

Quick installation and start-up guide ACS480 Drive



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Safety instructions

Read the safety instructions in the ACS480 Hardware manual (3AXD5000047392 [EN]).

- WARNING!** Obey these safety instructions to prevent physical injury or death, or damage to the equipment. If you are not a qualified electrician, do not do electrical installation or maintenance work.
- When you install the drive, make sure that dust does not go into the drive.
 - When the drive or connected equipment is energized, do not do work on the drive, motor cable, motor, control cables or control circuits.
 - After you disconnect the input power, wait for 5 minutes to let the intermediate circuit capacitors discharge.
 - Make sure that the equipment is not energized:
 - Use a multimeter with an impedance of at least 1 Mohm.
 - Make sure that the voltage between the drive output terminals (U, V, W) and the ground (PE) is 0 V.
 - Make sure that the voltage between the drive input power terminals (L1, L2, L3) and the ground (PE) is 0 V.
 - Make sure that the voltage between the DC and brake resistor terminals (UDC+, UDC- and R-) and the ground (PE) is 0 V.
 - If you use a permanent magnet synchronous motor, do not do work on the drive when the motor rotates. A permanent magnet motor that rotates energizes the drive and the input power terminals.

- WARNING!** The installation, start-up and operation of this equipment requires detailed instructions. Refer to the detailed instructions in the ACS480 Hardware manual (3AXD5000047392 [EN]) and ACS480 Firmware manual (3AXD5000047399 [EN]). You can download these manuals from the ABB website or order hard copies of the manuals with the delivery. Keep this guide near the unit at all times.

1. Examine the installation area

The drive is intended for cabinet installation and has an ingress protection rating of IP20.

Make sure that in the installation area:

- There is sufficient cooling and hot air does not recirculate.
- The ambient conditions are suitable. Refer to [Free space requirements](#).
- The mounting surface is non-flammable and can hold the weight of the drive. Refer to [Dimensions and weights](#).
- Materials near the drive are non-flammable.
- There is sufficient space above and below the drive maintenance work. Refer to [Free space requirements](#).

2. Install the drive

You can install the drive with screws or to a DIN rail.

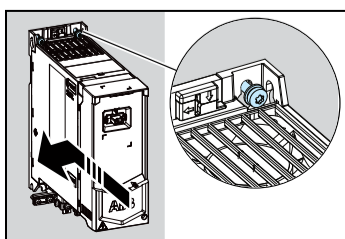
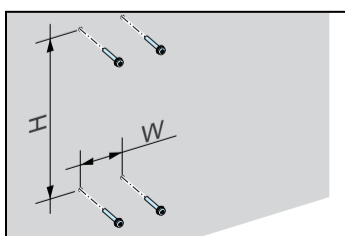
Installation requirements:

- Make sure that there is a minimum of 75 mm of free space at the top and bottom of the drive for cooling air.
- You can install the R1, R2, R3 and R4 drives tilted by up to 90 degrees, from vertical to fully horizontal orientation.
- You can install several drives side by side. Side-mounted options require approximately 20 mm of space on the right side of the drive.

- WARNING!** Do not install the drive upside down. Make sure that the cooling air exhaust (at the top) is always above the cooling air inlet (at the bottom).

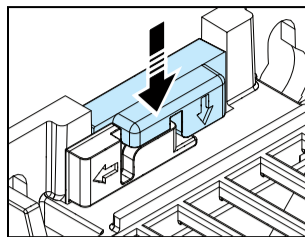
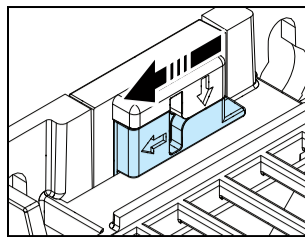
To install the drive with screws

- Make marks onto the surface for the mounting holes. Refer to [Dimensions and weights](#). The R3 and R4 drives come with a mounting template.
- Make the holes for the mounting screws and install suitable plugs or anchors.
- Start to tighten the screws into the mounting holes.
- Install the drive onto the mounting screws.
- Tighten the mounting screws.



To install the drive to a DIN rail

- Move the locking part to the left.
- Push and hold the locking button down.
- Put the top tabs of the drive onto the top edge of the DIN installation rail.
- Put the drive against the bottom edge of the DIN installation rail.
- Release the locking button.
- Move the locking part to the right.
- Make sure that the drive is correctly installed.
- To remove the drive, use a flat-head screwdriver to open the locking part.



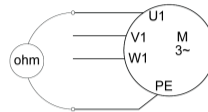
3. Measure the insulation resistance

Drive: Do not do voltage tolerance or insulation resistance tests on the drive, because this can cause damage to the drive.

Input power cable: Before you connect the input power cable, measure the insulation of the input power cable. Obey the local regulations.

Motor and motor cable:

- Make sure that the motor cable is connected to the motor and disconnected from the drive output terminals T1/U, T2/V and T3/W.
- Use a voltage of 500 V DC to measure the insulation resistance between each phase conductor and the protective earth conductor. The insulation resistance of an ABB motor must be more than 100 Mohm (at 25 °C/77 °F). For the insulation resistance of other motors, refer to the manufacturer's documentation. Moisture in the motor decreases the insulation resistance. If you think that there is moisture in the motor, dry the motor and do the measurement again.



4. Select the cables

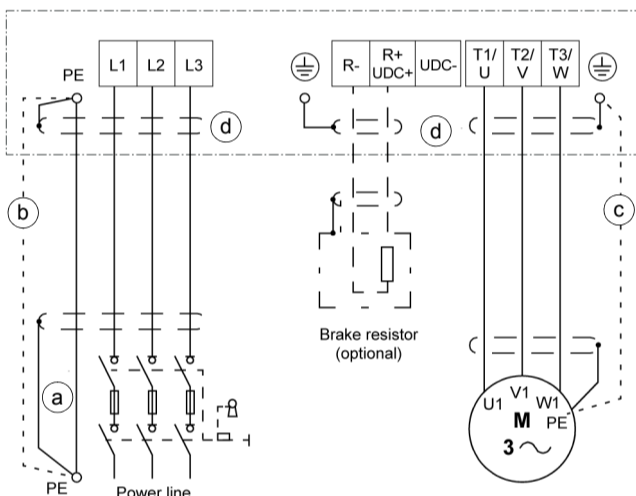
Input power cable: For the best EMC performance, use a symmetrical shielded cable and two grounding conductors.

Motor cable: Use a symmetrical shielded cable.

Control cable: Use a double-shielded twisted-pair cable for the analog signals. Use a double- or single-shielded cable for the digital, relay and I/O signals. Do not mix 24 V and 115/230 V signals in the same cable.

5. Connect the power cables

Connection diagram

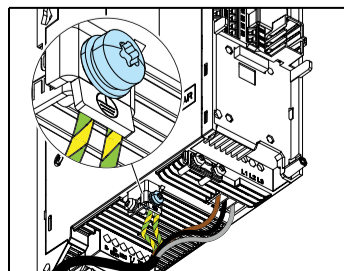
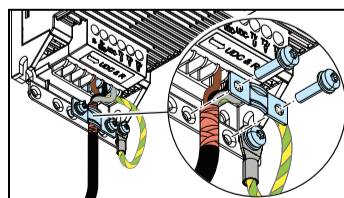
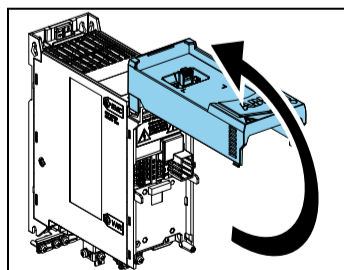


- Two grounding conductors. Use two conductors, if the cross-section of the grounding conductor is less than 10 mm² Cu or 16 mm² Al (IEC/EN 61800-5-1). For example, use the cable shield in addition to the fourth conductor.
- Separate grounding cable (line side). Use it if the conductivity of the fourth conductor or shield is not sufficient for the protective grounding.
- Separate grounding cable (motor side). Use it if the conductivity of the shield is not sufficient for the protective grounding, or there is no symmetrically constructed grounding conductor in the cable.
- 360-degree grounding of the cable shield. This is required for the motor cable and brake resistor cable, and recommended for the input power cable.

Connection procedure

- WARNING!** Obey the safety instructions in the ACS480 Hardware manual (3AXD5000047392 [EN]). If you ignore them, injury or death, or damage to the equipment can occur.
- WARNING!** If the drive is connected to an IT (non-grounded) system or to a corner-grounded TN system, disconnect the EMC filter grounding screw.

- Open the front cover. To open the front cover, loosen the locking screw and lift the front cover up.
- Strip the motor cable.
- Ground the motor cable shield under the grounding clamp.
- Twist the motor cable shield into a bundle, mark it accordingly and connect it to the grounding terminal.
- Connect the phase conductors of the motor cable to the T1/U, T2/V and T3/W motor terminals. Torque the terminals to 0.8 N·m (7 lbf-in).
- If it is applicable, connect the brake resistor cable to the R- and UDC+ terminals. Torque the terminals to 0.8 N·m (7 lbf-in). Use a shielded cable and ground the shield under the grounding clamp.
- Strip the input power cable.
- If the input power cable has a shield, twist it into a bundle, mark it and connect it to the grounding terminal.
- Connect the PE conductor of the input power cable to the grounding terminal. If it is necessary, use a second PE conductor.
- Connect the phase conductors of the input power cable to the L1, L2 and L3 input terminals. Torque the terminals to 0.8 N·m (7 lbf-in).
- Mechanically attach the cables on the outside of the drive.

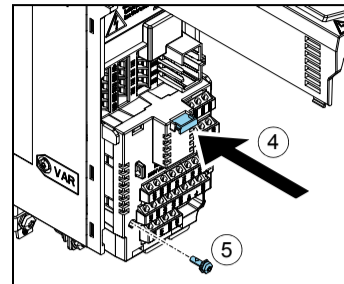
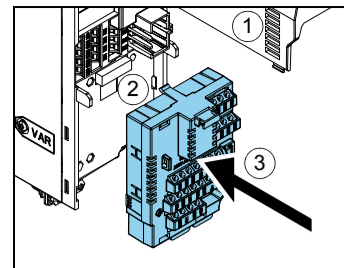


Note! If you power up the drive before you install the I/O or fieldbus module, the drive gives a warning.

6. Install the communication module

To install the communication module (I/O module or fieldbus module):

- Open the front cover.
- Align the communication module contacts with the contacts on the drive.
- Carefully push the communication module into position.
- Push the locking tab in.
- Tighten the locking screw to fully attach and electrically ground the communication module.



7. Connect the control cables

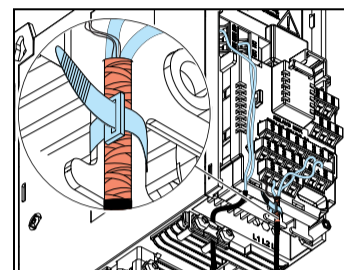
Connection procedure

Do the connections according to the default control connections of the application macro that you select. For the connections of the factory default macro (ABB standard macro), refer to [Default I/O connections \(ABB standard macro\)](#). For the other macros, refer to the [ACS480 Firmware manual \(3AXD5000047399 \[EN\]\)](#).

Note! If you do not use the I/O module, select the ABB limited macro.

Keep the signal wire pairs twisted as near to the terminals as possible to prevent inductive coupling.

- Strip a part of the outer shield of the control cable for grounding.
- Use a cable tie to ground the outer shield to the grounding tab.
- Strip the control cable conductors.
- Connect the conductors to the correct control terminals. Torque the terminals to 0.5 N·m (4.4 lbf-in).
- Connect the shields of the twisted pairs and grounding wires to the SCR terminal. Torque the terminals to 0.5 N·m (4 lbf-in).
- Mechanically attach the control cables on the outside of the drive.
- Close the front cover and tighten the locking screw.



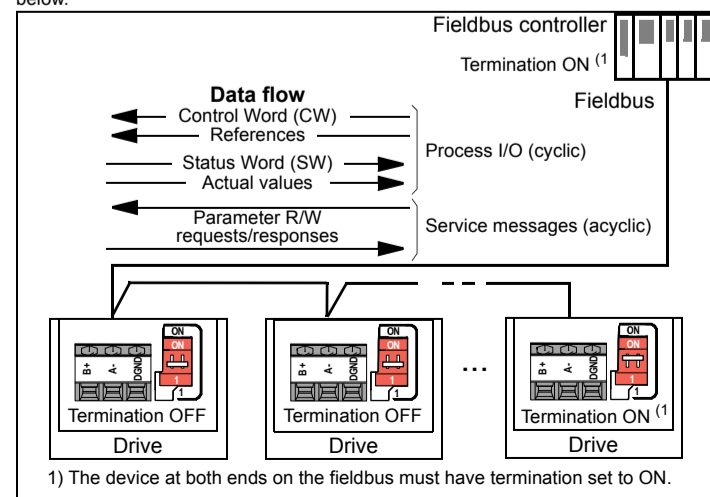
Default I/O connections (ABB standard macro)

For the standard drive with the I/O module. The fixed terminals in the base module are marked in the table:

Terminal	Description	Fixed
SCR	Signal cable shield (screen)	
A11	Output frequency/speed reference: 0...10 V	
AGND	Analog input circuit common	
+10 V	Reference voltage 10 V DC	
A12	Not configured	
AGND	Analog input circuit common	
AO1	Output frequency: 0...20 mA	
AO2	Output current: 0...20 mA	
AGND	Analog output circuit common	
Aux. voltage output and programmable digital inputs		
+24 V	Aux. voltage output +24 V DC, max. 250 mA	X
DGND	Aux. voltage output common	X
DCOM	Digital input common for all	X
D11	Stop (0)/Start (1)	X
D12	Forward (0)/Reverse (1)	X
D13	Constant frequency/speed selection	
D14	Constant frequency/speed selection	
D15	Ramp set 1 (0)/Ramp set 2 (1)	
D16	Not configured	
Relay outputs		
RO1C	Ready	X
RO1A	250 V AC/30 V DC	X
RO1B	2 A	X
RO2C	Running	
RO2A	250 V AC/30 V DC	
RO2B	2 A	
RO3C	Fault (-1)	
RO3A	250 V AC/30 V DC	
RO3B	2 A	
EIA-485 Modbus RTU		
B+	Embedded Modbus RTU (EIA-485)	
A-		
DGND		
TERM&BIAS	Serial data link termination switch	
Safe torque off		
SGND	Safe torque off. Factory connection. Both circuits must be closed for the drive to start.	X
IN1		X
IN2		X
OUT1		X
+24V	Auxiliary voltage output. The alternative terminals have the same supply as the base unit.	
DGND		
DCOM		

Connecting EIA-485 Modbus RTU terminal to the drive

Connect the fieldbus to the EIA-485 Modbus RTU terminal on the BMIO-01 module which is attached on the control unit of the drive. The connection diagram is shown below.



1) The device at both ends on the fieldbus must have termination set to ON.

