

ABB INDUSTRIAL DRIVES

BCU-02, BCU-12 and BCU-22 control units Hardware manual



BCU-02, BCU-12 and BCU-22 control units

Hardware manual

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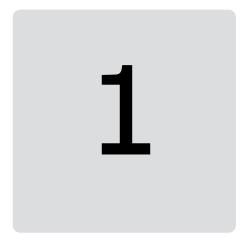


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Introduction to the manual

Contents of this chapter

This chapter gives basic information about the manual and the terms used in the manual.

Safety



▲ WARNING Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do electrical work.

This manual does not contain the safety instructions of the drive. It only includes the instructions related to the scope of this manual. In addition to this manual:

- for ACS880 single drives, refer to the drive hardware manual
- for ACS880 air-cooled multidrives, refer to ACS880 multidrive cabinets and modules safety instructions (3AUA0000102301 [English])
- for ACS880 liquid-cooled multidrives, refer to ACS880 liquid-cooled multidrive cabinets and modules safety instructions (3AXD50000048633 [English]).

Terms and abbreviations

Term	Description
BCU	Type of control unit
Brake chopper	Conducts the surplus energy from the intermediate circuit of the drive to the brake resistor when necessary. The chopper operates when the DC link voltage exceeds a certain maximum limit. The voltage rise is typically caused by deceleration (braking) of a high inertia motor.
Brake chopper module	Brake chopper enclosed in a metal frame or housing. Intended for cabinet installation.
Brake unit	Brake chopper modules and the necessary auxiliary equipment, such as control electronics, fusing and cabling
CIO	I/O module for controlling cooling fans
Control unit	The part in which the control program runs.
Converter	Converts direct current and voltage to alternating current and voltage, or vice versa.
DC/DC-converter	Charges or discharges an external energy storage (such as a battery or capacitor bank) from or into the DC bus
DC/DC-converter module	Converter power electronics, related components and DC capacitors enclosed in a metal frame or enclosure. Intended for cabinet installation.
DC/DC-converter unit	DC/DC-converter module(s) under control of one control unit, and related components
Drive	Frequency converter for controlling AC motors
Drive module	Frequency converter enclosed in a metal frame or enclosure. Intended for cabinet installation.
FDPI	Diagnostics and panel interface board
FSO-12, FSO-21	Optional functional safety modules
Inverter	Converts direct current and voltage to alternating current and voltage.
Inverter module	Inverter bridge, related components and drive DC link capacitors enclosed in a metal frame or enclosure. Intended for cabinet installation.
Inverter unit	Inverter module(s) under control of one control unit, and related components. One inverter unit typically controls one motor.
Multidrive	Drive for controlling several motors which are typically coupled to the same machinery. Includes one supply unit, and one or several inverter units.
RDCO	Optical DDCS communication module
SD card	Secure digital memory card (maximum 4 GB)
SDHC card	Secure digital high capacity memory card (432 GB)
STO	Safe torque off (IEC/EN 61800-5-2)
Supply module	Rectifier bridge and related components enclosed in a metal frame or enclosure. Intended for cabinet installation.
Supply unit	Supply module(s) under control of one control unit, and related components.

Later in this manual, the term converter covers the terms drive, converter, inverter and brake chopper.

Related documents

You can find manuals on the Internet. See below for the relevant code/link. For more documentation, go to www.abb.com/drives/documents.



ACS880 multidrive module manuals



Operation principle and hardware description

Contents of this chapter

This chapter gives information about the hardware of the control units.

Hardware description

The control unit is used for controlling converter modules via fiber optic links. The control unit contains integrated branching unit functionality for collecting and storing real-time data from the converter modules to help fault tracing and analysis. The data is stored on a memory card which can be analyzed by ABB service personnel.

The control unit requires an external 24 V DC power source. It has three option slots for I/O extensions, encoders and fieldbus adapters, and a removable memory unit. If it is necessary to replace the control unit, you can keep the parameter settings by moving the memory unit from the defective control unit to the new one. The control unit has one option slot for connecting a RDCO DDCS communication option module. The control unit also has a connection for a control panel.

The drive-to-drive link (XD2D) is a daisy-chained RS-485 transmission line that allows basic master/follower communication with one master and multiple followers. The X485 connection provides a connection for the optional CIO-01 I/O module.

Fiber optic connections

The different control unit types have a different number of fiber optic connections.

Туре	Number of fiber optic connections
BCU-02	2
BCU-12	7
BCU-22	12

The maximum length of the cables with 1 mm plastic optical fiber (POF) cable is 35 m (115 ft).

Make sure that:

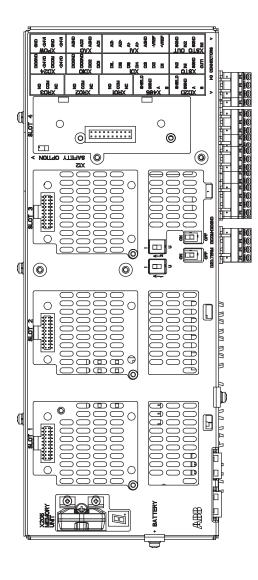
- both cables in a fiber optic pair have the same length, and
- each fiber optic pair connected to one control unit has the same length.

With long distances, cables of different lengths cause different delays, which can have an unwanted effect on the operation.

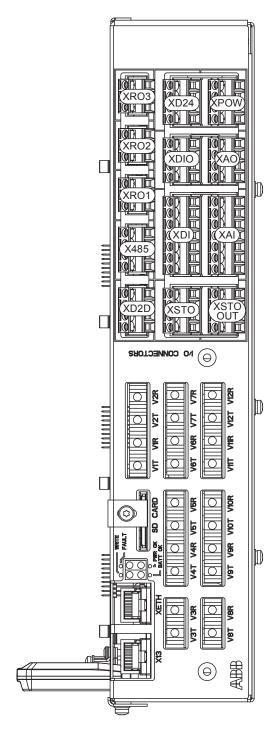
For instructions on how to connect the control unit to the converter module(s), refer to the applicable hardware manual.

Layout

The figures show the layout of the control unit. For the default I/O connection diagrams and more information on the connections, refer to the converter hardware manual.



	Description
1/0	I/O terminals (see following diagram)
SLOT 1	I/O extension, encoder interface or fieldbus adapter module connection. (This is the sole location for an FDPI-02 diagnostics and panel interface.)
SLOT 2	I/O extension, encoder interface or fieldbus adapter module connection
SLOT 3	I/O extension, encoder interface, field- bus adapter or FSO safety functions module connection
SLOT 4	RDCO DDCS communication option module connection
X205	Memory unit connection
BATTERY	Holder for real-time clock battery (BR2032)
Al1	Mode selector for analog input Al1 (I = current, U = voltage)
AI2	Mode selector for analog input AI2 (I = current, U = voltage)
D2D TERM	Termination switch for drive-to-drive link (D2D)
DICOM= DIOGND	Ground selection. Determines whether DICOM is separated from DIOGND (ie. the common reference for the digital inputs floats). See the ground isolation diagram.
7-segment d	isplay
Multicharacte sequences of	er indications are displayed as repeated f characters
	("U" is indicated briefly before "o".)
	Control program running
	Control program startup in progress
8	(Flashing) Firmware cannot be started. Memory unit missing or corrupted
B	Firmware download from PC to control unit in progress
2	At power-up, the display may show short indications of eg. "1", "2", "b" or "U". These are normal indications immediately after power-up. If the display ends up showing any other value than those described, it indicates a hardware failure.



	Description
VAL	Description
XAI	Analog inputs
XAO	Analog outputs
XDI	Digital inputs, Digital input interlock (DIIL)
XDIO	Digital input/outputs
XD2D	Drive-to-drive link
XD24	+24 V output (for digital inputs)
XETH	Ethernet port – Not in use
XPOW	External power input
XRO1	Relay output RO1
XRO2	Relay output RO2
XRO3	Relay output RO3
XSTO	Safe torque off connection (input signals)
XSTO OUT	Safe torque off connection (to inverter modules)
X12	(On the opposite side) Connection for FSO safety functions module (optional)
	Note: The FSO safety functions module can be used only with ACS880 inverters.
X13	Control panel, PC connection through the control panel
X485	Not in use by default
V1T/V1R, V2T/V2R	Fiber optic connection to modules 1 and 2 (VxT = transmitter, VxR = receiver)
V3T/V3R 	Fiber optic connection to modules 37 (BCU-12 and BCU-22 only)
V7T/V7R	(VxT = transmitter, VxR = receiver)
V8T/V8R	Fiber optic connection to modules 812 (BCU-22 only)
 V12T/V12R	(VxT = transmitter, VxR = receiver)
SD CARD	Data logger memory card for inverter module communication
BATT OK	Real-time clock battery voltage is higher than 2.8 V. If the LED is off when the control unit is powered, replace the battery.
FAULT	The control program has generated a fault. See the firmware manual of the supply/inverter unit.
PWR OK	Internal voltage is sufficient
WRITE	Writing to memory card in progress. Do not remove the memory card.

Mechanical installation

Contents of this chapter

This chapter gives information on the mechanical installation of the control unit and the contents of the delivery.

Examining the delivery

Make sure that these items are included:

- control unit with the I/O connector plugs
- memory unit
- SD/SDHC flash memory card (inserted in its slot)
- real-time clock battery (BR2032).

Make sure that there are no signs of damage to the items.

Identifying different control unit types

Before you install the control unit, make sure that it has the correct control program. The control program is shown on the label attached to the memory unit.

Make sure that the control unit is correct for your equipment configuration.



Installing the control unit onto a DIN rail

NOTICE Do not install the control unit adjacent to electromagnetic disturbance sources (for example, relays, contactors, brake choppers, and power cabling). The minimum recommended distance to such components is 200 mm (7.9 in). ABB recommends that you install metallic screening between the control unit and the source of disturbance. This can reduce the required distance.

NOTICE Make sure that air can pass freely through the ventilation holes in the control unit housing. Do not install the control unit directly above heat-generating equipment. If you do not obey these instructions, the control unit can become too hot.

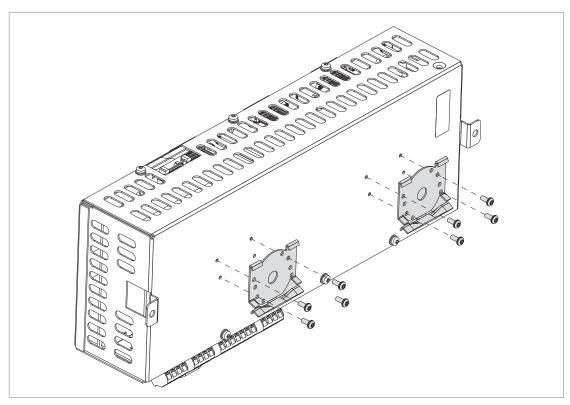
You can install the control unit horizontally or vertically onto a standard $35 \times 7.5/15$ mm DIN rail. If the control unit is installed horizontally, make sure that the connectors point down. If the control unit is installed vertically, the connectors can point to the left or right.

Leave sufficient free space around the control unit for:

- cabling
- cooling
- replacing the memory unit and real-time clock battery.

The control unit is grounded through the DIN rail and the grounding screw.

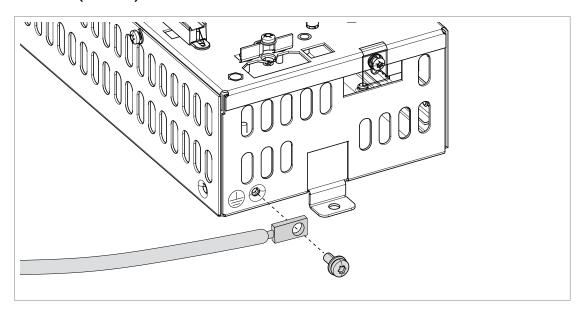
 Attach the two latches to the back of the control unit with four screws for each latch.



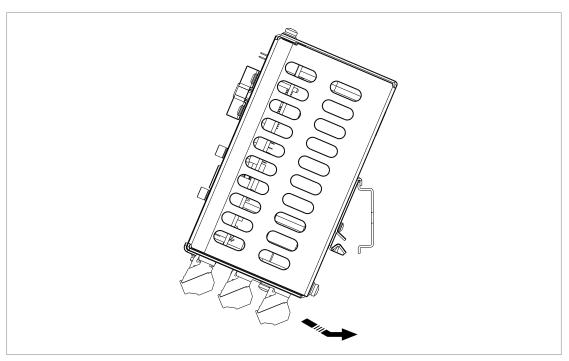
2. Ground the control unit to the cabinet frame with a grounding conductor. Use a M4×6 or M4×8 screw to attach the grounding conductor to the control unit. Refer



to the figure below. The minimum cross-sectional area of the grounding conductor is 4 mm^2 (12 AWG).

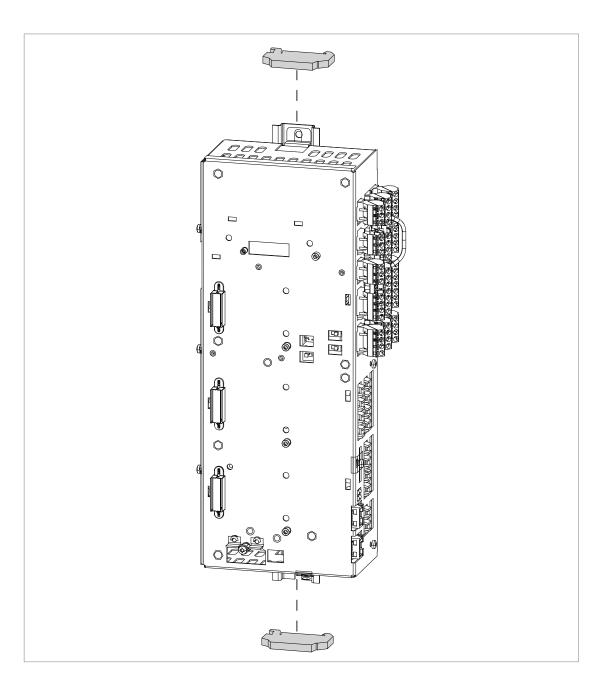


3. Push the control unit to the rail as shown below. It makes a click.



4. Attach the control unit to the rail with screws or end brackets. This prevents accidental movement of the control unit. If the control unit is installed horizontally, the screws and end brackets are optional.







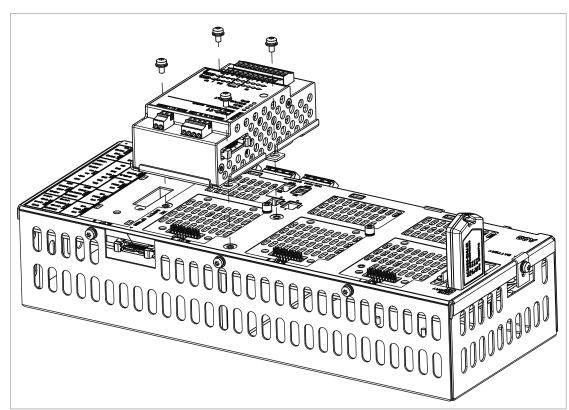


AWARNING Obey the safety instructions given in If you ignore the safety instructions, injury or death, or damage to the equipment can occur.

If you are not a qualified electrical professional, do not do installation or maintenance work.

This procedure describes the installation of an FSO safety functions module onto the BCU control unit. As an alternative, the FSO module can be installed adjacent to the control unit, which is the standard method for factory-installed FSO modules. For instructions, refer to the applicable FSO module user's manual.

- 1. Stop the drive and do the steps in section **Electrical safety precautions** of the converter hardware manual.
- The FSO module comes with alternative bottom plates for installation onto different control units. For installation onto a BCU control unit, the mounting points should be located at the long edges of the module as shown in the illustration below. If necessary, replace the bottom plate of the FSO module.
- 3. Attach the FSO module onto slot 3 of the BCU control unit [A41] with four screws.



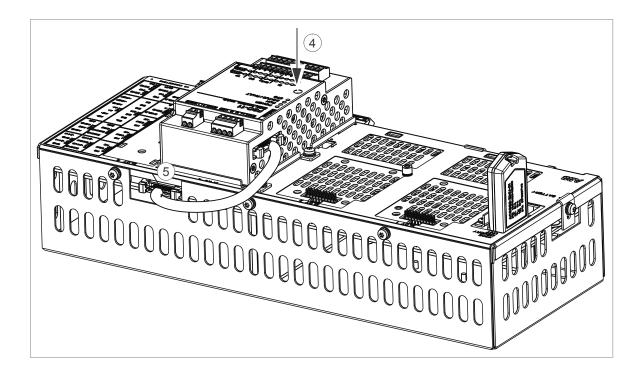
4. Torque the FSO module electronics grounding screw to 0.8 N·m (7.1 lbf·in).

Note: The screw tightens the connections and grounds the module. It is essential for fulfilling the EMC requirements and for proper operation of the module.

- 5. Connect the FSO module data cable between FSO connector X110 and BCU connector X12.
- 6. To complete the installation, refer to the instructions in the applicable FSO module user's manual.



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Installing I/O extension, fieldbus adapter and pulse encoder interface modules



AWARNING Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation, commissioning or maintenance work.

NOTICE Use ESD wristband when you handle printed circuit boards. Do not touch the boards unnecessarily. The boards are sensitive to electrostatic discharge.

Pay attention to the free space required by the cabling or terminals coming to the option modules.

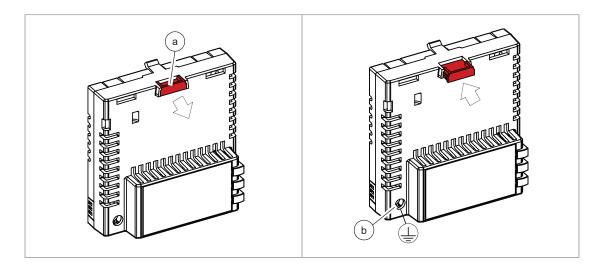
- 1. Stop the drive and do the steps in section **Electrical safety precautions** of the converter hardware manual.
- 2. Pull out the lock (a) with a screw driver.

Note: The location of the lock depends on the module type.

- 3. Install the module to a free option module slot on the control unit.
- 4. Push in the lock (a).
- 5. Tighten the grounding screw (b) to a torque of $0.8 \text{ N} \cdot \text{m}$ (7 lbf·in).

Note: The screw tightens the connections and grounds the module. It is essential for fulfilling the EMC requirements and for proper operation of the module.

NOTICE Do not use excessive force, or leave the screw too loose. Over-tightening can cause damage to the screw or module. A loose screw can cause an operation failure.



6. Connect the wiring to the module. Obey the instructions given in the documentation of the module.

If you must remove the option module after it is installed into the drive, use a suitable tool (for example, small pliers) to carefully pull out the lock.



Electrical installation

Contents of this chapter

This chapter gives information on the electrical installation of the control unit.

Installation procedure



AWARNING Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation, commissioning or maintenance work.

- Connect an external power supply to the control unit connector XPOW. For the power supply specifications, refer to the technical data. If necessary, you can connect a second power supply for redundancy.
- 2. Connect the fiber optic cables from the converter module to the control unit. Refer to the instructions given in the converter module hardware manual.
- 3. Connect the control cables to the control unit. Refer to the instructions given in the converter module hardware manual.

Related documents

For information on the electrical installation of the FSO safety functions module, refer to the applicable FSO module user's manual.

For information on the electrical installation of an I/O extension, fieldbus adapter, or pulse encodure interface module, refer to the documentation of the module.

For the default I/O connection diagrams and more information on the connections, refer to the applicable converter module hardware manual.



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Maintenance

Contents of this chapter

This chapter gives instructions on how to do maintenance on the control unit.

Replacing the real-time clock battery

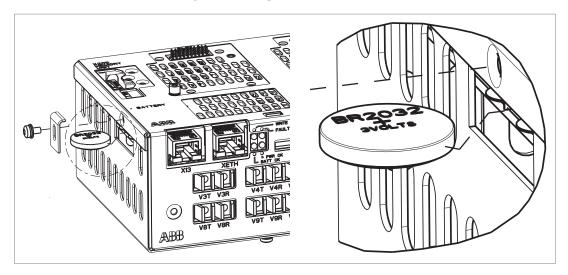


AWARNING Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation, commissioning or maintenance work.

Replace the real-time clock battery if the BATT OK LED is off when the control unit is powered.

- Stop the drive and do the steps in section Electrical safety precautions of the converter hardware manual.
- 2. Remove the fastening screw.
- 3. Replace the battery with a new BR2032 battery.

- 4. If necessary, set the real-time clock.
- 5. Discard the old battery according to local disposal rules or applicable laws.



Replacing the memory unit

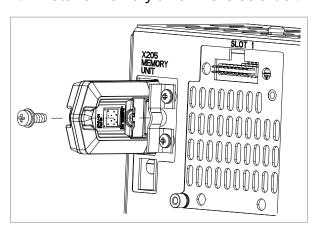
If you replace the control unit, move the memory unit from the old control unit to the new control unit to keep the existing parameter settings.



▲ WARNING Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation, commissioning or maintenance work.

NOTICE Do not remove or insert the memory unit when the control unit is powered.

- 1. Stop the drive and do the steps in section **Electrical safety precautions** of the converter hardware manual.
- 2. Make sure that the control unit is not powered.
- 3. Remove the fastening screw and pull the memory unit out.
- 4. Install a memory unit in reverse order.



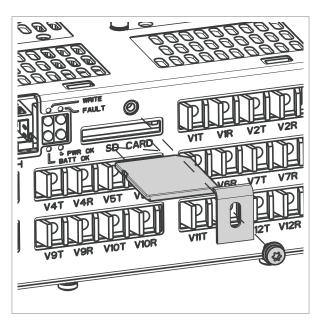
Replacing the SD/SDHC memory card



AWARNING Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation, commissioning or maintenance work.

Do not remove the SD card while the yellow WRITE LED is on. Writing to the SD card is in progress. For the replacement card type, see the technical data.

- 1. Stop the drive and do the steps in section **Electrical safety precautions** of the converter hardware manual.
- 2. Remove the screw and the clip covering the memory card.
- 3. Push the card to remove it.
- 4. Install the new card in reverse order.



Replacing the control unit



AWARNING Obey the safety instructions of the drive. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do installation, commissioning or maintenance work.

Replace the control unit as follows:

- 1. Stop the drive and do the steps in section **Electrical safety precautions** of the converter hardware manual.
- 2. Disconnect the fiber optic cables.
- 3. Disconnect the control cables. You can pull out the detachable terminal blocks that have control cables connected.
- 4. If the control unit is attached to the rail with screws or end brackets, remove them.
- 5. Remove the control unit from the rail.

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- 6. Disconnect the grounding conductor from the control unit.
- 7. Remove the latches from the back of the control unit.
- 8. Install the new control unit. Refer to section Installing the control unit onto a DIN rail (page 16).
- 9. Connect the control cables to the new control unit.
- 10. Connect the fiber optic cables to the new control unit.
- 11. Move the memory unit from the old control to the new control unit. Refer to section Replacing the memory unit (page 26).

If there is a safety circuit connected to the XSTO terminals of the control unit, do the validation test of the safety function after you replace the control unit. Refer to the drive or inverter module hardware manual, safety option user's manual, and/or the related FSO safety functions module user's manual.



Technical data

Contents of this chapter

This chapter contains the technical data for the control units.

Connector data

The wire size accepted by all screw terminals (for both stranded and solid wire) is 0.5 ... 2.5 mm² (22...12 AWG). Connector pitch is 5 mm.

The maximum tightening torque for screw terminals is 0.45 N·m (4 lbf·in).

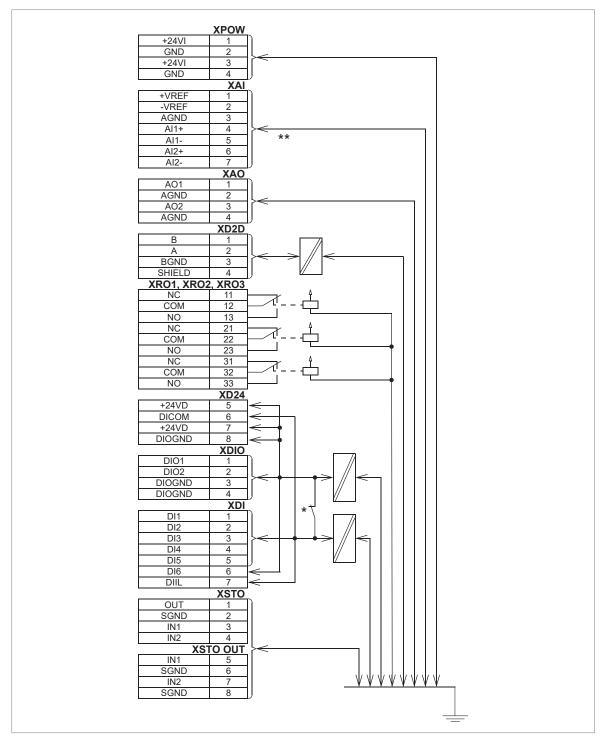
Power supply (XPOW)	24 V DC (±10%), 2 A
	External power input.
	Two supplies can be connected to the BCU control unit for redundancy.
Relay outputs RO1RO3	250 V AC / 30 V DC, 2 A
(XRO1XRO3)	Protected by varistors
+24 V output (XD24:5 and XD24:7)	Total load capacity of these outputs is 4.8 W (200 mA / 24 V) minus the power taken by DIO1 and DIO2.
Digital inputs DI1DI6	24 V logic levels: "0" < 5 V, "1" > 15 V
(XDI:1XDI:6)	R _{in} : 2.0 kohm (DI1DI5)
	Input type: NPN/PNP (DI1DI5), PNP (DI6)
	Hardware filtering: 0.04 ms, digital filtering up to 8 ms
	I _{max} : 15 mA (DI1DI5), 5 mA (DI6)
Start interlock input DIIL (XDI:7)	24 V logic levels: "0" < 5 V, "1" > 15 V
	R _{in} : 2.0 kohm
	Input type: NPN/PNP
	Hardware filtering: 0.04 ms, digital filtering up to 8 ms

Digital inputs/outputs DIO1 and DIO2 (XDIO:1 and XDIO:2)	<u>As inputs:</u> 24 V logic levels: "0" < 5 V, "1" > 15 V. <i>R</i> _{in} : 2.0 kohm. Filtering: 1 ms.
Input/output mode selection by parameters.	As outputs: Total output current from +24VD is limited to 200 mA
DIO1 can be configured as a frequency input (016 kHz with hardware filtering of 4 microseconds) for 24 V level square wave signal (sinusoidal or other wave form cannot be used).	
In some control programs, DIO2 can be configured as a 24 V level square wave frequency output. Refer to the firmware manual, parameter group 11.	
Reference voltage for analog inputs +VREF and -VREF (XAI:1 and XAI:2)	10 V ±1% and -10 V ±1%, R _{load} 110 kohm Maximum output current: 10 mA
Analog inputs Al1 and Al2 (XAI:4 XAI:7).	Current input: -2020 mA, R_{in} = 100 ohm Voltage input: -1010 V, R_{in} > 200 kohm
Current/voltage input mode selection	Differential inputs, common mode range ±30 V
by switches	Sampling interval per channel: 0.25 ms
	Hardware filtering: 0.25 ms
	Resolution: 11 bit + sign bit
	Inaccuracy: 1% of full scale range
Analog outputs AO1 and AO2 (XAO)	020 mA, R _{load} < 500 ohm
	Frequency range: 0500 Hz
	Resolution: 11 bit + sign bit
	Inaccuracy: 2% of full scale range
XD2D connector	Physical layer: RS-485
	Transmission rate: 8 Mbit/s
	Cable type: Shielded twisted-pair cable with a twisted pair for data and a wire or another pair for signal ground (nominal impedance 100 165 ohm, for example Belden 9842)
	Maximum length of link: 50 m (164 ft)
	Termination by switch
RS-485 connection (X485)	Physical layer: RS-485
	Cable type: Shielded twisted-pair cable with a twisted pair for data and a wire or another pair for signal ground (nominal impedance 100 165 ohm, for example Belden 9842)
	Maximum length of link: 50 m (164 ft)
Safe torque off connection (XSTO)	Input voltage range: -330 V DC
	Logic levels: "0" < 5 V, "1" > 17 V.
	Note: Both circuits must be closed to enable start and operation (IN1 and IN2 must be connected to OUT). This applies to all control units (including drive, inverter, supply, brake, DC/DC converter etc. control units), but SIL/PL classified Safe torque off functionality is only achieved through the XSTO connector of the drive/inverter control unit.
	Current consumption: 66 mA (continuous) per STO channel per drive/inverter module
	EMC (immunity) according to IEC 61326-3-1 and IEC 61800-5-2
Safe torque off output (XSTO OUT)	To STO connector of inverter module.
Control panel connection (X13)	Connector: RJ-45
	Cable length < 100 m (328 ft)

Ethernet connection (XETH)	Connector: RJ-45
	This connection is not supported by the firmware
SDHC memory card slot (SD CARD)	Memory card type: SDHC
	Maximum memory size: 4 GB
Battery	Real-time clock battery type: BR2032

The terminals of the control unit fulfill the Protective Extra Low Voltage (PELV) requirements. The PELV requirements of a relay output are not fulfilled if a voltage higher than 48 V is connected to the relay output.

BCU ground isolation diagram



*Ground selector (DICOM=DIOGND) settings

DICOM=DIOGND: ON

All digital inputs share a common ground (DICOM connected to DIOGND). This is the default setting.

DICOM=DIOGND: OFF

Ground of digital inputs DI1...DI5 and DIIL (DICOM) is isolated from DIO signal ground (DIOGND). Isolation voltage 50 V.

**The maximum common mode voltage between each AI input and AGND is +30 V

Additional information on the connections

Power supply for the control unit (XPOW)

Refer to the control unit connector data for the current and voltage ratings of the power supply.

Connect an additional external power supply to the free +24 V and GND terminals of the XPOW terminal block if:

- the control unit must be kept operational during input power breaks, for example, because of continuous fieldbus communication
- immediate restart is necessary after a power break (that is, no control unit power-up delay is permitted).

Digital interlock (DIIL)

Digital interlock input (DIIL) terminal is originally intended for interlock signals that stop the drive/unit when necessary. In the ACS880 primary control program, DIIL terminal is the source for the run enable signal by default. The inverter unit or drive cannot start, or it stops when there is no DIIL signal. In other control programs (and units), the default use of the DIIL terminal varies. Refer to firmware manual for more information.

Note: This input is not SIL or PL classified.

The XD2D connector

The XD2D connector has an RS-485 connection that can be used for

- basic master/follower communication with one master drive/unit and multiple followers
- fieldbus control through the embedded fieldbus interface (EFB)
- drive-to-drive (D2D) communication implemented by application programming.

Refer to the firmware manual for the availability of these features and related parameter settings.

Terminate the bus on the units at the ends of the drive-to-drive link. Disable bus termination on the intermediate units.

Use a shielded twisted-pair cable for data, and another pair or a wire for signal ground (nominal impedance 100...165 ohm, for example Belden 9842). For the best immunity, use high quality cable. Keep the cable as short as possible. Avoid unnecessary loops and parallel runs near power cables such as motor cables.

N က 4 က α က N Ш BGND BGND Ш BGND Ш \Box ᆸ ᆸ

The following diagram shows the wiring between control units.

The X485 connector

Termination ON

The X485 provides a connection for the optional CIO-01 I/O module. For more information, refer to CIO-01 I/O module for distributed I/O bus control user's manual (3AXD50000126880 [English]).

Termination ON

Termination OFF

Safe torque off (XSTO, XSTO OUT)

The XSTO input only acts as a true Safe torque off input on the inverter control unit. De-energizing the STO input terminals of other control units (supply, DC/DC converter, or brake unit) stops the unit but does not constitute a SIL/PL classified safety function.

FSO safety functions module connection (X12)

In drives or inverter units with a compatible control program, an optional FSO safety functions module can be connected to the X12 connector. The control program in supply, brake, and DC/DC converter units does not support the FSO safety functions module.

For more information on the FSO safety functions module, refer to the applicable FSO module user's manual.

Note: Inverter modules and control units that have a sticker with the text "No FSO support" are not compatible with the FSO safety functions module.

SDHC memory card slot

The control unit has an on-board data logger that collects real-time data from the power modules to help fault tracing and analysis. The data is stored onto the SDHC memory card inserted into the SD CARD slot and can be analyzed by ABB service personnel.

Other information

Protection classes	
Degree of protection (IEC/EN 60529)	IP10
Enclosure type (UL 508C)	UL Open Type
Overvoltage category (IEC 60664-1)	II
Protective class (IEC/EN 61800-5-1)	I
Protective class (IEC 62109-1)	II
Ambient conditions	
Air temperature in operation	070 °C (32158 °F)
Materials	
Housing	Hot-dip zinc coated steel, cover painted
Label	Polycarbonate
Package	Cardboard
Applicable standards	
EN 61800-5-1:2007	Adjustable speed electrical power drive systems. Part 5-1: Safety requirements – electrical, thermal and energy
EN 61800-3:2004	Adjustable speed electrical power drive systems. Part 3: EMC requirements and specific test methods
IEC/EN 62109-1:2010	Safety of power converters for use in photovoltaic power systems Part 1: General requirements
UL508C:2002	UL Standard for Safety, Power Conversion Equipment, third edition
For other standards, refer to the applicable hardware and functional safety manuals.	
Markings	
cULus	The control unit is cULus Listed.

Cyber security disclaimer

This product is designed to be connected to and to communicate information and data via a network interface. It is Customer's sole responsibility to provide and continuously ensure a secure connection between the product and Customer network or any other network (as the case may be). Customer shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc.) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information.

ABB and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

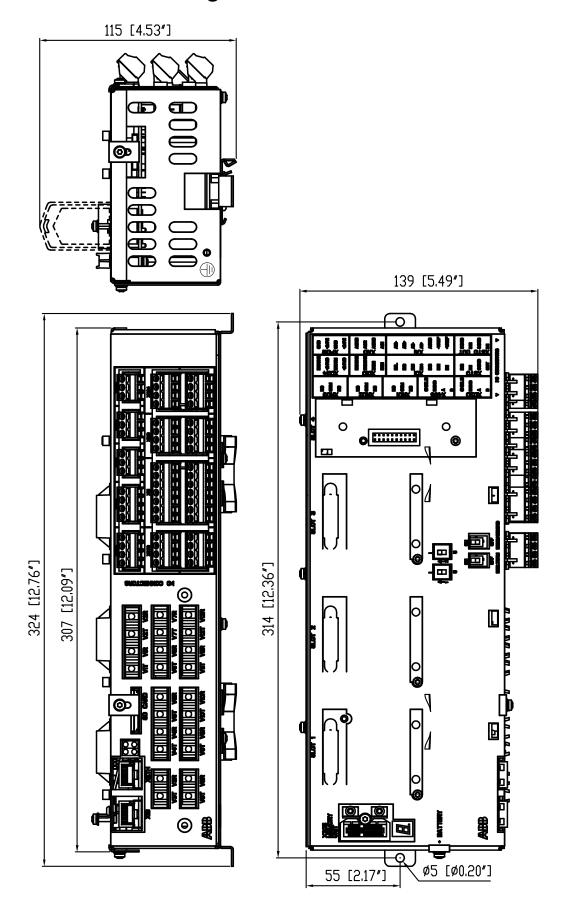


Dimension drawings

Contents of this chapter

This chapter shows the dimensions of the control unit.

Dimension drawing of the control unit



Further information

Product and service inquiries

Address any inquiries about the product to your local ABB representative, quoting the type designation and serial number of the unit in question. A listing of ABB sales, support and service contacts can be found by navigating to www.abb.com/contact-centers.

Product training

For information on ABB product training, navigate to new.abb.com/service/training.

Providing feedback on ABB manuals

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