MVC–80 Comfort

User Manual

Rev. 1.3 – 082073

en

Dantherm®

CONTROL YOUR CLIMATE

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CONTROL YOUR CLIMATE

1.0 Introduction

A complete DanX ventilation system for comfort ventilation requires a control system that corresponds to the actual unit configuration in the most energy efficient way as possible. Dantherm offer various options depending on the unit configuration, all are individually tested before delivery and are therefore giving the most reliable and energy efficient operation possible. The electronic control system with contactors, main switch and function switch etc. is built into a separate control cabinet, normally mounted near the ventilation unit. This manual gives you an introduction how to set the control system for your comfort unit.

For the exact connection of DanX unit and the el. panel, please refer to the separate electrical diagrams.

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

1.1 DanX control panel

The components on the electric panel can be different from panel to panel depending on the ordered specification, but in general the panel will look like the following.

1)   Plug for electrical connection between unit and el panel (accessory).
     There can be up to 4 different plugs for control and running current. If there are no plugs, the electrical components from the unit must be connected directly to the terminal strips inside the el panel.

2)   MVC 80 controller.

3) Main service breaker. Disconnects all power to the unit and control panel, so no safety function like frost thermostat is active any longer! Do not stop the unit with this switch! Always stop the unit with the function switch!

4) Function switch.
This switch has 4 steps. Normally the setting will be 1-AUTO.

- 0 - Stop: Unit is stopped, but all safety devices are still active.
- 1 - Auto: Unit runs with the MVC 80 program settings in time program.

1.2 MVC 80 controller

The DanX 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.
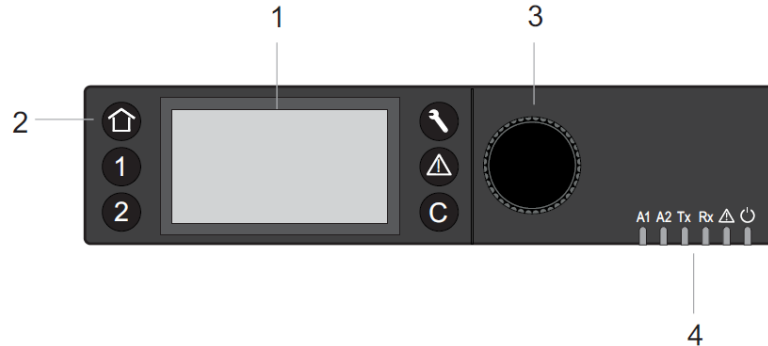
(1) LCD display.

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.
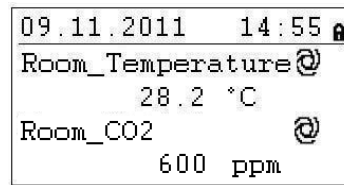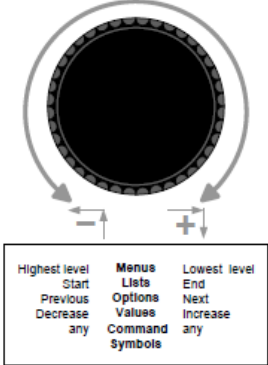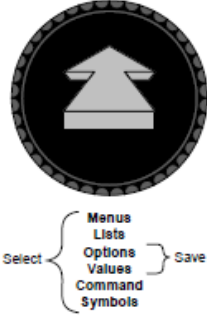

You will now see the actual day, month, year and time at the top and the actual room conditions. For a more exact explanation see 2.0 Quick access menu.

(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 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

2.0 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.
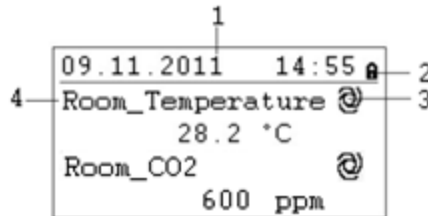
1) Shows the actual day, month, year and time.
2) Shows if the program is secured by a password.
3) Shows if the actual shown point is running in AUTO mode or MANUAL mode .
4) Shows the room condition.

> 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!

2.1 Password handling

There are three different access levels in the program. In Level 1 values can be changed used without a password. This is possible for all set points in the time program TP01 and 02.

To change set points which are not in TP01/02, you have to 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
🔒	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 has to be uploaded to the controller if the password has been forgotten.
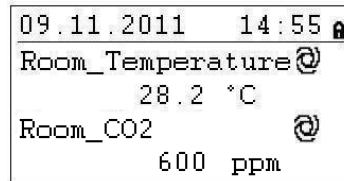
To access level 2 or 3 highlight the 🔒 icon in the top right of the start display by rotating the **Rotate button**. Press the **Rotate button** and you now have the possibility to enter your password.

```
5***                    🔒
Room_Temperature @
         28.2 ˚C
Room_CO2            @
           600  ppm
```
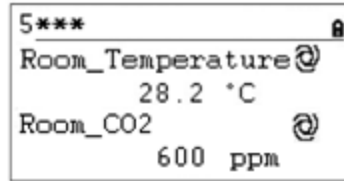
Find the right number by rotating the **Rotate button** and then press the **Rotate button** to accept. Do so with all 4 numbers. After having accepted the last one, the password icon will change either to 🔓 or ✗, depending on the password you have entered.

2.2 Start display

(1) The start display will show the actual room conditions:
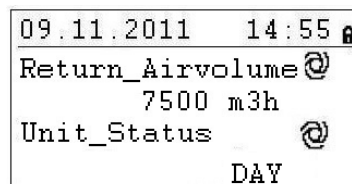
```
09.11.2011    14:55 🔒
Room_Temperature @
        28.2 °C
Room_CO2          @
         600  ppm
```

Room_Temperature. This point shows the actual room temperature.

Room_CO2. This point shows the actual CO2 content in the room. Instead of the CO2 the display can also show the actual duct pressure, depending how the ventilation unit is controlled (see also chapter 3.2).

(2) Rotate the **Rotate button** and the start display will show you:
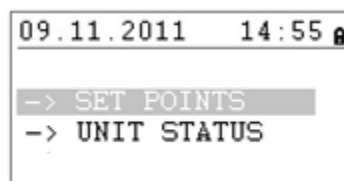
```
09.11.2011    14:55 🔒
Return_Airvolume @
        7500 m3h
Unit_Status       @
             DAY
```

Return_Airvolume and **Supply_Airvolume**. These points show the actual return air and supply air volume.

Unit_Status. This point shows which current status the unit has. It can be STOP / DAY or NIGHT COOLING, 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.

(3) If you rotate the **Rotate button** further on, the start display will change again, now to the following picture with three different menus; Set Points and Unit Status. These menus are explained on the next page.

```
09.11.2011    14:55 🔒

-> SET POINTS
-> UNIT STATUS
```

2.3 Set Point menu

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

```
-> SET POINTS
Temperatur_Room  @ ⊕
         28.0 °C      ⊠
CO2_Room         @ ⊕
         600 ppm      ⊠
```
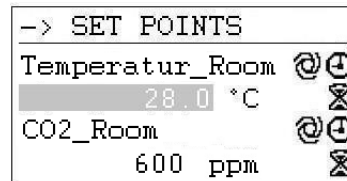
Here you will find the following set points (if you cannot see them please scroll down by rotating the **Rotate button**):

- Temperatur_Room
- CO2_Room (Only with CO2 control*)
- Supply_Duct_Pressure (Only with duct pressure control*)
- Return_Duct_Pressure (Only with duct pressure control*)
- Return_Air_Volume (Only with CO2 / Air Volume control*)
- Supply_Air_Volume (Only with CO2 / Air Volume control*)
- Return_Air_Volume_Max (Only with CO2 control*)
- Supply_Air_Volume_Max (Only with CO2 control*)
- Min_Supply_Temp (Setpoint minimum supply air temperature)
- Max_Supply_Temp (Setpoint maximum supply air temperature)

* See also chapter 3.2

In the quick access menu you have two possibilities to change a set point.

2.3.1 Set Point change

Before changing the set points, you need to enter the password for access level 2. 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
Temperatur_Room  @ ⊕
         28.0 °C    T ⊠
CO2_Room         @ ⊕
         600 ppm      ⊠
```
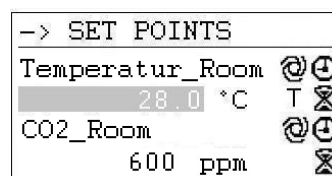
2.4 Unit Status menu

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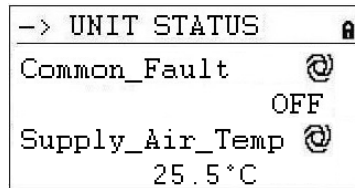
Here you will find the following unit status points (Scroll down with the **Rotate button**):

- Common Fault (Actual fault status)
- Supply Air Temp (Actual supply air temperature)
- Outdoor Air Temp (Actual outdoor temperature)
- Evaporator Temp (Actual temperature evaporator surface, only with HP)
- Heating Signal (Actual position of heating coil actuator, signal to electrical heating coil)
- Heating Coil Pump (Actual status if pump is running)
- Cooling Signal (Actual position of cooling coil actuator)
- Cooling Coil Pump (Actual status if pump is running)
- Duct Dampers (Actual outdoor damper position)
- Bypass Damper (Actual by pass damper position)
- Compressor (Compressor running or not, only with HP)
- Heat Demand (Actual demand for heating)
- Cooling Demand (Actual demand for cooling)
- Room Temp CALC (Actual room temperature set point)
- CO2 CALC (Actual room CO2 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.

3.0 Service menu

To enter the service menu you have to 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.

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 (Running hours for the unit)
- Trending (For service use only)
- Interface Config (For service use only)
- Time Program (See chapter 3.1 / 3.2)
- System Data (See chapter 3.3)
- Point Data (See chapter 3.4)

3.1 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 RUN / STOP / NIGHT COOLING 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 TP01:

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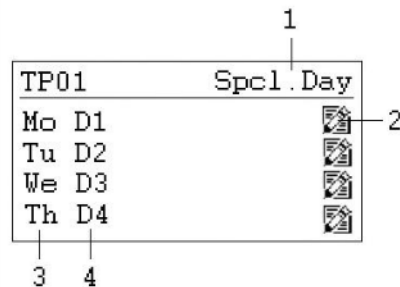
1)   Gateway to the special day programs
2)   Icon for editing the day time program
3)   Shows the different days of the week (scroll down by rotating the **Rotate button** to see the other days)
4)   Shows which daily program (D1,D2,...) is connected to each day

3.1.1 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                 ⬆  │
 │ 08:00 Program_RUN     │
 │ 20:00 Program_Stop    │
 │                       │
 └──────────────────────┘
```
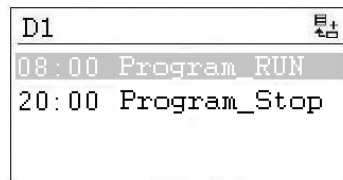
All seven daily programs (D1-D7) are built up in the same way and contain a starting time switch point when the unit should run and a closing time switch point when the unit should stop, or night cooling should be activated. If you want for example to change the opening time or unit status, highlight the switch point (Program_Status RUN) and press the **Rotate button**. You will now see the following display:

```
 ┌──────────────────────┐
 │ D1                 🗑  │
 │ 08:00 Program_Status  │
 │ RUN                   │
 │                       │
 └──────────────────────┘
```
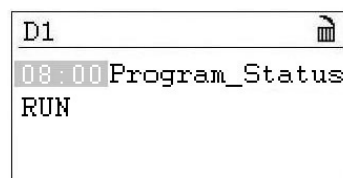
You now see and change in the first line the start time and in the second the status of the unit which can be either:

- RUN
- STOP
- NIGHT COOLING

If for you want to change the unit start time to 11:00 am, you press the Rotate button and by turning the button change the time to 11:00. Press the **Rotate button** again to accept the value and return to the earlier display by pressing the ⊙ **Cancel** key.

```
┌─────────────────────────┐
│ D1                    ⬚ │
│ ▓11:00▓Program_Status   │
│ RUN                     │
│                         │
│                         │
└─────────────────────────┘
```

```
┌─────────────────────────┐
│ D1                   ⬚  │
│ ▓11:00 Program_RUN▓     │
│ 20:00 Program_Stop      │
│                         │
│                         │
└─────────────────────────┘
```
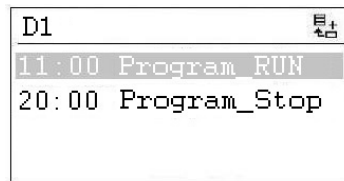
If you want to have more than one start and stop time switch point for one day, you have to add a new switch point to the daily program by highlighting the ⬚ icon and press the **Rotate button**. You will enter the following display.

```
┌─────────────────────────┐
│ D1                    ⬚ │
│ Program_Status          │
│                         │
│                         │
│                         │
└─────────────────────────┘
```
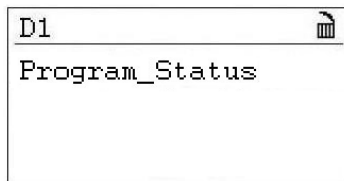
Press the button once more and you now can change the start time and program status. Press the **Rotate button** again to accept the value and return to the earlier display by pressing the ⊙ **Cancel** key.

```
┌─────────────────────────┐
│ D1                    ⬚ │
│ ▓08:00▓Program_Status   │
│ RUN                     │
│                         │
│                         │
└─────────────────────────┘
```

```
┌─────────────────────────┐
│ D1                   ⬚  │
│ 08:00 Program_RUN       │
│ ▓11:00 Program_RUN▓     │
│ 20:00 Program_Stop      │
│                         │
└─────────────────────────┘
```
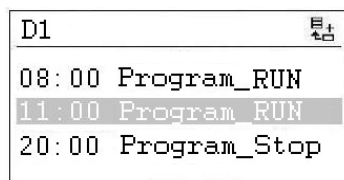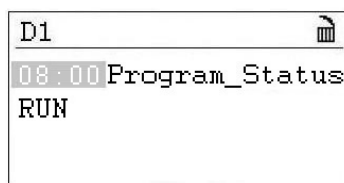
You will now see that you have added a third line into your D1 daily program.

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    │
│ RUN                     │
│                         │
│                         │
└─────────────────────────┘
```

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.

3.1.2 Add a daily program

Normally in Time Program TP01 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 TP01 time program and highlight Spcl. Day, as shown below.

```
┌─────────────────────────┐
│ TP01         Spcl.Day   │
│ Mo D1               📋  │
│ Tu D2               📋  │
│ We D3               📋  │
│ Th D4               📋  │
└─────────────────────────┘
```

Now press the **Rotate button** and the following display appears:
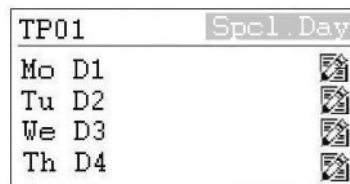
```
┌─────────────────────────┐
│ Special Day             │
│ Annual                  │
│ Bank Holiday            │
│ Daily Programs          │
│                         │
└─────────────────────────┘
```
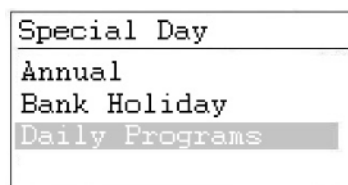
Highlight the line with Daily Programs and press the **Rotate button** again and the following display appears:

```
┌─────────────────────────┐
│ Daily Programs       📑 │
│ Select to modify:       │
│ D1              📋 🗑   │
│                         │
│                         │
└─────────────────────────┘
```
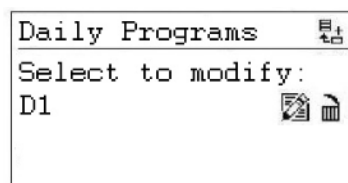
Under this Daily Program it is possible to modify 🖺 or delete 🗑 the selected daily program (here D1) as described in chapter 4.4.1.1, but also to add a new daily program for a bank holiday or another special day. To add a new daily program you have to highlight the 🖳 icon on the right top of the screen and press the **Rotate button**. You will now see the following display:

```
Add daily prog:    🖳
Copy from:
D1
D2
D3
```
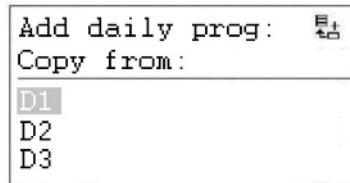
You can now add a new daily program by making a copy of an old one, like for example D1 in this case. But you can of course choose any existing program to make a copy of it. By highlighting D1 and again pressing the **Rotate button** you have now made a copy of the daily program D1. The new program is called DP_1 and is shown below.

```
DP_1               🖳
11:00 Program_RUN
20:00 Program_Stop
```
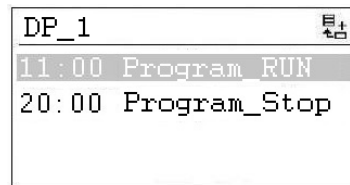
From here you can now modify the new daily program DP_1 as described in chapter 3.1.1. After the modifications have been done, you can go back to the start screen "Special days" by pressing the Ⓒ **Cancel** key four times.

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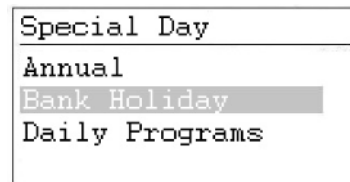
If you now want to connect the new daily program DP_1 to New Year you have to highlight the Bank Holiday line and press the **Rotate button**. In the new display highlight the line to the right of New Year and press again the **Rotate button**. You now can choose the daily program that you want to connect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

3.2 Time program Unit Configuration

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

```
-> UNIT CONFIC      🔒
Heating_Coil      @
            Water
Cooling_Coil      @
            No
```
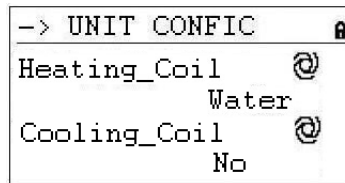
Here you will find the following unit configuration points, which only can be changed with a service technician password (Scroll down with the **Rotate button**):

- Air_Volume_Control (see 3.2.1)
- Heating_Coil (see 3.2.2)
- Night_Cooling (see 3.2.3)
- Wake_Up_Temp (see 3.2.4)
- Wake_Up_CO2 (see 3.2.4)
- BMS_SP_Control (see 3.2.5)

3.2.1 Air volume control

Here you set if the unit should control the CO2, the duct pressure or just run after the air volume set point. This point is normally set by the factory to the correct value.

3.2.2 Heating Coil

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

3.2.3 Night cooling

Under the point Night cooling you can configure if you want to use free cooling in night time to cool down the room.

3.2.4 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 has to be placed directly in the room or replaced by a room CO2 / 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 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.

3.2.5 BMS Set point Control

If you connected the DanX 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 have to 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!

3.3 Interface Configuration (Modbus)

If you connected the DanX 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 have to be logged in as installer (service password).

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3.4 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.

3.4.1 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.

3.4.2 Day light saving

Normally the controller runs in winter time mode. If in your country you have summer-time, 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.

3.5 Data points and parameters

As a user it is only possible to view the data points and parameters. It does not matter if you use access level 1 or 2 (no password or 2222). To be able to make changes (manual operation) you have to be an educated service engineers with a special password for access level 3. Normally you will use these data points in case of commissioning or a malfunction of the DanX, as the Data points can give you an indication if all sensors and connected output functions are working correctly.

To enter data points and parameters press the **Service Button**, press Continue or enter the service password in the Login Installer and scroll down to the point Point Data.

```
Service Menu
Continue
Login Installer
```

```
Service Menu
Trending
Interface Config
Time Program
Point Data
```
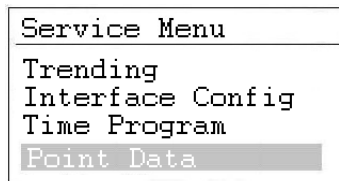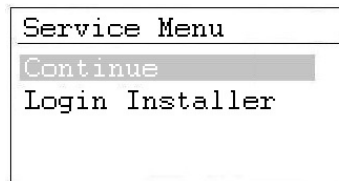
Press Point Data and you will find two types of data points here. The first are the physical data points (analog/binary in- and outputs), which are inputs and outputs directly connected to the MVC 80 such as sensors or actuators. The second are the pseudo data points (analog/binary) which are generated in the MVC 80 software. They are not connected to any hardware device.

Depending on the different types of DanX units there can be different data points and parameters in the MVC 80 software. To get an overview of the data points and parameters, please see section 5. Appendix.

3.5.1 Analog input and outputs

Under analog inputs you can see the actual temperature and CO2 readings for the different sensors connected from the DanX unit to the MVC 80 control. Here you can check if all sensors are giving a sensible reading or if a sensor gives a wrong signal, for example a too high or low value.

Under analog outputs you can see what signal the MVC 80 control gives to the different damper motors and coil actuators of the unit. Her you can check if the output is correct. If for example the temperature in the room is below the set point you can check if the coil actuator is getting a signal from the MVC 80 software. If there is a signal you can now check the valve actuator if it is connected correctly.

3.5.2 Binary input and outputs

Under binary inputs you can see the connected safety sensors for the DanX unit, if they are in ALARM or in NORMAL. If a sensor is in ALARM you will see that as an alarm message on the display.

Under binary outputs you can see the signal which is send from the MVC 80 control to for example compressor or heating coil pump. Her you can check if the output is correct. For example if the compressor is not running, you can check if the MVC 80 is giving the start signal or not. If the signal is given then there must be a mechanical or electrical problem with the compressor.

3.5.3 Pseudo analog and binary

Pseudo analog and binary data points are calculated data points or set points. For example is the supply air temperature depending on the return air temperature and the set point of the room temperature. Depending how big the gap between these two temperatures is the right supply air temperature is calculated. Normally only a service engineer will use these data points.

3.5.4 Manual operation

As a service engineer with a special password you have the possibility to set data points in "MANUAL", which means that you have the possibility to override a setting with a different value, to see if the unit is reacting correctly. For example by overriding the actual heating signal from 0% to 100%, you are able to see if the valve of the heating coil starts to open.

```
Service Menu

Analog Input
Pseudo Analog
Analog Output
Binary Input
```
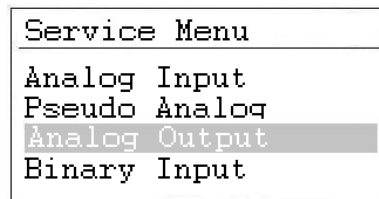
Press the **Rotation Button** at Analog Output:

```
Analog Output

Heating_Si      0 %
Comp_A_Sig     50 %
Return_Fan     70 %
```
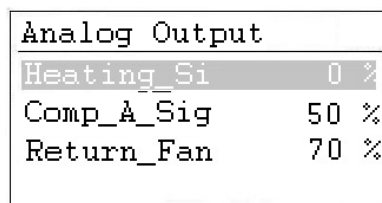
Press the **Rotation Button** at Heating_Signal:

```
Heating_Signal   @

Y7.1 valve/el_coil
                 0 %
Suppress Alarm:  ☑
Trend Log:       ☐
```
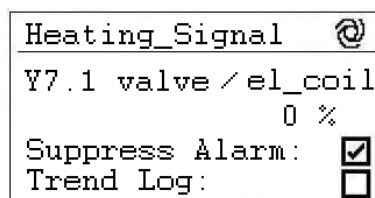
By changing the @ symbol to the ✍ symbol you can change the data point from automatic to manual. After that you can change now the valve signal from 0% to the value you want.

4.0 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 chapter 5.2).
- 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.

4.1 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
```

4.1.1 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.

4.1.2 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.

4.1.3 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
Comp_Overload	Thermo relay for compressor has switched off (Only units with HP)
HP_LP_Alarm	HP/LP pressure compressor alarm (Only units with HP)

4.1.4 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
Filter_Dirty	Outdoor or exhaust air filter should be checked

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4.2 How to solve alarms

Alarm	Problem	Cause	Action
Frost	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	Return air temperature > 40°C	• Fire in the building	
	Supply air temperature > 70°C	• After heating coil not working correct at low air volume • Fire in the unit	• Check heating coil controls
Filter	Filter is dirty	• Filter blocked	• Change filter
Fan	Flow error	• Fan belt broken • Fan motor broken • Damper not open	• Change belt • Change/repair motor • Check damper/motor
	Thermo relay switched off	• Fan motor broken • Phase missing • Fan belt broken • Thermo relay broken	• Change/Repair motor • Connect all phases correct • Change belt • Change thermo relay
	Frequency inverter switched off	• Fan motor overload • Fan motor broken • Phase missing	• Check air volume/pressure • Change/Repair motor • Connect all phases correct
HP/ LP	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 • Deice evaporator/Check de-icing function
Compressor	Thermo relay switched off	• Compressor broken • Phase missing • Thermo relay broken	• Change compressor • Connect all phases correct • Change thermo relay

For more detailed explanations see the Service Manual for DanX units.

5.1 Parameter and Data list

Analog inputs	Function	Comment
Room_Temperature	Return air sensor	Temperature in room (sensor placed either in return air duct or in room)
Supply_Air_Temp	Supply air duct sensor	Supply air temperature (sensor placed after heating coil)
Outside_Air_Temp	Outside air sensor	Outside air temperature (sensor placed before mixing box inside unit or outside the building)
Evaporator_Temp	Evaporator sensor*	Temperature on evaporator coil (sensor placed in evaporator)
FunctionSwitch	Function switch	Function switch position on el- panel
Room_CO2	CO2 duct/room sensor	CO2 level in room (sensor placed either in return air duct or in room)
Press_Supply_Duct	Pressure sensor duct	Pressure sensor (normally inside the unit)
Analog outputs		
Exhaust_Damper	Exhaust air damper	Degree of exhaust damper opening. (100% means fully open/ 0% fully closed)
Outdoor_Damper	Outdoor damper	Degree of outdoor damper opening. (100% means fully open/ 0% fully closed)
Bypass_Damper	Damper over by pass	Degree of damper opening over by pass. (100% means fully open by pass/ fully closed over heat exchanger)
Heating_Signal	Actuator heating coil	Degree of heating coil valve opening (100% means fully open valve)
Cooling_Signal	Actuator cooling coil	Degree of cooling coil valve opening (only visible if installed) (100% means fully open valve)
Digital inputs		
Fan_Alarm	Thermo relay / flow switch	Thermo relay fan motor / frequency inverter and flow switch (Normal/Alarm)
HeatingCoil_Alarm	Frost thermostat	Frost thermostat for LPHW coil (Normal/Alarm)
HpLp_Alarm	HP / LP pressostat switch*	HP/LP switch for compressor (Normal/Alarm)
Comp_Overload	Thermo relay compressor*	Thermo relay for compressor (Normal/Alarm)
Filter_Dirty	Filter switch	Filter switch for fresh / return air filter (Normal/Alarm)
Fire_Alarm	Fire thermostat	Temperature sensor in supply air duct and return air inside unit (Normal/Alarm)
Digital outputs		
Supply_Fan_Start	Supply air fan start	Signal for supply air fan start (ON/Off)
Return_Fan_Start	Return air fan start	Signal for return air fan start (On/Off)
Compressor	Compressor*	Signal for compressor start (On/Off)
Heating_Coil_Pump	Pump heat coil	Signal for water pump heating coil (On/Off)
Common_Fault	Common fault	Signal for common fault relay (On/Off)

Pseudo analog		
Return_Air_Calc	Calculated temperature	Calculated temperature for return air
Supply_Air_Calc	Calculated temperature	Calculated temperature for supply air
Heat_Demand	Calculated demand	Calculated demand for heating (55-100%) or cooling (45-0%)
Supply_Airvolume	Supply air volume	Actual supply air volume
Return_Airvolume	Return air volume	Actual return air volume
Room_CO2	Set point	Set point for CO2
Room_Temp	Set point	Set point for temperature
Duct_Press	Set point	Set point for duct pressure
Min_Supply_Temp	Set point	Set point for minimum supply air temperature
Max_Supply_Temp	Set point	Set point for maximum supply air temperature
Supply_Fan_High	Set point	Set point for minimum supply air volume
Supply_Fan_Low	Set point	Set point for maximum supply air volume
Return_Fan_High	Set point	Set point for minimum return air volume
Return_Fan_Low	Set point	Set point for maximum return air volume
Pseudo digital		
Defrost_Evaporator	Deice function	Evaporator deice function (On/Off)
Wake_up_Humid	Set point	Set point for wake up function humidity (On/Off)
Wake_up_Temp	Set point	Set point for wake up function temperature (On/Off)
Function_Switch	Function switch	Shows position of function switch on panel
Program_Status	Status time program	Shows if unit is Running / stopped or in night cooling
Unit_Status	Status time program	Shows if unit is Running / stopped or in night cooling

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