

ABB INDUSTRIAL DRIVES

# ACS880-01

## Quick installation and start-up guide

This guide is applicable to the global IEC and NEC North American installations.

Documentation in other languages

Ecodesign information  
(EU 2019/1781 and SI 2021 No. 745)

About this document



3AXD50000754618 Rev C EN  
2022-06-01  
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Original instructions.



3AXD50000754618C

## Safety instructions

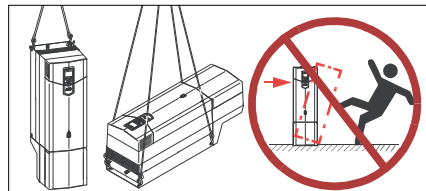


**WARNING!** Obey these instructions. If you ignore them, injury or death, or damage to the equipment can occur. If you are not a qualified electrical professional, do not do electrical installation or maintenance work.



**WARNING!** If you activate the automatic fault reset or automatic restart functions of the drive control program, make sure that no dangerous situations can occur. These functions reset the drive automatically and continue operation after a fault or supply break. If these functions are activated, the installation must be clearly marked as defined in IEC/EN 61800-5-1, subclause 6.5.3, for example, "THIS MACHINE STARTS AUTOMATICALLY".

- Do not do work on the drive, motor cable, motor, or control cables when the drive is connected to the input power. Before you start the work, isolate the drive from all dangerous voltage sources and measure that there are no dangerous voltages. Always wait for 5 minutes after disconnecting the input power to let the intermediate circuit capacitors discharge.
- Do not do work on the drive when a rotating permanent magnet motor is connected to it. A rotating permanent magnet motor energizes the drive, including its input and output terminals.
- Make sure that debris from drilling, cutting and grinding, does not enter the drive.
- Frames R4...R9:** Use the lifting eyes of the drive when you lift the drive. Do not tilt the drive. The drive is heavy and its center of gravity is high. An overturning drive can cause physical injury.



## 1. Unpack the drive

Keep the drive in its package until you are ready to install it. After unpacking, protect the drive from dust, debris and moisture. Make sure that these items are included: cable/conduit box (frames R5...R9 of IP21 [UL Type 1]), drive, mounting template, control panel, quick installation and start-up guide, multilingual residual voltage warning stickers, hardware and firmware manuals (if ordered), options in separate packages (if ordered). Make sure that there are no signs of damage to the items.

## 2. Reform the capacitors

If the drive has not been powered up for a year or more, you must reform the DC link capacitors. See [Related documents](#) or contact ABB technical support.

## 3. Select the cables and fuses

- Select the power cables. Obey the local regulations.
  - Input power cable:** Use symmetrical shielded cable (VFD cable) for the best EMC performance. **NEC installations:** Conduit with continuous conductivity is also allowed and must be grounded on both ends.
  - Motor cable:** ABB recommends symmetrically shielded VFD motor cable to reduce bearing current and wear and stress on motor insulation and to provide the best EMC performance. Although not recommended, conductors inside continuously conductive conduit is allowed in NEC installations. Ground conduit on both ends.
  - Power cable types:** **IEC installations:** Use copper cables. Aluminum cables can only be used with frame sizes R5...R9. **NEC installations:** Only copper conductors are allowed.
  - Current rating:** max. load current.
  - Voltage rating (minimum):** **IEC installations:** 600 V AC cable is accepted for up to 500 V AC, 750 VAC cable is accepted for up to 600 V AC, 1000 V AC cable is accepted for up to 690 V AC. **NEC installations:** 600 V AC for 230 V AC

motors and 1000 V AC for 480 V AC and 600 V AC motors. 600 V AC for 230 V AC and 480 V AC power lines; 1000 V AC for 600 V AC power line.

- **Temperature rating:** IEC installations: Select a cable rated for at least 70 °C maximum permissible temperature of conductor in continuous use. NEC installations: Use 75 °C conductors minimum. Insulation temperature can be higher as long as the ampacity is based on 75 °C conductors.
- Select the control cables.
  - Use double-shielded twisted-pair cable for analog signals. Use double-shielded or single-shielded cable for the digital, relay and I/O signals. Do not run 24 V and 115/230 V signals in the same cable.
- Protect the drive and input power cable with the correct fuses. See *Ratings, fuses and typical power cables*.

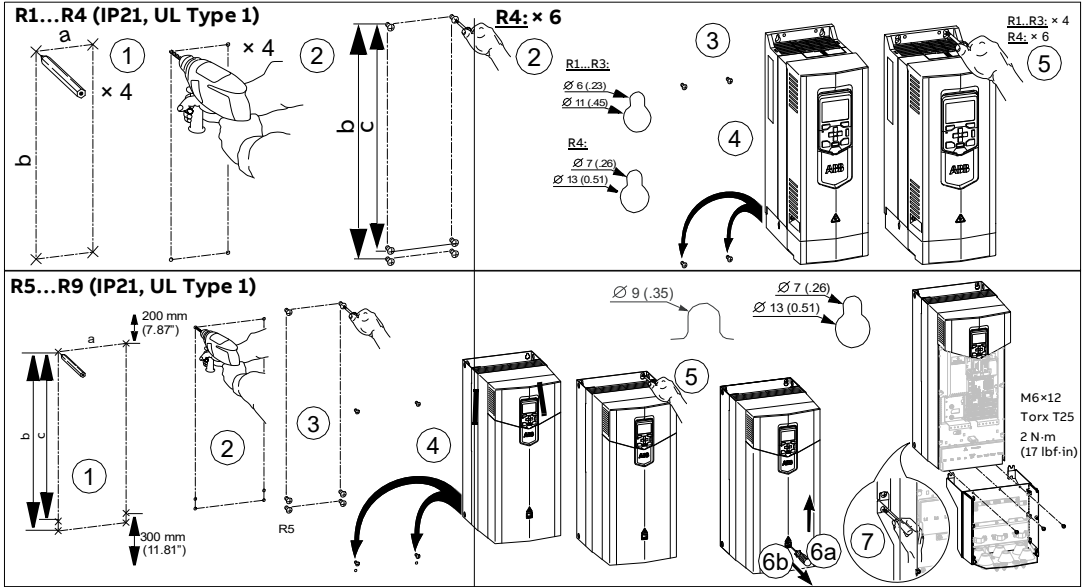
**4. Examine the installation site**

Examine the drive installation site. Make sure that:

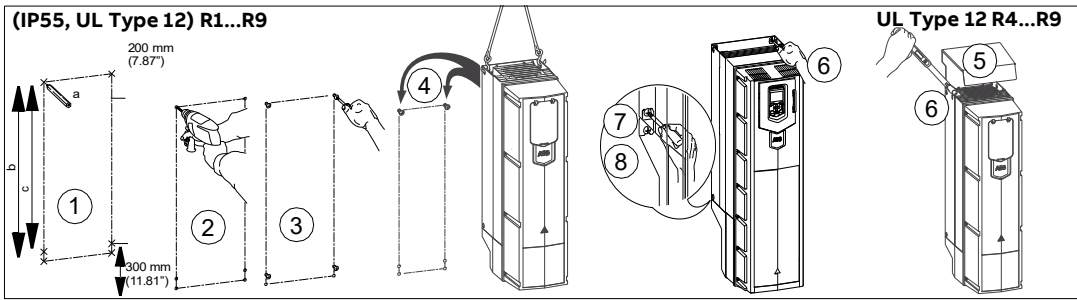
- The installation site is sufficiently ventilated or cooled to remove heat from the drive.
- The ambient conditions of the drive meet the specifications. See *Ambient conditions*.
- The wall behind the drive and the material above and below the unit is of non-flammable material.
- The installation surface is as close to vertical as possible and strong enough to support the drive.
- There is sufficient free space around the drive for cooling, maintenance and operation. For the minimum free space requirements, refer to *Dimensions, weights and free space requirements*.
- There are no sources of strong magnetic fields such as high-current single-core conductors or contactor coils near the drive. A strong magnetic field can cause interference or inaccuracy in the operation of the drive.

**5. Install the drive on the wall**

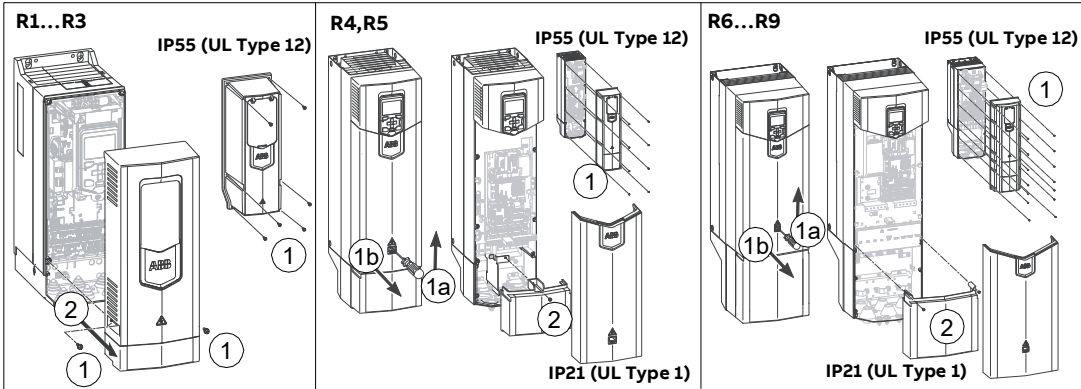
Select fasteners that comply with local requirements applicable to wall surface materials, drive weight and application.



|   | R1  |       | R2  |       | R3  |       | R4  |       | R5  |       | R6    |       | R7  |       | R8    |       | R9  |       |
|---|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-------|-------|-----|-------|-------|-------|-----|-------|
|   | mm  | in    | mm  | in    | mm  | in    | mm  | in    | mm  | in    | mm    | in    | mm  | in    | mm    | in    | mm  | in    |
| a | 98  | 3.85  | 98  | 3.85  | 125 | 4.92  | 160 | 6.30  | 160 | 6.30  | 212.5 | 8.37  | 245 | 9.65  | 262.5 | 10.33 | 345 | 13.58 |
| b | 358 | 14.09 | 358 | 14.09 | 451 | 17.75 | 505 | 19.88 | 612 | 24.10 | 571   | 22.50 | 623 | 24.53 | 701   | 27.61 | 718 | 28.29 |
| c | -   | -     | -   | -     | -   | -     | 475 | 18.70 | 581 | 22.87 | 531   | 20.91 | 583 | 22.95 | 658   | 25.91 | 658 | 25.91 |



**6. Remove the covers.**



**7. Make sure that the drive is compatible with the grounding system**

You can connect all drives to a symmetrically grounded TN-S system (center-grounded wye). With option +E200 or +E202: If you install the drive to a different system, you must remove the EMC screw (disconnect the EMC filter) and/or remove the VAR screw (disconnect the varistor circuit).

| Frame   | Symmetrically grounded TN-S systems (center-grounded wye) | Corner-grounded delta and midpoint-grounded delta systems | IT systems (ungrounded or high-resistance grounded) | TT systems <sup>1)2)</sup>                   |
|---------|---|---|---|--|
| R1...R4 | Do not remove EMC AC or VAR screws.                       | Do not remove EMC AC or VAR screws.                       | Remove EMC AC, EMC DC and VAR screws.               | Remove EMC AC, EMC DC and VAR screws.        |
| R5      |   | Do not remove EMC AC or VAR screws. Remove EMC DC screw.  | Remove EMC AC, EMC DC and VAR screws.               | Remove EMC AC, EMC DC screws and VAR screws. |
| R6...R9 |   | Do not remove EMC AC or VAR screws. Remove EMC DC screw.  | Remove EMC AC, EMC DC and VAR screws.               | Remove EMC AC, EMC DC and VAR screws.        |

1) A residual current device must be installed in the supply system. In NEC installations the residual current device is only required at or above 1000 amps.

2) ABB does not guarantee the EMC category or the operation of the ground leakage detector built inside the drive.

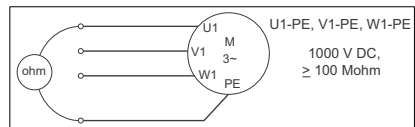


**WARNING!** Do not install the drive on a 525...690 V corner-grounded or midpoint-grounded delta system. Disconnecting the EMC filter and ground-to-phase varistor does not prevent damage to the drive.

**8. Measure the insulation resistance of the power cables and the motor**

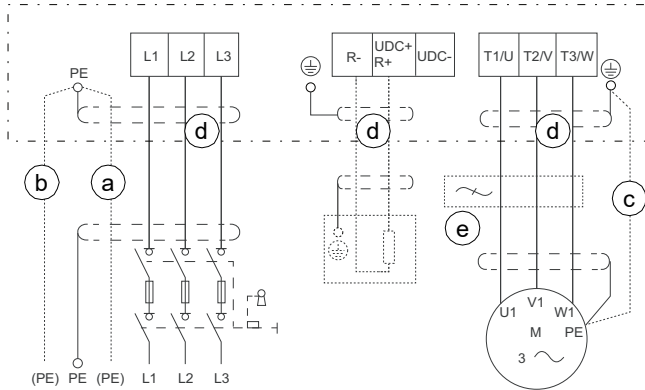
Measure the insulation resistance of the input cable before you connect it to the drive. Obey local regulations.

Measure the insulation resistance of the motor cable and motor when the cable is disconnected from the drive. Measure the insulation resistance between each phase conductor and the PE conductor. Use a measuring voltage of 1000 V DC. The insulation resistance of an ABB motor must be more than 100 Mohm (reference value at 25 °C). For the insulation resistance of other motors, see the manufacturer's instructions. Moisture inside the motor decreases the insulation resistance. If you think that there is moisture, dry the motor and do the measurement again.



## 9. Connect the power cables

### IEC connection diagram with shielded cables

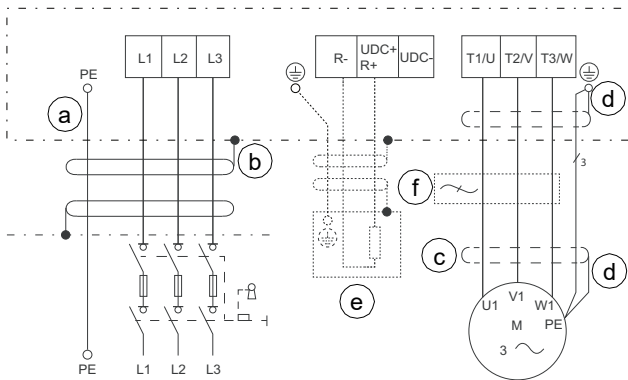


- a. Two protective earth (ground) conductors. Drive safety standard IEC/EN 61800-5-1 requires two PE conductors, if the cross-sectional area of the PE conductor is less than 10 mm<sup>2</sup> Cu or 16 mm<sup>2</sup> Al. For example, you can use the cable shield in addition to the fourth conductor.

- b. Use a separate grounding cable or a cable with a separate PE conductor for the line side, if the conductivity of the fourth conductor or shield does not meet the requirements for the PE conductor.
- c. Use a separate grounding cable for the motor side, if the conductivity of the shield is not sufficient, or if there is no symmetrically constructed PE conductor in the cable.
- d. 360-degree grounding of the cable shield is required for the motor cable and brake resistor cable (if used). It is also recommended for the input power cable.
- e. If necessary, install an external filter (du/dt, common mode, or sine filter). Filters are available from ABB.

Frames R1...R4 have a built-in brake chopper as standard. Frames R5 and up can be equipped with optional built-in brake chopper (+D150). Brake resistors are available as add-on kits.

### NEC connection diagram with symmetrically shielded cable or conduit



**Note:** NEC installation can include separate insulated conductors inside a conduit, shielded VFD cable in conduit, or shielded VFD cable without conduit. The normal dashed symbol (c) in this diagram represents the shield of shielded VFD cable. The same solid symbol (b) represents conduit.

- a. **Insulated ground conductor in a conduit:** Ground to drive's PE terminal and to the distribution panel ground bus. For a VFD cable installation see d.
- b. **Conduit ground:** Bond the conduit to the drive's conduit box and to the distribution panel enclosure. For a VFD cable installation see c.

- c. **Shield of a VFD shielded cable:** Ground the shield 360° under drive's grounding clamp, then twist with the ground conductors and connect under the drive's ground terminal. Ground the shield also 360° at the motor end, then twist and connect under the motor's ground terminal. For a conduit installation see b.
- d. **Symmetrically constructed grounding conductors inside a VFD shielded cable:** Twist together, combine with the shield and connect under the drive's ground terminal and under the motor's ground terminal. For a conduit installation see a.
- e. **External brake resistor connection (if used):** For a conduit installation see a and b. For a VFD cable installation see c and d. In addition, cut the third phase conductor which is not needed for the brake resistor connection.
- f. If necessary, install an external filter (du/dt, common mode, or sine filter). Filters are available from ABB.

Frames R1...R4 have a built-in brake chopper as standard. Frames R5 and up can be equipped with optional built-in brake chopper (+D150). Brake resistors are available as add-on kits.

**Note:** All openings in the drive enclosure must be closed with UL listed devices having the same Type rating as the drive Type.

### Connection procedure with VFD cable

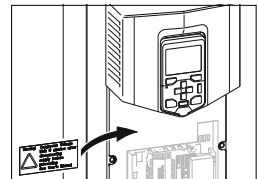
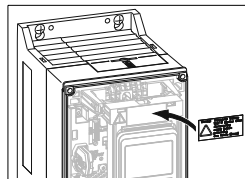
For connection procedure with conduits, see [Connection procedure with conduit](#).

Attach a residual voltage warning sticker in the local language:

Frames R1...R3: to the control panel mounting platform

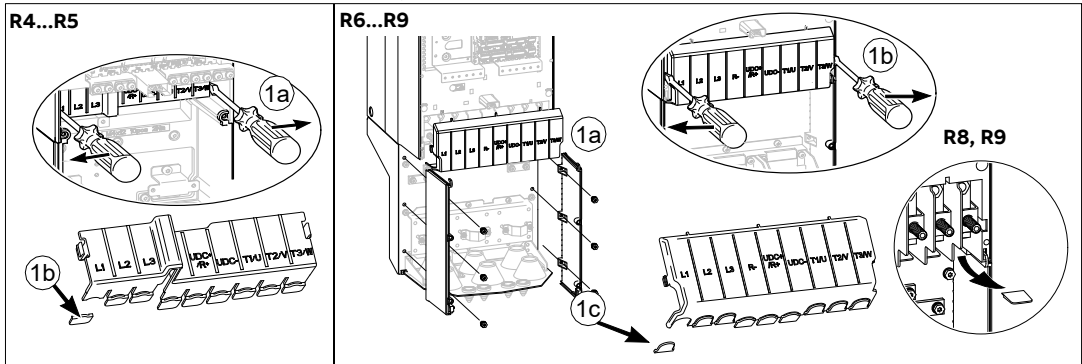
Frames R4, R5: next to the control unit top

Frames R6...R9: next to the control unit.



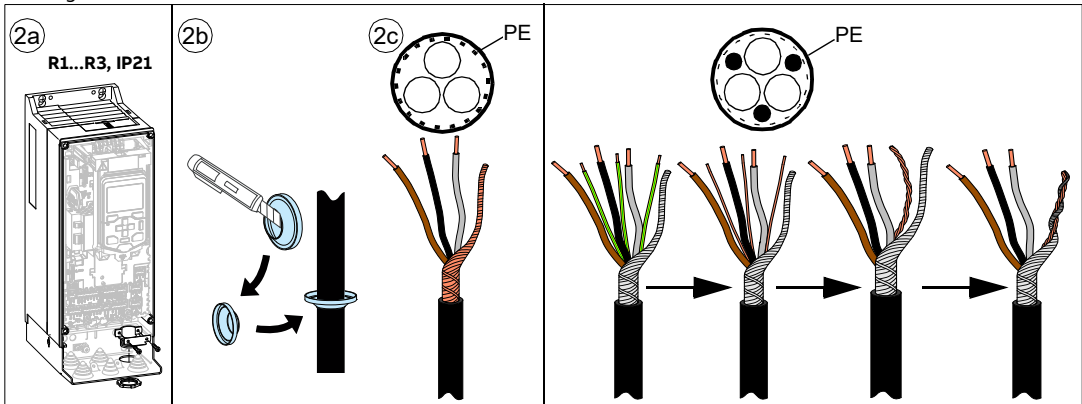
- Frames R5...R9:** Remove the shroud on the power cable terminals (1a), then make the necessary holes for the cables (1b).

**Frames R6...R9:** Remove the side plates (1a). Remove the shroud (1b), then make the necessary holes for the cables (in R8...R9, also do this for the lower shroud).



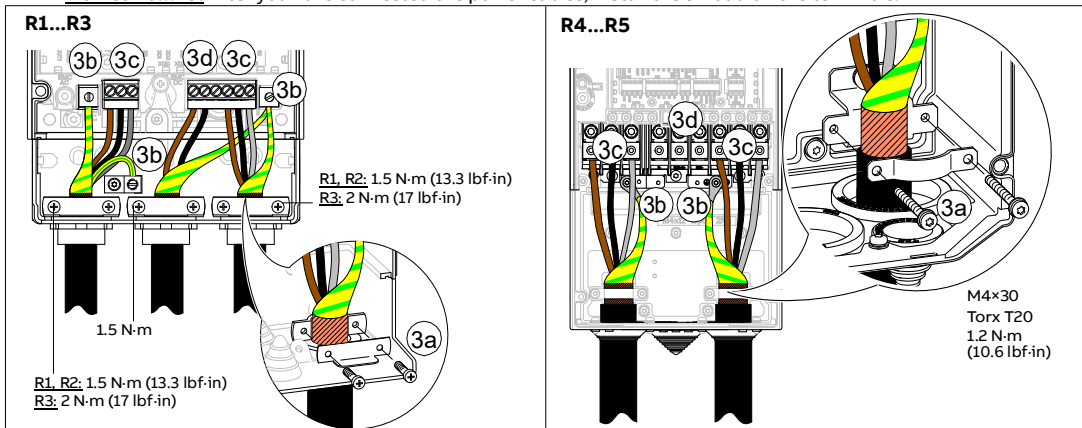
- Prepare the power cables:

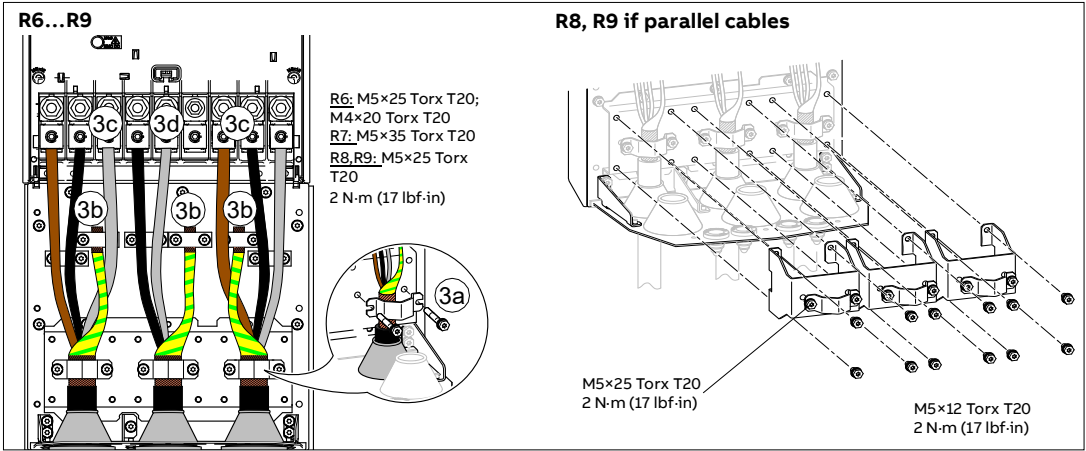
  - Remove the rubber grommets from the cable entry.
  - Frames R1...R3, IP21:** Attach the Romex clamps (included in the delivery in a plastic bag) to the cable entry plate holes (2a).
  - Frames R1...R9 IP55:** Cut a sufficient hole in the rubber grommet. Slide the grommet onto the cable (2b).
  - Prepare the ends of the input power cable and motor cable as illustrated in the applicable figure (2c).
  - Frames R4...R9 IP21 and frames R1...R9 IP55:** Slide the cables through the holes in the cable entry and attach the grommets to the holes.



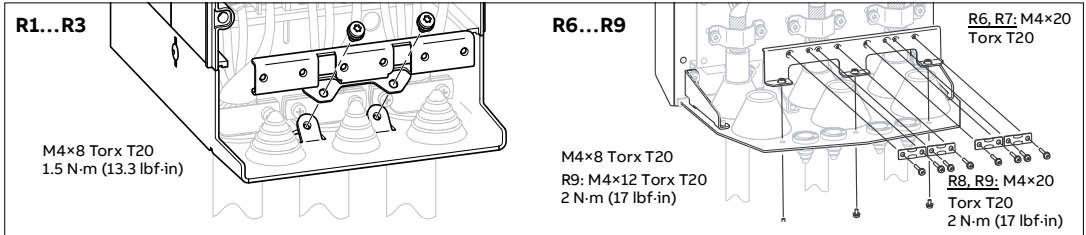
- Connect the power cables. For the tightening torques, refer to [Terminal data](#).

  - For frames **R1...R3:** Ground the cable shields 360 degrees in the Romex clamp (IP21/Type 1 units). For IP55 (Type 12) ground the cable shield 360 degrees on grounding shelf as shown in R4...R5 (a). R1...R3 grounding shelf is not shown for IP55/Type 12 drive.
  - For frames **R4...R9:** Tighten the clamps of the power cable grounding shelf onto the stripped part of the cables (a).
  - Connect the twisted shield of the cable shields to the grounding terminals (b).
  - Frames R6...R9:** To install the common mode filter, see [Related documents](#).
  - Connect the phase conductors of the motor cable to the T1/U, T2/V and T3/W terminals. Connect the input power cable to the L1, L2 and L3 terminals (c). Connect the brake resistor cables to R+ and R- terminals if brake chopper is in use (d).
  - Frames R6...R9:** After you have connected the power cables, install the shroud on the terminals.

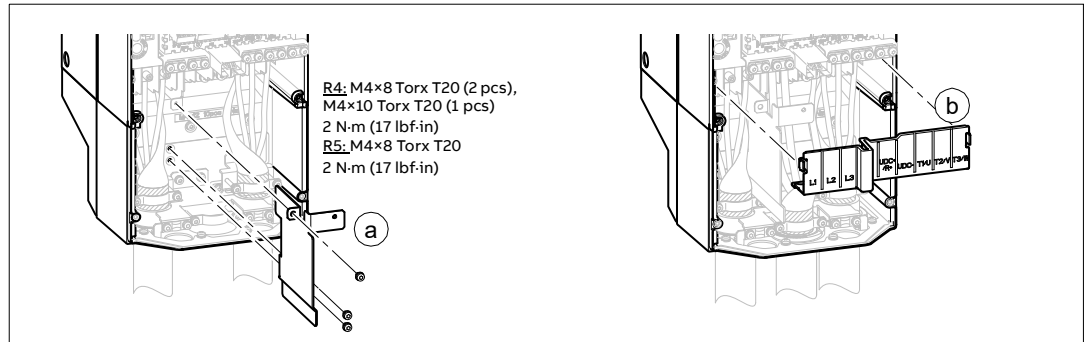




4. Frames R1...R3 and R6...R9: Install the control cable grounding shelf.

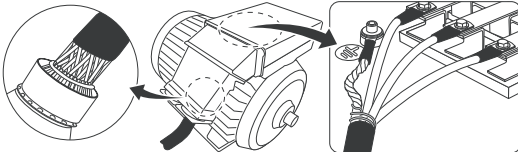


Frames R4, R5: Install the EMC shroud (a). Frames R4...R9: Install the shroud (b).



5. In frames R6...R9, install the side plates if removed. Attach the cables outside the drive mechanically.

6. Ground the motor cable shield at the motor end. For minimum radio frequency interference, ground the motor cable shield 360 degrees at the cable entry of the motor terminal box.



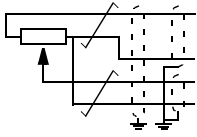
### 10. Connect the control cables

Make the connections according to the application. Keep the signal wire pairs twisted as near to the terminals as possible to prevent inductive coupling.

1. Cut a hole into the rubber grommet and slide the grommet onto the cable.
2. Ground the outer shield of the cable 360 degrees under the grounding clamp. Keep the cable unstripped as close to the terminals of the control unit as possible. **Frames R1...R3:** Ground also the pair-cable shields and grounding wires at the cable entry box grounding clamp. **Frames R4...R9:** Ground the pair-cable shields and all grounding wires to the clamp below the control unit.
3. Tie all control cables to the provided cable tie mounts.

## Default I/O connections

Wire sizes:  
0.5 ... 2.5 mm<sup>2</sup>  
(24...12 AWG)  
Tightening  
torques: 0.5 N·m  
(5 lbf·in) for both  
stranded and  
solid wiring.

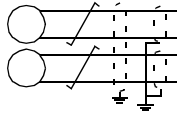


### XPOW External power input

|   |       |              |
|---|-------|--------------|
| 1 | +24VI | 24 V DC, 2 A |
| 2 | GND   |              |

### XAI Reference voltage and analog inputs

|    |       |   |
|----|-------|---|
| 1  | +VREF | 11 V DC, $R_i$ 1...10 kohm                              |
| 2  | -VREF | -11 V DC, $R_i$ 1...10 kohm                             |
| 3  | AGND  | Ground  |
| 4  | AI1+  | <b>Speed reference</b> 0(2)...11 V, $R_{in} > 200$ kohm |
| 5  | AI1-  |   |
| 6  | AI2+  | By default not in use. 0(4)...22 mA, $R_{in} = 100$ ohm |
| 7  | AI2-  |   |
| J1 | J1    | AI1 current/voltage selection jumper                    |
| J2 | J2    | AI2 current/voltage selection jumper                    |



### XAO Analog outputs

|   |      |   |
|---|------|---|
| 1 | AO1  | <b>Motor speed rpm</b> 0...22 mA, $R_L < 500$ ohm |
| 2 | AGND |   |
| 3 | AO2  |   |
| 4 | AGND | <b>Motor current</b> 0...22 mA, $R_L < 500$ ohm   |

### XD2D Drive-to-drive link

|    |      |  |
|----|------|--|
| 1  | B    |  |
| 2  | A    | Drive-to-drive link                    |
| 3  | BGND |  |
| J3 | J3   | Drive-to-drive link termination switch |

### XRO1, XRO2, XRO3 Relay outputs

|    |     |                    |
|----|-----|--------------------|
| 11 | NC  | <b>Ready</b>       |
| 12 | COM | 250 V AC / 30 V DC |
| 13 | NO  | 2 A                |
| 21 | NC  | <b>Running</b>     |
| 22 | COM | 250 V AC / 30 V DC |
| 23 | NO  | 2 A                |
| 31 | NC  | <b>Faulted(-1)</b> |
| 32 | COM | 250 V AC / 30 V DC |
| 33 | NO  | 2 A                |

### XD24 Digital interlock

|    |        |                               |
|----|--------|-------------------------------|
| 1  | DIIL   | Run enable                    |
| 2  | +24VD  | +24 V DC 200 mA <sup>1)</sup> |
| 3  | DICOM  | Digital input ground          |
| 4  | +24VD  | +24 V DC 200 mA <sup>1)</sup> |
| 5  | DIOGND | Digital input/output ground   |
| J6 |        | Ground selection switch       |

### XDIO Digital input/outputs

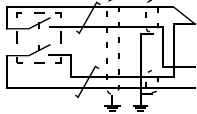
|   |      |                 |
|---|------|-----------------|
| 1 | DIO1 | Output: Ready   |
| 2 | DIO2 | Output: Running |

### XDI Digital inputs

|   |     |                                    |
|---|-----|------------------------------------|
| 1 | DI1 | Stop (0) / Start (1)               |
| 2 | DI2 | Forward (0) / Reverse (1)          |
| 3 | DI3 | Reset                              |
| 4 | DI4 | Acceleration & deceleration select |
| 5 | DI5 | Constant speed 1 (1 = On)          |
| 6 | DI6 | By default not in use.             |

### XSTO Safe torque off

|   |      |   |
|---|------|---|
| 1 | OUT1 |   |
| 2 | SGND | Safe torque off. Both circuits must be closed for the drive to start. |
| 3 | IN1  |   |
| 4 | IN2  |   |



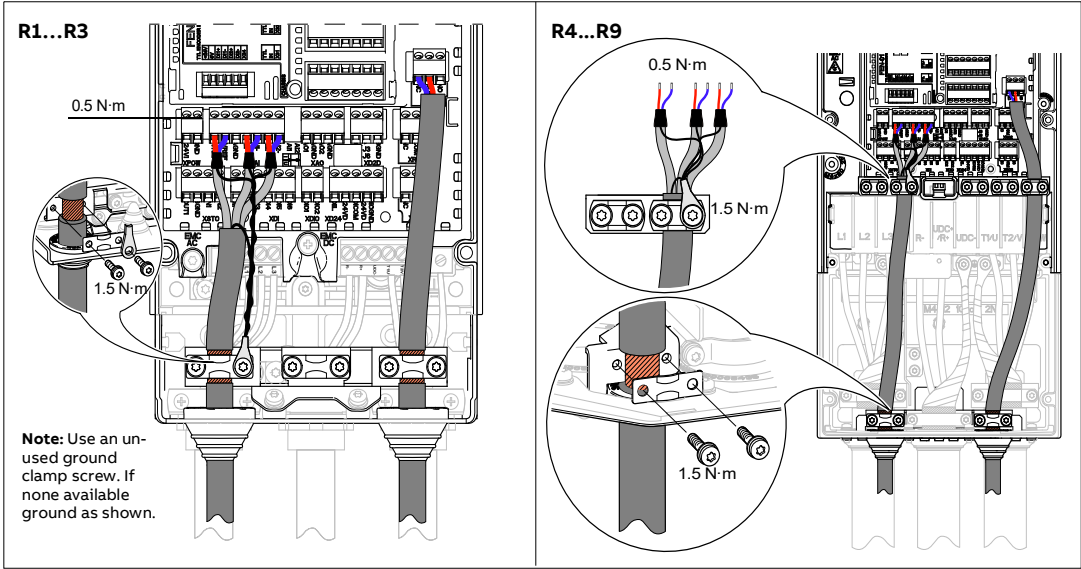
### X12 Safety functions module connection

### X13 Control panel connection

### X205 Memory unit connection

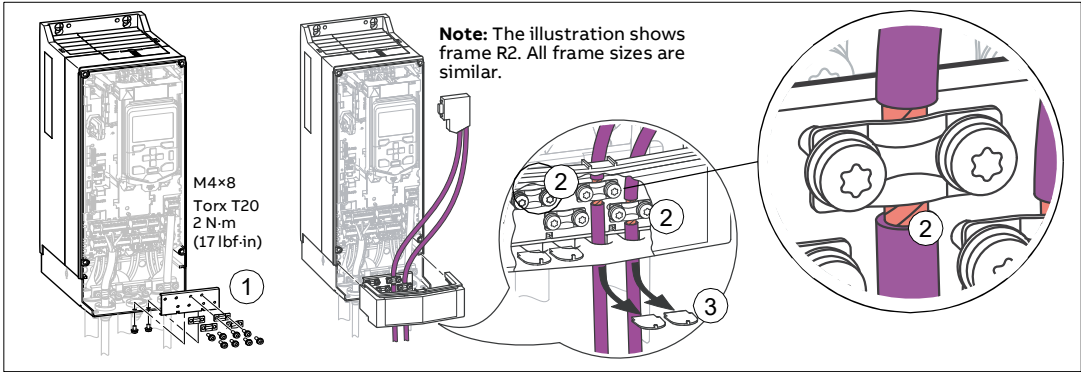
<sup>1)</sup> Total load capacity of these outputs is 4.8 W (200 mA / 24 V) minus the power taken by DIO1 and DIO2.

**Control cable installation examples**

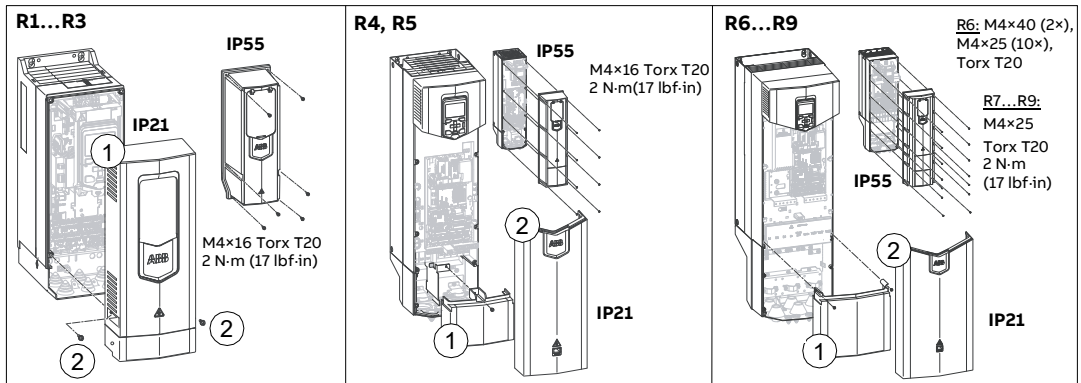


**11. Install optional modules, if included in the delivery**

**Fieldbus cabling example**



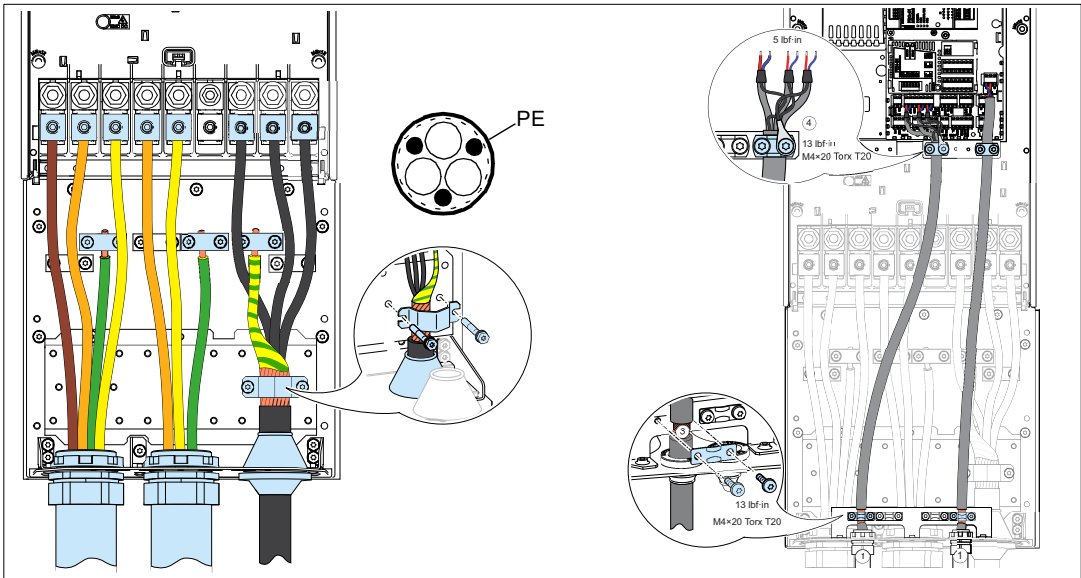
**12. Install the cover(s)**





## Connection procedure with conduit



- Connect the power cables. ABB recommends symmetrically shielded VFD cable for connecting the motor.
  - Attach the residual voltage warning sticker and remove the covers as instructed in [Connection procedure with VFD cable](#).
  - Remove the rubber grommets from the conduit plate for the conduit to be connected.
  - Attach the conduit to the drive conduit plate, and to the motor or source of power distribution. Make sure conduit is correctly bonded at both ends of the conduit. Ensure conductivity of the conduit. Slide the VFD shielded cable or discrete conductors through the conduit and strip the cable ends.
  - If you use a symmetrically shielded VFD cable, twist the grounding wires together with the cable shield and connect them to the grounding terminals. Ground the shield 360 degrees at the grounding clamp. If you use discrete conductors connect the insulated ground conductor to the ground terminal.
  - Connect the input and motor conductors and tighten cable terminals. For the tightening torques, refer to [Terminal data](#).
  - Frames R4, R5:** Install the EMC shroud separating the input and output cabling if not installed yet.
  - If brake chopper is in use:** Connect the brake resistor conductors to the R+ and R- terminals.
  - Reinstall the shroud on the power cable terminals.
- Connect the control cables
  - Attach the cable conduits to the drive conduit plate. Make sure conduit is correctly bonded at both ends and that the conductivity is consistent throughout the conduit. Slide the control cables through the conduit.
  - Cut to suitable length (note the extra length of the grounding conductors) and strip the conductors.
  - Ground the outer shields of all control cables 360 degrees at a grounding clamp.
  - Ground the pair-cable shields to the grounding clamp. Use an unused ground clamp screw. If none available ground as shown. Leave the other end of the shields unconnected or ground them indirectly via a high-frequency capacitor with a few nanofarads, eg. 3.3 nF / 630 V.
  - Connect the conductors to the appropriate terminals of the control unit.
  - Wire the optional modules if included in the delivery.
  - Reinstall the front covers as instructed in [Install the cover\(s\)](#).



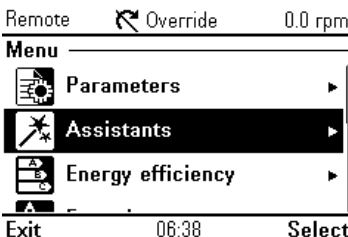

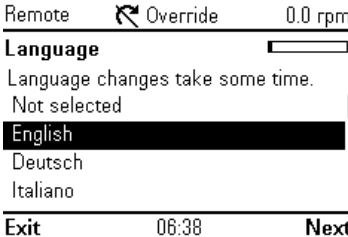
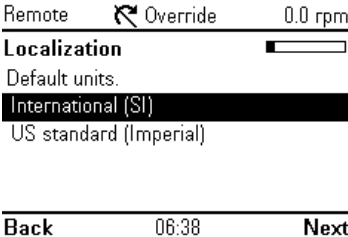
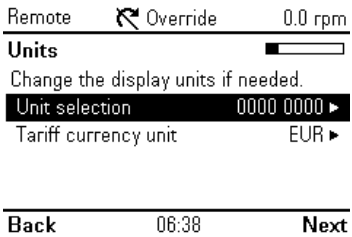
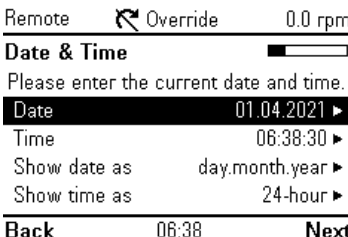
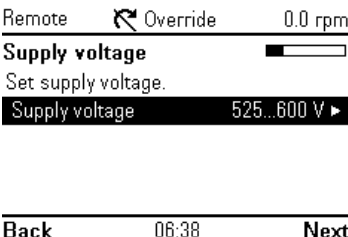
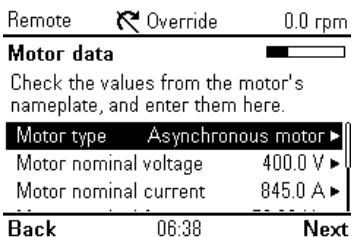
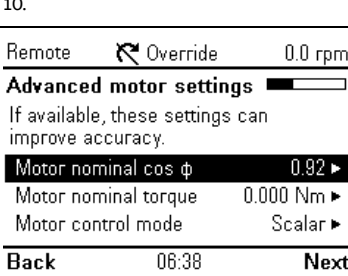
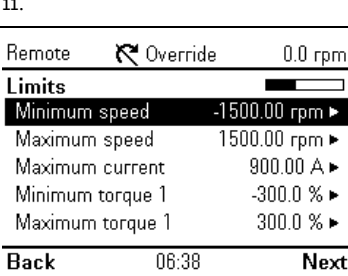
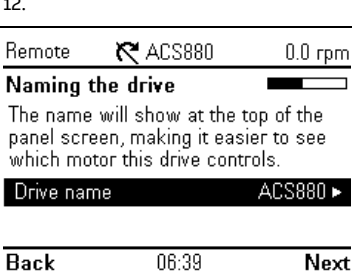
## 13. Start-up the drive








**WARNING!** Obey these instructions. 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 installation or maintenance work.

Use the control panel to do the start-up procedure. The two commands at the bottom of the display show the functions of the two softkeys  and  located below the display. The commands assigned to the softkeys are different

depending on the context. Use the arrow keys (←, →, ↑, ↓) and (↵) to move the cursor or change values depending on the active view. Key (?) shows a context-sensitive help page.

|  |  |   |
|--|--|---|
| <p>1.<br/>Power up the drive. Make sure that you have the motor name plate data available.</p>   | <p>2.<br/>The First start assistant guides you through the first start-up.<br/>Select <b>Menu</b> and press (↵) (<b>Menu</b>) to open the main Menu.<br/>Select <b>Assistants</b> and press (↵) (<b>Select</b>).</p>  | <p>3.<br/>Select <b>Basic setup</b> and press (↵) (<b>Select</b>).</p>  |
| <p>4.<br/>Select the language you want to use and press (↵) (<b>Next</b>).<br/><b>Note:</b> After you have selected the language, it takes a few minutes for the control panel to wake up.</p> | <p>5.<br/>Select the localization you want to use and press (↵) (<b>Next</b>).</p>   | <p>6.<br/>Do the following selections. After each, press (↵) (<b>Next</b>).</p>   |
|   |   |   |
| <p>7.</p>  | <p>8.</p>  | <p>9.</p>   |
|   |   |   |
| <p>10.</p>    | <p>11.</p>    | <p>12.</p>    |
| <p>13.</p>   | <p>14.</p>   |   |

|  |   |   |
|--|---|---|
| Remote  ACS880 0.0 rpm   | Remote  ACS880 0.0 rpm  | Remote  ACS880 0.0 rpm |
| <b>Direction test</b> <br>Spin the motor to check direction.<br><b>No, skip the test</b><br>Yes, test now | <b>Make backup?</b> <br>Copies all settings into a backup file stored in the control panel. To restore a backup, go to Menu > Backups.<br><b>Not now</b><br>Backup | <b>Set-up complete</b><br>Drive is ready for use.   |
| <b>Back</b> 06:39 <b>Next</b>  | <b>Back</b> 06:41 <b>Next</b>   | <b>Back</b> 06:41 <b>Done</b>   |

## Motor overload protection

The factory motor overload protection is not enabled by default. Motor thermal overload protection can be measured using motor temperature devices, can be estimated using a motor model defined by parameters, or can use measured motor current and motor Class curves. To enable protection using motor model parameters or measurement devices set parameter 35.11 and subsequent parameters through 35.55. To enable motor Class curves set parameter 35.56. Motor overload Class is defaulted to 20 and selectable in parameter 35.57.

Use the information key (i) on the drive control panel for more information on setting group 35 parameters. You must set the drive overload parameters correctly, or motor damage could occur.

## Fieldbus communication

To configure the embedded fieldbus communication for Modbus RTU, you must set at least these parameters:

| Parameter                   | Setting             | Description  |
|-----------------------------|---------------------|--|
| 20.01 Ext1 commands         | Embedded fieldbus   | Selects fieldbus as the source for the start and stop commands when EXT1 is selected as the active control location. |
| 22.11 Speed ref1 source     | EFB ref1            | Selects a reference received through the embedded fieldbus interface as speed reference 1.                           |
| 26.11 Torque ref1 source    | EFB ref1            | Selects a reference received through the embedded fieldbus interface as torque reference 1.                          |
| 28.11 Frequency ref1 source | EFB ref1            | Selects a reference received through the embedded fieldbus interface as frequency reference 1.                       |
| 58.01 Protocol enable       | Modbus RTU          | Initializes embedded fieldbus communication.   |
| 58.03 Node address          | 1 (default)         | Node address. There must be no two nodes with the same node address on-line.   |
| 58.04 Baud rate             | 19.2 kbps (default) | Defines the communication speed of the link. Use the same setting as in the master station.                          |
| 58.05 Parity                | 8 EVEN 1 (default)  | Selects the parity and stop bit setting. Use the same setting as in the master station.                              |
| 58.06 Communication control | Refresh settings    | Validates any changed EFB configuration settings. Use this after changing any parameters in group 58.                |

Other parameters related to the fieldbus configuration:

|                                 |                       |                                   |                          |
|---------------------------------|-----------------------|-----------------------------------|--------------------------|
| 58.14 Communication loss action | 58.17 Transmit delay  | 58.28 EFB act1 type               | 58.34 Word order         |
| 58.15 Communication loss mode   | 58.25 Control profile | 58.31 EFB act1 transparent source | 58.101 Data I/O 1<br>... |
| 58.16 Communication loss time   | 58.26 EFB ref1 type   | 58.33 Addressing mode             | 58.124 Data I/O 24       |

## Warnings and faults

| Warning | Fault | Aux. code                           | Description   |
|---------|-------|-------------------------------------|---|
| A2A1    | 2281  | Current calibration                 | <b>Warning:</b> Current calibration is done at the next start.<br><b>Fault:</b> Output phase current measurement fault. |
| -       | 2310  | Overcurrent                         | The output current is more than the internal limit. This can also be caused by an earth fault or phase loss.            |
| A2B3    | 2330  | Earth leakage                       | A load unbalance that is typically caused by an earth fault in the motor or the motor cable.                            |
| A2B4    | 2340  | Short circuit                       | There is a short-circuit in the motor or the motor cable.   |
| -       | 3130  | Input phase loss                    | The intermediate DC circuit voltage oscillates due to missing input power line phase.                                   |
| -       | 3181  | Wiring or earth fault               | Incorrect input and motor cable connection.   |
| A3A1    | 3210  | DC link overvoltage                 | Intermediate DC circuit voltage is too high.  |
| A3A2    | 3220  | DC link undervoltage                | Intermediate DC circuit voltage is too low.   |
| -       | 3381  | Output phase loss                   | All three phases are not connected to the motor.  |
| -       | 5090  | STO hardware failure                | STO hardware diagnostics has detected hardware failure. Contact ABB.  |
| A5A0    | 5091  | Safe torque off                     | The Safe torque off (STO) function is active.   |
| A7CE    | 6681  | EFB comm loss                       | Break in embedded fieldbus communication.   |
| A7C1    | 7510  | FBA A communication                 | Communication lost between drive (or PLC) and fieldbus adapter.   |
| A7AB    | -     | Extension I/O configuration failure | The I/O extension module types and locations specified by parameters do not match the detected configuration.           |
| AFF6    | -     | Identification run                  | The motor ID run occurs at the next start.  |
| -       | FA81  | Safe torque off 1 loss              | The Safe torque off circuit 1 is broken.  |
| -       | FA82  | Safe torque off 2 loss              | The Safe torque off circuit 2 is broken.  |

### Ratings, fuses and typical power cables

- 1) Typical motor power with no overload capacity (nominal use). The kilowatt ratings apply to most IEC 4-pole motors. The horsepower ratings apply to most NEMA 4-pole motors.
- 2) For IEC installations, ABB recommends aR fuses. See hardware manual for guidelines in selecting between aR and gG fuses, and for additional fuse alternatives.
- 3) The recommended branch protection fuses must be used to maintain the IEC/EN/UL 61800-5-1 and CSA C22.2 No. 274 certifications. Refer to note 6 for circuit breaker protection.
- 4) **IEC 61439-1:** The drive is suitable for use on a circuit capable of delivering not more than 65 kA when protected by the fuses given in this table.
- 5) **UL 61800-5-1, CSA C22.2 No. 274:** The drive is suitable for use on a circuit capable of delivering not more than 100 kA symmetrical amperes (rms) at 600 V maximum when protected by the ABB recommended fuses.
- 6) Refer to *Alternate Fuses, MMPs and Circuit Breakers for ABB Drives (3AXD50000645015 [English])* for additional UL fuses and circuit breakers that can be used as branch circuit protection.
- 7) Class J, CC, and CF fuses are also allowed at the same nominal current and voltage ratings.
- 8) **IEC 61800-9-2:** Typical drive losses when it operates at 90% of the nominal output frequency and 100% of the nominal output current.
- 9) **IEC Installations:** The cable sizing is based on max. 9 cables laid on a cable ladder side by side, three ladder type trays one on top of the other, ambient temperature 30 °C, PVC insulation, surface temperature 70 °C (EN 60204-1 and IEC 60364-5-52/2001). For other conditions, size the cables according to local safety regulations, appropriate input voltage and the load current of the drive.
- 10) **NEC Installations:** The cable sizing is based on NEC Table 310-16 for copper wires, 75 °C (167 °F) wire insulation at 40 °C (104 °F) ambient temperature. Not more than three current-carrying conductors in raceway or cable or earth (directly buried). For other conditions, size the cables according to local safety regulations, appropriate input voltage and the load current of the drive.

| ACS880<br>-01-...                    | Frame<br>size | Nominal ratings<br>IEC / UL (NEC) |                   |                              |                | Fuses <sup>3)</sup>                  |  |                                    | Typical power cable |          | Typical<br>power<br>loss <sup>8)</sup> |
|--------------------------------------|---------------|-----------------------------------|-------------------|------------------------------|----------------|--------------------------------------|--|------------------------------------|---------------------|----------|--|
|                                      |               | Input<br>current                  | Output<br>current | Motor<br>power <sup>1)</sup> |                | gG fuse <sup>4)</sup><br>(DIN 43620) | aR fuse <sup>2)4)</sup><br>(DIN 43653) | UL<br>class<br>T <sup>5)6)7)</sup> | Copper              |          |  |
|                                      |               |                                   |                   | $I_n$                        | $I_2 / I_{Ld}$ |                                      |  |                                    | $P_n$               | $P_{Ld}$ |  |
| A                                    | A             | kW                                | hp                | ABB type                     | Bussmann type  |                                      |  |                                    |                     |          |  |
| <b>U<sub>n</sub> = 3-phase 230 V</b> |               |                                   |                   |                              |                |                                      |  |                                    |                     |          |  |
| 04A6-2                               | R1            | 4.6 / 4.4                         | 4.6 / 4.4         | 0.75                         | 1.0            | OFAF000H6                            | 170M1309                               | JJS-15                             | 3×1.5               | 14       | 61                                     |
| 06A6-2                               | R1            | 6.6 / 6.3                         | 6.6 / 6.3         | 1.1                          | 1.5            | OFAF000H10                           | 170M1309                               | JJS-15                             | 3×1.5               | 14       | 85                                     |
| 07A5-2                               | R1            | 7.5 / 7.1                         | 7.5 / 7.1         | 1.5                          | 2.0            | OFAF000H16                           | 170M1309                               | JJS-15                             | 3×1.5               | 14       | 96                                     |
| 10A6-2                               | R1            | 10.6 / 10.1                       | 10.6 / 10.1       | 2.2                          | 3.0            | OFAF000H16                           | 170M1309                               | JJS-20                             | 3×1.5               | 14       | 149                                    |
| 16A8-2                               | R2            | 16.8 / 16.0                       | 16.8 / 16.0       | 4.0                          | 5.0            | OFAF000H25                           | 170M1311                               | JJS-25                             | 3×6                 | 10       | 210                                    |
| 24A3-2                               | R2            | 24.3 / 23.1                       | 24.3 / 23.1       | 5.5                          | 7.5            | OFAF000H40                           | 170M1313                               | JJS-35                             | 3×6                 | 8        | 368                                    |
| 031A-2                               | R3            | 31.0 / 29.3                       | 31.0 / 29.3       | 7.5                          | 10             | OFAF000H50                           | 170M1315                               | JJS-50                             | 3×10                | 8        | 354                                    |
| 046A-2                               | R4            | 46 / 44                           | 46 / 44           | 11                           | 15             | OFAF000H63                           | 170M1316                               | JJS-80                             | 3×16                | 6        | 541                                    |
| 061A-2                               | R4            | 61 / 58                           | 61 / 58           | 15                           | 20             | OFAF000H80                           | 170M1318                               | JJS-80                             | 3×25                | 4        | 804                                    |
| 075A-2                               | R5            | 75 / 71                           | 75 / 71           | 18.5                         | 25             | OFAF000H100                          | 170M3013                               | JJS-110                            | 3×35                | 3        | 925                                    |
| 087A-2                               | R5            | 87 / 83                           | 87 / 83           | 22                           | 30             | OFAF000H125                          | 170M3014                               | JJS-110                            | 3×35                | 2        | 1142                                   |
| 115A-2                               | R6            | 115 / 109                         | 115 / 109         | 30                           | 40             | OFAF000H160                          | 170M3015                               | JJS-150                            | 3×50                | 1/0      | 1362                                   |
| 145A-2                               | R6            | 145 / 138                         | 145 / 138         | 37                           | 50             | OFAF0H200                            | 170M3016                               | JJS-200                            | 3×95                | 3/0      | 1935                                   |
| 170A-2                               | R7            | 170 / 162                         | 170 / 162         | 45                           | 60             | OFAF0H250                            | 170M3017                               | JJS-250                            | 3×120               | 4/0      | 1968                                   |
| 206A-2                               | R7            | 206 / 196                         | 206 / 196         | 55                           | 75             | OFAF1H315                            | 170M3018                               | JJS-300                            | 3×150               | 300 MCM  | 2651                                   |
| 274A-2                               | R8            | 274 / 260                         | 274 / 260         | 75                           | 100            | OFAF2H400                            | 170M3019                               | JJS-400                            | 2×(3×95)            | 2×2/0    | 3448                                   |
| <b>U<sub>n</sub> = 3-phase 400 V</b> |               |                                   |                   |                              |                |                                      |  |                                    |                     |          |  |
| 02A4-3                               | R1            | 2.4                               | 2.4               | 0.75                         | -              | OFAF000H4                            | 170M1311                               | -                                  | 3×1.5               | -        | 43                                     |
| 03A3-3                               | R1            | 3.3                               | 3.3               | 1.1                          | -              | OFAF000H6                            | 170M1311                               | -                                  | 3×1.5               | -        | 52                                     |
| 04A0-3                               | R1            | 4.0                               | 4.0               | 1.5                          | -              | OFAF000H6                            | 170M1311                               | -                                  | 3×1.5               | -        | 59                                     |
| 05A6-3                               | R1            | 5.6                               | 5.6               | 2.2                          | -              | OFAF000H10                           | 170M1311                               | -                                  | 3×1.5               | -        | 78                                     |
| 07A2-3                               | R1            | 8.0                               | 8.0               | 3.0                          | -              | OFAF000H10                           | 170M1311                               | -                                  | 3×1.5               | -        | 112                                    |
| 09A4-3                               | R1            | 10.0                              | 10.0              | 4.0                          | -              | OFAF000H16                           | 170M1311                               | -                                  | 3×1.5               | -        | 146                                    |
| 12A6-3                               | R1            | 12.9                              | 12.9              | 5.5                          | -              | OFAF000H16                           | 170M1311                               | -                                  | 3×1.5               | -        | 217                                    |
| 017A-3                               | R2            | 17.0                              | 17.0              | 7.5                          | -              | OFAF000H25                           | 170M1313                               | -                                  | 3×6                 | -        | 235                                    |
| 025A-3                               | R2            | 25.0                              | 25.0              | 11.0                         | -              | OFAF000H32                           | 170M1313                               | -                                  | 3×6                 | -        | 412                                    |
| 032A-3                               | R3            | 32.0                              | 32.0              | 15.0                         | -              | OFAF000H40                           | 170M1315                               | -                                  | 3×10                | -        | 400                                    |
| 038A-3                               | R3            | 38.0                              | 38.0              | 18.5                         | -              | OFAF000H50                           | 170M1315                               | -                                  | 3×10                | -        | 515                                    |
| 045A-3                               | R4            | 45.0                              | 45.0              | 22.0                         | -              | OFAF000H63                           | 170M1316                               | -                                  | 3×16                | -        | 526                                    |
| 061A-3                               | R4            | 61                                | 61                | 30                           | -              | OFAF000H80                           | 170M1317                               | -                                  | 3×25                | -        | 818                                    |
| 072A-3                               | R5            | 72                                | 72                | 37                           | -              | OFAF000H100                          | 170M1318                               | -                                  | 3×35                | -        | 841                                    |
| 087A-3                               | R5            | 87                                | 87                | 45                           | -              | OFAF000H100                          | 170M1319                               | -                                  | 3×35                | -        | 1129                                   |
| 105A-3                               | R6            | 105                               | 105               | 55                           | -              | OFAF000H125                          | 170M3015                               | -                                  | 3×50                | -        | 1215                                   |
| 145A-3                               | R6            | 145                               | 145               | 75                           | -              | OFAF000H160                          | 170M3016                               | -                                  | 3×95                | -        | 1962                                   |
| 169A-3                               | R7            | 169                               | 169               | 90                           | -              | OFAF0H250                            | 170M3017                               | -                                  | 3×120               | -        | 2042                                   |
| 206A-3                               | R7            | 206                               | 206               | 110                          | -              | OFAF1H315                            | 170M3018                               | -                                  | 3×150               | -        | 2816                                   |
| 246A-3                               | R8            | 246                               | 246               | 132                          | -              | OFAF1H355                            | 170M5009                               | -                                  | 2×(3×70)            | -        | 3026                                   |
| 293A-3                               | R8            | 293                               | 293               | 160                          | -              | OFAF2H425                            | 170M5010                               | -                                  | 2×(3×95)            | -        | 3630                                   |
| 363A-3                               | R9            | 363                               | 363               | 200                          | -              | OFAF2H500                            | 170M5012                               | -                                  | 2×(3×120)           | -        | 4688                                   |

| ACS880<br>-01-...                                   | Frame<br>size | Nominal ratings<br>IEC / UL (NEC) |                   |                              |          | Fuses <sup>3)</sup>                  |  |                                    | Typical power cable |                              | Typical<br>power<br>loss <sup>8)</sup> |
|---|---------------|-----------------------------------|-------------------|------------------------------|----------|--------------------------------------|--|------------------------------------|---------------------|------------------------------|--|
|   |               | Input<br>current                  | Output<br>current | Motor<br>power <sup>1)</sup> |          | gG fuse <sup>4)</sup><br>(DIN 43620) | aR fuse <sup>2)4)</sup><br>(DIN 43653) | UL<br>class<br>T <sup>5)6)7)</sup> | Copper              |                              |  |
|   |               |                                   |                   | $P_n$                        | $P_{Ld}$ |                                      |  |                                    | mm <sup>2</sup> 9)  | AWG/<br>kcmil <sup>10)</sup> |  |
|   |               | A                                 | A                 | kW                           | hp       | ABB type                             | Bussmann type                          | W                                  |                     |                              |  |
| 430A-3  | R9            | 430                               | 430               | 250                          | -        | OFAF3H630                            | 170M5013                               | -                                  | 2x(3x150)           | -                            | 5797                                   |
| $U_n = 3\text{-phase } 480\text{ V, } 500\text{ V}$ |               |                                   |                   |                              |          |                                      |  |                                    |                     |                              |  |
| 02A1-5  | R1            | 2.1                               | 2.1               | 0.75                         | 1.0      | OFAF000H4                            | 170M1308                               | JJS-15                             | 3x1.5               | 14                           | 42                                     |
| 03A0-5  | R1            | 3.0                               | 3.0               | 1.1                          | 1.5      | OFAF000H6                            | 170M1308                               | JJS-15                             | 3x1.5               | 14                           | 50                                     |
| 03A4-5  | R1            | 3.4                               | 3.4               | 1.5                          | 2.0      | OFAF000H6                            | 170M1308                               | JJS-15                             | 3x1.5               | 14                           | 55                                     |
| 04A8-5  | R1            | 4.8                               | 4.8               | 2.2                          | 3.0      | OFAF000H10                           | 170M1308                               | JJS-15                             | 3x1.5               | 14                           | 71                                     |
| 05A2-5  | R1            | 5.2                               | 5.2               | 3.0                          | 3.0      | OFAF000H10                           | 170M1308                               | JJS-15                             | 3x1.5               | 14                           | 76                                     |
| 07A6-5  | R1            | 7.6                               | 7.6               | 4.0                          | 5.0      | OFAF000H16                           | 170M1308                               | JJS-15                             | 3x1.5               | 14                           | 110                                    |
| 11A0-5  | R1            | 11.0                              | 11.0              | 5.5                          | 7.5      | OFAF000H16                           | 170M1308                               | JJS-20                             | 3x1.5               | 14                           | 180                                    |
| 014A-5  | R2            | 14                                | 14                | 7.5                          | 10       | OFAF000H25                           | 170M1313                               | JJS-25                             | 3x6                 | 12                           | 191                                    |
| 021A-5  | R2            | 21                                | 21                | 11.0                         | 15       | OFAF000H32                           | 170M1313                               | JJS-35                             | 3x6                 | 10                           | 330                                    |
| 027A-5  | R3            | 27                                | 27                | 15.0                         | 20       | OFAF000H40                           | 170M1315                               | JJS-40                             | 3x10                | 8                            | 326                                    |
| 034A-5  | R3            | 34                                | 34                | 18.5                         | 25       | OFAF000H50                           | 170M1315                               | JJS-50                             | 3x10                | 8                            | 454                                    |
| 040A-5  | R4            | 40                                | 40                | 22.0                         | 30       | OFAF000H63                           | 170M1316                               | JJS-60                             | 3x16                | 6                            | 424                                    |
| 052A-5  | R4            | 52                                | 52                | 30                           | 40       | OFAF000H80                           | 170M1317                               | JJS-80                             | 3x25                | 4                            | 600                                    |
| 065A-5  | R5            | 65                                | 65                | 37                           | 50       | OFAF000H100                          | 170M1318                               | JJS-90                             | 3x35                | 4                            | 715                                    |
| 077A-5  | R5            | 77                                | 77                | 45                           | 60       | OFAF000H100                          | 170M1319                               | JJS-110                            | 3x35                | 3                            | 916                                    |
| 096A-5  | R6            | 96                                | 96                | 55                           | 75       | OFAF000H125                          | 170M3015                               | JJS-150                            | 3x50                | 1                            | 1157                                   |
| 124A-5  | R6            | 124                               | 124               | 75                           | 100      | OFAF000H160                          | 170M3016                               | JJS-200                            | 3x95                | 2/0                          | 1673                                   |
| 156A-5  | R7            | 156                               | 156               | 90                           | 125      | OFAF0H250                            | 170M3017                               | JJS-225                            | 3x120               | 3/0                          | 1840                                   |
| 180A-5  | R7            | 180                               | 180               | 110                          | 150      | OFAF1H315                            | 170M3018                               | JJS-300                            | 3x150               | 4/0                          | 2281                                   |
| 240A-5  | R8            | 240                               | 240               | 132                          | 200      | OFAF1H355                            | 170M5008                               | JJS-350                            | 2x(3x70)            | 2x1/0 or<br>350 MCM          | 2912                                   |
| 260A-5  | R8            | 260                               | 260               | 160                          | 200      | OFAF2H400                            | 170M5009                               | JJS-400                            | 2x(3x70)            | 2x2/0                        | 3325                                   |
| 302A-5  | R9            | 302                               | 302               | 200                          | 250      | OFAF2H500                            | 170M5011                               | JJS-400                            | 2x(3x95)            | 2x3/0                        | 3663                                   |
| 361A-5  | R9            | 361                               | 361               | 200                          | 300      | OFAF3H630                            | 170M5012                               | JJS-500                            | 2x(3x120)           | 2x4/0                        | 4781                                   |
| 414A-5  | R9            | 414                               | 414               | 250                          | 350      | OFAF3H630                            | 170M5013                               | JJS-600                            | 2x(3x150)           | 2x300<br>MCM                 | 5672                                   |
| $U_n = 3\text{-phase } 575\text{ V}$                |               |                                   |                   |                              |          |                                      |  |                                    |                     |                              |  |
| 07A4-7  | R3            | 7.0                               | 7.0               | -                            | 5.0      | -                                    | -                                      | JJS-15                             | -                   | 14                           | 101                                    |
| 09A9-7  | R3            | 9.4                               | 9.4               | -                            | 7.5      | -                                    | -                                      | JJS-20                             | -                   | 14                           | 128                                    |
| 14A3-7  | R3            | 13.6                              | 13.6              | -                            | 10       | -                                    | -                                      | JJS-30                             | -                   | 12                           | 189                                    |
| 019A-7  | R3            | 18                                | 18                | -                            | 15       | -                                    | -                                      | JJS-40                             | -                   | 10                           | 271                                    |
| 023A-7  | R3            | 22                                | 22                | -                            | 20       | -                                    | -                                      | JJS-50                             | -                   | 10                           | 338                                    |
| 027A-7  | R3            | 27                                | 27                | -                            | 25       | -                                    | -                                      | JJS-50                             | -                   | 8                            | 426                                    |
| 035A-7  | R5            | 41                                | 41                | -                            | 40       | -                                    | -                                      | JJS-60                             | -                   | 6                            | 416                                    |
| 042A-7  | R5            | 52                                | 52                | -                            | 50       | -                                    | -                                      | JJS-80                             | -                   | 6                            | 524                                    |
| 049A-7  | R5            | 52                                | 52                | -                            | 50       | -                                    | -                                      | JJS-80                             | -                   | 6                            | 650                                    |
| 061A-7  | R6            | 62                                | 62                | -                            | 60       | -                                    | -                                      | JJS-110                            | -                   | 4                            | 852                                    |
| 084A-7  | R6            | 77                                | 77                | -                            | 75       | -                                    | -                                      | JJS-150                            | -                   | 3                            | 1303                                   |
| 098A-7  | R7            | 99                                | 99                | -                            | 100      | -                                    | -                                      | JJS-150                            | -                   | 1                            | 1416                                   |
| 119A-7  | R7            | 125                               | 125               | -                            | 125      | -                                    | -                                      | JJS-200                            | -                   | 2/0                          | 1881                                   |
| 142A-7  | R8            | 144                               | 144               | -                            | 150      | -                                    | -                                      | JJS-250                            | -                   | 3/0                          | 1970                                   |
| 174A-7  | R8            | 180                               | 180               | -                            | 200      | -                                    | -                                      | JJS-300                            | -                   | 4/0                          | 2670                                   |
| 210A-7  | R9            | 242                               | 242               | -                            | 250      | -                                    | -                                      | JJS-400                            | -                   | 350 MCM                      | 2903                                   |
| 271A-7  | R9            | 271                               | 271               | -                            | 250      | -                                    | -                                      | JJS-400                            | -                   | 500 MCM                      | 4182                                   |
| $U_n = 3\text{-phase } 690\text{ V}$                |               |                                   |                   |                              |          |                                      |  |                                    |                     |                              |  |
| 07A4-7  | R3            | 7.4                               | 7.4               | 5.5                          | -        | OFAA000GG16                          | 170M1309                               | -                                  | 3x1.5               | -                            | 101                                    |
| 09A9-7  | R3            | 9.9                               | 9.9               | 7.5                          | -        | OFAA000GG20                          | 170M1310                               | -                                  | 3x1.5               | -                            | 128                                    |
| 14A3-7  | R3            | 14.3                              | 14.3              | 11                           | -        | OFAA000GG25                          | 170M1312                               | -                                  | 3x2.5               | -                            | 189                                    |
| 019A-7  | R3            | 19                                | 19                | 15                           | -        | OFAA000GG35                          | 170M1313                               | -                                  | 3x4                 | -                            | 271                                    |
| 023A-7  | R3            | 23                                | 23                | 18.5                         | -        | OFAA000GG50                          | 170M1314                               | -                                  | 3x6                 | -                            | 338                                    |
| 027A-7  | R3            | 27                                | 27                | 22                           | -        | OFAA000GG50                          | 170M1314                               | -                                  | 3x10                | -                            | 426                                    |
| 035A-7  | R5            | 35                                | 35                | 30                           | -        | OFAA000GG63                          | 170M1315                               | -                                  | 3x10                | -                            | 416                                    |
| 042A-7  | R5            | 42                                | 42                | 37                           | -        | OFAA000GG80                          | 170M1316                               | -                                  | 3x16                | -                            | 524                                    |
| 049A-7  | R5            | 49                                | 49                | 45                           | -        | OFAA000GG100                         | 170M1316                               | -                                  | 3x16                | -                            | 650                                    |
| 061A-7  | R6            | 61                                | 61                | 55                           | -        | OFAA000GG100                         | 170M1318                               | -                                  | 3x25                | -                            | 852                                    |
| 084A-7  | R6            | 84                                | 84                | 75                           | -        | OFAA1GG160                           | 170M1319                               | -                                  | 3x35                | -                            | 1303                                   |
| 098A-7  | R7            | 98                                | 98                | 90                           | -        | OFAA1GG160                           | 170M3015                               | -                                  | 3x50                | -                            | 1416                                   |
| 119A-7  | R7            | 119                               | 119               | 110                          | -        | OFAA1GG200                           | 170M3015                               | -                                  | 3x70                | -                            | 1881                                   |
| 142A-7  | R8            | 142                               | 142               | 132                          | -        | OFAA1GG250                           | 170M3016                               | -                                  | 3x95                | -                            | 1970                                   |
| 174A-7  | R8            | 174                               | 174               | 160                          | -        | OFAA2GG315                           | 170M3017                               | -                                  | 3x120               | -                            | 2670                                   |
| 210A-7  | R9            | 210                               | 210               | 200                          | -        | OFAA3GG400                           | 170M5008                               | -                                  | 3x185               | -                            | 2903                                   |
| 271A-7  | R9            | 271                               | 271               | 250                          | -        | OFAA3GG400                           | 170M5009                               | -                                  | 3x240               | -                            | 4182                                   |

## Terminal data

| Frame size | Cable entries      |                      |      | L1, L2, L3, T1/U, T2/V, T3/W |                                  |                   |        | Grounding terminals |           |                   |        |
|------------|--------------------|----------------------|------|------------------------------|----------------------------------|-------------------|--------|---------------------|-----------|-------------------|--------|
|            | pcs per cable type | Max. cable diameter* |      | Wire size                    |                                  | Tightening torque |        | Max. wire size      |           | Tightening torque |        |
|            |                    | mm                   | in   | mm <sup>2</sup>              | kcmil/AWG                        | N-m               | lbf-ft | mm <sup>2</sup>     | AWG       | N-m               | lbf-ft |
| R1         | 1                  | 17                   | 0.67 | 0.75...6                     | 18...10                          | 0.6               | 0.44   | 25                  | 4         | 1.8               | 1.3    |
| R2         | 1                  | 17                   | 0.67 | 0.75...6                     | 18...10                          | 0.6               | 0.44   | 25                  | 4         | 1.8               | 1.3    |
| R3         | 1                  | 21                   | 0.83 | 0.5...16                     | 20...6                           | 1.7               | 1.25   | 25                  | 4         | 1.8               | 1.3    |
| R4         | 1                  | 24                   | 0.94 | 0.5...35                     | 20...2                           | 3.3               | 2.4    | 25                  | 4         | 2.9               | 2.1    |
| R5         | 1                  | 32                   | 1.26 | 6...70                       | 6...1/0                          | 15                | 11.0   | 35                  | 2         | 2.9               | 2.1    |
| R6         | 1                  | 45                   | 1.77 | 25...150                     | 4...300 MCM                      | 30                | 22.1   | 185                 | 350 MCM   | 9.8               | 7.2    |
| R7         | 1                  | 54                   | 2.13 | 95...240<br>(25...150**)     | 3/0...400 MCM<br>(4...300 MCM**) | 40                | 29.5   | 185                 | 350 MCM   | 9.8               | 7.2    |
| R8         | 2                  | 45                   | 1.77 | 2×(50...150)                 | 2×(1/0...300 MCM)                | 40                | 29.5   | 2×185               | 2×350 MCM | 9.8               | 7.2    |
| R9         | 2                  | 54                   | 2.13 | 2×(95...240)                 | 2×(3/0...500 MCM)                | 70                | 51.6   | 2×185               | 2×350 MCM | 9.8               | 7.2    |

| Frame size | Cable entries |                      |      | R-, R+/UDC+ and UDC- terminals |                     |     |        |                   |  |  |  |
|------------|---------------|----------------------|------|--------------------------------|---------------------|-----|--------|-------------------|--|--|--|
|            | pcs           | Max. cable diameter* |      | Wire size                      |                     |     |        | Tightening torque |  |  |  |
|            |               | mm                   | in   | mm <sup>2</sup>                | kcmil/AWG           | N-m | lbf-ft |                   |  |  |  |
| R1         | 1             | 17                   | 0.67 | 0.75...6                       | 18...10             | 0.6 | 0.44   |                   |  |  |  |
| R2         | 1             | 17                   | 0.67 | 0.75...6                       | 18...10             | 0.6 | 0.44   |                   |  |  |  |
| R3         | 1             | 21                   | 0.83 | 0.5...16                       | 20...6              | 1.7 | 1.25   |                   |  |  |  |
| R4         | 1             | 24                   | 0.94 | 0.5...35                       | 20...2              | 3.3 | 2.4    |                   |  |  |  |
| R5         | 1             | 32                   | 1.26 | 6...70                         | 6...1/0             | 15  | 11.0   |                   |  |  |  |
| R6         | 1             | 35                   | 1.38 | 25...95                        | 4...3/0             | 20  | 14.8   |                   |  |  |  |
| R7         | 1             | 43                   | 1.69 | 25...150                       | 4...300 MCM         | 30  | 22.1   |                   |  |  |  |
| R8         | 2             | 45                   | 1.77 | 2 × (50...150)                 | 2 × (1/0...300 MCM) | 40  | 29.5   |                   |  |  |  |
| R9         | 2             | 54                   | 2.13 | 2 × (95...240)                 | 2 × (3/0...500 MCM) | 70  | 51.6   |                   |  |  |  |

\* maximum cable diameter accepted. Cable clamp connector inside diameter: Frames R1, R2: 3/4" (19.05 mm), Frame R3: 1" (25.4 mm).

\*\* 525...690 V drives

### Notes:

- The minimum specified wire size does not necessarily have sufficient current carrying capacity at maximum load.
- For IEC installations using mm<sup>2</sup> cable, the terminals do not accept a conductor that is one size larger than the recommended wire size. For NEC installations using AWG cable, this applies only to the R2 frame drive.
- For frames R1...R7: The maximum number of conductors per terminal is 1. For frames R8 and R9: The maximum number of conductors per terminal is 2.

## Dimensions, weights and free space requirements

| Frame size | Weights          |     |                   |     | IP21                  |       |   |       |                      |       |                      |       | IP55                                |       |                     |       |       |       |
|------------|------------------|-----|-------------------|-----|-----------------------|-------|---|-------|----------------------|-------|----------------------|-------|-------------------------------------|-------|---------------------|-------|-------|-------|
|            | IP21 (UL Type 1) |     | IP55 (UL Type 12) |     | Height with cable box |       | Height without cable box (option +P940) |       | Width with cable box |       | Depth with cable box |       | Height with cable box <sup>1)</sup> |       | Width <sup>2)</sup> |       | Depth |       |
|            | kg               | lb  | kg                | lb  | mm                    | in.   | mm                                      | in.   | mm                   | in.   | mm                   | in.   | mm                                  | in.   | mm                  | in.   | mm    | in.   |
| R1         | 7.0              | 15  | 8.1               | 18  | 409                   | 16.11 | 370                                     | 14.57 | 155                  | 6.10  | 226                  | 8.89  | 450                                 | 17.72 | 162                 | 6.38  | 292   | 11.50 |
| R2         | 8.4              | 19  | 9.5               | 21  | 409                   | 16.11 | 370                                     | 14.57 | 155                  | 6.10  | 249                  | 9.80  | 450                                 | 17.72 | 162                 | 6.38  | 315   | 12.40 |
| R3         | 10.8             | 24  | 12.0              | 26  | 475                   | 18.71 | 420                                     | 16.54 | 172                  | 6.77  | 261                  | 10.28 | 525                                 | 20.70 | 180                 | 7.09  | 327   | 12.87 |
| R4         | 18.6             | 41  | 19.1              | 42  | 580                   | 22.85 | 490                                     | 19.29 | 203                  | 7.99  | 274                  | 10.79 | 580                                 | 22.85 | 203                 | 7.99  | 344   | 13.53 |
| R5         | 23               | 50  | 23.4              | 52  | 732                   | 28.80 | 596                                     | 23.46 | 203                  | 7.99  | 274                  | 10.77 | 732                                 | 28.80 | 203                 | 7.99  | 344   | 13.53 |
| R6         | 42.2             | 93  | 42.9              | 95  | 727                   | 28.60 | 569                                     | 22.40 | 252                  | 9.92  | 357                  | 14.10 | 727                                 | 28.60 | 252                 | 9.92  | 421   | 16.59 |
| R7         | 53.0             | 117 | 54.0              | 119 | 880                   | 34.66 | 621                                     | 24.45 | 284                  | 11.18 | 365                  | 14.35 | 880                                 | 34.66 | 284                 | 11.18 | 423   | 16.65 |
| R8         | 68.0             | 150 | 74.0              | 163 | 965                   | 38.01 | 700                                     | 27.56 | 300                  | 11.81 | 386                  | 15.21 | 966                                 | 38.01 | 300                 | 11.81 | 452   | 17.78 |
| R9         | 95.0             | 209 | 102.0             | 225 | 955                   | 37.59 | 700                                     | 25.56 | 380                  | 14.96 | 413                  | 16.27 | 955                                 | 37.59 | 380                 | 14.96 | 477   | 18.78 |

200 mm (7.9 in) free space is required at top of the drive.

300 mm (11.8 in) free space (when measured from the drive base without the cable box) is required at bottom of the drive.

1) Hood increases height with 155 mm (6.10 in) in frames R4 to R8 and with 230 mm (9.06 in) in frame R9.

2) Hood increases width with 23 mm (0.91 in) in frames R4 and R5, 40 mm (1.57 in) in frames R6 and R7 and 50 mm (1.97 in) in frames R8 and R9.

## Ambient conditions

|                             |   |
|-----------------------------|---|
| Installation altitude       | 0 ... 4000 m (0 ... 13123 ft) above sea level. The output current must be derated at altitudes above 1000 m (3281 ft). The derating is 1% for each 100 m (328 ft) above 1000 m (3281 ft).<br>TN (grounded) and IT (ungrounded) systems. Installing on 525...690 V corner-grounded or midpoint-grounded delta systems is not allowed.                        |
| Surrounding air temperature | <u>Operation:</u> -15 ... +55 °C (5 ... 131 °F). Frost is not permitted. The rated output current must be derated by 1% for each 1 °C (1.8 °F) over 40 °C (104 °F) for IP21 (UL Type 1) drives and for IP55 (UL Type 12) frames R1...R7 and R9 (for frame R8, see the hardware manual).<br><u>Storage (in the package):</u> -40 to +70 °C (-40 to +158 °F). |

## Safe torque off (STO)

The drive has a Safe torque off function (STO) in accordance with IEC/EN 61800-5-2. It can be used, for example, as the final actuator device of safety circuits that stop the drive in case of danger (such as an emergency stop circuit).

When activated, the STO function disables the control voltage of the power semiconductors of the drive output stage, thus preventing the drive from generating the torque required to rotate the motor. The control program generates an indication as defined by parameter 31.22. If the motor is running when Safe torque off is activated, it coasts to a stop. Closing the activation switch deactivates the STO. Any faults generated must be reset before restarting.

The STO function has a redundant architecture, that is, both channels must be used in the safety function implementation. The safety data given in this manual is calculated for redundant use, and does not apply if both channels are not used.



**WARNING!** The STO function does not disconnect the voltage from the main and auxiliary circuits of the drive.

### Notes:

- If stopping by coasting is not acceptable, stop the drive and machinery using the appropriate stop mode before activating the STO.
- The STO function overrides all other functions of the drive.

### Wiring

The safety contacts must open/close within 200 ms of each other.

Double-shielded twisted-pair cable is recommended for the connection. The maximum length of the cabling between the switch and the drive control unit is 300 m (1000 ft). Ground the shield of the cable at the control unit only.

### Validation

To ensure the safe operation of a safety function, a validation test is required. The test must be carried out by a competent person with adequate expertise and knowledge of the safety function. The test procedures and report must be documented and signed by this person. Validation instructions of the STO function can be found in the drive hardware manual.

### Technical data

- Minimum voltage at IN1 and IN2 to be interpreted as "1": 17 V DC
- STO reaction time (shortest detectable break): 1 ms
- STO response time: 2 ms (typical), 5 ms (maximum)
- Fault detection time: Channels in different states for longer than 200ms
- Fault reaction time: Fault detection time + 10ms
- STO fault indication (parameter 31.22) delay: < 500 ms
- STO warning indication (parameter 31.22) delay: < 1000 ms
- Safety integrity level (EN 62061): SIL 3
- Performance level (EN ISO 13849-1): PL e

The drive STO is a type A safety component as defined in IEC 61508-2.

For the full safety data, exact failure rates and failure modes of the STO function, refer to the drive hardware manual

## Markings

The applicable markings are shown on the type designation label of the drive.



CE

UL

RCM

EAC

KC

EIP

WEEE

TÜV Nord

UKCA

## Related documents

| Document  | Code (English)  |
|---|-----------------|
| ACS880-01 hardware manual   | 3AUA0000078093  |
| ACS880 primary control program firmware manual  | 3AUA0000085967  |
| ACS-AP-I, -S, -W and ACH-AP-H, -W Assistant control panels user's manual  | 3AUA0000085685  |
| Drive composer PC tool user's manual  | 3AUA0000094606  |
| Converter module capacitor reforming instructions   | 3BFE64059629    |
| Common mode filter kit for ACS880-01 frame R6 (option +E208) installation instructions  | 3AXD50000015178 |
| Common mode filter kit for ACS880-01 frame R7, and for ACS880-11, ACS880-31, ACH580-31 and ACQ580-31 frame R8 installation instructions | 3AXD50000015179 |
| Common mode filter kit for ACS880-01 frame R8 (option +E208) installation instructions  | 3AXD50000015180 |
| Common mode filter kit for ACS880-01 drives (frame R9, option +E208) installation instructions  | 3AXD50000015201 |
| ACS880 Declaration of China RoHS II Conformity  | 3AXD10001497397 |

## Declarations of Conformity

**ABB**

**EU Declaration of Conformity**  
Machinery Directive 2006/42/EC

We, **Manufacturer:** ABB Oy  
Address: Hornviken 33, 00380 Helsinki, Finland.  
Phone: +358 10 22 11

declare under our sole responsibility that the following product:

**Frequency converter(s)**  
ACS880-01/11/31  
ACS880 04/ 04F/MD4/14/34

with regard to the safety functions(s)

- Safe Torque Off
- Safe stop 1, Safe stop emergency, Safely-limited speed, Safe maximum speed, Safe brake control, Prevention of unexpected start-up (with FSD-32 option module, +QRT3, encoderless)
- Safe stop 2, Safe stop emergency, Safely-limited speed, Safe maximum speed, Safe brake control, Safe speed monitor, Safe direction, Prevention of unexpected start-up (with FSD-31 and FSD-31 option modules, +QRT3 and +LS2, encoder supported)
- Safe motor temperature (with PF-FCC-01 thermostat protection module, +LS39)
- Safe stop 1 (SS1), with FSD-31 PROSafe module, +QRT6

is/are in conformity with all the relevant safety component requirements of EU Machinery Directive 2006/42/EC, when the listed safety function is used for safety component functionality.

The following harmonized standards have been applied:

|                               |  |
|-------------------------------|--|
| EN 61800-5-2:2007             | Adjustable speed electrical power drive systems – Part 5-2: Safety requirements – Functional                                 |
| EN 60204-2:2005               | Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems |
| + AC:2004 + A1:2013 + A2:2015 |  |
| EN ISO 13849-1:2015           | Safety of machinery – Safety-related parts of control systems, Part 1: General requirements                                  |
| EN ISO 13849-2:2012           | Safety of machinery – Safety-related parts of the control systems, Part 2: Validation  |
| EN 60204-1:2018               | Safety of machinery – Electrical equipment of machines – Part 1: General requirements  |

The following other standards have been applied:

|                             |   |
|-----------------------------|---|
| IEC 61508-2:2010, parts 1-2 | Functional safety of electrical / electronic / programmable electronic safety-related systems |
| IEC 61800-5-2:2006          | Adjustable speed electrical power drive systems – Part 5-2: Safety requirements – Functional  |

The product(s) referred in this Declaration of conformity fulfil(s) the relevant provisions of other European Union Directives which are notified in single EU Declaration of conformity 34630002088646.

Person authorized to certify the technical file:  
Name and address: Jari Vesa, Hornviken 33, 00380 Helsinki, Finland.

Helsinki, 20.10.2020  
Signed for and on behalf of

*Tuomo Tanka*  
Tuomo Tanka  
Vice president, ABB

*Vesa Tupajainen*  
Vesa Tupajainen  
Product Engineering manager, ABB

Document number 34630002088646

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**ABB**

**Declaration of Conformity**  
Supply of Machinery (Safety) Regulations 2008

We, **Manufacturer:** ABB Oy  
Address: Hornviken 33, 00380 Helsinki, Finland.  
Phone: +358 10 22 11

declare under our sole responsibility that the following product:

**Frequency converters**  
ACS880-01/11/31  
ACS880 04/ 04F/MD4/14/34

with regard to the safety functions

- Safe Torque Off
- Safe stop 1, Safe stop emergency, Safely-limited speed, Safe maximum speed, Safe brake control, Prevention of unexpected start-up (with FSD-32 option module, +QRT3, encoderless)
- Safe stop 2, Safe stop emergency, Safely-limited speed, Safe maximum speed, Safe brake control, Safe speed monitor, Safe direction, Prevention of unexpected start-up (with FSD-31 and FSD-31 option modules, +QRT3 and +LS2, encoder supported)
- Safe motor temperature (with PF-FCC-01 thermostat protection module, +LS39)
- Safe stop 1 (SS1), with FSD-31 PROSafe module, +QRT6

are in conformity with all the relevant safety component requirements of the Supply of Machinery (Safety) Regulations 2008, when the listed safety functions are used for safety component functionality.

The following harmonized standards have been applied:

|                               |  |
|-------------------------------|--|
| EN 61800-5-2:2007             | Adjustable speed electrical power drive systems – Part 5-2: Safety requirements – Functional                                 |
| EN 60204:2005                 | Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems |
| + AC:2004 + A1:2013 + A2:2015 |  |
| EN ISO 13849-1:2015           | Safety of machinery – Safety-related parts of control systems, Part 1: General requirements                                  |
| EN ISO 13849-2:2012           | Safety of machinery – Safety-related parts of the control systems, Part 2: Validation  |
| EN 60204-1:2018               | Safety of machinery – Electrical equipment of machines – Part 1: General requirements  |

The following other standards have been applied:

|                             |   |
|-----------------------------|---|
| IEC 61508-2:2010, parts 1-2 | Functional safety of electrical / electronic / programmable electronic safety-related systems |
| IEC 61800-5-2:2006          | Adjustable speed electrical power drive systems – Part 5-2: Safety requirements – Functional  |

The product(s) referred in this declaration of conformity fulfil(s) the relevant provisions of other UK statutory requirements, which are notified in a single Declaration of conformity 34630002088646.

Authorized to certify the technical file: ABB Limited, Derebury Park, Chesham, United Kingdom, MK4 4BT.

Helsinki, May 7, 2021  
Signed for and on behalf of

*Tuomo Tanka*  
Tuomo Tanka  
Local Director Manager, ABB Oy

*Aaron D. Wade*  
Aaron D. Wade  
Product Line Manager, ABB Oy

Document number 34630002088646

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