ecocycle

HEAT PUMPS

ecoteq HEAT PUMPS *Made in Holland*

ekoturk ISITMA SOĞUTMA

USER MANUAL

ON/OFF SERIES RVS21

INTRODUCTION

In addition to information about operating and use of the ECOCYCLE heat pump, you will also find information about installing the heat pump. There are also some sections explaining the overall operation of heat pumps. In addition, you will get back ground information and advice that can assist in designing the entire system around the heat pump.

Caution for danger!

Please read this manual carefully before using the heat pump.

PICTOGRAMS

In this guide, different pictograms are used to point the reader to items that require extra attention or potential dangers. Below are the following icons:

Hint!

Instructions that help you safely use and maintain the device.

Pay attention!

Indicates situations or actions that can damage the unit.

Danger warning!

Indicates situations or actions that may cause (serious) injury.

TARGET AUDIENCE

This manual gives the user information about the operation and maintenance of the heat pump. In addition, the manual serves as a reference for the installer during commissioning.

Caution for danger!

The installation and maintenance of the heat pump must only be carried out by qualified personnel.

SAFETY

General

Caution for danger!

The installation and maintenance of the heat pump must only be carried out by qualified personnel.

- When a negativity occurs, (excessive noise, smoke, smell, etc.), the device must be turned o fffrom the fuse, and the service must be called.
- The inner parts of the board must not contact with water; if it does, call the service.
- Do not drink the water produced by or discharged from the device.
- Do not touch the device or any other part connected to it with wet hands.

Caution for danger!

The heat pump housing may only be opened by qualified personnel.
Improper operation can cause injury and / or damage.
Danger of injury due to parts under tension!
The electrical connection of the device must be cut off during cleaning and maintenance.

- Do not manually pull or crush the electric cables, otherwise you may suffer from electric shocks.
- Electrical connections must comply with the electrical connection diagrams specified in the manual.
- The voltage of the grid must be suitable for the device. It must be checked to see it complies. The rules of grounding must be definitely followed. Otherwise, it may cause electric shocks. Our company is not liable for damages and failures that may occur in case the device is not operated in line with the current-voltage values specified in the table of technical characteristics regarding the operation of the device.
- Do not connect the grounding cable to the lightning rod, gas pipe, water pipe or telephone cable.
- Electrical connections must comply with the electrical connection diagrams specified in the manual.

Caution for danger!

Work on the refrigerant circuit may only be carried out by qualified and certified personnel.

Caution for danger!

In case of leakage of the refrigerant circuit, do not inhale gases and vapors. Avoid contact with the gas.
When the leak outlet of the refrigerant is touched, there is a danger of freezing.

Caution for danger!

When R407C is exposed to an open flame, toxic degradation products form. Evacuate the space immediately.
Persons with poisoning symptoms should be brought to fresh air immediately.

Caution for danger!

The refrigerant is a gas that is heavier than air at room temperature. Provide adequate ventilation when operating in a cool room with a coolant to avoid choking hazard.

INDEX

1. DATA HEAT PUMP INSTALLATION

1.1 Required documents of this documentation

F-Gas regulation
- Work registration Page 8
- Leak density certificate Page 9

PED / NEN378:2008
- Pressure proof document Page 10
- Vacuum and Filling Procedure Document Page 11
- Flow schedule (from PED category II) Page
- CE declaration (from PED category II) Page
- Warranty Page

Contact details owner / user

Name .....
Street address .....
City .....
Zip code .....
.....
Phone number .....
E-mail address .....
Name of contact person .....

Contact details installer

Registration number .....
Company name .....
Street address .....
City .....
Zip code .....
Phone number .....
E-mail address .....
Maintenance contract number .....

Contact details manufacturer

Registration number .....
Company name .....
Street address .....
City .....
Zip code .....
Phone number .....
E-mail address .....
Order number .....

Date	Company Reg. number	Type of service	Work ticket number	Refrigerant activities	
				Refilled	Tapped

1.1.1 Work registration

- Registration of management must correspond to the existing work tickets.
- At each visit to the installation, the work performed must be described and can be referred to the individual job registration, provided that it is attached.

Serial number:

1.1.2 Leak density certificate

The installation has been checked for correct operation and leakage density after commissioning. The leak detection is performed with a leak detector whose detection limit is at least 5 ppm.

Leak density control in accordance with NEN-EN378: 2008 performed by:

Name of supplier / installer .....

F-gases business certificate number .....

Name mechanic .....

F-gas diploma number mechanic .....

Implementation date: Signature:

Serial number:

1.1.3 Pressure proof document

During the test, the installation has been checked for leakage and deformation.
The leakage density control is performed by means of Visual inspection of the pressures and by means of Leak tracking devices.
The installation is leakproof and no deformations have been detected.

Pressure proof: Final pressure = 1,1x design pressure (EN378-2 § 6.3.3)

		Bar(a)		Bar(a)
Design pressure:	LP=		HP=	
Final testing pressure:	LP=		HP=	

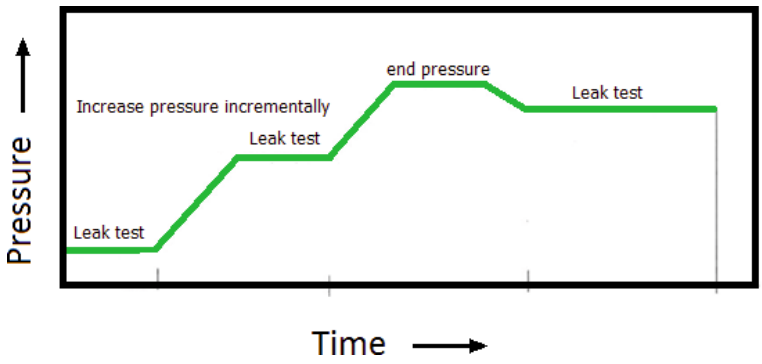
Ambient temperature: °C

Press medium: Dry nitrogen (N_2)

Total time pressure test (hours):

Gauge number: Calibration valid until:

Gradient pressure test: (EN378-2 § 6.3.4)



Name of supplier / installer

F-gases business certificate number

Name mechanic

F-gas diploma number mechanic

Implementation date: Signature:

Serial number:

1.1.4 Vacuum and Filling Procedure Document

The complete installation has been pulled vacuum in accordance with NEN-EN378: 2008

Installations with refrigerant content <30 kg.

Reached vacuum pressure:		Pa/Torr/Micron*		
Stand time**		Uren		Minutes
Times broken with N2:		(2 times minimal)		
Ambient temperature:		°C		

During filling, the following amount of refrigerant is added.

Type of refrigerant		
Refrigerant mass		kg

Vacuuming and filling is performed by:

Name of supplier / installer _____

F-gases business certificate number _____

Name mechanic _____

F-gas diploma number mechanic _____

*) *Cross out what is not applicable. (270 Pa = 2 Torr = 2000 Micron)*
**) *Time that vacuum is maintained*

Implementation date: Signature:

Serial number:

1.1.5 CE – Declaration of conformity

According to Machine guidelines 2006/42/EG

Here by we declare that ECOCYCLE heat pumps that are built

with: Cooling components, electric cabinets, circulation pumps,
Safety switches, temperature sensors and other components,

are intended for incorporation in homes, offices and commercial premises, such as
Defined in the EC Machinery Directive 2006/42 / EC and installation regulations are provided by ECOCYCLE.

In accordance with the following applicable guidelines:

Machinery Directive (2006/42 / EC) and amendments
Low Voltage Directive (2006/95 / EC) and amendments
EMC Directive (2004/108 / EC) and amendments
Pressure Equipment Directive (97/23 / EC) and amendments

And complies with the following harmonized European standards:

NEN-EN-ISO 12100-2010	Safety for machine - General design principles Risk assessment and risk reduction EN ISO 14121-1: 2007
NEN-EN 842:1996+A1:2008	Machine Safety - Visual Hazard Signals - General Requirements, Design Principles and Test Methods
NEN-EN 953:1997+A1.2009	Machine Safety - Shielding - General requirements for design and constitution of fixed and movable shielding
NEN-EN 1299:1997+A1:2008	Mechanical vibration and shock vibration isolation of machines - Data for the application of source isolation
NEN-EN-IEC 20529:1992/A2:2013	Degree of protection of electrical equipment coverings. (EP Encoding)
NEN-EN-IEC 60204-1	Machine safety - Electrical equipment of machinery - Part 1: General requirements

However, it is not allowed to operate our ECOCYCLE heat pumps until the installation in which they are incorporated or which they are part of the whole, including the product of this statement, does not conform with the statutory requirements.

Management of EKOTURK

Implementation date:

Signature:

2. INSTALLATION CONDITIONS

2.1. General installation instructions

When installing the heat pump, the installer must comply with European Standard and Legislation.

Please pay attention to the following points:

Item	Action
1.	All instructions contained in the applicable manuals and / or instructions must be followed strictly!
2.	Place the unit in such a way that mechanical damage caused by external causes is not possible.
3.	Do not put the heat pump in an aggressive and / or explosion hazardous area (s). The heat pump must be placed in a clean and dust-free area at all times. So that the heat pump, including components, cannot be damaged and / or defective.
4.	The heat pump must be installed in accordance with the installation instructions, so that the engine can properly reach the heat pump in case of malfunction and operation. The heat pump must be easily accessible and there must be sufficient work space around the heat pump. This means that the heat pump must be at least 1 meter in space and one of the two side panels must be able to drain, even with 1 meter of work space. See Annex 4.2. ***If this is not the case, ECOCYCLE will charge additional costs if the mechanic is prevented from labour during his time.***
5.	Conduits must be connected to the unit in such a way that no voltages of any kind can occur. The connection must also be vibration damping (flexible hoses, rubber anti-vibration gaskets, etc.). Conduits must be connected properly. Use the enclosed appendix 3.2. The conduits must be clean and equipped with dirt filters.
6.	Operation, Maintenance, Checks and Service may only be carried out by authorized and skilled engineers.
7.	The filling of water must be carried out in accordance with the regulations. Always use the prescribed and / or calculated water / glycol percentage.
8.	The electrical installations must be properly connected to the heat pump, see attached Annexes 5.2 and 5.3.
9.	Commissioning must not take place before installation complies with local regulations and legislation. The ECOCYCLE directive on commissioning is also required. (see annex 2.2.)
10.	The installer must inform the end user regarding the legal commissioning in accordance with Amending Decision I (339) and Periodic Revision in accordance with Amending Decision II (387)
11.	All points and / or activities not specifically mentioned must be performed to ensure safe and responsible commissioning and management.

3. SPECIFICATIONS

3.1. S-SZ Series

			ECOCYCLE S-12	ECOCYCLE S-16	ECOCYCLE SZ-12	ECOCYCLE SZ-16
HEATING WATER	CAPACITY (1)	kW			14,18	20,38
	POWER	kW			3,26	4,72
	COP (1)	W/W			4,35	4,31
HEATING	CAPACITY (2)	kW	12,60	15,88	12,92	16,20
	POWER	kW	2,92	3,64	2,98	3,76
	COP (2)	W/W	4,31	4,36	4,34	4,31
	CAPACITY (3)	kW	12,20	14,98	12,56	15,33
	POWER	kW	3,63	4,43	3,66	4,48
	COP (3)	W/W	3,36	3,38	3,43	3,41
	OPERATING TEMPERATURE	° C	-15/+45	-15/+45	-22/+45	-22/+45
	MAXIMUM WATER TEMPERATURE	° C	56	56	62	62
COOLING	CAPACITY (4)	kW	9,35	12,00	9,57	12,15
	POWER	kW	3,67	4,68	3,45	4,45
	EER	W/W	2,55	2,56	2,77	2,73
	OPERATING TEMPERATURE	° C	+24/+43	+24/+43	+24/+48	+24/+48
	MINIMUM WATER TEMPERATURE	° C	5	5	5	5
COMPRESSOR	TYPE		Scroll	Scroll	Scroll	Scroll
	REFRIGERANT		R407C	R407C	R407C	R407C
	QUANTITY		1	1	1	1
EXCHANGER	TYPE		PHE	PHE	PHE	PHE
FAN	TYPE		Axial	Axial	Axial	Axial
	BRAND		Rosenberg	Rosenberg	Rosenberg	Rosenberg
	FAN SPEED		670-880 rpm	670-880 rpm	670-880 rpm	670-880 rpm
	SOUND LEVEL		52 dB	53 dB	50 dB	50 dB
	FAN POWER		220-270 W	220-270 W	220-270 W	220-270 W
DIMENSIONS	WIDTH	mm	1360	1360	1360	1360
	DEPTH	mm	500	500	500	500
	HEIGHT	mm	1110	1110	1110	1110
	WEIGHT	kg	138	148	138	148
VOLUME		dBA	60	62	58	60
RECIRCULATION PUMP		m^3/h	2,5	3	2,5	3
DEVICE PRESSURE LOSS		Kpa	30	38	30	38
CABLE SECTION		mm^2	5x2,50	5x2,50	5x2,50	5x2,50
FUSE		A	20	20	20	20
(INPUT-OUTPUT) PIPE DIAMETER		DN	32	32	32	32
VOLTAGE		V/PH/HZ	380/3/50	380/3/50	380/3/50	380/3/50
ADDITIONAL HEATER			Optional	Optional	Optional	Optional
AUTOMATIC DEFROST			Yes	Yes	Yes	Yes
LOW PRESSURE PROTECTION SYSTEM			Yes	Yes	Yes	Yes
HİGH PRESSURE PROTECTION SYSTEM			Yes	Yes	Yes	Yes

(1) : Heating Power A20/W15-55 (EN14511). Outer air temperature KT 20 ° C YT 15 ° C

(2) : Heating Power A7/W35-30 (EN14511). Outer air temperature KT 7 ° C YT 6 ° C

(3) : Heating Power A7/W45-40 (EN14511). Outer air temperature KT 7 ° C YT 6 ° C

(4) : Cooling Power A35/W7-12 (EN14511). Outer air temperature 35 ° C

3.2. 13-26-39-46-Series

			ECOCYCLE 13	ECOCYCLE 26	ECOCYCLE 39	ECOCYCLE 46
HEATING WATER	CAPACITY (1)	kW	13,72	26,24	39,24	46,03
	POWER	kW	3,30	6,20	9,16	10,58
	COP (1)	W/W	4,15	4,20	4,28	4,35
HEATING	CAPACITY (2)	kW	12,32	21,93	31,67	38,01
	POWER	kW	2,90	5,10	7,40	8,80
	COP (2)	W/W	4,25	4,30	4,28	4,32
	CAPACITY (3)	kW	12,02	20,44	30,04	36,33
	POWER	kW	3,70	6,10	9,05	10,75
	COP (3)	W/W	3,25	3,35	3,32	3,38
	OPERATING TEMPERATURE	° C	-15/+45	-15/+45	-15/+45	-15/+45
	MAXIMUM WATER TEMPERATURE	° C	56	56	56	56
COOLING	CAPACITY (4)	kW	9,28	15,53	22,39	26,75
	POWER	kW	3,67	6,06	8,99	10,70
	EER	W/W	2,53	2,56	2,49	2,50
	OPERATING TEMPERATURE	° C	+24/+43	+24/+43	+24/+43	+24/+43
	MINIMUM WATER TEMPERATURE	° C	5	5	5	5
COMPRESSOR	TYPE		Scroll	Scroll	Scroll	Scroll
	REFRIGERANT		R407C	R407C	R407C	R407C
	QUANTITY		1	1	1	1
EXCHANGER	TYPE		PHE	PHE	PHE	PHE
FAN	TYPE		Axial	Axial	Axial	Axial
	BRAND		Rosenberg	Rosenberg	Rosenberg	Rosenberg
	FAN SPEED		915-1015 rpm	620-850 rpm	670-880 rpm	670-880 rpm
	SOUND LEVEL		52 dB	55 dB	58 dB	58 dB
	FAN POWER		220-270 W	460-550 W	521-600 W	521-600 W
DIMENSIONS	WIDTH	mm	717	927	1027	1030
	DEPTH	mm	753	803	953	953
	HEIGHT	mm	803	1003	1003	1003
	WEIGHT	kg	135	210	270	310
VOLUME		dBA	62	64	68	68
RECIRCULATION PUMP		m^3/h	2,5	4	6	6,5
DEVICE PRESSURE LOSS		Kpa	30	40	50	55
CABLE SECTION		mm^2	5x2,50	5x2,50	5x4	5x4
FUSE		A	20	20	32	32
(INPUT-OUTPUT) PIPE DIAMETER		DN	32	32	32	32
VOLTAGE		V/PH/HZ	380/3/50	380/3/50	380/3/50	380/3/50
ADDITIONAL HEATER			Optional	Optional	Optional	Optional
AUTOMATIC DEFROST			Yes	Yes	Yes	Yes
LOW PRESSURE PROTECTION SYSTEM			Yes	Yes	Yes	Yes
HİGH PRESSURE PROTECTION SYSTEM			Yes	Yes	Yes	Yes

(1) : Heating Power A20/W15-55 (EN14511). Outer air temperature KT 20 ° C YT 15 ° C

(2) : Heating Power A7/W35-30 (EN14511). Outer air temperature KT 7 ° C YT 6 ° C

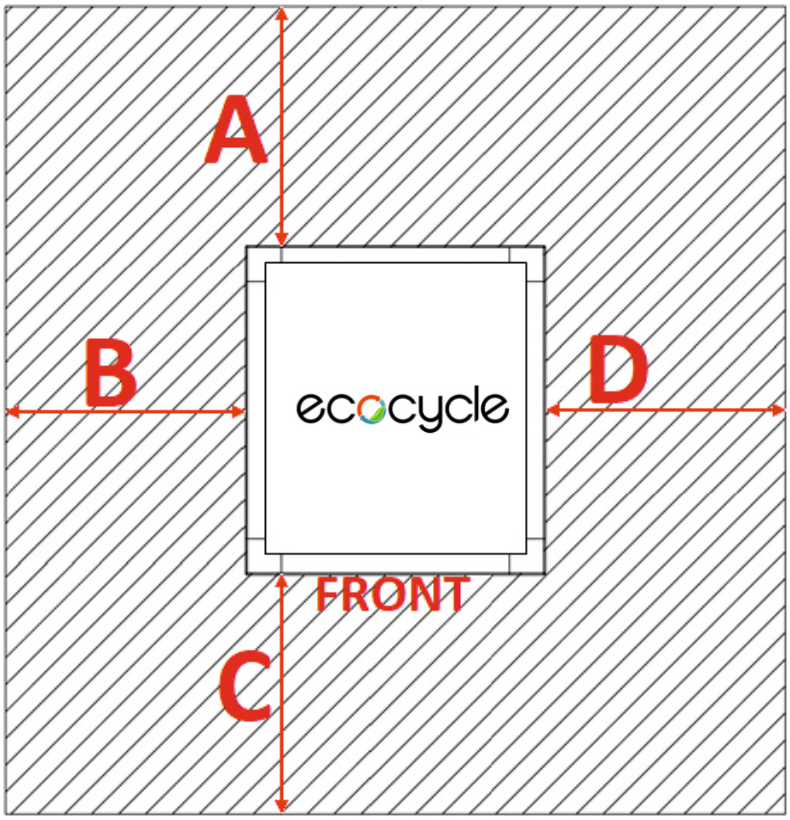
(3) : Heating Power A7/W45-40 (EN14511). Outer air temperature KT 7 ° C YT 6 ° C

(4) : Cooling Power A35/W7-12 (EN14511). Outer air temperature 35 ° C

3.3. PLACEMENT OF THE MACHINES

The value's below are the minimal distance from side to wall/edge. Minimal height of the room where the heat pump is installed is 2000mm. Place the ECOCYCLE heat pump on a solid floor.

For service and maintenance it is important that the heat pump is accessible at all times. Therefore, we recommend a minimum distances of:



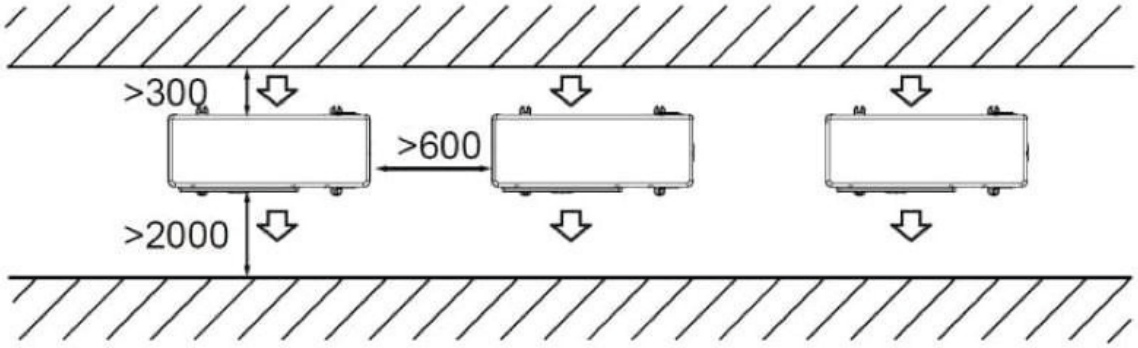
3.3.1 ECOCYCLE S and SZ Series

A = 300mm
B = 300mm
C = 2000mm
D = 750mm

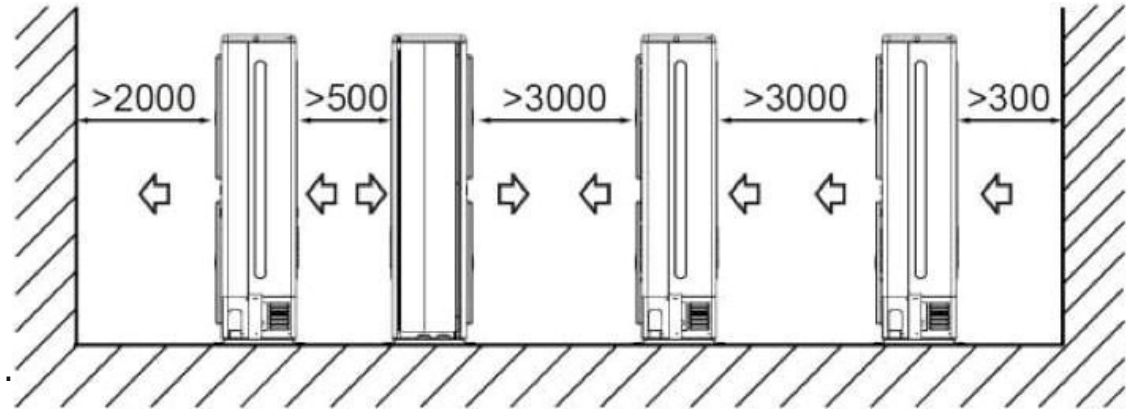
3.3.2 ECOCYCLE 13-26-39-46 Series

A = 400mm
B = 400mm
C = 2000mm
D = 750mm
C = 2000mm
D = 500mm

3.3.3 Air-water heat pumps side by side placement



3.3.4 Air-water heat pumps double-sided placement



4. TRANSPORT AND INSTALLATION OF THE HEAT PUMP

4.1. General

This chapter provides guidelines and advice for the correct installation of the ECOCYCLE heat pump. The heat pump will always be part of a heating and / or cooling system. The efficiency of the entire installation can or may be matched with the correct components. ECOCYCLE provides information, but it is the installer who will choose and assemble the appropriate components. The installer is therefore responsible for the optimal functioning of the installation as a whole. This does not affect ECOCYCLE willingness to support her knowledge and expertise in building an installation.

4.2. Transport

The heat pump must be transported upright. Use proper lifting belts to lift the heat pump. Prevent the heat pump from being exposed to shock or vibration during transport.

Warning for danger!

Only use approved lifting devices for lifting the heat pump.

4.3. Installing the heatpump

Installing and commissioning
Before installing an ECOCYCLE heat pump, it is important to observe a number of advice.

Warning for danger!

The heat pump installation may only be carried out by qualified personnel.

When designing the ECOCYCLE heat pumps, care is taken to prevent annoying vibrations and noise. Nevertheless, a heat pump remains a machine with moving parts. Any resonance is therefore not entirely excluded. To minimize this we advise to use flexible hoses between the heat pump and the further piping system.

4.3.1. Requirements for the delivery system

We recommend installing dirt filters in the return pipes to the heat pump. These will prevent the heat exchangers from being clogged by contamination that may have occurred during the installation of the system. When the filters are mounted, they have to be checked regularly during the first months of using the heat pump. If, for example, one year does not accumulate any pollution in the filters, it may be considered to remove it. The improved flow will benefit from the heat pump performance.

It is important that (automatic) air chambers are placed in each system's circuit, at the highest point. Air is often the cause of malfunctions in the systems.

Make sure that expansion vents are placed on the delivery and Source side with a corresponding filling point.

The ECOCYCLE heat pumps can be supplied with built-in circulation pumps. For both the source system and the delivery system. It is important that the total resistance of each system does not exceed the capacity of the built-in circulation pump. Each installation has a certain resistance. For the efficiency of the installation it is important that the correct circulation pump is applied. A too small pump will cause insufficient power to be delivered. An excessive pump is negative for the overall efficiency of the installation. In the relevant tab at the end of this documentation you will find information about the standard applied pumps and the internal resistance in the heat pump. As an option, the heat pump can be equipped with other circulation pumps, if that is beneficial to the total efficiency of the installation.

Pay attention!

It is the responsibility of the installer to select the optimal circulation pump(s) for the installation that he installs.

4.3.2. Checklist installation and first boot

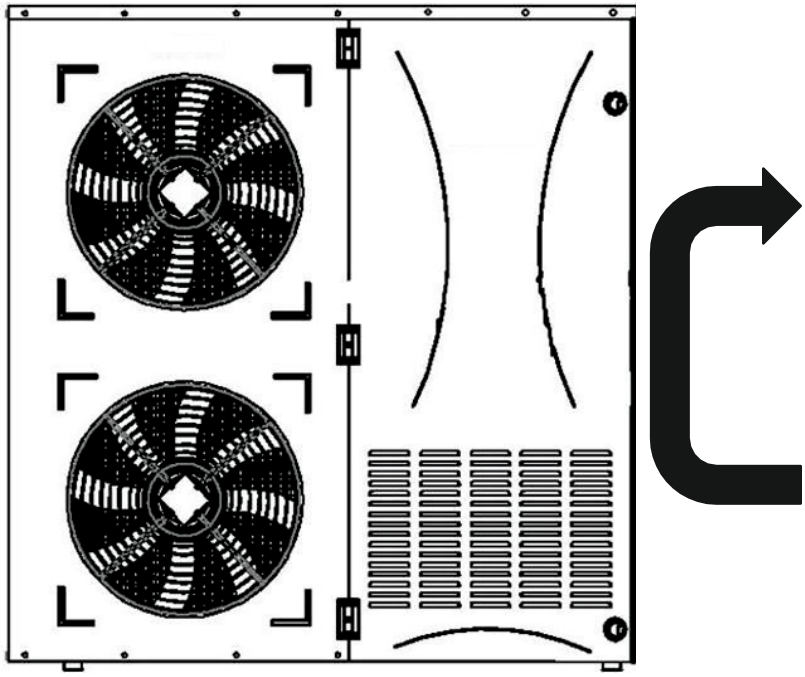
Item	Action
12.	Check that the pipework around the heat pump is properly installed.
13.	Check the pipework for leaks.
14.	Check that the electrical connections are made correctly.
15.	Check in the heat pump whether all components are properly seated.
16.	Check the electrical connections and wiring in the heat pump.
17.	Check the heat pump internally for leaks. Pay particular attention to leaking refrigerant.
18.	Check the pressure in the source system and delivery system.
19.	Check the glycol content of the liquid in the source.
20.	Check that expansion vessels are provided in the correct places.
21.	Inspect the filters in the pipes and clean them if necessary.
22.	Be 100% sure there is no air left inside the piping system

After this first checklist, the heat pump can be switched on. Further points can be considered.

Item	Action
23.	Check the settings of the heat pump for deviations.
24.	Check if all functions of the heat pump work properly.

4.3.3. Water connections Air-Water heat pumps

ECOCYCLE Air-Water-Series have 1 ¼" inner thread water connection points, the lower is inlet, the upper one is the outlet.

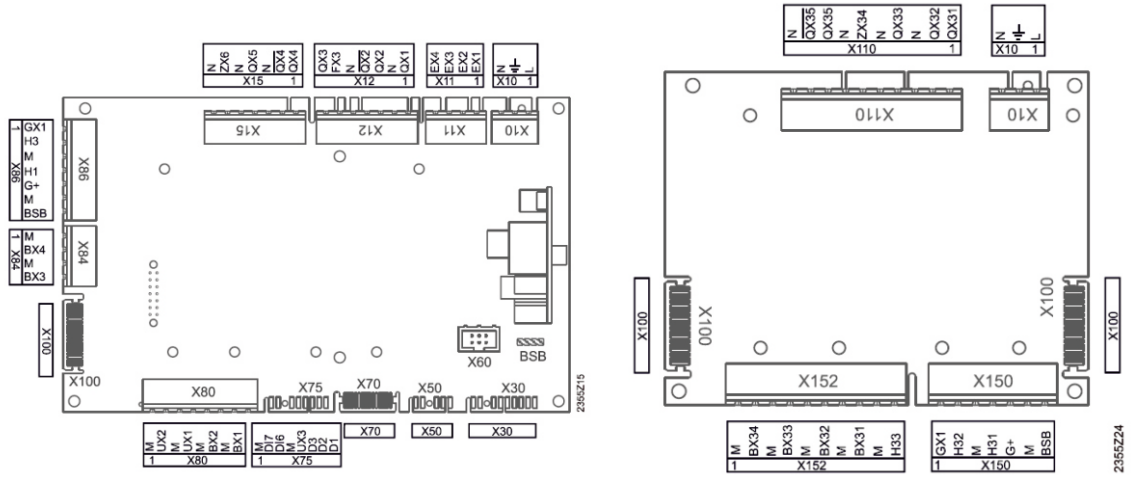


5. ELECTRICAL CABLE CONNECTION

In this part of the documentation you will find electrical schedules and how to connect your heat pump in your setup.

5.1 Main control board

For the main controller the Siemens RVS21 is used, see image below for an example:



All electrical operations and installations should be carried out by authorized persons. National electricity standards must be complied with while carrying out the electricity assembly.

Pay attention!

Maximum 2A, 230 V electricity can be obtained from all relay outputs on the control card.

Pay attention!

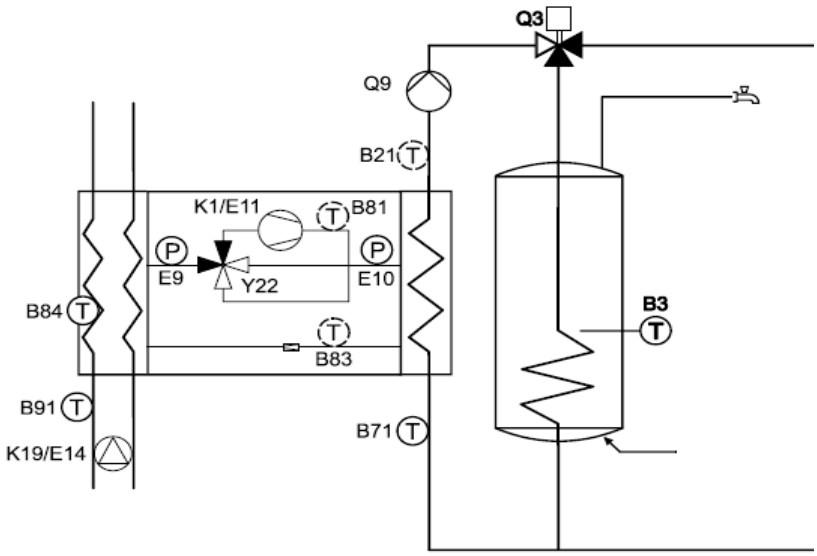
The connections of the tools and sensors to be connected to the control card during the installation must be carried out as shown in the diagram as per their purpose of use.

Notes:

5.3 Electrical connection diagrams Air-Water heat pumps

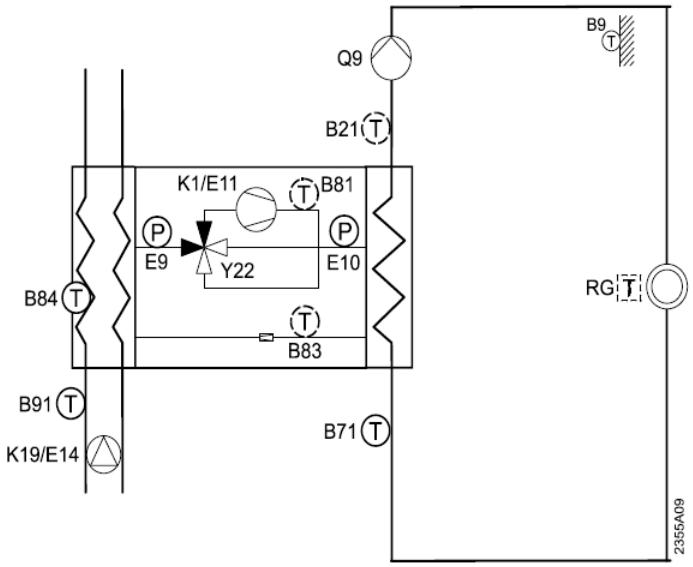
ECOCYCLE Heat pumps can be used in three ways as only hot water, only heating-cooling, and heating-cooling and hot water. Drawings for three types of use are shown.

5.3.1 Only Hot Water Setting:



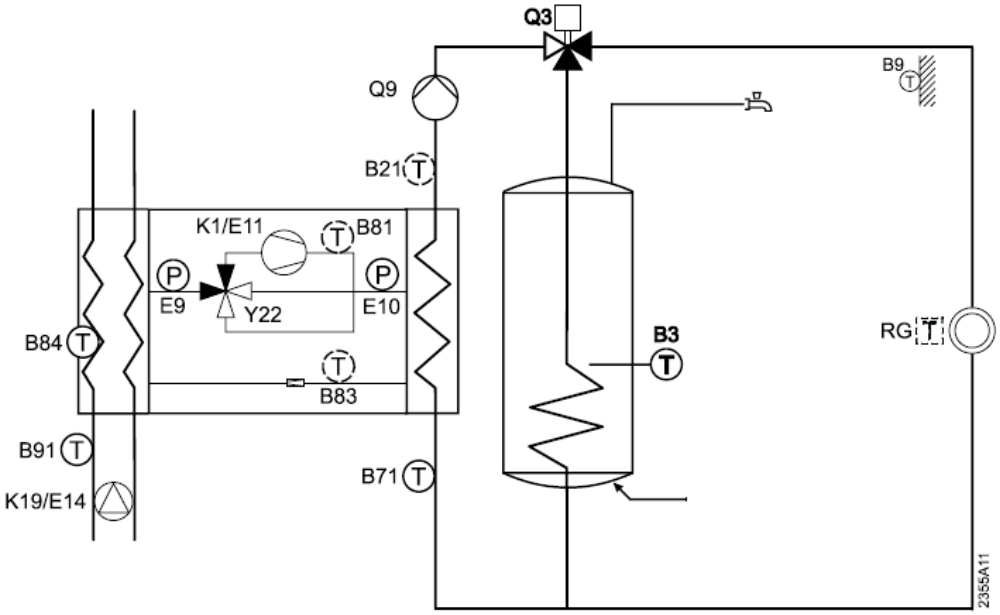
Connection Point	Socket	Terminals	Remark	Connection Status
BX2	X80	3-4	Boiler Sensor B3	Connection during installation
BX3	X84		Hot Gas Sensor B81	Factory-connected
BX4	X84	5-6	Outer Air Sensor B9	Connection during installation
BX31	X152		Hot Water Stream Sensor B21	Factory-connected
BX34	X152		Hot Water Return Sensor B71	Factory-connected
BX32	X152		Air Inlet Temperature Sensor B91	Factory-connected
BX33	X152		Air Outlet Temperature Sensor B92	Factory-connected
QX1	X12		Four-Way Valve Relay Outlet Y22	Factory-connected
QX31	X110	7	Boiler Resistance	Connection during installation (Optional)
ZX6	X15		Compressor Crank Heater K40	Factory-connected
QX2	X12		Compressor Relay Outlet K1	Factory-connected
QX3	X12		Fan Relay Outlet K19	Factory-connected
QX4	X15	11	Boiler Circulation Pump Q9	Connection during installation (contactor should be used more than 2 amperes stream or three phase pumps)
EX2	X11		Flow Switch	Factory-connected
EX3	X11		Low Pressure Switch E9	Factory-connected
EX4	X11		High Pressure Switch E10	Factory-connected
EX1	X11		Compressor Overload Switch E11	Factory-connected
G+ M BSB	X86	12-13-14	Room Unit Connection G+=1 M=2 BSB=3	Connection during installation

5.3.2 Heating and Cooling Setting:



Connection Point	Socket	Terminals	Remark	Connection Status
BX3	X84		Hot Gas Sensor B81	Factory-connected
BX4	X84	5-6	Outer Air Sensor B9	Connection during installation
BX31	X152		Hot Water Stream Sensor B21	Factory-connected
BX34	X152		Hot Water Return Sensor B71	Factory-connected
BX32	X152		Air Inlet Temperature Sensor B91	Factory-connected
BX33	X152		Air Outlet Temperature Sensor B84	Factory-connected
QX1	X12		Four-Way Valve Relay Outlet Y22	Factory-connected
ZX6	X15		Compressor Crank Heater	Factory-connected
QX2	X12		Compressor Relay Outlet K1	Factory-connected
QX3	X12		Fan Relay Outlet K19	Factory-connected
QX32	X110	8	Extra Resistance Relay Outlet	Connection during installation (Optional)
QX4	X15	11	Condenser Pump Q9	Connection during installation (contactor should be used more than 2 amperes stream or three phase pumps)
EX2	X11		Water Flow Switch	Factory-connected
EX3	X11		Low Pressure Switch E9	Factory-connected
EX4	X11		High Pressure Switch E10	Factory-connected
EX1	X11		Compressor Overload Switch E11	Factory-connected
G+ M BSB	X86	12-13-14	Room Unit Connection G+=1 M=2 BSB=3	Connection during installation

5.3.3 Heating-Cooling-Hot Water Tank Setting:



Connection Point	Socket	Terminals	Remark	Connection Status
BX2	X80	3-4	Boiler Sensor B3	Connection during installation
BX3	X84		Hot Gas Sensor B81	Factory-connected
BX4	X84	5-6	Outer Air Sensor B9	Connection during installation
BX31	X152		Hot Water Stream Sensor B21	Factory-connected
BX34	X152		Hot Water Return Sensor B71	Factory-connected
BX32	X152		Air Inlet Temperature Sensor B91	Factory-connected
BX33	X152		Air Outlet Temperature Sensor B84	Factory-connected
QX1	X12		Four-Way Valve Relay Outlet Y22	Factory-connected
QX32	X110	8	Extra Resistance Relay Outlet	Connection during installation (Optional)
QX31	X110	7	Boiler Resistance B3	Connection during installation (Optional)
ZX6	X15		Compressor Crank Heater	Factory-connected
QX2	X12		Compressor Relay Outlet K1	Factory-connected
QX33	X110	10	3 Way Valve Q3	Connection during installation
QX3	X12		Fan Relay Outlet K19	Factory-connected
QX4	X15	11	Condenser Pump Q9	Connection during installation (contactor should be used more than 2 amperes stream or three phase pumps)
EX2	X11		Water Flow Switch	Factory-connected
EX3	X11		Low Pressure Switch E9	Factory-connected
EX4	X11		High Pressure Switch E10	Factory-connected
EX1	X11		Compressor Overload Switch E11	Factory-connected
G+ M BSB	X86	12-13-14	Room Unit Connection G+=1 M=2 BSB=3	Connection during installation

6. ECOCYCLE CONTROL PANEL

The ECOCYCLE heat pumps are controlled by a control panel.

6.1. Buttons and functions

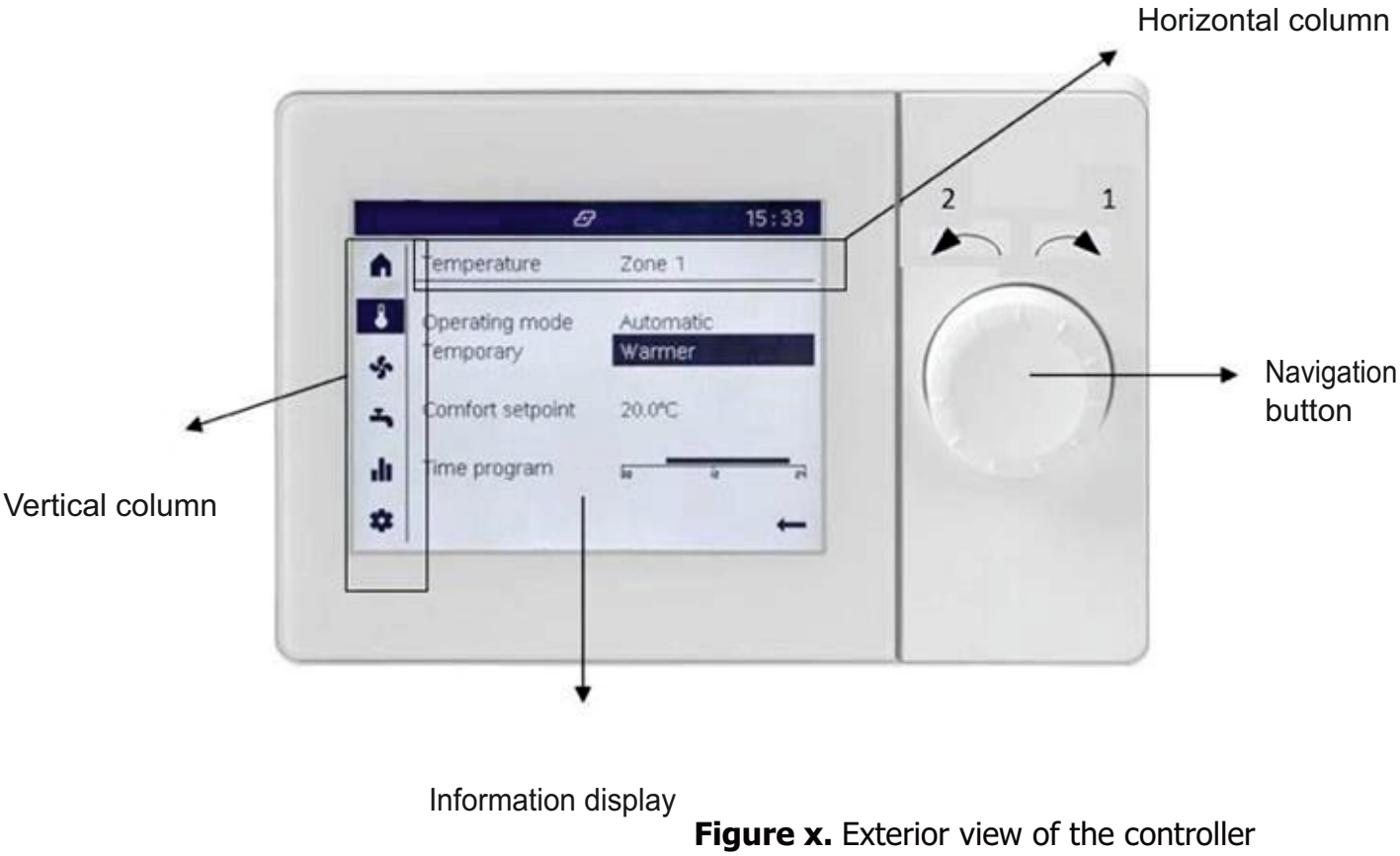


Figure x. Exterior view of the controller

Navigating the menus:		
	Turning the button:	Pre-selection of menu items: The indicator goes one step down or up at each turn forwards or backwards. (the indicator is a in a shape of a black rectangular frame.)
	Pressing the button:	When you come over the indicator selected in the menu, it selects and opens that item by pressing the button. The black retangle now fills up in black and the symbol/text turns white, this means you are now able to navigate to other set values.
	Back	Select the symbol and press the back arrow to go back to another level
Entering the items by adjusting the values:		
	Turning the button:	Pre-selection of the items

	Pressing the button:	Select an item. If it is demanded to open multiple level in the menu, press the button more than once.
	Turning the button:	Set the values by turning the button.
	Pressing the button:	Confirm after setting the values. The value is written to the auditor after being confirmed.
	Turning the button:	Continue to move in the menu, select the title line to go to another page, reverse the menu, and confirm by pressing the button to go back.

Time arrangement	5 seconds	If not value is set, it will go back to its previous form.
Time lock	1 minute	In case of a selection in the foreground of the screen, (e.g. a special change), it disappears after 1 minute.
Operation time	8 minutes	It automatically goes back to the main page in the end of this duration.

6.2. Display and meaning of symbols

The display shows room temperature, desired temperature, operating mode, time, etc. Below is a list of symbols and text that can be shown on the display.

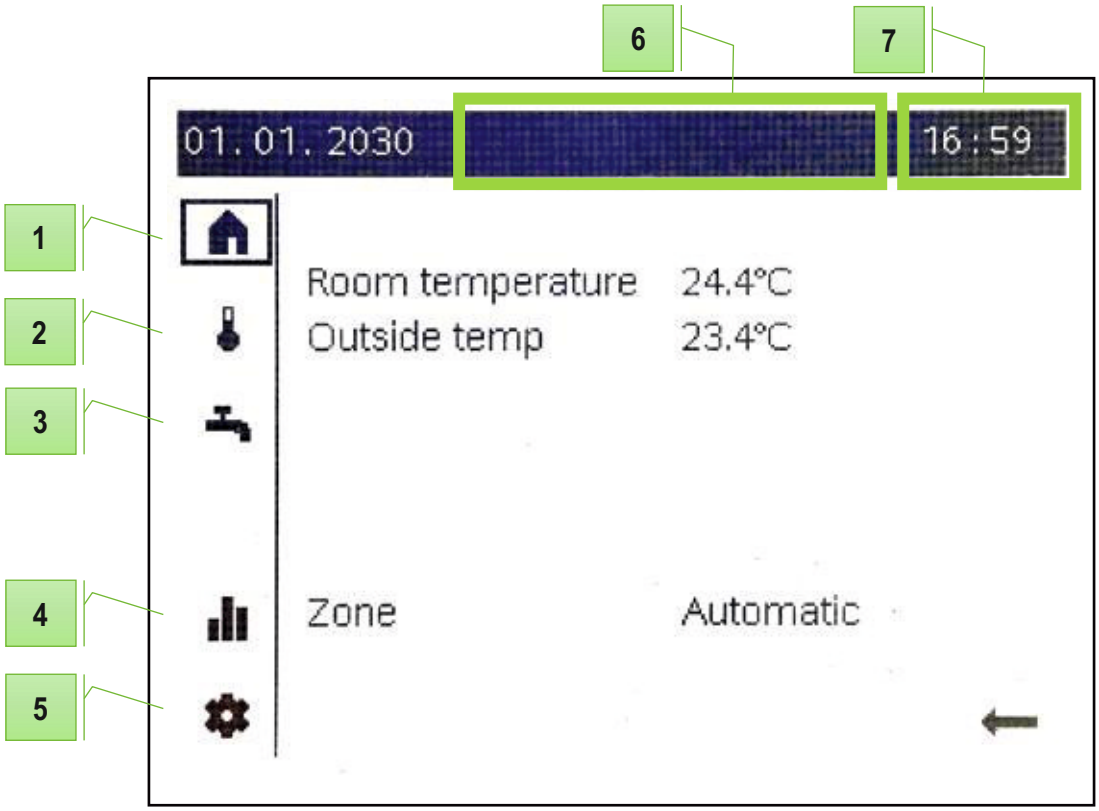


Figure x. Internal view of the controller

No.	Symbol	Name	Function
Vertical column:			
1.		Main screen	The menu where the instant values are seen
2.		Temperature adjustment	The menu where the heating adjustments are made for the desired heating-cooling.
3.		Domestic hot water	The menu where the available domestic water's temperature values are seen and adjusted.
4.		Information	The menu where all the data are reported and error logs can be found
5.		Adjustments	The menu where adjustments can be made in the machine, like local adjustments, special operating modes and the log-in mode for installer.
Horizontal column:			
6.		Alarm	Indicates that there is an error.
6.		Special operation mode	Indicates that maintenance or reperation is required
6.		Event	Points out the places of event.
6.		Hand	Thows the manual operation of the whole device.
6.		User	Shows what level of access is active
6.		Source	Shows the moment the sources are active
7.	00:00	Time	Indicates the time.

6.3. Changing operating mode

6.3.1 Reading current values

Navigate towards the main screen) by rotating the navigation button and press the navigation button. (the indicator is a in a shape of a black rectangular frame.)
When the main screen icon turns whie and the box around it black, you have entered the main screen menu. Current values are now visible on the display. The values are the room temperature and room moisture values.

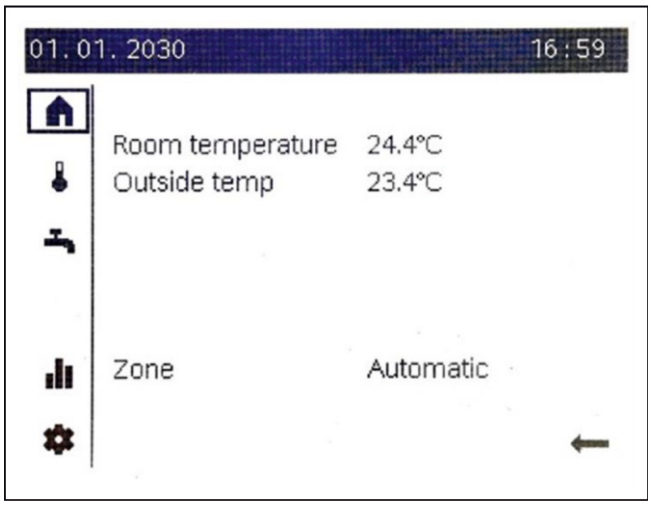


Figure x. "Main screen" menu

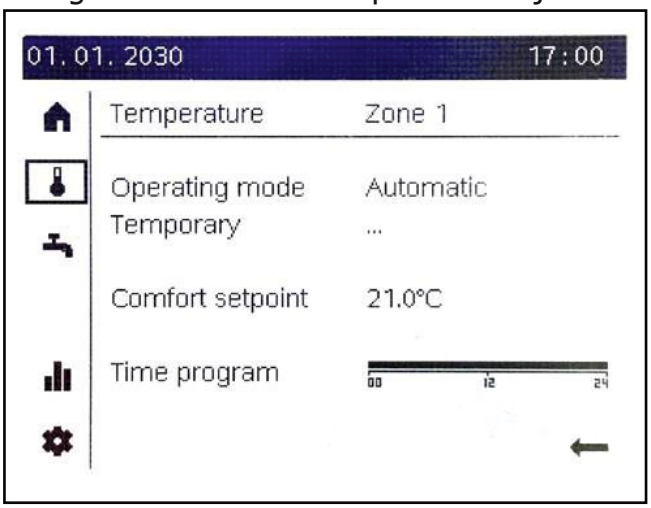
The main screen menu is entered and the indicator moves towards zone adjustment (see Figure x).
There are two options, which are "automatic" and "off", in this sub-menu.

a) Automatic: It means that all of the heating, cooling and hot water functions are active.
b) OFF: It means that the heating and cooling are off, only the hot water function is on.

Following the completion of the process, in order to go back to the main screen menu or to other menus, the button is turned one level toward the direction 2, the back arrow is reached and the button is pressed.

6.3.2 Temperature settings menu

Navigate towards the temperature adjustment menu.



The temperature setting menu features:

A) Operating mode
   a. Automatic
   b. Reduced

c. Comfort
d. Protection

B) Comfort setpoint

C) Time program

Figure x. “Temperature settings” menu

A) Operating mode

a. Automatic: The device is operated as per the commands assigned by the last user in the "time program" menu. - "time program" adjustment will be analysed under the title "time program".

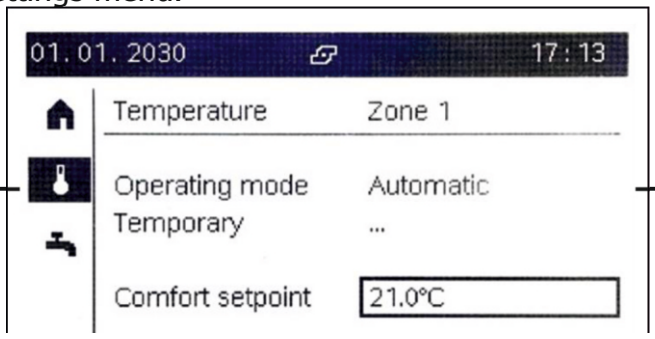
b. Reduced: This feature is used in case lower temperature is requested in heating mode, and higher temperature in cooling mode. *For instance, the pre-adjusted temperature for the heating mode is 29°C; however, it is used if it is demanded to be 25°C, and used if demanded to be 22°C while the pre-adjusted temperature is 18°C in the cooling mode.*
The option reduced is adjusted by the settings menu). The way to perform the process will be analysed in the settings menu chapter.

c. Comfort: The device operates at the value assigned as the comfort value. The "comfort value" is arranged in the settings menu).
The way to perform the process will be analysed in the settings menu chapter.

d. Protection: This function is used in case the place the device is located will not be occupied for a while, and it is demanded to perform heating/cooling in this location despite this fact.
For instance, if a user having a pet does not want the house ambient temperature to exceed 28°C when he is away for holiday during summer, he sets the protection to 28°C and therefore the ambient temperature does not exceed 28°C.

B) Comfort setpoint

The device opterates as the value assigned. The setpoint can be changed inside the settings menu.



C) Time program

When time program is adjusted, the heat pump operates within the specified range of time value. If not adjusted by the user, the heat pump operates by its factory settings.

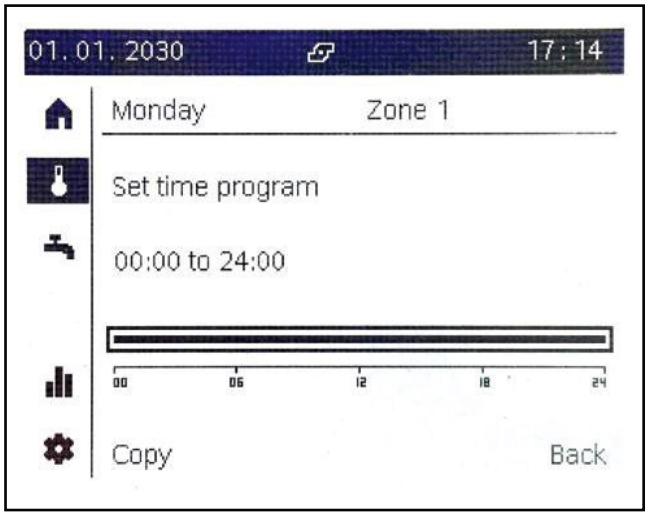


Figure x. "Time program" menu

Select "Time program", an option appears including all days of the week in the "time program" sub-menu. Each day has its own sub-menu. Any day can be selected with the navigation button. When this process is carried out, the remark "set time program" appears.

The time sheet in figure X shows time zones (00-24).

The beginning and end times demanded are determined.
For instance, let's assume that the start time is specified as 08:00, and the end time as 21:00 for Monday. In this case, the heat pump operates at the comfort temperature between 08:00 and 21:00. It operates in a reduced way until 08:00 next morning starting from 21:00 in the evening.

By turning the button towards the "back" symbol (⬅), the upper menu is reached. This process is repeatable the sub-menus to proceed to the vertical column.

6.4. Domestic hot water menu

Navigate the indicator towards the domestic hot water) by rotating the navigation button and press the navigation button (the indicator is a in a shape of a black rectangular frame).
When this symbol) doesn't appear in the main menu, please check the electrical wiring (E.g boiler sensor), before proceeding anything ells.

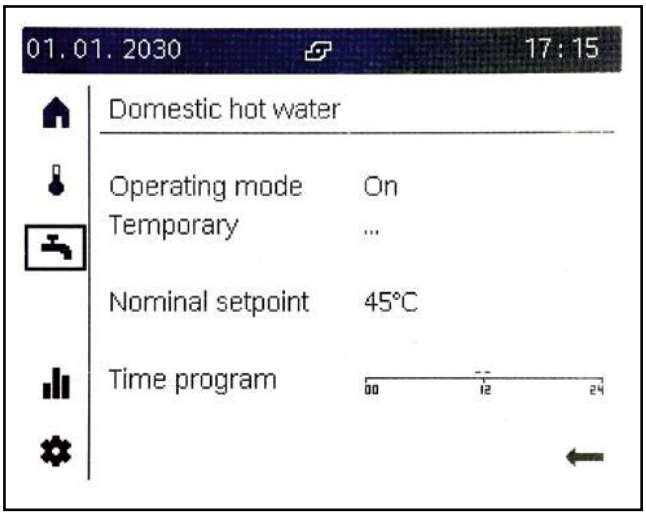


Figure x. "Domestic hot water" menu

Domestic hot water menu features:

- Operating mode
  If the heat pump has the opportunity for domestic hot water, this sub-menu can be used. In the sub-menu "operating mode", there are two options which are On and Off. In the "On" mode, hot water production occurs, while in the "Off" mode, only heating-cooling are carried out, but no production of domestic hot water.

- Nominal setpoint
  This is the sub-menu from which the domestic water temperature is set to the value desired.

- Time program
  This sub-menu must not be used by the "end user".

6.5. Information screen menu

Navigate the indicator towards the information screen) by rotating the navigation button and press the navigation button (the indicator is a in a shape of a black rectangular frame).

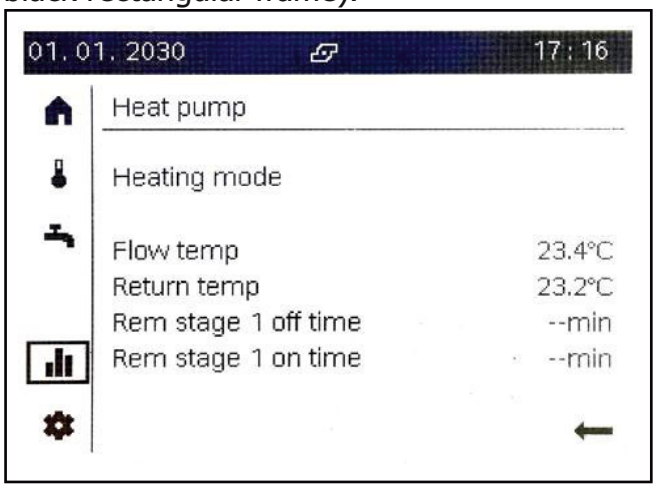


Figure x. "Information screen" menu

Information screen menu features:

- Error:
  The screen where errors are seen. You may find detailed information about errors in the "Troubleshooting" chapter.
- Display of current values and setpoints
  In this menu the is the possibility to scroll through the systems setpoints and currend values, you can select different pages, for example: "Heat pump", "Heating zone", "Cooling zone" or "Domestic hot water".

  In the selected information page information is given about whether it is on or off, the operating mode or current values.

6.6. Settings

Navigate the indicator towards the settings ⚙) by rotating the navigation button and press the navigation button (the indicator is a in a shape of a black rectangular frame).

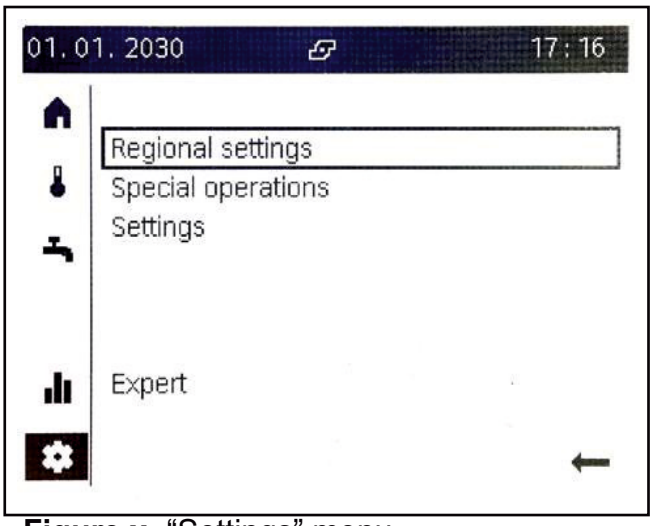


Figure x. “Settings” menu

There are sub-menus which are "Regional settings", "special operations", "settings" and "expert".

6.6.1 Regional Settings:

The regional settings sub-menu is divided into three pages

Page 1:

Figure x. “Regional settings” page 1

"Time" and "date" settings can be made on the first page of the regional settings sub-menu.

Page 2:

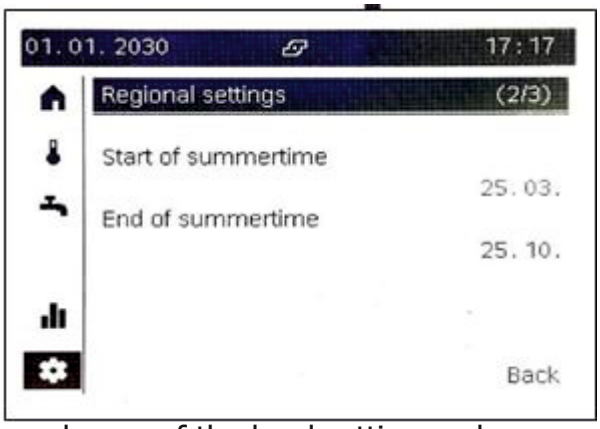


Figure x. “Regional settings” page 2

On the second page of the local settings sub-menu, "summer period start" and "summer period end" settings can be carried out.

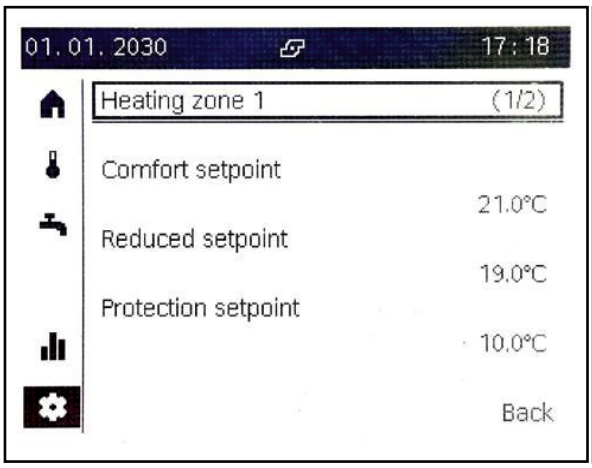
Page 3: Preferred language can be selected.

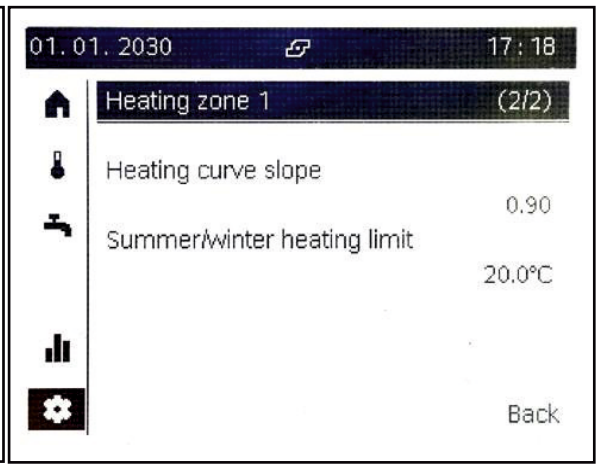
6.6.2 Special operations

In the special operations sub-menu, the "economy mode" is available. The economy mode can be set as "on or "off". If the economy mode is turned on, the heat pump operates and stores in periods of time where low electricity tariff is used in the settings with a variable electricity tari ffduring the day.

6.6.3 Settings

The settings sub-menu features the "heating zone 1". The "heating zone 1" is divided into two pages.





The first page of the "heating zone 1"
"comfort setting value"

"reduced setting value"

"frost protection setting value"

The second page of the "heating zone 1"
"heating curve inclination"
The value assignment must not be carried out by the end user.

"summer/winter heating limit" are available.
The detailed remarks on this chapter is made in the MODE CHANGING chapter.

6.7. Configurations for Domotica/External controller

Using the heatpump combined with domotica systems is possible, although you need to change some parameters in the thermostat. Once you have changed the settings it is not necessary to keep using the thermostat.

The heatpump can be controlled by Digital Input signals, one for cooling and one for heating (and domestic hot water). If you use make use of these settings you give a run command towards the heatpump, as long as the run command is active, the heatpump will continu running until it reaches it's maximum or minimum temperature setpoint. These setpoints can be changed as shown above. It is not possible to connect any buffer or boiler sensors to the mainboard, the DOMOTICA is responsible for turning on and off the machine when it reaches its desired setpoints.

Enter engineering user level and find configuration pane. Set parameters as below.

Activating heating mode for use with an external controller:

5710 : Off (Heating Circuit) 5950 : Consumer Request VK1

Connect the digital input wires onto H1 and M on the main board.

*Additional option: If you want to make domestic hot water you need to change the maximum temperature for heating mode to the required setpoint you want. But be aware that this is the maximum temperature, the heatpump will only shut down when it reaches this setpoint, or when there is no request on digital input H1. So be 100% sure that you are running in the boiler circuit or ells you might put this temperature into the floor which can cause serious damage or cracks in the floor.

Activating cooling mode for use with an external controller:

5711 : Off (Cooling Circuit) 5960 : Consumer Request VK2

Connect the digital input wires onto H3 and M on the main board.

Note: Please check if standard parameters of temperature setpoints are the ones you desire.

Note: With this function, if customer request is active for heating or cooling, heat pump will work until to reach its permited design temperature. So with this function, buffer tank sensors must be connected to external controller.

6.8. Installing the thermostat

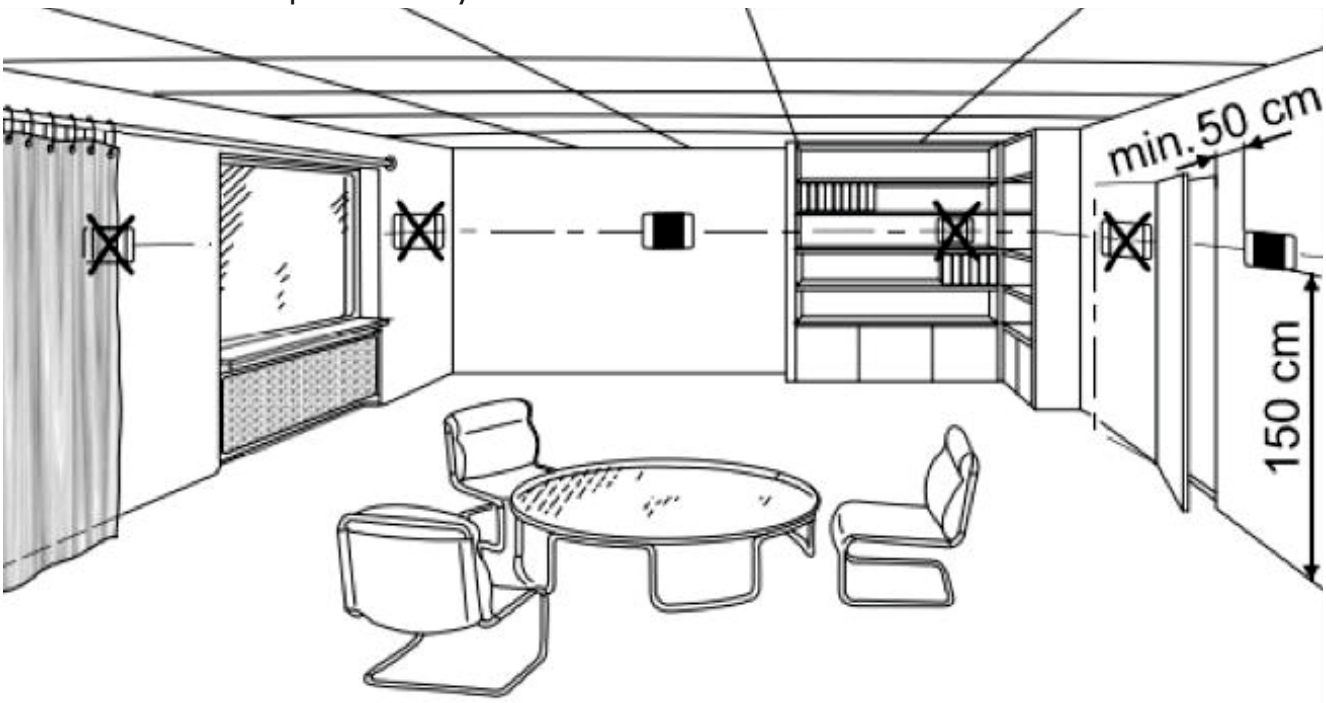
The controller is positioned as shown in the pictures below and assembled as demonstrated (the sequence of numbers must be followed).

As it can be seen from the picture below, the controller must be installed at minimum 150 cm height from the ground, and minimum 50 cm beyond the door space.

Where not to install it:

- Behind the door, electrical devices, sun-shields, curtains, etc.
- Along windows
- inside bookshelves, or sunny places in your house.

See below for places how you can install it:

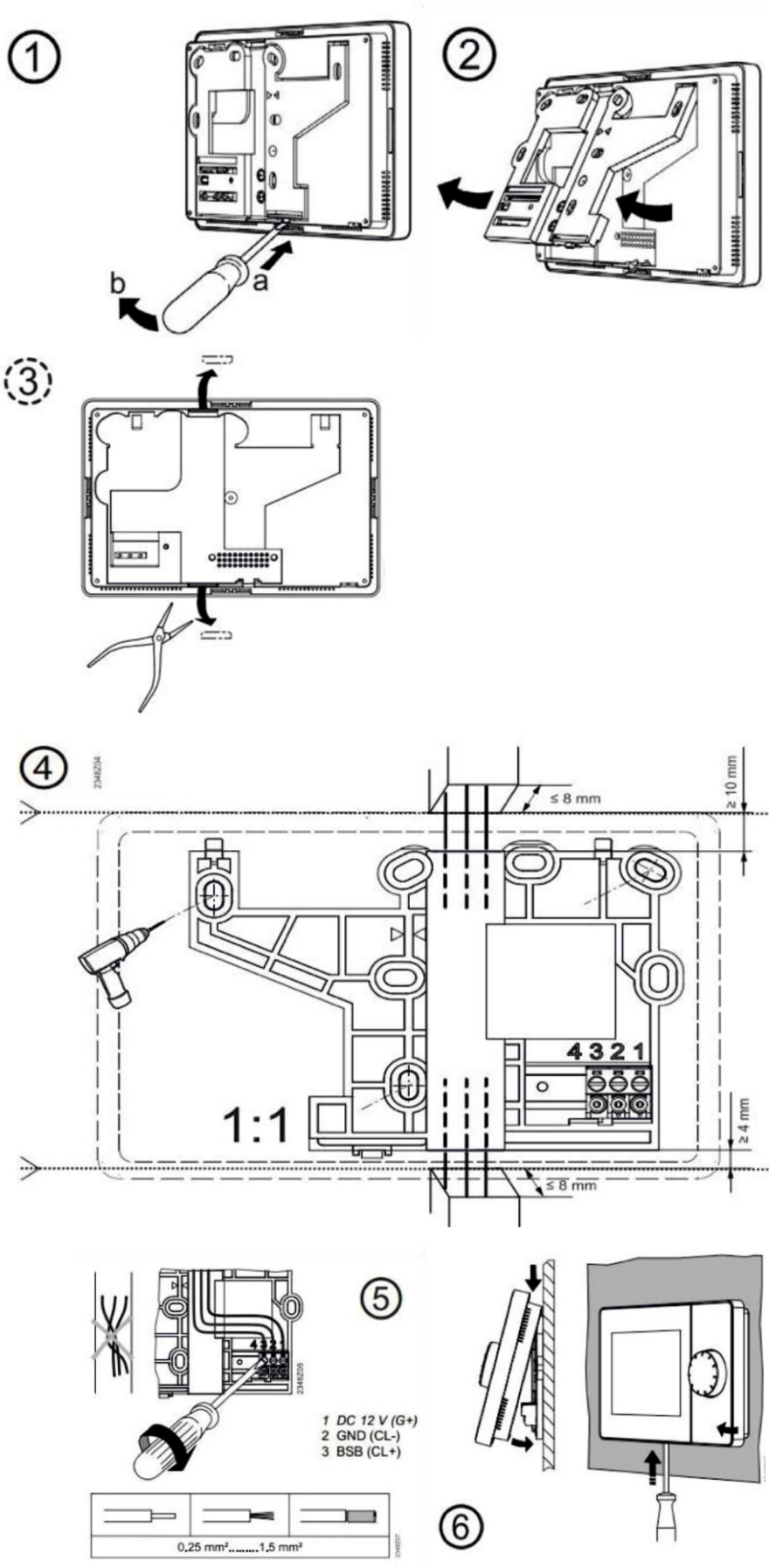


For proper communication with the heat pump it is important that the main thermostat is properly connected. The connection is made with screwed cable connections. There are a number of conditions for the cable:

- Solid or braided cable with a diameter between 0.8 and 2.5 mm2
- 2-wire cable, twisted pair, not shielded (UTP)
- The maximum distance between two units is 700 meters.

Hint!

In the case of renovation projects, the existing thermostat cable (which remains of the old boiler) will generally not be suitable for connection to the new thermostat.


①
②
b
a
③
④
≤ 8 mm
≥ 10 mm
4 3 2 1
1:1
≥ 4 mm
≤ 8 mm
⑤
1 DC 12 V (G+)
2 GND (CL-)
3 BSB (CL+)
0,25 mm².....1,5 mm²
⑥

7. SERVICING

7.1. Repairs

	**Warning for danger!** Repairs to the heat pump may only be carried out by qualified personnel.
	**Warning for danger!** Make sure that the heat pump is disconnected from the power supply before opening the housing. Additionally, take measures to prevent the power from being switched on prematurely.

When the heat pump is disconnected from the mains, the unit can be safely operated.

7.2. Troubleshooting

A malfunction of your heat pump system may have several causes. We can't always see some of these by monitoring the system from distance, but most of the time we can see the consequences.
Below are instructions for a first general check and more directed instructions for specific error messages.

7.2.1. First check in case of an error

In order to be able to assist you in a number of cases, we have prepared a checklist for malfunctions. As you follow this, we can detect the problem faster and more accurately. A problem is often noticed when the temperature of the living space and / or the hot water boiler drops. Make sure the room thermostat is turned on. To turn it on, refer to the thermostat manual.

Item	Action
1.	Check the pressure of both expansion vessels is sufficient. This often is between 1.5 and 2 bars (depends on the installation calculations). If necessary, fill in with the filling hose. When the system has been running for some time and needs to be refilled regularly, there may be a leak.
2.	If the room is not on the right temperature, check the temperature setpoint first. The heat pump will only turn when it receives a signal.
3.	Verify that no error messages are displayed. The following section lists these reports. Follow the instructions for the appropriate notification and contact your installer if necessary.

7.2.2. Error messages and solutions

The error symbol) appears on the information screen on the controller, when any error occurs. (see figure below) When the alarm symbol is seen, enter the information screen) on the vertical column to see the reason of the error. The error code and reason will be seen on the information screen.

The following table includes the error codes, error reasons and the way to eliminate the errors.

When an error is observed, read the error code and error reason written on the information screen. Check the method of elimination of the error written for the same code in the table. Please make sure that you read the information of the correct code. Do not attempt to eliminate the errors you are not allowed to interfere in as the end user (when there are expressions like call the technical team / inform the official / call an official / inform our company / contact our company / call the call centre). Otherwise, our company will not be responsible for the accidents, damages or injures that may occur.

Code	Error	Possible cause	Solution
10	Outer air sensor	Sensor may be displaced or damaged.	Check connections on the control card.
		Sensor or wire may be broken.	Call the authorized service to ask for replacement of the sensor.
33	Hot water outlet sensor	Sensor may be displaced or damaged.	Check connections on the control card.
		Sensor or wire may be broken.	Call the authorized service to ask for replacement of the sensor.
35	Source inlet sensor	Sensor may be displaced or damaged.	Check connections on the control card.
		Sensor or wire may be broken.	Call the authorized service to ask for replacement of the sensor.
36	Compressor outlet gas temperature sensor	Sensor may be displaced or damaged.	Check connections on the control card.
		Sensor or wire may be broken.	Call the authorized service to ask for replacement of the sensor.
39	Evaporator sensor	Sensor may be displaced or damaged.	Check connections on the control card.
		Sensor or wire may be broken.	Call the authorized service to ask for replacement of the sensor.

Code	Error	Possible cause	Solution
44	Hot water return sensor	Sensor may be displaced or damaged.	Check connections on the control card.
		Sensor or wire may be broken.	Call the authorized service to ask for replacement of the sensor.
50	Domestic hot water boiler sensor	Sensor may be displaced or damaged.	Check connections on the control card.
		Sensor or wire may be broken.	Call the authorized service to ask for replacement of the sensor.
73	Collector sensor 1	Sensor may be displaced or damaged.	Check connections on the control card.
		Sensor or wire may be broken.	Call the authorized service to ask for replacement of the sensor.
74	Collector sensor 2	Sensor may be displaced or damaged.	Check connections on the control card.
		Sensor or wire may be broken.	Call the authorized service to ask for replacement of the sensor.
106	Source Temperature Too Low	Outer air temperature may have become -10°C.	In this case, all resistances will automatically be activated.
108	Compressor gas temperature	The filter drier in the system may be obstructed	Call the authorized service to ask for replacement of the filter drier.
		The quantity/quality of the refrigerant in the system may be wrong.	Call the authorized service to ask for help.
201	Frost alarm	If the device gives this error in cooling mode, there is no flow.	Circulation pump may be broken, clogged pipes, clogged filters or other flow restrictions.
		If the device gives this error in heating mode, there is no flow.	Circulation pump may be broken, clogged pipes, clogged filters or other flow restrictions.
222	High pressure	If the device gives this error, there can be no flow.	Circulation pump may be broken, clogged pipes, clogged filters or other flow restrictions.
		Too high quantity of refrigerant inside the system.	Call the authorized service to ask for help.
		High pressure switch may be broken.	Call the authorized service to ask for replacement.

225	Low pressure	If the device gives this error, there can be no flow.	Circulation pump may be broken, clogged pipes, clogged filters or other flow restrictions.
		Too low quantity of refrigerant inside the system.	Call the authorized service to ask for help.
225	Low pressure	Low pressure switch may be broken.	Call the authorized service to ask for replacement.
226	Voltage fluctuations	The voltage fluctuations in the compressor overload system may have caused this situation	Press the reset button on the overload switch available on the wall box. At the same time, reset the heat pump from the control panel as shown in the operating manual.
330	No BX1 Connection	Problems in the connections	Check connections on the control card.
331	No BX2 Connection	Problems in the connections	Check connections on the control card.
332	No BX3 Connection	Problems in the connections	Check connections on the control card.
333	No BX4 Connection	Problems in the connections	Check connections on the control card.
334	No BX5 Connection	Problems in the connections	Check connections on the control card.
335	No BX21 Connection	Problems in the connections	Check connections on the control card.
336	No BX22 Connection	Problems in the connections	Check connections on the control card.
-	Collector pump Q5 lost	Problems in the connections	Check connections on the control card.
-	Collector pump Q16 lost	Problems in the connections	Check connections on the control card.
-	Collector sensor B6 lost	Problems in the connections	Check connections on the control card.
-	B31 solar-based water use loss	Problems in the connections	Check connections on the control card.
-	B91 source sensor is disabled	Problems in the connections	Check connections on the control card.
-	B92 source sensor is disabled	Problems in the connections	Check connections on the control card.
-	B84 compressor sensor is disabled	Problems in the connections	Check connections on the control card.

7.2.3 Resetting the Heat pump

If it is suggested you reset the heat pump in the remarks section of the table above in order to eliminate the error when encountered one, to reset (see Figure XX).

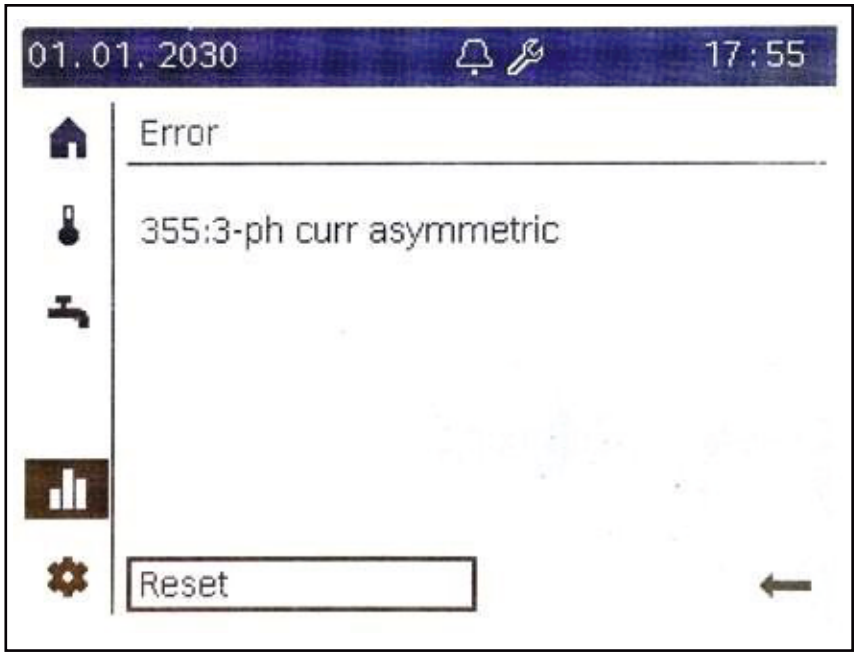


Figure XX: Heat pump reset menu

Enter the information). When you are in the information menu, go to the "reset" option appearing on the bottom of the screen, and press the navigation button. When you press the button, you will see an option "yes" or "no". Press "yes" to reset the error, press "no" to do nothing.

The heat pump will be reset after this process. When the resetting process is done, the heat pump will go back to its factory settings.

If the same error occurs when the heat pump is operated again, please call the authorized service to ask for help.

A coolant air leakage test must be implemented on the device once a year. In case of an air leakage after this test, the technical service must be called.

WARNING!

- The refrigerant in the device, R-407C, is a mixture gas. No gas should be added on it as it is a mixture gas. In case of a leakage in the system, the gas must be fully discharged following the reparation of the leakage, and R-407 C refrigerant charging must be implemented again.

WARNING!
When the device does not operate;

- Do not unplug the power supply cable from the device, even if it will not be used for a long time.

Please:

- Regularly check the electric cable connection and grounding cable leading to the power supply.
- If the system is going to operate for a long time in extremely cold areas (below 0 C), the water in the tank must be discharged to prevent damages and frosts in the tank.
- If you are going to operate the device after a long time, including the first operation, there may be some rusty water. Discharge the water until it gets normal.
- It the output water is adequate, a lower temperature is suggested to make energy saving, to prevent calcification and to reduce the heat loss.
- Shut down the power source before shutting down the system for a long period of time; Discharge all the water in the water tank and in the pipeline, and turn off all valves.
- Check if pipes and valves are damaged; have them repaired to prevent leakages, if damaged.
- Check if there is a foreign body blocking the air inlet-outlet
- You must keep the controller surface clean by wiping it with a soft, damp cloth. NEVER use detergents.
- There is an anode bar indicator on the boiler. When the bar turns red from green, the bar must be replaced. The calcification inside must be cleaned by removing the cleaning lid once in 2-3 years. This process can be carried out by the user himself.
- In case of an icing on the exterior unit during the heating process or the during the process of providing hot water, the process of defrosting will be automatically initiated to protect the heating capacity, while the ice defrosted will float over the base plate of the exterior unit.
- Be attentive to the fact that no snow falls on the exterior unit, or the unit does not get frozen.
- Antifreeze must be used in the circuit of water circulating in the heat pump.

!! Defrosting: Defrosting process is carried out automatically. The time of completion for this process is 5-10 minutes. The heat pump stops operating during this period.

Call the service in the following cases.

- In case of an abnormal smell of burnt, or an excessive noise, stop the device and turn o ffthe switch. Do not try to repair the device on your own in such cases.
- In case of a switch, fuse or power switch malfunction,
- If the main power supply cable is too hot or damaged, call the service.

7.3 Maintenance

7.3.1 Small regular maintenance

For proper operation of the system, regular maintenance is required. The items listed below can be used as a user by yourself. In case of doubt, contact your installer.

Item	Action
1.	Regularly check the pressure of the Delivery system. This is usually between 1.5 and 2 bar. Fill in the system if necessary. Do not forget to vent the system after filling. If you do not know the desired pressure for your resource or how to replenish, contact your installer.
2.	Regularly check the pressure of the source system. This is usually between 1.5 and 2 bar. Fill in the system if necessary. Do not forget to vent the system after filling. If you do not know the desired pressure for your resource or how to replenish, contact your installer.
3.	In an open source system, check the groundwater filter regularly and clean if necessary.
4.	Keep in mind that the supply filters on the heat pump can also be hidden. Clean it if necessary. Do not forget to close all taps.

7.3.2 Annual Maintenance

Warning for danger!

Maintenance of the heat pump may only be carried out by qualified personnel.

VISUAL INSPECTION

Item	Action
1.	Disconnect the heat pump from the mains and take measures to prevent accidental premature switching on.
2.	Check the pipework for leaks.
3.	Check in the heat pump whether all components are properly seated.
4.	Check the electrical connections and wiring in the heat pump.
5.	Check the heat pump internally for leaks. Pay particular attention to leaks of the coolant.
6.	Check the pressure in the source system and delivery system.
7.	Check the glycol content of the liquid in the source.
8.	Check that the expansion vessels are still functioning properly.
9.	Inspect the filters in the pipes and clean them if necessary.

After this checklist, the heat pump can be switched on. Further points can be considered. See next page.

Item	Action
10.	Check the settings in the heat pump software for deviations.
11.	Check that all the heat pump functions work properly.

When the heat pump has been in operation for some time, some data are interesting to note and build a history of the heat pump:

Item	Action
12.	Measure the current over each phase and record it. Increased power consumption is often an indication of wear.
13.	Note the number of operating hours of the heat pump.
14.	Note the difference in temperature between source and delivery system.
15.	Record the amount of start / stops since the previous inspection.
16.	Read recent malfunctions and see if they may be affected.

Now start the measuring, you can find an example of the maintenance sheet on the next page, but also on our website.

Add a copy of the maintenance in the documentation.

7.4 Spare parts

The ECOCYCLE heat pump is a carefully designed and highly robust device. The risk of malfunction is small, but it may prevent a component from failing. The most common components can be delivered by ECOCYCLE in the short term.

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HEAT PUMPS

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