



Original instructions

Dantherm DanX-1-2-3 M172 XD/HP

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Introduction

Overview

Models

Dantherm no.	Model*)
343230	DanX 1 XD
343231	DanX 1 HP
343240	DanX 2 XD
343241	DanX 2 HP
343250	DanX 3 XD
343251	DanX 3 HP

*) The model is indicated on the nameplate which is located on the outside of the unit.

Target group

This manual is for both installers and operators of the product. Installation and repair of the unit is to be carried out by qualified personnel only. It is the responsibility of the installer to read and understand this manual prior to commissioning and setup of the unit. The warranty is limited to units that have been installed by trained personnel.

Apart from replacing the air filter and cleaning the outside of the system, any other type of maintenance activity must be carried out by persons suitably qualified.

Copyright

No part of this manual may be reproduced without the prior written permission of Dantherm.

Recycling

This unit is designed to provide a long service life. At the end of its service life, the unit must be recycled in accordance with national regulations and with high environmental protection considerations.

Reservations

Dantherm reserves the right to make changes and improvements to the product and the manual at any time without any obligation to give prior notice.

Abbreviations in this document

The following abbreviations are used in this manual:

Abbreviation	Description
AI/AO	Analogue input/output
BMS	Building Management System
CTR	Control Signal
DI/DO	Digital input/output
GND	Common electrical ground potential
INT	Interlock
LED	Light-emitting diode (LED)
LPHW	Low Pressure Hot Water
PIR sensor	Pyroelectric Infrared Sensor
PLC	Programmable logic controller
WCC	Water-Cooled Condenser

Symbols used in the operating instructions

In these operating instructions, particularly important text passages are highlighted with signal words and symbols that are described below.

DANGER

Indicates a hazard which, if not avoided, will result in death or serious injury.

WARNING

Indicates a hazard which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazard which, if not avoided, could result in a minor or moderate injury.

NOTICE

Indicates important information (e.g. property damage) but does not indicate hazards.

INFO

Information marked with this symbol helps you to carry out your tasks quickly and safely.

Hazard symbols



Potential risk of injuries

This symbol is used to warn you of potential risk of injuries. Follow all safety instructions indicated in the manual next to the warning triangle to avoid potential injury or death.



Electrical voltage

This symbol indicates that there are dangers to the life and health of persons due to electrical voltage when handling the system.



Risk of injury due to moving parts

Touching moving parts can cause serious injury.



Protective gloves

This symbol indicates that it is required to wear protective gloves when performing a specific operation.



Protective mask

This symbol indicates that it is required to wear a protective mask when performing a specific operation.

Safety



Note! Read carefully before use. Keep for future reference.

It is the responsibility of the operator to read and understand this manual and other information provided and to apply the correct operating procedures.

Read the entire manual before commissioning the unit for the first time. It is important to be familiar with the correct operating procedures for the unit and all related safety precautions to avoid the risk of personal injury and/or property damage.

The following safety instructions must be observed:

- Ensure that all electric cables outside of the unit are protected from damage. Never use the unit if electric cables or the power supply connection are damaged!
- Only plug the power plug into a properly fused (earthed) mains socket.
- Only install the unit in accordance with the national regulations for electrical connection.
- Observe the operating conditions specified in the "Technical data" chapter.
- Unloading, transport, assembly and connection of the unit should only be carried out by trained specialists or by persons supervised by authorised personnel. It is the responsibility of the installer to read and understand this manual and other information given.
- Commissioning, maintenance and repair work should only be carried out by trained specialists or by persons supervised by authorised personnel. It is the responsibility of the installer to read and understand this manual and other information given.

Intended use

There are two unit types of the DAN-X 1/2/3, the HP and XD versions, which are to be set up the same way:

- DanX 1/2/3 XD - unit with double cross flow heat exchanger for 1-stage heat recovery.
- DanX 1/2/3 HP - unit with additional heat pump for 2-stage heat recovery.

Both unit types are used for automatic monitoring and control of temperature and humidity in private swimming pool areas and hotel swimming pools.

Using these devices includes the required inspection and maintenance of the units.

Foreseeable misuse

Any operation other than as described in this manual is prohibited. Non-observance renders all claims for liability and guarantee null and void.

If any unauthorised modifications are made, any claims for liability and guarantee are rendered null and void.

Personnel qualifications

The unit must only be operated by qualified (trained) personnel and repair of the electrical system is to be performed by qualified personnel only. Failure to do so may result in personal injury or damage to the equipment.

Stage of life	Target group
Transport / Unloading	Qualified personnel
Installation	Qualified personnel
Electrical connection	Qualified personnel
Initial commissioning	Qualified personnel
Operation	Operating personnel
Maintenance	Qualified personnel

Dantherm offers training on installation, operation and maintenance activities. Contact information can be found on the back page.

Product description

General description

INFO

The units depicted in this manual are always represented as left-sided versions with the controller (PLC) on the left-hand side. If you are using a right-sided unit, all the unit components are arranged in the opposite direction.

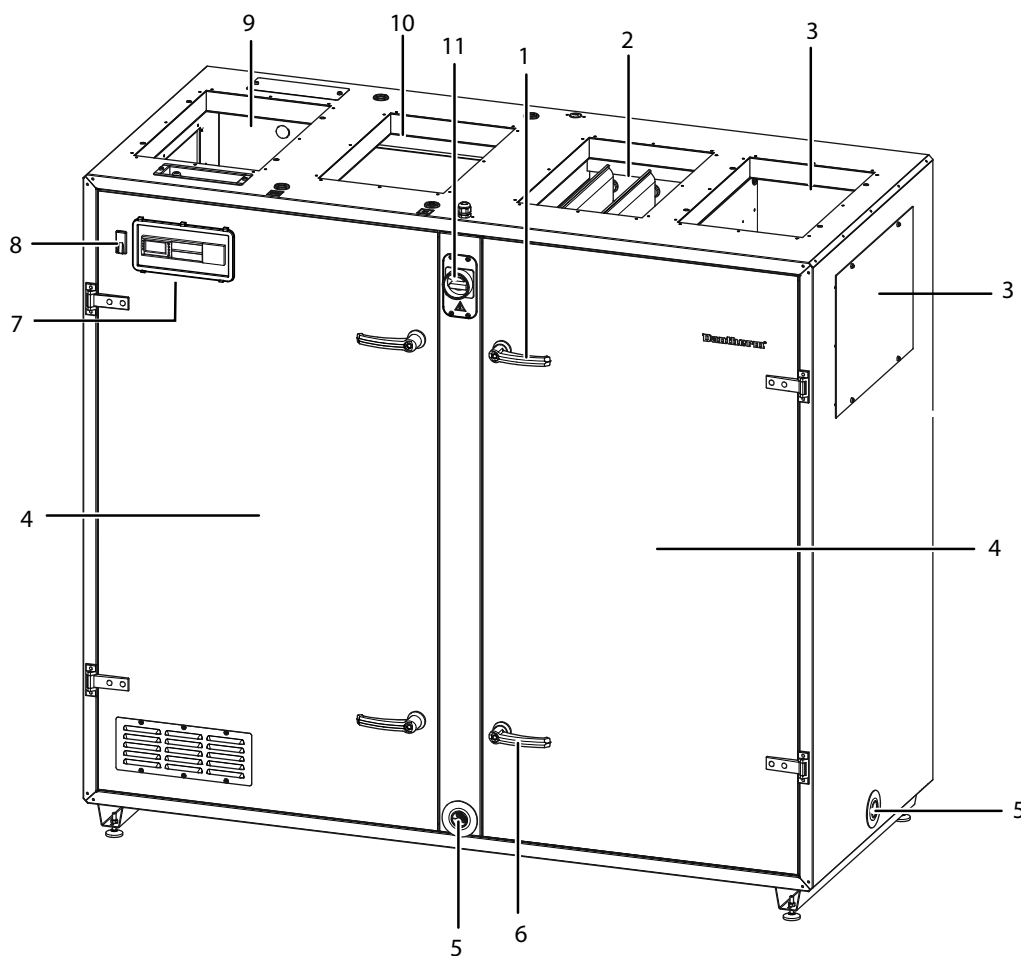


Fig. 1: Unit design (left-sided unit version)

- | | |
|--|----------------------------|
| 1. Door handle, with lock on both doors | 7. Controller (M172 PLC) |
| 2. Outdoor air inlet | 8. RJ 45 connection |
| 3. Exhaust air outlet (top or side) | 9. Return air inlet |
| 4. Inspection door | 10. Supply air outlet |
| 5. Condensate outlet | 11. Main disconnect switch |
| 6. Door handle, without lock on both doors | |

The unit is equipped with a self-supporting cabinet with hot-dip galvanised, powder-coated sandwich panels with 50 mm mineral wool insulation, 30 mm internal partition walls and a base with adjustable feet. All modules and internal components are particularly designed to withstand the aggressive swimming pool environment (corrosion class C4 according to EN/ISO 12944-2).

The two lockable inspection doors provide for an easy access to perform maintenance work. The controller of the DAN-X 1/2/3 which is based on a Schneider Electric Modicon M172 PLC is integrated in the inspection doors. There is an RJ45 connection on the left or right side of the control unit to provide for easy maintenance.

INFO

Your maintenance company has the right tools to maintain your unit.

The main disconnect switch is also located on the front of the unit. This disconnect switch cuts off all power to the unit and the controller.



CAUTION

Loss of function when disconnecting the power supply

Actuating the main disconnect switch will deactivate the safety devices, such as the frost thermostat. In addition, neither the outdoor air nor the extract air dampers which are used to supply the swimming pool hall with cooled air are closed during this process.

- Do not stop the unit by means of the main disconnect switch. Always use the function switch of the controller (see page 35) to switch off the unit and, if necessary, use the main disconnect switch only afterwards.

Components description

The DanX 1/2/3 HP and XD units consist of a double cross flow heat exchanger in combination with an integrated mixing box and directly driven EC fans.

DanX 1/2/3 XD

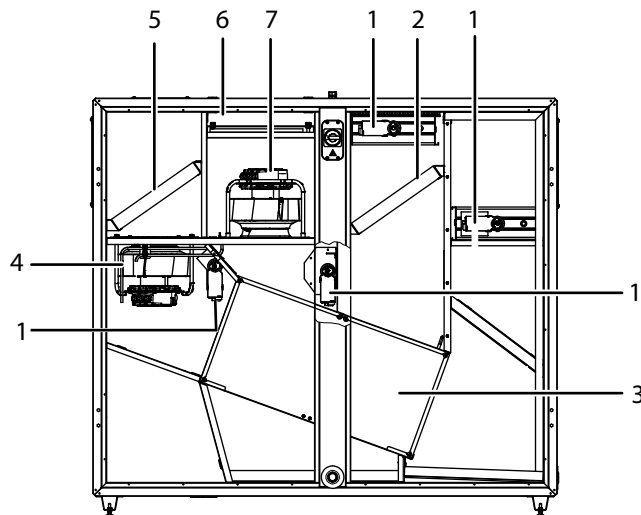


Fig. 2: Components – DanX 1/2/3 XD

- | | |
|-------------------------------------|----------------------|
| 1. Air dampers | 5. Return air filter |
| 2. Outdoor air filter | 6. LPHW heating coil |
| 3. Double cross flow heat exchanger | 7. Supply air fan |
| 4. Return air fan | |

DanX 1/2/3 HP

The HP model is also fitted with a compressor-driven heat pump.

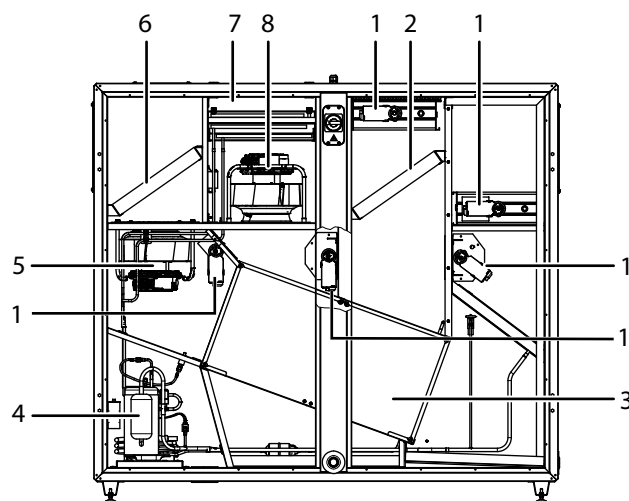


Fig. 3: Components – DanX 1/2/3 HD

- | | |
|-------------------------------------|----------------------|
| 1. Air damper | 5. Return air filter |
| 2. Outdoor air filter | 6. Return air filter |
| 3. Double cross flow heat exchanger | 7. LPHW heating coil |
| 4. Heat pump | 8. Supply air fan |

Heat exchanger	An essential component of the DanX 1, 2 and 3 is the double cross flow heat exchanger through which the energy contained in the extract air is used to preheat the outdoor air before it enters the room. The extract air and return air side of the cross-flow heat exchanger is equipped with a collecting tray through which the condensate from the heat exchanger and the mixing box is drained from the unit.
EC fans	The DanX 1, 2 and 3 units are equipped with two fans (return air fan and supply air fan, directly driven) with EC motors that provide for air circulation and constant airflow.
Air dampers	The amount of incoming outdoor air and outgoing extract air is controlled via the air dampers. The two airflows are mixed via a mixing damper and led past the heat exchanger via a bypass damper. A recirculation damper is used to control how much return air is fed back into the room. For an overview of the different air dampers, see page 62.
Air filter	Compact filters on filter rails are used to filter the air. • Return air: ISO ePM10 70 % (M5) • Outdoor air: ISO ePM1 55 % (F7)
Heat pump	In the DanX HP units, the heat pump is used for both heat recovery and air dehumidification. At night, when no outdoor air is needed in the swimming pool hall, the cooling circuit fully operates as a dehumidifier. During the day, when outdoor air is required, the cooling circuit is used as a heat pump to regain as much energy as possible from the extract air.



Description of the DanX 1/2/3 XD controller

The DanX 1/2/3 XD units are equipped with a double cross flow heat exchanger and a mixing box. They use a minimum of outdoor air to maintain a healthy, comfortable and energyefficient climate in swimming pool areas. By supplying outdoor air, the units dilute and eliminate indoor pollutants, such as chlorine vapours and odours, thus improving the air quality. The DanX control unit regulates the humidity in the room, which reduces the risk of mould, condensation and structural damage.

Moreover, the supplied outdoor air helps to regulate the indoor temperature, which increases energy efficiency by reducing the load on heating and cooling systems. In many cases, compliance with building and health regulations requires the use of outdoor air to ensure adequate ventilation. The DanX control unit automatically regulates the required amount of outdoor air using Dantherm's proprietary control software. To maximise energy efficiency, only part of the outdoor air is passed through the heat exchanger, while the rest is recirculated and heated by the reheater.

If the dehumidification capacity is insufficient, the controller automatically increases the supply of dry outdoor air to optimise the energy consumption while maintaining the desired indoor conditions.

INFO

As the control strategy for a swimming pool unit is quite complex, only the basic functions of the controller are described in this user manual. In general, the humidity control always takes precedence over the temperature control.

Humidity control	Actual state	Controller behaviour
	The humidity level in the pool hall is lower or equals the setpoint	The outdoor air / exhaust air dampers are partly open in day time (menu -> Setpoints -> "Minimum air from outside") and will be closed during night time.
	The humidity level in the swimming pool hall is higher than the setpoint	The outdoor air / exhaust air dampers will open more to get more dry outdoor air into the pool hall (overriding the setpoint "Minimum air from outside").

If the outdoor air temperature exceeds a value of 23 °C, there is no longer a problem with condensation in the swimming hall. Therefore, from outdoor air temperatures of 23 °C, the humidity setpoint increases by 1 % for each °C, but by a maximum of 5 %. Accordingly, the maximum possible relative humidity results in a value of 60 % with a setpoint of 55 % RH and an outdoor air temperature of 28 °C.

Temperature control

Actual state	Controller behaviour
The temperature level in the swimming pool hall is in accordance with the setpoint	• The heating coil ceases to operate. • The outdoor air / exhaust air dampers are partly open in day time (menu -> Setpoints -> "Minimum air from outside") and will be closed during night time.
The temperature level in the swimming pool hall is lower than the setpoint	• The heating coil is active. • The outdoor air / exhaust air dampers are partly open in day time (menu -> Setpoints -> "Minimum air from outside") and will be closed during night time.
The temperature level in the swimming pool hall is higher than the setpoint	• The heating coil ceases to operate. • The outdoor air / exhaust air dampers will open more to get more cooled outdoor air into the pool hall (overriding the setpoint "Minimum air from outside"). In addition, the bypass damper opens slowly to prevent the outdoor air from heating up in the heat exchanger. • The control unit transmits an analogue signal to the optional cooling unit.

Fan control

Normally, the fans run at the speed that has been set in the Time Program menu (see page 44). However, if the speed is set to a low level (UnOccupied Low or Occupied Low) and the unit is still running at the highest speed level, this may be due to the following reasons:

- If the calculated dehumidification demand is >5 %, the fans switch to the highest speed level until the calculated dehumidification demand is <5 % again.
- If free cooling is required (supply air temperature < room temperature), the fans switch to the highest speed level until the target temperature is reached again.
- If the deviation between the actual pool hall temperature and the setpoint is more than 2 °C, the fans switch to the highest speed level until the deviation is less than 2 °C.
- The supply air temperature is above the setpoint ("maximum supply air temperature").
- An external signal is activated and has overwritten the time setting.



Description of the DanX 1/2/3 HP controller

The DanX 1/2/3 HP units are equipped with a double cross flow heat exchanger, a mixing box and a heat pump. They use a minimum of outdoor air to maintain a healthy, comfortable and energy-efficient climate in swimming pool areas. By supplying outdoor air, the units dilute and eliminate indoor pollutants, such as chlorine vapours and odours, thus improving the air quality. The DanX control unit regulates the humidity in the room, which reduces the risk of mould, condensation and structural damage.

Moreover, the supplied outdoor air helps to regulate the indoor temperature, which increases energy efficiency by reducing the load on heating and cooling systems. In many cases, compliance with building and health regulations requires the use of outdoor air to ensure adequate ventilation. The DanX control unit automatically regulates the required amount of outdoor air using Dantherm's proprietary control software.

To maximise energy efficiency, only part of the outdoor air is passed through the heat exchanger, while the rest is recirculated. Thus, while a part of the extract air leaves the unit, another part is recirculated and flows together with the outdoor air. These two airflows are preheated in the cross flow heat exchanger and then heated in the condenser of the heat pump. If the supply air temperature is too low, the reheater is activated. In this operating mode, dehumidification is achieved due to the dry outdoor air and the heat pump. If the dehumidification capacity is insufficient, the controller automatically increases the supply of dry outdoor air to optimise the energy consumption while maintaining the desired indoor conditions.

INFO

As the control strategy for a swimming pool unit is quite complex, only the basic functions of the controller are described in this user manual. In general, the humidity control always takes precedence over the temperature control.

Humidity control

Actual state	Controller behaviour
The humidity level in the pool hall is lower or equals the setpoint	• The compressor comes to a standstill. If the compressor runs, the temperature control function has started. • The outdoor air / exhaust air dampers are partly open in day time (menu -> Setpoints -> "Minimum air from outside") and will be closed during night time.
The humidity level in the swimming pool hall is higher than the setpoint	• The compressor will start to dehumidify. • If the dehumidification capacity of the compressor is insufficient, the outdoor air / exhaust air dampers open further to transport more outdoor air into the swimming pool hall (exceeding the setpoint for "Minimum air from outside").

INFO

If the compressor does not start even when the humidity value in the swimming pool hall is above the setpoint, this may be due to the following reasons:

- The outdoor air / exhaust air damper is >90 % open (usually during summer).
- The temperature control function has taken over with free or active cooling.

Operation

If the outdoor air temperature exceeds a value of 23 °C, there is no longer a problem with condensation in the swimming hall. Therefore, from outdoor air temperatures of 23 °C, the humidity setpoint increases by 1 % for each °C, but by a maximum of 5 %. Accordingly, the maximum possible relative humidity results in a value of 60 % with a setpoint of 55 % RH and an outdoor air temperature of 28 °C.

Temperature control

Actual state	Controller behaviour
The temperature level in the swimming pool hall is in accordance with the setpoint	- The compressor comes to a standstill. If the compressor runs, the humidity control or a built-in water-cooled condenser have taken over. - The heating coil ceases to operate. - The outdoor air / exhaust air dampers are partly open in day time (menu -> Setpoints -> "Minimum air from outside") and will be closed during night time.
The temperature level in the swimming pool hall is lower than the setpoint	- The compressor is running. - The heating coil is active if the compressor capacity is not sufficient or if the compressor is not running (usually at night time). - The outdoor air / exhaust air dampers are partly open in day time (menu -> Setpoints -> "Minimum air from outside") and will be closed during night time.
The temperature level in the swimming pool hall is higher than the setpoint	- The compressor comes to a standstill. If the compressor runs, the humidity control or a built-in water-cooled condenser have taken over. - The heating coil ceases to operate. - The outdoor air / exhaust air dampers will open more to get more cooled outdoor air into the pool hall (overriding the setpoint "Minimum air from outside" in the <i>Setpoints</i> menu). In addition, the bypass damper opens slowly to prevent the outdoor air from heating up in the heat exchanger. - The control unit transmits an analogue signal to the optional cooling unit.

INFO

If the compressor does not start even when the temperature value in the swimming pool hall is below the setpoint, this may be due to the following reasons:

- The unit operates in night mode (UnOccupied High / UnOccupied Low or Stopped).
- The outdoor air / extract air damper setting (with minimum outdoor air volume) is <10 %.

**Evaporator de-frosting**

If the evaporator sensor (AI3) measures temperatures $< +5\text{ }^{\circ}\text{C}$ for a period longer than 20 minutes, the compressor stops and the outdoor air / extract air dampers close. At the same time, the fan speed switches to the highest speed level. As soon as deicing of the evaporator is completed, all functions return to their normal state.

Fan control

Normally, the fans run at the speed that has been set in the Time Program menu (see page 44). However, if the speed is set to a low level (UnOccupied Low or Occupied Low) and the unit is still running at the highest speed level, this may be due to the following reasons:

- When the unit detects a need for dehumidification, the fans switch to the highest speed level until the humidity is acceptable again.
- If free cooling is required (supply air temperature $<$ room temperature), the fans switch to the highest speed level until the target temperature is reached again.
- If the deviation between the actual pool hall temperature and the setpoint is more than $2\text{ }^{\circ}\text{C}$, the fans switch to the highest speed level until the deviation is less than $2\text{ }^{\circ}\text{C}$.
- The supply air temperature is above the setpoint ("max. supply air temperature").
- The evaporator is undergoing defrosting. The deicing process stops once the evaporator temperature (evaporator temperature – AI3) is $> +7\text{ }^{\circ}\text{C}$ (hysteresis of $2\text{ }^{\circ}\text{C}$).
- The compressor is in operation.
- An external signal is activated and has overwritten the time setting.

Description of the cooling system

The heat pump of the DanX 1/2/3 HP consists of a cooling circuit with a compressor.
The cooling circuit is equipped with all necessary components such as high/low pressure switch, dry filter, etc.
The cooling circuit is filled with refrigerant and does not need to be mounted separately.

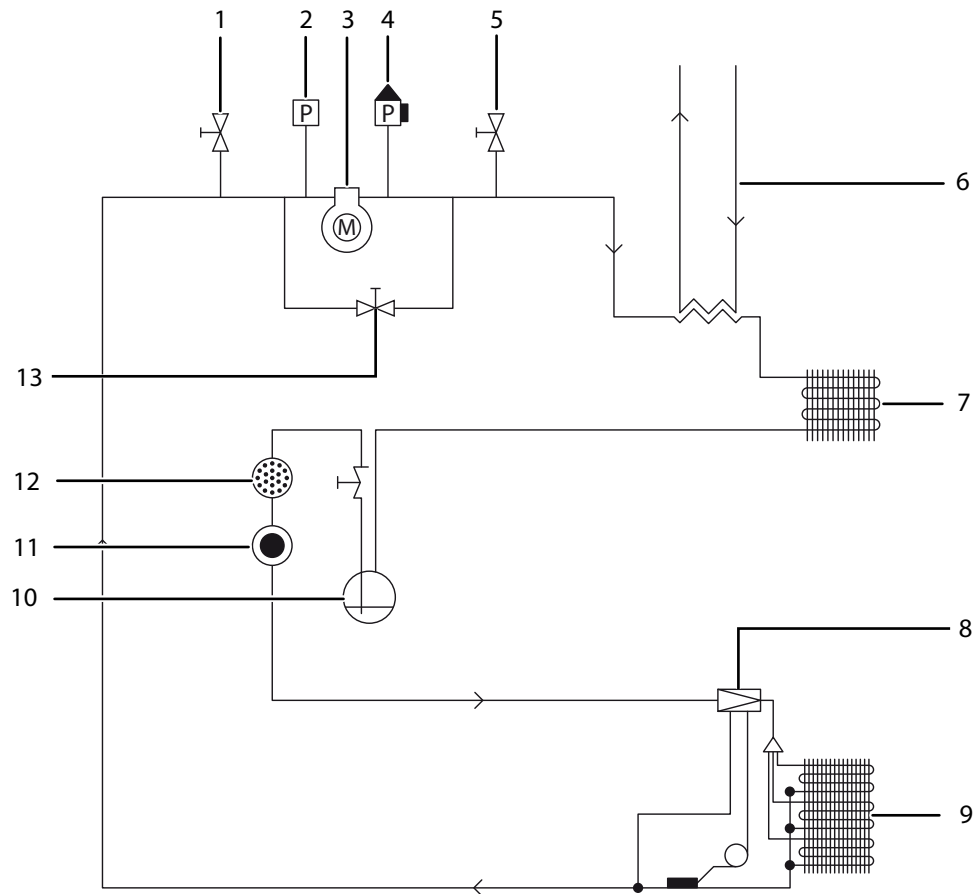


Fig. 4: Representation of the cooling circuit

- | | |
|------------------------------------|--|
| 1. Schrader valve | 8. Expansion valve |
| 2. Low pressure protection switch | 9. Evaporator |
| 3. Compressor | 10. Receiver |
| 4. High pressure protection switch | 11. Inspection glass |
| 5. Schrader valve | 12. Dry filter |
| 6. Water-cooled condenser (option) | 13. Solenoid valve for compressor start-up |
| 7. Condenser | |

Transport and storage

Unloading



CAUTION

Transport and unloading by qualified personnel only

The present unit is very heavy (up to 500 kg). Errors during transport or unloading may result in injury to personnel or damage to the unit.

- The DanX 1/2/3 should only be transported and unloaded by trained specialists or by persons supervised by authorised personnel.

The unit is supplied as an assembly on wooden cross-beams wrapped in protective packaging. The following steps should be followed when unloading the assembly:

- Choose a suitable location for unloading. Observe the requirements for the installation site (see page 22).
- Unload the assembly using a forklift or crane (see the following instructions).
- Do not tilt or lay down units with integrated cooling system (DanX 1/2/3 HP).
- Check the packaging and unit for transport damage and report any damage to the driver and Dantherm A/S immediately.
- Leave the unit in its packaging until it is positioned at the installation site to avoid damage to casing parts and connection parts.
- As the unit is supplied with a built-in control panel, it should be handled with care and stored in a safe and dry place until assembly is carried out.

Transport with forklift

If you use a forklift for transport, please ensure that the forks are long enough to reach completely under the unit so that the bottom of the cabinet is not damaged. Rough and improper handling may damage the unit and result in malfunctions.

Ensure that the centre of gravity of the unit is as close as possible to the centre of the two forks so that the assembly can be transported stably.

Transport with crane



DANGER

Serious risk of injury and damage to equipment due to falling load

An improperly secured load can cause serious injury or equipment damage when falling. There is always a risk of the crane or auxiliary material breaking.

- No persons must stand below the suspended load at any time!
- Only use lifting gear suitable for the weight of the unit!
- Never use defective lifting gear!
- Use soft straps!
- Lift the assembly carefully and avoid sudden movements!
- Carefully set down the assembly!

Lift the assembly as follows:

1. Insert two round iron rods (min. 1") into the holes of the base frame and secure them.
2. Use four soft straps, slide them over the iron bars and move them together in the crane hook.

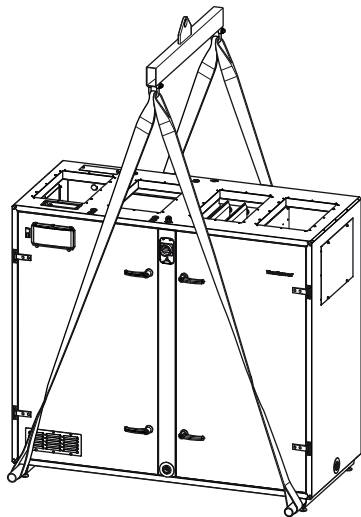


Fig. 5: Transport with crane

Storage

If the unit is not to be set up immediately but is to be stored, the following storage conditions must be observed:

- Do not leave the unit outdoors. Instead, store it inside a building.
- Do not remove the original packaging.
- Protect the unit from dust, dirt and damage until installation.
- The air temperature for storage conditions should be between 5 °C and 40 °C.
- The unit should be stored in a dry, non-condensing atmosphere.

Installation

General requirements

Before starting up and commissioning the DanX 1/2/3, all components and duct parts of the ventilation unit must be correctly assembled.



CAUTION

Component assembly and installation by qualified personnel

Assembly and installation work should only be carried out by trained specialists or by persons supervised by authorised personnel. It is the responsibility of the installer to read and understand this manual and other information given.

The installation location of the unit must comply with 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 (up to 500 kg).
- The deflection of the substructure should be a maximum of 1 mm/m.
- For the connection of the condensate drain it is required that the height between the condensate drain of the unit and the substructure is at least the required height for the water separator.
- A minimum distance of 850/850/1100 mm (DanX 1/2/3) should be provided between the inspection side of the unit and the wall in order to be able to carry out operation, maintenance and servicing of parts such as heating coils, air dampers, filters, etc. Furthermore, it is recommended to keep a minimum distance of 200 mm between the wall and the side of the unit where the water outlet is located.

Setting up the unit

Before setting up the unit, the wooden pallet must be removed and the supplied feet must be fitted to the base frame. To do so, carry out the following steps:

- ✓ The requirements for the installation site have been observed.
- 1. Unpack the assembly.
- 2. Open the inspection door and remove the separate box with the feet.
- 3. Lift the unit using a forklift or pallet lift and unscrew the wooden pallet (1).

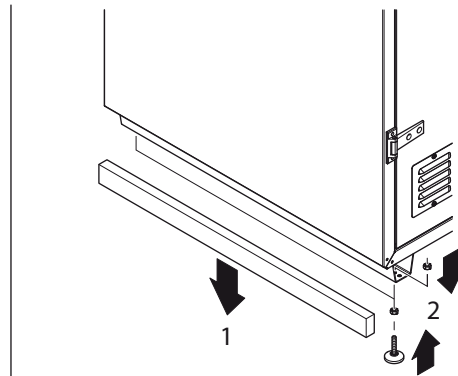
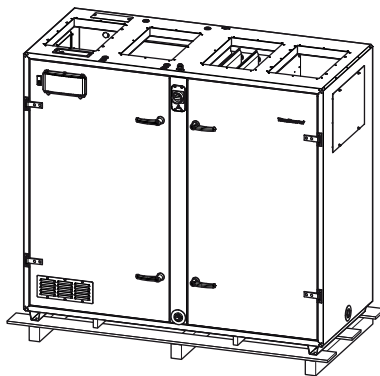


Fig. 6: Mounting the feet

- 4. Screw the feet (2) onto the base frame.
- 5. Position the unit on its intended installation location.
- ⇒ The unit has been set up.

Mounting the door handles

The door handles are not factory-fitted but stowed inside the unit for transport purposes. One door handle with lock and one door handle without lock must be fitted to each inspection door.

To do so, please proceed as follows:

1. Remove the door handles from the unit.
2. Insert the lockable door handles (1) into the upper recesses on the inspection doors.

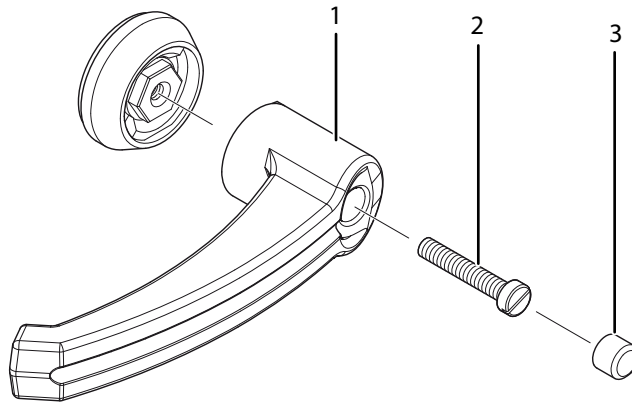


Fig. 7: Mounting the handles

3. Fasten the door handles with one screw (2) each and push a plastic filler plug (3) onto each door handle.
 4. Repeat the procedure with the door handles without lock on the lower recesses of the inspection doors.
- ⇒ The door handles are now mounted.

Mounting the ducts

The ducts can be connected directly to the DanX 1/2/3 or with flexible connections to suppress unit vibrations.

To ensure that the flexible connection serves its purpose, it is essential that it is not fully stretched. When using a flexible connection, an earth connection must be installed between the unit and the duct system.

Ducts mounted on the side of the unit must be supported or braced with support elements, as the duct connection panels are not robust enough to hold the duct system.

INFO

If a frost thermostat is provided, install it before mounting the supply air duct (see page 28).

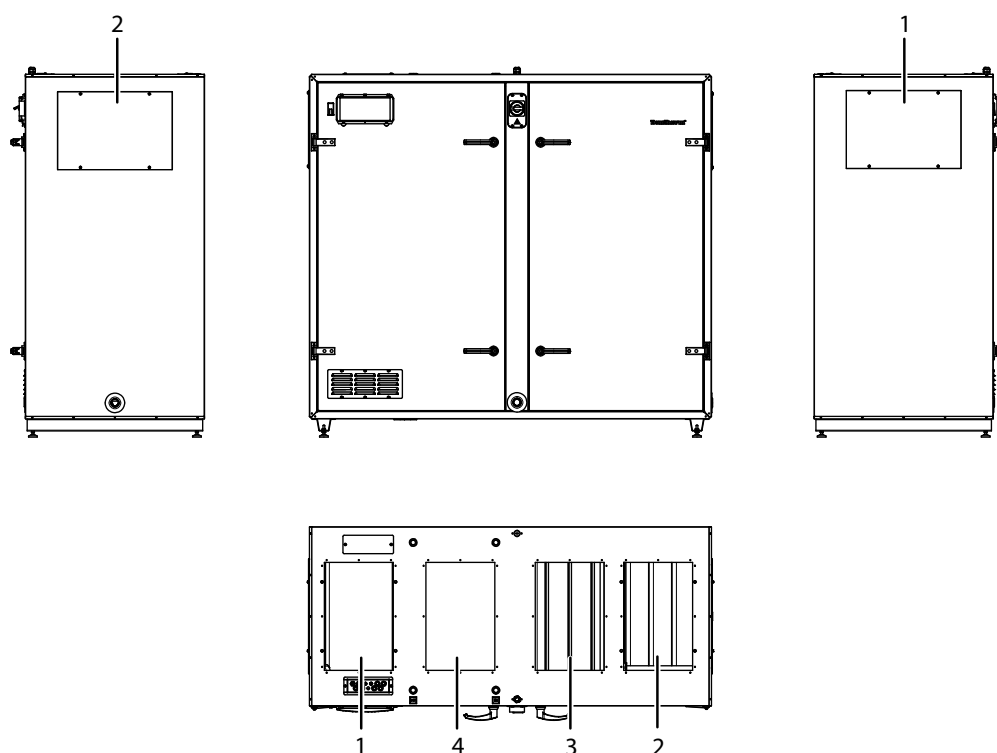


Fig. 8: Duct connections (left-sided unit version)

- | | |
|--|-------------------------------------|
| 1. Return air connection, top or side | 3. Outdoor air connection, top only |
| 2. Extract air connection, top or side | 4. Supply air connection, top only |

Installing the condensate drain

The condensate is drained from the collecting tray through two outlets, one on the extract air side (excess pressure, outlet at the side) and one on the supply air side (underpressure, outlet at the front).

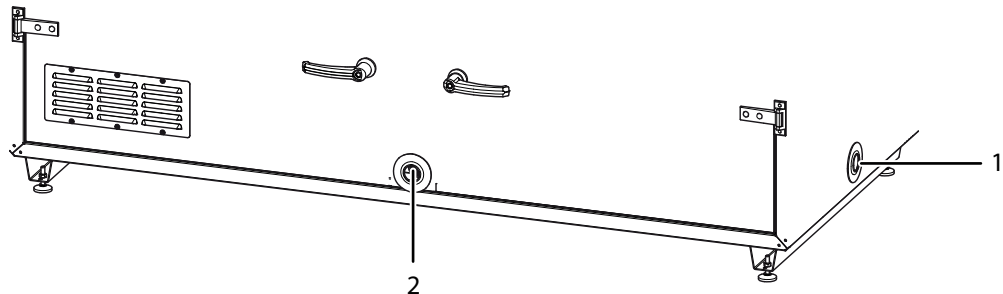


Fig. 9: Condensation water outlets (left-sided unit version)

- | | |
|--|---|
| 1. Condensation water outlet, extract air side | 2. Condensation water outlet, supply air side |
|--|---|

Usually, the drain pipe only needs to be connected to the extract air side. We recommend using our special siphon with ball to prevent humid air from being blown into the plant room through the outlet.



CAUTION

Using the siphon with ball under excess pressure

If the siphon with ball is used on the extract air side, the following measures must be observed so that the siphon can be operated with excess pressure:

- It is very important that you remove the small rubber plug (1) from the siphon!
- The arrow with PA+ (2) must point in the direction of the drain!

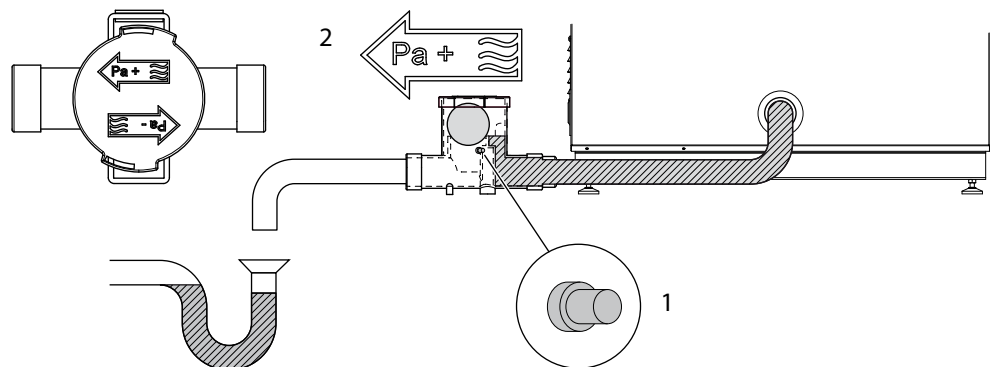


Fig. 10: Drain pipe on extract air side with siphon with ball

The drain at the front of the unit (supply air side) is closed at the factory because only a very small amount of condensate accumulates on this side of the heat exchanger. This small amount of condensate evaporates into the airflow.

INFO

If it appears that a larger amount of condensate is being produced than usual, the plug can be removed from the outlet and the outlet can be connected to the drain using a siphon with ball.

If you connect a siphon with ball to the condensate outlet on the supply air side, it is important that the arrow with the PA- symbol points to the direction of the drain, as the supply air side operates with underpressure! In this case, you should not remove the small rubber plug from the siphon!

Mounting the sensors

All temperature sensors are ready mounted and wired to the control panel, only the supply air temperature sensor and return air temperature /humidity duct sensor (in short: supply air duct sensor and return air duct sensor) must be mounted in the air duct system.

INFO

The supply air and return air duct sensors must be installed after connecting the unit to the duct system.

The two rolled-up duct sensors for measuring air temperature and humidity (10 m) can be found inside the unit in the upper unit area.

The supply air duct sensor is mounted behind the heating coil inside the supply air duct of the swimming pool area. To do so, please proceed as follows:

1. Drill an 8 mm diameter hole in the supply air duct, leaving a minimum distance of 1.5 m to the last unit component.
2. Position the sensor inside the hole.
3. Fasten the sensor casing to the duct with two screws and close the sensor.

The return air duct sensor is installed in the return air duct of the swimming pool. The installation is carried out in the same way as for the supply air duct sensor.

Room air sensor

If you have ordered a room air temperature/room air humidity sensor instead of an attached duct, please proceed as follows:

- ✓ The sensor should be installed at a minimum height of 2.5 m and not above doors through which people enter and leave the swimming pool hall.
 - ✓ The sensor should not be placed in locations where the measurement result can be influenced by heating, ventilation or direct sunlight.
1. In order to test the function, connect the sensor to the terminal block of the unit using a short cable.
 2. After the completion of the function test, remove the short cable and place the sensor at the desired location between the swimming pool and the unit.
 3. Connect the sensor with a cable of the correct length.

Outdoor temperature sensor

If you have ordered an optional separate outdoor temperature sensor, you will find it separately in the unit without wiring. Mount the sensor outside the dwelling in a place away from direct sunlight. Disconnect the standard outdoor sensor installed in the unit (see separate electrical wiring diagram) and connect the new outdoor sensor to the two connections.

Installing the LPHW heating coil

To connect the LPHW heating coil, please proceed as follows:

1. Connect the water supply to the coil inlet.
2. Connect the water return duct to the coil outlet so that the water flow always operates as counter flow.
3. Connect the two-way valve outside the unit to the water system as depicted in the drawings.

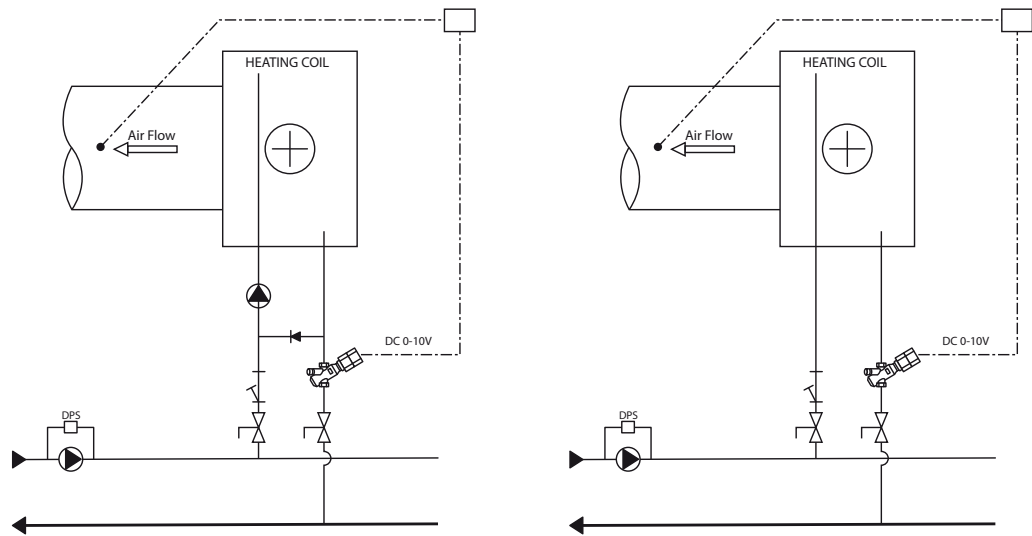


Fig. 11: LPHW heating coil – connection

4. After mounting the water valve, set the maximum coil current on the valve (please also refer to the separate instructions).
5. Mount the actuator on the valve and connect it to the electric panel (see separate electrical wiring diagram).



CAUTION

When connecting the heat exchanger, use a suitable tool for counter-holding to avoid damage to the pipes.

Installing a frost thermostat for the LPHW heating coil

INFO

If the unit has been ordered with the frost protection option, the frost thermostat is already installed at the factory. The following instructions describe the retrofitting of a unit without the frost protection option.

If a frost thermostat is to be installed, it is easier to do this before installing the supply air duct.

The thermostat is supplied separately in a plastic bag, together with all the necessary supports.

To install the frost thermostat, please proceed as follows:

1. Mount the frost thermostat in the upper part of the unit using the support supplied.
 2. Mount the bulb holder behind the heating coil in the supply air duct outlet.
 3. Drill a hole in the supply air duct.
 4. Guide the bulb with the capillary tube through the hole and attach the bulb to the bulb holder.
 5. Mount the duct on the DanX.
 6. The thermostat is pre-wired and the wire only needs to be connected to the main terminal strip of the unit (see wiring diagram).
- ⇒ The frost thermostat is installed.

Connecting the water-cooled condenser

The heat pump in a DanX 2/3 HP can be provided with a water-cooled condenser.

The condenser is used to transfer excess heat to the swimming pool water or sanitary water.

The inlet for the water pipes is located on the side of the unit where the condenser is positioned. Connect the water pipes to the water-cooled condenser in the compressor cabinet.

The controller must receive a digital input that the swimming pool water or sanitary water is below the setpoint and should be heated via the water-cooled condenser.



CAUTION

Material damage due to incorrect connection

Errors in connection can lead to damage to the unit.

- Only use pipe material suitable for chlorine water.
- Observe the maximum water volume of 800 l/h. If the water velocity is too high, this could severely damage or destroy the water-cooled condenser and the cooling circuit of the DanX.

Installing the electric heating coil

The optional electric heating coil is designed for insertion into conventional spiral ducts and is fixed in the supply air duct with screws. Please observe the following when inserting the heating coil:

- The air must flow through the heating coil in the direction of the arrow (on the side of the heating coil next to the connection box).
- The heating coil can be installed in horizontal or vertical duct systems.
- The electrical connection cabinet can be positioned as desired, pointing upwards or sideways up to a maximum angle of 90°. However, downward mounting is NOT permitted.

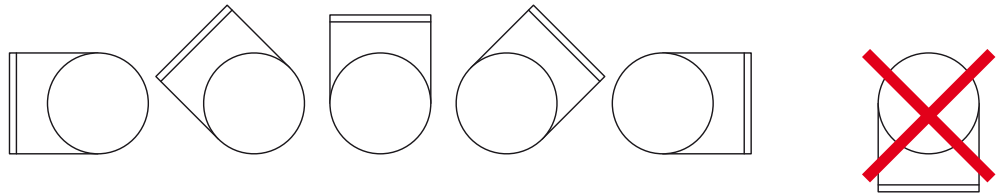


Fig. 12: Heating coil – alignment of the connection cabinet

- The distance from the heating coil to/from a duct bend, valve, filter, etc. should be at least twice the duct diameter. Otherwise there is a risk of air flowing irregularly through the heating coil, which can lead to the activation of the shut-off function.
- The heating coil can be insulated according to the valid guidelines for ventilation ducts. However, the insulating material must be fireproof. The cover of the heating coil must not be insulated so that the name plate is visible and the cover can be removed.
- The distance from the connection cabinet of the heating coil to wood or other combustible material must NOT be less than 30 mm.
- The maximum permissible ambient temperature is 30 °C.

Electrical connection



DANGER

Danger from electric current!

You can be seriously injured or killed by an electric shock.

- The DanX control panel may only be installed by qualified electricians!
- When working on the control panel, the electrical power supply must always be disconnected before opening the door of the control unit!

Most of the components and sensors are already connected to the electric panel ex factory. However, some components, for example accessories or components that are to be installed (e.g. pumps) must be connected on site in accordance with the electrical wiring diagrams. In order to connect these components to the electric panel, you can install the wiring through the cable entries on top of the unit and connect them to the connections. For information on the exact connection of the unit and its components, please refer to the separate electrical wiring diagrams.

Connecting the main current

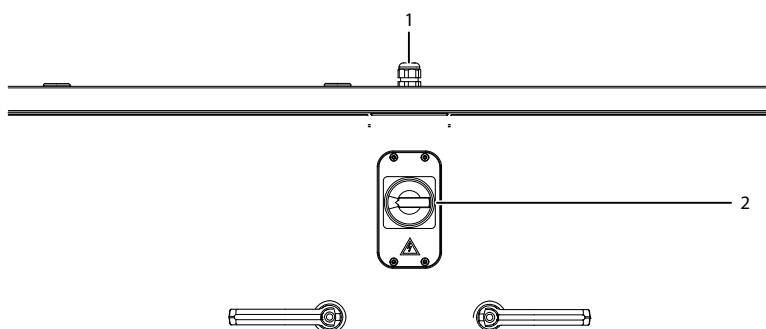


Fig. 13: Connecting the main current

To connect the unit to the main current, please proceed as follows:

1. Remove the small plate together with the main disconnect switch (2) on the front of the unit.
 2. Guide the main power cable through the cable entry (1) on top of the unit.
 3. Connect the cable to the main disconnect switch and the earthing conductor to the unit according to the electrical wiring diagram.
 4. Reattach the front cover panel with the main disconnect switch to the unit.
- ⇒ The main current is now connected.



4. Switch on the DanX and wait for approx. 30 seconds. The following display should appear on the screen:

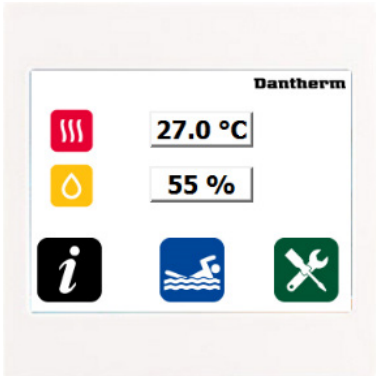
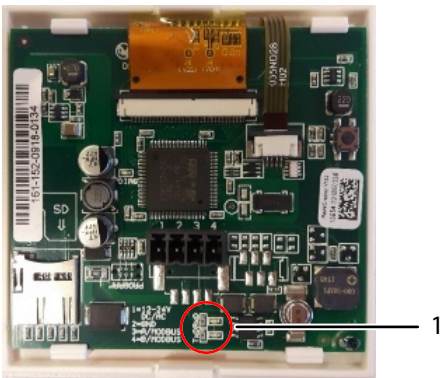


Fig. 15: Touch screen – structure of the elements

⇒ The touch screen has been connected.

5. If the temperature and humidity values are not displayed correctly, open the touch screen and use the two LEDs (1) to check whether the Modbus connection has been correctly established.



LED	Status	Meaning	Remedy
Tx	Flashing	Communication OK	-
Rx	Flashing		
Tx	Flashing	No communication	Replace the Modbus cable
Rx	Illuminated		
Tx	Flashing	No communication	- The cables are connected to the correct connectors in the DanX (especially Modbus cables A and B). - Unit no. 2 is set under Modbus in the controller (see page 39).
Rx	Off		

Tab. 2: Touch screen – meaning of the LEDs

Optional external display



The optional external display mimics the display on the local controller. It allows the external placement of the same functionality, as available directly on the controller.

When the external display is delivered with the AHU from the factory, everything is setup, tested and working.

If the display is purchased as an accessory, these are the details for installing the external display.

Connecting the external display

The external display is connected using the CAN connection on the controller.

The connections are:

- CAN L - Terminal: X3.17S
- CAN H - Terminal: X3.18S
- CAN_GS - Terminal: X3.19S - Special conditions apply.

CAN_GS:

Grounding of the shield. For older M172 controller, which are of the non-isolated type, the CAN_GS should not be connected to anything. The controller can be identified by the controller ID: TM172PDG42R

The newer isolated controller can be identified by the controller ID: TM172PDG42RI
This controller should have the CAN_GS connected to the CAN GND from the controller.

The connection cable for the CAN connection should not exceed 50m.

The external display also requires a 24V power supply.

The connections for the external displays power supply should not exceed 10 metres.

Note that if the external display is the last component on the CAN line it must be terminated, using the termination jumpers, on the backside of the external display.

Programming the external display

Once the external display is installed and connected to the M172 controller, the software must be updated from the controller. To do this, hold "Left" and "Down" for 5 seconds, until the page changes to the setup menu. Press "Down" to go to "HMI manage". Press "OK" to enter "HMI manage" menu. Press "OK" again, to enter next menu. Press "Down" twice, to go to the HMI icon. Press "OK" to upload HMI to external display from the controller. Upload page opens and press "OK" to start the upload process. Wait until the transfer is complete. A status bar is available on the display, to indicate when it is done. When the upload is successful, the display goes back to the main menu and should now show the same as the display on the controller. The display is now ready to use.

Operation with controller (M172 PLC)

The controller of this DanX unit is based on a Schneider Electric Modicon M172 PLC, with a software program by Dantherm to provide the most energy-efficient execution of control strategies and functions.

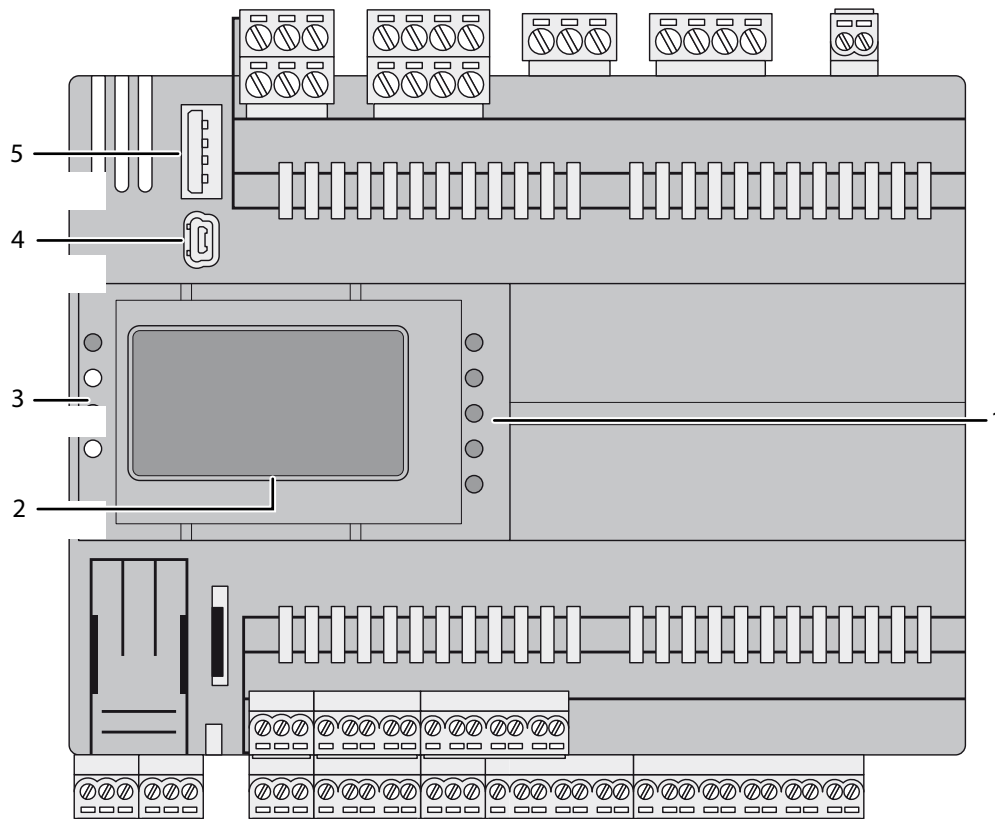


Fig. 16: Structure of the controller

- | | |
|-----------------|--------------------------|
| 1. Push buttons | 4. USB mini-B connection |
| 2. Display | 5. USB A connection |
| 3. LEDs | |

Display

The display panel indicates the unit type, unit status and the conditions in the swimming pool hall (temperature and humidity). The function button, the alarm indicator and the menu button are located in the lower area of the display (see page 35).

LEDs

The LEDs serve as the operation indicators for the controller.

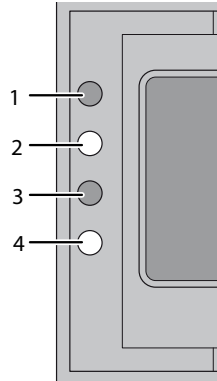


Fig. 17: Description of the LEDs (when the controller is active)

Item	Designation	Status	Description
1	Power LED	green	Sufficient power supply
		Off	Insufficient power supply
2	Alarm LED	red	An alarm on the controller (Common Fault)
		Off	Normal operation
3	-	yellow	New software is installed from USB stick
		Off	Normal operation
4	-	green	Normal operation
		Off	Active alarm

Push buttons

The push buttons next to the display are used to navigate through the menu and to set the values (see page 37).

Push button	Press	Press and hold
	- Move cursor upwards. - In edit mode: Increase value.	No function
	- Move cursor downwards. - In edit mode: Decrease value.	No function
	- Navigate left in menu. - In edit mode: Move the cursor to the left. - Navigate back to the last page.	Navigate back to the last page in the Time Program menu
	- Navigate right in menu. - In edit mode: Move the cursor to the right.	No function
	- Enter/confirm selected value. - Enter edit mode. - In edit mode: Confirm operation.	No function

USB mini-B connection

The USB mini-B connection is located in the upper left corner of the front panel. The mini USB connection is used to connect the controller to a PC via a mini B/A USB cable. It is used to perform monitoring, downloads, commissioning, troubleshooting and uploads using the Schneider PC software.

USB-A connection

The USB-A connection is used to upload new software versions via a formatted (FAT32) USB stick (see page 38).



Description of the start screen

If no button is actuated, the start screen looks like the one depicted below. The backlight turns off after 10 minutes. For better readability, press one of the arrow buttons so that the display lights up.

INFO

The DanX units shown here are only examples and do not necessarily correspond to your unit.

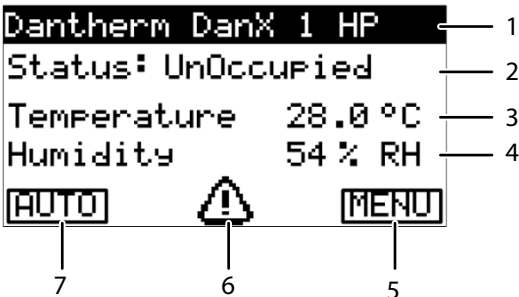


Fig. 18: Example of standard view (DanX 1 HP)

Item	Designation	Description
1	Unit type	Shows the PLC software installed (in this case "Dantherm DanX 1 HP").
2	Unit status	Shows the current unit status.
3	Temperature	Indicates the temperature in the swimming pool hall.
4	Humidity	Indicates the humidity level in the swimming pool hall.
5	Menu button	Button to open the main menu.
6	Alarm indicator	Shows the current alarm status. Is only visible if one or several alarm(s) is/are active.
7	Function button	Button for changing the operating mode (AUTO or STOP). Indicates the current operating mode.

INFO

If the information on the standard view differs from the data shown above, please refer to the information on page 64.

Menu navigation By using the arrow push buttons next to the display panel, the user can highlight either the button at the bottom left (function button) or at the bottom right (menu).

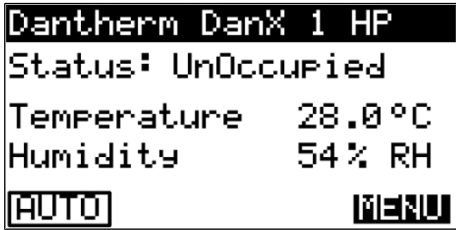


Fig. 19: Start screen – menu button highlighted
To open the menu, select the menu button and press the OK push button.

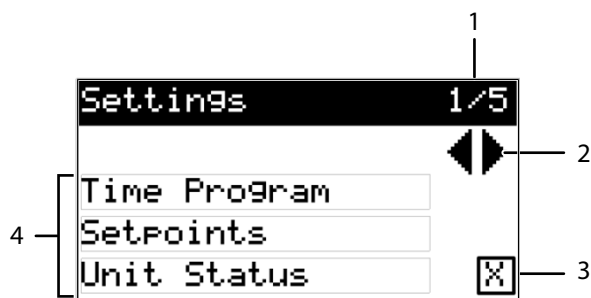


Fig. 20: Menu – structure

Item	Description
1	Indicates the current menu page and the total number of menu pages.
2	Indicates that the LEFT and RIGHT arrow buttons can be used to switch between menu pages.
3	The menu is closed with the Exit button.
4	Indicates the menu items available on the current menu page.

The different menus are arranged on the menu pages as follows:

- 1/5

 - Time Program
 - Setpoints
 - Unit Status
- 2/5

 - Configuration
 - Language
 - Time and Date
- 3/5

 - Modbus
 - Network
 - Simulation
- 4/5

 - List of alarms
 - Access control
 - Alarm history
- 5/5

 - IO Analogue In
 - IO Analogue Out
 - IO Digital In
 - IO Digital Out

Change settings

INFO

Editing the values in the different menus requires different authorisation levels (see page 58).

To adjust the set values in the menu, please proceed as follows:

1. Select the desired menu item on the respective menu page using the arrow push buttons.
2. Confirm the selection with the OK button.
 - ⇒ The first submenu page of the menu item opens.
 - ⇒ The respective value is already highlighted.
3. Press the OK button to change the value.
 - ⇒ A correct indication of the edit mode is indicated by the flashing underline of the first digit of the value.



Fig. 21: Menu – edit mode

4. By pressing the UP and DOWN arrow buttons, the value can now be increased or decreased.
5. When you have selected a new value, the LEFT arrow button can be used to proceed to the second digit of the value.
 - ⇒ The underline is now placed under the second digit.
6. This position can also be changed using the UP and DOWN arrow buttons.
7. Once you have configured all the digits of the value in the desired way, confirm the new value by pressing the OK button.
 - ⇒ The underline now disappears.
 - ⇒ The value has been changed.

Performing software updates

INFO

Before performing software updates on the M172 PLC, check the current settings and configurations on your unit and note them down. After each software update, the controller is reset to the factory settings and must be reconfigured.



NOTICE

Damage to the controller in case of non-observance

Errors in the execution of software updates can damage the controller.

- Strictly follow the procedure for performing software updates described below.

To install/upload the new software version, please proceed as follows:

- ✓ To perform software updates, you need a USB type A stick with a minimum capacity of 2 MB and a PC to transfer the software files to the USB stick.
- ✓ The USB stick must be formatted in FAT32.
 1. Obtain the latest software from Dantherm.
 2. Transfer the acquired files from a PC to the FAT32 formatted USB stick.
 3. Remove the USB stick once the transfer is complete.
 4. Disconnect the DanX from the power supply and turn the main disconnect switch at the front of the unit to OFF.
 5. Insert the USB stick into the USB type A connection of the DanX (see page 33).
 6. Turn the main disconnect switch to ON and switch on the power to the unit.
- ⇒ Shortly hereafter, the PLC will start up, which is indicated by the upper LED turning green.
- ⇒ The M172 PLC will detect the USB stick and start transferring the software files. This is indicated by the activation of the orange LED.
- ⇒ After approximately 1–2 min. the orange LED will turn off and the standard view will be indicated.
- 7. Turn the main disconnect switch at the front of the unit to OFF.
- 8. Remove the USB stick from the M172 PLC.
- ⇒ The new software has been successfully installed on the M172 PLC.

Operation with external touch screen

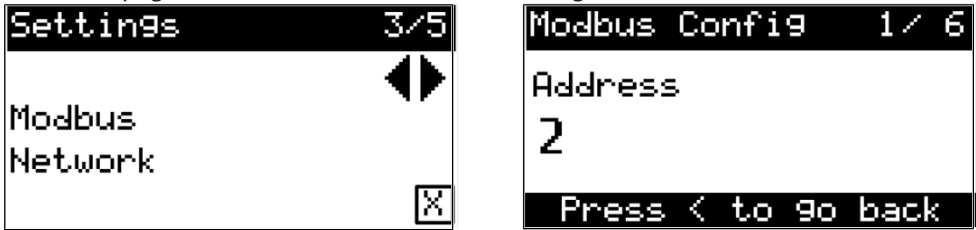
In addition to operating the controller through the PLC, users can also control it via an external touchscreen located in the swimming pool hall. The touchscreen must be installed in accordance with the instructions provided in this manual (see page 31).

INFO

To start the unit for the first time, the M172 PLC must be used.

Activate external touch screen

If communication with the touch screen does not work, check that it is connected correctly. If the touch screen is connected correctly, check the address value in the Modbus Config menu (see page 53). If the value is not set to 2, change it to 2.



Start screen of the touch screen

Four different pages are available: the start/info pages, the setpoint pages, the alarm pages and the start/stop page for the unit.

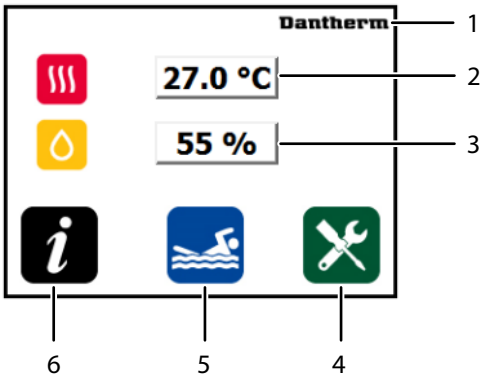


Fig. 22: Start screen of the touch screen

Item	Description
1	Touch button for screen calibration
2	Actual room temperature
3	Actual relative room humidity
4	Touch button for setpoint pages
5	Touch button for stopping the unit and for information about the unit status
	 Unit stopped
	 Pool area occupied (unit is operating with outdoor air)
	 Pool area not occupied (unit is operating in recirculation mode)
6	Touch button for setpoint pages

Calibrating the touch screen

The touch screen must be calibrated before use. To do so, use the pin included and tap the Dantherm logo on the home screen to follow the instructions.

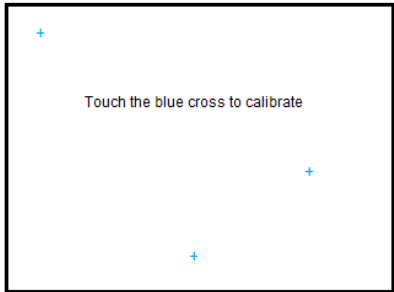


Fig. 23: Calibrating the touch screen

Adjusting the setpoints

The setpoint pages comprise four menu pages, of which, however, only the first three are used to adjust the setpoints.
Please proceed as follows to enter the setpoints for the unit:

- ✓ To edit the setpoints with the touch screen, you must set "Modbus Control" to ON in the M172 PLC (see page 39).
- 1. Tap the green tool symbol.
- ⇒ A window for entering the password will be opened.

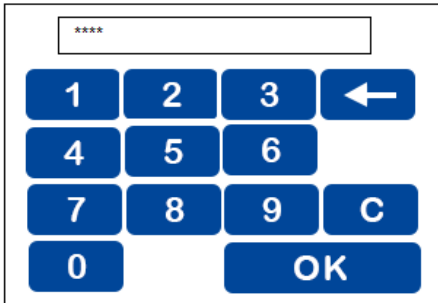
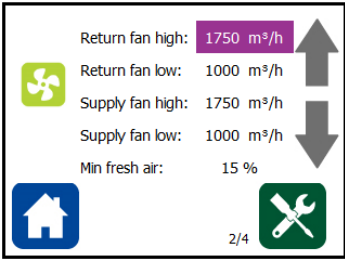
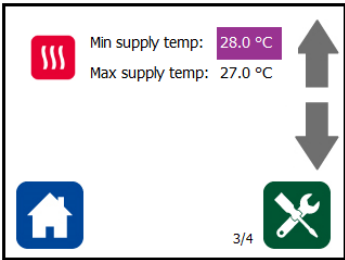


Fig. 24: Touch screen – enter password for setpoints

- 2. Enter password **2222** and confirm the entry with the OK button.
- 3. You can now scroll through the menu pages with the UP and DOWN arrow buttons and enter the following setpoints for the unit:

Menu page	Screen	Description
1/4	A rectangular screen with a white background. On the left, there are four icons: a red flame, a blue water drop, a yellow water drop, and a blue house. To the right of these icons, there are four rows of text: "28.0 °C", "27.0 °C", "55 %", and "60 %". At the bottom left is a blue house icon, and at the bottom right is a green tool icon. In the center, there are two large grey arrows pointing up and down. At the bottom center, the text "1/4" is displayed.	The setpoints for the room temperature and relative humidity for occupied and unoccupied pool areas

Menu page	Screen	Description
2/4	 The screenshot shows a menu page with a list of settings: Return fan high: 1750 m³/h, Return fan low: 1000 m³/h, Supply fan high: 1750 m³/h, Supply fan low: 1000 m³/h, and Min fresh air: 15 %. There are up and down arrows to the right of the fan settings. At the bottom, there is a home icon on the left and a wrench icon on the right, with '2/4' in the center.	Air volumes for supply, return and minimum outdoor air
3/4	 The screenshot shows a menu page with two settings: Min supply temp: 28.0 °C and Max supply temp: 27.0 °C. There are up and down arrows to the right of the temperature settings. At the bottom, there is a home icon on the left and a wrench icon on the right, with '3/4' in the center.	Minimum and maximum supply temperature

General settings

The fourth setpoint page is for adjusting general touch screen settings.

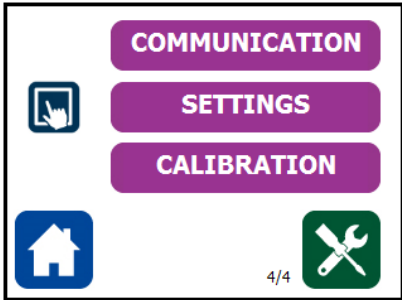


Fig. 25: Touch screen – setpoint page four

The “Communication” button is to be used exclusively by the service technician to check the Modbus connection between the unit and the touch screen.

Tap the “Settings” button to make the following settings:

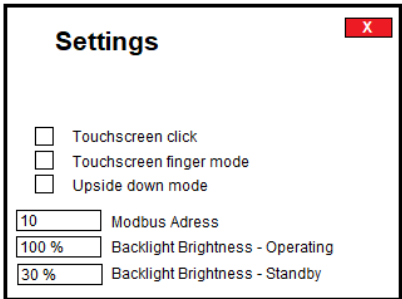


Fig. 26: Touch screen – settings

- Touchscreen click – tick this option to activate a click sound every time you touch the screen.
- Touchscreen finger mode – activate this option to use your fingers to operate the touch panel instead of a pin.
- Upside down mode – activate this option to rotate the screen by 180°.
- Modbus address – this setting should not be changed.
- Backlight Brightness – Operating/Standby – here you can set the backlight brightness used for operation and standby mode in percentages.

The “Calibration” button can be used to perform a new screen calibration. The screen described on page 40 will be opened.

Switching the unit on/off

The touch button for the start/stop page allows you to view the unit status. You will now be asked to enter a password which is **2222**.

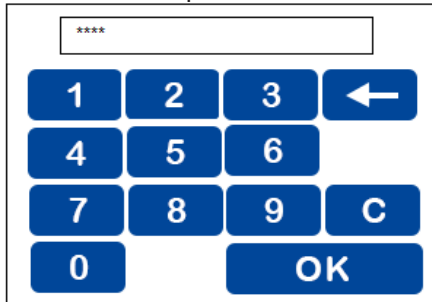


Fig. 27: Touch screen – enter password for unit status

A page indicating the ON or OFF button will open depending on the unit status.

1. To switch off the unit, tap the OFF button.

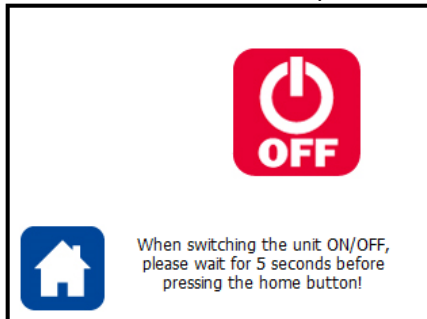


Fig. 28: Touch screen – OFF button

⇒ The OFF symbol disappears and the ON symbol is indicated.

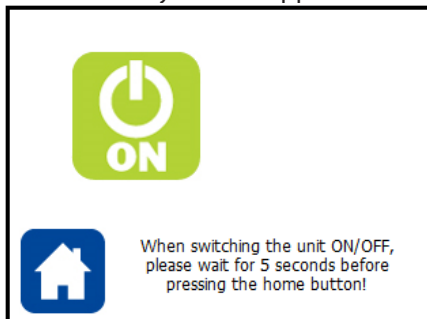


Fig. 29: Touch screen – ON button

2. Wait for 5 seconds, then tap the HOME button.

⇒ The operation of the unit is now stopped.

To restart the unit, tap the ON button.

Unit information



Tap the black symbol for the info pages to view two pages regarding information on the unit.

Menu page	Screen	Description
1/2	 Return air: 1750 m³/h Supply air: 1750 m³/h  Supply air: 38.4 °C Outdoor air: 15.4 °C   1/2	- Return air volume - Supply air volume - Supply air temperature - Outdoor air temperature
2/2	 Duct dampers: 100 % By Pass damper: 100 %  Heating coil signal: 100 % Cooling coil signal: 0 % Compressor: OFF   2/2	- Air duct dampers - Bypass damper - Heating coil signal - Cooling coil signal - Compressor status

INFO

For DanX XD units, no compressor information is displayed.

List of alarms

In the event of an alarm, a red alarm symbol appears on the start display.

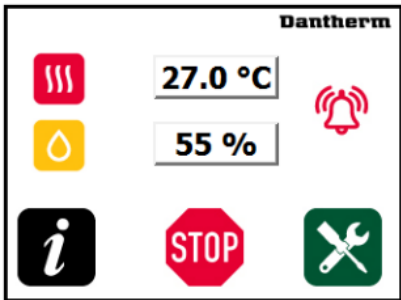


Fig. 30: Touch screen – alarm display

Tapping this symbol will open the alarm list and indicate which alarm is active.

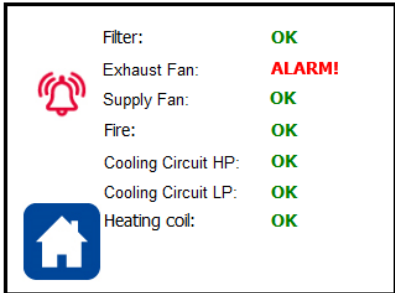


Fig. 31: Touch screen – alarm list

To correct the present fault, follow the troubleshooting instructions (see page 68).

Menu overview

Time program

The Time Program menu allows the user to select different operating modes within a defined period of time. Selecting the menu and pressing the OK button will display the following view:



Fig. 32: Menu – Time program

Item	Description
1	Indicates the current menu page and the total number of menu pages (20 schedule options in total).
2	Indicates the daytime in the 24h indication.
3	Indicates whether the day of the week below is selected.
4	Indicates the selected operating mode for the selected time and day of the week.

There are five operating modes that can be selected in the Time Program menu:

Item	Description
StpStandby	Stop / Standby - By default, the unit is stopped in this mode. - When the wake up function is used, the unit is in standby in this operating mode (see page 46).
UnOcc Low	Pool is unoccupied, fans operate at low speed
UnOcc High	Pool is unoccupied, fans operate at high speed
Occ Low	Pool is occupied, fans operate at low speed
Occ High	Pool is occupied, fans operate at high speed

INFO

"UnOcc" refers to a pool that is not being used (no people in the pool). "Occ" refers to a pool that is being used (people in the pool).

INFO

To exit the Time Program menu and return to the main menu, press and hold the LEFT arrow button.

Schedule options

The various menu pages of the *Time Program* menu allow you to set multiple schedules. These provide for an automatic change of the operating mode at different times of the day and days of the week. Example:

The pool area is closed at 22:00 every day, so the unit should not be in use after this time. On weekdays, the pool area reopens at 08:00.

1. Setting menu page 1/20.



⇒ The unit will stop after 22:00 if no wake up function is activated. The black dots above the days of the week indicate that operation is set for each day of the week.

INFO

If a wake up function is activated, the unit is in standby mode. There is a wake up function each for the room temperature and for the room humidity (see page 46).

2. Setting menu page 2/20.



⇒ On weekdays at 07:00, the unit will switch on in "UnOccupied Low" mode. Even if the pool area is still closed to guests, the unit should start operating on low air volume to ensure that all conditions are met when the pool area opens at 08:00.

3. Setting menu page 3/20.



⇒ Once the pool area opens, the pool(s) will be in use and a higher dehumidification capacity will be required. Therefore, the operating mode of the unit switches to "Occupied Low" at 08:00. The maximum airflow may not yet be required because the pool area has not yet reached the required usage volume and amount of guests.

4. Setting menu page 4/20.



- ⇒ After a few hours, the required dehumidification capacity (for example due to a higher number of guests in the pool area) might have reached a level that requires the maximum dehumidification capacity. Therefore, the unit switches to "Occupied High" at 10:00.
- ⇒ As this is the last page used in the Time Program menu, the unit will now operate according to the time schedules set above. The only setting made here for the weekend is "StpStndby". At 22:00 on Friday, the unit will switch to "StpStndby". This setting will not be changed during the weekend. The unit does not switch to another operating mode until the Monday following at 07:00. The cycle will continue until the following weekend.

You can also use the Time Program to change the operating mode within a shorter time frame. This is useful for special events that require a high pool usage for the duration of which the maximum dehumidification capacity is to be used.

To save the new schedule and activate it immediately, the controller must be restarted.

Otherwise, the change will only be applied when one of the newly set time limits has been reached for the first time.

It is currently 11:00 and the unit is running in "Occupied Low" mode. A new schedule is created for the period between 10:00 and 22:00 with the "Occupied High" mode. Without a restart of the controller, the unit will continue to run in the previous operating mode "Occupied Low" and a change will only take place at 22:00. However, if the controller is restarted, the "Occupied High" mode planned in the new schedule will be adopted immediately, since the starting point has already been exceeded.

Wake up function

After activating the wake up function, the unit is no longer stopped in the "StpStndby" operating mode but is put into standby mode. In this case, the unit starts automatically if it detects an exceeded humidity level or a temperature that is too low.

To use the wake up function, the parameters Wake Up Function Humidity and/or Wake Up Function Temperature must be set from OFF (default setting) to ON in the Configuration menu (see page General configuration).

If ON is selected, the unit operates until the desired setpoint is reached (see page 47). Once the setpoint is reached, the unit stops again automatically. If OFF is selected, the unit will not start even if the room conditions do not correspond to the desired setpoints.

INFO

When using the wake up function, it is important that the return air duct sensor for measuring humidity and temperature is positioned directly behind the return air duct grille. If this is not possible, the sensor must be placed directly in the room or replaced by a room air sensor.



Setpoints

In the *Setpoints* menu (Homepage --> Menu --> Setpoints), the desired setpoints for operation can be set.

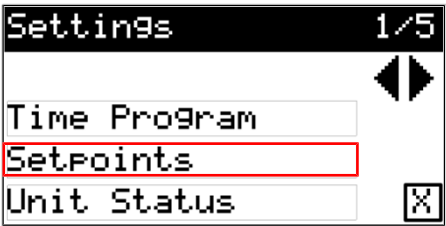


Fig. 33: Setpoints menu

Using the UP or DOWN arrow button allows you to scroll between pages within the menu. The following setpoints can be configured/changed within the menu in the previously described way:

Parameter	Unit
Room Temperature Occupied Pool	°C
Room Temperature Unoccupied Pool	°C
Room Humidity Occupied Pool	%
Room Humidity Unoccupied Pool	%
Return Fan Low Air Volume	m3/h
Return Fan High Air Volume	m3/h
Supply Fan Low Air Volume	m3/h
Supply Fan High Air Volume	m3/h
Minimum Air From Outside	%
Minimum Air Temp For Supply Air	°C
Maximum Air Temp For Supply Air	°C
Preheating Coil Start Temperature	°C

Unit status

The *Unit Status* menu gives you an overview of the operating status of the unit. The different states are listed in the following table. Please note that the states indicated without a unit are Boolean values, thus either 0 or 1 for OFF or ON respectively.

Status	Configuration	Default
Alarm, Common Fault	On / Off	
Minor Alarm Active	On / Off	
Return Fan, Air Flow Return	m3/h	
Supply Fan, Air Flow Supply	m3/h	
Room Temperature	°C	
Room Humidity	% RH	
Supply Air Temperature	°C	
Outdoor Air Temperature	°C	
Evaporator Temperature (HP only)	°C	
Heating Signal	%	
Heating Coil Pump	On / Off	
Preheating Signal	%	
Duct Dampers	%	
Actual Damper Mode	1–6	
Bypass Damper	%	
Compressor Running (HP only)	On / Off	
Compressor Pause Active (HP only)	On / Off	
Compressor Test Activated (HP only)	On / Off	Off
Compressor Disabled (HP only)	Yes / No	Off
WCC Heat Demand (HP only)	On / Off	
WCC Pump Running (HP only)	On / Off	
Cooling Signal	%	
DX Cooling	On / Off	
Heat Demand	%	
Dehumidification Demand	%	
Room Temperature Calculated Setpoint	°C	
Room Humidity Calculated Setpoint	%	
Time Program	Shows current Time <i>Program Mode</i>	
Return Fan High	Yes / No	
Supply Fan High	Yes / No	
IP Address		
Software Version (Example: Software Version DanX HP 2.15)		

Note that (almost) all status information is read-only and cannot be changed by the user.

Compressor test (DanX 1/2/3 HP)

The DanX 1/2/3 HP provides two exceptions for the write protection. These are the menu items on the pages *Compressor Test Activated* and *Compressor Disabled*. These menu items can be useful to test the operation of the compressor and the cooling circuit.



CAUTION

Items 14 and 15 on the pages *Compressor Test Activated* and *Compressor Disabled* should only be used by authorised personnel! If in doubt, contact Dantherm A/S.

Configuration

The *Configuration* menu allows the user to configure general unit parameters. The parameters are set according to the factory default configuration of the unit. If the unit is equipped with a prefabricated water heater, for example, it will be configured at the factory.

For example, if the owner decides to implement a heat option after the unit has been put into operation, the *Configuration* menu allows this variable to be adjusted so that the unit operates accordingly.



CAUTION

Equipment damage due to incorrect configuration

Changing variables within the configuration menu can lead to severe performance changes of the unit. Dantherm A/S accepts no responsibility for damage caused by changing the variables on the unit.

- Please proceed with caution and, if in doubt, contact the point of sale where you purchased the product.

The standard configuration is set to a unit that is not equipped with any additional accessories.

Parameter	Configuration	Default
Wake Up Function Humidity	On / Off	Off
Wake Up Function Temperature	On / Off	Off
Any cooling active when unoccupied	On / Off	Off
Select the installed heating coil	No heating Water heating Electric heating	no heating
Preheating coil installed?	Yes / No	No
Water-cooled condenser installed? (HP only)	Yes / No	No
Configuration of an external signal	Stop / Standby Occupied Low Occupied High UnOccupied Low UnOccupied High	Stop / Standby
Return Fan K Value (DanX 1, 2 or 3)	60, 70 or 106	Depending on the model
Supply Fan K Value (DanX 1, 2 or 3)	60, 70 or 106	Depending on the model
Return Fan Ramp Value	1	1
Return Fan Ramp Time	10	10
Supply Fan Ramp Value	1	1
Supply Fan Ramp Time	10	10
Modbus Controller	On / Off	Off
BACnet Communication	On / Off	Off
BACnet Control	On / Off	Off
BACnet Node Number	1–10000	1958
BACnet Subnet	0–127	0
BACnet Port	1024–65535	47808 (corresponds to 0)

Parameter	Configuration	Default
Outdoor Air Filter Alarm Active?	On / Off	Depending on the year of production
Return Air Filter Alarm Active?	On / Off	Depending on the year of production

Configuring an external signal

If you want to start or stop the unit with the help of an external signal, you can define this in the *Configuration of External signal* menu item ("Configuration --> Configuration of External Signal").

The operation with an external signal works in conjunction with the *Time Program* menu (see page 44). If an external signal is acquired from a PIR sensor or a pool cover switch, the external signal will overwrite the current operating mode configured in the *Time Program* menu. As soon as no external signal is received, the unit returns to the operating mode configured in the *Time Program*.

If you are using an external sensor, you should set one of the following values in the *Configuration of External Signal* menu item and *Time Program* menu:

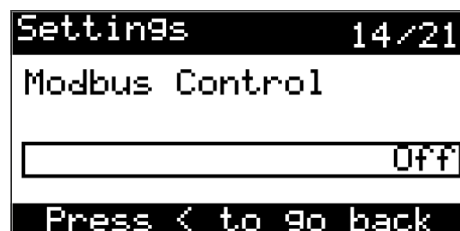
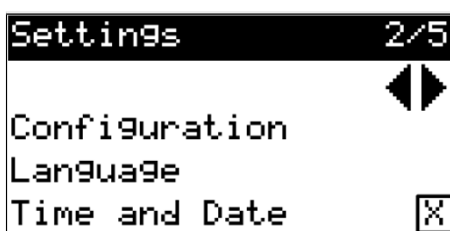
External sensor	Configuration of External Signal menu item	Time Program menu
PIR sensor	- Occupied Low – If a signal is detected by the PIR sensor, the unit switches to the "Occupied Low" mode in which the fans operate at low speed. - Occupied High – If a signal is detected by the PIR sensor, the unit switches to the "Occupied High" mode in which the fans operate at high speed.	If the PIR sensor indicates that the pool is occupied, the time program should have an UnOccupied mode or stop/standby mode with wake up function configured. In this way, the unit switches back to this more economical mode when no external signal is received.
Pool cover switch	- UnOccupied Low – If a signal is detected by the pool cover switch, the unit switches to the "UnOccupied Low" mode, in which the fans operate at low speed. - UnOccupied High – If a signal is detected by the pool cover switch, the unit switches to the "UnOccupied High" mode, in which the fans operate at high speed. - Stop / Standby – If a signal is detected from the pool cover switch, the unit switches to the Stop / Standby mode, in which the fans are at a standstill.	If a pool cover switch is used to indicate that the pool is covered, the time program should be set to "Occupied High" operating mode. In this way, the pool hall will be ventilated as quickly as possible after removing the pool cover.

Enabling Modbus control

If the *Modbus Control* menu item is activated, you can alternatively adjust the setpoints via a Modbus connection (e.g. with an external touchscreen). To enable Modbus control, go to the *Configuration* menu and change the "Modbus control" menu item to ON.

INFO

When Modbus control is enabled, all setpoints are copied from the controller and can no longer be changed via the controller. As long as Modbus control is active, all setpoints can only be changed via the Modbus connection.

**Languages**

In the *Languages* menu, the user has the option to change the language of the PLC. The following languages are available for selection:

- Danish
- German
- English (Standard)
- Estonian
- French
- Italian
- Dutch
- Norwegian
- Portuguese
- Swedish
- Spanish
- Ukrainian
- Hungarian

INFO

Additional languages will be made available with upcoming software updates.

Time and Date

In the "Time and Date" menu , the user can set the time of day and the date. When opening the menu, the following standard start page opens:

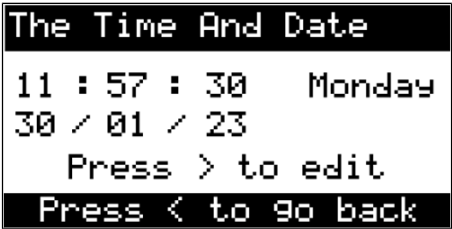


Fig. 34: Time and date – standard view

To edit the preset time and date, please proceed as follows:

1. Press the RIGHT arrow button.
⇒ The edit mode is activated.
2. Change the values as described in the chapter "Changing settings" (see page 37).

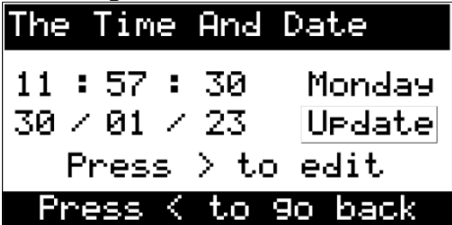


Fig. 35: Time and date – apply change

3. To save the change, press the "Update" button.
⇒ Time and date have been saved

Modbus (RS485)

If you connect the DanX unit to a BMS system via Modbus, you have the option to change the general settings in the "Modbus Config" menu:

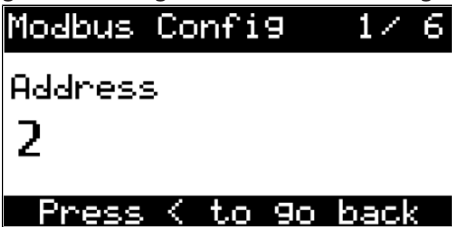


Fig. 36: Modbus – standard view

The user now has the option to change the following settings:

Parameter	Description/Option	Default value
Address	Setpoint for the number assigned to the unit.	2
Data bit number	Setpoint for number of data bits	8
Stop bit number	Setpoint for number of stop bits	1
Parity	Setpoint for parity	even
Baud rate (transmission rate)	Setpoint for transmission rate	38400

For information regarding the different Modbus addresses, see page 73.

Network

The Network menu allows the user to configure the various Ethernet settings listed in the following table:

Parameter	Default value
HTTP Port number	0 (corresponds to port 80)
Modbus TCP/IP port	502
IP addr. (1st part)	10
IP addr. (2nd part)	0
IP addr. (3rd part)	0
IP addr. (4th part)	100
Def. Gatew. (1st part)	10
Def. Gatew. (2nd part)	0
Def. Gatew. (3rd part)	0
Def. Gatew. (4th part)	1
Net mask (1st part)	255
Net mask (2nd part)	255
Net mask (3rd part)	255
Net mask (4th part)	0
Prim. DNS (1st part)	8
Prim. DNS (2nd part)	8
Prim. DNS (3rd part)	8
Prim. DNS (4th part)	8
Sec. DNS (1st part)	8
Sec. DNS (2nd part)	8
Sec. DNS (3rd part)	4
Sec. DNS (4th part)	4
Enable DHCP	1/0 (true/false)



Simulation

With the Simulation menu, the DanX control unit offers a powerful simulation function that allows you to test and validate the functionality of your inputs, outputs and values when commissioning the unit.

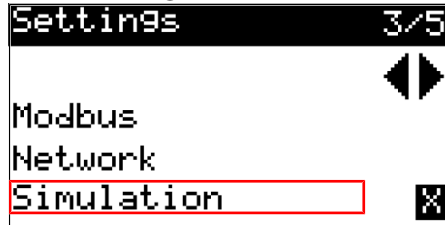


Fig. 37: Simulation menu

Activating the simulation

To activate simulation mode, please proceed as follows:

1. Open the Simulation menu.
2. Select the Simulation menu item and change the value from "Off" to "On".

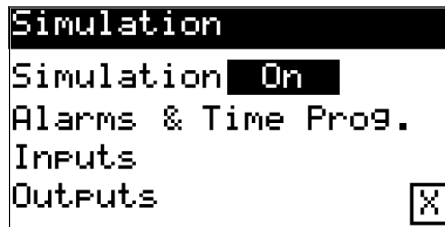


Fig. 38: Simulation mode activated

⇒ Simulation mode is activated.



CAUTION

Equipment damage due to incorrect configuration

Changing the values can lead to severe performance changes of the unit. Dantherm A/S accepts no responsibility for damage caused by changing the variables on the unit.

- Before starting the test, make sure that simulation mode is activated as described above.

Simulating digital inputs

Once simulation mode is activated, you can simulate digital inputs to test how the controller responds to various signals. To simulate digital inputs, please proceed as follows:

1. Click on the Inputs menu item.
 2. Check whether the "Sim. Digital Input" option is activated. Should the option be deactivated, activate the option.
 3. Select the digital input you want to simulate and assign the desired value to it.
- ⇒ The controller treats this value as if it came from a real sensor/unit.

Simulating digital outputs

To simulate digital outputs, please proceed as follows:

1. Click on the Outputs menu item.
 2. Check whether the "Sim. Digital Output" option is activated. Should the option be deactivated, activate the option.
 3. Select the digital output you want to simulate and assign the desired value to it.
- ⇒ The controller behaves as if it was sending this signal to a real external unit.

Simulating specific values

For more detailed tests, it is also possible to simulate certain values within the system. To test the effect of the various setting options, please proceed as follows:

1. Make sure that simulation mode is activated.
2. Use the controller to change the value you want to test. You could, for example, adjust the values for the 6 default analogue outputs in the IO Analogue Out menu (see page 59).
3. Let the unit operate and observe the effect of the changed values on the operation.
4. To stop testing a particular value, set the modified value to "-1".



Fig. 39: Simulation mode – resetting values

⇒ Setting a value to -1 deactivates the simulation for that particular item and the controller no longer uses the simulated value for operation.

CAUTION

Equipment damage due to incorrect configuration

If the modified value is not set to "-1" after the test, the test value is adopted for normal operation. Changing values can lead to severe performance changes of the unit.

Dantherm A/S accepts no responsibility for damage caused by changing the variables on the unit.

- After each test, make sure that the tested values are set to "-1" via the controller.

Deactivation of simulation mode

To deactivate simulation mode, please proceed as follows:

1. Make sure that you have set all tested values to "-1".
2. Open the Simulation menu.
3. Select the Simulation menu item and change the value from "On" to "Off".

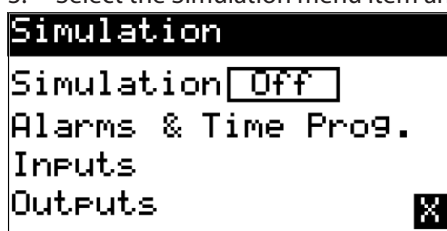


Fig. 40: Simulation mode deactivated

⇒ Simulation mode is deactivated.

List of alarms

The *List of alarms* menu indicates the alarms that can occur in the system. If the user opens the menu, the following page appears (if heating coil alarm is not active):

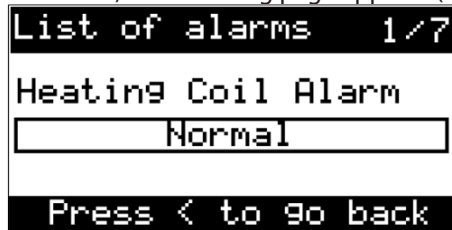


Fig. 41: List of alarms – standard view

By default, the alarms indicate "Normal", which means that the respective alarm is currently not active and the system is operating properly.

Use the UP and DOWN arrow buttons to switch between the alarms indicated in the "List of alarms" menu.

Critical alarms

The first six alarms from the List of alarms menu correspond to critical alarms. A critical alarm will either stop the entire unit (heat pump and fans) or just the heat pump. The unit can only be started up again when the alarm has been acknowledged. Critical alarms are:

Alarm	Description
Heating Coil	Risk of frost for LPHW heating coil, or OT for electric heating coil
Fire	Fire thermostat on supply or return air side has switched off
Supply Fan	Supply air fan overload
Return Fan	Return fan overload
High Pressure	High pressure compressor alarm (only for units with heat pump)
Low Pressure	Low pressure compressor alarm (only for units with heat pump)

The unit will automatically stop if any of the critical alarms occur in the system. If the alarm button appears on the start display, please proceed as follows:

1. Switch off the unit at the main disconnect switch.
 2. Locate the fault and correct it (see page 68).
 3. Switch the unit back on.
- ⇒ The alarm button is no longer indicated which means that the alarm has been reset and eliminated.

Non-critical alarms

The last page in the List of Alarms menu corresponds to a non-critical alarm. A non-critical alarm will not stop the unit but acts as a reminder to check the component for which the alarm is indicated. Non-critical alarms are:

Alarm	Description
Return Filter	The return air filter should be checked.
Outdoor Filter	The outdoor air filter should be checked.
Preheating OT	Over temperature during preheating (only when a preheating coil is installed)
Evaporator sensor	Evaporator sensor is not functioning (only for units with heat pump, i.e. DanX 1/2/3 HP)
Supply air sensor	Supply air sensor is not functioning
Outdoor air sensor	Outdoor air sensor is not functioning



Access control

The *Access Control* menu allows the operator to log in with different authorisation levels that allow for a superior configurability of access to the PLC.



Fig. 42: Access control – standard view

The program contains three different authorisation levels:

- Authorisation level 1 allows you to operate the function button on the start display. You can also change settings that are safe and non-critical. For example, the settings in the Time Program menu and the setpoints in the Setpoints menu can be changed. Some parameters in the Configuration menu can also be set with this authorisation level.
- The password for authorisation level 2 allows you, among other things, to change further parameters in the Configuration menu (after login).
- Some other menu items and parameters require authorisation level 3 and can only be changed by entering a service password* (available from your Dantherm A/S service technician).

Open the Login submenu to enter the password and change the access level. Logout sets the access level to the default level 0.

INFO

If the password is forgotten, new software must be uploaded to the control unit.

INFO

The current authorisation level can be viewed after login. To do so, click on the Login submenu in the Access Control menu again.

Access level	Password
0	
1	1
2	4321
3	*

Alarm history

The *Alarm History* menu allows the operator to view the history of the last 50 alarm entries.

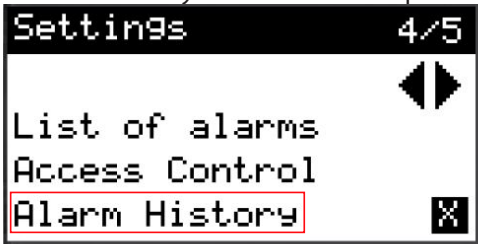


Fig. 43: Alarm History menu
The times at which the alarm was activated ("Active") and deactivated ("Normal") are stored.
To delete the entire alarm history, select the Reset Alarm Log menu item.

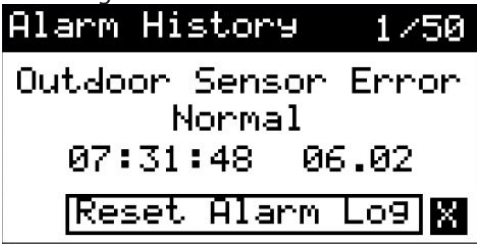


Fig. 44: Alarm history entries

Inputs / outputs (IO)

IO Analogue In

The IO Analogue In menu indicates all 12 default analogue inputs. These are all read only and can therefore not be changed:

Analogue input	Description	Unit
1	Outdoor Air Temp.	°C
2	Supply Air Temp.	°C
3	Evaporator Temp. (HP only)	°C
4	No function	-
5	Room Temperature	°C
6	Room Humidity	%
7	Pressure Return Fan	Pa
8	Pressure Supply Fan	Pa
9	No function	-
10	No function	-
11	No function	-
12	No function	-

IO Analogue Out

The IO Analogue Out menu indicates the six default analogue outputs. They indicate the actual values of the system components.

Analogue output	Description	Unit
1	Return air fan	%
2	Supply air fan	%
3	Duct Dampers	%
4	Bypass damper	%
5	Heating Signal	%
6	Cooling Signal (Preheating Signal if selected)	%

IO Digital In

The IO Digital In menu indicates all 12 default digital inputs. These are all read only and can therefore not be changed:

Digital input	Description
1	High Pressure Alarm (DanX 1/2/3 HP only)
2	Low Pressure Alarm (DanX 1/2/3 HP only)
3	Heating Coil Alarm
4	Fire Alarm
5	Return Fan Alarm
6	Supply Fan Alarm
7	External signal
8	WCC Heat Demand (DanX 1/2/3 HP only)
9	Outdoor Filter Alarm
10	Return Filter Alarm
11	No function
12	Preheating Coil Alarm

IO Digital Out

The IO Digital Out menu indicates all 12 default digital outputs. These are all read only and can therefore not be changed:

Digital output	Description
1	Heating Coil Pump
2	WCC Pump Running (DanX 1/2/3 HP only)
3	Compressor Running (DanX 1/2/3 HP only)
4	Solenoid Valve (DanX 1/2/3 HP only)
5	Cooling Coil Pump
6	No function
7	No function
8	Common fault
9	No function
10	No function
11	No function
12	Preheating Start

Initial commissioning



CAUTION

Commissioning by qualified personnel

Commissioning, maintenance and repair work should only be carried out by trained specialists or by persons supervised by authorised personnel. It is the responsibility of the installer to read and understand this manual and other information given.

To carry out the initial commissioning of the DanX 1/2/3, please proceed as follows:

- Check whether the drain pipes are correctly installed and ensure that the drip trays in the unit are clean.
- Ensure that all loose parts/accessories have been removed from inside the unit.
- Check the components listed below.

Checking the air dampers

Before starting to operate the unit, ensure that the air dampers open/close in the correct direction.

DanX 1/2/3 HP

A DanX 1/2/3 HP unit is equipped with the following five air dampers:

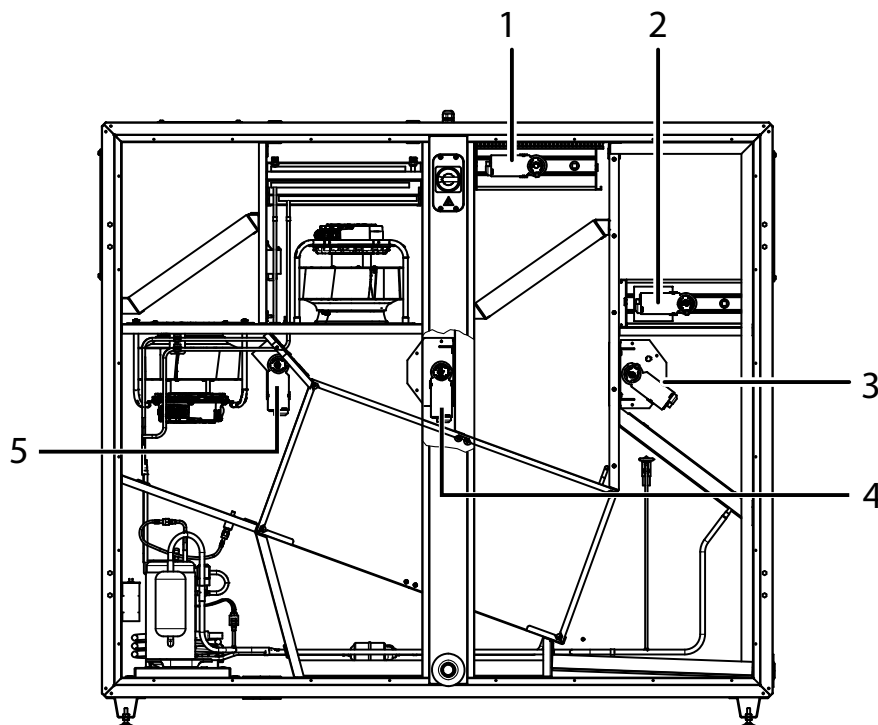


Fig. 45: Air dampers – DanX 1/2/3 HP

- | | |
|-----------------------|-------------------------|
| 1. Outdoor air damper | 4. Bypass damper |
| 2. Extract air damper | 5. Recirculation damper |
| 3. Mixing damper | |

To check the air dampers of the DanX 1/2/3 HP, proceed as follows:

1. Switch to "Simulation mode" (see page 55).
 2. Set the controller to UNOCCUPIED (no outdoor air). The air dampers should be in the following positions:
 - ⇒ Recirculation damper completely open.
 - ⇒ Mixing damper completely open.
 - ⇒ Outdoor air damper and extract air damper completely closed.
 3. Set the controller to OCCUPIED and check whether the air dampers respond as follows:
 - ⇒ Outdoor air and extract air dampers start to open.
 - ⇒ The recirculation and mixing dampers start to close.
 4. Set the outdoor air to 100 %. Wait for a few minutes and check whether the dampers are in the following positions:
 - ⇒ Recirculation damper and mixing damper are completely closed.
 - ⇒ Outdoor air damper and extract air damper are completely opened.
 5. Now check the operation of the bypass damper.
 - ⇒ The bypass damper should now be completely closed.
- ⇒ After successfully testing the air dampers, you can exit simulation mode.

DanX 1/2/3 XD

A DanX 1/2/3 XD unit is equipped with the following four air dampers:

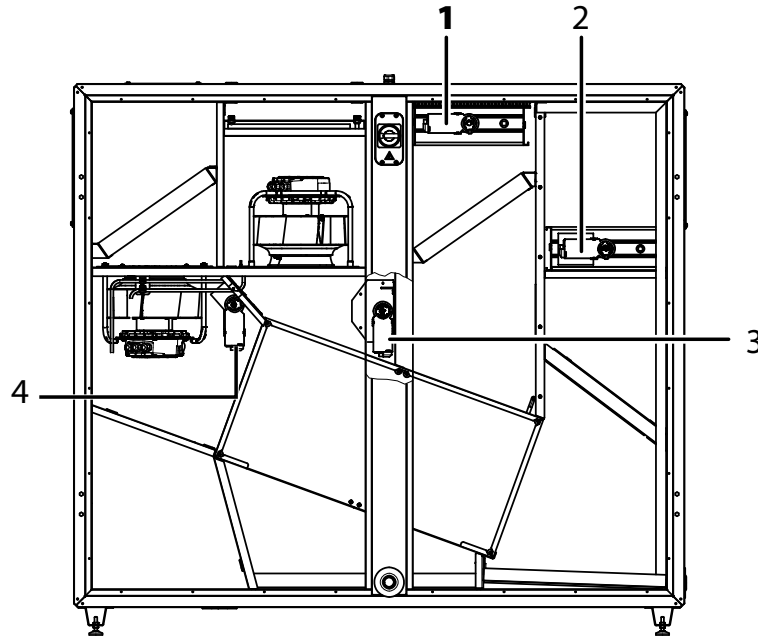


Fig. 46: Air dampers – DanX 1/2/3 XD

- | | |
|-----------------------|---------------------------------------|
| 1. Outdoor air damper | 3. Mixing damper |
| 2. Extract air damper | 4. Recirculation damper/mixing damper |

1. Switch to "Simulation mode" (see page 55).
 2. Set the controller to UNOCCUPIED (no outdoor air). The air dampers should be in the following positions:
 - ⇒ Recirculation damper/mixing damper completely open.
 - ⇒ Outdoor air damper and extract air damper completely closed.
 3. Set the controller to OCCUPIED and check whether the air dampers respond as follows:
 - ⇒ Recirculation damper/mixing damper starts to close.
 - ⇒ Outdoor air and extract air dampers start to open.
 4. Now set the outdoor air to 100 %. Wait for a few minutes and check whether the dampers are in the following positions:
 - ⇒ Recirculation damper/mixing damper is completely closed.
 - ⇒ Outdoor air damper and extract air damper are completely opened.
 5. Switch to "Simulation mode" (see page 55) and check the operation of the bypass damper.
 - ⇒ The bypass damper should now be completely closed.
- ⇒ After successfully testing the air dampers, you can exit simulation mode.

Checking the fans

The following actions must be performed prior to initial commissioning of the EC fans:

- ✓ First ensure that the air dampers are operating properly as described above.
- 1. Use your hand to check whether the fan wheel rotates freely.
- 2. Ensure that the duct system is clean and not blocked by any parts.

Checking the frost thermostat

If a frost thermostat is installed, ensure it is set to the correct temperature. The factory setting is +8 °C.

Checking the cooling circuit

If you are using a DanX 1/2/3 HP, the cooling circuit must also be checked during initial commissioning.

When commissioning the cooling circuit compressor for the first time, let the compressor run for approx. 5 minutes and check the inspection glass of the cooling circuit to see whether there is enough refrigerant in the unit (no bubbles). If the amount of refrigerant is too low, stop the compressor immediately and perform a leakage check.

Checking the M172 PLC

After the initial commissioning of the unit, check whether the standard view on the PLC indicates the correct unit details (see page 35). The following error sources should be checked:

- Incorrect unit indication – the standard view should only indicate the installed unit type. If the incorrect unit is displayed or no configurations are available, please contact the point of sale where you purchased the product to have the problem rectified.
- Incorrect temperature display – check the temperature sensor for errors and ensure the sensor is connected correctly. If the PLC cannot receive a signal from the sensor, the display will indicate a default temperature of - 40.0 °C.
- Incorrect humidity display – check the humidity sensor for errors and ensure the sensor is connected correctly. If the PLC cannot receive a signal from the sensor, the display will indicate a default humidity value of 0 % RH.

Maintenance and troubleshooting

General maintenance instructions



DANGER

Risk of electric shock!

You can be seriously injured by working with the power supply switched on.

- Observe the personnel requirements on page 9.
- When maintaining the unit, always switch off the power supply and the main disconnecting switch (complete switch-off) and secure it against being switched on again by unauthorised persons.



WARNING

Risk of injury due to moving parts

After the unit is switched off, the fan wheel continues to run for approx. 1 to 3 minutes before it comes to a complete stop. Touching moving parts can cause serious injury.

- Only open the maintenance openings when the unit is stopped and the fans are at a standstill.
- Never stop the fan wheel with your hand or any object.



CAUTION

Release of substances hazardous to health

Substances hazardous to health may be released when removing dust and other contaminations.

- Avoid cleaning with compressed air.
- Wear a dust mask (filter class FFP2 or higher) when carrying out cleaning tasks.
- Never use strong solvents or solutions containing chlorinated hydrocarbons, esters, ketones, abrasives or polish.



To achieve the best possible operation and a long service life of the unit, it must be maintained properly and within the specified guidelines. Regular maintenance activities are described in this section.

After completion of the maintenance activities, put the unit into operation to ensure that the normal function is restored.

The following maintenance intervals must be observed:

Component	every 3 months	every 6 months	every 12 months
Cabinet	X		X
EC fans	X	X	X
Filter		X	X
Heating coil			X
Heat exchanger			X
Air dampers		X	X
Cooling circuit (DanX 1/2/3 HP)			X

Quarterly maintenance activities

Perform the following maintenance activities on the unit every 3 months:

1. Check the inside of the cabinet for dust and dirt. If necessary, dry-clean it or use a damp cloth.
2. Dry-clean all collecting trays or use a damp cloth and check whether the condensate can drain freely.
3. Check the cabinet for damages to the paint and rust. Clean damaged/corroded parts and protect them with a new coat of paint.
1. Check the EC fans for imbalances.
2. Check the EC fans and motor bearings for unusual noises.
3. Check the EC fans for dust and dirt. If necessary, dry-clean the EC fans or use a damp cloth.

Semi-annual maintenance activities

Perform the following maintenance activities on the unit every 6 months:

1. Remove the filters.
2. Check the filters for dirt and damage.
3. Clean the filter rail and reinsert the filter.
4. Ensure that the air damper adjustment corresponds to the current operating mode.
5. Ensure that the air vents of the air dampers can rotate when the damper motor is running and that they close/open completely.

Annual maintenance activities

Perform the following maintenance activities on the unit every 12 months:

1. Check all seals on the inspection doors for leaks and damage. If necessary, replace the damaged seals.
2. Lubricate the door locks and hinges.
3. The filters must be replaced every 12 months (or when the check prompt for the filter appears on the display panel). Remove the filters, clean the filter rail and insert a new filter.
4. Check the LPHW heating coil for dust and dirt. If necessary, clean the aluminium fins with a soft brush or vacuum cleaner.
5. Check the LPHW heating coil for water leaks.
6. Vent the LPHW heating coil circuit via the air vent valves of the piping system as remaining air in the piping system can reduce the performance.
7. Check the frost thermostat (if installed) for correct attachment.
8. The cross flow heat exchanger has no mechanical parts, i.e. only the plates need to be checked and cleaned if necessary. Clean the plates every 12 months with a soft brush or use a high-pressure cleaner with compressed air and blow against the airflow.
9. Check the attachment of the motor/air damper shaft.
10. If necessary, dry-clean the air vents of the air dampers or use a damp cloth.
11. Check the rubber seals of the air dampers for damage.
12. If you are using an HP type unit, follow the instructions for maintaining the cooling circuit on page 67.

Maintenance of the cooling circuit (DanX 1/2/3 HP)

The following steps should be carried out every 12 months to maintain the cooling circuit:

1. Check the evaporator and condenser coils of the cooling circuit for dirt and dust. If necessary, clean the aluminium fins with a soft brush or vacuum cleaner.
2. Straighten any bent fins with a suitable tool.
3. Ensure that the frost sensor is properly fixed in the evaporator coil.
4. Remove the air grille from the inspection doors and guide the hoses of your high/low pressure gauges through the opening.
5. Connect the pressure gauges to the high pressure and low pressure sides of the cooling circuit.
6. Close all inspection doors and start up the unit. Wait for a few minutes and check the high/low pressure gauges.
⇒ The high pressure gauge should indicate a value between 40–50 °C, the low pressure gauge 0–10 °C, depending on operating conditions and outdoor conditions.
7. Keep the unit running, open the right inspection door and check whether there are no visible bubbles in the sight glass of the cooling circuit.



CAUTION

If there is any doubt about the condition of the cooling circuit, stop the compressor immediately to avoid damage and call a Dantherm Service refrigeration engineer.

Troubleshooting

A malfunction usually triggers an alarm on the controller display panel. More information can be found on page 57.

INFO

If you are using an external touch screen, you can view the alarm displays on page 43.

Alarm/Fault	Problem	Cause	Action
Return air filter	Excessive air pressure drop across the filter	Filter is clogged	Change filter
Outdoor air filter			
Supply air fan	Fan has stopped	Thermal overload	1. Wait until motor has cooled down. 2. Start the unit. 3. If the fan stops again after a short time, replace/repair the motor
Return air fan			
Heating coil*	LPHW only: Valve is not opening	Actuator defective	Replace/repair actuator
		Valve stuck	Replace/repair valve
	No hot water	Pump not working	Replace/repair pump
		Boiler problem	See boiler manual
	Electric heater only: Temperature switched off	Low airflow	Ensure correct airflow
		Defective component	Replace/repair component
Fire*	Return air temperature > 40 °C	Fire in the dwelling	Check reason for high temperature in return air duct
	Supply air temperature > 70 °C	Heating coil did not operate properly before at low air volume	Check the controller of the heating coil
		Fire inside the unit	
High Pressure*	High pressure exceeding 24 bar	Air volume too low	Check air volume
		Blockage in cooling circuit	Check/repair cooling circuit
		Outdoor temperature too high	Reset high pressure switch
Low Pressure	LP pressure under 1.5 bar	Leakage in the cooling circuit	Repair cooling circuit
		Evaporator iced up	De-ice evaporator/ Check de-icing function
Evaporator sensor	Sensor measures temperature < -100 °C (a false value), red LED lights up	Sensor malfunction	Replace sensor
Supply air sensor			
Outdoor air sensor			

* This alarm requires the respective safety device to be reset after the problem has been solved (see the description below).

Safety devices

Certain critical alarms require the following triggered safety devices to be reset after the problem has been solved:

Frost thermostat

If a manual frost thermostat is used, it must be reset manually after a *"Heating Coil"* alarm before restarting the unit.

The thermostat is typically located in the upper section of the unit, next to the LPHW heating coil.

Fire thermostats

If a *"Fire"* alarm was triggered, the affected fire thermostat must be reset manually before the unit can be restarted.

Press the red reset button on the thermostat.

Fire thermostats are located in:

- Extract air duct (70 °C thermostat)
- Supply air duct (40 °C thermostat)

High Pressure Protection Switch

If a *"High Pressure"* alarm occurs, the high-pressure switch must be reset manually before the compressor can restart.

Press the grey button (1) located inside the unit, directly next to the compressor.

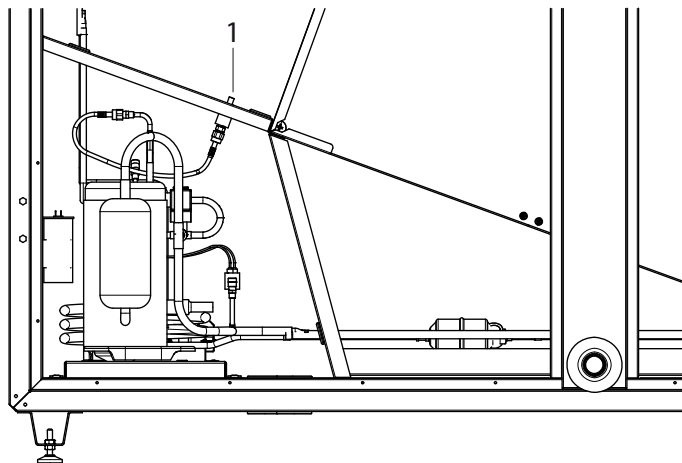


Fig. 47: High pressure protection switch

Disassembly and Disposal

Disassembly and disposal of the unit may only be carried out by qualified personnel.

- Ensure that no water-glycol mixture leaks out.
- All supply lines, such as electricity and hot water, must be disconnected before the equipment is taken out of operation and disassembled.
- Empty the heating coil for the water-glycol mixture before removing it from the unit.
- Drain the cooling circuit for oil and refrigerant before removal.
- Recycle all materials in accordance with national regulations and procedures for environmental protection.



Annex

Technical data

DanX 1/2/3 XD/HP

Specifications	Unit	Value		
		DanX 1 HP/XD	DanX 2 HP/XD	DanX 3 HP/XD
Air volume range High speed	m ³ /h	500–1250	1000–2000	1500–3500
Nominal air volume	m ³ /h	1000	1750	2750
LPHW heating coil	RR	2, 3 or 4		
Heating coil connection	"	1/2	3/8	3/8
Collecting tray connection	"	1		
Outdoor air filter	-	ePM1 55% (F7)		
Return air filter	-	ePM10 70% (M5)		
Length	mm	1570	1570	1920
Width	mm	515	780	890
Height	mm	1750	1750	2250
Long-term storage	°C	+5 to +40 / dry, non-condensing atmosphere		

DanX 1/2/3 XD

Specifications	Unit	Value		
		DanX 1 XD	DanX 2 XD	DanX 3 XD
Weight	kg	254	344	465
Electrical connection	V	1 x 230 + N		
Max full load current	A	5.0	6.6	12.2
Max. power consumption	kW	1.2	1.5	2.9
Max. main fuse	A	10	10	16

DanX 1/2/3 HP

Specifications	Unit	Value		
		DanX 1 HP	DanX 2 HP	DanX 3 HP
Weight	kg	279	379	500
Electrical connection	V	1 x 230 + N	2 x 400 + N	2 x 400 + N
Max full load current	A	7.7	11.0	19.5
Max. power consumption	kW	1.73	2.24	3.25
Max. power consumption L1		-	1.4	2.7
Max. power consumption L2		-	1.34	2.15
Max. main fuse	A	10	16	25
Refrigerant/quantity	kg	R407C/1.0	R407C/1.6	R407C/4.0
Global warming potential (GWP)	-	1774		
PED category (Pressure Equipment Directive)	-	1		
WCC maximum volume flow	l/h	-	800	800

Touch screen

Specifications	Unit	Value
Dimensions	mm	85 x 85 x 19
Display	"	3.5
Screen resolution	px	320 x 240
Operating temperature	°C	0 – 50
IP class	-	20

Modbus register

The following applies for the register lists in the sections below:

ENUM Unit Status:

1. Stopped
2. Occupied
3. UnOccupied
4. Standby

ENUM Time Program:

1. Stop / Standby
2. Occupied, low
3. Occupied, high
4. UnOccupied, low
5. UnOccupied, high

* Writing is only possible when Modbus Control is set to 1/TRUE. In this state, all writable points are managed exclusively via Modbus.

**Modbus register –
Model XD**

Address	Register Name	Unit	Message type	Scaling/Note
18000	Room Temperature	°C	read only	0.1(/10) (example: 285 / 10 = 28.5)
18001	Supply Air Temperature	°C	read only	0.1(/10) (example: 285 / 10 = 28.5)
18002	Outdoor Air Temperature	°C	read only	0.1(/10) (example: 285 / 10 = 28.5)
18003	Room Humidity	%RH	read only	
18004	Return Air Volume	m3/h	read only	
18005	Supply Air Volume	m3/h	read only	
18006	Duct Dampers Opening	%	read only	
18007	ByPass Damper Opening	%	read only	
18008	Heating Signal	%	read only	
18009	Cooling Signal	%	read only	
18010	Unit Status	ENUM	read only	ENUM Unit Status
18011	Time Program	ENUM	read only	ENUM Time Program
18012	SP Occupied Temperature	°C	read and write*	0.1(/10) (example: 285 / 10 = 28.5)
18013	SP UnOccupied Temperature	°C	read and write*	0.1(/10) (example: 285 / 10 = 28.5)
18014	SP Occupied Humidity	%RH	read and write*	
18015	SP UnOccupied Humidity	%RH	read and write*	
18016	SP Minimum Outdoor Air	%	read and write*	
18017	SP Return Fan High AirVolume	m3/h	read and write*	
18018	SP Return Fan Low AirVolume	m3/h	read and write*	
18019	SP Supply Fan High AirVolume	m3/h	read and write*	

Address	Register Name	Unit	Message type	Scaling/Note
18020	SP Supply Fan Low AirVolume	m3/h	read and write*	
18021	SP Max Supply Air Temperature	°C	read and write*	0.1/(10) (example: 285 / 10 = 28.5)
18022	SP Min Supply Air Temperature	°C	read and write*	0.1/(10) (example: 285 / 10 = 28.5)
18023	External Signal Configuration	ENUM	read and write*	ENUM Time Program
18024	Not used		read only	OK to read, will return a value
18025	Not used		read only	OK to read, will return a value
18026	SP Return Fan Speed Low	%	read and write*	for use with units without pressure transmitters
18027	SP Return Fan Speed High	%	read and write*	for use with units without pressure transmitters
18028	SP Supply Fan Speed Low	%	read and write*	for use with units without pressure transmitters
18029	SP Supply Fan Speed High	%	read and write*	for use with units without pressure transmitters
18030	PreHeating Signal	%	read only	0–100%
18031	Outdoor Air Absolute Humidity	g/kg	read only	0.1/(10) (example: 285 / 10 = 28.5)
18032	Outdoor Air Relative Humidity	%RH	read only	
18033	SP Max Outdoor Abs Humidity	g/kg	read and write*	This only applies to projects in high humidity locations.
18100	Common_Fault	On/Off	read only	(0) Normal / (1) Alarm
18101	Return Fan Alarm	On/Off	read only	(0) Normal / (1) Alarm
18102	Supply Fan Alarm	On/Off	read only	(0) Normal / (1) Alarm
18103	Check Filter Alarm	On/Off	read only	(0) Normal / (1) Alarm
18104	Fire Alarm	On/Off	read only	(0) Normal / (1) Alarm
18105	Heating Coil Alarm	On/Off	read only	(0) Normal / (1) Alarm
18106	Heating Coil Pump	On/Off	read only	(0) Off / (1) On
18107	DX Cooling Digital Out	On/Off	read only	(0) Off / (1) On
18108	Cooling Coil Pump	On/Off	read only	(0) Off / (1) On
18109	External Stop	On/Off	read and write*	Normal Operation /
18110	External Signal	On/Off	read and write*	Time Program /
18111	Modbus Control	On/Off	read and write*	Controller Setpoints /
18112	Not used	-	read only	OK to read, will return a value
18113	Not used	-	read only	OK to read, will return a value

Address	Register Name	Unit	Message type	Scaling/Note
18112	Not used		read only	OK to read, will return a value
18113	Not used		read only	OK to read, will return a value
18114	Not used		read only	OK to read, will return a value
18115	Not used		read only	OK to read, will return a value
18116	Not used		read only	OK to read, will return a value
18117	Fan Failure Alarm	On/Off	read only	only used in older configurations
18118	Not used		read only	OK to read, will return a value
18119	Return Fan High	On/Off	read only	(0) Off / (1) On
18120	Supply Fan High	On/Off	read only	(0) Off / (1) On
18121	Return Fan Start	On/Off	read only	(0) Off / (1) On
18122	Supply Fan Start	On/Off	read only	(0) Off / (1) On
18123	Outdoor Filter Alarm	On/Off	read only	(0) Off / (1) On
18124	Return Filter Alarm	On/Off	read only	(0) Off / (1) On
18125	PreHeating Start	On/Off	read only	(0) Off / (1) On
18126	PreHeating OT Alarm	On/Off	read only	(0) Off / (1) On
18127	PreHeating Installed	On/Off	read only	(0) No / (1) Yes
18128	High Humidity Location	On/Off	read and write*	(0) No / (1) Yes

**Modbus register –
Model HP**

Address	Register Name	Unit	Message type	Scaling/Note
18000	Room Temperature	°C	read only	0.1(/10) (example: 285 / 10 = 28.5)
18001	Supply Air Temperature	°C	read only	0.1(/10) (example: 285 / 10 = 28.5)
18002	Outdoor Air Temperature	°C	read only	0.1(/10) (example: 285 / 10 = 28.5)
18003	Room Humidity	%RH	read only	
18004	Return Air Volume	m3/h	read only	
18005	Supply Air Volume	m3/h	read only	
18006	Duct Dampers Opening	%	read only	
18007	ByPass Damper Opening	%	read only	
18008	Heating Signal	%	read only	
18009	Cooling Signal	%	read only	
18010	Unit Status	ENUM	read only	ENUM Unit Status
18011	Time Program	ENUM	read only	ENUM Time Program
18012	SP Occupied Temperature	°C	read and write*	0.1(/10) (example: 285 / 10 = 28.5)
18013	SP UnOccupied Temperature	°C	read and write*	0.1(/10) (example: 285 / 10 = 28.5)
18014	SP Occupied Humidity	%RH	read and write*	
18015	SP UnOccupied Humidity	%RH	read and write*	
18016	SP Minimum Outdoor Air	%	read and write*	
18017	SP Return Fan High AirVolume	m3/h	read and write*	
18018	SP Return Fan Low AirVolume	m3/h	read and write*	
18019	SP Supply Fan High AirVolume	m3/h	read and write*	
18020	SP Supply Fan Low AirVolume	m3/h	read and write*	
18021	SP Max Supply Air Temperature	°C	read and write*	0.1(/10) (example: 285 / 10 = 28.5)
18022	SP Min Supply Air Temperature	°C	read and write*	0.1(/10) (example: 285 / 10 = 28.5)
18023	External Signal Configuration	ENUM	read and write*	ENUM Time Program
18024	Evaporator Temperature	°C	read only	0.1(/10) (example: 285 / 10 = 28.5)
18025	Not used		read only	OK to read, will return a value
18026	SP Return Fan Speed Low	%	read and write*	for use with units without pressure transmitters
18027	SP Return Fan Speed High	%	read and write*	for use with units without pressure transmitters
18028	SP Supply Fan Speed Low	%	read and write*	for use with units without pressure transmitters

Address	Register Name	Unit	Message type	Scaling/Note
18029	SP Supply Fan Speed High	%	read and write*	for use with units without pressure transmitters
18030	PreHeating Signal	%	read only	0–100%
18100	Common_Fault	On/Off	read only	(0) Normal / (1) Alarm
18101	Return Fan Alarm	On/Off	read only	(0) Normal / (1) Alarm
18102	Supply Fan Alarm	On/Off	read only	(0) Normal / (1) Alarm
18103	Check Filter Alarm	On/Off	read only	(0) Normal / (1) Alarm
18104	Fire Alarm	On/Off	read only	(0) Normal / (1) Alarm
18105	Heating Coil Alarm	On/Off	read only	(0) Normal / (1) Alarm
18106	Heating Coil Pump	On/Off	read only	(0) Off / (1) On
18107	DX Cooling Digital Out	On/Off	read only	(0) Off / (1) On
18108	Cooling Coil Pump	On/Off	read only	(0) Off / (1) On
18109	External Stop	On/Off	read and write*	(0) Normal Operation / (1) Stopped
18110	External Signal	On/Off	read and write*	(0) Time Program / (1) External Signal Selection
	Common_Fault	On/Off	read only	(0) Normal / (1) Alarm
18111	Modbus Control	On/Off	read and write*	(0) Controller Setpoints / (1) Modbus Setpoints
18112	Compressor Running	On/Off	read only	(0) Off / (1) On
18113	High Pressure Alarm	On/Off	read only	(0) Normal / (1) Alarm
18114	Low Pressure Alarm	On/Off	read only	(0) Normal / (1) Alarm
18115	WCC Heat Demand	On/Off	read only	(0) Off / (1) On
18116	WCC Pump Running	On/Off	read only	(0) Off / (1) On
18117	Fan Failure Alarm	On/Off	read only	only used in older configurations
18118	HP LP pressure alarm	On/Off	read only	only used in older configurations
18119	Return Fan High	On/Off	read only	(0) Off / (1) On
18120	Supply Fan High	On/Off	read only	(0) Off / (1) On
18121	Return Fan Start	On/Off	read only	(0) Off / (1) On
18122	Supply Fan Start	On/Off	read only	(0) Off / (1) On
18123	Outdoor Filter Alarm	On/Off	read only	(0) Off / (1) On
18124	Return Filter Alarm	On/Off	read only	(0) Off / (1) On
18125	PreHeating Start	On/Off	read only	(0) Off / (1) On
18126	PreHeating OT Alarm	On/Off	read only	(0) Off / (1) On
18127	PreHeating Installed	On/Off	read only	(0) No / (1) Yes

Spare parts, ordering process

This section contains the general information needed when ordering spare parts.

How to order

Dantherm spare parts can be ordered at shop.dantherm.com

You will find the spare parts lists on the following pages. When ordering, please specify the following:

- Dantherm spare parts number/text
- Dantherm unit type
- Dantherm production number and serial number from the name plate of the unit (or approximate date of delivery).

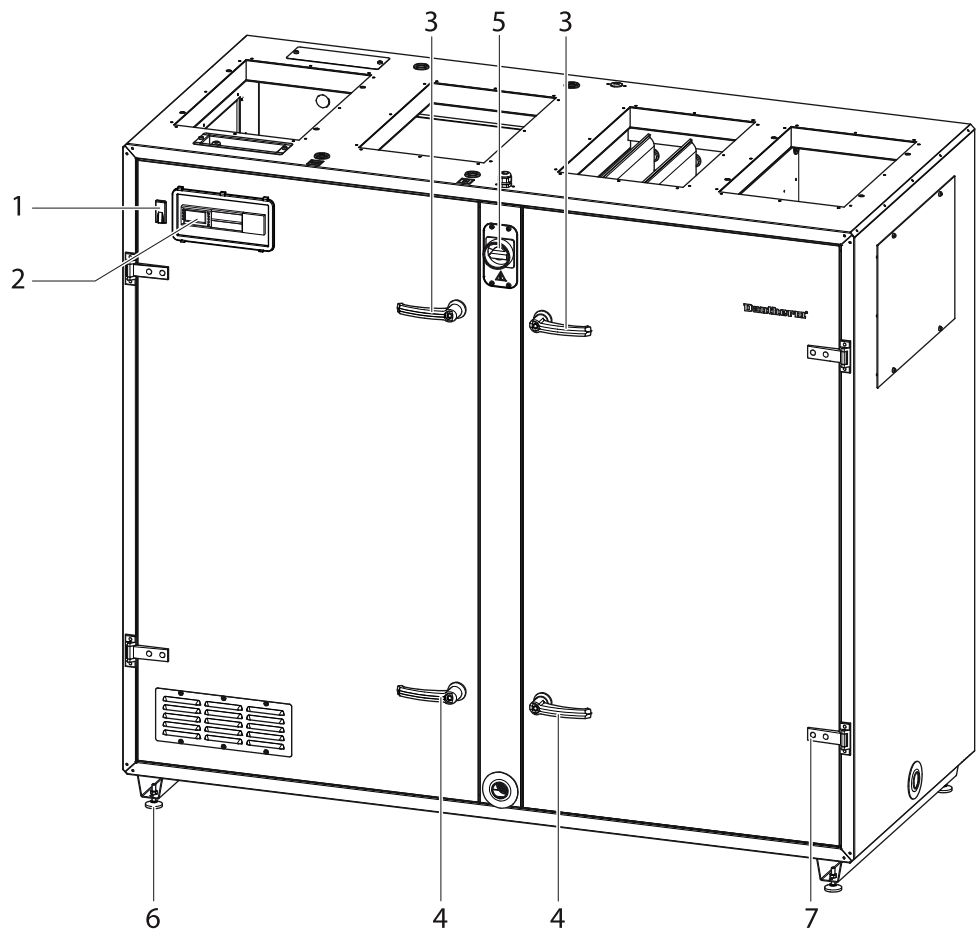
INFO

Not every item will be available individually if it is part of an assembly that forms a whole or if it is part of a complete component that has been purchased. Dantherm reserves the right to make this assessment.

Spare parts accessories

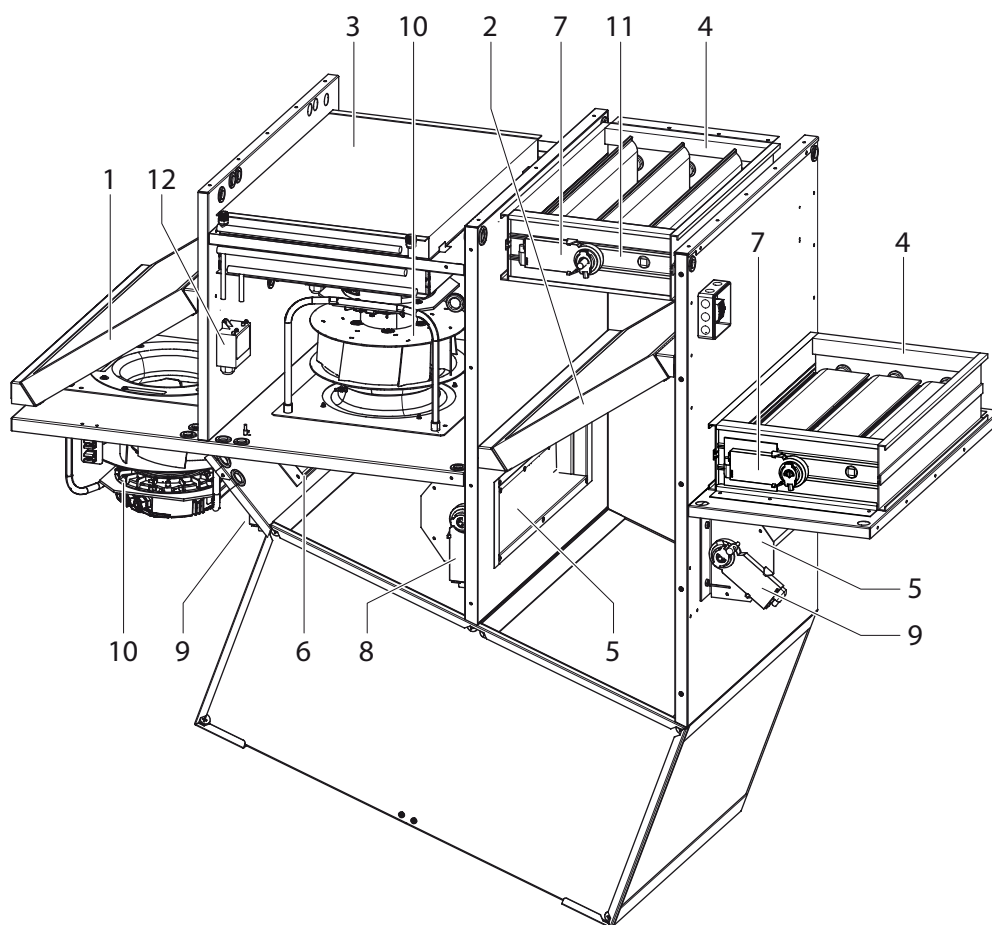
Description	Article number		
	DanX 1	DanX 2	DanX 3
Valve for heating coil	096268 / 096269 / 30101564		
Actuator for heating coil valve	068001		
Electrical heater for duct mounting, low capacity	4.5 kW, Ø315 31020623	7.5 kW, Ø400 31020624	12 kW, Ø400 31020629
Electrical heater for duct mounting, high capacity	7.5 kW, Ø315 31020628	12 kW, Ø400 31020629	18 kW, Ø500 31020625
Siphon with ball	088338		
Fire thermostat 40 °C-70 °C	087769		
Frost thermostat for LPHW heating coil, auto reset	513633		
Frost thermostat for LPHW heating coil, manual reset	513634		
Movement sensor (PIR sensor)	076092		
Outdoor temperature sensor	018092		
Control panel, touch screen, incl. micro SD card	109404		
Electric heating coil, 1 x 230 V, 5 kW, Ø315	31020626		

External spare
parts



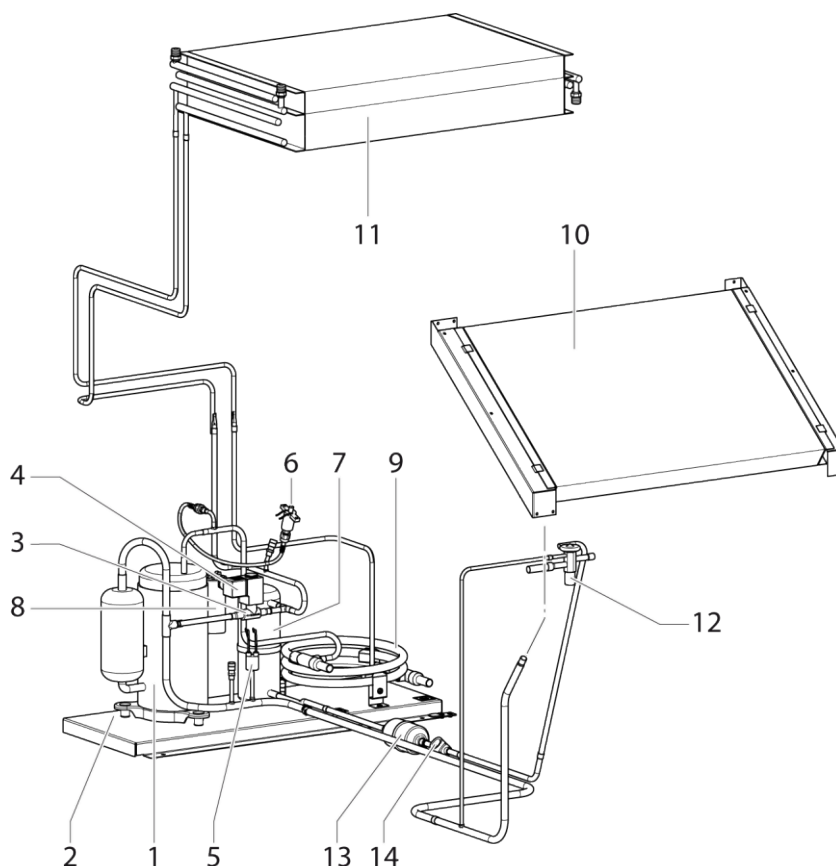
Item	Description	Article number		
		DanX 1	DanX 2	DanX 3
1	RJ 45 plug		014609	
2	M172 PLC		113643	
3	Door handle with key		071016	
4	Door handle without key		071017	
5	Main disconnect switch		521259	
6	Adjustable feet, 4 pcs.		163068	
7	Door hinge, 1 pc.		541820	
-	Return duct humidity / temperature sensor		096356	
-	Supply air duct sensor		039962	
-	Inspection glass/PLC cover		114057	
-	Room humidity/temperature sensor		081248	

Internal spare parts



Item	Description	Article number		
		DanX 1	DanX 2	DanX 3
1	Return air filter ePM10 70% (M5)	093983	071024	081862
2	Outdoor air filter ePM1 55 % (F7)	093984	071025	081863
3	2RR LPWH heating coil	091749	066814	075226
	3RR LPHW heating coil	093500	067883	075227
	4RR LPHW heating coil	30101277	30101275	30101276
4	Outdoor air/extract air damper	091758	066746	075465
5	Bypass / mixing damper	091729	066693	066693
6	Recirculation damper	091928	091729	
7	Modulating actuator Duct damper Spring return	067161		
	Modulating actuator for duct damper	067193		
8	Actuator for bypass damper			
9	Actuator for recirculation/mixing damper			
10	Return / Supply air fan with motor	091885	066794	053234
11	Outdoor air sensor	039961		
12	Pressure sensor	060596		
-	Filter guard	067197		

**Spare parts for
cooling circuit**



Item	Description	Article number		
		DanX 1	DanX 2	DanX 3
1	Compressor	029177	029242	075197
2	Vibration damper for compressor, 1 pc.	029179		-
3	Solenoid valve	026691		
4	Coil for solenoid valve	077068		
5	LP pressure switch, 1.5 bar	108403		
6	HP pressure switch, 24 bar	108404		
7	Refrigerant container	602740		602790
8	Condenser	029178	029243	480238
9	Water-cooled condenser	-	601020	
10	Evaporator	091746	066812	075224
11	Condenser	091748	066813	075225
12	Expansion valve	093136	603911	603942
13	Filter drier	607231		
14	Sight glass	607630		
-	Evaporator sensor	039961		

Declaration of conformity (EU)

Dantherm, Marienlystvej 65, DK-7800 Skive, declares that the units mentioned below

343230 DanX 1 XD
343231 DanX 1 HP
343240 DanX 2 XD
343241 DanX 2 HP
343250 DanX 3 XD
343251 DanX 3 HP

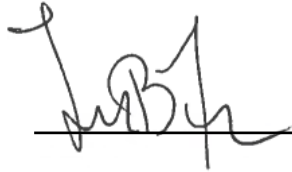
– comply with the provisions of the following guidelines:

2006/42/EU	Machinery Directive
2014/35/EU	Low Voltage Directive
2014/30/EU	EMC Directive
2014/68/EU	Pressure Equipment Directive
2011/65/EU	RoHS Directive

– and are manufactured in compliance with the following standards:

EN 12100-1:2011	Safety of machinery – General principles for design
EN 60204-1:2018	Safety of machinery – Electrical equipment of machines – Part 1: General requirements

Skive, 12th May 2020



Jakob Bonde Jessen
Managing Director



Dantherm Denmark A/S

Marienlystvej 65

7800 Skive

Denmark

support.dantherm.com

Dantherm can accept no responsibility for possible errors and changes (en)

Der tages forbehold for trykfejl og ændringer (da)

Irrtümer und Änderungen vorbehalten (de)

Dantherm n'assume aucune responsabilité pour erreurs et modifications éventuelles (fr)

