



Product manual

Panel Mounted Controller

IRC5
RobotWare 5.0

IRC5 Panel Mounted Controller

Control Module



Drive Module

Product manual

IRC5 Panel Mounted Controller

M2004

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Overview

About this manual

This manual contains instructions for

- installing the controller, mechanically as well as electrically
- maintenance of the controller
- mechanical and electrical repair of the controller.

Usage

This manual should be used during

- installation and preparation work
- maintenance work
- repair work.

Who should read this manual?

This manual is intended for:

- installation personnel
- maintenance personnel
- repair personnel.

Prerequisites

A maintenance/repair/ installation craftsman working with an ABB Robot must:

- be trained by ABB and have the required knowledge of mechanical and electrical installation/repair/maintenance work.

References

Reference	Document ID
Emergency safety information	3HAC027098-001
Operating manual - IRC5 with FlexPendant	3HAC16590-1
Operating manual - RobotStudio	3HAC032104-001
Operating manual - Getting started, IRC5 and RobotStudio	3HAC027097-001
Operating manual - Trouble shooting	3HAC020738-001
Technical reference manual - System parameters	3HAC17076-1
Application manual - MultiMove	3HAC021272-001

Revisions

Revision	Description
-	First edition

Continues on next page

Revision	Description
A	<p>New option EtherNet/IP Fieldbus Adapter is described in the new section <i>Replacement of fieldbus adapter in the computer unit DSQC 639</i>.</p> <p>Circuit diagram updated to revision 1.</p> <p>Minor corrections made.</p>
B	<p>New option PROFIBUS Fieldbus Adapter is added to section <i>Replacement of fieldbus adapter in the computer unit DSQC 639</i>.</p> <p>Minor corrections made.</p>
C	<p>Updates made with IRB 360 in sections:</p> <ul style="list-style-type: none"> • <i>Connecting the manipulator cables to the IRC5 Panel Mounted Drive Module</i> • <i>Configuration of the drive system, IRC5</i> • <i>Manipulator cables</i> <p>Changes made in section <i>Maintenance schedule, controller IRC5</i>. Replacement of fans every third year is withdrawn and inspection interval is changed from once a year to twice a year.</p> <p>Minor corrections made.</p>
D	<p>New option PROFINET Fieldbus Adapter is added to section <i>Replacement of fieldbus adapter in the computer unit DSQC 639</i>.</p> <p>New option PROFINET Master/Slave ,described in section <i>Replacement of Replacement of PCI boards in the computer unit DSQC639</i></p> <p>Filter time for safety stop AS/GS/SS is added in section The MOTORS ON/MOTORS OFF circuit on page 66.</p>

Product documentation, M2004

General

The robot documentation is divided into a number of categories. This listing is based on the type of information contained within the documents, regardless of whether the products are standard or optional. This means that any given delivery of robot products **will not contain all** documents listed, only the ones pertaining to the equipment delivered.

However, all documents listed may be ordered from ABB. The documents listed are valid for M2004 robot systems.

Product manuals

All hardware, robots and controllers, will be delivered with a **Product manual** that contains:

- Safety information
- Installation and commissioning (descriptions of mechanical installation, electrical connections)
- Maintenance (descriptions of all required preventive maintenance procedures including intervals)
- Repair (descriptions of all recommended repair procedures including spare parts)
- Additional procedures, if any (calibration, decommissioning)
- Reference information (article numbers for documentation referred to in Product manual, procedures, lists of tools, safety standards)
- Part list
- Foldouts or exploded views
- Circuit diagrams

Technical reference manuals

The following manuals describe the robot software in general and contain relevant reference information:

- **RAPID Overview:** An overview of the RAPID programming language.
- **RAPID Instructions, Functions and Data types:** Description and syntax for all RAPID instructions, functions and data types.
- **System parameters:** Description of system parameters and configuration workflows.

Application manuals

Specific applications (for example software or hardware options) are described in **Application manuals**. An application manual can describe one or several applications.

An application manual generally contains information about:

- The purpose of the application (what it does and when it is useful)
- What is included (for example cables, I/O boards, RAPID instructions, system parameters, CD with PC software)
- How to use the application
- Examples of how to use the application

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Continued

Operating manuals

This group of manuals is aimed at those having first hand operational contact with the robot, that is production cell operators, programmers and trouble shooters. The group of manuals includes:

- **Emergency safety information**
- **General safety information**
- **Getting started, IRC5**
- **IRC5 with FlexPendant**
- **RobotStudio**
- **Introduction to RAPID**
- **Trouble shooting**, for the controller and robot

1 Safety

1.1. Introduction

Overview

The safety information in this manual is divided in two categories:

- general safety aspects, important to attend to before performing any service or installation work on the controller. These are applicable for all service work and are found in section *General safety information*.
- specific safety information, pointed out in the procedure at the moment of the danger. How to avoid and eliminate the danger is either detailed directly in the procedure, or further detailed in separate instructions, found in section *Safety related instructions on page 24*.

1 Safety

1.2.1. Introduction

1.2 General safety information

1.2.1. Introduction

Definitions

This section details general safety information for personnel performing installation, repair and maintenance work.

Sections

The general safety information is divided into the following sections.

Contents	Containing
1. General information	<ul style="list-style-type: none">• safety, service• limitation of liability• related information
2. Safety risks (lists dangers relevant when working with the controller. The dangers are split into different categories).	<ul style="list-style-type: none">• safety risks during installation or service• risks associated with live electrical parts
3. Safety actions (details actions which may be taken to remedy or avoid dangers).	<ul style="list-style-type: none">• fire extinguishing• safe use of the FlexPendant

1.2.2. General Information

1.2.2.1. Safety in the robot system

Validity and responsibility

The information does not cover how to design, install and operate a complete system, nor does it cover all peripheral equipment, which can influence the safety of the total system. To protect personnel, the complete system must be designed and installed in accordance with the safety requirements set forth in the standards and regulations of the country where the robot is installed.

The users of ABB industrial robots are responsible for ensuring that the applicable safety laws and regulations in the country concerned are observed and that the safety devices necessary to protect people working with the robot system are designed and installed correctly.

Personnel working with robots must be familiar with the operation and handling of the industrial robot, described in the applicable documents, for example:

- *Operating Manual - IRC5 with FlexPendant* (M2004)
- *Product Manual*

Connection of external safety devices

Apart from the built-in safety functions, the robot is also supplied with an interface for the connection of external safety devices. Via this interface, an external safety function can interact with other machines and peripheral equipment. This means that control signals can act on safety signals received from the peripheral equipment as well as from the robot.

Limitation of liability

Any information given in this manual regarding safety, must not be construed as a warranty by ABB that the industrial robot will not cause injury or damage even if all safety instructions are complied with.

Related information

Type of information	Detailed in document	Section
Installation of safety devices	Product manual for the robot	Installation and commissioning
Changing operating modes	Operating manual - IRC5 with FlexPendant (RobotWare 5.0)	Operating modes
Restricting the working space	Product manual for the robot	Installation and commissioning

1 Safety

1.2.3.1. Risks associated with live electric parts

1.2.3. Safety risks

1.2.3.1. Risks associated with live electric parts

Voltage related risks, general

- Although troubleshooting may, on occasion, need to be carried out while the power supply is turned on, the robot must be turned off (by setting the mains switch to OFF) when repairing faults, disconnecting electric leads and disconnecting or connecting units.
- The mains supply to the robot must be connected in such a way that it can be turned off outside the robot's working space.

Voltage related risks, IRC5 controller

A danger of high voltage is associated with, for example, the following parts:

- Be aware of stored electrical energy (DC link, Ultracapacitor bank unit) in the controller.
- Units such as I/O modules, can be supplied with power from an external source.
- The mains supply/mains switch
- The transformers
- The power unit
- The control power supply (230 VAC)
- The rectifier unit (400-480 VAC and 700 VDC. Note: Capacitors!)
- The drive unit (700 VDC)
- The drive system power supply (230 VAC)
- The customer power supply (230 VAC)
- The power supply unit for additional tools.
- The external voltage connected to the controller remains live even when the robot is disconnected from the mains.
- Additional connections.

Voltage related risks, tools, material handling devices, etc

Tools, material handling devices, etc., may be live even if the robot system is in the OFFposition. Power supply cables which are in motion during the working process may be damaged.

1.2.4. Safety actions

1.2.4.1. Fire extinguishing



NOTE!

Use a CARBON DIOXIDE (CO₂) extinguisher in the event of a fire in the robot system (robot or controller)!

1 Safety

1.2.5.1. Overview of robot stopping functions

1.2.5. Safety stops

1.2.5.1. Overview of robot stopping functions

Overview

Stops are categorized/classified by standards IEC 60204-1:2005 and ISO 10218-1:2006.

There are several different robot stopping functions in the robot system.

- Hardware stops connected to the run chain.
- Manual stops.
- Stop with system input signals.
- Stop with RAPID instructions.
- System failure stops.

Stop modes

Stops can be in uncontrolled or controlled mode. The stop mode is configured with system parameters, see [Soft stops on page 17](#).

Uncontrolled stop	This is related to stop category 0 as described in IEC 60204-1:2005, which means that power is removed immediately from the drive units, by releasing the run chain through the software enable signal, and the brakes are activated. Also the servo motors are used for the braking, by reversing to "generator" and ramping down the generated power in a controlled way. In this way, both the brakes and the motors are used to stop the robot, giving the shortest possible stop time and stop distance. However it also means that the robot mechanics will be highly stressed and the robot will leave the programmed path and stop at an uncontrolled position.
Controlled stop	This is related to stop category 1 as described in IEC 60204-1:2005. It means that the power will be connected to the drive units for about 1 second, by a hardware delay, and the movement will be put to a full stop using the servo motors before the power is removed and the brakes are activated. This way the robot will stop at a controlled point on or very close to the programmed path. The controlled stop is also called "soft" because it will be more soft for the mechanics, but note, it is the same as a QuickStop when initiated via a system input, see below.

Hardware stops connected to the run chain

There are several hardware stops available. All these stops are of safety category 3 as described in EN 954-1 or EN 13849-1, that is double channel initiated stop.

Stop connections:	Description:
Emergency stop	Disconnects drive power in all operating modes.
Automatic mode stop	Disconnects drive power in automatic operating mode. To be used as "Protective stop" in auto. Also called "Safety stop". In manual mode this input connection will be inactive.

Continues on next page

Continued

Stop connections:	Description:
General stop	Disconnects drive power in all operating modes. To be used as "Protective stop" in all operating modes. Also called "Safety stop".
Superior stop	Disconnects drive power in all operating modes. To be used as "Protective stop" in all operating modes. Also called "Safety stop". Intended for external equipments.

Soft stops

The stop mode for hardware stops is configured with system parameters, one parameter for each stop. Each of these parameters can have the value TRUE or FALSE (true or false). If TRUE the stop will be controlled or soft, that is category 1, if FALSE it will be uncontrolled, that is category 0, (see exception below). Default values are TRUE for SoftAS, SoftGS, and SoftSS, and FALSE for SoftES. The parameters are of the type *Safety Run Chain* in the topic *Controller*. The following descriptions apply if the values are set to TRUE.

Soft Stop:	Description:
SoftES	Soft emergency stop is activated by pressing the emergency stop push button on the FlexPendant or the control module. SoftES is only used in auto. In manual mode, emergency stop will be a category 0 stop regardless if the value is TRUE or FALSE.
SoftAS	Soft automatic mode stop is intended for automatic mode during normal program execution. This stop is activated by safety devices such as light curtains, light beams, or sensitive mats.
SoftGS	Soft general stop is activated by safety devices such as light curtains, light beams, or sensitive mats.
SoftSS	Soft superior stop has the same function as a general stop but is intended for externally connected safety devices.

Manual stops

A manual stop is initiated by a person. It can be a controlled or an uncontrolled stop depending on how the stop is initiated.

Stop mode:	Manual stop:	Description:
Controlled	Stop button on FlexPendant or Release of Hold-to-run button	This will stop program execution and cause an immediate stop of robot movements in all tasks. The robots will stop in a controlled way and on the path with no deviation. This is called "normal program stop".
Uncontrolled	Release of enabling device or Switching operating mode key	This will stop program execution and stop all program movements.

Continues on next page

1 Safety

1.2.5.1. Overview of robot stopping functions

Continued

Stop with system input signals

In addition to the hardware stops as described above, it is also possible to define system input signals, which will give an immediate or delayed stop of different modes for all tasks and robots, when activated. Such signals are defined as system parameters of the type *System Input* in the topic *I/O* and for the following stop modes.

Stop mode:	Description:
Stop	Stops the RAPID program execution. All robot movements will be stopped on the path with no deviation. A program cannot be started when this signal is high. This stop is similar to a normal program stop using stop button on the FlexPendant.
QuickStop	Stops the RAPID program execution quickly, like a controlled category 1 emergency/safety stop . This stop is performed by ramping down motion as fast as possible using optimum motor performance. The different axes are still coordinated to trying to keep the robot on path even if the robot may slide off with some millimeter. Note, this kind of stop is more stressing for the mechanics than normal stop or SoftStop.
SoftStop	Stops the RAPID program execution much like an ordinary program stop, but slightly faster. The stop is performed by ramping down motion in a controlled and coordinated way, to keep the robot on the programmed path with minor deviation. This kind of stop is more "soft" to the mechanics than the QuickStop.
Stop at End of Cycle	Stops the RAPID program when the complete program is executed, that means when the last instruction in the main routine has been completed.
Stop at End of Program	Stops program execution after the current instruction is completed.

All of these stops are performed without using the brakes, and the power is never disconnected. The program execution can be continued directly, for example by activating a start signal.



NOTE!

Note, these stops shall not be used as safety stops, as they are not fulfilling safety category 3.

Stop with RAPID instructions

There are several RAPID instructions available that stops the robot.

Instruction:	Description:	Arguments:
SystemStopAction	Stops all robots in all tasks immediately.	<p>\Stop - similar to a normal program stop with stop button.</p> <p>\StopBlock - as above, but to restart the PP has to be moved.</p> <p>\Halt - this is like a category 0 stop, i.e. it will result in motors off state, stop of program execution and robot movements in all motion tasks. The Motors on button must be pressed before the program execution can be restarted.</p>

Continues on next page

Continued

Instruction:	Description:	Arguments:
Stop	The current move instruction will be finished before the robot stops. A restart will continue the program execution.	\NoRegain - the robot will not return to the stop point when restarted, e.g. after having been jogged away. \AllMoveTasks - all robots will be stopped
StopMove	The current move instruction will be stopped immediately as a normal program stop but the program execution will continue with the next instruction. This is often used in for example trap routines.	\Quick - the stop will be a soft stop on path, as described above for system input SoftStop, otherwise similar to a normal program stop. \AllMotionTasks - all robots will be stopped
BREAK	The current move instruction and the program execution will be stopped immediately as a normal program stop. A restart will continue the program execution.	
EXIT	The current move instruction and the program execution will be stopped immediately as a normal program stop. After stop the Program Pointer has to be reset to Main.	
EXITCYCLE	The current move instruction and program execution will be stopped immediately. The Program Pointer will be reset to Main and if running mode is continuous, the program will be restarted.	
SearchX	Search instructions can be programmed with arguments to stop the robot movement close to the point where a search hit was noticed. The program execution will continue with the next instruction.	\Stop - the robot will stop as fast as possible. This stop is performed by ramping down motion in each motor separate from each other, and as fast as possible. Since it will be without any coordination, the robot may slide off path fairly much. This is also called StiffStop. \PStop - the robot will stop like after a normal program stop. \SSStop - the robot will stop on path but quicker than a normal program stop. This is similar to a system input SoftStop.

RAPID instructions are described in *Technical reference manual - RAPID Instructions, Functions and Data types*.

Continues on next page

1 Safety

1.2.5.1. Overview of robot stopping functions

Continued

System failure stops

Type of stop:	Description:
SysFail	At system failure raising a SysFail error the robot will stop immediately, with brakes being activated. This is an uncontrolled stop category 0.
Power fail	At power failure the robot will stop immediately, with brakes being activated. This is an uncontrolled stop category 0.
Stop at collision	When a collision is detected the robot will stop immediately, with power disconnected from the drive units and the brakes activated. After full stop the power is reconnected and the residual forces are relieved by moving the robot in the reversed direction a short distance back to its path. Then the program execution will stop with an error message. The robot remains in the state Motors on so that program execution can be resumed after the collision error message has been acknowledged. This is an uncontrolled stop category 0.

1.2.5.2. What is an emergency stop?

Definition of emergency stop

An emergency stop is a state that overrides any other robot control, disconnects drive power from the robot motors, stops all moving parts, and disconnects power from any potentially dangerous functions controlled by the robot system.

An emergency stop state means that all power is disconnected from the robot except for the manual brake release circuits. You must perform a recovery procedure in order to return to normal operation.

The robot system can be configured so that the emergency stop results in either:

- An uncontrolled stop, immediately stopping the robot actions by disconnecting power from the motors.
- A controlled stop, stopping the robot actions with power available to the motors so that the robot path can be maintained. When completed, power is disconnected.

The default setting is uncontrolled stop. However, controlled stops are preferred since they minimize extra, unnecessary wear on the robot and the actions needed to return the robot system back to production. Please consult your plant or cell documentation to see how your robot system is configured.



NOTE!

The emergency stop function may only be used for the purpose and under the conditions for which it is intended.



NOTE!

The emergency stop function is intended for immediately stopping equipment in the event of an emergency.



NOTE!

Emergency stop should not be used for normal program stops as this causes extra, unnecessary wear on the robot. How to perform normal program stops, see [Stopping programs](#).

Classification of stops

The safety standards that regulates automation and robot equipment defines categories in which each type of stop applies:

If the stop is...	... then it is classified as...
uncontrolled	category 0 (zero)
controlled	category 1

Emergency stop devices

In a robot system there are several emergency stop devices that can be operated in order to achieve an emergency stop. There are emergency stop buttons available on the FlexPendant and on the controller cabinet (on the Control Module on a Dual Cabinet Controller). There can also be other types of emergency stops on your robot, consult your plant or cell documentation to see how your robot system is configured.

1 Safety

1.2.5.3. What is a safety stop?

1.2.5.3. What is a safety stop?

Definition of safety stops

A safety stop means that only the power to the robot motors is disconnected. There is no recovery procedure. You need only to restore motor power to recover from a safety stop. Safety stop is also called protective stop.

The robot system can be configured so that the stop results in either:

- An uncontrolled stop, immediately stopping the robot actions by disconnecting power from the motors.
- A controlled stop, stopping the robot actions with power available to the motors so that the robot path can be maintained. When completed, power is disconnected.

The default setting is controlled stop.

Controlled stops are preferred since they minimize extra, unnecessary wear on the robot and the actions needed to return the robot system back to production. Please consult your plant or cell documentation to see how your robot system is configured.



NOTE!

The safety stop function may only be used for the purpose and under the conditions for which it is intended.



NOTE!

Safety stop should not be used for normal program stops as this causes extra, unnecessary wear on the robot. How to perform normal program stops, see [Stopping programs](#).

Classification of stops

The safety standards that regulates automation and robot equipment defines categories in which each type of stop applies:

If the stop is...	... then it is classified as...
uncontrolled	category 0 (zero)
controlled	category 1

Type of safety stops

Safety stops are activated through special signal inputs to the controller, see *Product manual - IRC5*. The inputs are intended for safety devices such as cell doors, light curtains, or light beams.

Safety stop:	Description:
Automatic mode stop (AS)	Disconnects drive power in automatic mode. In manual mode this input is inactive.
General stop (GS)	Disconnects drive power in all operating modes.
Superior stop (SS)	Disconnects drive power in all operating modes. Intended for external equipment.



NOTE!

Use normal program stop for all other type of stops.

1.2.5.4. What is safeguarding?

Definition

Safeguarding are safety measures consisting of the use of safeguards to protect persons from hazards which cannot reasonably be removed or sufficiently eliminated by design.

A safeguard prevents hazardous situations by stopping the robot in a controlled manner when a certain safeguarding mechanism such as a light curtain is activated.

The safety stops described in [What is a safety stop? on page 22](#), should be used for safeguarding.



NOTE!

The safeguarding function may only be used for the purpose and under the conditions for which it is intended.



NOTE!

The safeguarding should not be used for normal program stops as this causes extra, unnecessary wear on the robot. How to perform normal program stops, see [Stopping programs](#).

Safeguarded space

The safeguarded space is the space guarded by the guards. For example, a robot cell is safeguarded by the cell door and its interlocking device.

Interlocking devices

Each present guard has an interlocking device which, when activated stops the robot. The robot cell door has an interlock that stops the robot when the door is opened. The only way to resume operation is to close the door.

Safeguarding mechanisms

A safeguarding mechanism consists of a number of guards connected in series. When a guard is activated, the chain is broken and the machine operation is stopped regardless of the state of the guards in the rest of the chain.



NOTE!

Use normal program stop for all other type of stops.

1 Safety

1.3.1. Safety signals, general

1.3 Safety related instructions

1.3.1. Safety signals, general





General

This section specifies all dangers that may arise from performing the work detailed in the manual. Each danger is detailed in its own section consisting of:

- A caption specifying the danger level (DANGER, WARNING or CAUTION) and the type of danger.
- A brief description of what will happen if the operator/service personnel **do not** eliminate the danger.
- An instruction of how to eliminate the danger to facilitate performing the activity at hand.

Danger levels




The table below defines the captions specifying the danger levels used throughout this manual.

Symbol	Designation	Signification
 danger	DANGER	Warns that an accident <i>will</i> occur if the instructions are not followed, resulting in a serious or fatal injury and/or severe damage to the product. It applies to warnings that apply to danger with, for example, contact with high voltage electrical units, explosion or fire risk, risk of poisonous gases, risk of crushing, impact, fall from height etc.
 warning	WARNING	Warns that an accident <i>may</i> occur if the instructions are not followed, that can lead to serious injury, possibly fatal, and/or great damage to the product. It applies to warnings that apply to danger with, for example, contact with high voltage electrical units, explosion or fire risk, risk of poisonous gases, risk of crushing, impact, fall from height etc.
 Electrical shock	ELECTRICAL SHOCK	The electrocution or electrical shock symbol indicates electrical hazards which could result in severe personal injury or death.
 caution	CAUTION	Warns that an accident may occur if the instructions are not followed, that can result in injury and/or damage to the product. It also applies to warnings of risks that include burns, eye injury, skin injury, hearing damage, crushing or slipping, tripping, impact, fall from height etc. Furthermore, it applies to warnings that include function requirements when fitting and removing equipment, where there is a risk of damaging the product or causing a breakdown.

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Continues on next page

Continued

Symbol	Designation	Signification
 Electrostatic discharge (ESD)	ELECTROSTATIC DISCHARGE (ESD)	The electrostatic discharge (ESD) symbol indicates electrostatic hazards which could result in severe damage to the product.
 Note	NOTE	Note symbols alert you to important facts and conditions.
 Tip	TIP	Tip symbols direct you to specific instructions, where to find additional information or how to perform a certain operation in an easier way.

1 Safety

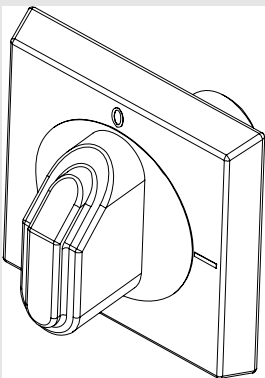
1.3.2. DANGER - Make sure that the main power has been switched off!

1.3.2. DANGER - Make sure that the main power has been switched off!

Description

Working with high voltage is potentially lethal. Persons subjected to high voltage may suffer cardiac arrest, burn injuries, or other severe injuries. To avoid these dangers, do not proceed working before eliminating the danger as detailed below.

Elimination, Panel Mounted Controller

	Action	Note/illustration
1.	Switch off the main switch for the controller.	 xx0600003255

1.3.3. WARNING - The unit is sensitive to ESD!

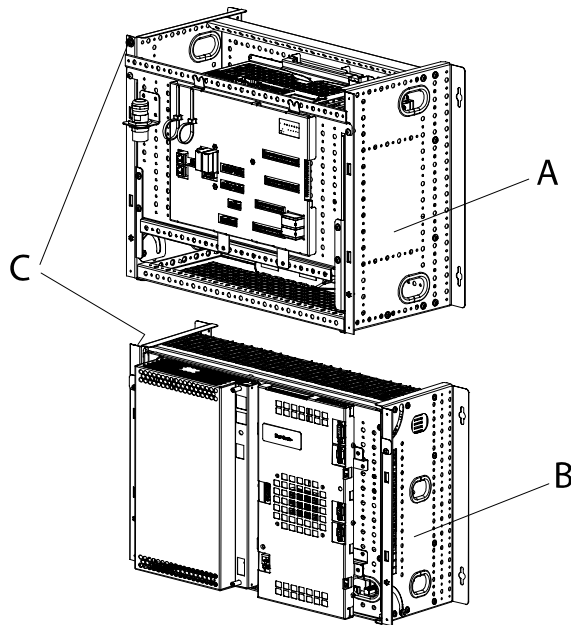
Description

ESD (electrostatic discharge) is the transfer of electrical static charge between two bodies at different potentials, either through direct contact or through an induced electrical field. When handling parts or their containers, personnel not grounded may potentially transfer high static charges. This discharge may destroy sensitive electronics.

Elimination

	Action	Note
1.	Use a wrist strap	Wrist straps must be tested frequently to ensure that they are not damaged and are operating correctly.
2.	Use an ESD protective floor mat.	The mat must be grounded through a current-limiting resistor.
3.	Use a dissipative table mat.	The mat should provide a controlled discharge of static voltages and must be grounded.

Location of wrist strap button



xx0600003249

A	Panel Mounted Control Module
B	Panel Mounted Drive Module
C	Wrist strap button NOTE! When not used, the wrist strap must always be attached to the wrist strap button.

1 Safety

1.3.4. CAUTION - Make sure that there are no loose screws or turnings inside the IRC5Panel Mounted Controller

1.3.4. CAUTION - Make sure that there are no loose screws or turnings inside the IRC5Panel Mounted Controller

Description

To avoid damaging the product, do not proceed working before checking that there are no loose screws, turnings or other parts inside the Control Module or Drive Module after that work has been performed inside the cabinet.

1.3.5. CAUTION - Hot components in controller

Description

Units and heat sinks are HOT after running the robot!

Touching the units and heat sinks may result in burns!

With higher environment temperature more surfaces on the controller get HOT and may result in burns.

1 Safety

1.3.5. CAUTION - Hot components in controller

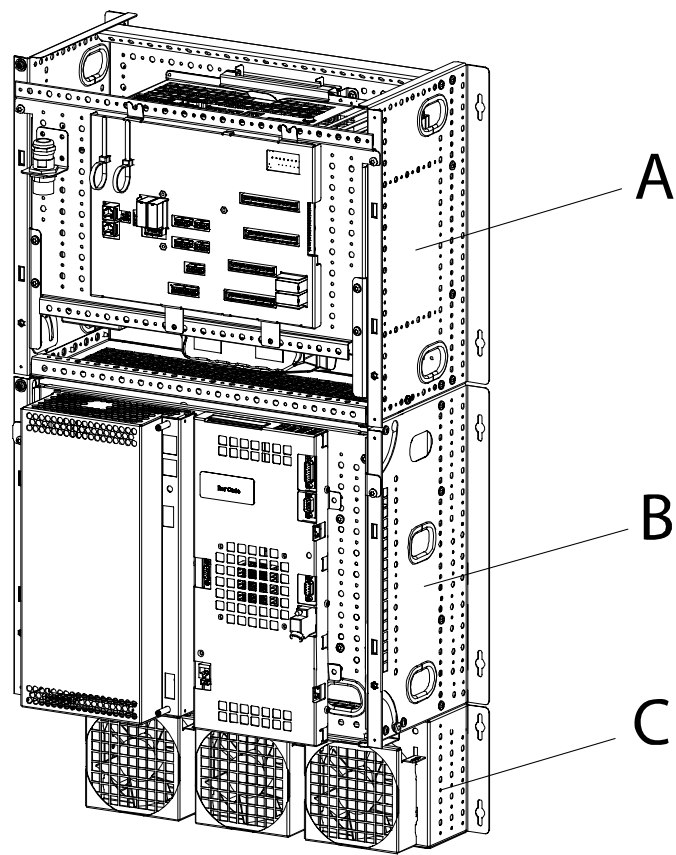
2 Installation and Commissioning, IRC5

2.1. Overview

General

The IRC5 Panel Mounted Controller is made up of the following modules:

- Control Module
- Drive Module



xx0600003313

A	Control Module
B	Drive Module
C	Fan unit

2 Installation and Commissioning, IRC5

2.1. Overview

Continued

Control Module contains the computer unit, communication interfaces, FlexPendant connection, service ports and also the system software which includes all basic functions for operation and programming.

Drive Module contains the drive system.



NOTE!

When replacing a unit in the controller, report to ABB:

- the serial number
- article number
- revision

of both the replaced unit and the replacement unit.

This is particularly important for the safety equipment to maintain the safety integrity of the installation.

Equipment

Following parts can be delivered with the IRC5 Panel Mounted Controller:

Part. no.	Description	Note
3HAC026292-001	Ethernet cable	Standard
3HAC027818-001	Connection Power supply	Standard
3HAC024322-001	Mains line filter	Standard
3HAC023195-001	GTPU 2, 10m cable	Option 701-1 and 701-3
3HAC11266-4	TPU cable, 30m	Option 701-3
3HAC021914-001	Harness - TPU jumper plug	Option 702-1
3HAC12934-1	Customer I/O power supply DSQC 608	Option 727-1
3HAC13398-2	Power supply	Option 728-1
3HAC025600-005	Harness - Drive/Control 4m	Option 761-1
3HAC025600-006	Harness - Drive/Control 30m	Option 761-3
3HAC027201-001	Transformator unit	Option 881-1
3HAC027058-001	Fan unit	Option 882-1
3HAC026486-001	Additional module Digital 24V	Option 816-1
3HAC026486-002	Additional module Analogue/Digital Combi	Option 817-2
3HAC026486-003	Additional module Digital with relays	Option 818-2
3HAC1543-1	Additional unit Analogue I/O	Option 819-1
3HAC1793-1	Additional unit ProfiBus	Option 820-1
3HAC1789-1	Additional unit RIO	Option 821-1
3HAC1792-1	Additional unit InterBus, -S Slave	Option 822-1
3HAC2588-2	Additional unit Que TRack unit	Option 826-1

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2.2. Installation Activities

Preconditions

The following section details the main steps on how to unload, transport, install and connect the IRC5 Panel Mounted Controller modules.

Procedure

	Action	Info/Illustration
1.	Unpack the delivered IRC5 Panel Mounted Controller.	How to unpack and transport the IRC5 controller is detailed in section Unpacking, IRC5 Panel Mounted Controller on page 34
2.	Install the IRC5 Panel Mounted Controller.	How to install the IRC5 controller is detailed in section Installation, IRC5 Panel Mounted Controller on page 36
3.	Connect the manipulator to IRC5 Panel Mounted Controller.	How to connect the manipulator to IRC5 controller is detailed in section Connecting the manipulator cables to the IRC5 Panel Mounted Drive Module on page 39 .
4.	Connect power supply to the IRC5 Panel Mounted Controller.	How to connect power supply is detailed in sections, Connecting power supply to the IRC5 Panel Mounted Controller on page 53
5.	Connect the FlexPendant to the IRC5 Panel Mounted Controller.	How to connect the FlexPendant is detailed in section Connecting a FlexPendant on page 61 .
6.	Miscellaneous connections.	<p>How to connect MOTORS ON/MOTORS OFF circuits is detailed in section The MOTORS ON/MOTORS OFF circuit on page 66.</p> <p>How to connect to an external safety relay is detailed in Connection of external safety relay on page 71.</p> <p>How to connect buses e.g DeviceNet, is detailed in the Application manual for the bus respectively.</p> <p>How to connect I/O units to the IRC5 controller is detailed in the Application manual for the I/O unit respectively.</p> <p>How to connect to a network is detailed in section Connecting a PC to the service port on page 62.</p>
7.	If used, install add-ons.	How to install add-ons is detailed in section Installation of add-ons on page 85

2 Installation and Commissioning, IRC5

2.3.1. Unpacking, IRC5 Panel MountedController

2.3 Transporting and handling

2.3.1. Unpacking, IRC5 Panel MountedController

General

Before unpacking and installing the robot system, read the safety regulations and other instructions very carefully. These are found in Chapter *Safety*.

The installation must be done by qualified installation personnel and should conform to all national and local codes.

When unpacking the controller, check that it was not damaged during transport.



NOTE!

If the IRC5 Panel MountedController is going to be stored before unpacking and installation, read the following information regarding storage conditions.

Storage conditions

The table below shows the recommended storage conditions for the IRC5 Panel MountedController:

Parameter	Value
Min. ambient temperature	-25 C
Max. ambient temperature	+55 C
Max. ambient humidity	Max. 95% at constant temperature

Weight controller

The table below shows the weight for the IRC5 Panel MountedController:

Controller	Weight
Panel Mounted Controller	max. 40 kg
• Control Module	12 kg
• Drive Module	24 kg

Operating conditions

The table below shows the allowed operating conditions for the IRC5 Panel Mounted Controller:

Parameter	Value
Min. ambient temperature	+5 C
Max. ambient temperature	+45 C
Max. ambient humidity	Max. 95%

Protection class

The table below shows the protection classes for the IRC5 Panel MountedController and FlexPendant:

Equipment	Protection class
IRC5 Panel Mounted Controller	IP20
FlexPendant	IP54

2 Installation and Commissioning, IRC5

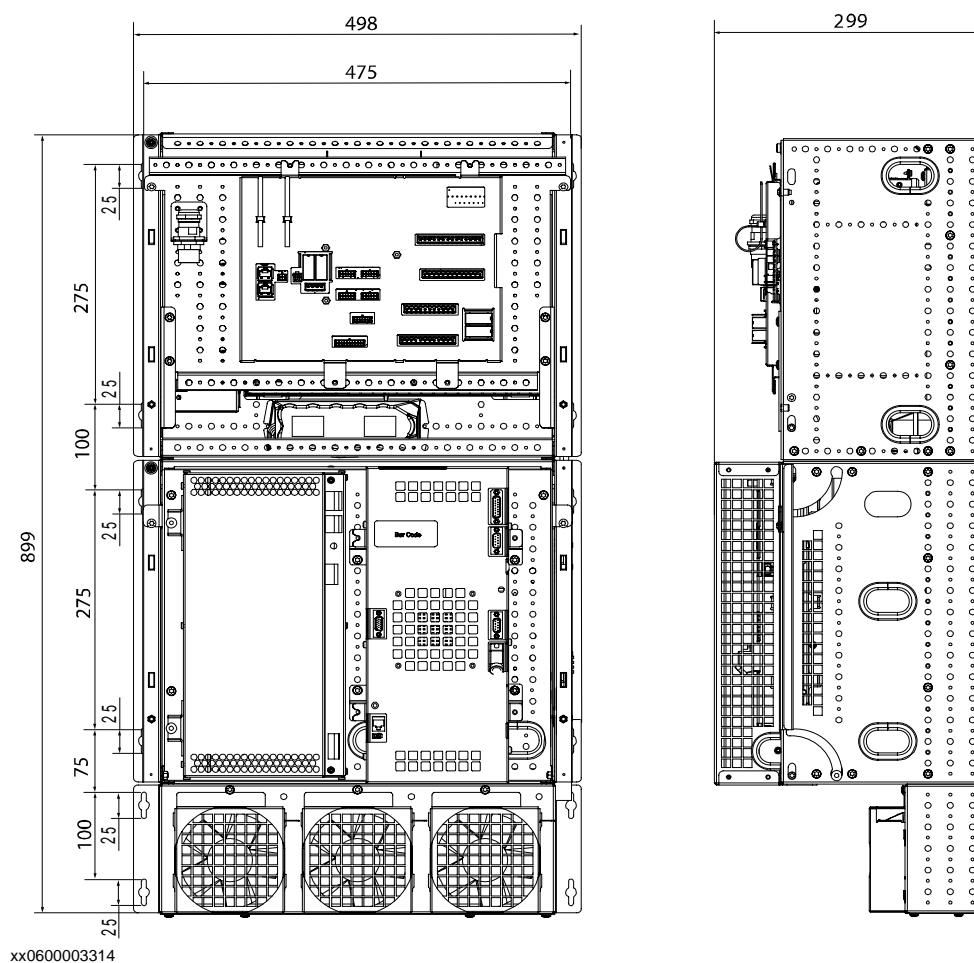
2.4.1. Installation, IRC5 Panel Mounted Controller

2.4 On-site Installation

2.4.1. Installation, IRC5 Panel Mounted Controller

Dimensions

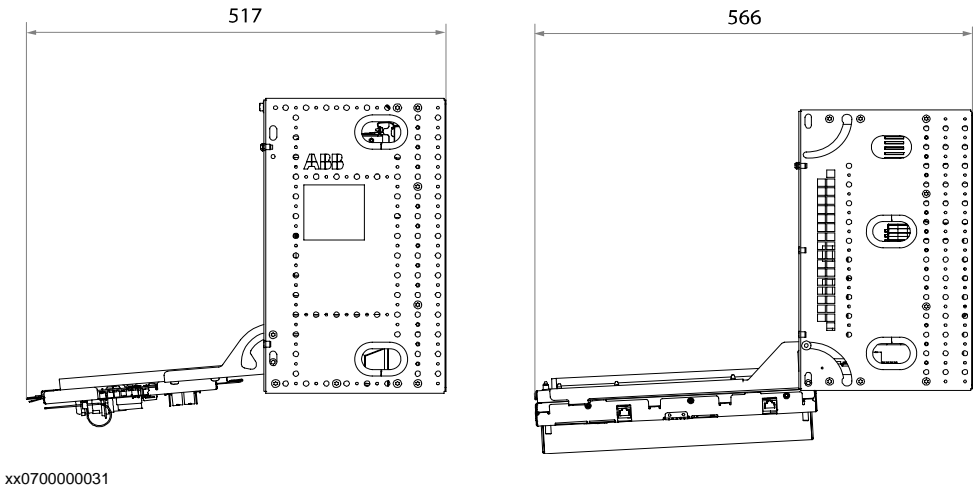
The illustration below shows the required installation space for the IRC5 Panel Mounted Controller.



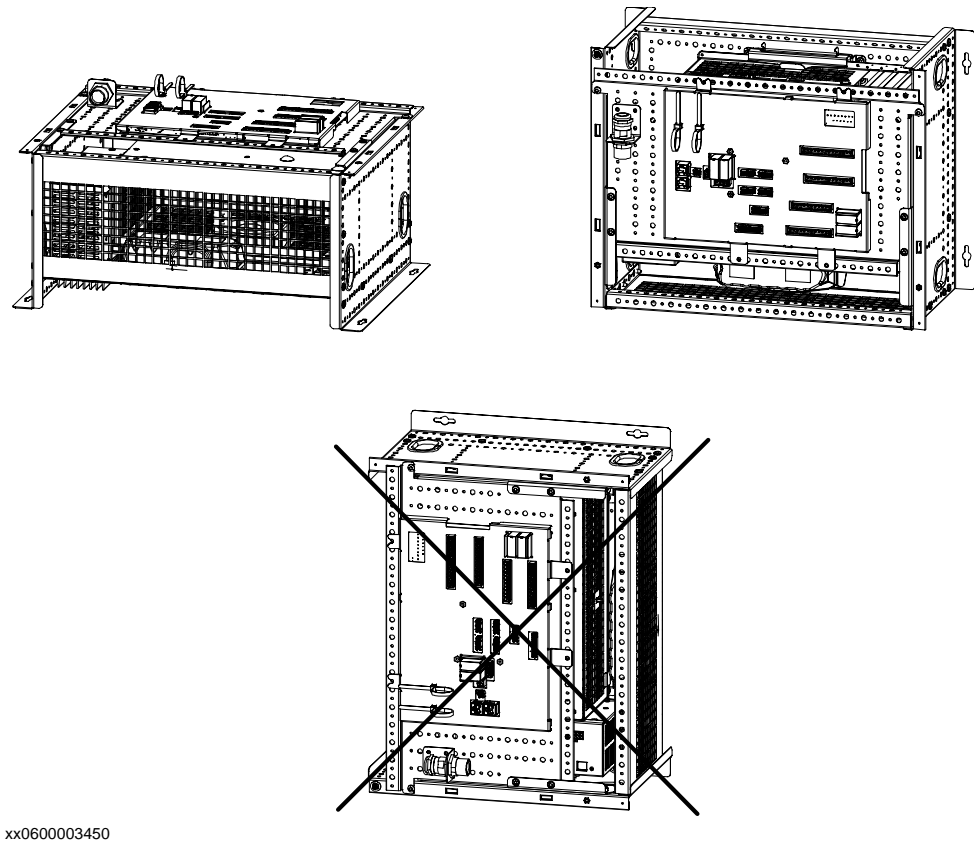
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Continued



Installation conditions



2 Installation and Commissioning, IRC5

2.4.1. Installation, IRC5 Panel Mounted Controller

Continued



NOTE!

The Control Module and Drive Module must be mounted according to figure above.



NOTE!

Do not mount the Control Module or Drive Module on a painted surface.

The modules framing must be connected to earth.

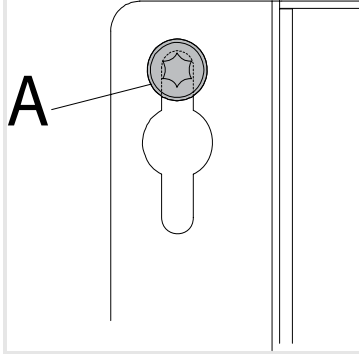
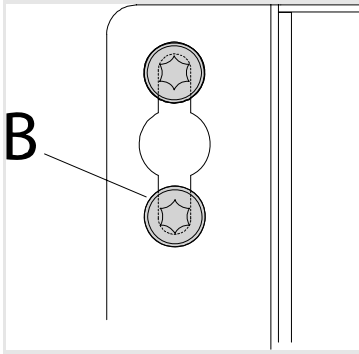


NOTE!

The Control Module and Drive Module must be mounted and connected to the same earth.

Procedure

The following procedure details how to install the IRC5 Panel Mounted modules.

	Action	Note/Illustration
1.	Fit the module on pre-mounted M5 screws (4 pcs).	 xx0600003452 • A: M5 screws (4 pcs)
2.	Secure the module with new M5 screws (4 pcs).	 xx0600003453 • B: M5 screws (4 pcs)
3.	Fasten the module (M5 screw, 8 pcs)	Tightening torque 4,5 Nm.

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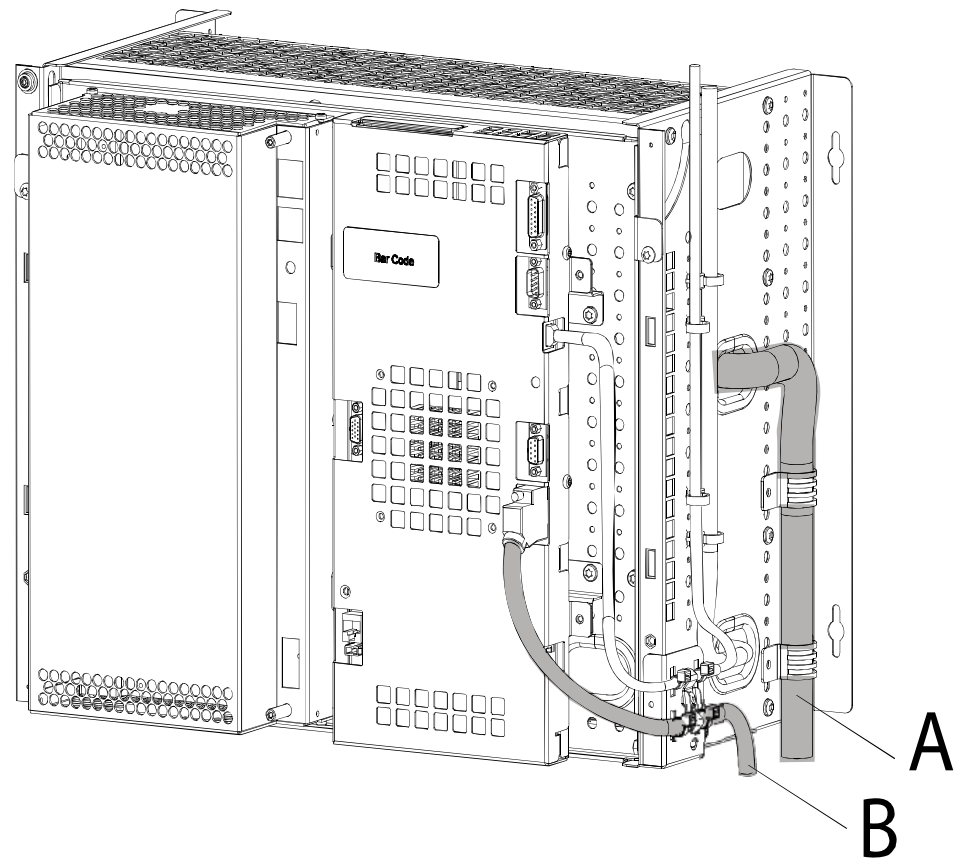
2.5 Connections

2.5.1. Connecting the manipulator cables to the IRC5 Panel Mounted Drive Module

General

The following section details how to connect the manipulator cables to the IRC5 Panel Mounted Drive Module.

Location



A	Power cable
B	Signal cable

Required equipment

Equipment	Note
Power cable	
Signal cable	
Cable clamp	
Standard toolkit	Described in section Standard Toolkit
Circuit diagram	See Circuit Diagram on page 195 .

Continues on next page

2 Installation and Commissioning, IRC5

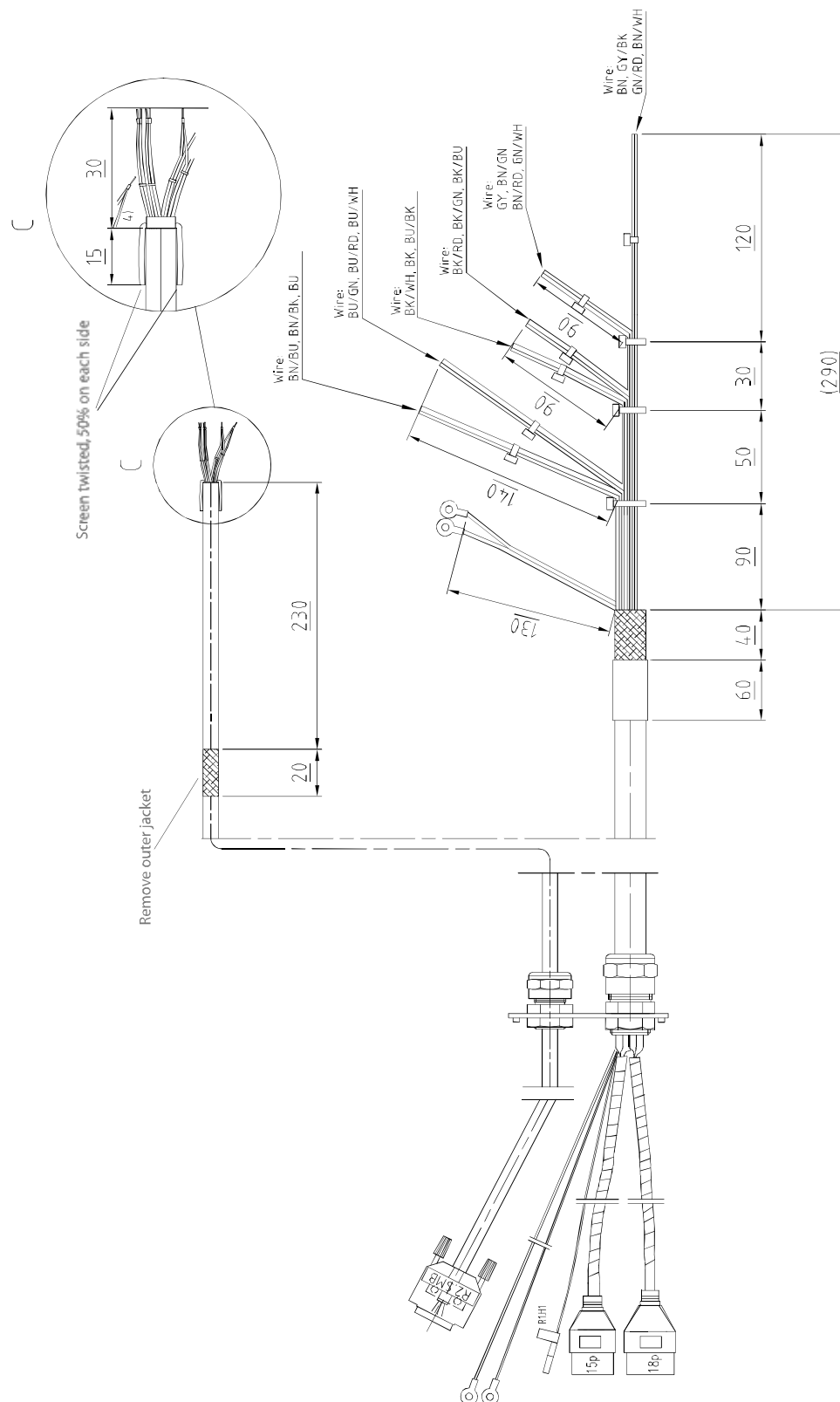
2.5.1. Connecting the manipulator cables to the IRC5 Panel Mounted Drive Module

Continued

Prepare the power and signal cable

If the power and signal cables are not as open end cables they need to be prepared.

Cut the connectors and remove the outer jacket. See illustration below.



xx0800000080

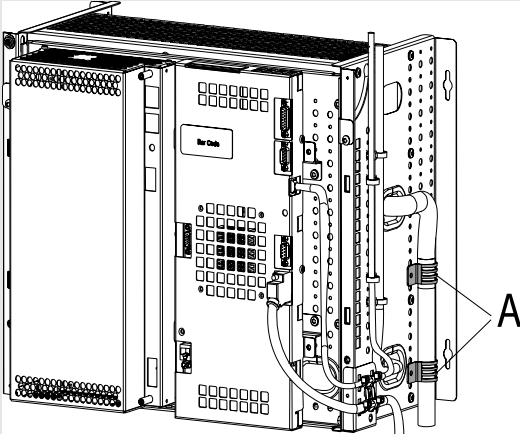
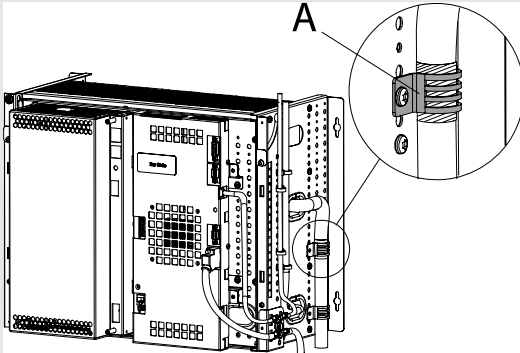
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Continued

Connecting the power cable

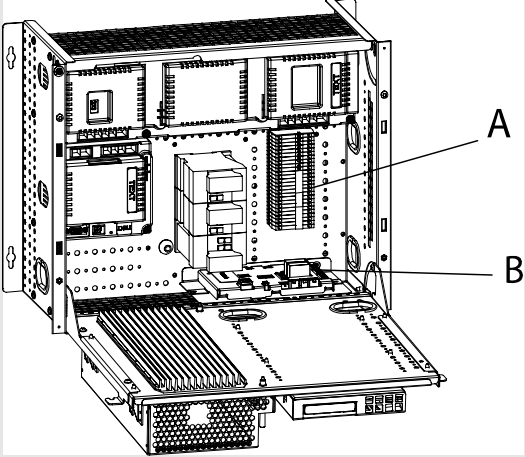
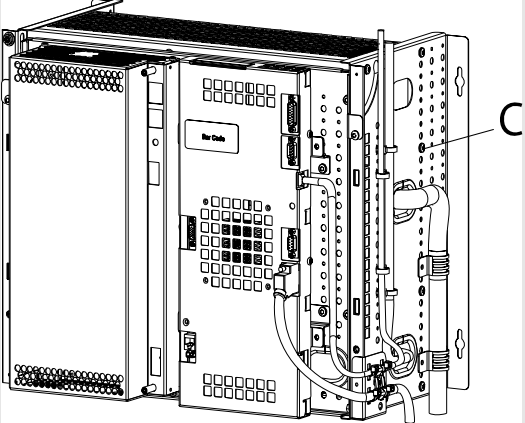
The following procedure details how to connect the manipulator power cable to the IRC5 Panel Mounted Drive Module.

Action	Note/Illustration
1. Rout the power cable as the illustration to the right shows and fasten it with the cable clamp.	<div></div> <div>xx0600003281</div> <ul style="list-style-type: none">A: cable clamp (2 pcs)
2. Connect the power cable shield.	<div></div> <div>xx0600003283</div> <ul style="list-style-type: none">A: shield connection

2 Installation and Commissioning, IRC5

2.5.1. Connecting the manipulator cables to the IRC5 Panel Mounted Drive Module

Continued

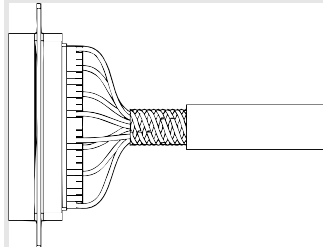
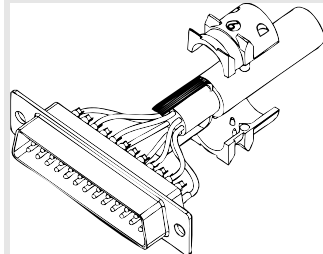
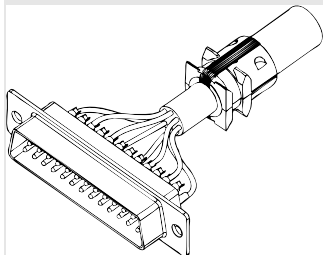
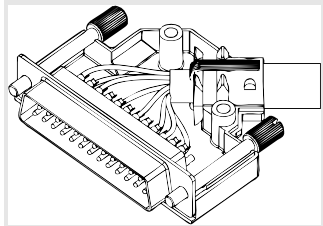
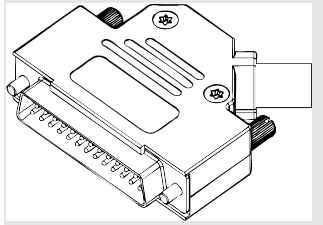
Action	Note/Illustration
<p>3. Connect the power cable to the connection block XT1 and Contactor interface board connector A43:XS21 and Drive Module earth point.</p> <p>NOTE! Connect earth cables in two separate screws.</p>	<div><p>xx0600003284</p><p>xx0600003296</p><ul style="list-style-type: none">• A: Connection block XT1• B: Contactor interface board connector A43:XS21• C: Drive Module EARTH point<p>See connection table for IRB 140 Connection table IRB 140 on page 45 or IRB 340, 360 Connection table IRB 340, 360 on page 46 or IRB 260 Connection table IRB 1600, 260, 2400 on page 49</p></div>

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Continued

Connecting the signal cable

The following procedure details how to connect the manipulator signal cable to the IRC5 Panel Mounted Drive Module.

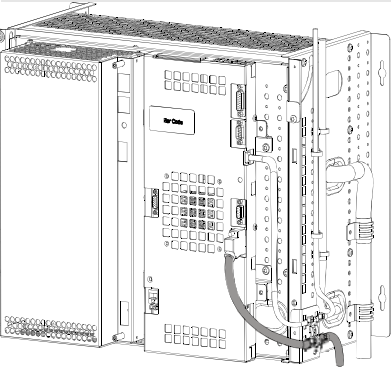




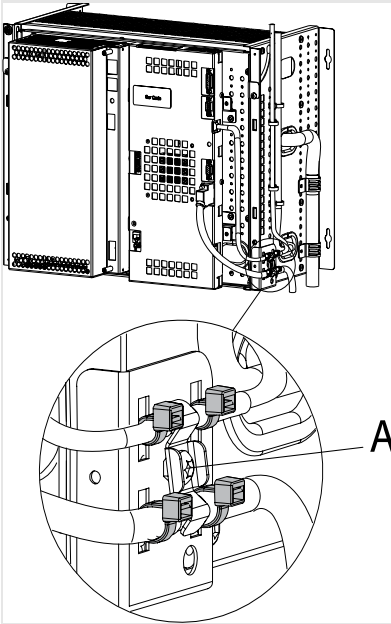
Action	Note/Illustration
1. Strip cable 18mm and shape to two pigtails.	 xx0600003297
2. Attach the strain relief around the cable.	 xx0600003298
3. Bend cable shielding back on outside of strain relief.	 xx0600003299
4. Mount connector and cable into the backshell.	 xx0600003300
5. Assemble the other half screwing force: 100 - 120 Ncm.	 xx0600003301

Continues on next page

2 Installation and Commissioning, IRC5

2.5.1. Connecting the manipulator cables to the IRC5 Panel Mounted Drive Module

Continued

Action	Note/Illustration
<p>6. Route the signal cable as the illustration to the right shows and fasten it with cable straps.</p>	 <p>xx0600003289</p>
<p>7. Connect the signal cable shield.</p> <p> NOTE! Your signal cable might be prepared for shield connection. In that case the isolation is removed at right length at delivery. If it is not, you need to cut out the isolation at suitable place so that the connection can be provided both mechanically and electrically.</p> <p> NOTE! Unless you need additional EMC-shielding, you do not need to make an electrical connection for the Ethernet cable. However, the mechanical connection must be provided, see section <i>Installation of EMC shield on page 85</i>.</p> <p> WARNING! Both cables are connected to the chassis. Make sure that you have extra length so that cable removal before opening the module will not be necessary.</p> <p> NOTE! A tightening torque must be used at 0.5 Nm.</p>	 <p>xx0600003288</p> <ul style="list-style-type: none"> • A: shield connection
<p>8. Connect the signal cable to the Axis computer board connector A42.X4</p>	<p>See connection table for IRB 140 Connection table IRB 140 on page 45 or IRB 340, 360 Connection table IRB 340, 360 on page 46 or IRB 260 Connection table IRB 1600, 260, 2400 on page 49.</p>

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Continues on next page

Connection table IRB 140

Power cable:

Wire no.	Specification	Connection point
	30XAWG16 2XAWG10	
1	BK/WH	XT1:1 ¹
2	BK	XT1:2
3	BU/BK	XT1:3
4	BN/WH	XT1:4
5	BN/RD	XT1:5
6	BN/GN	XT1:6
7	BN	XT1:7
8	GN/RD	XT1:8
9	GN/WH	XT1:9
10	BN/BU	XT1:10
11	BN/BK	XT1:11
12	BU	XT1:12
13	BU/GN	XT1:13
14	BU/RD	XT1:14
15	BU/WH	XT1:15
16	BK/RD	XT1:16
17	BK/GN	XT1:17
18	BK/BU	XT1:18
19	OG	XT1:19
20	GY/BK	XT1:20
21	GY/BU	XT1:21
22	OG/WH	XT1:22
23	OG/BU	XT1:23
24	OG/BK	XT1:24
25	OG/RD	XT1:25
26	GY/GN	XT1:26
27	OG/GN	A43:XS21
28	GY/WH	A43:XS21
29	GY	A43:XS21
30	GY/RD	A43:XS21
31	GN/YE	Drive Module earth ²
32	GN/YE	Drive Module earth

Signal cable:

Wire no.	Specification	Connection point
	2X6XAWG24	
	Pair1 WH	A42.X4:1 ³
	Pair1 BU	A42.X4:2

Continues on next page

2 Installation and Commissioning, IRC5

2.5.1. Connecting the manipulator cables to the IRC5 Panel Mounted Drive Module

Continued

Wire no.	Specification	Connection point
	Pair2 WH	A42.X4:4
	Pair2 OG	A42.X4:5
	Pair3 WH	A42.X4:6
	Pair3 GN	A42.X4:7
	Pair4 WH	A42.X4:6
	Pair4 BN	A42.X4:7
	Pair5 WH	Isolate
	Pair5 GY	Isolate
	Pair6 RD	Isolate
	Pair6 BU	Isolate

Customer signal cable:

Wire no.	Specification	Connection point
	Pair1 WH	XT5 (CSA)
	Pair1 BU	XT5 (CSB)
	Pair1 WH	XT5 (CSC)
	Pair1 OG	XT5 (CSD)
	Pair1 WH	XT5 (CSE)
	Pair1 GN	XT5 (CSF)
	Pair1 WH	XT5 (CSG)
	Pair1 BN	XT5 (CSH)
	Pair1 WH	XT5 (CSJ)
	Pair1 GY	XT5 (CSK)
	Pair1 RD	XT5 (CSL)
	Pair1 BU	XT5 (CSM)

Notes:

¹ End sleeve AWG16

² Ring lug AWG10 M5

³ Housing D-sub 9p male, terminal male AWG24, Hood D-sub 9p shielded.

Connection table IRB 340, 360

Power cable:

Wire no.	Specification	Connection point
	30XAWG16 2XAWG10	
1	BU/GN	XT1:1 ¹
2	BU/RD	XT1:2
3	BU/WH	XT1:3
4	BN/BU	XT1:4
5	BN/BK	XT1:5

Continues on next page

2.5.1. Connecting the manipulator cables to the IRC5 Panel Mounted Drive Module

Continued

Wire no.	Specification	Connection point
6	BU	XT1:6
7	BK/WH	XT1:7
8	BK	XT1:8
9	BU/BK	XT1:9
10	BK/RD	XT1:10
11	BK/GN	XT1:11
12	BK/BU	XT1:12
13	GY	XT1:13
14	BN/GN	XT1:14
15	BN/RD	XT1:15
16	GN/WH	XT1:16
17	BN	XT1:17
18	GY/BK	XT1:18
19	GN/RD	XT1:19
20	BN/WH	XT1:20
21	GN/YE	Drive Module earth ²
22	GN/YE	Drive Module earth

Signal cable:

Wire no.	Specification	Connection point
	2X6XAWG24	
	Pair1 WH	A42.X4:1 ³
	Pair1 BU	A42.X4:2
	Pair2 WH	A42.X4:4
	Pair2 OG	A42.X4:5
	Pair3 WH	A42.X4:6
	Pair3 GN	A42.X4:7
	Pair4 WH	A42.X4:6
	Pair4 BN	A42.X4:7
	Pair5 WH	Isolate
	Pair5 GY	Isolate
	Pair6 RD	Isolate
	Pair6 BU	Isolate

Internal customer signal cable:

Wire no.	Specification	Connection point
1	RD	XT5 (CPA)
2	BU	XT5 (CPB)
3	GN	XT5 (CPC)
4	YE	XT5 (CPD)
5	WH	XT5 (CPE)
6	BK	XT5 (CPF)

Continues on next page

2 Installation and Commissioning, IRC5

2.5.1. Connecting the manipulator cables to the IRC5 Panel Mounted Drive Module

Continued

Wire no.	Specification	Connection point
7	BN	XT5 (CPJ)
8	VT	XT5 (CPK)
9	OG	XT5 (CPL)
10	PK	XT5 (CPM)
11	TQ	Conductor to cut off
12	GY	Conductor to cut off
Shield		XT5 (0V Earth)

Wire no.	Specification	Connection point
	Pair 1 WH	XT5 (CSA)
	Pair 1 BU	XT5 (CSB)
	Pair 2 WH	XT5 (CSC)
	Pair 2 OG	XT5 (CSD)
	Pair 3 WH	XT5 (CSE)
	Pair 3 GN	XT5 (CSF)
	Pair 4 WH	XT5 (CSG)
	Pair 4 BN	XT5 (CSH)
	Pair 5 WH	XT5 (CSJ)
	Pair 5 GY	XT5 (CSK)
	Pair 6 RD	XT5 (CSL)
	Pair 6 BU	XT5 (CSM)
	Pair 7 RD	XT5 (CSN)
	Pair 7 OG	XT5 (CSP)
	Pair 8 RD	XT5 (CSR)
	Pair 8 GN	XT5 (CSS)
	Pair 9 RD	XT5 (CST)
	Pair 9 BN	XT5 (CSU)
	Pair 10 RD	XT5 (CSV)
	Pair 10 GY	XT5 (CSW)
	Pair 11 BK	XT5 (CSX)
	Pair 11 BU	XT5 (CSY)
	Pair 12 BK	XT5 (CSZ)
	Pair 12 OG	Conductor to cut off
	Pair 13 BK	Conductor to cut off
	Pair 13 GN	Conductor to cut off
	Pair 14 BK	Conductor to cut off
	Pair 14 BN	Conductor to cut off
	Pair 15 BK	Conductor to cut off
	Pair 15 GY	Conductor to cut off
	Pair 16 YE	Conductor to cut off
	Pair 16 BU	Conductor to cut off
SHIELD		XT5 (0V Earth)

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Continues on next page

2.5.1. Connecting the manipulator cables to the IRC5 Panel Mounted Drive Module

Continued

External customer signal cable:

Wire no.	Specification	Connection point
	Pair 1 WH	XT5 (CSA)
	Pair 1 BU	XT5 (CSB)
	Pair 2 WH	XT5 (CSC)
	Pair 2 OG	XT5 (CSD)
	Pair 3 WH	XT5 (CSE)
	Pair 3 GN	XT5 (CSF)
	Pair 4 WH	XT5 (CSG)
	Pair 4 BN	XT5 (CSH)
	Pair 5 WH	XT5 (CSJ)
	Pair 5 GY	XT5 (CSK)
	Pair 6 RD	XT5 (CSL)
	Pair 6 BU	XT5 (CSM)

Notes:

¹ End sleeve AWG16

² Ring lug AWG10 M5

³ Housing D-sub 9p male, terminal male AWG24, Hood D-sub 9p shielded.

Connection table IRB 1600, 260, 2400

Power cable:

Wire no.	Specification	Connection point
	30XAWG16 2XAWG10	
1	BU/GN	XT1:1 ¹
2	BU/RD	XT1:2
3	BU/WH	XT1:3
4	BN/WH	XT1:4
5	BN/RD	XT1:5
6	BN/GN	XT1:6
7	BU	XT1:7
8	BN/BK	XT1:8
9	BN/BU	XT1:9
10	GN/WH	XT1:10
11	GN/RD	XT1:11
12	BN	XT1:12
13	BK/BU	XT1:13
14	BK/GN	XT1:14
15	BK/RD	XT1:15
16	BU/BK	XT1:16
17	BK	XT1:17
18	BK/WH	XT1:18
19	OG	XT1:19

Continues on next page

2 Installation and Commissioning, IRC5

2.5.1. Connecting the manipulator cables to the IRC5 Panel Mounted Drive Module

Continued

Wire no.	Specification	Connection point
20	GY/BK	XT1:20
21	GY/BU	XT1:21
22	OG/WH	XT1:22
23	OG/BU	XT1:23
24	OG/BK	XT1:24
25	OG/RD	XT1:25
26	GY/GN	XT1:26
27	OG/GN	A43:XS21
28	GY/WH	A43:XS21
29	GY	A43:XS21
30	GY/RD	A43:XS21
31	GN/YE	Drive Module earth ²
32	GN/YE	Drive Module earth

Signal cable:

Wire no.	Specification	Connection point
	2X6XAWG24	
	Pair1 WH	A42.X4:1 ³
	Pair1 BU	A42.X4:2
	Pair2 WH	A42.X4:4
	Pair2 OG	A42.X4:5
	Pair3 WH	A42.X4:6
	Pair3 GN	A42.X4:7
	Pair4 WH	A42.X4:6
	Pair4 BN	A42.X4:7
	Pair5 WH	Isolate
	Pair5 GY	Isolate
	Pair6 RD	Isolate
	Pair6 BU	Isolate
	Shield	A42.X4 Shield

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Continues on next page

2.5.1. Connecting the manipulator cables to the IRC5 Panel Mounted Drive Module

Continued

Customer cable:

Wire no.	Specification	Connection point
1	RD	XT5 (CPA)
2	BU	XT5 (CPB)
3	GN	XT5 (CPC)
4	YE	XT5 (CPD)
5	WH	XT5 (CPE)
6	BK	XT5 (CPF)
7	BN	XT5 (CPJ)
8	VT	XT5 (CPK)
9	OG	XT5 (CPL)
10	PK	XT5 (CPM)
11	TQ	XT5
12	GY	XT5
SHIELD		XT5 (0V Earth)

Wire no.	Specification	Connection point
	Pair 1 WH	XT5 (CSA)
	Pair 1 BU	XT5 (CSB)
	Pair 2 WH	XT5 (CSC)
	Pair 2 OG	XT5 (CSD)
	Pair 3 WH	XT5 (CSE)
	Pair 3 GN	XT5 (CSF)
	Pair 4 WH	XT5 (CSG)
	Pair 4 BN	XT5 (CSH)
	Pair 5 WH	XT5 (CSJ)
	Pair 5 GY	XT5 (CSK)
	Pair 6 RD	XT5 (CSL)
	Pair 6 BU	XT5 (CSM)
	Pair 7 RD	XT5 (CSN)
	Pair 7 OG	XT5 (CSP)
	Pair 8 RD	XT5 (CSR)
	Pair 8 GN	XT5 (CSS)
	Pair 9 RD	XT5 (CST)
	Pair 9 BN	XT5 (CSU)
	Pair 10 RD	XT5 (CSV)
	Pair 10 GY	XT5 (CSW)
	Pair 11 BK	XT5 (CSX)
	Pair 11 BU	XT5 (CSY)
	Pair 12 WH	XT5 (CSZ)
	Pair 12 OG	Conductor to cut off
	Pair 13 BK	Conductor to cut off
	Pair 13 GN	Conductor to cut off

Continues on next page

2 Installation and Commissioning, IRC5

2.5.1. Connecting the manipulator cables to the IRC5 Panel Mounted Drive Module

Continued

Wire no.	Specification	Connection point
	Pair 14 BK	Conductor to cut off
	Pair 14 BN	Conductor to cut off
	Pair 15 BK	Conductor to cut off
	Pair 15 GY	Conductor to cut off
	Pair 16 YE	Conductor to cut off
	Pair 16 BU	Conductor to cut off
SHIELD		XT5 (0V Earth)

Notes:

¹ End sleeve AWG16

² Ring lug AWG10 M5

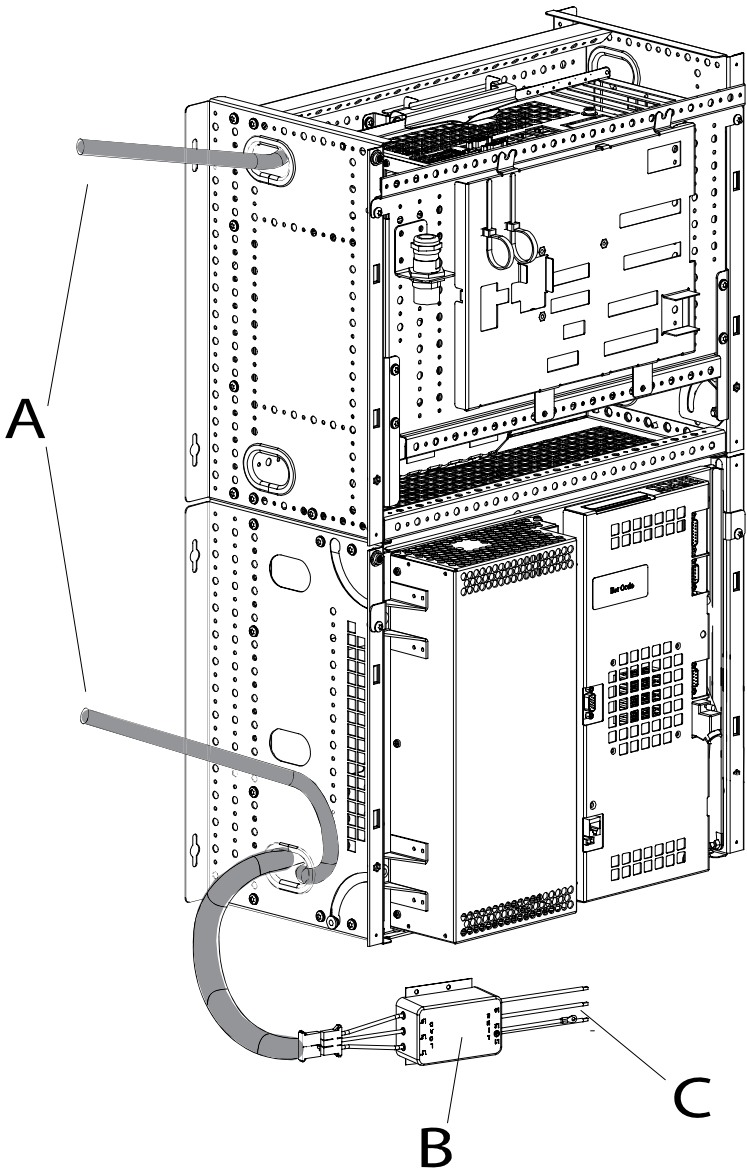
³ Housing D-sub 9p male, terminal male AWG24, Hood D-sub 9p shielded.

2.5.2. Connecting power supply to the IRC5 Panel Mounted Controller

General

The following section details how to connect power supply to the IRC5 Panel Mounted Controller.

Location



xx0600003295

A	Power supply 230V 10A
B	Line filter
C	Incoming power 3X262V 10A

2 Installation and Commissioning, IRC5

2.5.2. Connecting power supply to the IRC5 Panel Mounted Controller

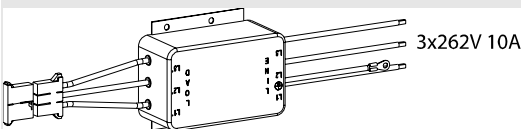
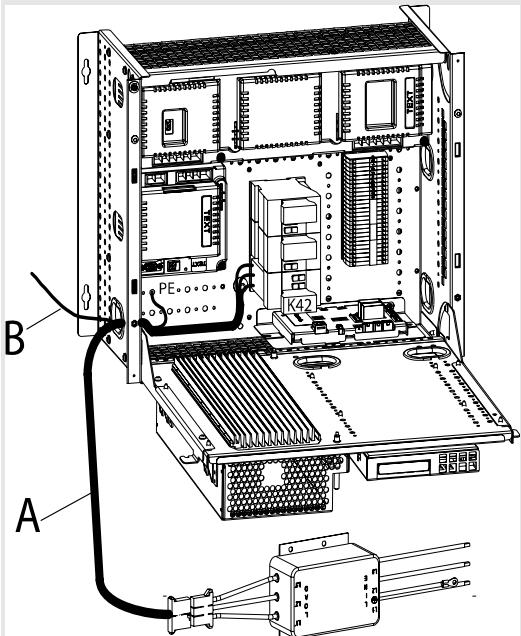
Continued

Required equipment

Equipment	Note
Incoming power cable	
Line filter	See Miscellaneous parts on page 186 .
Standard toolkit	The contents are defined in section Standard Toolkit
Circuit diagram	See Circuit Diagram on page 195 .

Connecting incoming power 3x262V 10A to Drive Module

The following procedure details how to connect power supply to the Drive Module.



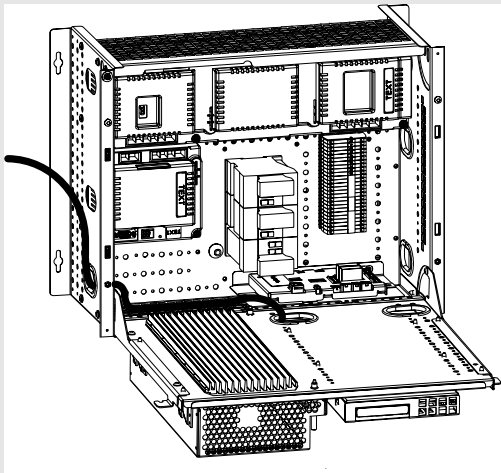
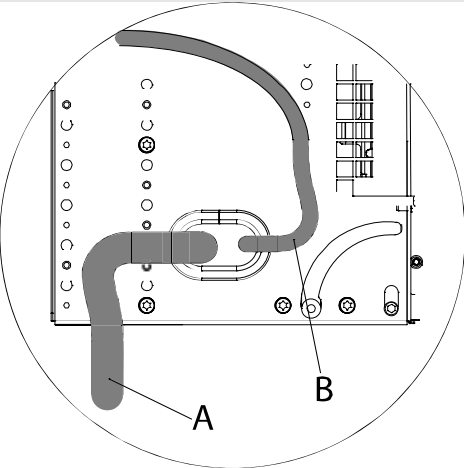
Action	Note/Illustration
1. Place the Line filter near to the Drive Module and it must be on the same ground.	
2. Connect 3x262V 10A to the Line filter (LINE).	 xx0600003315
3. Route, strap and connect the Line filter (LOAD) to the contactor K42: 1, 3, 5. Recommended tightening torque on the contactor K42 screw terminal is 1.00 Nm Max. tightening torque on the contactor K42 screw terminal is 1.20 Nm.	 xx0600003316 <ul style="list-style-type: none">• A: incoming power 3x262V 10A wires• B: incoming earth cable
4. Connect incoming earth cable to PE.	

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Continues on next page

Connecting power supply 230V 10A to Drive Module

The following procedure details how to connect power supply to the Drive Module.

Action	Note/Illustration
<div>1. Route the power supply 230V 10A cable as shown in the illustration to the right.</div> <div><p>CAUTION!</p><p>Route and strap the power supply 230V 10A cable so it will not be pinched by the cooling flange when closing the front.</p></div> <div><p>CAUTION!</p><p>Separate the power supply 230V 10A wires from the 3x262V 10A wires. These are disturbing on the Line filter LOAD side.</p></div>	<div><p>xx0600003317</p></div> <div><p>xx0600003318</p><ul style="list-style-type: none">• A: incoming power 3x262V 10A• B: power supply 230V 10A</div>
<div>2. Connect the power supply 230V 10A to the Drive system power supply connector X1.</div> <div><ul style="list-style-type: none">• phase 1 to G1.X1:1• earth to G1.X1:3• phase 2 (N) to G1.X1:5</div>	

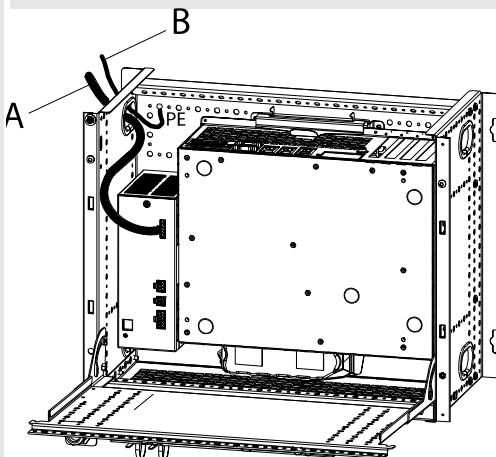
2 Installation and Commissioning, IRC5

2.5.2. Connecting power supply to the IRC5 Panel Mounted Controller

Continued

Connecting power supply 230V 10A to Control Module

The following procedure details how to connect power supply to the Control Module.

Action	Note/Illustration
1. Route and strap the power supply 230V 10A cable as the illustration to the right shows.	 <p>xx0600003321</p> <ul style="list-style-type: none">• A: power supply 230V 10A• B: incoming earth
2. Connect the power supply 230V 10A cable to the control power supply connector X1. <ul style="list-style-type: none">• phase 1 to G2.X1:1• earth to G2.X1:3• phase 2 (N) to G2.X1:5	
3. Connect incoming earth to PE.	

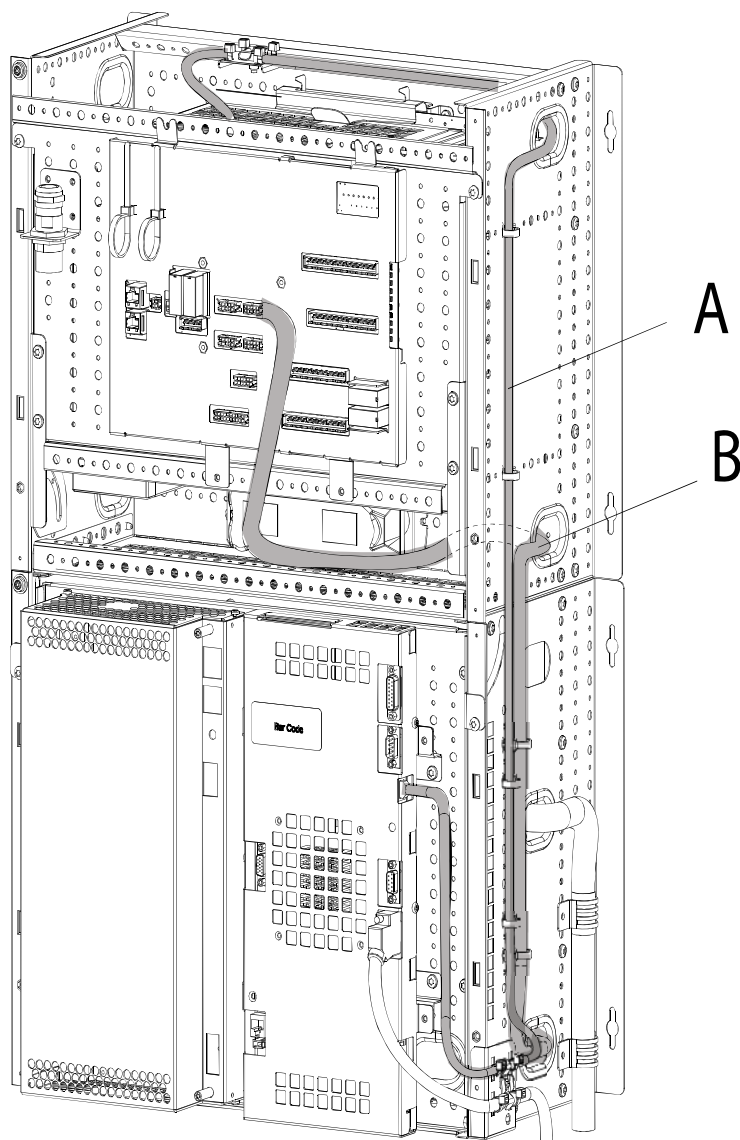
2.5.3. Connecting communication cables between IRC5 Panel Mounted Drive Module and Control Module

2.5.3. Connecting communication cables between IRC5 Panel Mounted Drive Module and Control Module

General

The following section details how to connect the communication cables between the IRC5 Panel Mounted Drive Module and Control Module.

Location



xx0600003294

A	Ethernet cable
B	Panel board/Contacor interface board cable

2 Installation and Commissioning, IRC5

2.5.3. Connecting communication cables between IRC5 Panel Mounted Drive Module and Control Module

Continued

Required equipment

Equipment	Art. no.	Note
Ethernet cable	3HAC026292-001	
Panel board/Contactor interface board cable	3HAC024201-001	
Standard toolkit		Described in section Standard toolkit.
Circuit diagram		See Circuit Diagram on page 195 .

Connecting the Ethernet cable

The following procedure details how to connect the Ethernet cable between the Drive Module and Control Module.

	Action	Note/Illustration
1.	Connect the cable to the Axis computer board connector A42.X2, route and strap the cable as shown in the illustration above.	
2.	Connect the cable to the Main computer connector A32.A9.	

Connecting the Panel board/Contactor interface board cable

The following procedure details how to connect the Panel board/Contactor interface board cable between the Drive Module and Control Module.

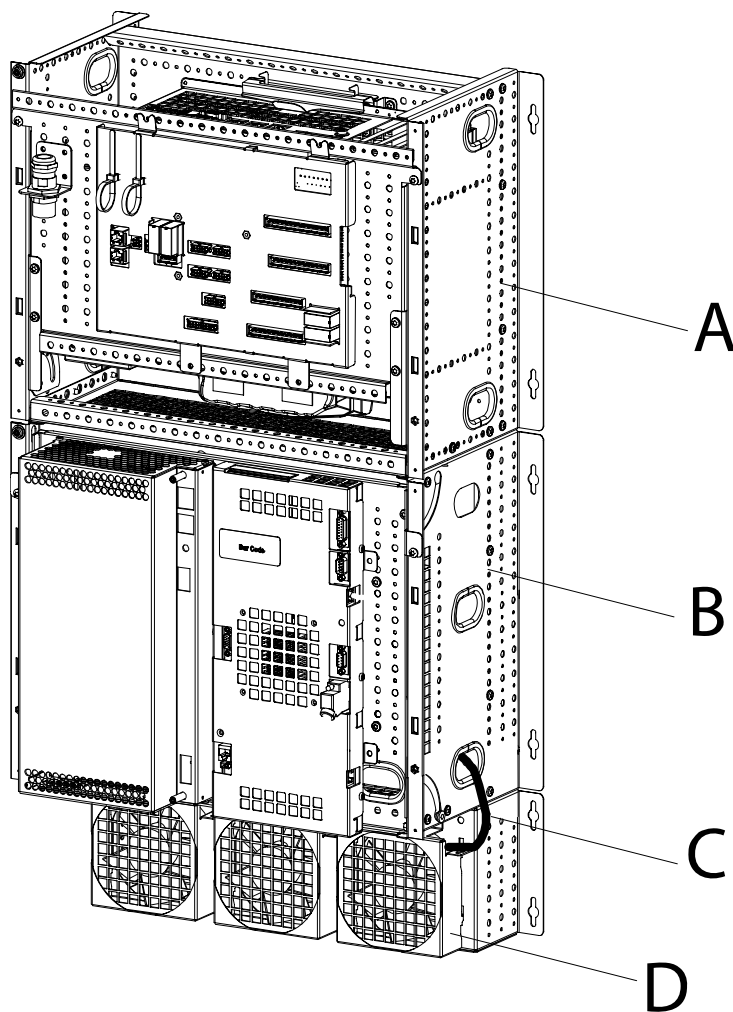
	Action	Note/Illustration
1.	Connect the cable to the Contactor interface board connector A43.X1, route and strap the cable as shown in the illustration above.	
2.	Connect the cable to the Panel board connector A21.X7.	

2.5.4. Connecting fan unit to IRC5 Panel Mounted Drive Module

General

The following section details how to connect the fan unit to the IRC5 Panel Mounted Drive Module.

Location



xx0600003323

A	Control Module
B	Drive Module
C	Fan cable
D	Fan unit

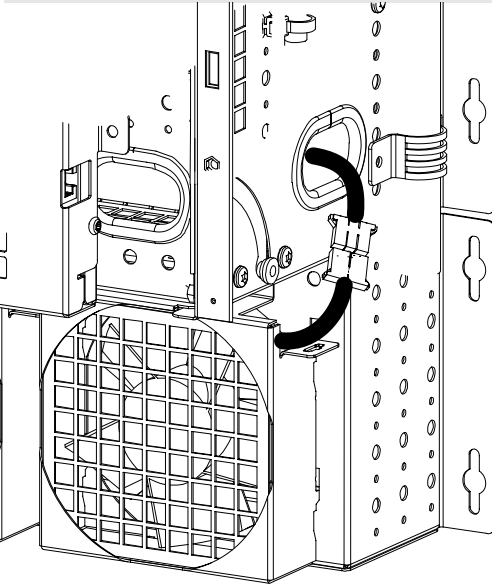

2 Installation and Commissioning, IRC5

2.5.4. Connecting fan unit to IRC5 Panel Mounted Drive Module

Continued

Connecting fan unit to Drive Module

The following procedure details how to connect the fan unit to the Drive Module.

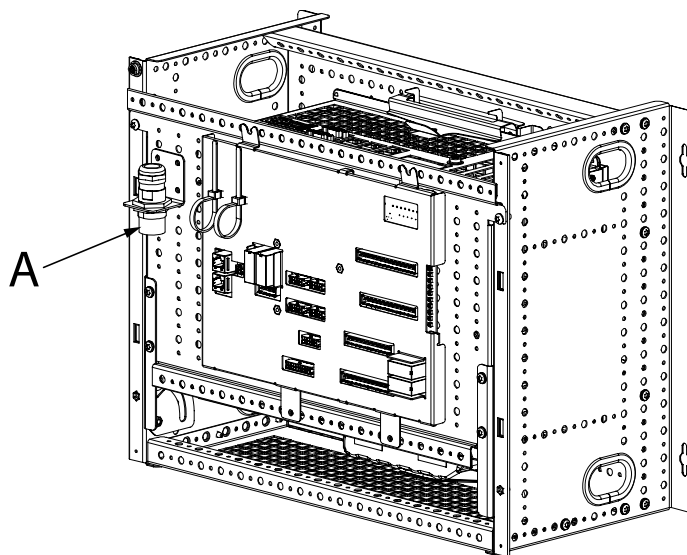
	Action	Note/Illustration
1.	Connect fan unit to Drive Module E1.XP1	 xx0600003324
2.	 WARNING! The fan unit must not be covered. Check that nothing covers or block the fan unit.	
3.	Temporarily turn the power supply to the modules on. Inspect all fans to make sure they function correctly. Turn the power supply back off.	

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2.5.5. Connecting a FlexPendant

Location of FlexPendant connector

The FlexPendant connector is located as shown below.



xx0600003219

A FlexPendant connector

Connecting a FlexPendant

	Action	Info
1.	Locate the FlexPendant socket connector on the controller.	The controller must be in manual mode.
2.	Plug in the FlexPendant cable connector.	
3.	Screw the connector lock ring firmly by turning it clockwise.	

2.5.6. Connecting a PC to the service port



NOTE!

The service port shall only be used for direct connection to a PC as described in this procedure. It must not be connected to a LAN (local area network), since it has a DHCP server that automatically distributes IP addresses to all units connected to the LAN.

Contact your network administrator if you need more information.



NOTE!

Maximum number of connected network clients using robapi are:

- LAN: 3
- Service: 1
- FlexPendant: 1

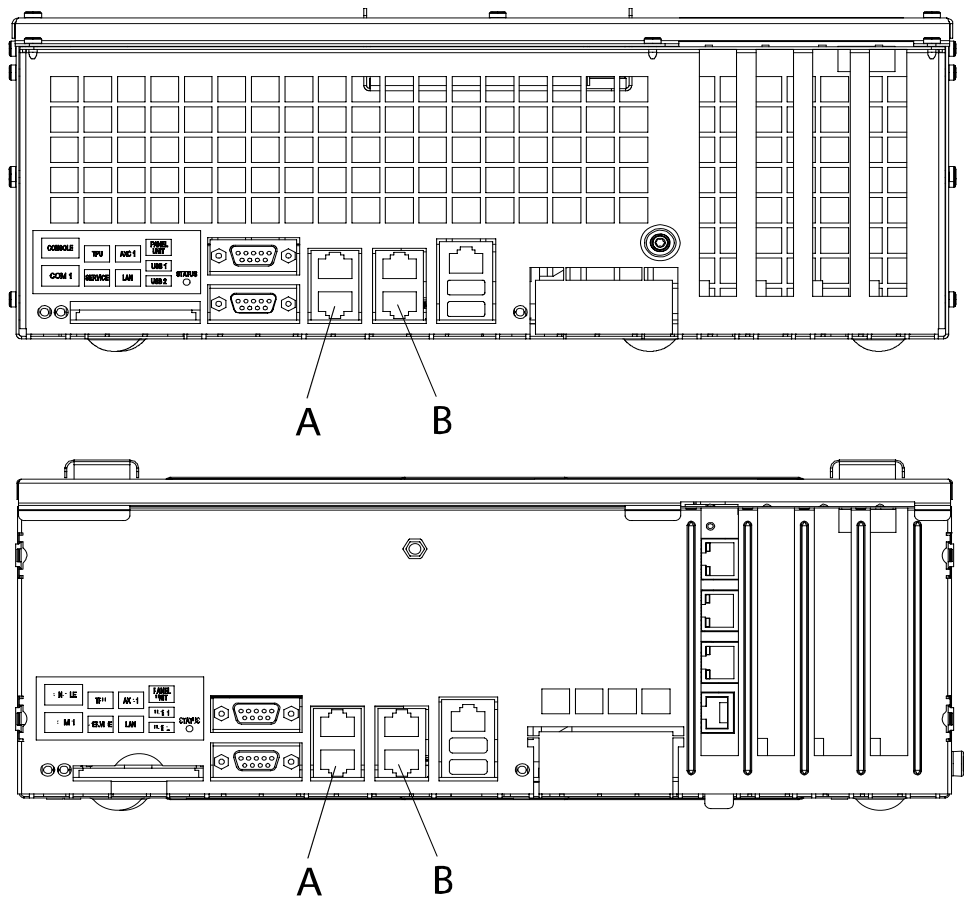
Continued

Total max. number of applications using robapi running on the same pc connected to one controller has no builtin maximum, however UAS limits the max number of logged on user's to 50.

Total max. number of concurrent connected ftp clients are 4.

Ports DSQC639

The illustration below shows the two main ports on the computer unit: the Service Port and the LAN port. Make sure the LAN (factory network) is not connected to any of the service ports!



xx0600002889

A	Service port on the computer unit
B	LAN port on computer unit (connects to factory LAN)

Connecting a PC to the service port

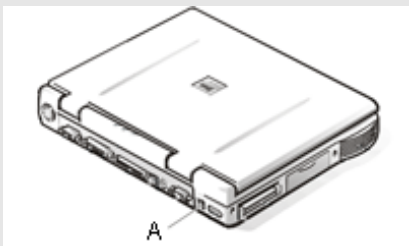
Action	Illustration
1. Make sure the network setting on the PC to be connected is correct.	Refer to the system documentation for your PC, depending on the operative system you are running. The PC must be set to "Obtain an IP address automatically" or set as described in Service PC Information in the Boot Application.

Continues on next page

2 Installation and Commissioning, IRC5

2.5.6. Connecting a PC to the service port

Continued

	Action	Illustration
2.	Use the delivered category 5 Ethernet crossover boot cable with RJ45 connectors.	The cable is delivered in the RobotWare product box.
3.	Connect the boot cable to the network port of your PC.	 xx0400000844 <ul style="list-style-type: none">• A: network port <p>The placement of the network port may vary depending on the PC model.</p>
4.	Connect the boot cable to the service port on the computer unit.	

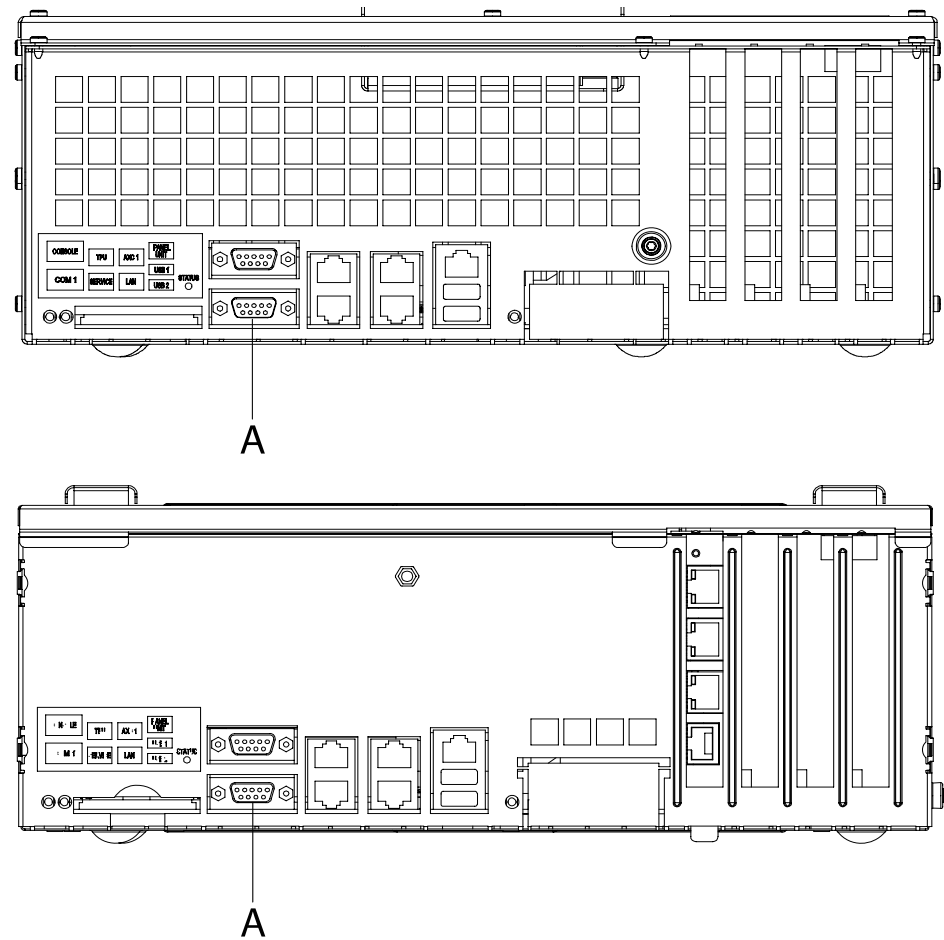
2.5.7. Connection to serial channel connector

Overview

The controller has one serial channel RS232 for permanent use which can be used for communication point to point with printers, terminals, computers or other equipment. The following sections detail connection to the serial channel connector (COM1) on the computer unit.

Location DSQC639

The serial channel connector is placed on the computer unit as shown below.



	Description
A	COM1

Required equipment

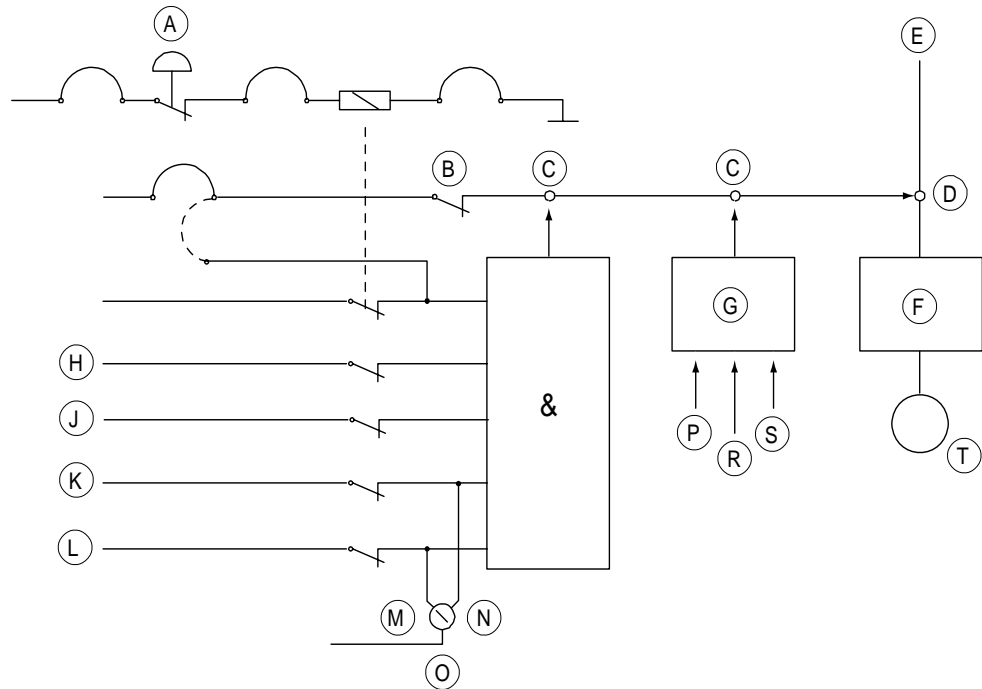
Equipment	Note
Circuit diagram	See Circuit Diagram on page 195

2.5.8. The MOTORS ON/MOTORS OFF circuit

Outline diagram

The MOTORS ON/MOTORS OFF circuit is made up of two identical chains of switches.

The diagram shows the available customer connections, AS, GS, SS and ES.



xx0100000174

A	ES (emergency stop)
B	LS (Limit switch)
C	Solid state switches
D	Contactor
E	Mains
F	Drive unit
G	Second chain interlock
H	GS (general mode safeguarded space stop)
J	SS (superior stop, same function as GS)
K	AS (Automatic mode safeguarded space stop)
L	ED (TPU enabling device)
M	Manual mode
N	Automatic mode
O	Operating mode selector
P	RUN
R	EN1
S	EN2
T	Motor

Continued

Function of the MOTORS ON/MOTORS OFF circuit

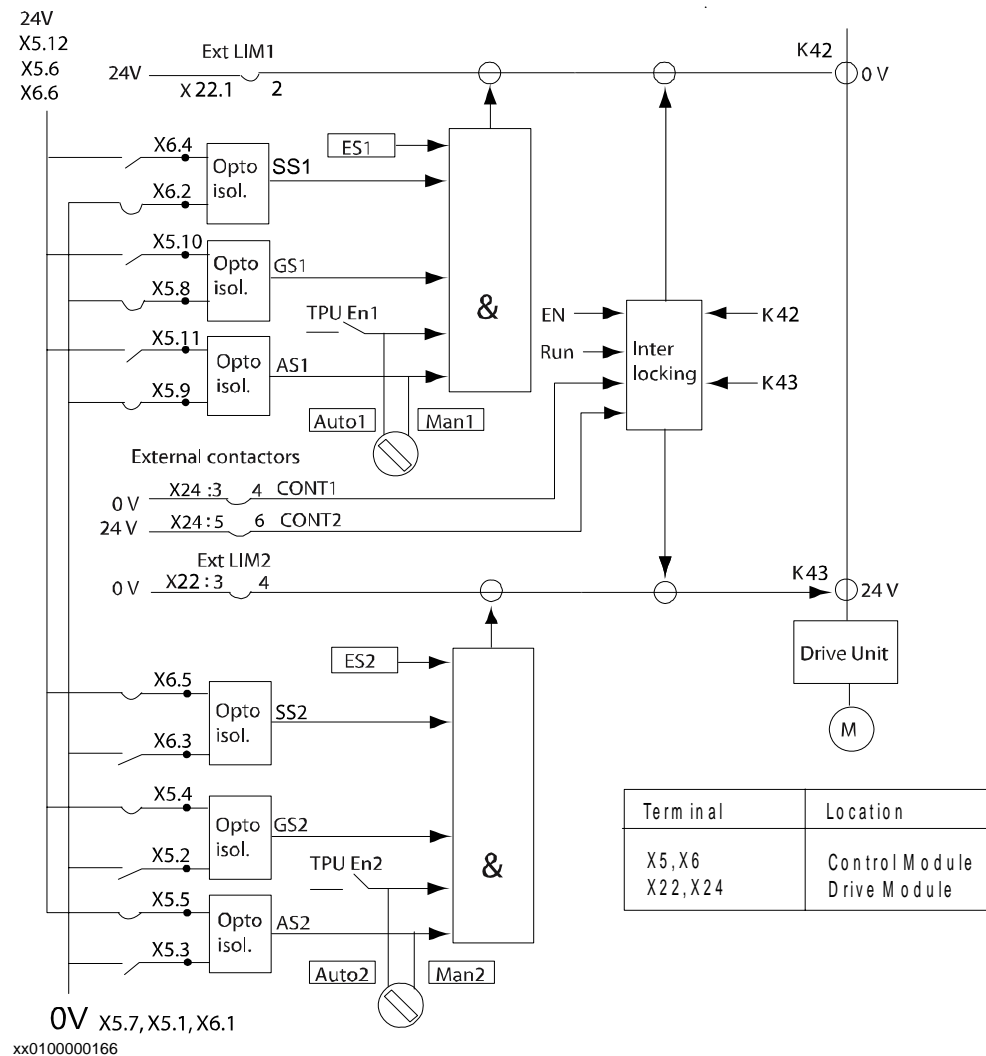
The circuit monitors all safety related equipment and switches. If any of the switches is opened, the MOTORS ON/MOTORS OFF circuit switches the power to the motors off.

As long as the two chains not are in an identical state, the robot will remain in MOTORS OFF mode.

Connection of safety chains

The diagram below shows the dual channel safety chain.

The supply from internal 24V and 0 V is displayed. For external supply of GS and AS check the circuit diagram.



Technical data per chain

Limit switch	Load: 300 mV Max. voltage drop: 1 V
External connectors	Load: 10 mA Max. voltage drop: 4 V
GS/AS/SS load at 24 V	25 mA
GS/AS/SS closed "1"	>18 V

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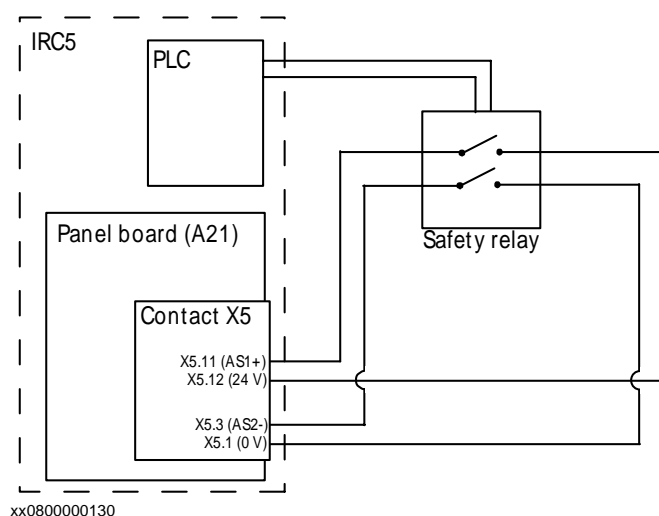
2 Installation and Commissioning, IRC5

2.5.8. The MOTORS ON/MOTORS OFF circuit

Continued

Technical data per chain	
GS/AS/SS open "0"	< 5 V
External supply of GS/AS/SS	Max. + 35 VDC Min. - 35 VDC
GS/AS/SS Filter time	2,0 ms ¹⁾
Max. potential in relation to the cabinet earthing and other signal groups.	300 V
Signal class	Control signals

1) When connecting e.g. a Safety PLC to a safety stop, make sure that the safety check pulses not exceeds 2,0 ms, otherwise a safety relay must be connected in between. See illustration below.



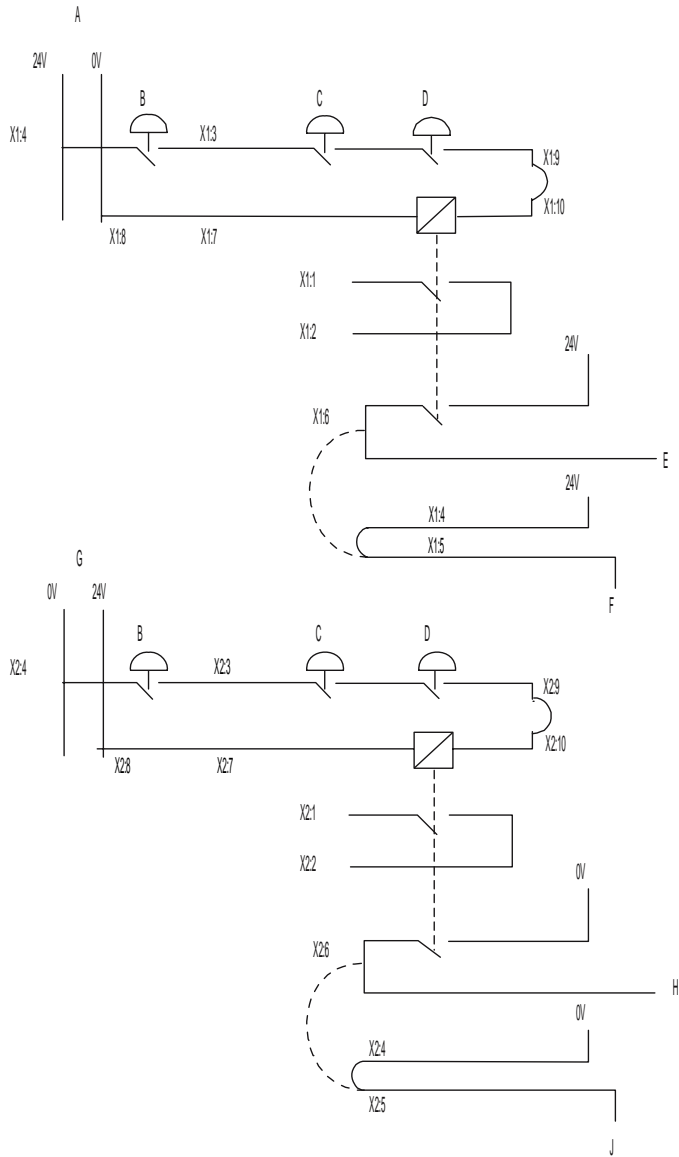
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Continues on next page

Continued

Connection of ES1/ES2 on panel unit

The diagram below shows the terminals for the emergency circuits.
The supply from internal 24V (X1/X2:10) and 0V (X1/X2:10) is displayed. For an ext. supply, X1:3 / X2:9 is connected to ext. 24V, and X1:9 / X2:3 is connected to ext. 0V (dotted lines).



xx0100000191

A	Internal
B	Ext stop
C	FlexPendant
D	Cabinet
E	ES1 internal
F	Run chain 1 top
G	Internal
H	ES2 internal
J	Run chain 2 top

Continues on next page

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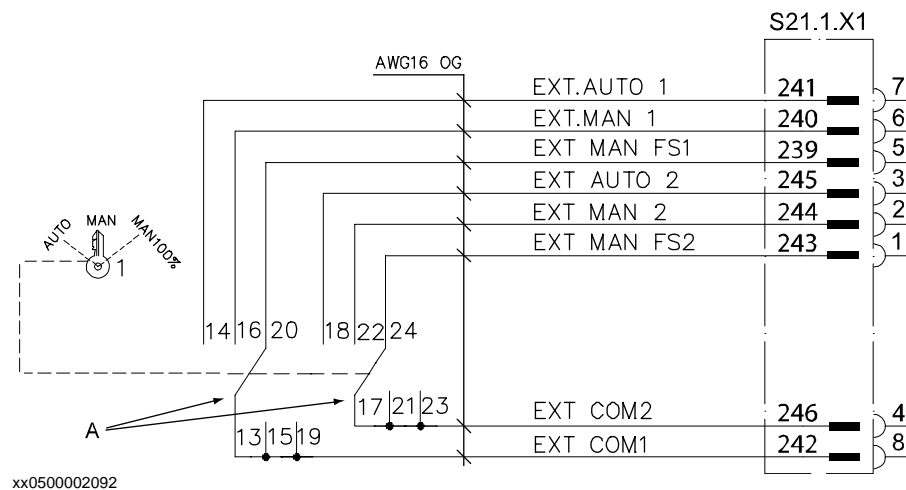
2.5.8. The MOTORS ON/MOTORS OFF circuit

Continued

Technical data	
ES1 and ES2 max output voltage	120 VAC or 48 VDC
ES1 and ES2 max output current	120 VAC: 4 A 48 VDC L/R: 50 mA 24 VDC L/R: 2 A 24 VDC R load: 8 A
External supply of ES relay	24 VDC \pm 10% between terminals X1:9, 8 and X2:9, 8 respectively. Note! In case of interference, the external supply must be properly filtered.
Rated current per chain	40 mA
Max. potential in relation to the cabinet earthing and other signal groups.	300 V
Signal class	Control signals

Connection to operating mode selector

The illustration below shows the connection of terminals for customer use.



xx0500002092

A	Mode selector
---	---------------

External manual FS (Full Speed) 100% is an option.

Technical data	
Max. voltage	48 VDC
Max. current	4 A
Max. potential in relation to the cabinet earthing and other signal groups.	300 V
Signal class	Control signals

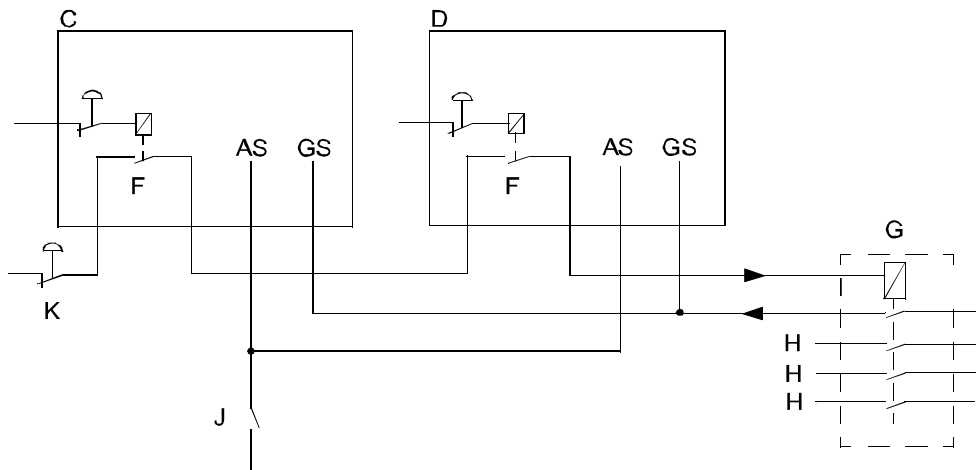
2.5.9. Connection of external safety relay

Description

The motor contactors K42 and K43 in the IRC5Panel Mounted Drive Module can operate with external equipment if external relays are used.

The figure below shows an example of how to connect an external safety relay.

Connection example



xx0100000246

C	Robot 1
D	Robot 2
F	ES (emergency stop) relay
G	External Safety relay
H	To other equipment
J	Safety gate
K	Cell ES (emergency stop)

2 Installation and Commissioning, IRC5

2.5.10. Connection of Drive Module Disconnect, by limit switch

2.5.10. Connection of Drive Module Disconnect, by limit switch

General

This function enables you to temporarily disconnect a Drive Module and deactivate any robot or additional mechanical units connected to this module. The procedures are detailed below.

It is also possible to connect a remote switch to enable a Drive Module Disconnect. The required equipment and procedure for connection of a switch are specified below.

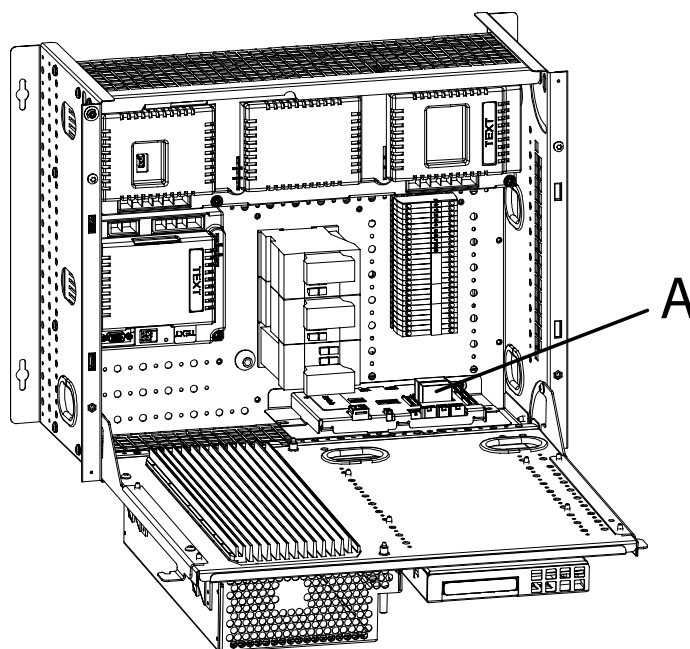


NOTE!

The system diagnostics monitors the connection and disconnection of Drive Modules, and event log messages regarding these events will be stored in the event log when required. These messages are accessible using the FlexPendant or RobotStudio.

Location

The contactor interface board unit is located in the Panel Mounted Drive Module as shown below.



xx0600003241

A	Contactor interface board
---	---------------------------

Required equipment

The table below details the required equipment.

Equipment	Note
Wire	AWG20
Switch	24V 0,5A
Operating manual - RobotStudio	
Operating manual - IRC5 with FlexPendant	
Standard toolkit	
Circuit diagram	See Circuit Diagram on page 195

Continues on next page

Enabling a Drive Module Disconnect in RobotStudio

The following procedures details how to enabeling the system for a Drive Module Disconnect.

	Action
1.	In RobotStudio, select the Topic: Motion .
2.	Select Type: Drive Module User Data .
3.	Set the parameter for selected drive module to YES .
4.	Restart the system. (Warm start)

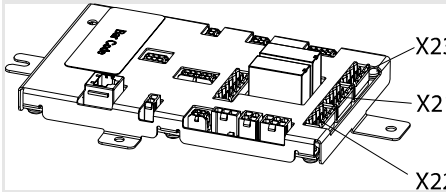
Enabling a Drive Module Disconnect with the FlexPendant

The following procedures details how to enabeling the system for a Drive Module Disconnect.

	Action
1.	On the FlexPendant, Tap ABB and then Tap Control Panel .
2.	In the Control panel menu, Tap Configuration .
3.	In the Configuration menu, Tap Topics , and select Motion .
4.	In the Topic: Motion , Tap Type: Drive Module User Data .
5.	Tap selected drive module.
6.	Tap the parameter in order to modify it.
7.	Restart the system (warm start).

Disconnect the Drive Module

The following procedure details how to disconnect a Drive Module.

	Action	Note/illustration
1.	Make sure that the system is in the MOTORS_OFF state.	
2.	Disconnect the connector X22.	It is also possible to use connector X21, but this is typically used for limit switches on the robot.  xx0600003250

Reconnect the Drive Module

The following procedure details how to reconnect the Drive Module.

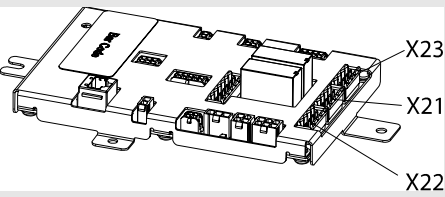
	Action	Note/illustration
1.	Make sure that the system is in the MOTORS_OFF state.	

Continues on next page

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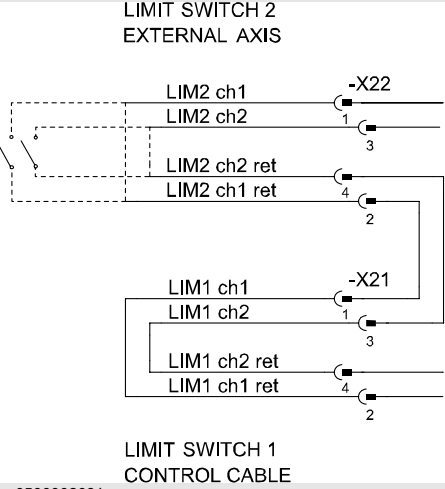
2.5.10. Connection of Drive Module Disconnect, by limit switch

Continued

	Action	Note/illustration
2.	Reconnect the X22 connector.	 <p>xx0600003250</p>
3.	Move the program pointer to main in the RAPID-program where the disconnected mechanical units are active.	

Connect a remote switch

The following procedures details how to connect a remote switch.

	Action	Note/illustration
1.	Make sure that the system is in the MOTORS_OFF state.	
2.	Disconnect the jumpers from the connector X22.	
3.	Connect the wires to the connector X22 according to the diagram on the right.	 <p>xx0500002091</p>

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2.5.11. Connecting a Limit switch override push button



DANGER!

The Limit switch override is used to disconnect safety limitations. Make sure the Limit switch override function is not active longer than absolutely necessary.

If the option SafeMove is implemented, Limit switch override must never be used at all. The SafeMove safety controller has its own override function.

General

The override circuit enables the possibility to jog an axis out of a forbidden (limited) zone.

Limitations


The switch has to be placed inside the controller to eliminate the risk of electrical noise.

Required equipment

Equipment	Art. no	Note
Contact block	1SFA 610 605 R1001	ABB CW Control
Contact blocks with holder	1SFA 611 605 R1201	ABB CW Control
Push button	1SFA 611 102 R1105	ABB CW Control
Connector X23	1SSA 245 204 R0100	ABB CW Control
Wire		Cable AWG 20 Blue
Standard toolkit		Described in section, Standard Toolkit .
Circuit diagram		See Circuit Diagram on page 195

Procedure for Panel Mounted Controller

The following procedure details how to connect a Limit switch override circuit in a Panel Mounted Controller.

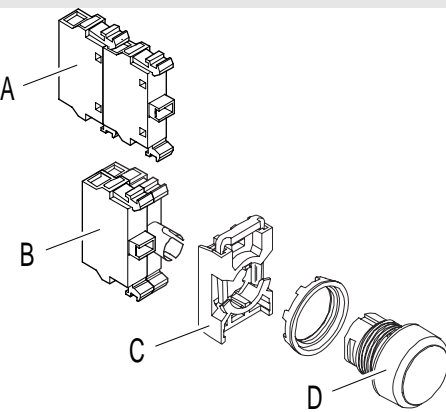
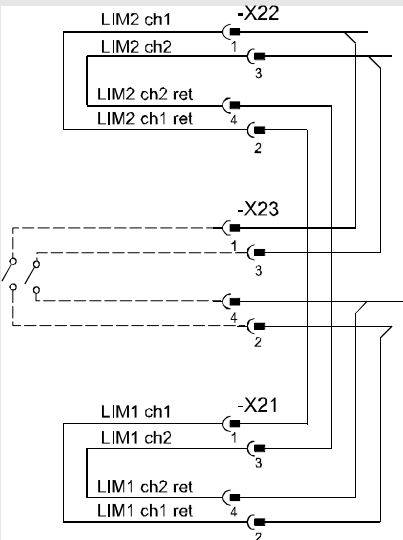
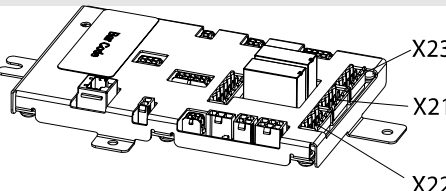
	Action	Note/illustration
1.	 DANGER! Before any work inside the IRC5 controller modules, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26 .	

Continues on next page

2 Installation and Commissioning, IRC5

2.5.11. Connecting a Limit switch override push button

Continued

	Action	Note/illustration
2.	Attach two additional contact blocks on the existing push button (Motors on).	 <p>xx0500002553</p> <ul style="list-style-type: none"> • A: Additional contact blocks • B: Existing contact, lamp blocks • C: Holder • D: Push button
3.	Connect wires from the contact blocks to the connector according to the diagram to the right.	 <p>xx0500002556</p>
4.	Fit the connector to the X23 connector on the contactor interface board.	 <p>xx0600003250</p>

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2.6 Drive system

2.6.1. Drive functions, general

General

The manipulator is powered by power electronics found in the IRC5 controller.

Standard configurations

The drive system (drive units and rectifier) is available in two sizes depending on which robot to drive and other power requirements.

How to configure the drive system is detailed in, [*Configuration of the drive system, IRC5 on page 78*](#)

2 Installation and Commissioning, IRC5

2.6.2. Configuration of the drive system, IRC5

2.6.2. Configuration of the drive system, IRC5

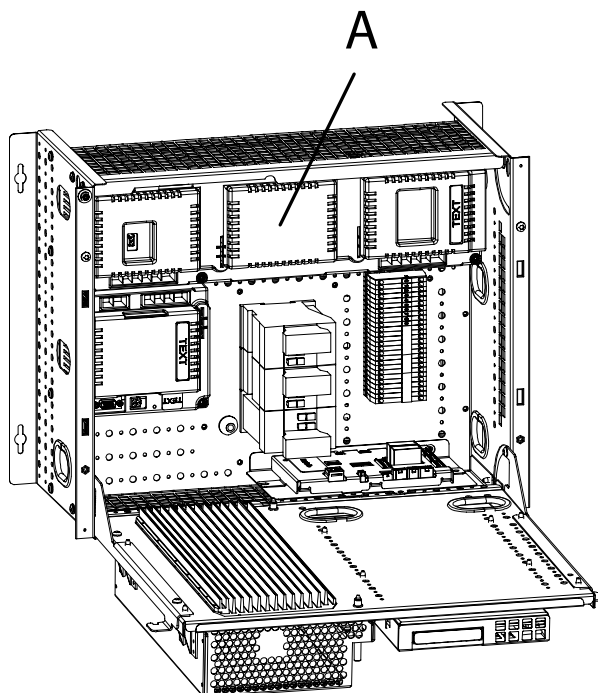
General

The IRC5 Panel Mounted Controller contains a number of drive units, rectifiers and filters. Any allowed combination of these, depending on the robot type, is specified below.

The robot system may also be equipped with up to three additional drive modules, which are described in the *Product manual - IRC5*, section *Installation of additional drive module*.

Location

The servo drive units and rectifiers are located in the Panel Mounted Drive Module as shown below.



xx0600003244

A	Drive system, (drive units and rectifier)
---	---

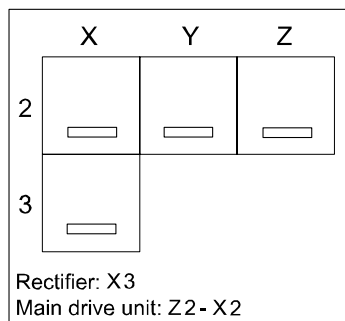
DC busbars

Between the units are fitted DC-busbars, which are specified below:

Description	Art. no.	Note
DC-bus bar	3HAC17281-3	DC_S2: short busbar with two connector groups

IRB 140

The figure below shows the drive unit positions. The table specifies which units may be fitted in which positions.

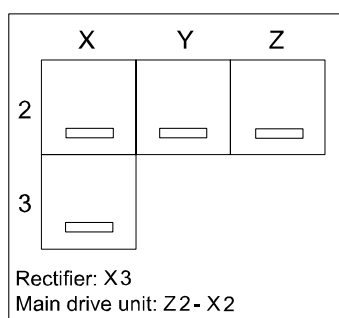


xx0600003245

Pos.	Identification	Description	Art. no.	Note
X3	DSQC 618_RC1	Rectifier	3HAC14549-1	
Z2, Y2, X2	DSQC 617_3B3A	Main Drive unit	3HAC025338-001	Z2 - X2 is ONE unit!

IRB 340, 360

The figure below shows the drive units positions. The table specifies which units may be fitted in which positions.



xx0600003245

Pos.	Identification	Description	Art. no.	Note
X3	DSQC 618_RC1	Rectifier	3HAC14549-1	
Z2, Y2, X2	DSQC 617_3E1C	Main Drive unit	3HAC025338-003	Z2 - X2 is ONE unit!

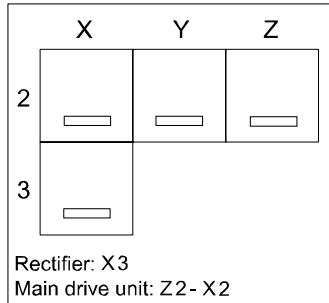
2 Installation and Commissioning, IRC5

2.6.2. Configuration of the drive system, IRC5

Continued

IRB 1600, 260, 2400

The figure below shows the drive unit. The table specifies which units may be fitted in which positions.



xx0600003245

Pos.	Identification	Description	Art. no.	Note
X3	DSQC 618_RC1	Rectifier	3HAC14549-1	
Z2, Y2, X2	DSQC 617_2E2C2B	Main Drive unit	3HAC025338-002	Z2 - X2 is ONE unit!

Drive unit connection

The table below shows the drive unit connection for each drive unit.

Main drive unit	Power stage	Designation in circuit diagram	Template file name (drive unit name)
DSQC 617_3B3A Used for irb 140	• B	M1 (R,S,T) ^b	M1 (DMX) ^c
	• B	M2 (R,S,T)	M2 (DMX)
	• A	M3 (R,S,T)	M3 (DMX)
	• A	M4 (R,S,T)	M4 (DMX)
	• B	M5 (R,S,T)	M5 (DMX)
	• A	M6 (R,S,T)	M6 (DMX)
DSQC 617_2E2C2B Used for irb 1400, 1600, 2400 and 260	• E	M1 (R,S,T) ^b	M1 (DMX) ^c
	• E	M2 (R,S,T)	M2 (DMX)
	• B	M3 (R,S,T)	M3 (DMX)
	• B	M4 (R,S,T)	M4 (DMX)
	• C	M5 (R,S,T)	M5 (DMX)
	• C	M6 (R,S,T)	M6 (DMX)
DSQC 617_3E1C Used for irb 340, 360	• E	M1 (R,S,T) ^b	M1 (DMX) ^c
	• E	M2 (R,S,T)	M2 (DMX)
	• -	-	-
	• -	-	-
	• E	M3 (R,S,T)	M5 (DMX)
	• C	M4 (R,S,T)	M6 (DMX)

^b Phase R,S,t (U,V,W).

^c X= drive module number.

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2.7 Memory functions

2.7.1. Memory functions, IRC5

General

The controller may be fitted with memory functions found inside the Computer Module.

The memory functions are divided into two main categories:

- Mass memory (hard disk drive, solid state disk drive, etc)
- RAM memory (memory modules fitted on the main computer motherboard)

Computer units

Computer unit DSQC639:

- Compact flash memory 256MB containing ABB VxWorks boot image software.
- 256 MB DDR SDRAM memory (Synchronous Dynamic Random Access Memory).



Note

NOTE!

Only use Compact flash memory and DDR SDRAM memory supplied by ABB.

Further information

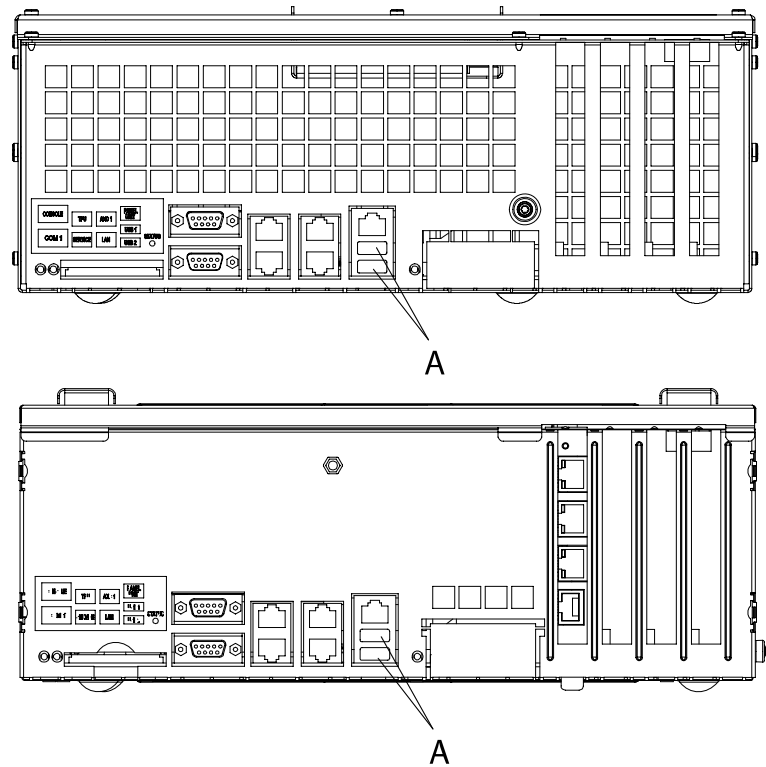
The table gives references to additional information.

Information:	Found in:
How to replace malfunctioning memory units and restore the drive system to full operation:	Section Replacement of DDR SDRAM memory on motherboard in computer unit DSQC639 on page 132

2.7.2. Connecting a USB memory to the computer unit

Location DSQC639


A USB memory may be connected to either one of the USB ports on the computer unit. The USB ports are shown in the figure below:



xx0600002895

A	USB 1, 2 The USB connectors provide two legacy USB 2.0 ports supporting High Speed/Full Speed/Low Speed (HS/FS/LS)
---	--

Connection

	Action	Info/illustration
1.	Remove the end cover on the USB memory and connect it to the connector. Do not disconnect the USB memory approx. 10 seconds after connecting it.	The USB memory and its contents may now be accessed from the computer unit just as any other hard drive unit.
2.	 CAUTION! CAUTION! Handling of USB memory is described in Operating manual - IRC5 with FlexPendant, section File Managing.	

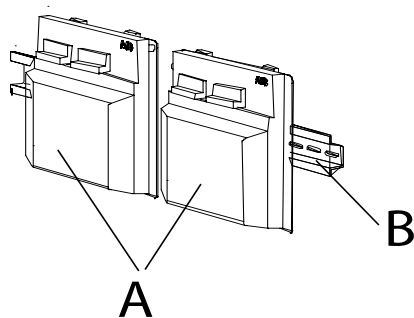
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2.8 I/O system

2.8.1. Definition of I/O units, IRC5

General

The IRC5 controller may be fitted with I/O, Gateway or Encoder units. These are configured in an identical way.



xx0600003256

A	I/O, Gateway or Encoder units
B	Mounting rail

Standard configuration

In the standard form, no fieldbus is mounted to the controller. .

It is possible to connect any type of DeviceNet compliant I/O unit on the DeviceNet - DSQC 603 - master bus. All I/O units should comply with the DeviceNet standard and be conformance tested by ODVA.

I/O units

The table below specifies the I/O units:

Description	Note
AD Combi I/O	DSQC 651 See I/O System parts for the spare part number
Digital I/O	DSQC 652 See I/O System parts for the spare part number
Digital I/O with relay outputs	DSQC 653 See I/O System parts for the spare part number
Analog ± 10 V I/O	DSQC 355A See I/O System parts for the spare part number

Continues on next page

2 Installation and Commissioning, IRC5

2.8.1. Definition of I/O units, IRC5

Continued

Gateways

The table below specifies the Gateways:

Description	Art. no.	Note
DeviceNet/Allen Bradely Remote I/O Gateway	3HNE00025-1	DSQC 350A
DeviceNet/Interbus Gateway	3HNE00006-1	DSQC 351A
DeviceNet/Profibus DP Gateway	3HNE00009-1	DSQC 352A

Encoder interface units

The table below specifies the encoder interface units:

Description	Art. no.	Note
Encoder interface unit for conveyor tracking	3HNE01586-1	DSQC 377A.

Further information

The table below gives references to additional information:

Information:	Found in:
How to install the I/O units and Gateways mechanically and electrically.	Section Installation of I/O, Gateways and encoder interface units, IRC5 on page 94 .
Allowed configurations of I/O units and how to setup the configurations.	Technical reference manual - System parameters
How to install the I/O unit and Gateways software related in a new system.	The Application manual for the different I/O buses respectively.
Detailed descriptions of all available I/O units and Gateways.	The Application manual for the different I/O buses respectively.

2.9 Installation of add-ons

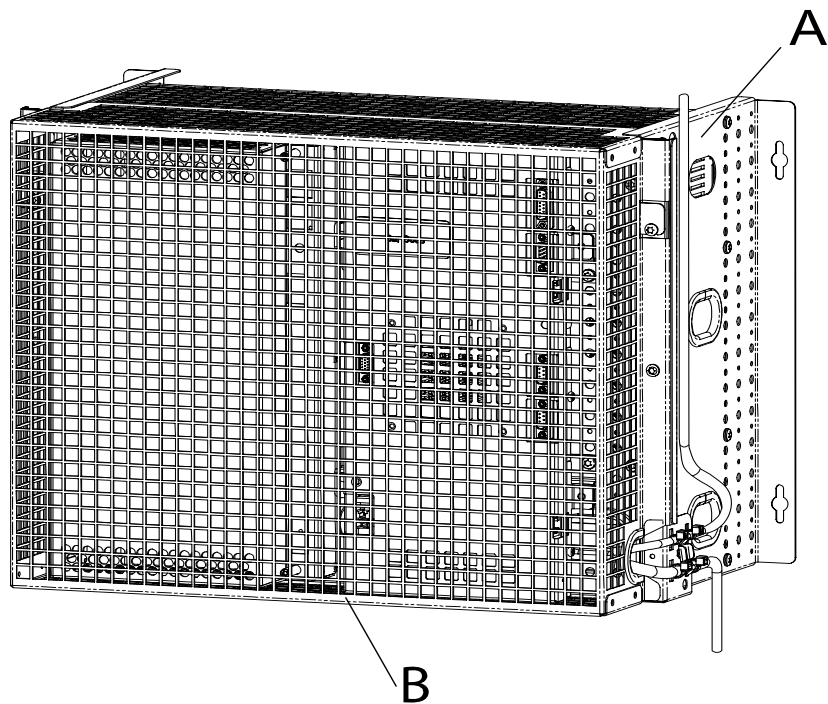
2.9.1. Installation of EMC shield

General

IRC5 Panel Mounted Controller is a compact robot controller prepared for integration into existing machines and cabinets. The EMC shielding is initially assumed to be provided by the outer shielding provided by the system, into which the IRC5 Panel Mounted Controller is integrated. However, to increase the level of protection, the controller units are prepared for additional shielding that ensure Class A immunity and emission according to EN55011. The following section describes the preparation work for the additional EMC shielding.

Location

The EMC cage is installed on the IRC5 Panel Mounted Drive Module as shown in the illustration below.



xx0600003443

A	Drive Module
B	EMC cage

Required equipment

Equipment	Note
EMC cage	
Standard toolkit	The contents are described in section Standard toolkt.
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	

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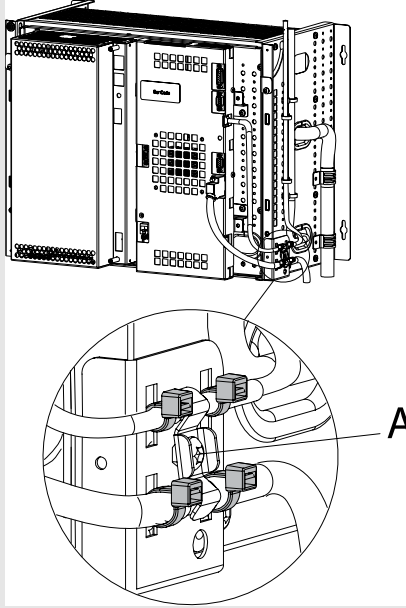
2 Installation and Commissioning, IRC5

2.9.1. Installation of EMC shield

Continued



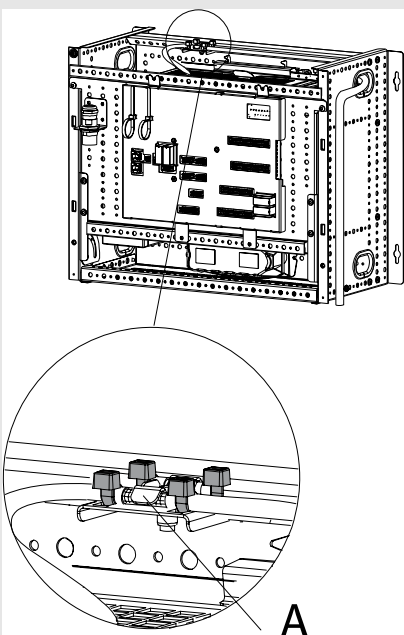
Procedure

The procedure below details how to install the EMC cage on the Drive Module.

Action	Info/Illustration
<p>1.</p>  <p>DANGER!</p> <p>Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off!</i> on page 26.</p>	
<p>2. Connect the Ethernet cable shield on the Drive Module.</p>  <p>NOTE!</p> <p>Both signal and Ethernet cables must be in good mechanical and electrical contact with the specified shield plate. The signal cable might be prepared for shield connection at delivery but the Ethernet cable is not. In any case make sure that the isolation is removed at right lenght for both cables.</p>  <p>WARNING!</p> <p>Make sure that the internal shield of the cable is not damaged during the isolation removal.</p>  <p>WARNING!</p> <p>Both cables are connected to the upper plate. Make sure that you have extra lenght so that cable removal before opening the module will not be necessary.</p>  <p>NOTE!</p> <p>A tightening torque must be used at 0.5 Nm.</p>	 <p>xx0600003288</p> <ul style="list-style-type: none">• A: shield connection

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Continues on next page

Action	Info/Illustration
<p>3. USB cables, signal cable for the external operator's panel and Ethernet cables that are connected to the main computer must be mechanically and electrically connected to the chassis. You need to prepare the cables by cutting out the outer isolation at suitable length.</p> <p></p> <p>NOTE! A tightening torque must be used at 0.5 Nm.</p> <p></p> <p>WARNING! Make sure that the internal shield of the cable is not damaged during the isolation removal.</p>	 <p>xx0600003446</p> <ul style="list-style-type: none"> • A: shield connection
4. Fit the EMC cage on the Drive Module.	

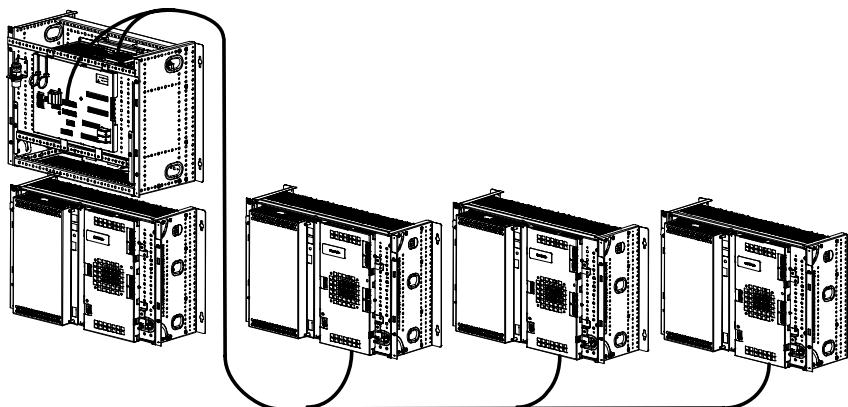
2 Installation and Commissioning, IRC5

2.9.2. Installation of additional Drive Module

2.9.2. Installation of additional Drive Module

General

To be able to use a Multi Move system or to control more than 3 additional axes, an additional Drive Module is needed. The IRC5 controller is prepared for up to three additional Drive Modules.




xx0600003253

Prerequisites

Equipment	Note
Drive Module (Includes all cabling and required mounting hardware)	Specified in Specification Form
Ethernet board	DSQC 612 See Computer unit DSQC 623 parts or Computer unit DSQC 639 parts on page 185 for the spare part number
Standard toolkit	The contents are defined in section Standard toolkit!
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	These procedures include references to the tools required.
Circuit Diagram	See Circuit Diagram on page 195



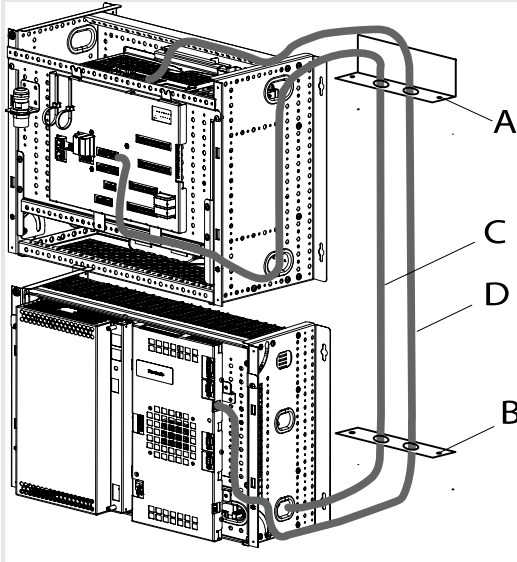
Procedure

The procedure below details how to install the additional drive module.

	Action	Info/Illustration
1.	 DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26.	

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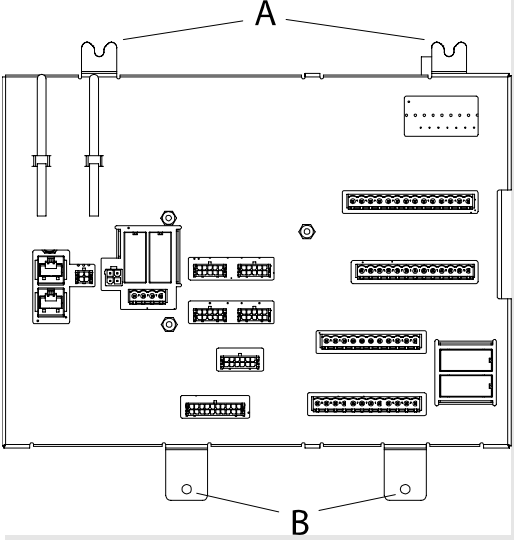
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	Action	Info/Illustration
2.	 esd WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27	
3.	Fit the DSQC 612 Ethernet board into the computer unit.	How to fit the Ethernet board is detailed in section Replacement of PCI boards in the computer unit DSQC639 on page 137
4.	Place the additional drive module in position and secure it with the included screws and washers.	See Installation, IRC5 Panel Mounted Controller on page 36
5.	Route and strap the cables as shown in the illustration.  NOTE! The attachment plates on the cables must be connected to the same ground point as the modules	 xx0600003393 <ul style="list-style-type: none"> • A: Fit to Control Module ground point • B: Fit to Drive Module ground point • C: Panel Board/Contactor interface board cable • D: Ethernet cable
6.	Connect the ethernet cable (A32.X9) to the DSQC 612 Ethernet board. Connector: <ul style="list-style-type: none"> • A32.X9 to Ethernet board connector, AXC1 	

2 Installation and Commissioning, IRC5

2.9.2. Installation of additional Drive Module

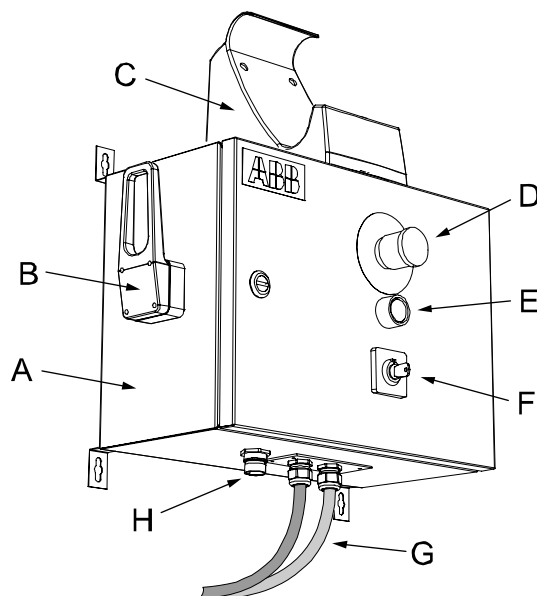
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	Action	Info/Illustration
7.	Connect the safety signal cable (A21.X7) to the Panel board. Connector: <ul style="list-style-type: none"> • A21.X8 - 1 additional drive • A21.X14 - 2 additional drives • A21.X17 - 3 additional drives 	 <p>The diagram shows the internal layout of the IRC5 control cabinet. Label 'A' points to the safety signal cable connector at the top. Label 'B' points to the panel board at the bottom. The diagram also shows various other components like the power supply, motor modules, and communication modules.</p> <p>xx0600003227</p>
8.	Connect the Ethernet cable to the Axis computer board connector A42.X2.	
9.	Connect the Panel board/Contactor interface board cable to the Contactor interface board connector A43.X1.	
10.	Strap the cabling to existing straps inside the module.	

2.9.3. Installation of external operator's panel, IRC5

Location

An external operator's panel may be fitted in a separate wall cabinet as shown in the illustration below.



xx0400000956

A	Wall cabinet IRC5
B	Bracket
C	FlexPendant holder
D	Emergency stop button
E	Motor ON button
F	Position mode switch
G	External Operator's panel harness
H	FlexPendant connector

Required equipment

Equipment	Art. no.	Note
Wall cabinet IRC5	3HAC022035-001	
External Operator's panel cable	3HAC021273-005	30 m
	3HAC021273-001	22 m
	3HAC021273-006	15 m
Standard toolkit		The contents are defined in section, Standard Toolkit .
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.		These procedures include references to the tools required.
Circuit Diagram		See Circuit Diagram on page 195

Continues on next page


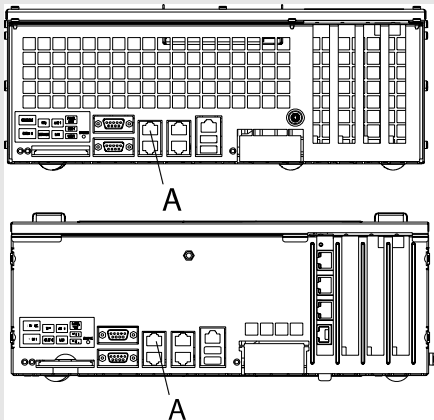
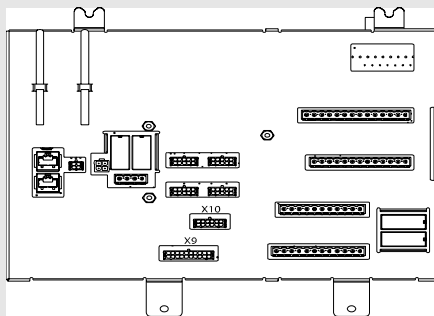
2 Installation and Commissioning, IRC5

2.9.3. Installation of external operator's panel, IRC5

Continued

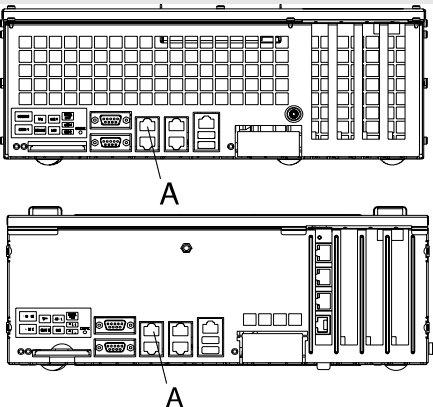
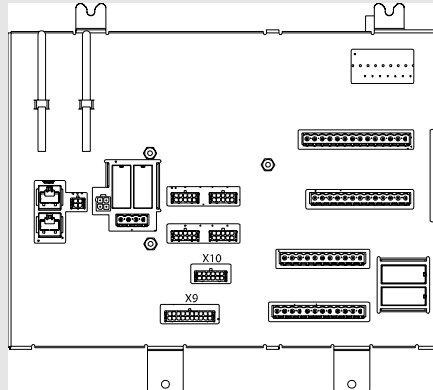
Procedure

The procedure below details how to install the external control panel.

Action	Info/Illustration
<div>1.</div> <div></div> <div>DANGER!</div> <div>Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off! on page 26.</i></div>	
<div>2.</div> <div>Disconnect the cable from the ethernet connector for FlexPendant on the computer unit.</div>	<div>DSQC639:</div> <div></div> <div>xx0600002897</div> <div><ul style="list-style-type: none">A: FlexPendant port</div>
<div>3.</div> <div>Disconnect signal cabling from the panel board unit.</div> <div>Connectors:</div> <div><ul style="list-style-type: none">A21.X9A21.X10</div>	<div></div> <div>xx0600003257</div>

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Continued

	Action	Info/Illustration
	4. Connect the ethernet connector A32.A8 to the computer unit.	<p data-bbox="994 320 1114 349">DSQC639:</p>  <p data-bbox="994 779 1101 795">xx0600002897</p> <ul data-bbox="1034 801 1284 831" style="list-style-type: none">• A: FlexPendant port
	5. Connect the signal connectors A21.X9 and A21.X10 to the <i>connector X9 and X10</i> on the panel board unit.	 <p data-bbox="994 1267 1101 1283">xx0600003257</p>
	6. Strap the cabling to the existing cable straping inside the module.	

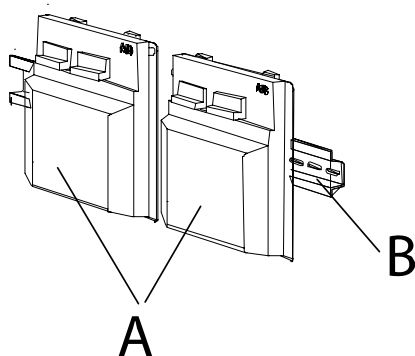
2 Installation and Commissioning, IRC5

2.9.4. Installation of I/O, Gateways and encoder interface units, IRC5

2.9.4. Installation of I/O, Gateways and encoder interface units, IRC5

Location

The I/O units, Gateway or encoder interface units to be installed are shown in the illustration below.



xx0600003256


A	I/O units, Gateways or Encoder interface units
B	Mounting rail

Required equipment

Equipment	Art. no.	Note
I/O units, Gateways or encoder interface units		Specified in Definition of I/O units, IRC5 .
Application manual - DeviceNet	3HAC020676-001	
Circuit Diagram		See Circuit Diagram on page 195

Fitting

The procedure below details how to fit the units.

	Action	Note/Illustration
1.	 DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26 .	
2.	Fit the I/O unit by snapping it onto the mounting rail.	
3.	Connect the DC supply to the board.	
4.	Connect wires to the inputs and output connectors as required.	Detailed in the Application manual for the respective busses.

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3 Maintenance activities, controller IRC5

3.1. Maintenance schedule, controller IRC5

General

The IRC5 robot controller must be maintained at regular intervals to ensure its function. The maintenance activities and their respective intervals are specified below:

Intervals

Equipment	Maintenance activity	Interval	Note!	Detailed in section:
Complete controller modules	Inspection	12 months *		Inspection of the controller on page 96.
Drive system fans	Inspection	6 months *		Inspection of the controller on page 96.
Drive system fans	Cleaning	12 months		Cleaning of the IRC5 controller on page 99.
FlexPendant	Cleaning	When needed		Cleaning the FlexPendant on page 100.

*) The time interval depends on the working environment of the equipment: a cleaner environment may extend the maintenance interval and vice versa.

3 Maintenance activities, controller IRC5

3.2.1. Inspection of the controller

3.2 Inspection activities

3.2.1. Inspection of the controller

Inspection

The procedure below details how to inspect the IRC5 controller.

WARNING!



Please observe the following before commencing any repair work on the IRC5 controller or units connected to the controller.

- Switch off all electric power supplies with the power switches.
- Before handling, make sure you are grounded through a special ESD wrist bracelet or similar. Many components inside the controller modules are sensitive to ESD (ElectroStaticDischarge) and can be destroyed if exposed to discharge. See the Safety chapter, *WARNING - The unit is sensitive to ESD! on page 27*.

WARNING!

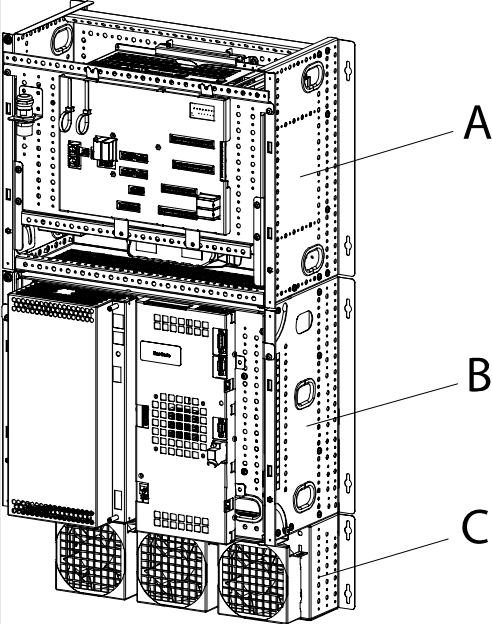



Please observe the following before commencing any repair work on the IRC5 Panel MountedController modules or units connected to the controller:

- Switch off all electric power supplies with the power switch!
- Before handling, make sure you are grounded through a special ESD wrist bracelet or similar. Many components inside the module are sensitive to ESD (ElectroStatic Discharge) and can be destroyed if exposed to discharge. See the Safety chapter, *WARNING - The unit is sensitive to ESD! on page 27*

	Action	Note/Illustration
1.	Inspect all sealing joints and cable glands to make sure they are airtight in order to prevent dust and dirt from penetrating into the cabinet andcontroller.	
2.	Inspect connectors and cabling to make sure they are securely fastened and cabling not damaged.	

Continued

	Action	Note/Illustration
3.	<p>Inspect the drive system fans and air channels in the controller to make sure they are clean.</p>	 <p>xx0600003313</p> <ul style="list-style-type: none"> • A: Control Module • B: Drive Module • C: Fan unit
4.	 <p>WARNING! The fan unit must not be covered. Check that nothing covers or block the fan unit.</p>	
5.	<p>After cleaning: Temporarily turn the power supply to the modules on. Inspect all fans to make sure they function correctly. Turn the power supply back off.</p>	

3.3 Changing/replacing activities

3.3.1. Activities

References

Certain activities to be performed as specified in the Maintenance Schedule are not detailed in this chapter, but in the Repairs chapter.

Please refer to the Repair chapter of the equipment in question.

3.4 Cleaning activities

3.4.1. Cleaning of the IRC5 controller

Required equipment

Equipment, etc.	Note
Vacuum cleaner	ESD Protected

Internal cleaning

The procedure below details how to clean the interior of the Panel Mounted Controller.

	Action	Note/Illustration
1.	Clean the cabinet interior with a vacuum cleaner if necessary.	

Do's and don'ts!

The section below specifies some special considerations when cleaning the controller.

Always:

- use ESD Protection
- use cleaning equipment as specified above! Any other cleaning equipment may shorten the life of signs or labels!
- check that all protective covers are fitted to the controller before cleaning!

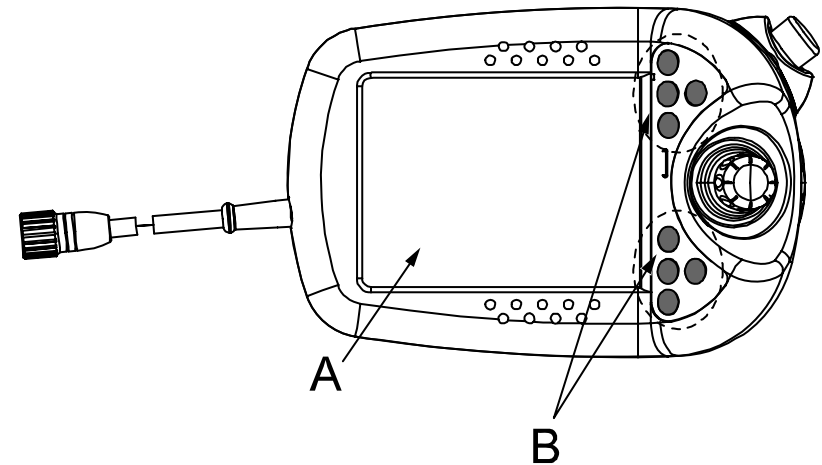
3 Maintenance activities, controller IRC5

3.4.2. Cleaning the FlexPendant

3.4.2. Cleaning the FlexPendant

Location

The surfaces to clean are shown in the illustration below.



xx0400000973

A	Touch screen
B	Hard buttons

Required equipment

Equipment, etc.	Note
Soft cloth	ESD Protected
Warm water/Mild cleaning agent	

Clean the touch screen

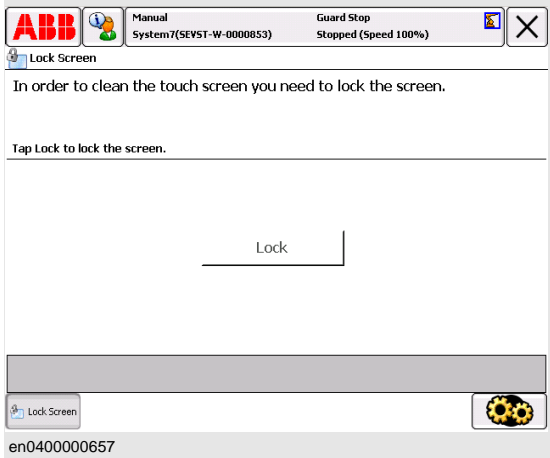


This section details how to clean the touch screen.

Action	Info/Illustration
1. Before cleaning the screen, tap the Lock Screen on the ABB menu.	<p>The screenshot shows a grid of application icons. The 'Lock Screen' icon, which depicts a padlock, is highlighted with a grey background. Other visible icons include 'FlexPendant Explorer', 'Inputs and Outputs', 'Jogging', 'Production Window', 'Program Data', 'Program Editor', 'RobotWare Arc', 'Backup and Restore', 'Calibration', 'Control Panel', 'Event Log', 'Operator Window', 'System Info', 'Logout (Default User)', and 'Restart'.</p>

en0400001221

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Continued

Action	Info/Illustration
2. Tap the Lock button in the following window.	
3. When the next window appears, it is safe to clean the screen.	
4. Clean the touch screen and hardware buttons using a soft cloth and water or a mild cleaning agent.	
5. To unlock the screen, follow the instructions on the screen.	

3 Maintenance activities, controller IRC5

3.4.2. Cleaning the FlexPendant

Continued

Do's and don'ts!

The section below specifies some special considerations when cleaning the FlexPendant.

Always:

- use ESD Protection
- use cleaning equipment as specified above! Any other cleaning equipment may shorten the life time of the touch screen.
- check that all protective covers are fitted to the device before cleaning!
- make sure that no foreign objects or liquids can penetrate into the device.

Never:

- remove any covers before cleaning the FlexPendant!
- spray with a high pressure cleaner!
- clean the device, operating panel and operating elements with compressed air, solvents, scouring agent or scrubbing sponges.

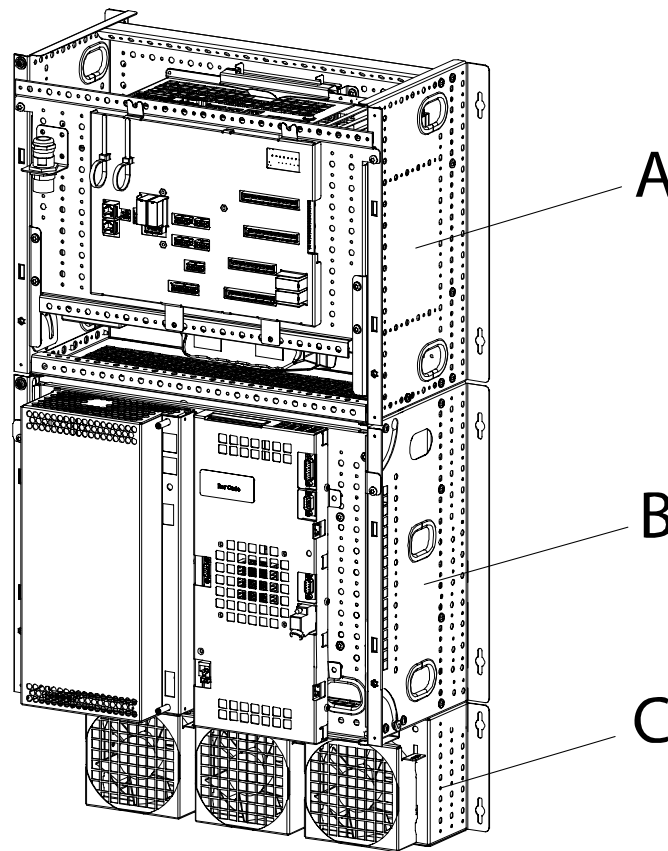
4 Repair activities, controller IRC5

4.1. Overview

General

The IRC5 Panel Mounted Controller is made up of the following modules:

- Control Module
- Drive Module



xx0600003313

A	Control Module
B	Drive Module
C	Fan unit

Continues on next page

4 Repair activities, controller IRC5

4.1. Overview

Continued

Control Module contains the computer unit, communication interfaces, FlexPendant connection, service ports and also the system software which includes all basic functions for operation and programming.

Drive Module contains the drive system.



NOTE!

When replacing a unit in the controller, report to ABB:

- the serial number
- article number
- revision

of both the replaced unit and the replacement unit.

This is particularly important for the safety equipment to maintain the safety integrity of the installation.

Equipment

Following parts can be delivered with the IRC5 Panel Mounted Controller:

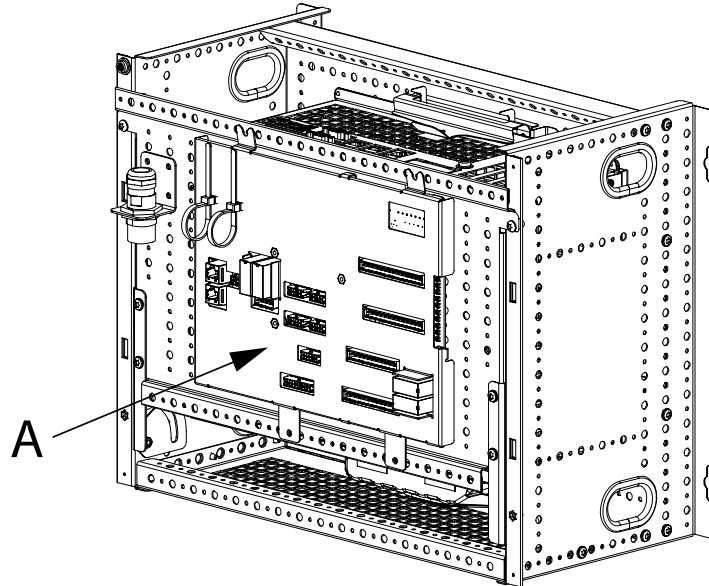
Part. no.	Description	Note
3HAC026292-001	Ethernet cable	Standard
3HAC027818-001	Connection Power supply	Standard
3HAC024322-001	Mains line filter	Standard
3HAC023195-001	GTPU 2, 10m cable	Option 701-1 and 701-3
3HAC11266-4	TPU cable, 30m	Option 701-3
3HAC021914-001	Harness - TPU jumper plug	Option 702-1
3HAC12934-1	Customer I/O power supply DSQC 608	Option 727-1
3HAC13398-2	Power supply	Option 728-1
3HAC025600-005	Harness - Drive/Control 4m	Option 761-1
3HAC025600-006	Harness - Drive/Control 30m	Option 761-3
3HAC027201-001	Transformator unit	Option 881-1
3HAC027058-001	Fan unit	Option 882-1
3HAC026486-001	Additional module Digital 24V	Option 816-1
3HAC026486-002	Additional module Analogue/Digital Combi	Option 817-2
3HAC026486-003	Additional module Digital with relays	Option 818-2
3HAC1543-1	Additional unit Analogue I/O	Option 819-1
3HAC1793-1	Additional unit ProfiBus	Option 820-1
3HAC1789-1	Additional unit RIO	Option 821-1
3HAC1792-1	Additional unit InterBus, -S Slave	Option 822-1
3HAC2588-2	Additional unit Que TRack unit	Option 826-1

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4.2. Replacement of panel board

Location

The panel board unit is located as shown in the illustration below.



xx0600003220


A	Panel board unit
---	------------------

Required equipment

Equipment	Note
Panel board unit	DSQC643 See Control Module parts on page 183
Standard toolkit	The contents are defined in section Standard toolkit!
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	These procedures include references to the tools required.
Circuit Diagram	See Circuit Diagram on page 195

Removal

The procedure below details how to remove the panel board unit.



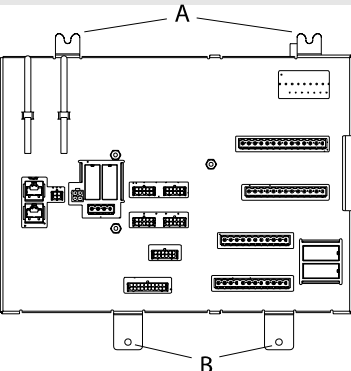
	Action	Note/Illustration
1.	 <p>DANGER!</p> <p>Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26.</p>	

Continues on next page

4 Repair activities, controller IRC5


4.2. Replacement of panel board

Continued

	Action	Note/Illustration
2.	 WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27	
3.	Disconnect all connectors.	 NOTE! Make a note of any connections.
4.	Remove the lower attachment screws, and remove the Panel Unit.	 xx0600003227 <ul style="list-style-type: none">• A: fixed attachments• B: hole for attachment screw

Refitting


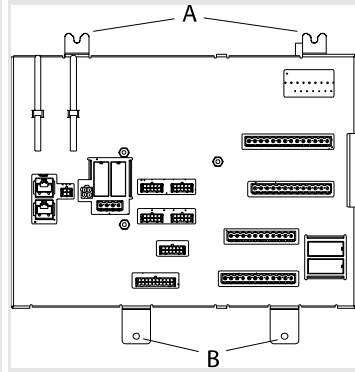
The procedure below details how to refit the panel board unit.

	Action	Note/Illustration
1.	 DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26 .	

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Continues on next page

Continued

	Action	Note/Illustration
2.	 <p>esd</p> <p>WARNING!</p> <p>The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27</p>	
3.	Refit the panel board unit.	
4.	Refit the lower attachment screws.	 <p>xx0600003227</p> <ul style="list-style-type: none"> • A: fixed attachments • B: hole for attachment screw
5.	Reconnect all connectors.	

4 Repair activities, controller IRC5

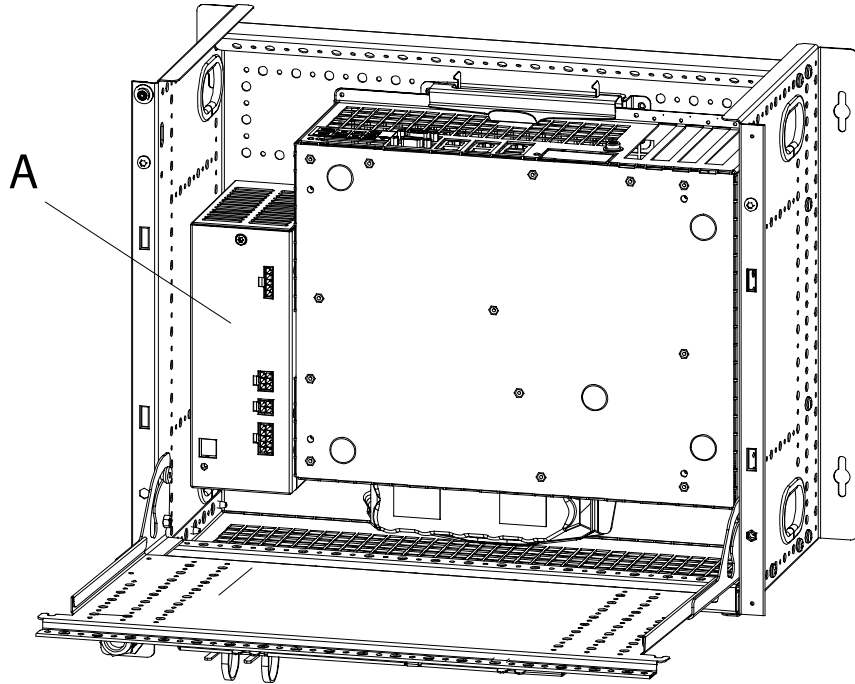
4.3.1. Replacement of control power supply

4.3 Replacement of power supply

4.3.1. Replacement of control power supply

Location

The control power supply is located as shown the illustration below.



xx0600003228

A	Control power supply
---	----------------------


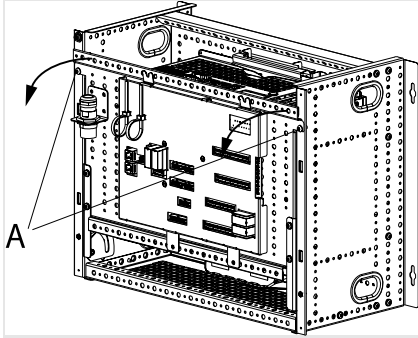
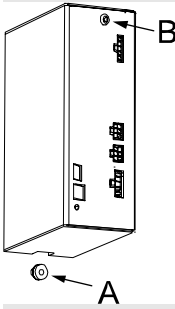
Required equipment

Equipment	Spare part no.	Art. no.	Note
Control Power Supply	3HAC12928-1		DSQC 604
Standard toolkit			The contents are defined in section Standard toolkit!
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.			These procedures include references to the tools required.
Circuit Diagram		3HAC026871-005	Complete control system

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Removal

The procedures below details how to remove the control power supply.

	Action	Note/Illustration
1.	 <p>DANGER! Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off! on page 26.</i></p>	
2.	Loosen the attachment screws and pull the front with the Panel Board Unit in the arrow direction.	 <p>xx0600003233</p> <ul style="list-style-type: none"> A: attachment screws
3.	Disconnect the connectors X1 - X4 on the control power supply.	
4.	Loosen the attachment screw and push the power supply up to release it from the cap nut.	 <p>xx0600003229</p> <ul style="list-style-type: none"> A: cap nut B: attachment screw
5.	Remove the power supply unit.	


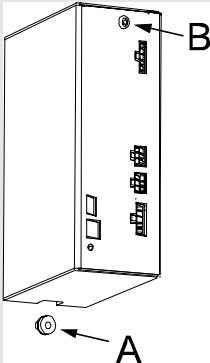
4 Repair activities, controller IRC5

4.3.1. Replacement of control power supply

Continued

Refitting

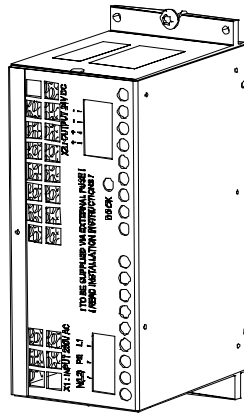
The procedures below details how to refit the control power supply.

	Action	Note/Illustration
1.	 DANGER! Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off!</i> on page 26.	
2.	Refit the control power supply by pull it down to fit the cap nut.	 xx0600003229 <ul style="list-style-type: none">• A: cap nut• B: attachment screw
3.	Lock the unit in place by tighten the attachment screw.	
4.	Reconnect the connectors X1 - X4.	
5.	Refit the front with the Panel Board Unit.	

4.3.2. Replacement of customer I/O power supply, IRC5

Location

The customer I/O power supply is shown in the illustration below.




xx0600003258

Required equipment

Equipment	Spare part no.	Art. no.	Note
Customer I/O Power Supply	3HAC12934-1		DSQC 608
Standard toolkit			The contents are defined in section Standard toolkit!
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.			These procedures include references to the tools required.
Circuit Diagram		3HAC026871-005	Complete control system

Removal

The procedure below details how to remove the customer I/O power supply.


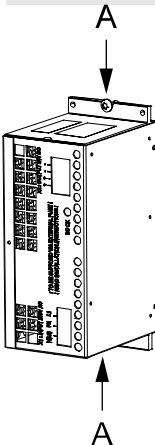
	Action	Note/Illustration
1.	 <p>DANGER! Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off! on page 26.</i></p>	

Continues on next page

4 Repair activities, controller IRC5


4.3.2. Replacement of customer I/O power supply, IRC5

Continued

	Action	Note/Illustration
2.	Disconnect all connectors.	 NOTE! Make a note of any connections.
3.	Remove the upper and lower attachment screws.	 xx0400000908 • A: attachment screw (2 pcs)
4.	Remove the power supply unit.	

Refitting

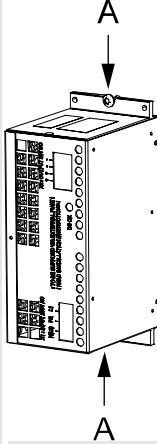
The procedure below details how to refit the customer I/O power supply.

	Action	Note/Illustration
1.	 DANGER! Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off!</i> on page 26.	
2.	Refit the new power supply unit.	

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Continues on next page

Continued

	Action	Note/Illustration
3.	Refit the attachment screws.	 <p>xx0400000908</p> <ul style="list-style-type: none"> A: attachment screw (2pcs)
4.	Reconnect all connectors.	

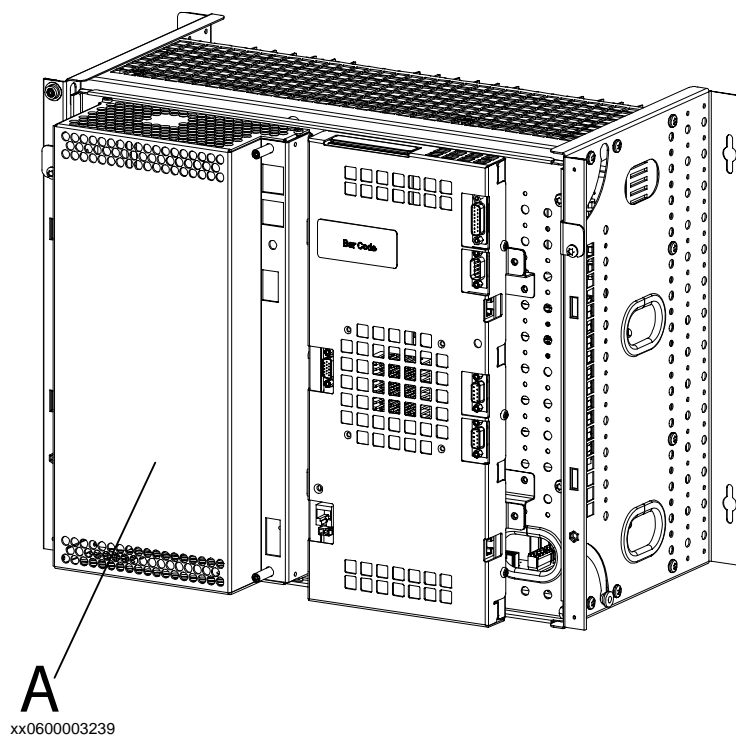
4 Repair activities, controller IRC5

4.3.3. Replacement of drive system power supply

4.3.3. Replacement of drive system power supply

Location

The illustration below shows the location of the drive system power supply in the IRC5 controller.



A	Drive system power supply
---	---------------------------

Required equipment


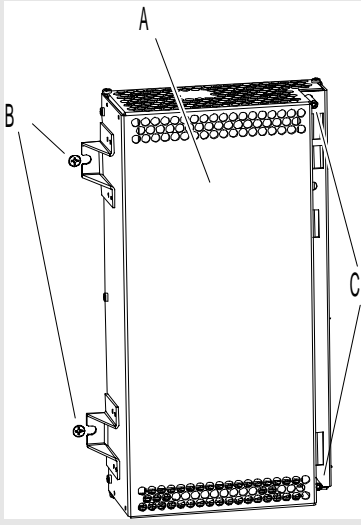
Equipment	Spare part no.	Art. no.	Note
Drive system power supply	3HAC026289-001		DSQC 626A
Drive system power supply	3HAC020466-001		DSQC 627
Standard toolkit			The contents are defined in section Standard toolkit!
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.			These procedures include references to the tools required.
Circuit Diagram		3HAC026871-005	Complete control system

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Continues on next page


Removal

The procedure below details how to remove the drive system power supply.

Action	Note/Illustration
1.  DANGER! Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off! on page 26.</i>	
2. Disconnect all connectors from the unit.	 <p>xx0500001842</p> <ul style="list-style-type: none"> • A: drive system power supply • B: cup nut (2 pcs) • C: attachment screw (2 pcs)
3. Loosen the attachment screws.	
4. Pull the power supply unit to the right to release it from the <i>cap nuts</i> , and remove it.	

Refitting

The procedure below details how to refit the drive system power supply.

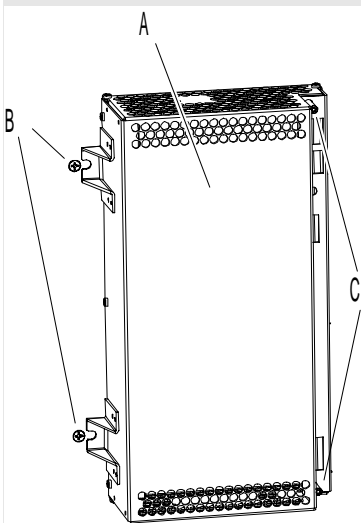
Action	Note/Illustration
1.  Danger DANGER! Before any repair work, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off!.</i>	

Continues on next page

4 Repair activities, controller IRC5

4.3.3. Replacement of drive system power supply

Continued

Action	Note/Illustration
2. Refit the power supply by sliding the recess in beneath the cap nuts, and push it to the left.	 <p>xx0500001842</p> <ul style="list-style-type: none">• A: drive system power supply• B: cup nut (2 pcs)• C: attachment screw (2 pcs)
3. Tighten the <i>attachment screws</i> .	
4. Reconnect all connectors to the unit .	

4.4. Replacement of I/O units and Gateways

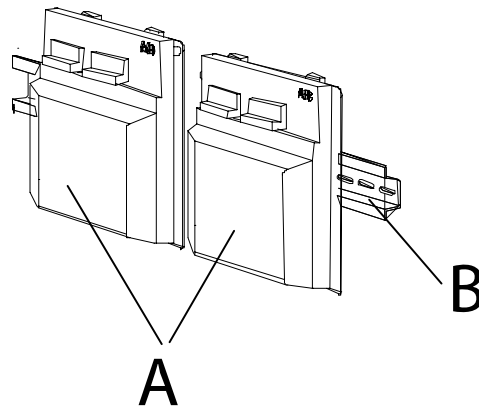
General

A number of I/O units and Gateways may be installed. These are specified in Definition of I/O units, IRC5

How to configure the I/O units is detailed in *Operating manual - RobotStudio*.

Location

The I/O units, Gateways or encoder interface units are shown in the illustration below.



xx0600003256


A	I/O units, Gateways or Encoder interface units
B	Mounting rail

Required equipment

Equipment	Note
A number of choices are available!	Specified in section Definition of I/O units, IRC5 on page 83 .
Standard toolkit	The contents are defined in section Standard toolkit!
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	These procedures include references to the tools required.
Circuit Diagram	See Circuit Diagram on page 195 .

Removal

The procedure below details how to remove the I/O units or Gateways.


	Action	Note/Illustration
1.	 <p>DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26.</p>	

Continues on next page

4 Repair activities, controller IRC5



4.4. Replacement of I/O units and Gateways

Continued

	Action	Note/Illustration
2.	 WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section <i>WARNING - The unit is sensitive to ESD! on page 27</i>	
3.	Identify the I/O unit or Gateway to be replaced.	
4.	Disconnect the connectors from the unit.	Note which connector goes where, to facilitate reassembly.
5.	Tip the unit away from the mounting rail and remove it.	

Refitting

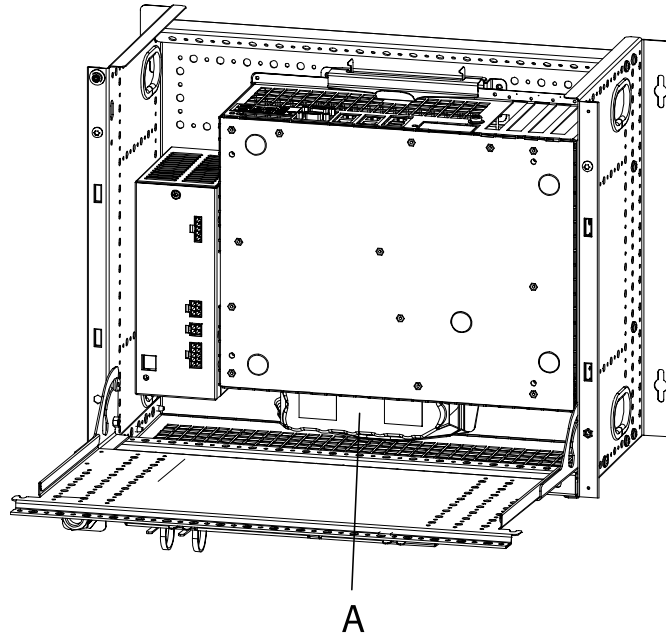
The procedure below details how to refit the I/O units or Gateways.

	Action	Note/Illustration
1.	 DANGER! Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off! on page 26.</i>	
2.	 WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section <i>WARNING - The unit is sensitive to ESD! on page 27</i>	
3.	Hook the unit back onto the mounting rail and snap it gently in position.	
4.	Reconnect all connectors disconnected during removal.	

4.5. Replacement of backup energy bank

Location

The illustration below shows the location of the backup energy bank in the IRC5 controller.



xx0600003230


A Backup energy bank

Required equipment

Equipment	Note
Backup energy bank	DSQC 655 See Control Module parts on page 183 .
Standard toolkit	The contents are defined in section Standard toolkit!
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	These procedures include references to the tools required.
Circuit Diagram	See Circuit Diagram on page 195 .

Removal

The procedure below details how to remove the backup energy bank.

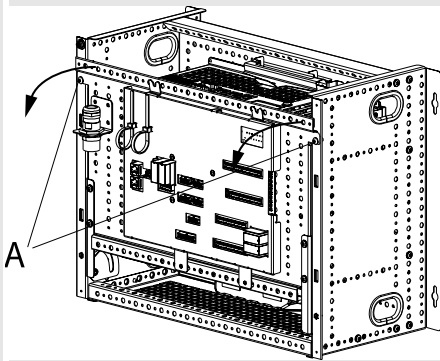
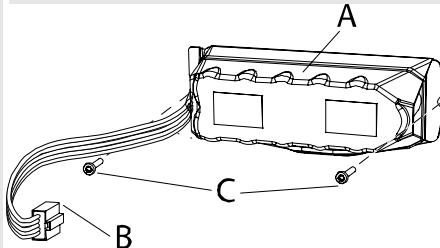
Action	Note/Illustration
<p>1. </p> <p>DANGER!</p> <p>Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26.</p>	

Continues on next page

4 Repair activities, controller IRC5


4.5. Replacement of backup energy bank

Continued

	Action	Note/Illustration
2.	Remove the attachment screws and pull the front with the Panel Board Unit in the arrow direction.	 <p>xx0600003233</p> <ul style="list-style-type: none"> A: attachment screws
3.	Disconnect the connector X4 from the control power supply.	
4.	Remove the <i>attachment screw</i> .	 <p>xx0600003231</p> <ul style="list-style-type: none"> A: Backup energy bank B: connector C: attachment screws
5.	Pull the <i>backup energy bank</i> out.	

Refitting

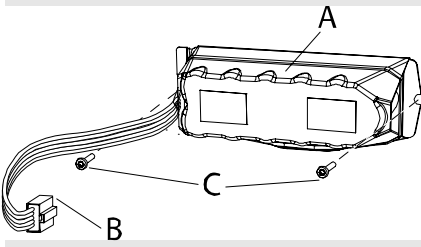
The procedure below details how to refit the backup energy bank.

	Action	Note/Illustration
1.	 <p>DANGER! Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off! on page 26.</i></p>	
2.	Refit the new backup energy bank.	

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Continued

	Action	Note/Illustration
3.	Refit the <i>attachment screw</i> , and tighten it.	 <p>xx0600003231</p> <ul style="list-style-type: none"> • A: Backup energy bank • B: connector • C: attachment screws
4.	Reconnect the connector to the <i>control power supply</i> connector X4.	
5.	Refit the front with the Panel Board Unit.	

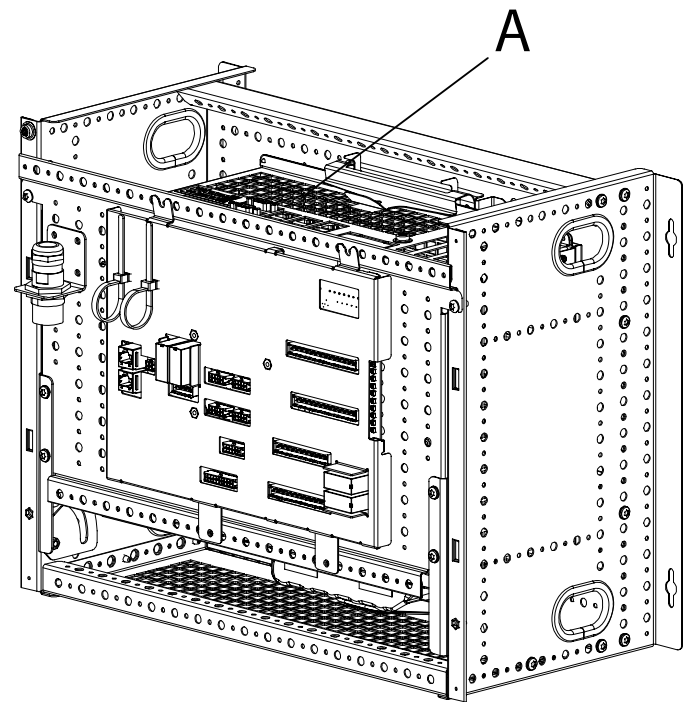
4 Repair activities, controller IRC5

4.6. Replacement of computer unit DSQC639

4.6. Replacement of computer unit DSQC639

Location

The computer unit is located as shown below.



xx0600003232

A	Computer unit
---	---------------

Required equipment

Equipment	Note
Computer unit	DSQC 639 See Computer unit DSQC 639 parts on page 185 .
Standard toolkit	The contents are defined in section Standard toolkit.
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	These procedures include references to the tools required.
Circuit diagram	See Circuit Diagram on page 195

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Continues on next page



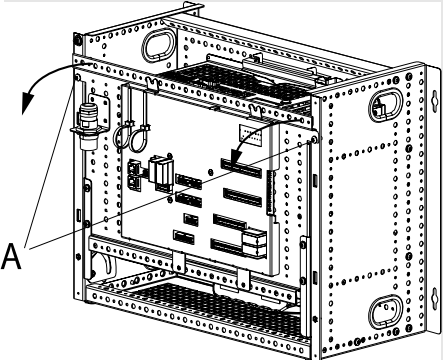
Removal

The procedure below details how to remove the computer unit.



NOTE!

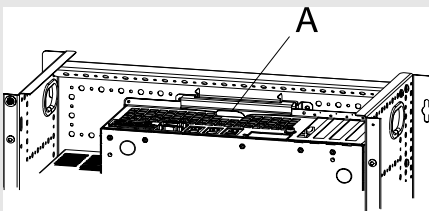
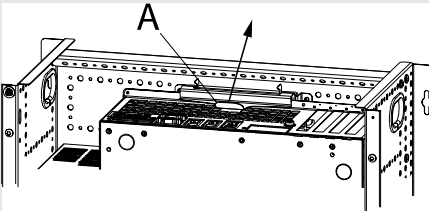
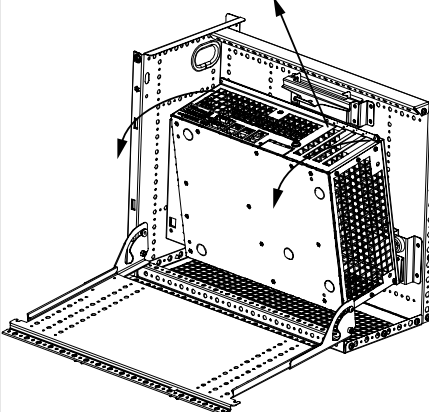
The computer unit can have different design. The procedure how to remove the computer unit is the same.

	Action	Note/Illustration
1.	 <p>DANGER!</p> <p>Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off! on page 26.</i></p>	
2.	 <p>esd</p> <p>WARNING!</p> <p>The unit is sensitive to ESD, before handling the unit please observe the safety information in section <i>WARNING - The unit is sensitive to ESD! on page 27</i></p>	
3.	Disconnect all connectors from the computer unit.	NOTE! Make a note of any connections.
4.	Loosen the attachment screws and pull the front with the Panel Board Unit in the arrow direction.	 <p>xx0600003233</p> <ul style="list-style-type: none"> A: attachment screws

4 Repair activities, controller IRC5

4.6. Replacement of computer unit DSQC639

Continued

	Action	Note/Illustration
5.	Remove the transportation screw.	 <p>xx0600003234</p> <ul style="list-style-type: none">• A: transportation screw
6.	Push the spring lock in the arrow direction	 <p>xx0600003235</p> <ul style="list-style-type: none">• A: Spring lock
7.	Let the front end of the computer unit down and lift the unit out.	 <p>xx0600003236</p>

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Continues on next page



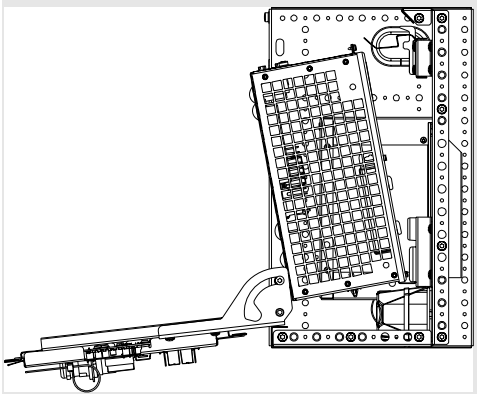
Refitting

The procedure below details how to refit the computer unit.



NOTE!

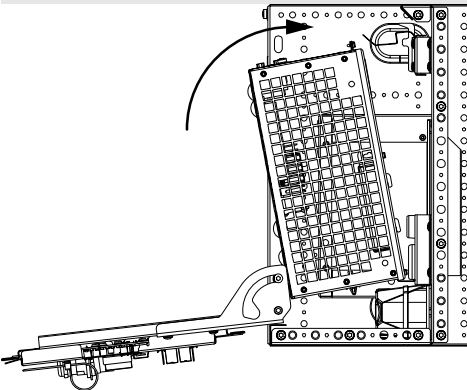
The computer unit can have different design. The procedure how to refit the computer unit is the same.

	Action	Note/Illustration
1.	 <p>DANGER!</p> <p>Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off!</i> on page 26.</p>	
2.	 <p>esd</p> <p>WARNING!</p> <p>The unit is sensitive to ESD, before handling the unit please observe the safety information in section <i>WARNING - The unit is sensitive to ESD!</i> on page 27</p>	
3.	Fit the computer unit in position	 <p>xx0600003237</p>

4 Repair activities, controller IRC5

4.6. Replacement of computer unit DSQC639

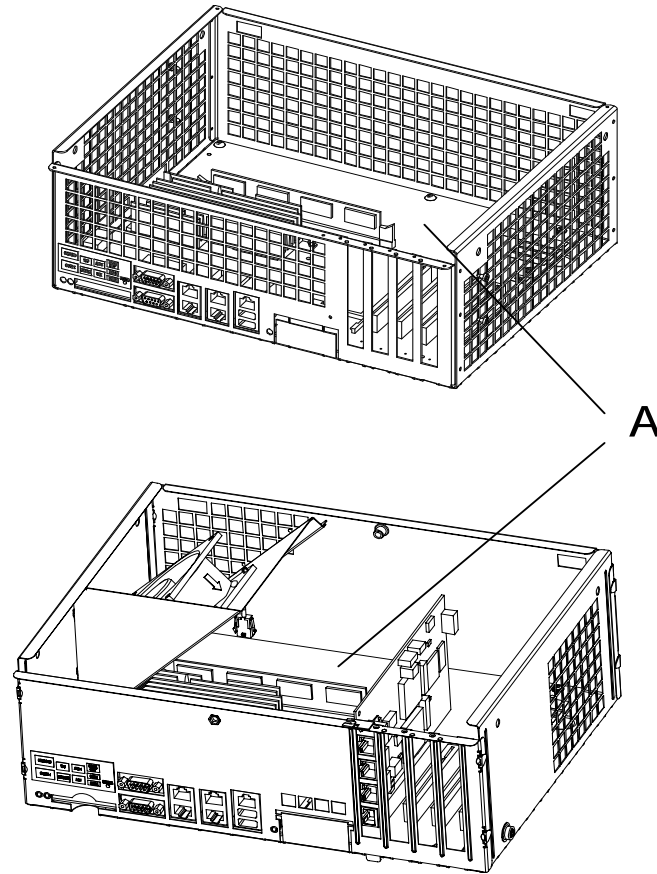
Continued

	Action	Note/Illustration
4.	Push the computer unit up until the spring lock snaps into position.	 xx0600003238
5.	Refit the transportation screw.	
6.	Reconnect all connectors to the computer unit.	
7.	Refit the front with the Panel Board Unit.	

4.7. Replacement of motherboard in computer unit DSQC639

Location

The motherboard is located as shown in the figure below.



xx0600002912

A	Motherboard
---	-------------

Required equipment

Equipment	Note
Computer unit	DSQC 639 See Computer unit DSQC 639 parts on page 185 .
Standard toolkit	The contents are defined in section Standard toolkit.
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	These procedures include references to the tools required.
Circuit diagram	See Circuit Diagram on page 195

Continues on next page




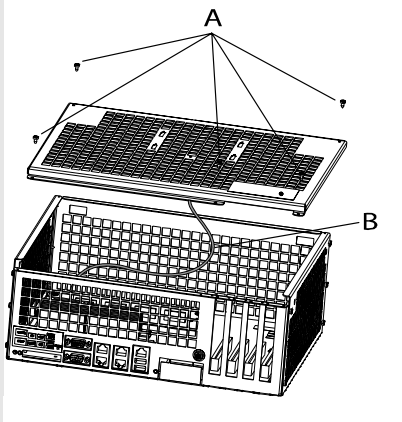
4 Repair activities, controller IRC5

4.7. Replacement of motherboard in computer unit DSQC639

Continued

Removal (old design of computer unit DSQC 639)

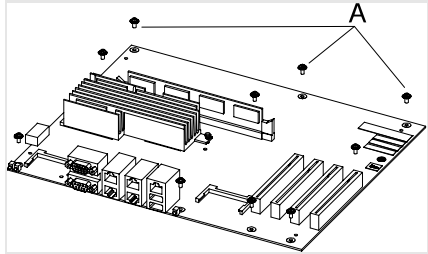
The procedure below details how to remove the motherboard in the computer unit.

	Action	Note/Illustration
1.	 DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26.	
2.	 esd WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27	
3.	Remove the computer unit.	Detailed in section Replacement of computer unit DSQC639 on page 122
4.	Remove the five attachment screws, and remove the cover plate.  WARNING! Be careful with the fan cable when opening and removing the cover plate. The fan cable must not be stretched.	 xx0600002913 <ul style="list-style-type: none">• A: attachment screw (5 pcs)• B: fan cable
5.	Disconnect the fan cable from the motherboard.	
6.	Remove the Compact flash disk.	Detailed in section Replacement of Compact Flash memory in computer unit DSQC639 on page 153.
7.	Remove the PCI boards.	Detailed in section Replacement of PCI boards in the computer unit DSQC639 on page 137.

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Continues on next page

Continued

Action	Note/Illustration
8. Remove the ten motherboard attachment screws	 <p>xx0600002914</p> <ul style="list-style-type: none"> A: attachment screw (10 pcs) <p>Always grip the board around the edges to avoid damage to the board or its components!</p>
9. Gently lift the motherboard out.	Immediately put the board in an ESD safe bag or similar.

Removal (new design of computer unit DSQC 639)

The procedure below details how to remove the motherboard in the computer unit.

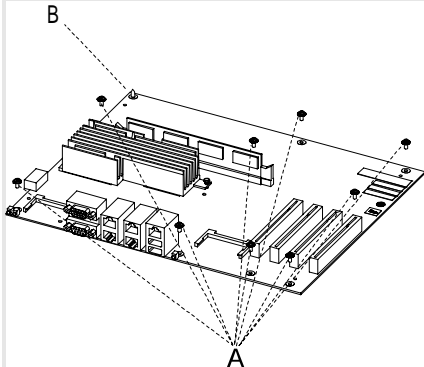
Action	Note/Illustration
1.  DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26.	
2.  esd WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27	
3. Remove the computer unit.	Detailed in section Replacement of computer unit DSQC639 on page 122
4. Remove the cover plate.	
5. Disconnect the fan cable from the motherboard.	
6. Remove the fan.	Detailed in section Replacement of fan in computer unit DSQC639 on page 147
7. Remove the Compact flash disk.	Detailed in section Replacement of Compact Flash memory in computer unit DSQC639 on page 153.

Continues on next page

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4.7. Replacement of motherboard in computer unit DSQC639

Continued

	Action	Note/Illustration
8.	Remove the PCI boards.	Detailed in section Replacement of PCI boards in the computer unit DSQC639 on page 137 .
9.	Remove the nine motherboard attachment screws Loosen the motherboard from the snap-lock	 <p>xx0800000205</p> <ul style="list-style-type: none">• A: attachment screw (9 pcs)• B: snap-lock <p>Always grip the board around the edges to avoid damage to the board or its components!</p>
10.	Gently lift the motherboard out.	Immediately put the board in an ESD safe bag or similar.

Refitting

The procedure below details how to refit the motherboard in the computer unit.

	Action	Note/Illustration
1.	 DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26 .	
2.	 esd WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27	
3.	Gently lift the motherboard out of the ESD safe bag and fit it into position in the computer unit.	Always grip the board around the edges to avoid damage to the board or its components!

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Continues on next page

4.7. Replacement of motherboard in computer unit DSQC639

Continued

	Action	Note/Illustration
4.	Secure the motherboard with its attachment screws.	
5.	Refit the PCI boards.	Detailed in section Replacement of PCI boards in the computer unit DSQC639 on page 137 .
6.	Refit the flash disk.	Detailed in section Replacement of Compact Flash memory in computer unit DSQC639 on page 153 .
7.	Reconnect the fan connector on the motherboard and refit the coverplate.	
8.	Refit the computer unit.	Detailed in section Replacement of computer unit DSQC639 on page 122

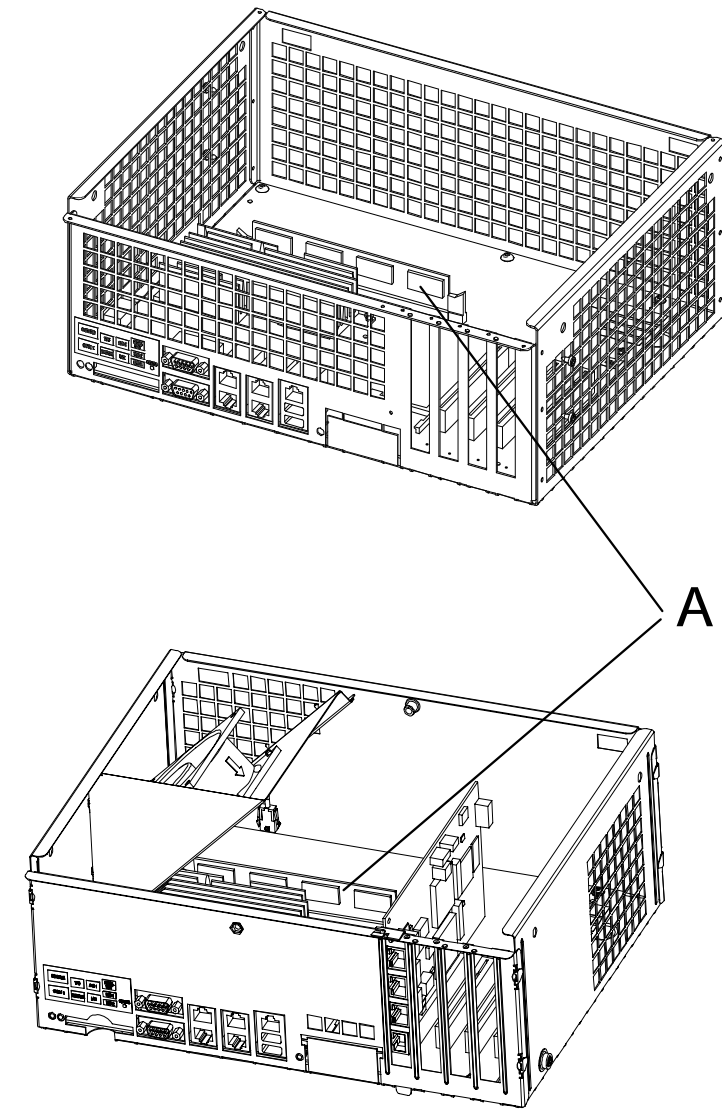
4 Repair activities, controller IRC5

4.8. Replacement of DDR SDRAM memory on motherboard in computer unit DSQC639

4.8. Replacement of DDR SDRAM memory on motherboard in computer unit DSQC639

Location

The DDR SDRAM memory is located as shown in figure below.



xx0600003031

A	DDR SDRAM memory
---	------------------

Required equipment

Equipment	Note
Computer unit DSQC639	DSQC 639 See Computer unit DSQC 639 parts on page 185 .
DDR SDRAM 256MB	See Computer unit DSQC 639 parts on page 185 .

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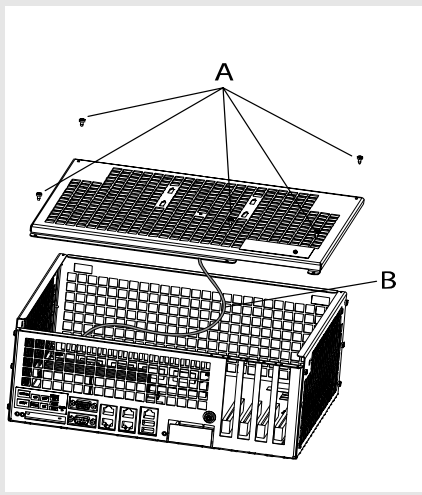
4.8. Replacement of DDR SDRAM memory on motherboard in computer unit DSQC639

Continued

Equipment	Note
Standard toolkit	The contents are defined in section Standard toolkit
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	These procedures include references to the tools required.
Circuit diagram	See Circuit Diagram on page 195

Removal (old design of the computer unit DSQC 639)

The procedure below details how to remove the DDR SDRAM memory on the motherboard in the computer unit.

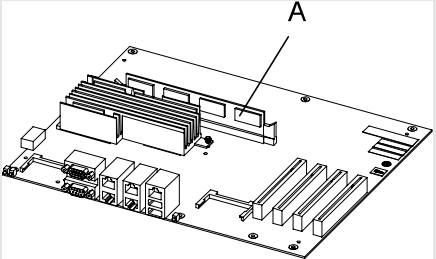
Action	Note/Illustration
<p>1. </p> <p>DANGER!</p> <p>Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26.</p>	
<p>2. </p> <p>esd</p> <p>WARNING!</p> <p>The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27</p>	
<p>3. Remove the computer unit</p>	Detailed in section Replacement of computer unit DSQC639 on page 122 .
<p>4. Remove the five attachment screws, and remove the cover plate.</p> <p></p> <p>WARNING!</p> <p>Be careful with the fan cable when opening and removing the cover plate. The fan cable must not be stretched.</p>	 <p>xx0600002913</p> <ul style="list-style-type: none"> A: attachment screws (5 pcs) B: fan cable

Continues on next page

4 Repair activities, controller IRC5



4.8. Replacement of DDR SDRAM memory on motherboard in computer unit DSQC639

Continued

	Action	Note/Illustration
5.	Disconnect the fan cable from the motherboard.	
6.	Gently lift the DDR SDRAM memory straight up.	 <p>xx0600003033</p> <ul style="list-style-type: none">• A: DDR SDRAM memory <p>NOTE! Always grip the memory around the edges to avoid damage to the memory or its components!</p> <p>NOTE! Immediately put the memory in an ESD safe bag or similar!</p>

Removal (new design of the computer unit DSQC 639)

The procedure below details how to remove the DDR SDRAM memory on the motherboard in the computer unit.

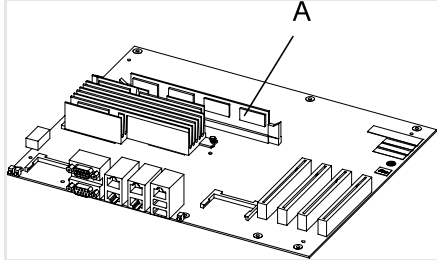
	Action	Note/Illustration
1.	 DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26 .	
2.	 esd WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27	
3.	Remove the computer unit	Detailed in section Replacement of computer unit DSQC639 on page 122 .
4.	Remove the cover plate.	

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Continues on next page



4.8. Replacement of DDR SDRAM memory on motherboard in computer unit DSQC639

Continued

Action	Note/Illustration
5. Gently lift the DDR SDRAM memory straight up.	 <p>xx0600003033</p> <ul style="list-style-type: none"> A: DDR SDRAM memory <p>NOTE! Always grip the memory around the edges to avoid damage to the memory or its components!</p> <p>NOTE! Immediately put the memory in an ESD safe bag or similar!</p>

Refitting

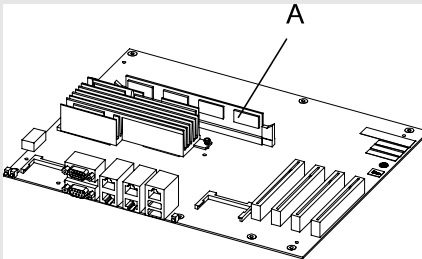
The procedure below details how to refit the DDR SDRAM memory on the motherboard in the computer unit DSQC639.

Action	Note/illustration
<p>1. </p> <p>DANGER!</p> <p>Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26.</p>	
<p>2. </p> <p>esd</p> <p>WARNING!</p> <p>The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27</p>	

4 Repair activities, controller IRC5

4.8. Replacement of DDR SDRAM memory on motherboard in computer unit DSQC639

Continued

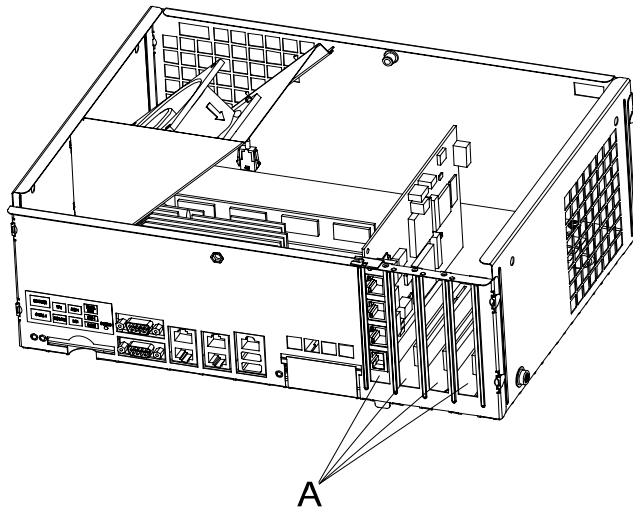
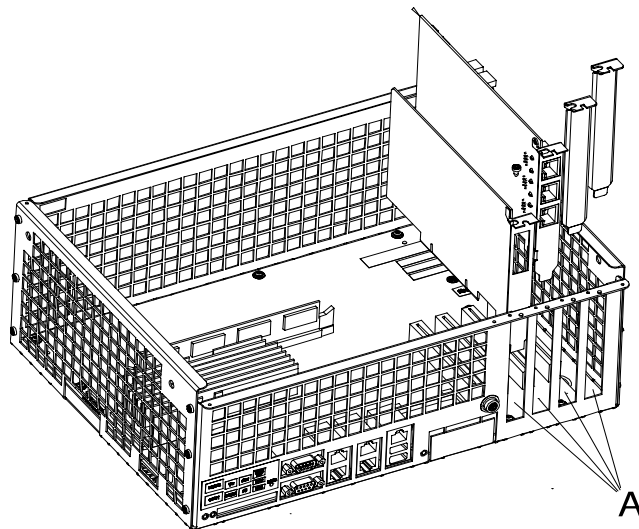
	Action	Note/illustration
3.	Gently lift the DDR SDRAM memory out of the ESD safe bag and fit it into position on the motherboard.	 <p>xx0600003033</p> <ul style="list-style-type: none">• A: DDR SDRAM memory <p>NOTE! Always grip the memory around the edges to avoid damage to the memory or its components!</p>
4.	Reconnect the fan connector on the motherboard and refit the coverplate.	
5.	Refit the computer unit.	Section Replacement of computer unit DSQC639 on page 122 .

4.9. Replacement of PCI boards in the computer unit DSQC639

Location

A number of boards may be fitted in the slots in the computer unit as shown in the figure below:

- Ethernet card
- Profibus-DP Master/Slave
- DeviceNet Master/Slave single
- DeviceNet Master/Slave dual
- PROFINET Master/Slave



xx0600002915

	Description
A	Slot for PCI cards

4 Repair activities, controller IRC5

4.9. Replacement of PCI boards in the computer unit DSQC639


Continued

Required equipment

Equipment	Art. no.	Note
Ethernet card	3HAC15639-1	DSQC 612 Only used in multirobot applications.
Profibus-DP Master/Slave	3HAC023047-001	DSQC 637 Profibus communication is described in " <i>Application manual - Profibus</i> "
DeviceNet Master/Slave single	3HAC025779-001	DSQC 658 Devicenet communication is described in " <i>Application manual - DeviceNet</i> "
DeviceNet Master/Slave dual	3HAC025780-001	DSQC 659 DeviceNet communication is described in " <i>Application manual - DeviceNet</i> "
PROFINET Master/Slave	3HAC030327-001	DSQC 678 PROFINET communication is described in " <i>Application manual - PROFINET master/slave</i> "
Standard toolkit		The contents are described in section Standard toolkit, IRC5 on page 179 .
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.		These procedures include references to tools required.
Application manual - Profibus	3HAC023008-001	Contains information on how to configure the system for Profibus cards.
Application manual - DeviceNet	3HAC020676-001	Contains information on how to configure the system for DeviceNet cards.
Application manual -PROFINET master/slave	3HAC031975-001	Contains information on how to configure the system for PROFINET master/slave card DSQC 678.
Circuit diagram		See Circuit Diagram on page 195 .

Removal


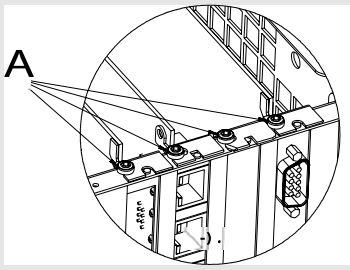
The procedure below details how to remove the PCI cards from the computer unit.

	Action	Note/Illustration
1.	 DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26 .	

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Continues on next page

Continued

	Action	Note/Illustration
2.	 <p>WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27</p>	
3.	Remove the computer unit.	Detailed in section Replacement of computer unit DSQC639 on page 122 .
4.	Open the computer unit.	Detailed in section Replacement of motherboard in computer unit DSQC639 on page 127 .
5.	Identify the card to be replaced.	The barcode sticker contains information on type designation.
6.	Disconnect any cables to/from the card	Make a note of which cables are disconnected.
7.	Remove the attachment screw on top of the card bracket.	 <p>xx0600002916</p> <ul style="list-style-type: none"> A: attachment screws <p>NOTE! Always grip the card around the edges to avoid damage to the card or its components!</p>
8.	Gently lift the card straight up.	NOTE! Immediately put the card in an ESD safe bag or similar!

Refitting

The procedure below details how to refit the PCI cards in the computer unit.


	Action	Note/Illustration
1.	 <p>DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26.</p>	

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4 Repair activities, controller IRC5

4.9. Replacement of PCI boards in the computer unit DSQC639

Continued

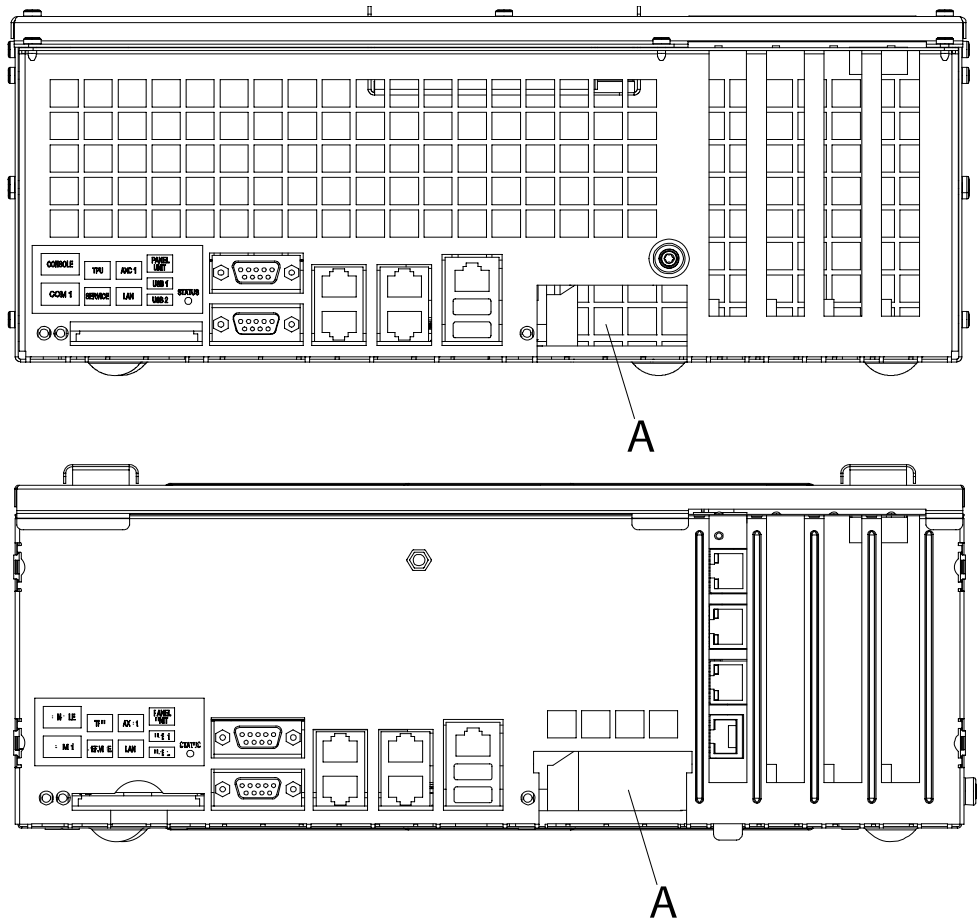
	Action	Note/Illustration
2.	 esd WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27	
3.	Fit the card in position by pushing the card into the socket on the motherboard. Secure it with its attachment screw on top of the card bracket.	NOTE! Always grip the card around the edges to avoid damage to the card or its components!
4.	Reconnect any additional cables to the card.	
5.	Close the computer unit.	Detailed in section Replacement of motherboard in computer unit DSQC639 on page 127 .
6.	Refit the computer unit.	Detailed in section Replacement of computer unit DSQC639 on page 122 .
7.	Make sure the robot system is configured to reflect the PCI cards installed.	Detailed in section Required equipment on page 138 .

4.10. Replacement of fieldbus adapter in the computer unit DSQC639

Location

The following fieldbus adapter may be fitted in the compact flash slot as shown in the figure below:

- EtherNet/IP Fieldbus Adapter
- PROFIBUS Fieldbus Adapter
- PROFINET Fieldbus Adapter



xx0700000162

A	Compact flash slot for fieldbus adapters
---	--

Required equipment

Equipment	Art. no.	Note
EtherNet/IP Fieldbus Adapter	3HAC027652-001	DSQC 669, Ethernet/IP communication is described in "Application manual - EtherNet/IP Fieldbus adapter"

4 Repair activities, controller IRC5



4.10. Replacement of fieldbus adapter in the computer unit DSQC639

Continued

Equipment	Art. no.	Note
PROFIBUS Fieldbus Adapter	3HAC026840-001	DSQC 667, PROFIBUS communication is described in "Application manual - PROFIBUS Fieldbus Adapter"
PROFINET Fieldbus Adapter	3HAC031670-001	DSQC 688, PROFINET communication is described in "Application manual - PROFINET Fieldbus Adapter"
Application manual - EtherNet/IP Fieldbus adapter	3HAC028509-001	Contains information on how to configure the system for Ethernet/IP Fieldbus Adapter DSQC 669.
Application manual - PROFIBUS Fieldbus Adapter	3HAC029338-001	Contains information on how to configure the system for PROFIBUS Fieldbus Adapter DSQC 667.
Application manual - PROFINET Fieldbus Adapter	3HAC031974-001	Contains information on how to configure the system for PROFINET Fieldbus Adapter DSQC 688.
Standard toolkit		The contents are described in section Standard toolkit, IRC5 on page 179 .
Circuit diagram		See Circuit Diagram on page 195

Removal

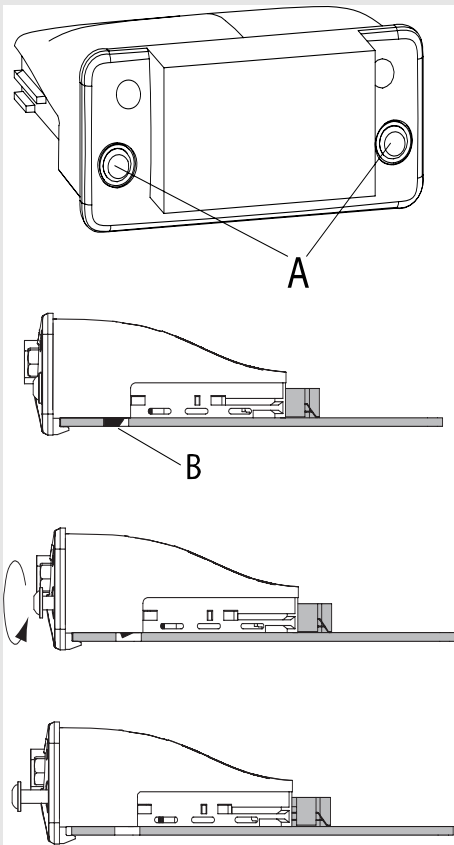
The following procedure details how to remove the fieldbus adapter from the computer unit.

	Action	Note/Illustration
1.	 DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26 .	
2.	 esd WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27	
3.	Remove the computer unit.	Detailed in section Replacement of computer unit DSQC639 on page 122
4.	Open the computer unit.	Detailed in section Replacement of motherboard in computer unit DSQC639 on page 127

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Continues on next page

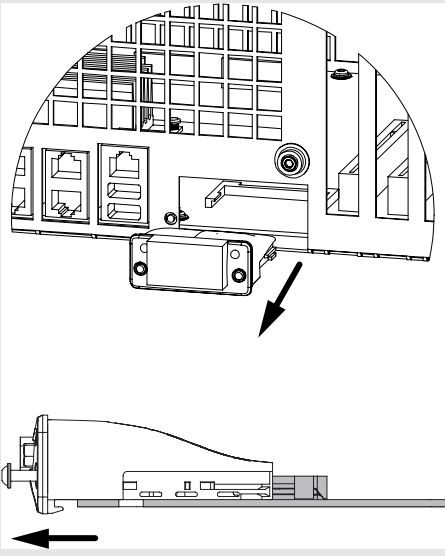
Continued

Action	Note/Illustration
5. Identify the fieldbus adapter.	The barcode sticker contains information on type designation.
6. Disconnect the cable to/from the fieldbus adapter.	
7. Loosen the attachment screws (2 pcs) on front of the fieldbus adapter to release the fastening mechanism. <div data-bbox="517 568 592 640" data-label="Image"> </div> NOTE! Only loosen the attachment screws. Do not remove them.	 <p>xx0700000193</p> <ul style="list-style-type: none"> • A: Attachment screws (2 pcs) • B: Fastening mechanism

4 Repair activities, controller IRC5



4.10. Replacement of fieldbus adapter in the computer unit DSQC639

Continued

Action	Note/Illustration
8. Grip the loosen attachment screws and gently pull the fieldbus adapter out in the arrow direction.	 xx0700000195


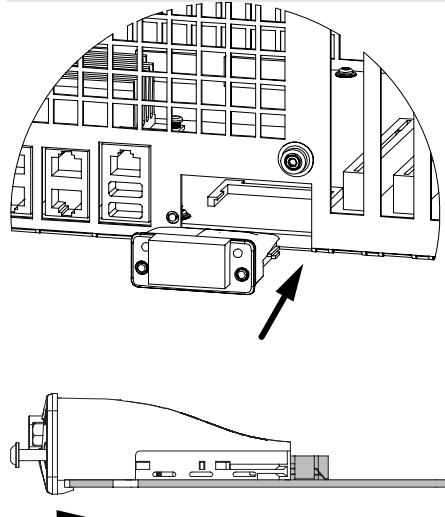
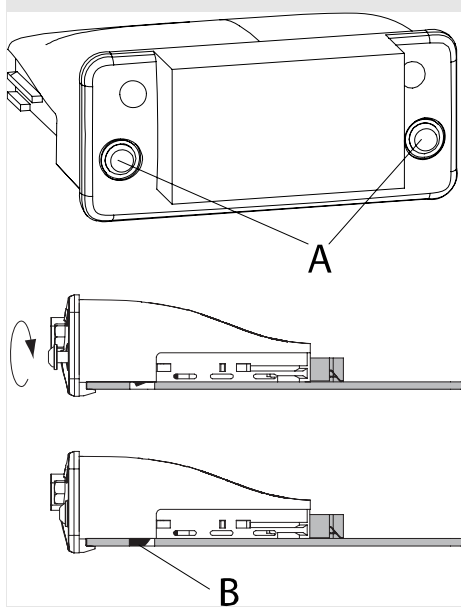
Refitting

The following procedure details how to refit the fieldbus adapter in the computer unit.

Action	Note/Illustrator
1.  DANGER! Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off!</i> on page 26.	
2.  esd WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section <i>WARNING - The unit is sensitive to ESD!</i> on page 27	

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Continues on next page

Action	Note/Illustrator
<p>3. Fit the fieldbus adapter in position by pushing the fieldbus adapter along the rails on the motherboard.</p> <p></p> <p>WARNING! Push carefully so no pins are damaged. Make sure that the adapter is pushed straight onto the rails.</p>	<p>NOTE! Always grip the fieldbus adapter around the edges to avoid damage to the adapter or its components.</p>  <p>xx0700000194</p>
<p>4. Secure it with its attachment screws (2 pcs) on front of the fieldbus adapter.</p>	 <p>xx0700000201</p> <ul style="list-style-type: none"> • A: Attachment screws • B: Fastening mechanism
<p>5. Reconnect the cable to the fieldbus adapter.</p>	
<p>6. Close the computer unit.</p>	<p>Detailed in section Replacement of motherboard in computer unit DSQC639 on page 127</p>
<p>7. Refit the computer unit.</p>	<p>Detailed in section Replacement of computer unit DSQC639 on page 122</p>

4 Repair activities, controller IRC5

4.10. Replacement of fieldbus adapter in the computer unit DSQC639

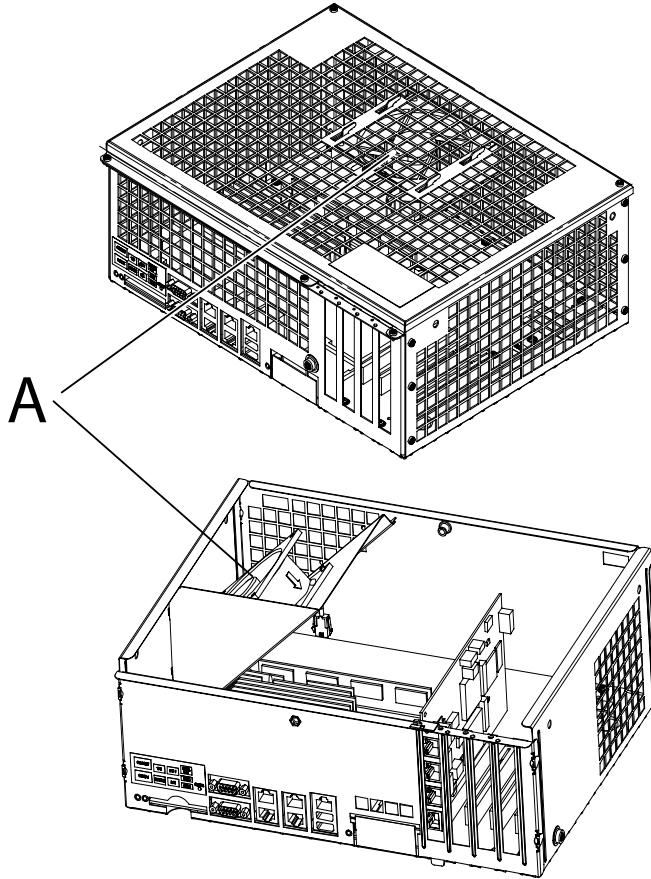
Continued

	Action	Note/Illustrator
8.	Make sure the robot system is configured to reflect the fieldbus adapter installed.	

4.11. Replacement of fan in computer unit DSQC639

Location

The computer fan is located as shown in the figure below.



xx0600002917

A

Fan

Required equipment

Equipment	Note
Fan	See Computer unit DSQC 639 parts on page 185 .
Standard toolkit	The contents are defined in section Standard toolkit.
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	These procedures include references to the tools required.
Circuit diagram	See Circuit Diagram on page 195 .

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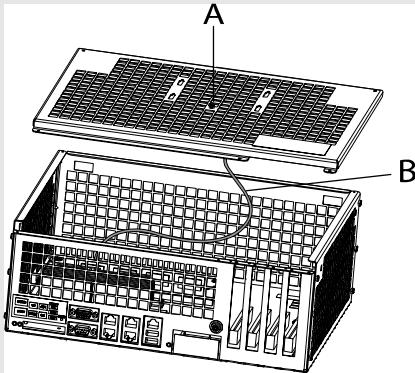
4 Repair activities, controller IRC5

4.11. Replacement of fan in computer unit DSQC639

Continued

Removal (old design) of the computer unit DSQC 639)

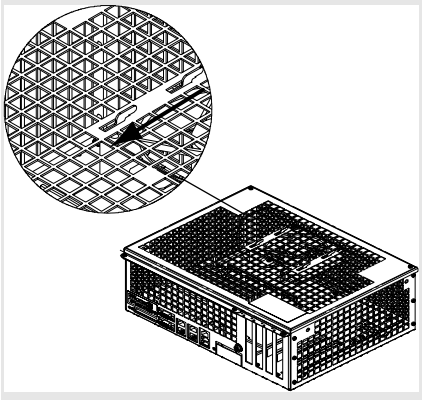
The procedure below details how to remove the fan in the computer unit.

	Action	Note/Illustration
1.	 DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26.	
2.	 esd WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27	
3.	Remove the computer unit.	Detailed in section Replacement of computer unit DSQC639 on page 122.
4.	Open the computer unit.  WARNING! Be careful with the fan cable when opening and removing the cover plate. The fan cable must not be stretched.	Detailed in section Replacement of motherboard in computer unit DSQC639 on page 127.
5.	Disconnect the fan cable from the motherboard.	
6.	Remove the attachment screw.	 xx0600002919 <ul style="list-style-type: none">• A: attachment screw (1 pcs)• B: fan cable

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Continued

Action	Note/Illustration
7. Remove the fan from the cover plate in arrow direction.	 <p>xx0600002920</p>

Removal (new design of the computer unit DSQC 639)

The procedure below details how to remove the fan in the computer unit.

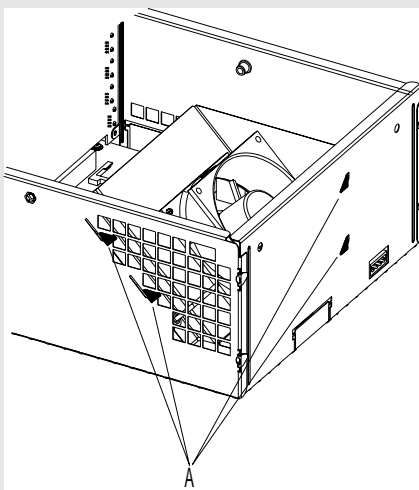
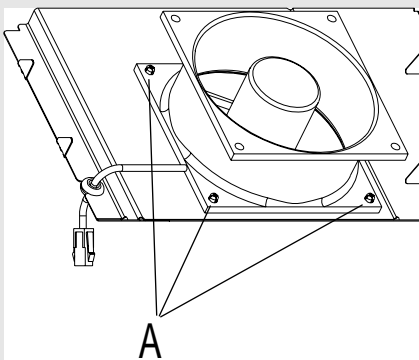
Action	Note/Illustration
1.  DANGER! Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off! on page 26.</i>	
2.  esd WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section <i>WARNING - The unit is sensitive to ESD! on page 27</i>	
3. Remove the computer unit.	Detailed in section <i>Replacement of computer unit DSQC639 on page 122.</i>
4. Open the computer unit.	Detailed in section <i>Replacement of motherboard in computer unit DSQC639 on page 127.</i>
5. Disconnect the fan cable from the motherboard.	

Continues on next page

4 Repair activities, controller IRC5


4.11. Replacement of fan in computer unit DSQC639

Continued

Action	Note/Illustration
6. Straighten the fan plate locking device to loosen the fan unit. Remove the fan unit.	 <p>xx0800000206</p> <ul style="list-style-type: none"> A: fan plate locking device
7. Press out the plastic rivets. Remove the fan from the fan plate.	 <p>xx0800000207</p> <ul style="list-style-type: none"> A: plastic rivet (4 pcs)

Refitting (old design of the computer unit DSQC 639)


The procedure below details how to refit the fan in the computer unit.

Action	Note/Illustration
1.  DANGER! Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off!</i> on page 26.	

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Continues on next page

Continued

	Action	Note/Illustration
2.	 <p>WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27</p>	
3.	Refit the fan on the cover plate.	
4.	Refit the attachments screw.	
5.	Reconnect the cable to the motherboard.	
6.	Close the computer unit.	Detailed in section Replacement of motherboard in computer unit DSQC639 on page 127 .
7.	Refit the computer unit.	Detailed in section Replacement of computer unit DSQC639 on page 122 .

Refitting (new design of the computer unit DSQC 639)

The procedure below details how to refit the fan in the computer unit.

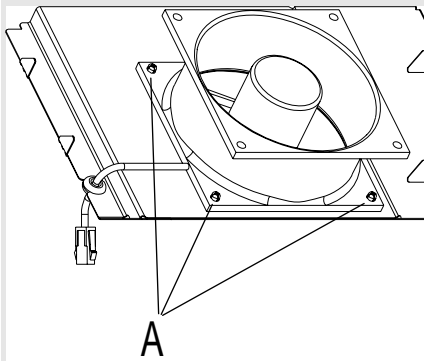
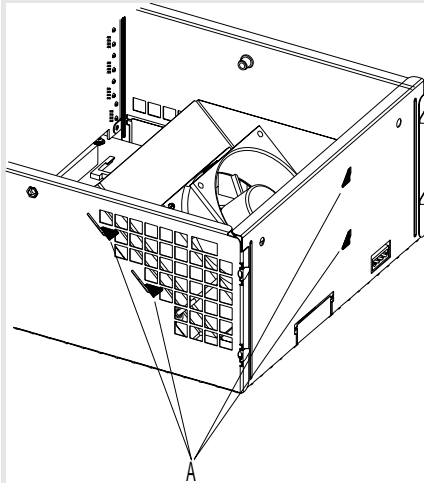
	Action	Note/Illustration
1.	 <p>DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26.</p>	
2.	 <p>WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27</p>	

Continues on next page

4 Repair activities, controller IRC5

4.11. Replacement of fan in computer unit DSQC639

Continued

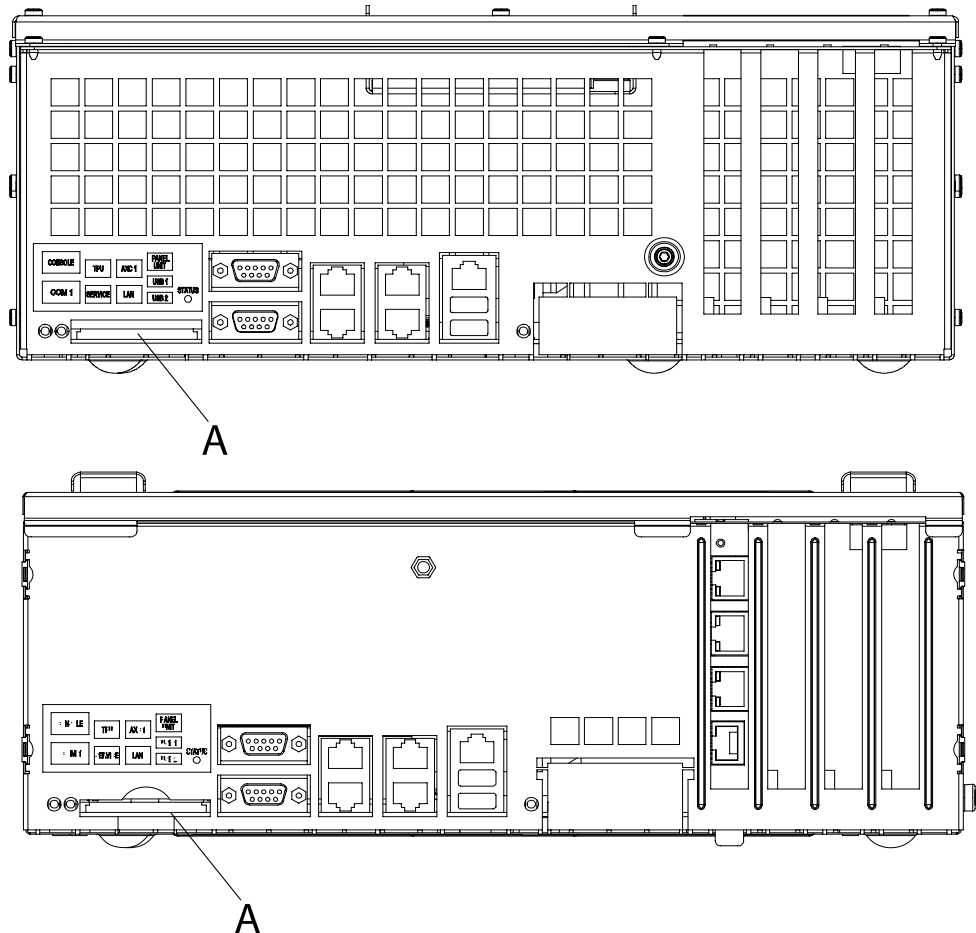
	Action	Note/Illustration
3.	Refit the fan on the fan plate. Press in the plastic rivets to fasten the fan on the fan plate.	 xx0800000207 <ul style="list-style-type: none">A: plastic rivet (4 pcs)
4.	Refit the fan unit in to the computer unit. Fold the fan plate locking device to fasten the fan unit to the computer unit.	 xx0800000206 <ul style="list-style-type: none">A: fan plate locking device
5.	Reconnect the cable to the motherboard.	
6.	Close the computer unit.	Detailed in section Replacement of motherboard in computer unit DSQC639 on page 127 .
7.	Refit the computer unit.	Detailed in section Replacement of computer unit DSQC639 on page 122 .

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4.12. Replacement of Compact Flash memory in computer unit DSQC639

Location

The Compact Flash memory is located in the computer unit as shown in the figure below.



xx0600002922

A	Slot for Compact Flash memory
---	-------------------------------

NOTE!

Only use Compact flash memory supplied by ABB.



Required equipment

Equipment	Note
Compact Flash 256MB	DSQC 656 256MB NOTE! Only use Compact flash memory supplied by ABB. Includes <i>ABB Vx-Works boot image</i> software to correctly reboot the robot controller. See Computer unit DSQC 639 parts on page 185 .

Continues on next page

4 Repair activities, controller IRC5



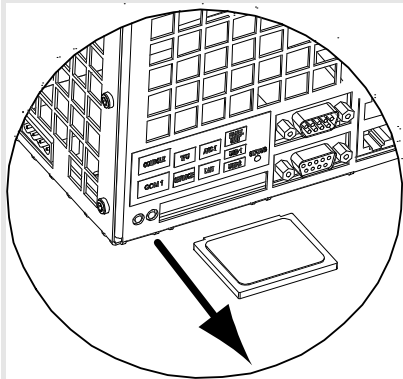
4.12. Replacement of Compact Flash memory in computer unit DSQC639

Continued

Equipment	Note
Compact Flash 2GB	DSQC 656 2GB NOTE! Only use Compact flash memory supplied by ABB. Includes <i>ABB Vx-Works boot image</i> software to correctly reboot the robot controller. See Computer unit DSQC 639 parts on page 185 .
Standard toolkit	
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	
Circuit diagram	See Circuit Diagram on page 195

Removal

The procedure below details how to remove the Compact Flash memory from the computer unit.



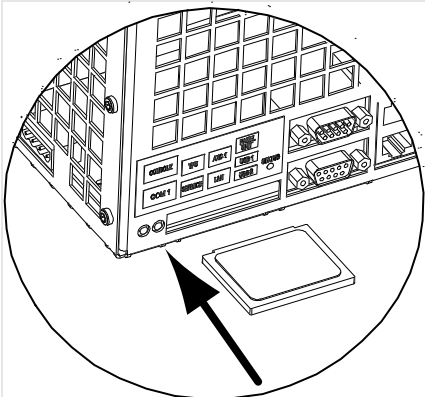
Action	Note/Illustration
<p>1. </p> <p>DANGER!</p> <p>Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26.</p>	
<p>2. </p> <p>esd</p> <p>WARNING!</p> <p>The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27</p>	
<p>3. Gently, pull the Compact Flash memory out in arrow direction.</p>	 <p>xx0600002923</p>

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Continues on next page

Refitting

The procedure below details how to refit the Compact Flash memory in the computer unit.

	Action	Note/Illustration
1.	 <p>DANGER!</p> <p>Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off! on page 26.</i></p>	
2.	 <p>esd</p> <p>WARNING!</p> <p>The unit is sensitive to ESD, before handling the unit please observe the safety information in section <i>WARNING - The unit is sensitive to ESD! on page 27</i></p>	
3.	Refit the Compact Flash memory.	 <p>xx0600002924</p>

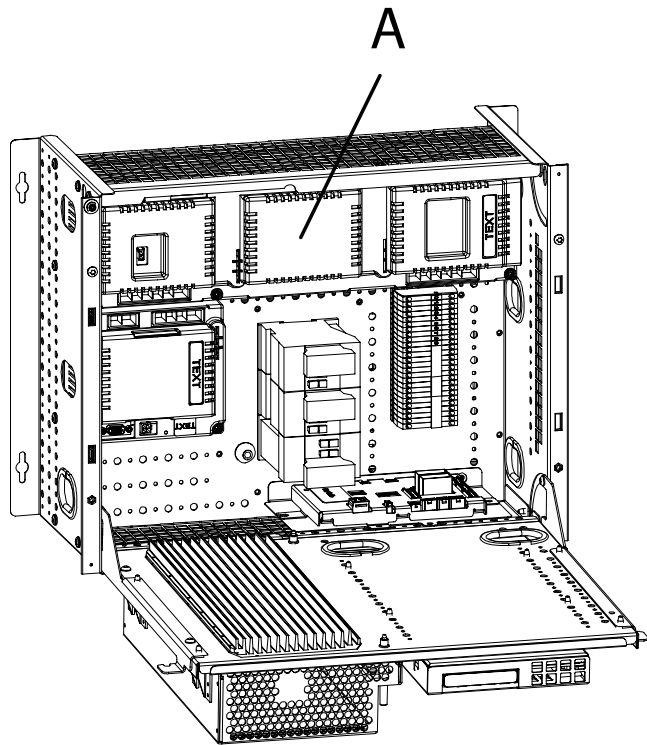
4 Repair activities, controller IRC5

4.13. Replacement of servo drive units and rectifier

4.13. Replacement of servo drive units and rectifier

Location

The illustration below shows the location of the servo drive units and rectifier in the IRC5 controller.



xx0600003244

A Drive system (Drive units and rectifier)

Configuration

The drive module exists in a number of versions, these are described in section [Configuration of the drive system, IRC5 on page 78](#)

Required equipment


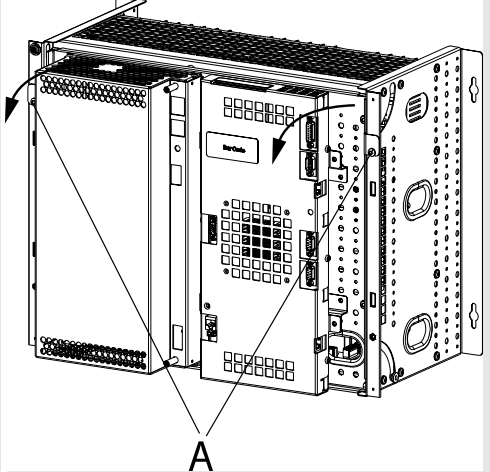
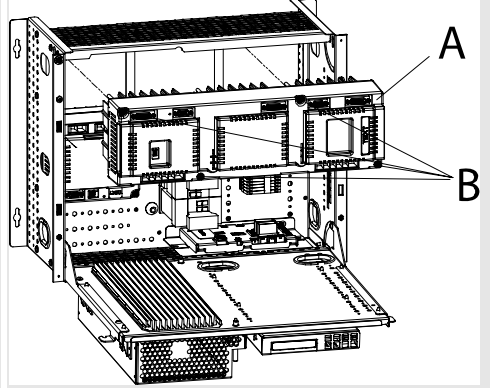
Equipment	Note
Drive units and rectifier	Specified in section Configuration of the drive system, IRC5 on page 78
Standard toolkit	The contents are defined in section Standard toolkit!
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	These procedures include references to the tools required.
Circuit Diagram	See Circuit Diagram on page 195 .

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Continues on next page

Removal

The procedure below details how to remove the servo drive units and rectifier.

Action	Note/Illustration
<p>1.  DANGER! Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off!</i> on page 26.</p>	
<p>2. Loosen the attachment screws and pull the front (axis computer/drive system power supply unit) in the arrow direction.</p>	 <p>xx0600003242</p> <ul style="list-style-type: none"> A: attachment screws
<p>3. Disconnect all connectors from the unit to be replaced.</p>	
<p>4. Remove the drive unit after unscrewing its attachment screws.</p>	 <p>xx0600003248</p> <p>Parts:</p> <ul style="list-style-type: none"> A: drive unit B: attachment screw


4 Repair activities, controller IRC5

4.13. Replacement of servo drive units and rectifier

Continued

Refitting

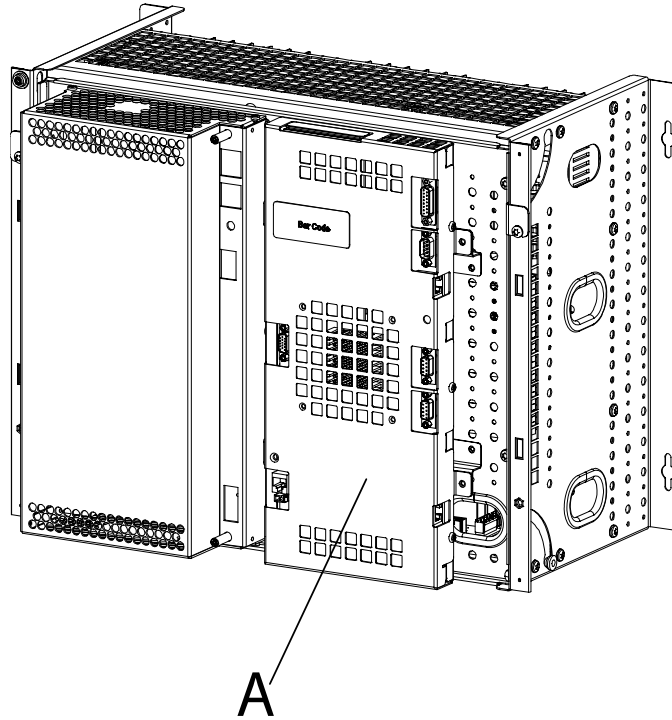
The procedure below details how to refit the servo drive units and rectifier.

	Action	Note/Illustration
1.	 DANGER! Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off!</i> on page 26.	
2.	Fit the unit in its intended position and orientation. Secure it with its <i>attachment screws</i> .	
3.	Reconnect any connectors disconnected at removal.	
4.	Refit the front (axis computer/drive system power supply unit)	

4.14. Replacement of Axis computer

Location

The illustration below shows the location of the axis computer in the IRC5 controller.





xx0600003240

A	Axis computer
---	---------------

Removal

The procedure below details how to remove the axis computer.

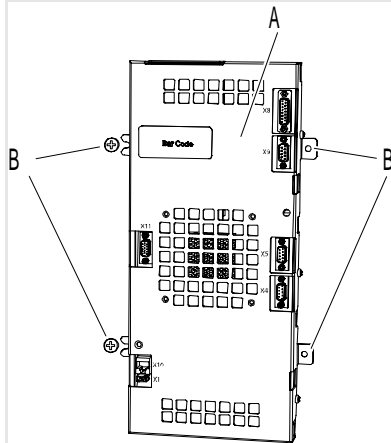
	Action	Note/Illustration
1.	 <p>DANGER!</p> <p>Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26.</p>	
2.	 <p>esd</p> <p>WARNING!</p> <p>The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27</p>	

Continues on next page

4 Repair activities, controller IRC5


4.14. Replacement of Axis computer

Continued

	Action	Note/Illustration
3.	Disconnect all connectors from the axis computer.	NOTE! Make a note of any connections,
4.	Remove the attachment screws.	 <p>xx0500002002</p> <ul style="list-style-type: none"> • A: axis computer • B: attachment screws
5.	Remove the axis computer.	

Refitting

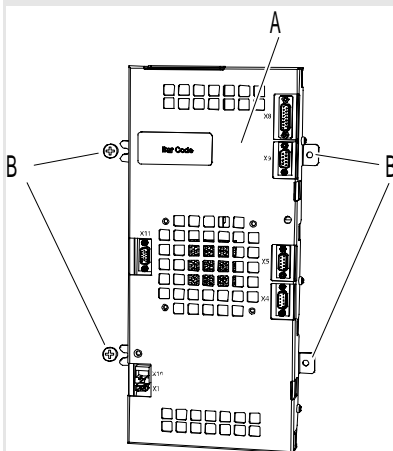
The procedure below details how to refit the axis computer.

	Action	Note/Illustration
1.	 <p>DANGER! Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off!</i> on page 26.</p>	

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Continues on next page

Continued

	Action	Note/Illustration
2.	Fit the new axis computer.	 <p>xx0500002002</p> <ul style="list-style-type: none"> • A: axis computer • B: attachment screws
3.	Refit the <i>attachment screws</i> .	
4.	Reconnect all the connectors.	

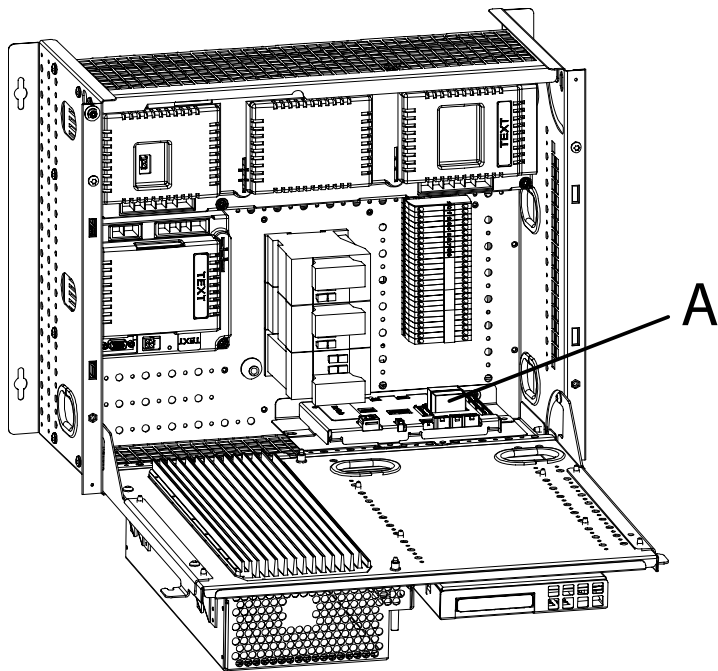
4 Repair activities, controller IRC5

4.15. Replacement of Contactor Interface Board

4.15. Replacement of Contactor Interface Board

Location

The illustration below shows the location of the contactor interface board in the IRC5 Panel Mounted Controller.



xx0600003241

A	Contactor interface board
---	---------------------------

Required equipment



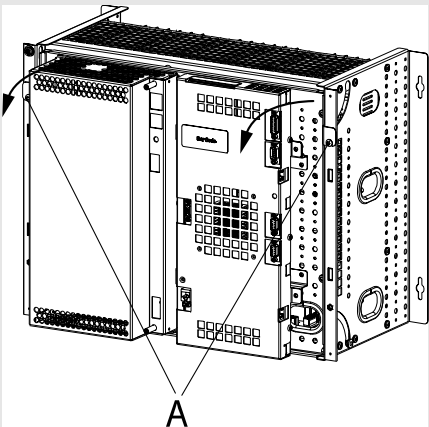
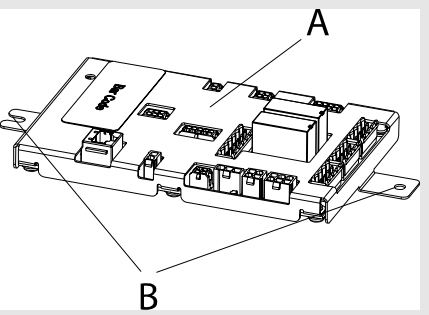
Equipment	Note
Contactor Interface board	DSQC 611 See Drive Module parts on page 184 .
Standard toolkit	The contents are defined in section Standard toolkit!
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	These procedures include references to the tools required.
Circuit Board	See Circuit Diagram on page 195 .

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Continues on next page

Removal

The procedure below details how to remove the contactor board.

Action	Note/Illustration
<p>1.</p>  <p>DANGER!</p> <p>Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off! on page 26.</i></p>	
<p>2.</p>  <p>esd</p> <p>WARNING!</p> <p>The unit is sensitive to ESD, before handling the unit please observe the safety information in section <i>WARNING - The unit is sensitive to ESD! on page 27</i></p>	
<p>3. Loosen the attachment screws and pull the front (axis computer/drive system power supply unit) in the arrow direction.</p>	 <p>xx0600003242</p> <ul style="list-style-type: none"> A: attachment screws
<p>4. Disconnect all connectors.</p>	<p>NOTE!</p> <p>Make a note of any connections.</p>
<p>5. Refit the attachment screws.</p>	 <p>xx0600003243</p> <ul style="list-style-type: none"> A: contactor interface board B: attachment screws

Continues on next page

4 Repair activities, controller IRC5



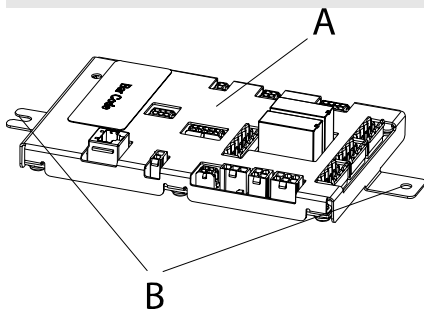
4.15. Replacement of Contactor Interface Board

Continued

	Action	Note/Illustration
6.	Remove the contactor interface board.	

Refitting

The procedure below details how to refit the contactor board.

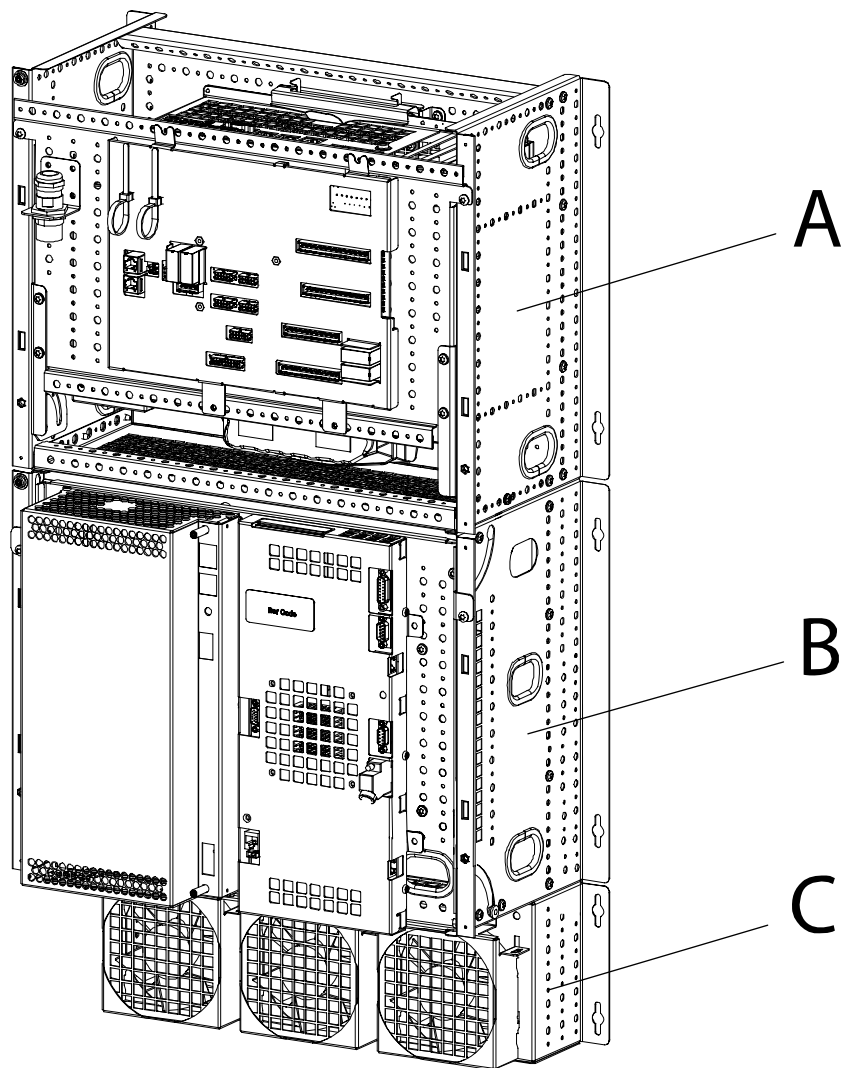
	Action	Note/Illustration
1.	 DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26 .	
2.	 esd WARNING! The unit is sensitive to ESD, before handling the unit please observe the safety information in section WARNING - The unit is sensitive to ESD! on page 27	
3.	Refit the contactor interface board.	
4.	Refit the attachment screws.	 xx0600003243 <ul style="list-style-type: none">• A: contactor interface board• B: attachment screws
5.	Reconnect all connectors.	
6.	Refit the front (with axis computer/drive system power supply unit).	

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4.16. Replacement of drive system fans

Location

The illustration below shows the location of the fan unit in the IRC5 Panel Mounted Controller.



xx0600003313

A	Control Module
B	Drive Module
C	Fan unit

Required equipment

Equipment	Note
Fan with receptacle	See Miscellaneous parts on page 186 .
Standard toolkit	The contents are defined in section Standard toolkit.

Continues on next page

4 Repair activities, controller IRC5

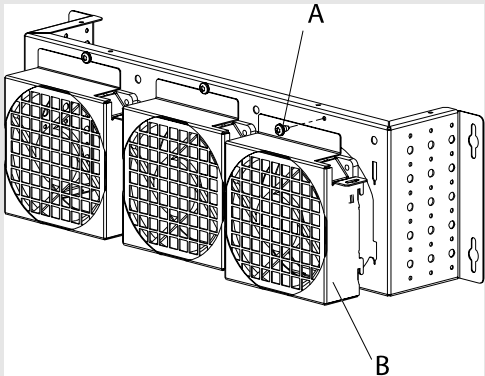
4.16. Replacement of drive system fans

Continued

Equipment	Note
Other tools and procedures may be required. see references to these procedures in the step-by-step instructions below.	These procedures include references to the tools required.
Circuit diagram	See Circuit Diagram on page 195 .

Removal

The following procedure details how to remove a fan.

Action	Note/Illustration
1. Disconnect the fan cable.	
2. Remove the attachment screw.	 <p>xx0600003328</p> <ul style="list-style-type: none">• A: attachment screw• B: fan with receptacle
3. Push the fan unit upwards and remove it.	
4. Remove attachment screws and remove the cover from the fan.	

Refitting

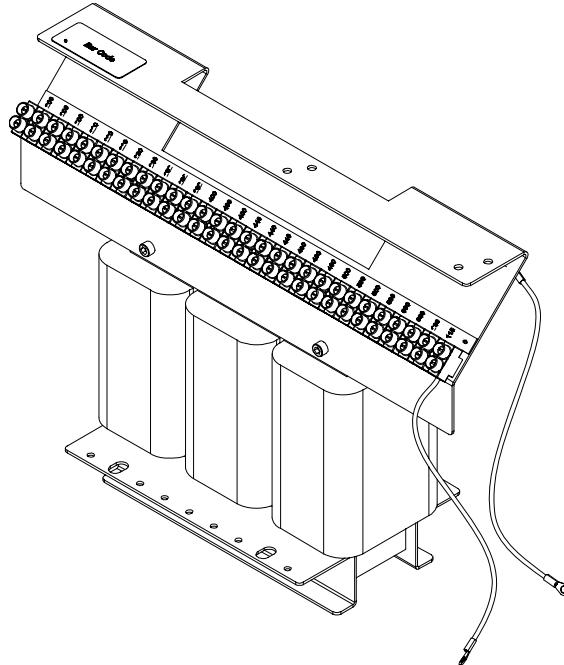
The following procedure details how to refit the drive system fan.

Action	Note/Illustration
1. Refit the fan to the cover.	
2. Refit the fan unit.	
3. Reconnect the fan cable.	

4.17. Replacement of transformer unit

Location

The illustration below shows the transformer unit.




xx0600003259

Required equipment

Equipment	Note
Transformer unit	13kVA, 6kVA, 1,8kVA See Miscellaneous parts on page 186 .
Standard toolkit	The contents are defined in section Standard toolkit
Circuit diagram	See Circuit Diagram on page 195 .

Removal

The following procedures details how to remove the transformer unit.



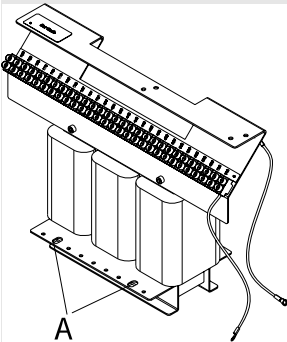
	Action	Note/illustration
1.	 <p>DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26.</p>	

Continues on next page

4 Repair activities, controller IRC5



4.17. Replacement of transformer unit

Continued

	Action	Note/illustration
2.	 <p>WARNING! The transformer weighs between 15 and 40 kg, use a hoist and lifting slings.</p>	
3.	Disconnect the two grounding wires (green, blue).	
4.	Disconnect the mains power supply wires,	 <p>NOTE! Make a note of the terminal to which each of the wires are connected. This will facilitate reconnection to the same terminal.</p>
5.	Remove the two transformer attachment screws.	 <p>xx0600003260</p> <ul style="list-style-type: none"> A: attachment screw (2pcs)
6.	Lift the transformer unit out with lifting slings and a hoist.	

Refitting

The following procedure details how to refit the transformer unit.

	Action	Note/illustration
1.	 <p>DANGER! Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off!</i> on page 26.</p>	
2.	 <p>WARNING! The transformer weighs between 15 and 40 kg, use a hoist and lifting slings.</p>	

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Continues on next page

Continued

	Action	Note/illustration
3.	Fit the new transformer in place with a hoist and lifting slings.	
4.	Refit the attachment screws.	
5.	Reconnect the mains power supply wires and grounding wires.	

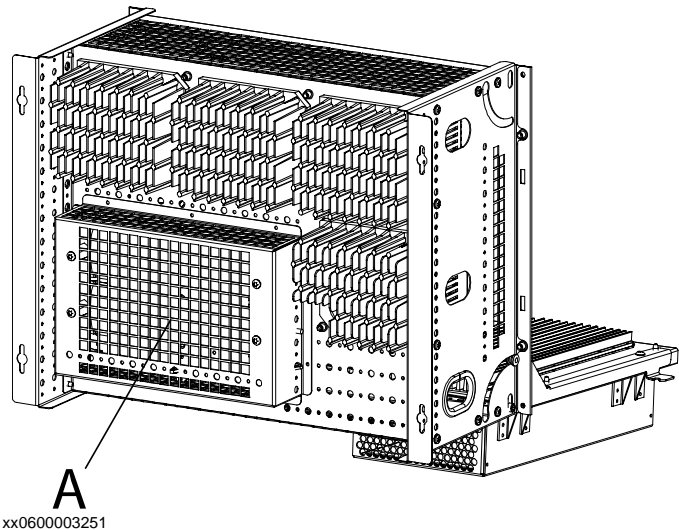
4 Repair activities, controller IRC5

4.18. Replacement of brake resistor bleeder

4.18. Replacement of brake resistor bleeder

Location

The illustration below shows the location of the brake resistor bleeder in the IRC5 Panel Mounted Controller. Note! The brake resistor bleeder is placed on the backside of the Drive Module.




A Brake resistor bleeder

Required equipment

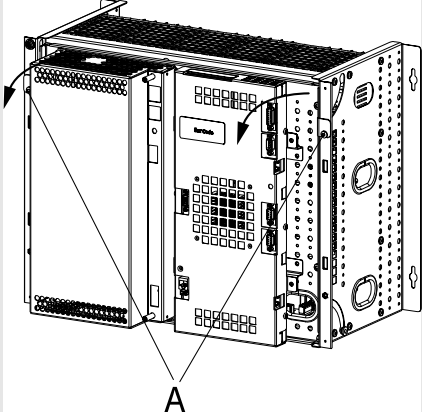
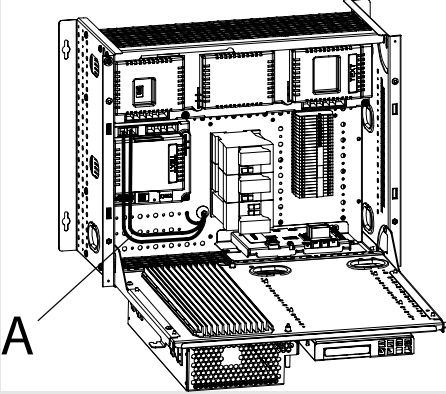
Equipment	Note
Brake resistor bleeder	See Drive Module parts on page 184 .
Standard toolkit	The contents are defined in section Standard toolkit
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	These procedures include references to the tools required.
Circuit diagram	See Circuit Diagram on page 195 .

Removal

The following procedure details how to remove the brake resistor bleeder.

Action	Note/Illustration
1.  DANGER! Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off! on page 26 .	

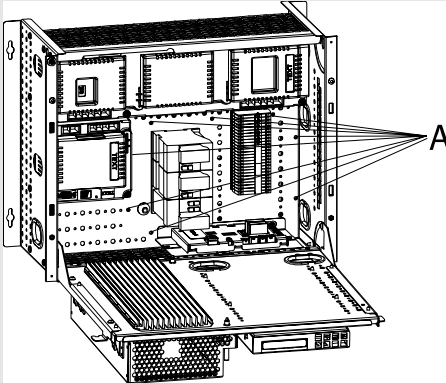
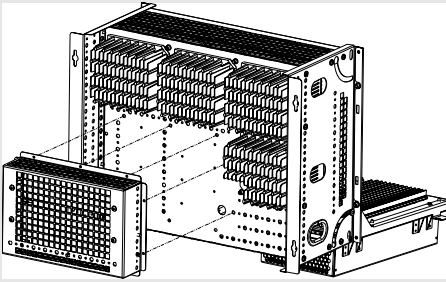
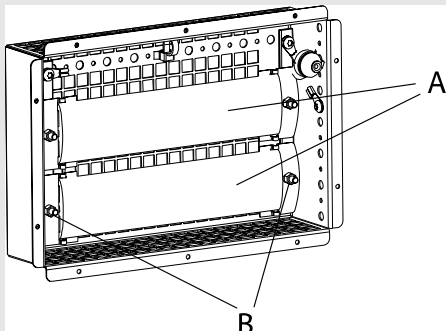
Continued

Action	Note/Illustration
<p>2. Remove the attachment screws and pull the front (axis computer/drive system power supply unit) in the arrow direction.</p>	 <p>xx0600003242</p> <ul style="list-style-type: none"> • A: attachment screws
<p>3. Disconnect all the cables from the Drive Module.</p>	<p>NOTE! Make a note of any connections.</p>
<p>4. Remove the Drive Module.</p>	
<p>5. Remove the Contactor interface board.</p>	<p>See Replacement of Contactor Interface Board on page 162</p>
<p>6. Disconnect the brake resistor bleeder cables.</p>	 <p>xx0600003291</p> <ul style="list-style-type: none"> • A: brake resistor bleeder cable

4 Repair activities, controller IRC5

4.18. Replacement of brake resistor bleeder

Continued

Action	Note/Illustration
7. Remove the attachment screws for the brake resistor bleeder unit and remove the unit.	 <p>xx0600003252</p> <ul style="list-style-type: none"> A: attachment screws (10 pcs)  <p>xx0600003329</p>
8. Remove the attachment nuts.	 <p>xx0600003330</p> <ul style="list-style-type: none"> A: bleeder B: attachment nut (2 pcs)
9. Remove the bleeder.	

Refitting

The following procedure details how to refit the brake resistor bleeder

Action	Note/Illustration
1. Refit the bleeder and attachment nuts.	
2. Refit the brake resistor bleeder unit to the Drive Module.	
3. Refit the attachment screws (10 pcs)	
4. Reconnect the brake resistor bleeder cables.	

Continues on next page

Continued

	Action	Note/Illustration
5.	Refit the Contactor interface board.	
6.	Refit the Drive Module.	
7.	Reconnect all connectors and cables to the Drive Module.	
8.	Refit the front (axis computer/drive system power supply).	

4 Repair activities, controller IRC5

4.18. Replacement of brake resistor bleeder

5 Reference information, IRC5

5.1. Introduction

General

This chapter includes general information, complementing the more specific information in the different procedures in the manual.

5.2. Unit conversion

Converter table

Use the table below to convert units used in this manual.

Quantity	Units		
Length	1 m	3.28 ft	39.37 in
Weight	1 kg	2.21 lb	
Pressure	1 bar	100 kPa	14.5 psi
Force	1 N	0.738 lbf	
Moment	1 Nm	0.738 lbf·tn	
Volume	1 L	0.264 US gal	

5.3. Screw joints

General

This section details how to tighten the various types of screw joints on the controller.

The instructions and torque values are valid for screw joints comprised of metallic materials and do *not* apply to soft or brittle materials.

Tightening torque

Before tightening any screw, note the following:

- Determine whether a standard tightening torque or special torque is to be applied. The standard torques are specified in the tables below. Any special torques are specified in the Repair, Maintenance or Installation procedure description. Any special torque specified overrides the standard value.
- Use the *correct tightening torque* for each type of screw joint.
- Only use *correctly calibrated* torque keys.
- Always *tighten the joint by hand*, and never use pneumatical tools.
- Use the *correct tightening technique*, i.e. *do not* jerk. Tighten the screw in a slow, flowing motion.
- Maximum allowed total deviation from the specified value is **10%!**

The table below specify the recommended standard tightening torque for *oil-lubricated screws with slotted or cross-recess head screws*.

Dimension	Tightening torque (Nm) Class 4.8, oil-lubricated
M2.5	0.25
M3	0.5
M4	1.2
M5	2.5
M6	5.0

5.4. Weight specifications

Definition

In all repair and maintenance instructions, weights of the components handled are sometimes specified. All components exceeding 22 kg (50 lbs) are high-lighted in this way.

To avoid injury, ABB recommends the use of lifting equipment when handling components with a weight exceeding 22 kg.

Example

Below is an example of how a weight specification is presented:



CAUTION!

Caution!

The transformer weighs 55 kg! All lifting equipment used must be sized accordingly!

5.5. Standard toolkit, IRC5

General

All service (repair, maintenance and installation) instructions contain lists of tools required to perform the specified activity. All special tools, i.e. all tools that are not considered standard as defined below, are listed in their instructions respectively.

This way, the tools required are the sum of the Standard Toolkit and any tools listed in the instruction.

Contents, standard toolkit, IRC5

Tool	Remark
Screw driver, Torx	Tx10
Screw driver, Torx	Tx20
Screw driver, Torx	Tx25
Ball tipped screw driver, Torx	Tx25
Screw driver, flat blade	4 mm
Screw driver, flat blade	8 mm
Screw driver, flat blade	12 mm
Screw driver	Phillips-1
Box spanner	8 mm

5 Reference information, IRC5

5.6. Document references

5.6. Document references

General

The contents of this manual may include references to additional documentation necessary to perform certain procedures. This section specifies the article numbers for the referenced documentaion.

Product specification, controller

The product specification includes generic technical data. The specification listed below is the English version.

Document name	Document ID
Product Specification - Controller IRC5 with FlexPendant	3HAC021785-001

Operating manuals

The operating manuals contains instructions for daily operation of robot systems. The operating manuals listed below is the English version.

Document name	Document ID	Note
IRC5 with FlexPendant	3HAC16590-1	
Getting started	3HAC027097-001	
RobotStudio	3HAC032104-001	
Trouble shooting - IRC5	3HAC020738-001	

Product manual, robot

The product manuals include information about installation and service activities. The table below specifies the article numbers of the product manuals for all robot models. The part number -001 is the English version.

Document name	Document ID
Product manual, IRB 140	3HAC023297-001
Product manual, IRB 140 Type C	3HAC024400-001
Product manual, IRB 1400	3HAC021111-001
Product manual, IRB 1410	3HAC026320-001
Product manual, IRB 1600	3HAC023637-001
Product manual, IRB 1600 Type A	3HAC026660-001
Product manual, IRB 2400	3HAC022031-001
Product manual, IRB 4400/4450S	3HAC022032-001
Product manual, IRB 6400RF	3HAC027076-001
Product manual, IRB 6600/6650 type A	3HAC020938-001
Product manual, IRB 6600/6650 type B	3HAC023082-001
Product manual, IRB 6650S	3HAC020993-001
Product manual, IRB 6620	3HAC027151-001
Product manual, IRB 6640	3HAC026876-001
Product manual, IRB 6660	3HAC028197-001

Continues on next page

Continued

Document name	Document ID
Product manual, IRB 260	3HAC026048-001
Product manual, IRB 660	3HAC025755-001
Product manual, IRB 7600	3HAC022033-001
Product manual, IRB 340	3HAC022546-001
Product manual, IRB 360	3HAC030005-001

5.6. Document references

6 Spare Parts

6.1 Controller parts

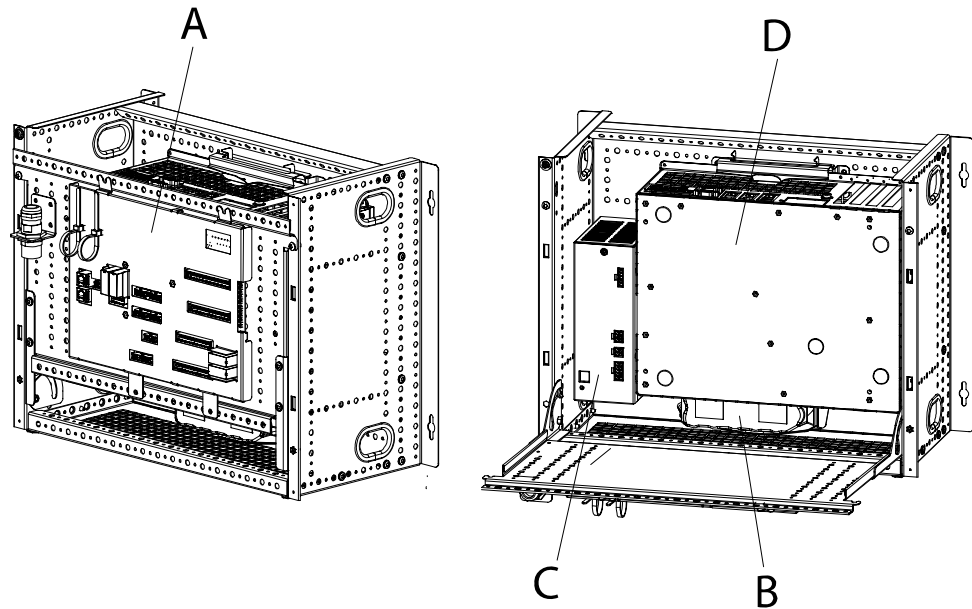
6.1.1. IRC5Panel Mounted Controller

General

The illustrations in this section show the locations of the parts in the IRC5Panel Mounted Controller.

Control Module parts

The illustration below shows the placement of the Control Module parts in the recommended spare part list.



xx0600003333

	Spare part no.	Description	Note
A	3HAC024488-001	Panel board unit	DSQC 643
B	3HAC025562-001	Backup energy bank	DSQC 655
C	3HAC12928-1	Control power supply	DSQC 604
D	3HAC025527-001	Computer unit	DSQC 639
	3HAC021975-001	Harness-DSQC 604/Computer unit USB	
	3HAC024244-001	Ethernet cable cross conn	
	3HAC021377-001	Bridge connector for panel board	
	3HAC024000-001	Bridge connector for panel board X1	
	3HAC024000-002	Bridge connector for panel board X2	
	3HAC024000-003	Bridge connector for panel board X6	
	3HAC024000-004	Bridge connector for panel board X5	
	3HAC024323-001	Harness-DSQC 604/Comp/P.board	

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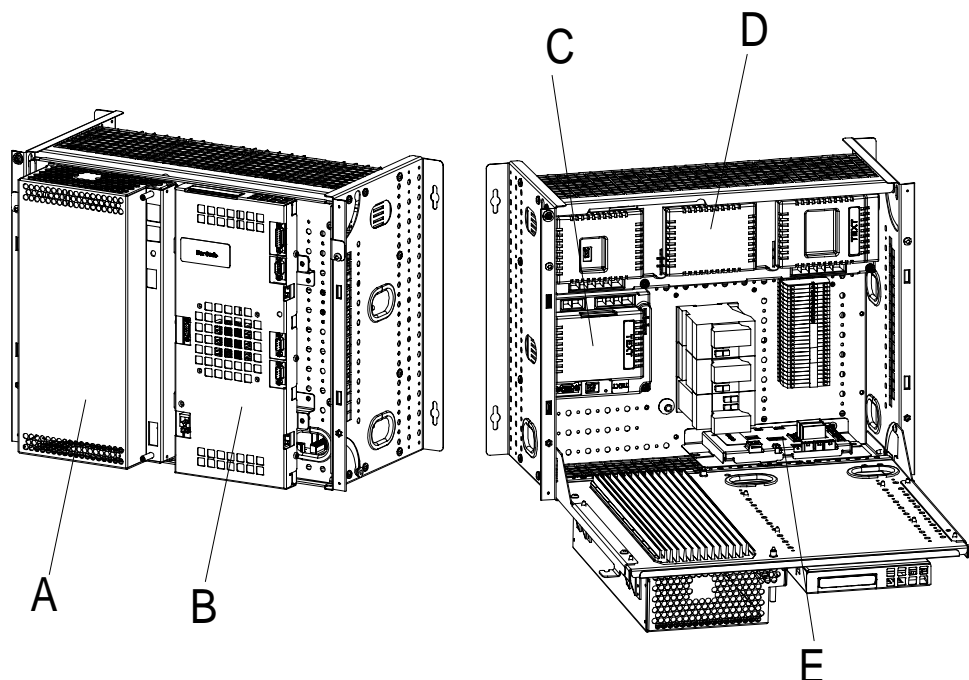
6 Spare Parts

6.1.1. IRC5Panel Mounted Controller

Continued

Drive Module parts

The illustration below shows the placement of the Drive Module parts in the recommended spare part list.



xx0600003334

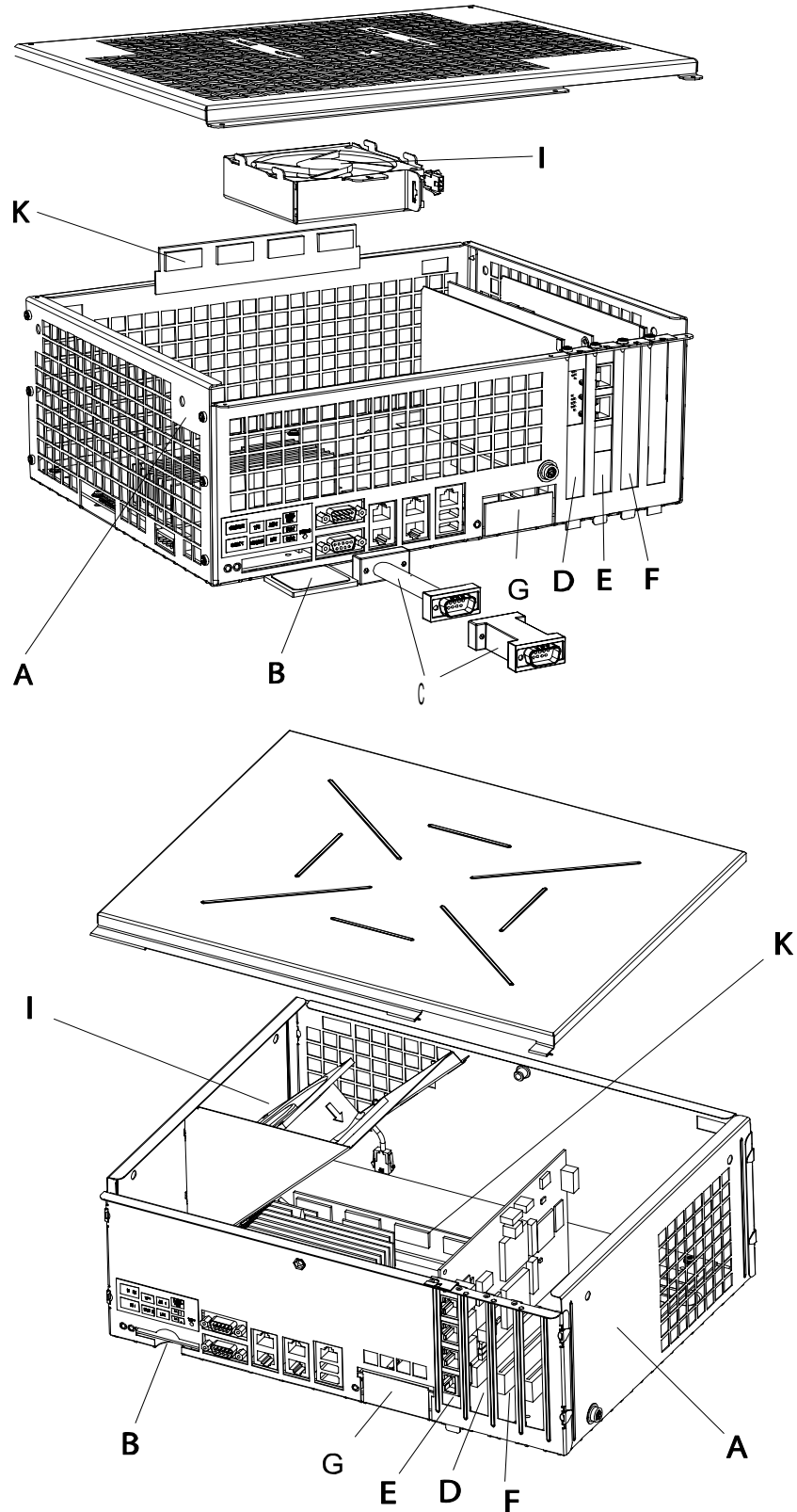
	Spare part no.	Description	Note
A	3HAC026289-001	Drive system power supply	DSQC 626A
	3HAC020466-001	Drive system power supply ext.	DSQC 627
B	3HAC024473-001	Axis computer unit	DSQC 601
C	3HAC14549-1	Rectifier	DSQC 618
D	3HAC025338-001	Main Servo Drive Unit, D6 3B 3A	DSQC 617
D	3HAC025338-002	Main Servo Drive Unit, D6 2E 2C 2B	DSQC 617
D	3HAC025338-003	Main Servo Drive Unit, D4 3E 1C	DSQC 617
E	3HAC13389-2	Contactor interface board	DSQC 611
	3HAC17281-3	DC-Bus Bar S2	
	3HAC026899-001	Brake resistor bleeder	IRB 140, 340, 360
	3HAC027027-001	Brake resistor bleeder	IRB 260
	3HAC026865-001	Harness-Power supply/Drive	
	3HAC024254-001	Ethernet cable strait con	

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Continues on next page

*Continued***Computer unit DSQC 639 parts**

The illustration below shows the placement of the computer unit parts in the recommended spare part list.



xx0600003029

Continues on next page

6 Spare Parts

6.1.1. IRC5Panel Mounted Controller

Continued

	Spare part no.	Description	Note
A	3HAC025527-001	Computer unit	DSQC 639
B	3HAC025465-001	Compact flash 256MB	DSQC 656 256MB
B	3HAC025465-003	Compact flash 2GB	DSQC 656 2GB
C	3HAC14944-1	RS-232/422 Converter	DSQC 615
E, D, F	3HAC025779-001	DeviceNet Master/Slave Single	DSQC 658
E, D, F	3HAC025780-001	DeviceNet Master/Slave Dual	DSQC 659
E, D, F	3HAC15639-1	Ethernet card	DSQC 612
E, D, F	3HAC11819-1	Interbus Master/Slave copper wire	DSQC 529
E, D, F	3HAC5579-1	Interbus Master/Slave optical fibre	DSQC 512
E, D, F	3HAC023047-001	Profibus-DP Master/Slave	DSQC 637
E, D, F	3HAC030327-001	PROFINET Master/Slave	DSQC 678
G	3HAC031670-001	PROFINET Fieldbus Adapter	DSQC 688
I	3HAC16751-3	Fan	
K	3HAC025097-016	DDR SDRAM 256MB	

Miscellaneous parts

The table below details parts in the recommended spare part list.

	Spare part no.	Description	Note
	3HAC021702-001	Fans with receptacle	
	3HAC024322-001	Line filter	
	3HAC024180-001	Transformer unit 6kVA	
	3HAC024125-001	Harness-XP10/T1	
	2CDS253001R0104	3-pol automatic fuse	
	1SCA02235R6610	Switch	
	3HAC15326-3	Main switch	
	3HAC023195-001	GTPU 2, 10 M Cable	
	3HAC11266-4	TPU Cable, 30m	
	3HAC021914-001	Harness-TPU Jumper plug	
	3HAC12934-1	Customer I/O Power supply	DSQC 608

I/O parts

The table below details parts in the recommended spare part list.

	Spare part no.	Description	Note
	3HAC025784-001	ADCombi I/O	DSQC 651
	3HAC025917-001	Digital I/O	DSQC 652
	3HAC025918-001	Digital I/O with relay outputs	DSQC 653
	3HNE00554-1	Analog $\pm 10V$ I/O	DSQC 355A

Ext I/O parts

The table below details parts in the recommended spare part list.

	Spare part no.	Description	Note
	3HAC026486-001	Additional Module Dig 24V	
	3HAC026486-002	Additional Module AD Combi	
	3HAC026486-003	Additional Unit Digital with relays	

6 Spare Parts

6.2.1. Manipulator variants

6.2 Manipulator cables

6.2.1. Manipulator variants

General

When ordering cables, consider the option numbers for the manipulators.

Manipulator	Variants	Option no.
IRB 140	Standard	435-2
	Standard 6-0.8	435-87
	High speed	435-44
	High speed 6-0.8	435-87
IRB 1600	5-1.2	435-60
	5-1.45	435-61
	6-1.2	435-91
	6-1.45	435-92
	7-1.2	435-56
	7-1.45	435-57
	8-1.2	435-89
	8-1.45	435-90
IRB 1600ID	4-1.5	435-79
IRB 2400	10kg	435-7
	16kg	435-8
	L	435-9
IRB 260		435-58
IRB 340	Standard	435-33
	Wash down	435-34
	Stainless wash down	435-35
	2kg standard	435-47
	2kg wash down	435-48
	2kg stainless wash down	435-49
IRB 360	1	435-80
	3	435-81
	1 800	435-82
	130-3.1	435-78

6.2.2. Manipulator cables

Signal cables, IRB 1600

Art. no.	Description	Option no.
3HAC2493-1	Control cable signal L=7m	210-2
3HAC2530-1	Control cable signal L=15m	210-3
3HAC2540-1	Control cable signal L=22m	210-4
3HAC2566-1	Control cable signal L=30m	210-5

Signal cables, IRB 2400, IRB 260

Art. no.	Description	Option no.
3HAC7998-1	Control cable signal L=7m	210-2
3HAC7998-2	Control cable signal L=15m	210-3
3HAC7998-3	Control cable signal L=22m	210-4
3HAC7998-4	Control cable signal L=30m	210-5

Power cables, IRB 140

Art. no.	Description	Option no.
3HAC7996-1	Control cable power L=3m	210-1
3HAC7996-5	Control cable power L=7m	210-2
3HAC7996-6	Control cable power L=15m	210-3
3HAC7996-7	Control cable power L=22m	210-4
3HAC7996-8	Control cable power L=30m	210-5
3HAC7996-12	Control cable power L=7m Open end.	210-2

Power cables, IRB 1600, IRB 2400

Art. no.	Description	Option no.
3HAC2492-1	Control cable power L=7m	Standard: 210-2 and 287-4
3HAC2529-1	Control cable power L=15m	Standard: 210-3 and 287-4
3HAC2539-1	Control cable power L=22m	Standard: 210-4 and 287-4
3HAC2564-1	Control cable power L=30m	Standard: 210-5 and 287-4
3HAC9038-1	Control cable power L=7m	Foundry: 210-2 and 287-3 Wash: 210-2 and 287-5
3HAC9038-2	Control cable power L=15m	Foundry: 210-3 and 287-3 Wash: 210-3 and 287-5
3HAC9038-3	Control cable power L=22m	Foundry: 210-4 and 287-3 Wash: 210-4 and 287-5
3HAC9038-4	Control cable power L=30m	Foundry: 210-5 and 287-3 Wash: 210-5 and 287-5

Continues on next page

6 Spare Parts

6.2.2. Manipulator cables

Continued

Power cables, IRB 260

Art. no.	Description	Option no.
3HAC9038-1	Control cable power L=7m	Foundry: 210-2 and 287-3 Wash: 210-5 and 287-5
3HAC9038-2	Control cable power L=15m	Foundry: 210-3 and 287-3 Wash: 210-5 and 287-5
3HAC9038-3	Control cable power L=22m	Foundry: 210-4 and 287-3 Wash: 210-5 and 287-5
3HAC9038-4	Control cable power L=30m	Foundry: 210-5 and 287-3 Wash: 210-5 and 287-5

Power cables, IRB 340

Art. no.	Description	Option no.
3HAC8158-1	Control Cable power L=7m	(435-33 or 435-34 or 435-35 or 435-47 or 435-48 or 435-49) and 210-2
3HAC027635-001	Control Cable power L=7m Open end.	(435-33 or 435-34 or 435-35 or 435-47 or 435-48 or 435-49) and 210-2
3HAC8159-1	Control Cable power L=15m	(435-33 or 435-34 or 435-35 or 435-47 or 435-48 or 435-49) and 210-3
3HAC8160-1	Control Cable power L=22m	(435-33 or 435-34 or 435-35 or 435-47 or 435-48 or 435-49) and 210-4
3HAC8162-1	Control Cable power L=30m	(435-33 or 435-34 or 435-35 or 435-47 or 435-48 or 435-49) and 210-5

Power cables, IRB 360

Art. no.	Description	Option no.
3HAC029903-001	Control cable, power and signal L=3m	(435-803 or 435-81 or 435-82)
3HAC029903-002	Control cable, power and signal L=7m	(435-803 or 435-81 or 435-82)
3HAC029903-003	Control cable, power and signal L=15m	(435-803 or 435-81 or 435-82)
3HAC029903-004	Control cable, power and signal L=22m	(435-803 or 435-81 or 435-82)
3HAC029903-005	Control cable, power and signal L=30m	(435-803 or 435-81 or 435-82)

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6.2.3. Position switch cables

IRB

Axis 1

Art. no.	Description	Option no.
3HAC3363-1	Pos. switch cable L=7m	273-1
3HAC3364-1	Pos. switch cable L=15m	273-2
3HAC3365-1	Pos. switch cable L=22m	273-3
3HAC3366-1	Pos. switch cable L=30m	273-4

IRB 1600, 2400, 260

Axis 1

Art. no.	Description	Option no.
3HAC7997-1	Pos. switch cable L=7m	273-1
3HAC7997-2	Pos. switch cable L=15m	273-2
3HAC7997-3	Pos. switch cable L=22m	273-3
3HAC7997-4	Pos. switch cable L=30m	273-4

6 Spare Parts

6.2.4. Customer signal, CS/CP and CS

6.2.4. Customer signal, CS/CP and CS

IRB 1600, 2400

Art. no.	Description	Option no.
3HAC3353-1	Customer cable sign. L=7m	Standard: 94-1 and 287-4
3HAC3354-1	Customer cable sign. L=15m	Standard: 94-2 and 287-4
3HAC3355-1	Customer cable sign. L=22m	Standard: 94-3 and 287-4
3HAC3356-14	Customer cable sign. L=30m	Standard: 94-4 and 287-4
3HAC8183-1	Customer cable sign. L=7m	Foundry: 94-1 and 287-3 Wash: 94-1 and 287-5
3HAC8183-2	Customer cable sign. L=15m	Foundry: 94-2 and 287-3 Wash: 94-2 and 287-5
3HAC8183-3	Customer cable sign. L=22m	Foundry: 94-3 and 287-3 Wash: 94-3 and 287-5
3HAC8183-4	Customer cable sign. L=30m	Foundry: 94-4 and 287-3 Wash: 94-4 and 287-5

IRB 260

Art. no.	Description	Option no.
3HAC8183-1	Customer cable signal, L=7m	Foundry: 94-1 and 287-3 Wash: 94-1 and 287-5
3HAC8183-2	Customer cable signal, L=15m	Foundry: 94-2 and 287-3 Wash: 94-2 and 287-5
3HAC8183-3	Customer cable signal, L=22m	Foundry: 94-3 and 287-3 Wash: 94-3 and 287-5
3HAC8183-4	Customer cable signal, L=30m	Foundry: 94-4 and 287-3 Wash: 94-4 and 287-5

IRB 340, 360

Art. no.	Description	Option no.
3HAC14860-1	Customer cable sign. L=7m	218-9 and 94-1
3HAC14860-2	Customer cable sign. L=15m	218-9 and 94-2
3HAC14860-3	Customer cable sign. L=22m	218-9 and 94-3
3HAC14860-4	Customer cable sign. L=30m	218-9 and 94-4

6.2.5. Customer power-signal

IRB 340

Art. no.	Description	Option no.
3HAC3358-4	Internal Customer cable L=3m	218-5 and 94-6
3HAC3358-1	Internal Customer cable L=7m	218-5 and 94-1
3HAC3359-1	Internal Customer cable L=15m	218-5 and 94-2
3HAC3360-1	Internal Customer cable L=22m	218-5 and 94-3
3HAC3361-1	Internal Customer cable L=30m	218-5 and 94-4

IRB 360

Art. no.	Description	Option no.
3HAC030198-001	Internal Customer cable L=3m	218-5 and 94-6
3HAC030198-002	Internal Customer cable L=7m	218-5 and 94-1
3HAC030198-003	Internal Customer cable L=15m	218-5 and 94-2
3HAC030198-004	Internal Customer cable L=22m	218-5 and 94-3
3HAC030198-005	Internal Customer cable L=30m	218-5 and 94-4

6 Spare Parts

6.2.5. Customer power-signal

7 Circuit Diagram

7.1. Introduction

Definitions

This chapter specifies the circuit diagram of the IRC5 Panel Mounted Controller.



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Latest revision:			Lab/Office:	IRC5 PANEL MOUNTED CONTROL COPYRIGHT page	Status: 2008-09-01 Approved	Plant: = CAB Location: + CONTROLLER Sublocation: +	Document no. 3HAC026871-005	Rev. Ind 03	Page 1
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Prepared by, date:		Approved by, date:		Title page/cover sheet	3HAC026871-005	03	Total 69		



Customer :
Control cabinet : IRC5 PANEL MOUNTED CONTROL
Drawing number : 3HAC026871-005
Drawing version :

Manufacture :
Type :
Type of installation :
Control cabinet :
Mains voltage :
Supply :
Control voltage :
Year of construction :

Project start :
Project manager :
Last revision :
Designed by : sejesun
Designed date : 2008-09-01
Number of pages :
:

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REV 02									
Page 66 Added interruptionpoints from A42-X4:6 and :7 to SMB card on all robotmodels									
Page 77 Added interruptionpoints from A42-X4:6 and :7 to SMB card									
Page 82 Added interruptionpoints from A42-X4:6 and :7 to SMB card									
Page 87 Added interruptionpoints from A42-X4:6 and :7 to SMB card									
Page 92 Added interruptionpoints from A42-X4:6 and :7 to SMB card									
Page 43-47, 83, 84, 88, 93 Changed documentnumber from 3HAC024480-004 to 3HAC026871-005									
REV 03									
Page 37.1 New page, Fieldbus adapters added.									
Page 38.1 New page, ProfiNet added.									
Page 80-84 Added IRB360									
Latest revision:			Lab/Office:	IRC5 PANEL MOUNTED CONTROL REVISION INFORMATION	Status: 2008-09-01 Approved		Plant: = CAB Location: + REV Sublocation: +		
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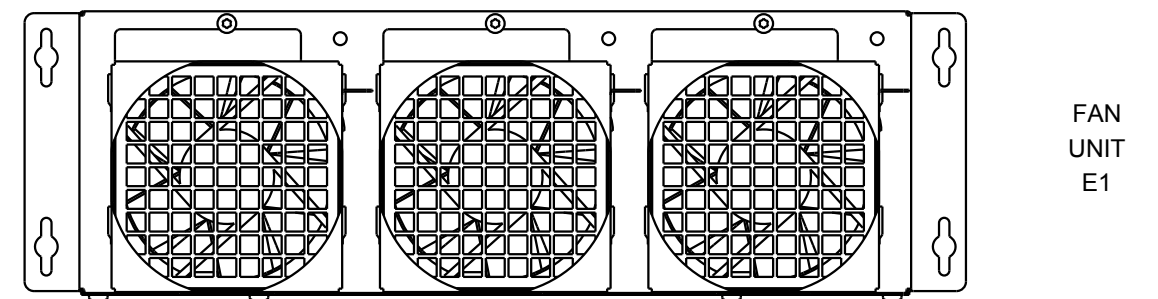
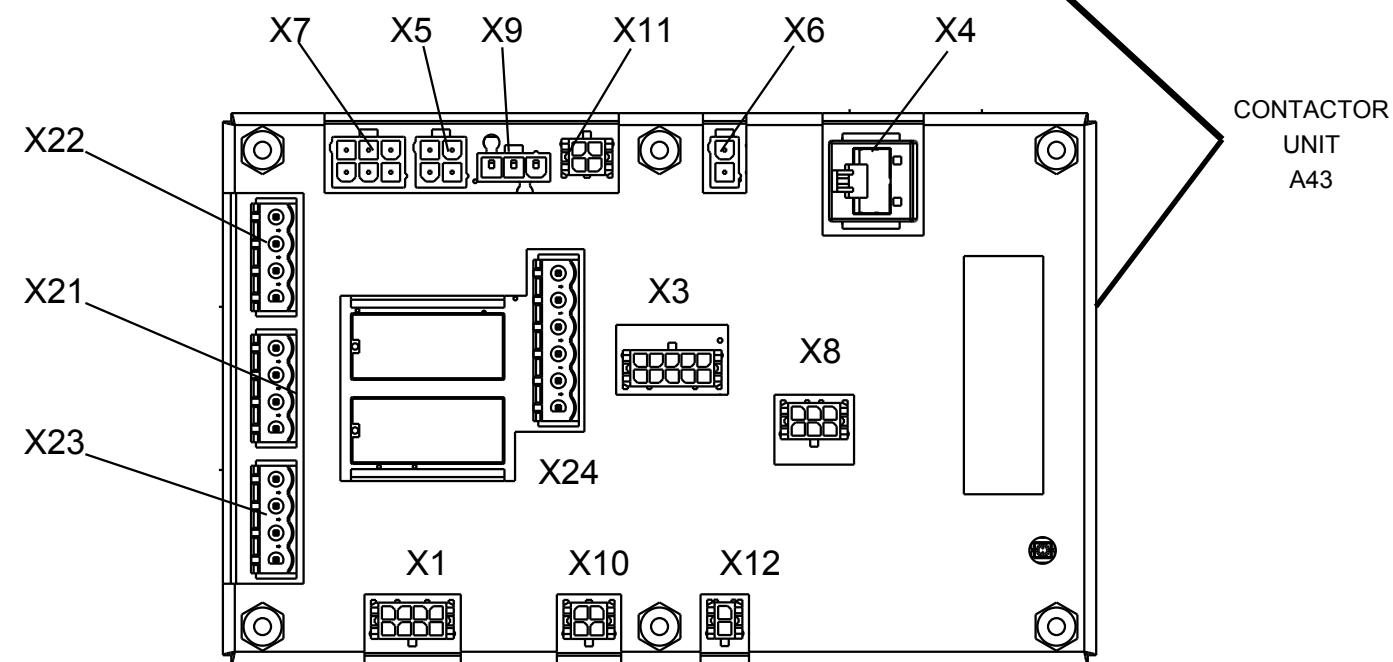
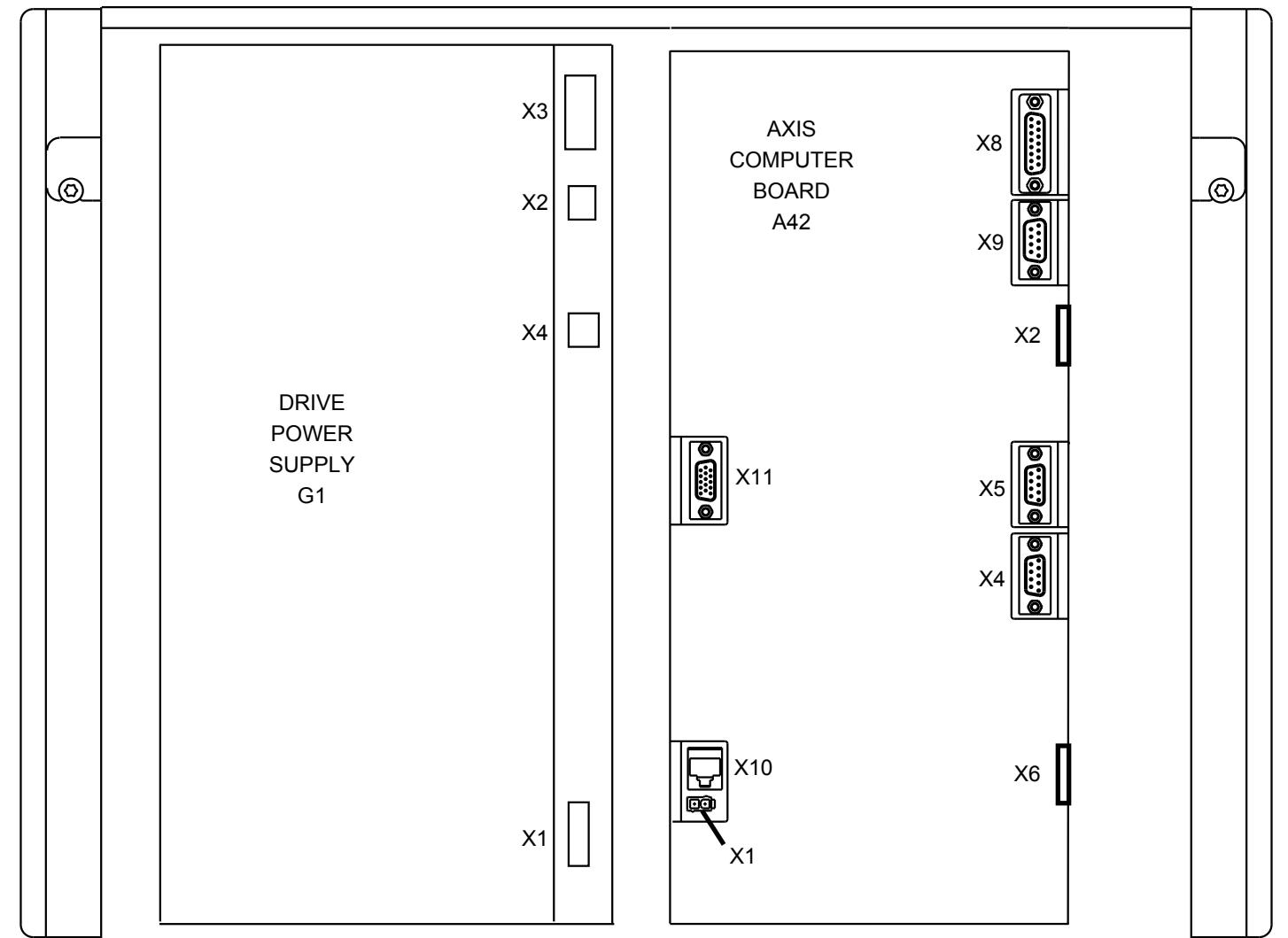
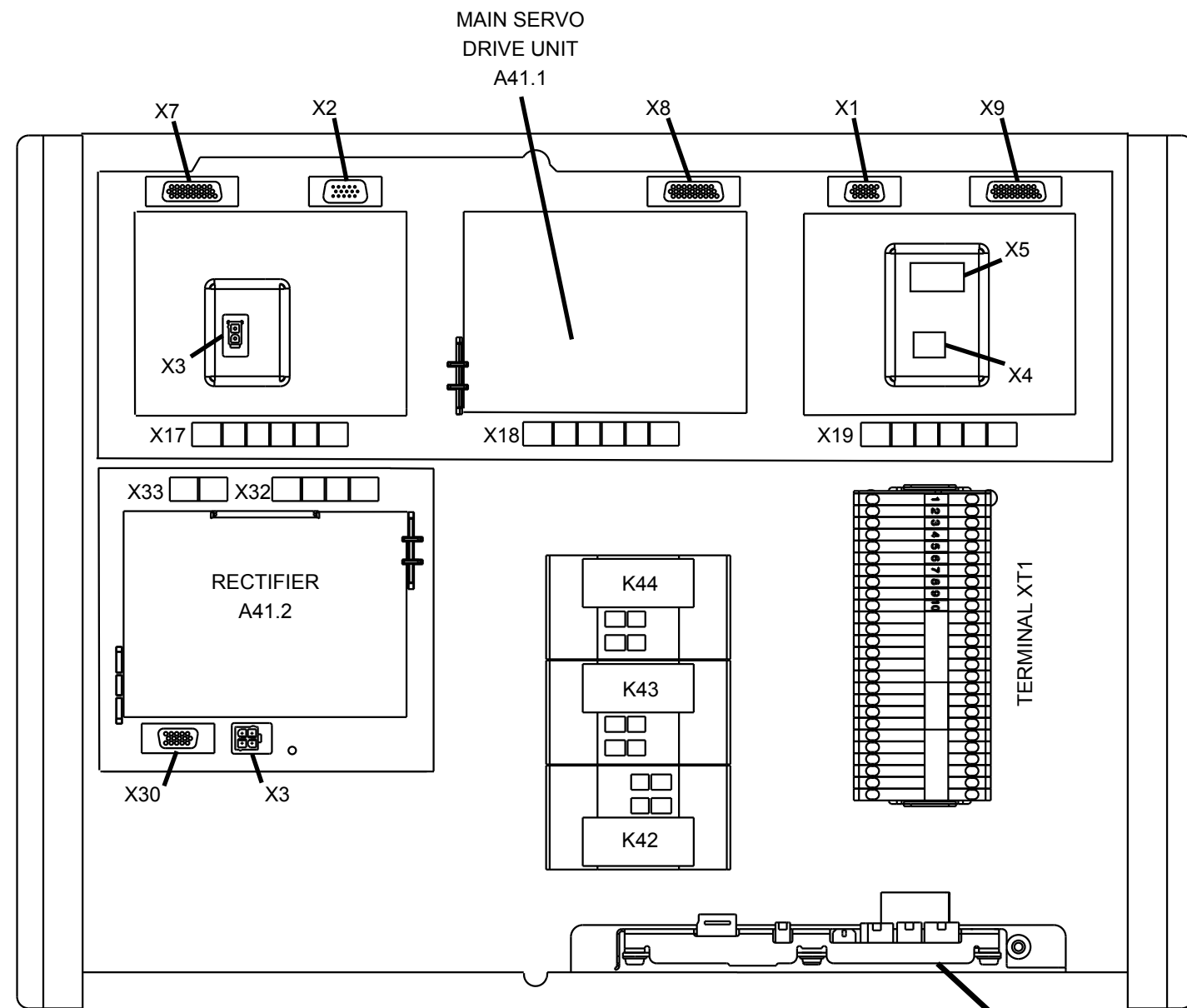
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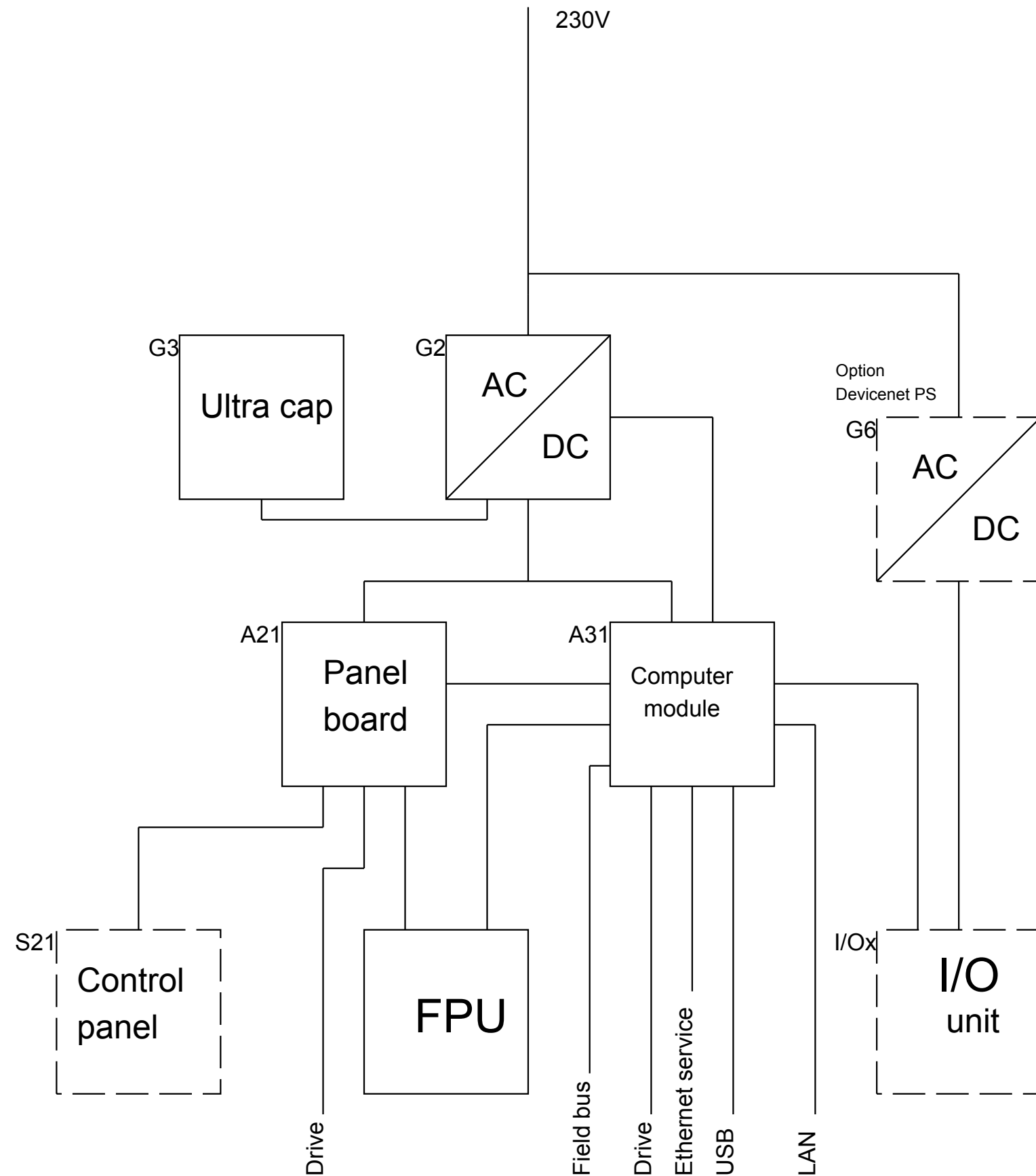


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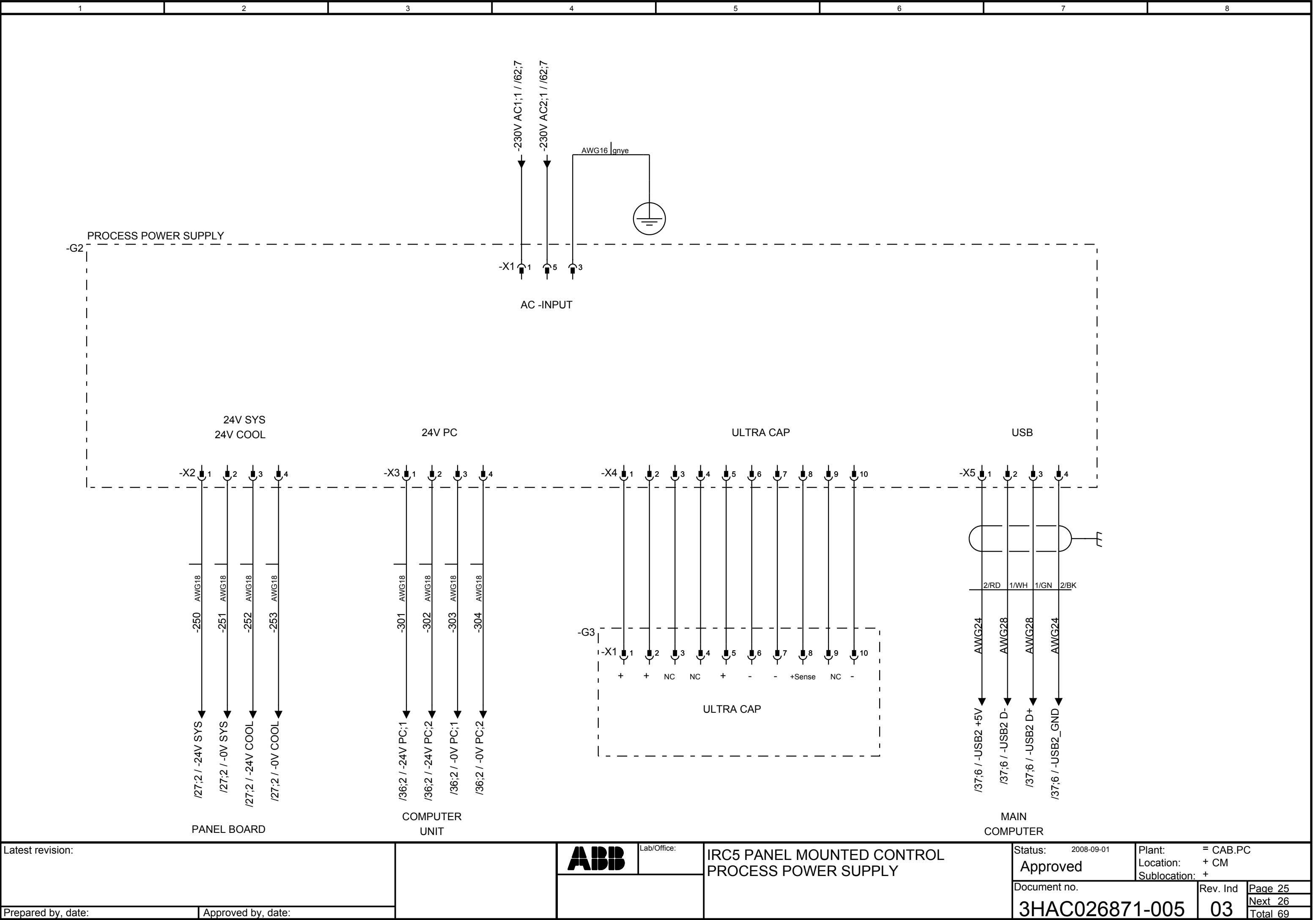
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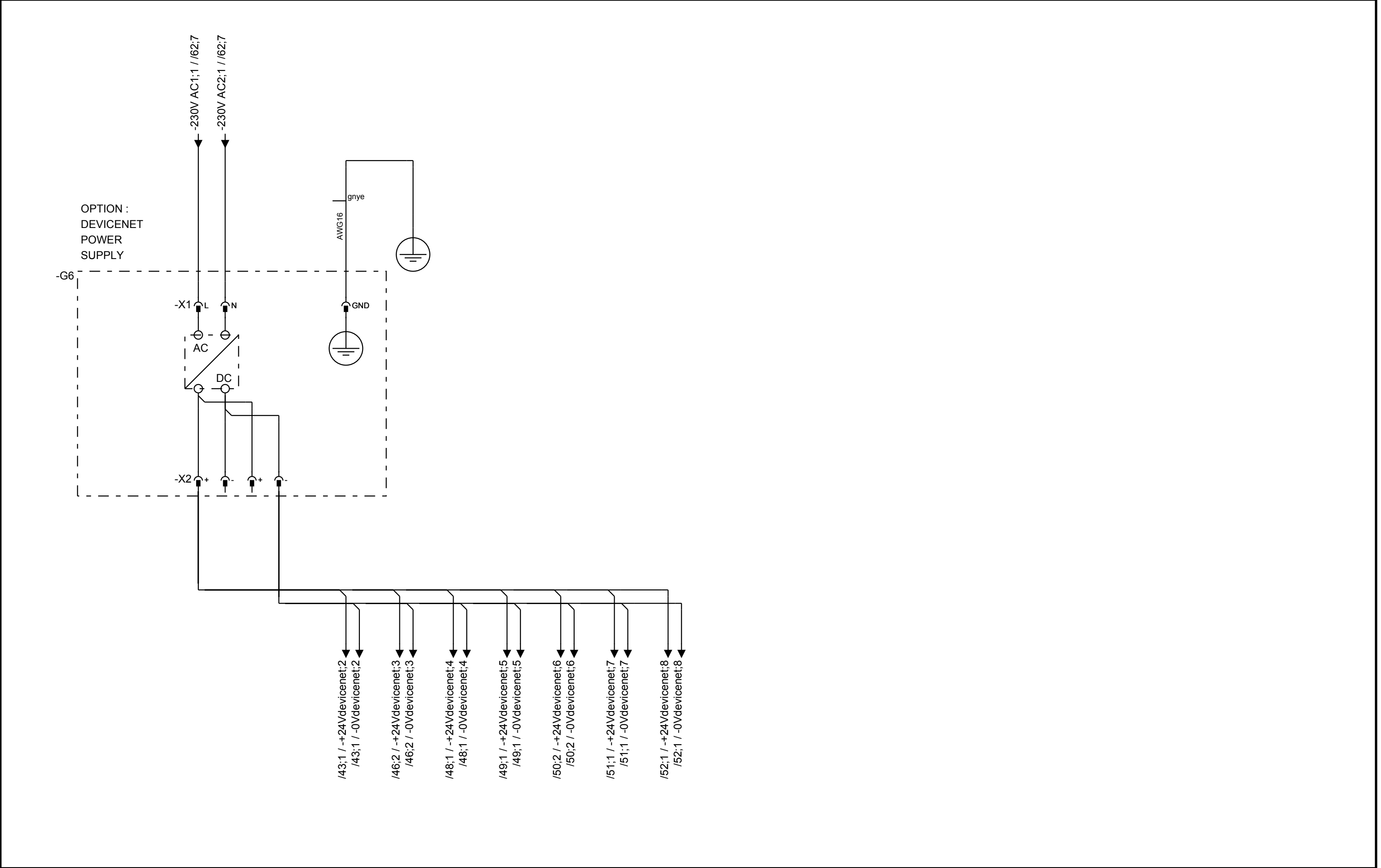
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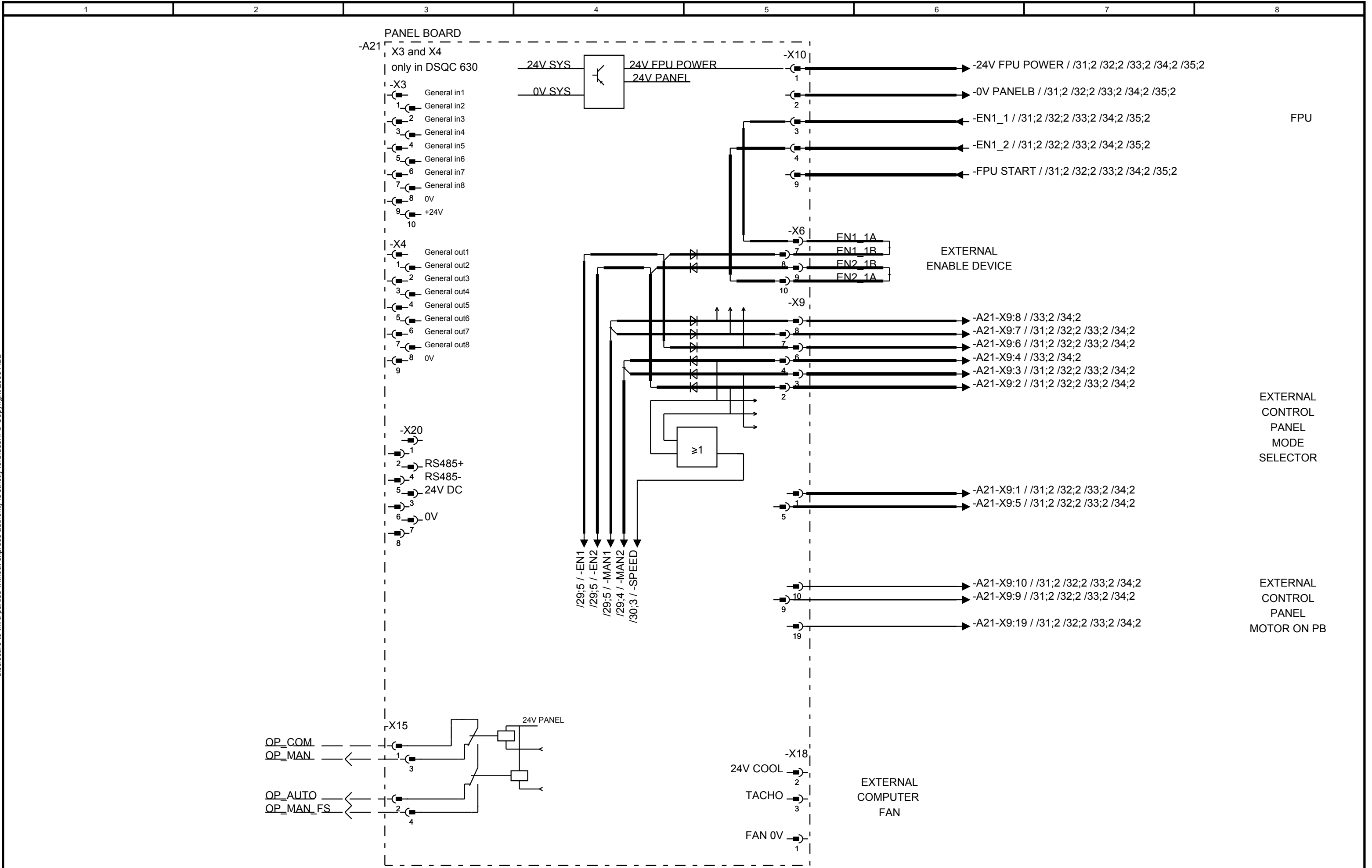
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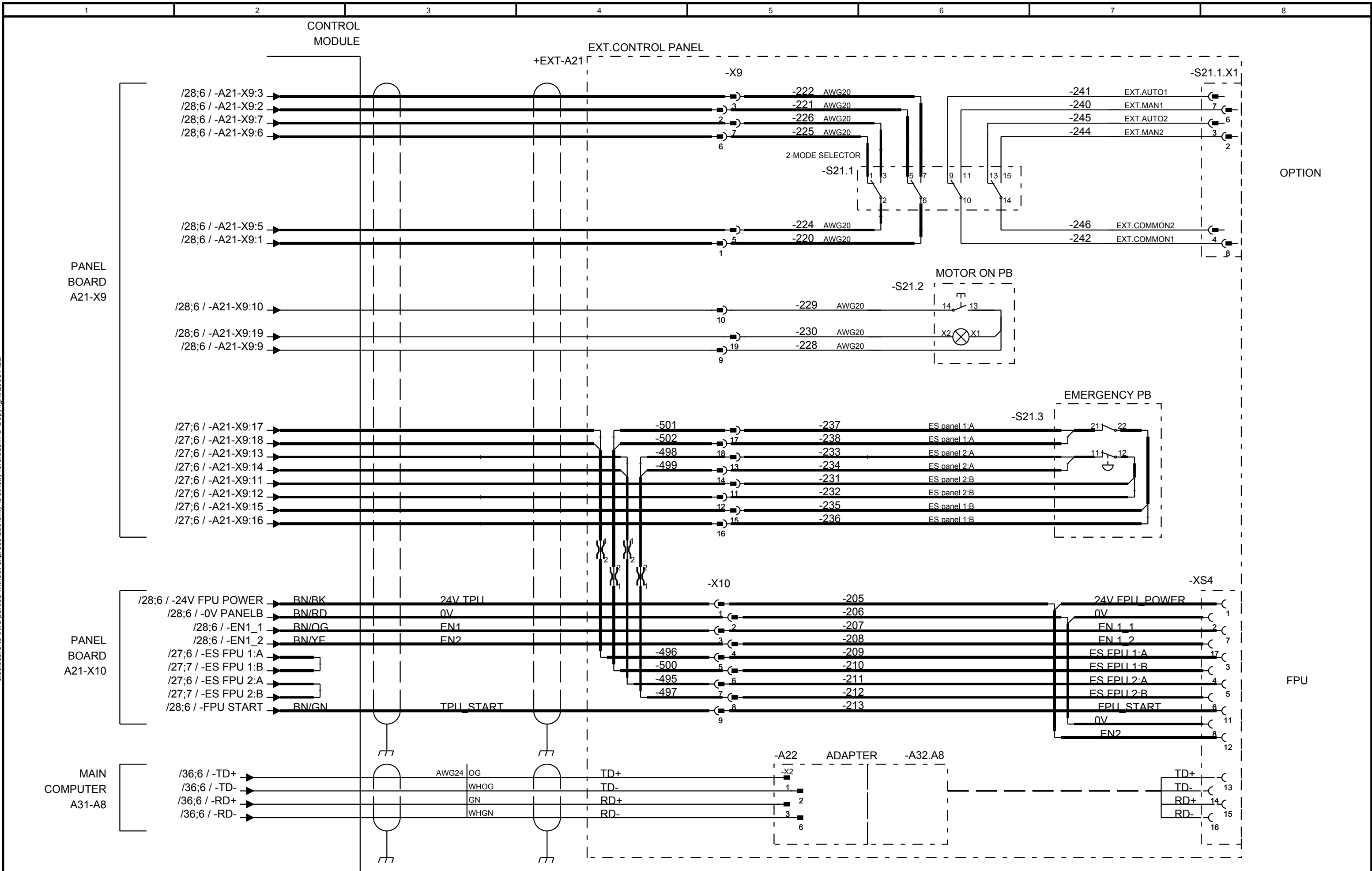




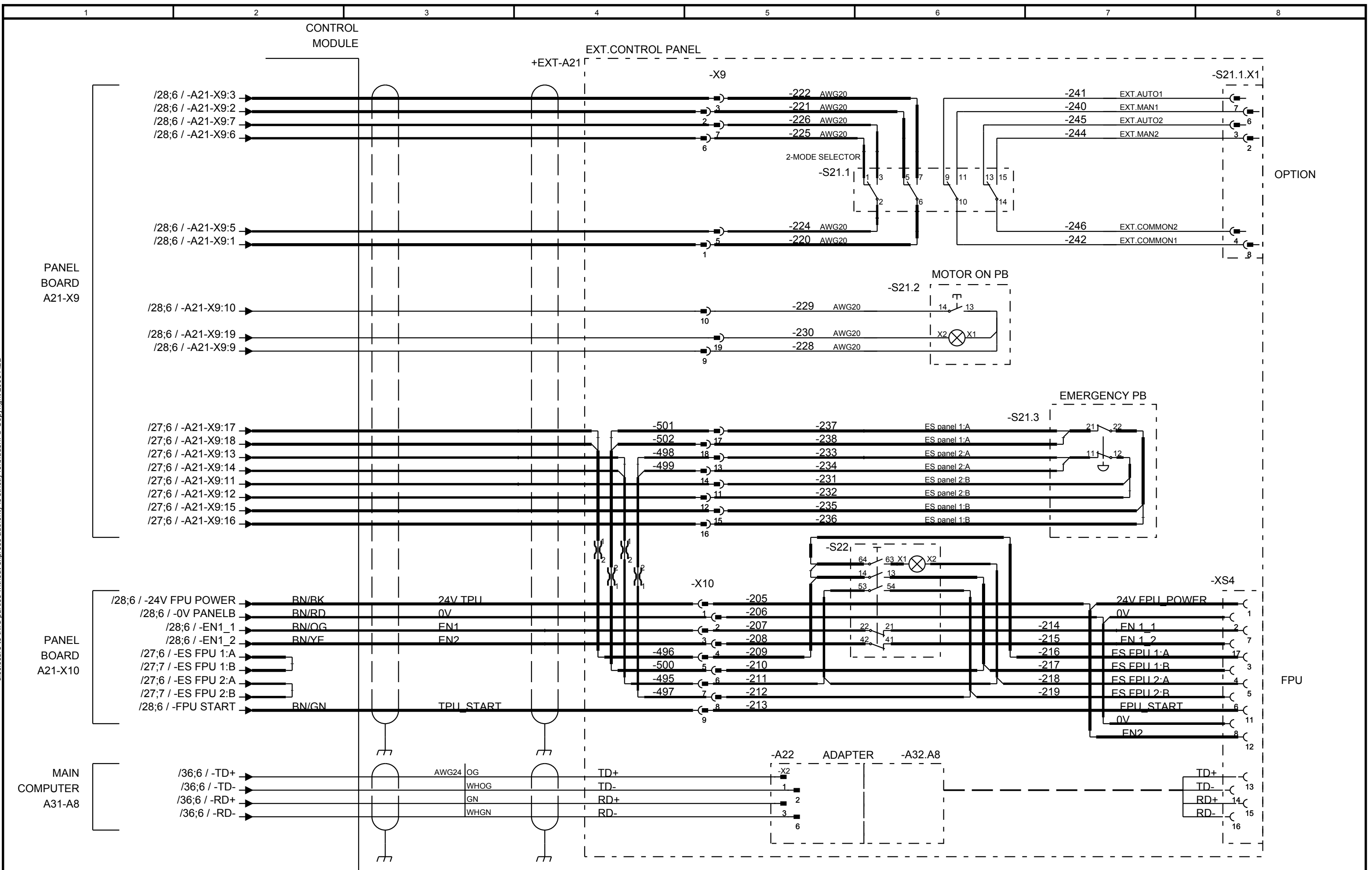
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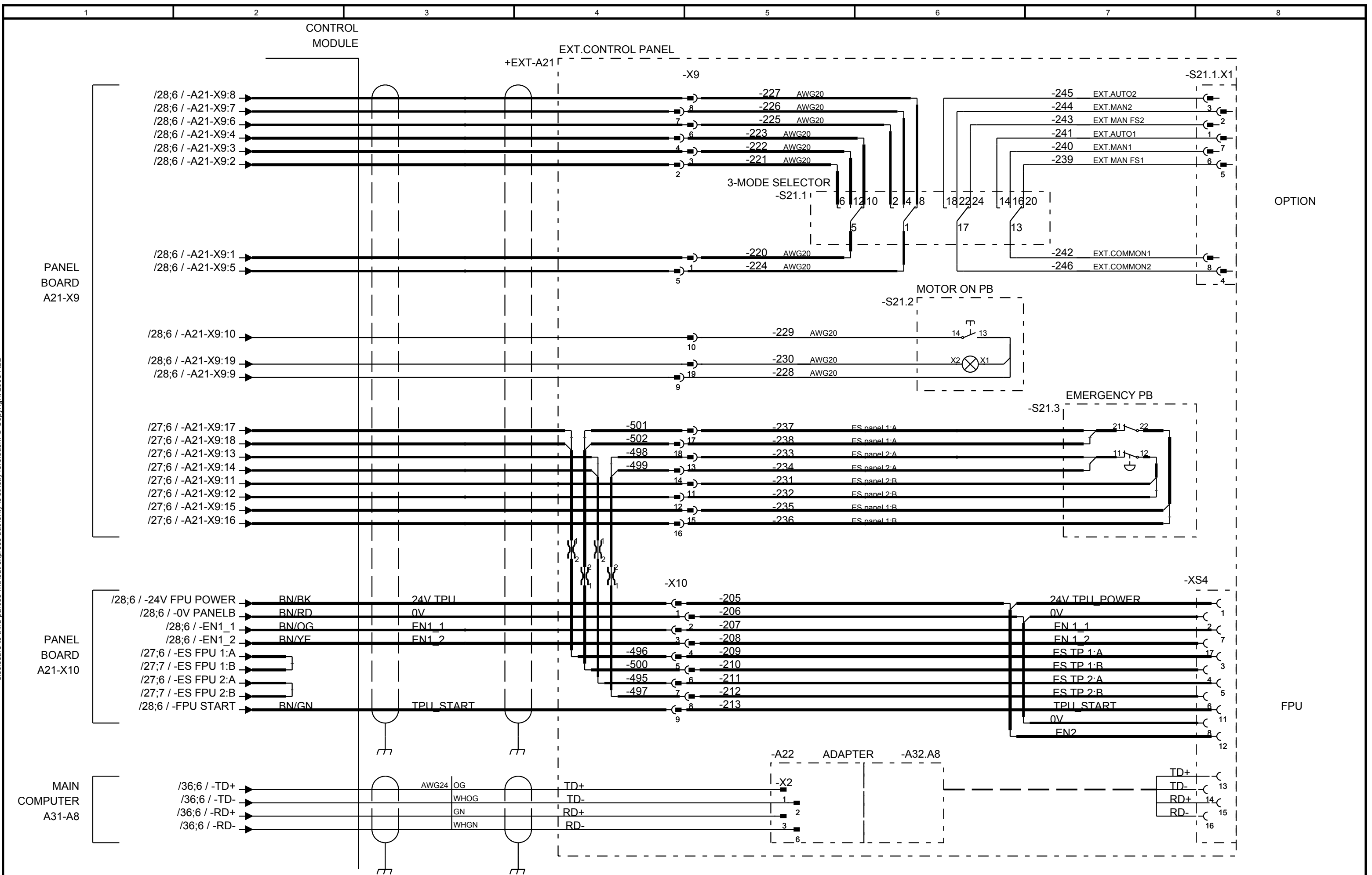



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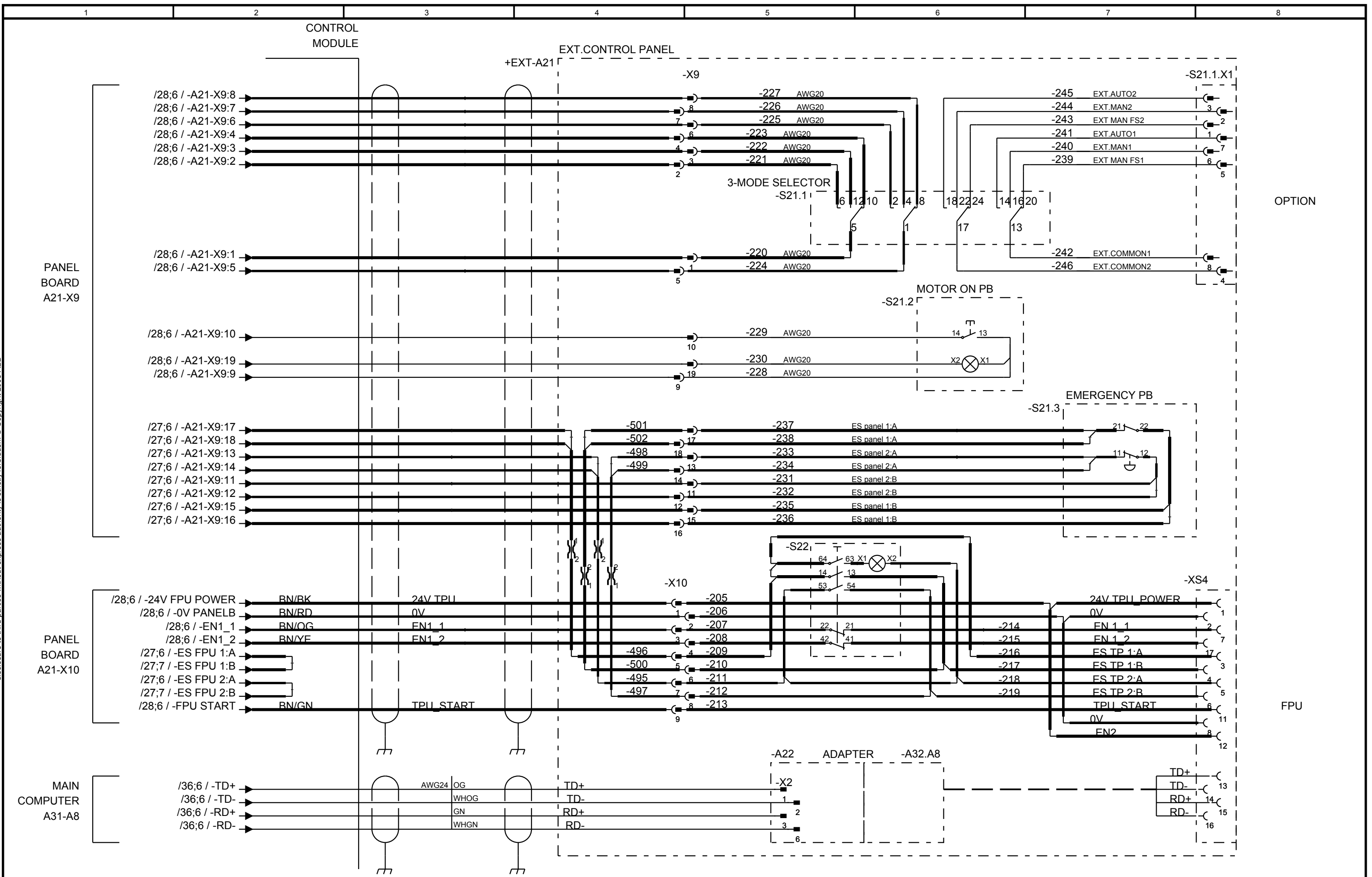


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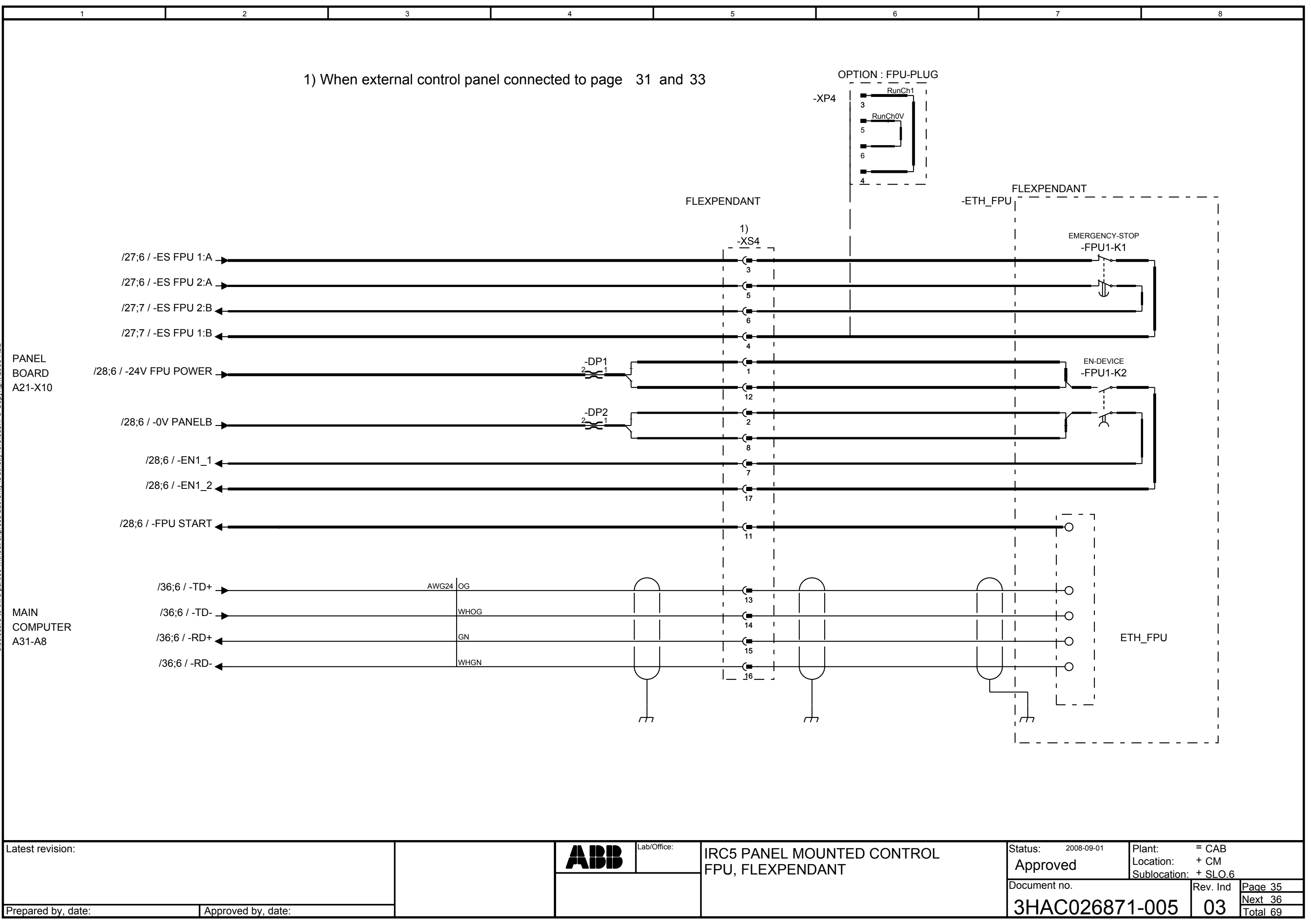
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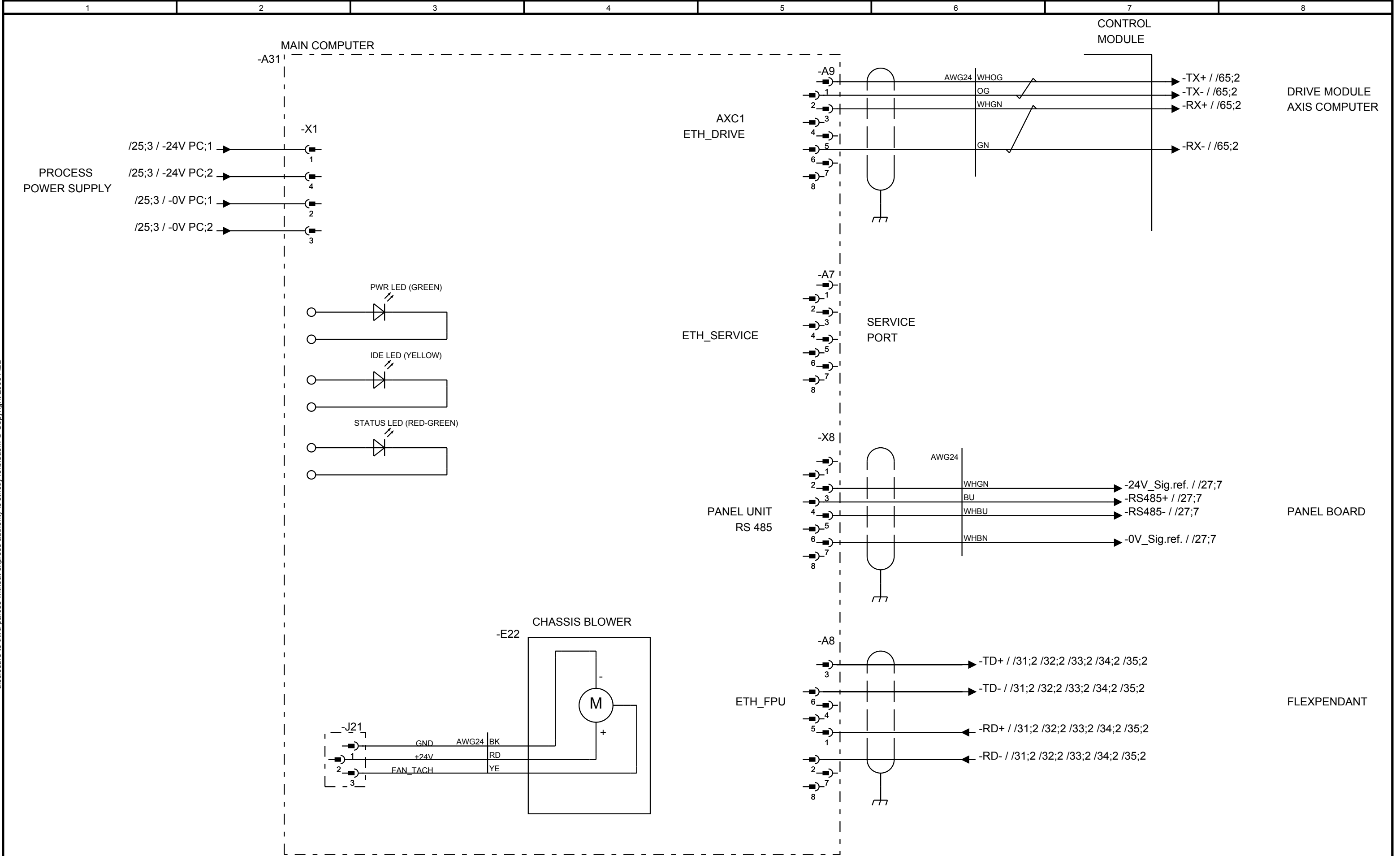
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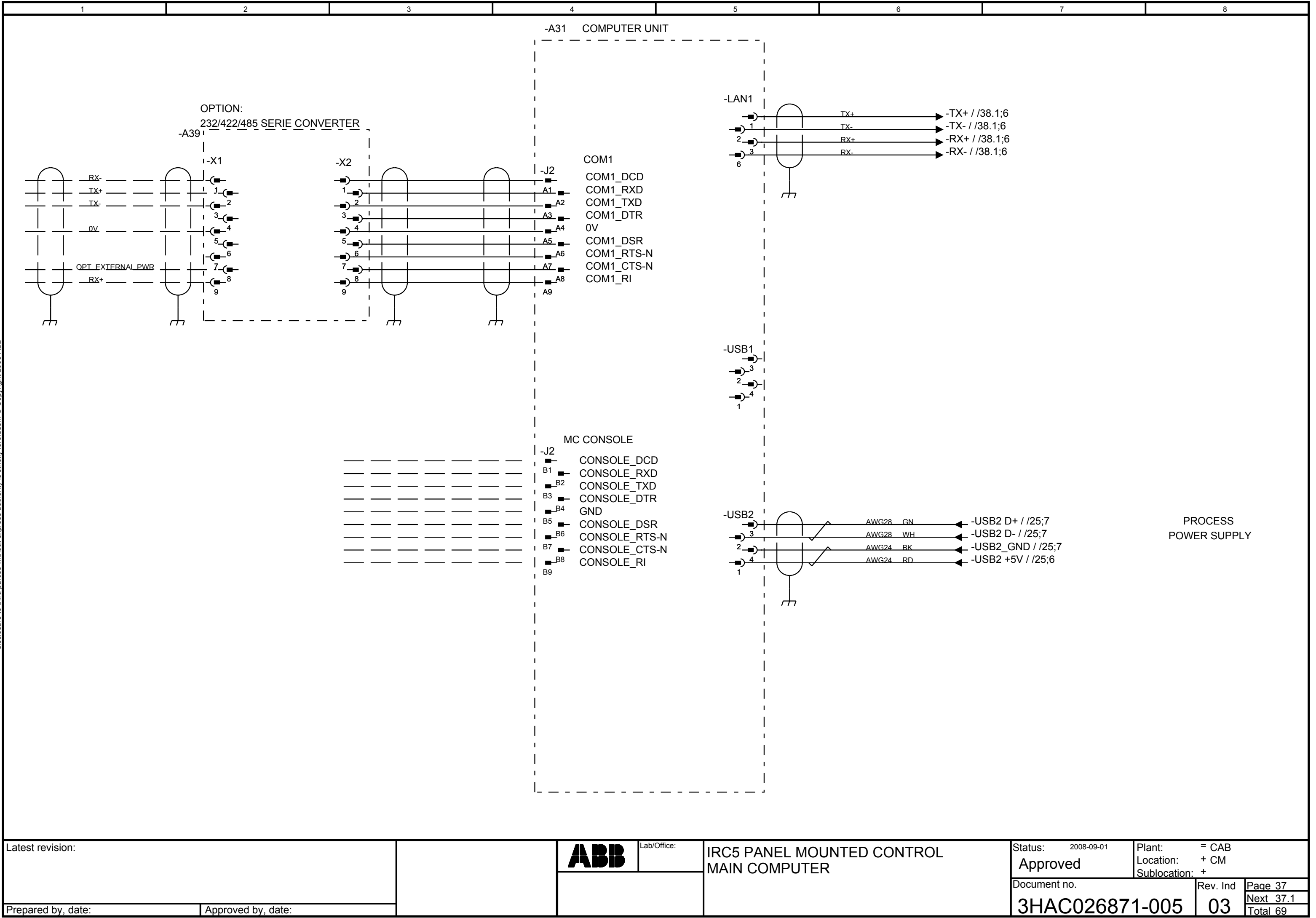
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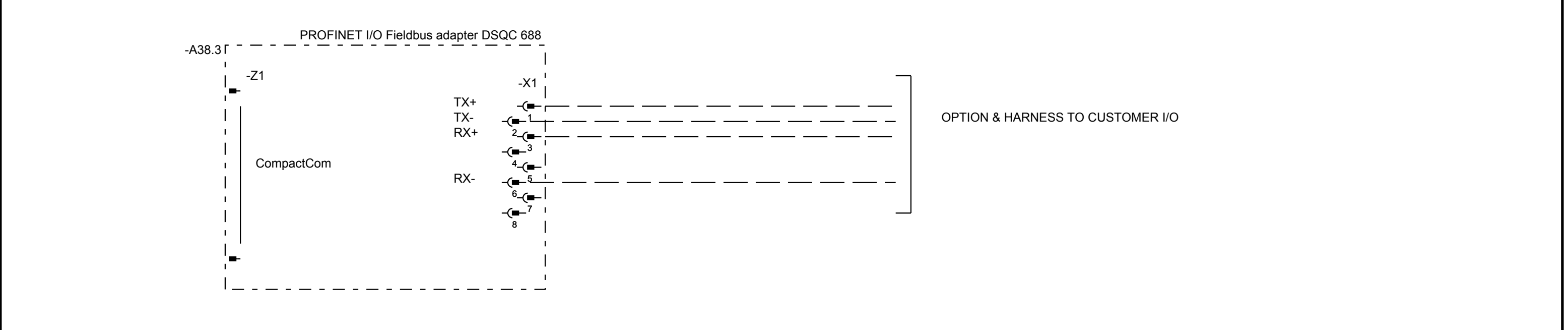
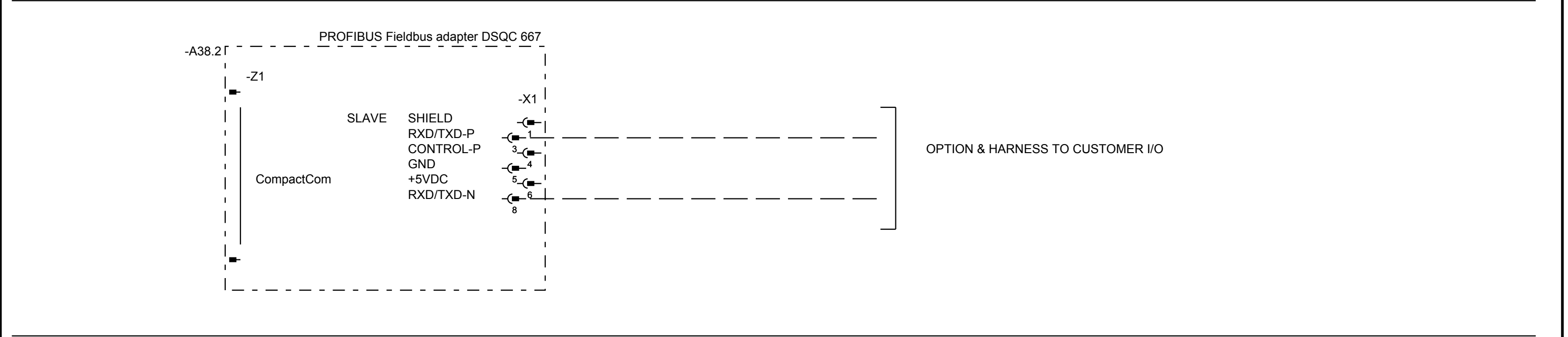
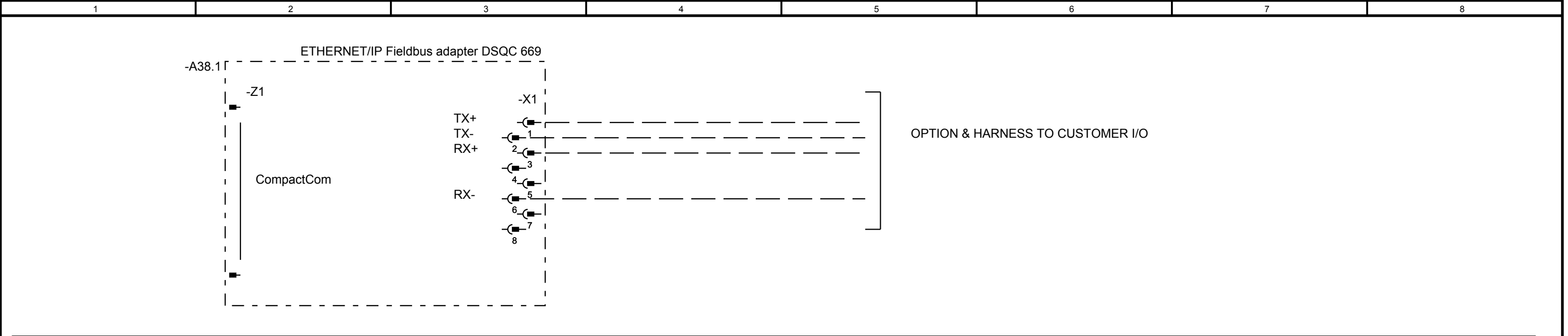
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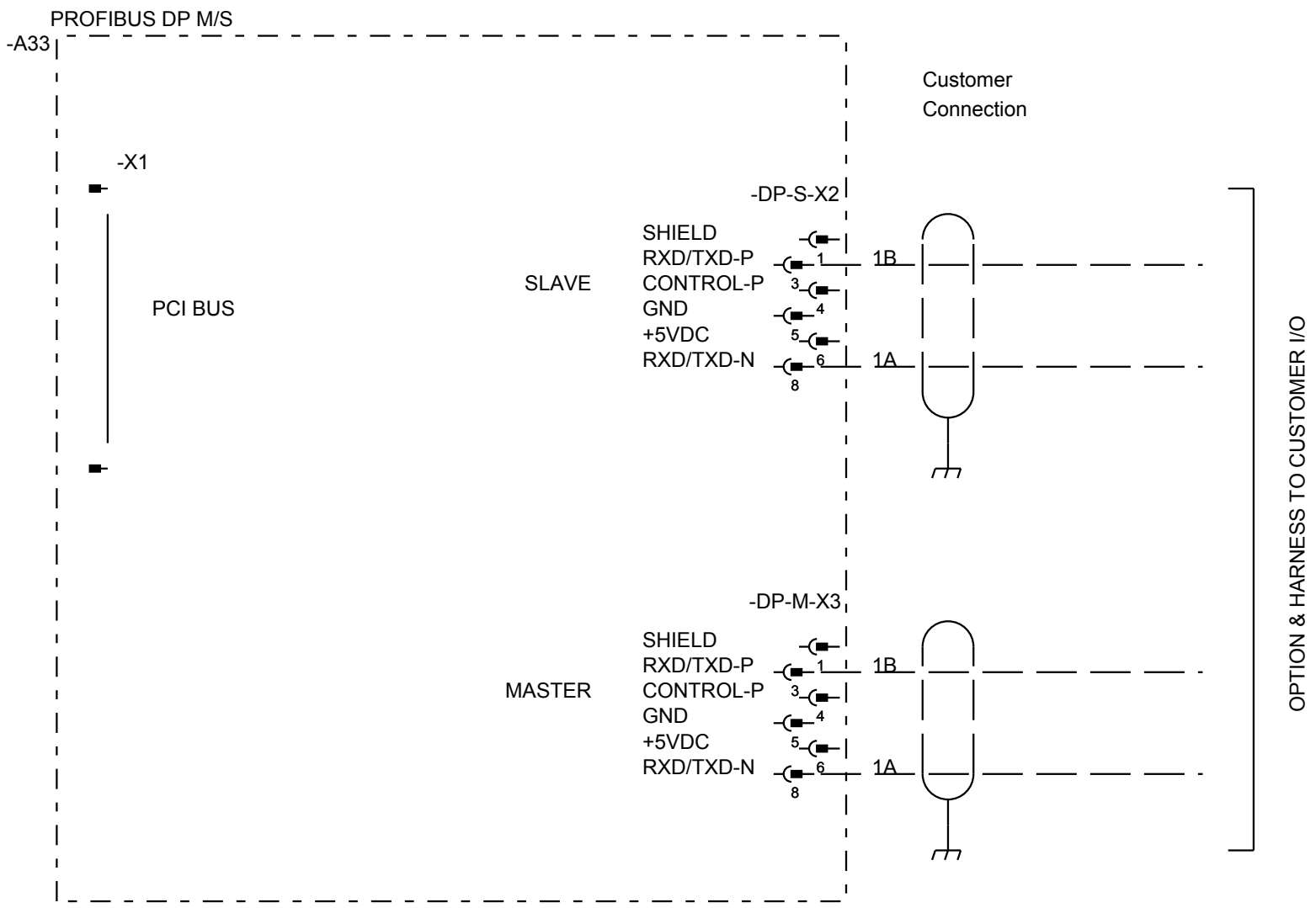
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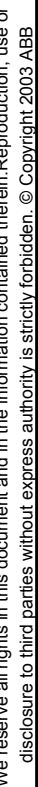
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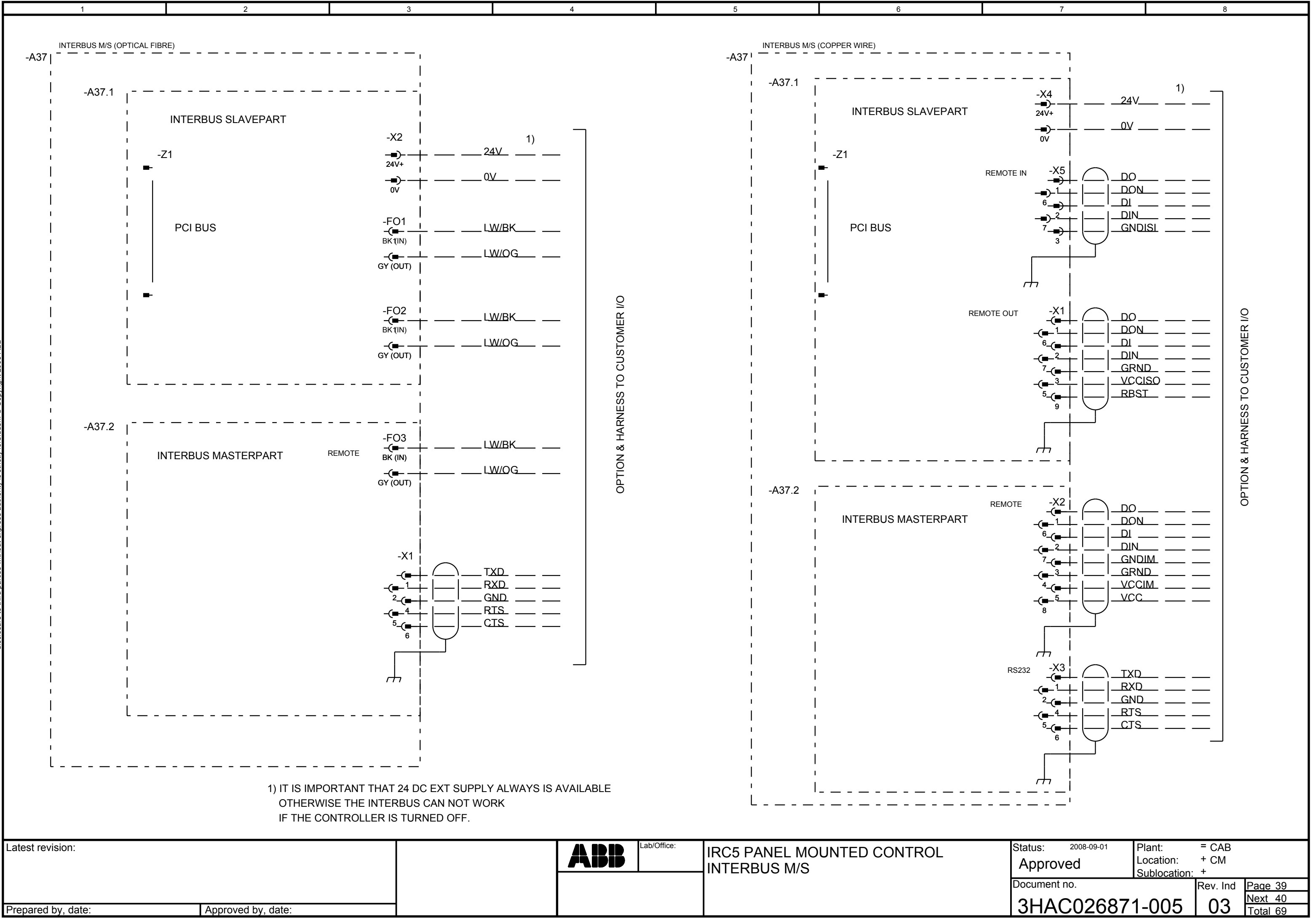
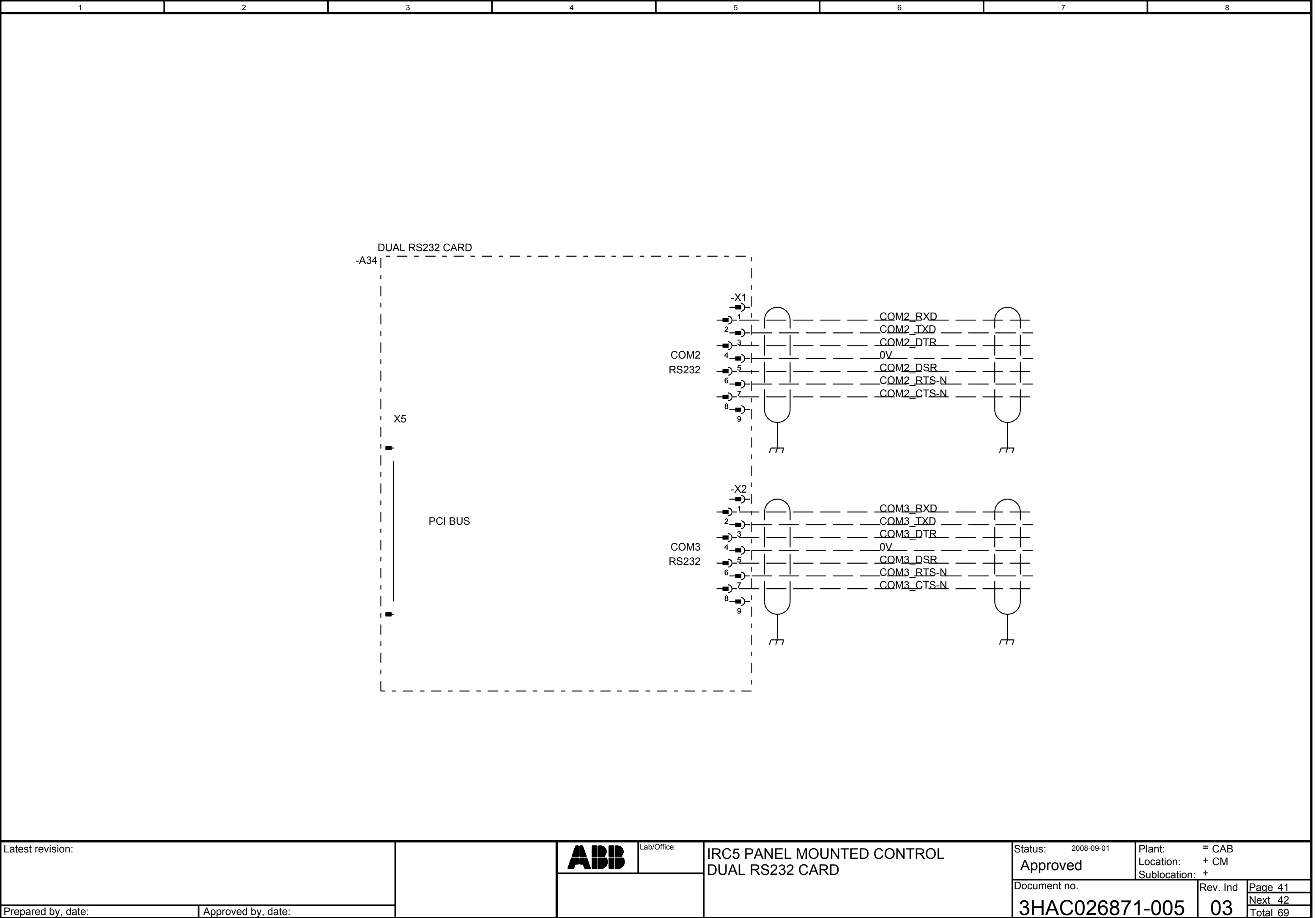
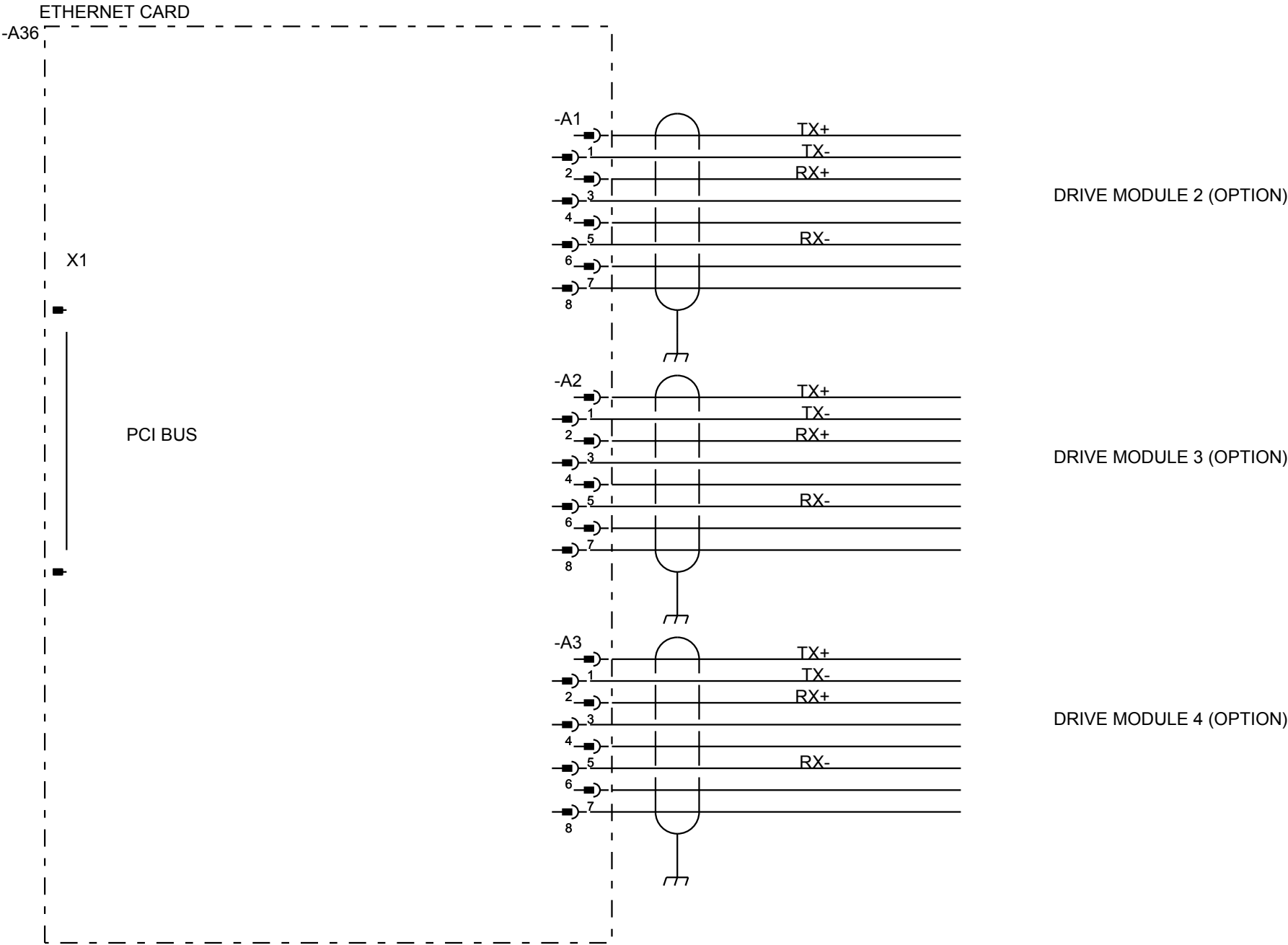




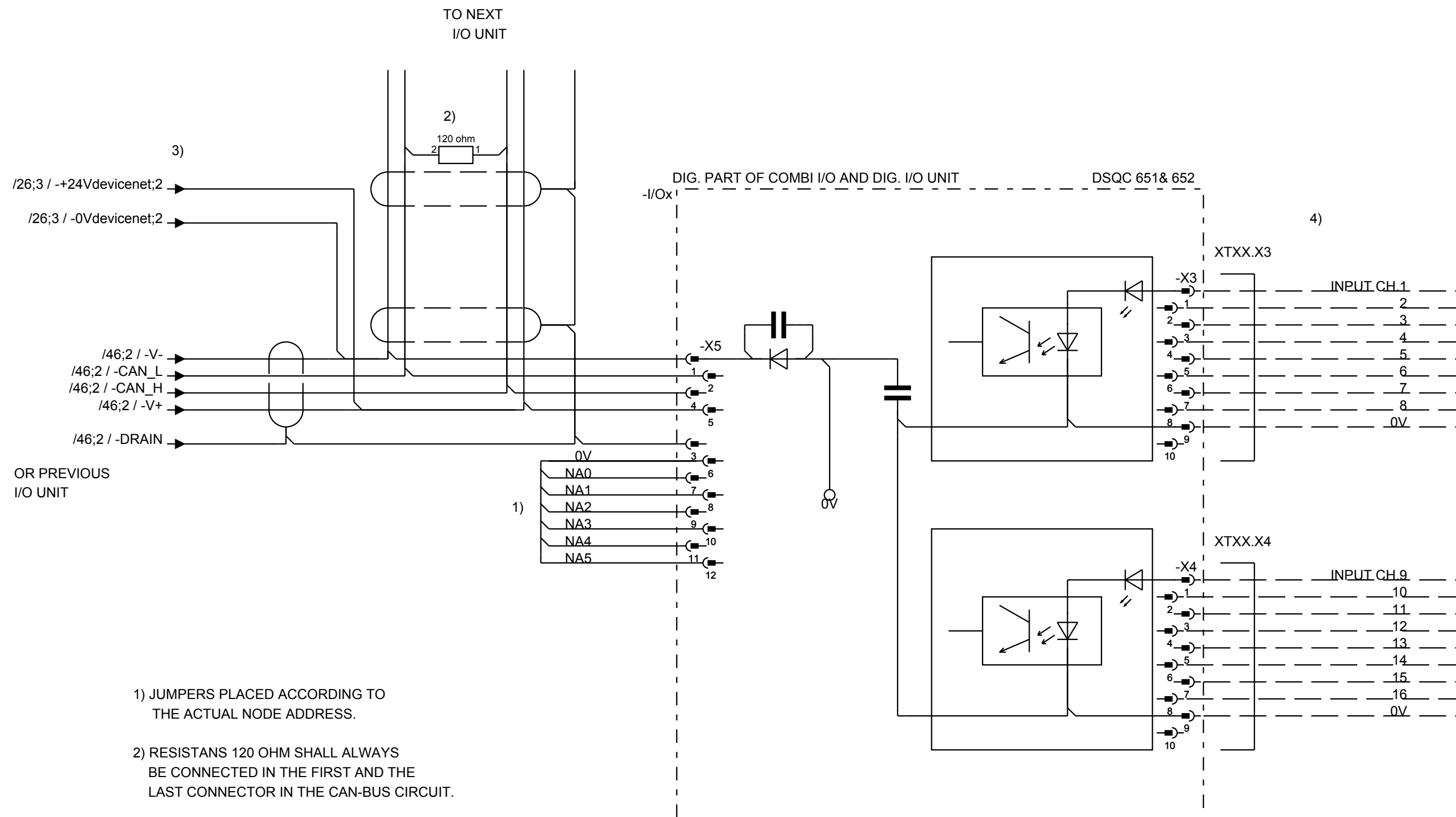
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3) CONNECTED IN THE LAST CONNECTOR IN THE CAN-BUS CIRCUIT.

4) FOR COMBI I/O DSQC 651, 8 INPUT, NO X4.
FOR DIGITAL I/O DSQC 652, 16 INPUT, X3 AND X4.

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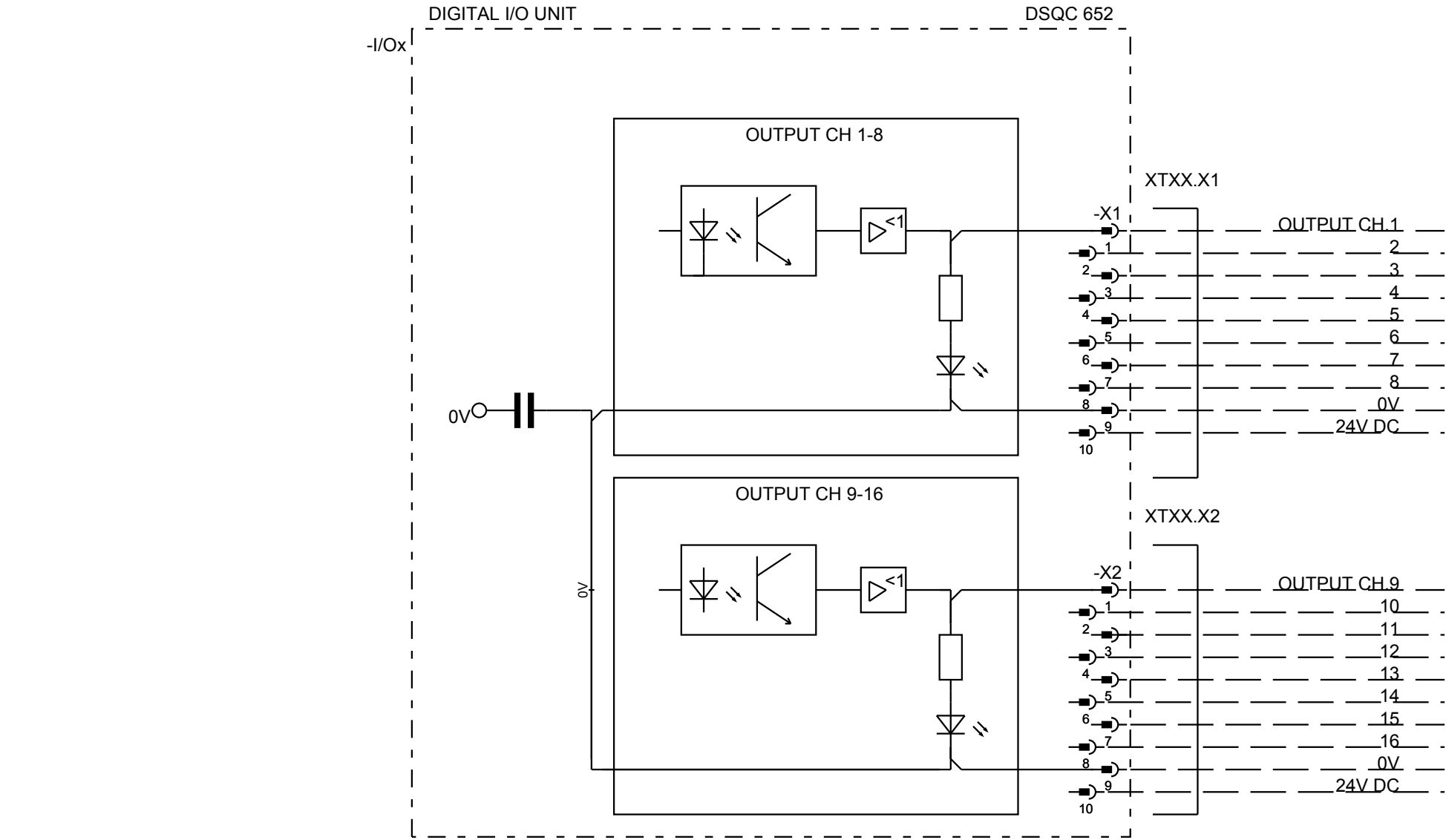
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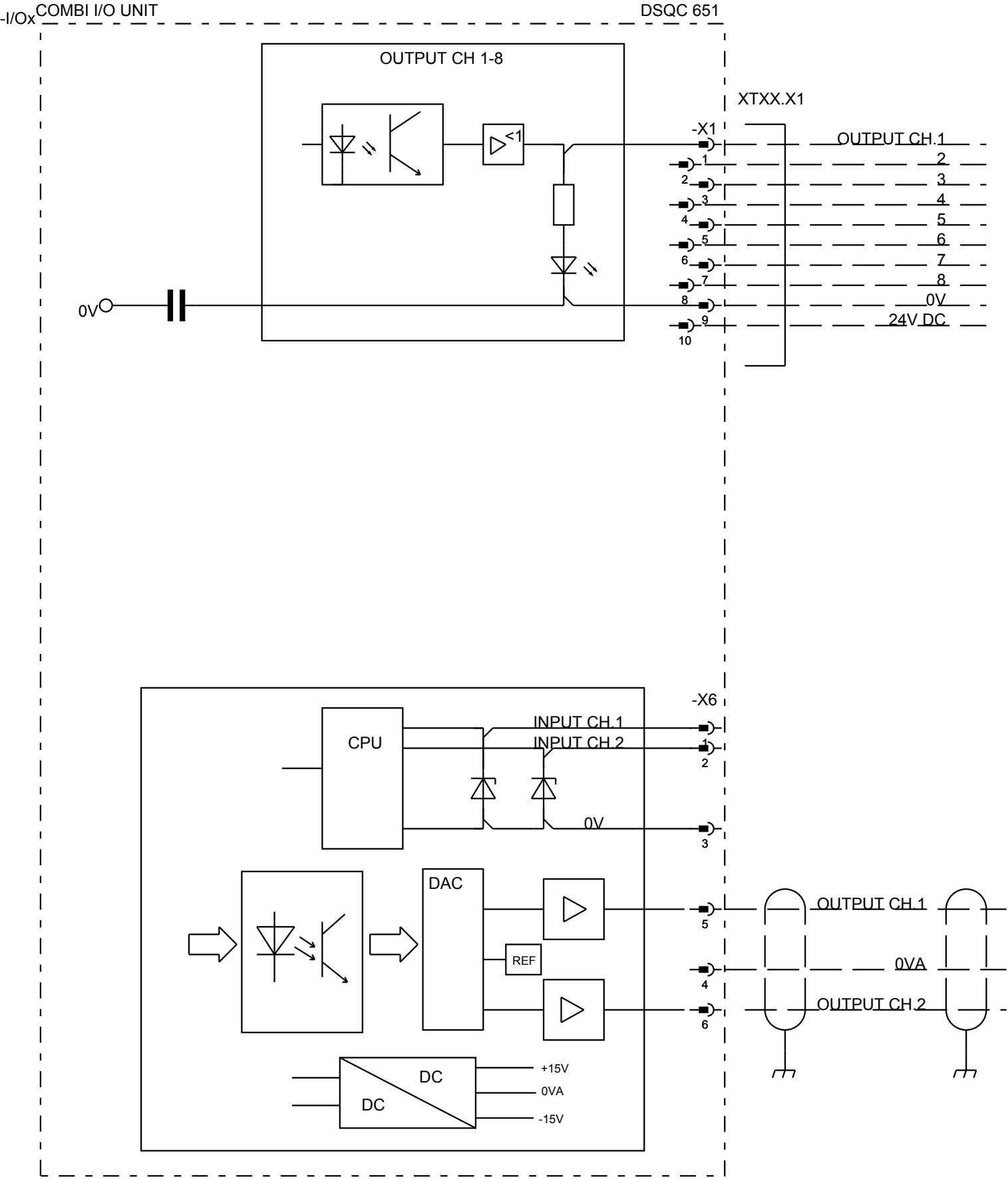
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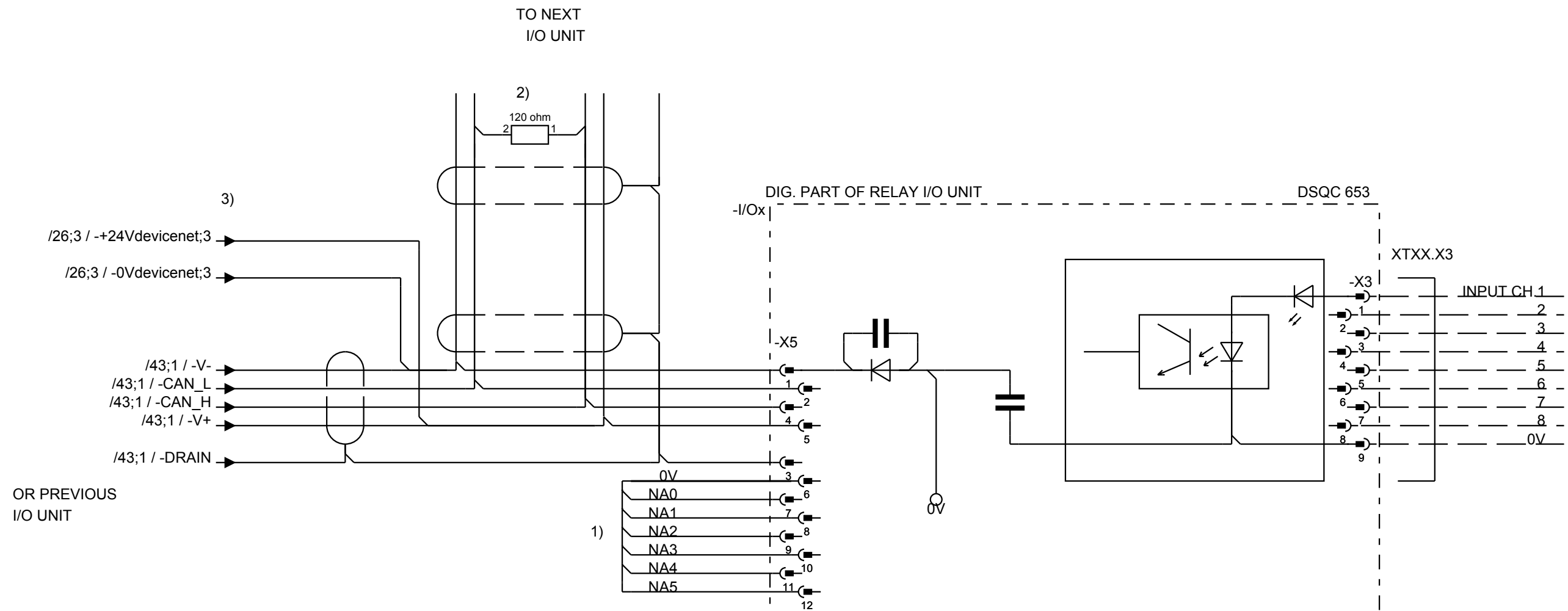
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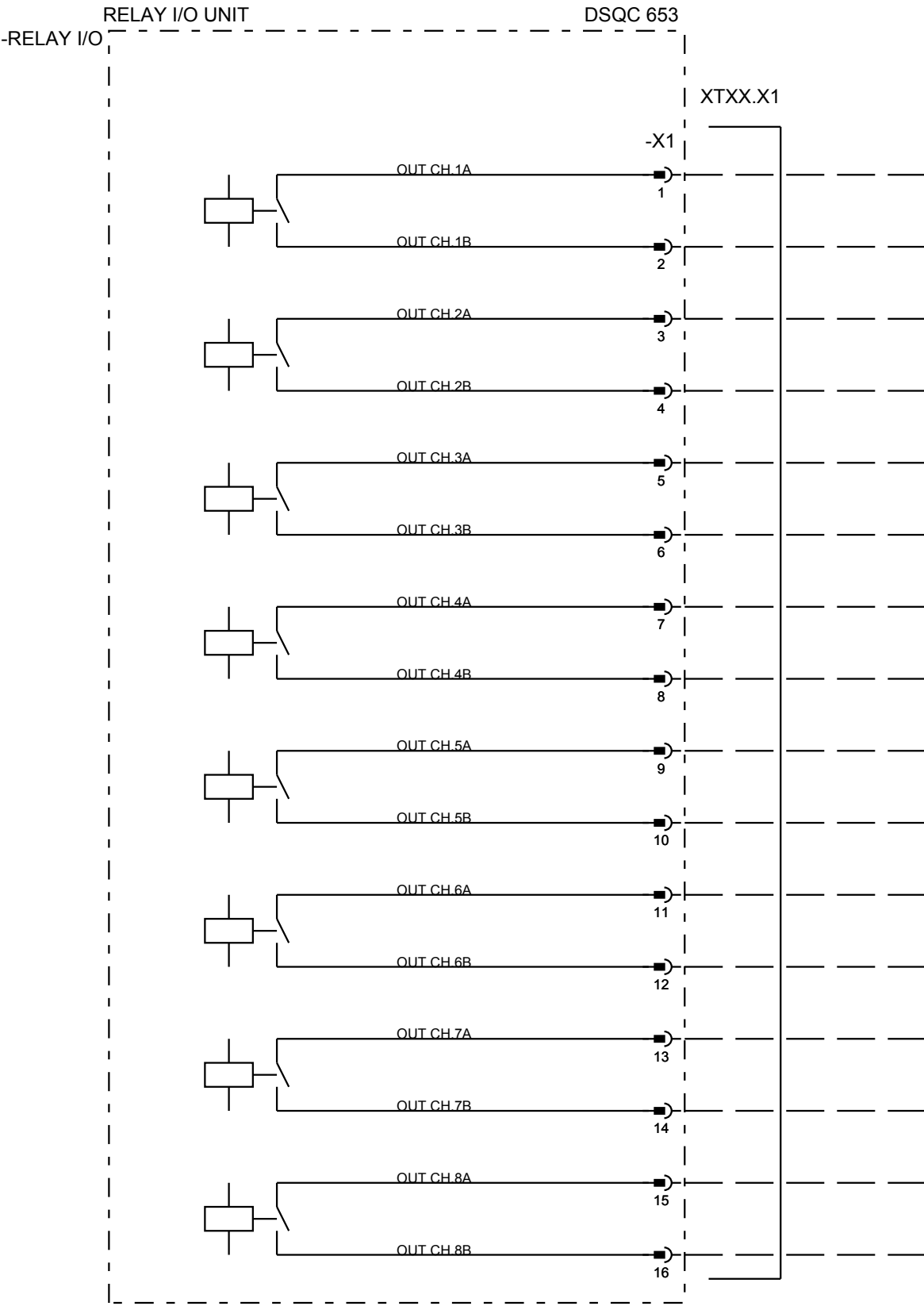




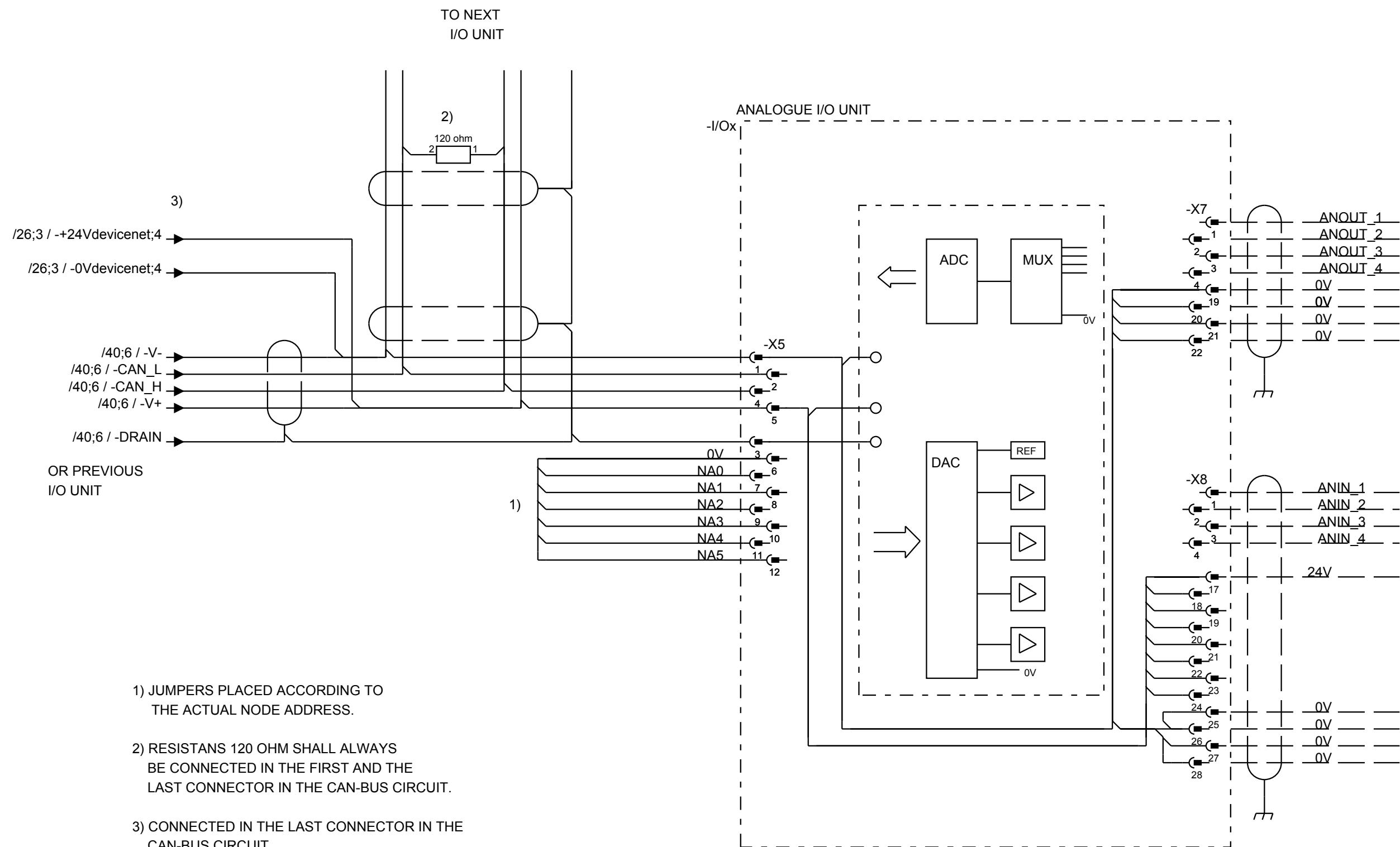
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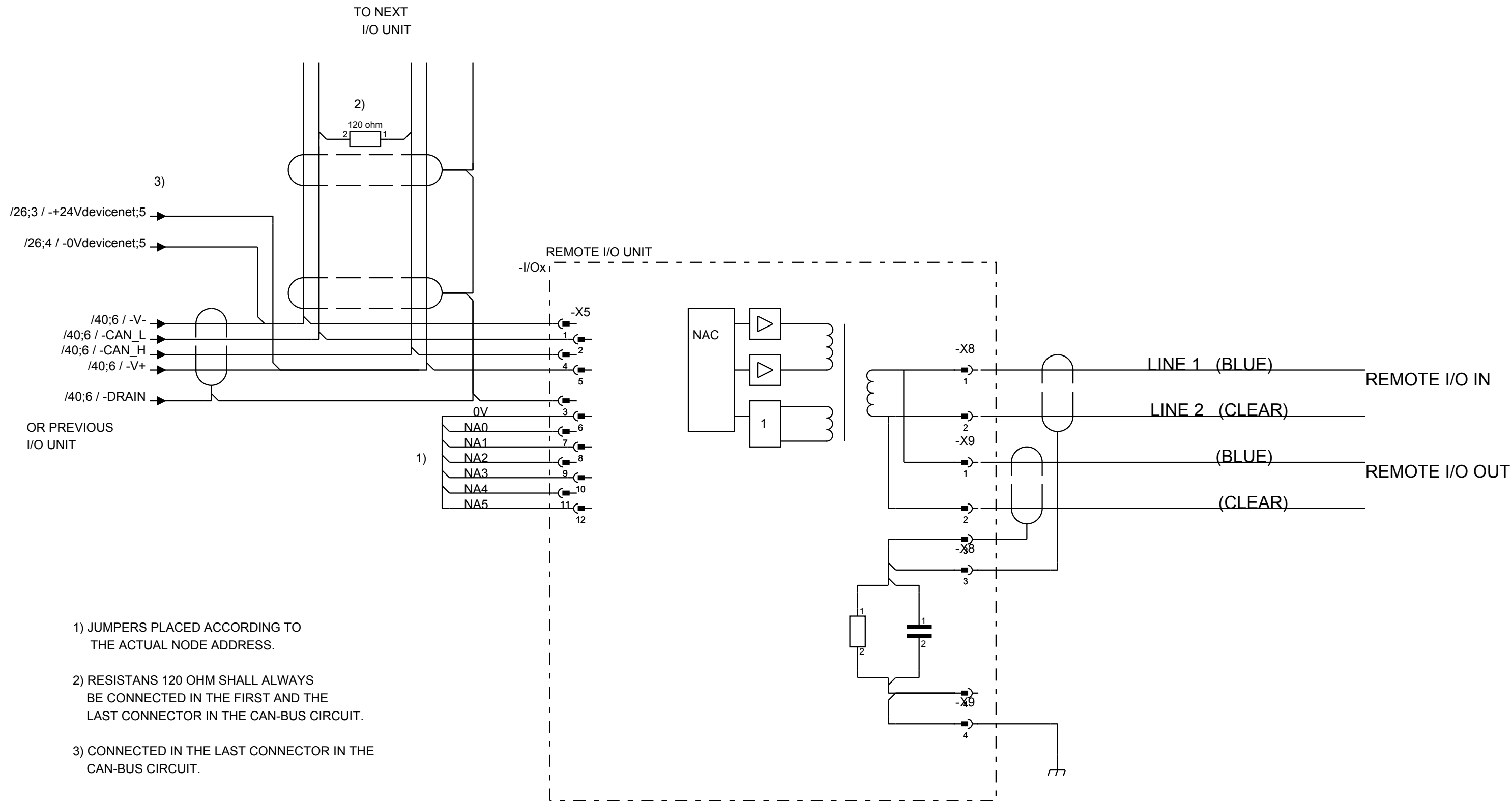
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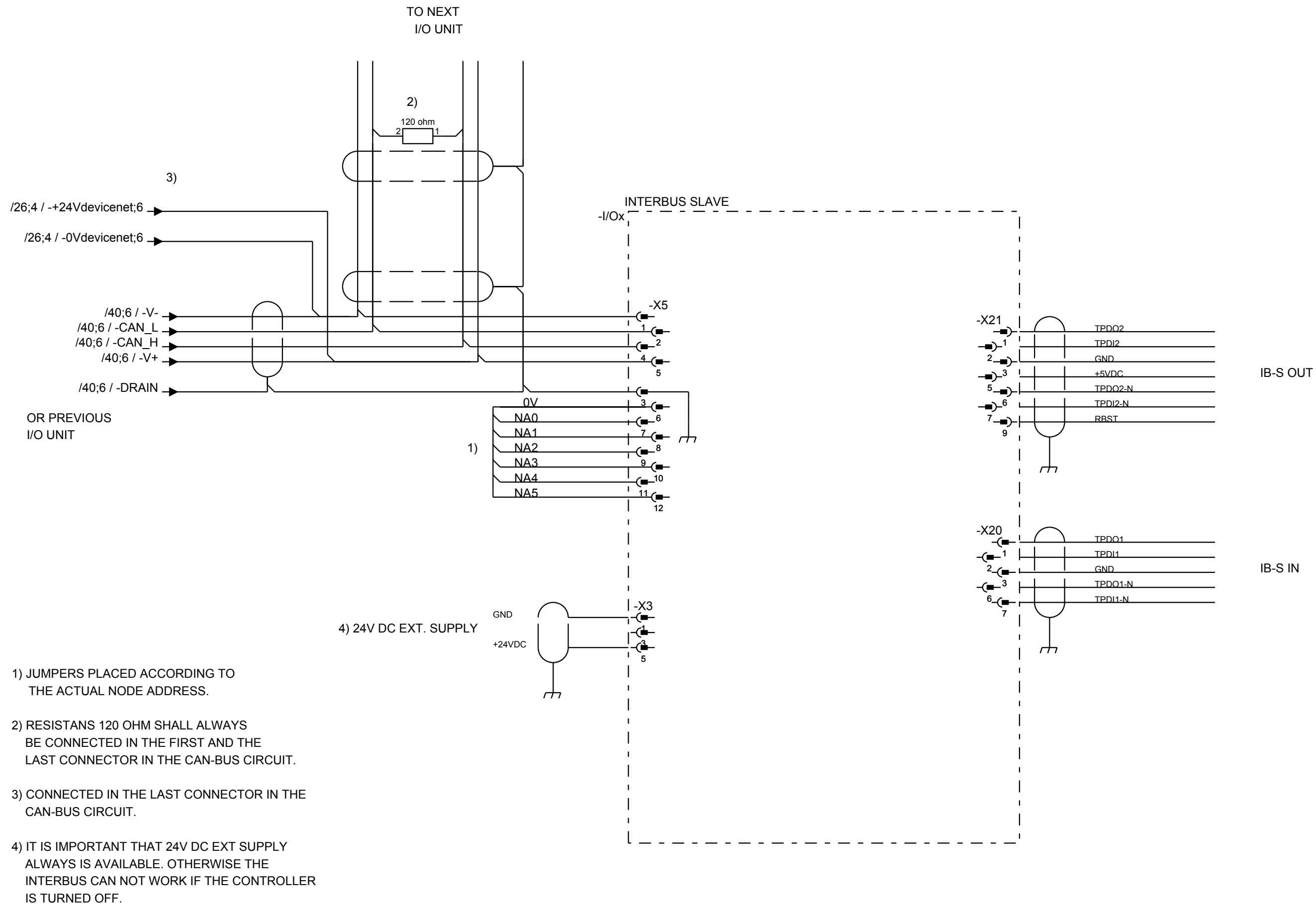
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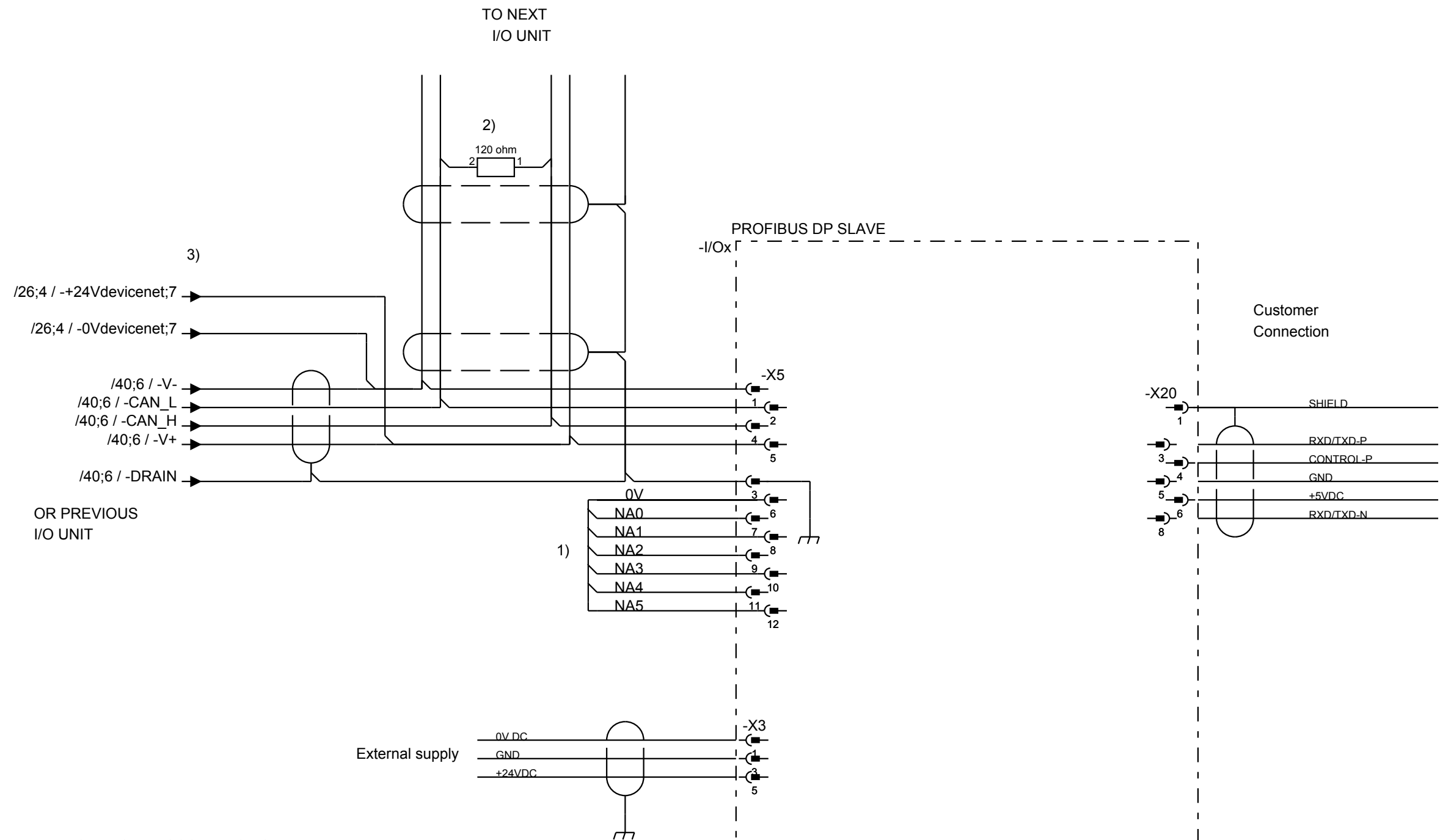
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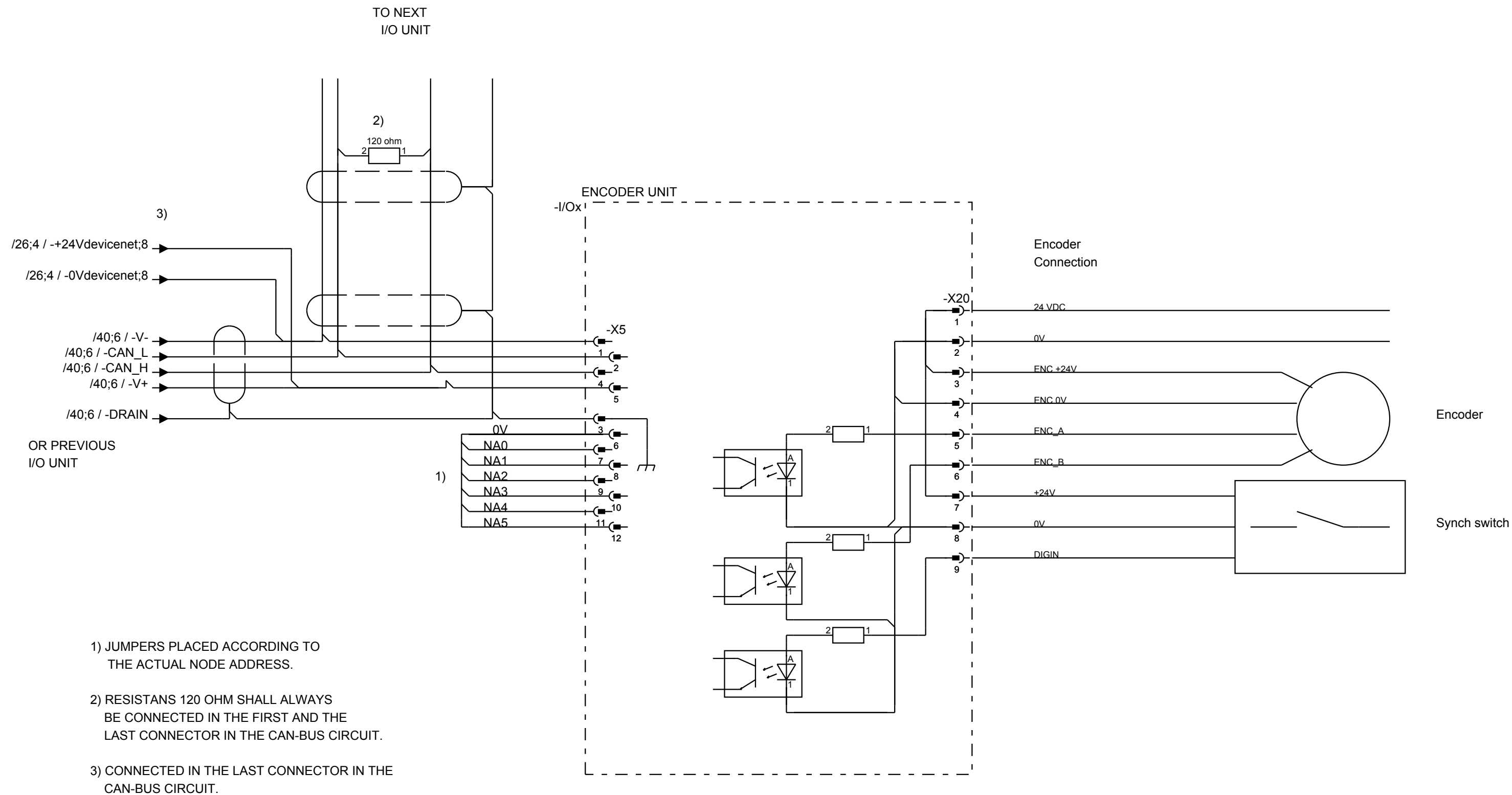
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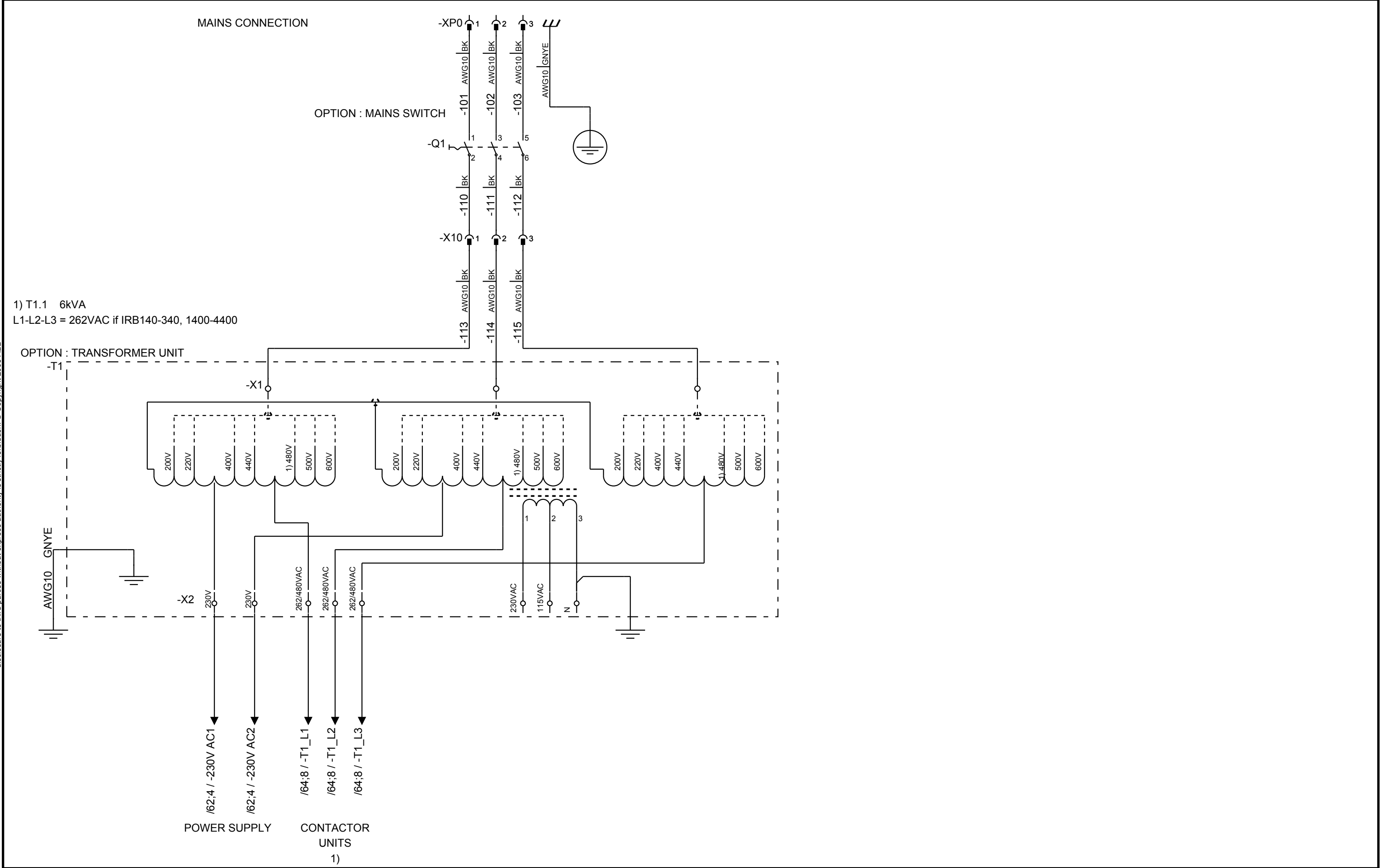
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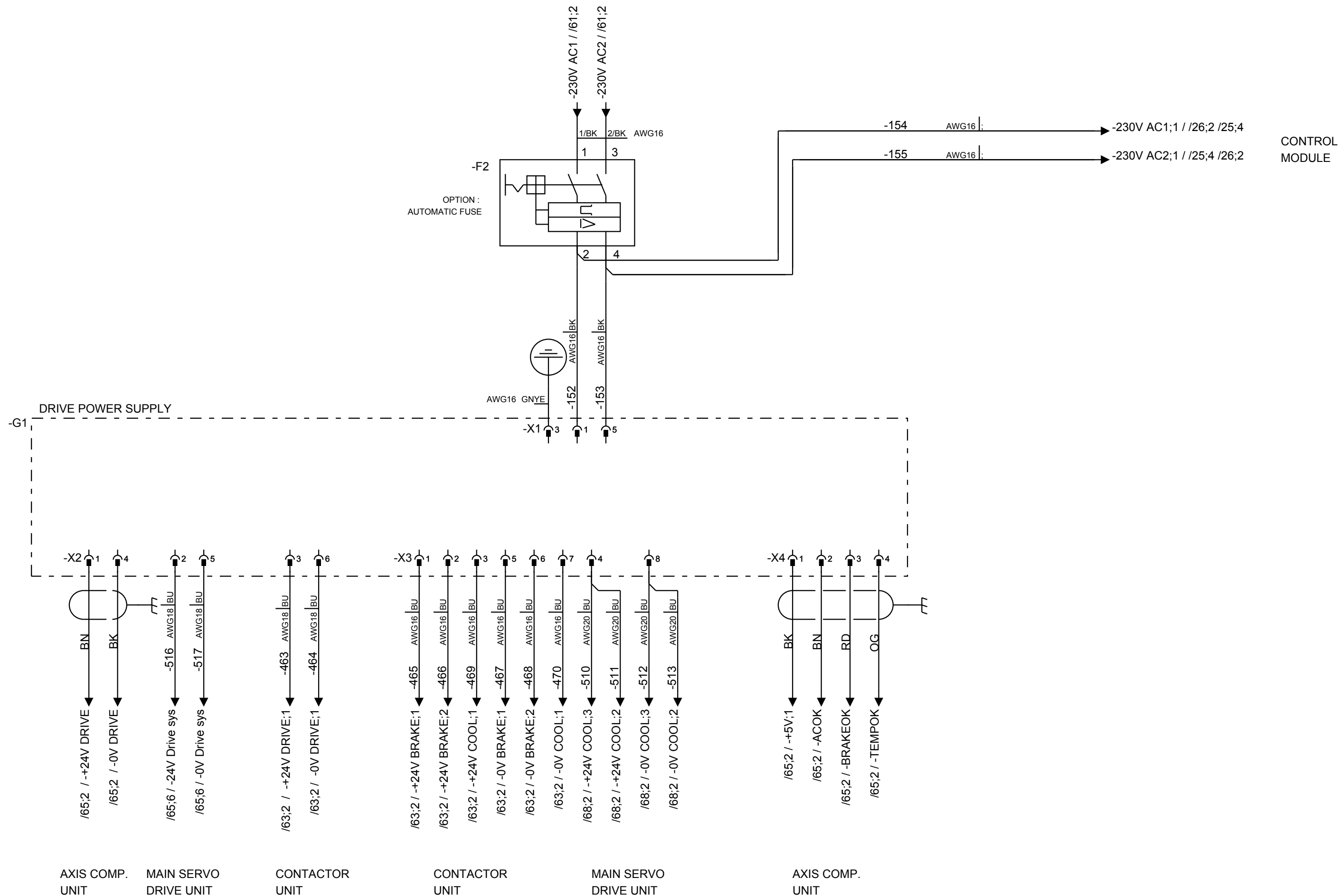
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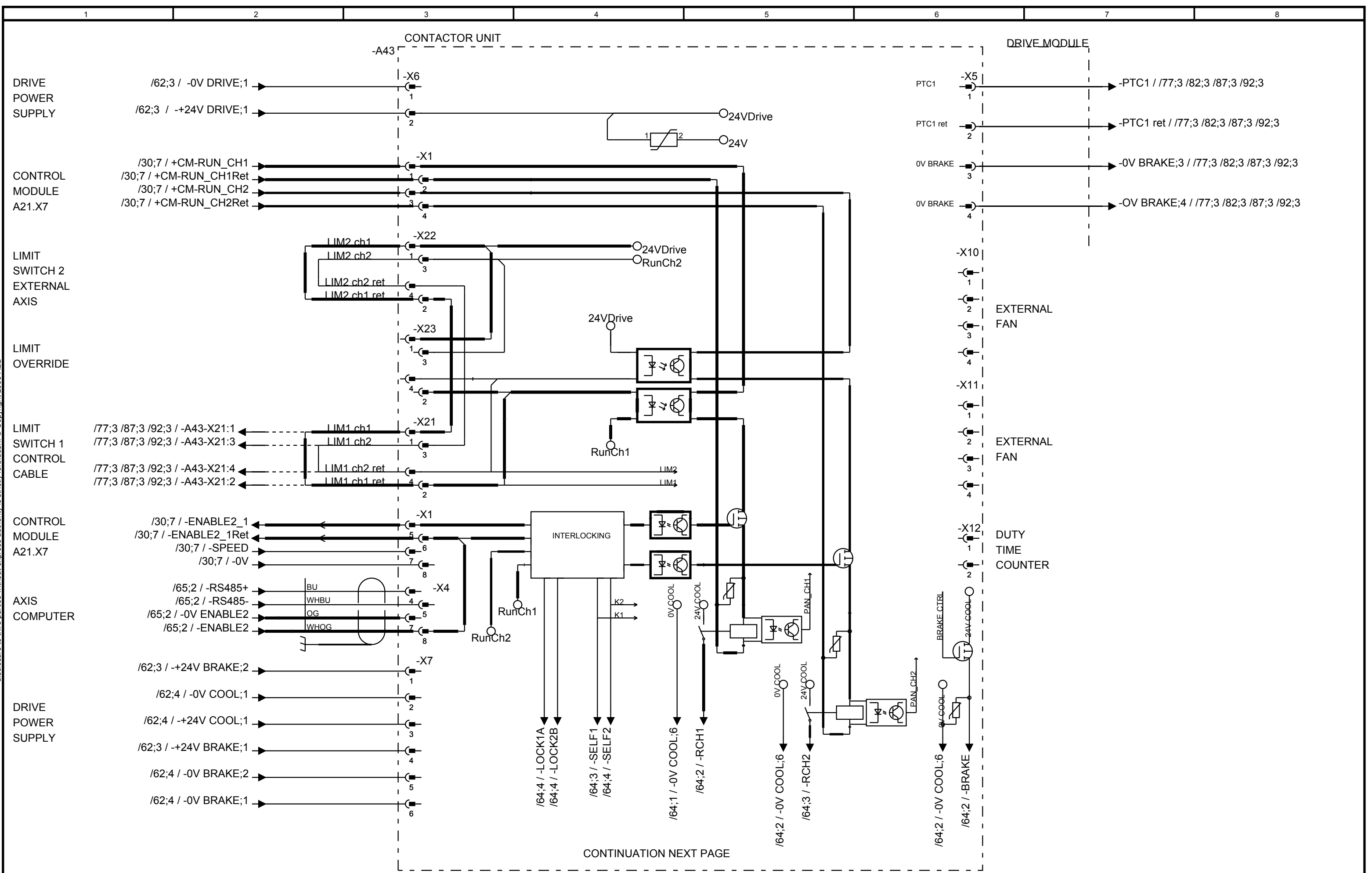



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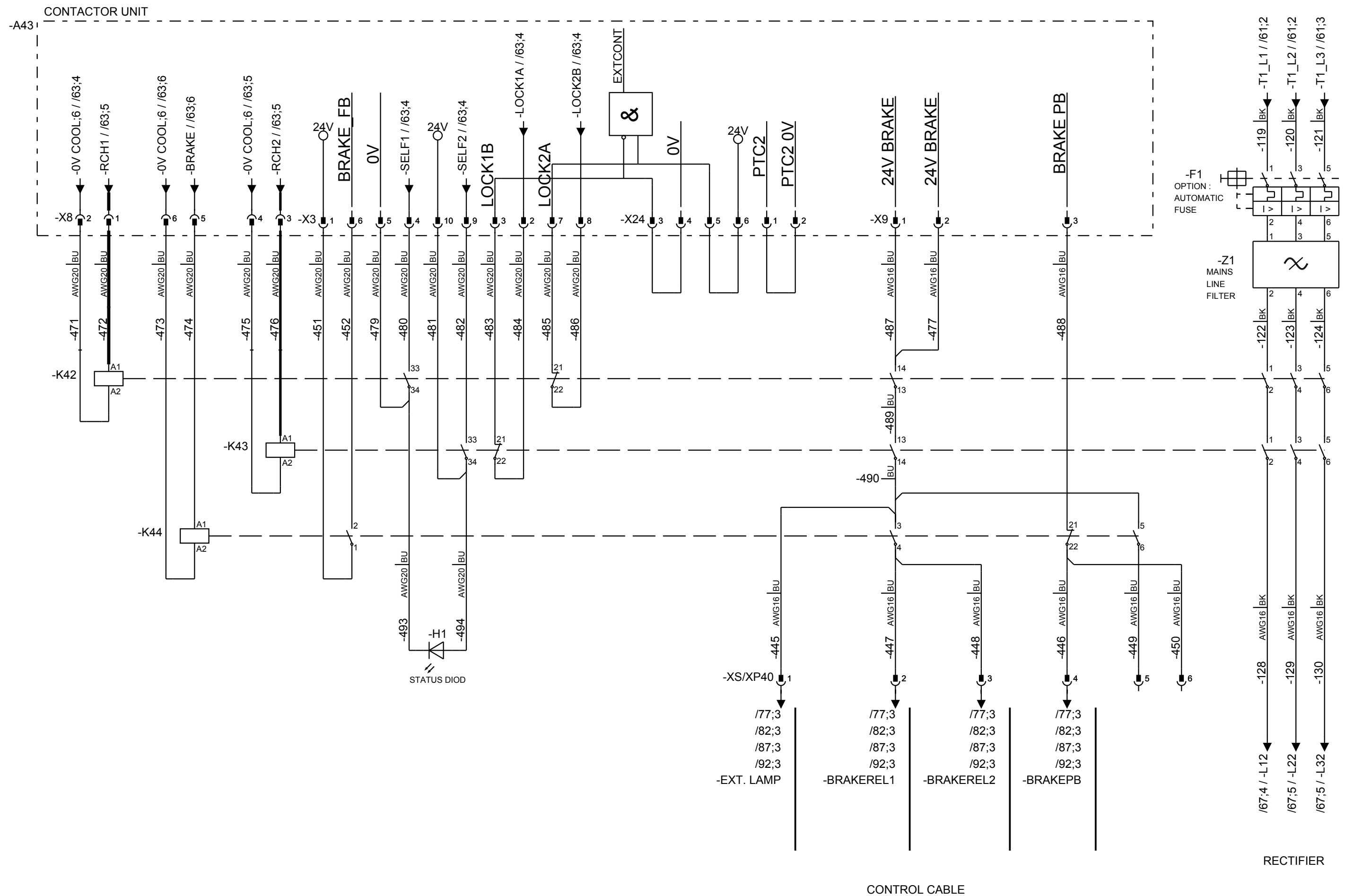
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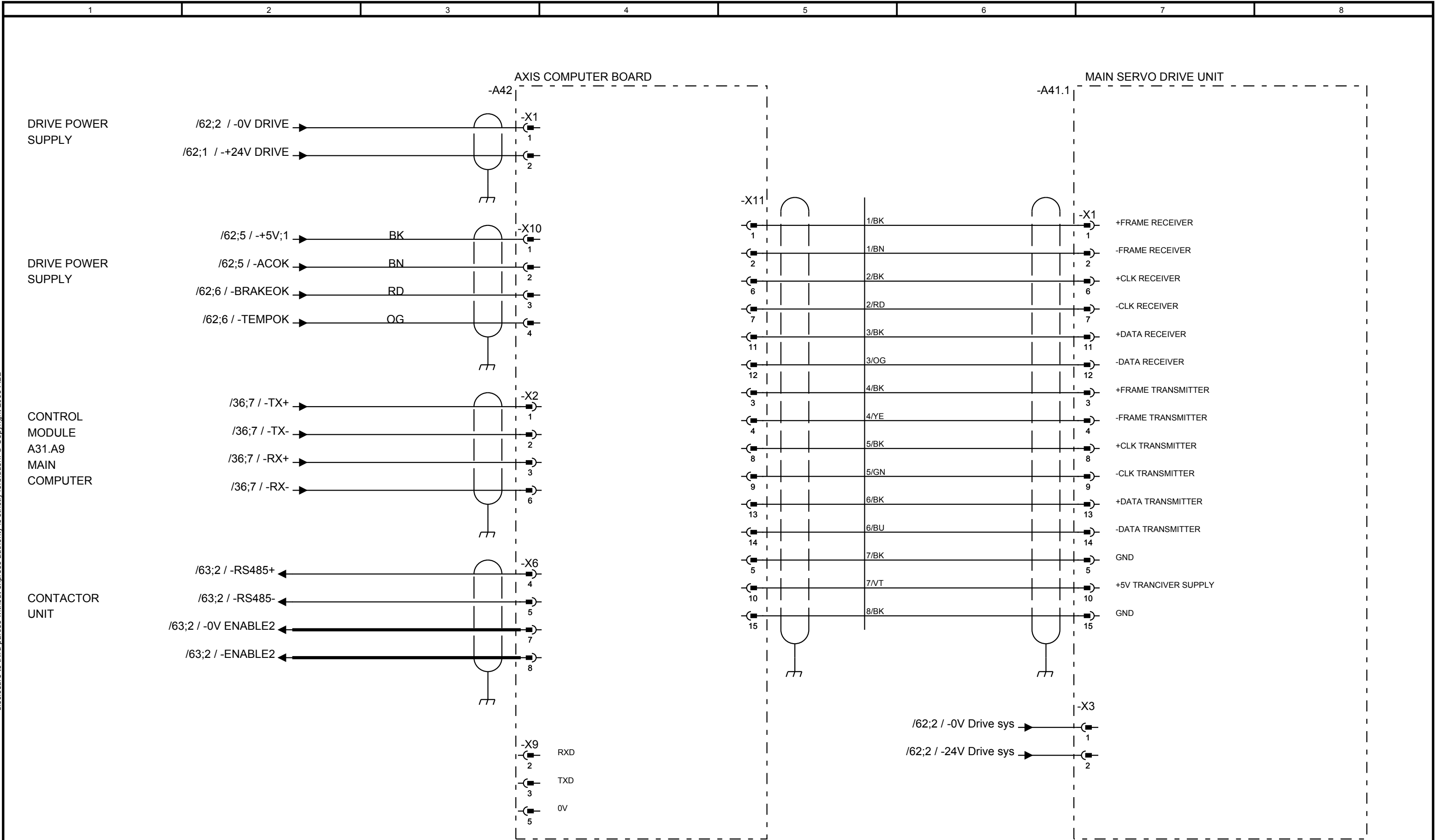
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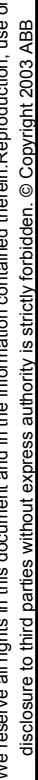
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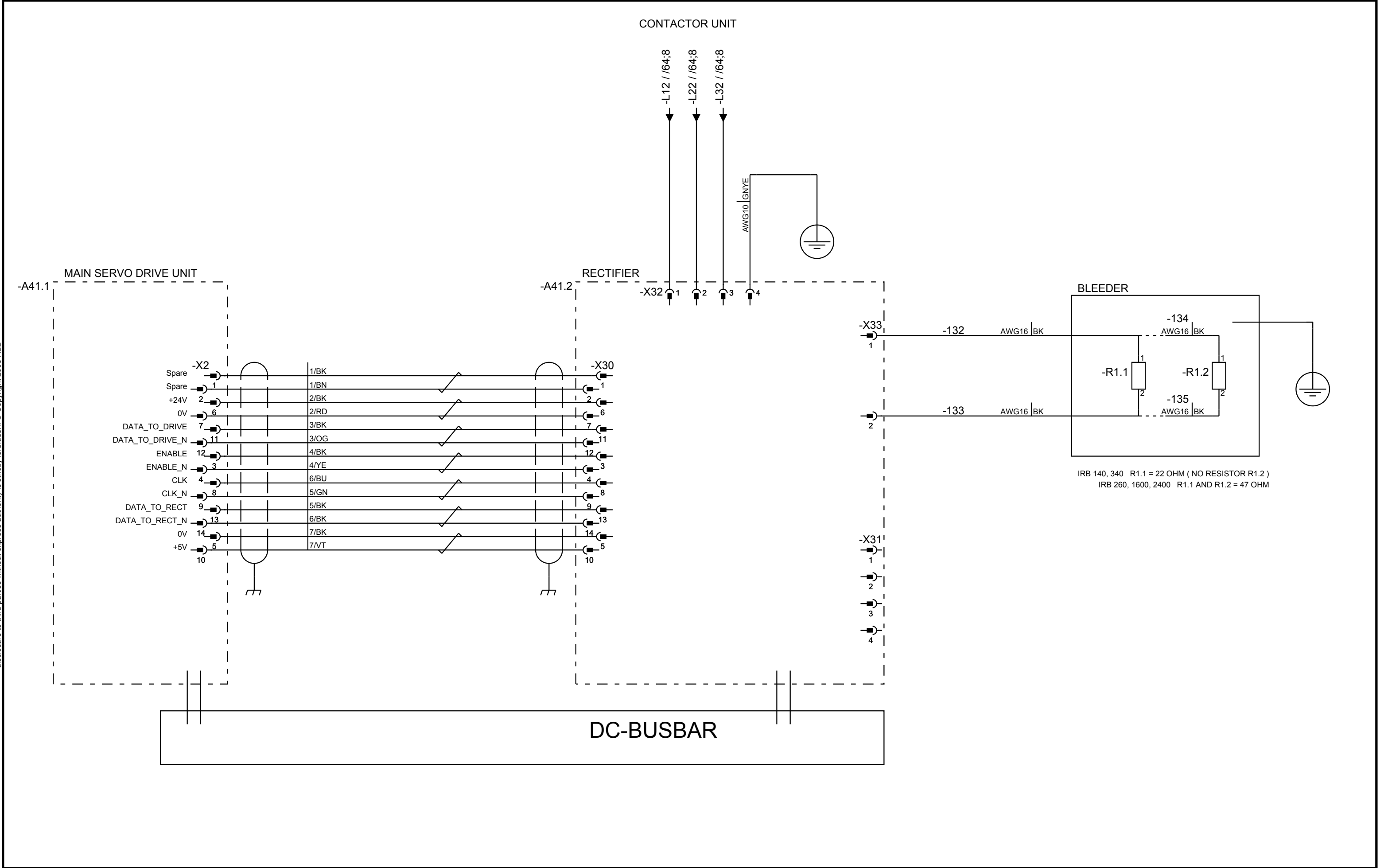
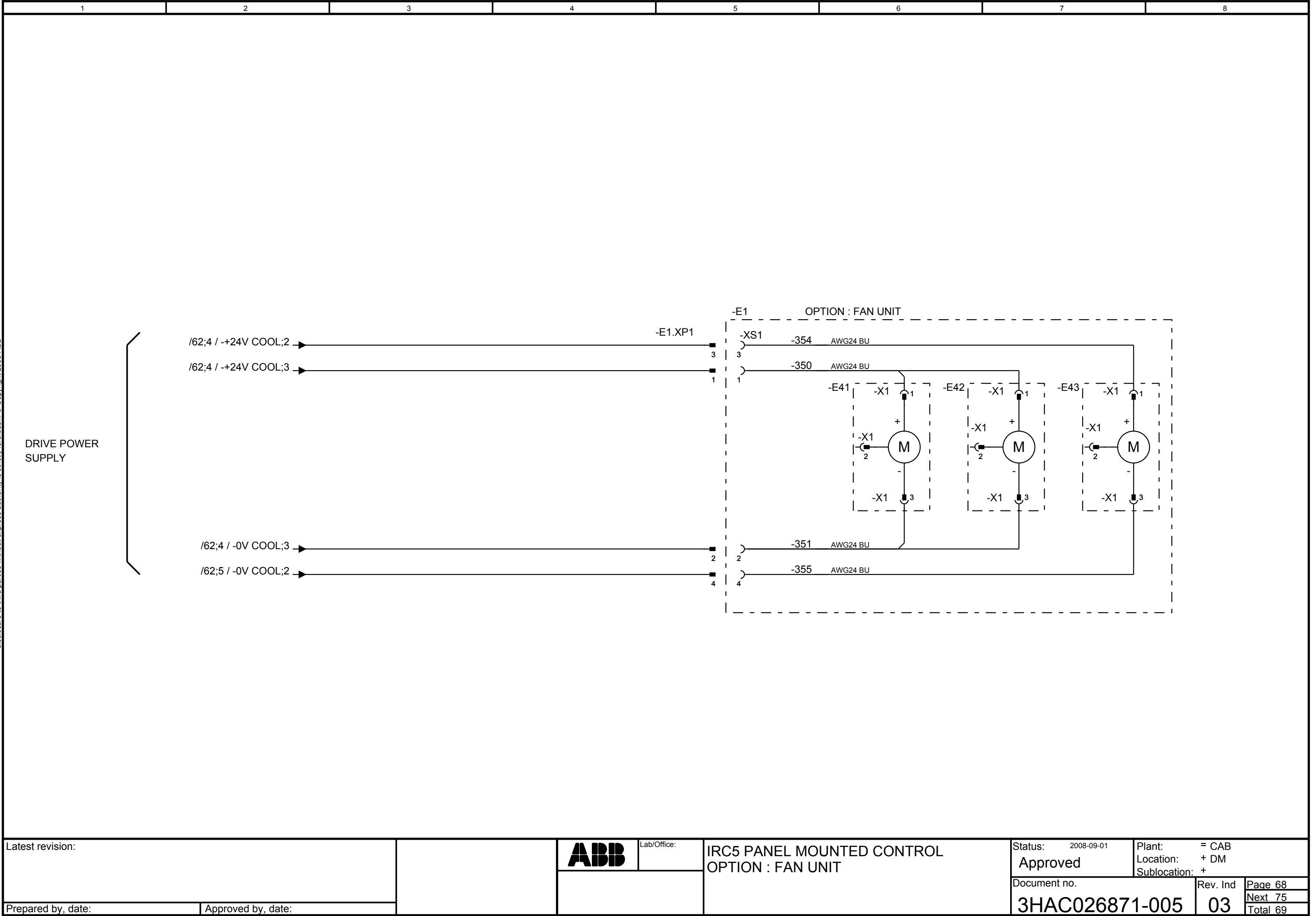


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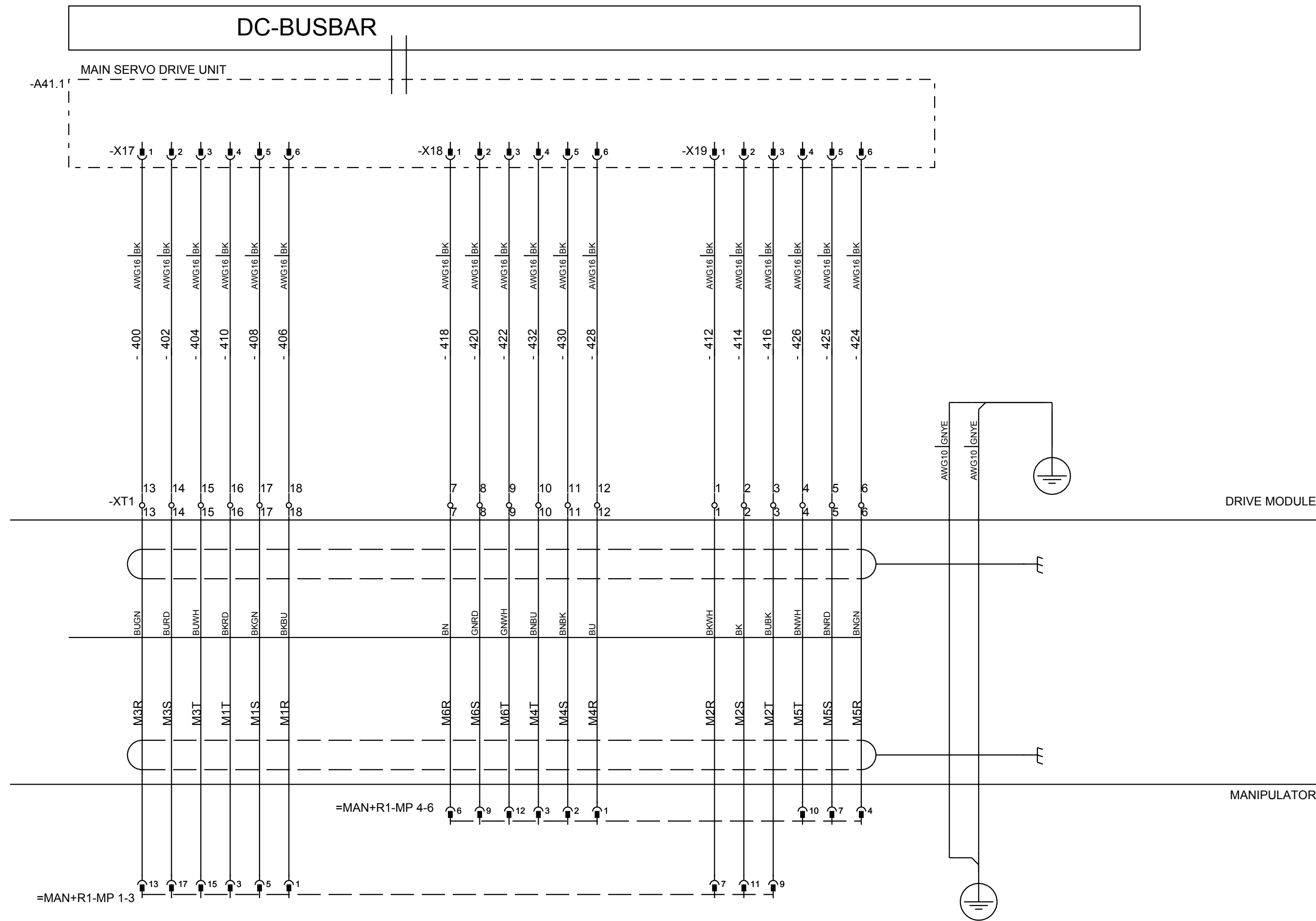
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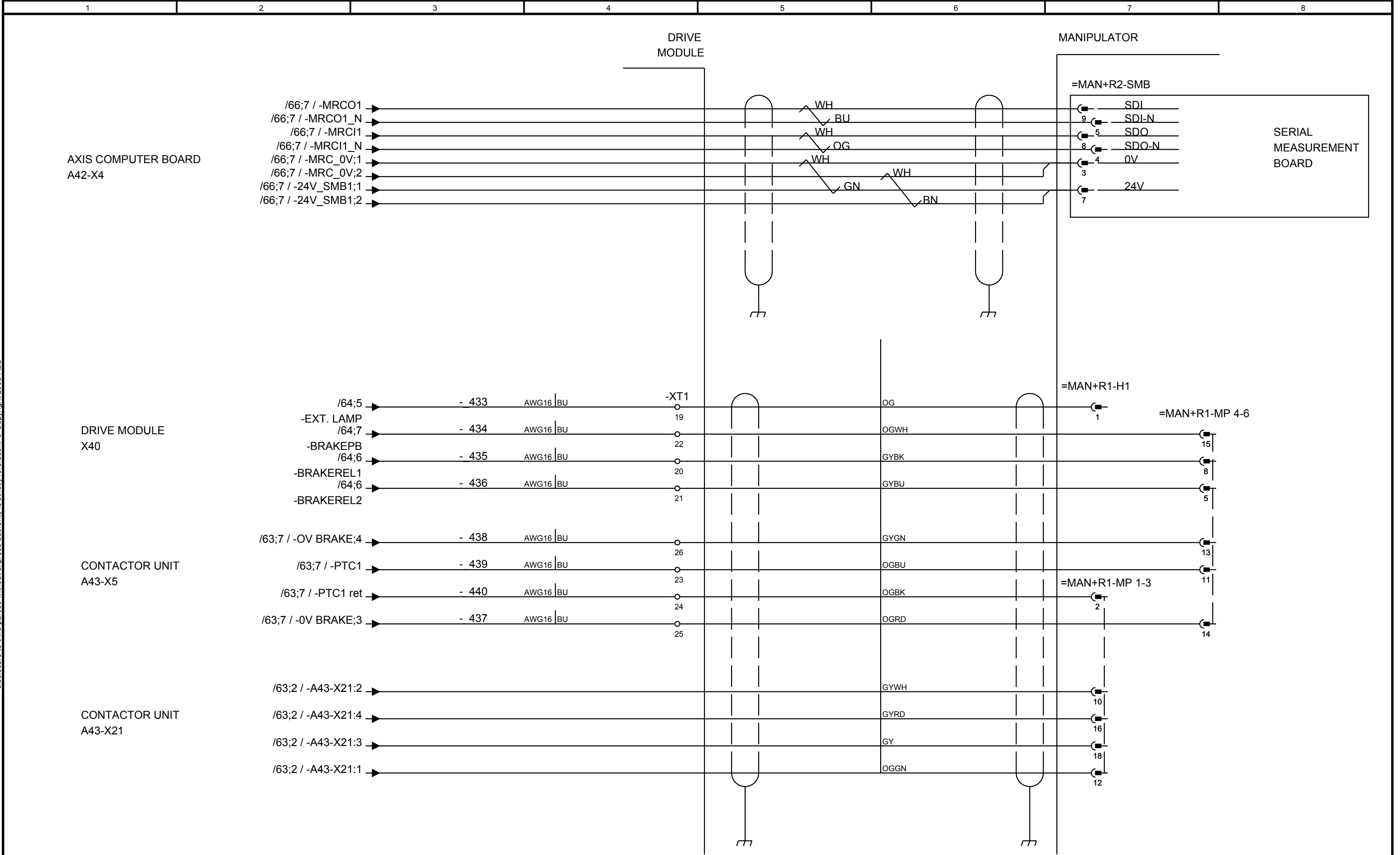
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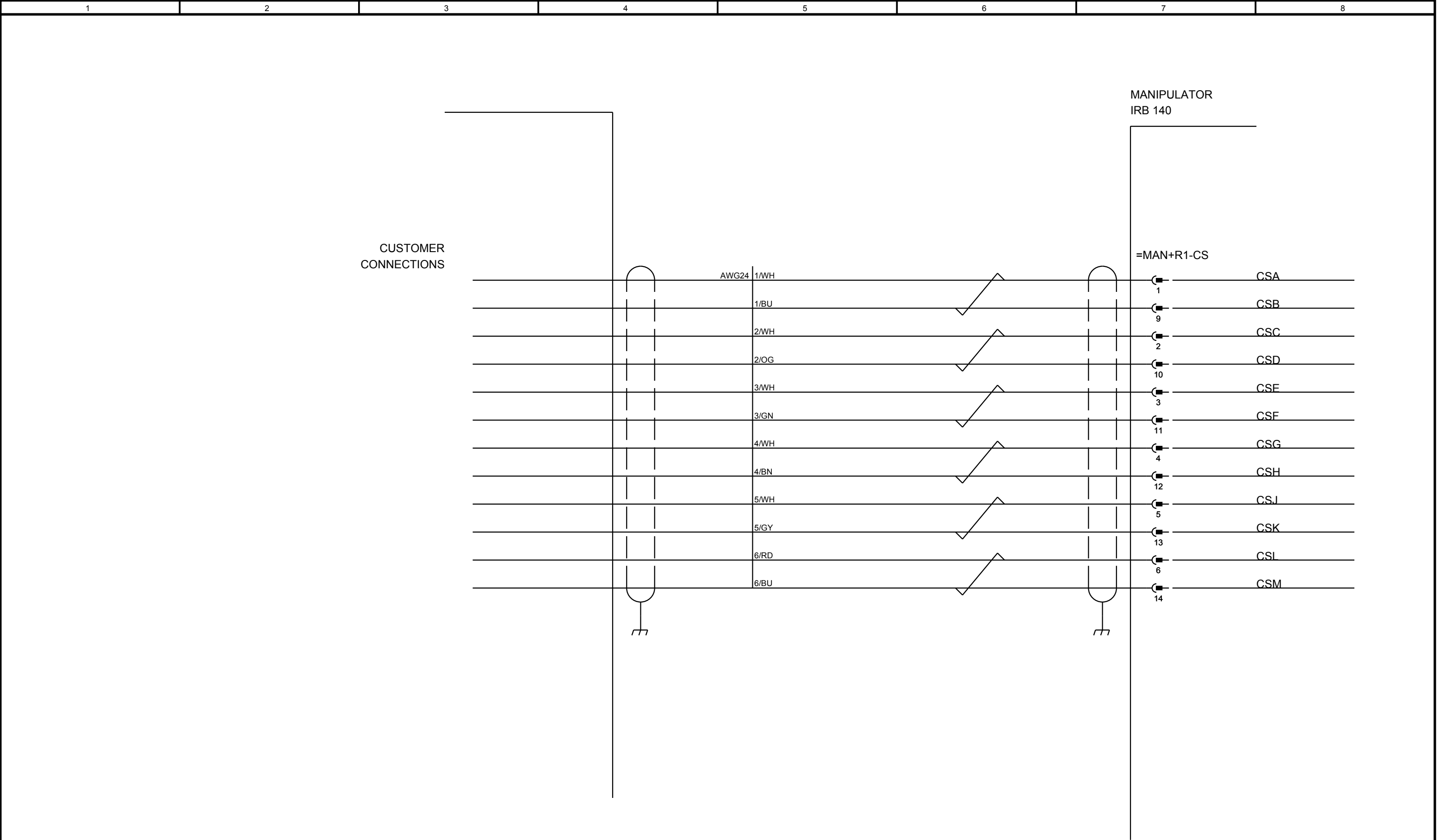
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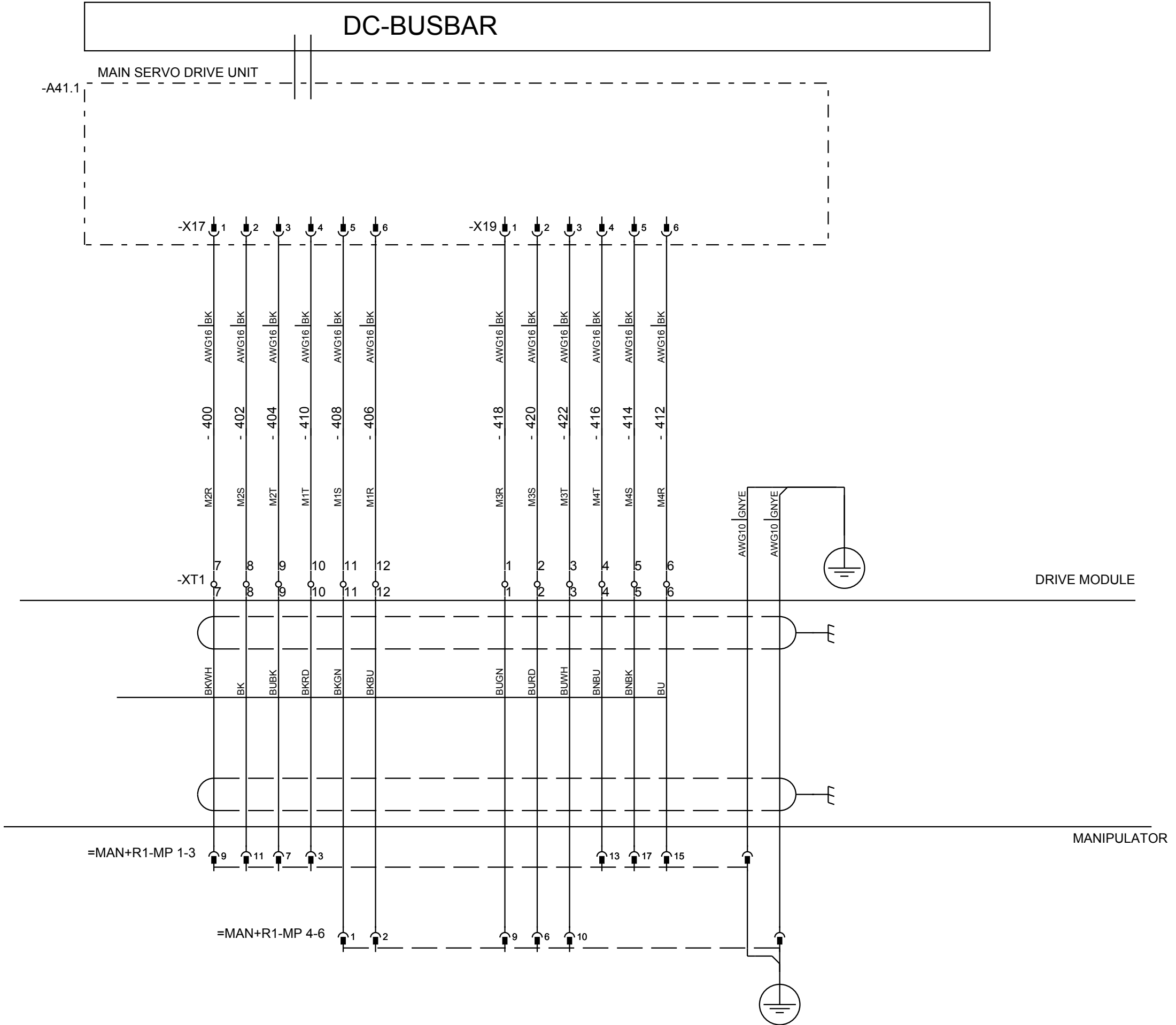


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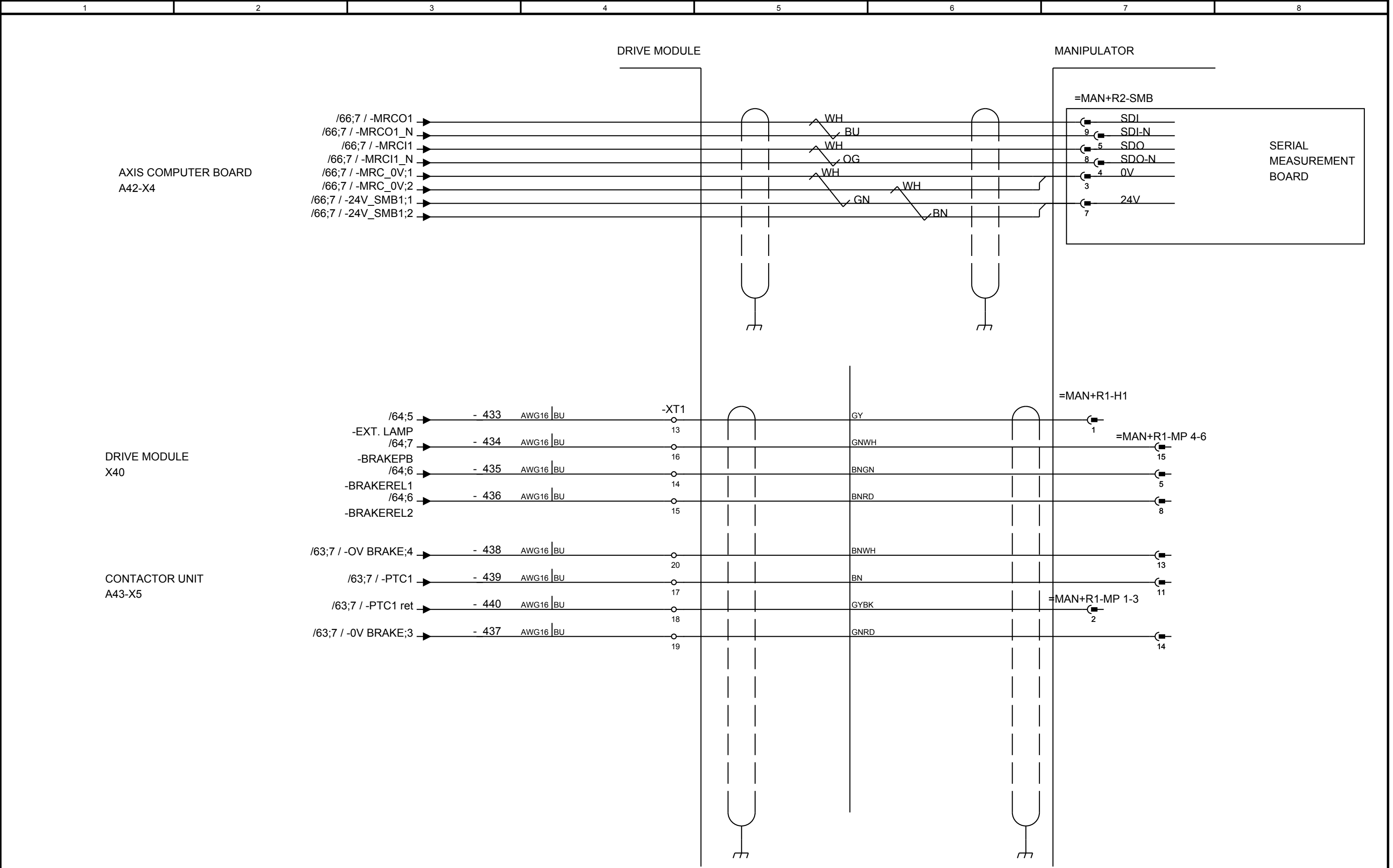
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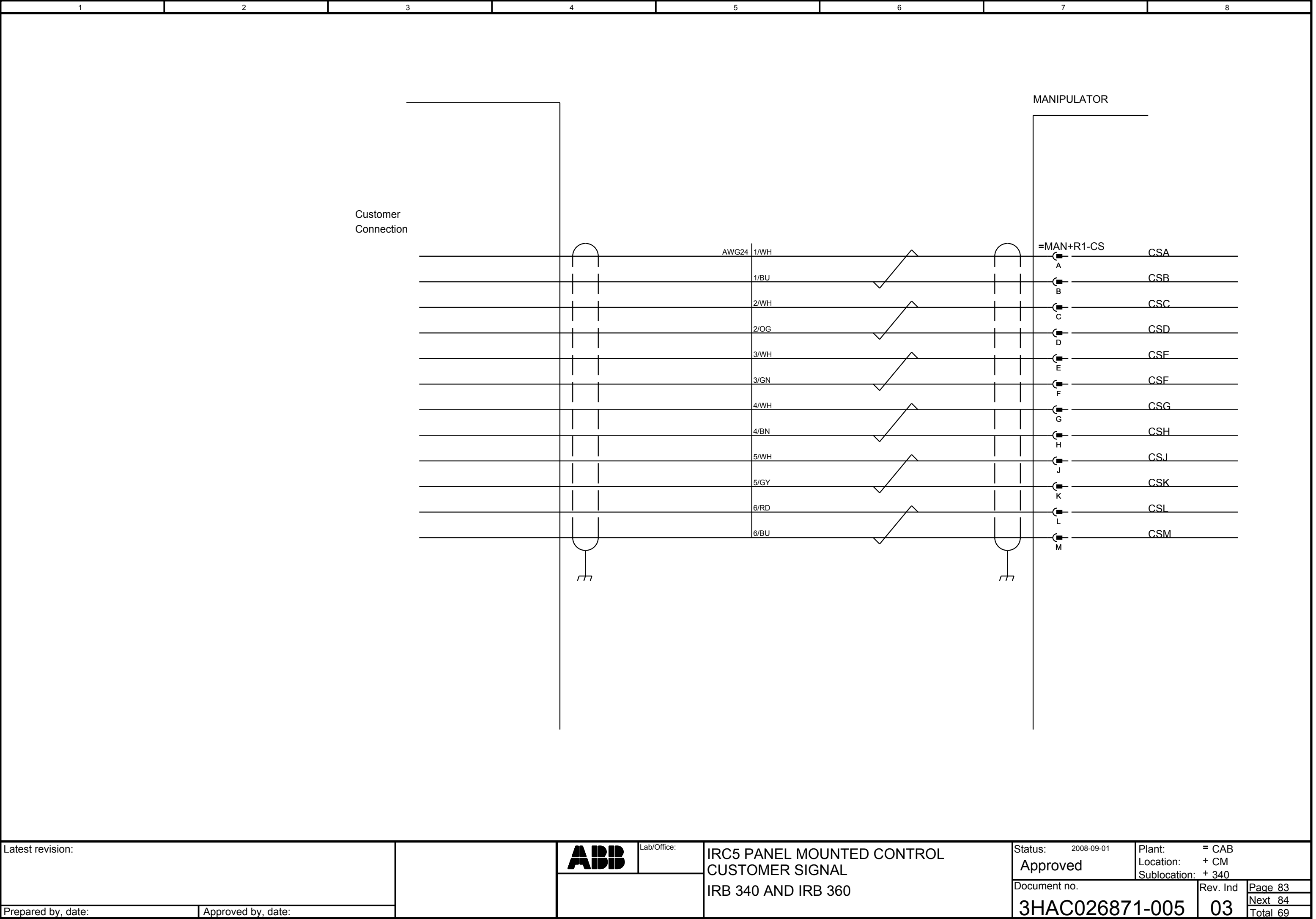
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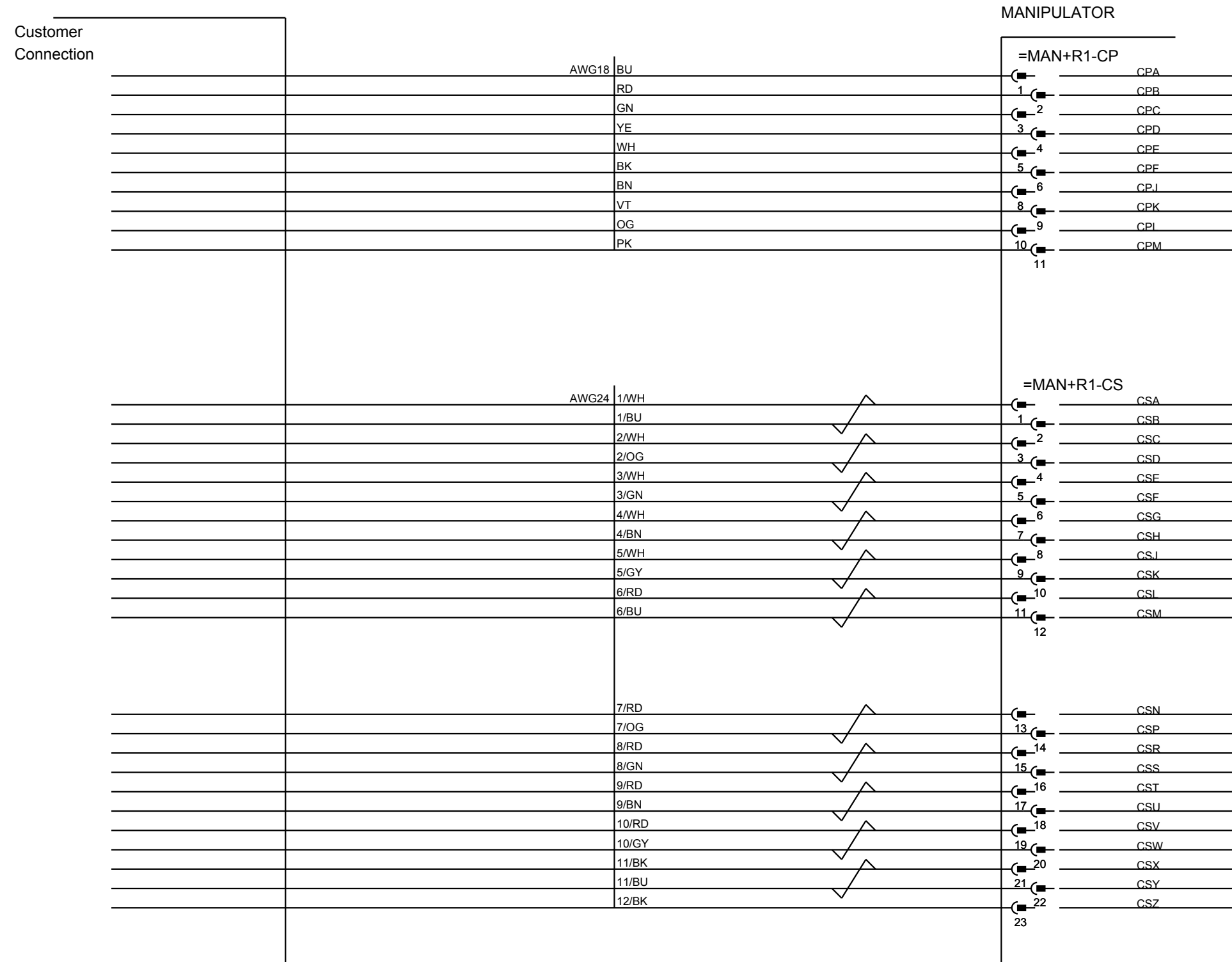
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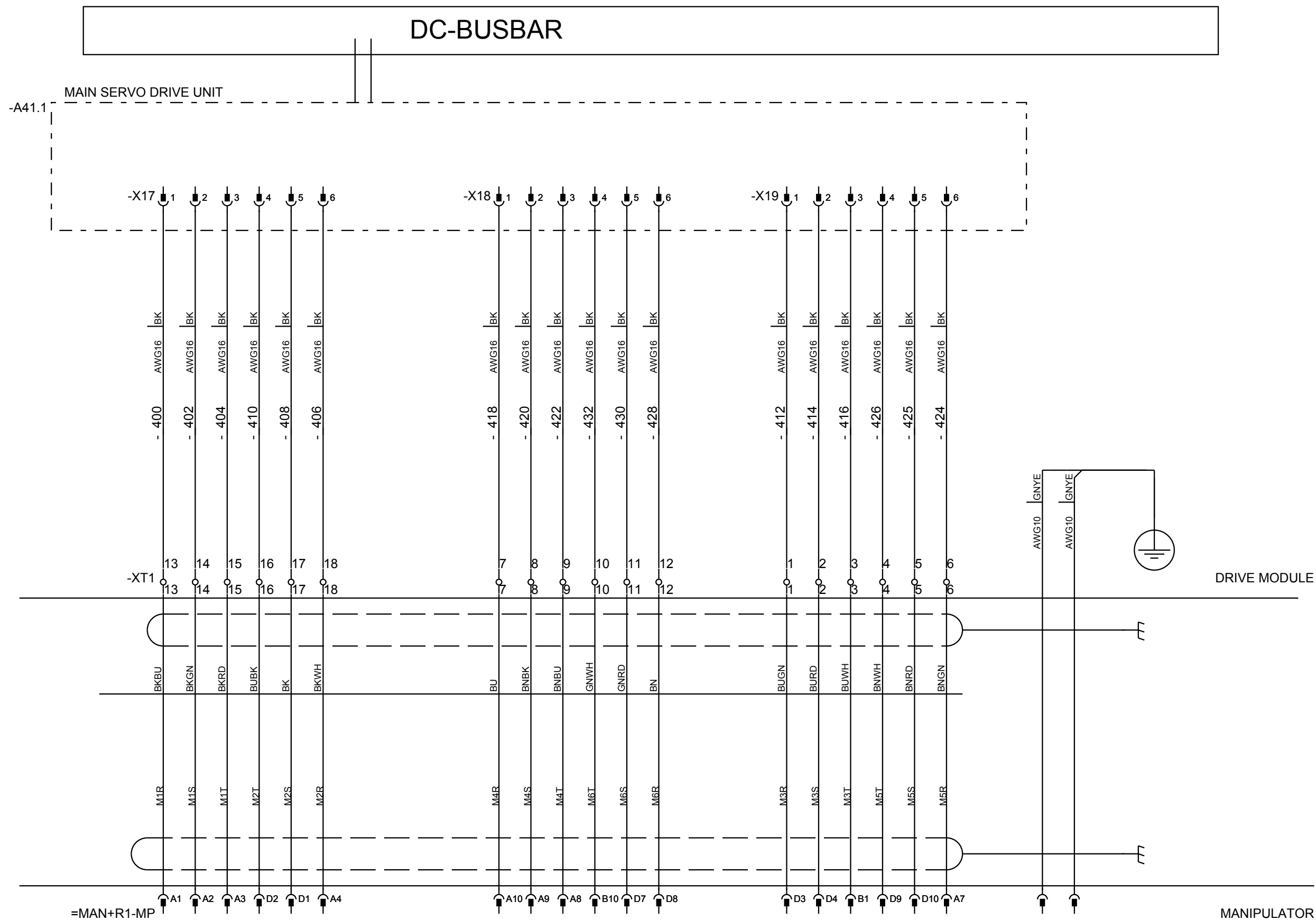


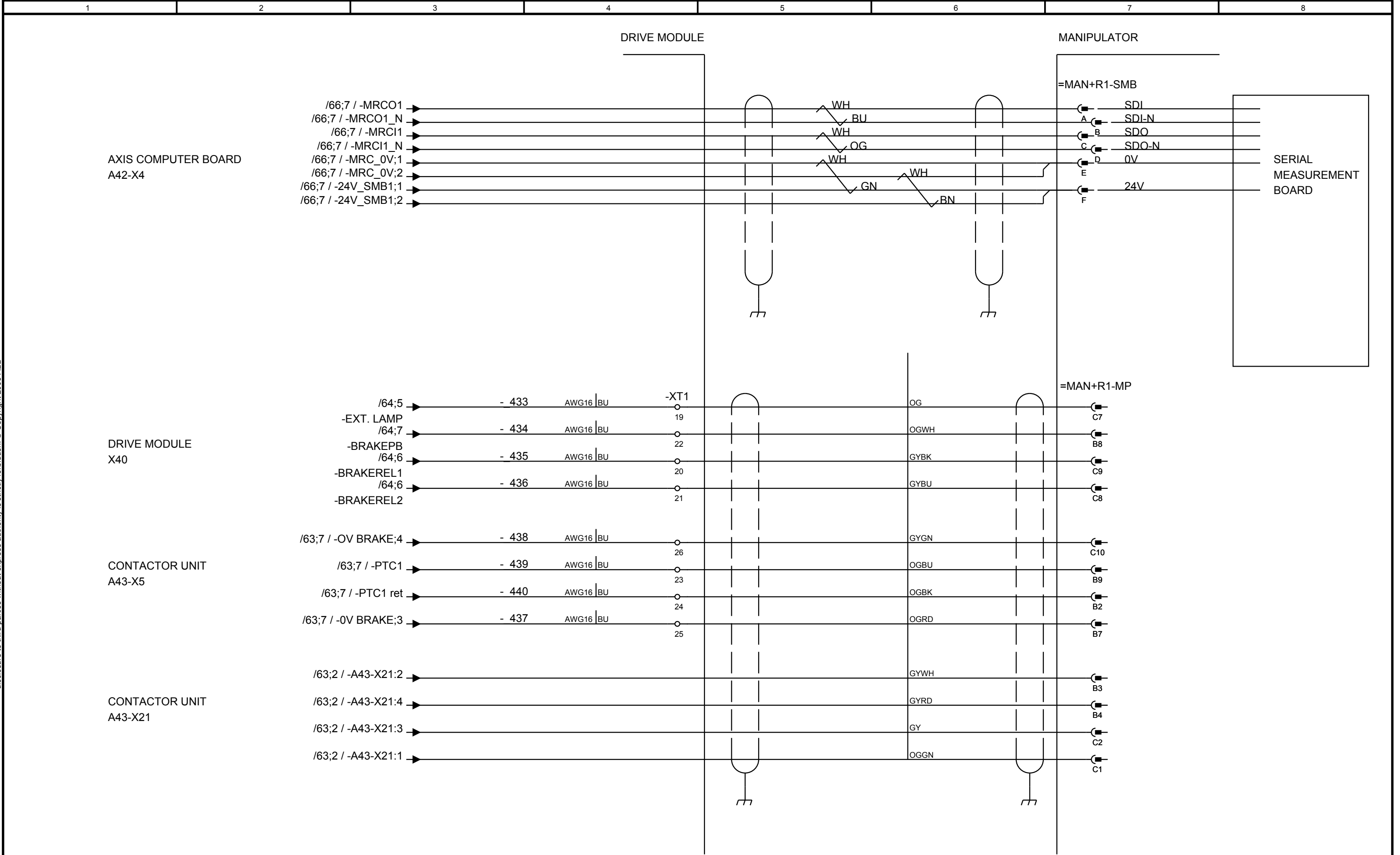


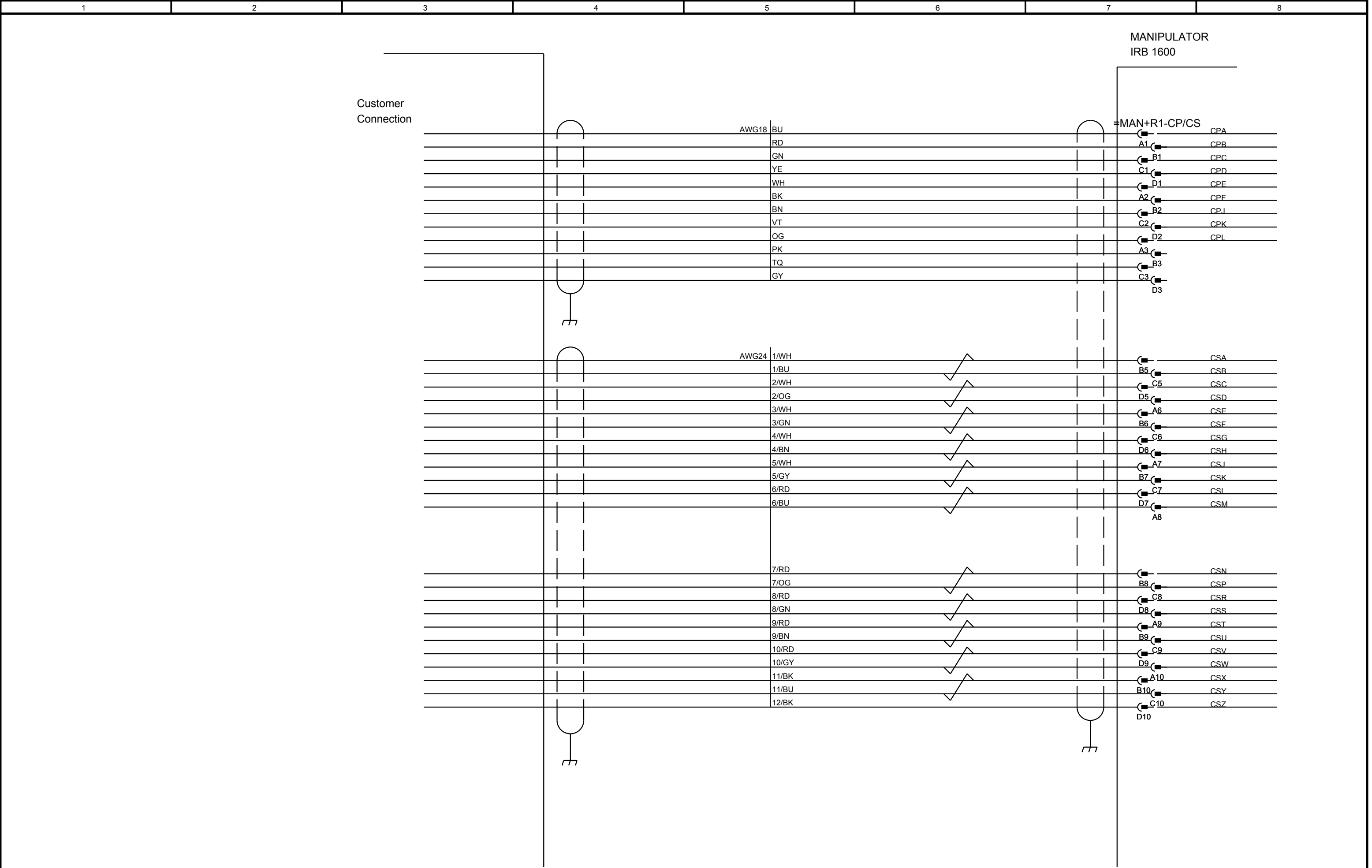
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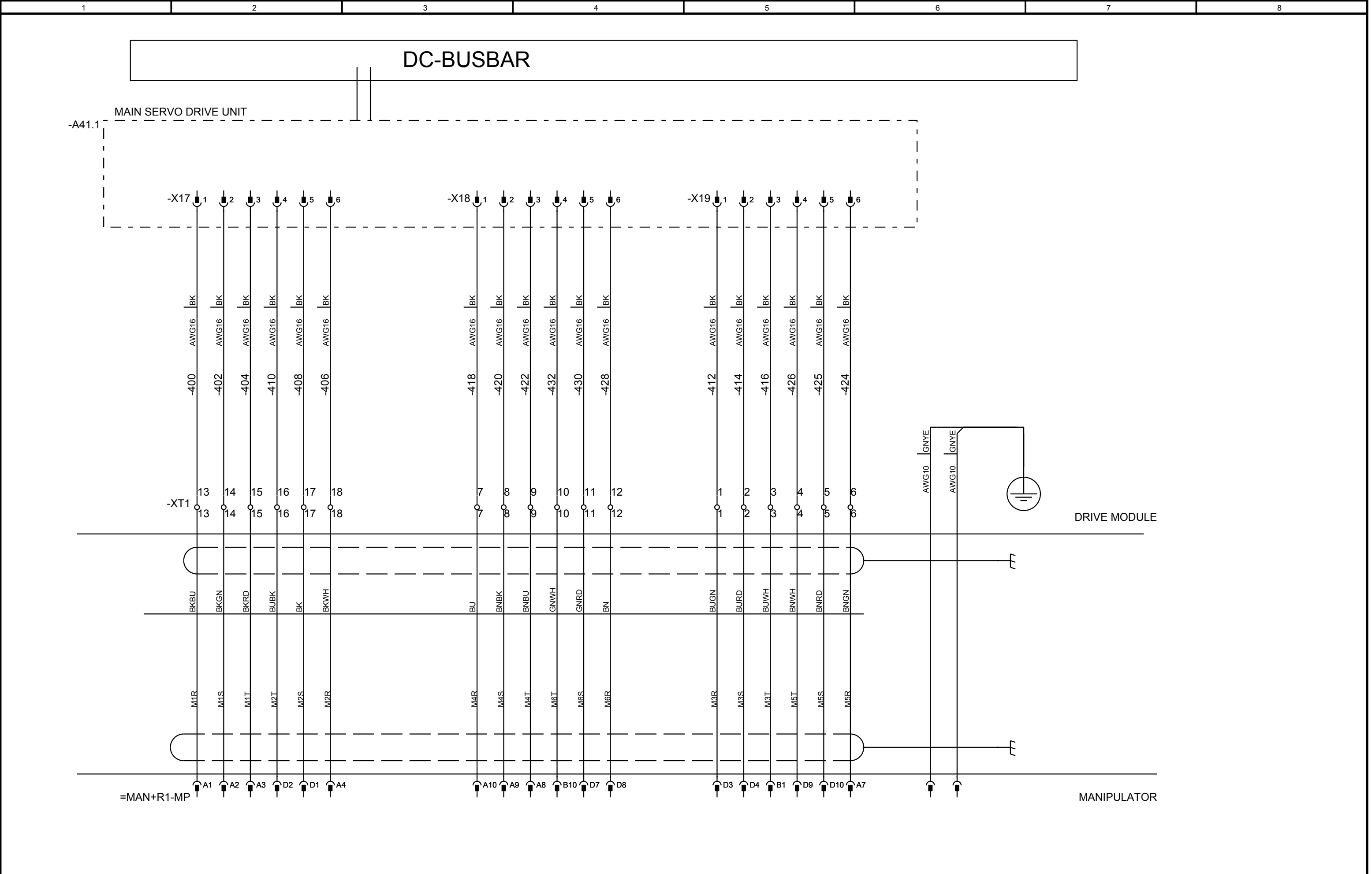




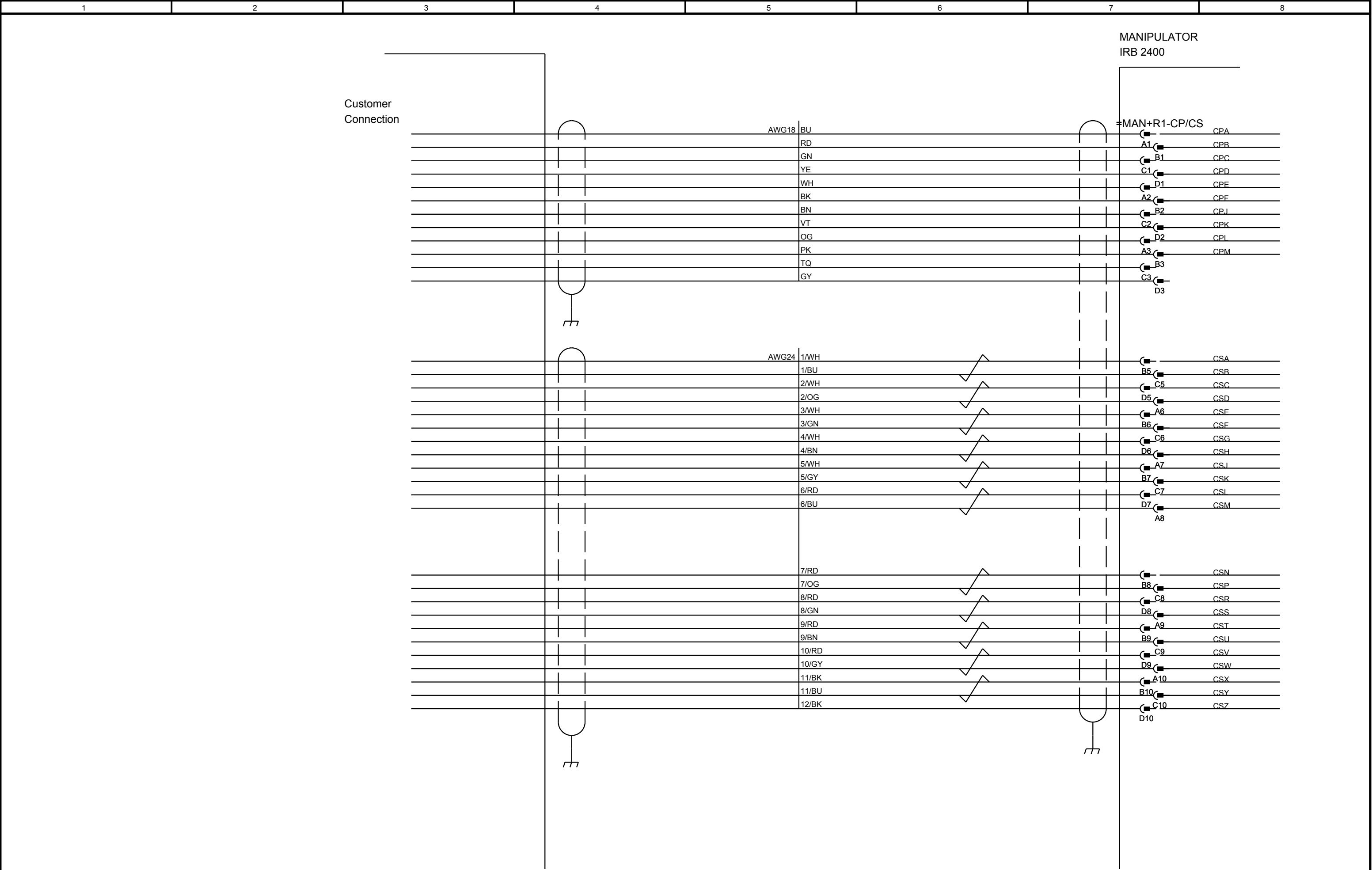
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