Installation manual

ACW600 Multidrive to ACS880LC Retrofit

ACS880R-307LCS6 Liquid Cooled Multidrive Retrofit
# List of related manuals and documents

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<th>Code (English)</th>
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<td>3AXD50000048633</td>
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<tr>
<td>ACS880-307LC (+A018) diode supply units Hardware manual</td>
<td>3AXD50000579662</td>
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<td>ACS880-304LC (+A018) diode supply modules Hardware manual</td>
<td>3AXD50000568963</td>
</tr>
<tr>
<td>ACS-AP-x assistant control panels user’s manual</td>
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<tr>
<td>ACS880 diode supply control program firmware manual</td>
<td>3AUA0000103295</td>
</tr>
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<td>Drive composer start-up and maintenance PC tool user’s manual</td>
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1 Safety

This section follows ABB Safety instructions for ACS880 multidrive cabinets and modules.

1.1 General safety for installation, start-up and maintenance

These instructions are for all personnel who work on the drive.

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

- Keep the drive in its package until you install it. After unpacking, protect the drive from dust, debris and moisture.
- Use the required personal protective equipment: safety shoes with metal toe cap, protective gloves, etc.
- Lift the drive with a lifting device. Use the designated lifting points. See the dimension drawings.
- Secure the drive cabinet to the floor to prevent it from toppling over. The cabinet has a high center of gravity. When you pull out heavy components or power modules, there is a risk of overturning. When necessary, also secure the cabinet to the wall.

![Image of a person trying to lift a heavy object](image)

- Do not stand or walk on the cabinet roof. Make sure that nothing presses against the roof, side or back plates or door. Do not store anything on the roof while the drive is in operation.
- Be careful when handling a tall module. The module overturns easily because it is heavy and has a high center of gravity. Whenever possible, secure the module with chains. Do not leave an unsupported module unattended, especially on a sloping floor.
- Beware of hot surfaces. Some parts, such as heatsinks of power semiconductors and brake resistors, remain hot for a while after disconnection of the electrical supply.

- Make sure that debris from borings and grindings does not enter the drive during the installation. Electrically conductive debris inside the drive may cause damage or malfunction.

- Make sure that there is sufficient cooling. See the technical data.

- Keep the cabinet doors closed when the drive is powered. With the doors open, a risk of a potentially fatal electric shock, arc flash or high-energy arc blast exists. If you cannot avoid working on a powered drive, obey the local laws and regulations on live working (including – but not limited to – electric shock and arc protection).

- Before you adjust the drive operation limits, make sure that the motor and all driven equipment can operate throughout the set operation limits.

- Before 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".

- The maximum drive power cycles is once every 2 minutes. Power cycling the drive too often can damage the charging circuit of the DC capacitors.

- Validate any safety circuits (for example, Safe torque off or emergency stop) in start-up. See separate instructions for the safety circuits.

1.1.1 Work on the liquid cooling system

These instructions are intended for all personnel that do installation, commissioning and maintenance work on the liquid cooling system.

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

- Use the required personal protective equipment. See the Safety data sheet for Antifrogen®L coolant by Clariant (www.clariant.com) for the instructions on the respiratory, hand and eye protection when handling the coolant.
• Beware of hot, high-pressure coolant (6 bar, max. 50 °C) that is present in the internal cooling circuit when it is in operation. Before you disconnect a pipe, release the pressure. Close the appropriate stop valve(s). If necessary, stop the cooling circuit pumps.

• Avoid skin contact with coolant. If coolant splashes onto the skin or in the eyes, rinse immediately with plenty of water. Do not syphon it by mouth. If you swallow or get it into the eyes, seek medical advice.

• Before the drive power up, make sure that the internal cooling circuit is filled up with coolant, and the cooling is in operation (coolant circulates). Safety instructions 13

• Make sure that coolant meets the ABB specification. See the appropriate hardware manual of the drive/unit.

• To avoid breaking the coolant pipes, do not overtighten the nuts of the unions. Leave 2 to 3 millimeters (0.08 to 0.12 inches) of thread visible.

• Do not drain coolant into the sewer system.

• If you need to store the drive at temperature below -15 °C (5 °F), drain the cooling circuit, or make sure that it is filled with the coolant specified by ABB.

• Drives with the cooling unit: Do not open the cooling unit pump inlet or outlet valves before filling up the coolant circuit. The pumps are filled with a mixture at the factory to prevent corrosion and the valves are closed at the factory.

• Drives with the cooling unit: Do not run the cooling unit pump dry.

1.2 Electrical safety in installation, start up and maintenance

These instructions are for all personnel who work on the drive, motor cable and motor.

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**WARNING!**

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

*If you are not a qualified electrician, do not do installation or maintenance work. Go through these steps before you begin any installation or maintenance work.*

---

1. Keep the cabinet doors closed when the drive is powered. With the doors open, a risk of a potentially fatal electric shock, arc flash or high-energy arc blast exists.

2. Clearly identify the work location and equipment

3. Disconnect all possible voltage sources. Lock out and tag out.

   • Open the main disconnecting device of the drive.

   • Open the charging switch if present.

   • Open the disconnector of the supply transformer. (The main disconnecting device in the drive cabinet does not disconnect the voltage from the AC input power busbars of the drive cabinet.)
• Close the grounding switch or switches ([Q9], option +F259) if present. Do not use excessive force as the switch has electromagnetic interlocking.

• If the drive is equipped with a DC/DC converter unit (optional): Open the DC switch/disconnector ([Q11], option +F286) of the DC/DC converter. Open the disconnecting device of the energy storage connected to the DC/DC converter unit (outside the drive cabinet).

• Open the auxiliary voltage switch-disconnector (if present). Also open all other possible disconnecting devices that isolate the drive from dangerous voltage sources.

• In the liquid cooling unit (if present), open the motor protective circuit breaker(s) of the cooling pumps.

• If you have a permanent magnet motor connected to the drive, disconnect the motor from the drive with a safety switch or by other means.

• Make sure that re-connection is not possible. Lock out and tag out.

• Disconnect any dangerous external voltages from the control circuits.

• After you disconnect power from the drive, always wait 5 minutes to let the intermediate circuit capacitors discharge before you continue. Protect any other energized parts in the work location against contact.

4. Protect any other energized parts in the work location against contact.

5. Take special precautions when close to bare conductors.

6. Measure that the installation is de-energized. If the measurement requires removal or disassembly of shrouding or other cabinet structures, obey the local laws and regulations applicable to live working (including - but not limited to- electric shock and arc protection).

   • Use a multimeter with an impedance of at least 1 MΩ.
   
   • Make sure that the voltage between the drive input power terminals (L1, L2, L3) and the grounding (PE) busbar is close to 0 V.

   • Make sure that the voltage between the drive DC busbars (+ and -) and the grounding (PE) busbar is close to 0 V.

   • If you have a permanent magnet motor connected to the drive, make sure that the voltage between the drive output terminals (T1/U, T2/V, T3/W) and the grounding (PE) busbar is close to 0 V.

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**WARNING!**
The busbars inside the cabinet are partially coated. Measurements made through the coating are potentially unreliable, so only measure at uncoated portions. Note that the coating does not constitute a safe or touch-proof insulation.

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7. Install temporary grounding as required by the local regulations.

8. Ask the person in control of the electrical installation work for a permit to work.
1.2.1 Additional instructions and notes

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

- Make sure that the electrical power network, motor/generator, and environmental conditions agree with the drive data. Verify that the network voltage matches with the input voltage on the drive type designation label.

- Remove the code labels attached to mechanical parts such as busbars, shrouds and sheet metal parts before installation. They may cause bad electrical connections, or, after peeling off and collecting dust in time, cause arcing or block the cooling air flow.

**Note:**
- The motor cable terminals of the drive are at a dangerous voltage when the input power is on, regardless of whether the motor is running or not.
- When the input power is on, the drive DC bus is at a dangerous voltage.
- External wiring can supply dangerous voltages to the relay outputs of the control units of the drive.
- The Safe torque off function does not remove the voltage from the main and auxiliary circuits. The function is not effective against deliberate sabotage or misuse.

1.3 Printed circuit boards

**WARNING!**
Use a grounding wrist band when you handle printed circuit boards. Do not touch the boards unnecessarily. The boards contain components sensitive to electrostatic discharge.
2 General Information

ACS880R-307LCS6 is a multidrive solution that is used for retrofitting the old ACW631/ACW633 products. The product consists of several pre-assemblies, however some loose parts are delivered. The example of cabinet layout after retrofit presented in figure 2.1.

This manual is applicable to the ACS880R-307LCS6 multidrive units. It is intended for engineers who plan the installation, install or do the service work in retrofit projects. The engineers are expected to know the fundamentals of electricity, wiring electrical components and electrical schematic symbols. If other required repair or maintenance tasks occur before or during the installation and commissioning which have not been detailed in this instruction, the service personnel should be familiar with the working methods needed to safely do the required actions without any potential danger, or risk to personnel or equipment safety.

Before starting the installation work, the whole work must be carefully planned so that the required actions can be performed safely and effectively.

Figure 2.1 Cabinet layout after Retrofit (1xB5 with bottom cabling and ACB)
3 Design and preparation work

Before you retrofit a drive, complete the following preparatory tasks.

- Confirm Retrofit technical appendix information
- Obtain documents and forms
- Obtain basic and special tools
- Parameter backup and conversion if applicable

3.1 Confirm Retrofit technical appendix information

Verify the following information in the existing installation. This information is located in the ABB Salesforce case ID.

- Type code of multidrive cabinet and type code of each inverter unit
- Verify the cabling variant (top or bottom, applies for auxiliary and supply cables)
- What is the auxiliary supply voltage?
- How is the communication to the upper level?
- What is the fieldbus type?
- Is there emergency stop and what kind?
- What are the other installed options in the old ACW600 installation that need to be replaced?

**Note! If the target site equipment is to be retrofitted for the first time, visit the installation site once before you start the installation. Get pictures and layout drawings and other relevant information. Make sure that all necessary parts and kits have been delivered.**

3.2 Obtain documents and forms

Before you start the installation, get the following documents:

- Project specific electrical circuit diagrams (if available).
- Valid print copies of Electrical Circuit diagrams from the old ACW600 installation. These may have been modified at the customer site during the products lifetime.
3.3 Obtain basic and special tools

Use the following recommended tools for the installation:

**Basic tools**

- Multimeter (1000 V)
- Isolation test meter (500 VDC)
- Cordless screwdriver
- Torque wrench(s) (15-100 Nm)
- Power drill
- Adjustable pliers
- Socket set with drive 7-13 mm, sockets 8-21 mm
- Extension bars for torque wrench (500mm length needed in total)
- Torx T10, T20, T25, T30
- Screwdriver bit extension 150 mm
- Hex key 6mm (suitable for 15Nm torque wrench)
- Fork spanners 10-19 mm
- Tape measure
- High quality drills Ø5.3, Ø4.5, Ø3.6 and Ø10 mm
- Contact cleaner
- Contact grease (for Cu-Al)
- Scouring pad or equivalent polishing material
- Ratcheting PVC Cutters (tube sizes Ø8, Ø17 and Ø22)
- Metal saw (for removing old sheet metal part, see chapter 5.1.1)

**Special tools**

- Pressure tester (42000383 or equal)
- Lifter for lifting modules and other heavy equipment (3AXD50000047447 or equal)
4 Material and parameter backup inspection on-site

4.1 Parameter backup

Make sure that the latest backup of ACW600 is available for later commissioning use. If the ACW600 backup is not available at the office prior to decommissioning and installation, first complete the parameter backup and conversion, before you begin the installation.

4.2 Inspect materials

Before you begin the mechanical on-site work, make sure that all materials to be installed are available.

- Check if all materials’ type and quantity are consistent with the packing list;
- Check if all materials’ appearance is intact.

In ACS880R-307LCS6 Liquid Cooled Multidrive Retrofit, the following packages are delivered to the customer site:

- ACS880-304LC-1060A-7+A018 modules (amount depends on supply type, see appendix 1)
- Packages with all mechanical and electrical parts and the pre-assemblies.
  - Including options, accessories and screws
  - Documentation for installation, including
    - Circuit diagrams (standard or project specific)
    - Mechanical assembly drawings for site installation
    - Bill of materials
- New doors
5 Mechanical installation

5.1 Remove the old hardware

Refer to old assembly drawings and remove the old hardware.

WARNING!
Follow the safety instructions in chapter 1

WARNING! Make sure that there is no live voltage (AC/DC).

1. Re-confirm that there is no live voltage (AC/DC).
2. Remove the door.
3. If there are customer wires, mark their connector ID for reconnecting them, then disconnect the customer wires from cabinet. You can also disassemble the cables. If possible, leave the connector terminals connected to ensure their correct reconnection.
4. Remove the other existing old hardware parts from the cabinet. Refer to “dismantled state of the cabinet” in step 1 of the relevant assembly drawing for the cabinet. See table 1.

5.1.1 Tips for removing the old hardware

In the old DC-busbar cover plate, there is one connection point behind the plate. Connection point can be accessed when all other screws are removed, and plate is tilted forward from the bottom end. See figure 5.1.

Figure 5.1: Old DC-busbar cover plate
5.2 Install the new hardware

Follow the assembly procedure and the main mechanical assembly work from the mechanical assembly drawings. Assembly drawings are delivered with the retrofit product or can be found on SAP or DMS with the provided document codes.

**Note!** Mechanical assembly is done in conjunction with electrical installation. Make sure to read chapter 6 *Electrical installation* before starting the retrofit installation.

### Table 1 Main assembly drawings of ACS880R-307LCS6 Liquid Cooled Multidrive Retrofit

<table>
<thead>
<tr>
<th>SAP Code</th>
<th>DMS Code</th>
<th>Description</th>
<th>Type Designation</th>
<th>Cabinet width (mm)</th>
<th>Size/Rating/Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>3AXD50000803095</td>
<td>LAYOUT DRAWING</td>
<td>MAIN ASSEMBLY</td>
<td>1200</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3AXD50000808663</td>
<td>LAYOUT DRAWING</td>
<td>MAIN ASSEMBLY</td>
<td>2400</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3AXD50000821297</td>
<td>ASSEMBLY DRAWING</td>
<td>ICU cabinet with ACB and TOP</td>
<td>600</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3AXD50000821730</td>
<td>ASSEMBLY DRAWING</td>
<td>ICU cabinet with ACB and BOT</td>
<td>600</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3AXD50000821488</td>
<td>ASSEMBLY DRAWING</td>
<td>ICU cabinet with OT and TOP</td>
<td>600</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3AXD50000821747</td>
<td>ASSEMBLY DRAWING</td>
<td>ICU cabinet with OT and BOT</td>
<td>600</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3AXD50000767427</td>
<td>ASSEMBLY DRAWING</td>
<td>Module cabinet (common for all ICU variants)</td>
<td>600</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

5.3 Cabinet pressure testing after new hardware is installed

The purpose of the pressure test is to verify the sufficient tightness of the piping, unions and other components of the cooling circuit. Test shall be always done with Antifrogen L 25/ 50% mixture and with proper pressure pump (42000383 or equal).

---

**WARNING!**

Never perform pressure test with compressed air or other gasses due safety reasons!
5.3.1 Performing the pressure test

Fill up the internal circuit with Antifrogen L 25/50%-coolant. Bleed the circuit. Bleed the pumps separately through their bleed nipples. Raise the pressure to test specification 10 bar – note: at 6 bar, close expansion vessel valve V0003 in LCU unit ACS880R-1007LCS6 if it exists. After the test duration (15 minutes), check that the pressure remains at 10 bar. Check the circuit visually for leaks.

Table 2 Specifications for the pressure test

<table>
<thead>
<tr>
<th>Test description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Test pressure</td>
<td>Internal circuit: 10 bar</td>
</tr>
<tr>
<td>Pressure tolerance</td>
<td>± 0.3 bar</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>20-25°C</td>
</tr>
<tr>
<td>Duration</td>
<td>Internal circuit: 15 min</td>
</tr>
<tr>
<td>Pass criteria</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No visible leaks.</td>
</tr>
<tr>
<td></td>
<td>The pressure drops no more than 0.2 bar from initial test pressure.</td>
</tr>
</tbody>
</table>

5.4 Installation Hints

Be careful while installing sub-assemblies and parts which weigh more than 25kg. Use suitable lifting device. All parts and sub-assemblies weighting more than 25 kg are listed below. Heavy parts are also marked in the assembly drawings.

Table 3 Heavy parts of ACS880R-307LCS6 Liquid Cooled Multidrive Retrofit

<table>
<thead>
<tr>
<th>Item Code</th>
<th>Description</th>
<th>Type Designation</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3AXD50000755639</td>
<td>SUB-ASSEMBLY</td>
<td>OT SWITCH PRE-ASSEMBLY</td>
<td>38.4</td>
</tr>
<tr>
<td>3AXD50000769599</td>
<td>SUB-ASSEMBLY</td>
<td>ACB PRE-ASSEMBLY for bottom variant</td>
<td>101.5</td>
</tr>
<tr>
<td>3AXD50000753079</td>
<td>SUB-ASSEMBLY</td>
<td>ACB PRE-ASSEMBLY for top variant</td>
<td>101.5</td>
</tr>
<tr>
<td>3AXD5000048346</td>
<td>BREAKER</td>
<td>AIR CIRCUIT BREAKER E4.2</td>
<td>56.0</td>
</tr>
<tr>
<td>3AXD50000751501</td>
<td>ELECTRICAL PART</td>
<td>DIODE SUPPLY MODULE D8T</td>
<td>88.0</td>
</tr>
<tr>
<td>T11.1</td>
<td>TRANSFORMER</td>
<td>AUXILIARY TRANSFORMER</td>
<td>70.0</td>
</tr>
</tbody>
</table>

5.4.1 Axilock installation and tightening

In the design, TEEKAY, AXILOCK-S TYPE1 60.3 EPDM (68410509) -connector has been used in the steel pipe connections (main cooling pipes and LCU piping).

Axilock installation steps:

1. Clean the surface of the pipe in the joint area and remove any excess dirt.
2. Check that there are no deformations or depressions in the pipe in the connection area.
3. Center the pipe ends against each other and leave the recommended spacing between the pipe ends (0-5 mm)
4. Insert the connector into the second pipe
5. Align the pipes to be connected and pull the connector on the other pipe as well
6. Tighten both bolts alternately until the seal bites against the pipe. After this, do not turn the connector again to another position on the pipe.
7. Tighten both bolts alternately with a torque wrench until the torque indicated on the type plate is achieved (15 NM).

Figure 5.2: Example picture of Axilock
5.4.2 Module cooling pipes installation

Due to manufacturing tolerances, module cooling pipes (see figure 5.3) are sometimes too long. When installing the module cooling pipes, verify that pipe length is appropriate, and pipes don't interfere with door closing, shrouds etc. In case of too long pipe, make pipe shorter by cutting it with appropriate pipe cutters.

Note: Cutting pipes with knife etc. sharp tool is not allowed since cutting surface will be uneven/crooked which can later cause liquid leakages. Pipes are only allowed to be cut with appropriate pipe cutters which are meant for plastic pipes (Ratcheting PVC Cutters).

Figure 5.3: Module liquid cooling pipes
6 Electrical installation

NOTE: Electrical installation should be done in conjunction with mechanical installation.

6.1 Wiring routes common parts

The standard component layout of the DSU cabinets is shown in the figure 6.1.1. The figure represents the air circuit breaker option. The right cabinet is reserved for the diode supply unit’s DSU modules and left cabinet for the air circuit breaker and customer incoming section. In the left cabinet there is also the hinge frame, where the control unit, relays, most of the auxiliary devices are located. Behind the hinge frame there is installation plate for optional earthing switch, auxiliary voltage switch and auxiliary transformers supply fuses.

The final layout of the components can vary as most of the deliveries of the original supply sections had lot of customer specified components. These components’ location and installation are instructed in different document (etc. customer specified circuit diagrams, layout drawings).

Figure 6.1.1: Layout of the DSU cabinets with ACB option. Left figure shows the bottom entry and right figure the top entry of the supply cables option.

The main wiring routes are shown in the figure 6.1.2. The hinge frame is mostly prewired and other ends of the wires needs to be installed according to the electrical drawings. In the module cabinet there are two cable ducts installed vertically which are meant to be used as main wiring routes between the top of the cabinet and bottom of the cabinet.
Figure 6.1.2: The main wiring routes for the DSU cabinets with ACB option. Left figure shows the bottom entry and right figure the top entry of the supply cables option.

6.2 Common parts for all DSU variants

ICU cabinet’s fan is installed in the common cabinet -drawings’ step 11 and its supply power in step 12. Connect the wire set to the fan and its power supply unit. Connect the supervision wires to the BCU after the hinge frame is installed in ICU cabinet assembly drawings step 7 (ACB variants) or in step 9 (Main switch variants). Wiring routes are shown in the figure 6.2.1 and the location of the ICU cabinet fan, power supply and terminal block are shown in the figure 6.2.2.

Install cable duct on the bottom plate of the module cabinet. Avoid the space right below the cabinet fan G115.2/.4 (see figure 6.2.1).

Figure 6.2.1: Wiring routes from and to the 48 Voltage power supply T115.x. While installing the cable ducts on the bottom plate of the module cabinet, avoid the space under the cabinet fan G115.2/.4.
Figure 6.2.2: Location of the ICU cabinet fan and its power supply unit.

The main auxiliary transformer is installed to the ICU cabinet. In 12-pulse supply unit, there is only one transformer installed. Check the installation cabinet from the electrical drawings. In the cabinet where the transformer T11 is installed attach transformer’s terminal block on the plate left side of the module cabinet’s fan right side of the terminal block X31.1 (see figure 6.2.3).

Figure 6.2.3: Terminal block plate of X12, X31 and transformer terminals T11X1/2

The door devices are wired after the doors are installed to the cabinet (see figure 6.2.4). Remember to leave a loop of the wires at the door’s hinge side.

The door devices can be installed to the door device holder (see figure 6.2.5). Drill hole in the plastic part using the metal holder as a guide.
6.3 ACB +F255 Specific wiring routes and installation order

Next electrical installation is in step 3 of the ACB assembly drawings. While installation of the air circuit breaker \textit{Q1.x} and if there are option for the current measurement \textit{G335} make sure the wires are connected to the current transformers \textit{B2.x}, \textit{B3.x} and \textit{B4.x}. The other ends of the wires are installed to the door after the step 8, when the door has been installed.

In the step 5 the earthing switch's plate is installed. The earthing switch \textit{Q9.x} is included in option code \textit{+F259}. Make sure the auxiliary contacts have been wired before installation of the plate. After installing the plate connect the auxiliary supply wires from main phase busbars to \textit{Q10.x}, supply wires from \textit{F11.x} to transformer \textit{T11}. 
Attach the external supply wires to the LCU supply switch Q200.1 and wire the LCU supply for the Q200.1 to the LCU =20+20.1-F201.

**Figure 6.3.1:** Layout of the earthing switch plate. Components can vary depending on the options.

**Figure 6.3.2:** Wiring routes from the earthing switch’s plate in the top entry variant.
In the step 6 the earth fault monitoring assembly plate and top customer auxiliary supply terminal block X30.0 (only in +H351 supply top entry) is installed. Install terminal block X34.x for voltage distribution of the air circuit breaker.

**Figure 6.3.x:** Example of cable duct installation in the top entry variant’s bottom plate.

**Figure 6.3.2:** Wiring routes from the air circuit breaker and the earth fault monitoring device in the top cabling variant.
In the step 7 install the hinge frame and route wires from it to respective destinations.

Figure 6.3.x: Wiring routes from the hinge frame in the top entry variant.

In the step 8 install the door and wire the control panel, buttons and meters on the door.

6.4 Switch option +F253 Specific wiring routes and installation order

Next electrical installation is in step 4 of the OT assembly drawings. While installation of the main switch Q1.x. In the step 5 the current transformers (option +XG335) are installed. Make sure the wires are connected to the current transformers B2.x, B3.x and B4.x. The other ends of the wires are installed to the door after the step 10, when the door has been installed.

In the step 7 the earthing switch’s plate is installed. The earthing switch Q9.x is included in option code +F259. Make sure the auxiliary contacts have been wired before installation of the plate. After installing the plate connect the auxiliary supply wires from main phase busbars to Q10.x, supply wires from F11.x to transformer T11. Wiring routes are presented in the figure 6.4.2. The cable ducts installed, in the top variant, on top of the bottom plate in the ICU cabinet are presented in the figure 6.4.3.

Attach the external supply wires to the LCU supply switch Q200.1 and wire the LCU supply for the Q200.1 to the LCU =20+20.1-F201.
Figure 6.4.1: Layout of the earthing switch plate. Components can vary depending on the options.

Figure 6.4.2: Wiring routes from the earthing switch’s plate in the top entry variant.

Figure 6.4.3: Example of cable duct installation in the top entry variant’s bottom plate.
In the step 9 install the hinge frame and route wires from it to respective destinations.
7 Commissioning

Only certified engineers must adjust the drive parameters to meet the precise demands of the application. Make sure you consider safety issues related to the application.

Manuals mentioned below can be used for the commissioning,

- ACS880 diode supply control program firmware manual 3AUA0000103295
- ACS-AP-x Assistant control panels user's manual 3AUA0000085685
8 Documentation

To install the product, obey the manufacturer's instructions, safety regulations and agreed functional requirements that are included in the following documentation.

8.1 Documents for the customer

- Electrical drawing of the module
- Electrical drawing of power supply connections
- Commissioning report
- Backup package of commissioning parameter setting

8.2 Documents for ABB

- Service report / Installation verification
- Commissioning report
- Parameter package

8.3 New type labels and stickers

Apply new type label and modernization stickers to the cabinet door. Follow the instruction document 3AXD10000962402 provided in the documentation package. Make sure the warning stickers are applied also as mentioned in the documentation.

- Apply "Modernized by ABB sticker" to the top left corner of each drive/ supply section, see example in Figure 1
- Apply type labels and warning stickers according to the document

Figure 1, position of modernization sticker
8.4 Registering the new installation to ABB Drives Installed Base (DIB)

It is important to register the new retrofit installation to ABB Drives Installed Base to keep the database- and customer fleet information up to date. Additionally, by registering the new installation is possible to see the dedicated spare parts, preventive maintenance packages and other service products for the new serial number.

**NOTE! If registration not done, spare parts or PM packages for new installation are not visible.**

Note. Examples given in this document are from DIB test environment, thus might not represent the real installation.

### 8.4.1 Accessing to DIB

ABB Drives Installed Base is for ABB- or ABB partner employees use.

Go to the web site:


If no access, fill the access request form.

**NOTE! It is recommended to submit access request form before the installation, e.g. in project planning phase, due to some delays might occur.**

Additionally, it is recommended to find in advance the serial numbers from the database for which the retrofit installation is planned for. In the case old serial numbers are not found it is possible to report missing drives, see Figure 2.

**NOTE! Some ACS600 drives might not be found from DIB.**

Enter the needed info and wait for reply from DIB technical support team.

![Figure 2](https://businessapps.abb.com/sites/DrivesIB4/Pages/Default.aspx)

Use the Support menu if you need help in DIB features.

### 8.4.2 Registering the new installation

Find the original ACS600 multidrive by entering the serial number or by sales order. If the original multidrive is not registered do the registration first for it.
When drive found, double click to see details.

When the drive found, the **single drive module** or **multidrive unit or supply unit** can be replaced with new retrofit type code and serial number. Be aware of multiple levels of the component structure, drive units are below transport lengths.
Figure 5, *a drive module of single drive*

**Do not edit main ‘Single drive’ or ‘Multidrive’ or ‘Transport length’ level serial numbers!**

**NOTE!** Double check that the old serial number and type code match the installation in question, do not proceed if unsure!

Figure 6, *a drive unit of a multidrive.*

Enter new serial number from the new type label delivered with the retrofit kit and wait the new ‘Description’ and ‘Component code’ appears.

**NOTE! Before clicking ‘Confirm’, double-check the serial number and the new type is correct, there is no “UN-DO” button if wrong serial number is entered!**

When all clear, click confirm.
Check that the new retrofit type code and serial number appears to product structure, see example in below Figure 7.

![Figure 7](image)

**Note! Do the registration also for the new installed ACS880R/U type!**

This is important to do since the new installation is not automatically registered along with the main level serial number.

### 8.4.1 Services for the new installation

It is possible to see spare parts and PM packages by double clicking the serial number of the new retrofit type.

Go to the ‘Services’ tab and click ‘Refresh’ if items does not appear automatically.
Fill the commissioning report, upload it to DIB and prepare a copy for customer documentation.
# Appendix 1: Product scope table

Table 4 Available types and ratings of standard ACS880-307LCS6 Retrofit for ACW631/ACW633

<table>
<thead>
<tr>
<th>Old Drive type</th>
<th>Old Frame</th>
<th>ACW600 Idc</th>
<th>New module type</th>
<th>New frame</th>
<th>Retrofit type</th>
<th>ACS880R Idc</th>
</tr>
</thead>
<tbody>
<tr>
<td>690 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACW631-2600-6</td>
<td>1xB5</td>
<td>2664</td>
<td>ACS880-304LC-1060A-7+A018</td>
<td>3xD8T</td>
<td>ACS880R-307LCS6-2176A-7</td>
<td>2664</td>
</tr>
<tr>
<td>ACW633-5200-6</td>
<td>2xB5</td>
<td>5328</td>
<td>ACS880-304LC-1060A-7+A018</td>
<td>6xD8T</td>
<td>ACS880R-307LCS6-4352A-7</td>
<td>5328</td>
</tr>
</tbody>
</table>
## Appendix 2: Tightening torques

Note: If possible, pls refer to the latest version of the following file (code 3AFE003132) from DMS

<table>
<thead>
<tr>
<th>Combi screw/bolt</th>
<th>Elect. connection Nm</th>
<th>Note!</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>M4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>M5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>M6</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>M8</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>M10</td>
<td>42</td>
<td>See exceptions</td>
</tr>
<tr>
<td>Hexagon bolt</td>
<td>Elect. connection Nm</td>
<td>Note!</td>
</tr>
<tr>
<td>M6</td>
<td>9</td>
<td>Strenght class 8.8</td>
</tr>
<tr>
<td>M8</td>
<td>22</td>
<td>Strenght class 8.8</td>
</tr>
<tr>
<td>M10</td>
<td>42</td>
<td>See exceptions</td>
</tr>
<tr>
<td>M12</td>
<td>70</td>
<td>See exceptions</td>
</tr>
<tr>
<td>M16</td>
<td>120</td>
<td>See exceptions</td>
</tr>
<tr>
<td>Torx screw</td>
<td>Elect. connection Nm</td>
<td>Mechanical Nm</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set Screw for Fuses</td>
<td>Bussman Nm</td>
<td>Ferraz S. Nm</td>
</tr>
<tr>
<td>8</td>
<td>20</td>
<td>13,5</td>
</tr>
<tr>
<td>10</td>
<td>40</td>
<td>26</td>
</tr>
<tr>
<td>12</td>
<td>50</td>
<td>46</td>
</tr>
<tr>
<td>Cable Shoe</td>
<td>Elect. connection Nm</td>
<td>Note!</td>
</tr>
<tr>
<td>M8</td>
<td>15</td>
<td>Strenght class 8.8</td>
</tr>
<tr>
<td>M10</td>
<td>32</td>
<td>Strenght class 8.8</td>
</tr>
<tr>
<td>M12</td>
<td>50</td>
<td>Strenght class 8.8</td>
</tr>
<tr>
<td>Exceptions</td>
<td>Elect. connection Nm</td>
<td>Mechanical Nm</td>
</tr>
<tr>
<td>6 Serpress</td>
<td>5</td>
<td>Strenght class 5.8</td>
</tr>
<tr>
<td>8 Serpress</td>
<td>15</td>
<td>Strenght class 5.8</td>
</tr>
<tr>
<td>10 Serpress</td>
<td>35</td>
<td>Strenght class 5.8</td>
</tr>
<tr>
<td>M10 Combi bolt</td>
<td>10</td>
<td>LCL-capasitor</td>
</tr>
<tr>
<td>M16 Hexagon bolt</td>
<td>80</td>
<td>LCL-reactor bus bar</td>
</tr>
<tr>
<td>M16 Hexagon bolt</td>
<td></td>
<td>70</td>
</tr>
<tr>
<td>fastening M12</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>elect. terminal M10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fastening M6</td>
<td></td>
<td>3 (M5) and 5 (M6)</td>
</tr>
<tr>
<td>elect. terminal M5/M6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation supports: to the frame and the bus bar</td>
<td>Upper / Lower thread</td>
<td>MRP-code</td>
</tr>
<tr>
<td>M6</td>
<td>64610121</td>
<td></td>
</tr>
<tr>
<td>M8 / M8</td>
<td>09707301</td>
<td>NTGD 1N1</td>
</tr>
<tr>
<td>M8 / M8</td>
<td>64575945</td>
<td>D30 H30 M</td>
</tr>
<tr>
<td>M10 / M10</td>
<td>09707255</td>
<td>NTGB 1A4</td>
</tr>
<tr>
<td>M10 / M10</td>
<td>09707409</td>
<td>NTGM 1N1</td>
</tr>
<tr>
<td>M10 / M10</td>
<td>09707263</td>
<td>NTGB 1A8</td>
</tr>
<tr>
<td>M12 / M12</td>
<td>09707271</td>
<td>NTGB 1A15</td>
</tr>
</tbody>
</table>
# Appendix 3: Installation inspection template

## Hardware installation checklist

<table>
<thead>
<tr>
<th>Inspection items</th>
<th>self-inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Check if all material types and quantities are consistent with the packing list; Check if the appearance is intact.</td>
<td>☐</td>
</tr>
<tr>
<td>2. Check if position and direction of all pre-assemblies and parts are corresponding with assembly drawing requirements.</td>
<td>☐</td>
</tr>
<tr>
<td>3. Visual check if all fixing screws inside cabinet are tightened, no missing. Especially for switch and contactor or du/dt.</td>
<td>☐</td>
</tr>
<tr>
<td>4. Check if ID stickers on the surface of bus bars connection have been removed.</td>
<td>☐</td>
</tr>
<tr>
<td>5. Check if lead through plates of cabinet are used correctly according requirement of cabinet option</td>
<td>☐</td>
</tr>
<tr>
<td>6. Check if all bolts for main wires &amp; bus bars are tightened by torque spanner with required torque, and marked properly. Smear conductive paste between different materials.</td>
<td>☐</td>
</tr>
<tr>
<td>7. Visual check if stickers for input &amp; output bus bars, PE bus bars are pasted properly</td>
<td>☐</td>
</tr>
<tr>
<td>8. Check if the clearance between the bus bars, between the frame and the phase busbar, is not less than 12mm</td>
<td>☐</td>
</tr>
<tr>
<td>9. Check if the type and serial number of module are consistent with the bill of materials, and the appearance is intact</td>
<td>☐</td>
</tr>
<tr>
<td>10. Visual check if all screws and brackets for fixing module are tightened</td>
<td>☐</td>
</tr>
<tr>
<td>11. Visual check if all bolts for module input &amp; output bus bars and cable connection are tightened by torque spanner with required torque and marked properly. Smear conductive paste between different materials.</td>
<td>☐</td>
</tr>
<tr>
<td>12. Check if all air guides in front of module are assembled with tightened screws</td>
<td>☐</td>
</tr>
<tr>
<td>13. Check if input/output voltage of transformers are corresponding with requirements of cabinet</td>
<td>☐</td>
</tr>
<tr>
<td>14. Check if air flow direction of all cooling fans is correct</td>
<td>☐</td>
</tr>
<tr>
<td>15. Check if the number, version, type and installation direction of the fuse are correct.</td>
<td>☐</td>
</tr>
<tr>
<td>16. Check if jumpers on terminals are correctly installed, corresponding with requirements of electrical diagram</td>
<td>☐</td>
</tr>
<tr>
<td>17. Check if the wires are correctly connected and fastened.</td>
<td>☐</td>
</tr>
<tr>
<td>18. Check if the length of switch shaft is correct, tightened and locks the door when switch is on.</td>
<td>☐</td>
</tr>
<tr>
<td>19. Check if all the labels inside cabinet are correct (electrical parts label, warning label, fuse label, etc.)</td>
<td>☐</td>
</tr>
<tr>
<td>20. Clean cabinet after assembly to ensure no tools, screws, gaskets, iron filings, debris, etc.</td>
<td>☐</td>
</tr>
<tr>
<td>21. Visual check if all insulating covers and shrouds are correctly installed with warning labels</td>
<td>☐</td>
</tr>
<tr>
<td>22. Visual check if the appearance of doors are intact before door installation</td>
<td>☐</td>
</tr>
<tr>
<td>23. Check if ventilation covers are correctly used according to requirement of cabinet IP class</td>
<td>☐</td>
</tr>
<tr>
<td>24. Check if white sealing plugs on front door are correctly used according to IP class option</td>
<td>☐</td>
</tr>
<tr>
<td>25. Visual check if all labels and stickers on door are posted correctly in right position</td>
<td>☐</td>
</tr>
<tr>
<td>26. Check if the IP class and the plugs and sealing strip are used according requirements of IP class of cabinet</td>
<td>☐</td>
</tr>
<tr>
<td>27. Visual check if all screws on cabinet cover are tightened</td>
<td>☐</td>
</tr>
<tr>
<td>28. Cosmetic visual check</td>
<td>☐</td>
</tr>
<tr>
<td>29. Clean site after assembly to ensure no tools, screws, gaskets, iron filings, debris, etc.</td>
<td>☐</td>
</tr>
</tbody>
</table>
Contact us

www.abb.com/drives