Dantherm®
CONTROL YOUR CLIMATE

DanX Comfort XWP / RWP / XK / R

User Manual

Rev. 2.2 - 961402

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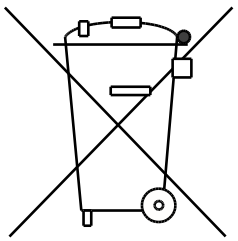
CONTROL YOUR CLIMATE



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0. TABLE OF CONTENTS

1.1 Introduction

The DanX type XWP, RWP, XK and R equipment is designed for comfort ventilation, with either CO2, duct pressure or air volume control. The use of the unit includes the required inspection and maintenance for these units, which is described in the back of this manual.

Unloading, transportation, assembly, connecting of the DanX modules should only be carried out by trained specialists or by people supervised by authorized staff. It is the responsibility of the fitter to read and understand this guide and other given information.

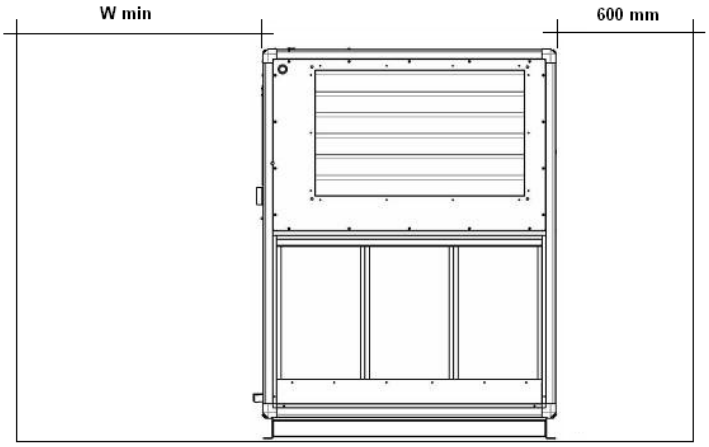
1.2 Foundation for the unit

The DanX unit must be installed in a location that meets the following requirements:

- The supporting structure must be level, stable and vibration-free.
- The supporting structure must be able to bear the weight of the unit.
- The deflection of the substructure should be max. 1 mm/m.
- For the connection of the condensate drain, it is necessary that the height between condense outlet of the unit and the substructure is at least the required height for the water trap.
- If the unit is mounted on a roof, the bearing ability of the roof and its support structure must be examined.

1.3 Minimum distances

For the operation, maintenance and servicing of parts as heating coils, dampers and others a minimum clearance between inspection side of the unit and the wall should be the width of the unit. It is also recommended to have a minimum clearance of 600 mm between the wall and the rear of the unit for service and installation purposes.



Model	W min [mm]
DanX 2/4	900
DanX 3/6	900
DanX 5/10	1400
DanX 7/14	1900

Model	W min [mm]
DanX 9/18	1800
DanX 12/24	2200
DanX16/32	2200

2.1 Unloading

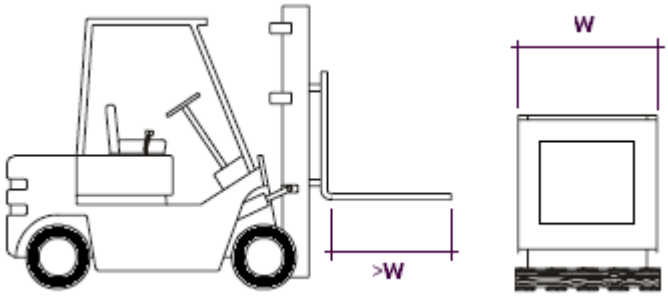
The unit is normally delivered in separate modules placed on wooden cross beams or a wooden pallet. Each part is wrapped in protective packing. The following steps should be taken when unloading the modules:

- Find a suitable place for unloading as modules can be very heavy (up to 2500 kg).
- Unload the modules with a forklift or crane (see instructions below).
- Do not tilt or lay down modules with integrated refrigeration system (compressor).
- Check the packing and modules for transport damage and report immediately any damage to the driver and to Dantherm Air Handling.
- Retain the packing until the sections/modules are placed on the mounting location to avoid damages on cabinet parts or connecting pieces that overhang.
- If the unit is delivered with a separate control panel, it should be handled with special caution and stored in a safe and dry location until the installation is carried out.

2.2 Lifting with a forklift

If a fork-lift is being used it must be ensured that the forks are long enough to reach all through under the unit so that the bottom of the cabinet is not damaged. Rough and incorrect handling can damage the unit and hereby result in glitch.

Make sure that the modules centre of gravity is always in the centre of the two forks, so the module can be transported stable. Be extra careful when transporting short but high and wide units.



Depending if the module is short or long there are two ways to lift. Long modules with a base frame and wooden cross beams or without a base frame on a pallet, should always be lifted from the inspection or backside of the unit, never in the longitudinal direction, as the base frame or pallet is not designed for this.

Short modules (475 up to 600 mm) with or without a base frame will always stand on a pallet and can only be lifted in the longitudinal direction as they are too short for lifting from the inspection or back side.

2.3 Lifting with a crane

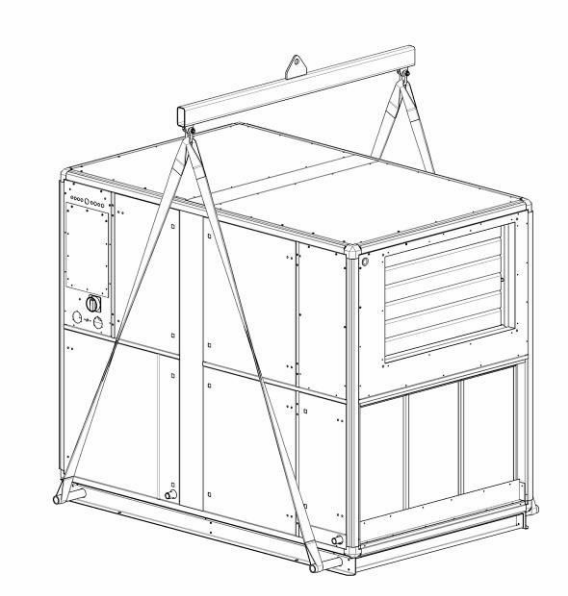
Never walk under a module when it is lifted with a crane.
There is always a risk that the crane or helping material may break and cause serious injuries or death.

Please be aware of the following general points:

- Only use a hoist that can manage the weight of the module!
- Never use a hoist which is damaged!
- Use soft straps!
- Lift the module cautiously, without jerky movements!
- Do not touch down hard!

Lifting is done in the following way:

- Insert 2 bars of round iron (min. 1 ½") in the holes of the base frame and secure them.
- Use four soft straps, push them over the iron bars and put them together in the crane hook.



2.4 Storage

If the unit is not installed at once but should be stored, note the permissible storage conditions:

- Do not leave the unit standing outside, but in a building.
- Do not remove the original packaging.
- Protect the unit until the installation from dust, dirt and damage.
- The air temperature in storage should be between 5 °C to 40 °C.
- The storage should be in a non-condensing atmosphere.

If the unit is delivered with a separate control panel, it should be handled with special caution and stored in a safe and dry location until the installation is carried out.

3.1 Introduction

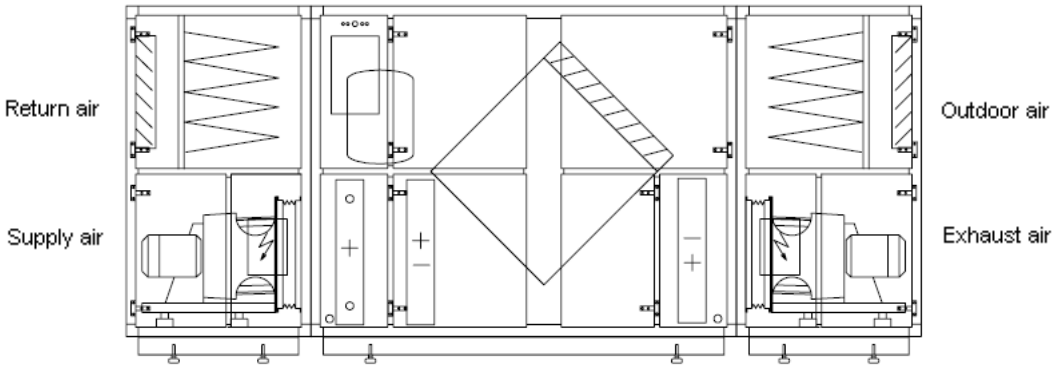
There are four basic models of DanX units for comfort ventilation. Your DanX unit may differ a little from these. If you are in doubt how to assemble the modules, please ask you supplier for an exact drawing of the unit. Please refer to the type plate on the inspection side of the unit to find out if it is a XWP, RWP, XK or R unit you are about to install.

The units shown in the drawings in this manual are all left hand units, with the outdoor air coming from the right hand side. If you have a right hand unit, all components of the unit are the other way around.

Assembly of the DanX modules should only be carried out by trained specialists or by people supervised by authorized staff. It is the responsibility of the fitter to read and understand this guide and other given information.

3.1.1 Unit construction DanX – XWP

The DanX – XWP consist of a cross flow heat exchanger in combination with a compressor driven heat pump in the same module. The cooling circuit is mounted in the XWP module, filled with refrigerant and do not need any extra installation, except the seize 16/32.



From left to right the unit consists of the following components/modules:

1) Supply air fan below.
2) Return air damper and filter above.
3) Cross flow heat exchanger with heat pump and heating coil.
4) Outdoor air damper and filter above.
5) Exhaust air fan below.

3.1.2 Unit construction DanX – RWP

The DanX – RWP consist of a rotary heat exchanger in combination with a compressor driven heat pump. The cooling circuit is filled with refrigerant and do not need any extra installation.

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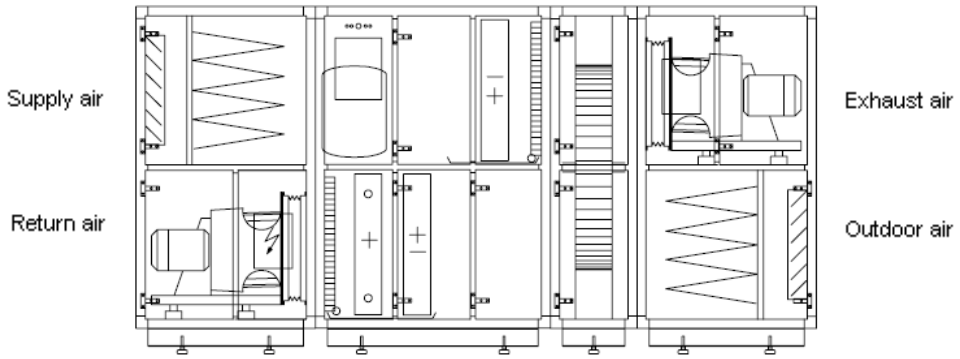
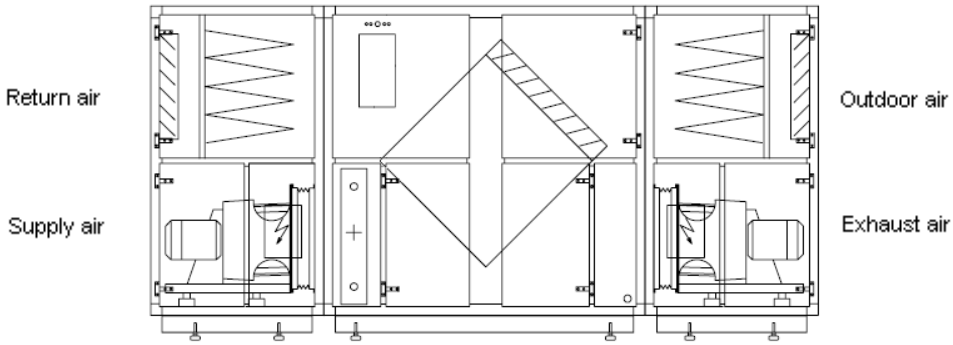


From left to right the unit consists of the following components/modules:

1) Supply air fan below.
2) Return air damper filter above.
3) Heat pump with heating coil.
4) Rotary heat exchanger.
5) Exhaust air fan above.
6) Outdoor air damper and filter below.

3.1.3 Unit construction DanX – XK

The DanX – XK consist of a cross flow heat exchanger.



From left to right the unit consists of the following components/modules:

1) Supply air fan below.
2) Return air damper and filter above.
3) Cross flow heat exchanger with heating coil.
4) Exhaust air fan below.
5) Outdoor air damper and filter above.

3.1.4 Unit construction DanX – R

The DanX – R consist of a rotary heat exchanger.

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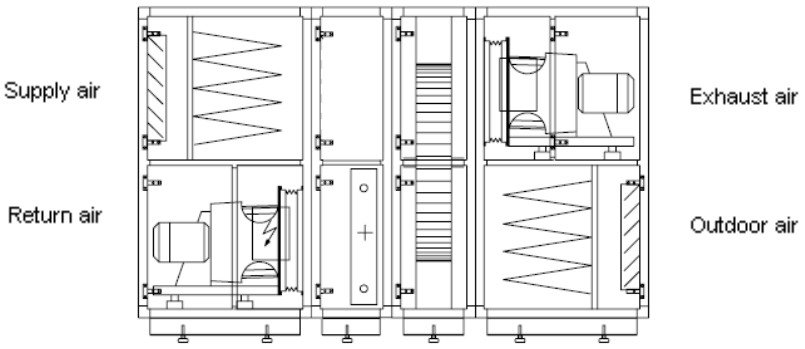


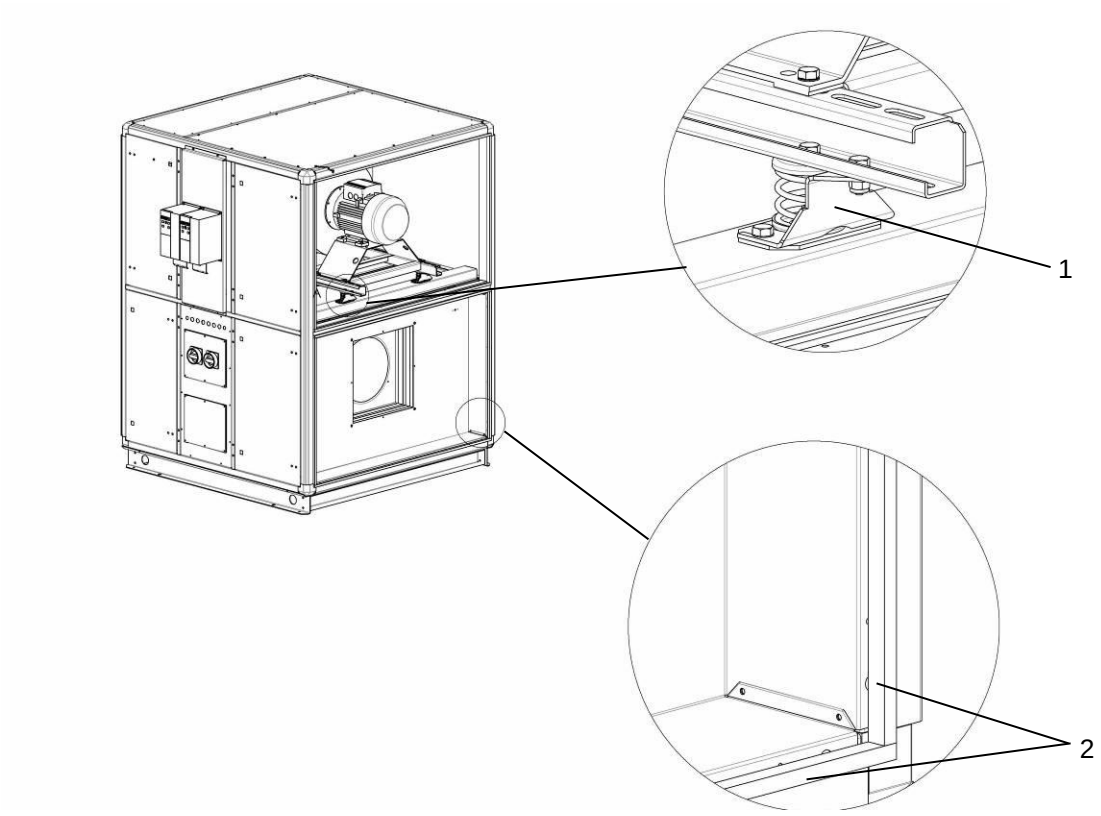
From left to right the unit consists of the following components/modules:

1) Supply air fan below.
2) Return air damper filter above.
3) Heating coil module.
4) Rotary heat exchanger module.
5) Exhaust air fan above.
6) Outdoor air damper and filter below.

3.2 Installation of modules

Before placing the single modules in the right order, accordingly to chapter 3.1 the wooden crossbeams or pallets have to be removed and the separate delivered feet mounted on the base frame. To do so the following has to be done:

- Unwrap the module, open the inspection door and take out the separate box with the feet and the assembly rails for the unit.
- On the fan modules remove the transport brackets (1) which are holding the fan (spring vibration dampers only) as it is easier now then after the unit has been assembled (see drawing).



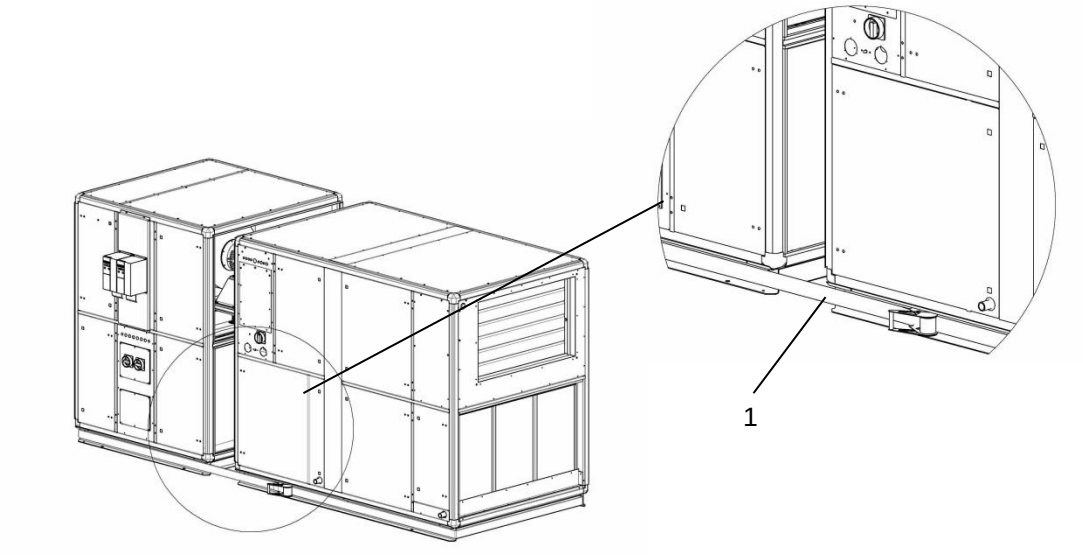
- Check the rubber gaskets (2) at the end of each module that they are not damaged or loose. This is important, as it is impossible to replace the gaskets after the modules have been assembled!
- Lift the unit with a fork lift or pallet lift and unscrew the wooden cross beams.
- Screw the feet on the base frame (see drawing) and place the modules as close as possible together where they should be installed. When the feet are mounted it is only possible to move the modules a few millimetres, otherwise the feet can bend or break. If you have to move the modules more, then use a fork lift or pallet lift.

3.2.1 Modules side by side

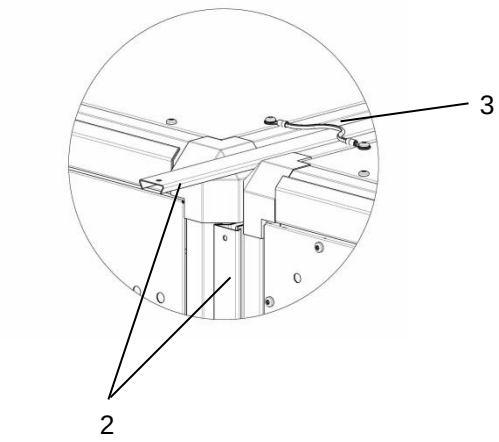
After placing all bottom modules in the right order on the floor, the modules must be assembled. If the unit includes halve height modules, install the bottom modules **before** the top modules.

Follow these steps for mounting the modules:

- Adjust the height of the modules with the adjustable feet, so that all modules are in level and in same height.
- Use straps (1) to move the modules the last few millimetres. Straps should only be mounted at the bottom or/and top of the modules.



- Connect neighbour modules by pushing assembly rails (2) from the top over the outside of the frame profile all the way around the unit. The assembly rail can at difficult accessible space be divided into smaller pieces, which are then mounted in the same way.



- To finish the installation all modules must be connected with the green/yellow earth connection (3) at the top of the modules.

3.2.2 Modules above each other

After the installation of the bottom modules (se chapter 3.2.1) the halve height top modules can be placed above the bottom modules in the following way.

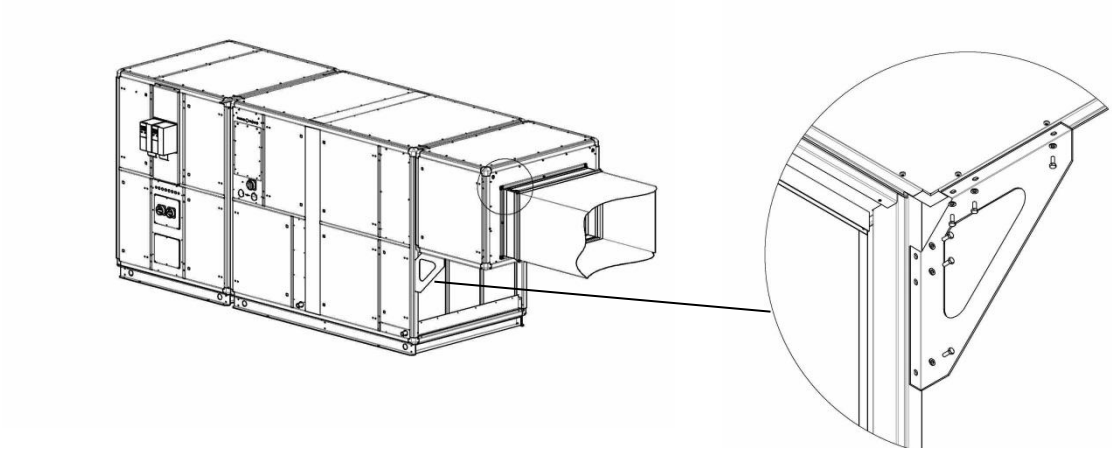
- Lift the module with a fork lift and push the module from the wooden pallet onto the bottom module.
- Use a strap to get the modules as close together as possible. Straps should only be mounted at the bottom or/and top of the modules
- Use the assembly rails as described in chapter 3.2.1, not only vertical but also horizontal to connect the upper module with the module below.

3.2.3 Half height hanging filter modules

Half height hanging filter modules are mounted on a set of support brackets (to be found in a box inside the module).

Follow these steps for mounting the modules:

- Screw the two brackets into the end frame of the DanX unit, by using the bolts delivered with the brackets.
- Lift the filter module onto the brackets
- Fasten the filter module with the assembly rails to the top and side of the DanX. The assembly rails can only be used on three sides and not beneath the module.
- Use the self-cutting screws to fasten the filter module to the support brackets.

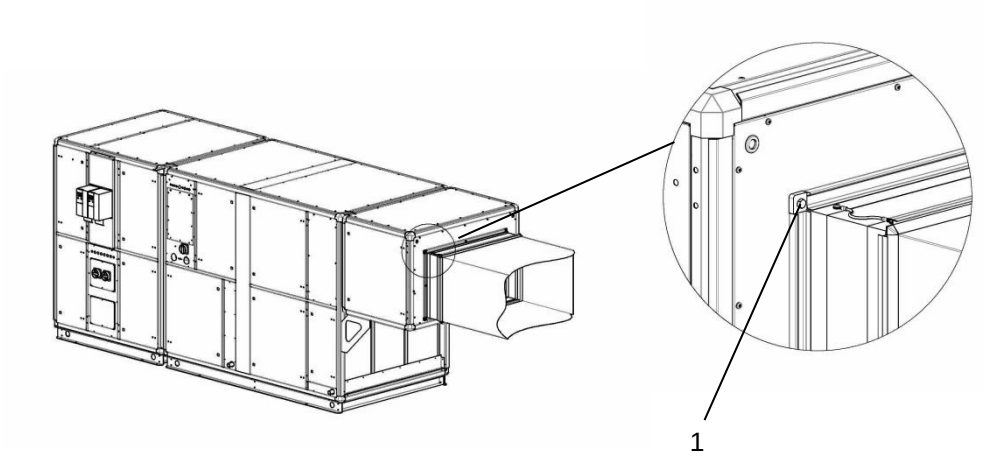


Important:
If the module is longer than 880 mm or contains other functions than a filter, the module must be supported at the free end of the module, to avoid that the module sinks.
This supporting is not included in the delivery.

3.2.4 Duct mounting

The ducts connected to the AHU must be suspended or underpinned with support elements as the duct connection panel of the unit is not strong enough to hold the duct work.

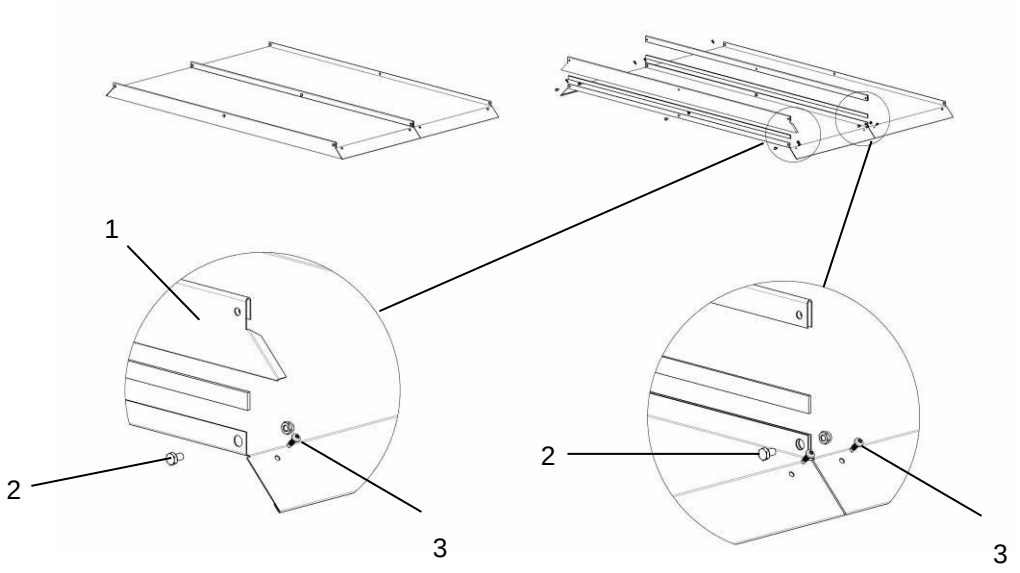
The ducts can be connected to the DanX with flexible connections (optional accessory) to suppress vibrations of the unit. Flexible connections are equipped with flanges and can be fastened to the unit with four bolts (1), one on each corner. It is important that the flexible connection is not totally stretched to work properly. When a flexible connection is used an earth connection must be mounted between unit and duct work.



3.2.5 Outdoor unit

Installation of outdoor and indoor units are done in the same way, however, outdoor units often come completely assembled on one base frame, ready to be lifted onto the roof in one piece. Outdoor units must have a roof cover, which is delivered separately together with the unit. Depending on the length of the unit, the roof cover consists of two gable ends (1) and one or more middle parts.

- Assemble the roof panels with the rails and bolts (2) delivered with the roof as shown in the drawing.
- Finish the installation by securing the assembled roof with self-cutting screws (3) to the upper frame of the units as shown in the drawing.



3.3 Installation and connection of components

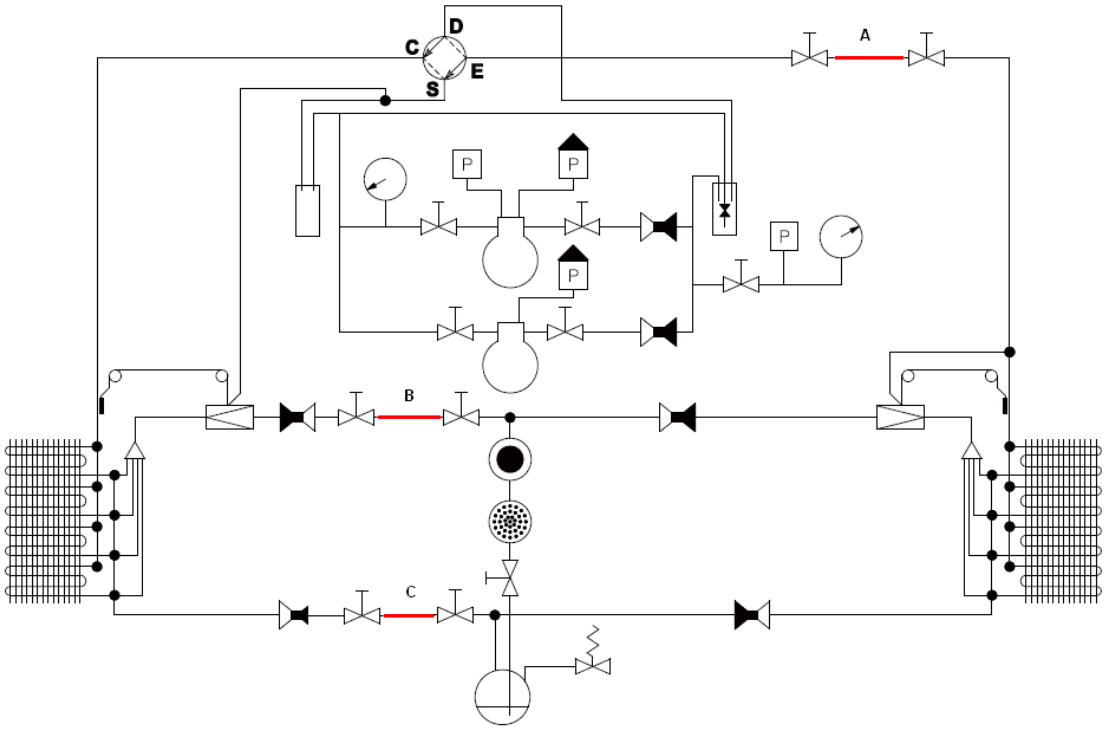
All components and duct work of the air handling unit must be installed correctly before starting up and commissioning the DanX unit.

Installation and connection work should only be carried out by trained specialists or by people supervised by authorized staff. It is the responsibility of the fitter to read and understand this guide and other given information.

3.3.1 Cooling circuit XWP 16/32

Because of the weight of the cooling section, the XWP 16/32 is delivered in two parts. This means that the cooling circuit first has to be connected before the compressor can be started up. To connect the cooling circuit the following has to be done:

- Take the three copper pipes for the cooling circuit (A/B/C) out of the box which is inside the XWP module.
- Check that the pipes are totally clean before installation.
- Install the three pipes at each end of the cooling circuit after the shoot off valves (see drawing)
- Open for all six shoot off valves and check that the connections a tied with no refrigerant leakage.



3.3.2 Condensed water outlet

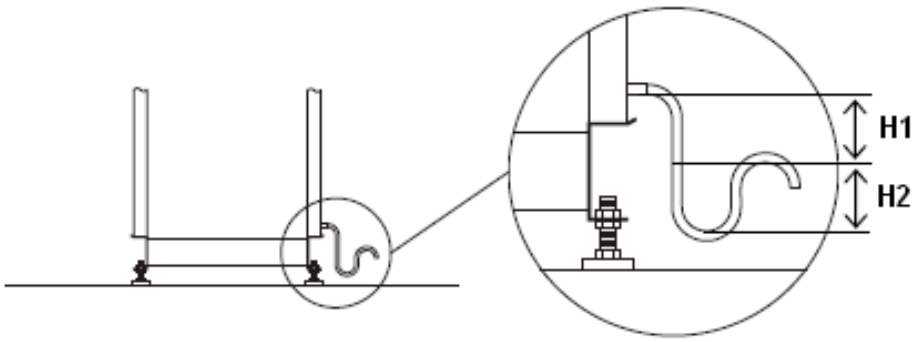
Drainage from the condensate tray is taking place through a connection in front of the inspection side through the cover panel. On a XWP / RWP unit there will be two condense outlets, one on the exhaust side and one on the supply side (normally both negative pressure). On XK units there will be one outlet on the exhaust side (normally negative pressure). There are two different types of water traps available.

Drain trap with ball valve
This drain trap should only be installed where there is negative pressure in the drain system as the ball valve will open on positive pressure. The inserted float ball prevents the intake of air under dry operation, where in a traditional drain trap you have to refill water to avoid air been sagged into the unit. At the same time you need less space in height than on a traditional drain pipe. This drain trap can be used up to -900 Pa.

Normal drain pipe
The normal drain pipe with screw cap for filling with water and check can be used for negative and positive pressure. The length of the pipe can be calculated the following way.

Positive pressure : H1 = 50 mm H2 = ∆p + 50 mm
Negative pressure : H1 = ∆p + 50 mm H2 = ∆p / 2 + 50 mm

∆p = pressure in mm WS (100 Pa = 10 mm WS)



3.3.3 Damper motors

All damper motors are installed, prewired and connected to the terminal strip of the XWP, RWP, XK or R module. For further information see the electrical diagram of the unit.

3.3.4 Filter gauges

The filter gauges for outside and return air are mounted at the front of the XWP, RWP, XK or R module and prewired to the terminal strip.
After assembling the unit the pressure tubes have to be connected to the probes in the filter section. You find the pressure tubes, which are marked – and +, inside the main section. Run the pressure tubes inside the cable channel to the filter section and connect the + tube to the probe behind the filter and the – tube to the probe before the filter.

3.3.5 Flow gauges for centrifugal fans

The flow gauges for centrifugal fans are mounted at the front of the XWP, RWP, XK or R module and prewired to the terminal strip of the module. After assembling the unit the pressure tubes have to be connected to the probes in the fan section. You find on pressure tube for each fan inside the main section. Run the pressure tube inside the cable channel to the fan section and connect the tube to the probe on the low pressure side of the fan.

3.3.6 Temperature sensors

All temperature sensors in the unit are mounted and prewired to the terminal strip of the XWP, RWP, XK or R module.

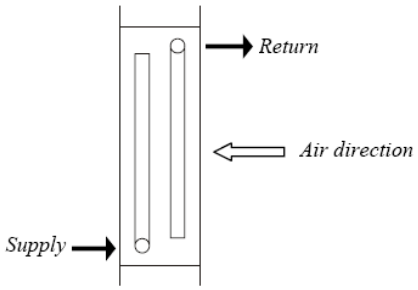
Only the supply air duct sensor has to be installed after assembling the DanX unit. You find the coiled up duct sensor near the connection panel of the XWP, RWP, XK or R module.

The supply air duct sensor is installed in the supply air duct after the heating coil in the following way.

- Drill an 8 mm hole in the supply air duct about 1.5 m from the unit.
- Place the sensor in the hole.
- Fasten the sensor housing to the duct with two screws.

3.3.7 LPHW coil

The supply is always connect to the bottom of 1 and 2 row LPHW coils, as this makes it easy to bleed the coil for air.
If the coil is larger than 2 rows, the water and air flow must be counter flow to obtain the calculated heat capacity.



NB!
When connecting the heat exchanger, counter hold with a suitable tool in order to avoid any damage to the pipes. Mount the connections in a way that it is possible to access the heat exchanger for maintenance afterwards.

3.3.8 Frost thermostat for LPHW coil

The frost thermostat is normally placed in the compartment above the LPHW heating coil, with the capillary tube mounted on the heating coil. The thermostat is prewired and the wire only has to be connected to the main terminal strip of the unit (see wiring diagram).

3.3.9 CO2 sensor

The CO2 sensor is often duct mounted, and includes also the return air temperature sensor. You find the coiled up duct sensor near the connection panel of the XWP, RWP, XK or R module.

The duct humidistat is installed in the following way:

- Drill a 15 mm hole in the return air duct about 1.5 m from the unit.
- Fasten the sensor housing to the duct with two screws.
- Connect the sensor directly to the electrical panel.

If a room sensor has been ordered, the sensor will be in the electric panel. The room sensor is installed in the following way:

- Find a suitable place for the sensor in the room. Avoid placing the sensor in direct sun light or near the supply air duct.
- Fasten the sensor housing to the wall with screws.
- Connect the sensor directly to the electrical panel.

3.3.10 Separate outdoor sensor

If there is ordered a separate outdoor temperature sensor, you will find the sensor separately in the electrical panel without cabling. Install the sensor outside the building where there is no direct sunlight. Disconnect the standard outdoor sensor which is installed inside the DanX unit (see electrical diagram) and connect the new outdoor sensor to the two terminals.

3.3.11 Frequency inverter

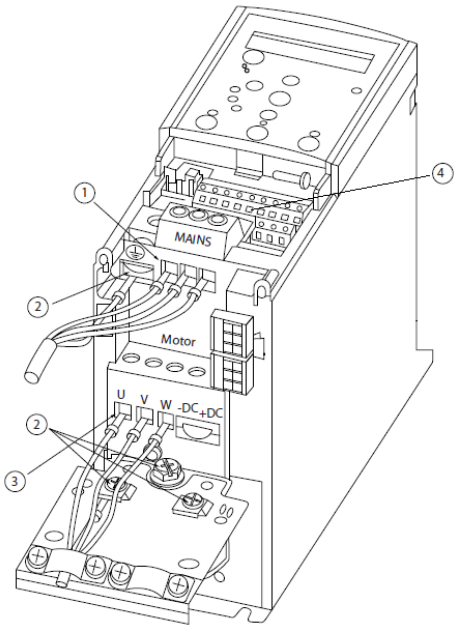
The voltage of the frequency inverter is dangerous whenever the equipment is connected to mains. Incorrect installation of motor or frequency inverter may cause damage to the equipment, serious injury or death. Touching the electrical parts may be fatal - even after the equipment has been disconnected from mains: Wait at least 4 minutes for current dissipates. Installation must comply with the instructions in this manual and the separate manual for the frequency inverter as well as national and local legislation and safety regulations.

NB!
It is the responsibility of the user or installer to ensure correct earthing and protection in accordance with national and local standards.

Frequency inverters delivered by Dantherm Air Handling are found in the fan section, where they are stored under transport. Unpack the frequency inverters and mount them either on a special framework on the fan section or in another place next to the DanX unit, depending on what has been ordered.

If the frequency inverters are mounted on the fan section, all cabling in the DanX unit has been done from the factory and only the following steps should be done to finish the installation:

- Remove the lower plastic protection for the frequency inverter terminals.
- Connected the control current cable to the frequency inverters terminals (4) accordingly to the DanX wiring diagram.
- Connected the prewired cables for mains (3)
- Connected the prewired cables for the motor (1).



If the frequency inverters are mounted separately from the DanX unit all cabling has to be done according to the wiring diagrams and the inverters handbook supplied with the DanX unit and the separate handbook for the Danfoss inverter.

4.1 Introduction

When servicing on air handling units always turn off the electricity on the main switch *and* the repair switch (complete shutdown) *and* secure for reconnection from unauthorized persons. Only open the inspection doors when the unit is totally stopped and the fans have come to a stop. After switching off the unit the fan impeller will run for about 1 to 3 minutes before stopping totally. The fan wheel must never be stopped by hand or with an object.

Commissioning, maintenance and repair work should only be carried out by trained specialists or by people supervised by authorized staff. It is the responsibility of the fitter to read and understand this guide and other given information.

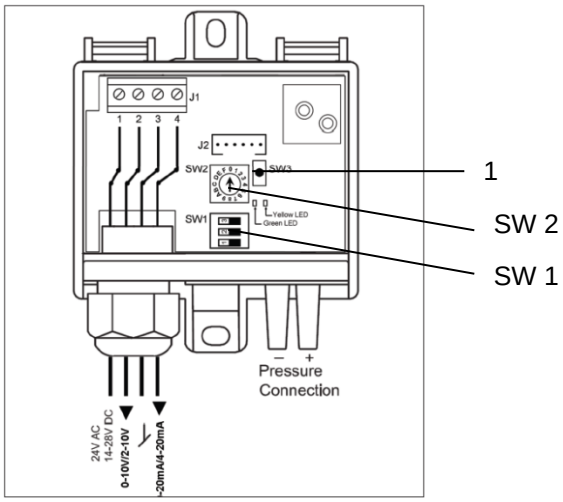
4.2 Fans

To commission the plug fans for the first time, the following actions have to be taken:

- Check that the four measuring probes below the pressure transmitter are blanked.
- Check if the transportation brackets have been removed.
- Check by hand if the fan wheel is turning freely.
- Check that all dampers in the duct system are open.
- Check if the duct system is clean and not blocked by any parts.
- Start up the fan for a few seconds and check if the fan wheel turns in the right direction (see arrow on fan casing). If this is not the case stop the unit, switch off the main current and change two phases of the fan on the terminal strip.

4.2.1 Pressure transducer

The pressure transducers for the supply and exhaust fan are installed in a separate box below the electrical connection box for the fan motors. The transducer factory settings should normally not be changed.



After installing the unit and before the first start, it is recommended to zero-set the trans-ducer. After the power supply is established (green LED on) press the zero-set button (SW3) and the yellow LED will flash for 3 seconds. After this the pressure transducer is reset.

There are two LED lamps on the printed circuit board, which are indicating the following:

LED	On	Flashing	Off
Green	OK	Pressure outside set range	No power supply
Yellow	>50Pa	Zero setting in progress	<50Pa

If the yellow LED is ON when the fans are stopped, please check if the tubes to the fans are bended or pressed. The yellow LED must be OFF when the fans are stopped to have the pressure transducer work properly!

If the green LED is flashing you have to change the pressure range setting. Change of setting can be done with the switch (SW2). This can be the case if you run with a higher or lower air volume than first designed. The pressure range depending on the switch setting can be seen below.

Pressure range	SW2
0..+500 Pa	0
0..+1000 Pa	1
0..+1600 Pa	2
0..+2000 Pa	3
0..+2500 Pa	4
0..+3000 Pa	5
0..+4000 Pa	6
0..+5000 Pa	7

Another reason for the green LED flashing could be that the + and – tube have been switched when connecting to the pressure transducer.

The DIP switch (SW1) is factory set as follows and should not been changed:

SW1	DIP 1	DIP 2	DIP 3
	OFF (0-10V signal)	OFF (Damping 0,4s)	OFF (No function)

4.2.2 Air volume check

If you want to check the air volume of the unit with a differential pressure meter, the two measuring probes (+/-), which are located beneath the pressure transducer, can be used. The differential pressure, measured at these two points, compares the static pressure in front of the inlet ring with the static pressure in the inlet ring of the narrowest point. The differential pressure between the static pressures is related to the air volume via the energy conservation rate as follows:

$$V = k * \sqrt{\Delta Pw}$$

Where k takes into account the specific ring characteristics.

Model	K nozzle coefficient		Model	K nozzle coefficient
DanX 2/4	121		DanX 9/18	394
DanX 3/6	154		DanX 9/18 (2 x 6.0 kW)	616
DanX 5/10	197		DanX 12/24 (EC fans)	616
DanX 5/10 (2 x 2.4 kW)	308		DanX 12/24 (AC fans)	490
DanX 7/14	308		DanX 16/32 (EC fans)	616
DanX 7/14 (2 x 5.2 kW)	394		DanX 16/32 (AC fans)	620

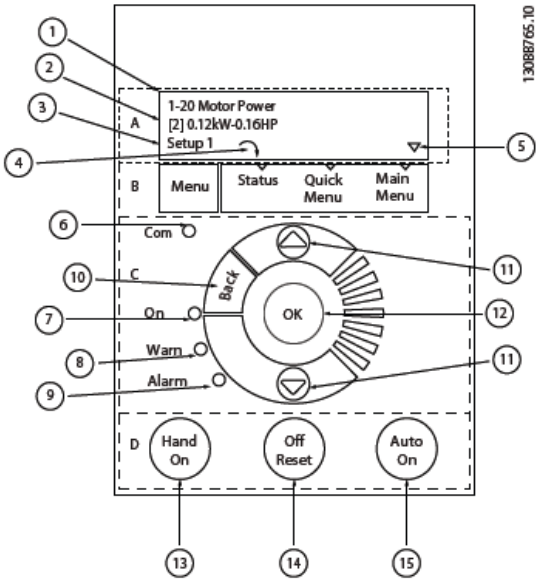
EXAMPLE: If you have measured a static pressure difference of 700 Pa for a DanX 5/10 then the air volume will be:

$$V = 197 * \sqrt{700} = 5212 \text{ m}^3/\text{h}$$

4.2.3 Frequency inverter setup (if installed)

All frequency inverter parameters are set by the factory. For a list of parameters please refer to chapter 8. For change of settings of the most important parameters, please refer to the Danfoss Quick Menu booklet.

The display of the inverter I divided into four functional sections:



(A) Alphanumeric display:

1. Parameter number und name
2. Parameter value
3. Active set up number
4. Motor running direction

(B) Menu key:

5. Use the MENU key to select one of the three menus

(C) Navigation key and indicator lights

6. Not used in DanX
7. Inverter working LED
8. Warning LED
9. Alarm LED
10. Moving one step back

11. Manoeuvring between parameters
12. Selecting and accepting parameters

(D) Operation keys and indicator lights

13. Hand on enables the control over the inverter over the panel
14. Stops the motor
15. Inverter is controlled by the DanX controller

4.3 XWP / RWP section

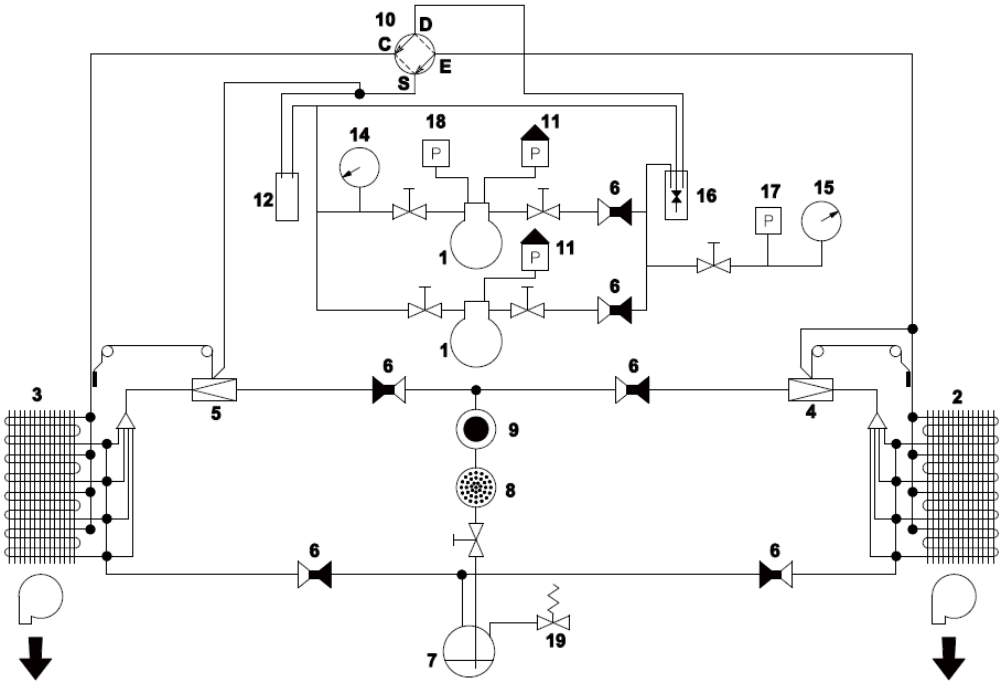
To commission the XWP / RWP section for the first time, the following actions have to be taken:

- On a XWP 16/32 check if the cooling circuit has been connected probably (see 3.3.1).
- Check if the drain pipes have been installed correctly (see 3.3.2) and if the drip trays inside the unit are clean.
- Check that all loss parts/accessories have been removed from the inside of the unit.
- Check the control panel if all the right set points are set in the controller (see separate instruction manual controls)

4.3.1 Cooling circuit

When starting up the compressor of the cooling circuit for the first time, please check the following:

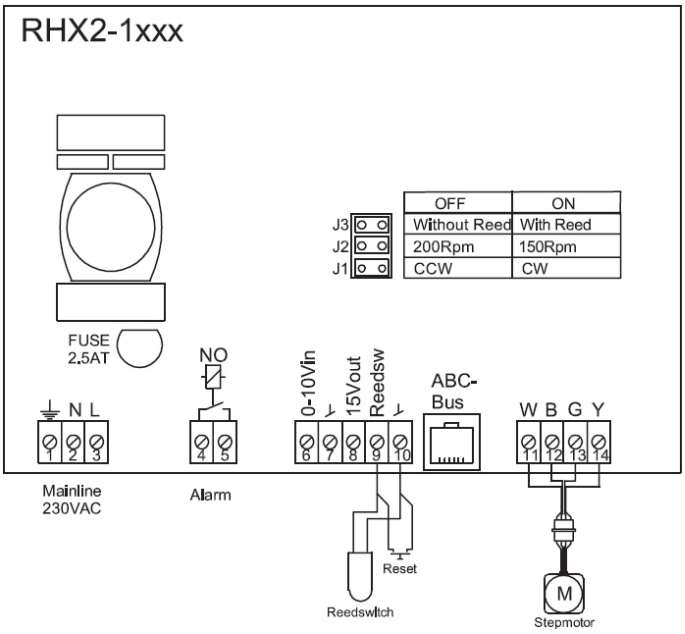
- Start up the compressor and watch the HP gauge. The HP and LP gauge should now show a reasonable temperature / pressure.
- Check the sight glass of the cooling circuit if there is enough refrigerant in the unit. If refrigerant is missing stop the compressor at once and check for a leakage.



1. Compressor (one or two)
2. Evaporator (heating mode)
3. Condenser (heating mode)
4. Primary expansion valve
5. Secondary expansion valve
6. Non return valve
7. Receiver
8. Dry filter
9. Sight glass
10. 4 way valve
11. HP pressostat
12. Suction accumulator
14. LP gauge
15. HP gauge
16. Oil separator
17. Running pressostat
18. LP pressostat
19. Safety valve

4.4 Rotary heat exchanger

The rotor exchanger is run by a step motor with a control box. The step motor and control box are pre wired to the terminal strip of the R module. The motor and the control box are placed in the lower part of the R module right behind the cover plates.



The jumpers J1/J2/J3 should be set according the following table:

Jumper	OFF	ON
J1		
J2	Should always be OFF (200 rpm)	-
J3	Should be OFF if ON/OFF control signal	Should be ON if 0-10V control signal

4.5 Frost thermostat

Check if the frost thermostat is set to the correct temperature. The factory setting is +8°C.

4.6 Filter pressure transmitter

Check if the pressure transmitters are set to the correct maximum pressure loss. The factory setting for the different filter classes are shown in the table below.

Filter type	Recommended pressure loose	Max pressure loose
G4 panel	200 Pa	200 Pa
G3 bag	250 Pa	250 Pa
F5 bag	250 Pa	400 Pa
F7 bag	250 Pa	400 Pa
F7 compact	250 Pa	400 Pa
F9 bag	250 Pa	400 Pa

5.1 Introduction

For optimum operation conditions and a long product life it is necessary to perform preventive maintenance on various parts within the stipulated intervals (see 5.2).

When servicing on air-handling unit always turn off the electricity on the main switch and repair switch (complete shutdown) and secure for reconnection from unauthorized persons. Only open the inspection doors when the unit is stopped and the fans have come to a standstill. After switching off the unit the fan impeller will run for about 1 to 3 minutes before stopping totally. The fan wheel must never be stopped by hand or with an object.

Commissioning, maintenance and repair work should only be carried out by trained specialists or by people supervised by authorized staff. It is the responsibility of the fitter to read and understand this guide and other given information.

5.2 Maintenance plan

Component	Ref	Every 3 month	Every 6 month	Every 12 month
Cabinet	5.3			X
Fans	5.4	X	X	X
Filter	5.5		X*	X*
Heating coil	5.6			X
Crossflow heat exchanger	5.7			X
Rotary heat exchanger	5.8			X
Dampers	5.9		X	X
Cooling circuit	5.10			X

* Or when filter alarm is shown

5.3 Cabinet

The following steps should be taken to maintain the cabinet of the unit:

- Check the inside of the cabinet for dust or dirt. If necessary, clean either dry or wet.
- Clean all drip trays, either dry or wet and check if condense water can run out freely.
- Check for paint damage and rust. Clean the damaged/rusting part and protect it with new paint.
- Check all gaskets on the service doors for leaks and damage. Replace damaged gaskets where necessary.
- Lubricate door locks and hinges.

5.4 Fans

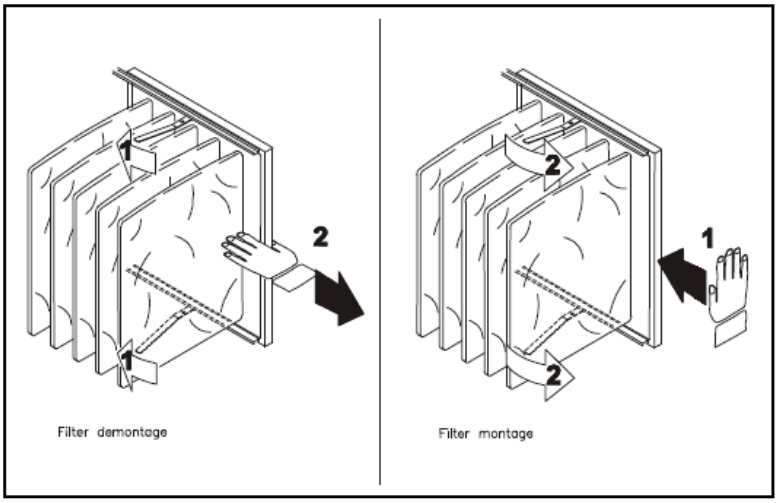
The following general steps should be taken to maintain the fans:

- Check the fan wheel for unbalance (every 3 month).
- Check the fan and motor bearings for unusual noise (every 3 month).
- Check vibration dampers for damage (every 3 month)
- Check the fan for dust or dirt. If necessary, clean the fan wheel, either dry or wet (every 12 month).
- Check all flexible connections for damage/leakage (every 12 month).
- Check if all mounting bolts are tight (every 12 month).
- Check the pressure hoses from the pressure transmitter to the fan for leakage or damage (every 3 month).

5.5 Filter

If the filters are equipped with a pressure transducer the control panel automatically gives an alarm when the filters have to be changed. Still every 6 month the filters should be checked for damage/leakages which will not be detected by the pressure transmitter. If no pressure transmitter is installed the following steps should be taken every 6 month:

- Check the filter for dirt and damage.
- Measure the pressure loss over the filter which should not be above 150 Pa (G3/G4) or 250 Pa (F5/F7). If the pressure loss is higher the filters have to be changed.
- Open the filter rail by the blue handles (1).
- Take out the filters (2) and check the gasket on the filter rail for damage.
- Clean the filter rail and reinstall the old/new filters.



5.6 Heating coil

The following steps should be taken to maintain the heating coil:

- Check the coils for dust or dirt. If necessary, clean the aluminium fins by a soft brush or a vacuum cleaner.
- Straighten any bent slats using appropriate tools
- Air the coil circuits through the exhaust valves of the pipe system (air in the pipe system may reduce the capacity)
- Check that the frost sensor is properly fixed.

5.7 Cross flow heat exchanger

The cross flow heat exchanger has no mechanical part, therefore only the plates should be checked and cleaned if necessary. Clean the plates with a soft brush or use high pressure cleaner with compressed air and blow against the air stream.

5.8 Rotary heat exchanger

The following steps should be taken to maintain the rotary heat exchanger unit.

- Check the rotor for dust or dirt. If necessary, clean the aluminium fins by a soft brush, a vacuum cleaner or compressed air. If this is not sufficient wash the rotor with fat dissolving detergent to remove fat and dirt and use a high pressure washer.
- Check that the brushes around the rotor are tight and not damaged.
- Check the rotor driving belt and the transmission for the right tension.
- Check that the rotor can rotate freely.

When using high pressure air or a high pressure washer the air or water direction should always be rectangular to the rotor! Otherwise there is a chance for destroying the rotor material!

5.9 Dampers

The following steps should be taken to maintain the dampers of the unit.

- Check that the damper setting is in accordance with the current operation mode (every 6 month).
- Check that the damper louvers can rotate when the damper motor is running and that they close/open completely (every 6 month).
- Check the fixing of the motor/damper shaft (every 12 month).
- If necessary, clean the damper louvers either dry or wet (every 12 month).
- Check the rubber gaskets for damage (every 12 month).

5.10 Cooling circuit

The following steps should be taken to maintain the evaporator and condenser coil of the cooling circuit:

- Check the coils for dust or dirt. If necessary, clean the aluminium fins by a soft brush or a vacuum cleaner.
- Straighten any bent slats using appropriate tools.
- Check that the frost sensor is properly fixed in the evaporator coil.

The following steps should be taken to check the cooling circuit:

- Close all inspection doors and start up the unit. Wait for a few minutes and check the LP/HP gauge. The HP gauge should show between 35-50 °C and the LP gauge about 0-10°C, depending on the running and outside conditions.
- Keep the unit running, open the inspection door by the receiver and check if there is enough refrigerant in the receiver and if the sight glass of the refrigerant circuit is free of bubbles.

If you are in doubt about the condition of the cooling circuit, stop the compressor at once to avoid damage and call a cooling technician or the Dantherm service.

6.1 Introduction

Normally an operation fault will give an alarm in the display of the control panel. The alarm messages may be named differently. For details, please refer to the manual of the control panel.

If the frequency inverter for the fan is showing an alarm, please refer to the manual of the frequency inverter.

6.2 Fault finding

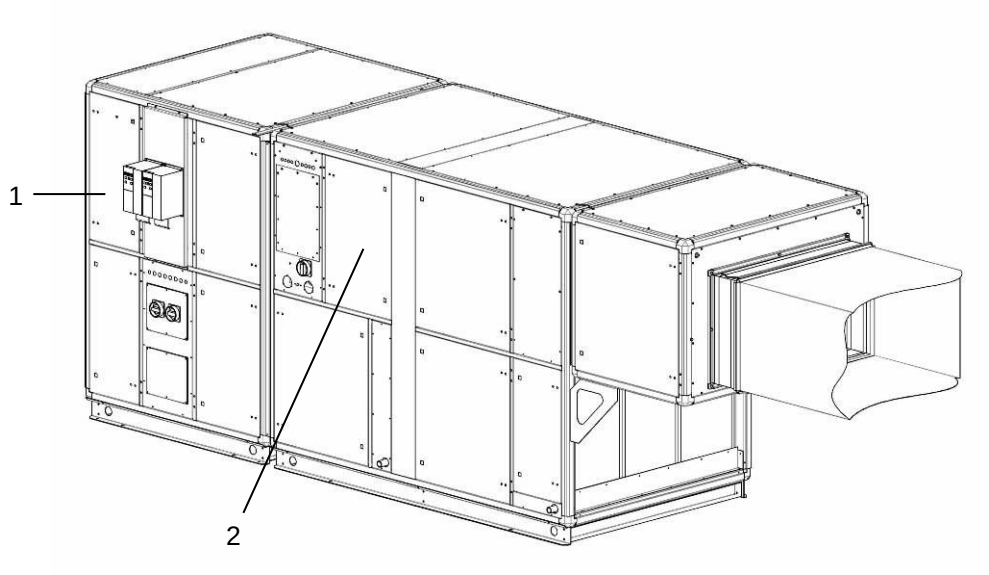
Alarm	Problem	Cause	Action
Frost [1]	Valve not opening	• Defect actuator • Valve stuck	• Change/Repair actuator • Change/Repair valve
	No hot water	• Pump not working • Boiler problem	• Change/Repair pump • See boiler manual
Fire [2]	Return air temperature > 40°C	• Fire in the building	
	Supply air temperature > 70°C	• After heating coil not working correct at low air volume • Fire in the unit	• Check heating coil controls
Filter	Filter is dirty	• Filter blocked	• Change filter
Flow	Flow error	• Fan belt broken • Fan motor broken • Damper not open	• Change belt • Change/repair motor • Check damper/motor
	Thermo relay switched off	• Fan motor broken • Phase missing • Fan belt broken • Thermo relay broken	• Change/repair motor • Connect all phases correct • Change belt • Change thermo relay
	Frequency inverter switched off [3]	• Fan motor overload • Fan motor broken • Phase missing	• Check air volume/pressure • Change/repair motor • Connect all phases correct
HP/ LP [4]	HP pressure over 24 bar	• Air volume too small • Blockage in cooling circuit • Outside temperature too high	• Check air volume • Check/repair cooling circuit • Reset pressure switch
	LP pressure under 1.5 bar	• Leakage in the cooling circuit • Evaporator iced up	• Repair cooling circuit • De-ice evaporator/check de-icing function
Rotor fault [5]	Rotor not running	• Defect motor • Defect transmission	• Change motor • Change / tied transmission
Compressor	Thermo relay switched off	• Compressor broken • Phase missing • Thermo relay broken	• Change compressor • Connect all phases correct • Change thermo relay

[1] If the frost thermostat is manual, it must be you have to reset before starting the unit. The thermostat is located in the compartment (1) above the LPHW heating coil.

[2] The fire thermostat must be reset before the unit is started again. Press the red button on the thermostat to reset. The thermostats are located in the exhaust (70°C thermostat) and supply (40°C) air.

[3] For further explanations see the manual of the frequency inverter.

[4] The HP pressostat has to be reset before the compressor can start again. The red reset button is placed inside the heat pump section (2) beneath the compressors.



[5] During operation, the LED diode in the front of the control box will provide information on the operational state

Green	Normal operation and motor running
Green blink	The LED will blink each time the rotation guard is activated
Red	General alarm
Red blink	Rotation guard alarm; To reset rotation guard alarm, the rotation guard input must be short circuited (see wiring diagram section 4.5)

If the controller cannot detect rotation, the motor is ramped down to 0 RPM and the speed is then ramped up to the reference speed. This is repeated 3 times, and only then is the alarm relay activated and the diode blinks red. Until the motor has been ramped up 3 times no alarm is indicated.

7.1 Disposal of the unit

Removal and disposal of the unit may only be performed by professionals.

All supply lines like electricity and hot water must be shut down before decommissioning and dismantling the equipment. Make sure that no water-glycol mixture is leaking.

Empty the heating coil for the water-glycol mixture before removing it from the unit.

Empty the refrigerant circuit for oil and refrigerant before dismantling.

Recycle all material according to national rules and procedures to protect the environment.

8.1 VLT FC 101 parameter settings open loop (0-10V control from MVC 80)

Parameter	Description	Value	Function / unit	Comment
1-00	Configuration	0	Process open loop	
1-03	Torque characteristic	1	Variable torque medium	
1-20	Motor power	*	kW	* See motor plate
1-22	Motor voltage	400	V	
1-23	Motor frequency	50	Hz	
1-24	Motor current	*	A	* See motor plate
1-25	Motor speed	*	rpm	* See motor plate
1-90	Motor protection	2	Thermistor trip	With thermistor
	Motor protection	4	ETR Trip	No thermistor
1-93	Connection	6	Digital input 29	With thermistor
	Connection	0	No thermistor	No thermistor
3-02	Minimum Reference	0	Hz	
3-03	Maximum Reference	*	Hz	* Max motor frequency
3-41	Ramp up time	150	Sec	
3-42	Ramp down time	100	Sec	
4-12	Motor Speed low	15	Hz	
4-14	Motor Speed high	*	Hz	* Max motor frequency
4-19	Max Output Frequency	*	Hz	* Max motor frequency
5-40	Relay output 1-3	9	Alarm	
6-10	Low voltage	0	V	
6-11	High voltage	10	V	
6-15	Terminal 53 High Ref.	*	Hz	* Max motor frequency
6-19	Terminal 53 mode	1	V	
** Thermistor connection at terminal 29 and 50				
All other parameters are standard Danfoss factory settings.				

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