

Installation Manual

NordFlex Controller

Software version 2.30 and later

6 – 19 kW range (V5+)

30 – 90 kW range (EVI)

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1 Safety

Safety precautions must meet the requirements that apply to this type of equipment. The following recommendations should be observed in addition to the standard safety regulations that apply to the workplace.

The safety precautions stated in this manual address the most important topics for proper and safe installation and operation of the heat pump. For this reason, follow them carefully.

For further questions contact your installer or technical support from Energy Save. Contact details can be found on the last page of this document, or on the Energy Save website: <https://energysave.se/contact/>

Personnel

The installer has the ultimate responsibility for ensuring that anyone who works on or near the equipment observes all the relevant safety precautions.



Installation, disassembly, and maintenance of the unit must be carried out by trained and qualified personnel that is well-acquainted with the equipment.

All electrical connections must be done by a professional and in accordance with the electrical standards.

Personal safety

Always wear recommended personal safety equipment, such as safety glasses, safety gloves, ear protection, and protective clothing.

Maintenance must not be carried out on the equipment during operation.



Do not touch the fan grill when the fan motor is running.

Do not touch the fins of the coil with bare fingers, it might cause injury.



WARNING

Electric shock can kill!

Install and earth the unit in accordance with the applicable instructions.

Do not touch live electrical parts with bare skin, wet gloves, or wet clothing.

Ensure your working position is safe.

Equipment

It is forbidden to make any changes to the structure or construction of the equipment since this can lead to personal injury or damage to the units. Improper installation or attachment of equipment or accessories could result in electric shock, short-circuit, leaks, fire, or other damage to the equipment.



Water or other form of liquid is strictly forbidden to be poured on or into the equipment. This may cause electric shock or destruction of the units.

Be sure only to use accessories which are specifically designed for use with the equipment. If not provided or agreed upon by Energy Save, the accessories must comply with the specifications given in this manual. The accessories must be installed by a professional.



CAUTION

The power supply to the device must be earthed.

General precautions



CAUTION

Electrical work should only be performed by qualified personnel. To avoid electrical shock, make sure to disconnect the power supply 1 minute or more before servicing electrical parts, and then measure the voltage at the terminals of main circuit capacitors or electrical parts before touching.

Make sure that no voltage is present.



CAUTION

This unit is not allowed to be used by children younger than 8 years. Children should not play with the unit. Cleaning and user maintenance shall not be made by children without supervision. Under supervision and/or with appropriate instructions, children above 8 years or persons with reduced sensory or mental capabilities may operate the unit.

Disposal



This marking indicates that this product should not be disposed of with other household waste, valid throughout the EU. To prevent possible damage to the environment or human health, this product must be recycled responsibly.

To return the device, follow local instructions for return and recycling, or contact the dealer where the product was purchased.

1.1 About this manual

This manual aims to ensure correct installation of the system so that the functionality is both safe and reliable. Store this manual and all related documents in such a way that they are available whenever required.

The manufacturer accepts no liability for any damage caused by failure to observe the information in this manual.

1.2 Symbols used in this document

The following attention symbols are used throughout this document, the warning levels explained below.



DANGER

Risk of serious and potentially life-threatening personal injury and/or severe damage to property if the instructions are not followed.



WARNING

Risk of personal injury and/or damage to equipment if the instructions are not followed.



CAUTION

Risk of minor or moderate personal injury. Risk of equipment damage, loss of data, extra work, or unexpected results, if the instructions are not followed.



NOTE

Facts and conditions to be considered.

2 Introduction

2.1 NordFlex Controller description

The NordFlex Controller controls, monitors, and optimizes the function of your climate system and can be used for both homes and buildings.

Developed for small to medium-sized commercial buildings, the NordFlex Controller allows you, as the property owner, to monitor and control your property's indoor climate.

The manufacturer's range of 6-19 kW (V5+) heat pumps and 30-90 kW (EVI) heat pumps are used as the building blocks for larger installations where the baseline system is determined by the heating and cooling needs of the property.

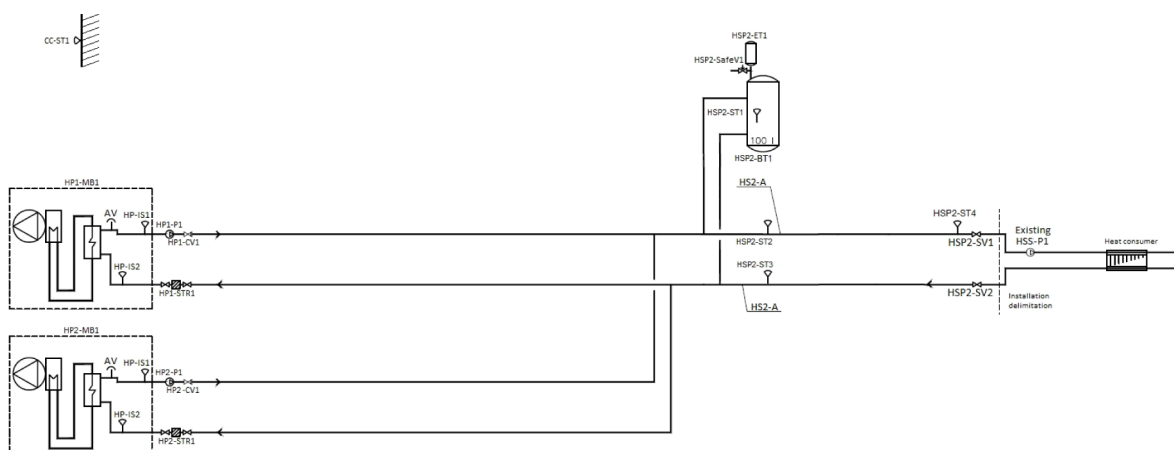


NOTE

The cascade module, CM-AW6/19R32M, must be used together with the 6-19 kW range of heat pumps.

2.2 Installation example

Below is an example of a basic installation to serve as a reference point.



Abbreviations

HP	Heat pump
HSS1	Heating system 1
HSS2	Heating system 2
CS1	Cooling system 1
SV	Shut off Valve
STR	Strainer
MV	Mixing Valve
WV	Way Valve
BT	Buffer Tank
SafeV	Safety Valve
IS	Internal Sensor
CTS	Contact Temperature Sensor
CW	Cold Water
DHW	Domestic Hot Water
DHWC	Domestic Hot Water Circulation
EXP	Expansion Vessel
P1	Circulation Pump 1
P2	Circulation Pump 2

Capacity/Piping Dimension*

	CS1	HS1	HS2
20 kW	DN50	DN50	DN32
40 kW	DN65	DN65	DN40
60 kW	DN65	DN65	DN50
80 kW	DN80	DN80	DN65
100 kW	DN100	DN100	DN65
120 kW	DN100	DN100	DN65
140 kW	DN100	DN100	DN65

* These dimensions are only for guidance. We recommend a professional review of the dimensioning by a consultant before assembly. Also note that the pipe dimension will change at pipe intersections. This means that when two pipes from two 20 kW heat pumps merge, the pipe dimension afterwards needs to be dimensioned for 40 kW.

2.3 Sensor roles

Depending on the system selection, the NordFlex Controller receives information from different sensors for it to base decisions on. See the system schematic drawing from the ES Configurator for sensor positions.

– Outdoor temperature sensor

Controlling sensor for calculating heat curve and supply temperature except in systems with external control.

- **Flow temperature sensor**

HSP2-ST1 is the primary sensor for the heat pumps should be mounted according to the system drawing for ES Multi Heat pump.

HSP2-ST4 is the primary sensor for additional heating.

- **DHW tank**

DHW-ST2 and DHW-ST1 control DHW hot water start and stop.

2.4 Key features

- User-friendly interface with touch screen.
- Monitoring and controlling all functions in the heat pumps and overall climate system.
- Optimizes operation, economy, and comfort of the heating/cooling system.
- Displays measured and set values such as temperatures, operating hours, and alarms.
- Extra DHW (Domestic Hot Water) on request.
- Time schedules for night mode, DHW production, and holiday mode.
- Handles parallel-connected heat pumps in the range from 6 to 90 kW.
- Increases the internal safety features of the heat pumps.

2.5 Serial number

The serial number is found in **Basic menu » Settings » System** in the NordFlex Controller interface. It is also found on the plate in the cabinet where all electronics are attached.

3 Menu system

The most common settings are accessed directly from the basic menu. Settings that are intended for an installer during commissioning the system are mainly located in **Basic menu » Settings » Installer's menus**. To enter this menu, enter access code 2 2 2 2. To enter the user settings in this menu directly, enter access code 1 1 1 1 instead.



NOTE

If the PIN code is changed and forgotten, the NordFlex Controller must be sent to the factory to be unlocked.



NOTE

In most screens, there are no OK buttons. An altered value turns grey for a few seconds and then it switches to black to indicate that the change has been saved.

3.1 The display

A tap is used to activate the display and for selection.

A swipe is used to scroll lists.



CAUTION

Only use your finger or a blunt object to interact with the display. Sharp objects can damage the screen.

The display is backlit. The backlight illuminates at start-up, at an alarm, and when the display is used. It dims when it's inactive and switches off after about 60 minutes. If there are active alarms that are not acknowledged, the screen fully lights up until the alarm is acknowledged.

3.2 Start screen

The start screen is displayed when the NordFlex Controller is started or when there has been no activity for 20 minutes. This screen shows the status of the application, ambient temperature, tap water tank temperature, and indoor temperature when a room sensor is connected.

It is possible to change the setpoint for the room temperature of the heating system directly in this screen. Icons for plus or minus raises or lowers the offset. This means that the adjustment of the heat level represents the adjustment of the supply line temperature.

STATUS: ALARM

Thu 2023-02-23 15:38



Heat level

20





Ambient °C

25.0

Tap water tank °C

25.1

Indoor °C

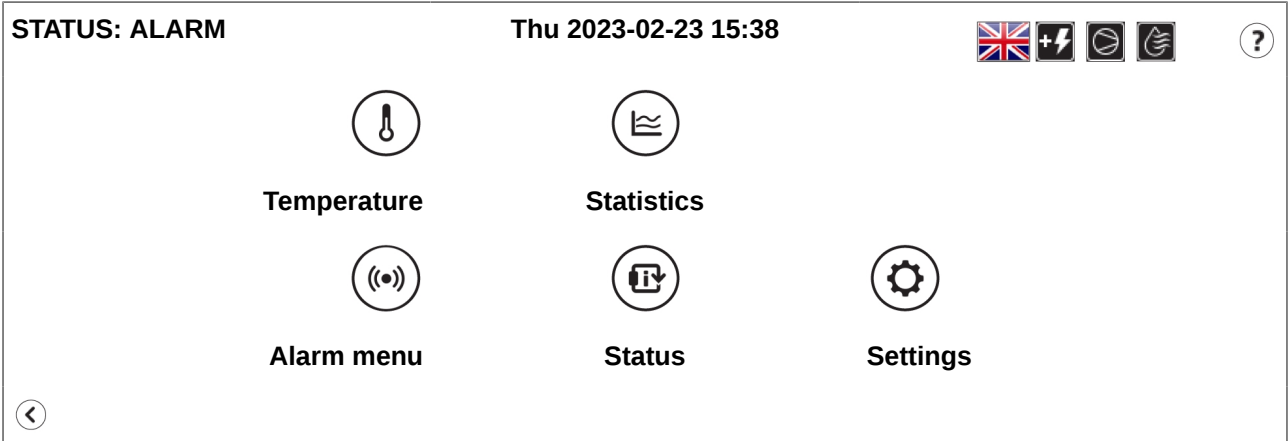
25.0



	Change language of the user interface.
	Additive heat
	Compressor
	DHW
	Cooling
	Go to the basic menu.

3.3 Basic menu

Located in **Start screen » Basic menu** 



Temperature	View system temperatures.
Statistics	View hours of operation.
Alarm menu	View and acknowledge active alarms. Access the alarm history.
Status	Graphic view of the heating system.
Settings	View and edit settings for Scheduling, Heating curve, Users menu, Date and Time, System, Installer's menu.
	Change language of the user interface.
	Additive heat
	Compressor
	DHW
	Access the built-in manual.
	Go to the previous screen (start screen).

4 Software functionality

The NordFlex software manages all parts of the energy solution. In order to do this, the software is divided into three blocks.

Heat pump

The ES heat pump is protected and controlled by its own internal logic. The NordFlex Controller sends a request based on a heating demand to the ES internal logic. The diverting valves for domestic hot water and cooling is included in this block but are connected to the NordFlex Controller.

Warm side

The additional heating and domestic hot water generation of the heat pump are functions controlled by NordFlex.

Secondary heat

Heat requirements in up to four heating circuits, with corresponding circulation pump and mixing valve.

4.1 Building heating

Adaptive condensation (curve control) means that the flow temperature of the heating water from the heat pump varies with the outdoor temperature. Colder outdoor temperature demands a higher flow temperature.

The **heating curve** controls the energy supply to the building. By adjusting the heating curve, the right amount of energy for the current outdoor temperature is supplied. The NordFlex Controller handles systems with up to four heating zones (heat curves). The heating zone which calculates the highest value of its desired supply temperature "wins" and the heat pump plus additional heating delivers this temperature. The other heat zones will regulate their output to adjust to the correct supply temperature.

See the user guide for more information about the heating curve.

To reduce the amount of starting and stopping of the heat pumps, the NordFlex Controller uses a **heat balance** calculation. This means that the heat pumps are blocked until there is a demand for heating from the building and all heat sources can be configured to how slow/quick they should react when a heat need occurs. The first heat pump starts in heating mode when the heat balance is below the parameter A0. This parameter is located in **Installer's menu » User settings » Settings » Heat pump**. The next heat pumps are started when the heat balance is below parameter A1 in the same menu.

Auxiliary heating is allowed to start when the two conditions below are fulfilled:

- Heat balance is below parameter A2 in **Installer's menu » User settings » Settings » Additional heat 1**.
- Outdoor temperature is below the AH1 ambient T limit in **Installer's menu » User settings » Settings » Additional heat 1**.

The NordFlex Controller blocks the heating function when the outdoor temperature exceeds the set value (factory default is 17 °C). The block is released when temperature is 3 °C lower than the set value.



NOTE

Domestic hot water (DHW) production runs as usual, only the heating function is blocked.

4.2 Domestic hot water (DHW)

A NordFlex system can be configured with one or more heat pumps dedicated for domestic hot water production. The need is calculated from the DHW temperature sensor(s). Temperature below the start set point will start one or more heat pumps. The DHW production is finished when the temperature in the tank is above the stop setpoint **or** if the return temperature to the heat pump is above a set maximum limit.

The NordFlex Controller can use **auxiliary heating** to top up the DHW tank(-s). This heating is used if the heat pump can't deliver enough energy or, during cold weather, the heat pumps is more needed for the heating circuits.

The domestic hot water temperature can be programmed by a schedule to vary over the day so that there is plenty of hot water for morning showers. The timetable is specified by the user while increasing the temperature can only be done via the installer's menus in the same way as for extra hot water comfort.



NOTE

The time-controlled hot water increase changes the heat pump start and stop temperatures only.

The **holiday mode** is used in NordFlex to lower the hot water temperature during a specific period.

The NordFlex Controller can with the help of the electrical immersion heater control the domestic hot water system to prevent the growth of **legionella bacteria**. It's recommended that water temperature shall be maintained at no less than 65 °C (can be set to 55 - 75 °C). To combat potential legionella growth, the temperature is typically increasing during the night when hot water consumption is low by activating the electrical immersion heater. Legionella cycle interval, start and stop time control, and temperature control is set in the settings menu for DHW.

4.3 Comfort cooling

The NordFlex Controller can use one or more heat pumps to generate cooling water for comfort cooling to air systems or cooling baffles. There are several settings associated with this feature.

All settings are located in **Installer's menus » User settings » Settings » Cooling**.

For the cooling settings to be accessible, cooling must first be activated in **Installer's menus » SYSTEM Installation » SYSTEM setup » Cooling**.

4.4 Restriction rules

Time restrictions

To save the heat pump's compressor from too many starts and stops, there are several adjustable time conditions built into the NordFlex Controller. Time conditions have priority and the heat pump cannot start until the time conditions allow it.

During start up of the NordFlex Controller (for example when restarting the control cabinet) there is a 15 min hard limit before the NordFlex Controller runs any actions.

If any of the following conditions are true, the heat pump will not start:

- Alarms are triggered.
- It is less than 15 minutes (adjustable) since the heat pump last started.
- It is less than 5 minutes (adjustable) since the heat pump stopped (pressure equalization time).

Temperature restrictions

In order to optimize operation, there are adjustable outdoor temperatures where heat pump and auxiliary heating is blocked for radiator heat.

In order to prevent operation when there is a risk of the heat pump tripping its high-pressure protection, there is a parameter that prevents operation when the return water temperature is too high (if the hot gas temperature is too high, operation is restricted by the heat pump).

System operation while there is a heat pump alarm

To alert the user that something is wrong, the NordFlex lowers the supply temperature corresponding to about two degrees room temperature and the hot water temperature by 10 degrees until the alarm has been acknowledged in the NordFlex alarm menu. If the alarm is critical (C and up), the heat pump will not run.

After the alarm is acknowledged, the control returns to the set setpoints and uses auxiliary energy to heat the house.

4.5 Communication Modbus TCP

The NordFlex Controller has the Modbus TCP communication package built into it. The communication is switched off by default but can be activated in **Basic menu » Settings » System**.

In the activation dialog, it's possible to select whether The NordFlex Controller should listen to all incoming questions or only questions from a particular IP address.

See the Modbus manual for more information.

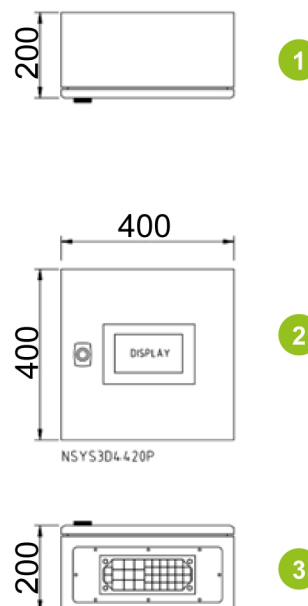
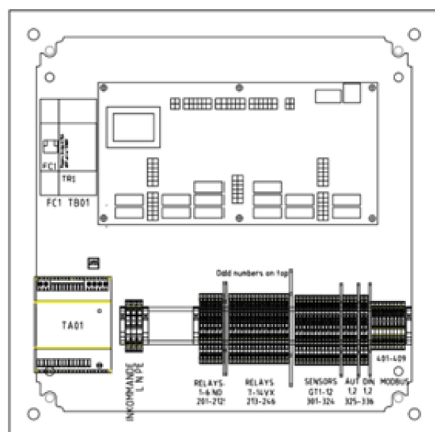
5 Installation

5.1 Inspection at delivery

At delivery, the entire package and its content must be checked to ensure that it is complete and that there is no visible damage.

In case of damage, make a note on the freight bill and have it signed by the shipment company. Contact your supplier for further instructions.

5.2 Dimensions



- 1 Top
- 2 Front
- 3 Bottom

5.3 Mounting the NordFlex Controller on a wall

- 1 Position the NordFlex Controller in a way that makes it possible to connect it electronically and that it is accessible for users.
- 2 Use the supplied attachment and follow the installation instructions in this manual. For more information, see Schneider Electric Spacial S3D.

5.4 Mounting contact sensors

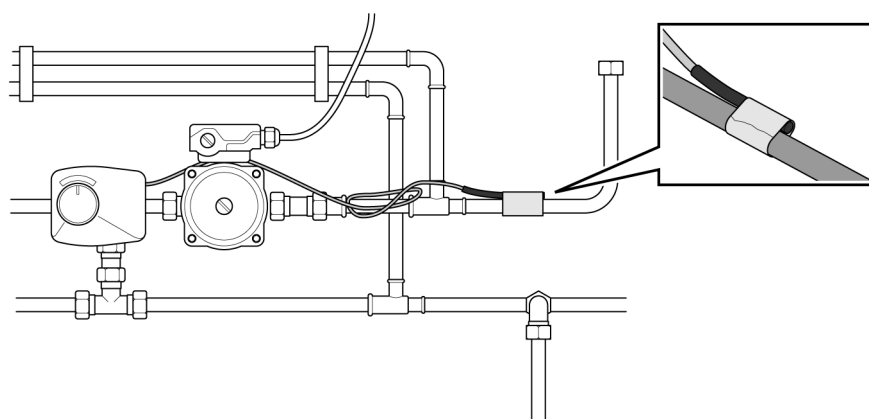


Figure 1: Example of sensor mounting

- 1 Use thermal contact paste and attach the sensor as a contact sensor with two cable ties to the pipe, or alternatively, mount the sensor in a dip tube.
- 2 Place a loop of the sensor cable so that there is slack of about 30 cm near the sensor. This facilitates replacement of the sensor if the transducer breaks.
- 3 Insulate on top of the contact sensor and along the cable at least 15 cm to minimize the risk of measurement errors.



NOTE

See the system drawing for the position of the various sensors.

5.5 Mounting room sensors

In the case of heavy heat supplements, for example through large windows facing south, the outdoor sensor can be supplemented with room sensors mounted on a wall in a suitable place.



CAUTION

If NordFlex Controller is supplemented with room sensors (with regulating function) there must be no other type of room control (e.g. radiator or floor heating thermostats) in the same room.

- 1 Place the room sensor so that it senses a representative room temperature in the house, on an inner wall. Do **not** place the sensor in niches or between shelves, behind curtains, above or in the vicinity of heat sources or windows, in the bathroom toilet or other damp rooms.
- 2 Make sure no spotlights are directed towards the sensor and that the sensor is not exposed to solar radiation.

5.6 Mounting outdoor sensors

- 1 Place the outdoor sensor on the north or northwest wall.



NOTE

Mounting on the south or south-east wall can be an alternative if the house is well insulated and receives a large heat addition of sun through the south window.

- 2 Make sure the sensor is easily accessible, e.g. about 2.5 m above the ground. Do **not** place the outdoor sensor where it may be exposed to heating from a valve grille or the like.

5.7 Connecting the NordFlex Controller

- 1 Install the NordFlex Controller via an isolator switch and connect it to a 230 V power supply.
- 2 Connect the Nordflex Controller according to the I/O-list.

- 3 Before operation, perform an ocular inspection of the installation to detect any errors.
- 4 Check connections for protective earth and neutral conductors.
- 5 Tighten the connections. The tightening torque of the screws can be impaired by transport. Pay extra attention to retightening the power connection.
- 6 Set parameters for the system according to the documentation. Alternatively, if the ES Configurator is used, use the included configurator-file to configure.
- 7 Power on and perform necessary function tests on installed hardware, e.g. heat pumps, circulation pumps, diverting valves, etc.
- 8 After two to three days of operation, tighten all connections again. The heat development can change the tightening torque of the screws. Check functions and settings.

5.8 Connecting sensors



CAUTION

When installing low voltage cables in parallel with mains cables, it is important to keep a distance of at least 10 cm at lengths of up to 1 m, 20 cm at lengths up to 10 m, and above 10 m the distance must be further increased.

One outdoor sensor and seven temperature sensors are included in the delivery of the NordFlex Controller.

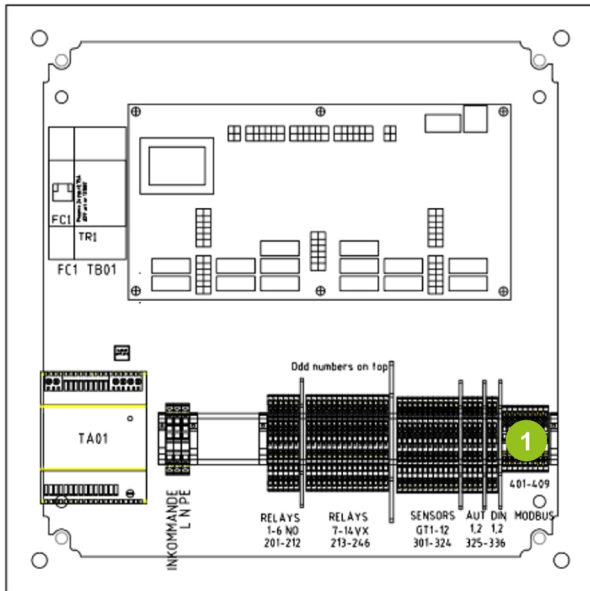
All sensors are in -40 to +105 °C range.

- 1 Connect a sensor to the terminal according to I/O list.

Use a twin core cable with a cable area of at least 0.5 mm². If shielded cable is used, the screen must be connected to protective earth. The screen should only be connected to the NordFlex Controller side.

5.9 Modbus TCP connection

Connect to Modbus via the RJ45 network connector on the back of the display.



1 RJ45 network connector

The display uses DHCP to request an IP address from the local network. The given address is shown in **Basic menu » Settings » System**. There is no option to use a static IP address.

NordFlex Controller responds to Modbus address 127.



NOTE

Max two questions per second. Delay from question to response can be up to four seconds.

Modbus unit address list:

1-126	Optional external units connected on the Modbus RTU segment between display and controller card. The display acts as a TCP to RTU converter.
127	The Nordflex controller. See this manual for data addresses.
128	Reserved
129-144	Reserved for heat pumps 1 - 16 internal Modbus registers.
145-247	Reserved for future use.

6 Configuration

When the hardware has been mounted and connected, it is time to configure the system using the NordFlex Controller software.

6.1 Activating Modbus TCP communication

- 1 Go to **Basic menu » Settings » System** and select settings for Modbus.



- 2 Select **Enable all address** or **Enable with whitelist**.
- 3 Select **Save**.

The display is rebooted and Modbus TCP is activated.

6.2 Activating sensors

A sensor must be physically connected to a free sensor input on the back of the display and activated in the NordFlex Controller software.



NOTE

It is possible to connect one physical sensor input to several logical functions.

Refer to the following examples. In example 1 you want to activate a room sensor in heating zone 1 and this sensor is connected to the input GT11. In example 2 you want to activate a sensor in heating zone 2 and this sensor is connected to input GT12.

Example 1: Activating room sensors

- 1 Go to **Basic menu » Settings » Installer's menus** and enter access code 2 2 2 2.
- 2 Go to **SYSTEM Installation » I/O Cross connection » Analog inputs » HC 1..4 » Room sensor 1**.
- 3 Enter the number 11 with the plus button.
- 4 Select **Return**.
Now the sensor is connected as a purely measuring sensor.
- 5 For the sensor to affect the control loop, go to **Basic menu » Settings » User settings » Settings » Heating circuits 1..4 » Heat circuit 1**.
- 6 For P-factor, change from 0.0 to 2.0 to allow the room temperature sensor to start affecting the flow temperature (in this case with 2 ° C per degree deviation in the room temperature).
- 7 For I-factor, change from 0.0 to 0.2 to allow the room sensor to adjust the room temperature over time.

Example 2: Activating sensor for shunt group

- 1 Go to **Basic menu » Settings » Installer's menus** and enter access code 2 2 2 2.
- 2 Go to **SYSTEM Installation » I/O Cross connection » Analog inputs » HC 1..4 » Rad shunt 2**.
- 3 Enter the number 12 with the plus button.
- 4 Select **Return**.

The sensor is now connected and included in the control loop.

6.3 Activating outputs

An output must be physically connected to a free relay on the back of the display and activated in the NordFlex Controller software.



NOTE

A relay can only have one connected function, but you can connect several relays to the same function if desired.

- 1 Go to **Basic menu » Settings » Installer's menus** and enter acces code 2 2 2 2.
- 2 Go to **SYSTEM Installation » I/O Cross connection » Digital outputs**.
- 3 First select the relay.
- 4 Select the question mark to open the help that shows which function code is to be entered on the respective relay and set which function to connect to this output.
Analog outputs are set accordingly.

6.4 Activating an additional shunt group heat circuit 2

HC2 has a circulation pump and a shunt valve. It needs a relay output and an analog output. See the following example where we connect the circulation pump to relay 13 and the shunt to analog output 2.

- 1 Go to **Basic menu » Settings » Installer's menus** and enter acces code 2 2 2 2.
- 2 Go to **SYSTEM Installation » I/O Cross connection » Digital outputs » Digital outputs 8..14**.
- 3 Select the question mark to open the help and find code 28 for "Circulation pump radiator circuit 2".
- 4 Select **Back**.
- 5 Select Relay output 13 and enter the number 28.
- 6 Select **Back** two steps and select **Analog outputs** (the shunt valve has an analog output).
- 7 Select the question mark to open the help and find code 6 for "RAD shunt 2".
- 8 Select Analog output 2 and enter the number 6.

A shunt group needs a sensor as well, proceed with "Activating sensor for shunt group" in "Activating sensors".

6.5 Settings for installed hardware

Located in **Basic menu » Settings » Installer's menu » SYSTEM Installation** and contains all settings that are related to an installation. There are also settings for communication and functions for updating software.

Menu	Description
Manual operation	Activate test mode for manual operation of all outputs, either via the logical function names or direct control of relays.
Calibration	Submenu. Calibration of all sensors in the system.
SYSTEM setup	Submenu. System solution settings and various settings for each system type.
HEATPUMP setup	Submenu.
TWC	Submenu.
Additional heat AH1 (immersion heater or boiler)	Submenu.
Additional heat AH2 (additional heat in tank)	Submenu.
Additional heat AH3 (additional heat in DHW-tank)	Submenu.
Heat circuits HC1..HC4	Submenu.
Energy measurement	Submenu.
I/O Cross connection	Submenu. "Switching panel" for all inputs and outputs in NordFlex Controller. Specify which physical input is to be connected to a logic sensor and which relay is to be activated when a certain logic output function is set.

6.5.1 Test mode for manual operation

Located in **Basic menu » Settings » Installer's menu » SYSTEM Installation » Manual operation** and is used to activate test mode for manual operation of all outputs, either via the logical function names or direct control of relays.



NOTE

Settings in the manual menu apply until the user resets them.

No safety functions are operating.

In this menu, choose to either run the function manually or directly control the relay. Manual control via function activates the logical function you want to test, e.g. "Switching valve to DHW" while manual operation at the relay is a pure test mode to test a certain relay output.

Menu	Description
Heat balance	Set the heat balance manually to a chosen value and continue the process regulation based on this.
Speed up timers mode	Set the internal control clock to tick 10 or 100 times faster than normal. May only be used by a qualified technician during commissioning tests, but it is generally not recommended to use due to risk of damaging connected hardware.

Menu	Description
By functions	Submenu for manual operation of functions. – Activate Manual operation must be activated here before the rest of the menus are displayed.  NOTE Activating this menu stops all automatic control and alarm functions. – Multi heat pumps – Warm side – HC 1..4 – ALARM Run the alarm functions manually against external systems.
Directly on the outputs	Submenu for manual control of the individual relays. – Activate test mode Activate a test mode where all physical outputs can be manually operated. Activating this menu stops all automatic control and alarm functions. – Relay 1..14 Set/reset individual relays directly.

6.5.2 Calibration of temperature sensors

Located in **Basic menu » Settings » Installer's menu » SYSTEM Installation » Calibration** and is used to calibrate all different types of sensors in the system.

In this menu, enter a correction value to a sensor if necessary. For example: if the sensor shows 2.4 ° C too hot on the screen, enter -2.4 ° C.

Menu	Description
Ambient temp (degrees celsius)	Calibration of the outdoor sensor.
Heatpump out	Calibration of the heatpump sensor.
Supply line	Calibration of the supply line sensor.
DHW tank (lower)	Calibration of the DHW tank (lower) sensor.
DHW tank 2 (upper)	Calibration of the DHW tank 2 (upper) sensor.
Cold tank	Calibration of the cold tank sensor.
System 3 Tank 1 (upper)	Calibration of the system 3 tank 1 (upper) sensor.
System 3 Tank 2 (lower)	Calibration of the system 3 tank 2 (lower) sensor.

Menu	Description
Solar	Submenu...
HC 1..4	Submenu for heating system 1...4 room and flow sensors.

6.5.3 Basic configuration

Located in **Basic menu » Settings » Installer's menu » SYSTEM Installation » SYSTEM setup** and is used to set the basic configuration of the hydraulic system.



NOTE

This description is focused on the System 4 setup, the other system selections are just mentioned as a reference.

System 3 (special cases): One heat pump delivers energy to a system tank. AUX2 is also connected in the system tank. No hot water production. AUX1 can be connected to provide extra heating water after the system tank.

System 4 (standard): Up to 16 EVI-type heat pumps (AW30, AW45, and AW90). AUX heat sources both on the heating and DHW systems. Comfort cooling.

External control (special cases): NordFlex controls the compressor(s) on external signal from host system. All control and protection functions for the cold side and the compressors are active. The active signal can be digital relay signals or via a host Modbus system.

Menu	Description
SYSTEM select	Set basic configuration. System 4 is standard.
Tap water	On or off.
DHW alarm active	On or off.
Cooling	On or off.
Legionella	Submenu for prevention of legionella bacteria. – Legionella control enabled – Legionella interval (days) – Legio minimum temperature (degrees) – Keep warm time (minutes) – Start time (hour) – Stop time (hour) – Delta on (degrees) – Delta off (degrees)
Electric cartridge in buffer-tank	Submenu for... – Active – Number of heating elements – Start temp diff

Menu	Description
ADVANCED settings	Submenu. - Time between jump (minutes) Minimum time between forcing a heat source on/off due to high temperature difference between current flow temperature and the setpoint. - Jump temp up (degrees celsius) Minimum positive temperature difference between current flow temperature and the setpoint to trigger a forced shut off a heat source. - Jump temp down (degrees celsius) Minimum negative temperature difference between current flow temperature and the setpoint to trigger a forced start of the next heating source. - Max Heat balance Max value of the heating balance. - Min Heat balance Minimum value of the heating balance below the starting point for the last heat source.
Tap water max temp	Max value of the setpoint for heat pump DHW production.
Pressure sensors/guards	Submenu for pressure sensors. - Alarm stops heat pump - Alarm stops additional heat 1 - Alarm stops additional heat 2 - Analog pressure sensors

6.5.4 Heat pump setup

Located in **Basic menu » Settings » Installer's menu » SYSTEM Installation » HEATPUMP setup** and is used to set the installation parameters for the heat pumps.

Menu	Description
Heat pump model	Type of heat pump
Multi heat pump	Submenu for systems with multiple heat pumps. – Activated – Number of heat pumps – On / Off switch principle – Availability radiator heating – Availability domestic hot water – Availability cooling
System min temp for heat pmp defrost	When the ambient temperature is below the set limit where defrosting is allowed.
Heatpump min temp RAD	Minimum system temp in heating regardless of ambient temperature.
Heatpump max temp RAD	Maximum temperature from the heat pumps during heating (AUX 1 heating will supply higher temperature if needed).
Max return temperature for heatpumps	

6.5.5 Additional heat for immersion heater or boiler

Located in **Basic menu » Settings » Installer's menu » SYSTEM Installation » Additional heat AH1 (immersion heater or boiler)** and is used to set heater support for the building heat.

The AH1 is placed as in the hydraulic schematic and can be of different types. For instance, electrical, oil and gas, with or without internal heated volume.

Menu	Description
Type	Type of heat

6.5.6 Additional heat for heat in tank

Located in **Basic menu » Settings » Installer's menu » SYSTEM Installation » Additional heat AH2 (additional heat in tank)** and is used to set heater support for the building heat.

AH2 is always in the DHW tank. Normally it is electrical heaters, but it can be any kind of heat source.

Menu	Description
Type	Type of heat
Number of immersion heater elements	When the type is electrical heater, set number of elements.

6.5.7 Additional heat in DHW-tank

Located in **Basic menu » Settings » Installer's menu » SYSTEM Installation » Additional heat AH3 (additional heat in DHW-tank)** and is used to support DHW-production (DHW-EL1 and DHW-EL2 in drawings).

Menu	Description
AH3 ambient T limit (degrees celsius)	
DHW start temp (degrees celsius)	
DHW stop temp (degrees celsius)	

6.5.8 Heating systems

Located in **Basic menu » Settings » Installer's menu » SYSTEM Installation » Heat circuits HC1..HC4** and is used to define the number of heating systems there are in the building where one is the minimum. If two or more systems are controlled, mixing valves are required on all systems.

Menu	Description
Number of heat circuit	One up to four heat circuits can be defined.
HC Shunt settings	Submenu for each heat circuit – Time between pulse(s) Time in seconds between each relay pulse. The length of the pulse is proportional to the deviation between actual and setpoint. – Shunt end to end operation time (minutes) Shunt motor running time in minutes between end positions. – Shortest shunt pulse(s) Minimum pulse time in seconds that is output to the shunt motor.

6.5.9 Energy measurement

Located in **Basic menu » Settings » Installer's menu » SYSTEM Installation » Energy measurement**. When this is activated, it is possible to switch to energy data in **Statistics** and shows both consumed and emitted energy and calculated COP.

Supported electrical meters:

- ABB B23
- Carlo Gavazzi EM340 (EM330, ET340, and EM530 are also compatible).

Supported calorie meters:

- Kamstrup 603
- Xylem Pollustat

Menu	Description
Electric input power measure	
Electric measure id	
Water measure method	
Electric input power measure	
Electric measure 2 id	

6.5.10 Connection of physical inputs and outputs with their logical functions

Located in **Basic menu » Settings » Installer's menu » SYSTEM Installation » I/O Cross connection** and is used to connect physical inputs and outputs on the NordFlex card to the logical functions they serve.

Menu	Description
Analog inputs	Submenu for connecting the physical sensor inputs to different logical sensor functions. A sensor connected to input zero is disconnected and will not be used in control or display. A physical sensor can be used for several logical functions, ie the same sensor number can be found on several input lines.
Digital inputs	Submenu for connecting digital alarms and control inputs. There is also a submenu that determines the polarity of each input "active" status.
Analog outputs	Submenu for connecting the physical analogue outputs on the NordFlex card to a logical function number. The line 0-10V calibration sets the gain factor for the analogue outputs so that 100% output signal gives 10.0 volts. Don't change this!
Digital outputs	Submenu for connecting the physical digital outputs on the NordFlex card to a logical function number. One relay can only be linked to one logic function number. However, it is possible to link several relays to the same function.

6.5.11 Communication

Located in **Basic menu » Settings » Installer's menu » SYSTEM Installation » Communication** shows communication parameters with the parent system.

Menu	Description
Port 1 - Display	Diagnostic counters for the communication between the display and NordFlex Controller.
Port 2	 CAUTION Do not change anything in this menu. Communication with heat pumps. Port 2 type shall always be set to Master.

6.6 Settings for functionality of installed hardware

Located in **Basic menu » Settings » Installer's menu » User settings » Settings** and contains most of the system settings that are made after a first installation.



NOTE

A short cut to this menu is to enter code 1 1 1 1 instead of 2 2 2 2 when accessing the **Installer's menu**.

If a system function is not activated, its settings will be hidden.

Menu	Description
Heat pump	Settings for the heat pump(s).
Tap water	Tap water control.
Cooling	Settings for active cooling.
Additional heat 1	
Additional heat 2	
Additional heating DHW-tank	
Heating circuits 1..4	Setting the heat curve for all activated heating systems (sub-shunt groups) and some parent settings.
Option code	N/A
Change pincode	Set a new pin code.

6.6.1 Heat pump settings

Located in **Basic menu » Settings » Installer's menu » User settings » Settings » Heat pump**.

Menu	Description
Heat balance A0 (°min)	Starting point for the first heat pump.
Heat balance A0a (°min)	The difference in heat balance between min control signal and max control signal when using capacity-controlled heat pumps.
Prerun time circulation pump (seconds)	Circulation pump pre-run time before compressor start.
	NOTE Circulation pump run time after compressor stop is fixed to 60 s.
After run time circulation pump (seconds)	Circulation pump run time after compressor stop.

6.6.2 Tap water settings

Located in **Basic menu » Settings » Installer's menu » User settings » Settings » Tap water**.

Menu	Description
DHW start temp (degrees celsius)	Heat pump start producing DHW when temperature is below this setting.
DHW stop temp (degrees celsius)	Target temperature for DHW. Heat pump stops or switches to heating mode.



NOTE

There is also a general stop condition: If the return temperature to the heat pump exceeds max limit, the hot water production will end. Parameter: Heat pump warning high return temp.

6.6.3 Cooling settings

Located in **Basic menu » Settings » Installer's menu » User settings » Settings » Cooling**.

Menu	Description
Cooling start temp (degrees)	Temperature in the cooling tank above this level starts one heat pump in cooling mode.
Cooling stop temp (degrees)	Temperature in cooling tank to stop heat pump.
Cool ambient T limit (degrees celsius)	Specifies how fast the control signal to the heat pump changes in % per minute when the control requirement changes. A higher number causes the speed of the compressor to change faster.

6.6.4 Additional heat 1 settings

Located in **Basic menu » Settings » Installer's menu » User settings » Settings » Additional heat 1** and is used for the added heat to a building heating system.

Menu	Description
Heat balance A2 (°min)	Heat balance level to release the additional heating block.
AH1 ambient T limit (degrees celsius)	Ambient temperature above this blocks the additional heating. Block is released at 3°C lower temperature.

6.6.5 Additional heat 2 settings

Located in **Basic menu » Settings » Installer's menu » User settings » Settings » Additional heat 2** and is used to boost the DHW temperature.

Menu	Description
AH2 ambient T limit (degrees celsius)	Ambient temperature above this blocks the additional heating. Block is released at 3°C lower temperature.
DHW start temp (degrees celsius)	
DHW stop temp (degrees celsius)	

6.6.6 Additional heating DHW-tank

Located in **Basic menu » Settings » Installer's menu » User settings » Settings » Additional heating DHW-tank** and is used to...

Menu	Description
AH2 ambient T limit (degrees celsius)	Ambient temperature above this blocks the additional heating. Block is released at 3°C lower temperature.
DHW start temp (degrees celsius)	
DHW stop temp (degrees celsius)	

6.6.7 Heating system settings

Located in **Basic menu » Settings » Installer's menu » User settings » Settings » Heating circuits 1..4** and is used to handle up to four heating zones (heating curves).

Menu	Description
Summer stop heating (degrees ambient)	Set outdoor temperature for when the heat shuts off in the house. When the outdoor temperature has dropped three degrees below this temperature, the heat is switched on again.
Summer stop of circulation pumps	"Yes" shows that the circulation pumps on the hot side switch off at the same time as the summer stop in heat production. This parameter is common to all VS.
Night reduction (degrees celsius)	Default setting for room temperature night setback
Heat circuit 1	Settings for heating system 1.
Fine adjust the heating curve	Global setting. In this menu, you can adjust the heating curve if the house does not have a room sensor while it is exposed to wind.
Activate HC1	Normally "Yes". Possibility to turn off a HS, e.g. during the summer turn off the HS upstairs. If HC is not active, the shunt closes and the CP switches off regardless of the heat demand in the heating zone.
HC1 external setpoint	Normally "No". Set Yes if the heating zone is not to calculate its own heating needs but receive this information via Modbus from a higher-level system.
HC1 Room setpoint (degrees celsius)	Heating curve level adjustment - same as in the user's menu "Heating curve".
HC1 Heating curve (gradient)	Slope, steepness, adjustment of the heating curve - same as in the user's menu "Heating curve".
HC1 SL min (degrees celsius)	Minimum calculated flow setpoint in VS - regardless of setting level and slope.
HC1 SL max (degrees celsius)	Highest calculated flow setpoint in VS - regardless of setting level and slope

7 Commissioning

When the system has been installed and configured, it's time for commissioning before it is put into use. This is done in two parts:

Start up protocol

This is a checklist that the installer goes through on-site to make sure the installation has been performed correctly and that the system works as expected.

Registration in ES Web Portal

The installation is added to the ES Web Portal feature Fleet Manager.

The NordFlex Controller arrives preconfigured for the overall set-up but by registering the specific heat pumps, it's easier to monitor the systems when the system is in use. The Fleet Manager also ensures that remote support and troubleshooting is possible provided that there is internet connectivity on site.

7.1 Start up protocol

Object: _____

Test date: _____

Test by: _____

General checklist

Item	OK
Control cabinets cleaned, no loose cable parts or other debris.	☐
Sensors installed in the right place in the system according to system drawing.	☐
Sensors marked according to system drawing, both on the cable and in the correct place on the pipe.	☐
Actuators, shift valves and modulating actuators, installed according to system drawing.	☐
Actuators marked according to system drawing.	☐
Cables marked next to the control cabinet.	☐

Heat pump installation checklist

Item	OK
Heat pumps installed and prepared for operation according to below.	☐
– Space is cleaned.	
– Packaging is cleaned away.	
– No visible leaks.	
– No unassembled components.	
– Any holes in the outer wall are sealed.	
Communication cable properly routed, including signal zero between control cabinet and heat pumps.	☐
Each heat pump has the correct modbus address set on the control board in the indoor section.	☐
The heat pump has a nameplate with a number corresponding to its address (both indoor and outdoor).	☐

NordFlex Controller cabinet installation checklist

Item	OK
Control cabinet physically installed as described.	☐
Control cabinets have power supply – including a correct fuse.	☐
Sensor connected in control cabinet as instructed in I/O list. Sensor cable marked next to the control cabinet.	☐
Actuators connected in control cabinets according to I/O list. Actuators have cable marking next to the control cabinet.	☐

Heat pump communication checklist

Test the communication of each heat pump according to the following test procedures.

	HP 1 OK	HP 2 OK	HP 3 OK	HP 4 OK	HP 5 OK	HP 6 OK	HP 7 OK
1. Set the NordFlex Controller to operating mode = switched off.							
2. Set the controller to manual mode.	☐	☐	☐	☐	☐	☐	☐
The sensors for supply from, and return to, the heat pump must show similar values to pass the test.							
1. Set heat pump Running mode = Heating (2)							
2. Set heat pump Speed = 8	☐	☐	☐	☐	☐	☐	☐
The heat pump must start to pass the test.							

	HP 1 OK	HP 2 OK	HP 3 OK	HP 4 OK	HP 5 OK	HP 6 OK	HP 7 OK
1. Check that the sensors for supply shows an increase in temperature.	☐	☐	☐	☐	☐	☐	☐
The value must be about 3-5°C higher than the return sensor to pass the test.							
1. Set heat pump Speed = 0							
2. Set heat pump Running mode = Off (0)	☐	☐	☐	☐	☐	☐	☐
The heat pump must stop to pass the test.							

Heat pump compressor and temperature checklist

Check and fill in the following values after 10-15 minutes of operation.

Heat pump values

Heat pump 1

TA - Outdoor Temp	To or TUO	Ti or TUI	Ts (suction temp)	Td (discharge temp)
°C	°C	°C	°C	V
Compressor speed	EEV	TUP	Lp (low pressure)	Hp (high pressure)
hZ		°C	bar	bar

Heat pump 2

TA - Outdoor Temp	To or TUO	Ti or TUI	Ts (suction temp)	Td (discharge temp)
°C	°C	°C	°C	V
Compressor speed	EEV	TUP	Lp (low pressure)	Hp (high pressure)
hZ		°C	bar	bar

Heat pump 3

TA - Outdoor Temp	To or TUO	Ti or TUI	Ts (suction temp)	Td (discharge temp)
°C	°C	°C	°C	V
Compressor speed	EEV	TUP	Lp (low pressure)	Hp (high pressure)
hZ		°C	bar	bar

Heat pump 4

TA - Outdoor Temp	To or TUO	Ti or TUI	Ts (suction temp)	Td (discharge temp)
°C	°C	°C	°C	V

Heat pump values

Compressor speed	EEV	TUP	Lp (low pressure)	Hp (high pressure)
hZ		°C	bar	bar

Heat pump 5

TA - Outdoor Temp	To or TUO	Ti or TUI	Ts (suction temp)	Td (discharge temp)
°C	°C	°C	°C	V
Compressor speed	EEV	TUP	Lp (low pressure)	Hp (high pressure)
hZ		°C	bar	bar

Heat pump 6

TA - Outdoor Temp	To or TUO	Ti or TUI	Ts (suction temp)	Td (discharge temp)
°C	°C	°C	°C	V
Compressor speed	EEV	TUP	Lp (low pressure)	Hp (high pressure)
hZ		°C	bar	bar

Heat pump 7

TA - Outdoor Temp	To or TUO	Ti or TUI	Ts (suction temp)	Td (discharge temp)
°C	°C	°C	°C	V
Compressor speed	EEV	TUP	Lp (low pressure)	Hp (high pressure)
hZ		°C	bar	bar

Temperature sensor inputs tests

Perform the following test procedure to check that the correct sensor is changed and enter the values in the table.

1. Change the sensor body temperature where possible.

The correct sensor must change value in the NordFlex Controller display to pass the test.

Number	Sensor name	In display	OK
GT1			☐
GT2			☐
GT3			☐
GT4			☐
GT5			☐

Number	Sensor name	In display	OK
GT6			☐
GT7			☐
GT8			☐
GT9			☐
GT10			☐
GT11			☐
GT12			☐

Outputs / actuators tests

Item	OK
Make sure that the valve is physically mounted correctly so that the common port is connected to the correct pipe.	☐
Manually run the valve via the function in the NordFlex Controller.	☐
Make sure the valve moves in the right direction:	☐
– An unpowered switching valve shall direct flow towards the radiator heat (not checked symbol in NordFlex Controller manual mode menu). – An analogue shunt increases energy flow with increasing NordFlex operating signal.	

Digital outputs to switching valves

Number	Type	Function	OK
1 (RE7)	VX		☐
2 (RE8)	VX		☐
3 (RE9)	VX		☐
4 (RE10)	VX		☐
5 (RE11)	VX		☐
6 (RE12)	VX		☐
7 (RE13)	VX		☐
8 (RE14)	VX		☐

Digital outputs to on/off functions

Number	Type	Function	OK
1 (RE1)	NO		☐
2 (RE2)	NO		☐
3 (RE3)	NO		☐
4 (RE4)	NO		☐

Number	Type	Function	OK
5 (RE5)	NO		☐
6 (RE6)	NO		☐

Analogue outputs

Number	Type	Function	OK
1	0-10		☐
2	0-10		☐

7.2 ES Fleet Manager Registration

The Fleet Manager is a web-based application used for managing and monitoring Heat Pump installations. It provides real-time tracking and offers remote management of the system.

Access the Fleet Manager via <https://cloud.energysave.se/login>: ES Cloud.

7.2.1 Supported heat pump models

- AW6-R32-M
- AW9-R32-M
- AW12-R32-M
- AW15-R23-M
- AW19-R32-M
- AW30-EVI
- AW45-EVI
- AW90-EVI

7.2.2 Installation overview

The main view lists all existing (if any) commercial installations.

Field	Description
Connectivity ID	Unique identifier for connecting and monitoring the heat pump installation.
Installation Name	Name of the installation for easy identification.
Address	Physical location of the installation.
Installation Manager	Link to see more management section.

7.2.3 Register a new installation

This process can be done directly in the ES Fleet Manager.

- 1 Go to **FLEET MANAGER** and select **Commercial** in the menu on the left.
- 2 Select **+ Add Installation**.
- 3 Enter **Name** and **Location**. Only ZIP codes and countries are saved to respect data privacy.
- 4 Select **Add Installation**.
- 5 Select **Add Connectivity ID**. It's optional to add the connectivity ID but without it, it's not a proper installation.

The connectivity ID refers to the display MAC address that can be found in the NordFlex Controller: **Basic menu » Settings » Installer's menu (access code 2 2 2 2) » CCV MCU system functions » Advanced update » MQTT settings**.

As an admin, it's possible to edit Name, Location, and Connectivity ID.

Installations can be shared with sub-companies and commercial clients.

7.2.4 Installation manager

Dashboard

This section has a dashboard format, with main values as a top summary and specific subareas such as Heat Pumps—it is possible to have more than one—heat Energy Meters, Electric Meters, and Tank values, including Buffer, Radiator, DHW, and Cooling Tanks. What is visualized depends on the Heat Pump installation and configuration.

General settings that are accessible from the dashboard are: Operation mode, Only DHW, No additional heating, Only additional heating (blocked heat pump), and temperature curve settings.

Trends

A trend is a composition of values over time, for example, temperatures (hot water, flow temp, return temp, etc.) and other units (alarms, parameters, percentages, speeds). These can be shown together or individually, and together with external sources, such as weather information if regionally available.

In this section, it is possible to:

- Create a new trend with manually selected parameters to be displayed.
- View or edit (select pencil) existing trends that are created automatically.

It is possible to always select to reset the example trends if they have been changed and save them with a new name.

Alarms log

This section covers alarm logs and separates information into active alarms and history alarms. The history alarms are updated with some delay compared to active ones.

Field	Description
Started date	When the alarm started
Ended date	When the alarm was resolved
Code	Alert code
Description	More information regarding the alarm
Class	Type of alarm

8 Maintenance

Located in **Basic menu » Settings » Installer's menu » CCV MCU system functions** and contains options for maintaining the system.

Menu	Description
Read CCV settings from MCU to USB	
Write CCV settings from USB to MCU	
Update display	
Update CCV MCU	
Clean alarm history	
Advanced update	Submenu. – Read settings – Write new settings – Restarts CCV card – Calibrate touch screen

8.1 Calibrating the touch screen

Recalibrate the touch function if the press on the screen does not match what is selected.

- 1 Go to **Basic menu » Settings » Installer's menu** and enter access code 2 2 2 2.
- 2 Select **CCV MCU system functions » Advanced update » Calibrate touch screen**.
- 3 Select the five crosshairs on the screen. Start at the top left and then clockwise. The last one is in the centre of the screen.



CAUTION

If you make a mistake so that one corner is skipped, for example that you click twice in the same corner, do not continue. Turn off the power to the display and restart instead. Otherwise, you risk the screen becoming unusable.

8.2 Updating software

Software update is done in two stages where both the display and the NordFlex Controller are updated separately.

- 1 Connect a USB memory with at least 4 GB of free space to a PC.
- 2 Download latest software from supplier's server, contact supplier for more information.
- 3 Unzip the downloaded file into a directory on your computer, it will be a folder with the same name as the downloaded file.
- 4 Open the downloaded folder and locate a folder named "jeff".
- 5 Copy the folder "jeff" to the root of the USB memory.
- 6 Insert the USB memory into the USB socket marked "host" on the back of the display.
- 7 Go to **Basic menu » Settings » Installer's menus** and enter acces code 2 2 2 2.
- 8 Go to **CCV MCU system functions**.
To update the display, select **Update display**.
To update the NordFlex Controller, select **Update CCV MCU**
- 9 Select **OK** to start the update and wait until finished.



CAUTION

Do not turn off the power to the display when updating is in progress!

For the display, the update process takes 3 to 5 minutes and it will restart automatically when finished.

For the NordFlex Controller, the update process takes about 15 minutes.

8.3 Copying settings from one heat pump to another



NOTE

Copying settings only works if both systems have the same software version.

Read settings from an existing system

- 1 Insert a USB memory into the USB socket marked "host" on the back of the display.
- 2 Go to **Basic menu » Settings » Installer's menus** and enter acces code 2 2 2 2.
- 3 Go to **CCV MCU system functions** and select **Read CCV settings from MCU to USB**.
- 4 Select **OK** and wait about 60 seconds until the routine is complete.



CAUTION

Do not turn off the power to the display when updating is in progress!

- 5 Remove the USB memory.

Write settings from USB to a new CCV

- 1 Insert the USB memory into the USB socket marked "host" on the back of the display.
- 2 Go to **Basic menu » Settings » Installer's menus** and enter access code 2 2 2 2.
- 3 Go to **CCV MCU system functions** and select **Write CCV settings from USB to MCU**.
- 4 Select **OK** and wait until the routine is complete.



CAUTION

Do not turn off the power to the display when updating is in progress!

- 5 Remove the USB memory.
- 6 Restart the NordFlex Controller.

9 Troubleshooting

9.1 Troubleshooting using the NordFlex Controller

- 1 Read and take note of what is in the alarm menu/the alarm history (there may be errors that have already been acknowledged and therefore do not appear in the list of current alarms).

If no errors are present: Enter manual mode and activate functions one by one to find errors:



CAUTION

Manual operation, if used incorrectly, can damage the system and its components. This menu is intended for trained service personnel only.

- 1.1 Go to **Basic menu » Settings » Installer's menu » SYSTEM Installation » Manual operation**.
- 1.2 Select **By functions** and go to the feature group you want to try.
- 2 Acknowledge the alarm. The fault disappears and the heat pump starts.



NOTE

Some alarms can be auto-acknowledged if the issue is fixed.

- 3 Note when the fault occurred and wait. If the same error occurs again or persists, contact the installer.

9.2 Common alarms

The following list describes the most common alarms. The full alarm list can be found in the separate Alarms List document.

Type	Description	Possible cause	Corrective action
Alarms			
High pressure gas circuit Class A	The high-pressure switch has tripped. HP is stopped.	Can trip if the heat pump is unable to dissipate the heat or that too hot water returns to the heat pump.	Check flow and return temperatures. Until acknowledgment takes place, hot water and house heating with reduced temperature are produced by immersion heaters. After acknowledgment, but before resetting, full heat / hot water is produced by immersion heaters. If the error persists after recovery, contact support.
Warnings			
Poor circulation, warm side	Poor circulation in the heating water.		Check dirt filter on hot side, check circulation pump.
High temperature	High return temperature, the heat pump revs down.		Check flows if the warning returns.
All sensor errors	Alarm is displayed. The function controlled by the sensor is switched off / off.		Disconnect the sensor from the NordFlex card and measure with an ohmmeter the resistance in the sensor cable. Check measured value according to reference table in "Temperature to resistance conversion, NTC22k".

10 Appendix

10.1 Temperature to resistance conversion, NTC22k

Refer to the following table when performing resistance measurement of the sensors.

Temp [°C]	Res. [kΩ]	Temp [°C]	Res. [kΩ]	Temp [°C]	Res. [kΩ]	Temp [°C]	Res. [kΩ]	Temp [°C]	Res. [kΩ]	Temp [°C]	Res. [kΩ]
-25	238	-4	80.6	8	46.0	20	27.1	40	12.2	52	7.9
-20	181	-2	73.4	10	41.8	22	25.0	42	11.4	54	7.4
-15	139	0	66.2	12	38.5	24	23.0	44	10.5	56	6.9
-10	108	2	60.7	14	35.2	26	21.2	46	9.8	58	6.4

Temp [°C]	Res. [kΩ]	Temp [°C]	Res. [kΩ]	Temp [°C]	Res. [kΩ]	Temp [°C]	Res. [kΩ]	Temp [°C]	Res. [kΩ]	Temp [°C]	Res. [kΩ]
-8	98,3	4	55.2	16	32.2	30	18.0	48	9.1	60	6.0
-6	88,9	6	50.3	18	29.7	35	14.8	50	8.4	65	5.0

10.2 Outputs

I/O Cross connection - Digital outputs

Cross connection (paching) is used to connect the logic's functional output with a physical relay. Select relay and enter which function code shall be associated with this relay.

Not used (always OFF)	0
AH1 immersion heater 1	13
AH1 immersion heater 2	14
AH1 immersion heater 3	15
AH1 immersion heater 4	16
AH1 Boiler On	17
AH1 shunt increase	18
AH1 shunt decrease	19
AH2 immersion heater 1	20
AH2 immersion heater 2	21
AH2 immersion heater 3	22
AH2 immersion heater 4	23
AH2 Boiler On	24
AH2 shunt increase	25
AH2 shunt decrease	26
Circulation pump HC 1	27
Circulation pump HC 2	28
Circulation pump HC 3	29
Circulation pump HC 4	30
HC1 shunt increase	31
HC2 shunt increase	32
HC3 shunt increase	33
HC4 shunt increase	34
HC1 shunt decrease	35
HC2 shunt decrease	36
HC3 shunt decrease	37
HC4 shunt decrease	38
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Solar circulation pump	40
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Sum alarm B	42
Sum alarm C	43
Sum warnings D	44
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Sum ALL alarms	46
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Switching valve ES DHW 2	51
Switching valve ES DHW 3	52
Switching valve ES DHW 4	53
Switching valve ES DHW 5	54
Switching valve ES DHW 6	55
Switching valve ES DHW 7	56
Switching valve ES DHW 8	57
Switching valve ES COOL 1	58
Switching valve ES COOL 2	59
Switching valve ES COOL 3	60
Switching valve ES COOL 4	61
Switching valve ES COOL 5	62
Switching valve ES COOL 6	63
Switching valve ES COOL 7	64
Switching valve ES COOL 8	65
TWC circulation pump	68
TWC heatpump digital	69
AH TWC immersion heater 1	70
AH TWC immersion heater 2	71
AH TWC immersion heater 3	72
AH TWC immersion heater 4	73
AH TWC Boiler On	74
AH TWC shunt increase	75
AH TWC shunt decrease	76
DHW EL2	77
DHW EL1	78
EVI HP1 CP	79
EVI HP2 CP	80
EVI HP3 CP	81
EVI HP4 CP	82
EVI HP5 CP	83
EVI HP6 CP	84
EVI HP7 CP	85

EVI HP8 CP	86
Second tick	87
EVI HP9 CP	88
EVI HP10 CP	89
EVI HP11 CP	90
EVI HP12 CP	91
EVI HP13 CP	92
EVI HP14 CP	93
EVI HP15 CP	94
EVI HP16 CP	95
Switching valve ES DHW 9	96
Switching valve ES DHW 10	97
Switching valve ES DHW 11	98
Switching valve ES DHW 12	99
Switching valve ES DHW 13	100
Switching valve ES DHW 14	101
Switching valve ES DHW 15	102
Switching valve ES DHW 16	103
Switching valve ES COOL 9	104
Switching valve ES COOL 10	105
Switching valve ES COOL 11	106
Switching valve ES COOL 12	107
Switching valve ES COOL 13	108
Switching valve ES COOL 14	109
Switching valve ES COOL 15	110
Switching valve ES COOL 16	111
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Radiator-tank electric cartridge 2	113
Radiator-tank electric cartridge 3	114
Radiator-tank electric cartridge 4	115
Block HP high return	116
DHWC electric cartridge 1	117
DHWC electric cartridge 2	118
DHWC electric cartridge 3	119

I/O Cross connection - Analog outputs

Cross connection (paching) is used to connect the logic's functional output with a physical output. Analog outputs gives a voltage between 0-10 V DC. Select output and enter which function code shall be associated with this output.

Not in use	0
Compressor speed	1

Outdoor unit Fan speed	2
Additional heater 1	3
Additional heater 2	4
HC1 shunt position	5
HC2 shunt position	6
HC3 shunt position	7
HC4 shunt position	8
Reserved	9
Main shunt after tank (System 3)	10
TWC shunt	29
TWC heatpump analog	30
TWC AH analog	31

0 - 10 V calibration: This is a calibration constant for the analog outputs. A higher value gives a higher output.



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