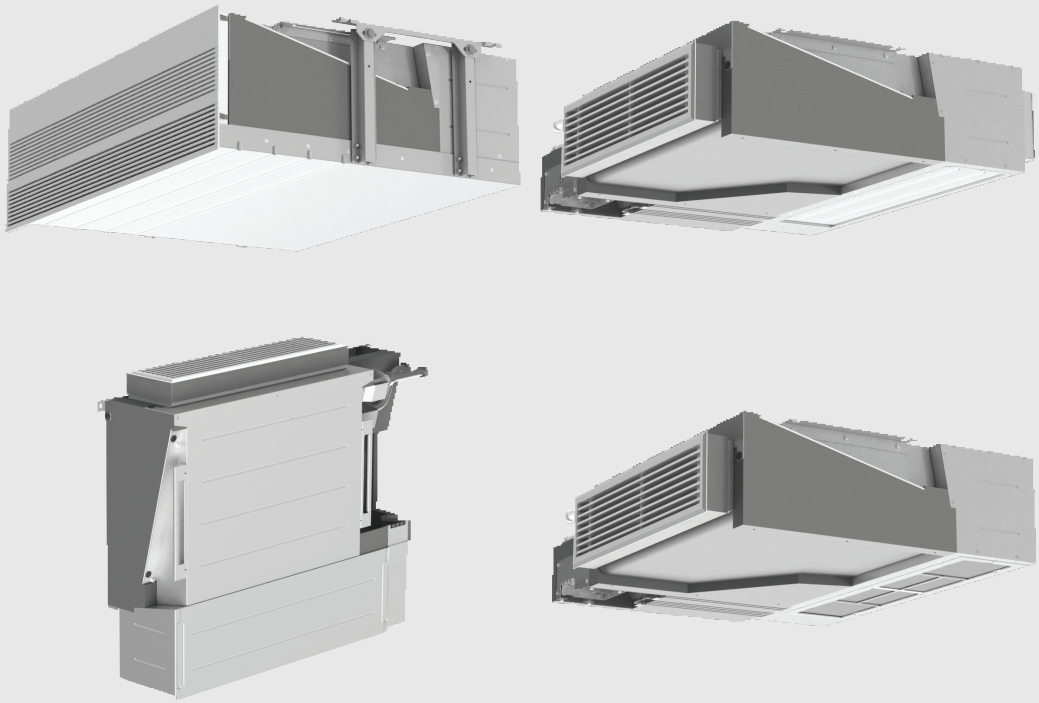
Chiller

BLOCK

Vari & Vari Pro

Installation, Operation, and Maintenance Manual



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N03229971 Rev. B

Chiller Oy will not assume responsibility for any errors or shortcomings that may appear in this document. The end user is responsible for ensuring that the unit operates appropriately and safely. Working with electric components is subject to permission. Always abide by the existing national legislation, regulations and standards.

Chiller Oy is constantly developing its products and reserves the right to change its products.

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Approvals and version history

REVISION	DATE	DESCRIPTION OF CHANGE	APPROVED BY
A	01.02.2022	First issue	MH
B	14.03.2023	Second issue	MH

Contents

1 General

1.1 About this manual

This Installation, Operation, and Maintenance Manual has been prepared as general instructions for appropriate installation, operation, and maintenance procedures. When operating the unit, always follow the precautionary instructions related to each component as well as the regulations and recommendations given by the local authorities.

The unit must be installed, operated, and maintained by a professional and in such a way that it does not cause danger to humans, the environment, or the unit itself. The unit must not be used for other than its intended purposes without a written consent from the manufacturer.

NOTICE

Before you start to install, operate, or maintain the system, read this manual carefully and familiarize yourself with all of the instructions.

Keep the manual for later reference.

1.2 Guarantee

The guarantee for this unit is based on the terms of guarantee of Chiller Oy.

The guarantee becomes void if:

- The product is modified or repaired without a written consent from Chiller Oy.
- The unit parameters are modified without permission.
- The configuration of the unit is changed.
- The installation site, unit connections, installation ground, or installation procedures do not follow these instructions.
- The instructions in this Installation, Operation, and Maintenance Manual are not followed.

The guarantee does not cover damages if:

- The user does not follow the instructions of the manufacturer.
- The unit is used in a way that it is not designed for and that causes damage to the unit.
- The unit is not maintained according to the schedule and instructions in this manual.

Note! Warranty claims are processed only if the complete type and serial numbers of the unit (see Section 2.3 Type plate) are notified to the manufacturer in written form.

1.3 Inspection of the unit

The units are shipped from the factory as assembled (apart from some accessories), wired, and tested. In some unit models, part of the grille is shipped

in a separate package for mounting onto the lower surface of the lowered ceiling after installation.

When you receive the unit:

1. Inspect the delivery against the order.
2. Verify that the contents of the delivery meet the order.
3. Inspect all the delivered units carefully.

    a. If the units have transport damages, notify the expeditor and the seller of them.

    b. Record the transport damages on the bill of freight.

    c. Send a complaint about the damages to the transport company within 24 hours of delivery.

1.4 Related documentation

In addition to this manual, the unit is delivered with a unit-specific wiring diagram.

In case you need a new wiring diagram, you can order it. You need the unit serial number from the type plate for the order (see *Section 2.3 Type plate*).

2 Unit overview

2.1 Introduction of the unit

The BLOCK fan coil unit is designed for room air conditioning. BLOCK is available in three different variants: BLOCK front, BLOCK free, and BLOCK duct. BLOCK can be equipped with two automation options: Vari and VariPro.

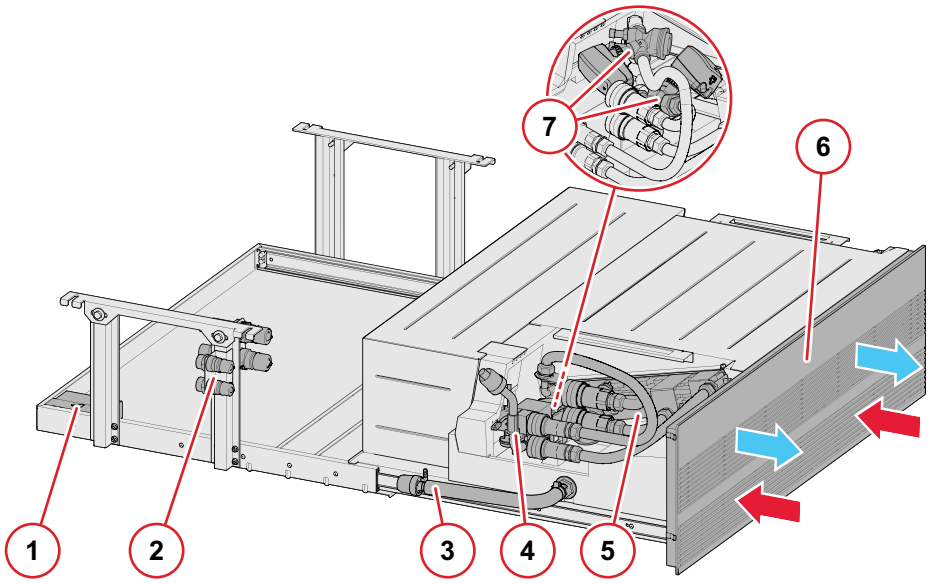


Figure 1: BLOCK front (horizontal installation)

1. *Electrical box*
2. *Water connections*
3. *Condensate pump outlet (option)*
4. *Free drain outlet, sewerage (option)*
5. *Coil, water connections*
6. *Grille with filter*
7. *Valves (option)*

BLOCK front is installed horizontally. BLOCK front can be maintained from the wall side through the ventilation grille and requires no maintenance hatch. BLOCK front draws air from the front (red arrows) and directs it back to the room from the same side (blue arrows).

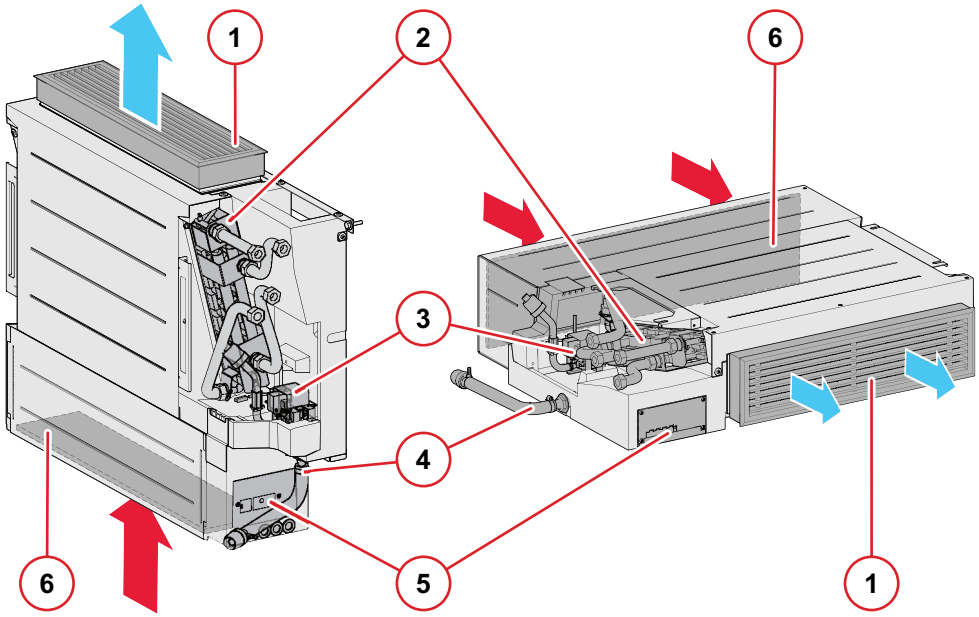


Figure 2: BLOCK free (horizontal & vertical installation)

1. *Pressure-air duct and grille*
2. *Coil, water connections*
3. *Condensate pump outlet (option)*
4. *Free drain outlet, sewerage (option)*
5. *Electrical box*
6. *Suction chamber and air filters*

BLOCK free can be installed vertically or horizontally. BLOCK free draws air freely from the room from one end (red arrows) and pushes the cool air out from the other end (blue arrows).

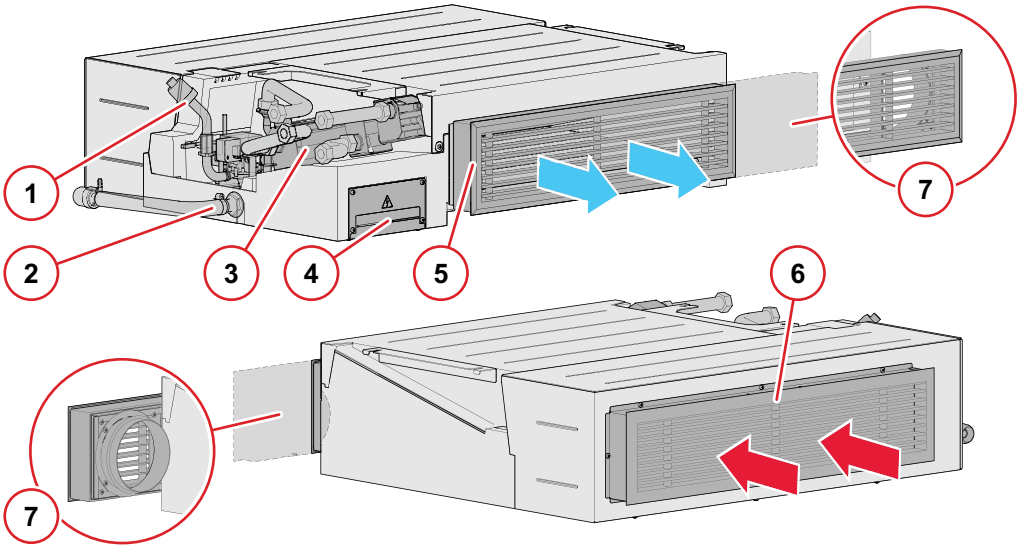


Figure 3: BLOCK duct (horizontal installation)

1. *Condensate pump outlet (option)*
2. *Free drain outlet, sewerage (option)*
3. *Coil, water connections*
4. *Electrical box*
5. *Pressure-air duct and grille*
6. *Air filters*
7. *Fresh air connection (option)*

BLOCK duct is installed horizontally, and it is connected to a ducting system. BLOCK duct draws air from one end of the unit (red arrows) and pushes the cool air out from the other end (blue arrows). BLOCK duct is available with an optional fresh air connection. The suction duct can be directed to the back or to the bottom.

Note! The size of the grille depends on whether the fresh air connection option is enabled at the ordering stage.

2.2 Unit dimensions

The unit comes in three variants: BLOCK front, BLOCK free, and BLOCK duct.

Note!
The unit dimensions are given as a reference. Chiller Oy reserves the right to make changes to the dimensions. For more detailed dimensions, see the unit-specific dimensional drawings.

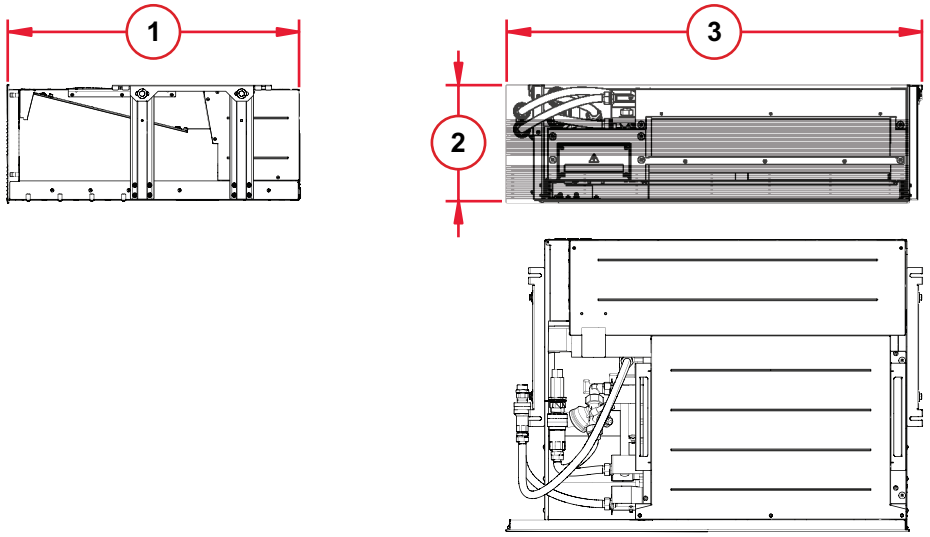


Figure 4: Unit dimensions of BLOCK front

1. *1,049 mm*
2. *300 mm*
3. *738 mm*

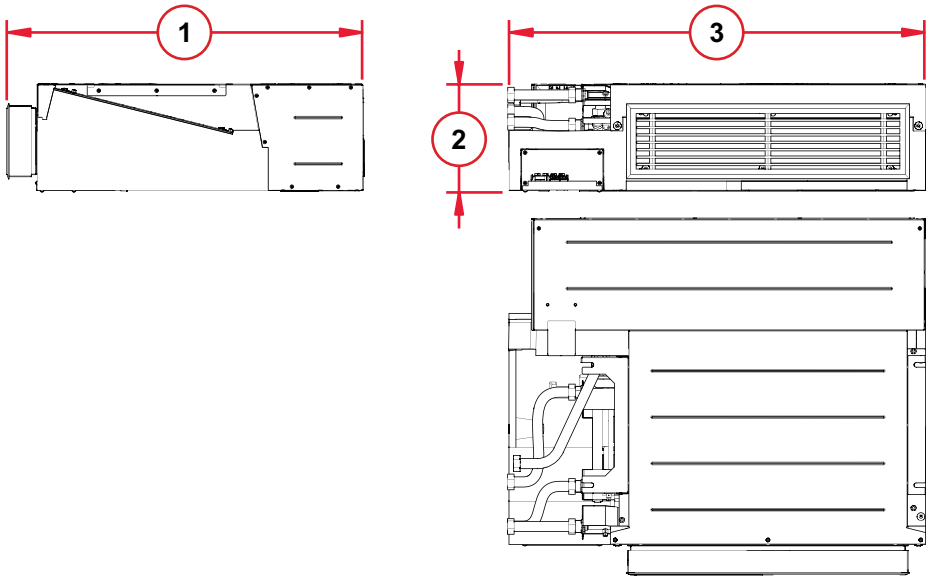


Figure 5: Unit dimensions of BLOCK free (horizontal installation)

1. *1,020 mm*
2. *231 mm*
3. *780 mm*

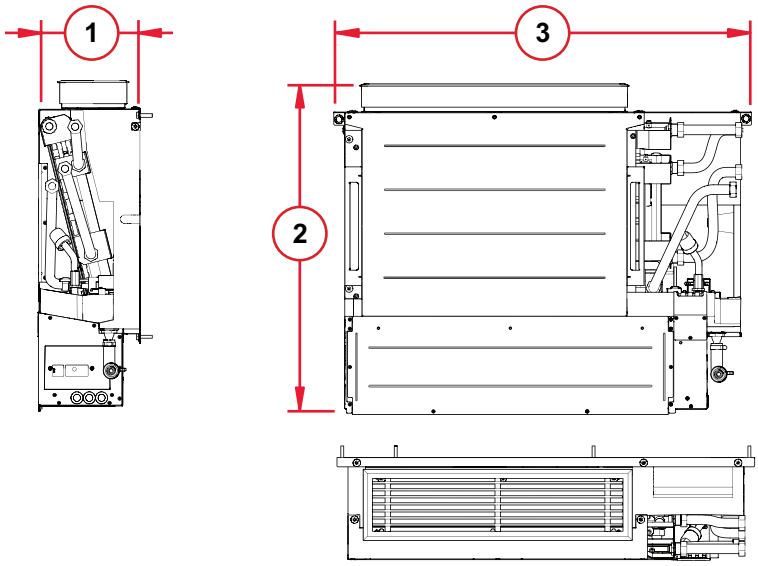


Figure 6: Unit dimensions of BLOCK free (vertical installation)

1. *232 mm*
2. *692 mm*
3. *950 mm*

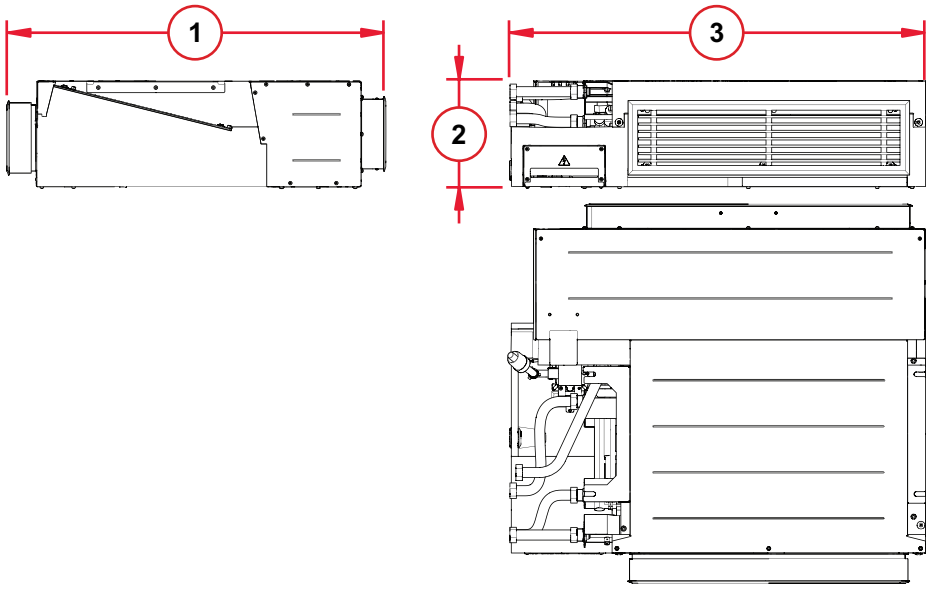


Figure 7: Unit dimensions of BLOCK duct (return air from the back)

1. *854 mm*
2. *229.5 mm*
3. *1,050 mm*

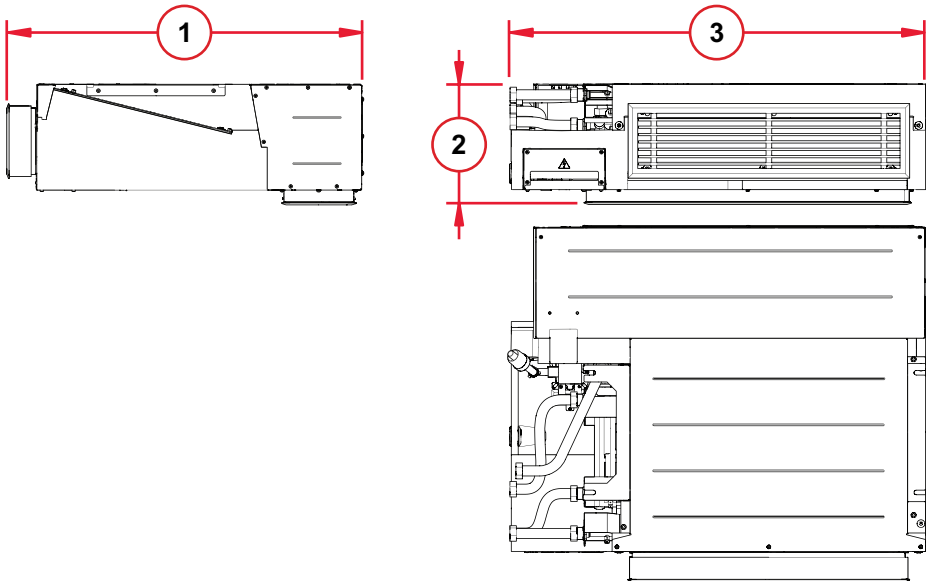


Figure 8: Unit dimensions of BLOCK duct (return air from the bottom)

1. *789 mm*
2. *280 mm*
3. *1,020 mm*

2.3 Type plate

One type plate is located above the outlet opening and another one is located on the electrical box cover. The type plate above the outlet opening is visible when you remove the intake grille and filter.

Note! Record the type plate information on the unit card and file it carefully. The type and serial numbers of the unit are required for identifying the unit when, for instance, purchasing spare parts.

When you order spare parts or maintenance, you always need the serial number. You cannot make an order without the serial number.

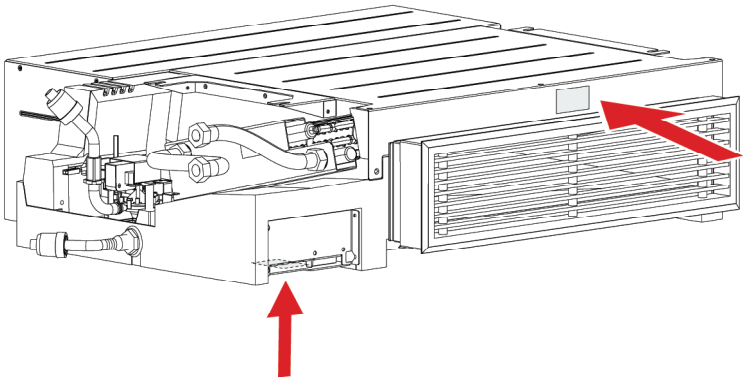


Figure 9: Type plates

For type plate information, refer to Table *1: Type plate information*.

Table 1: Type plate information

TYPE	Unit type	Including accessories (18 characters consisting of letters and numbers)
SER.NR.	Unit serial number	Seven (7) number combination
POWER	Power type	230 VAC, 50 Hz
INPUT	Electrical information	Input power W and current A, max. values*: Dual fan version: 94 W 0.9 A
MANUF.DATE	Date of manufacture	
*The actual input power of the unit is usually below the max. value. For specific information, please contact your nearest reseller.		

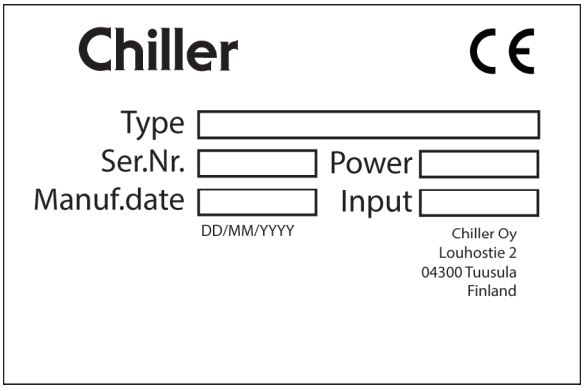


Figure 10: Example of the type plate

2.4 Automation options and control connections

The unit is available with two automation options referred to as Vari and Vari Pro. The automation option is selected during the unit order. Once the unit is delivered, you can see the automation type on the type plate (“Type”, unit type is either Vari or Vari Pro). The automation option of the unit affects the way the fan coil is controlled and what external equipment can be connected to the unit.

Note! Perform all electrical connections always according to the wiring diagrams supplied with the unit delivery.

Note! When connecting the alarm signal to the BMS, add a 30 s filter time to alarm management.

2.4.1 Vari-option

The automation option Vari has the following properties:

- Analogue control (0-10 V and 24 V AC/DC for on/off on all inputs)
- Suitable for analogue control from building automation or traditional room controller

- Potential free alarm contact, open in alarm or when unit not powered
- No additional sensor inputs or control outputs.

See *Appendix A Vari-option control connections* for further details.

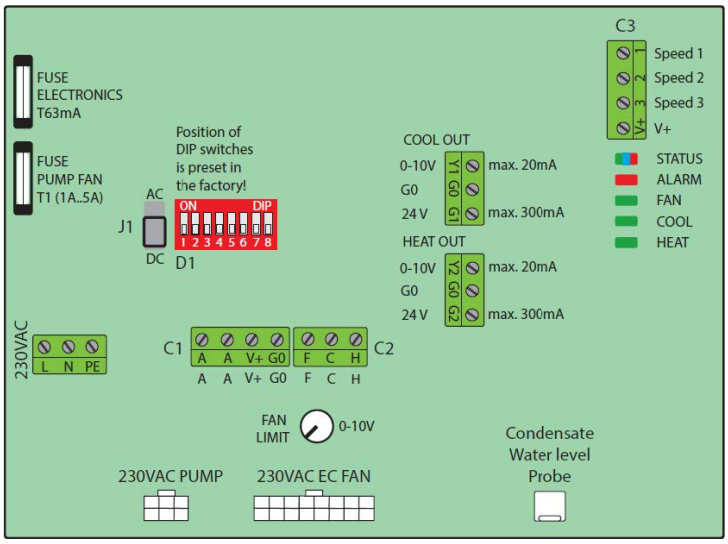


Figure 11: Vari control card

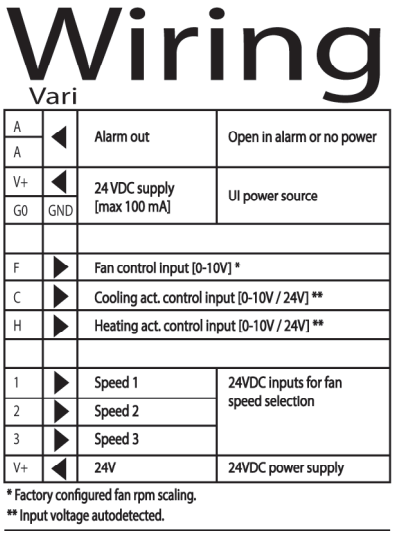


Figure 12: Vari wiring instructions on the electrical box cover

2.4.2 Vari Pro-option

The automation option Vari Pro has the following properties:

- Control with the Vari Pro graphical room controller or directly by Modbus RTU from building management system
- 1 analogue sensor input (defined during unit order process)
- 1 digital control output (defined during unit order process)
- No analogue control options.

Note! Vari Pro has advanced timed functions, such as valve exercise every 24 hours. The unit will resume normal operation after the timed function has ended.

See *Appendix B Register listing for Vari Pro-option* for further details.

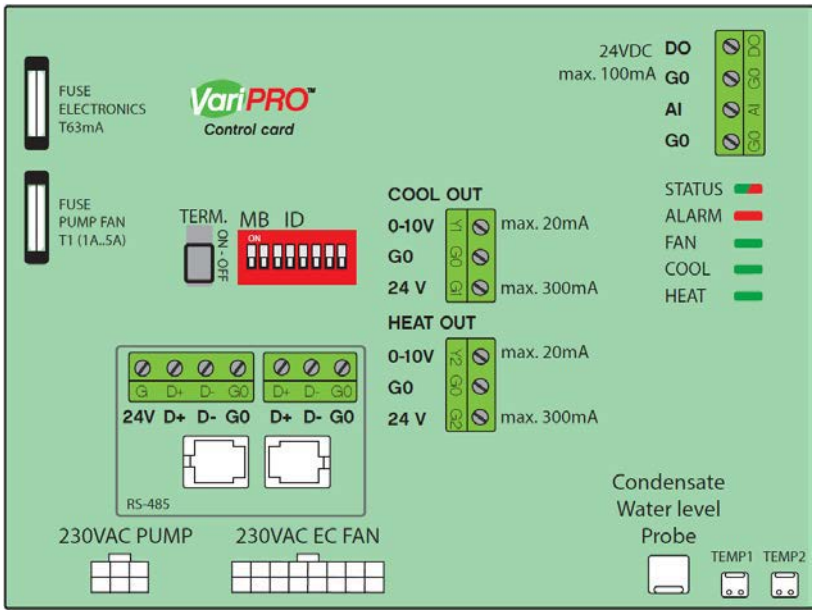


Figure 13: Vari Pro control card

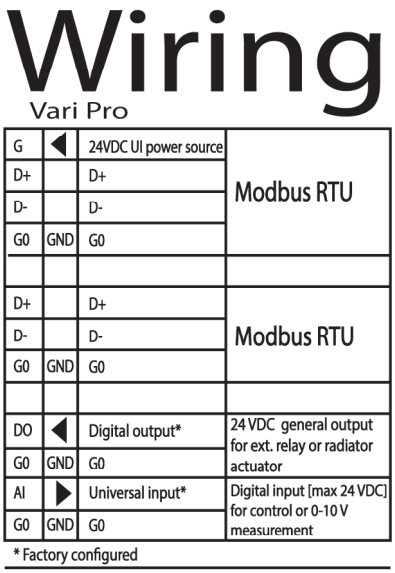


Figure 14: Vari Pro wiring instructions on the electrical box cover

3 Safety

3.1 General safety instructions

This unit is designed so that it does not expose people to hazard or risk, provided that:

- The unit is installed, operated, and maintained according to the instructions in this manual.
- No structural changes are made to the unit.

3.2 Safety-related signs

These are the safety-related signs used in this manual.

DANGER

DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Note! Notes are used to indicate important information and useful tips.

3.3 Safety symbols

Hazard symbols

These symbols indicate a hazardous situation or action. Symbols are used to warn of situations, which can cause environmental damage and personal injury.

	General warning sign
	Electrical hazard

Prohibited action symbols

These symbols are used in warnings and notifications to indicate an action that should not be taken. The prohibited action symbols are shown below.

	Limited or restricted access
	Do not touch

Mandatory action symbols

These symbols are used in warnings and notifications to indicate an action that must be taken. The mandatory action symbols are shown below.

	Read the manual or instructions

4 Installation of the unit

4.1 General installation instructions

CAUTION

Only professionally skilled and qualified personnel can install the unit.

Note! Always follow local safety regulations when you install, operate, and maintain the unit.
Read these instructions carefully before you install the unit.

When you install the unit, make sure that:

- The unit is mounted firmly and that it does not cause danger or harm to any person, object, structure, or equipment.
- All instructions given by the manufacturer and seller are followed.
- Installation, lifting, and moving the unit is performed carefully.
- Fire safety and the availability of fire equipment is ensured when performing welding or soldering operations.
- There are shut-off valves in the line.

Note! The manufacturer is not accountable for installations that have not been performed according to the installation instructions, or for using the unit in conditions that differ from those specified in Section 4.2 Choosing the installation site .

The installation concept "Install, Use, Maintain" is applied with this unit.

The installation order of this concept is:

- Mechanical installation
- Pipe connections
- Electrical connections
- Grille
- Testing and commissioning of the unit.

Note! Do not remove any of the coverings that protect the unit openings before the installation is complete and all dust has been cleared.

4.2 Choosing the installation site

When the unit is installed, there must be enough service room to access the pipe fittings and electrical connections.

Note! See the unit-specific dimensional drawings for further service room requirements.

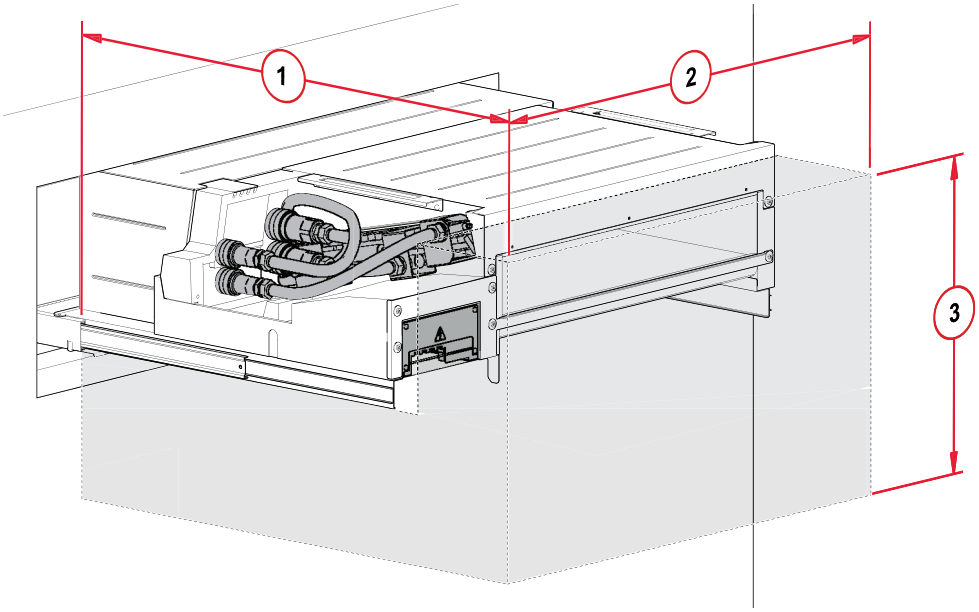


Figure 15: Maintenance area requirements for BLOCK front

1. *800 mm*
2. *1,300 mm*
3. *780 mm*

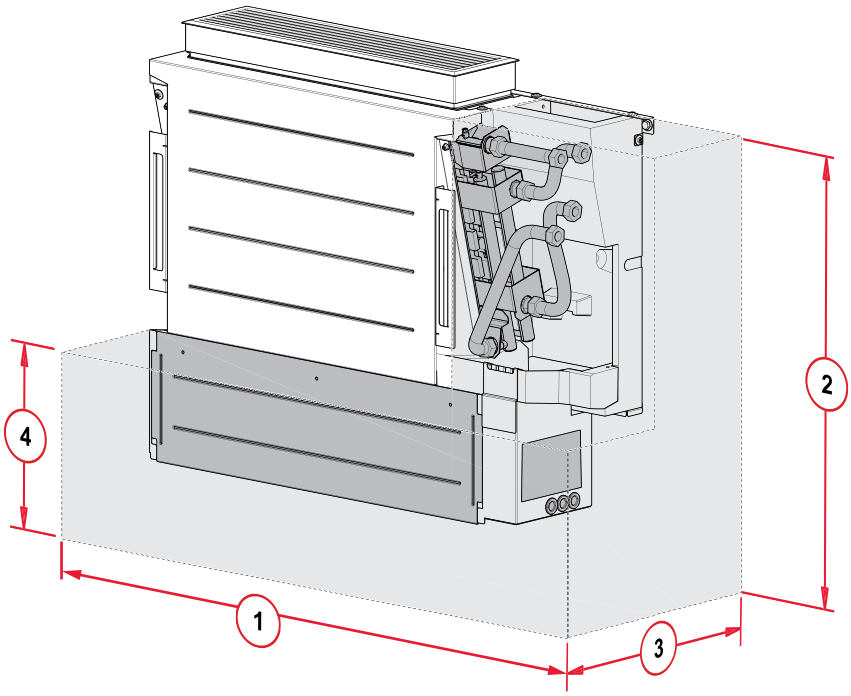


Figure 16: Maintenance area requirements for BLOCK free (vertical installation)

1. *1,150 mm*
2. *820 mm*
3. *730 mm*
4. *300 mm*

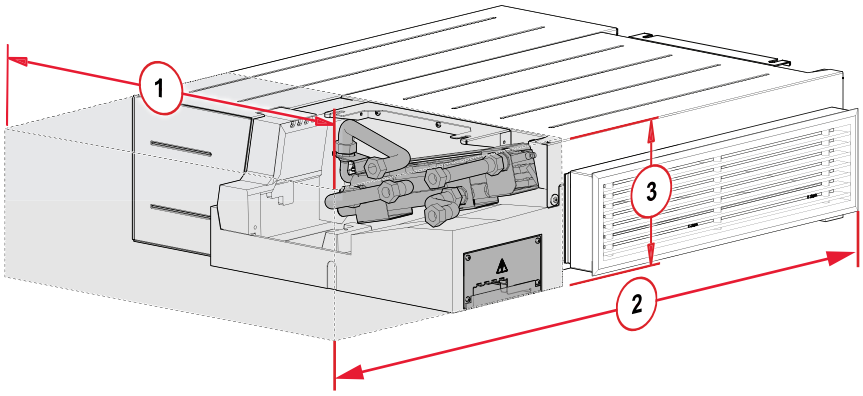


Figure 17: Maintenance area requirements for BLOCK free (horizontal installation) and BLOCK duct

1. *705 mm*
2. *1,200 mm*
3. *530 mm*

Note! Always take local safety regulations and installation requirements into account when you choose the installation site and before you start the installation.

Also take the following things into consideration when you choose the installation site:

- The requirements for the service room and the safety requirements for the unit and its accessories must be complied with.
- The installed unit must stand in a level position.

- The unit must not be installed above any other units or equipment.
- The unit must not be installed in a room that has flammable or explosive substances or has airborne substances that corrode PVC plastics, EPS plastics, ABS plastics, EPP plastics, Bulpren, copper, aluminium, or galvanized steel.
- The unit must be installed in the room so that it allows free air circulation in the unit.
- The unit must not be installed in a room where recirculation air can bring such substances to the inlet opening of the unit that block air circulation (for instance greases from the kitchen).
- The installation and maintenance room required for electrical installations, pipe-laying, and installation of sewerage for condensation water.

Table 2: Limitations for the BLOCK installation site

Temperatures	Min.	Max.
Indoor air	5 °C **(A)**	32 °C / 50% Rh
Water	4 °C **(B)**	80 °C **(C)**
Ethyl alcohol (35%)	4 °C	80 °C
Ethylene glycol (35%)	4 °C	80 °C
Propylene glycol (35%)	4 °C	80 °C

Notes.
A If the room temperature is below 0 °C, the unit must be drained of water and the condensation water must be removed.

B For lower temperatures, using anti-freeze agent is imperative.

C The maximum water pressure is 1000 kPa/10 bar.

4.3 Mounting the unit (BLOCK front)

The unit is mounted from four (4) mounting points. The mounting points are integrated in the unit frame.

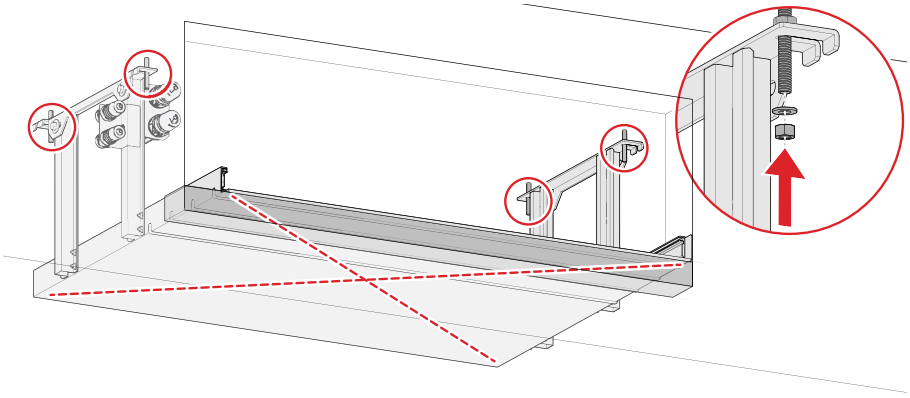
DANGER

This task requires 2 people and a hoisting aid, for example, a drywall panel lift.

DANGER

Risk of severe injury. Make sure that you attach the unit firmly to the ceiling. If the unit is not properly attached, it can fall and cause severe injury.

1. Attach the M8 threaded bars according to the dimensional drawing.



   a. Secure the joint between the threaded bar and the support with locknuts and washers.

   b. Make sure that the bars are attached tightly to the ceiling and they do not come off.

   c. Make sure that the installation is level.

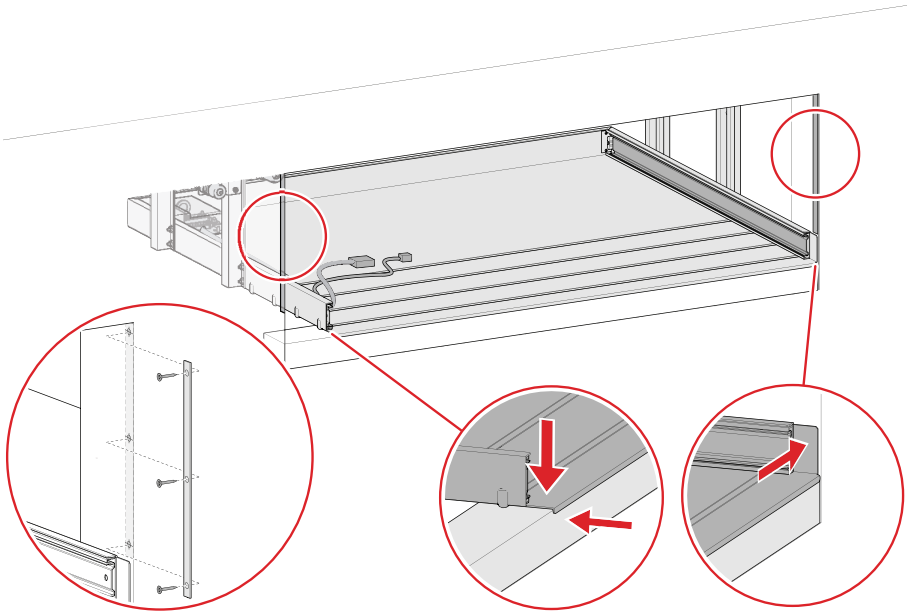
DANGER

Electrocution hazard. Danger of severe injury or death.

Before you continue with the installation, disconnect the mains supply from the installation frame. To disconnect the mains supply, open the mains isolator switch, remove the mains plug from the wall socket, or disconnect the mains fuse from the electrical panel.

Make sure that the power is disconnected before you continue with the installation. Only restore power when the installation is complete.

2. Place the installation frame into position. Make sure that the slide rails of the installation frame are pushed in all the way.



a. Set the right side of the installation frame to the right side of the installation hole.

b. Place the leading edge of the installation frame onto the outer side of the wall.

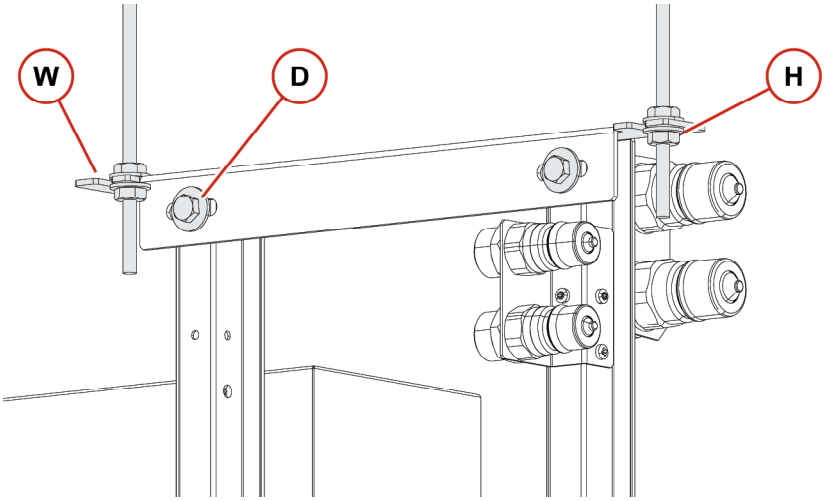
c. Place the lower part of the installation frame on the lower part of the installation hole.

d. Install the edge covers to the sides of the installation frame.

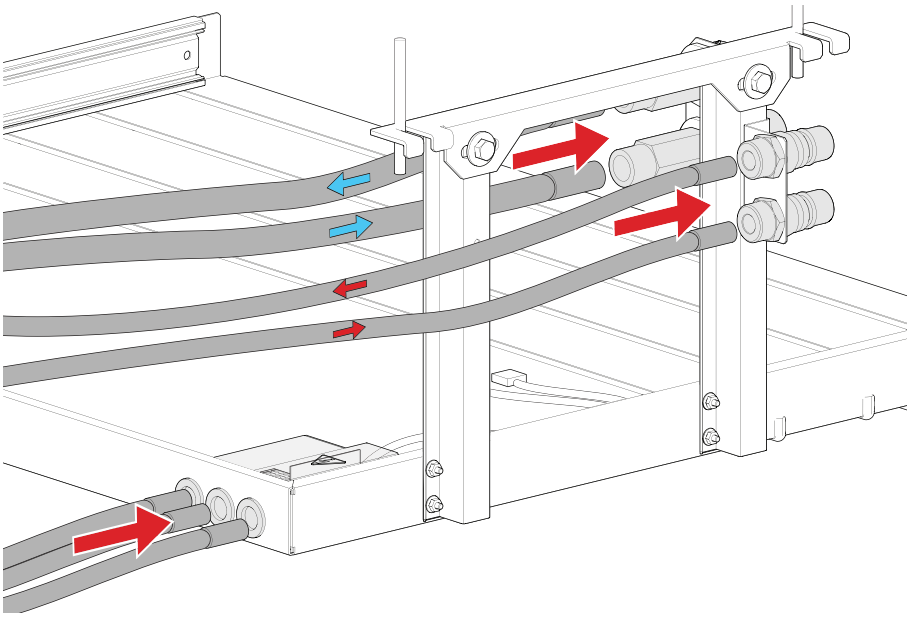
CAUTION

The unit must be level. If the unit is not leveled properly, the condensation water runs incorrectly, which can damage the unit or surroundings.

3. The unit must be leveled. If it is necessary, adjust the width (W), depth (D) and height (H) of the installation with the related bolts.



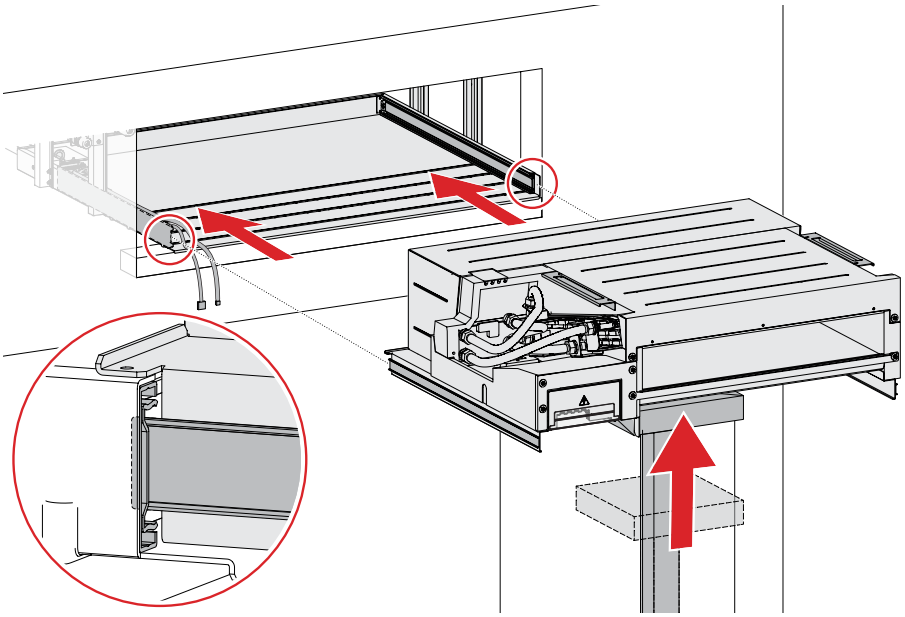
4. Attach the electrical connections and the cooling water connections (blue). If the unit has the heating water connections (red), attach the connections. Attach the inlet connection (lower connection) before the outlet connection (upper connection). See the technical drawings and *Section 4.6 Attaching the water connections* for more information about the connections.



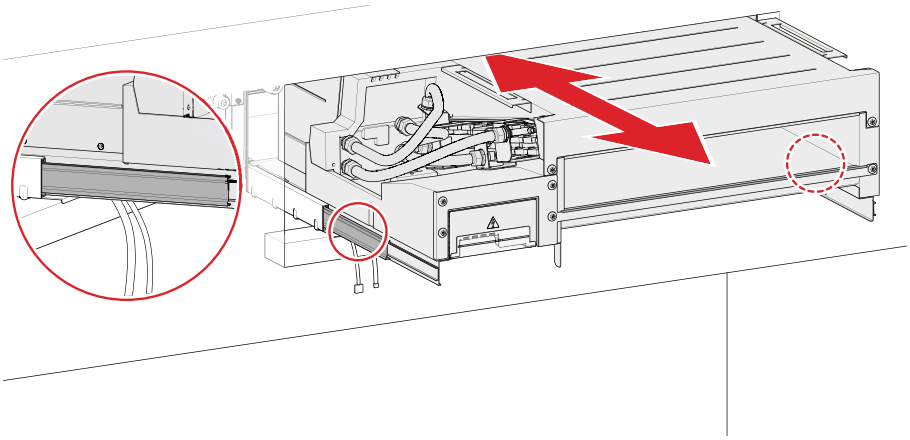
5. Lift the unit with another person and put the unit on top of the drywall panel lift or a similar hoisting aid. Lift the unit with the hoisting aid so that you can put the unit on top of the front edge of the installation frame. Make sure that the slide rails of the installation frame are aligned with the rails of the fan coil unit.

DANGER

This work phase requires 2 people, one person on each side of the unit. After this phase, the hoisting aid supports the weight of the unit while you can guide the unit.

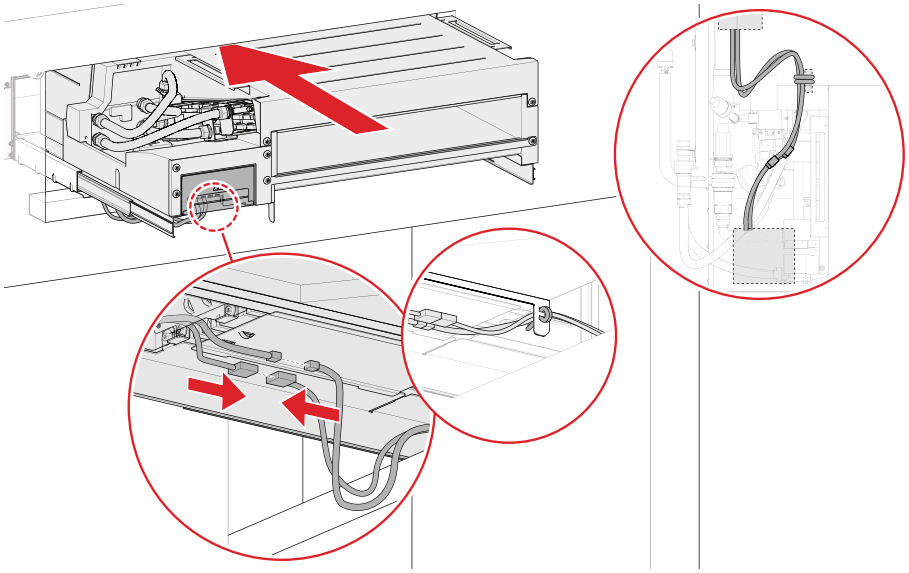


6. Push the unit all the way into the installation frame along the slide rails to lock the unit onto the slide rails. The unit is all the way in when the front edges of the unit and the front edges of the slide rails are level.

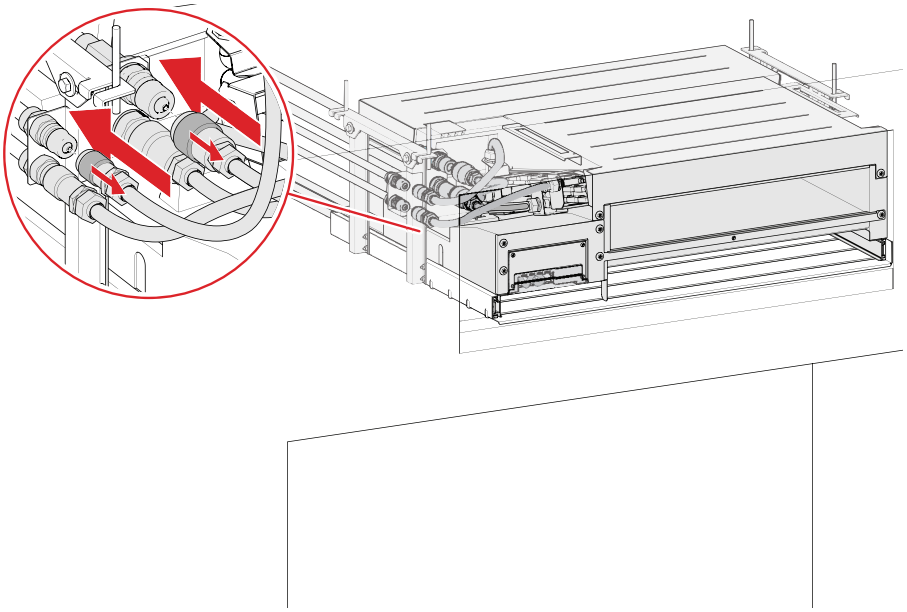


7. Pull the unit out. Make sure that the slide rails move outward with the unit.

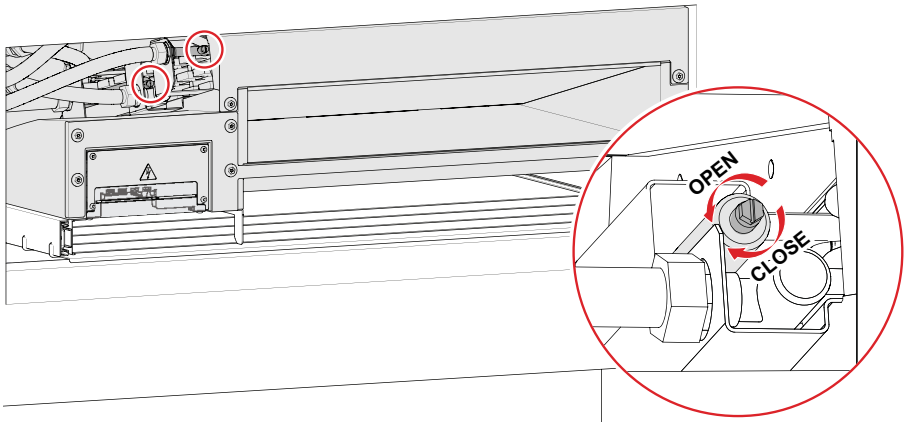
8. Connect the electric quick connectors. Tie the wiring harness into the rear support leg with a cable tie. Push the unit all the way into the installation frame along the slide rails. Make sure that the wiring folds neatly and does not move away from the bottom of the unit.



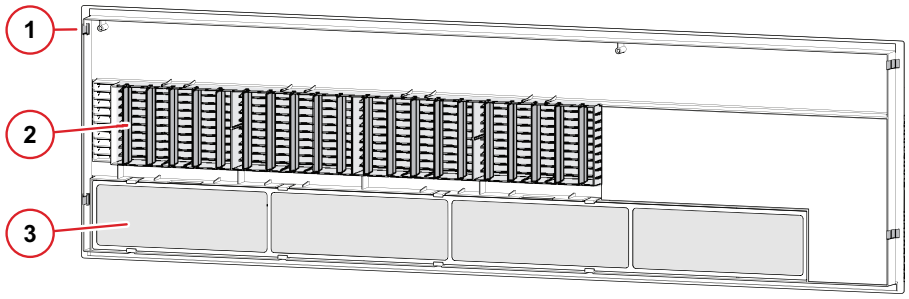
9. Connect the unit to the circuit and water circulation.
   a. Make sure that the connections are sealed.
   b. Attach the condensation water drain connection. See *Section 4.8 Installing the sewerage for condensation water* for instructions.
   c. Do a leak test.



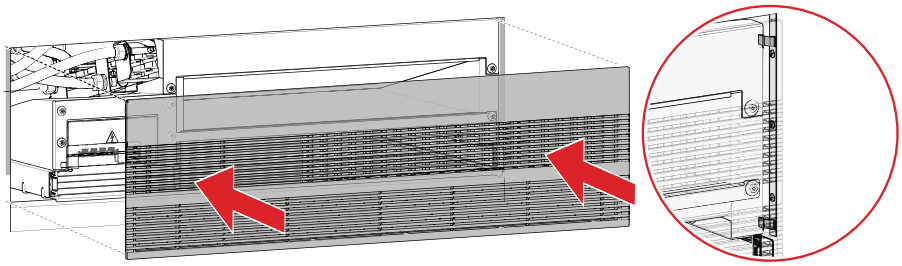
10. Turn the bleed valve counterclockwise to bleed the air. Turn the valve clockwise after the bleeding to close the valve. See *Section 4.7 Bleeding the air and balancing the system* for instructions.



11. Adjust the air guides (2) on the grille to guide the air flow. Make sure that the clips (1) of the grille and the filter (3) are in place.



12. Attach the grille.



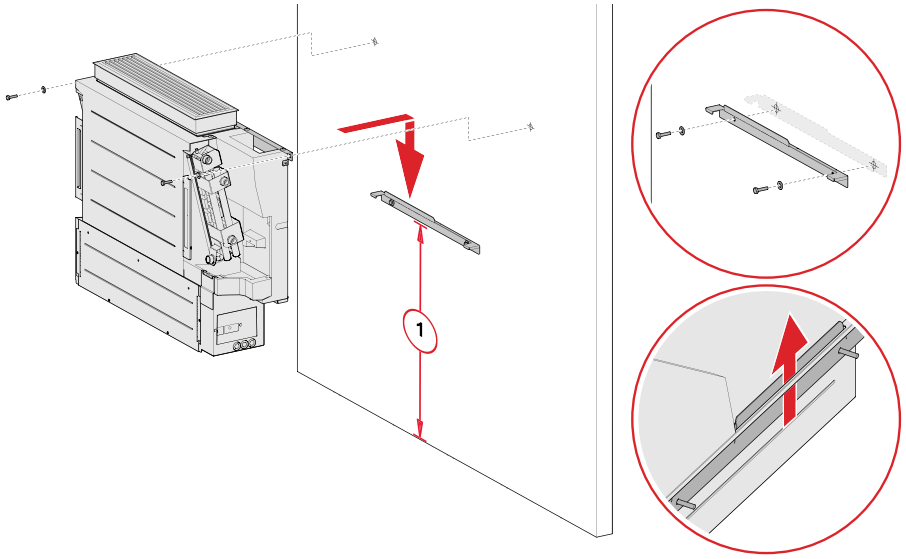
4.4 Mounting the unit (BLOCK free, vertical installation)

The unit is mounted on the wall from four (4) mounting points. The mounting points are integrated in the unit frame.

DANGER

Risk of severe injury. Make sure you attach the unit firmly to the wall. If the unit is not properly attached, it can fall and cause severe injury.

1. Use M8 bolts or threaded bars to install the shelf.



   a. Secure the joint between the threaded bar and the support with locknuts and washers.

   b. Make sure that the bars are attached tightly to the wall and they do not come off.

   c. Make sure that the installation is level.

   d. Make sure that you install the lower support to a height of at least 226 mm (1) so that there is sufficient space for the return air to get into the unit.

2. Take measurements for the location of the upper attachment spots or install the unit on top of the shelf and draw marks on the wall through the holes of the upper slide rails.
3. Use M8 bolts or threaded bars to attach the unit to the shelf.

Note! The supports must be strong enough for the max. weight (55 kg) of the unit.

Note! Do not hoist the unit from pipe joints, valves, or the condensation water basin. You can hoist the unit on the wall by using a drywall panel lift, or similar.

WARNING

Use a hoist that is rated to handle the weight of the unit.

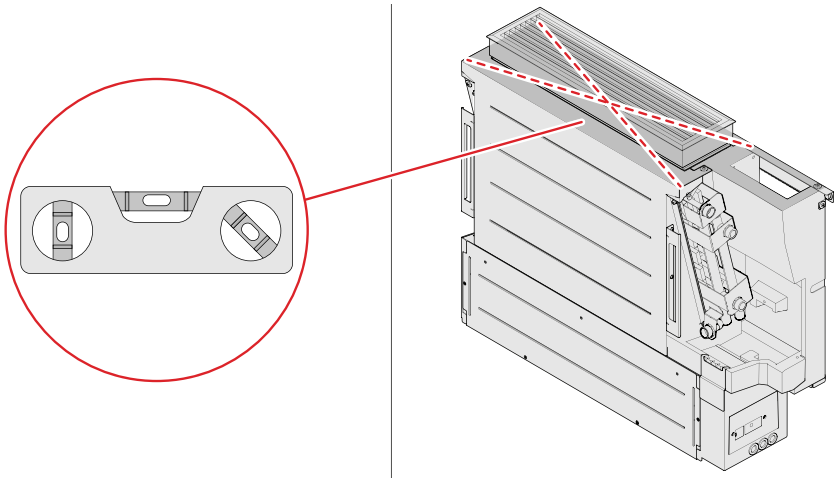
   a. If you use threaded bars for supporting the unit, you must secure the joint between the threaded bar and the support with locknuts and washers.

   b. Make sure that the bars are attached tightly to the wall and they do not come off.

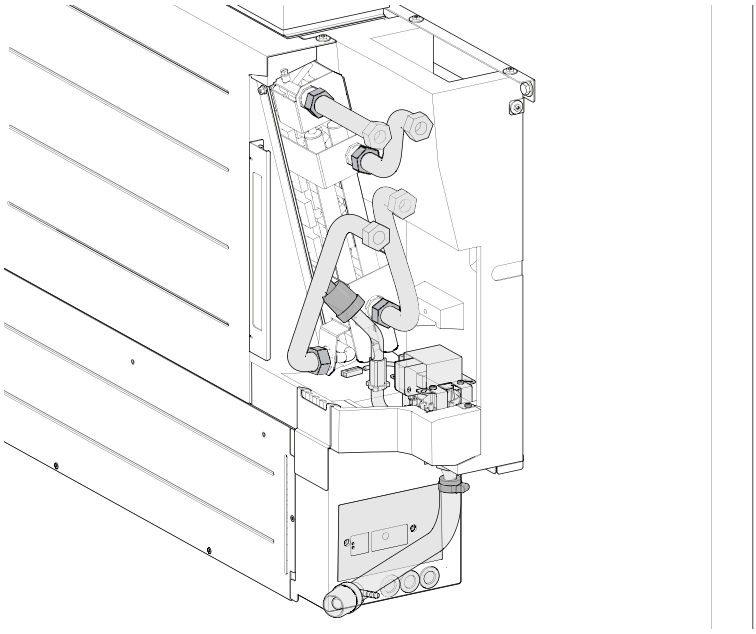
4. After you mount the unit to the wall, use a spirit level to make sure that the unit is horizontally leveled.

CAUTION

The unit must be level. If the unit is not leveled properly, the condensation water will run in a wrong way and this can damage the unit or surroundings.



5. Install the accessories, such as the control valves, the shut-off valves, and the condensate pump outlet, if they are delivered as separate items. Make sure that you install the condensate pump outlet above the condensation water basin to prevent leakage.



Note! Install pipework supports near the unit.

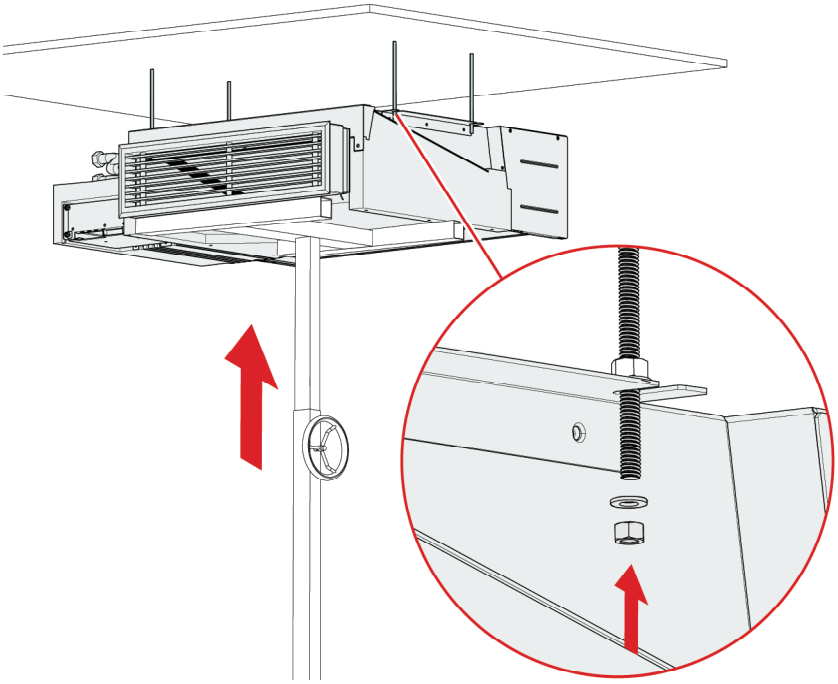
4.5 Mounting the unit (BLOCK free & BLOCK duct, horizontal installation)

The unit is mounted on the ceiling from four (4) mounting points. The mounting points are integrated in the unit frame.

DANGER

Risk of severe injury. Make sure you attach the unit firmly to the ceiling. If the unit is not properly attached, it can fall and cause severe injury.

1. Attach the M8 threaded bars according to the dimensional drawing.



   a. Secure the joint between the threaded bar and the support with locknuts and washers.

   b. Make sure that the bars are attached tightly to the ceiling and they do not come off.

2. Use supports to mount the unit to the ceiling. Make sure that you use supports that are suitable for the installation site and the ceiling material.

Note! The supports must be strong enough for the max. weight (55 kg) of the unit.

Note! Do not hoist the unit from pipe joints, valves, or the condensation water basin. You can hoist the unit on the ceiling by using a drywall panel lift, or similar.

WARNING

Use a hoist that is rated to handle the weight of the unit.

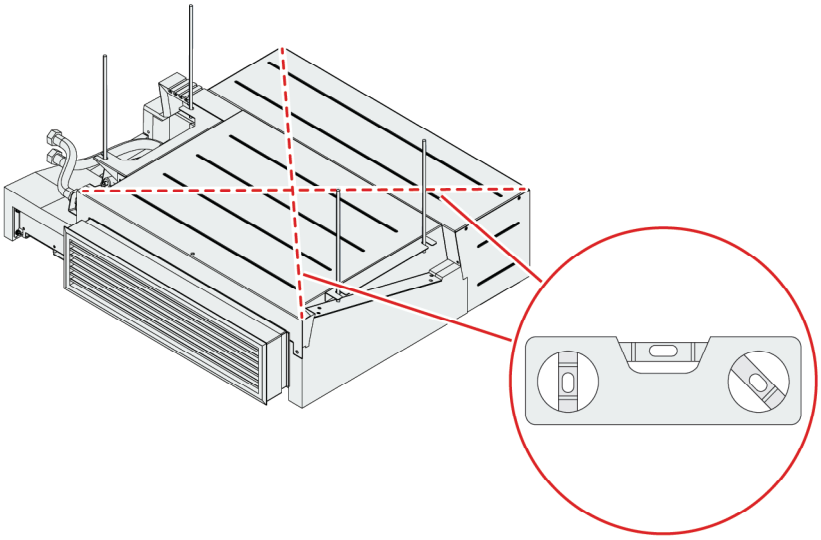
   a. If you use threaded bars for supporting the unit, you must secure the joint between the threaded bar and the support with locknuts and washers.

   b. Make sure that the bars are attached tightly to the ceiling and they do not come off.

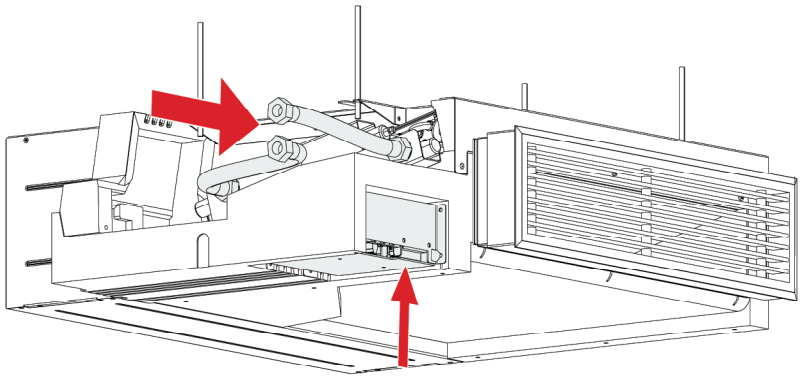
3. After you have mounted the unit to the ceiling, use a spirit level to make sure that the unit is horizontally leveled.

CAUTION

The unit must be leveled. If the unit is not leveled properly, the condensation water runs incorrectly. This can damage the unit or surroundings.



4. Install the accessories (control valves, shut-off valves etc.), if they are delivered as separate items.



Note! Install pipework supports near the unit.

4.6 Attaching the water connections

The unit is intended to be connected to a cooling and/or heating water circulation that cannot damage the heat exchanger. More detailed information on water connections are specified separately for each order, depending on the accessories selected.

Note! Connecting the unit to the water circuit causes pressure losses. For information on unit-specific pressure losses in the water circuit, see the unit-specific technical selection document.

1. Before you connect the unit to a cooling and/or heating water circulation, make sure that the water in the water circuit has:
   a. A maximum operation pressure of 10 bar
   b. A minimum temperature of +4 °C (inlet water)

Note! Water must never be allowed to freeze inside the coil, condensate basin, or piping of the unit.

   c. A maximum temperature of +80 °C (inlet water)

2. Attach the water connections. See the unit-specific dimensional drawing for information on the water connections.

3. Use flat seal connectors when you attach the water connections. Make sure that the connector material is suitable for the connector type. Incorrect connector materials can damage the connection sets in the unit.

Note! The maximum tightening torque is 15 Nm (3/4"). Overtightening can break the connection joint or damage the flat seal.

Note! Always use two wrenches when you tighten the connections to avoid transmitting loads to internal pipework. Failure to do so can cause severe damage to the coil or pipework.

4.7 Bleeding the air and balancing the system

Bleed the air and balance the system before you install the sewerage for condensation water.

1. If the control valve which affects the flow rate of the unit is included in the delivery, or is installed in some other part of the system, set it to on (open) when you do the balancing of the system.
2. Connect the unit to power from the distribution board.
3. Set the control valve to open or open it manually.
4. Open the bleed screw of the unit carefully. Use a towel or a rag to avoid possible spillage.
5. After all the air comes out, close the bleed screw.
6. Install the grille and adjust the air connections.

4.8 Installing the sewerage for condensation water

The factory-made Block unit is available without or with a condensation water pump.

Note! Always follow the national construction regulations when you install the sewerage.

For further information on installing the sewerage for condensation water, see *Sections 4.8.1 Sewerage with a condensation water pump (option)* and *4.8.2 Sewerage without a condensation water pump*.

4.8.1 Sewerage with a condensation water pump (option)

The Block unit is available with a condensation water pump for a rise of 1,000 mm. The pump pressure side has an outlet pipe (plastic, outer diameter 15 mm, inner diameter 12 mm) that is connected to a fixed condensation water pipework. The outlet set for condensation water is located on the same side as the water sets in the unit.

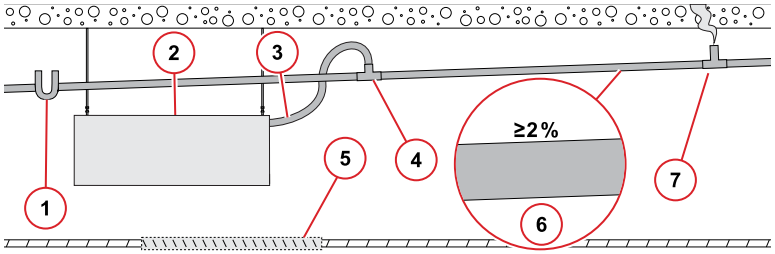
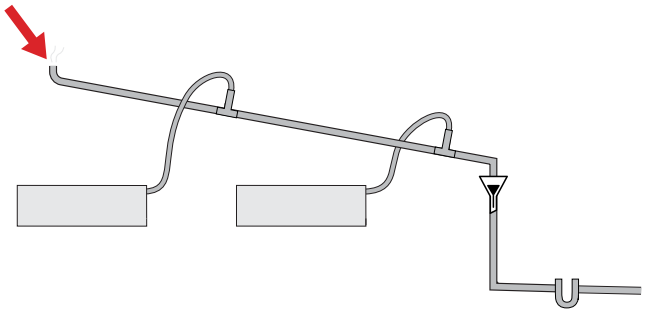


Figure 18: Overview of sewerage with condensation water pump

1. *Drain trap*
2. *Unit*
3. *Condensation water hose*
4. *Drain connection (must be accessible through a maintenance hatch)*
5. *Maintenance hatch (where applicable, see the unit-specific dimensional drawing)*
6. *Condensation sewerage*
7. *Supplementary air*

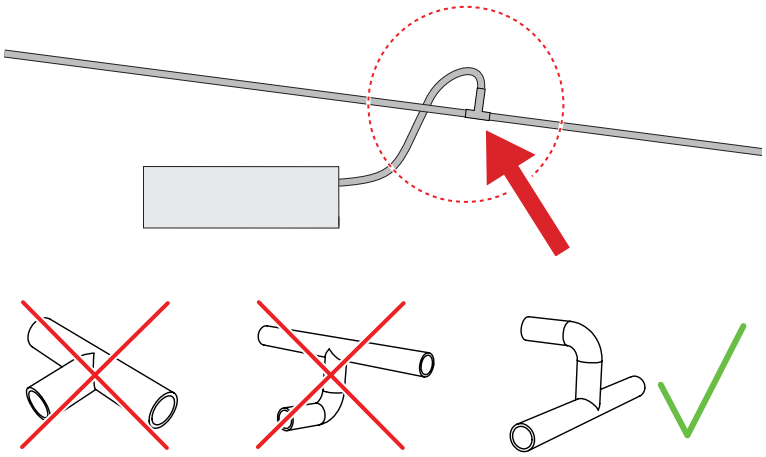
Before you install the sewerage, make sure that:

- The cross-sectional area of the condensation water network is sufficient.
- The cross-sectional area of the condensation water pipe is sufficient, at least 22 mm.
- You install a drain trap to the condensation water pipeline, if condensation water is directed to the sewerage system of the property. The drain trap is dimensioned according to the installation height to ensure that water is constantly discharged at a sufficient rate.
- The condensation water pipe is insulated, if the unit is installed in rooms where condensation can occur on the pipe surface.
- You support the condensation water pipe so that it does not bend at any place.
- You take into account the availability of supplementary air, when planning the sewerage.

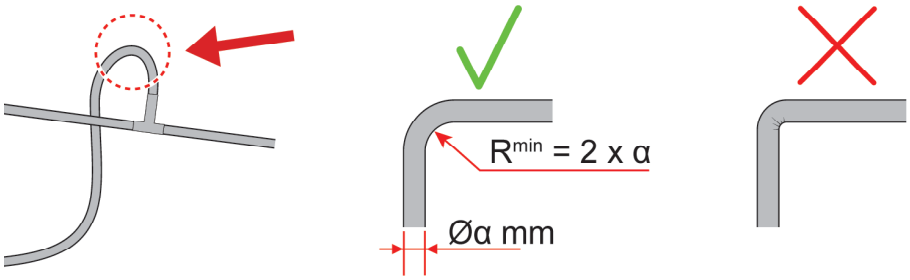


When you install the sewerage, make sure that:

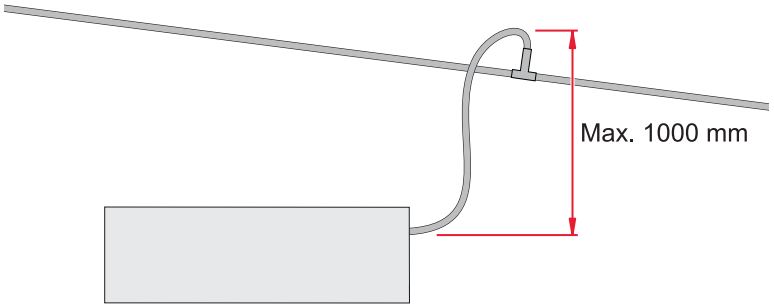
- You connect the condensation pump hose to the sewerage from the upper side.



- The minimum radius of the hose is sufficient.



- The rise for the condensation water pump is max. 1,000 mm.



- You connect the unit to the sewerage with a stiff pipe (such as Cu or PVC).
- You connect the pump hose tightly to the piping, so that the pressure variations caused by the condensation water pump do not remove the hose from the pipe. If necessary, use a seal.

Note! Do not push the hose too far into the sewerage pipe. The end of the hose should be approximately 30–50 mm inside the seal.

- You cut the hose to a suitable length.

Note! Do not extend the condensation water hose with another hose.

Connection to sewerage:

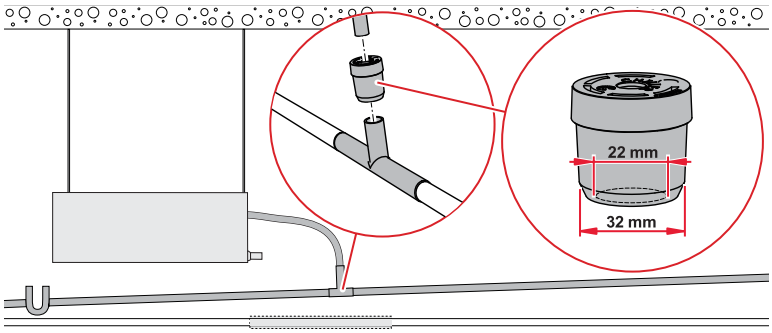
1. Pull the condensation hose of the unit through the drainage adaptor to the desired length.

2. Cut off any excess hose, leaving 30–50 mm inside the adaptor.
3. Connect the adaptor to the fixed condensation pipe.

Note! You can connect the drainage adaptor to a ∅ 22 mm (outer diameter) copper pipe or to a ∅ 32 mm (inner diameter) sewer socket.

Note! Make sure that the air venting of the drainage adaptor is facing upwards and at an inclination of max. 45°.

Note! Make sure that the condensation pump hose does not block the sewerage.

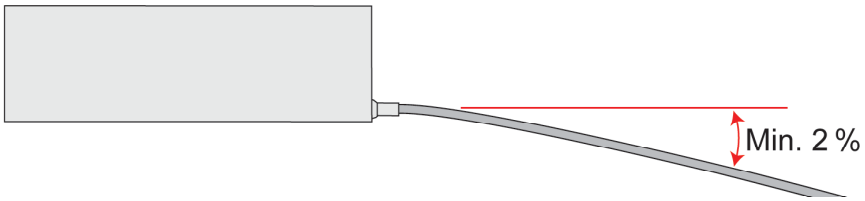


4. After the installation, make sure that the horizontal inclination of the fall for the condensation sewerage is at least 2%.

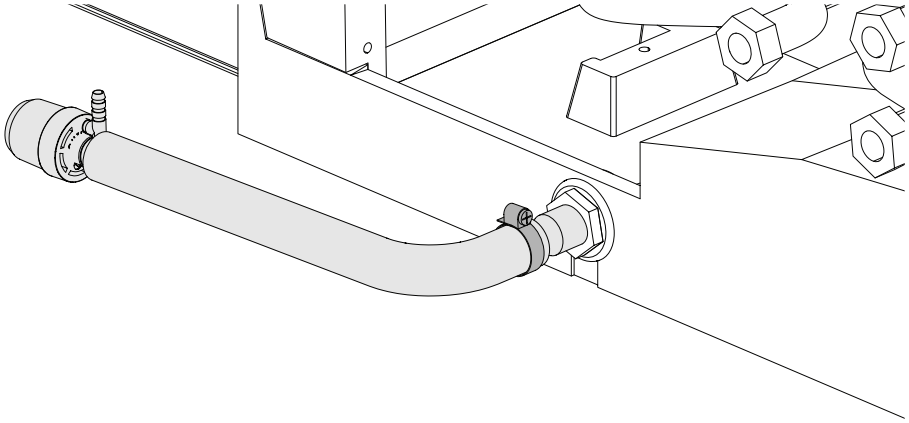
4.8.2 Sewerage without a condensation water pump

When you install the sewerage, make sure that:

1. The sewerage has sufficient inclination of at least 2%.



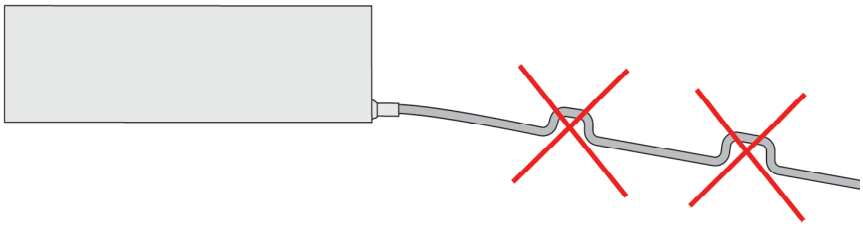
2. You attach the pipe for the condensation water properly and the pipe is the correct size.



WARNING

Do not use too much force when you connect the free drainage outlet as this can damage the unit and cause leakage.

3. The pipe is not bent or dented. If the pipe is bent or dented, the flow rate can decrease or the flow can stop.



Note! Make sure that the pipeline has sufficient support to prevent sagging over time.

4.9 Attaching the electrical connections

DANGER

Electrocution hazard. Touching live parts or components of the unit can cause severe injury or death.

Only qualified persons are allowed to perform electrical work on the unit.

DANGER

The mains wiring and low-voltage control wiring must be installed separately. Never run the mains and control wiring in the same cable. This can cause unit malfunction, severe injury, or death.

DANGER

BLOCK front:

If the electrical connections are made to the installation base before the unit is installed, the electrical contractor must leave the mains power disconnected until the unit installation is complete. Failure to do so causes danger of electric shock.

CAUTION

When you connect the unit to the circuit, make sure that the connection is done in accordance with local laws and decrees.

Note! The unit is available with Vari or Vari Pro equipment. The unit is delivered with model-specific electric diagrams that must be used when doing the electrical connections.

The unit is delivered as wired (including internal wirings) and connected so that the unit only needs to be connected to the supply and to possible control wirings at the installation site. Contact the seller of the unit for further information on the specific electrical and control connections of the unit and the wirings required for them.

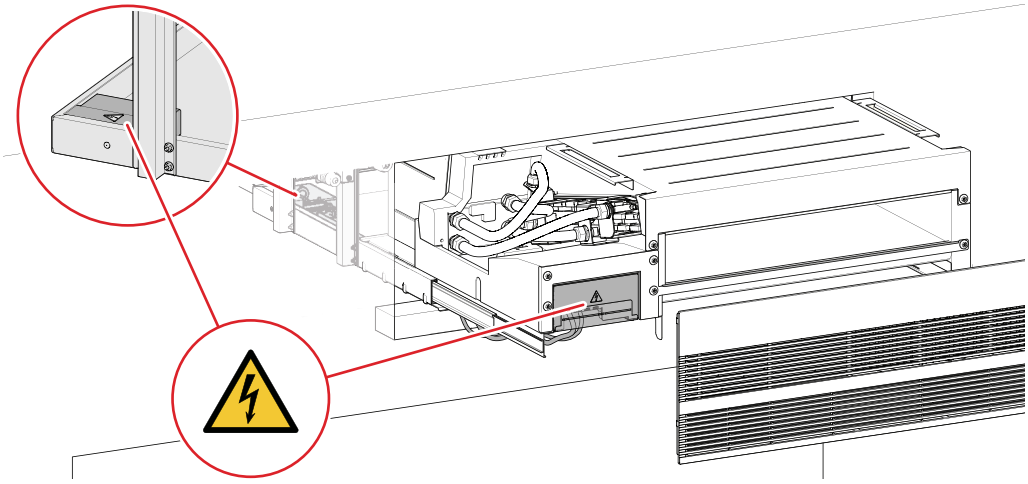


Figure 19: Electrical box, BLOCK front

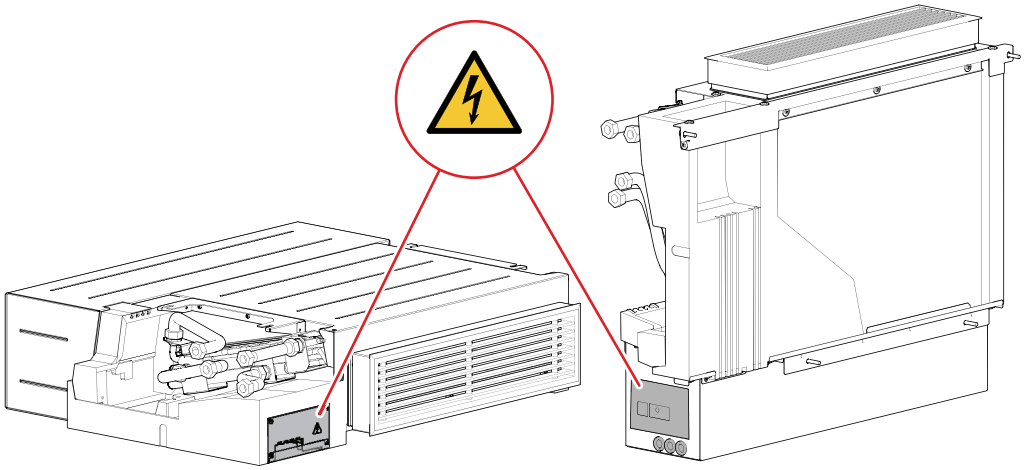


Figure 20: Electrical box, BLOCK free & BLOCK duct

DANGER

Electrocution hazard. Danger of severe injury or death.

BLOCK free & BLOCK duct:

Disconnect the mains power before you connect or disconnect the internal wiring harness.

1. When you connect the unit, make sure that the supply of the unit is protected by means of a front fuse.
2. If several units are connected in parallel behind the same supply, make sure that the size and sufficiency of the fuse are sufficient for unit-specific protection.
3. Make sure that the cable is dimensioned in accordance with the maximum values that the type plate of the unit specifies. See *Section 2.3 Type plate* for more information.

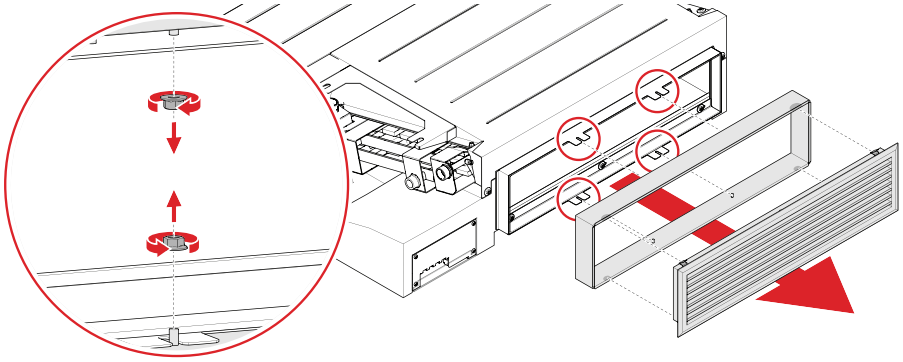
Note! The power supply to the unit must always be continuous. If the power supply is off, the water condensation pump and the automation of the unit do not work.

4. Connect the external cabling on the unit to the coupling card in the link box. The coupling card contains a terminal block.

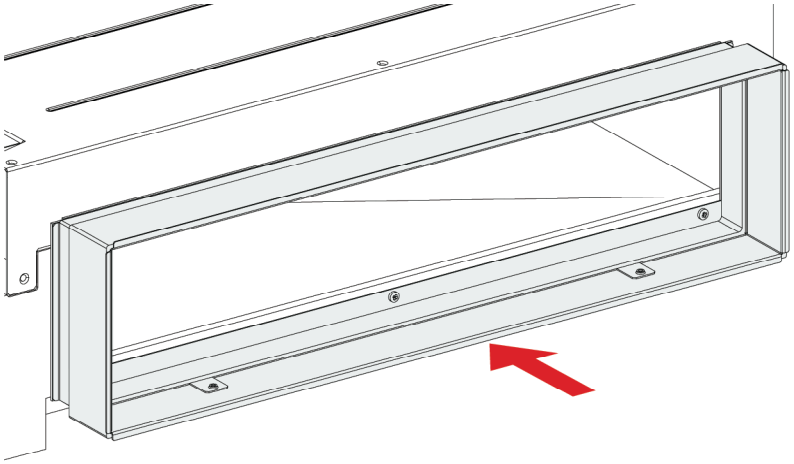
4.10 Installing the pressure air duct (BLOCK free & BLOCK duct)

The pressure air duct is located at the front of the unit.

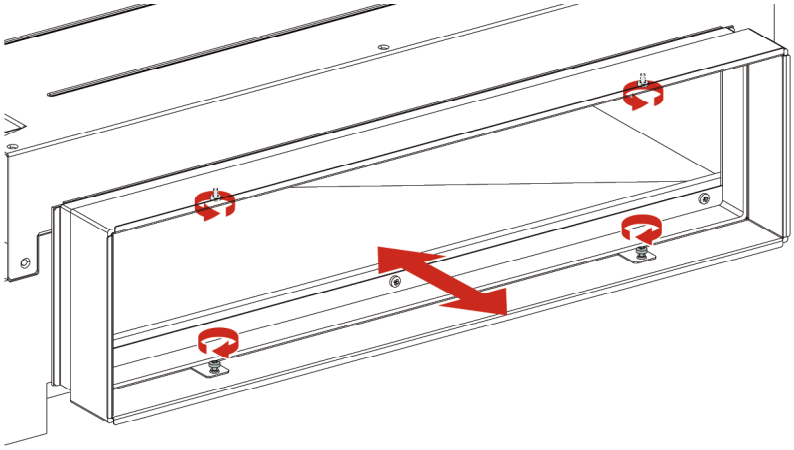
1. The pressure air duct is delivered assembled. Remove the room-facing telescopic duct piece before installation.



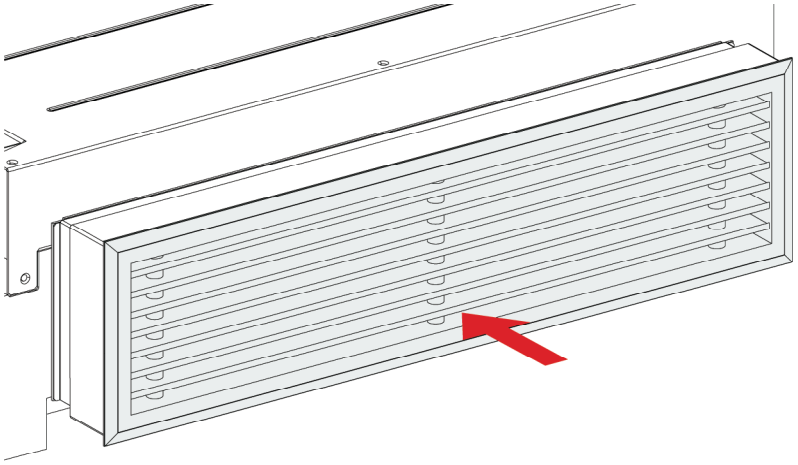
2. Attach the telescopic duct on the collar of the pressure air duct.



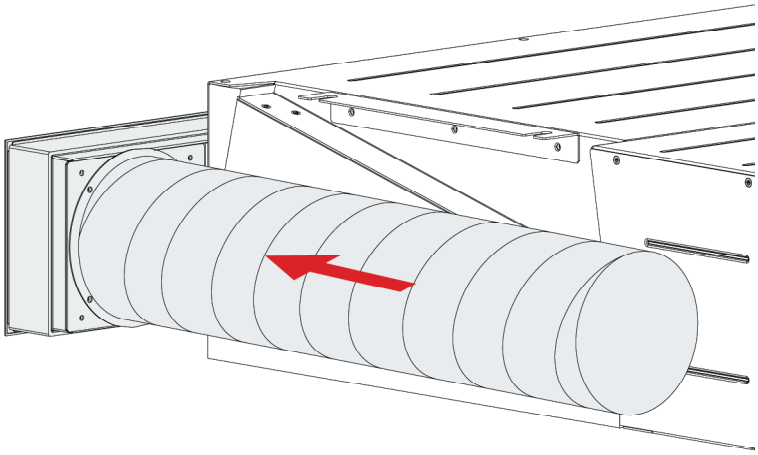
3. Adjust the telescopic duct and attach it with 4 nuts.



4. Attach the grille.



5. If you have a unit with the optional fresh air connection, attach the duct.



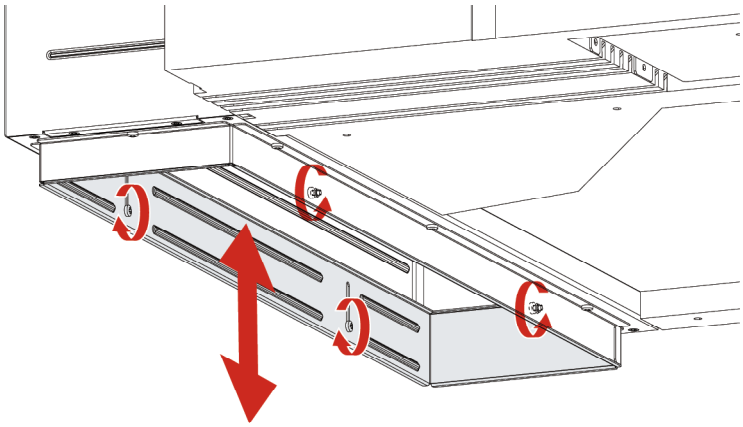
CAUTION

Obey national regulations regarding the noise absorption of supply air.

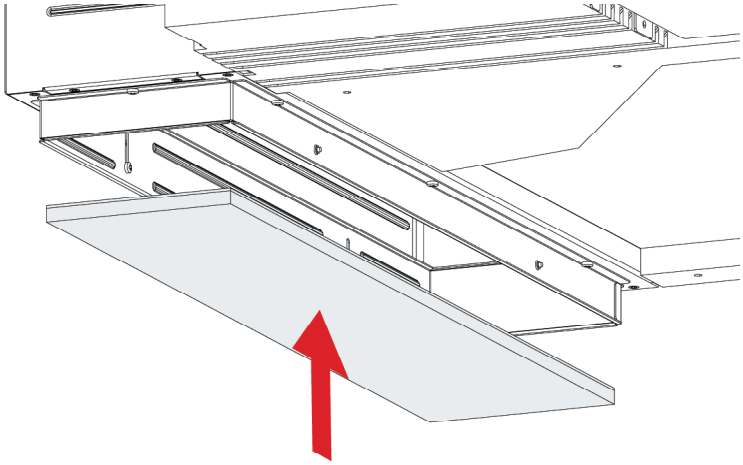
4.11 Installing the suction duct (option)

The optional suction duct is located under the unit.

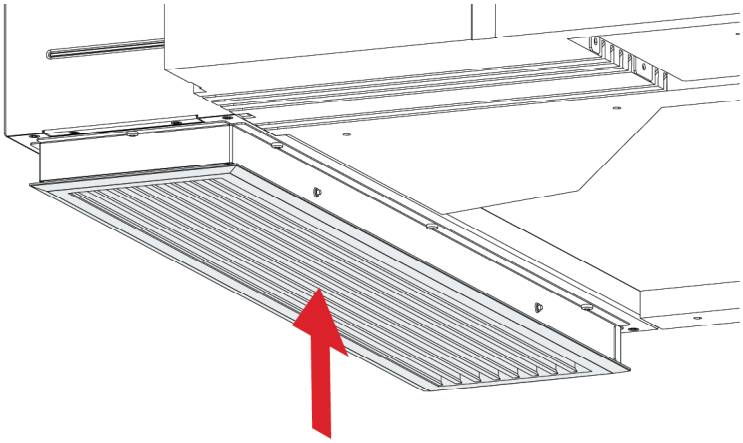
1. Adjust the telescopic duct on the collar of the suction duct.
   a. Attach the telescopic duct with 4 screws.
   b. Cover the adjustment holes next to the screws with duct tape.



2. Make sure that there is a filter in the suction duct. If there is no filter, attach the filter into the suction duct.



3. Attach the grille.



4.12 Testing the condensation water pump

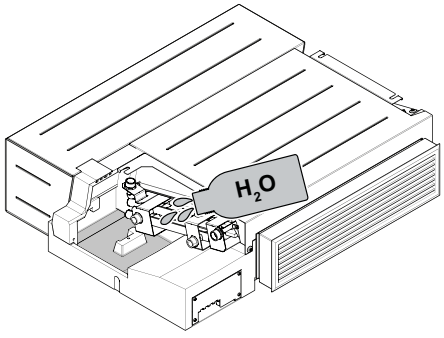
CAUTION

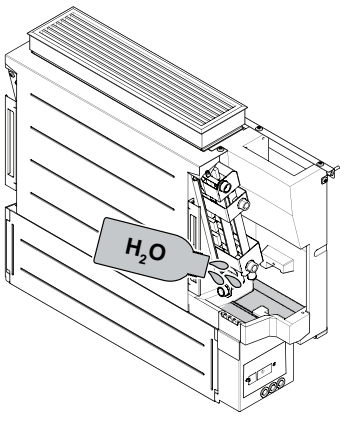
Risk of water damage. You must test the condensation water pump after you install the unit.

Do not operate the unit before you have run the test successfully.

Before you can operate the unit, you must test the condensation water pump. Run a leak test after you have mounted the unit and done the necessary electrical and pipe connections.

1. To test the condensation water pump, pour approximately 2 liters of water into the condensate sump.





2. After you have poured the water into the basin, make sure that:
   a. The condensation water pump starts
   b. The pump moves the water to the condensation sewerage
   c. The pump stops after the water has gone to the sewerage
   d. There are no leaks anywhere in the system.

Note! The leak test has been successful if the pump starts, moves the water, stops, and there are no leaks.

3. If the leak test was successful, you can start to use the unit.
4. If the leak test failed, do not use the unit before you have run another, successful test.

5 Operation of the unit

5.1 Controlling the unit

The fan motor of the unit is equipped with a modern EC (electronically commuted) motor. The fan motor is controlled with voltage messages of 0–10 VDC. At 0 V, the fan motor is stopped, and at 10 V, the fan motor operates at full speed.

You can adjust room temperature by changing the speed and valve positions of the unit to achieve the set room temperature. The control valve and speed are controlled by a separate room/house automation control.

Note! This applies only if the unit contains two- or three-way valves.

The condensate pump is controlled internally. The condensate pump operates, even if the unit is stopped with the controller or the house automation control. The unit operates independently according to the control method selected.

6 Maintenance of the unit

6.1 Maintenance schedule

WARNING

If you detect water leakage during unit operation, shut down the unit and contact maintenance.

For the unit to function properly, you must do the maintenance procedures regularly. We recommend that you maintain the unit components according to the following schedule.

Table 3: Maintenance intervals

Component	Action	Maintenance interval
Grille	Clean the grille with a clean, damp cloth.	Every 12 months or when needed
Filter	Replace the filter, vacuum when needed.	Every 12 months or when needed
Condensation water basin	Drain and clean the condensation water basin.	Every 5 years or when needed

Table 4: Order codes for filters

Order code	Description	Quantity
N08003294	BLOCK front filter	1
N08002689	BLOCK free/duct filter	2

Note! If there are local and/or site-specific regulations, such as hygiene regulations, that differ from the maintenance schedule above, follow the local and/or site-specific regulations.

Note! You can find more detailed instructions for maintenance in the following sections.

6.2 Cleaning the grille

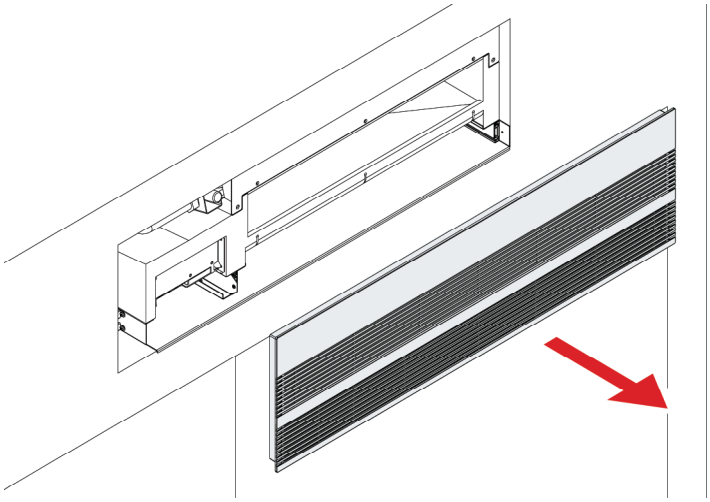
WARNING

Electrocution hazard. Before you do any maintenance work on the unit, make sure that the unit is disconnected from the circuit and that it is de-energized.

WARNING

Risk of injury. When you use or maintain the unit, be careful with the moving parts of the machine to avoid injury.

1. Open the grille.



2. Clean the grille with a clean, damp cloth.

Note! Do not use detergents or solvents that can damage the grille.

3. Attach the grille on the unit.

6.3 Replacing the filter of the unit

The filter is located behind the grille. The need for cleaning the filter depends on the location and use of the unit.

Note! You must visually examine the filter regularly, at least once a year, depending on the conditions of the installation site. Regular maintenance ensures a longer life cycle for the unit.

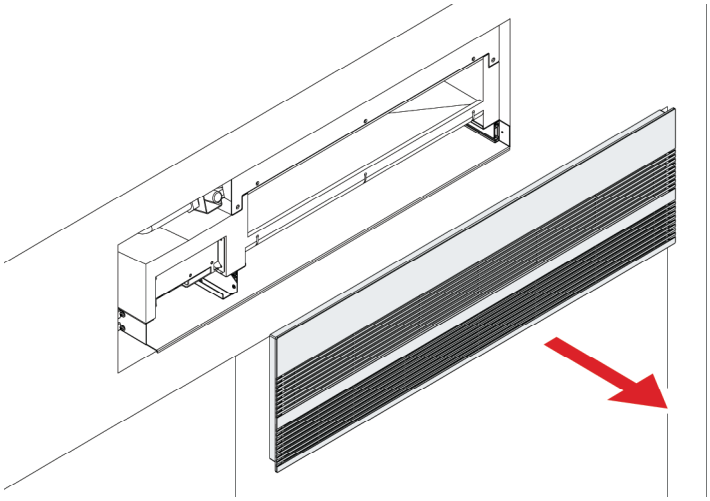
Note! For information on filters, see Table 4: Order codes for filters.

6.3.1 Replacing the filter (BLOCK front)

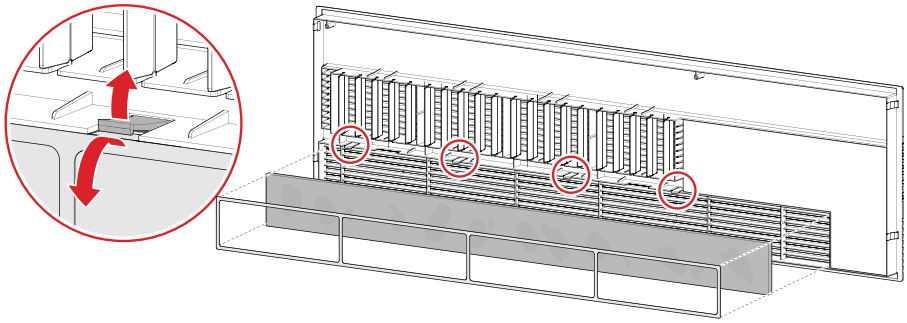
WARNING

Electrocution hazard. Before you do any maintenance work on the unit, make sure that the unit is disconnected from the circuit and that it is de-energized.

1. Open the grille.



2. Replace the filter with a new filter.



3. Close the grille.

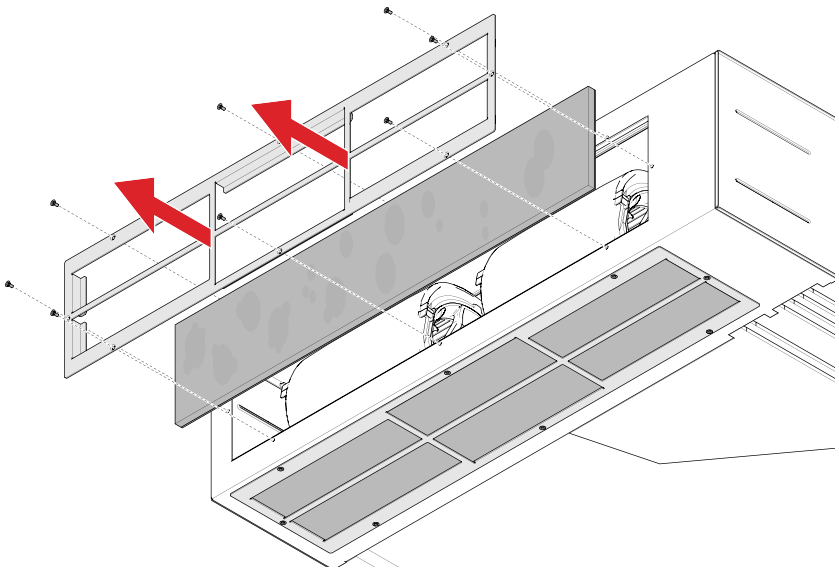
Note! Make sure that you close the grille properly.

6.3.2 Replacing the filter (BLOCK free, horizontal installation)

WARNING

Electrocution hazard. Before you do any maintenance work on the unit, make sure that the unit is disconnected from the circuit and that it is de-energized.

1. To remove the filter, open the grille.



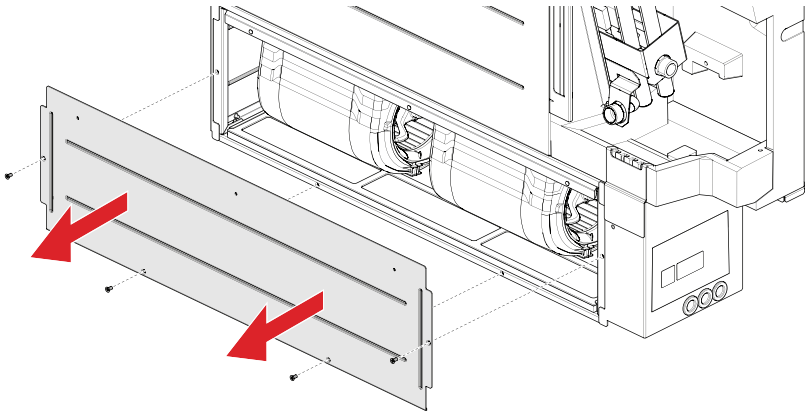
2. Replace the filter with a new filter.
3. Close the grille.

6.3.3 Replacing the filter (BLOCK free, vertical installation)

WARNING

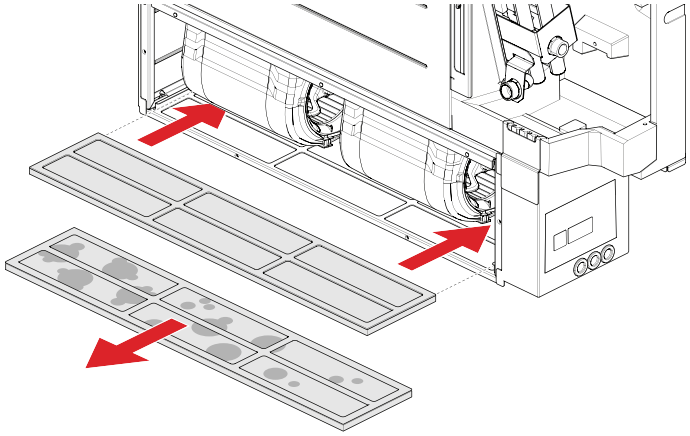
Electrocution hazard. Before you do any maintenance work on the unit, make sure that the unit is disconnected from the circuit and that it is de-energized.

1. Open the cover plate on the water connection side of the unit.



2. Remove the filter.

3. Attach a new filter.



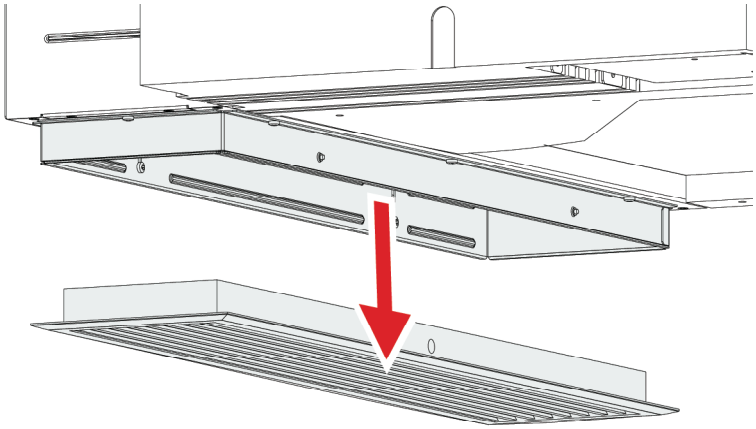
4. Close the cover plate.

6.3.4 Replacing the filter (BLOCK duct)

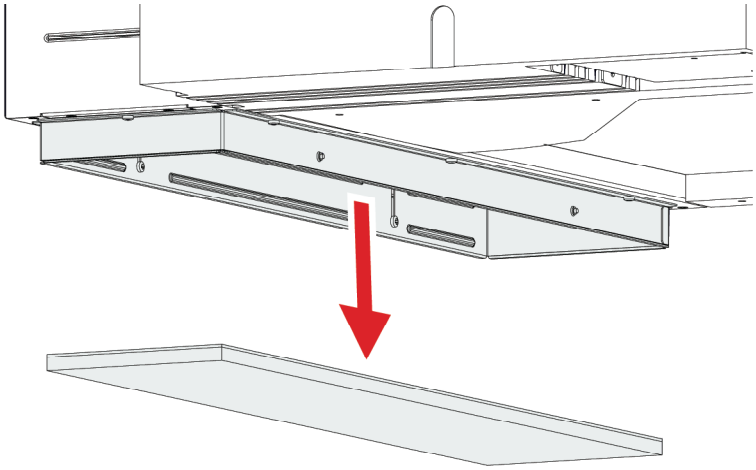
WARNING

Electrocution hazard. Before you do any maintenance work on the unit, make sure that the unit is disconnected from the circuit and that it is de-energized.

1. To remove the filter, open the grille.



2. Replace the filter with a new filter.



3. Close the grille.

Note! Make sure that you close the grille properly.

6.4 Removing the unit (BLOCK front)

DANGER

This task requires 2 people and a hoisting aid, for example, a drywall panel lift.

Note! Read the entire contents of this manual before you attempt to remove the unit.

1. Disconnect the mains power to the unit. There are three (3) ways to disconnect:
   a. Unplug the power lead.
   b. Turn off the safety isolation switch.
   c. Turn off the power from the distribution board.

DANGER

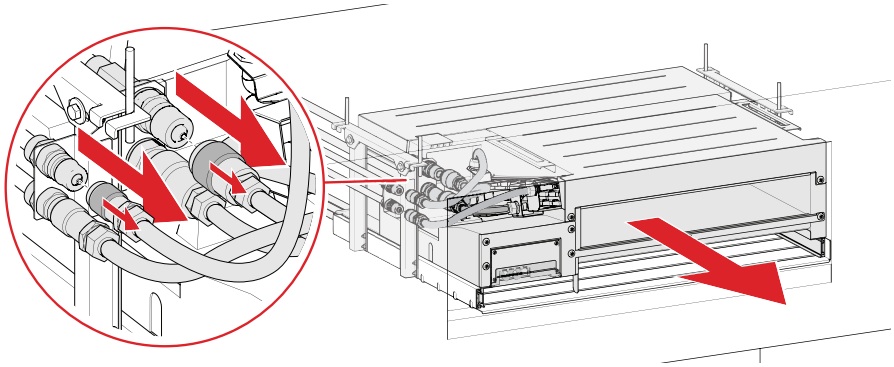
There is a risk of an electric shock if you try remove the unit when the unit is connected to the mains power. Always disconnect the mains power before you remove the unit.

2. Close the valves of the liquid pipelines that feed the unit.
3. Remove the grille.
4. Open the bleed screw carefully. Use a towel or something similar to avoid spillage.

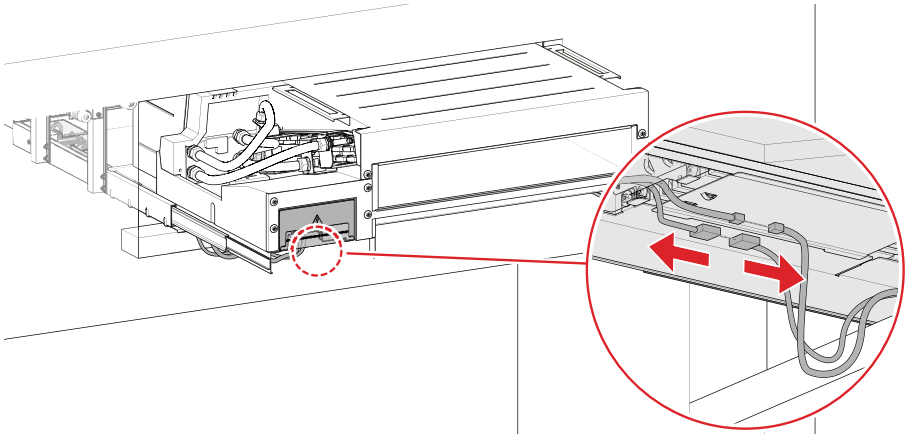
5. After all the pressure comes out of the unit and no more liquid comes out of the bleed screw, continue to the next step.
6. Close the bleed screw.

Note! Use a rag when you release the pipe fittings. The fittings have an internal shut-off valve but some liquid can leak when you disconnect the pipe fittings.

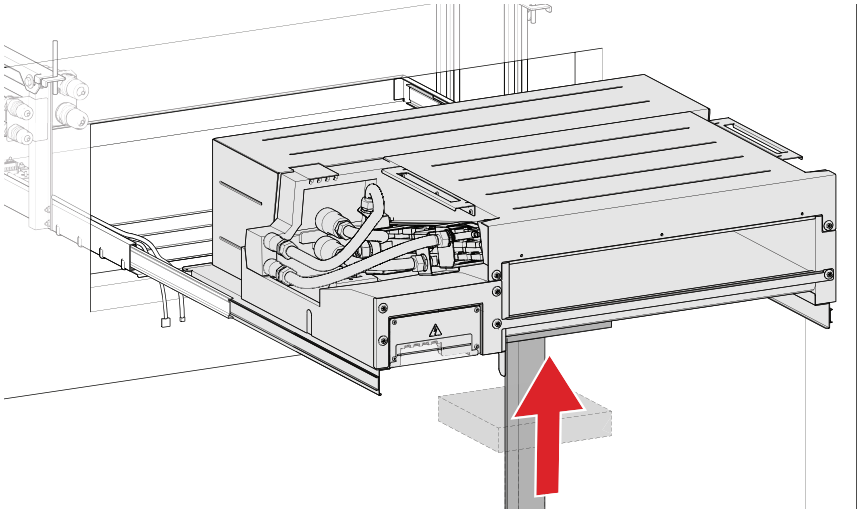
7. Disconnect the quick connectors of the water side.



8. Make sure that the condensation water basin is empty.
9. Disconnect the condensation outlet hose. To avoid possible spillage, use a towel or a rag. Make sure that water does not get into the structures of the unit.
10. Pull the unit out carefully. Make sure that the electrical wiring does not become damaged when you remove the unit.
11. Disconnect the electric quick connectors below the unit.



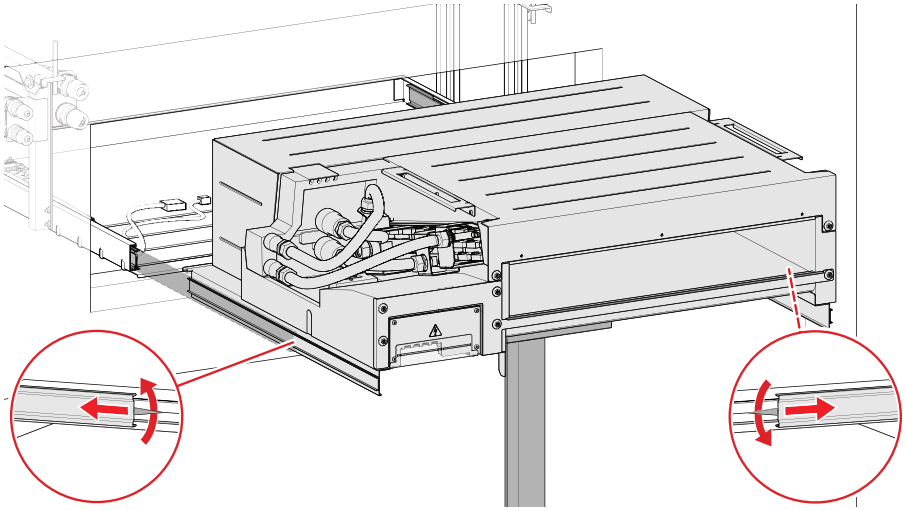
12. Put the drywall panel lift, or a similar hoisting aid, against the bottom of the unit so that the hoisting aid supports the weight of the unit when you remove the unit.



13. Release the locking levers of the slide rails on both sides. Push in the part of the rail that releases the locking lever.

DANGER

This work phase requires 2 people, one person on each side of the unit. After this phase, the hoisting aid supports the weight of the unit while you can guide the unit.



14. Push the slide rail back into the installation frame to free the unit.
15. Lower the unit to the ground.

Note! To put the unit back, follow the instructions in Section 4.3 Mounting the unit (BLOCK front).

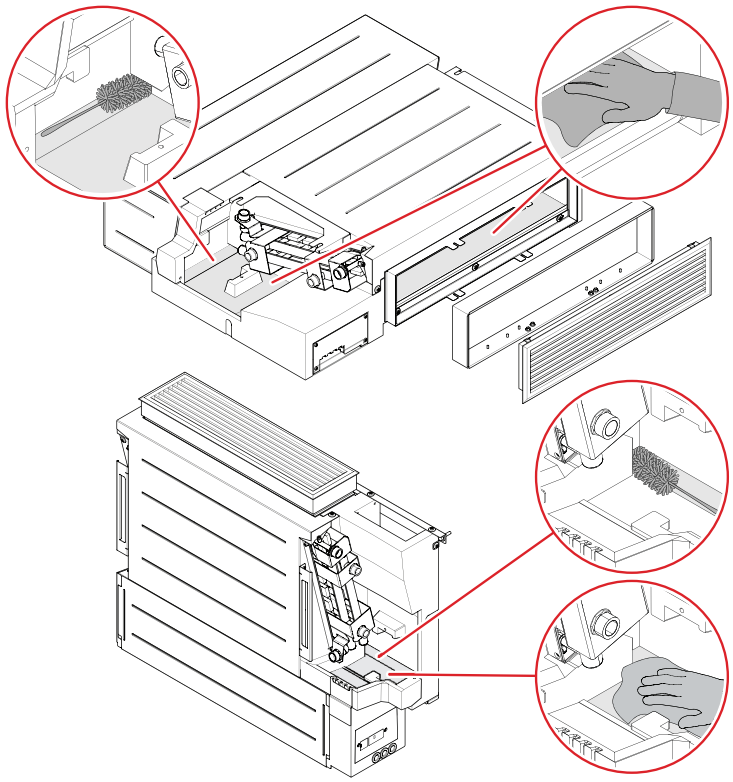
6.5 Cleaning the condensation water basin

WARNING

Electrocution hazard. Before you do any maintenance work on the unit, make sure that the unit is disconnected from the circuit and that it is de-energized.

1. Disconnect the unit from the mains power. Verify that the unit is de-energized.
2. Use a long cotton swab or a bottle brush to clean the connecting channel.
3. Use a soft cloth to clean the condensation water basin.

Note! Do not use detergents or solvents that can damage the unit. Do not use abrasives or sharp objects.



4. After cleaning, make sure that the condensate pump system functions correctly.

APPENDIX A: Vari-option control connections

Table 5: Vari-option control connections

POS	Connector	Function	Technical description
PWR	L	230 V AC/line	Fuse on card, max. 5 A
	N	230 V AC/neutral	
	PE	Protective Earth	
C1	AA	Alarm contact (in or out)	OPEN when alarm active or unit not powered. Potential free.
	AA	Alarm contact (in or out)	OPEN when alarm active or unit not powered. Potential free.
	V+	24 V auxiliary output from the control card. Selectable between AC or DC with jumper J1 (DC when in DOWN position).	Max. output current 0.6 A
	G0	Signal ground. All I/O signals are referenced to this connector.	Common for aux. 24 V output, 0–10 V control inputs, 0–10 V control outputs, 24 V AC/DC control inputs and 24 V AC control outputs. Not connected to Protective Earth (PE).
C2	F	Fan speed input, 0–10 V (linear), or 24 V AC/DC for ON/OFF control.	Impedance 50 kΩ. Desired control mode detected automatically.
	C	Cooling valve control input, 0–10 V (linear), or 24 V AC/DC for ON/OFF control.	Impedance 50 kΩ. Desired control mode detected automatically.
	H	Heating valve control input, 0–10 V (linear), or 24 V AC/DC for ON/OFF control.	Impedance 50 kΩ. Desired control mode detected automatically.
C3	1	Fixed fan speed 1 control input, 24 V AC or DC control	When active, takes priority over F-control input.
	2	Fixed fan speed 2 control input, 24 V AC or DC control	When active, takes priority over F-control input.
	3	Fixed fan speed 3 control input, 24 V AC or DC control	When active, takes priority over F-control input.
	V+	Same as in connector C1	Same as in connector C1
COOL OUT	0–10 V	0–10 V valve output for cooling actuator	Follows C input
	G0	Same as in connector C1	Same as in connector C1
	24 V	24 V AC PWM output for cooling actuator/ 24 V AC power output for 0–10 V actuators	Follows C-input, or continuous 24 V AC output voltage

POS	Connector	Function	Technical description
HEAT OUT	0–10 V	0–10 V valve output for heating actuator	Follows H-input
	G0	Same as in connector C1	Same as in connector C1
	24 V	24 V AC PWM output for heating actuator/ 24 V AC power output for 0–10 V actuators	Follows C-input, or continuous 24 V AC output voltage

APPENDIX B: Register listing for Vari Pro-option

Note! Observe proper delays when communicating over Modbus. Use at least 200 ms polling delay. If you observe bus errors, increase the delay until there are no errors. Continuously rewrite (= refresh) fan speed, cooling valve, and heating valve registers at least every 5 minutes, even when desired value is 0. Always write to all 3 registers, even if there is no heating (or cooling) option in the unit.

When controlling fan coil directly (without the room controller), use the following register map.

Table 6: Register listing for Vari Pro-option

Vari Pro FCU Controller Card Register Map v 1.4					Modbus RTU RS485 38400, 8N1	
	Description	**Read/ Write**	**Min.**	**Max.**	**Unit**	**Note(s)**
Write register 16 bit integer register						
4x00002	Set fan speed	W	0	100	%	0...100 = 0...10 V 0 = OFF 100 = ON 24 V
4x00003	Set cool output	W	0	100	%	0...100 = 0...10 V 0 = OFF 100 = ON 24 V
4x00004	Set heat output	W	0	100	%	0...100 = 0...10 V 0 = OFF 100 = ON 24 V
4x00101	Reset service reminder counter	W	0	1		1 = reset
4x35203	Manufacturing year	W	20xx	20xx		By reading this data, modbus register configuration and address alignment can be validated.
4x35204	Manufacturing month	W	1	12		
4x35205	Manufacturing day	W	1	31		
Read register 16 bit integer register (*)						
3x00005	Alarm register	R				Bit0: Condense sensor alarm Bit1: Missing RPM from fan1 Bit2: Missing RPM from fan2 Bit3: Sensor fault, water in Bit4: Sensor fault, water out Bit11: Parameter file Bit15: Service reminder (Filter alarm)
3x00007	Current fan speed output	R	0	100	%	Scaled to maximum speed
3x00010	Condensate tank state	R	0	3		Level 2 pump start, 3 alarm
3x00011	Condensate pump status	R	1	16		1 = OFF, 16 = ON
3x00012	Cooling output	R	0	1000	x10mV	Scaled to maximum flow

Vari Pro FCU Controller Card Register Map v 1.4					Modbus RTU RS485 38400, 8N1	
	Description	**Read/ Write**	**Min.**	**Max.**	**Unit**	**Note(s)**
3x00013	Heating output	R	0	1000	xx10mV	Scaled to maximum flow
3x00018	Temperature water in	R			x10C	
3x00019	Temperature water out	R			x10C	
3x00025	Service reminder counter	R			h	
(*) Reading via User Interface Address: 3x00N (RR-2) N = Unit count RR = Register address Example: 3x00010 (Condensate tank state) from 1st unit, user interface address 3x00108						

APPENDIX C: Register listing for unit with Vari Pro room controller

When controlling fan coil with the room controller, use the following register map.

Table 7: Register listing for unit with Vari Pro room controller

Vari Pro User Interface Register Map v 1.4					**Modbus RTU RS485 Baudrate: 9k6, 19k2, 38k4 Parity: None, odd, even**	
	Description	**Read/ Write**	**Min.**	**Max.**	**Unit**	**Note(s)**
Write register 16 bit integer register						
4x00001	Application state	W				1 = Stand-by (OFF) 2 = Normal 3 = Away 4 = Flush (set cool & heat 100%) 5 = Stopped 10 = Test mode (allow cool/ heat without fan)
4x00003	Fan speed control	W				0 = OFF, 1–3 = Speed, 4 = Auto
4x00004	Room set point, Normal	W			x10C	
4x00005	Room set point, Away	W			x10C	
Read register 16 integer register						
3x00004	Application state	R				0 = Init 1 = StandBy 2 = Normal, 3 = Away 4 = Flush 10 = Test
3x00006	Current fan control	R	0	4		0 = OFF, 1–3 = Speed, 4 = Auto
3x00007	Room temperature	R			°C	x10
3x00008	Current room set point	R			°C	x10
3x00009	Current fan speed	R	0	100	%	
3x00010	Cooling output	R	0	100	%	
3x00011	Heating output	R	0	100	%	

Vari Pro User Interface Register Map v 1.4					Modbus RTU RS485 Baudrate: 9k6, 19k2, 38k4 Parity: None, odd, even	
	Description	**Read/ Write**	**Min.**	**Max.**	**Unit**	**Note(s)**
3x00103	Alarm “Unit 1”	R				Bit0: Condense sensor alarm Bit1: Missing RPM from fan1 Bit2: Missing RPM from fan2 Bit3: Sensor fault, water in Bit4: Sensor fault, water out Bit11: Parameter file Bit15: Service reminder (Filter alarm)
3x00203	Alarm “Unit 2”	R				

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