
Using this method to select the fixed PID setpoint (FF-PID) allows you to choose up to 7 different PID setpoints.
The setpoints are selected according to the following table:

Example:

		DIN3	DIN2	DIN1
	OFF	Inactive	Inactive	Inactive
P2201	PID-FF1	Inactive	Inactive	**Active**
P2202	PID-FF2	Inactive	**Active**	Inactive
P2203	PID-FF3	Inactive	**Active**	**Active**
P2204	PID-FF4	**Active**	Inactive	Inactive
P2205	PID-FF5	**Active**	Inactive	**Active**
P2206	PID-FF6	**Active**	**Active**	Inactive
P2207	PID-FF7	**Active**	**Active**	**Active**

Dependency:
P2000 = 1 required in user access level 2 to enable setpoint source.

In mode 1 (above):
ON command required to start motor (enable pulses).

In mode 2 (above):
If inputs programmed to PID fixed setpoint and selected together, the selected setpoints are summed.

Note:
You may mix different types of frequencies; however, remember that they will be summed if selected together.

P2201 = 100 % corresponds to 4000 hex

P2202	**Fixed PID setpoint 2**			**Min:** -130.00	Level:
CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:** 10.00	**2**
P-Group: TECH	**Active:** Immediately	**QuickComm.** No	**Max:** 130.00	

Defines Fixed PID Setpoint 2
Details:
See P2201 (Fixed PID Setpoint 1).

P2203	**Fixed PID setpoint 3**			**Min:** -130.00	Level:
CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:** 20.00	**2**
P-Group: TECH	**Active:** Immediately	**QuickComm.** No	**Max:** 130.00	

Defines Fixed PID Setpoint 3
Details:
See P2201 fixed PID setpoint 1 (FF-PID 1).

P2204	**Fixed PID setpoint 4**			**Min:** -130.00	Level:
CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:** 30.00	**2**
P-Group: TECH	**Active:** Immediately	**QuickComm.** No	**Max:** 130.00	

Defines Fixed PID Setpoint 4
Details:
See P2201 (Fixed PID Setpoint 1).

P2205	**Fixed PID setpoint 5**			**Min:** -130.00	Level:
CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:** 40.00	**2**
P-Group: TECH	**Active:** Immediately	**QuickComm.** No	**Max:** 130.00	

Defines Fixed PID Setpoint 5
Details:
See P2201 (Fixed PID Setpoint 1).

P2206	**Fixed PID setpoint 6**			**Min:**	-130.00	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:**	50.00	**2**
	P-Group: TECH	**Active:** Immediately	**QuickComm.** No	**Max:**	130.00	

Defines Fixed PID Setpoint 6

Details:
See P2201 (Fixed PID Setpoint 1).

P2207	**Fixed PID setpoint 7**			**Min:**	-130.00	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:**	60.00	**2**
	P-Group: TECH	**Active:** Immediately	**QuickComm.** No	**Max:**	130.00	

Defines Fixed PID Setpoint 7

Details:
See P2201 (Fixed PID Setpoint 1).

P2216	**Fixed PID setpoint mode - Bit 0**			**Min:**	1	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	1	**3**
	P-Group: TECH	**Active:** first confirm	**QuickComm.** No	**Max:**	3	

Fixed frequencies for PID setpoint can be selected in three different modes. Parameter P2216 defines the mode of selection Bit 0.

Possible Settings:
1	Direct selection
2	Direct selection + ON command
3	Binary coded selection + ON command

P2217	**Fixed PID setpoint mode - Bit 1**			**Min:**	1	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	1	**3**
	P-Group: TECH	**Active:** first confirm	**QuickComm.** No	**Max:**	3	

BCD or direct selection Bit 1 for PID setpoint.

Possible Settings:
1	Direct selection
2	Direct selection + ON command
3	Binary coded selection + ON command

P2218	**Fixed PID setpoint mode - Bit 2**			**Min:**	1	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	1	**3**
	P-Group: TECH	**Active:** first confirm	**QuickComm.** No	**Max:**	3	

BCD or direct selection Bit 2 for PID setpoint.

Possible Settings:
1	Direct selection
2	Direct selection + ON command
3	Binary coded selection + ON command

P2220	**BI: Fixed PID setp. select Bit 0**			**Min:**	0:0	Level:
	CStat: CT	**Datatype:** U32	**Unit:** -	**Def:**	0:0	**3**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines command source of fixed PID setpoint selection Bit 0

Common Settings:
722.0	=	Digital input 1 (requires P0701 to be set to 99, BICO)
722.1	=	Digital input 2 (requires P0702 to be set to 99, BICO)
722.2	=	Digital input 3 (requires P0703 to be set to 99, BICO)
722.3	=	Digital input 4 (via analog input, requires P0704 to be set to 99)

P2221	**BI: Fixed PID setp. select Bit 1**			**Min:**	0:0	Level:
	CStat: CT	**Datatype:** U32	**Unit:** -	**Def:**	0:0	**3**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines command source of fixed PID setpoint selection Bit 1.

Common Settings:
722.0	=	Digital input 1 (requires P0701 to be set to 99, BICO)
722.1	=	Digital input 2 (requires P0702 to be set to 99, BICO)
722.2	=	Digital input 3 (requires P0703 to be set to 99, BICO)

P2222	**BI: Fixed PID setp. select Bit 2**			**Min:**	0:0	Level:
	CStat: CT	**Datatype:** U32	**Unit:** -	**Def:**	0:0	**3**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines command source of fixed PID setpoint selection Bit 2

Common Settings:
722.0	=	Digital input 1 (requires P0701 to be set to 99, BICO)
722.1	=	Digital input 2 (requires P0702 to be set to 99, BICO)
722.2	=	Digital input 3 (requires P0703 to be set to 99, BICO)

r2224	**CO: Act. fixed PID setpoint**			**Min:** -	Level:
		Datatype: Float	**Unit:** %	**Def:** -	**2**
	P-Group: TECH			**Max:** -	

Displays total output of PID fixed setpoint selection.

Note:

r2224 = 100 % corresponds to 4000 hex

P2231	**Setpoint memory of PID-MOP**			**Min:** 0	Level:
	CStat: CUT	**Datatype:** U16	**Unit:** -	**Def:** 0	**2**
	P-Group: TECH	**Active:** Immediately	**QuickComm.** No	**Max:** 1	

Setpoint memory
Possible Settings:
   0   PID-MOP setpoint will not be stored
   1   PID-MOP setpoint will be stored (P2240 is updated)
Dependency:
   P2231 = 0:
   If 0 selected, setpoint returns to value set in P2240 (setpoint of PID-MOP) after an OFF command.

   P2231 = 1:
   If 1 is selected, active setpoint is 'remembered' and P2240 updated with current value.
Details:
   See P2240 (setpoint of PID-MOP)

P2232	**Inhibit rev. direct. of PID-MOP**			**Min:** 0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:** 1	**2**
	P-Group: TECH	**Active:** first confirm	**QuickComm.** No	**Max:** 1	

Inhibits reverse setpoint selection when PID motor potentiometer is chosen either as a main setpoint or additional setpoint.
Possible Settings:
   0   Reverse direction is allowed
   1   Reverse direction inhibited
Note:

Setting 0 enables a change of motor direction using the motor potentiometer setpoint (increase/decrease frequency either by using digital inputs or motor potentiometer up/down buttons.

P2235	**BI: Enable PID-MOP (UP-cmd)**			**Min:** 0:0	Level:
	CStat: CT	**Datatype:** U32	**Unit:** -	**Def:** 19:13	**3**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:** 4000:0	

Defines source of UP command.
Common Settings:
   722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
   722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
   722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)

   19.D   = Keypad UP cursor
Dependency:
   To change setpoint:
   1. Use UP / DOWN key on BOP or
   2. Set P0702/P0703 = 13/14 (function of digital inputs 2 and 3)

P2236	**BI: Enable PID-MOP (DOWN-cmd)**			**Min:** 0:0	Level:
	CStat: CT	**Datatype:** U32	**Unit:** -	**Def:** 19:14	**3**
	P-Group: COMMANDS	**Active:** first confirm	**QuickComm.** No	**Max:** 4000:0	

Defines source of DOWN command.
Common Settings:
   722.0 = Digital input 1 (requires P0701 to be set to 99, BICO)
   722.1 = Digital input 2 (requires P0702 to be set to 99, BICO)
   722.2 = Digital input 3 (requires P0703 to be set to 99, BICO)
   722.3 = Digital input 4 (via analog input, requires P0704 to be set to 99)

   19.E   = Keypad DOWN cursor
Dependency:
   To change setpoint:
   1. Use UP / DOWN key on BOP or
   2. Set P0702/P0703 = 13/14 (function of digital inputs 2 and 3)

P2240	**Setpoint of PID-MOP**			**Min:** -130.00	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** %	**Def:** 10.00	**2**
	P-Group: TECH	**Active:** Immediately	**QuickComm.** No	**Max:** 130.00	

Setpoint of the motor potentiometer.

Allows user to set a digital PID setpoint in [%].

Note:

P2240 = 100 % corresponds to 4000 hex

r2250	CO: Output setpoint of PID-MOP			Min:	-	Level:
		Datatype: Float	**Unit:** %	**Def:**	-	**2**
	P-Group: TECH			**Max:**	-	

Displays output setpoint of motor potentiometer in [%].

Note:	
	r2250 = 100 % corresponds to 4000 hex

P2253	CI: PID setpoint			Min:	0:0	Level:
	CStat: CUT	**Datatype:** U32	**Unit:** -	**Def:**	0:0	**2**
	P-Group: TECH	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Defines setpoint source for PID setpoint input.
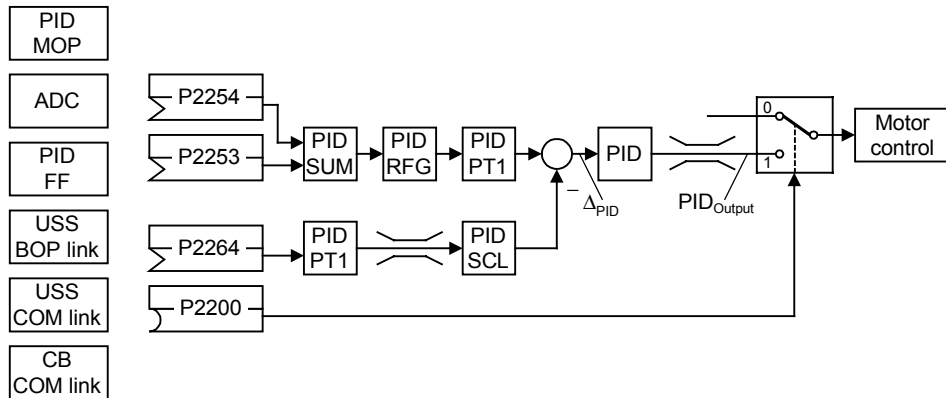
This parameter allows the user to select the source of the PID setpoint. Normally, a digital setpoint is selected either using a fixed PID setpoint or an active setpoint.

Common Settings:
755 = Analog input 1
2224 = Fixed PI setpoint (see P2201 to P2207)
2250 = Active PI setpoint (see P2240)

P2254	CI: PID trim source			Min:	0:0	Level:
	CStat: CUT	**Datatype:** U32	**Unit:** -	**Def:**	0:0	**3**
	P-Group: TECH	**Active:** first confirm	**QuickComm.** No	**Max:**	4000:0	

Selects trim source for PID setpoint. This signal is multiplied by the trim gain and added to the PID setpoint.

Common Settings:
755 = Analog input 1
2224 = Fixed PI setpoint (see P2201 to P2207)
2250 = Active PI setpoint (see P2240)

P2255	PID setpoint gain factor			Min:	0.00	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** -	**Def:**	100.00	**3**
	P-Group: TECH	**Active:** Immediately	**QuickComm.** No	**Max:**	100.00	

Gain factor for PID setpoint. The PID setpoint input is multiplied by this gain factor to produce a suitable ratio between setpoint and trim.

P2256	PID trim gain factor			Min:	0.00	Level:
	CStat: CUT	**Datatype:** Float	**Unit:** -	**Def:**	100.00	**3**
	P-Group: TECH	**Active:** Immediately	**QuickComm.** No	**Max:**	100.00	

Gain factor for PID trim. This gain factor scales the trim signal, which is added to the main PID setpoint.

P2257	**Ramp-up time for PID setpoint**			**Min:**	0.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** s	**Def:**	1.00	**2**
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

Sets the ramp-up time for the PID setpoint.
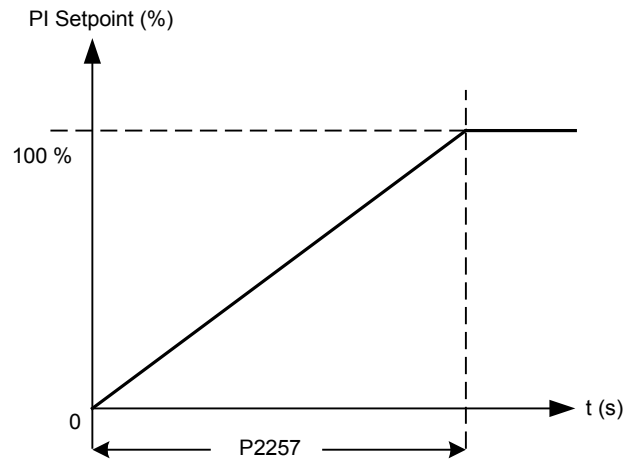
Dependency:

P2200 = 1 (PID control is enabled) disable normal ramp-up time (P1120).

PID ramp time effective only on PID setpoint and only active when PID setpoint is changed or when RUN command is given (when PID setpoint uses this ramp to reach its value from 0 %).

Notice:

Setting the ramp-up time too short may cause the inverter to trip, on overcurrent for example.

P2258	**Ramp-down time for PID setpoint**			**Min:**	0.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** s	**Def:**	1.00	**2**
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Max:**	650.00	

Sets ramp-down time for PID setpoint.
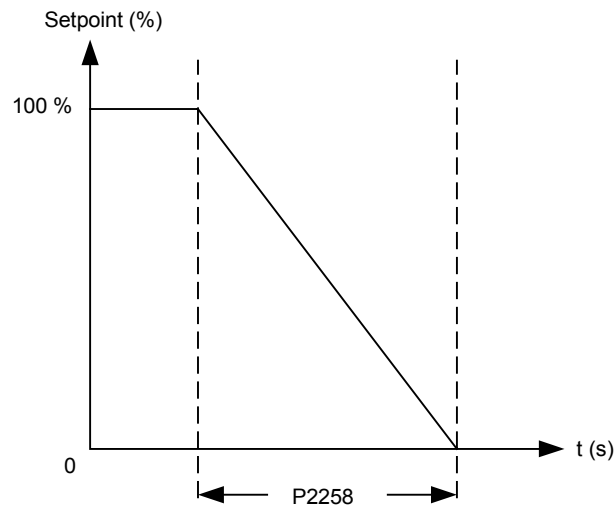
Dependency:

P2200 = 1 (PID control is enabled) disables normal ramp-up time (P1120).

PID setpoint ramp effective only on PID setpoint changes.

P1121 (ramp-down time) and P1135 (OFF3 ramp-down time) define the ramp times used after OFF1 and OFF3 respectively.

Notice:

Setting the ramp-down time too short can cause the inverter to trip on overvoltage (F0002) / overcurrent (F0001).

r2260	CO: PID setpoint after PID-RFG			Min:	-	Level:
		Datatype: Float	Unit: %	Def:	-	2
	P-Group: TECH			Max:	-	

Displays total active PID setpoint after PID-RFG in [%].

Note:	
	r2260 = 100 % corresponds to 4000 hex

P2261	PID setpoint filter timeconstant			Min:	0.00	Level:
	CStat: CUT	Datatype: Float	Unit: s	Def:	0.00	3
	P-Group: TECH	Active: Immediately	QuickComm. No	Max:	60.00	

Sets a time constant for smoothing the PID setpoint.

Note:	
	0 = no smoothing

r2262	CO: Filtered PID setp. after RFG			Min:	-	Level:
		Datatype: Float	Unit: %	Def:	-	3
	P-Group: TECH			Max:	-	

Displays filtered PID setpoint after PID-RFG in [%].

Note:	
	r2262 = 100 % corresponds to 4000 hex

P2264	CI: PID feedback			Min:	0:0	Level:
	CStat: CUT	Datatype: U32	Unit: -	Def:	755:0	2
	P-Group: TECH	Active: first confirm	QuickComm. No	Max:	4000:0	

Selects the source of the PID feedback signal.

Common Settings:
755 = Analog input 1 setpoint
2224 = Fixed PID setpoint
2250 = Output setpoint of PID-MOP

Note:	
	When analog input is selected, offset and gain can be implemented using parameters P0756 to P0760.

P2265	PID feedback filter timeconstant			Min:	0.00	Level:
	CStat: CUT	Datatype: Float	Unit: s	Def:	0.00	2
	P-Group: TECH	Active: Immediately	QuickComm. No	Max:	60.00	

Defines time constant for PID feedback filter.

r2266	CO: PID filtered feedback			Min:	-	Level:
		Datatype: Float	Unit: %	Def:	-	2
	P-Group: TECH			Max:	-	

Displays PID feedback signal in [%].

Note:	
	r2266 = 100 % corresponds to 4000 hex

P2267	Max. value for PID feedback			Min:	-200.00	Level:
	CStat: CUT	Datatype: Float	Unit: %	Def:	100.00	3
	P-Group: TECH	Active: Immediately	QuickComm. No	Max:	200.00	

Sets the upper limit for the value of the feedback signal in [%].

Note:	
	P2267 = 100 % corresponds to 4000 hex
Notice:	
	When PID is enabled (P2200 = 1) and the signal rises above this value, the inverter will trip with F0222 .

P2268	Min. value for PID feedback			Min:	-200.00	Level:
	CStat: CUT	Datatype: Float	Unit: %	Def:	0.00	3
	P-Group: TECH	Active: Immediately	QuickComm. No	Max:	200.00	

Sets lower limit for value of feedback signal in [%].

Note:	
	P2268 = 100 % corresponds to 4000 hex
Notice:	
	When PID is enabled (P2200 = 1) and the signal rises below this value, the inverter will trip with F0221.

P2269	Gain applied to PID feedback			Min:	0.00	Level:
	CStat: CUT	Datatype: Float	Unit: -	Def:	100.00	3
	P-Group: TECH	Active: Immediately	QuickComm. No	Max:	500.00	

Allows the user to scale the PID feedback as a percentage value [%].

A gain of 100.0 % means that feedback signal has not changed from its default value.

P2270	**PID feedback function selector**				**Min:**	0	Level:
	CStat:	CUT	**Datatype:** U16	**Unit:** -	**Def:**	0	**3**
	P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Max:**	3	

Applies mathematical functions to the PID feedback signal, allowing multiplication of the result by P2269 (gain applied to PID feedback).
Possible Settings:

0	Disabled	
1	Square root	(root(x))
2	Square	(x*x)
3	Cube	(x*x*x)

P2271	**PID transducer type**				**Min:**	0	Level:
	CStat:	CUT	**Datatype:** U16	**Unit:** -	**Def:**	0	**2**
	P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Max:**	1	

Allows the user to select the transducer type for the PID feedback signal.
Possible Settings:

0	Disabled
1	Inversion of PID feedback signal

Value:

P2271 = 0 : [default]
If the feedback signal is less than the PID setpoint, the PID controller will increase motor speed to correct this.

P2271 = 1 :
If the feedback signal is greater than the PID setpoint, the PID controller will reduce motor speed to correct this.

Notice:

It is essential that you select the correct tranducer type.

If you are unsure whether 0 or 1 is applicable, you can determine the correct type as follows:
1. Disable the PID function (P2200 = 0).
2. Increase the motor frequency while measuring the feedback signal.
3. If the feedback signal increases with an increase in motor frequency, the PID transducer type should be 0.
4. If the feedback signal decreases with an increase in motor frequency the PID transducer type should be set to 1.

r2272	**CO: PID scaled feedback**			**Min:**	-	Level:
		Datatype: Float	**Unit:** %	**Def:**	-	**2**
	P-Group: TECH			**Max:**	-	

Displays PID scaled feedback signal in [%].

Note:

r2272 = 100 % corresponds to 4000 hex

r2273	**CO: PID error**			**Min:**	-	Level:
		Datatype: Float	**Unit:** %	**Def:**	-	**2**
	P-Group: TECH			**Max:**	-	

Displays PID error (difference) signal between setpoint and feedback signals in [%].

Note:

r2273 = 100 % corresponds to 4000 hex

P2280	**PID proportional gain**			**Min:**	0.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** -	**Def:**	3.00	**2**
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Max:**	125.00	

Allows user to set proportional gain for PID controller.

The PID controller is implemented using the standard model.
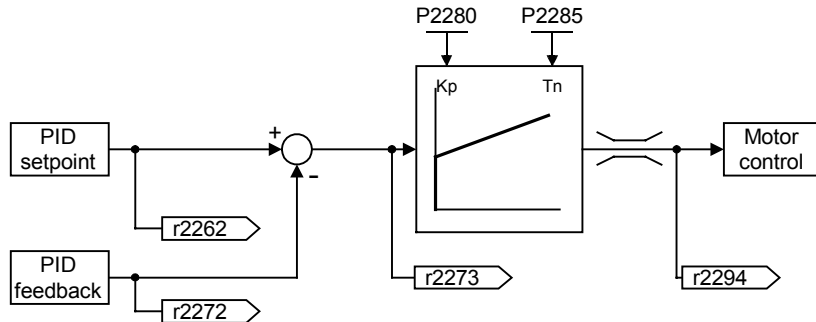
For best results, enable both P and I terms.

Dependency:
P2280 = 0 (P term of PID = 0):
I term acts on the square of the error signal.

P2285 = 0 (I term of PID = 0):
PID controller acts as a P or PD controller respectively.

Note:
If the system is prone to sudden step changes in the feedback signal, P term should normally be set to a small value (0.5) with a faster I term for optimum performance.

P2285	**PID integral time**			**Min:**	0.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** s	**Def:**	0.00	**2**
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Max:**	100.00	

Sets integral time constant for PID controller.

Details:
See P2280 (PID proportional gain).

P2291	**PID output upper limit**			**Min:**	-200.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Def:**	100.00	**2**
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Max:**	200.00	

Sets upper limit for PID controller output in [%].

Dependency:
If F max (P1082) is greater than P2000 (reference frequency), either P2000 or P2291 (PID output upper limit) must be changed to achieve F max.

Note:
P2291 = 100 % corresponds to 4000 hex (as defined by P2000 (reference frequency)).

P2292	**PID output lower limit**			**Min:**	-200.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** %	**Def:**	0.00	**2**
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Max:**	200.00	

Sets lower limit for the PID controller output in [%].

Dependency:
A negative value allows bipolar operation of PID controller.

Note:
P2292 = 100 % corresponds to 4000 hex

P2293	**Ramp-up /-down time of PID limit**			**Min:**	0.00	Level:
CStat:	CUT	**Datatype:** Float	**Unit:** s	**Def:**	1.00	**3**
P-Group:	TECH	**Active:** Immediately	**QuickComm.** No	**Max:**	100.00	

Sets maximum ramp rate on output of PID.

When PI is enabled, the output limits are ramped up from 0 to the limits set in P2291 (PID output upper limit) and P2292 (PID output lower limit). Limits prevent large step changes appearing on the output of the PID when the inverter is started. Once the limits have been reached, the PID controller output is instantaneous.

These ramp times are used whenever a RUN command is issued.

Note:
If an OFF1 or OFF 3 are issued, the inverter output frequency ramps down as set in P1121 (ramp-down time) or P1135 (OFF3 ramp-down time).

r2294	CO: Act. PID output			Min:	-	Level:
		Datatype: Float	**Unit:** %	Def:	-	**2**
	P-Group: TECH			Max:	-	

Displays PID output in [%]

Note:

r2294 = 100 % corresponds to 4000 hex

P3900	End of quick commissioning			Min:	0	Level:
	CStat: C	**Datatype:** U16	**Unit:** -	Def:	0	**1**
	P-Group: QUICK	**Active:** first confirm	**QuickComm.** Yes	Max:	3	

Performs calculations necessary for optimized motor operation.

After completion of calculation, P3900 and P0010 (parameter groups for commissioning) are automatically reset to their original value 0.

Possible Settings:

0	No quick commissioning
1	Start quick commissioning with factory reset
2	Start quick commissioning
3	Start quick commissioning only for motor data

Dependency:

Changeable only when P0010 = 1 (quick commissioning)

Note:

P3900 = 1 :
When setting 1 is selected, only the parameter settings carried out via the commissioning menu "Quick commissioning", are retained; all other parameter changes, including the I/O settings, are lost. Motor calculations are also performed.

P3900 = 2 :
When setting 2 is selected, only those parameters, which depend on the parameters in the commissioning menu "Quick commissioning" (P0010 = 1) are calculated. The I/O settings are also reset to default and the motor calculations performed.

P3900 = 3 :
When setting 3 is selected, only the motor and controller calculations are performed. Exiting quick commissioning with this setting saves time (for example, if only motor rating plate data have been changed).

Calculates a variety of motor parameters, overwriting previous values. These include P0344 (motor weight), P0350 (demagnetization time), P2000 (reference frequency), P2002 (reference current).

P3950	Access of hidden parameters			Min:	0	Level:
	CStat: CUT	**Datatype:** U16	**Unit:** -	Def:	0	**4**
	P-Group: ALWAYS	**Active:** first confirm	**QuickComm.** No	Max:	255	

Accesses special parameters for development (expert only) and factory functionality (calibration parameter).

r3954[13]	CM version and GUI ID			Min:	-	Level:
		Datatype: U16	**Unit:** -	Def:	-	**4**
	P-Group: -			Max:	-	

Used to classify firmware (only for SIEMENS internal purposes).

Index:

r3954[0] : CM version (major release)
r3954[1] : CM version (minor release)
r3954[2] : CM version (baselevel or patch)
r3954[3] : GUI ID
r3954[4] : GUI ID
r3954[5] : GUI ID
r3954[6] : GUI ID
r3954[7] : GUI ID
r3954[8] : GUI ID
r3954[9] : GUI ID
r3954[10] : GUI ID
r3954[11] : GUI ID major release
r3954[12] : GUI ID minor release

P3980	**Commissioning command selection**			**Min:**	0	Level:
	CStat: T	**Datatype:** U16	**Unit:** -	**Def:**	0	**4**
	P-Group: -	**Active:** first confirm	**QuickComm.** No	**Max:**	66	

Toggles command and setpoint sources between freely programmable BICO parameters and fixed command/setpoint profiles for commissioning.

The command and setpoint sources can be changed independently. The tens digit selects the command source, the ones digit the setpoint source.

Possible Settings:

0	Cmd = BICO parameter	Setpoint = BICO parameter
1	Cmd = BICO parameter	Setpoint = MOP setpoint
2	Cmd = BICO parameter	Setpoint = Analog setpoint
3	Cmd = BICO parameter	Setpoint = Fixed frequency
4	Cmd = BICO parameter	Setpoint = USS on BOP link
5	Cmd = BICO parameter	Setpoint = USS on COM link
6	Cmd = BICO parameter	Setpoint = CB on COM link
10	Cmd = BOP	Setpoint = BICO parameter
11	Cmd = BOP	Setpoint = MOP setpoint
12	Cmd = BOP	Setpoint = Analog setpoint
13	Cmd = BOP	Setpoint = Fixed frequency
15	Cmd = BOP	Setpoint = USS on COM link
16	Cmd = BOP	Setpoint = CB on COM link
40	Cmd = USS on BOP link	Setpoint = BICO parameter
41	Cmd = USS on BOP link	Setpoint = MOP setpoint
42	Cmd = USS on BOP link	Setpoint = Analog setpoint
43	Cmd = USS on BOP link	Setpoint = Fixed frequency
44	Cmd = USS on BOP link	Setpoint = USS on BOP link
45	Cmd = USS on BOP link	Setpoint = USS on COM link
46	Cmd = USS on BOP link	Setpoint = CB on COM link
50	Cmd = USS on COM link	Setpoint = BICO parameter
51	Cmd = USS on COM link	Setpoint = MOP setpoint
52	Cmd = USS on COM link	Setpoint = Analog setpoint
53	Cmd = USS on COM link	Setpoint = Fixed frequency
54	Cmd = USS on COM link	Setpoint = USS on BOP link
55	Cmd = USS on COM link	Setpoint = USS on COM link
60	Cmd = CB on COM link	Setpoint = BICO parameter
61	Cmd = CB on COM link	Setpoint = MOP setpoint
62	Cmd = CB on COM link	Setpoint = Analog setpoint
63	Cmd = CB on COM link	Setpoint = Fixed frequency
64	Cmd = CB on COM link	Setpoint = USS on BOP link
66	Cmd = CB on COM link	Setpoint = CB on COM link

P3981	**Reset active fault**			**Min:**	0	Level:
	CStat: CT	**Datatype:** U16	**Unit:** -	**Def:**	0	**4**
	P-Group: ALARMS	**Active:** first confirm	**QuickComm.** No	**Max:**	1	

Resets active faults when changed from 0 to 1.

Possible Settings:

0	No fault reset
1	Reset fault

Note:

Automatically reset to 0.

Details:

See P0947 (last fault code)

2 Function Diagrams

Overview					1100_Overview.vsd	V1.13	Function diagram	- 1100 -
General Overview					06.11.2001		MICROMASTER 420	

Sequence control

BI: ON/OFF1 P0840 (722:0)
BI:ON/OFF1 reverse P0842 (0:0)
BI: 1. OFF2 P0844 (1:0)
BI: 2. OFF2 P0845 (19:1)
BI: 1. OFF3 P0848 (1:0)
BI: 2. OFF3 P0849 (1:0)
BI: Pulse enable P0852 (1:0)

CO/BO: Act StatWd1 r0052 r0052
CO/BO: Act StatWd2 r0053 r0053
CO/BO: Act CtrlWd1 r0054 r0054
CO/BO: Add. CtrlWd r0055 r0055

AFM RFG V/f FOC Imax contr.

BI: Inh. neg. setp P1110 (0:0)
BI: Reverse P1113 (722:1)
BI: RFG enable P1140 (1:0)

SUM/JOG selection

JOG frequency -> 0.00 ... 650.00 [Hz] P1058 (5.00)
JOG frequency <- 0.00 ... 650.00 [Hz] P1059 (5.00)

CO: Tot. freq.setp [Hz] r1078
CO: Act.PID output [%] r2294

SUM

PID controller

CI: Add. setpoint P1075 (0:0)
CI: Add. setp.scal P1076 (1:0)
BI: Disab.add.setp P1074 (0:0)
CI: Main setp scal P1071 (1:0)
CI: Main setpoint P1070 (755:0)

CI: PID setpoint P2253 (0:0)
CI:PID trim source P2254 (0:0)
CI: PID feedback P2264 (755:0)
BI: Enab. PID ctrl P2200 (0:0)

CO: MOP outp.freq. r1050
CO: Act. FF r1024
CO: Fixed.PID setp r2224
CO: MOP outp. setp r2250

MOP
FF
FF PID
PID MOP

BI: Enable JOG -> P1055 (0:0)
BI: Enable JOG <- P1056 (0:0)
BI: Enable MOP(UP) P1035 (19:13)
BI:Enable MOP(DWN) P1036 (19:14)
BI: FF sel. Bit 0 P1020 (0:0)
BI: FF sel. Bit 1 P1021 (0:0)
BI: FF sel. Bit 2 P1022 (0:0)
BI:PID setp->Bit 0 P2220 (0:0)
BI:PID setp->Bit 1 P2221 (0:0)
BI:PID setp->Bit 2 P2222 (0:0)
BI: PID-MOP (UP) P2235 (19:13)
BI: PID-MOP (DWN) P2236 (19:14)

CO/BO: Bin.inp.val r0722 r0722
BI: Fct. of DOUT 1 P0731 (52:3)
CO:ADC scal[4000h] r0755
CI: DAC P0771 (21:0)
CO/BO: BOP CtrlWd r0019 r0019
CO: PZD<-COM (USS) r2018 [4]
BO: CtrlWd1 <- COM r2036
BO: CtrlWd2 <- COM r2037
CI: PZD->BOP (USS) P2016 [4] (52:0)
CO: PZD from CB r2050 [4]
BO: CtrlWd1 <- CB r2090
BO: CtrlWd2 <- CB r2091
CI: PZD to CB P2051 [4] (52:0)
CO: PZD<-BOP (USS) r2015 [4]
BO: CtrlWd1 <- BOP r2032
BO: CtrlWd2 <- BOP r2033
CI: PZD->BOP (USS) P2016 [4] (52:0)

DIN
DOUT
ADC
DAC
BOP
USS (COM-link) RS485
CB (COM-link)
USS (BOP-link) RS232

1 2 3 4 5 6 7 8

Overview Function diagram - 1200 -
Connection of External and Internal Setpoints
1200_BICO_Overv.vsd V1.13 24.07.2001 MICROMASTER 420

							- 2000 -
1	2	3	4	5	6	7	8
					2000_DIN.vsd V1.13	Function diagram	MICROMASTER 420
					09.08.2001		
External Command + Setpoint Source							
Digital Inputs							

External Command + Setpoint Source

Analog Input (ADC)

1	2	3	4	5	6	7	8
					2200_ADC.vsd	Function diagram	**- 2200 -**
					21.09.2001 V1.13	MICROMASTER 420	

Act. DAC value[mA]
r0774

Analog output

DAC deadband width
0 … 20
P0781 (0)

Value x2:DAC scal.
-99999.0 … 99999.0 [%]
P0779 (100.0)

Value x1:DAC scal.
-99999.0 … 99999.0 [%]
P0777 (0.0)

Type of DAC
0 … 0
P0776 (0)

Value y2:DAC scal.
0 … 20
P0780 (20)

Value y1:DAC scal.
0 … 20
P0778 (0)

Smooth time DAC
0 … 1000 [ms]
P0773 (2)

CI: DAC
P0771   (21:0)

x(t)

$4000\ h \cong 20\ mA$

mA

$y_{100\%}$

20 mA

y_2

y_1

P0781

%

100 %

x_{20mA}

x_2

x_1

D / A

1	2	3	4	5	6	7	8

External Command + Setpoint Source

Analog Output (DAC)

2300_DAC.vsd   V1.13
22.08.2001

Function diagram   MICROMASTER 420

- 2300 -

Note:
Activation of the raise and lower keys is only effective if the operating display (r0000) is selected, a changeover to the value display has taken place with the toggle key and the unit is in the "Operation" status.

Operating display (r0000) selected and operation=1 of sequence control

Raise motor potentio-meter from BOP

Lower motor poten-tiometer from BOP

Toggle key to operating system, fault acknowl-edgement to control word 1

Toggle key to operating system, fault acknowl-edgement to control word 1

Actuation of seven-segment display

Positive direction of rotation from BOP

ON/OFF1, OFF2, OFF3 from BOP

CO/BO: BOP
r0019.D

CO/BO: BOP
r0019.D

CO/BO: BOP
r0019.E

CO/BO: BOP
r0019.E

CO/BO: BOP
r0019.B

CO/BO: BOP
r0019.B

CO/BO: BOP
r0019.1

CO/BO: BOP
r0019.1

Priority
1 RESET
2 SET

Priority
1 RESET
2 SET

SET (Q=1)   Q

RESET (Q=0)   Q

POWER ON

≥1

Set command

Reset command

≥1

≥1

POWER ON

Basic Operator Panel BOP

SIEMENS

150.00

Seven-segment display

Raise key
Toggle key
Reversing key
ON key

OFF key
JOG key
Program key
Lower key

5 V

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

External Command + Setpoint Source

Basic Operator Panel (BOP)

Function diagram   MICROMASTER 420

2400_BOP.vsd   V1.13

06.07.2001

- 2400 -

Bit00 ON/OFF1
Bit01 OFF2: Electrical stop
Bit02 OFF3: Fast stop
Bit03 Pulse enable
Bit04 RFG enable
Bit05 RFG start
Bit06 Setpoint enable
Bit07 Fault acknowledge
Bit08 JOG right
Bit09 JOG left
Bit10 Control from PLC
Bit11 Reverse (setpoint inversion)
Bit13 Motor potentiometer MOP up
Bit14 Motor potentiometer MOP down
Bit15 CDS Bit 0 (Local/Remote)

Bit00 Fixed frequency Bit 0
Bit01 Fixed frequency Bit 1
Bit02 Fixed frequency Bit 2
Bit03 Fixed frequency Bit 3
Bit04 Drive data set (DDS) Bit 0
Bit05 Drive data set (DDS) Bit 1
Bit08 PID enabled
Bit09 DC brake enabled
Bit11 Droop
Bit12 Torque control
Bit13 External fault 1
Bit15 Command data set (CDS) Bit 1

BO: CtrlWd1 <- BOP
r2032

BO: CtrlWd2 <- BOP
r2033

r2015
[0]
[1]
[2]
[3]

PKW

PZD
0
1
2
3

Receive telegram
Receive
RxD

PZD
3 2 1 0

PKW
ADR LGE STX

BCC

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.

USS
configuration

Change par. via
0 ... 15
P0927 (15)

USS baudrate
3 ... 9
P2010 [2] (6)

USS address
0 ... 31
P2011 [2] (0)

USS PZD length
0 ... 4
P2012 [2] (2)

USS PKW length
0 ... 127
P2013 [2] (127)

USS telegram T_off
0 ... 65535 [ms]
P2014 [2] (0)

Bit2 = 1

All parameters:
Index = 1
=> BOP link

1	2	3	4	5	6	7	8
					2500_USSonBOP.vsd	Function diagram	- 2500 -
External Interfaces					08.03.2002 V1.13	MICROMASTER 420	
USS on BOP link, Receiving							

TxD

Transmit telegram

| STX | LGE | ADR | PKW | PZD | BCC |

Transmit

PZD: 3 2 1 0

USS configuration

Change par. via
0 … 15
P0927 (15)

USS baudrate
3 … 9
P2010 [2] (6)

USS address
0 … 31
P2011 [2] (0)

USS PZD length
0 … 4
P2012 [2] (2)

USS PKW length
0 … 127
P2013 [2] (127)

USS telegram T_off [ms]
0 … 65535
P2014 [2] (0)

Bit2 = 1

All parameters:
Index = 1
=> BOP link

PKW

PZD: 0 1 2 3

P2016: [0] [1] [2] [3]

Note:
P2016[0] = 52
P2016[1] = 21
P2016[3] = 53
are default settings

CO/BO: Act StatWd1
r0052
r0052

CO: Act. frequency [Hz]
r0021

CO/BO: Act StatWd2
r0053
r0053

Bit00 Drive ready
Bit01 Drive ready to run
Bit02 Drive running
Bit03 Drive fault active
Bit04 OFF2 active
Bit05 OFF3 active
Bit06 ON inhibit active
Bit07 Drive warning active
Bit08 Deviation setpoint / act. value
Bit09 PZD control
Bit10 Maximum frequency reached
Bit11 Warning: Motor current
Bit12 Motor holding brake active
Bit13 Motor overload
Bit14 Motor runs right
Bit15 Inverter overload

Bit00 DC brake active
Bit01 Act. freq. r0021 > P2167 (f_off)
Bit02 Act. freq. r0021 > P1080 (f_min)
Bit03 Act. current r0027 >= P2170
Bit04 Act. freq. r0021 >= P2155 (f_1)
Bit05 Act. freq. r0021 < P2155 (f_1)
Bit06 Act. freq. r0021 >= setpoint
Bit07 Act. Vdc r0026 < P2172
Bit08 Act. Vdc r0026 > P2172
Bit09 Ramping finished
Bit10 PID output r2294 == P2292 (PID_min)
Bit11 PID output r2294 == P2291 (PID_max)
Bit14 Download data set 0 from AOP
Bit15 Download data set 1 from AOP

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

External Interfaces   2510_USSonBOP.vsd   Function diagram   - 2510 -

USS on BOP link, Transmitting   08.03.2002   V1.13   MICROMASTER 420

Bit00 ON/OFF1
Bit01 OFF2: Electrical stop
Bit02 OFF3: Fast stop
Bit03 Pulse enable
Bit04 RFG enable
Bit05 RFG start
Bit06 Setpoint enable
Bit07 Fault acknowledge
Bit08 JOG right
Bit09 JOG left
Bit10 Control from PLC
Bit11 Reverse (setpoint inversion)
Bit13 Motor potentiometer MOP up
Bit14 Motor potentiometer MOP down
Bit15 CDS Bit 0 (Local/Remote)

Bit00 Fixed frequency Bit 0
Bit01 Fixed frequency Bit 1
Bit02 Fixed frequency Bit 2
Bit03 Fixed frequency Bit 3
Bit04 Drive data set (DDS) Bit 0
Bit05 Drive data set (DDS) Bit 1
Bit08 PID enabled
Bit09 DC brake enabled
Bit11 Droop
Bit12 Torque control
Bit13 External fault 1
Bit15 Command data set (CDS) Bit 1

BO: CtrlWd1 <- COM
r2036

BO: CtrlWd2 <- COM
r2037

r2018
[0]
[1]
[2]
[3]

PKW
PZD
0
1
2
3

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.

RxD
Receive telegram
Receive

BCC

PZD
3 2 1 0

PKW

ADR

LGE

STX

Bit3 = 1

USS configuration

Change par. via
0 … 15
P0927 (15)

USS baudrate
3 … 9
P2010 [2] (6)

USS address
0 … 31
P2011 [2] (0)

USS PZD length
0 … 4
P2012 [2] (2)

USS PKW length
0 … 127
P2013 [2] (127)

USS telegram T_off
0 … 65535 [ms]
P2014 [2] (0)

All parameters:
Index = 0
=> COM link

1	2	3	4	5	6	7	8

External Interfaces | | | | | 2600_USSonCOM.vsd | Function diagram | - 2600 -
USS on COM link, Receiving | | | | | 08.03.2002 V1.13 | MICROMASTER 420 |

Transmit telegram

Transmit

| BCC | PZD | PKW | ADR | LGE | STX |

PZD: 3 2 1 0

TxD

USS configuration

Change par. via
0 ... 15
P0927 (15)

USS baudrate
3 ... 9
P2010 [2] (6)

USS address
0 ... 31
P2011 [2] (0)

USS PZD length
0 ... 4
P2012 [2] (2)

USS PKW length
0 ... 127
P2013 [2] (127)

USS telegram T_off
0 ... 65535 [ms]
P2014 [2] (0)

Bit3 = 1

All parameters:
Index = 0
=> COM link

PKW

PZD: 0 1 2 3

P2019: [0] [1] [2] [3]

Note:
P2019[0] = 52
P2019[1] = 21
P2019[3] = 53
are default settings

CO/BO: Act StatWd1
r0052
r0052

CO: Act. frequency [Hz]
r0021

CO/BO: Act StatWd2
r0053
r0053

Bit00 Drive ready
Bit01 Drive ready to run
Bit02 Drive running
Bit03 Drive fault active
Bit04 OFF2 active
Bit05 OFF3 active
Bit06 ON inhibit active
Bit07 Drive warning active
Bit08 Deviation setpoint / act. value
Bit09 PZD control
Bit10 Maximum frequency reached
Bit11 Warning: Motor current
Bit12 Motor holding brake active
Bit13 Motor overload
Bit14 Motor runs right
Bit15 Inverter overload

Bit00 DC brake active
Bit01 Act. freq. r0021 > P2167 (f_off)
Bit02 Act. freq. r0021 > P1080 (f_min)
Bit03 Act. current r0027 >= P2170
Bit04 Act. freq. r0021 >= P2155 (f_1)
Bit05 Act. freq. r0021 < P2155 (f_1)
Bit06 Act. freq. r0021 >= setpoint
Bit07 Act. Vdc r0026 < P2172
Bit08 Act. Vdc r0026 > P2172
Bit09 Ramping finished
Bit10 PID output r2294 == P2292 (PID_min)
Bit11 PID output r2294 == P2291 (PID_max)
Bit14 Download data set 0 from AOP
Bit15 Download data set 1 from AOP

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

External Interfaces

USS on COM link, Transmitting

2610_USSonCOM.vsd   Function diagram   - 2610 -

08.03.2002   V1.13   MICROMASTER 420

Bit00 ON/OFF1
Bit01 OFF2: Electrical stop
Bit02 OFF3: Fast stop
Bit03 Pulse enable
Bit04 RFG enable
Bit05 RFG start
Bit06 Setpoint enable
Bit07 Fault acknowledge
Bit08 JOG right
Bit09 JOG left
Bit10 Control from PLC
Bit11 Reverse (setpoint inversion)
Bit13 Motor potentiometer MOP up
Bit14 Motor potentiometer MOP down
Bit15 CDS Bit 0 (Local/Remote)

Bit00 Fixed frequency Bit 0
Bit01 Fixed frequency Bit 1
Bit02 Fixed frequency Bit 2
Bit03 Fixed frequency Bit 3
Bit04 Drive data set (DDS) Bit 0
Bit05 Drive data set (DDS) Bit 1
Bit08 PID enabled
Bit09 DC brake enabled
Bit11 Droop
Bit12 Torque control
Bit13 External fault 1
Bit15 Command data set (CDS) Bit 1

BO: CtrlWd1 <- CB
r2090

BO: CtrlWd2 <- CB
r2091

r2050
[0]
[1]
[2]
[3]

PKW

PZD
0
1
2
3

Receive

CB-Frame

RxD   Receive telegram

CB-Frame   PKW   PZD
                     3 2 1 0

Bit0 = 1

Change par. via
0 ... 15
P0927 (15)

CB tel. off time
0 ... 65535 [ms]
P2040 (20)

CB parameter
0 ... 65535
P2041 [5] (0)

CB
configuration

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.

External Interfaces

CB on COM link, Receiving

2700_CBonCOM.vsd

08.03.2002   V1.13

Function diagram

MICROMASTER 420

- 2700 -

TxD

Transmit telegram

Transmit

| CB-Frame | PZD 3 2 1 0 | PKW | CB-Frame |

PKW

PZD
0
1
2
3

P2051
[0]
[1]
[2]
[3]

Note:
P2051[0] = 52
P2051[1] = 21
P2051[3] = 53
are default settings

CO/BO: Act StatWd1
r0052
r0052

CO: Act. frequency [Hz]
r0021

CO/BO: Act StatWd2
r0053
r0053

Bit00   Drive ready
Bit01   Drive ready to run
Bit02   Drive running
Bit03   Drive fault active
Bit04   OFF2 active
Bit05   OFF3 active
Bit06   ON inhibit active
Bit07   Drive warning active
Bit08   Deviation setpoint / act. value
Bit09   PZD control
Bit10   Maximum frequency reached
Bit11   Warning: Motor current
Bit12   Motor holding brake active
Bit13   Motor overload
Bit14   Motor runs right
Bit15   Inverter overload

Bit00   DC brake active
Bit01   Act. freq. r0021 > P2167 (f_off)
Bit02   Act. freq. r0021 > P1080 (f_min)
Bit03   Act. current r0027 >= P2170
Bit04   Act. freq. r0021 >= P2155 (f_1)
Bit05   Act. freq. r0021 < P2155 (f_1)
Bit06   Act. freq. r0021 >= setpoint
Bit07   Act. Vdc r0026 < P2172
Bit08   Act. Vdc r0026 > P2172
Bit09   Ramping finished
Bit10   PID output r2294 == P2292 (PID_min)
Bit11   PID output r2294 == P2291 (PID_max)
Bit14   Download data set 0 from AOP
Bit15   Download data set 1 from AOP

Bit0 = 1

Change par. via
0 ... 15
P0927 (15)

CB tel. off time
0 ... 65535 [ms]
P2040 (20)

CB parameter
0 ... 65535
P2041 [5] (0)

CB
configuration

External Interfaces
CB on COM link, Transmitting

2710_CBonCOM.vsd
08.03.2002   V1.13

Function diagram
MICROMASTER 420

- 2710 -

1   2   3   4   5   6   7   8

Internal Setpoint Source

Motor Potentiometer (MOP)

	1	2	3	4	5	6	7	8

3100_MOP.vsd　　V1.13

06.07.2001

Function diagram　　MICROMASTER 420

- 3100 -

- 3200 -

8

7 Function diagram MICROMASTER 420

6 3200_FF.vsd V1.13
02.04.2002

5

4

3

2

1 Internal Setpoint Source
Fixed Frequency (FF) bit coded (P1016 - P1018 = 1 or 2)

ON/OFF1

CO: Act. FF
r1024

≥1

FF mode - Bit 0
1...3
P1016 (1)

FF mode - Bit 1
1...3
P1017 (1)

FF mode - Bit 2
1...3
P1018 (1)

FF mode - Bit 0
1...3
P1016 (1)

FF mode - Bit 1
1...3
P1017 (1)

FF mode - Bit 2
1...3
P1018 (1)

BI: FF sel. Bit 0
P1020 (0:0)

BI: FF sel. Bit 1
P1021 (0:0)

BI: FF sel. Bit 2
P1022 (0:0)

Fixed frequency 1
-650.00 ... 650.00 [Hz]
P1001 (0.00)

Fixed frequency 2
-650.00 ... 650.00 [Hz]
P1002 (5.00)

Fixed frequency 3
-650.00 ... 650.00 [Hz]
P1003 (10.00)

Internal Setpoint Source

Fixed Frequency (FF) binary coded   (P1016 - P1018 = 3)

3210_FF.vsd	V1.13	Function diagram	- 3210 -	
02.04.2002		MICROMASTER 420		

Diagram labels:

- FF mode – Bit 0 1…3 P1016 (1)
- FF mode – Bit 1 1…3 P1017 (1)
- FF mode – Bit 2 1…3 P1018 (1)
- BI: FF sel. Bit 0 P1020 (0:0)
- BI: FF sel. Bit 1 P1021 (0:0)
- BI: FF sel. Bit 2 P1022 (0:0)
- 1: If all FF mode selections equal 3 (P1016 = P1017 = P1018 = 3)
- 0: For all other cases
- ON/OFF1
- OFF1
- CO: Act. FF r1024
- Fixed frequency 1 -650.00 … 650.00 [Hz] P1001 (0.00)
- Fixed frequency 2 -650.00 … 650.00 [Hz] P1002 (5.00)
- Fixed frequency 3 -650.00 … 650.00 [Hz] P1003 (10.00)
- Fixed frequency 4 -650.00 … 650.00 [Hz] P1004 (15.00)
- Fixed frequency 5 -650.00 … 650.00 [Hz] P1005 (20.00)
- Fixed frequency 6 -650.00 … 650.00 [Hz] P1006 (25.00)
- Fixed frequency 7 -650.00 … 650.00 [Hz] P1007 (30.00)

ON/OFF1

≥1

CO: Act. FF
r1024

- 3300 -

Function diagram   MICROMASTER 420

3300_FPID.vsd   V1.13

11.04.2002

Fix.PID setp.Bit 0
1...3
P2216 (1)

Fix.PID setp.Bit 1
1...3
P2217 (1)

Fix.PID setp.Bit 2
1...3
P2218 (1)

Fixed PID setp. 1
-200.00...200.00 [%]
P2201 (0.00)

Fixed PID setp. 2
-200.00...200.00 [%]
P2202 (10.00)

Fixed PID setp. 3
-200.00...200.00 [%]
P2203 (20.00)

Fix.PID setp.Bit 0
1...3
P2216 (1)

Fix.PID setp.Bit 1
1...3
P2217 (1)

Fix.PID setp.Bit 2
1...3
P2218 (1)

BI:PID setp->Bit 0
P2220 (0:0)

BI:PID setp->Bit 1
P2221 (0:0)

BI:PID setp->Bit 2
P2222 (0:0)

Internal Setpoint Source

Fixed PID setpoint, bit coded   (P2216 - P2218 = 1 or 2)

8 | 7 | 6 | 5 | 4 | 3 | 2 | 1

Internal Setpoint Source

Fixed PID setpoint, binary coded   (P2216 - P2218 = 3)

3310_FPID.vsd   V1.13

11.04.2002

Function diagram   MICROMASTER 420

- 3310 -

Internal Setpoint Source

PID Motor Potentiometer (PID-MOP)

Function diagram

MICROMASTER 420

3400_PIDMOP.vsd

06.07.2001   V1.13

- 3400 -

MOD

V/f control

Motor identification

RFG

AFM

SUM/JOG selection

○ 0 1

○ 1 0

○ 0 0

JOG frequency -> 0.00...650.00 [Hz] P1058 (5.00)

JOG frequency <- 0.00...650.00 [Hz] P1059 (5.00)

CO: Tot. freq.setp [Hz] r1078

CO: Act.PID output [%] r2294

PID controller

BI: Enable JOG -> P1055 (0:0)

BI: Enable JOG <- P1056 (0:0)

CI: Main setpoint P1070 (755:0)

CI: Main setp scal P1071 (1:0)

BI: Disab.add.setp P1074 (0:0)

CI: Add. setp.scal P1076 (1:0)

CI: Add. setpoint P1075 (0:0)

CI: PID setpoint P2253 (0:0)

CI:PID trim source P2254 (0:0)

CI: PID feedback P2264 (755:0)

BI: Enab. PID ctrl P2200 (0:0)

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

- 5000 -

Function diagram

MICROMASTER 420

5000_Overview.vsd   V1.13

14.03.2002

Overview

Setpoint channel and Motor control

Setpoint Channel | | | | | | Function diagram | - 5100 -
PID controller | | | | 5100_PID.vsd | V1.13 | MICROMASTER 420
| | | | 14.03.2002 | | |

P2200 = BI: Enable PID controller
P2251 = PID mode (0 = PID as setpoint, 1 = PID as trim)

P2350 = PID autotune enable
P2354 = PID tuning timeout length
P2355 = PID tuning offset

RFG

CO:Setp before RFG

r1119

- 5200 -

8

7

Function diagram

MICROMASTER 420

Max. frequency
0.00 ... 650.00 [Hz]
P1082 (50.00)

Min. frequency
0.00 ... 650.00 [Hz]
P1080 (0.00)

6

5200_AFM.vsd   V1.13

26.07.2001

Skip frequency 4
0.00 ... 650.00 [Hz]
P1094 (0.00)

Skip frequency 3
0.00 ... 650.00 [Hz]
P1093 (0.00)

Skip frequency 2
0.00 ... 650.00 [Hz]
P1092 (0.00)

Skip frequency 1
0.00 ... 650.00 [Hz]
P1091 (0.00)

Bandwidth

Skip frequency

Skipfreq bandwidth
0.00 ... 10.00 [Hz]
P1101 (2.00)

f_{IN}

f_{OUT}

r1114

CO:Setp-dir.ctrl.

5

4

No evaluation with PID

-1

r1079

CO: Sel. freq.setp

Bi: Inh. neg. setp
P1110   (0:0)

BI: Reverse
P1113   (722:1)

3

SUM/JOG
selection

2

JOG

SUM

PID controller

CO: Tot. freq.setp [Hz]
r1078

CO: Act. PID output [%]
r2294

P2200

1

Setpoint channel

Additional Frequency Modifications (AFM)
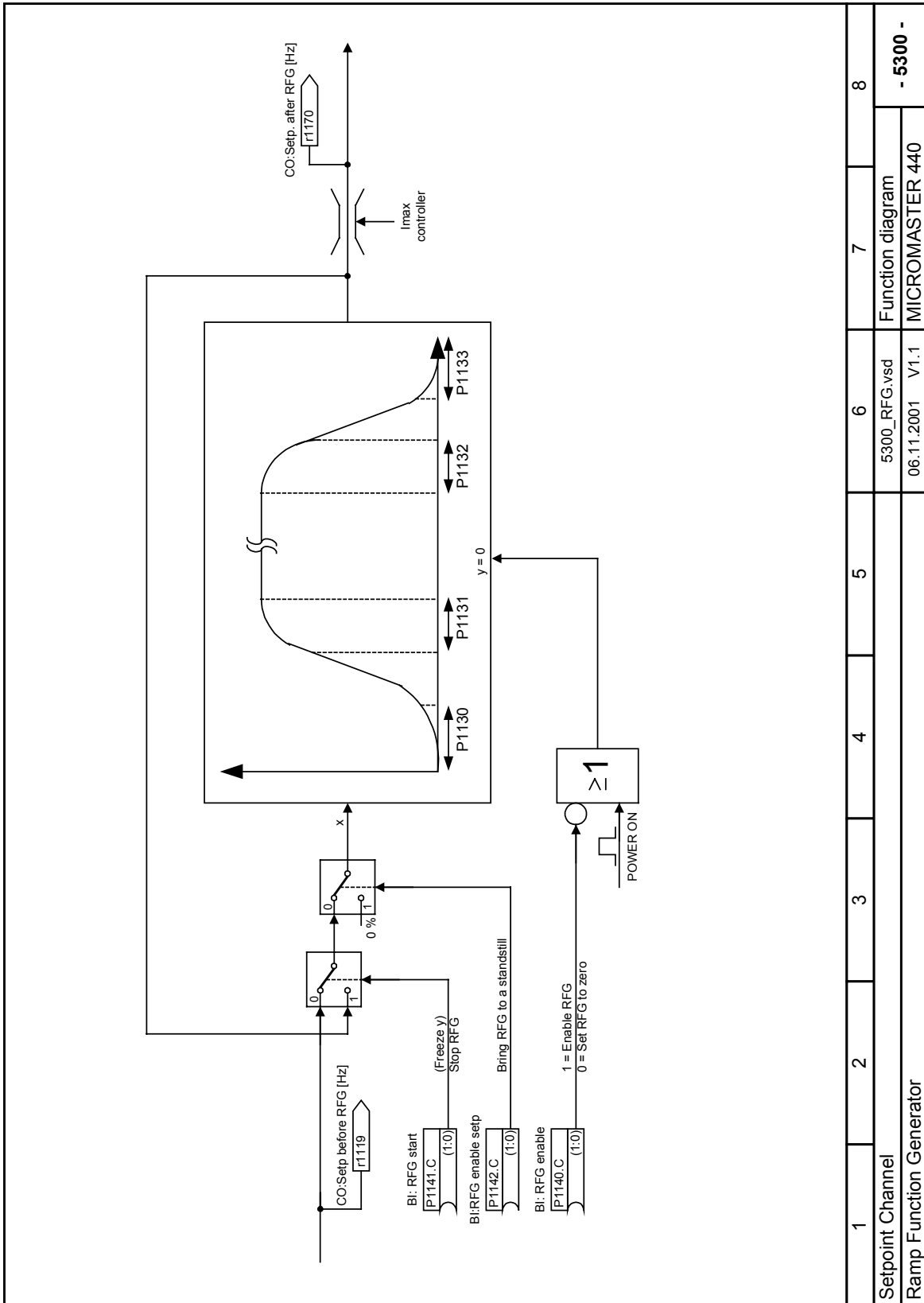
Setpoint Channel

Ramp Function Generator

Function diagram | MICROMASTER 440

5300_RFG.vsd | V1.1

06.11.2001

- 5300 -

	1	2	3	4	5	6	7	8	
Control						6100_V_f.vsd V1.13	Function diagram	- **6100** -	
Overview of V/f Control						24.07.2001	MICROMASTER 420		

Display values

CO: Act. freq setp [Hz]
r0020

CO:Setp before RFG [Hz]
r1119

Act. rotor speed [1/min]
r0022

CO: Act. frequency [Hz]
r0021

CO: Act.outp. freq [Hz]
r0024

CO: Act.outp. volt [V]
r0025

CO: Act. outp. cur [A]
r0027

CO: Act. Vdc [V]
r0026

Analogue outputs
Details refer to Sheet 2300

DAC characteristic **)

Value x1:DAC scal.
-99999.0 ... 99999.0 [%]
P0777 (0.0)

Value y2:DAC scal.
0 ... 20
P0780 (20)

CI: DAC
P0771
(21:0)

y = f(x)

D / A

0 ... 20 mA

12
13

DAC

**) Reference values
P2000 = Reference frequency
P2001 = Reference voltage
P2002 = Reference current

1	2	3	4	5	6	7	8
Control					8000.vsd	Function diagram	- 8000 -
Analog outputs and display values					06.07.2001 V1.13	MICROMASTER 420	

MICROMASTER 420   Parameter List
6SE6400-5BA00-0BP0

3   Faults and Alarms

3.1   MICROMASTER 420 fault messages

In the event of a failure, the inverter switches off and a fault code appears on the display.

NOTE

To reset the fault code, one of three methods listed below can be used:

1. Cycle the power to the drive.
2. Press the 🔘 button on the BOP or AOP.
3. Via Digital Input 3 (default setting)

Fault	Possible Causes	Diagnose & Remedy	Reaction
F0001 Overcurrent	➢ Motor power does not correspond to the inverter power ➢ Motor lead short circuit ➢ Earth fault	Check the following: 1. Motor power (P0307) must correspond to inverter power (P0206) 2. Cable length limits must not be exceeded 3. Motor cable and motor must have no short-circuits or earth faults 4. Motor parameters must match the motor in use 5. Value of stator resistance (P0350) must be correct 6. Motor must not be obstructed or overloaded ➢ Increase the ramp time ➢ Reduce the boost level	OFF2
F0002 Overvoltage	➢ DC-link voltage (r0026) exceeds trip level (P2172) ➢ Overvoltage can be caused either by too high main supply voltage or if motor is in regenerative mode ➢ Regenerative mode can be cause by fast ramp downs or if the motor is driven from an active load	Check the following: 1. Supply voltage (P0210) must lie within limits indicated on rating plate 2. DC-link voltage controller must be enabled (P1240) and parameterized properly 3. Ramp-down time (P1121) must match inertia of load	OFF2
F0003 Undervoltage	➢ Main supply failed ➢ Shock load outside specified limits	Check the following: 1. Supply voltage (P0210) must lie within limits indicated on rating plate 2. Supply must not be susceptible to temporary failures or voltage reductions	OFF2
F0004 Inverter Over-temperature	➢ Ambient temperature outside of limits, ➢ Fan failure	Check the following: 1. Fan must turn when inverter is running 2. Pulse frequency must be set to default value 3. Air inlet and outlet points are not obstructed Ambient temperature could be higher than specified for the inverter	OFF2
F0005 Inverter I^2t	➢ Inverter overloaded ➢ Duty cycle too demanding ➢ Motor power (P0307) exceeds inverter power capability (P0206)	Check the following: 1. Load duty cycle must lie within specified limits 2. Motor power (P0307) must match inverter power (P0206)	OFF2
F0011 Motor Over-temperature I^2t	➢ Motor overloaded ➢ Motor data incorrect ➢ Long time period operating at low speeds	1. Check motor data 2. Check loading on motor 3. Boost settings too high (P1310, P1311, P1312) 4. Check parameter for motor thermal time constant 5. Check parameter for motor I^2t warning level	OFF1

Fault	Possible Causes	Diagnose & Remedy	Reaction
F0041 **Stator resistance measurement failure**	Stator resistance measurement failure	1. Check if the motor is connected to the inverter 2. Check that the motor data has been entered correctly	OFF2
F0051 **Parameter EEPROM Fault**	Reading or writing of the non-volatile parameter storage has failed	1. Factory reset and new parameterization 2. Change inverter	OFF2
F0052 **Powerstack Fault**	Reading of the powerstack information has failed or the data is invalid	Change inverter	OFF2
F0060 **Asic Timeout**	Internal communications failure	1. Acknowledge fault 2. Change inverter if repeated	OFF2
F0070 **Communications board setpoint error**	No setpoint received from communications board during telegram off time	1. Check connections to the communications board 2. Check the master	OFF2
F0071 **No Data for USS (RS232 link) during Telegramm Off Time**	No response during telegram off time via USS (BOP link)	1. Check connections to the communications board 2. Check the master	OFF2
F0072 **No Data from USS (RS485 link) during Telegram Off Time**	No response during telegram off time via USS (COM link)	1. Check connections to the communications board 2. Check the master	OFF2
F0080 **Analogue input - lost input signal**	➢ Broken wire ➢ Signal out of limits	Check connection to analogue input	OFF2
F0085 **External Fault**	External fault is triggered via terminal inputs	Disable terminal input for fault trigger	OFF2
F0101 **Stack Overflow**	Software error or processor failure	1. Run self test routines 2. Change inverter	OFF2
F0221 **PI Feedback below minimum value**	PID Feedback below minimum value P2268	1. Change value of P2268 2. Adjust feedback gain	OFF2
F0222 **PI Feedback above maximum value**	PID Feedback above maximum value P2267	1. Change value of P2267 2. Adjust feedback gain	OFF2
F0450 (Service mode only) **BIST Tests Failure**	Fault value 1 Some of the power section tests have failed 2 Some of the control board tests have failed 4 Some of the functional tests have failed 8 Some of the IO module tests have failed 16 The Internal RAM has failed its check on power-up	1. Inverter may run but certain actions will not function correctly 2. Replace inverter	OFF2

3.2 MICROMASTER 420 alarm messages

Fault	Possible Causes	Diagnose & Remedy	Reaction
A0501 **Current Limit**	➢ Motor power does not correspond to the inverter power ➢ Motor leads are too short ➢ Earth faults	1. Check whether the motor power corresponds to the inverter power 2. Check that the cable length limits have not been exceeded 3. Check motor cable and motor for short-circuits and earth faults 4. Check whether the motor parameters correspond with the motor being used 5. Check the stator resistance 6. Increase the ramp-up-time 7. Reduce the boost 8. Check whether the motor is obstructed or overloaded	--
A0502 **Overvoltage limit**	➢ Mains supply too high ➢ Load regenerative ➢ Ramp-down time too short	1. Check that mains supply voltage is within allowable range 2. Increase ramp down times **Note**: Vdc-max controller is active, ramp-down times will be automatically increased	--
A0503 **Undervoltage Limit**	➢ Mains supply too low ➢ Short mains interruption	Check main supply voltage (P0210)	--
A0504 **Inverter Over-temperature**	Warning level of inverter heat-sink temperature (P0614) is exceeded, resulting in pulse frequency reduction and/or output frequency reduction (depending on parametrization in (P0610)	1. Check if ambient temperature is within specified limits 2. Check load conditions and duty cycle 3. Check if fan is turning when drive is running	--
A0505 **Inverter I²t**	Warning level is exceeded; current will be reduced if parameterized (P0610 = 1)	Check if duty cycle is within specified limits	--
A0506 **Inverter Duty Cycle**	Heatsink temperature and thermal junction model are outside of allowable range	Check if duty cycle are within specified limits	--
A0511 **Motor Over-temperature I²t**	Motor overloaded	Check the following: 1. P0611 (motor i²t time constant) should be set to appropriate value 2. P0614 (Motor i²t overload warning level) should be set to suitable level 3. Are long periods of operation at low speed occuring 4. Check that boost settings are not too high	--
A0541 **Motor Data Identification Active**	Motor data identification (P1910) selected or running	Wait until motor identification is finished	--
A0600 **RTOS Overrun Warning**	Software error		
A0700 **CB warning 1**	CB (communication board) specific	See CB user manual	--
A0701 **CB warning 2**	CB (communication board) specific	See CB user manual	--
A0702 **CB warning 3**	CB (communication board) specific	See CB user manual	--
A0703 **CB warning 4**	CB (communication board) specific	See CB user manual	--
A0704 **CB warning 5**	CB (communication board) specific	See CB user manual	--
A0705 **CB warning 6**	CB (communication board) specific	See CB user manual	--
A0706 **CB warning 7**	CB (communication board) specific	See CB user manual	--
A0707 **CB warning 8**	CB (communication board) specific	See CB user manual	--
A0708 **CB warning 9**	CB (communication board) specific	See CB user manual	--
A0709 **CB warning 10**	CB (communication board) specific	See CB user manual	--

Fault	Possible Causes	Diagnose & Remedy	Reac-tion
A0710 CB communi-cation error	Communication with CB (communication board) is lost	Check CB hardware	--
A0711 CB configu-ration error	CB (communication board) reports a configuration error	Check CB parameters	--
A0910 Vdc-max controller de-activated	Vdc max controller has been de-activated, since controller is not capable of keeping DC-link voltage (r0026) within limits (P2172) ➢ Occurs if main supply voltage (P0210) is permanently too high ➢ Occurs if motor is driven by an active load, causing motor to goes into regenerative mode ➢ Occurs at very high load inertias, when ramping down	Check the following: 1. Input voltage (P0756) lies within range? 2. Load must match In certain cases apply braking resistor	--
A0911 Vdc-max controller active	Vdc max controller is active; so ramp-down times will be increased automatically to keep DC-link voltage (r0026) within limits (P2172)	1. Check parameter inverter input voltage 2. Check ramp-down times	--
A0912 Vdc-min controller active	Vdc min controller will be activated if DC-link voltage (r0026) falls below minimum level (P2172) ➢ The kinetic energy of the motor is used to buffer the DC-link voltage, thus causing deceleration of the drive! ➢ So short mains failures do not necessarily lead to an undervoltage trip		--
A0920 ADC parameters not set properly	ADC parameters should not be set to identical values, since this would produce illogical results. ➢ Index 0: Parameter settings for output identical ➢ Index 1: Parameter settings for input identical ➢ Index 2: Parameter settings for input do not correspond to ADC type	Analogue input parameters should not be set to the same value as each other	--
A0921 DAC parameters not set properly	DAC parameters should not be set to identical values, since this would produce illogical results. ➢ Index 0: Parameter settings for output identical ➢ Index 1: Parameter settings for input identical ➢ Index 2: Parameter settings for output do not correspond to DAC type	Analogue Output parameters should not be set to the same value as each other	--
A0922 No load applied to inverter	➢ No Load is applied to the inverter ➢ As a result, some functions may not work as under normal load conditions Low output voltage eg when 0 boost applied at 0 Hz	1. Check that load is applied to the inverter 2. Check motor parameters correspond to motor attached 3. As a result, some functions may not work correctly, because there is no normal load condition	--
A0923 Both JOG Left and JOG Right are requested	Both JOG right and JOG left (P1055/P1056) have been requested. This freezes the RFG output frequency at its current value. JOG right and JOG left signals active together	Make sure that JOG right and JOG left signals are not applied simultaneously	--

Suggestions and/or Corrections

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Suggestions Corrections
For Publication/Manual: **MICROMASTER 420** Parameter List
User Documentation

From
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Company/Service Department
Address: _____
 _____
Phone: _____ / _____
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Suggestions for improvement are also welcome.