Dantherm

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Der tages forbehold for trykfejl og ændringer
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Irrtümer und Änderungen vorbehalten
Dantherm n'assume aucune responsabilité pour erreurs et modifications éventuelles

1.1 Introduction

The DanX 1/2/3 type HP and XD equipment is designed for the use for ventilation, humidity and temperature control in private and hotel swimming pool areas. The use of the unit includes the required inspection and maintenance for these units, which is described in the final chapter of this manual.

Unloading, transportation, assembly and connecting of the DanX 1/2/3 should only be carried out by trained professionals or by people supervised by authorized staff. It is the responsibility of the fitter to read and understand this guide and other given information.

1.2 Foundation for the unit

The DanX 1/2/3 unit must be installed in a location that meets the following requirements:

- The supporting structure must be level, stable and vibration-free.
- The supporting structure must be able to bear the weight of the unit (up to 500 kg).
- The deflection of the substructure should be max. 1 mm/m.
- For the connection of the condensate drain, it is necessary that the height between condense outlet of the unit and the substructure is at least the required height for the water trap.

1.3 Minimum distances

For the operation, maintenance and servicing of parts as heating coils, dampers, filters and others a minimum clearance of 850/850/1100 mm (DanX 1/2/3) between inspection side of the unit and the wall should be foreseen. It is also recommended to have a minimum clearance of 200 mm between the wall and the side of the unit were the water outlet is located.

2.1 Unloading

The unit is delivered in one module placed on wooden cross beams and wrapped in protective packing. The following steps should be followed when unloading the modules:

- Find a suitable place for unloading, as the unit can be heavy (up to 500 kg).
- Unload the modules with a forklift or crane (see instructions below).
- Do not tilt or lay down the unit with an integrated refrigeration system (DanX 1/2/3HP).
- Check packing and unit for damage in transit and report any damage to the driver and to Dantherm Air Handling immediately.
- Retain packing until the unit is placed on the mounting location to avoid damages on cabinet parts or connecting pieces.
- As the unit is delivered with a built-in control panel, it should be handled with caution and stored in a safe and dry location until installation is carried out.

2.2 Lifting with a forklift or crane

If a fork-lift is used, it must be ensured that the forks are long enough to fully reach under the unit, so that the bottom of the cabinet is not damaged. Rough and incorrect handling can damage the unit and hereby result in glitch. Make sure that the unit's centre of gravity is as near as possible to the centre of the two forks, so the module can be transported stable.

When using a crane for lifting, please be aware of the following general points:

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

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

Lifting is carried out as follows:

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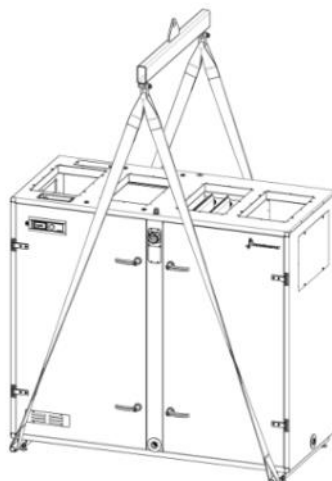
2.3 Storage

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

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

3.1 Introduction

There are two types of DanX 1/2/3 units for swimming pool ventilation; the HP and XD version, which are both installed in the same way.

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

Assembly of the DanX 1/2/3 unit should only be carried out by trained professionals or by people supervised by authorized staff. It is the responsibility of the fitter to read and understand this guide and other given information.

3.2 Unit construction

The DanX 1/2/3 HP and XD consist of a double cross flow heat exchanger in combination with a built-in mixing box and direct driven EC fans. The HP model is furthermore equipped with a compressor driven heat pump. The cooling circuit is filled with refrigerant and does not need any extra installation.
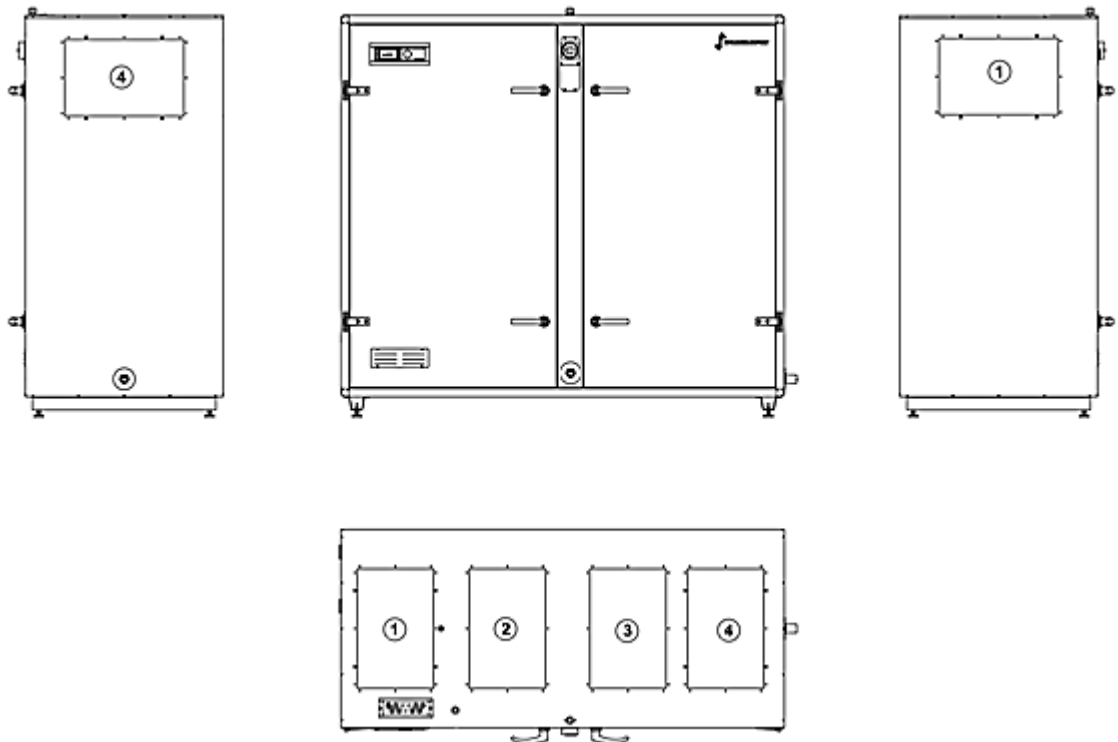
The units duct connections are as follows (left hand unit):

1) Return air connection, either top or side.
2) Supply air connection, only top.
3) Outdoor air connection, only top.
4) Exhaust air connection, either top or side.

3.3 Installation of unit

Before placing the unit, the wooden pallet must be removed and the separate delivered feet mounted on the base frame. To do so the following must be done:

- Unwrap the module, open the inspection door and take out the separate box with the feet.
- Lift the unit with a fork lift or pallet lift and unscrew the wooden pallet (1).
- Screw the feet (2) on the base frame and place the unit where it should be installed.
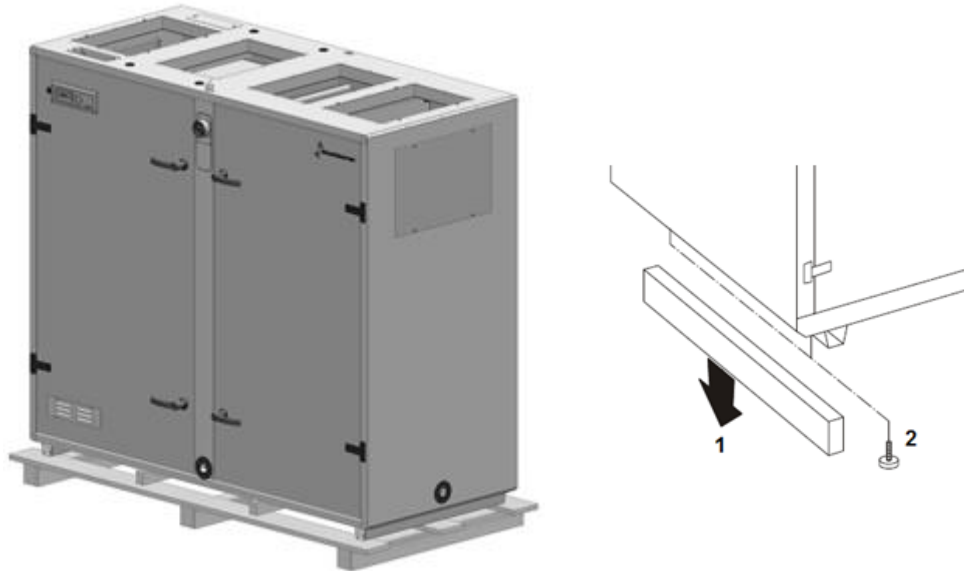
- For transport reasons the handles are not fitted from the factory. Find the handles inside the unit and fit one handle with lock and one without in each door. The handle (1) is fixed to the lock with a screw (2) and the plastic blinder (3) is pressed into the handle.
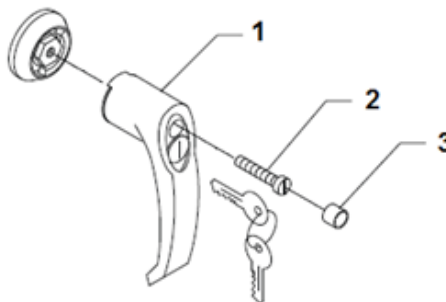
3.4 Duct mounting

The ducts connected to the unit must be suspended or underpinned with support elements, if you fit the ducts on the side of the unit, as the duct connection panels are not strong enough to hold the duct work.

The ducts can be connected to the DanX 1/2/3 directly, or with flexible connections to suppress vibrations of the unit. For the flexible connection to work probably, it is important that it is not totally stretched. When a flexible connection is used, an earth connection must be mounted between unit and duct work.

3.5 Installation and connection of components

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

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

All temperature sensors are ready mounted and wired to the control panel; just the supply air temperature sensor and return air temperature / humidity sensor have to be installed in the duct system.

3.5.1 Condensed water outlets

Drainage from the condensate tray (1") takes place in two outlets, one on the exhaust side (positive pressure, outlet on the side) and one on the supply side (negative pressure, outlet in the front).

Normally it is only necessary to connect the drainage from the exhaust air side. We recommend using our special ball valve to avoid that humid air is blown through the outlet into the technical room.

It is very important to remove the small rubber plug inside the valve; otherwise the valve cannot work with overpressure! Secondly the arrow with PA+ must show in the direction of the drainage!

Remove the small rubber plug inside the valve!
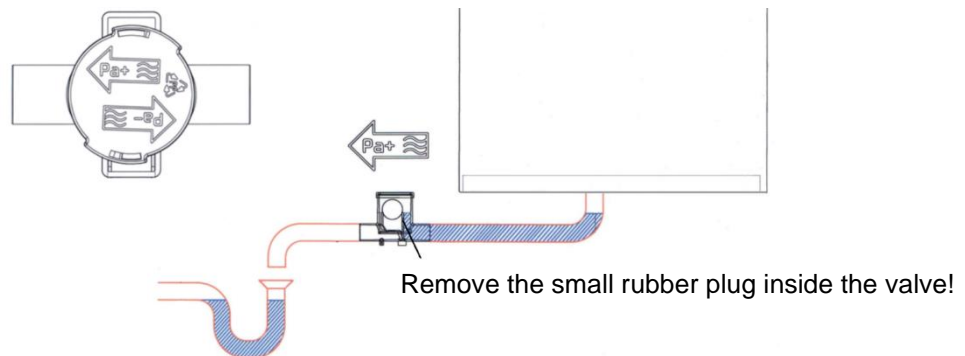
The drainage on the front of the unit (supply side) has been blocked by the factory as only very little condensate will appear on that side of the heat exchanger and this small amount of condense will then evaporate again into the airstream. If it should show that more condense then normal is produced, it is possible to remove the plug from the outlet and connected the outlet with the help of a ball valve to the drain. If you connect a ball valve to this outlet it is important that the arrow with PA- must show in the direction of the drainage, as the supply side works with under pressure!

When using a ball valve on the under-pressure side the small rubber plug inside the valve should not be removed!

3.5.2 Supply air temperature duct sensor

The supply air duct sensor must be installed after connecting the DanX 1/2/3 unit to the duct system. You find the coiled up (10m) sensor on the top deck of the unit.

The duct sensor is installed in the ***supply air duct*** of the swimming pool, after the heating coil in the following way.

- Drill an 8 mm hole in the supply air duct at least 1.5 m from the last component of the unit.
- Place the sensor in the hole.
- Fasten the sensor housing to the duct with two screws and close the sensor.

3.5.3 Return air humidity / temperature duct sensor

The return air temperature and humidity sensor have to be installed after connecting the DanX 1/2/3unit to duct system. You find the coiled up (10m) sensor on the top deck of the unit.

The duct temperature / humidistat sensor is installed in the ***return air duct*** from the swimming pool. Please follow the instructions, following with the duct sensor.

3.5.4 Room air humidity / temperature sensor

If you have ordered a room thermostat / humidistat sensor instead of a duct mounted on, this will only be connected to the terminal strip of the unit with a short cable to test the function. When installing the unit, you must replace this cable with a cable of the right length, to connect the room temperature / humidistat sensor between the pool room and the unit.

The room temperature/humidistat sensor should be installed at a height of minimum 2,5m and not above doors where people entering or leaving the pool hall. Secondly the sensor should not be placed where heating, ventilation or the sun can have an influence on the measuring result. Otherwise please follow the instructions, following with the room sensor.

> It is not possible to change from a duct sensor to a room sensor, or the other way around.
>
> If you wish to change the sensor, you need a software update for the controller!

3.5.5 Separate outdoor sensor

If there is ordered a separate outdoor temperature sensor, you will find the sensor separately in the unit without cabling. Install the sensor outside the building where there is no direct sunlight. Disconnect the standard outdoor sensor which is installed inside the DanX 1/2/3 unit (see electrical diagram) and connect the new outdoor sensor to the two terminals.

3.5.6 LPHW coil

The LPHW coil is connected in the following way:

- Connect the water supply to the inlet of the coil.
- Connect the water return to the outlet of the coil, so the water flow is always counter flow.
- Connect the two-way valve outside the unit to the water system, as shown in the drawings.
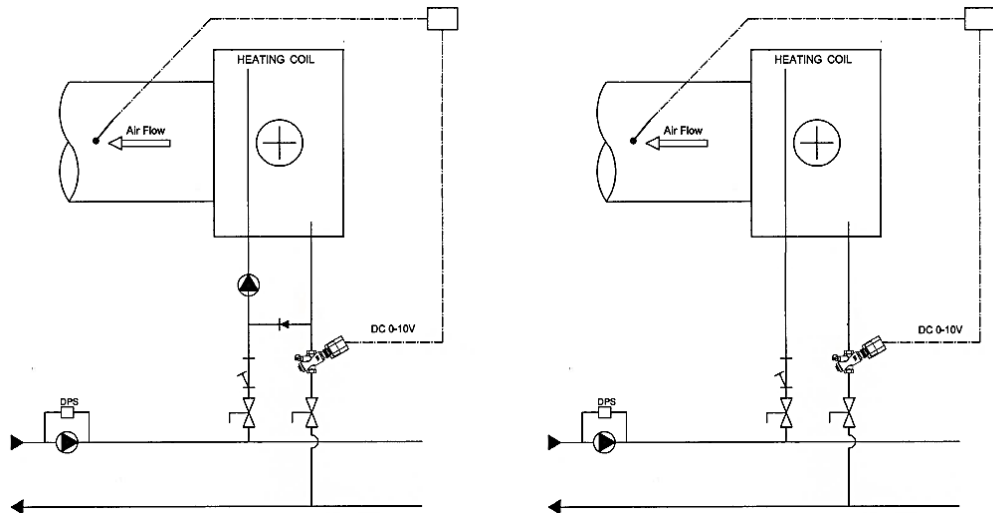
- After mounting the water valve, set the maximum flow for the coil on the valve (see also separate instructions).
- Install the actuator to the valve and connect it to the electrical panel (se electrical diagram)

NB!
When connecting the heat exchanger, counter hold with a suitable tool in order to avoid any damage to the pipes.

3.5.7 Frost thermostat for LPHW coil

In case a frost thermostat is installed, it is easier to do so before installing the supply air duct. You will find the thermostat delivered separately in a plastic bag together with all brackets needed.

- Mount the frost thermostat on the top deck of the unit with the bracket delivered with the thermostat.
- Mount the bracket for the bulb after the heating coil in the duct outlet.
- Take the duct and drill a hole, run the bulb with the capillary tube through the hole and fasten the bulb to the bulb holder. Then mount the duct on the DanX unit.
- The thermostat is prewired and the wire only must be connected to the main terminal strip of the unit (see wiring diagram).

3.5.8 Water cooled condenser

The heat pump in a DanX 2/3 HP may be fitted with a water-cooled condenser for transfer of surplus heat, which is not used for heating the supply air for the pool or sanitary water. The entry for the water pipes is at the bottom of the unit, where the condenser is placed. The piping has then to be connected to the water-cooled condenser inside the compressor cabinet.

NB!
Piping material must be suitable for chlorine water. Please be aware of the maximum water volume, which is 800 l/h, as a to high water velocity can destroy the water-cooled condenser and cooling circuit of the DanX unit.

3.5.9 Electrical heating coil

The heater is designed for insertion into standard spiral ducting and is fixed to the ducting with screws. When installing the heater, the following has to be taken care of:

- The air must flow through the heater in the direction of the arrow (located on the side of the heater close to the connection box).
- The heater can be fitted in either horizontal or vertical ducting.
- The electrical connection cabinet can be placed freely facing upwards or sideways to a maximum angle of 90°. Fitting with the box facing downwards is NOT allowed.
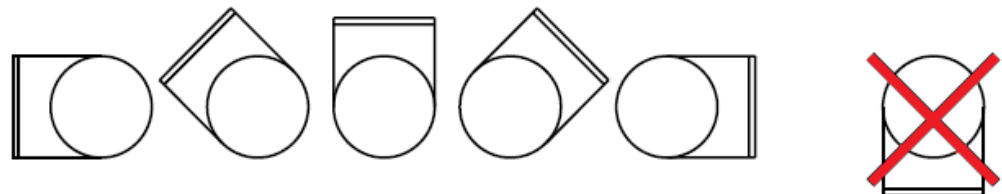
- The distance from (to) the heater to (from) a duct bend, valve, filter, etc. should correspond to at least twice the duct diameter; otherwise there is a risk that the airflow through the heater is uneven which can cause activation of the overheating cut-out.
- The heaters may be insulated in accordance with valid regulations for ventilation ducting. However, the insulation material must be incombustible. The cover of the heater must be free from insulation, so that the type plate is visible and the cover can be removed.
- The distance from the heater's metal casing to any wood or other combustible material must NOT be less than 30 mm.
- The maximum ambient temperature allowed is 30°C.

3.6 Electrical connection

⚠️ The installation of the DanX control panel should only be carried out by professional electricians! When working on the electric panel, always switch of the electric power before opening the panel door!

For the exact connection of the unit and its components, please refer to the separate electrical diagrams.

3.6.1 Main current

The main current of the unit is installed in the following way:

- Remove the small panel together with the main service breaker (1) at the front of the unit.
- Run the main current cable through the gland (2) on the top of the unit.
- Connect the cable to the main service breaker, according to the electrical diagram in chapter 9, and the earth wire to the unit.
- Reinstall the main service breaker panel on the unit.

3.6.2 Components

Most of the components and sensors are already connected to the electric panel by the factory. But a few, which are accessories, or are installed at the building site (for example pumps), must be connected on site according to the electrical diagrams. To connect these components to the electrical panel, you can run the wiring through the glands on top of the unit into the electrical panel and connect them to the terminals.

3.6.3 Electrical heating coil

The power supply to the electrical heating coil will not be delivered by the DanX 1/2/3, but must come separately from the building site. The 2-10V control signal (INT/GND/CTR) must be connected to the electrical panel, where the valve actuator is normally installed and the alarm contact (1/2) where the frost thermostat is connected. See also the electrical diagram delivered with the electrical heating coil.
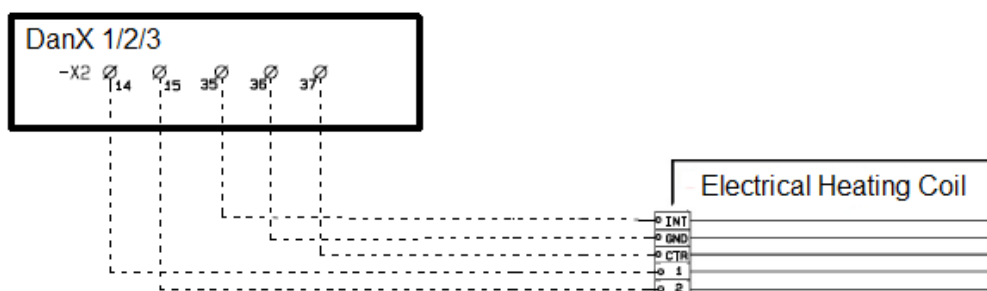
4.1 Introduction

A complete DanX 1/2/3 ventilation system for swimming pools requires a control system that corresponds to the actual unit configuration in the most energy efficient way possible. The controls are built into the unit and factory tested before delivery thereby providing the most reliable and energy efficient operation possible. This chapter gives you an introduction how to set the control system for exactly your swimming pool.

4.1.1 Unit function DanX 1/2/3 HP

The DanX 1/2/3 HP consists of a double cross flow heat exchanger in combination with a compressor driven heat pump and a mixing box.

The DanX 1/2/3 HP uses a minimum of outdoor air required for hygienic reasons in the pool hall. To keep pressure drop low and the dehumidification capacity of the heat pump high, only a part of the humid swimming pool air is run through the heat exchanger and evaporator.
Part of the exhaust air is leaving the unit and part of the exhaust air is re-circulated to join the outdoor air. These two airstreams are then preheated in the double cross flow heat exchanger and afterwards heated in the heat pumps condenser. If the supply air temperature is too low, the re-heater is activated. In this operation mode the dehumidification is obtained with the dry outdoor air and heat pump. If the dehumidification capacity is not enough, the amount of dry outdoor air automatically increases.

If the unit is running in night/closed mode, the outdoor and exhaust air damper are fully closed and the dehumidification is only done with the heat pump.

4.1.2 Unit function DanX 1/2/3 XD

The DanX 1/2/3 XD consists of a double cross flow heat exchanger and a mixing box.

The DanX 1/2/3 XD is uses a minimum of outdoor air required for hygienic reasons in the pool hall. To keep pressure drops low, only part of the outdoor air is run through the heat exchanger. The rest is re-circulated and heated in the re-heater. If the dehumidification capacity is not enough, the amount of dry outdoor air automatically increases.

If the unit is running in night/closed mode, the outdoor and exhaust air damper are fully closed and opens only partly if dehumidification is needed.

4.1.3 Controls in general

At the front of the unit you will find the main service breaker. This breaker disconnects all power to the unit and control panel, so no safety function like a frost thermostat is active any longer! Neither outdoor/exhaust air damper will be closed, which will lead cooled air the pool room. Therefore, do not stop the unit with this switch! Always stop the unit with the help of the controller!

In the front door you will find the DanX 1/2/3 control system, which is based on a Honeywell MVC 80 controller. On the left- or right-hand side of the controller you will see a RJ45 connection, which is used for easy servicing. Your service company will have to right tools to use this service device.

4.2 MVC 80 controller

The DanX 1/2/3 control system is based on a Honeywell MVC 80 controller, with a software program by Dantherm to perform control strategies and functions in the most energy efficient way.
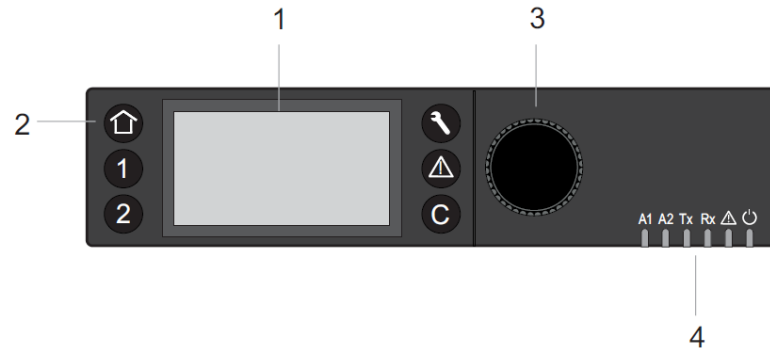
(1) LCD display.

Generally, when the display has not been in use, the display will show the following information. For easier reading press any button to light up the display.

```
09.11.2011    14:55 🔒
Room_Temperature@
        28.2 °C
Room_Humidity    @
         60 %
```
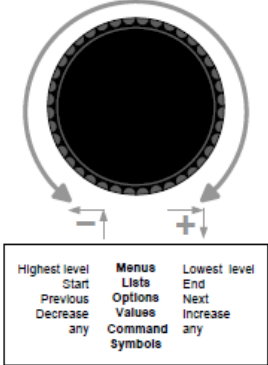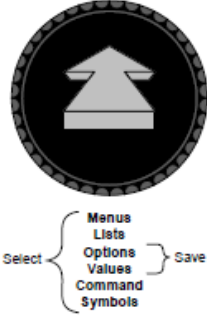
You will now see the actual day, month, year and time at the top and the actual pool hall condition (Temperature and Humidity) below. For a more exact explanation see 4.3 Quick access.

(2) Operating keys. These keys provide the following functions:

Home key calls up the Home menu, which provides information about the unit status. The Home menu is displayed by default if no operating key has been pressed for 10 minutes.

Application keys 1 and 2, not used in this unit.

Service key calls up the Service menu including user service functions and Installer Service submenu.

Alarm key calls up the Alarm menu, which provides information about alarm history, critical and non-critical alarms and acknowledges alarms.

Cancel key returns to the previous screen, discards current inputs and confirms alarm messages

(3) **Rotate & Push button**, which works as follows:

Turning the button	Navigate – Highlight - Adjust
Navigates through menus and lists **Highlights** items (menu, list, option, value, command symbol) **Adjust** options (On, Off, etc.) and values (temperature, humidity, etc.)	
Pushing the button	**Select - Save**
Selects items (menu, list, option, value, command symbol) **Saves** options and values	

(4) **LED´s**, which indicate the operational status of the controller. In the DanX 1/2/3 application only the Power LED and the Alarm LED are in function.

Power LED (Green)

	Power LED behaviour	Reason
1	ON	Normal operation
2	OFF	Power supply not OK

Alarm LED (red)

	Alarm LED behaviour	Reason
1	OFF after power up	Normal operation
2	Lit continuously after power up	Controller has encountered a hardware problem.
3	Flashes continuously 4 x ON/OFF followed by pause	Sensor failure of analog input

4.3 Quick Access Menu

When no keys are pressed the display will show the following information. For easier reading press the **Rotate button** to light up the display.

```
                    1
        ┌─────────────────────┐
        │ 09.11.2011    14:55 🔒 │── 2
  4 ────│ Room_Temperature @   │── 3
        │         28.2 °C       │
        │ Room_Humidity    @    │
        │          60 %         │
        └─────────────────────┘
```
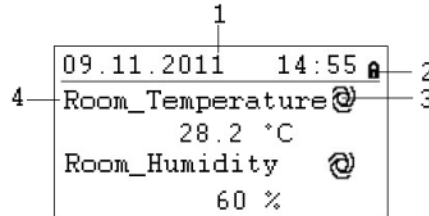
1) Shows the actual day, month, year and time.
2) Shows if the program is secured by a password.
3) Shows if the actual shown point is running in AUTO mode @ or MANUAL mode ✍
4) Shows the actual pool hall conditions (Temperature and Humidity).

> As the user of the unit you should normally not change a point from Auto mode into Manual mode. This should only be done by professional service technicians! The only exception is the Function_Switch point (see 4.3.2).

4.3.1 Password handling

There are three different access levels in the program. In Level 1 values can be changed without using a password. This is possible in the Time Program and for the switch point (Function_Switch) in the Start Display.

To change set points in the Set Point menu, you must use the level 2 password to get access. All other points are on access level 3 and can only be changed by entering a service password, which your Dantherm service technician has*.

Icon	Access level	Password	Points which can be changed in
🔒	1	Non	Time Program
🔓	2	2222	Set Point menu
✗	3	*	All service points for the unit

It is possible to change the password under the service menu, but it is not recommended by Dantherm, as new software must be uploaded to the controller if the password has been forgotten.

To access level 2 or 3 highlight the 🔒 icon in the top right of the start display by rotating the **Rotate button**. Press the **Rotate button** and you now have the possibility to enter your password.

```
┌──────────────────────────┐
│ 5✱✱✱                    🔒│
│──────────────────────────│
│ Room_Temperature @       │
│           28.2 °C        │
│ Room_Humidity     @      │
│              60 %        │
└──────────────────────────┘
```
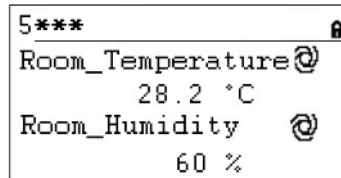
Find the right number by rotating the **Rotate button** and then press the **Rotate button** to accept. Do so with all 4 numbers. After having accepted the last one, the password icon will change either to 🔓 or ✗, depending on the password you have entered.

4.3.2 Start display

The start display will show the actual pool hall conditions.

```
09.11.2011    14:55 🔒
Room_Temperature @
          28.2 °C
Room_Humidity    @
          60 %
```
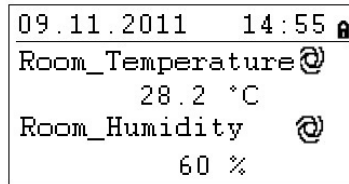
Rotate the **Rotate button** a few times; the start display will change to the air volumes:

```
09.11.2011    14:55 🔒

Return_Airvolume @
          0 m3h
Supply_Airvolume @
          0 m3h
```
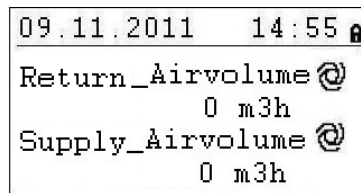
Rotate the **Rotate button** a few times; the start display will change to the following screen:

```
09.11.2011    14:55 🔒
Function_Switch  @
             Auto
Unit_Status      @
        Open Pool
```
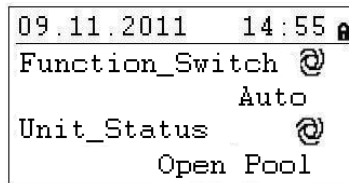
Function_Switch. This function is normally set to AUTO, which means the unit is running with the set points of the Time Program. For service reasons you can change this point to STOP. You can do this without a password; you just have to highlight the AUTO setting by rotating the **Rotate button**.

```
09.11.2011    14:55 🔒
Function_Switch  @
            Auto
Unit_Status      @
        Open Pool
```
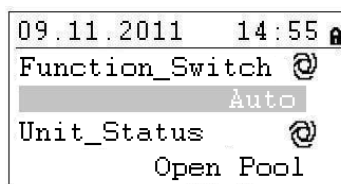
Then press the **Rotate button** and AUTO will start to flash. Now you can rotate the **Rotate button** and you change the setting, to for example STOP. When you see STOP, press the **Rotate button** again and the controls will now accept the command.

The display will now look like the following. Please note that at the same time you have stopped the unit over the Function_Switch point, the Unit_Status will change from Open Pool to Stop and the sign for Auto mode @ will switch to Manual mode ✍.

```
09.11.2011    14:55 🔒
Function_Switch  ✍
            Stop
Unit_Status      @
           Stop
```
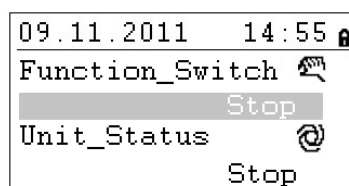
Unit_Status point. This point shows which current status the unit has. It can be either Open / Closed or Stop, depending on the time program TP1 and the setting of the function switch point. This point can only be switched if you have a service technician password.

If you rotate the **Rotate button** further on, the start display will change again, now to the following picture with two different menus; Set Points and Unit Status.

```
┌────────────────────────────┐
│ 09.11.2011    14:55 🔒      │
│                            │
│ Unit_Status        ⊚       │
│              STOP          │
│ ▶ SET POINTS               │
│ -> UNIT STATUS             │
└────────────────────────────┘
```
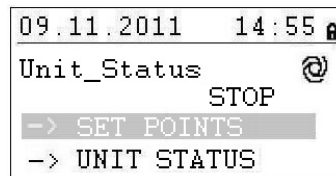
4.3.3 Set Point Menu

When the Set Point menu is highlighted, press the **Rotate button** and the following display will appear:

```
┌────────────────────────────┐
│ -> SET POINTS       🔒      │
│ Temp_Open_Pool             │
│        28.0 °C             │
│ Temp_Closed_Pool           │
│        28.0 °C             │
└────────────────────────────┘
```
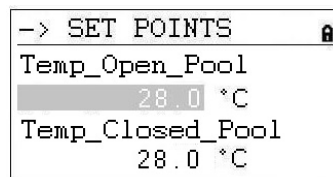
Here you will find the following set points (if you cannot see them please scroll down by rotating the **Rotate button**):

- Temp_Open_Pool (Set point temperature in the pool hall when pool open)
- Temp_Closed_Pool (Set point temperature in pool hall when pool closed)
- Humid_Open_Pool (Set point humidity in the pool hall when pool open)
- Humid_Closed_Pool (Set point humidity in pool hall when pool closed)
- Supply_Fan_Low (Set point low air volume supply air fan)
- Supply_Fan_High (Set point high air volume supply air fan)
- Return_Fan_Low (Set point low air volume return air fan)
- Return_Fan_High (Set point high air volume return air fan)
- Min_Fresh_Air (Set point minimum fresh air amount)
- Min_Supply_Temp (Set point minimum supply air temperature)
- Max_Supply_Temp (Set point maximum supply air temperature)

4.3.3.1 Set Point change

Before changing the set points, you need to enter the password for access level 2, see chapter 4.3.1. For Min/Max supply temperature level 3 password is needed.

To change one of the set points, move to the set point you wish to change. Push the **Rotate button** and you can now change the value by turning the **Rotate button** and then push the button again. Now the set point is changed.

```
-> SET POINTS        🔒
Temp_Open_Pool
         28.0 °C
Temp_Closed_Pool
         28.0 °C
```

4.3.4 Unit Status Menu

```
09.11.2011    14:55 🔒
Unit_Status      @
              STOP
-> SET POINTS
-> UNIT STATUS
```

When the Unit Status menu is highlighted, press the **Rotate button** to see following display:

```
-> UNIT STATUS      🔒
Common_Fault      @
              OFF
Supply_Air_Temp @
        25.5°C
```

Here you will find the following unit status points (Scroll down with the **Rotate button**):

- Common Fault (Actual fault status)
- Supply_Air_Temp (Actual supply air temperature)
- Outdoor_Air_Temp (Actual outdoor temperature)
- Evaporator_Temp (Actual temperature on the evaporator surface, only DanX HP)
- Heating_Signal (Actual position of heating coil actuator, signal to electrical heating coil)
- Heating_Coil_Pump (Actual status if pump is running)
- Duct_Dampers (Actual outdoor / exhaust air damper position)
- Bypass_Damper (Actual by pass damper position)
- Compressor_Status (Compressor running or not, only on heat pump units)
- Compressor_Test (Compressor test function)
- Compressor_Stop (Manually stop function for compressor)
- HP_LP_Alarm (Status of the HP/LP pressure switch)
- Heat_Demand (Actual demand for heating in %. A demand < 50% means cooling demand, > 50% means heating demand)
- Dehumidify_Demand (Actual demand for dehumidification in %)
- Room_Temp_CALC (Actual room temperature set point)
- Room_Humidity_CALC (Actual room humidity set point

The points under Unit Status give an overall view of the actual running situation of the unit. All points are read only for the user and can only be set into manual with the service password.

4.4 Service Menu

To enter the service menu, you must press the **Service Button** and the following display will appear.

```
Service Menu
Continue
Login Installer
```
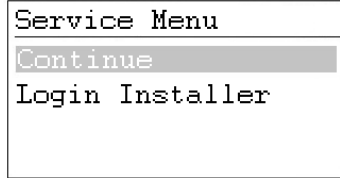
If you want to make changes in the Service menu, you can either "Continue" without a password to make changes in the two Time programs, or you have to first enter your password "Login Installer" to use the other service points. See chapter 4.3.1 for instructions.

When "Continue" is highlighted, press the **Rotate button** and you will enter the following display:

```
Service
Operating Hours
Trending
Interface Config
Time Program
```
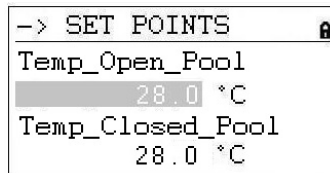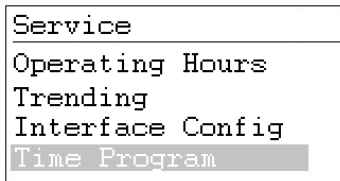
Here you will find the following unit status points (if you cannot see them please scroll down by rotating the **Rotate button**):

- Operating Hours (For service use only)
- Trending (For service use only)
- Interface Config (See 4.4.3)
- Time Program (See 4.4.1 and 4.4.2)
- Point Data (For service use only)
- System Data (See 4.4.4)

4.4.1 Set Point change in Unit Time Program

When pressing the **Rotate button** with "Time Program" highlighted you will enter the following display.

```
Time Programs
Unit Time Program
Unit Configuration
```
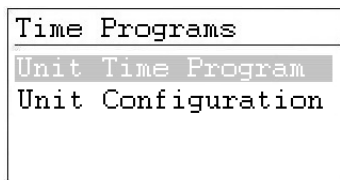
There are two Time programs in the controller, one for open / closed pool and fan speed settings (Unit Time Program) and one for the unit configuration (Unit configuration).

To enter one of the time programs, highlight it and press the **Rotate button**. You will enter the following display for the Unit Time Program:

```
              1
              │
┌─────────────────────┐
│ TP01      Spcl.Day  │
│ Mo D1            ▨──2
│ Tu D2            ▨  │
│ We D3            ▨  │
│ Th D4            ▨  │
└─────────────────────┘
   │   │
   3   4
```
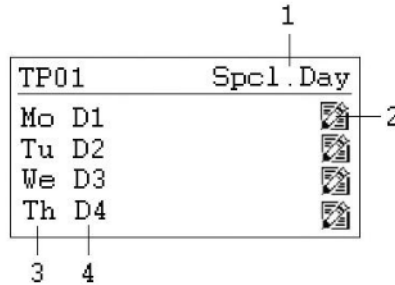
1)   Gateway to the special day programs
2)   Icon for editing the day time program
3)   Shows the different days of the week (scroll down by rotating the **Rotate button** to see the other days)
4)   Shows which daily program (D1, D2, ...) is connected to each day

4.4.1.1 Modify a daily program

If you want to modify the day program for Monday (D1), highlight the ▨ icon and press the **Rotate button**. You will now see the following display:

```
┌─────────────────────┐
│ D1               ▤  │
│ 07:00 Program_Open  │
│ 20:00 Program_Close │
│                     │
│                     │
└─────────────────────┘
```
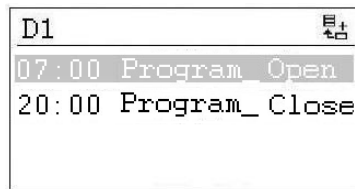
All seven daily programs (D1-D7) are built up in the same way and contain a starting time switch point (Program_Status Open) when the pool opens and a closing time switch point (Program_Status Close) when the pool shuts down. If you want for example to change the opening time, highlight the switch point (Program_Status Open) and press the **Rotate button**. You will now see the following display:

```
┌─────────────────────┐
│ D1               ▥  │
│ 07:00 Program_Status│
│ Open Pool Low       │
│                     │
│                     │
└─────────────────────┘
```
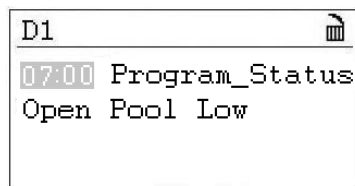
You now see in the first line the start time and in the second the status of the pool and unit which can be either:

- Open pool with fans in low speed
- Open pool with fans in high speed
- Closed pool with fans in low speed
- Closed pool with fans in high speed
- Unit stopped

To either change the time or the unit status, highlight the point you want to change and press the **Rotate button**. Rotate the **Rotate button** until you have found the right value and then press the button again to accept. Go back to the last menu by pressing the ⊙ **Cancel** key.

```
D1                          ⊟±
08:00 Program_ Open
20:00 Program_ Close
```
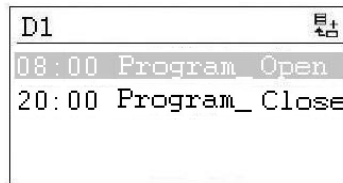
If you want to have more than one start and stop time switch point for one day, you must add a new switch point to the daily program by highlighting the ⊟ icon and press the **Rotate button**. You will enter the following display.

```
D1                          ⛁
11:00 Program_Status
Open Pool High
```
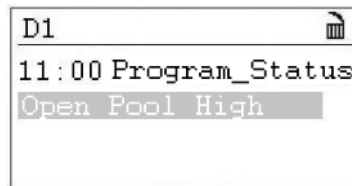
If for example you want to change the fan speed for the open pool at 11:00 am you set the time and unit status as before and go back to the last menu by pressing the ⊙ **Cancel** key. You will now see that you have added a third line into your D1 daily program.

```
D1                          ⊟±
08:00  Program_ Open
11:00  Program_ Open
20:00  Program_ Close
```
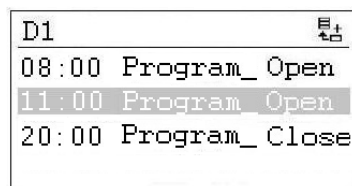
If you want to delete this switch point again, highlight the line and press the **Rotate button**. You will see the following display:

```
D1                          ⛁
11:00 Program_Status
Open Pool High
```
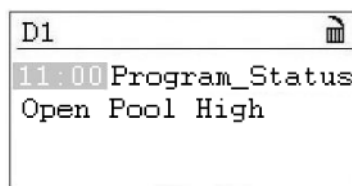
Highlight now the ⛁ icon and press the **Rotate button**. You will now be asked if you want to delete this switch point. Press yes and the switch point disappears.

4.4.1.2 Add a daily program

Normally in the Unit Time Program you only need to add a new daily time program if you want to include bank holidays or other special days, where opening and closing times are different from the usual days of the week. Open the Unit Time Program and highlight Spcl. Day, as shown below.
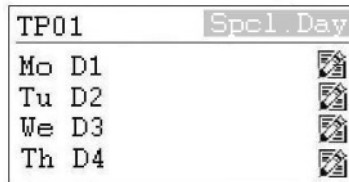
Now press the **Rotate button** and the following display appears:
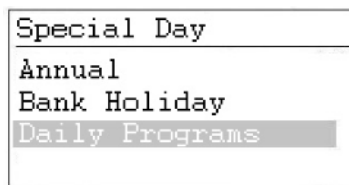
Highlight the line with Daily Programs and press the **Rotate button** again and the following display appears:
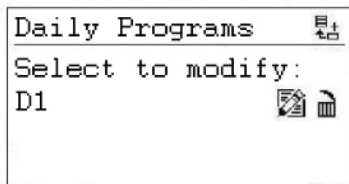
Under this Daily Program it is possible to modify or delete the selected daily program (here D1) as described in chapter 4.4.1.1, but also to add a new daily program for a bank holiday or another special day. To add a new daily program, you must highlight the icon on the right top of the screen and press the **Rotate button**. You will now see the following display:
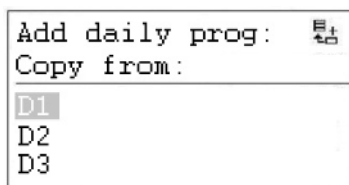
You can now add a new daily program by making a copy of an old one, like for example D1 in this case. But you can of course choose any existing program to make a copy of it. By highlighting D1 and again pressing the **Rotate button** you have now made a copy of the daily program D1. The new program is called DP_1 and is shown below.

Dantherm®
CONTROL YOUR CLIMATE
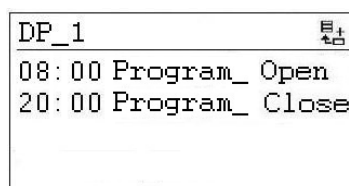
From here you can now modify the new daily program DP_1 as described in chapter 4.4.1.1. After the modifications have been done, you can now go back to the start screen "Special days" by pressing the ⊙ **Cancel** key four times.

```
Special Day
Annual
Bank Holiday
Daily Programs
```
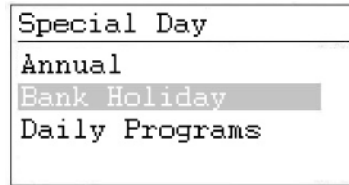
If you now want to connect the new daily program DP_1 to New Year you must highlight the Bank Holiday line and press the **Rotate button**. In the new display highlight the line to the right of New Year and press again the **Rotate button**. You now can choose the daily program that you want to connect to the New Year by turning the **Rotate button**. When you come to DP01 press the **Rotate button** and you now have connected the daily program to the New Year.

```
Bank Holiday
New Year        DP01
Epiphany        -----
Rosenmontag     -----
Fastn. Dienst.  -----
```
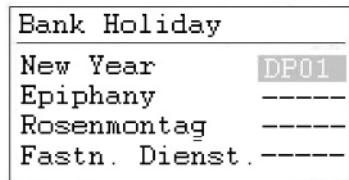
If you want to connect the daily program DP01 to one or more normal days, you have to select Annual instead of. Here you can now select the start and end day and connect the wanted daily program to these dates.

4.4.2 Time program Unit Configuration

When entering time program Unit Configuration, you will see the following start display in the program D1-7:

```
D1-7                    ⊟⊥
00:00 FilterCh 102
00:00 Heating_  Water
00:00 Signal_E Pir O
00:00 Wake_Up_ No
```

Here you will find the following unit configuration points:

- FilterCheckDate (see 4.4.2.1)
- Heating_Coil (see 4.4.2.2)
- Closed_Mode_Cool (see 4.4.2.3)
- Signal_TP_External (see 4.4.2.4)
- Wake_Up_Temp (see 4.4.2.5)
- Wake_Up_Humid (see 4.4.2.5)
- BMS_SP_Control (see 4.4.2.6)

4.4.2.1 Filter Check Date

Under Filter Check Date the date for the annual filter check can be given in. The first or two figures indicate the month, the next two figures indicate the day, when the filter check should appear on the display. 912 for example stand for September the 12th.

4.4.2.2 Heating Coil

Under the point Heating Coil, you can configure if your unit is equipped either with water or electrical heating coil.

4.4.2.3 Closed mode cooling

Under the point Closed Mode Cooling you can configure if your unit should cool (free and active cooling) when the pool is closed or not. Normally this point is set to NO, but for example in therapy pools, or hot countries it will be set to YES.

4.4.2.4 Signal TP External (PIR sensor or pool cover switch)

If you want to start or stop the unit with the help of an external contact, you can define this under Signal_TP_External.

If a PIR sensor is used, you should set the point Signal_TP_External in one of the following two modes:

- Open Low (When there is a signal from the PIR sensor the unit will go to Open Pool mode with the fans in low speed)

- Open High (When there is a signal from the PIR sensor the unit will go to Open Pool mode with the fans in high speed)

If a pool cover switch is used, you should set the point Signal_TP_External in one of the following three modes:

- Closed Low (When there is a signal from the pool cover switch the unit will go in Closed Pool mode with the fans in low speed)

- Closed High (When there is a signal from the pool cover switch the unit will go in Closed Pool mode with the fans in high speed)

- Closed Stop (When there is a signal from the pool cover switch the unit will go in Closed Pool mode with the fans stopped)

With the external signal set you must change the Unit Time Program in the following way:

Open the Unit_Time_Program and place the cursor on D1.

```
TP01          Spcl.Day
Mo  D1                ▨
Tu  D2                ▨
We  D3                ▨
Th  D4                ▨
```

By now turning the **Rotate button** you change the program from D1 to Pool Closed if a PIR sensor is connected, or Pool Open if a pool cover switch is connected. When you have done that with Monday you have to do the same with all other days, so the Unit_Time_Program would look like the following if you have connected a PIR sensor.

```
TP01          Spcl.Day
Mo  Pool Closed       ▨
Tu  Pool Closed       ▨
We  Pool Closed       ▨
Th  Pool Closed       ▨
```

You can now go into the program Pool Closed to modify the fan speed when the unit is in closed pool mode.

4.4.2.5 Wake up function

If using the Wake-Up function it is essential that the standard humidity and temperature duct sensor is being placed directly after the return air duct grill to be able to measure the humidity and temperature in the room without any air movement (fans stopped). If this is not possible, the duct sensor must be placed directly in the room or replaced by a room humidistat / temperature sensor.

With the wake-up function you can choose if the unit should start up automatically at too high humidity or too low temperature, if you have set the unit to be stopped in the Unit Time Program. If you have chosen YES, the unit will run as long as it takes to reach the wanted set point. When the set point is reached the unit will then automatically stop again. If you choose NO the unit will not start up, even if the room conditions not correspond to the wanted set points.

4.4.2.6 BMS Set point Control

If you connected the DanX 1/2/3 to a BMS system via Modbus communication, you can choose if you want to control the set points over the BMS system or the MVC 80 controller. This means if you only want to read values over the Modbus you leave this point in **OFF**. This is also the case if you want to use the external stop function. If you want to control the set points over the BMS system, you must set this point to **ON**.

It is very important, if you use the Modbus communication with set points, that **ALL** set points are set over the BMS system and not only some!

4.4.3 Interface Configuration (Modbus)

If you connected the DanX 1/2/3 to a BMS system via Modbus communication, you can change the general Modbus settings under Interface Config. Scroll down to the point Modbus and press the **Rotate button.**

```
Interface Config
Append bus number to
data point name    ☑
RF Teach-in
Modbus
```
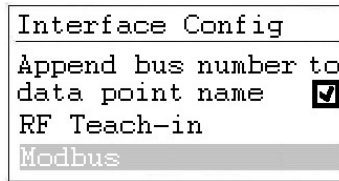
You can now change the following settings:

```
Modbus Communication
Device ID:          2
Baud Rate:    38400
Parity:          NONE
No. Stop Bits: 1
```
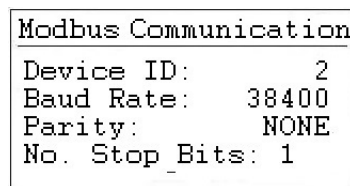
- Device ID (Set point for the number given to the unit)
- Baud Rate (Set point baud rate)
- Parity (Set point for parity)
- No. Stop Bits (Set point for number of stop bits)

To make changes to the Modbus communication you must be logged in as installer (service password).

For the different Modbus addresses please see Appendix 9.1.

4.4.4 System data

If the controller does not show the right time or date, you can change that under System data.

```
System Data
Parameters
Date / Time
System Info
Interface Config
```
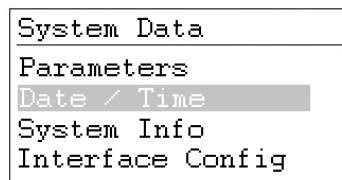
All points beside Date / Time are for service use only and therefore not explained in this manual. Highlight Date / Time and press the **Rotate button** and you will see the following display.

4.4.4.1 Date / Time change

```
┌─────────────────────────┐
│ Date / Time             │
│─────────────────────────│
│ Date:     09.11.2011    │
│ Time:        16:00      │
│ Format:   31.12.2009    │
│ Daylight Saving Time    │
└─────────────────────────┘
```

Rotate the **Rotate button** and highlight the line you will change. Press the **Rotate button**, change the value and press the **Rotate button** again to accept the value.

4.4.4.2 Day light saving

Normally the controller runs in winter time mode. If in your country you have summertime, you can set the start datum and the end datum for the summer time period under Daylight Saving Time. Highlight "Daylight Saving Time" and pressing the **Rotate button**, you can set now the start and stop days for summer / wintertime, so the controller automatically changes from winter- to summertime and the other way around.

4.5 Alarms

If there is a current alarm and the unit has stopped, the actual alarm will be shown in the display like this frost alarm.

```
┌─────────────────────────┐
│    !!! ALARM !!!        │
│ 2011-11-09     14:55    │
│ HeatingCoil    ALARM    │
│ ALARM                   │
│                         │
└─────────────────────────┘
```

When the unit has stopped, because of a critical fault you have to do the following:

- Switch off the unit at the repair breaker.
- Locate the fault and correct it (see 7.2).
- Switch on the unit again and you will find the following information on the screen.

```
┌─────────────────────────┐
│    !!! ALARM !!!        │
│ 2011-11-09     14:55    │
│ HeatingCoil Normal      │
│ Return to normal        │
│                         │
└─────────────────────────┘
```

Press the Ⓒ **Cancel key** button and you will see the standard display again.

4.5.1 Alarm menu

Activating the alarm menu (no password needed) gives access to historical and current alarms.

```
Alarms
Alarm Buffer
Points in Alarm
Critical Alarms
Non-Critical Alarms
```
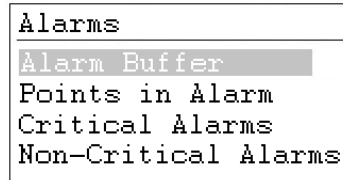
4.5.2 Alarm buffer

In the alarm buffer, you can find the last 99 alarms with the last one on top. By pressing the black button on the alarm, a new display opens and you can see at which day and at what time the alarm has appeared.

4.5.3 Points in alarm

Here all current critical and non-critical alarms can be read. The first one will be identical with the alarm in the normal display, but there can be more alarms at the same time, which can then only be read in this point.

4.5.4 Critical alarm

Here all current critical alarms can be read. A critical alarm will either stop the total unit (heat pump and fans) or just the heat pump. The unit can first be started up again when the alarm has been acknowledged. Critical alarms are:

Alarm point	Description
Heating_Coil	Frost danger for LPHW coil, or OT for electrical heating coil
Fire Alarm	Fire thermostat on supply or return air side has switched off
Fan Alarm	Return or supply fan overload
HP/LP_Alarm	HP/LP pressure compressor alarm (Only DanX HP)

4.5.5 Non critical alarm

Here all current non critical alarms can be read. A non-critical alarm will not stop the unit, but it is a reminder to check the part (filter) which is in alarm. Non critical alarms are:

Alarm point	Description
Check_Filters	Outdoor or exhaust air filter should be checked

4.6 Control description DanX 1/2/3 HP

The control strategy for a swimming pool unit is quite complex, therefore this user manual will only descript the basic functions of the control system. In generally the humidity control has always the highest preference, before the temperature control.

4.6.1 Humidity control

Humidity level in the pool hall is lower or equals the set point:

- The compressor will be stopped. If the compressor runs, the temperature control has taken over.
- The outdoor / exhaust air dampers are partly open in day time (Set point Fresh air amount - Min_Fresh_Air) and will be closed in night time.

Humidity level in the swimming pool hall is higher than the set point:

- The compressor will start to dehumidify.
- If the dehumidification capacity of the compressor is not efficient enough, the outdoor / exhaust air dampers will open more to get more dry outdoor air to the pool hall (overriding the set point Fresh air amount - Min_Fresh_Air)

If in summertime the outdoor air temperature is higher than 23°C, condense in the pool hall is no longer an issue. Therefore the humidity set point will be moved upwards with 1% for each °C above 23°C outside, but maximum by 5%. This means with a set point of 55% R.H. the maximum possible relative humidity is 60% at an outdoor temperature of 28°C.

IMPORTANT
If the compressor does not start, even if the humidity in the pool hall is above the set point there can be the following reasons:

- The outdoor / exhaust air damper is open >90% (normally in summertime).
- The temperature control has taken over with free or active cooling.

4.6.2 Temperature control

Temperature level in the swimming pool hall equals the set point:

- The compressor will be stopped. If the compressor runs, the humidity control, or a build in water cooled condenser has taken over.
- The heating coil will be stopped.
- The outdoor / exhaust air dampers are partly open in day time (Set point Fresh air amount - Min_Fresh_Air) and will be closed in night time.

Temperature level in the pool hall is lower than the set point:

- The compressor will be running.
- The heating coil is running, if the compressor capacity is not large enough or the compressor is not running (normally night time).
- The outdoor / exhaust air dampers are partly open in day time (Set point Fresh air amount - Min_Fresh_Air) and will be closed in night time.

IMPORTANT

If the compressor does not start, even if the temperature in the pool hall is below the set point there can be the following reasons:

- The unit runs in night mode (Closed Pool High / Closed Pool Low or STOP)
- The outdoor / exhaust air damper setting (Min_Fresh_Air) is <10%.

Temperature level in the swimming pool hall is higher than the set point:

- The compressor will be stopped. If the compressor runs, the humidity control, or a build in water cooled condenser has taken over.
- The heating coil will be stopped.
- The outdoor / exhaust air dampers will open more to get more cooled outdoor air to the pool hall (overriding the set point Fresh air amount - Min_Fresh_Air). Secondly the by-pass damper will slowly open to avoided heating the outdoor air in the heat exchanger.
- The controller will give a digital signal to an optional cooling unit.

4.6.3 Evaporator de-icing

If the evaporator sensor (B26) is measuring a temperature <+5°C for more than 20 minutes the compressor will be stopped and the outdoor / exhaust air dampers closed. At the same time the fan speed goes up to full speed. When the evaporator has been de-iced, all functions are going back to normal.

4.6.4 Fan control

Normally the fans are running at the speed set in the Time Program, but if the speed is set to low speed (Open Pool Low or Closed Pool Low) there can be the following reasons, why the unit is running still on full speed.

- If the calculated dehumidification demand is >50%, which means there is a larger difference between the actual humidity and the set point, the fans will go to full speed, until the calculated dehumidification is again <50%.
- If there is a demand for free cooling (Outdoor_Air_Temp < Room_Temperature) the fans will go over to full speed until the set point temperature has been reached again.
- If there is a larger difference between the actual hall temperature and the set point than 2°C the fans will go to high speed, until the difference is lower than 2°C.
- If the supply air temperature is above the set point (Max_Supply_Temp).
- If the evaporator is been de-iced. The de-icing stops when the evaporator temperature (Evap_Temperatur) is >+2°C.

4.7 Control description DanX 1/2/3 XD

The control strategy for a swimming pool unit is quite complex, therefore this user manual will only descript the basic functions of the control system. In generally the humidity control has always the highest preference, before the temperature control.

4.7.1 Humidity control

Humidity level in the pool hall is lower or equals the set point:

- The outdoor / exhaust air dampers are partly open in day time (Set point Fresh air amount - Min_Fresh_Air) and will be closed in night time.

Humidity level in the swimming pool hall is higher than the set point:

- The outdoor / exhaust air dampers will open more to get more dry outdoor air to the pool hall (overriding the set point Fresh air amount - Min_Fresh_Air).

If in summertime the outdoor air temperature is higher than 23°C, condense in the pool hall is no longer an issue. Therefore the humidity set point will be moved upwards with 1% for each °C above 23°C outside, but maximum by 5%. This means with a set point of 55% R.H. the maximum possible relative humidity is 60% at an outdoor temperature of 28°C.

4.7.2 Temperature control

Temperature level in the swimming pool hall equals the set point:

- The heating coil will be stopped.
- The outdoor / exhaust air dampers are partly open in day time (Set point Fresh air amount - Min_Fresh_Air) and will be closed in night time.

Temperature level in the pool hall is lower than the set point:

- The heating coil is running.
- The outdoor / exhaust air dampers are partly open in day time (Set point Fresh air amount - Min_Fresh_Air) and will be closed in night time.

Temperature level in the swimming pool hall is higher than the set point:

- The heating coil will be stopped.
- The outdoor / exhaust air dampers will open more to get more cooled outdoor air to the pool hall (overriding the set point Fresh air amount - Min_Fresh_Air). Secondly the by-pass damper will slowly open to avoided heating the outdoor air in the heat exchanger.
- The controller will give a digital signal to an optional cooling unit.

4.7.3 Fan control

Normally the fans are running at the speed set in the Time Program, but if the speed is set to low speed (Open Pool Low or Closed Pool Low) there can be the following reasons why the unit is running still on full speed.

- If the calculated dehumidification demand is >5%, the fans will go to full speed, until the calculated dehumidification demand is again <5%.
- If there is a demand for free cooling (Outdoor_Air_Temp < Room_Temperature) the fans will go over to full speed until the set point temperature has been reached again.
- If there is a larger difference between the actual hall temperature and the set point than 2°C the fans will go to high speed, until the difference is lower than 2°C.
- If the supply air temperature is above the set point (Max_Supply_Temp).

5.1 Introduction

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

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

To commission the DanX 1/2/2 for the first time, the following actions have to be taken:

- Check if the drain pipes are installed correctly and if the drip trays inside the unit are clean.
- Check that all loose parts/accessories have been removed from the inside of the unit.

5.2 Dampers DanX 1/2/3 HP

You will find the following 5 dampers installed in a DanX 1/2/3 HP:

1. Recirculation damper
2. By-pass damper
3. Mixing damper
4. Exhaust air damper
5. Outdoor air damper
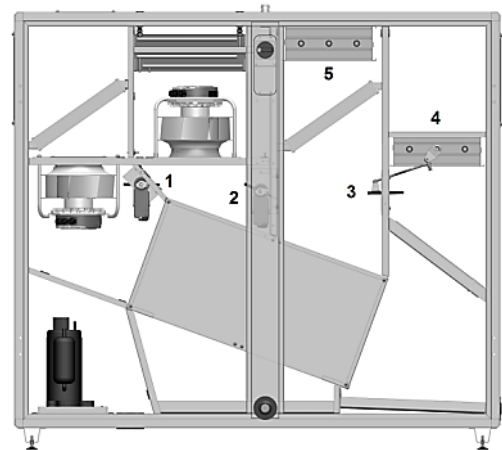
Before starting up the unit, make sure that the dampers are opening/closing in the right direction.

To check this, set the controls to **Close** (no outdoor air) and the dampers should be in the following positions:

- Recirculation damper half open (1) and mixing damper (3) fully open.
- Outdoor damper (5) and exhaust air damper (4) fully closed.

Now change the program to **Open** and see if damper 4 and 5 start to open and if damper 1 and 3 start to close. Now set the outside air to 100%, wait a few minutes and check if the dampers have taken the following positions:

- Recirculation damper (1) and mixing damper (3) fully closed.
- Outdoor damper (5) and exhaust air damper (4) fully open.

Now check the operation of the by-pass damper (2). Make sure that there is a temperature difference between the swimming pool hall temperature set point and the outdoor air temperature of at least 10°C, so that the unit runs in heat recovery mode. Now the by-pass damper (2) should be fully closed.

5.3 Dampers DanX 1/2/3 XD

You will find the following 4 dampers installed in the DanX 1/2/3XD:

1. Recirculation / mixing damper
2. By-pass damper
3. Exhaust air damper
4. Outdoor air damper
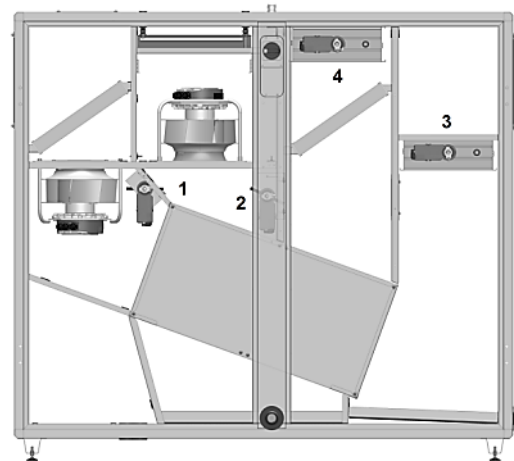
Before starting up the unit, make sure that the dampers are opening/closing in the right direction:

Set the controls to **Close** (no outdoor air) and the dampers will be in the following positions:

- Recirculation / mixing damper (1) fully open.
- Outdoor damper (4) and exhaust air damper (3) fully closed.

Now change the controls to **Open** and see if damper 4 and 3 start to open and if damper 1 start to close. Now set the outdoor air to 100%, wait a few minutes and check if the dampers are in the following positions:

- Recirculation / mixing damper (1) fully closed.
- Outdoor damper (4) and exhaust air damper (3) fully open.

Now check the operation of the by-pass damper (2). Make sure that there is a temperature difference between the swimming pool hall temperature set point and the outside air temperature of at least of 10°C, so that the unit runs in heat recovery mode. Now the by-pass damper (2) should be fully closed.

5.4 Fans

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

- Check by hand if the fan wheel is turning freely.
- Check that all dampers are open in the right way (see chapter 5.2 and 5.3)
- Check if the duct system is clean and not blocked by any parts.

5.5 Frost thermostat

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

5.6 Cooling circuit DanX 1/2/3 HP

When starting the compressor of the cooling circuit for the first time, let the compressor run for about 5 minutes and then check the sight glass of the cooling circuit to see if there is enough refrigerant in the unit (no bubbles). If refrigerant is missing, stop the compressor at once and check for a leakage.
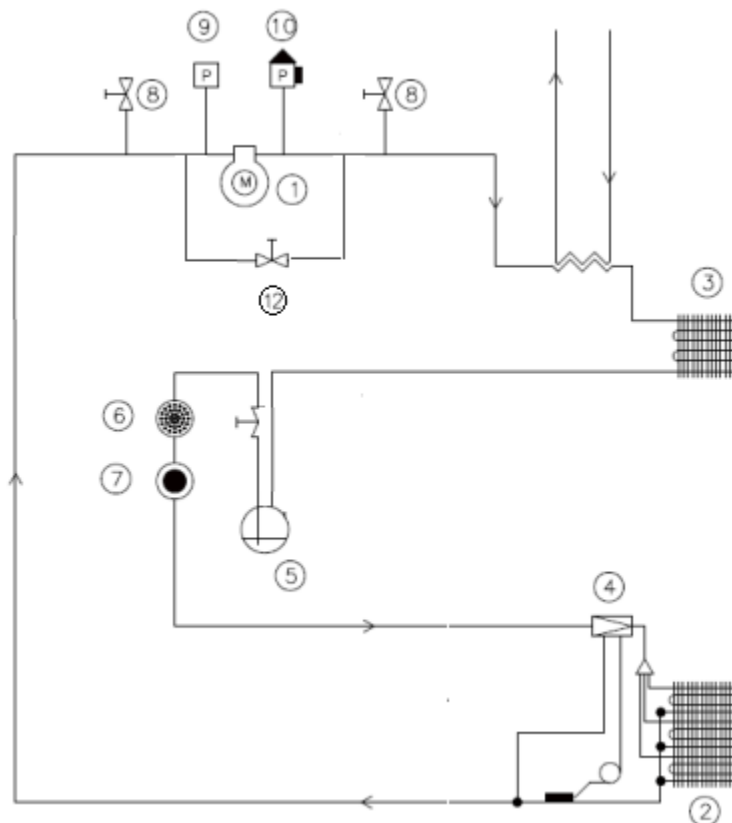
1.	Compressor	7. Sight glass
2.	Evaporator	8. Schrader valve
3.	Condenser	9. LP pressostat
4.	Expansion valve	10. HP pressostat
5.	Receiver	11. Water cooled condenser (option)
6.	Dry filter	12. Magnetic valve for compressor start

6.1 Introduction

For optimum operation conditions and a long product life, it is necessary to perform preventive maintenance on various parts within the stipulated intervals (see 6.2).

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

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

6.2 Maintenance plan

Component	Ref	Every 3. month	Every 6. month	Every 12. month
Cabinet	6.3	X		X
Fans	6.4	X	X	X
Filter	6.5		X	X
Heating coil	6.6			X
Heat exchanger	6.7			X
Dampers	6.8		X	X
Cooling circuit DanX 1/2/3HP	6.9			X

6.3 Cabinet

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

- Check the inside of the cabinet for dust or dirt. If necessary, clean either dry or wet (every 3 months).
- Clean all drip trays, either dry or wet, and check if condense water can run out freely (every 3 months).
- Check for paint damage and rust. Clean the damaged/rusting part and protect it with new paint (every 3 months).
- Check all gaskets on the service doors for leaks and damage. Replace damaged gaskets where necessary (every 12 months).
- Lubricate door locks and hinges (every 12 months).

Do not under any circumstances use strong solvents or solutions containing, chlorinated Hydrocarbons, esters, ketones or abrasive cleaner or polish.

6.4 Fans

The following steps should be taken to maintain the fans:

- Check the fan wheel for unbalance (every 3 months).
- Check the fan and motor bearings for unusual noise (every 3 months).
- Check the fan for dust or dirt. If necessary, clean the fan wheel either dry or wet (every 3 months).

6.5 Filter

Every 6 months:

- Take out the filters.
- Check the filters for dirt and damage.
- Clean the filter rail and reinstall the old/new filters.

Every 12 month (or if Filter Check appears on the display):

- Take out the filters.
- Clean the filter rail and reinstall new filters.
- Press the Ⓒ **Cancel** key to reset the service interval in the control

6.6 Heating coil

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

- Check the coils for dust or dirt. If necessary, clean the aluminium fins with a soft brush or a vacuum cleaner.
- Check for water leakages.
- Air the coil circuits through the exhaust valves of the pipe system (air in the pipe system may reduce the capacity)
- Check that the frost sensor (if installed) is properly fixed.

6.7 Double cross flow heat exchanger

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

6.8 Dampers

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

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

6.9 Cooling circuit

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

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

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

- Remove the air grill of the inspection door and run the tubes of your HP/LP manometers through the opening. Now connect your manometers to the high- and low-pressure side of the cooling circuit.
- Close all inspection doors and start up the unit. Wait a few minutes and check the LP/HP manometers. The HP gauge should show between 40-50 °C and the LP gauge about 0-10°C, depending on the running and outside conditions.
- Keep the unit running, open the right inspection door and check if the sight glass of the refrigerant circuit is free of bubbles.

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

7.1 Introduction

Normally an operation fault will give an alarm in the display of the control panel. For details, please refer to section 4 Controls in this manual.

7.2 Fault finding

Alarm	Problem	Cause	Action
Service	Filter is dirty	• Filter blocked	• Change filter
Fan	Fan stopped	• Thermal overload	• Wait until motor has cooled down. Start the unit. If fan stops quickly again change/repair motor
Frost [1]	Valve not opening	• Defect actuator • Valve stuck	• Change/Repair actuator • Change/Repair valve
	No hot water	• Pump not working • Boiler problem	• Change/Repair pump • See boiler manual
Fire [2]	Return air temperature > 40°C	• Fire in the building	• Check reason for high temperature in return air duct
	Supply air temperature > 70°C	• After heating coil not working correct at low air volume • Fire in the unit	• Check heating coil controls
HP/ LP [3] Compressor	HP pressure over 24 bar	• Air volume too small • Blockage in cooling circuit • Outside temperature too high	• Check air volume • Check/repair cooling circuit • Reset pressure switch
	LP pressure under 1.5 bar	• Leakage in the cooling circuit • Evaporator iced up	• Repair cooling circuit • De-ice evaporator/check de-icing function

[1] If the frost thermostat is manual, you have to reset the thermostat before starting the unit. The thermostat is normally located on the upper deck of the unit near the heating coil.

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

[3] The HP pressostat has to be reset before the compressor can start again. The red reset button (1) is placed inside the unit, just above the compressor.
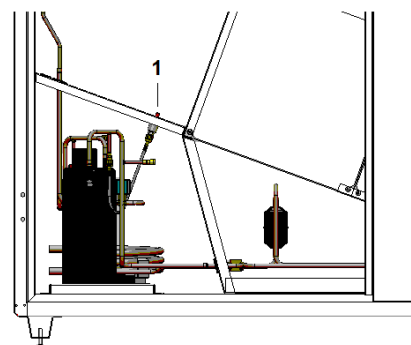
8.1 Disposal of the unit

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

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

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

Empty the refrigerant circuit for oil and refrigerant before dismantling.

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

9.1 Modbus register XD

Register	Register Name	Type	Message Type	Scaling Factor	Mapped Datapoint
40100	Room_Temp	uint16	Read only	0,1 to be applied by Modbus Master	MB_Room_Temp
40101	Supply_Temp	uint16	Read only	0,1 to be applied by Modbus Master	MB_Supply_Temp
40102	Outdoor_Temp	uint16	Read only	0,1 to be applied by Modbus Master	MB_Outdoor_Temp
40103	Room_Humidity	uint16	Read only		MB_Room_Humidity
40104	Return_AirVolume	uint16	Read only		Return_Airvolume
40105	Supply_AirVolume	uint16	Read only		Supply_Airvolume
40106	Duct_Dampers	uint16	Read only		MB_Duct_Dampers
40107	ByPass_Damper	uint16	Read only		MB_ByPass_Damper
40108	Heating_Signal	uint16	Read only		MB_Heating_Signal
40109	Unit_Status	uint16	Read only		UNIT_STATUS_OPEN
40110	Program_Status	uint16	Read only		Program_Status
40111	Open_Temp	uint16	Read and Write	0,1 to be applied by Modbus Master	MB_Open_Temp
40112	Closed_Temp	uint16	Read and Write	0,1 to be applied by Modbus Master	MB_Closed_Temp
40113	Open_Humidity	uint16	Read and Write		MB_Open_humidity
40114	Closed_Humidity	uint16	Read and Write		MB_Closed_humidity
40115	Min_Fresh_Air	uint16	Read and Write		MB_Min_Fresh_Air
40116	Return_Fan_High	uint16	Read and Write		MB_Return_Fan_High
40117	Return_Fan_Low	uint16	Read and Write		MB_Return_Fan_low
40118	Supply_Fan_High	uint16	Read and Write		MB_Supply_Fan_High
40119	Supply_Fan_Low	uint16	Read and Write		MB_Supply_Fan_Low
40120	Max_Supply_Temp	uint16	Read and Write	0,1 to be applied by Modbus Master	MB_Max_Sup
40121	Min_Supply_Temp	uint16	Read and Write	0,1 to be applied by Modbus Master	MB_Min_Sup
40150	Common_Fault	bool	Read only	(0) Normal / (1) Alarm	MB_Common_Fault
40151	Fan_Alarm	bool	Read only	(0) Normal / (1) Alarm	MB_Fan_Alarm
40152	CheckFilters	bool	Read only	(0) Normal / (1) Alarm	CheckFilters
40153	Fire_Alarm	bool	Read only	(0) Normal / (1) Alarm	MB_Fire_Alarm
40154	HeatingCoil_Alarm	bool	Read only	(0) Normal / (1) Alarm	MB_HeatCoilAlarm
40155	Heating_Coil_Pump	bool	Read only	(0) Off / (1) On	MB_HeatCoilPump
40156	DX_Cooling	bool	Read only	(0) Off / (1) On	MB_DX_Cooling
40157	External_Stop	bool	Read and Write	(0) Auto / (1) Stop	External_Stop
40158	Time_Program	bool	Read and Write	(0) MVC80 / (1) BMS	Time_Program

9.2 Modbus register HP

Register	Register Name	Type	Message Type	Scaling Factor	Mapped Datapoint
40100	Room_Temp	uint16	Read only	0,1 to be applied by Modbus Master	MB_Room_Temp
40101	Supply_Temp	uint16	Read only	0,1 to be applied by Modbus Master	MB_Supply_Temp
40102	Outdoor_Temp	uint16	Read only	0,1 to be applied by Modbus Master	MB_Outdoor_Temp
40103	Room_Humidity	uint16	Read only		MB_Room_Humidity
40104	Return_AirVolume	uint16	Read only		Return_Airvolume
40105	Supply_AirVolume	uint16	Read only		Supply_Airvolume
40106	Duct_Dampers	uint16	Read only		MB_Duct_Dampers
40107	ByPass_Damper	uint16	Read only		MB_ByPass_Damper
40108	Heating_Signal	uint16	Read only		MB_Heating_Signal
40109	Unit_Status	uint16	Read only		UNIT_STATUS_OPEN
40110	Program_Status	uint16	Read only		Program_Status
40111	Open_Temp	uint16	Read and Write	0,1 to be applied by Modbus Master	MB_Open_Temp
40112	Closed_Temp	uint16	Read and Write	0,1 to be applied by Modbus Master	MB_Closed_Temp
40113	Open_Humidity	uint16	Read and Write		MB_Open_humidity
40114	Closed_Humidity	uint16	Read and Write		MB_Closed_humidity
40115	Min_Fresh_Air	uint16	Read and Write		MB_Min_Fresh_Air
40116	Return_Fan_High	uint16	Read and Write		MB_Return_Fan_High
40117	Return_Fan_Low	uint16	Read and Write		MB_Return_Fan_low
40118	Supply_Fan_High	uint16	Read and Write		MB_Supply_Fan_High
40119	Supply_Fan_Low	uint16	Read and Write		MB_Supply_Fan_Low
40120	Max_Supply_Temp	uint16	Read and Write	0,1 to be applied by Modbus Master	MB_Max_Sup
40121	Min_Supply_Temp	uint16	Read and Write	0,1 to be applied by Modbus Master	MB_Min_Sup
40122	Evaporator_Temp	uint16	Read only	0,1 to be applied by Modbus Master	MB_Evaporator_Temp
40150	Common_Fault	bool	Read only	(0) Normal / (1) Alarm	MB_Common_Fault
40151	Fan_Alarm	bool	Read only	(0) Normal / (1) Alarm	MB_Fan_Alarm
40152	CheckFilters	bool	Read only	(0) Normal / (1) Alarm	CheckFilters
40153	Fire_Alarm	bool	Read only	(0) Normal / (1) Alarm	MB_Fire_Alarm
40154	HeatingCoil_Alarm	bool	Read only	(0) Normal / (1) Alarm	MB_HeatCoilAlarm
40155	Heating_Coil_Pump	bool	Read only	(0) Off / (1) On	MB_HeatCoilPump
40156	DX_Cooling	bool	Read only	(0) Off / (1) On	MB_DX_Cooling
40157	External_Stop	bool	Read and Write	(0) Auto / (1) Stop	External_Stop
40158	CompressorStatus	bool	Read only	(0) Off / (1) On	MB_CompStatus
40159	HP_LP_Alarm	bool	Read only	(0) Normal / (1) Alarm	MB_HP_LP_Alarm
40160	WCC_Pump	bool	Read only	(0) Off / (1) On	MB_WCC_Pump
40161	Time_Program	bool	Read and Write	(0) MVC80 / (1) BMS	Time_Program

9.3 Declaration of the unit

EU Declaration of Conformity

CE

Dantherm Air Handling A/S, Marienlystvej 65, DK-7800 Skive hereby declare that the unit mentioned below:

DanX 1 HP
DanX 1 XD
DanX 2 XD
DanX 2 HP
DanX 3 XD
DanX 3 HP

- complies with the following directives:

2006/42/EF	Directive on the safety of machines
2006/95/EC	Low Voltage Directive
2004/1 08/EF	EMC Directive
97/23/EEC	The Pressure Equipment Directive, class 1
2002/95/EEC	RoHs Directive
2002/96/EEC	Weee Directive
2004/12/EC	Packaging Directive

- and is manufactured in compliance with the following harmonized standards:

DS/EN ISO 12100	Safety of machinery
EN 60204-1	Electrical equipment of machines, Part 1: General requirements

Skive, 26.08.2016

9.4 External spare parts
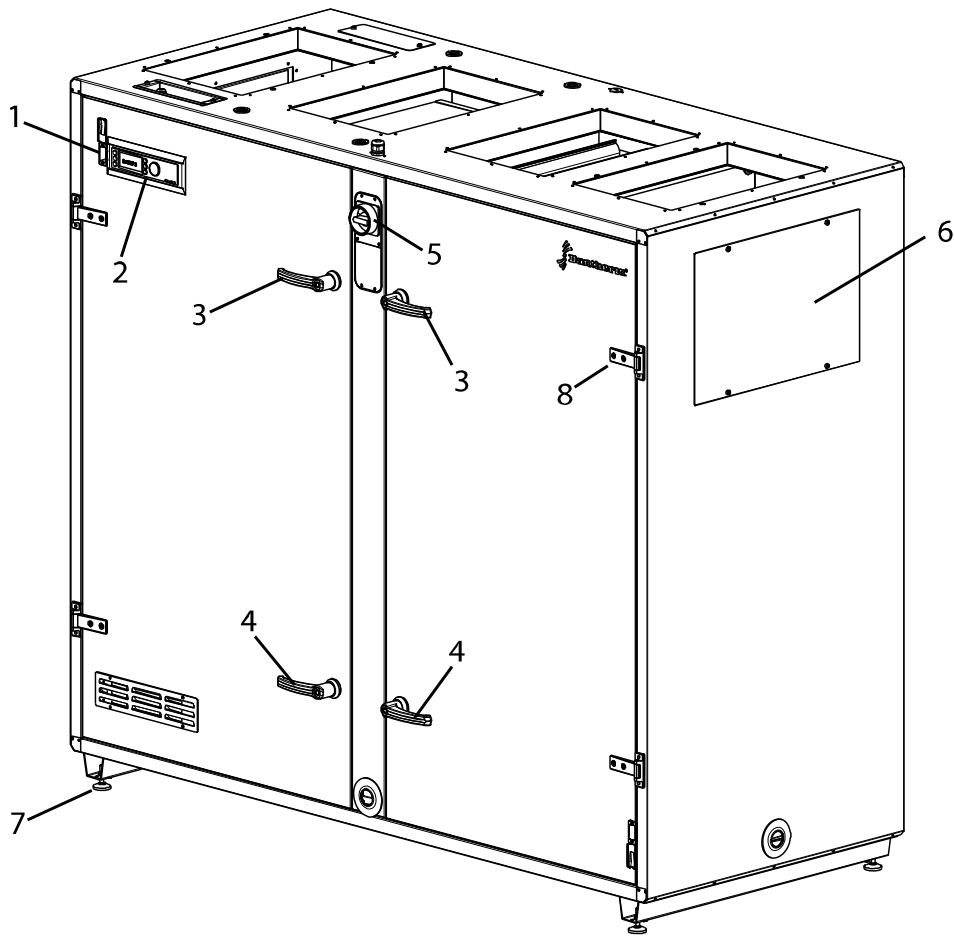
Pos.	DanX 1	DanX 2	DanX 3	Description
1		071014		RJ 45 connector
2		071015		MVC 80 controller
3		071016		Handle with key
4		071017		Handle without key
5		071019		Service breaker
6	093982	071020	081861	Duct cover panel
7		163068		Adjustable feet, 4. pcs.
8		071018		Door hinge, 1.pcs.
-		071022		Return duct humidity / temperature sensor
-		071023		Supply air duct sensor

9.5 Internal spare parts
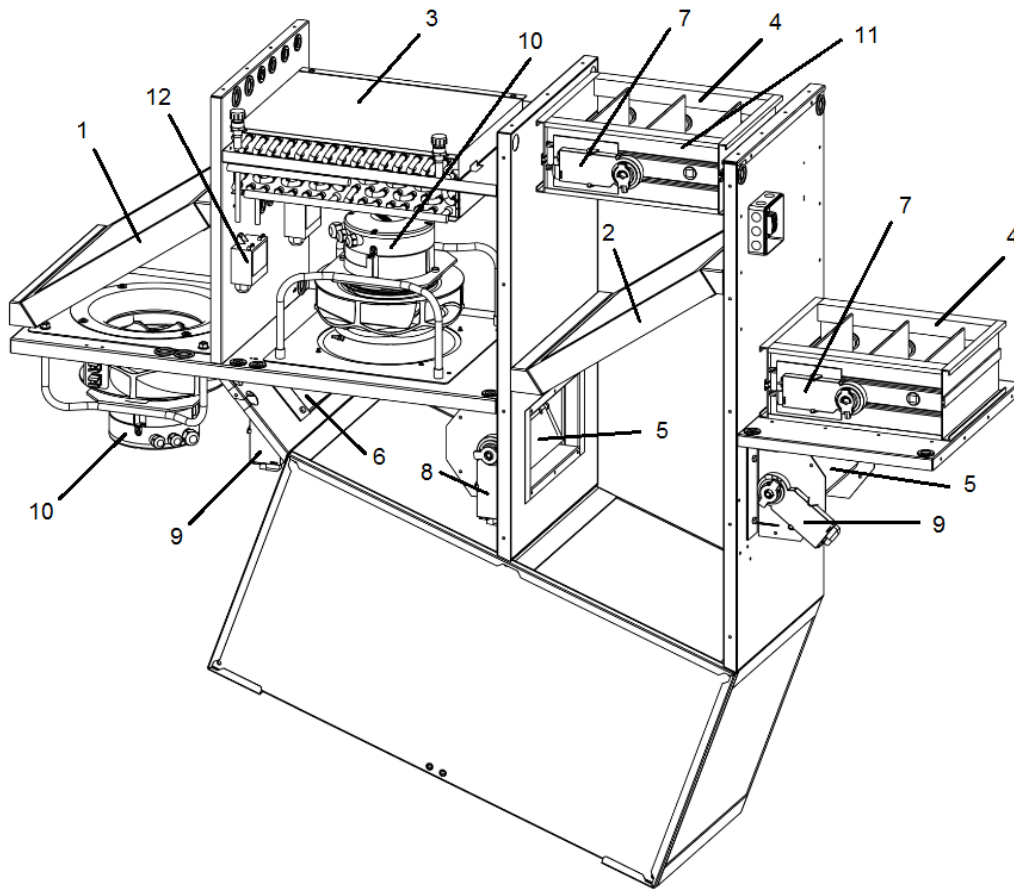
Pos.	DanX 1	DanX 2	DanX 3	Description
1	093983	071024	081862	Return air filter M5 / ePM10 70%
2	093984	071025	081863	Outdoor air filter F7 / ePM1 55%
3	093995	071026	081864	2RR Heating coil
OR	093996	071027	081865	3RR Heating coil
4	093997	071028	081866	Fresh air / Exhaust air damper
5	093998	071029	071029	By Pass / Mixing damper
6	093999	093998	071029	Recirculation damper
7		071030		Duct damper actuator modulating
OR		071031		Duct damper actuator modulating spring / return
8		071032		By Pass damper actuator
9		071030		Recirculation / Mixing damper actuator
10	093986	071034	081867	Return / Supply air fan with motor
11		071035		Fresh air sensor
12		094721		Pressure transmitter

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CONTROL YOUR CLIMATE

9.6 Spare parts, cooling circuit
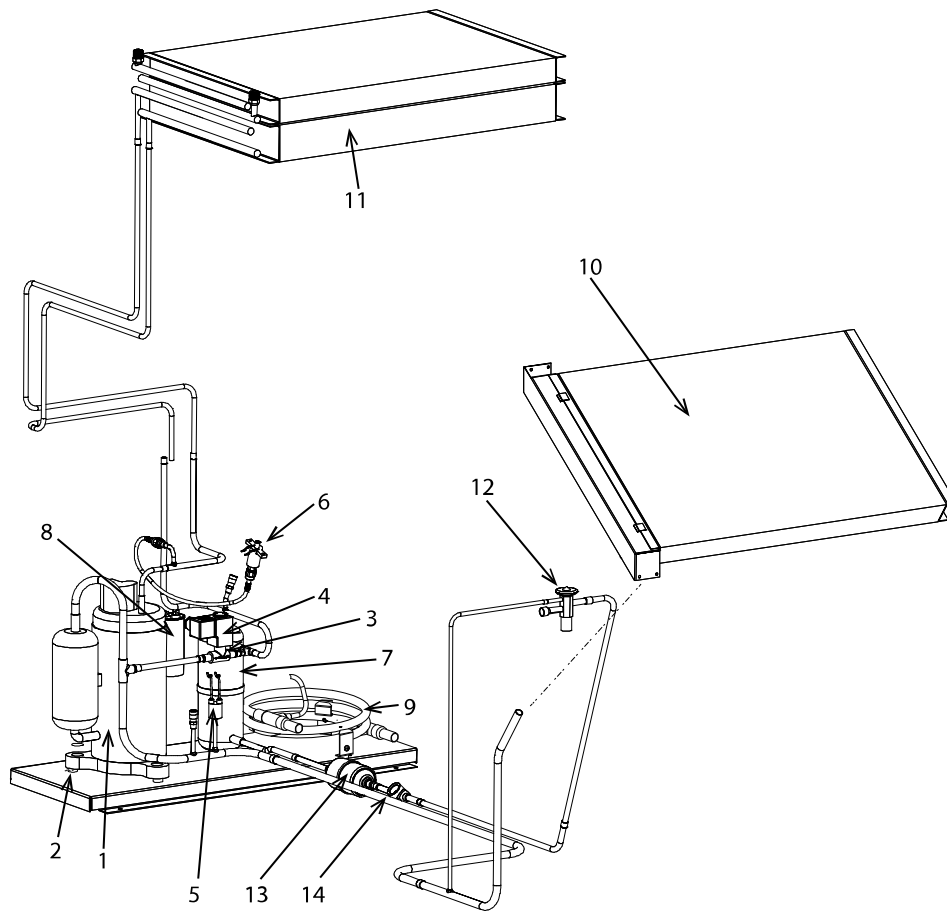
Pos.	DanX 1	DanX 2	DanX 3	Description
1	036961	071036	081869	Compressor
2	071037		-	Vibration absorber for compressor, 1. pcs.
3	037136			Solenoid valve
4	077188			Coil for solenoid valve
5	071038			LP Pressostat, 1,5 bar
6	071039			HP Pressostat, 24 bar
7	071040		081870	Receiver
8	093987	071041	081874	Compressor running capacitor
9	-	071042		Water cooled condenser
10	093988	071043	081871	Evaporator
11	093989	071044	081872	Condenser
12	093990	071045	081873	Expansion valve
13	071046			Filter drier
14	071047			Sight glass
-	071035			Evaporator sensor

9.7 Technical data DanX 1

General

Air volume range high speed	m³/h	500 – 1250
Air volume nominal	m³/h	1000

Supply air filter		F7 / ePM1 55%
Exhaust air filter		M5 / ePM10 70%

Heating coil	RR	2 / 3
Coil connection	"	3/8

Drip tray connection	"	1

DanX 1 XD

Length	mm	1570
Width	mm	515
Height	mm	1750
Weight	kg	254

Electrical connection	V	1 x 230 + N
Max full load current	A	5.0
Max. power consumption	kW	1.2
Max. main fuse	A	10

DanX 1 HP

Length	mm	1570
Width	mm	515
Height	mm	1750
Weight	kg	279

Refrigerant	kg	1.0 / R407c
GWP		1653
PED		1

Electrical connection	V	1 x 230 + N
Max full load current	A	8.7
Max. power consumption	kW	1.9
Max. main fuse	A	10

9.8 Technical data DanX 2

General

Air volume range high speed	m³/h	1000 – 2000
Air volume nominal	m³/h	1750

Supply air filter		F7 / ePM1 55%
Exhaust air filter		M5 / ePM10 70%

Heating coil	RR	2 / 3
Coil connection	"	3/8

Drip tray connection	"	1

DanX 2 XD

Length	mm	1570
Width	mm	780
Height	mm	1750
Weight	kg	344

Electrical connection	V	1 x 230 + N
Max full load current	A	6.6
Max. power consumption	kW	1.5
Max. main fuse	A	10

DanX 2 HP

Length	mm	1570
Width	mm	780
Height	mm	1750
Weight	kg	379

Refrigerant	kg	1.6 / R407c
GWP		1653
PED		1

WCC max flow	l/h	800

Electrical connection	V	2 x 400 + N
Max full load current	A	7.0
Max. power consumption	kW	1.6
Max. main fuse	A	10

9.9 Technical data DanX 3

General

Air volume range high speed	m³/h	1500 – 3500
Air volume nominal	m³/h	2750

Supply air filter		F7 / ePM1 55%
Exhaust air filter		M5 / ePM10 70%

Heating coil	RR	2 / 3
Coil connection	"	3/8

Drip tray connection	"	1

DanX 3 XD

Length	mm	1920
Width	mm	890
Height	mm	2250
Weight	kg	465

Electrical connection	V	1 x 230 + N
Max full load current	A	12.2
Max. power consumption	kW	2.9
Max. main fuse	A	16

DanX 3 HP

Length	mm	1920
Width	mm	890
Height	mm	2250
Weight	kg	500

Refrigerant	kg	4.0 / R407c
GWP		1653
PED		1

WCC max flow	l/h	800

Electrical connection	V	2 x 400 + N
Max full load current	A	12.6
Max. power consumption	kW	2.9
Max. main fuse	A	16

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