List of related manuals in English

### Drive manuals and guides

- **Drive manuals and program firmware manual**
  - Code: 3AXD0000049773
- **Quick start-up guide for ACQ580 pump control program**
  - Code: 3AXD0000049819
- **ACQ580-31 hardware manual**
  - Code: 3AXD0000049825
- **ACQ580-31 quick installation guide**
  - Code: 3AXD0000049859
- **ACE-AP–a assistant control panels user’s manual**
  - Code: 3AUA0000056055

### Option manuals and guides

- **ACS580, ACS880, ACH580 and ACQ580 drive module frames R3 to R9 for cabinet installation (options +P940 and +P944) supplement**
  - Code: 3AXD0000027030
- **ACS580-11, ACS580-31, ACH580-31 and ACQ580-31 UK gland plates (+H555) installation guide**
  - Code: 3AXD0000010771
- **CDRI-01 communication adapter module user’s manual**
  - Code: 3AXD60000000929
- **FCAN-01 CANopen adapter module user’s manual**
  - Code: 3AFE68815000
- **FOMA-01 Fieldbus adapter module user’s manual**
  - Code: 3AUA0000141850
- **FOMA-01 Dacorsoft™ adapter module user’s manual**
  - Code: 3AFE68872860
- **FOMA-01 EtherCAT adapter module user’s manual**
  - Code: 3AUA000008940
- **FOMA-01/i2i/3i Ethernet adapter module user’s manual**
  - Code: 3AUA0000093681
- **FPL-02 Ethernet/POWERLINK adapter module user’s manual**
  - Code: 3AUA0000122927
- **FLON-01 LONWORKS® adapter module user’s manual**
  - Code: 3AUA0000041017
- **FPBA-01 PROFIBUS DP adapter module user’s manual**
  - Code: 3AFE68572727
- **FSCA-01 RS-485 adapter module user’s manual**
  - Code: 3AUA0000100533

### Tool and maintenance manuals and guides

- **Drive composer PC tool user’s manual**
  - Code: 3AUA0000094606
- **Converter module capacitor reforming instructions**
  - Code: 3BFE64059629
- **NETA-21 remote monitoring tool user’s manual**
  - Code: 3AUA0000098939
- **NETA-21 remote monitoring tool installation and start-up guide**
  - Code: 3AUA0000098981

You can find manuals and other product documents in PDF format on the Internet. See section Document library on the Internet on the inside of the back cover. For manuals not available in the Document library, contact your local ABB representative.

The code below opens an online listing of the manuals applicable to this product.

![ACQ580 manuals](ACQ580 manuals)
This guide briefly describes how to install the drive. For complete information on installation, see ACQ580-31 drives hardware manual (3AXD50000045935 [English]). For cabinet installation, see also ACQ580, ACH580 and ACQ580 drive module frames R3, R5 to R9 for cabinet installation (options +P940 and +P944) supplement (3AXD50000210305 [English]). For start-up instructions, see ACQ580 drives with pump control program quick start-up guide (3AXD50000048773 [English]).

To read a manual, go to www.abb.com/drives/documents and search for the document number.

Obey the safety instructions

⚠️ WARNING! Obey these instructions. If you ignore them, injury or death, or damage to the equipment can occur:

- Only qualified electrical professionals are allowed to install and maintain the drive.
- Never work on the drive, motor cable or motor when main power is applied. If the drive is already connected to the input power, wait for 5 minutes after disconnecting the input power.
- Never work on the control cables when power is applied to the drive or to the external control circuits.
- Do not connect the drive to a voltage higher than what is marked on the type designation label.
- Always ground the drive, the motor and adjoining equipment to the protective earth (PE) bus of the power supply.
- Frames R6 and R6: The drive module is heavy and its center of gravity is high. Use a lifting device for lifting. Do not tilt the drive. Manual lifting, or overturning due to the tilting, can cause physical injury. Make sure that the wall and the fixing devices can carry the weight.
- Make sure that debris from drilling, cutting and grinding does not enter the drive.
- Make sure that the floor below the drive and the wall where the drive is installed are non-flammable.
Check if capacitors need to be reformed

Reform the capacitors if the drive has not been powered up (either in storage or unused) for a year or more.

You can determine the manufacturing date from the serial number, which you find on the type designation label attached to the drive. The serial number is of format XYYWWRXXXX. YY and WW tell the manufacturing year and week as follows:

YY: 17, 18, 19, ... for 2017, 2018, 2019, ...
WW: 01, 02, 03, ... for week 1, week 2, week 3, ...

For information on reforming the capacitors, see Converter modules with electrolytic DC capacitors in the DC link capacitor reforming instructions (3BFE64059629 [English]), available on the Internet at www.abb.com/drives/documents.

Data

IEC ratings

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<th>Cable Cu (mm²)</th>
<th>aR fuse</th>
<th>Losses (W)</th>
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<td>Phase (A) ≤ 400 V</td>
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</table>

Select the power cables

See Data on page 4.

Ensure cooling

See Data on page 4. No condensation or frost is allowed. The allowed operating temperature range of the drive without derating is -15 to +40 °C.
Protect the drive and input power cable with correct fusing
See Data on page 4.

A – Install the drive on the wall
See figure A on page 19.

B – Remove the cover
Remove the cover/s. See figures B (R3)... and ...B (R6, R8)... on page 19.

C – Check the compatibility with IT (ungrounded), corner-grounded delta, midpoint-grounded delta and TT systems
The standard drive with ground-to-phase varistors connected can be installed to a symmetrically grounded TN-S system. For other systems, see the drive hardware manual and figure C on page 19.

**WARNING!** Do not install the drive with the EMC filter connected to a system that the filter is not suitable for. This can cause danger, or damage the drive. See the drive hardware manual.

**WARNING!** Do not install the drive with the ground-to-phase varistor connected to a system that the varistor is not suitable for. If you do, the varistor circuit can be damaged. See the drive hardware manual.

D – Check the insulation of the power cables and the motor
Connect the motor cable 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. See figure D on page 19.
Check the insulation of motor and motor cable. See figure D on page 19. **Note:** Moisture inside the motor casing will reduce the insulation resistance. If moisture is suspected, dry the motor and repeat the measurement.
Check the insulation of the input cable before you connect it to the drive. Obey the local regulations.

E – Attach the warning stickers in local languages
See figure E on page 20.
6 EN – Quick installation guide

F – Connect the power cables

Use symmetrical shielded cable for motor cabling. If the cable shield is the sole PE conductor, make sure that it has sufficient conductivity for the PE.

Note for frame R3: Make sure that you have an additional PE conductor in the input power cabling. See the hardware manual for more information.

Procedure:
1. Frames R6 and R8: Remove the shroud on the power cable terminals. See figure F (R6, R8) ... on page 20. Frame R8: For easier installation, remove the side plates.
2. Remove the rubber grommets from the bottom plate for the cables to be connected. See figure ...F... on page 20.
3. Cut an adequate hole into the rubber grommets. Slide the grommets onto the cables. Attach the unused grommets to holes cone pointing downwards.
4. Prepare the ends of the cables. See figure ...F... on page 20.
   The bare shield will be grounded 360 degrees. Mark the pigtail made from the shield as a PE conductor with yellow-and-green color.
   Two alternative symmetrical three-conductor cable types are shown, and one four-conductor cable type. The four-conductor cable is only allowed for the input power cabling.
   If you use aluminum cables, put grease to the peeled aluminum cable before connecting it to the drive.
5. Put the cables through the holes of the cable entry plate and attach the grommets to the holes.
6. Connect the cables (use the torques defined in the figure). See figures ...F... on page 20 and 21:
   • Ground the shield 360 degrees by tightening the clamp of the power cable grounding shelf onto the stripped part of the cable.
   • Connect the twisted shield of the cable to the grounding terminal.
   • Use a separate grounding PE cable (6a) or a cable with a separate PE conductor (6b) if the conductivity of the shield does not meet the requirements for the PE conductor. If the protective PE conductor is smaller than 10 mm², you must use a second earthing conductor. See the hardware manual for more information.
   • Frame R3: Connect the additional PE conductor of the input power cabling.
   • Connect the phase conductors of the motor cable to the T1/U, T2/V and T3/W terminals and the phase conductors of the input cable to the L1, L2 and L3 terminals.
For frame R8: Install the common mode filter. For instructions, see Common mode filter kit for frames R7 and R8 (option +E208) installation guide (3AXD50000015179 [English]).

7. Frame R6 types -046A-4 and greater: Cut tabs in the shroud for the installed cables. Frame R8: Install the side plates if removed. Knock out holes in the shroud for the input cables. See figure ...F (R6, R8) on page 21.

8. Frames R6 and R8: Install the shroud on the power cable terminals. See figure ...F (R6, R8) on page 21.

9. Secure the cables outside the drive mechanically.

G – Connect the control cables

Procedure:
1. Remove the front cover(s) if not already removed.
2. Frame R3: Lift the control panel holder up. See figure G (R3) ... on page 21.
3. Cut an adequate hole into the rubber grommet and slide the grommet onto the cable. Slide the cable through a hole in the bottom plate and attach the grommet to the hole. Attach the unused grommets to holes core pointing downwards.
4. Route the cables. Frame R3: See figure ...G (R3) ... on page 21. Frame R6: See figure ...G (R6) ... on page 22. Frame R8: See figure ...G (R8) ... on page 22.
5. 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 board as possible.
6. Secure the cables inside the drive mechanically.
7. Ground the pair-cable shields and grounding wire at the grounding terminal (SCR) of the control unit.
8. Connect the conductors to the appropriate terminals of the control unit. See Default IO connection diagram on page 9.
9. Wire the optional modules if included in the delivery. See the option module user's manual or installation guide.
10. Secure the cables outside the drive mechanically.

Note:
- Leave the other ends of the control cable shields unconnected.
- Keep any signal wire pairs twisted as close to the terminals as possible.
H – Reinstall cover(s)

See figures H (R3, R6, R8) on page 23.
**Default IO connection diagram**

- **X1**: Reference voltage and analog inputs and outputs
  - 1: AIN: Analog input channel
  - 2: A1: Output frequency/speed reference 0…10 V
  - 3: +15 V: Isolated voltage 15 В DC
  - 4: A2: Actual feedback 0…10 V
  - 5: AGND: Analog input circuit common
  - 6: AO1: Output frequency 0…10 V
  - 7: AO2: Output current 0…20 mA
  - 8: AGND: Analog output circuit common

- **X2 & X3**: Auxiliary voltage output and programmable digital inputs
  - 9: +24 V: Auxiliary voltage output +24 V DC, max. 250 mA
  - 10: DGND: Auxiliary voltage output common
  - 11: DCOM: Digital input common for all
  - 12: DI1: Stop (0) / Start (1)
  - 13: DI2: Not configured
  - 14: DI3: Constant frequency/speed selection
  - 15: DI4: Not configured
  - 16: DI5: Not configured
  - 17: DI6: Not configured
  - 18: RG8: Not configured

- **X4 & X5**: Relay outputs
  - 19: RO1C: Ready run 250 V AC / 30 V DC, 2 A
  - 20: RO1A: Running 250 V AC / 30 V DC, 2 A
  - 21: RO1B: Fault (-1) 250 V AC / 30 V DC, 2 A
  - 22: RO2C: 250 V AC / 30 V DC, 2 A
  - 23: RO2A: 250 V AC / 30 V DC, 2 A
  - 24: RO2B: 250 V AC / 30 V DC, 2 A

- **X6, X7, X8**: Safe torque off
  - 25: OUT1: Safe torque off. Factory connection. Both circuits must be closed for the drive to start.
  - 26: OUT2: Safe torque off. Factory connection. Both circuits must be closed for the drive to start.

- **X9**: 24 V AC/DC
  - 27: SGND: 24 V AC/DC input to power up the control unit when the main supply is disconnected.

Total load capacity of the Auxiliary voltage output +24V (X2:10) is 6.0 W (250 mA / 24 V DC).

Wire sizes: 0.14...2.5 mm² (26...14 AWG): All terminals

Tightening torques: 0.5...0.6 N m (0.4...0.5 ft lb)
EN – US quick installation guide

This guide briefly describes how to install the drive. For complete information on installation, see ACQ580-31 drives hardware manual (3AXD50000045935 [English]). For cabinet installation, see also ACQ580, ACH580 and ACQ580 drive module frames R3, R5 to R9 for cabinet installation (options +P940 and +P944) supplement (3AXD50000210305 [English]). For start-up instructions, see ACQ580 drives with pump control program quick start-up guide (3AXD50000048773 [English]).

To read a manual, go to abb.com/drives/documents and search for the document number.

Obey the safety instructions

**WARNING!** Obey these instructions. If you ignore them, injury or death, or damage to the equipment can occur:

- Only qualified electrical professionals are allowed to install and maintain the drive.
- Never work on the drive, motor cable or motor when main power is applied. If the drive is already connected to the input power, wait for 5 minutes after disconnecting the input power.
- Never work on the control cables when power is applied to the drive or to the external control circuits.
- Do not connect the drive to a voltage higher than what is marked on the type designation label.
- Always ground the drive, the motor and adjoining equipment to the protective earth (PE) bus of the power supply.
- Frames R6 and R8: The drive module is heavy and its center of gravity is high. Use a lifting device for lifting. Do not tilt the drive. Manual lifting, or overturning due to the tilting, can cause physical injury. Make sure that the wall and the fixing devices can carry the weight.
- Make sure that debris from drilling, cutting and grinding does not enter the drive.
- Make sure that the floor below the drive and the wall where the drive is installed are non-flammable.

Check if capacitors need to be reformed

If the drive has not been powered up (either in storage or unused) for over three years, you must reform the capacitors.

You can determine the manufacturing date from the serial number, which you find on the type designation label attached to the drive. The serial number is of format YYYYWWXXXX, YY and WW tell the manufacturing year and week as follows:
For information on reforming the capacitors, see Converter module capacitor reforming instructions (3BFE64059629 [English]), available on the Internet at abb.com/drives/documents.

### Data

#### IEC ratings

<table>
<thead>
<tr>
<th>ACQ580-31-</th>
<th>Cu cable (AWG/kcmil)</th>
<th>UL fuse</th>
<th>Losses (W)</th>
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</tr>
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#### UL (NEC) ratings

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<th>Losses (W)</th>
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</table>
Select the power cables
See the Data table on page 12.

Ensure cooling
See the Data table on page 12. No condensation or frost is allowed. The allowed operating temperature range of the drive without derating is -15 to +40 °C.

Protect the drive and input power cable with correct fusing
Check on the fuse time-current curve to ensure that the operating time of the fuse is below 0.5 seconds for frames R3 and R6 and below 0.1 seconds for frame R8. Obey the local regulations.

A – Install the drive on the wall
See figure A... on page 25.
Frames R6 and R8 of UL Type 12 (option +B056): Install an additional hood on top of the drive before you tighten the upper fastening screws. Place the vertical edge of the hood in between the wall and the drive back plate. Then tighten the screws to fasten the hood and drive on its place. See figure ...A (R6, R8) on page 25.

B – Remove the cover
Remove the cover(s). See figures B (R3)... and ...B (R6, R8)... on page 25.

C – Check the compatibility with IT (ungrounded) and corner-grounded delta systems
See figure C on page 25.

⚠️ WARNING! Do not install the drive with the EMC filter connected to a system that the filter is not suitable for. This can cause danger, or damage the drive. See the drive hardware manual.

⚠️ WARNING! Do not install the drive with the ground-to-phase varistor connected to a system that the varistor is not suitable for. If you do, the varistor circuit can be damaged. See the drive hardware manual.
D – Check the insulation of the power cables and the motor

Check the insulation of motor and motor cable. See figure D on page 26. Note: Moisture inside the motor casing will reduce the insulation resistance. If moisture is suspected, dry the motor and repeat the measurement.

Check the insulation of the input cable before connecting it to the drive. Obey the local regulations.

E – Attach the warning stickers in local languages

See figure E on page 26.

F – Connect the power cables

Procedure:

1. Frames R6 and R8: Remove the shroud on the power cable terminals. See figure F (R6)… on page 26. Frame R8: For easier installation, remove the side plates.

2. Remove the rubber grommets from the bottom plate for the cable conduits to be installed. See figure …F… on page 26

3. Attach the cable conduits to the bottom plate holes. See figure …F… on page 26.

4. Remove the cable shelves (4a). Reinstall the four screws to avoid moisture exchange through the empty holes (4b). See figure …F (R6, R8)… on page 26.

5. Strip the cable ends. (Note the extra length of the grounding conductors.) Slide the cables through the connectors. See figure …F… on page 26.

6. Connect the grounding conductors to the grounding terminals. Connect the conductors of the input and motor cables. Tighten the screws. See figures …F (R3), …F (R6), …F (R8)… on page 26.

7. Connect the phase conductors of the motor cable to the T1/U, T2/V and T3/W terminals and the phase conductors of the input cable to the L1, L2 and L3 terminals.

   For frame R8: Install the common mode filter. For instructions, see Common mode filter kit for frames R7 and R8 (option +E208) installation guide.

   If the protective PE conductor is smaller than 10 mm², you must use a second earthing conductor (6a). See the hardware manual for more information.

   Frame R6 types –044A-4 and greater: Cut tabs in the shroud for the installed cables. Frame R8: Install the side plates if removed. Knock out holes in the shroud for the input cables. See figure …F (R6, R8)… on page 27.

   Frames R6 and R8: Install the shroud on the power cable terminals.
G – Connect the control cables

Procedure:
1. Remove the front cover(s) if not already removed.
2. Frame R3: Lift the control panel holder up. See figure G (R3) on page 27.
3. Remove the rubber grommets from the bottom plate for the cable conduits to be installed.
4. Attach the cable conduits to the bottom plate holes.
5. Strip the cable ends and cut to suitable length (note the extra length of the grounding conductors).
7. Secure the cables inside the drive with cable ties.
8. Ground the pair-cable shields and grounding wire at the grounding terminal (SCR) of the control unit.
9. Connect the conductors to the appropriate terminals of the control unit. See Default IO connection diagram on page 16.
10. Wire the optional modules if included in the delivery. See the option module user’s manual or installation guide.

Note:
• Leave the other ends of the control cable shields unconnected.
• Keep any signal wire pairs twisted as close to the terminals as possible.

H – Reinstall cover(s)

See figures H (R3, R6, R8)... on page 29.
**Default IO connection diagram**

<table>
<thead>
<tr>
<th>X1</th>
<th>Description</th>
<th>Terminal</th>
<th>Value</th>
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<tr>
<td>1</td>
<td>Reference voltage and analog inputs and outputs</td>
<td>AIN</td>
<td>Output frequency/spread reference: 0…10 V</td>
</tr>
<tr>
<td>2</td>
<td>AIN</td>
<td>AO2</td>
<td>Output frequency: 0…10 V</td>
</tr>
<tr>
<td>3</td>
<td>AIN</td>
<td>AO1</td>
<td>Output current: 0…20 mA</td>
</tr>
<tr>
<td>4</td>
<td>X1</td>
<td>DGND</td>
<td>Analog input circuit common</td>
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<tr>
<td>5</td>
<td>X1</td>
<td>AGND</td>
<td>Analog input circuit common</td>
</tr>
<tr>
<td>6</td>
<td>X1</td>
<td>+10V</td>
<td>Reference voltage, 10 V DC</td>
</tr>
<tr>
<td>7</td>
<td>X1</td>
<td>+24V</td>
<td>Auxiliary voltage output, +24 V DC, max. 250 mA</td>
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<tr>
<td>8</td>
<td>X1</td>
<td>RO3B</td>
<td>Fault (-1) 250 V AC / 30 V DC</td>
</tr>
<tr>
<td>9</td>
<td>X1</td>
<td>RO3C</td>
<td>Running 250 V AC / 30 V DC</td>
</tr>
<tr>
<td>10</td>
<td>X1</td>
<td>RO3A</td>
<td>Ready run 250 V AC / 30 V DC</td>
</tr>
<tr>
<td>11</td>
<td>X1</td>
<td>AGND</td>
<td>Analog output circuit common</td>
</tr>
<tr>
<td>12</td>
<td>X1</td>
<td>SCR</td>
<td>Signal cable shield (screen)</td>
</tr>
<tr>
<td>13</td>
<td>X1</td>
<td>DI1</td>
<td>Stop (0) / Start (1)</td>
</tr>
<tr>
<td>14</td>
<td>X1</td>
<td>DI2</td>
<td>Not configured</td>
</tr>
<tr>
<td>15</td>
<td>X1</td>
<td>DI3</td>
<td>Constant frequency/speed selection</td>
</tr>
<tr>
<td>16</td>
<td>X1</td>
<td>DI4</td>
<td>Not configured</td>
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<tr>
<td>17</td>
<td>X1</td>
<td>DI5</td>
<td>Not configured</td>
</tr>
<tr>
<td>18</td>
<td>X1</td>
<td>DI6</td>
<td>Not configured</td>
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<tr>
<td>19</td>
<td>X1</td>
<td>X10</td>
<td>24 V AC/DC</td>
</tr>
<tr>
<td>20</td>
<td>X1</td>
<td>OUT1</td>
<td>Factory connection. Both circuits must be closed for the drive to start.</td>
</tr>
<tr>
<td>21</td>
<td>X1</td>
<td>OUT2</td>
<td></td>
</tr>
<tr>
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<td>X1</td>
<td>SGND</td>
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<tr>
<td>23</td>
<td>X2</td>
<td>RO1B</td>
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<td>X2</td>
<td>RO1A</td>
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<tr>
<td>25</td>
<td>X2</td>
<td>RO1C</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>X2</td>
<td>X4</td>
<td>Safe torque off. Factory connection. Both circuits must be closed for the drive to start.</td>
</tr>
<tr>
<td>27</td>
<td>X2</td>
<td>X3</td>
<td>Safe torque off.</td>
</tr>
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<td>X2</td>
<td>X5</td>
<td>Embedded fieldbus</td>
</tr>
<tr>
<td>29</td>
<td>X2</td>
<td>B+</td>
<td>Embedded fieldbus, EFB (EIA-485)</td>
</tr>
<tr>
<td>30</td>
<td>X2</td>
<td>A-</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>X2</td>
<td>DGND</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>X2</td>
<td>S4</td>
<td>Termination switch</td>
</tr>
<tr>
<td>33</td>
<td>X2</td>
<td>S5</td>
<td>Bias termination switch</td>
</tr>
<tr>
<td>34</td>
<td>X4</td>
<td>S4</td>
<td>Termination switch</td>
</tr>
<tr>
<td>35</td>
<td>X4</td>
<td>S5</td>
<td>Bias termination switch</td>
</tr>
<tr>
<td>36</td>
<td>X10</td>
<td>S4</td>
<td>Factory connection. Both circuits must be closed for the drive to start.</td>
</tr>
<tr>
<td>37</td>
<td>X10</td>
<td>S5</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>X10</td>
<td>+24V</td>
<td>24 V AC/DC, input to power up the control unit when the main supply is disconnected.</td>
</tr>
</tbody>
</table>

Total load capacity of the Auxiliary voltage output +24V (X2:10) is 6.0 W (250 mA / 24 V DC).

Wire sizes: 0.14…2.5 mm² (26…14 AWG); All terminals

Tightening torques: 0.5…0.6 N·m (0.4…0.5 lbf·ft)
UL checklist

WARNING! Operation of this drive requires detailed installation and operation instructions provided in the hardware and software manuals. The manuals are provided in electric format in the drive package or on the Internet. Retain the manuals with the drive at all times. Hard copies of the manuals can be ordered through the manufacturer.

- Make sure that the drive type designation label includes the cULus Listed marking.
- CAUTION - Risk of electric shock. After disconnecting the input power, always wait for 5 minutes to let the intermediate circuit capacitors discharge before you start working on the drive, motor or motor cable.
- The drive is to be used in a heated, indoor controlled environment. The drive must be installed in clean air according to enclosure classification. Cooling air must be clean, free from corrosive materials and electrically conductive dust. UL Type 12 (IP55) enclosure provides protection from airborne dust and light sprays or splashing water from all directions. See the hardware manual.
- The maximum surrounding air temperature is 50 °C (122 °F) at rated current. The current is derated for 40 to 50 °C (104 to 122 °F).
- The drive is suitable for use in a circuit capable of delivering not more than 100,000 rms symmetrical amperes, 480 V maximum when protected by the UL fuses on page 12. The ampere rating is based on tests done according to the appropriate UL standard.
- The cables located within the motor circuit must be rated for at least 75 °C (167 °F) in UL-compliant installations. For UL Type 12 drives of frame R6, the power cables must be rated for 80 °C (176 °F) minimum. For ambient temperatures above +40 °C (+104 °F), the power cables must be rated for 90 °C (194 °F) minimum.
- Integral solid state short circuit protection does not provide branch circuit protection. The input cable must be protected with fuses. Suitable UL class T fuses are listed on page 12. These fuses provide branch circuit protection in accordance with the National Electrical Code (NEC) and Canadian Electrical Code. For installation in the United States, obey any other applicable local codes. For installation in Canada, obey any applicable provincial codes.
- Note: Circuit breakers must not be used without fuses in the USA. Consult ABB for suitable circuit breakers.

WARNING! The opening of the branch-circuit protective device may be an indication that a fault current has been interrupted. To reduce the risk of fire
or electric shock, current-carrying parts and other components of the device should be examined and replaced if damaged.

- The drive provides motor overload protection. For the adjustments, see the firmware manual.
- For the drive overvoltage category and pollution degree, see the hardware manual.
L1, L2, L3: 34 N·m
T1/U, T2/V, T3/W: 30 N·m

9.8 N·m
2 N·m

0.8 N·m (0.4 lbf·ft)
1.7 N·m (1.2 lbf·ft)
Total load capacity of the Auxiliary voltage output +24V (X2:10) is 6.0 W (250 mA / 24 V DC).

Wire sizes: 0.14...2.5 mm² (26...14 AWG): All terminals

Tightening torques: 0.5...0.6 N·m (0.4 lbf·ft)

0.5...0.6 N·m (0.4 lbf·ft)

1.7 N·m (1.2 lbf·ft)

1.7 N·m (1.2 lbf·ft)
A

B (R3)

B (R6, R8)

UL Type 1

UL Type 12

UL Type 12

TN-S system

IT system

Corner-grounded delta system

Midpoint-grounded delta system

TT system

See the hardware manual

UL Type 1

UL Type 12

UL Type 12

UL Type 1

UL Type 12

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UL Type 12
1000 V DC, \geq 100 \text{ Mohm}

U1-V1, U1-W1, V1-W1
U1-PE, V1-PE, W1-PE

M

3~

Drive

L1, L2, L3, T1/U, T2/V, T3/W

1.7 N·m (1.2 lbf·ft)

3AXD50000049859
L1, L2, L3, T1/U, T2/V, T3/W:
5.6 N·m (4.1 lbf·ft)

L1, L2, L3, T1/U, T2/V, T3/W:
2.9 N·m (2.1 lbf·ft)

L1, L2, L3, T1/U, T2/V, T3/W:
30 N·m (22.5 lbf·ft)

0.5…0.6 N·m (0.4 lbf·ft)
### Reference voltage and analog inputs and outputs

<table>
<thead>
<tr>
<th>Reference voltage and analog inputs and outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>X1</strong> Reference voltage and analog inputs and outputs</td>
</tr>
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<td>1</td>
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### SCR Signal cable shield (screen)

<table>
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<tbody>
<tr>
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### Reference voltage and programmable digital inputs

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### Aux. voltage output and programmable digital inputs

<table>
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### Auxiliary voltage output and programmable digital inputs

<table>
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### Embedded fieldbus

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<tbody>
<tr>
<td><strong>X5</strong> Embedded fieldbus</td>
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</table>

### AUX VOLTAGE OUTPUT

- **B+** Embedded fieldbus, EFB (EIA-485)
- **A-** DGND
- **B+** OUT1
- **A-** OUT2
- **B+** SGND
- **A-** IN1
- **B+** IN2
- **A-** X5

### Total load capacity of the Auxiliary voltage output +24V (X2:10) is 6.0 W (250 mA / 24 V DC).

- **Wire sizes:** 0.14...2.5 mm² (26...14 AWG): All terminals
- **Tightening torques:** 0.5...0.6 N·m (0.4 lbf·ft)
Further information

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

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

Providing feedback on ABB Drives manuals
Your comments on our manuals are welcome. Navigate to new.abb.com/drives/manuals-feedback-form.

Document library on the Internet
You can find manuals and other product documents in PDF format on the Internet at www.abb.com/drives/documents.