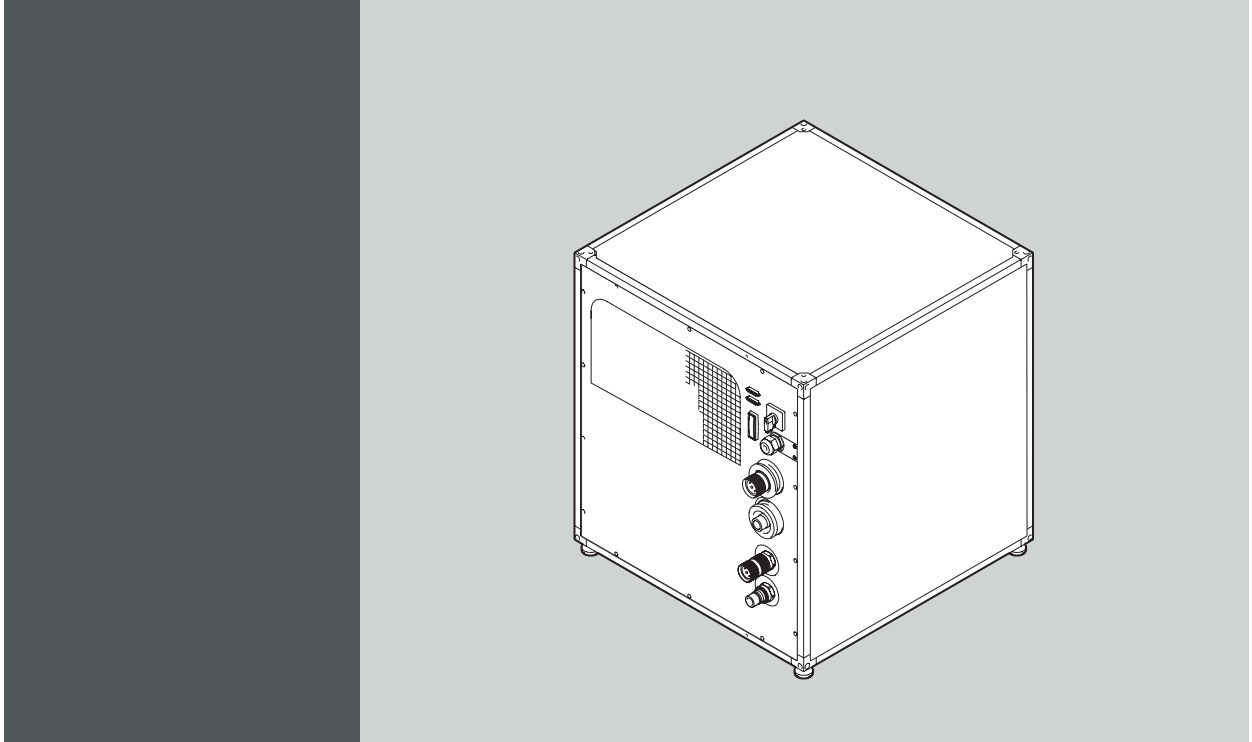


# ULC-30A



## Service manual

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# 1. SAFETY

## About this chapter

Read this chapter attentively. It contains important information to prevent personal injury while servicing the ULC-30A on-site. Furthermore, it includes several cautions to prevent damage of the ULC-30A components. Ensure you understand and follow all the safety guidelines, safety instructions and warnings mentioned in this chapter before performing any servicing on the ULC-30A. After this chapter additional "warnings" and "cautions" are given depending on the servicing procedure. Read and follow these "warnings" and "cautions" as well.



**WARNING:** This manual is only intended for qualified service personnel.

---

## Overview

- Servicing safety instructions

## 1.1 Servicing safety instructions

---



**WARNING:** Before removing/replacing any chiller components, switch off power. See "Switching off power and locking the switch", page 15.

---

## Personal protection



**WARNING:** Ensure you understand and follow all the safety guidelines, safety instructions, warnings and cautions mentioned in this manual.

---

## Safety Instructions

1. Before returning the chiller to the customer, always make a safety check of the entire chiller, including, but not limited to, the following items:
  - a) Be sure that no built-in protective devices are defective and/or have been defeated during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including, but not limited to, insulating materials, barriers, covers/shields, and isolation resistor/capacitor networks. Do not operate this chiller or permit it to be operated without all protective devices correctly installed and functioning. Service people who defeat safety features or fail to perform safety checks may be liable for any resulting damage.
  - b) Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, (1) excessively wide cabinet ventilation slots, and (2) an improperly fitted and/or incorrectly secured cover panels.
  - c) Leakage Current Hot Check. With the chiller completely reassembled, plug the AC line cord directly into a 220 V AC outlet (Do not use an isolation transformer during this test). Use a leakage current tester or a metering system that is designed to comply with the new IEC, ANSI and UL standards. With the chiller AC switch first in the on position and then in the off position, measure from a known earth ground (metal waterpipe, conduit, etc.) to all exposed metal parts of the chiller (antennas, handle bracket, metal cabinet, screwheads, metallic overlays, control shafts, etc.). especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 3,5 mA. Reverse the chiller power cord plug in the outlet and repeat test. ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER OR BEFORE CONNECTING ACCESSORIES.

### AC Leakage Test

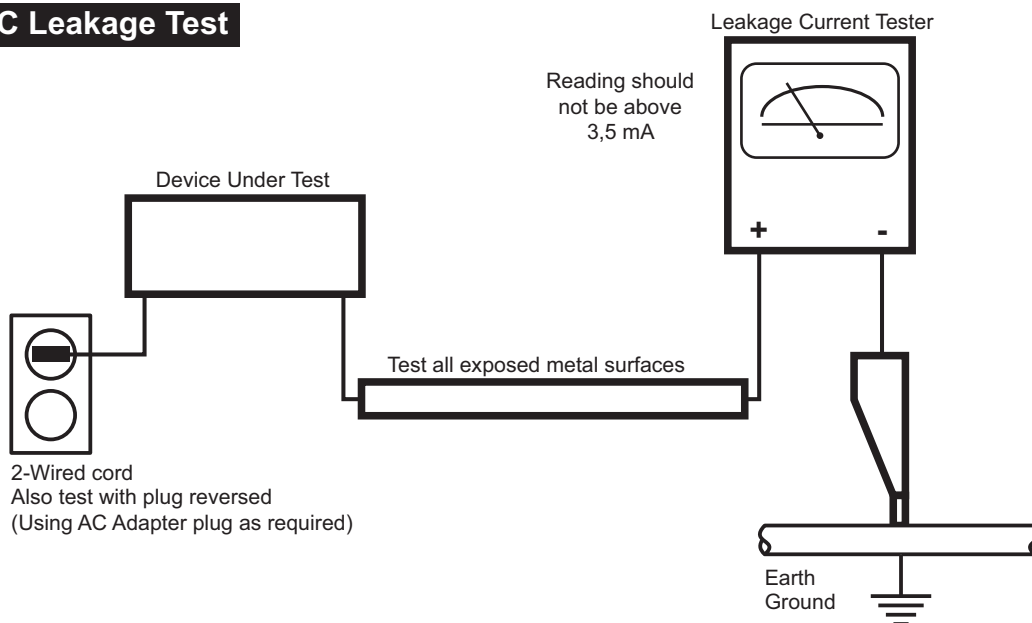


Image 1-1

2. Read and comply with all caution and safety-related notes on or inside the chiller.
3. Design Alteration Warning - Do not alter or add to the mechanical or electrical design of this apparatus. Design alterations and additions, including, but not limited to, circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristics of this apparatus and create a hazard to the user. Any design alterations or additions may void the manufacturer's warranty and may make you, the servicer responsible for personal injury or property damage resulting therefrom.
4. Observe original lead dress. Always inspect in all areas for pinched, out-of-face, or frayed wiring. Do not change spacing between components, and between components and the printed-circuit board. Check AC power cord for damage. Take extra care to assure correct lead dress in the following areas:
  - a) near sharp edges
  - b) near thermally hot parts - be sure that leads and components do not touch thermally hot parts
  - c) the AC supply
  - d) high voltage
5. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.
6. **PRODUCT SAFETY NOTICE** - Many electrical and mechanical parts have special safety-related characteristics some of which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part in BARCO service data parts list might create shock, fire, and/or other hazards. Product Safety is under review continuously and new instructions are issued whenever appropriate. For the latest information, always consult the appropriate current BARCO service literature.

7. Do not spray chemicals on or near the chiller or any of its assemblies.
8. Electrostatically Sensitive (ES) Devices. Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity:
  - a) Immediately before handling any semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Wear a commercially available high impedance discharging wrist strap device.
  - b) After removing an electrical assembly equipped with ES devices, place the assembly on a static dissipative surface such as a 3M No 8210 table mat, to prevent electrostatic charge buildup or exposure of the assembly.
  - c) Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
  - d) Do not remove a replacement ES device from its protective package until immediately before you are ready to install it (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminium foil or comparable conductive material).
  - e) Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed. CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
  - f) Minimize bodily motions when handling unpacked replacement ES devices (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device).



## 2. GENERAL INFORMATION

### Overview

- Conventions
- General description
- Covers
- Service kit
- Chiller service tool

### 2.1 Conventions

#### Chiller orientation

In this manual the reference to locations (i.e. left, right, front, rear, top, bottom) is taken with respect to the front side, where the Barco logo is situated.

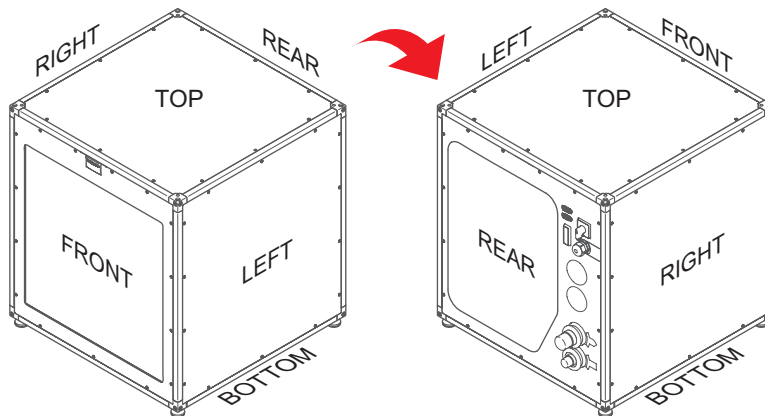


Image 2-1  
Chiller orientation

### 2.2 General description

#### Usage

The ULC-30A is designed and manufactured for the purpose of cooling the lasers and DMD of the laser projector. Cooling is established by means of a liquid solution made of glycol and demineralized water.

A circulation pump forces the coolant to circulate inside a closed circuit where it acquires the heat generated by the equipment being cooled. The radiator dissipates the heat acquired by the coolant by means of ambient temperature air generated by a fan.

The ULC-30A can be used either separately or coupled with another chiller of the same type. Two ULC-30A units are connected by means of a serial connection.

The ULC-30A is controlled by the projector by means of a serial connection.

### Main parts

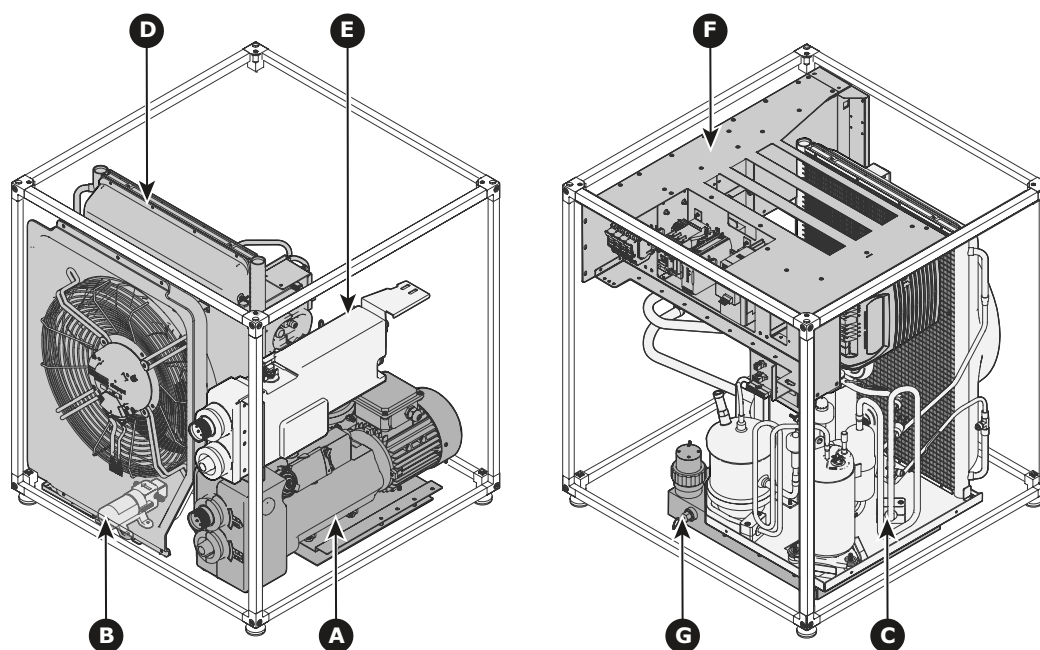


Image 2-2

- A Main pump unit
- B Pressurization unit
- C Refrigeration unit
- D Cooling fan unit
- E Secondary cooling unit
- F Electronic equipment unit
- G Coolant tank

## 2.3 Covers

---



**WARNING:** Always install all covers before using the chiller.

---

### About the covers

Safety covers can be removed by a 3 mm hex screwdriver. It is advised to use an electric screwdriver due to the high amount of screws each cover is attached with.



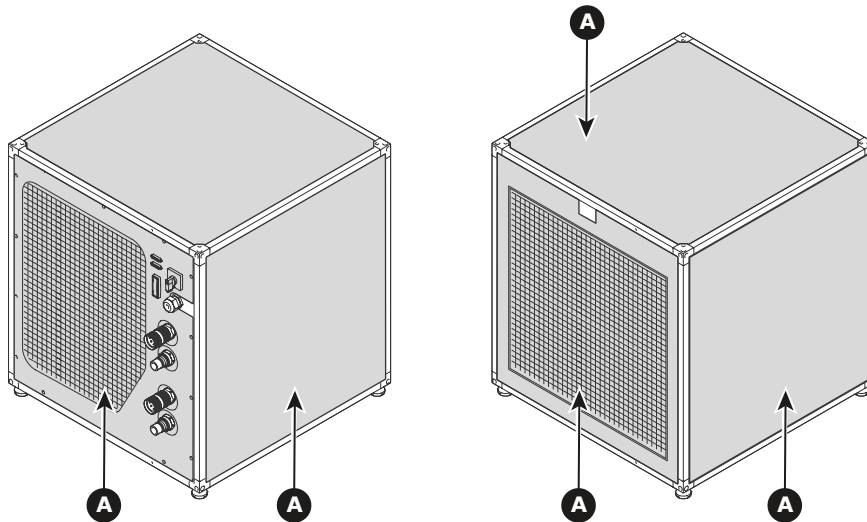


Image 2-3

A Fixed covers to prevent unwanted access to ULC-30A parts and electric components.

## 2.4 Service kit

### About the Chiller service kit

Barco has provided a kit with all accessories and hoses necessary to perform all service actions described in this service manual.

This kit includes the following:

- The PC cable to connect your computer to the chiller (customized USB to 15-pins serial connector).
- Bypass tube
- 2 Open-ended tubes (female connector to open end)
- 1 Open-ended tube (male connector to open end)
- 20 Spare cover screws
- 2 aluminium caps, used when removing the refrigeration module (to prevent fluid from leaking).
- 2 red plastic caps to cover the bypass tube
- Fan dummy plug
- Empty 5l tank

## 2.5 Chiller service tool

### About the Service Tool

Barco has provided a tool to help perform service actions on the Chiller. While the main page of the tool gives an overview of the chiller parameters, The tool also allows you to perform several service actions and diagnostics tests.

To check for the most recent software version, go to *myBarco log in* on Barco's web site <http://www.barco.com> and enter your credentials.

## 2. General information

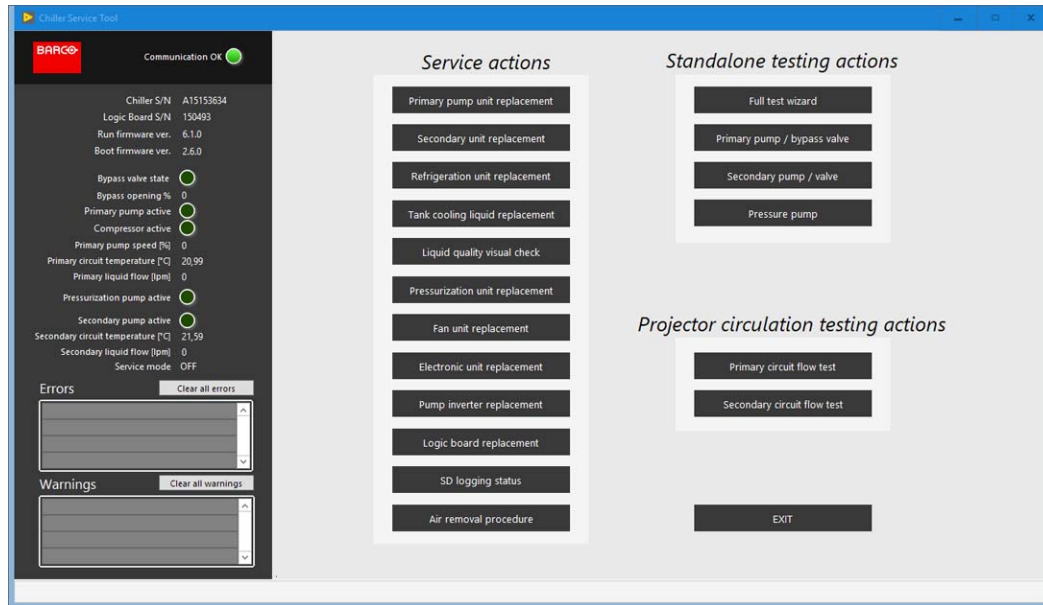


Image 2-4

### How to connect to the Service tool?

Proceed as follows:

- Plug the 15 pins serial connector of the PC cable (included in chiller service kit) to any one of the two serial ports at the rear side of the chiller. Plug the other end of the cable into a USB port of the PC.

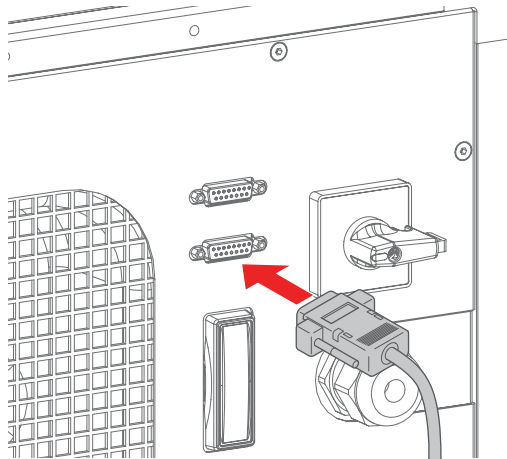


Image 2-5

- Launch the Chiller service tool.
- The service tool will automatically search for any connected chiller and add them in the "Connected Chiller" dropdown list. Select the desired chiller and click **RS485 connect**.

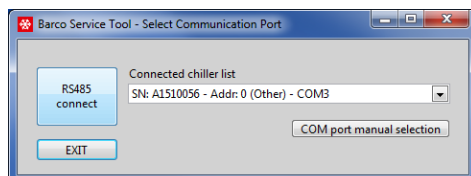


Image 2-6

- The Service tool will launch.



If the desired chiller did not appear in the drop-down list, click on the arrowhead and select Refresh.

If you want to test what the service tool does without connecting it to chiller, you can also select Demo mode. This will open the service tool and click on all service actions, without it affecting any device.

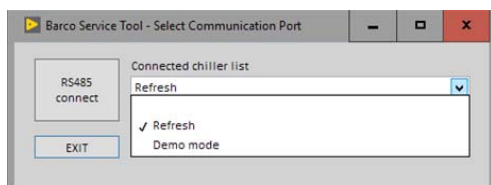


Image 2-7

## Service actions

The following service actions can be performed using the service tool:

- Primary Pump unit replacement. For more info on this procedure, see also "Primary pump replacement process", page 37.
- Secondary unit replacement. For more info on this procedure, see also "Secondary cooling unit", page 47.
- Refrigeration unit replacement. For more info on this procedure, see also "Refrigeration unit replacement process", page 55.
- Tank cooling liquid replacement. For more info on this procedure, see also "Coolant procedures", page 25.
- Liquid quality visual check. For more info on this procedure, see also "Cooling liquid visual check", page 35.
- Pressurization unit replacement. For more info on this procedure, see also "Pressurization Unit", page 89.
- Fan unit replacement. For more info on this procedure, see also "Fan unit", page 21.
- Electronic unit replacement. For more info on this procedure, see also "Electronics Unit", page 67.
- Pump inverter replacement. For more info on this procedure, see also "Pump inverter replacement", page 77.
- Logic board replacement. For more info on this procedure, see also "Replacing the logic board", page 75.
- SD logging status. For more info, see also "SD logging status", page 67.
- Air removal procedure. For more info on this procedure, see also "First use of the Chiller service kit — Air removal procedure", page 25.



While the service actions can be performed using the service tool only, it is strongly advised to read the service manual first to get a clear understanding of what needs to be done.

## Diagnostic tests

The following diagnostics tests can be performed:

What it tests	
Full test wizard	Full functionality test of the chiller. <sup>1</sup>
Primary pump / bypass valve	The primary cooling circuit is tested twice, once while the bypass valve is closed and again once opened.
Secondary pump / valve	The functionality of the secondary circuit is tested, if available.
Pressure pump	The pressure pump is given a few short bursts. Open the tank cap slightly to see if cooling liquid flows through properly.  In order to open the tank cap, the same procedure can be used as when adding coolant to the tank. For more info, see "Adding coolant to the tank", page 31.
Primary circuit flow test	Flow test of the primary cooling circuit
Secondary circuit flow test	Flow test of the secondary cooling circuit. <sup>2</sup>



The bypass tube from the service kit will be needed to perform the full test and the pump tests. Refer to the test wizard to see how the tube needs to be connected.

1. Take into account that a full functionality test will take up to 25 minutes  
2. Only available on Chiller units with the secondary cooling circuit installed



The flow tests are best performed when connected to a projector. While the tests can be performed using the bypass tube instead, the end result may trigger unnecessary errors or warnings.

---

## 3. PREVENTIVE MAINTENANCE



This chapter is intended for trained personnel or expert operators.

### Overview

- Monthly maintenance
- Yearly maintenance
- 3 yearly maintenance
- 30000 hours maintenance

### 3.1 Monthly maintenance

#### Overview

Description	Comments	Required parts
Check/clean/replace air filter	Check the air filter for dust and grease. Clean if necessary. If not possible due to damage, replace with a new one.	Spare Chiller filter

### 3.2 Yearly maintenance

#### Overview

Description	Comments	Required parts
Check air extraction system	Check booth air extraction system for adequate extraction	
Check for InfoT's	Check if any Info-T have been released that need an intervention on the ULC-30A.	
Check runtime	Check runtime to verify if any runtime-driven interventions are required.	
Check for leaks	Check for liquid leaks in the ULC-30A	
Check insulation	Check status of insulation	

### 3.3 3 yearly maintenance

#### Overview

Description	Comments	Required parts
Flush cooling liquid	Replace the cooling liquid of the system ( $\pm$ 30l) ULC-30A draining and refill tool needed. Includes refill tool, Service SW, cable to connect laptop to chiller.	Cooling liquid 5l Tooling

### 3.4 30000 hours maintenance

#### Overview

Description	Comments	Required parts
Replace Secondary cooling unit	Replace together with primary pump	DCM-60A secondary cooling unit

### 3. Preventive maintenance

---

Description	Comments	Required parts
Replace Main Pump	ULC-30A draining and refill tool needed. Includes refill tool, Service SW, cable to connect laptop to chiller. Replace together with Secondary cooling unit	Draining and refill tool kit
Replace filter cap	Replace together with primary pump	Chiller filter cap
Refrigeration unit		Chiller refrigeration unit

## 4. SWITCHING ON/OFF POWER

### About this chapter

This chapter explains the disconnection of the power supply to the ULC-30A and how to lock the main disconnect switch to prevent unintentional switching on during service.

### Overview

- Switching off power and locking the switch
- Switching on power

### 4.1 Switching off power and locking the switch

#### Necessary tools

Small padlock

#### How to switch off power and lock the switch?

1. Switch off power.

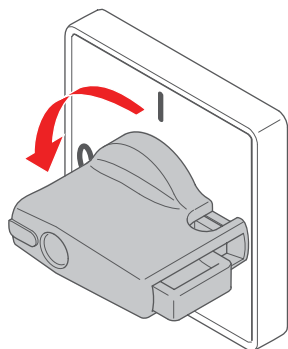


Image 4-1

2. Lock the power switch using a user-provided padlock.

- Press the yellow button (reference 1 image 4-2) to open the hole (reference 2 image 4-2).
- Insert a padlock (reference 3 image 4-2, not provided by Barco) in the hole and close the padlock.

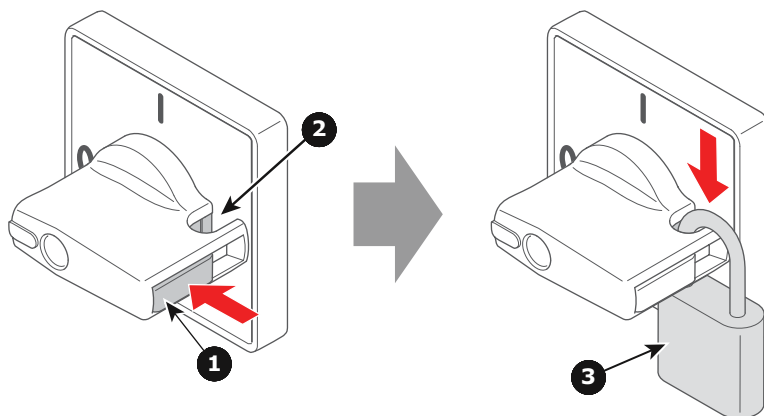


Image 4-2

### 4.2 Switching on power

#### How to switch on power?

1. Release the padlock from the power switch.

#### 4. Switching on/off power

---

2. Switch on the power switch.

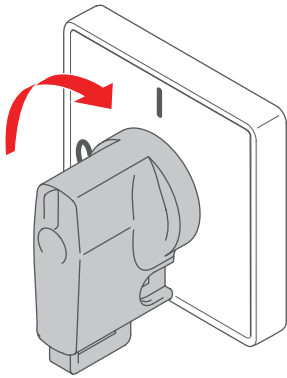


Image 4-3



**WARNING:** Always install all covers before using the chiller.

---



## 5. COVERS

### About this chapter

This chapter explains the removal and installation of chiller covers in detail. The removal of chiller covers is required to gain access to the chiller components during the maintenance and servicing procedures.



**WARNING:** Make sure that you switch off power and lock the switch of the chiller prior to removing or installing any chiller cover. See "Switching off power and locking the switch", page 15.

### Overview

- Removing a cover
- Installing a cover

## 5.1 Removing a cover

### Overview

All covers can be removed in a manner similar to the following procedure, where the left cover is removed.



Due to the high amount of screws holding each cover to the chiller, it is advised to use an electric screwdriver.

### Necessary tools

Allen wrench 3 mm

### How to remove a cover?

1. Remove the 14 screws (reference 1 image 5-1) from the cover.

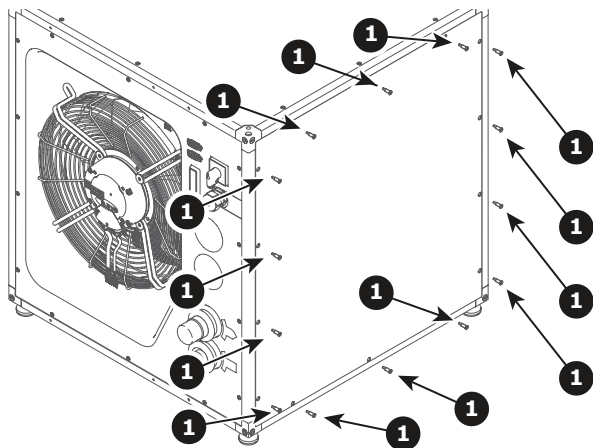


Image 5-1  
Removing 14 screws

2. Remove the cover.

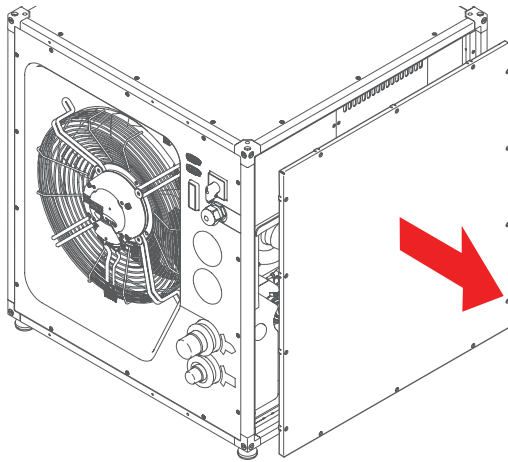


Image 5-2  
Removing the cover

### 5.2 Installing a cover

---

#### How to install a cover?

1. Install the cover.

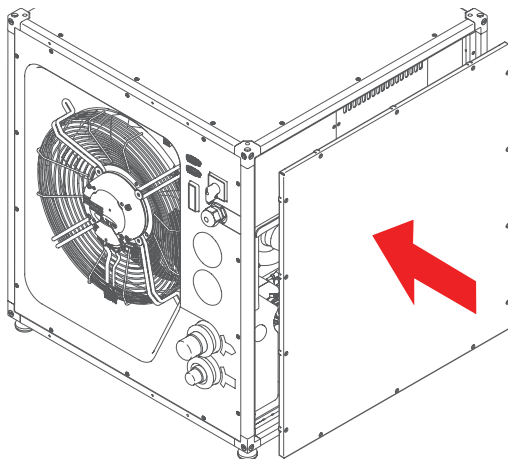


Image 5-3  
Installing the cover

2. Install the 14 screws.
  - First install the 3 screws (reference 1 image 5-4).
  - Then install the 11 remaining screws (reference 2 image 5-4).

**Note:** This sequence ensures the proper alignment of all screw holes.

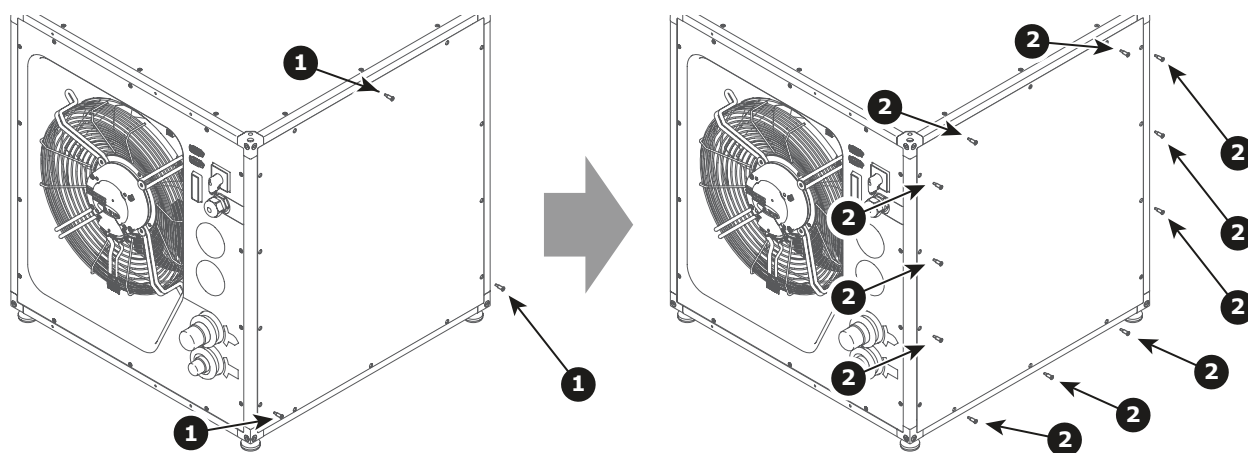


Image 5-4  
Installing the 14 screws



## 6. FAN UNIT

### Description of the fan unit

The fan unit creates an airflow through the condenser in order to dissipate the heat from the condenser.

### Overview

- Removal of the fan unit
- Installation of the fan unit

### 6.1 Removal of the fan unit



This procedure assumes the rear cover has been removed. For more info, see "Covers", page 8.

### Necessary tools

Nut spanner 8 mm

### How to remove the fan unit?

1. Unplug the cable connector.

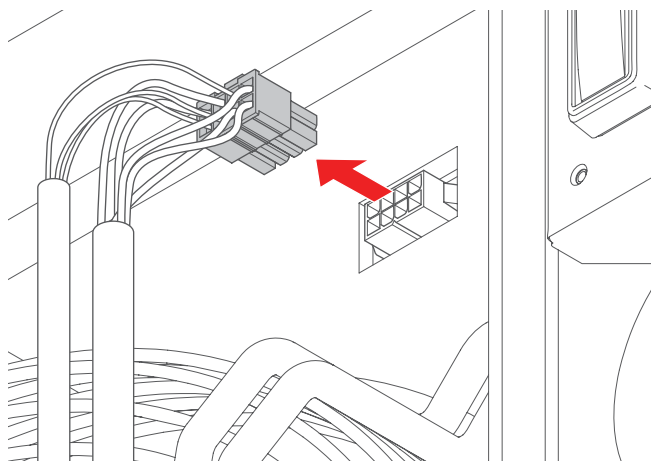


Image 6-1  
Unplugging the cable connector

2. Remove the 6 screws (reference 1 image 6-2) using the nut spanner 8 mm.

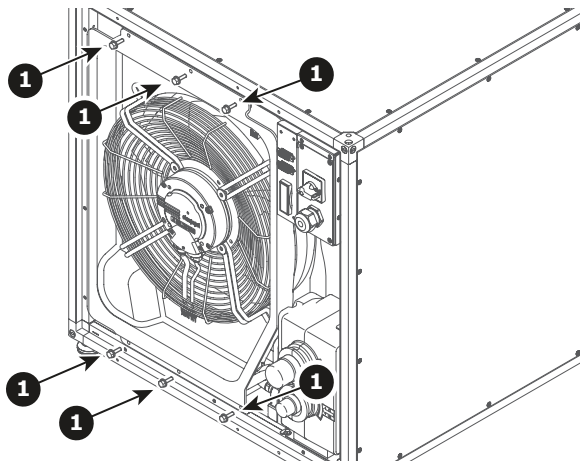


Image 6-2  
Removing the 6 screws

3. Remove the fan unit.

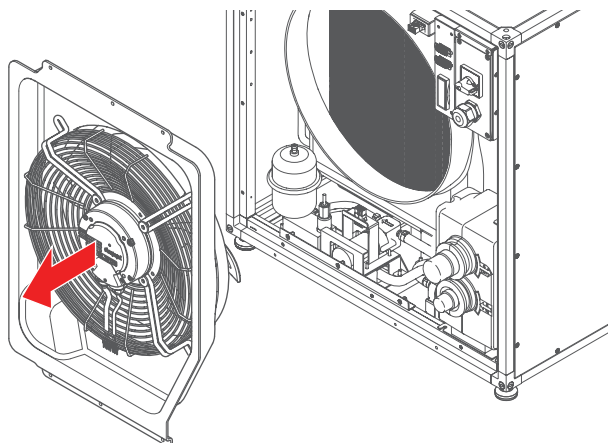


Image 6-3  
Removing the fan unit

### 6.2 Installation of the fan unit

---

#### Necessary tools

Nut spanner 8 mm

#### How to install the fan unit?

1. Install the fan unit.

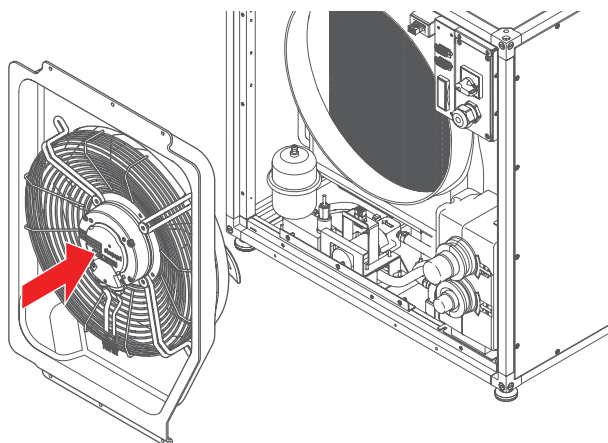


Image 6-4  
Installing the fan unit

2. Install the 6 screws (reference 1 image 6-5) using the nut spanner 8 mm.

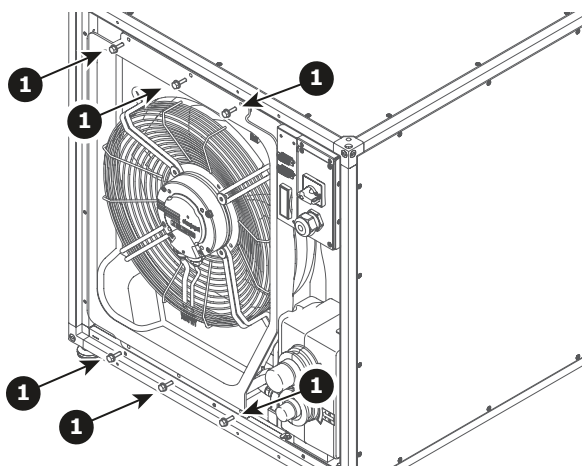


Image 6-5  
Installing the 6 screws

3. Plug in the cable connector.

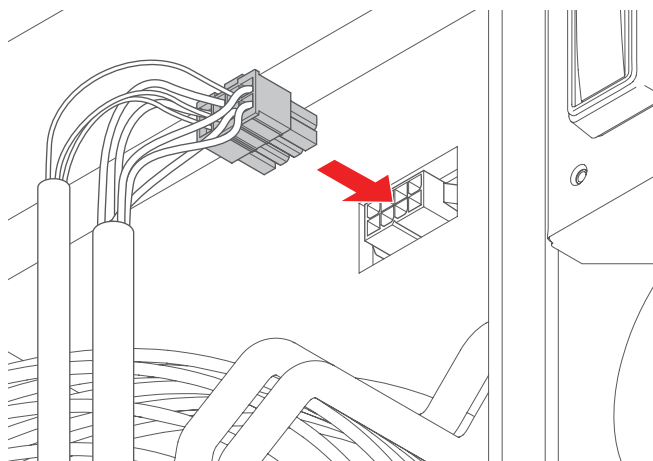


Image 6-6  
Plugging in the cable connector





## 7. COOLANT PROCEDURES

### About this chapter

This chapter contains step by step procedures for the (partial) replacement and filling up of coolant (cooling liquid).



The Draining and filling procedures can only be triggered by the Chiller Service Tool while your computer is connected to the chiller. Trying to do these procedures manually will have negative results. For more info on the Service tool, see "Chiller service tool", page 9.

The most up-to-date instructions will be the software instructions. In case of difference in instructions, the instructions of the service tool have priority over the service manual instructions.

### Overview

- First use of the Chiller service kit — Air removal procedure
- Draining the coolant circuit
- Filling the coolant circuit
- Adding coolant to the tank
- Replacing the tank cap assembly
- Cooling liquid visual check

## 7.1 First use of the Chiller service kit — Air removal procedure

### About the Chiller service kit bypass tube

Ensure the bypass tube has no air particles inside by performing the following procedure. This procedure will extract all air particles from the tube and released via the air trap of the Chiller.

The same procedure can also be used to remove air bubbles inside the chiller hydraulics circuits.

### How to extract the air from the Chiller service kit bypass hose?

1. On a chiller that has a secondary (DMD) circuit, connect the bypass tube from the service kit to the secondary circuit connectors.  
Or,  
on a chiller without a secondary circuit, connect the bypass tube to the main circuit connectors.

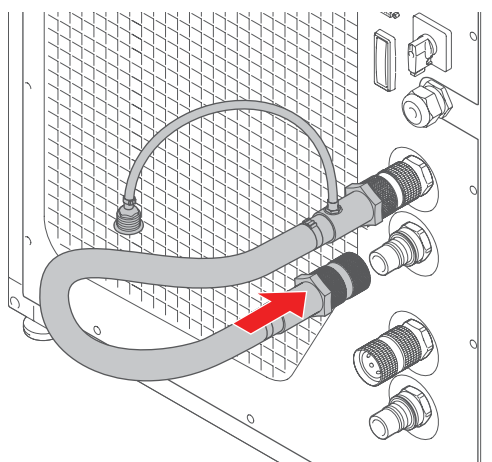


Image 7-1

2. Start the service tool and start the "air removal" wizard.
3. Follow the instruction of the wizard to extract all air bubbles from the tubing.
4. Once the wizard has completed, remove the tubing.

## 7.2 Draining the coolant circuit

### Necessary tools

- Service PC and software
- Chiller service kit
- Cloth or towels



**CAUTION:** This procedure assumes that power has been switched off. To switch off power, see procedure "Switching off power and locking the switch", page 15.



Make sure the chiller is disconnected from the projector and other chillers before attempting to drain the coolant circuit.



Keep a cloth or towels ready to clean up eventual spillage.



This procedure assumes the rear cover has been removed. For more info, see "Covers", page 8.

### How to drain the coolant circuit of a single ULC-30A chiller?

1. Remove the fan unit. See procedure "Removal of the fan unit", page 21.
2. If requested by the software, install the dummy fan connector in the same location the fan was plugged in.  
**Note:** *This step is no longer necessary nor requested in the current firmware. However, if you still have an older version of the chiller firmware, this step may still be requested.*
3. Remove the insulation cover.

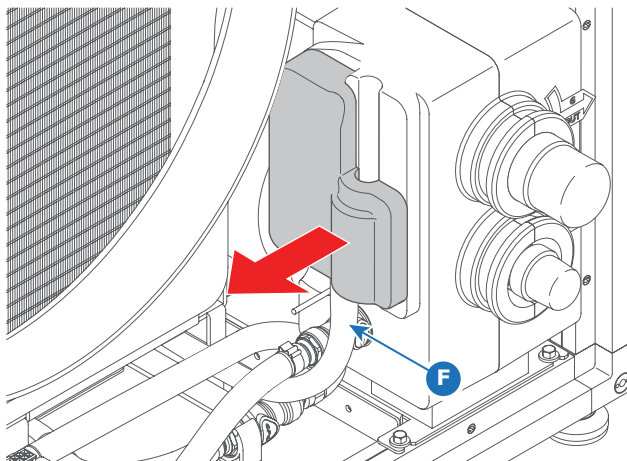


Image 7-2  
Removing the insulation cover

4. Disconnect hose "F" (chiller tank return line) from the upper and hose "E" (pressurization pump send line) from the lower coupler of the pump.

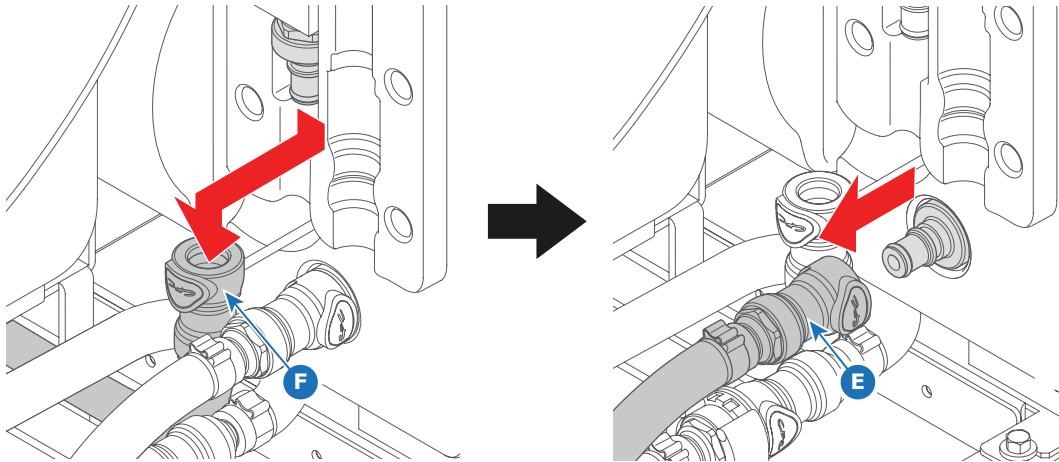


Image 7-3  
Disconnecting hoses 'F' and 'E'

5. Insert the open end of an open ended hose (included in the service kit) into a container and connect the other end to hose "E".

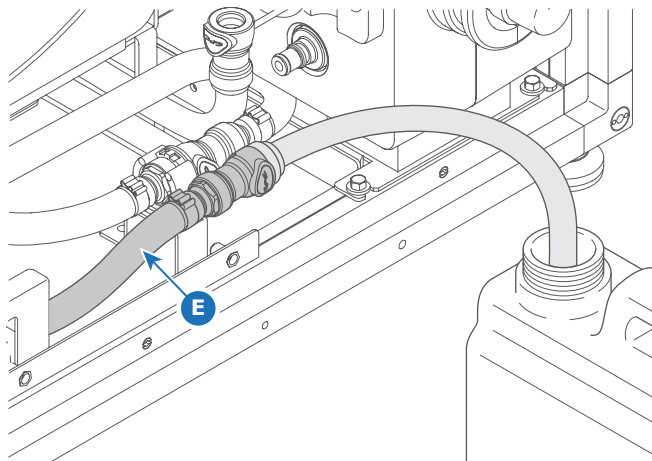


Image 7-4  
Connecting open ended hose to hose 'E'

**Note:** Risk of fluid spillage. Make sure the open ended hose is directed into the container before connecting to hose "E".

6. Disconnect hose "D" (pressurization pump suction line) from the coupler located on a small support on the bottom of the chiller and connect it to the previous location of hose "E" on the lower coupler of the pump.

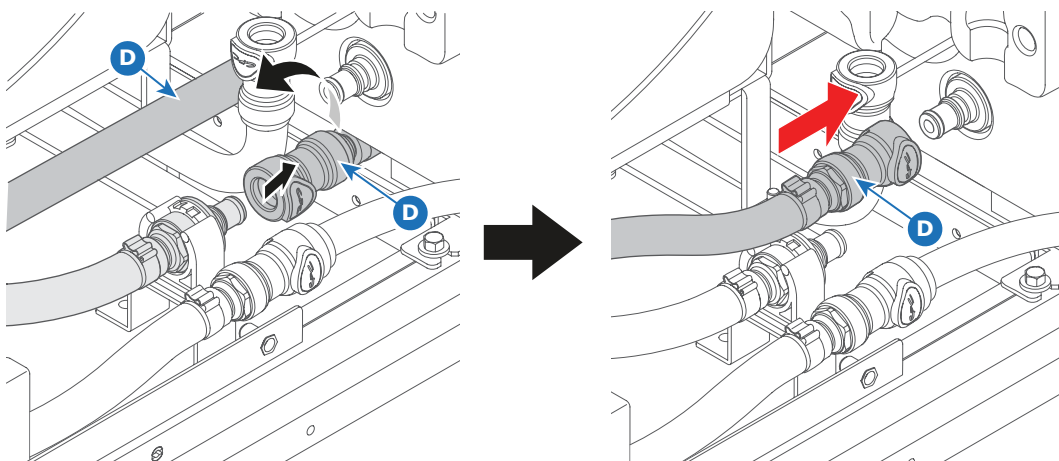


Image 7-5  
Redirecting hose 'D'

7. Switch on power. The pressurization pump will automatically work for 30 seconds. Liquid will flow into the container.  
**Note:** Wait until the pressurization pump has stopped working.
8. Open the bypass valve using the Service tool.
9. Connect the service kit hose to the upper quick coupler of the chiller and connect an open ended hose to the small service kit hose.  
Keep the open end in a high position (for venting).

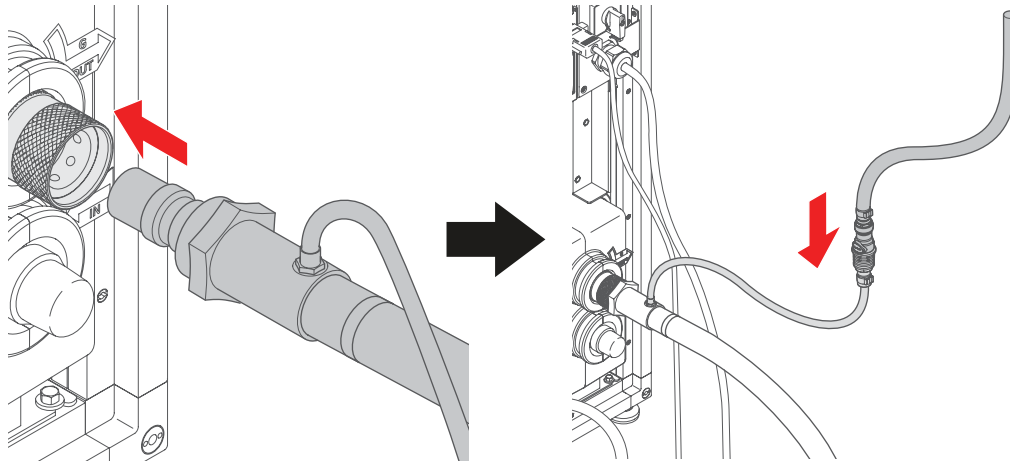


Image 7-6  
Connecting the service kit hoses

**Warning:** Risk of fluid spillage. Make sure that the previous step has been done and the pressurization pump has finished its operation before connecting the open ended hose.

**Note:** Keep a cloth or towels ready to clean up eventual spillage.

10. Use the Service tool wizard to drain (purge) the coolant circuit.

In this phase, the pressurization pump is activated to drain the pump unit. Air enters inside the unit through the venting tube and is pumped into the external container.

11. Switch off power. See procedure "Switching off power and locking the switch", page 15.

12. Remove the service kit hoses.

13. Disconnect hose "D" (pressurization pump suction line) from the lower coupler of the pump.

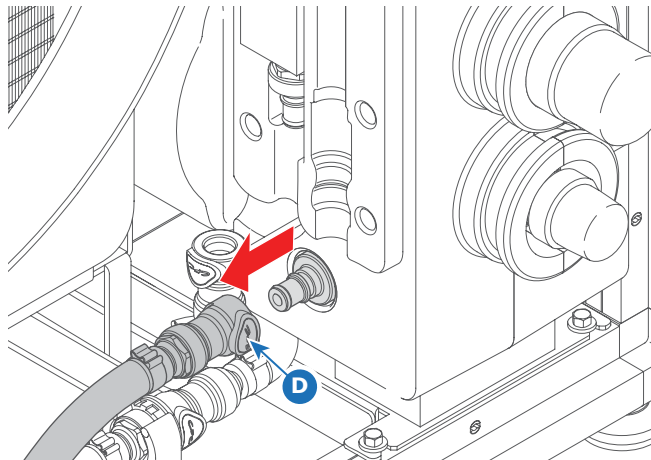


Image 7-7  
Disconnecting "D"

### 7.3 Filling the coolant circuit

#### Necessary tools

- Service PC and software
- Chiller service kit
- Cloth or towels



**CAUTION:** This procedure assumes that power has been switched off. To switch off power, see procedure "Switching off power and locking the switch", page 15.

#### How to fill the coolant circuit of the ULC-30A chiller?

1. Connect the hose "D" to the coupler located on a small support at the bottom of the chiller.

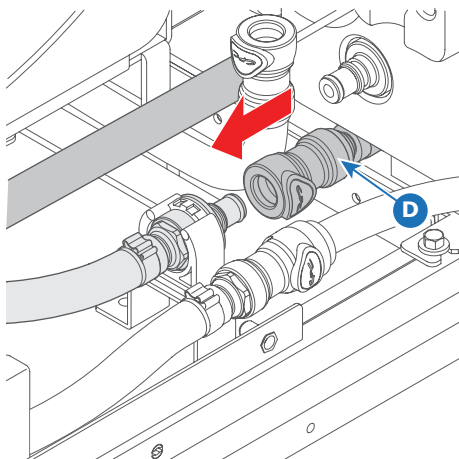


Image 7-8  
Connecting hose "D"

2. Connect hose "E" (pressurization pump send line) to the lower coupler of the pump.

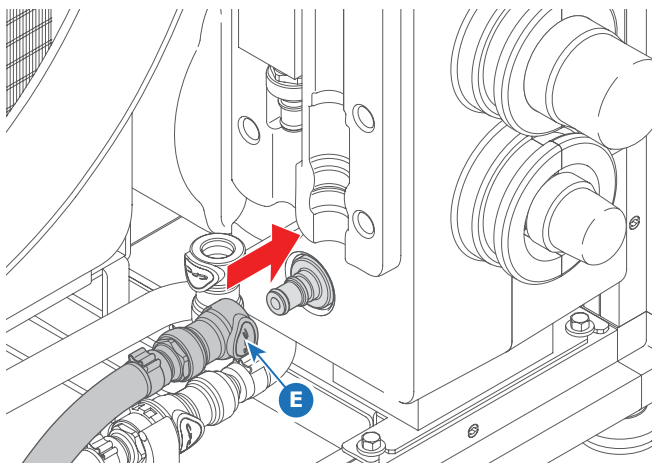


Image 7-9  
Connecting "E"

3. If not yet connected, connect the service kit hose to the upper metal quick connector of the chiller and connect the small hose that is part of the service kit hose to hose "F" (chiller tank return line).

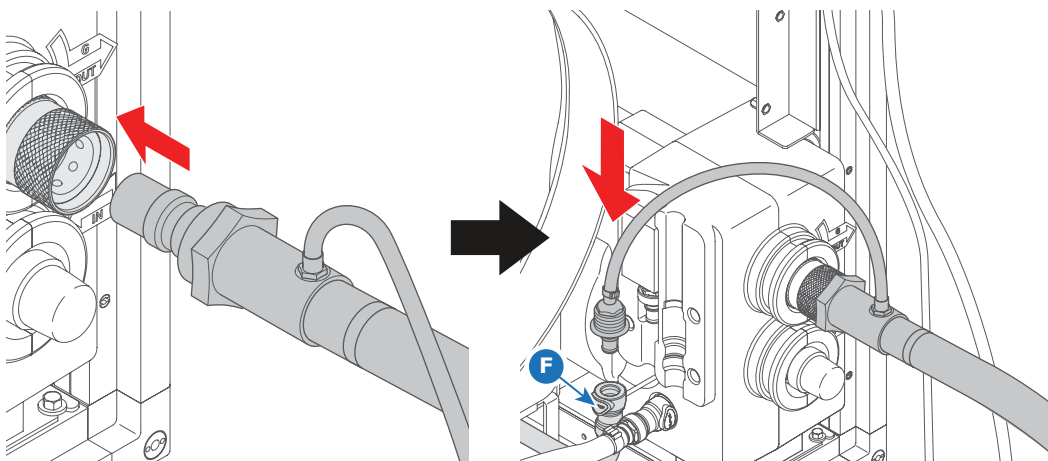


Image 7-10  
Connecting service kit hose to upper quick coupler

4. Manually fill the tank using half of the liquid collected while draining the chiller ("Coolant procedures", page 25). See procedure "Adding coolant to the tank", page 31.  
The remaining liquid can be added at a later stage.  
**Note:** Make sure the O-ring in the tank cap is correctly positioned.
5. Switch on power. The pressurization pump will automatically work for 30 seconds.  
**Note:** Wait until the pressurization pump has stopped working.
6. Use the service tool to fill the coolant circuit.

## 7. Coolant procedures

In this phase, the pressurization pump is activated to fill the pump. Liquid is flushed through the service kit tube connected to the tank filter cap.

7. Disconnect the small hose that is part of the service kit hose to hose "F" (chiller tank return line).

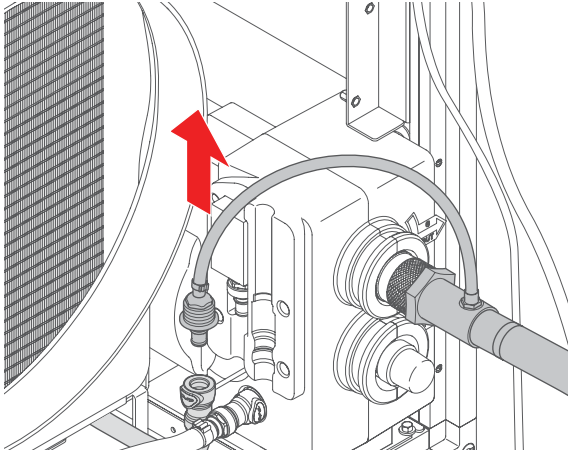


Image 7-11  
Disconnecting small service hose to hose "F"

8. Connect the other end of the service kit hose to the lower metal quick connector of the chiller (create a loop).

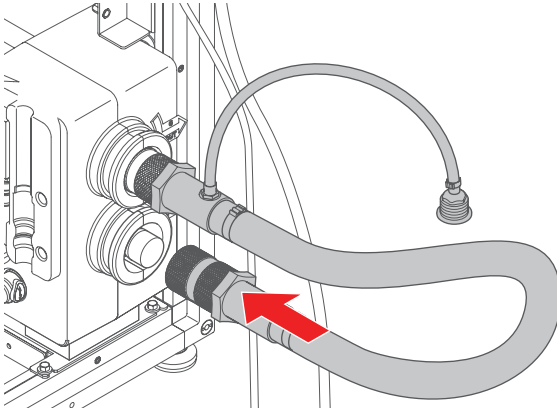


Image 7-12  
Connecting service hose to lower quick coupler

9. Connect hose "F" (chiller tank return line) to the upper coupler of the pump.

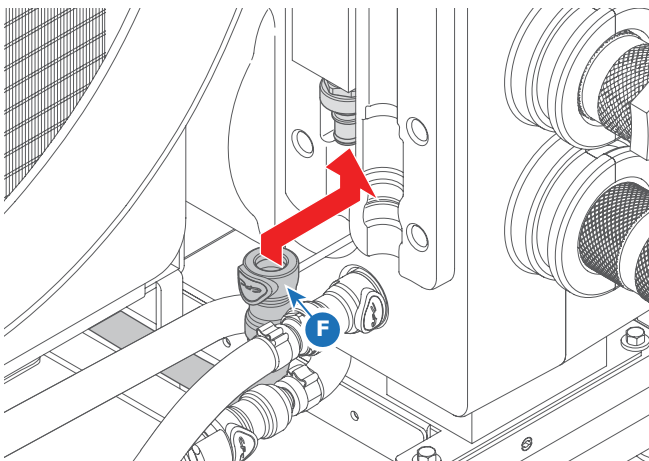


Image 7-13  
Connecting "F"

10. Top up the tank with the remaining fluid from the service kit container. See procedure "Adding coolant to the tank", page 31.

**Note:** Only use Barco approved cooling liquid. Refer to the Barco website for spare parts.

11. Follow the service tool wizard to fill the entire coolant circuit.
12. Remove the service kit hoses.
13. Mount the insulation cover.

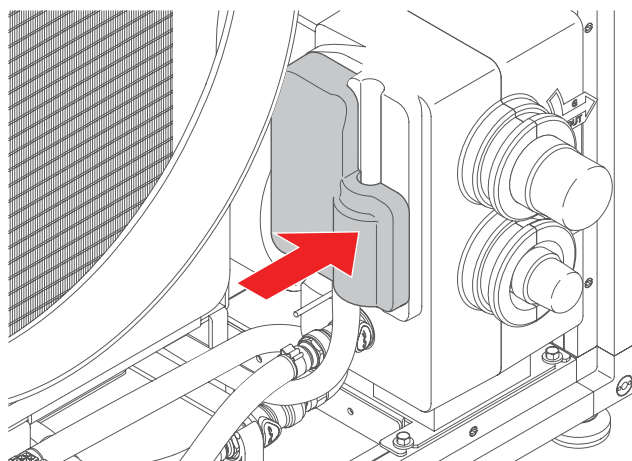


Image 7-14  
Installing the insulation cover

14. Switch off power. See procedure "Switching off power and locking the switch", page 15.

15. Install the fan. See procedure "Installation of the fan unit", page 22.

16. Install the covers. See procedure "Installing a cover", page 18.

## 7.4 Adding coolant to the tank

### Necessary parts

Coolant liquid (30% ethylene glycol, 70% demineralized water)



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.



Use only Barco approved cooling liquid. Refer to the Barco website for spare parts.

### How to add coolant to the tank?

1. Remove the front cover. See procedure "Removing a cover", page 17.
2. Unscrew the tank cap ring.

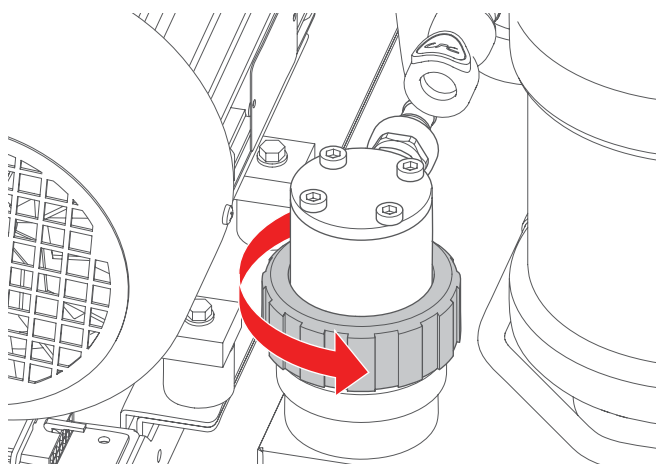


Image 7-15  
Unscrewing the tank cap ring

3. Remove the tank cap assembly.



## 7. Coolant procedures

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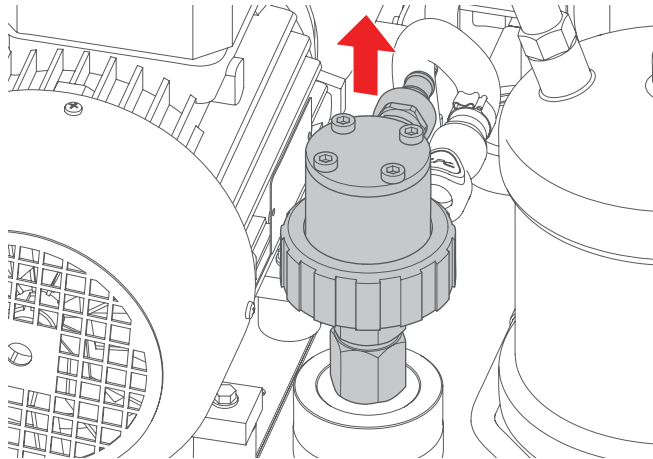


Image 7-16  
Removing the tank cap assembly

**Note:** Some liquid spillage may occur. Keep a cloth or towels ready.

4. Fill-up the liquid using a clean funnel.

**Note:** There is no visible upper limit. Make sure to keep watching to make sure you do not overfill!

5. Re-install the tank cap assembly.

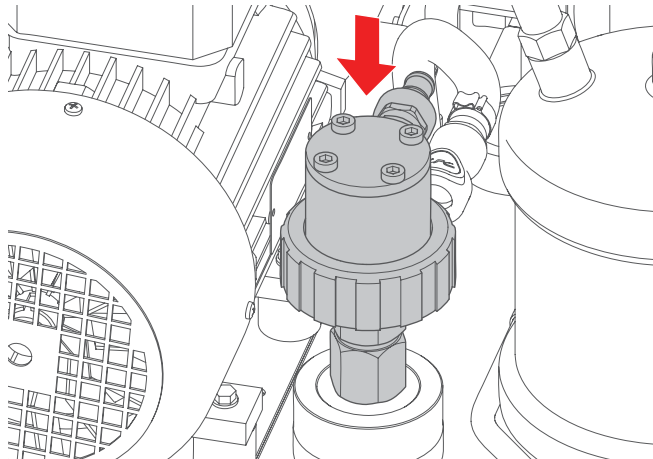


Image 7-17  
Installing the tank cap assembly

**Note:** Make sure the O-ring in the tank cap is correctly positioned.

**Note:** Remove the protective covers from the new tank cap assembly.

6. Tighten the tank cap ring.

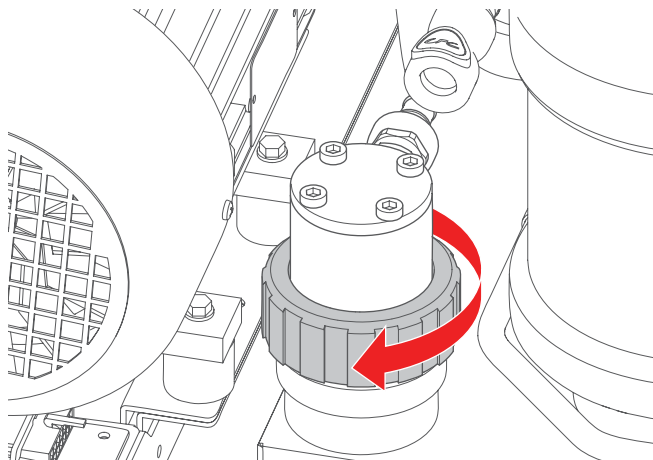


Image 7-18  
Tightening the tank cap ring

**Note:** Make sure the O-ring in the tank cap is correctly positioned.



## 7.5 Replacing the tank cap assembly

### Necessary tools

Dry cloth or towels



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.

### How to replace

1. Remove the coolant return hose.

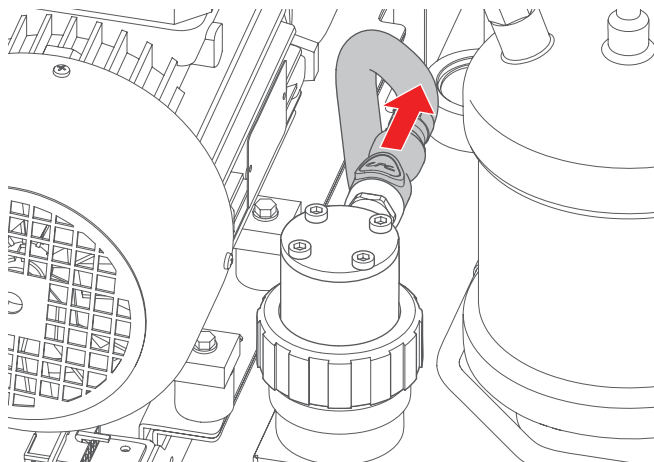


Image 7-19  
Removing the coolant return hose

2. Unscrew the tank cap ring.

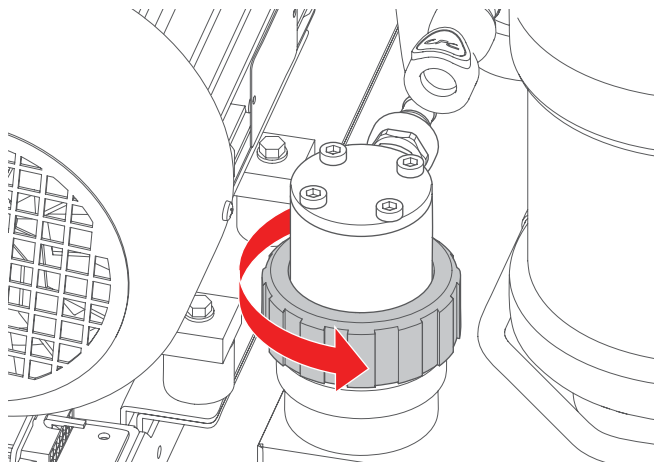


Image 7-20  
Unscrewing the tank cap ring

3. Replace the tank cap assembly as illustrated.

## 7. Coolant procedures

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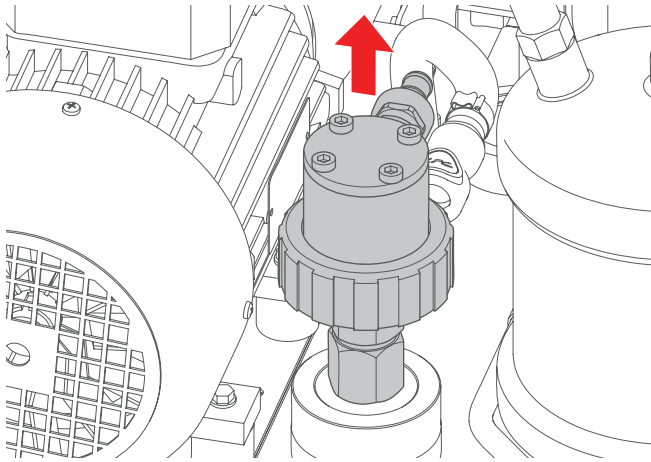


Image 7-21  
Removing the tank cap assembly

**Note:** Some liquid spillage may occur. Keep a cloth or towels ready.

4. Tighten the tank cap ring.

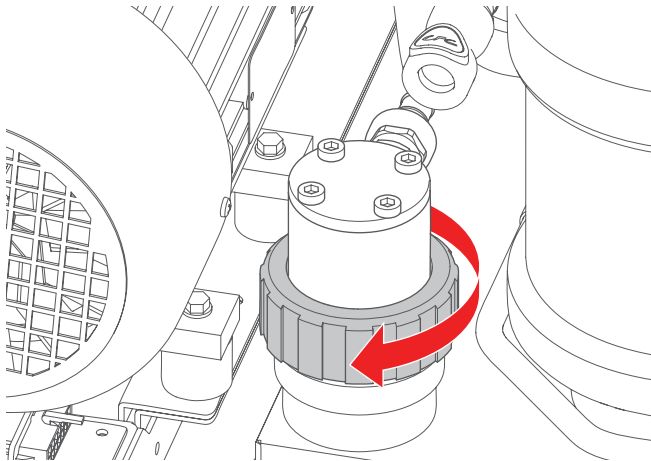


Image 7-22  
Tightening the tank cap ring

**Note:** Make sure the O-ring in the tank cap is correctly positioned.

5. Install the coolant return hose.

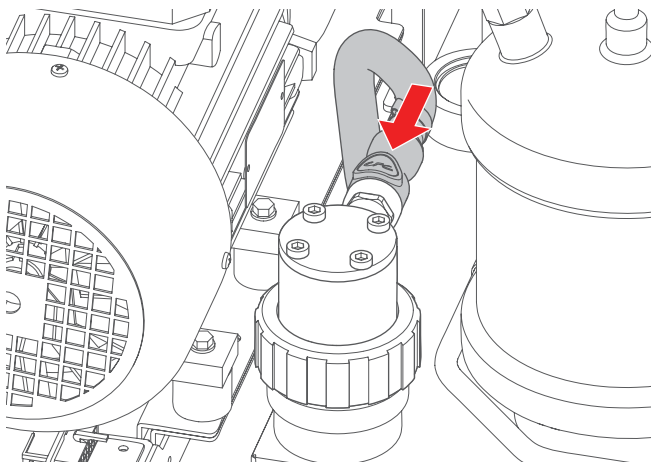


Image 7-23  
Installing the coolant return hose

## 7.6 Cooling liquid visual check



Ensure the chiller is turned off before connecting the open-end hose to the bypass tube. If not, spillage will occur.

### How to perform

1. Connect the bypass tube to the main cooling circuit quick couplers as illustrated.

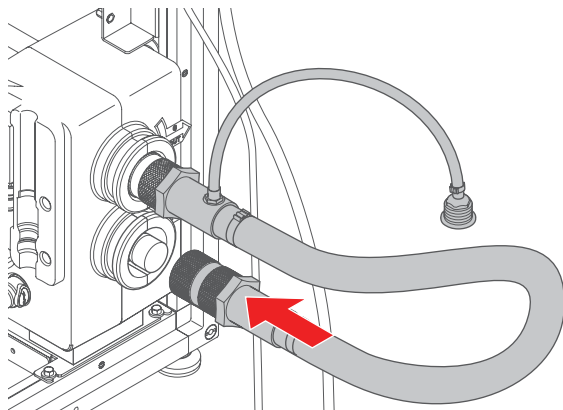


Image 7-24  
Connecting service hose to lower quick coupler

2. Insert the open end of an open ended hose (included in the service kit) into a container and connect the other end to the bypass tube.

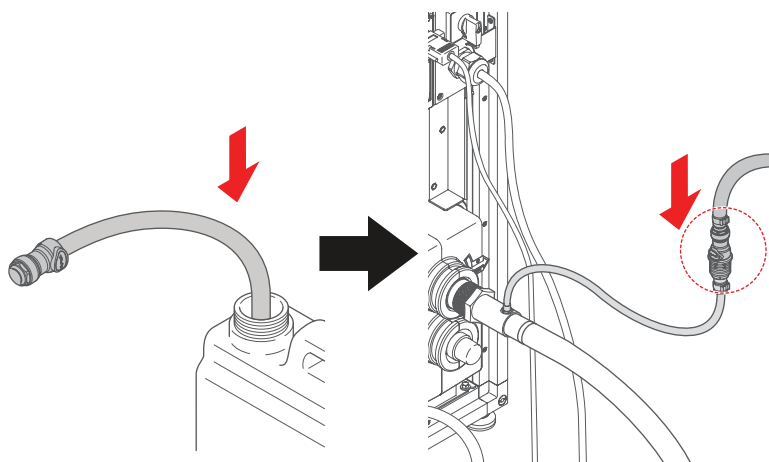


Image 7-25

**Note:** Ensure you first place the open-ended hose in the container before connecting it to the bypass tube. If not, there is a big chance you will spill fluid.

3. Switch on the power.

The chiller will notice a pressure difference due to the open-ended hose and the pump will activate. As a result, cooling fluid will fill the container.

4. Switch off the power after collecting about 1l of cooling liquid.

**Note:** If the power is not switched off, the pressure pump will continue to pump cooling liquid in the tank in bursts of 30 seconds.

5. Perform a visual check. The cooling liquid should be blue (azure/cerulean) with only minor levels of particles being present.

- If the cooling liquid is okay, add the coolant back to the tank. See procedure "Adding coolant to the tank", page 31.
- If the cooling liquid shows unacceptably high levels of contamination or has changed color, the cooling liquid must be replaced entirely. See procedure "Draining the coolant circuit", page 26.



## 8. PRIMARY PUMP UNIT

### Description of the primary pump unit

The primary pump forces the coolant to circulate inside a closed circuit where it acquires the heat generated by the equipment (projector lasers or DMD). The heat is dissipated by a heat exchanger connected to the refrigeration unit.

The primary pump unit has hydraulic connections to:

- the refrigeration unit
- the pressurization unit
- the laser (either green or blue/red) cooling circuit of the projector (via external quick couplers)

### Overview

- Primary pump replacement process
- Disconnecting the primary pump wiring
- Removing the primary pump unit
- Installing the primary pump unit
- Connecting the primary pump wiring

### 8.1 Primary pump replacement process



**WARNING:** During the entire replacement process, the Service tool wizard will request to connect or disconnect the chiller from the power net several times. Follow these instructions to avoid electrical shocks.



**CAUTION:** It is important to follow the Service Tool wizard step by step. Do not click too rapidly through the replacement process wizard. This could cause unwanted effects, such as gross spillage of coolant.

### How to replace?

1. Make sure the chiller is disconnected from the projector and other chillers.
2. Remove the rear, left and front cover. See procedure "Removing a cover", page 17.
3. Plug the 15 pins serial connector of the PC cable (included in chiller service kit) to any one of the two serial ports at the rear side of the chiller. Plug the other end of the cable into one of the USB ports of your PC.

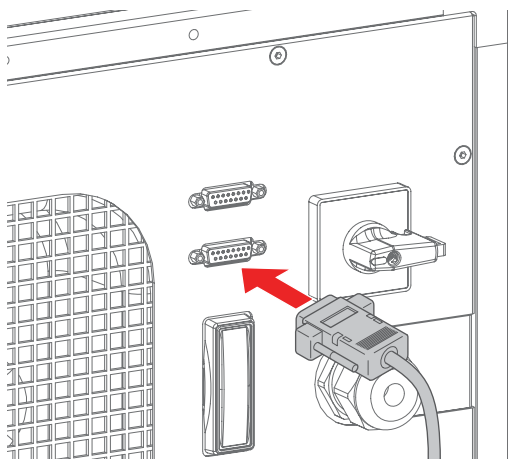


Image 8-1

4. Start the Chiller service tool and connect to the Chiller.  
**Note:** Ensure the software has been installed and tested before going on-site. To check for the most recent software version, go to myBarco log in on Barco's web site <http://www.barco.com> and enter your credentials.
5. Click on **Primary pump unit replacement** and follow the replacement wizard.
6. Remove the Fan unit. See "Removal of the fan unit", page 21.

7. Use the wizard to open the bypass valve.
8. Follow the wizard's instructions to drain the chiller. See "Draining the coolant circuit", page 26.
9. Disconnect the primary pump wiring. See "Disconnecting the primary pump wiring", page 38.
10. Remove the primary pump unit. See "Removing the primary pump unit", page 40.
11. Install the new pump. See "Installing the primary pump unit", page 43.
12. Connect the primary pump wiring. See "Connecting the primary pump wiring", page 45.
13. Follow the wizard's instructions to fill the chiller coolant circuit. See "Filling the coolant circuit", page 28.
14. Use the wizard to close the bypass valve.
15. Install the Fan unit. See "Installation of the fan unit", page 22.
16. Finish the replacement process by finishing the wizard, disconnecting the PC cable, installing the covers and connecting the chiller back to the projector, other chiller(s) and the power net.

### 8.2 Disconnecting the primary pump wiring

---

#### Necessary tools

- Phillips screwdriver PH2
- Nut spanner 7 mm



**This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.**

---

#### How to disconnect the primary pump wiring?

1. If not yet removed, remove the left cover. See procedure "Removing a cover", page 17.
2. Unplug the primary pump unit cable connector.

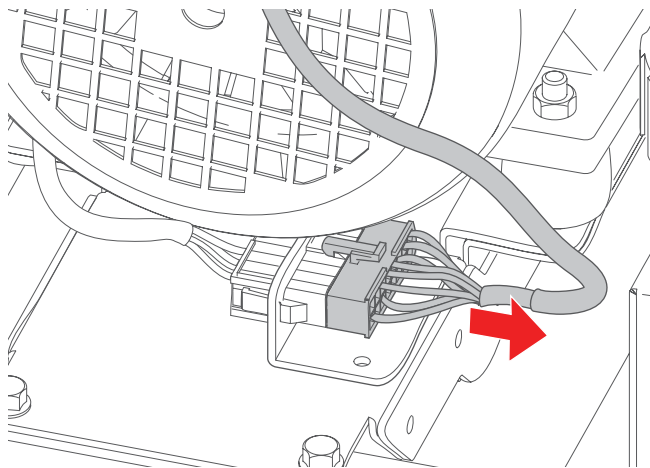


Image 8-2  
Unplugging the primary pump unit cable connector

3. Remove the pump motor connection box cover. Use the Phillips screwdriver PH2 to remove the 4 screws (reference 1 image 8-3).

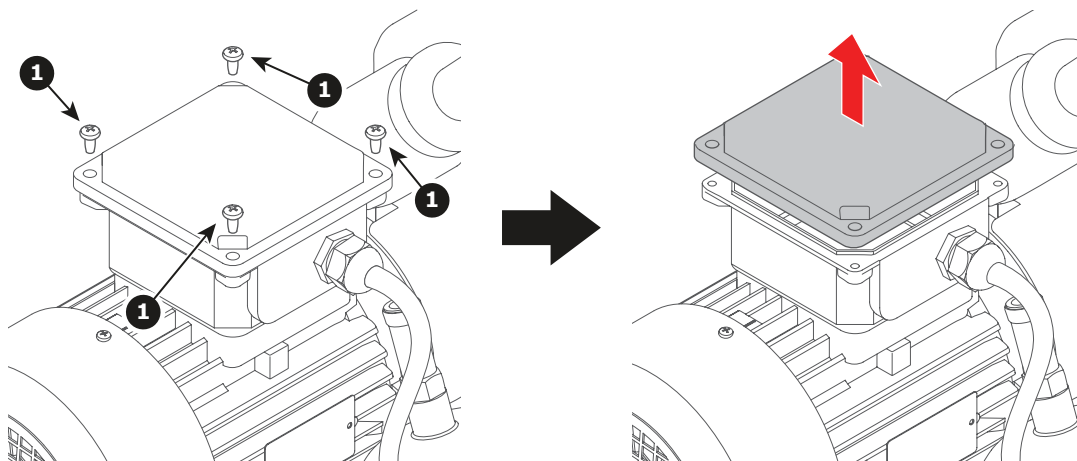


Image 8-3  
Removing the connection box cover

4. Disconnect the four electrical wires (reference 1, 2, 3 & 4 image 8-4). Use the nut spanner 7 mm.

**Tip:** While the cable numbers are printed on the black wires, it is still advised to mark these wires with cable markers or similar tool if your chiller is located in a dimly lit area. This will make it easier to reconnect the wiring afterwards.

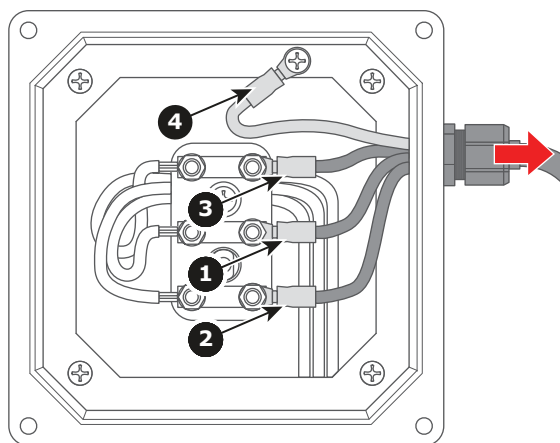


Image 8-4  
Removing the pump motor wiring

5. Loosen the cable gland and remove the cable from the connection box.

**Note:** Do not damage the wire connectors when pulling out the cable.

6. Install the pump motor connection box cover. Use the Phillips screwdriver PH2 to install the 4 screws (reference 1 image 8-5).

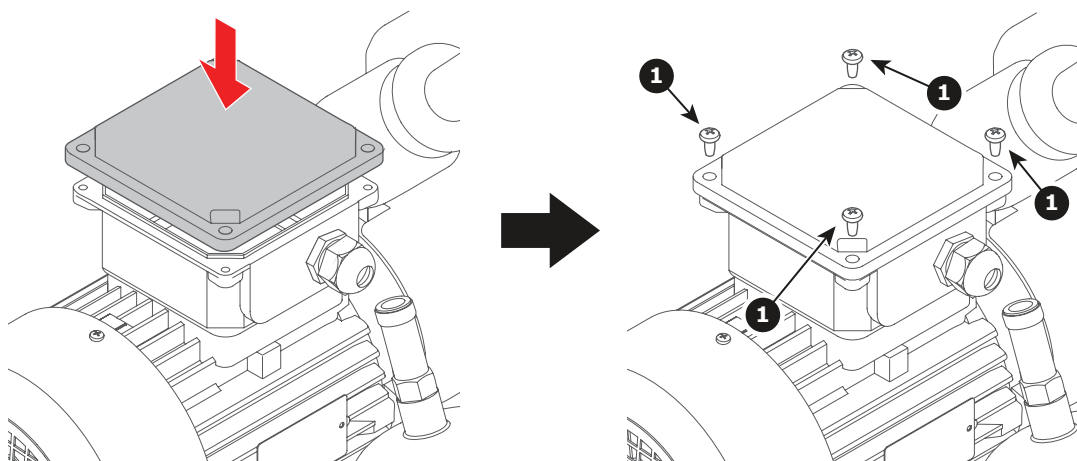


Image 8-5  
Installing the connection box cover

### 8.3 Removing the primary pump unit



**CAUTION:** Perform this procedure via the service tool wizard only. Ensure all required steps have been performed prior to pump removal. For more info, see "Primary pump replacement process", page 37.

#### Necessary tools

- Flat screwdriver
- Phillips screwdriver PH2
- Nut spanner 5.5 mm
- Nut spanner 8 mm
- Cutting pliers (for cable ties)



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.

#### How to remove the primary pump unit?

1. Remove the cable ties (reference 1 image 8-6) that secure the insulation on the refrigeration unit quick couplers.

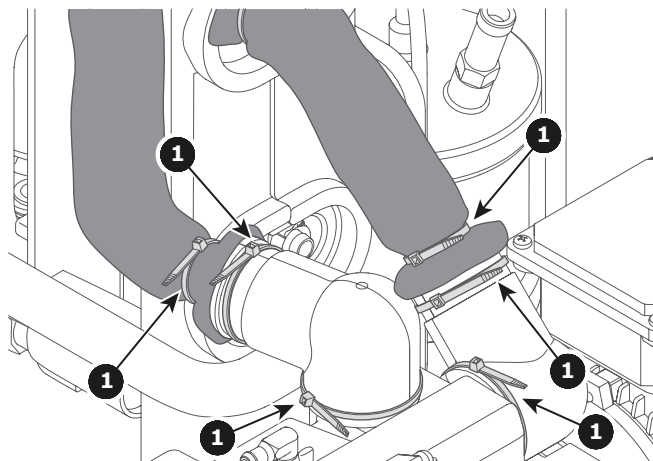


Image 8-6  
Removing cable ties

2. Pry open and discard the insulation shells.

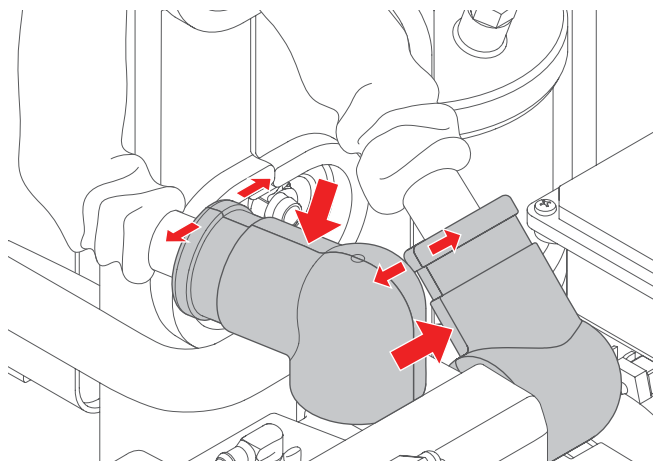


Image 8-7  
Removing insulation shells

3. Disconnect the two open type quick couplers from the refrigeration Unit. Perform the steps shown below for both quick coupler connections.



- a) Using a screwdriver, open the clip to unlock the coupler (image 8-8).
- b) Remove the coupler from the pump fitting (image 8-8). Use a cloth or towels to catch spillages before plugging the couplers using the service kit plugs and caps.
- c) Close the clip of the coupler (image 8-8).

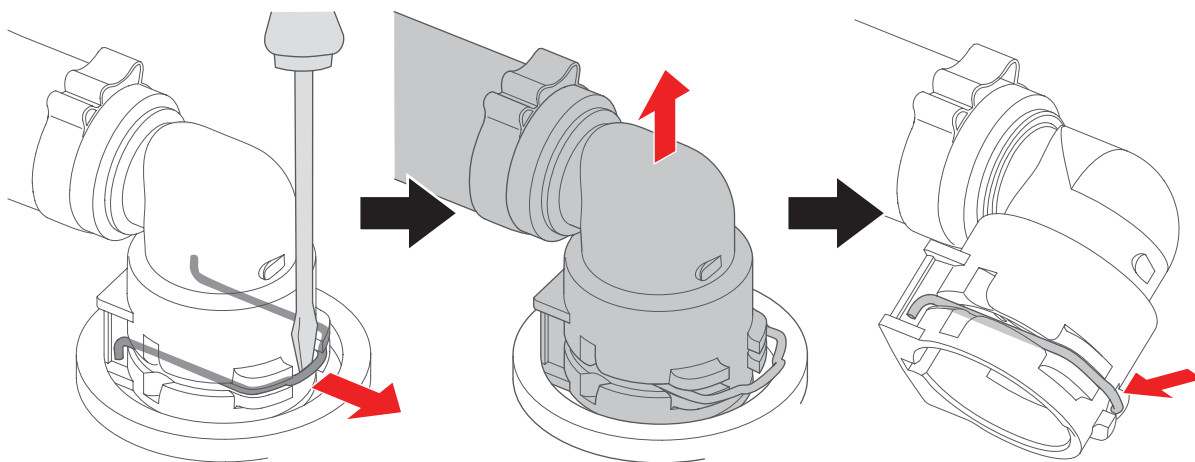


Image 8-8  
Removing the coupler

- d) Install the plug (included in the service kit) onto the coupler (image 8-9).
- e) Install the cap (included in the service kit) onto the pump fitting (image 8-9).

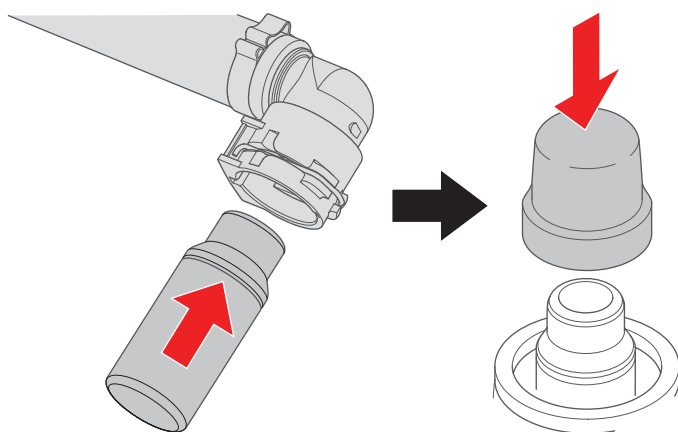


Image 8-9  
Installing plug and cap

**Note:** Always use the plugs and caps included in the service kit. Do not use paper or other material to cover the openings in order to avoid the introduction of foreign objects in the coolant circuit.

**Note:** Use a cloth or towels to clean up possible minor spillage.

4. Remove the two screws (reference 1 image 8-10) (front side of the chiller) using the nut spanner 8 mm.

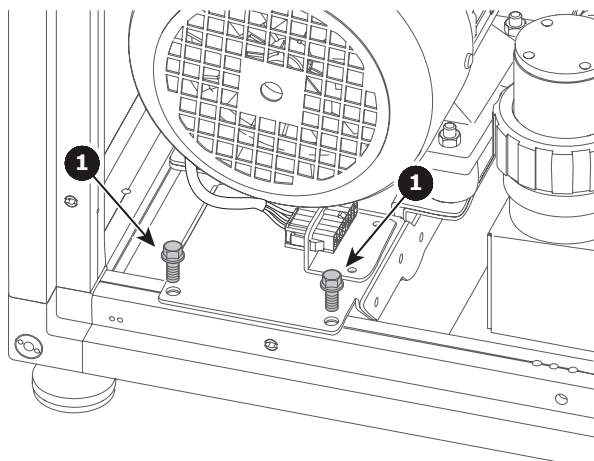


Image 8-10  
Removing the two screws

## 8. Primary pump unit

5. Loosen the two other screws (reference 1 image 8-11) (rear side of the chiller) using the nut spanner 8 mm.

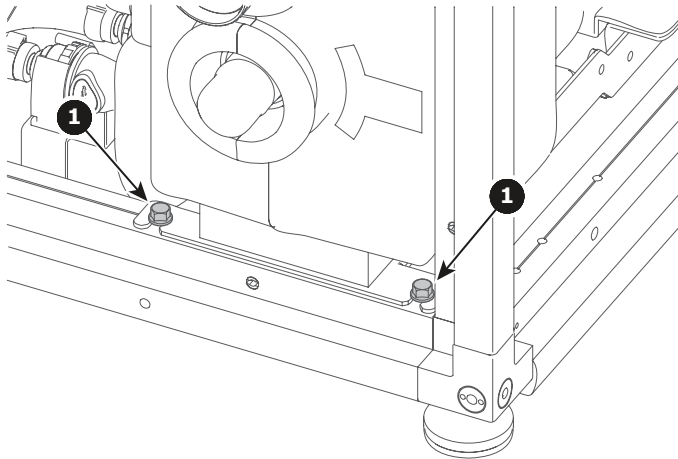


Image 8-11  
Loosening the two screws

**Note:** Complete removal of the screws is not necessary.

6. Remove the primary pump unit:

- a) First move the primary pump unit 10 cm towards the front of the chiller.

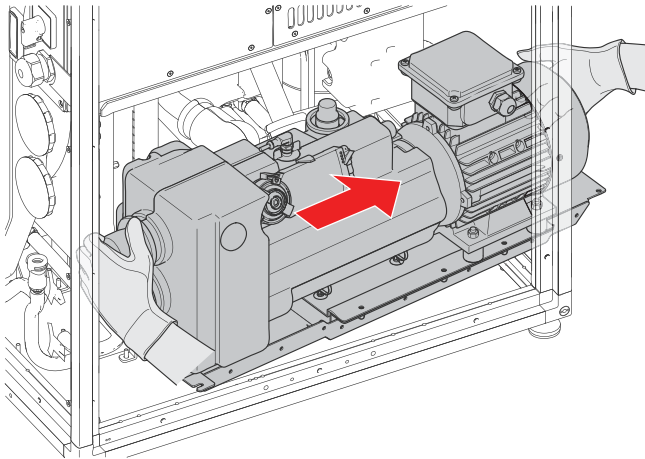


Image 8-12  
Removing the primary pump unit — step 1 of 2

- b) Then tilt the rear side of the primary pump unit outwards and remove the unit from the left side of the chiller.

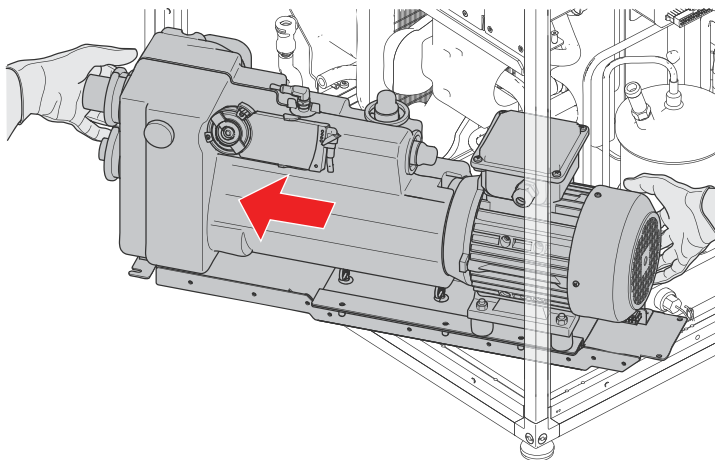


Image 8-13  
Removing the primary pump unit — step 2 of 2

## 8.4 Installing the primary pump unit

### Necessary tools

- Flat screwdriver
- Phillips screwdriver PH2
- Nut spanner 5.5 mm
- Nut spanner 8 mm
- Cutting pliers (for cable ties)
- Cable ties
- glue



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.

### How to install the primary pump unit?

1. Mount the primary pump unit:

- a) Tilt the front side of the primary pump unit inwards the left side of the chiller and move to the front for 10 cm.

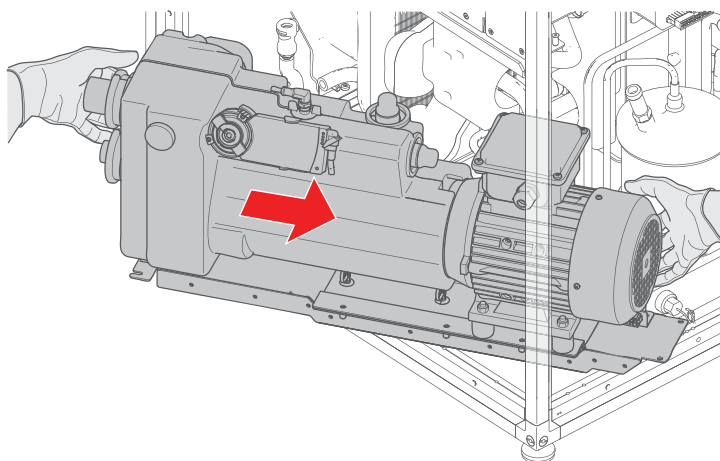


Image 8-14  
Installing the primary pump unit — step 1 of 2

- b) Move the primary pump unit towards the rear of the chiller until the two screws at the rear of the chiller are engaged in the slots of the primary pump unit base.

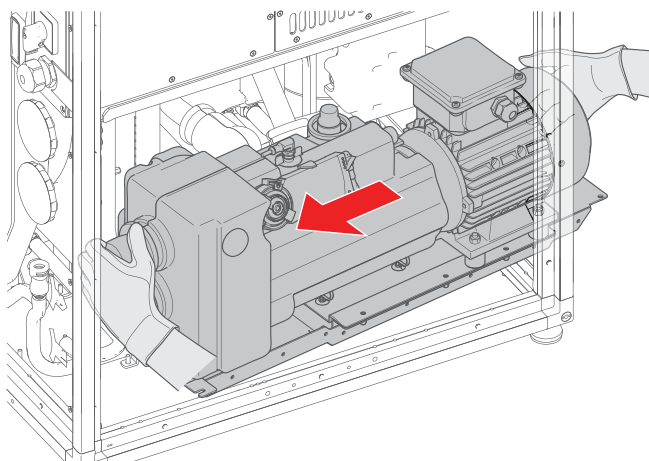


Image 8-15  
Installing the primary pump Unit — step 1 of 2

2. Install the two screws (reference 1 image 8-16) (front side of the chiller) using the nut spanner 8 mm.

## 8. Primary pump unit

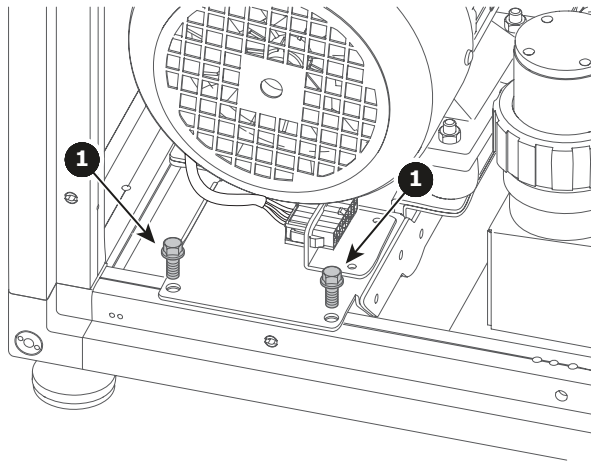


Image 8-16  
Installing the two screws

3. Tighten the two screws (reference 1 image 8-17) (rear side of the chiller) using the nut spanner 8 mm.

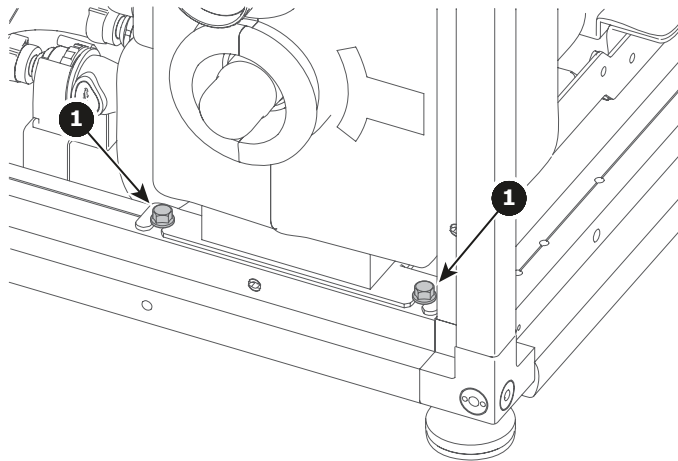


Image 8-17  
Tightening the two screws

4. Plug in the primary pump cable connector.

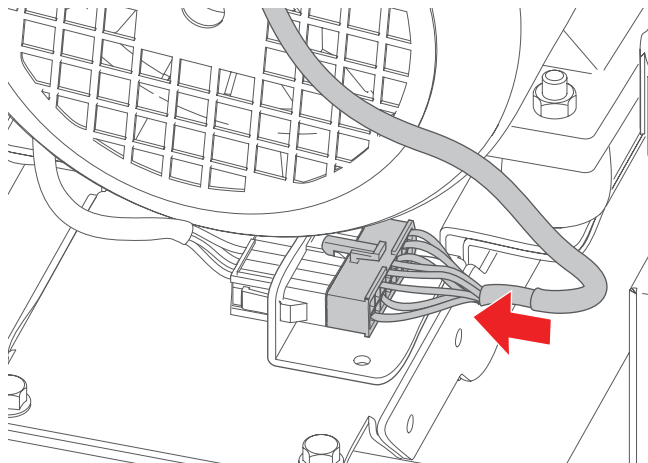


Image 8-18  
Plugging the primary pump Unit cable connector

5. Connect the two open type quick couplers of the refrigeration unit.

**Note:** First remove the caps and plugs. Check the cleanliness of the openings.

**Warning:** Risk of serious liquid spillage: Ensure that the clips are correctly & fully engaged after assembly. An audible click can be heard when the connector is correctly inserted.

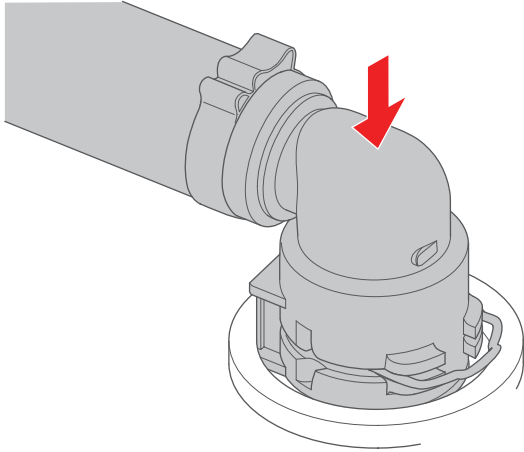


Image 8-19  
Connecting the quick coupler

6. Insulate the refrigeration unit quick couplers.
  - a) Apply contact glue to all mating surfaces of the insulation shells.
  - b) Allow the glue to dry for 20–40 minutes.
  - c) Install the insulation shells.
  - d) Make the insulation airtight using foam tape.
7. Install cable ties (reference 1 image 8-20) to secure the insulation to the refrigeration unit quick couplers.

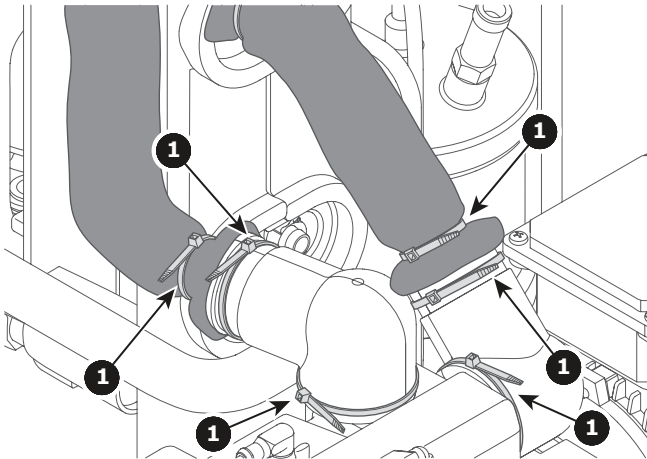


Image 8-20  
Installing cable ties

8. Perform the rest of the primary pump replacement process. For more info, see "Primary pump replacement process", page 37 .

## 8.5 Connecting the primary pump wiring

### Necessary tools

- Phillips screwdriver PH2
- Nut spanner 7 mm



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.

### How to connect the primary pump wiring?

1. Remove the left cover. See procedure "Removing a cover", page 17.
2. Remove the pump motor connection box cover. Use the Phillips screwdriver PH2 to remove the 4 screws (reference 1 image 8-21).

## 8. Primary pump unit

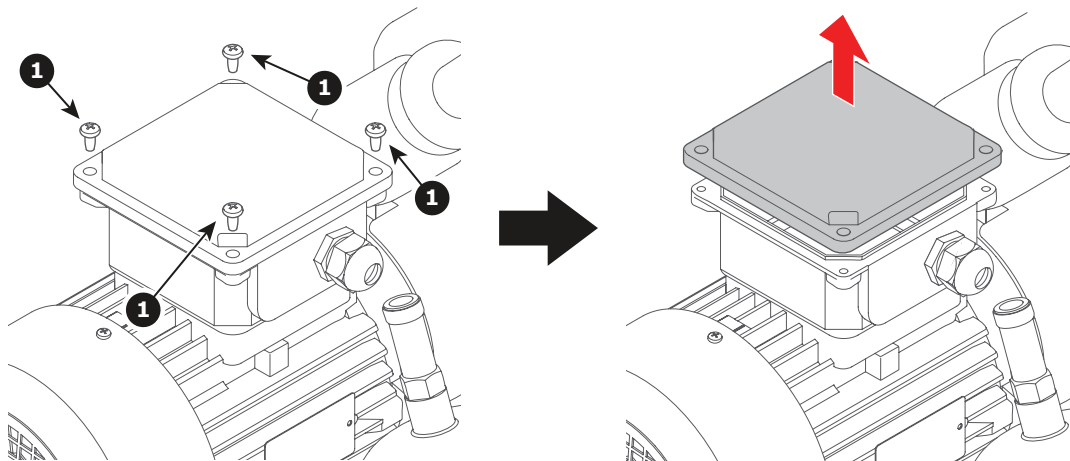


Image 8-21  
Removing the connection box cover

3. Insert the cable into the connection box.

4. Connect the four electrical wires (reference 1, 2, 3 & 4 image 8-22). Use a 7 mm nut spanner and a PH2 Phillips screwdriver.

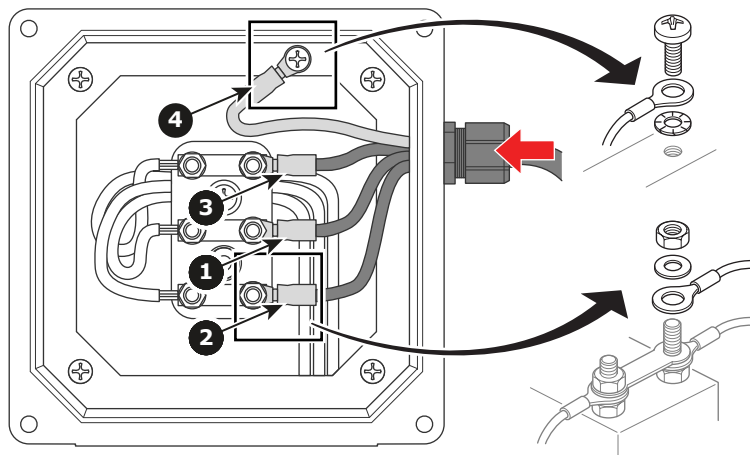


Image 8-22  
Connecting the pump motor wiring

- 1 Cable ID '1' to motor connection 'U'
- 2 Cable ID '2' to motor connection 'V'
- 3 Cable ID '3' to motor connection 'W'
- 4 Cable ID '4' to motor housing connection 'GND'

5. Tighten the cable gland to fix the cable.

6. Install the pump motor connection box cover. Use the Phillips screwdriver PH2 to install the 4 screws (reference 1 image 8-23).

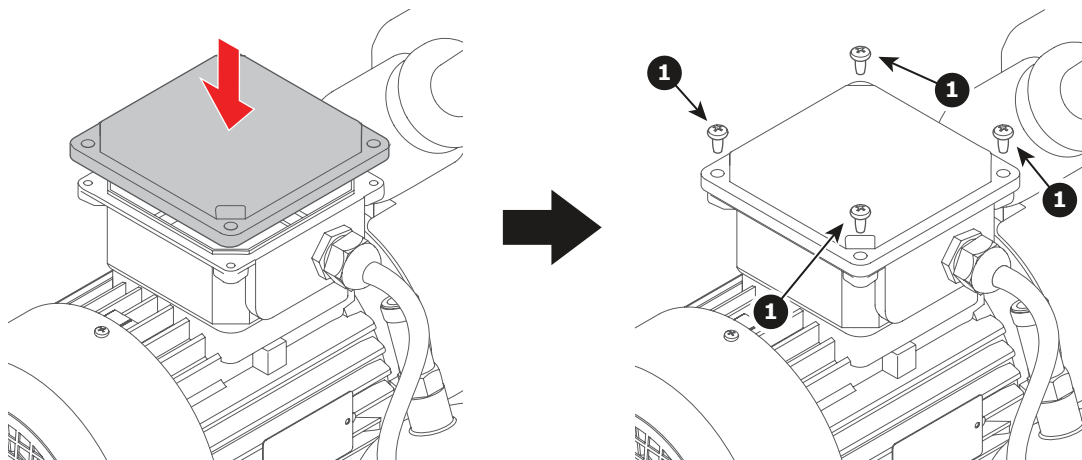


Image 8-23  
Installing the connection box cover

**Note:** Make sure the cover gasket is correctly installed.

## 9. SECONDARY COOLING UNIT

### Chiller secondary cooling circuit expansion for DMD cooling

The hydraulic couplings of this expansion unit are of the same type and size as those installed as standard within the chiller. However, the hoses of the DMD cooling (which require to be connected to the expansion unit) have a smaller diameter than the hoses for the Red, Green and Blue laser cooling.

Note that the cooling circuit expansion unit for the DMD cooling must be installed on-site.

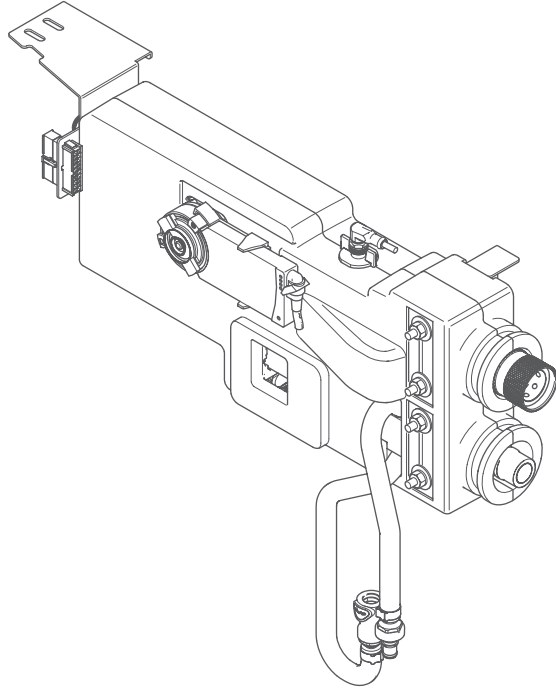


Image 9-1

### Overview

- Removing the Secondary cooling unit
- Installing the Secondary cooling unit

### 9.1 Removing the Secondary cooling unit

#### Necessary tools

- Allen wrench 4 mm
- Wire cutters



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.

#### How to remove the Secondary cooling unit?

1. Remove the left and front cover. See procedure "Removing a cover", page 17.
2. Remove the Fan unit. See procedure "Removal of the fan unit", page 21.
3. Remove the insulation cover & remove the cable ties around the foam.

## 9. Secondary cooling unit

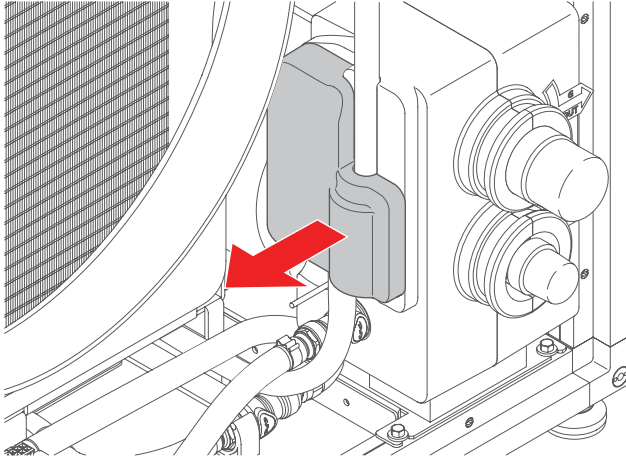


Image 9-2  
Removing the insulation cover

4. Disconnect hose "F" (chiller tank return line) from the DMD return line.

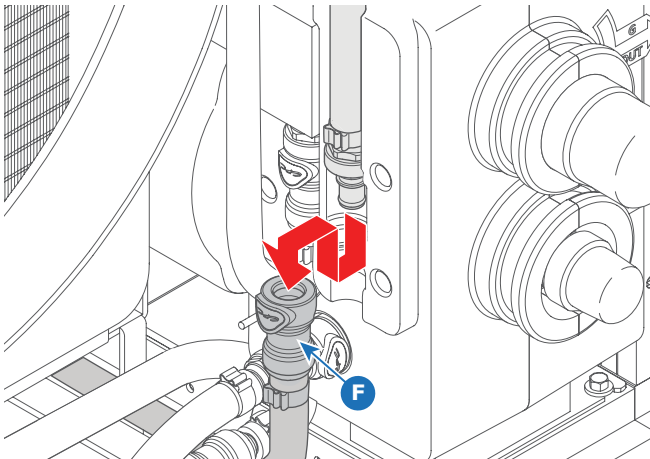


Image 9-3  
Disconnecting hose "F"

5. Disconnect the hose "G" of the DMD send line from the upper coupler of the pump.

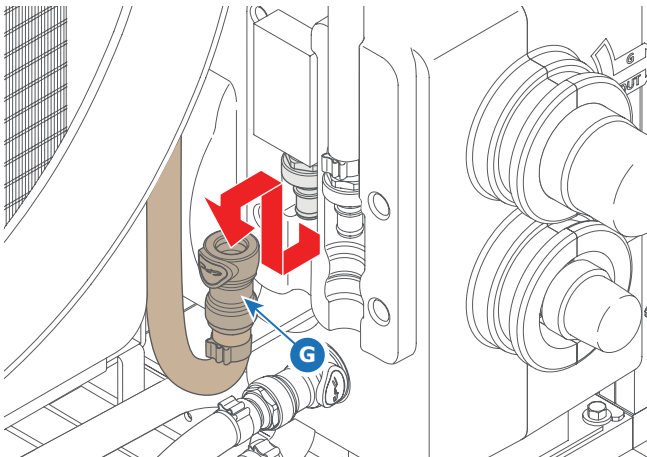


Image 9-4  
Disconnecting DMD send line

6. Unplug the cable connector of the Secondary cooling unit.



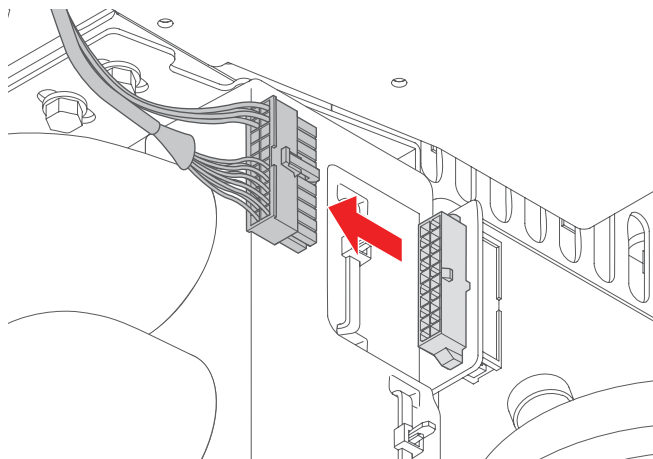


Image 9-5  
Unplugging the cable connector

7. Remove the 2 cable ties.

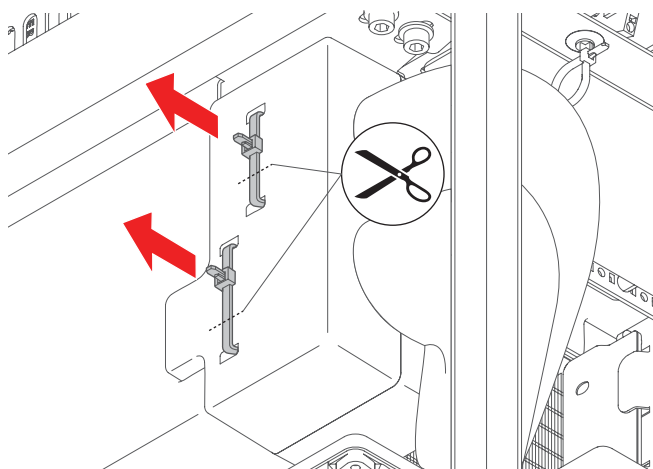


Image 9-6  
Removing cable ties

8. Remove the two insulation shells from the hose couplers of the secondary unit.

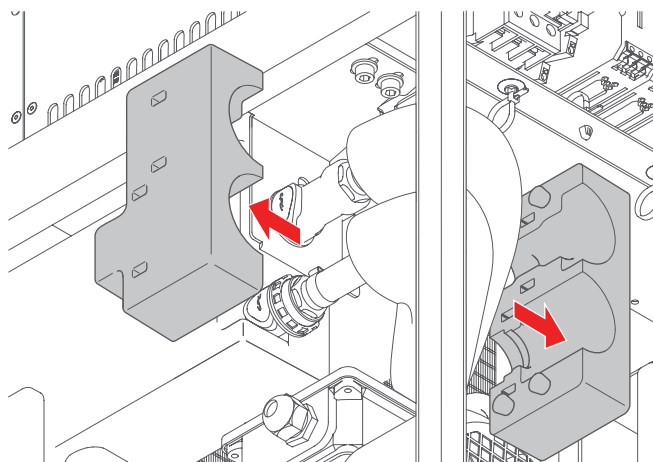


Image 9-7  
Removing insulation shells

9. Disconnect the two hoses from the Secondary cooling unit.

## 9. Secondary cooling unit

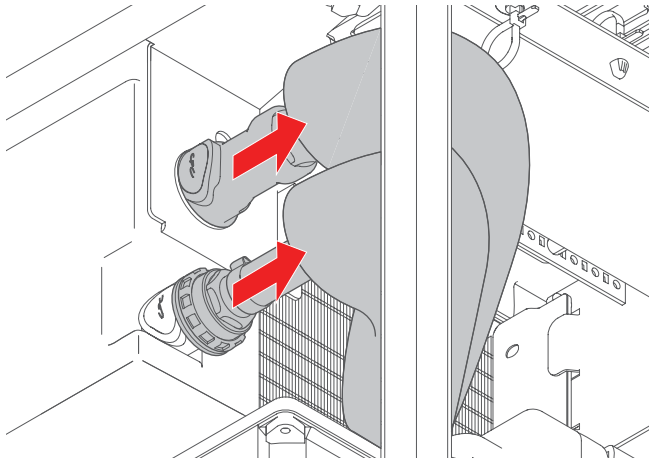


Image 9-8  
Disconnecting two hoses

10. Remove all 5 screws (reference 1 image 9-9 & image 9-10) and 2 washers (reference 2), holding the secondary unit to the chiller.

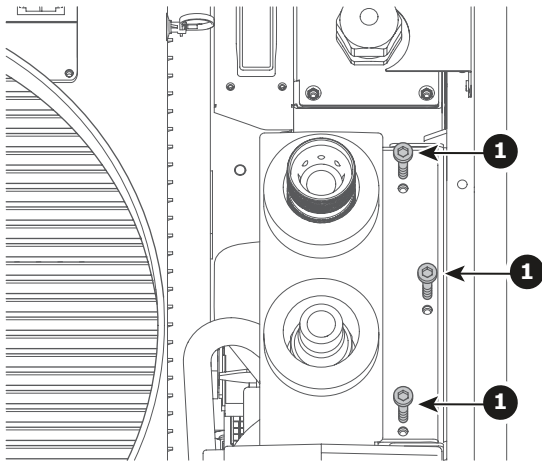


Image 9-9  
Removing three screws

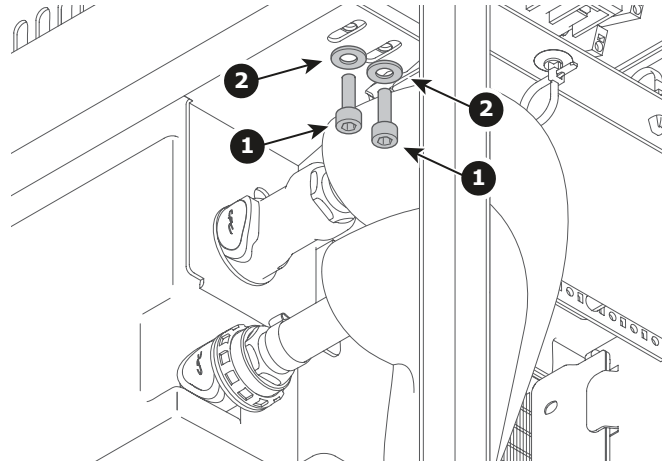


Image 9-10  
Removing two screws

11. Remove the secondary cooling unit.

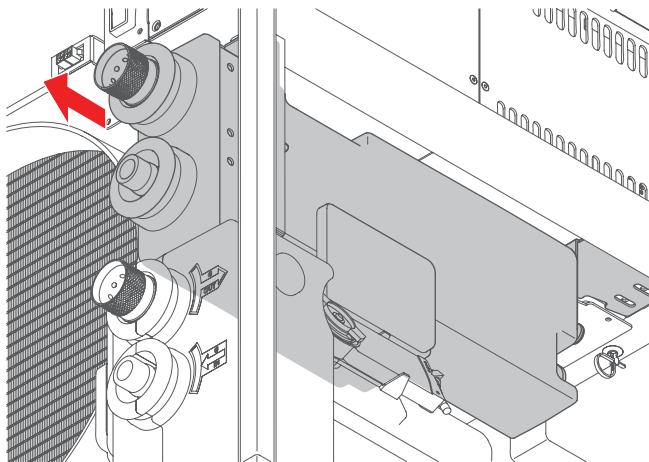


Image 9-11  
Removing Secondary cooling unit

12. If no further service of the chiller is required, do the following:

- Place the screws and washers (image 9-9 and image 9-10) back and tighten them.
- Install the Fan unit. See procedure "Installation of the fan unit", page 22.
- Install all covers. See procedure "Installing a cover", page 18.

## 9.2 Installing the Secondary cooling unit

### Necessary tools

- Allen wrench 4 mm
- Wire cutters
- Cable ties



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.



For a first time installation of the Secondary cooling unit, see installation manual of the ULC-30A chiller.

### How to install the Secondary cooling unit?

1. Remove the Fan unit. See procedure "Removal of the fan unit", page 21.
2. Remove the five screws and the washers (image 9-13 and image 9-14).
3. Mount the Secondary cooling unit.

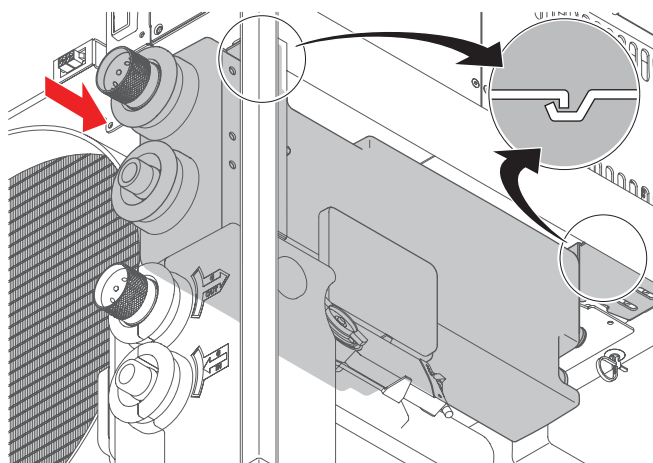


Image 9-12  
Installing Secondary cooling unit

**Note:** Ensure the rear support of the DMD slides into the dedicated groove of the chiller frame.

4. Install the five screws (reference 1 image 9-13 & image 9-14) and two washers (reference 2 image 9-14) to .

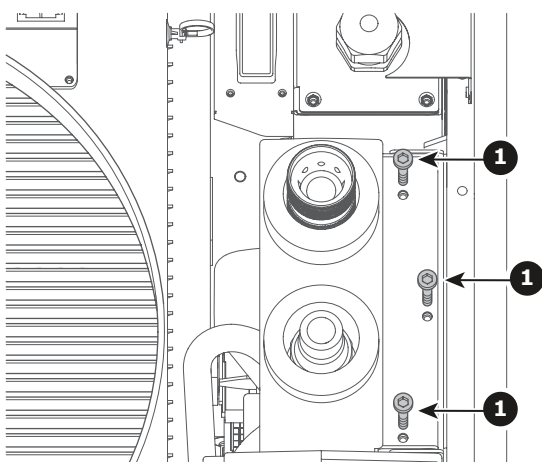


Image 9-13  
Installing three screws

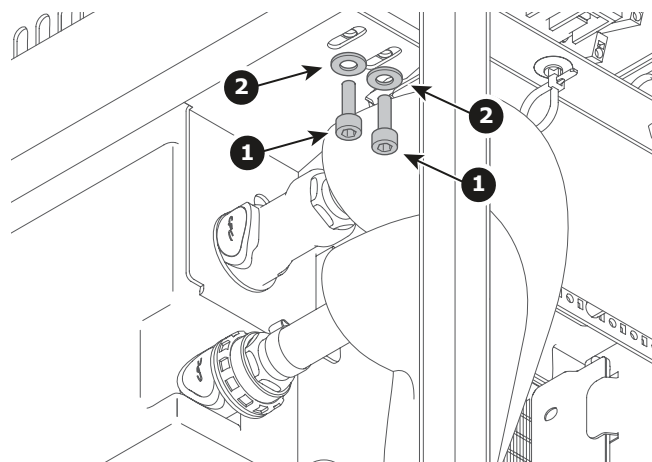


Image 9-14  
Installing two screws

5. Connect the two hoses onto the Secondary cooling unit.

## 9. Secondary cooling unit

---

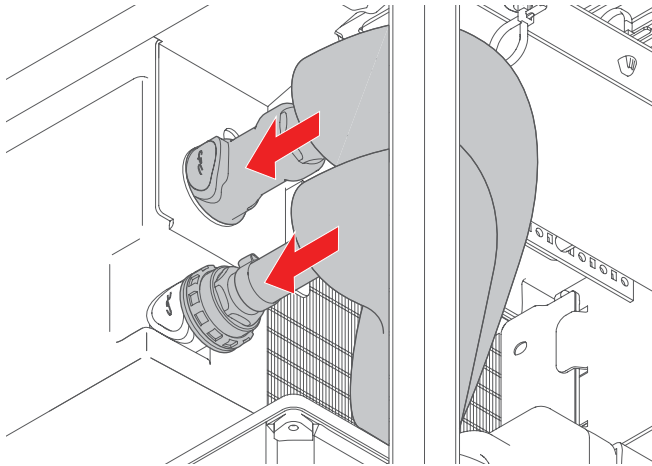


Image 9-15  
Connecting two hoses

6. Install the two insulation shells onto the hose couplers.

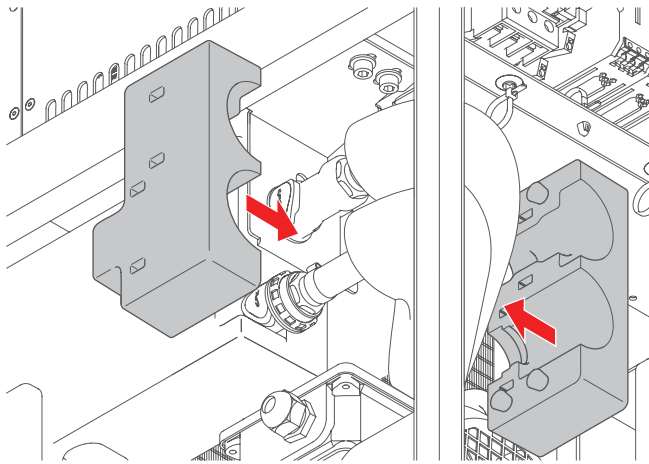


Image 9-16  
Installing insulation shells

7. Install new cable ties.

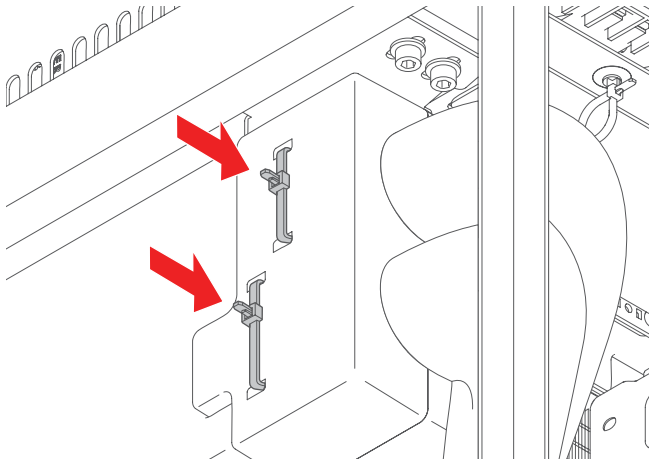


Image 9-17  
Installing cable ties

8. Plug in the cable connector of the Secondary cooling unit.

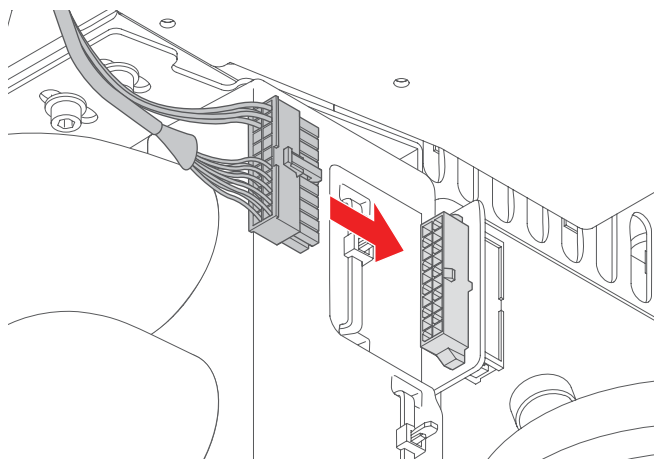


Image 9-18  
Plugging in the DMD cable connector

9. Connect hose "G" of the DMD send line onto the upper coupler of the pump.

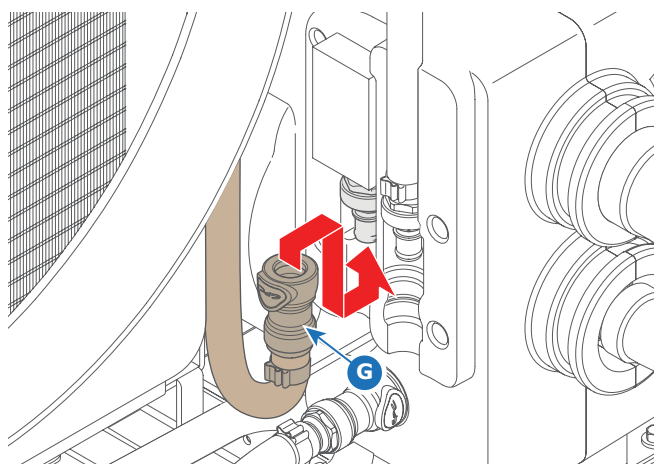


Image 9-19  
Connecting DMD send line

10. Connect hose "F" (chiller tank return line) onto the DMD return line.

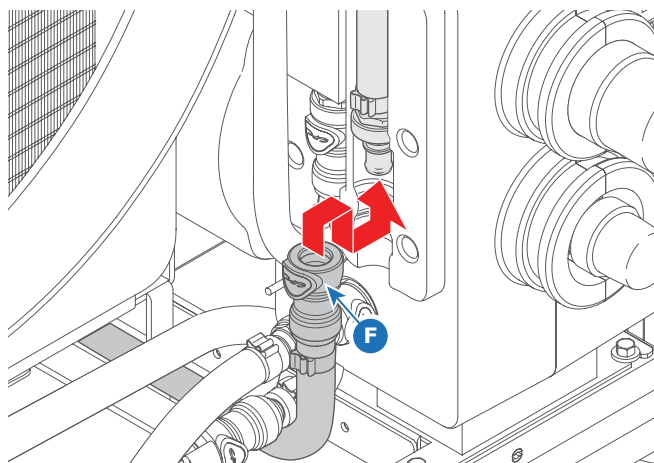


Image 9-20  
Connecting hose "F"

11. If no further service of the chiller is required, install the insulation cover.

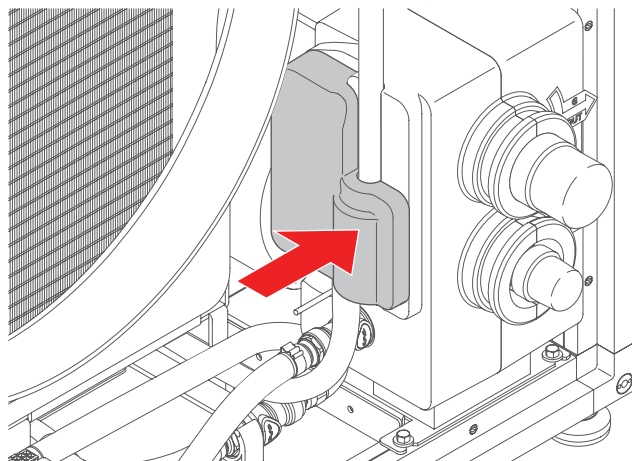


Image 9-21  
Installing the insulation cover

12. If no further service of the chiller is required, install the Fan unit. See procedure "Installation of the fan unit", page 22.
13. If no further service of the chiller is required, install all covers. See procedure "Installing a cover", page 18.

# 10. REFRIGERATION UNIT

## Description of the refrigeration unit

The refrigeration circuit absorbs the heat provided by the coolant circuit through a heat exchanger and removes the heat by means of a condenser where it is carried away by the fan air flow.

The refrigeration unit makes use of the refrigeration cycle principle, with a refrigerant as the medium to absorb and remove heat.

The refrigeration unit has hydraulic connections to:

- the primary pump unit
- the Secondary cooling unit (if installed)

## Overview

- Refrigeration unit replacement process
- Removing the refrigeration unit
- Installing the refrigeration unit

## 10.1 Refrigeration unit replacement process



**WARNING:** During the entire replacement process, the Service tool wizard will request to connect or disconnect the chiller from the power net several times. Follow these instructions to avoid electrical shocks.



**CAUTION:** It is important to follow the Service Tool wizard step by step. Do not click too rapidly through the replacement process wizard. This could cause unwanted effects, such as gross spillage of coolant.

## How to replace?

1. Make sure the chiller is disconnected from the projector and other chillers.
2. Remove the rear, left and front cover. See procedure "Removing a cover", page 17.
3. Plug the 15 pins serial connector of the PC cable (included in chiller service kit) to any one of the two serial ports at the rear side of the chiller. Plug the other end of the cable into one of the USB ports of your PC.

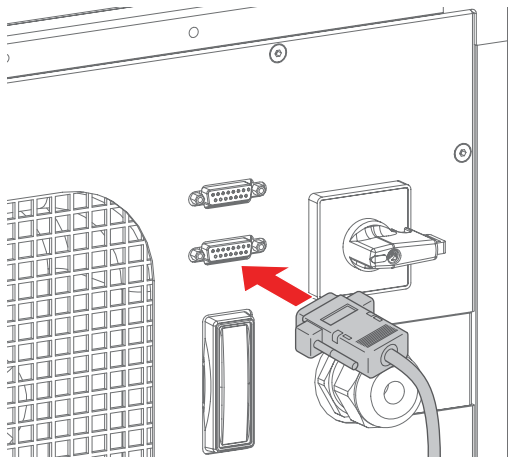


Image 10-1

4. Start the Chiller service tool and connect to the Chiller.  
**Note:** Make sure the software has been installed and tested before going on-site. To check for the most recent software version, go to myBarco log in on Barco's web site <http://www.barco.com> and enter your credentials.
5. Click on the **Refrigeration unit replacement** and follow the replacement wizard.
6. Remove the Fan unit. See "Removal of the fan unit", page 21.
7. Use the wizard to open the bypass valve.
8. Follow the wizard's instructions to drain the chiller. See "Draining the coolant circuit", page 26.

9. Remove the refrigeration unit. See "Removing the refrigeration unit", page 56.
10. Install the new refrigeration unit. See "Installing the refrigeration unit", page 61.
11. Follow the wizard's instructions to fill the chiller coolant circuit. See "Filling the coolant circuit", page 28.
12. Use the wizard to close the bypass valve.
13. Install the Fan unit. See "Installation of the fan unit", page 22.
14. Finish the replacement process by finishing the wizard, disconnecting the PC cable, installing the covers and connecting the chiller back to the projector, other chiller(s) and the power net.

### 10.2 Removing the refrigeration unit

---



**CAUTION:** Perform this procedure via the service tool wizard only. Ensure all required steps have been performed prior to pump removal. For more info, see "Refrigeration unit replacement process", page 55.

---

#### Necessary tools

- Flat screwdriver
- Allen wrench 4 mm
- Nut spanner 8 mm
- Wire cutters



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15 .

---

#### How to remove the refrigeration Unit?

1. Remove the rear, left and front cover. See procedure "Removing a cover", page 17.
2. Perform the draining procedure. See procedure "Draining the coolant circuit", page 26.
3. Remove the cable ties (reference 1 image 10-2) that secure the insulation on the refrigeration Unit quick couplers.

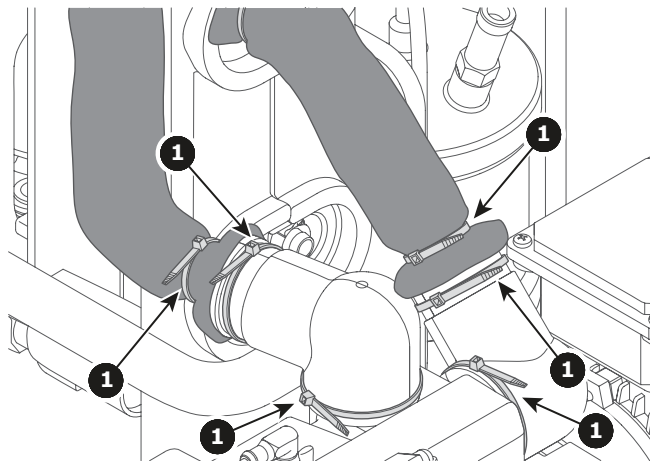


Image 10-2  
Removing cable ties

4. Pry open and discard the insulation shells.



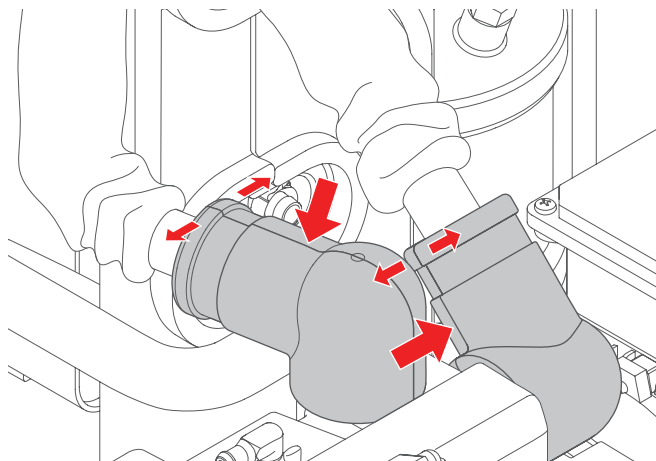


Image 10-3  
Removing insulation shells

**Warning:** Risk of spillage. Make sure the draining procedure (see "Draining the coolant circuit", page 26) has been performed.

5. Disconnect the two open type quick couplers from the refrigeration Unit. Perform the steps shown below for both quick coupler connections.
  - a) Using a screwdriver, open the clip to unlock the coupler (image 10-4).
  - b) Remove the coupler from the pump fitting (image 10-4).  
Use a cloth or towels to catch spillages before plugging the couplers using the service kit plugs and caps.
  - c) Close the clip of the coupler (image 10-4).

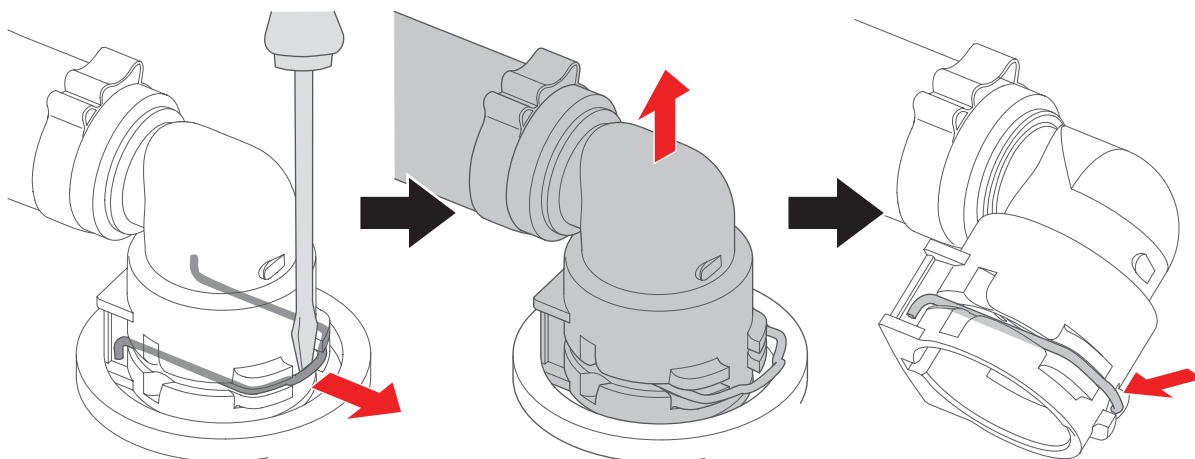


Image 10-4  
Removing the coupler

- d) Install the plug (included in the service kit) onto the coupler (image 10-5).
- e) Install the cap (included in the service kit) onto the pump fitting (image 10-5).

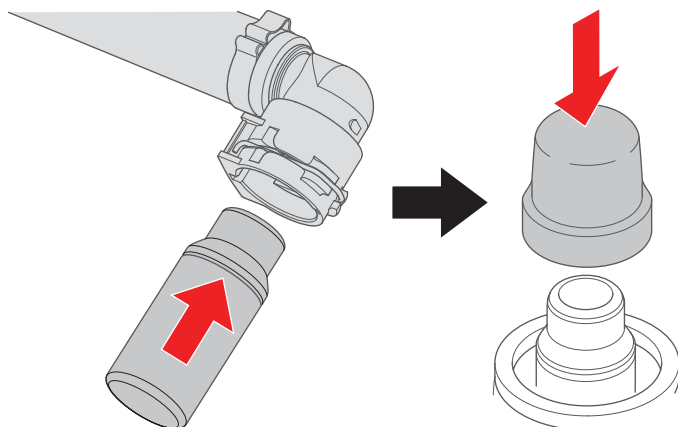


Image 10-5  
Installing plug and cap

**Note:** Always use the plugs and caps included in the service kit. Do not use paper or other material to cover the openings.

**Note:** Use a cloth or towels to clean up possible minor spillage.

## 10. Refrigeration unit

6. Unplug the 3 cable connectors.

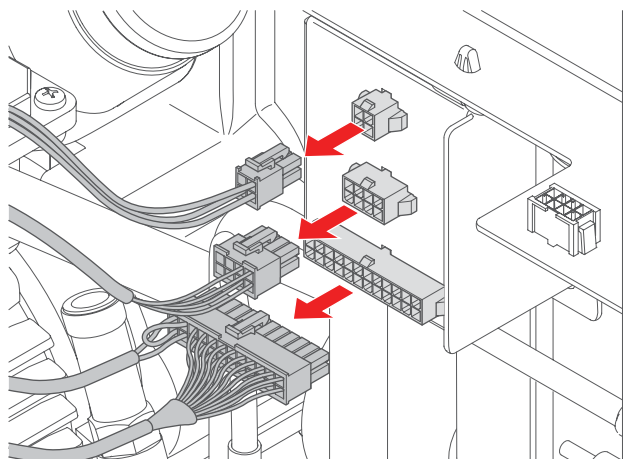


Image 10-6  
Unplugging the 3 cable connectors

7. Remove the compressor wiring connection cover (reference 2, image 10-7). In order to do so, remove the nut (reference 1) from the compressor.

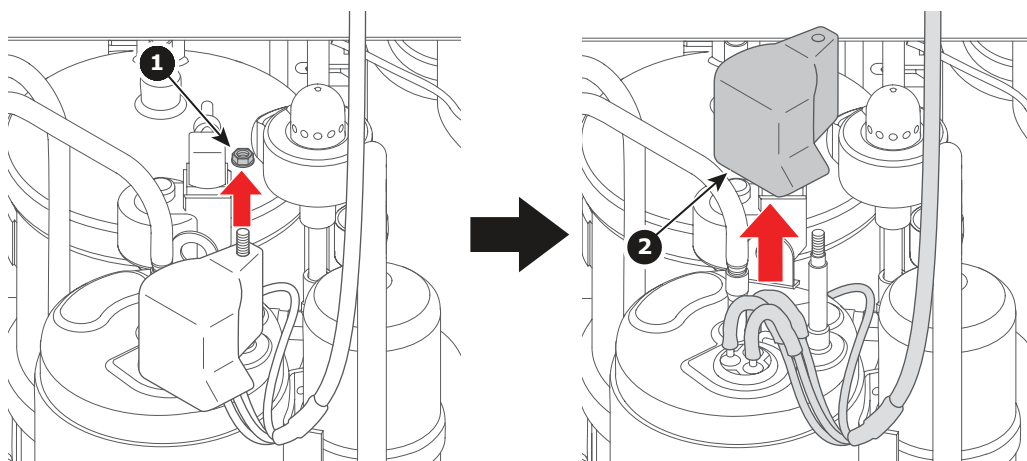


Image 10-7  
Removing the nut and wiring cover from the compressor

8. Disconnect the compressor wiring.

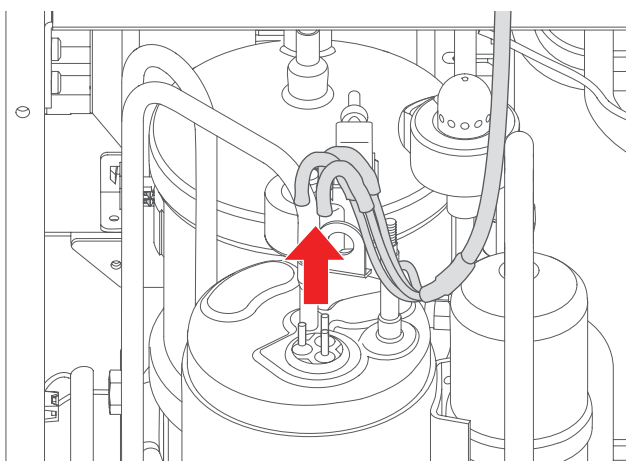


Image 10-8  
Disconnecting the compressor wiring

9. Remove the screw (reference 1 image 10-9) to disconnect the ground (GND) cable from the compressor.

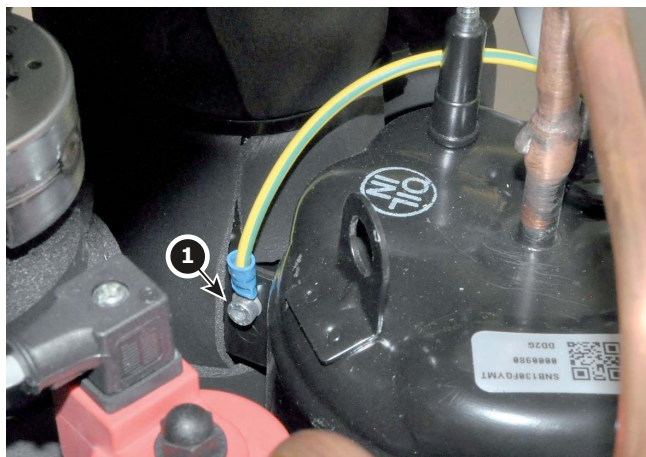


Image 10-9  
Disconnecting the compressor GND cable

10. Reinstall the compressor wiring connection cover and nut.

11. If present, remove the cables connected to the compressor thermal switch.

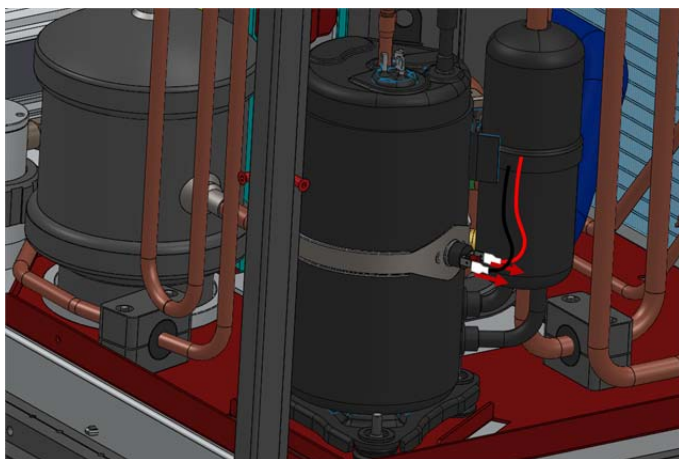


Image 10-10

12. Remove the 5 screws at the bottom of the refrigeration Unit. Use the nut spanner 8 mm to remove the screws.

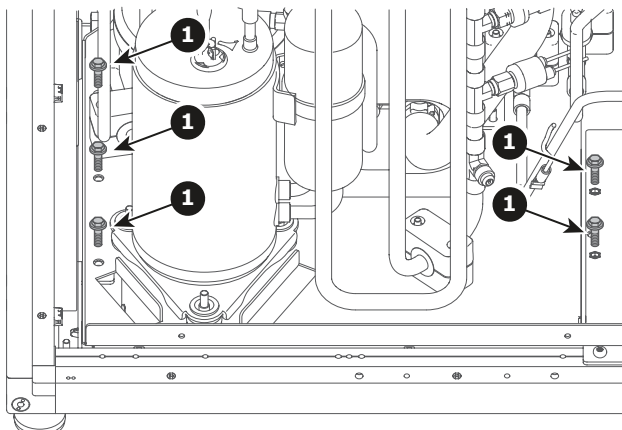


Image 10-11  
Removing the 5 screws

13. Remove the 3 screws at the top of the refrigeration unit, above the condenser unit. Use the nut spanner 8 mm to remove the screws.

## 10. Refrigeration unit

---

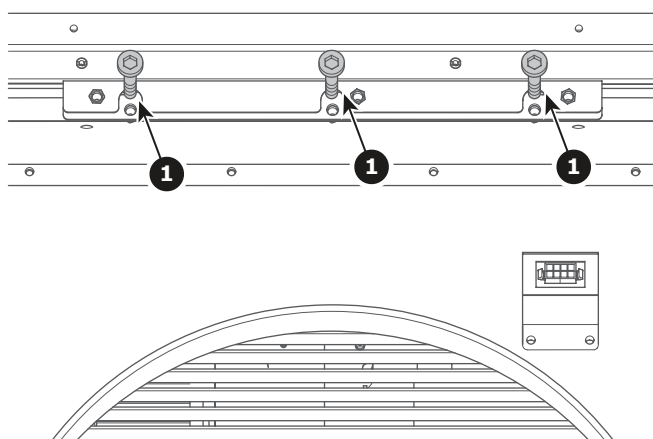


Image 10-12  
Removing the 3 screws

14. Remove the refrigeration unit.

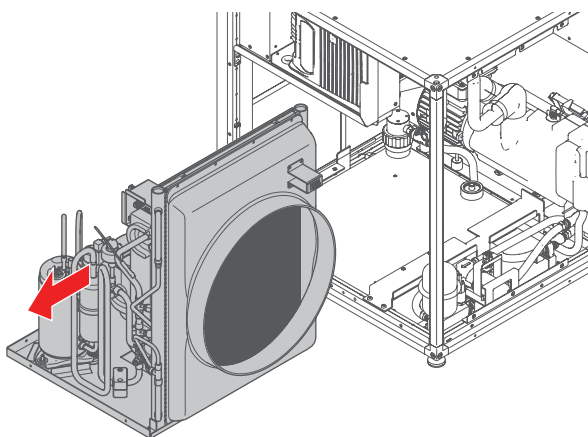


Image 10-13  
Removing the refrigeration Unit

15. Before shipping the defective refrigeration unit, it is important to use the original packaging that came with the replacement refrigeration unit.  
Install the 6 screws

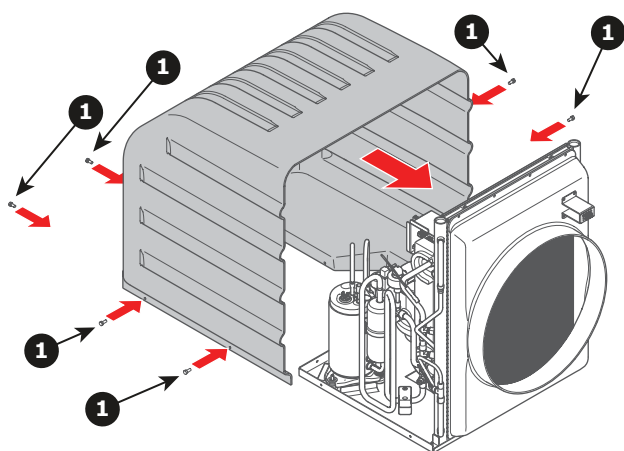


Image 10-14  
Preparing the refrigeration Unit for shipping

**Note:** Make sure the dummy fan connector is removed before shipping the unit.

## 10.3 Installing the refrigeration unit

### Necessary tools

- Flat screwdriver
- Allen wrench 4 mm
- Nut spanner 8 mm
- Wire cutters



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.

### How to install the refrigeration unit?

1. Install the refrigeration unit.

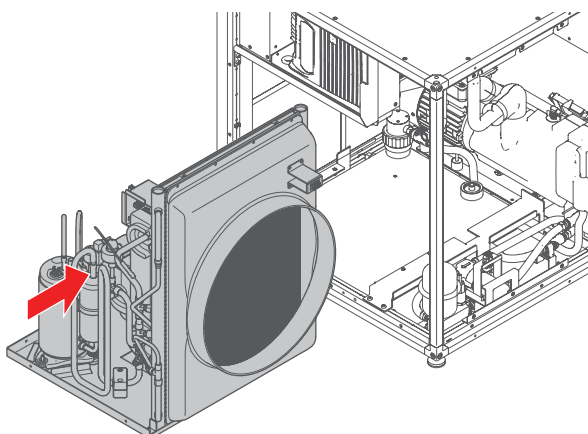


Image 10-15  
Installing the refrigeration Unit

2. Install the 3 screws (reference 1 image 10-16) at the top of the refrigeration Unit, above the condenser unit. Use the nut spanner 8 mm to install the screws.

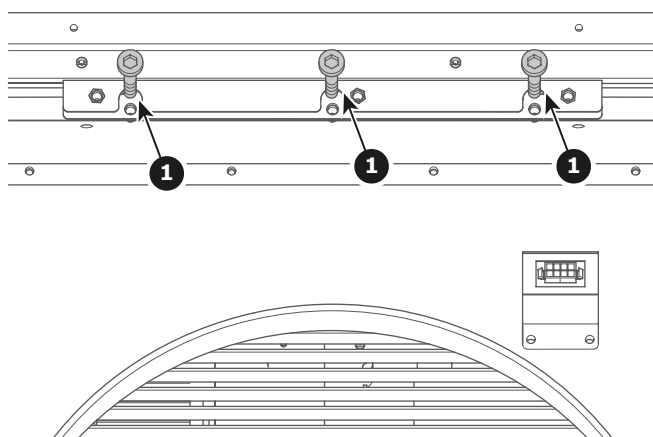


Image 10-16  
Installing the 3 screws

3. Install the 5 screws (reference 1 image 10-17) at the bottom of the refrigeration unit. Use the nut spanner 8 mm to install the screws.

## 10. Refrigeration unit

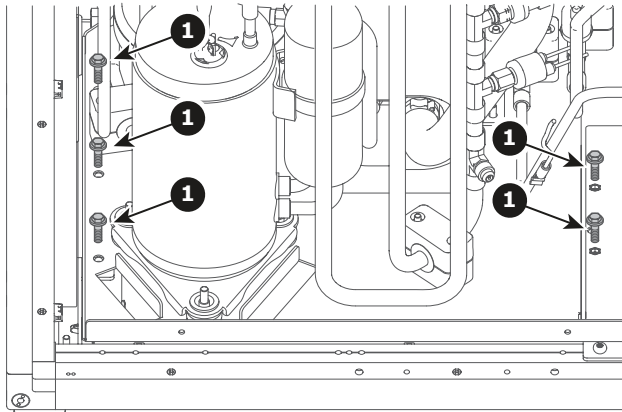


Image 10-17  
Installing the 5 screws

4. Remove the compressor wiring connection cover (reference 2, image 10-18). In order to do so, remove the nut (reference 1) from the compressor.

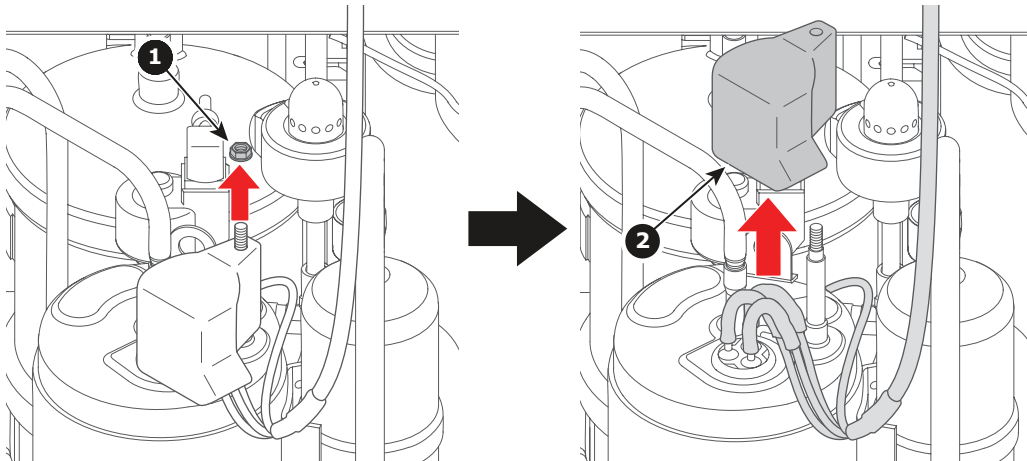


Image 10-18  
Removing the nut and wiring cover from the compressor

5. Connect the compressor wiring.

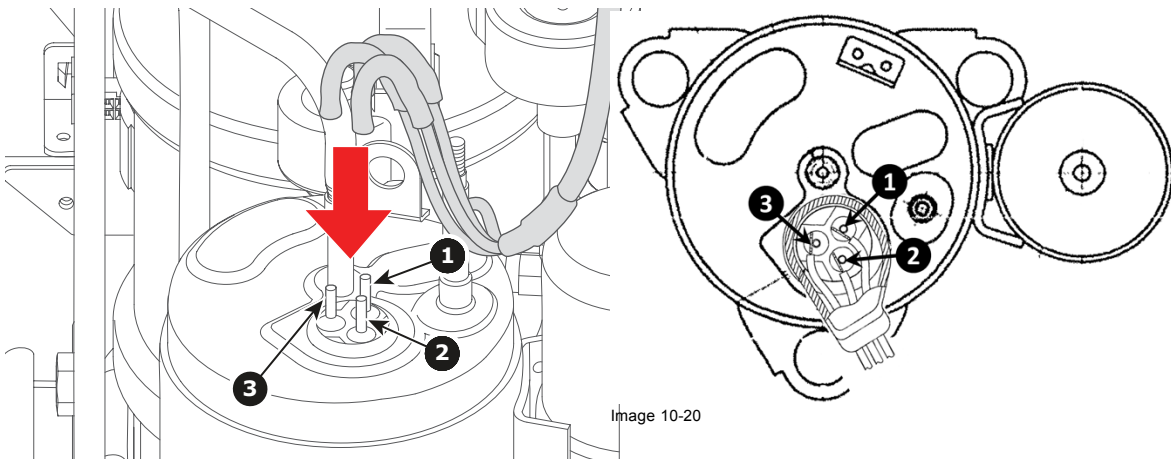


Image 10-19  
Connecting the compressor wiring

- 1 Cable ID '1'
- 2 Cable ID '2'
- 3 Cable ID '3'

**Warning:** Avoid damage to the compressor. Make sure the wires are correctly connected.

6. Install the screw (reference 1 image 10-21) and ground (GND) cable onto the compressor.



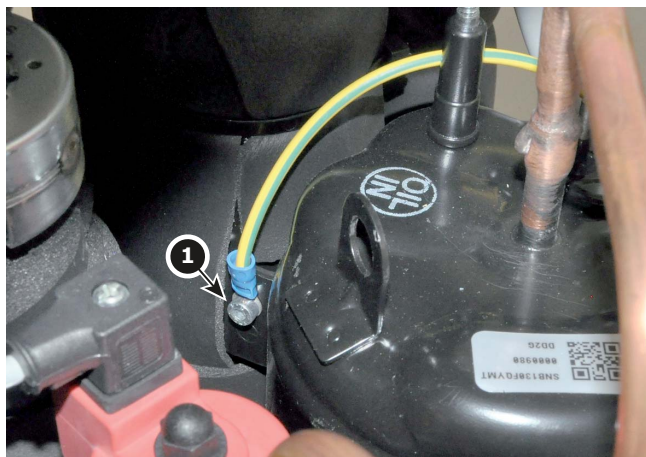


Image 10-21  
Connecting the compressor GND cable

7. Reinstall the compressor wiring connection cover and nut.
8. If a thermal switch is present in the compressor, connect the two wires to the thermal switch contacts.

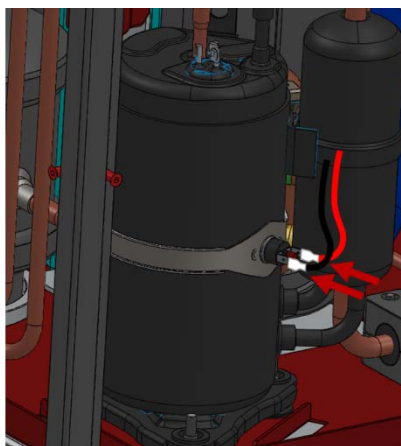
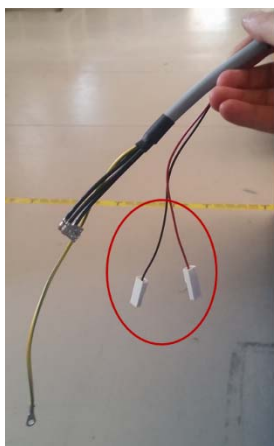


Image 10-22

Or,  
If a thermal switch is not present, use the jumper to short circuit the two wires.

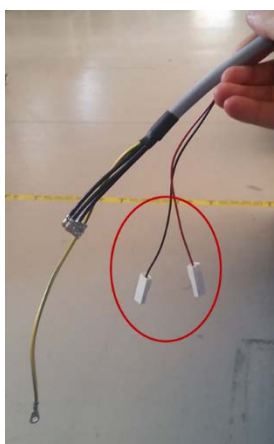


Image 10-23

9. Plug in the 3 cable connectors.

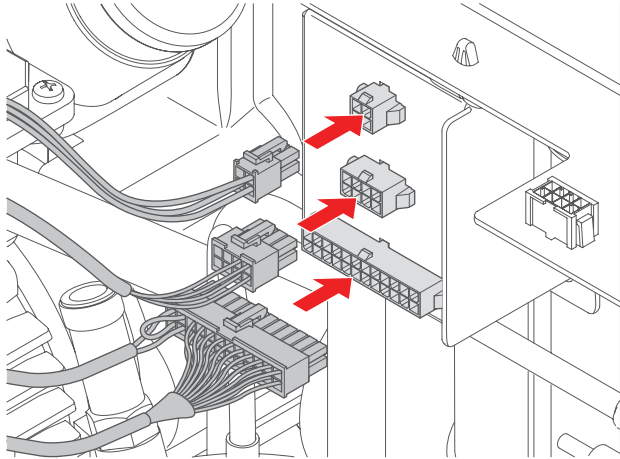


Image 10-24  
Plugging the 3 cable connectors

10. Connect the two open type quick couplers of the refrigeration Unit.

**Note:** First remove the caps and plugs.

**Warning:** Risk of serious liquid spillage: ensure that the clips are correctly & fully engaged after assembly. An audible click can be heard when the connector is correctly inserted.

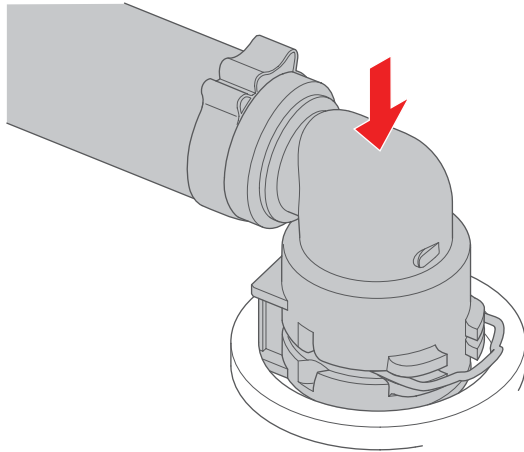


Image 10-25  
Connecting the quick coupler

11. Insulate the refrigeration Unit quick couplers.

- Apply contact glue to all mating surfaces of the insulation shells.
- Allow the glue to dry for 20–40 minutes.
- Install the insulation shells.
- Make the insulation airtight using foam tape.

12. Install cable ties (reference 1 image 10-26) to secure the insulation to the refrigeration Unit quick couplers.

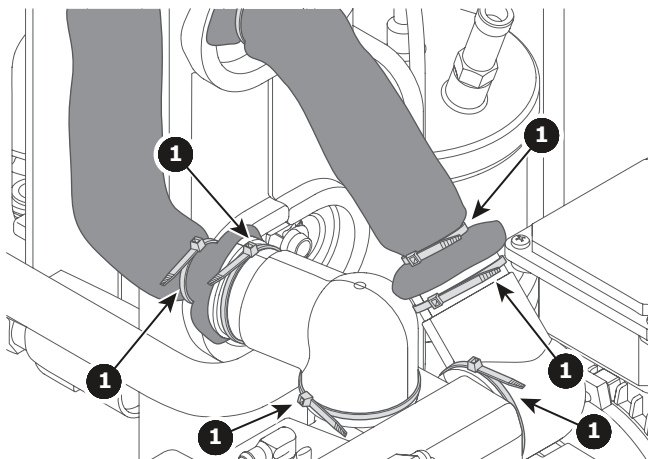


Image 10-26  
Installing cable ties



13. Perform the filling procedure (see procedure "Filling the coolant circuit", page 28).



---

# 11. ELECTRONICS UNIT

## Description

The electronics Unit contains the following the electronic parts and devices:

- main power supply
- fuses
- pump motor inverter
- compressor motor inverter
- Low voltage power
- contactor
- power supply filters
- logic board

## Overview

- SD logging status
- Removing the electronics unit
- Installing the electronics unit
- Replacing the logic board
- Pump inverter replacement

---

## 11.1 SD logging status

### About SD card logging

The Chiller logic board has an SD card installed, in order to allow logging of the chiller performance. In normal circumstances, this logging feature is disabled to allow for optimal performance of the Chiller and projector it is connected to.

However, in case the chiller is not performing as intended, or in case you suspect something is amiss with either the chiller, tubing or projector, you can enable the SD card logging for a certain amount of time (e.g. an entire day) to create a log dump of the entire chiller process (not active, projector starting up, playing, etc).

### How to (de)activate SD card logging?

In the Chiller service tool, click on the SD logging status button.

- To enable SD card logging, click **Send SD enable command** in the SD logging menu.
- To disable SD card logging, click **Send SD disable command** in the SD logging menu.

While the SD card logging is active, the following will be visible:

- The SD logging enabled button will be colored green in the SD logging menu.
- The red SD logging led will flash regularly on the logic board in the chiller.

---

## 11.2 Removing the electronics unit



**CAUTION:** Make sure the Chiller is disconnected from the power net **AFTER** the logic board parameters have been stored on your computer. Wait at least five minutes before disconnecting the primary pump wiring.

---

### Necessary tools

- Phillips screwdriver
- Allen wrench 3 mm
- Nut spanner 7 mm
- Nut spanner 8 mm



During this procedure, the service tool wizard will ask of you to turn the power off. To switch off power, see procedure "Switching off power and locking the switch", page 15.

### How to remove the electronics Unit?

1. Start the Electronic replacement procedure, using the service tool wizard.
2. Use the wizard to store a backup of the logic board parameters on your computer.
3. Remove all covers. See procedure "Removing a cover", page 17.
4. Unplug the 3 cable connectors.

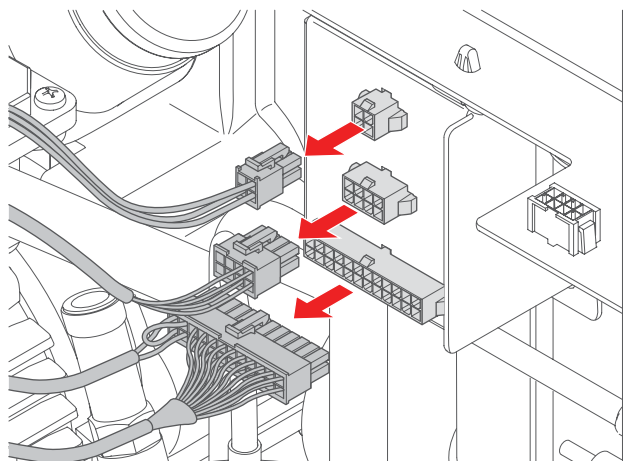


Image 11-1  
Unplugging the 3 cable connectors

5. Remove the compressor wiring connection cover (reference 2, image 11-2). In order to do so, remove the nut (reference 1) from the compressor.

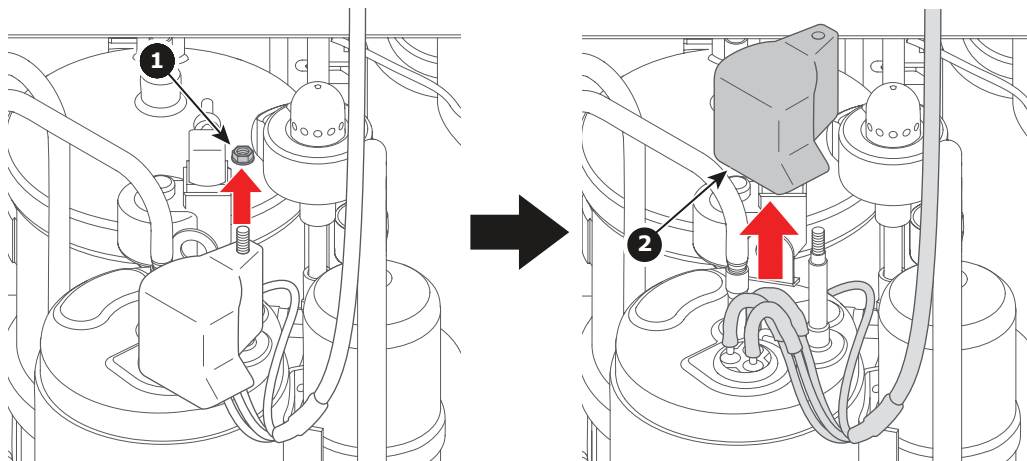


Image 11-2  
Removing the nut and wiring cover from the compressor

6. Disconnect the compressor wiring.

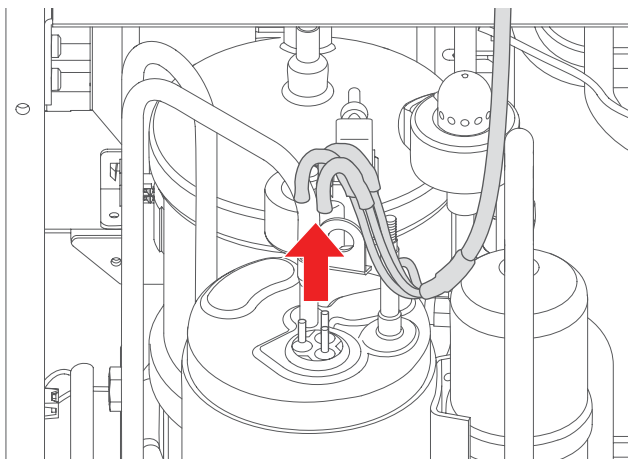


Image 11-3  
Disconnecting the compressor wiring

7. Remove the screw (reference 1 image 11-3) to disconnect the ground (GND) cable from the compressor.

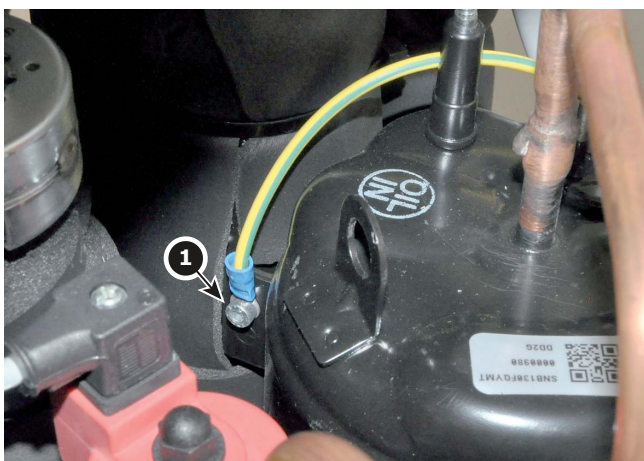


Image 11-4  
Disconnecting the compressor GND cable

8. Reinstall the compressor wiring connection cover and nut.
9. If present, remove the cables connected to the compressor thermal switch.

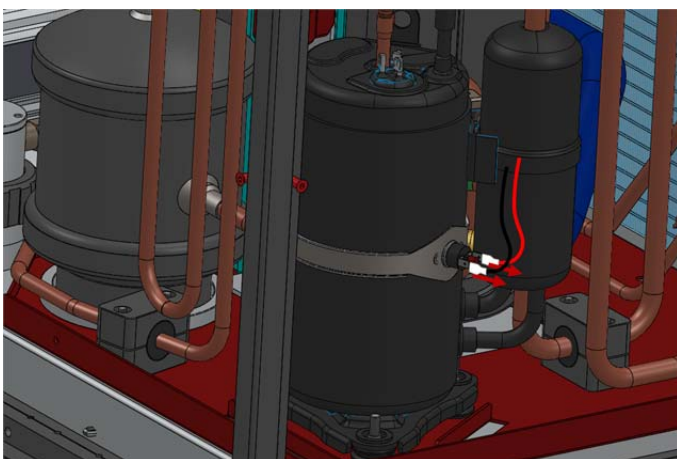


Image 11-5

10. Unplug the cable connector located below the logic board.

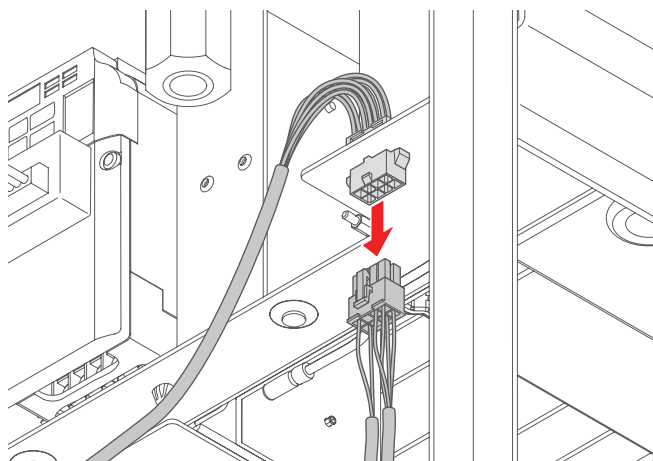


Image 11-6  
Unplugging the cable connector

11. Disconnect the primary pump motor wiring. See procedure "Disconnecting the primary pump wiring", page 38.

**Caution:** Make sure the Chiller has been disconnected from the power net before disconnecting the pump wiring. Make sure to at least wait five minutes before disconnecting the pump wiring.

12. If the secondary cooling unit has been installed, unplug the cable connector to the secondary cooling unit.

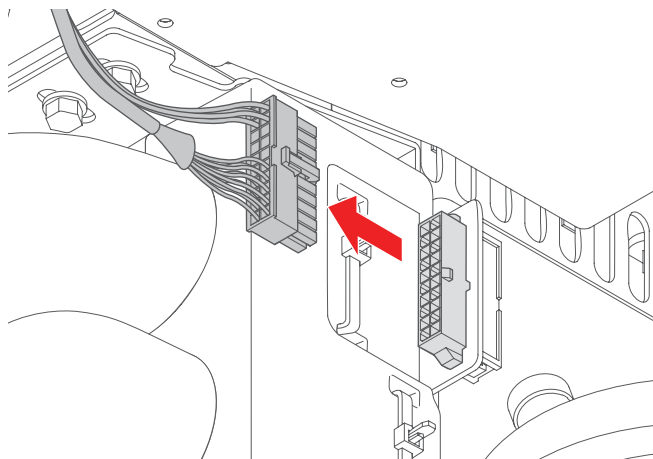


Image 11-7  
Unplugging the cable connector

13. Remove the Barco nameplate at the front of the chiller. Use a 3 mm Allen wrench to remove the screws.

14. Remove the 10 screws (reference 1 image 11-8). Use the nut spanner 8 mm to remove the screws.

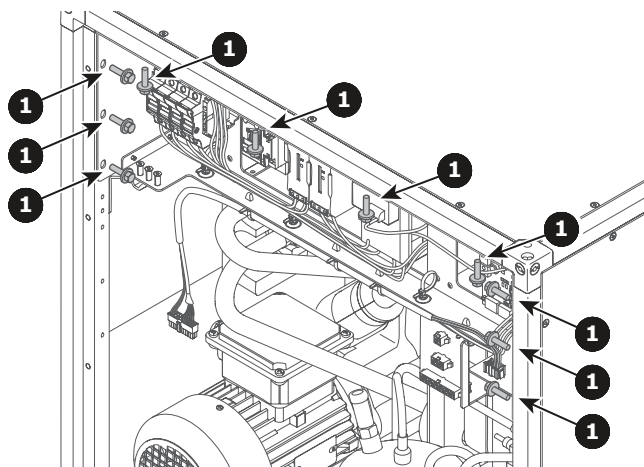


Image 11-8  
Removing the 10 screws

15. Remove the 2 screws (reference 1 image 11-8) at the rear side of the chiller. Use a 3 mm Allen wrench to remove the screws.

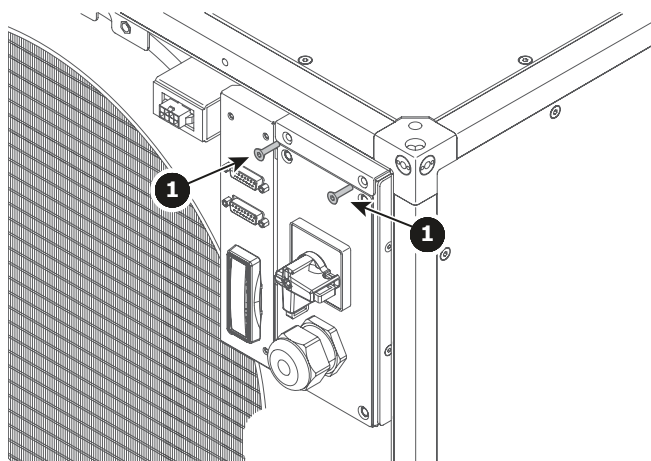


Image 11-9  
Removing the 2 screws

16. Remove the electronics unit.

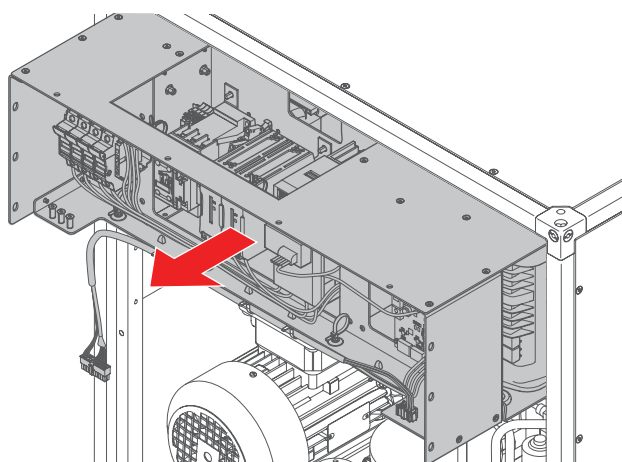


Image 11-10  
Removing the electronics Unit

### 11.3 Installing the electronics unit

#### Necessary tools

- Phillips screwdriver
- Allen wrench 3 mm
- Nut spanner 7 mm
- Nut spanner 8 mm
- Wire cutters



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.

#### How to install the electronics unit?

1. Mount the electronics unit.

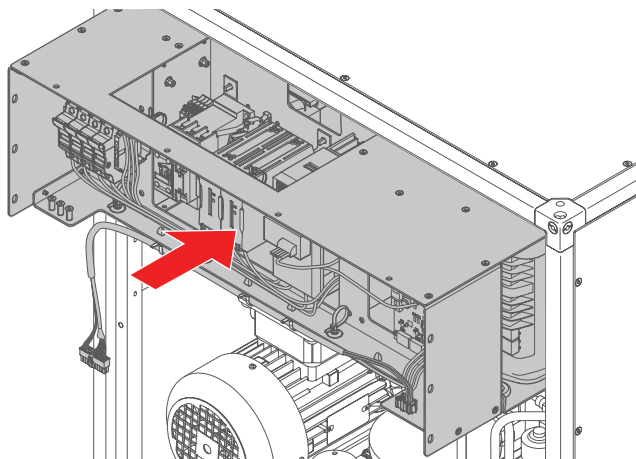


Image 11-11  
Installing the electronics Unit

2. Install the 2 screws (reference 1 image 11-8) at the rear side of the chiller. Use a 3 mm Allen wrench to install the screws.

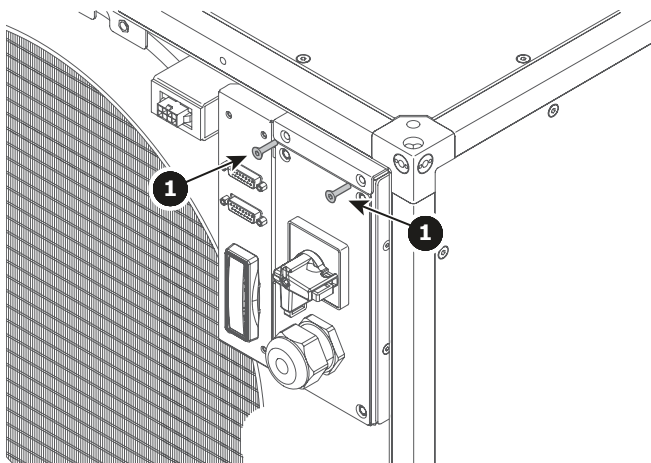


Image 11-12  
Installing the 2 screws

3. Install the 10 screws (reference 1 image 11-13). Use an 8 mm nut spanner to install the screws.

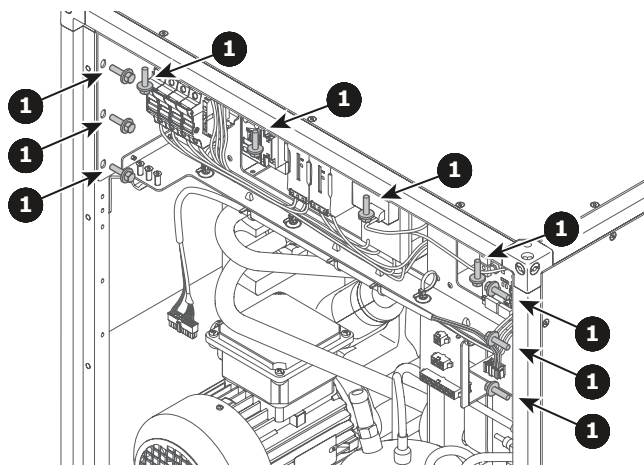


Image 11-13  
Installing the 10 screws

4. Install the Barco nameplate at the front of the chiller. Use a 3 mm Allen wrench to remove the screws.
5. Plug in the cable connector located below the logic board.



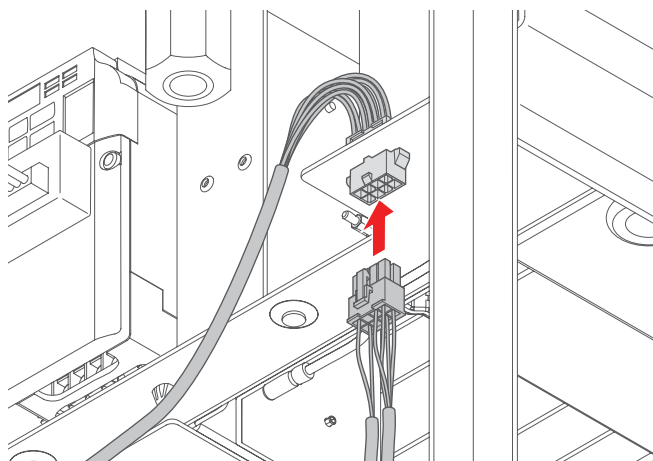


Image 11-14  
Plugging in the cable connector

6. If the Secondary cooling unit has been installed, plug in the cable connector to the Secondary cooling unit.

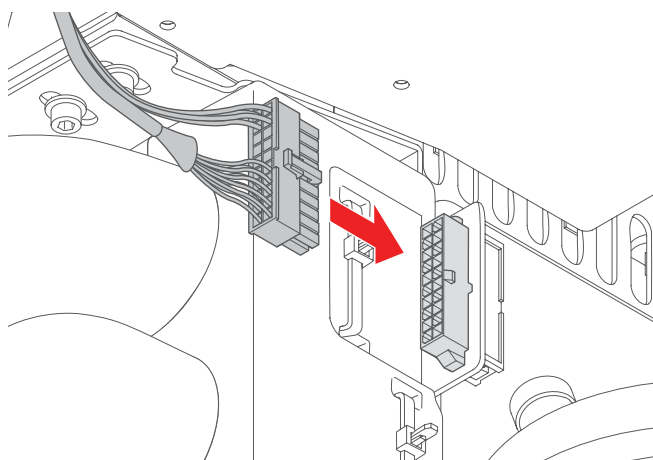


Image 11-15  
Plugging in the DMD cable connector

7. Connect the main pump motor wiring. See "Connecting the primary pump wiring", page 45.
8. Remove the compressor wiring connection cover (reference 2, image 11-16). In order to do so, remove the nut (reference 1) from the compressor.

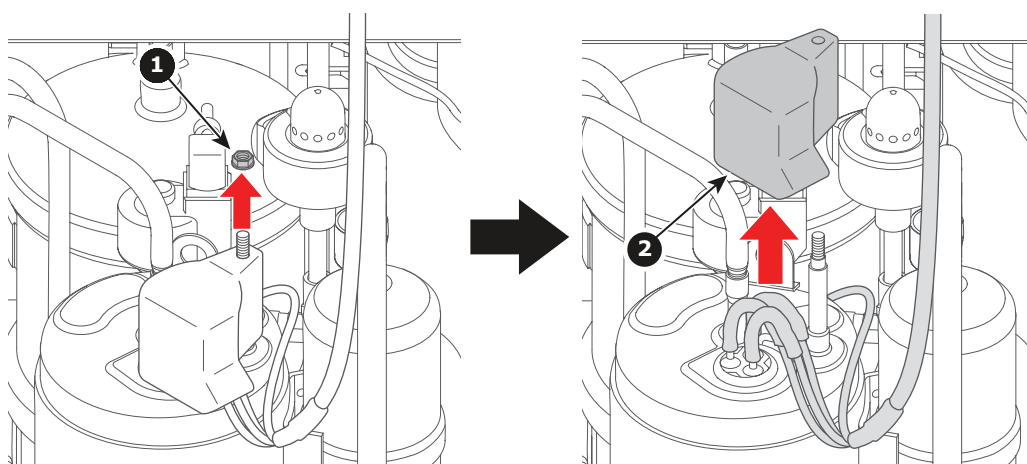


Image 11-16  
Removing the nut and wiring cover from the compressor

9. Connect the compressor wiring.

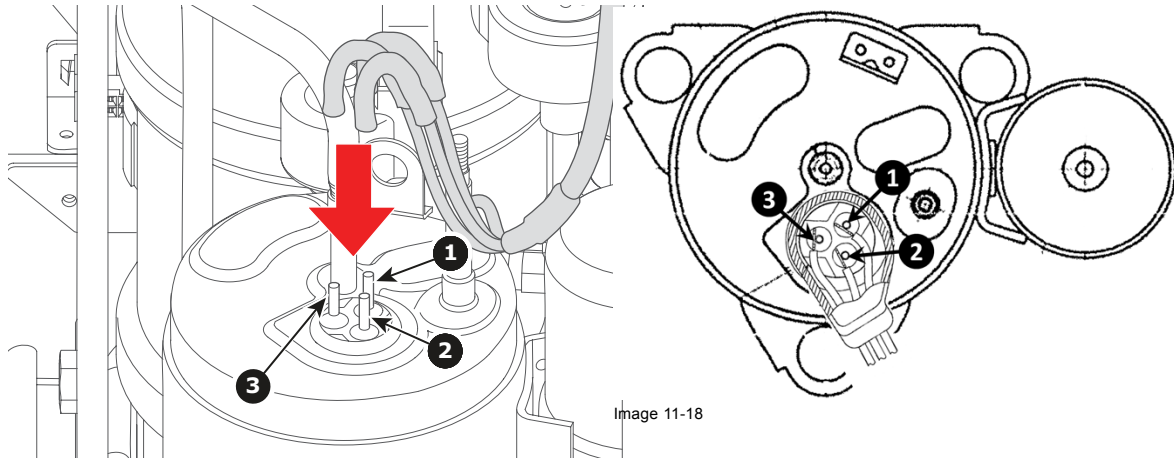


Image 11-17  
Connecting the compressor wiring

- 1 Cable ID '1'
- 2 Cable ID '2'
- 3 Cable ID '3'

**Warning:** Avoid damage to the compressor. Make sure the wires are correctly connected.

10. Install the screw (reference 1 image 11-19) and ground (GND) cable onto the compressor.

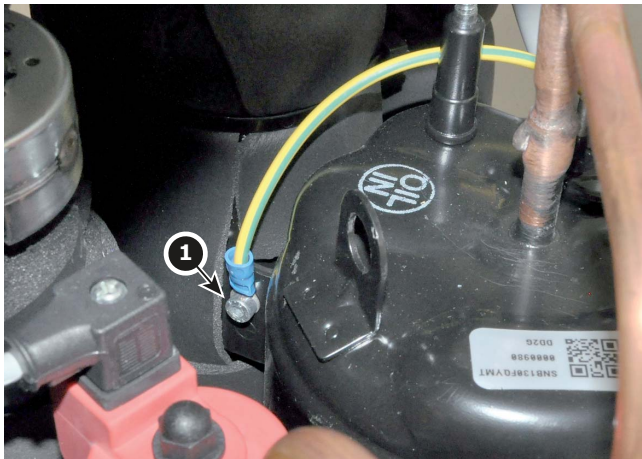


Image 11-19  
Connecting the compressor GND cable

11. Reinstall the compressor wiring connection cover and nut.

12. In case of the presence of the thermal switch cable, proceed as follows:

- If a thermal switch is present in the compressor, connect the two wires on the thermal switch contacts.

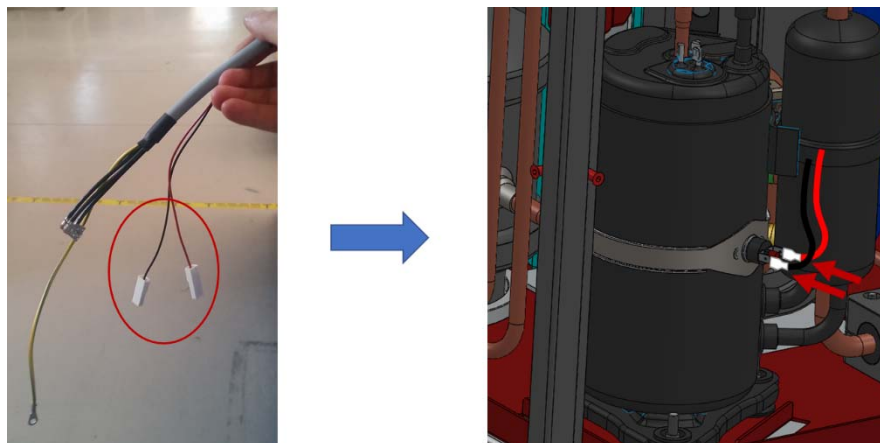


Image 11-20

- If a thermal switch is not present, use the jumper to short circuit the two wires.



Image 11-21

13. Refer to the chiller installation manual for the mains cable connection and chiller address setting.
14. Use the service tool wizard to install the parameters of the old logic board onto the new one.
15. Install all covers. See procedure "Installing a cover", page 18.

## 11.4 Replacing the logic board

### Description of the logic board

The logic board contains the central processing unit (CPU) and manages all inputs and outputs needed to control the chiller components and communicate with the projector(s).

### Necessary tools

Nut spanner 5.5 mm

### How to replace the logic board?

1. Start the Logic board replacement procedure, using the service tool wizard.
2. Use the wizard to store a backup of the logic board parameters onto your computer.
3. Unplug the 7 cable connectors (reference 1 image 11-22).

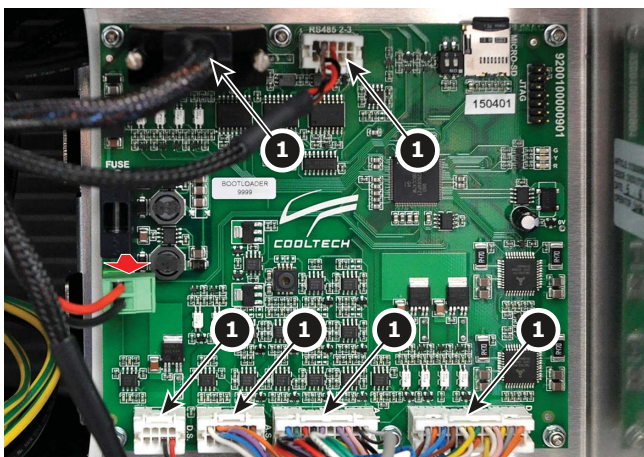


Image 11-22  
Unplugging 7 cable connectors

4. Remove the 6 screws (reference 1 image 11-23) using the nut spanner 5.5 mm.



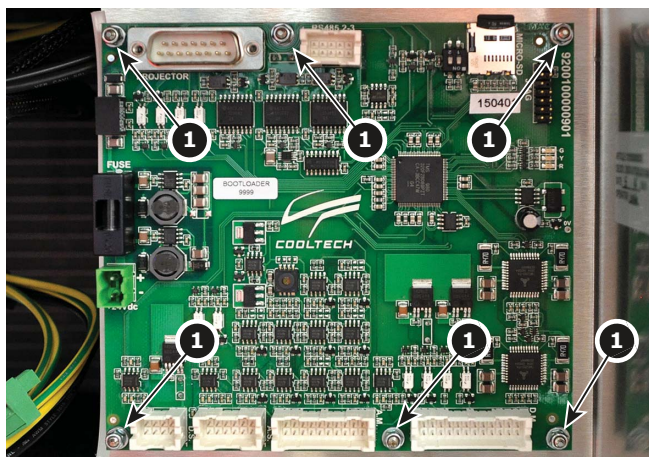


Image 11-23  
Removing 6 screws

5. Replace the logic board as illustrated.

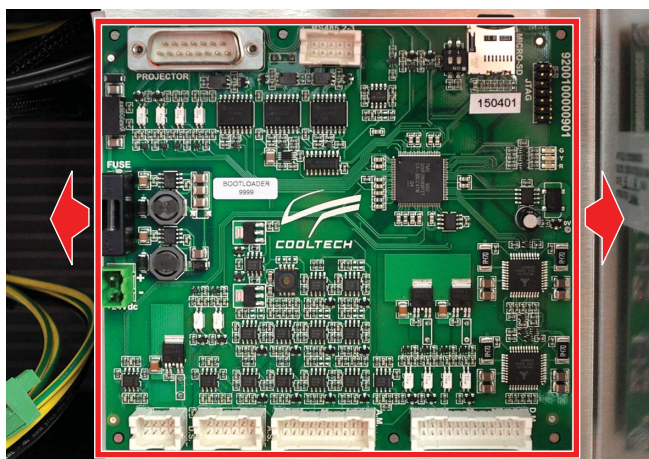


Image 11-24  
Removing the logic board

6. Install the 6 screws (reference 1 image 11-25) using the nut spanner 5.5 mm.

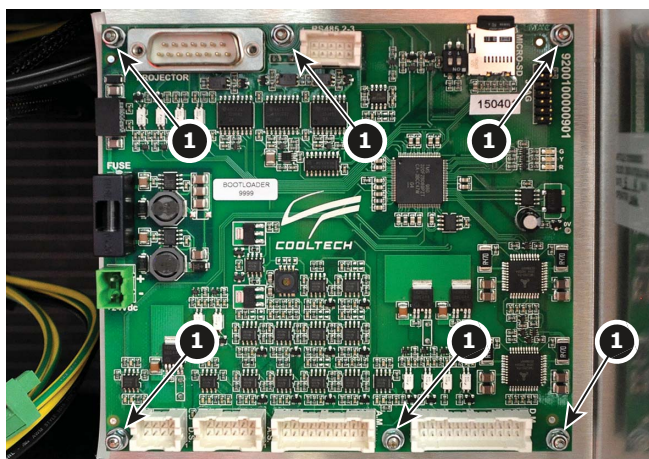


Image 11-25  
Installing 6 screws

7. Plug in the 7 cable connectors (reference 1 image 11-26).

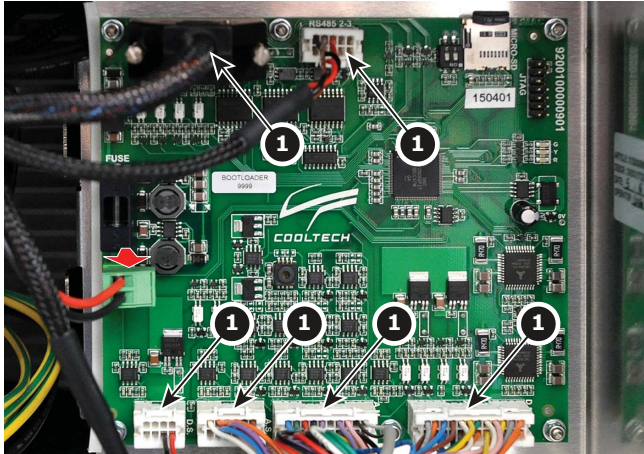


Image 11-26  
plugging in 7 cable connectors

8. Use the service tool wizard to push the parameters of the old logic board onto the new logic board.

## 11.5 Pump inverter replacement

### Description

The pump inverter (variable speed drive) controls the pump motor speed by varying the motor input frequency and voltage.

Each chiller has either of the following two possible inverter types installed:

- J1000
- V1000



The correct type of inverter is visible on the cover of the inverter itself.

### Overview

- Removing the J1000 pump inverter
- Installing the J1000 pump inverter
- Removing the V1000 pump inverter
- Installing the V1000 pump inverter

### 11.5.1 Removing the J1000 pump inverter

#### Necessary tools

- Phillips screwdriver PH1
- Allen wrench 3 mm



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.

#### How to remove the pump inverter?

1. Remove the front cover. See procedure "Removing a cover", page 17.
2. After switching off power, wait for at least 1 minute to allow the inverter capacitor to discharge.
3. Unplug the cable connector at the front cover of the pump inverter.

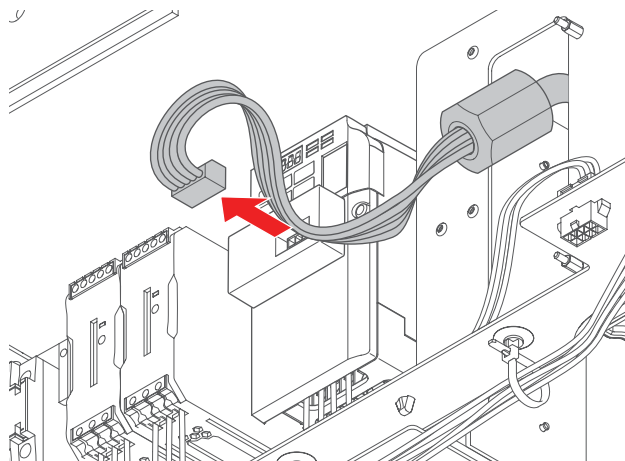


Image 11-27  
Unplugging the cable connector

4. Remove the screw (reference 1 image 11-28) of the front cover of the pump inverter.

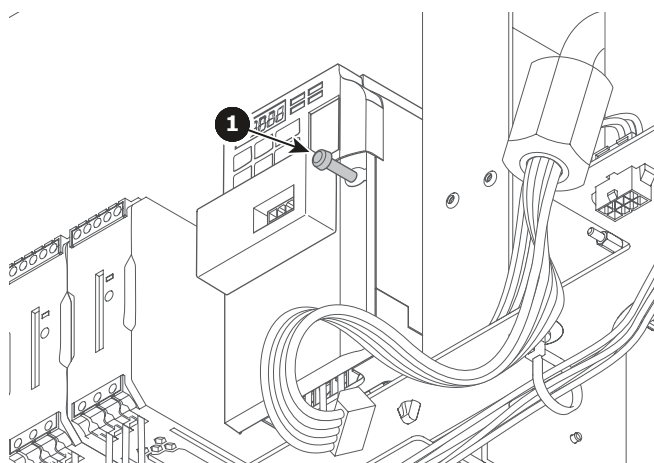


Image 11-28  
Removing the screw

5. Remove the front cover of the pump inverter.

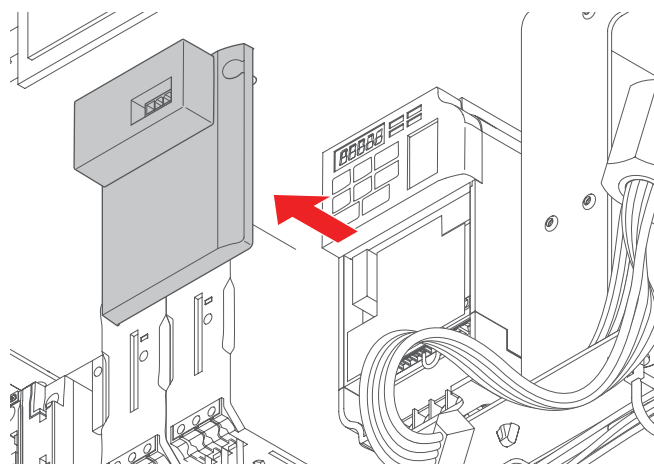


Image 11-29  
Removing the cover

6. Remove the 8 wires (reference 1 image 11-30) from the pump inverter.

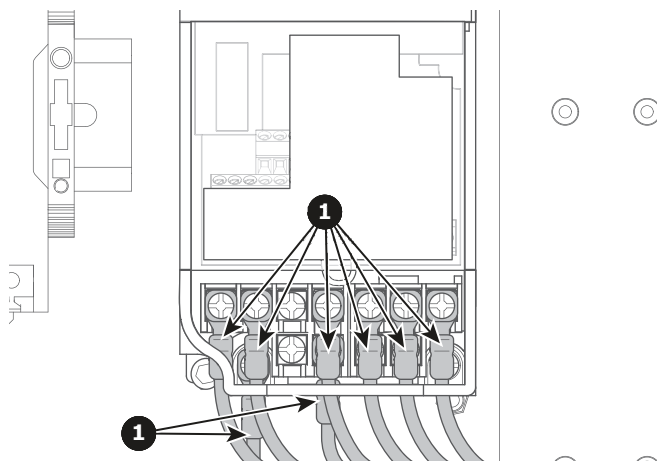


Image 11-30  
Removing the wires

7. Remove the 2 screws (reference 1 image 11-31).

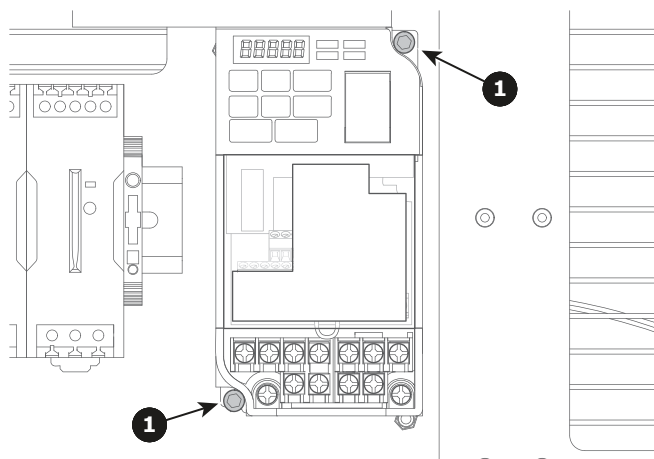


Image 11-31  
Removing the 2 screws

8. Remove the pump inverter.

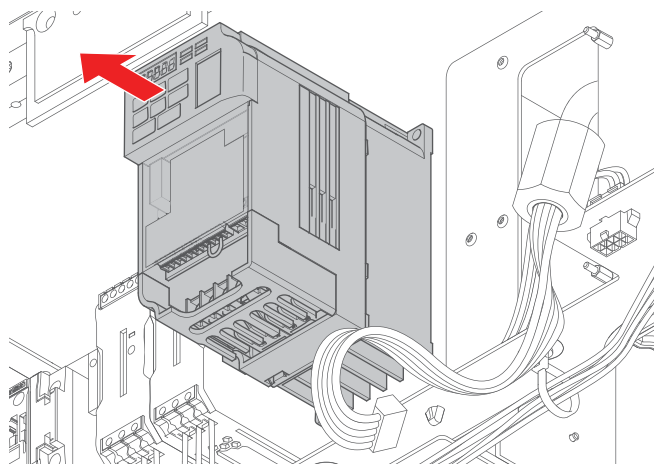


Image 11-32  
Removing the pump inverter

### 11.5.2 Installing the J1000 pump inverter



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.

## How to install the pump inverter?

1. Install the pump inverter.

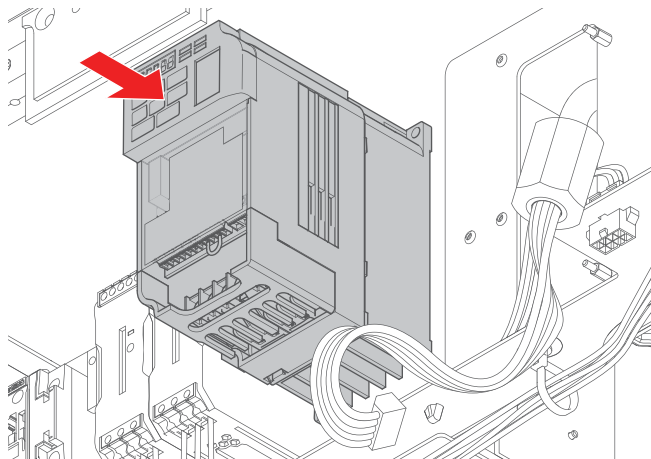


Image 11-33  
Installing the pump inverter

2. Install the 2 screws (reference 1 image 11-34).

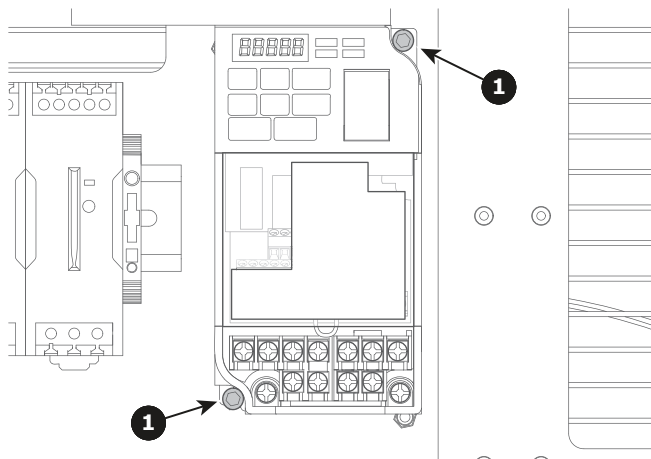


Image 11-34  
Installing the 2 screws

3. Connect the 8 wires from the pump inverter. Use the Phillips screwdriver PH2 to install the screws.

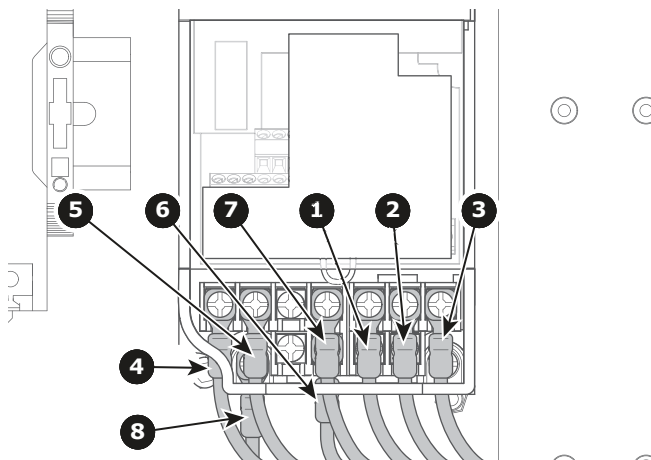


Image 11-35  
Connecting the wires

- 1 Pump motor connection '1' ('U')
- 2 Pump motor connection '2' ('V')
- 3 Pump motor connection '3' ('W')
- 4 'PMP INV N'
- 5 'PMP INV L'
- 6 'DC REACT'
- 7 '?'



8 'GND'

4. Install the front cover of the pump inverter.

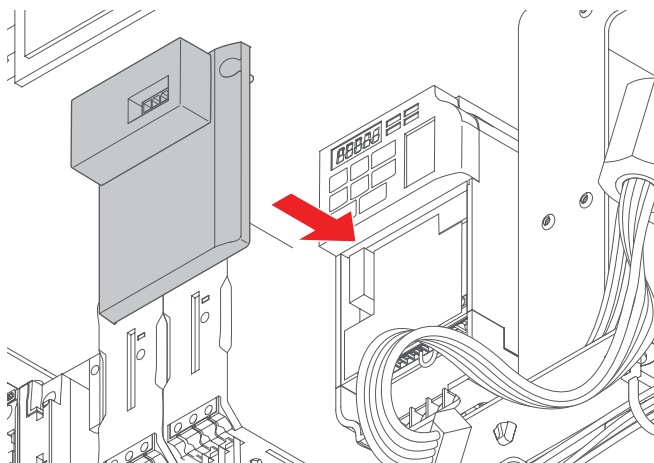


Image 11-36  
Installing the cover

5. Install the screw (reference 1 image 11-37) of the front cover of the pump inverter.

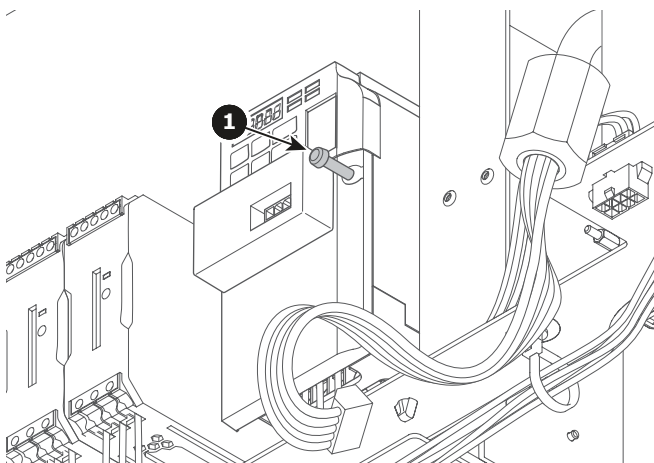


Image 11-37  
Installing the screw

6. Plug in the cable connector at the front cover of the pump inverter.

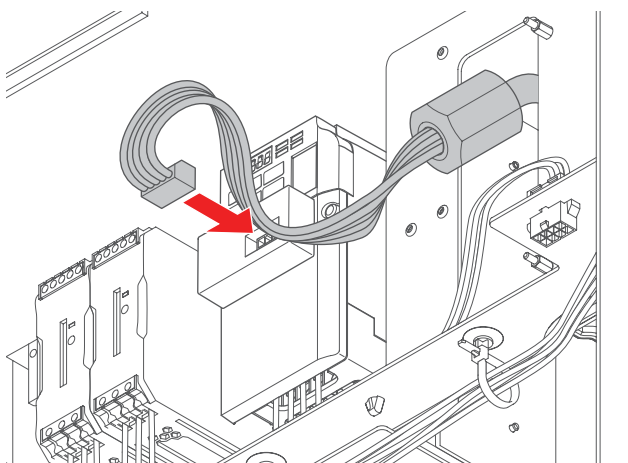


Image 11-38  
Plugging in the cable connector

7. Install the front cover. See procedure "Installing a cover", page 18

### 11.5.3 Removing the V1000 pump inverter

#### Necessary tools

- Phillips screwdriver PH1
- Allen wrench 3 mm
- Small flat screwdriver



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.

#### How to remove the pump inverter?

1. Remove the front cover. See procedure "Removing a cover", page 17.
2. After switching off power, wait for at least 1 minute to allow the inverter capacitor to discharge.
3. Unplug the cable connector at the front cover of the pump inverter.

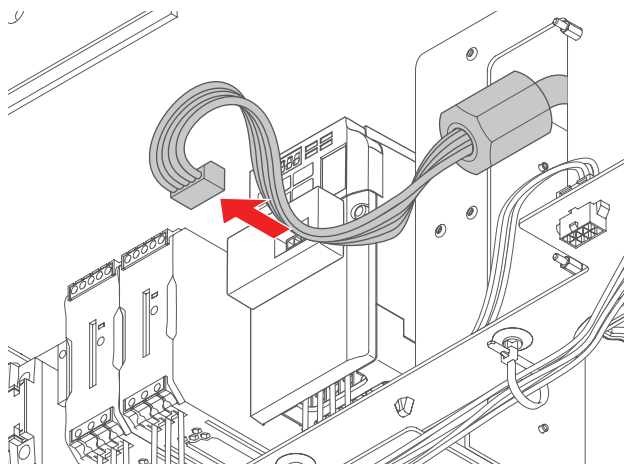


Image 11-39  
Unplugging the cable connector

4. Remove the screw (reference 1, image 11-40) on the front cover of the pump inverter. Use a PH1 Phillips screwdriver.

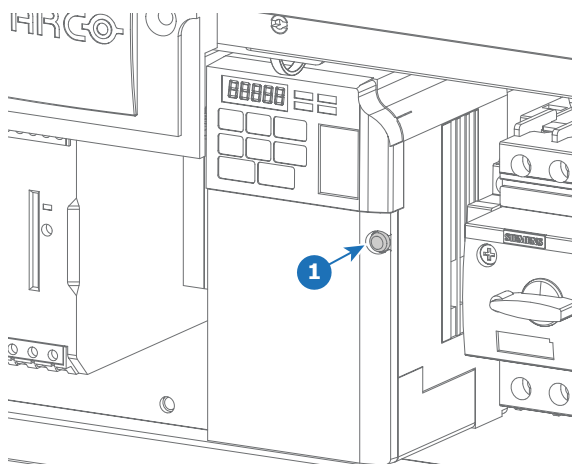


Image 11-40  
Removing the screw

5. Remove the cover of the inverter.

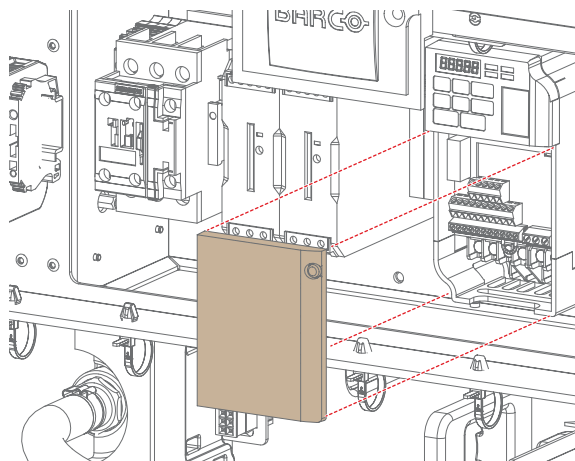


Image 11-41  
Removing the cover

6. Use a small flat screwdriver (2.5 mm or smaller) to release the terminal and pull the 8 wires out. Push the screwdriver down (1), turn the control wire (2) 45° (3) and pull it out of the terminal.

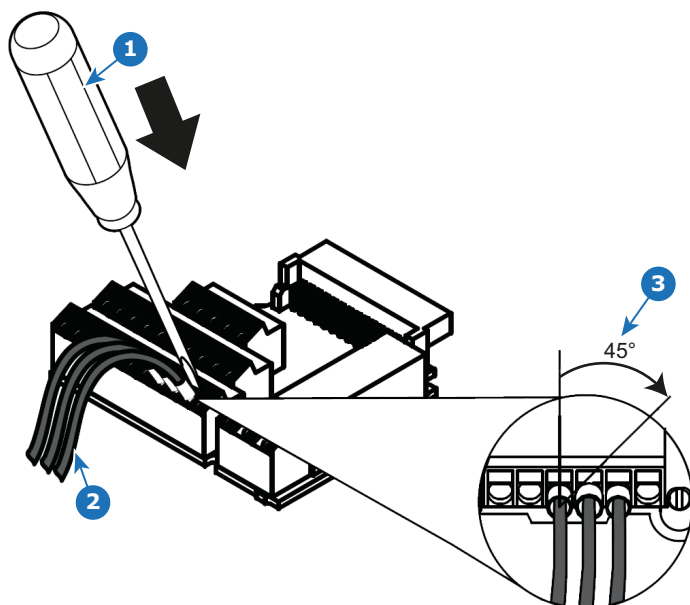


Image 11-42  
Removing the control wires

7. Use a small flat screwdriver to open the wiring terminals and remove the wiring.  
8. Remove the 2 screws (reference 1 image 11-43).

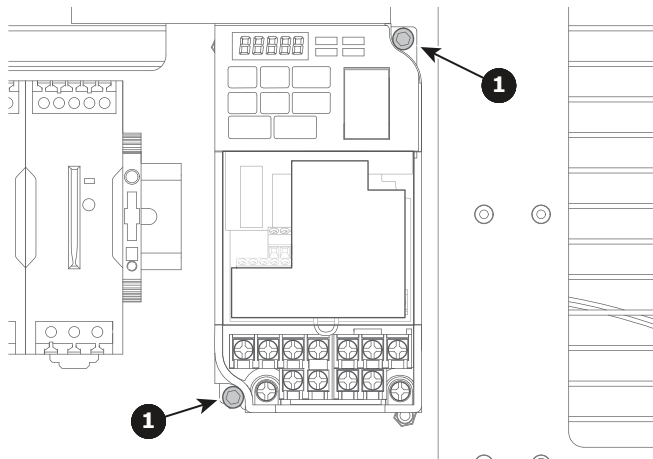


Image 11-43  
Removing the 2 screws

9. Remove the pump inverter.

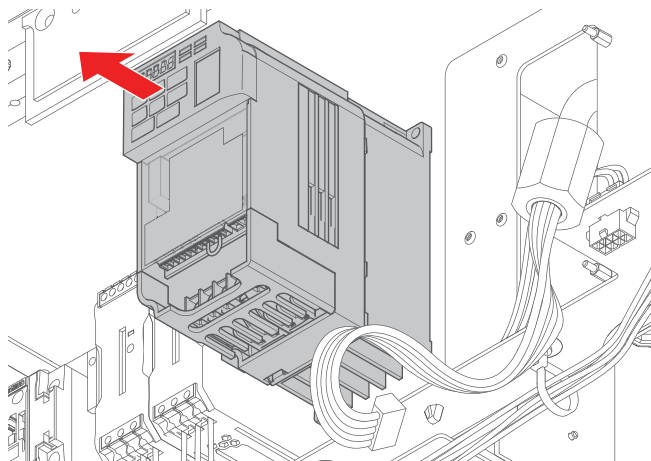


Image 11-44  
Removing the pump inverter

### 11.5.4 Installing the V1000 pump inverter



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.

#### How to install the pump inverter?

1. Install the pump inverter.

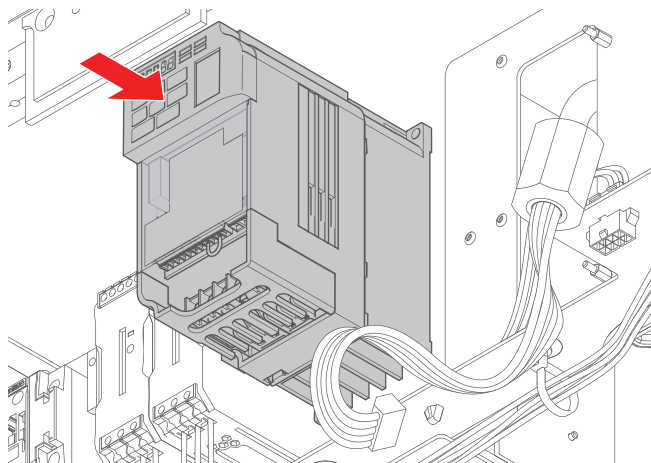


Image 11-45  
Installing the pump inverter

2. Install the 2 screws (reference 1 image 11-46).

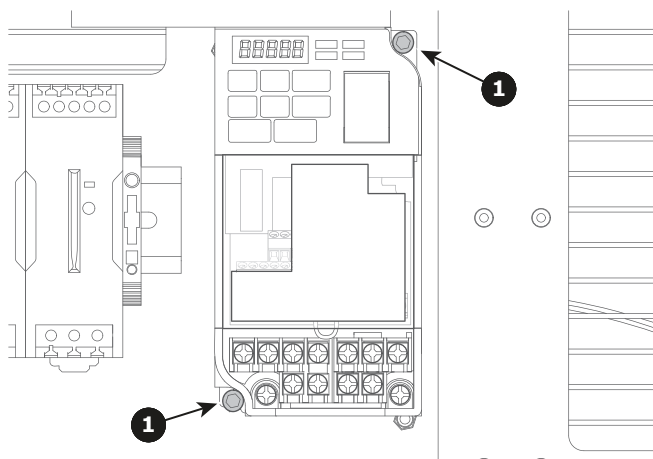


Image 11-46  
Installing the 2 screws

3. Connect the 8 wires from the pump inverter. Use the Phillips screwdriver PH2 to install the screws.

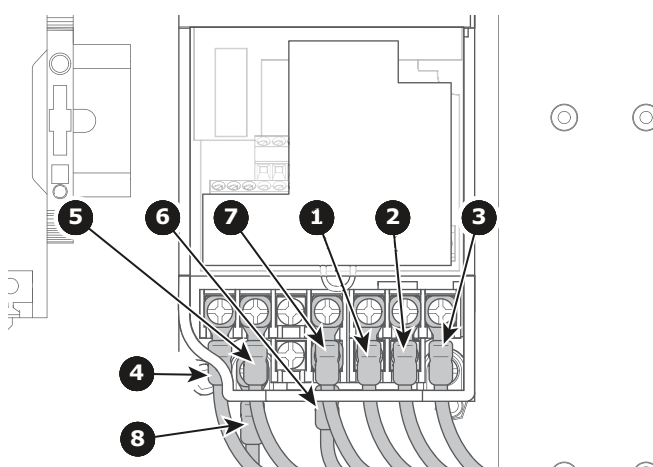


Image 11-47  
Connecting the wires

- 1 Pump motor connection '1' ('U')
- 2 Pump motor connection '2' ('V')
- 3 Pump motor connection '3' ('W')
- 4 'PMP INV' N'
- 5 'PMP INV' L'
- 6 'DC REACT'
- 7 '?'
- 8 'GND'

4. Use a small flat screwdriver (2.5 mm or smaller) to open the terminals and insert the communication cables.

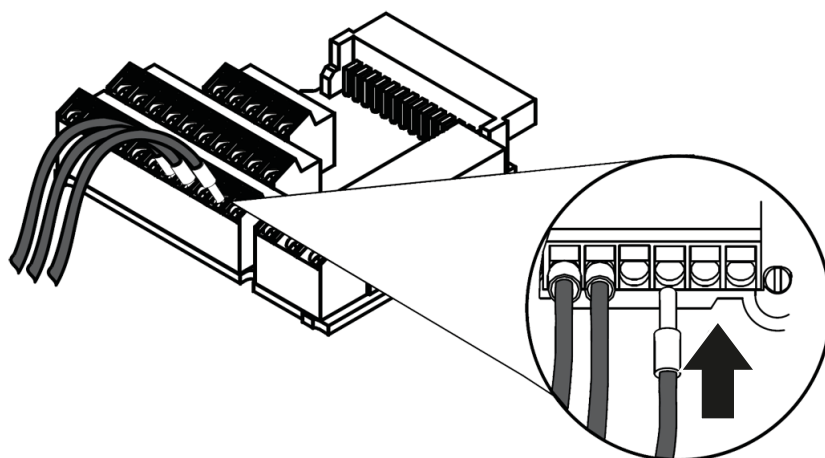


Image 11-48

**Tip:** Insert the communication cable wires as illustrated below.

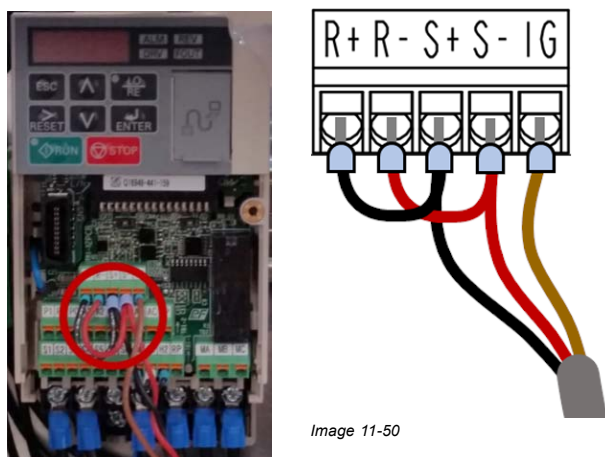


Image 11-49

Image 11-50

5. Install the front cover of the pump inverter.

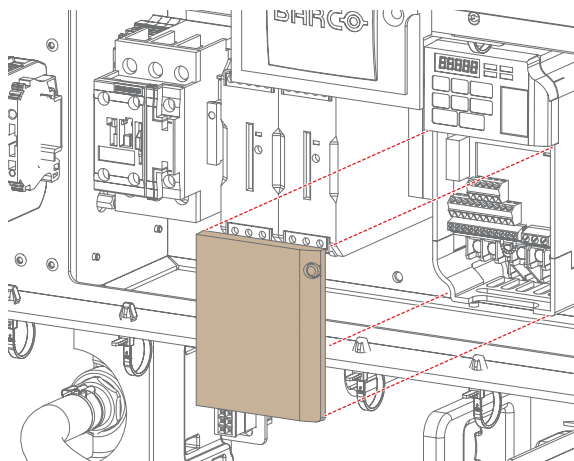


Image 11-51  
Installing the cover

6. Install the screw (reference 1 image 11-37) of the front cover of the pump inverter. Use a PH1 screwdriver.

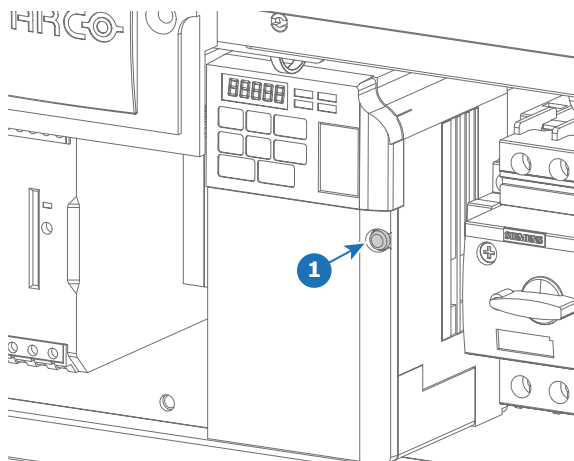


Image 11-52  
installing the screw

7. Plug in the cable connector at the front cover of the pump inverter.

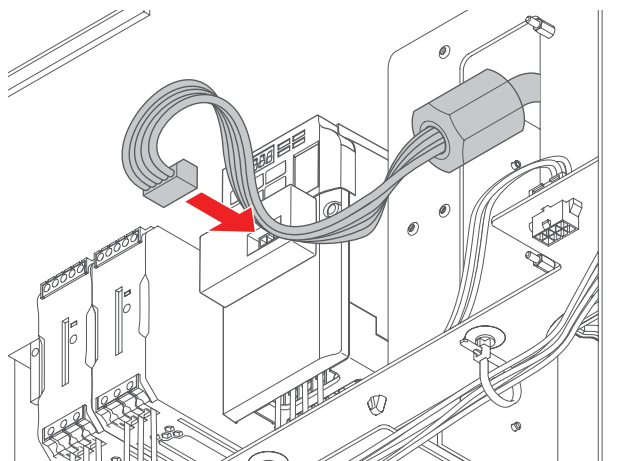


Image 11-53  
Plugging in the cable connector

8. Install the front cover. See procedure "Installing a cover", page 18





## 12. PRESSURIZATION UNIT

### Description of the pressurization Unit

The pressurization Unit ensures that the main coolant circuit as well as the DMD coolant circuit (if installed) is free of air and under the correct predefined working pressure. The pressurization Unit is equipped with a small pump to pressurize the coolant circuit and (if required) add fluid from the coolant tank.

### Overview

- Removing the pressurization Unit
- Installing the pressurization Unit

### 12.1 Removing the pressurization Unit

#### Necessary tools

Nut spanner 8 mm



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.

#### How to remove the pressurization Unit?

1. Remove the Fan unit. See procedure "Removal of the fan unit", page 21.
2. Unplug the cable connector.

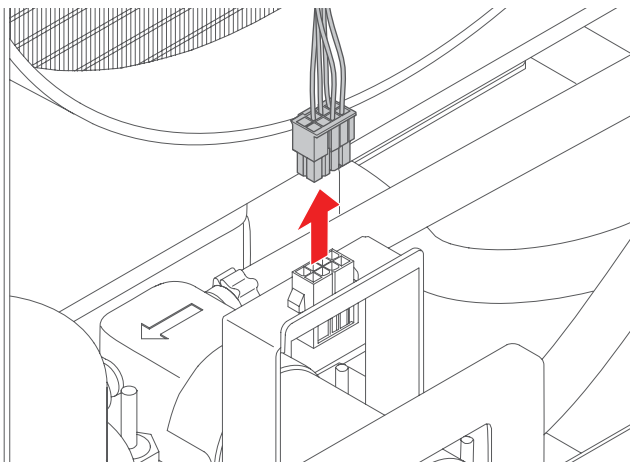


Image 12-1  
Unplugging the cable connector

3. Disconnect the two hoses "E" and "D".

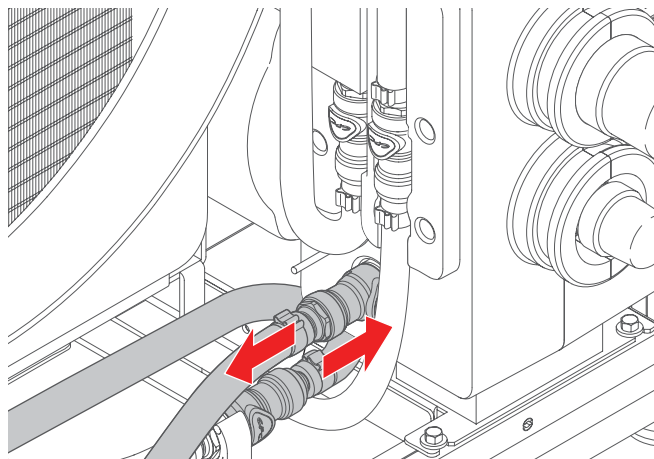


Image 12-2  
Disconnecting the two hoses

**Note:** Remove the surrounding DMD hoses for better accessibility.

4. Remove the 4 nuts (reference 1 image 12-3). Use the nut spanner 8 mm to remove the nuts.

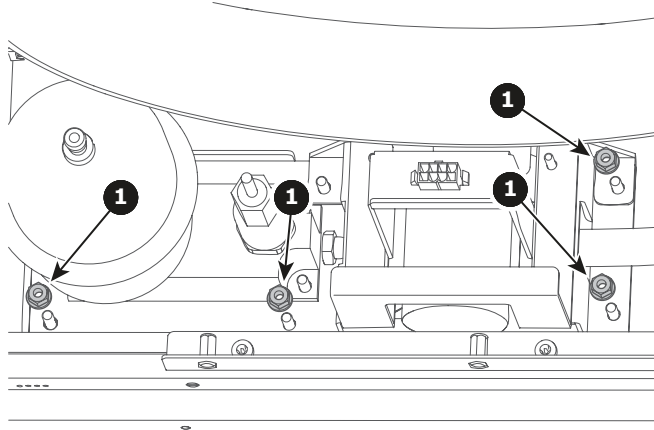


Image 12-3  
Removing the 4 nuts

**Note:** Only these 4 screws must be removed. The other screws must not be removed.

5. Remove the pressurization Unit.

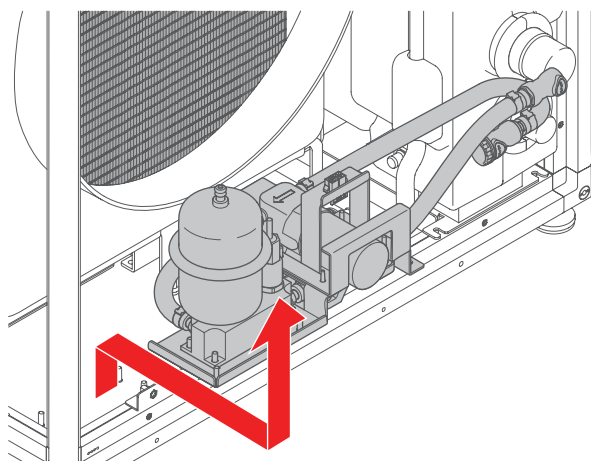


Image 12-4  
Removing the pressurization Unit

## 12.2 Installing the pressurization Unit



This procedure assumes that power has been switched off. Unless otherwise stated, power must be off prior to start with this procedure. To switch off power, see procedure "Switching off power and locking the switch", page 15.

### How to install the pressurization Unit?

1. Install the pressurization Unit.

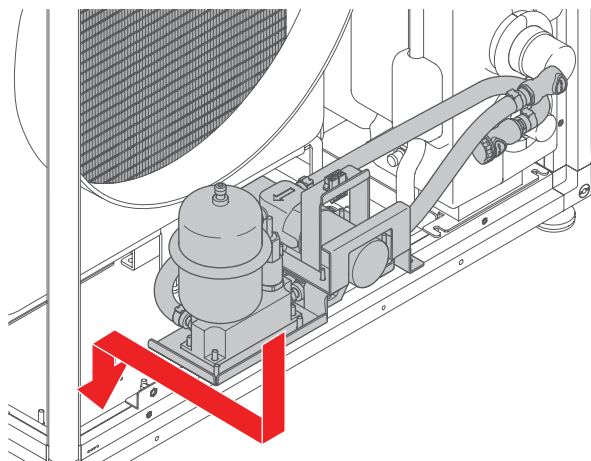


Image 12-5  
Removing the pressurization Unit

2. Install the 4 nuts (reference 1 image 12-6). Use the nut spanner 8 mm to install the nuts.

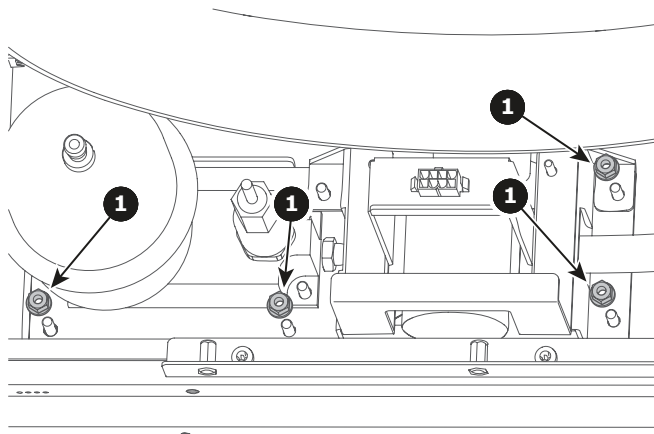


Image 12-6  
Installing the 4 nuts

3. Connect the two hoses "E" and "D".

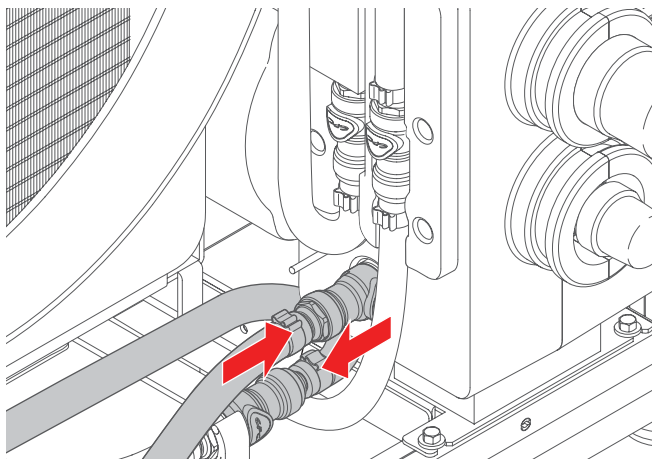


Image 12-7  
Connecting the two hoses

**Note:** Reinstall the surrounding DMD hoses if removed.

4. Plug in the cable connector.

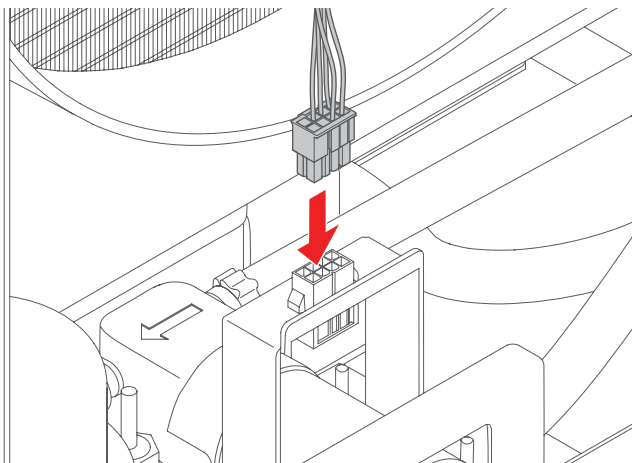


Image 12-8  
Plugging in the cable connector

5. If no further service is required, install the Fan unit. See procedure "Installation of the fan unit", page 22.

## 13. AIR FILTER

### Overview

- Replacing the filter
- Vacuum cleaning of the dust filters

### 13.1 Replacing the filter

#### How to replace

1. Unscrew the screws (A).

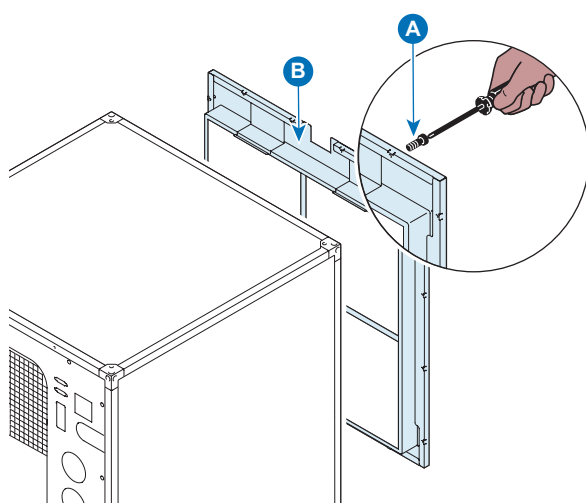


Image 13-1

2. Remove the front cover (B).
3. Lift the fasteners (C).

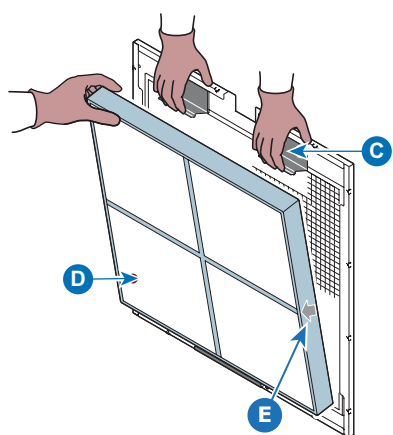


Image 13-2

4. Remove the filter (D).
5. Take a new filter and insert it at the back of the cover. Lift up the fasteners to mount the filter correctly.  
**Caution:** Pay attention to the airflow direction of the filter (E)
6. Mount the cover and fix the screws.

## 13.2 Vacuum cleaning of the dust filters

---

### When to vacuum the dust filters?

The dust filters should be checked every month. If the filters are contaminated with dust then cleaning the filters with a vacuum cleaner should be sufficient. However, the filters are not washable. If the filters cannot be improved by vacuum cleaning it, replace the filters.



**Grease on the filter can build up after several months in an environment contaminated with greasy air. Note that areas where popcorn is consumed are subject to greasy air.**

---



**This procedure assumes that the dust filters are removed from the chiller. See procedure "Replacing the filter", page 93.**

---

### Necessary tools

Vacuum cleaner with soft brush suction nuzzle.

### How to vacuum-clean the dust filter?

1. Carefully vacuum the air inlet side of the dust filter. Use a vacuum cleaner with a soft brush suction nuzzle. The air inlet side of the dust filter is the side which is surrounded with a glue edge.

**Tip:** *Lightly tap the filter on its dusty side to expel heavy dust contamination.*

**Tip:** *Compressed air is also permitted to clean the filters but take care not to damage them.*

**Caution:** *Do not damage the dust filter. Replace damaged dust filters immediately.*

## A. APPENDIX

### A.1 Hazards

---

#### **Safety notice Sodium Carbonate ( $\text{Na}_2\text{CO}_3$ )**

According to the Material Safety Data Sheet (MSDS), Sodium Carbonate could cause the following hazards:

- Potential Acute Health Effects: Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation (lung irritant).
- Potential Chronic Health Effects: Slightly hazardous in case of skin contact (sensitizer). The substance may be toxic to upper respiratory tract, skin, eyes. Repeated or prolonged exposure to the substance can produce target organ damage.





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