October 2011

AMBIflo
Installation Manual

Working towards
a cleaner future

ANDREWS
WATER HEATERS

Table of contents

1. About this manual

Please read these instructions carefully before operating the device!

1.1 Content of this manual

This manual deals with the installation of AMBIflo air to water heat pumps. The air/water operating mode may be used. An overview of the various documentation for this appliance may be found below. Please store all documents at the installation site of the heat pump!

1.2 Overview table

Documentation	Content	Intended for
Technical information	- Planning documentation - Functional description - Technical data / circuit diagrams - Basic equipment and accessories - Application examples - Tender documentation	Planners, operators
Installation manual - Extended information	- Appropriate use - Technical data / circuit diagram - Regulations, standards, CE - Notes on installation site - Example of standard application - Commissioning, operation and programming - Maintenance	Installer
Operating instructions	- Commissioning - Operation - User settings / programming - Fault table - Cleaning / maintenance - Notes on energy saving	Operator
Programming and hydraulics manual	- Table of settings, including all parameters and explanations - Other examples of applications	Installer
Protocol for commissioning	- Reference data for heating system	Installer
Brief instructions	- Brief operating guide	Operator
Maintenance manual	- Record of maintenance carried out	Operator
Accessories	- Installation - Operation	Installer

1.3 Symbols used

Danger! Disregarding this warning will pose a risk to life and limb.

Risk of electrocution! Non-observance of this warning will pose a risk to life and limb as a result of electricity!

Warning! Non-observance of this warning will pose a risk to the environment and the device.

Note/Suggestion: You will find background information and useful hints here.

Reference to additional information in other documentation

1.4 For who is this manual intended?

This installation manual is intended for the person installing the AMBIflo unit into a heating system.

2. Safety

Danger! Please ensure that you observe the following safety instructions.

2.1 Appropriate use

The heat pumps in this series come with electrically operated condensers and buffer stores (accessories) for heating systems according to EN 14511. The heat pump is only intended for use as explicitly intended. Where an application is not in accordance with the information given here, Andrews Water heaters do not accept responsibility or incur any liability.

This device is not intended to be used by persons with limited physical, sensory or mental capacity or a lack of experience and/or a lack of knowledge, unless such a person is supervised and instructed by another person who takes responsibility for his safety. Children should be supervised to ensure that they do not tamper with the device.

2.2 General safety notes

Danger! The installation of a heating system poses the risk of considerable injury to persons or damage to the environment and to objects. Heating systems may thus only be installed by specialised companies and must be commissioned by the manufacturers commissioning Engineers

The adjustment, maintenance and cleaning of the device may only be carried out by a qualified person!

The accessories used must be in accordance with the technical regulations and must be approved by the manufacturer for the specific device. Only original spares may be used.

Customers are not permitted to undertake conversions or adjustments of the device, as this will endanger lives and may result in damage to the device. The warranty will become invalid should this guidance not be adhered too.

Risk of electrocution! All electrical work association with the installation of the AMBIflo must be carried out by a qualified electrician!

2.3 Regulations and standards

Apart from the general technical standards, the relevant standards, regulations, ordinances and guidelines must be observed:

- DIN EN 378 (Parts 1-4); cooling systems and heat pumps – safety and environmentally relevant requirements
- DIN 4109; sound insulation in high-rise buildings
- DIN EN 12828; safety equipment for heating systems
- EN 14511; heat pumps with electrically operated condensers for indoor heating
- EnEV – energy savings ordinance
- DIN 18380; heating systems and central water-heating systems (VOB)
- DIN EN 12831; heating systems in buildings
- DIN 4753; water-heating systems for drinking and industrial water
- DIN 1988; technical regulations for Domestic Hot Water installations (TRWI)
- DIN VDE 0100; EN 50165; electrical design of non-electrical devices
- DIN VDE 0116; electrical equipment for heating systems
- VDE: EN 60335 and EN 50366 heating system ordinance; various state ordinances

- Regulations of local energy supply companies
- Notification requirement (or approval ordinance)
- ATV data sheet M251 of the Waste Water Association

2.4 CE Marking

CE marking means that all guidelines according to the CE standards have been adhered to in the design and manufacture of the AMBIflo unit (see conformity statement).

Adherence to the safety requirements according to Guideline 89/336/EWG can only be guaranteed if the heat pump is operated as intended.

The environmental conditions according to EN 55014 must be adhered to.

Operation is only permitted once a proper cover has been fitted.

The appliance must be earthed

When exchanging parts, only original spares as prescribed by the manufacturer may be used.

2.5 Conformity statement

BRÖTJE HEIZUNG

CE

Declaration of conformity

Product	Air/water heat pump
Trademark	AMBIflo
Type, model	AMBIFLO 16, AMBIFLO 20
EU directives	89/392/EWG or 98/37/EC 89/366/EWG, 73/23/EWG 97/23/EG
Standards	DIN EN 14511 -1/-2/-3/-4, DIN EN 378 -1/-2/-3/-4, DIN EN 60529, DIN EN 294, DIN EN 60335 -1/A2 -2 -40, DIN EN 292/T1 T2, DIN EN 349, DIN EN 55014-/T1 T2, DIN EN 61000-3-2 / 0303

The manufacturer hereby declares the following:

The duly labelled products meet the requirements of the guidelines and standards as listed. They concur with the tested prototype, but no specific characteristics can be guaranteed. The manufacturing process is subject to the monitoring procedures as listed. The product mentioned may only be used for installation in hot water heating systems. The system manufacturer must ensure that the regulations for installation and operation of the device are adhered to.

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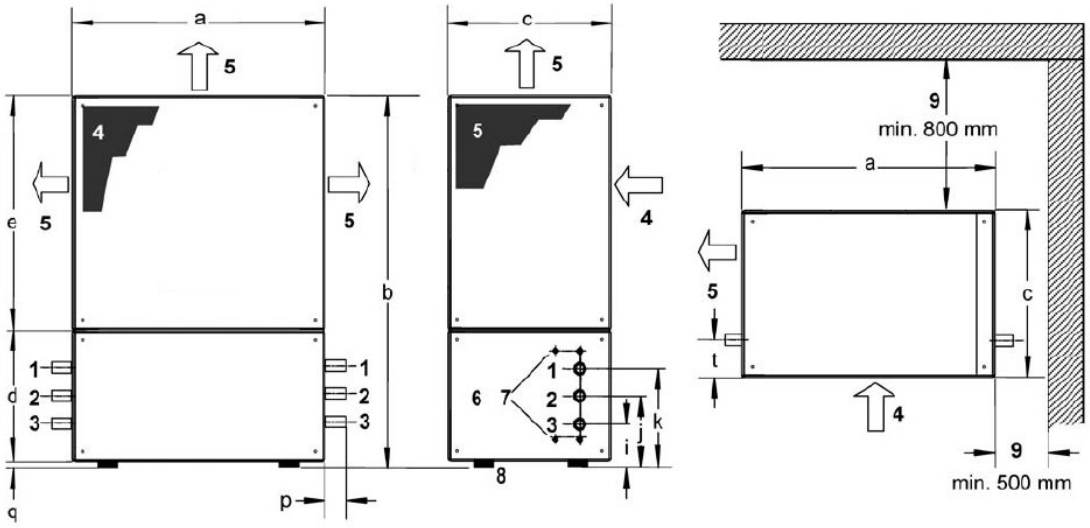
Rastede, 01/07/09

Oldenburg District Court
HRB 120714

3. Technical information

3.1 AMBIflo dimensions and connections

Fig. 1: Dimensions and connections



1	Heating flow Ø 1" (AMBIFLO 16), Ø 1¼" (AMBIFLO 20) flexible. The hydraulic and electrical connections can all be located on the left or right hand side of the heat pump.	4	Air inlet (at the back of the device), For details, see air connections
		5	Air outlet (at left, right or top),
		6	For details, see under air connections
		7	Internal electrical panel
2	Heating flow Ø1" (AMBIFLO 16), Ø 1¼" (AMBIFLO 20) flexible 9. A minimum distance of 800 mm must be maintained at the front of the heat pump for maintenance purposes. A minimum distance of 500 mm is required on the free side opposite the air outlet.	8	Electrical connections Adjustable legs, absorbing structure-borne noise
		9	A minimum distance of 800 mm must be maintained at the front of the heat pump for maintenance purposes. A minimum distance of 500 mm is required on the free side opposite the air outlet.
3	Condensation water outlet Ø ¾", flexible		

Table 1: Dimensions

AMBIflo	Width a	Height b	Depth c	Bottom height d	Top height e	Hydraulic connections					Legs q
						i	j	k	t	p	
	all dimensions in mm										
16	1195	1675	750	575	1060	210	300	390	100	300	40
20	1195	1695	880	670	975	230	385	545	110	300	50

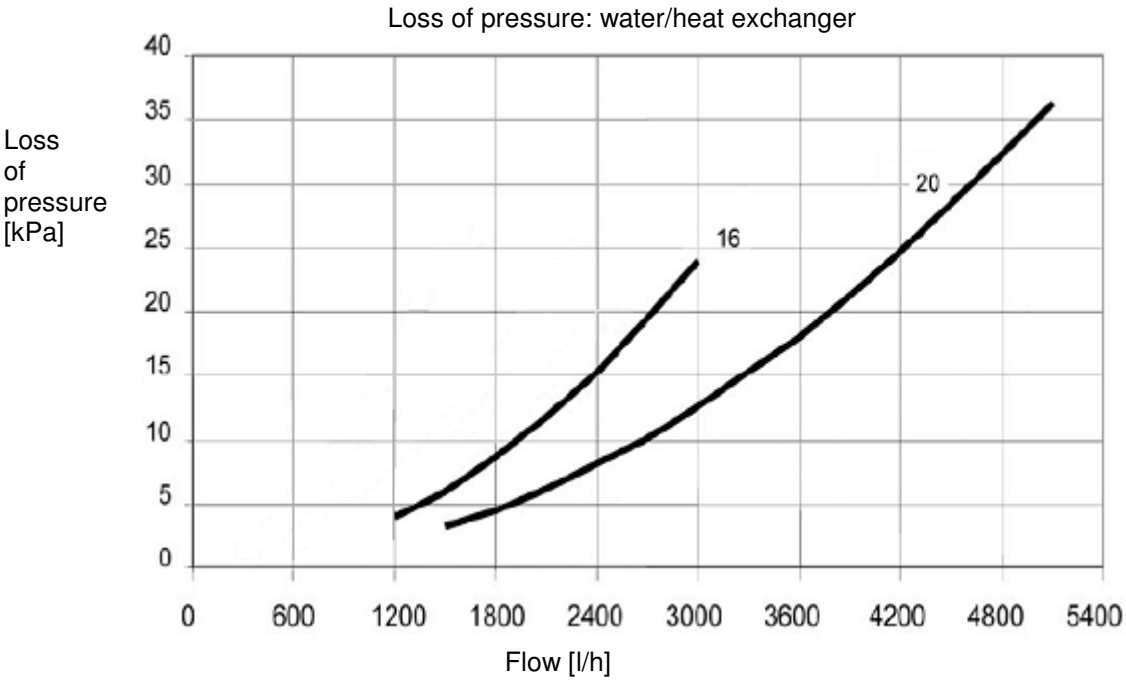
3.2 AMBIflo technical data

Model	**AMBIflo**	**16**	**20**
Heating system			
Heat output	kW	15.1	19.9
Power consumption	kW	4.0	6.3
COP	--	3.7	3.2
Condenser	Scroll hermetically		
Maximum power consumption	A	14.0	17.0
Starting current with smooth starter	A	36.0	40.0
Power intensity with locked rotor (LRA)	A	74	99
Power connection	V-f-Hz	400-3-50	
Fuse (inert) [1]	A/T	20	20
Max speed:fan/Q-pump (Prog.No.3010)	%	100	90
Smooth starter settings [2]	A	13.5	16
Water/heat exchanger	Material: AISI 316 chromium steel, 1.4401		
Hydraulic connections	R	1"	1¼"
Water content, incl. connection pipes	l	3.4	4.9
Nominal volume flow: heating system	l/h	1 461	1 754
Pressure loss: heating system	kPa	5.5	3.7
Nominal volume flow: cooling system	l/h	2 502	3 013
Pressure loss: cooling system	kPa	15.9	11.9
Air/heat exchanger/fan			
Volume flow	m^3/h	5 000	6 300
Pressure available	Pa	55	120
Power consumption of fan	kW	0.43	0.96
Nominal current consumption of fan	A	1	1.9
Cooling agent	--	R407C	
Cooling agent filling	kg	3.7	5.4
Cooling circuit oil	--	Ester oil	
Oil volume	l	1.89	4.1
Total weight of heating pump	kg	277	337
Sound pressure level [3]			
Outdoor installation [4]	dB(A)	40.3	44.1

1) The data given for the fuses only take into account the power consumption of the heat pump. Any additional heating has not been taken into account.
2) for AMBIFLO 16: Type 150-C16NBD; for AMBIFLO 20: 150-C25NBD
3) The sound pressure level refers to the measurements taken by the Federal laboratory in Dübendorf (EMPA)
4) An open distance of 10 m.

3.3 Loss of pressure

Fig. 2: AMBIflo pressure loss

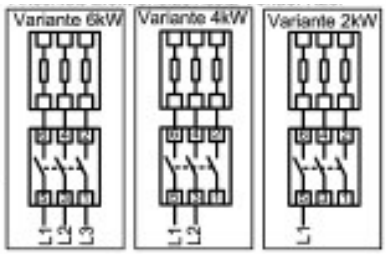


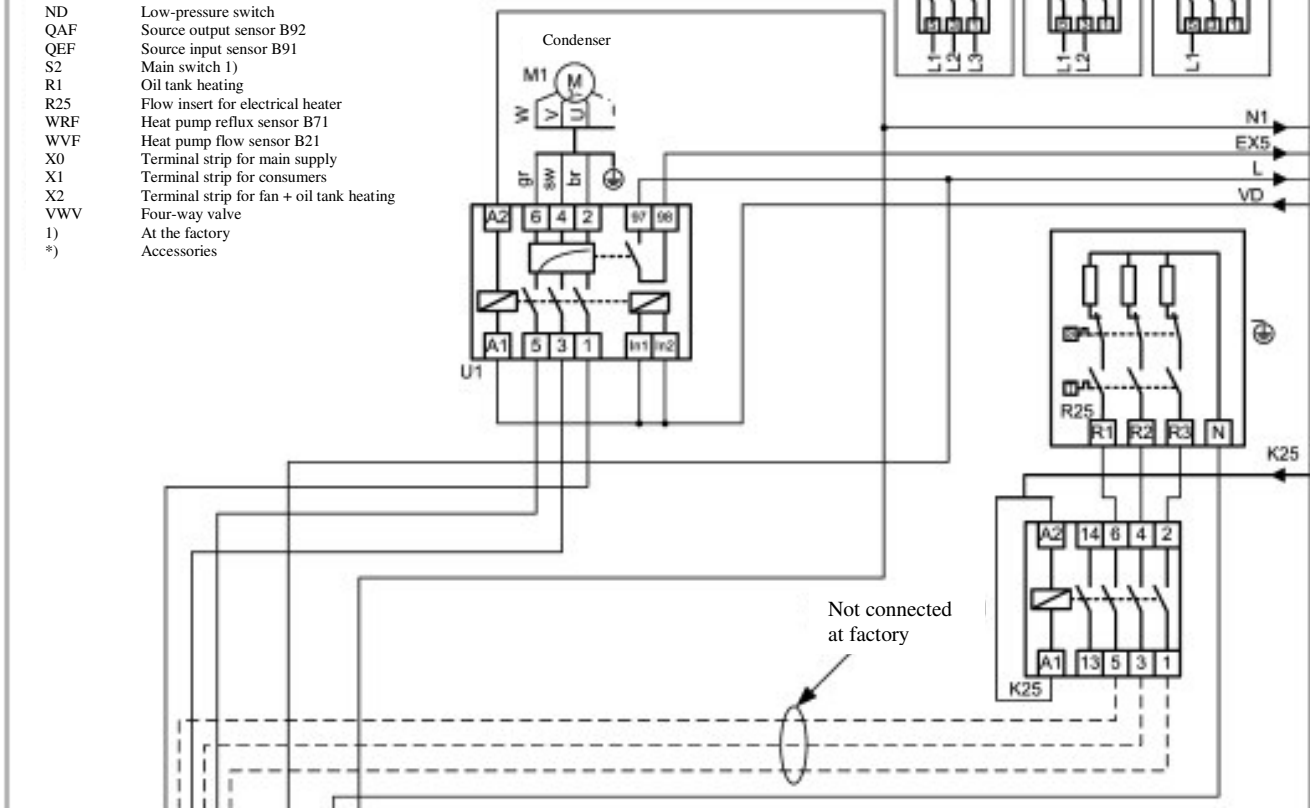
3.4 AMBIFLO 16 circuit diagram

Key:

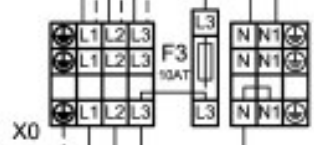
ATF	External temperature sensor QAC34
BE	Operating unit
F3	Fuse 10A T
F1	All phase circuit breaker
FB	Remote control *)
HD	High-pressure switch
HGF	Hot gas sensor B81
K25	Power switch for flow heating R25
KSP	Condenser pump *)
M19	Fan
ND	Low-pressure switch
QAF	Source output sensor B92
QEF	Source input sensor B91
S2	Main switch 1)
R1	Oil tank heating
R25	Flow insert for electrical heater
WRF	Heat pump reflux sensor B71
WVF	Heat pump flow sensor B21
X0	Terminal strip for main supply
X1	Terminal strip for consumers
X2	Terminal strip for fan + oil tank heating
VWV	Four-way valve
1)	At the factory
*)	Accessories

Flow connection for K25 electrical heater:

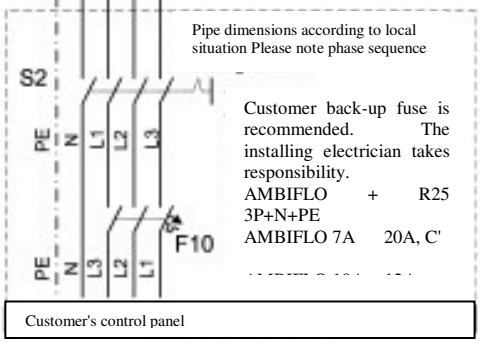




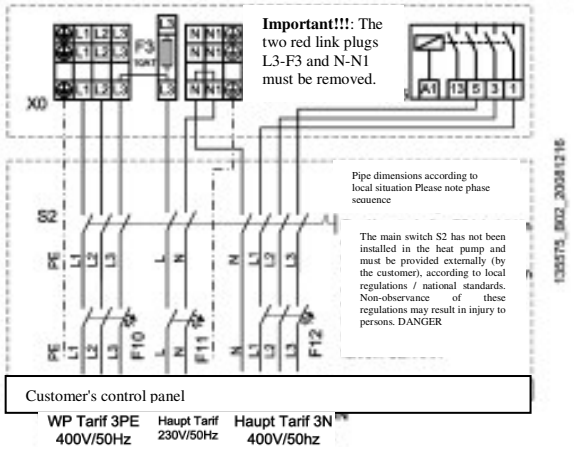
The main switch S2 has not been installed in the heat pump and must be provided externally (by the customer), according to local regulations / national standards. Non-observance of these regulations may result in injury to persons. DANGER



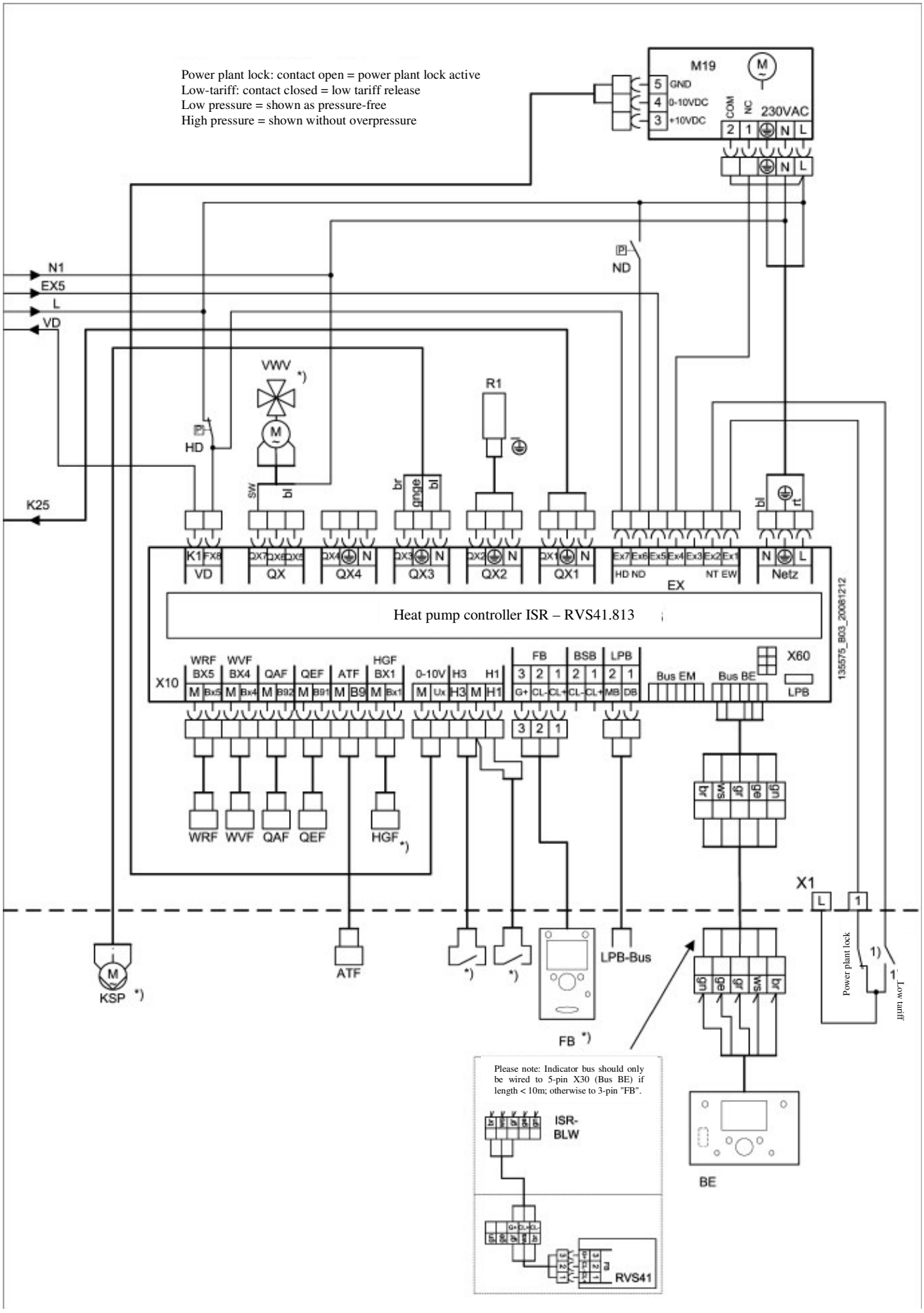
Externally



AMBIFLO7-16A power connection, provided that the energy provider allows all consumers (scroll condenser, additional heating, controls, etc.) to be operated at a single tariff and that the heat pump is not locked at the power plant lock for all phases.



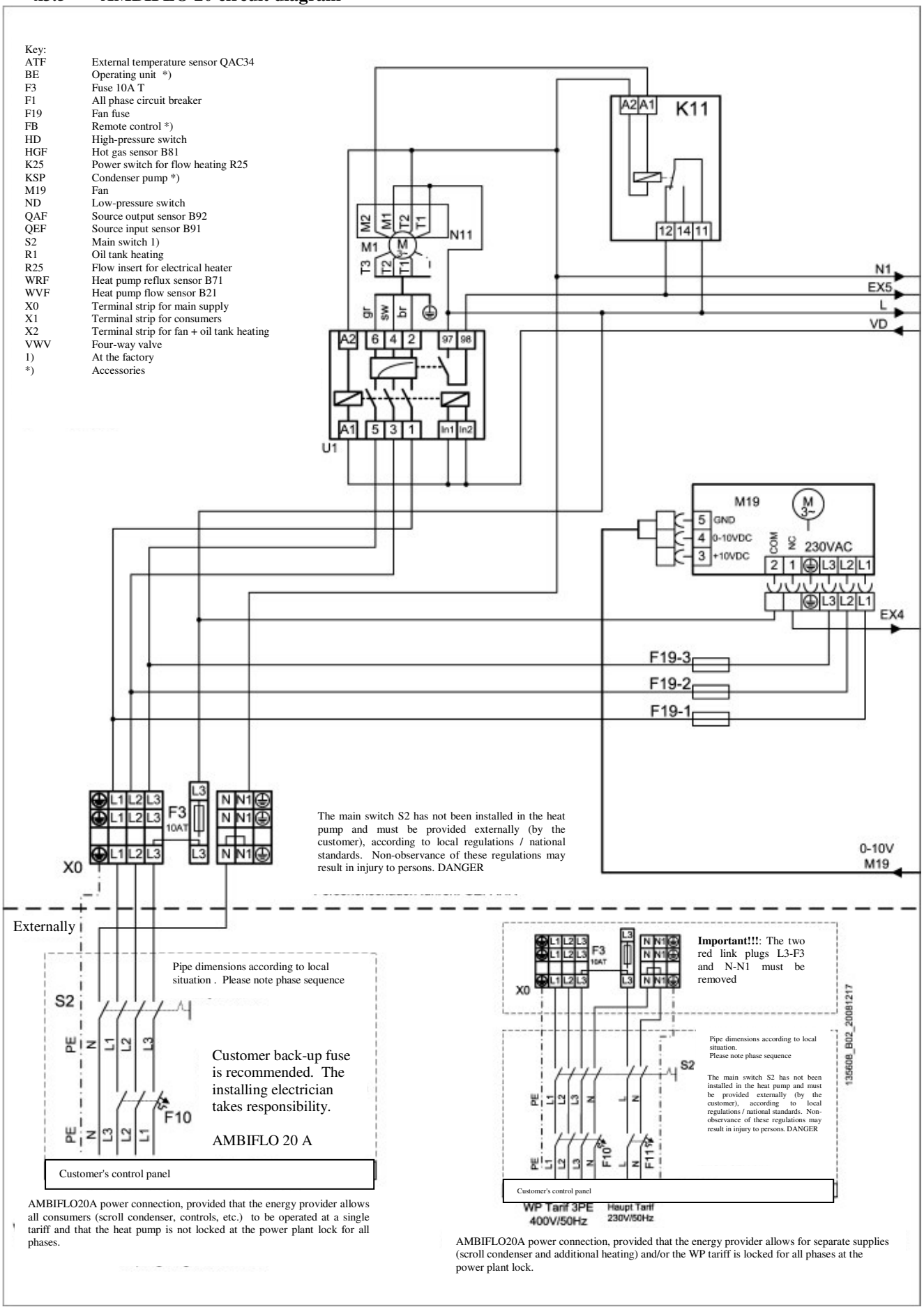
AMBIFLO7-16A power connection, provided that the energy provider allows for separate supplies (scroll condenser and additional heating) and/or the WP tariff is locked for all phases at the power plant lock.


Power plant lock: contact open = power plant lock active
Low-tariff: contact closed = low tariff release
Low pressure = shown as pressure-free
High pressure = shown without overpressure
M19
5 GND
4 0-10VDC
3 +10VDC
COM
NC
230VAC
2 1 N L
N L
ND
N1
EX5
L
VD
K25
VWV *)
HD
R1
sw
bl
br
gnge
bl
bl
K1 FX8 VD
QX7 QX6 QX5 QX
QX4 N QX4
QX3 N QX3
QX2 N QX2
QX1 N QX1
Ex7 Ex6 Ex5 Ex4 Ex3 Ex2 Ex1 HD ND NT EW EX
N L Netz
Heat pump controller ISR – RVS41.813
X10
WRF BX5
WVF BX4
QAF
QEF
ATF
HGF BX1
0-10V H3 H1
FB 3 2 1
BSB 2 1
LPB 2 1
Bus EM
Bus BE
X60
LPB
135575_B03_20081212
WRF WVF QAF QEF HGF *)
ATF
*) *)
LPB-Bus
FB *)
KSP *)
X1
L 1
Power plant lock
1)
Low tariff
Please note: Indicator bus should only be wired to 5-pin X30 (Bus BE) if length < 10m; otherwise to 3-pin "FB".
ISR-BLW
RVS41
BE

x3.5 AMBIFLO 20 circuit diagram

Key:

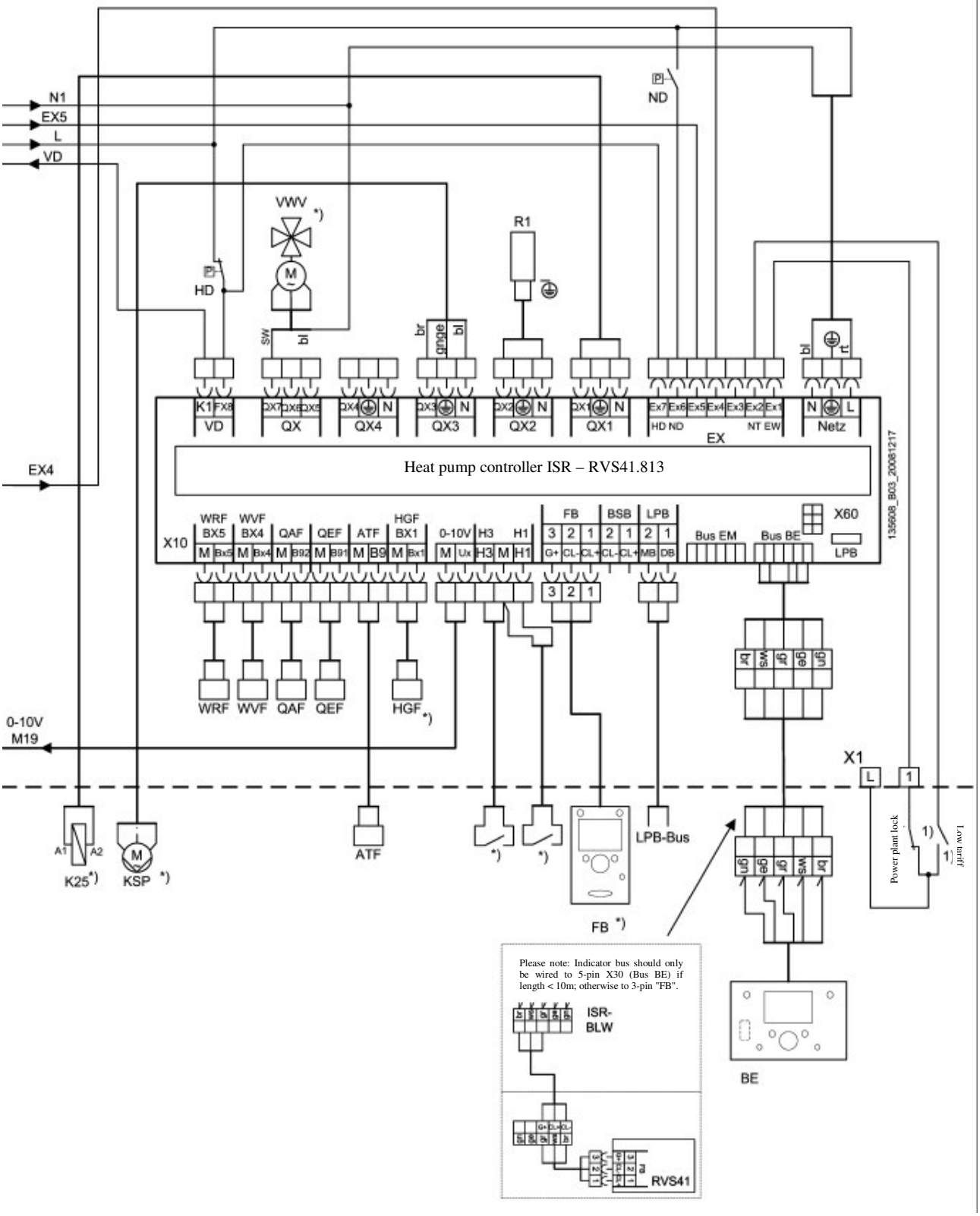
ATF	External temperature sensor QAC34
BE	Operating unit *)
F3	Fuse 10A T
F1	All phase circuit breaker
F19	Fan fuse
FB	Remote control *)
HD	High-pressure switch
HGF	Hot gas sensor B81
K25	Power switch for flow heating R25
KSP	Condenser pump *)
M19	Fan
ND	Low-pressure switch
QAF	Source output sensor B92
QEF	Source input sensor B91
S2	Main switch 1)
R1	Oil tank heating
R25	Flow insert for electrical heater
WRF	Heat pump reflux sensor B71
WVF	Heat pump flow sensor B21
X0	Terminal strip for main supply
X1	Terminal strip for consumers
X2	Terminal strip for fan + oil tank heating
VWV	Four-way valve
1)	At the factory
*)	Accessories

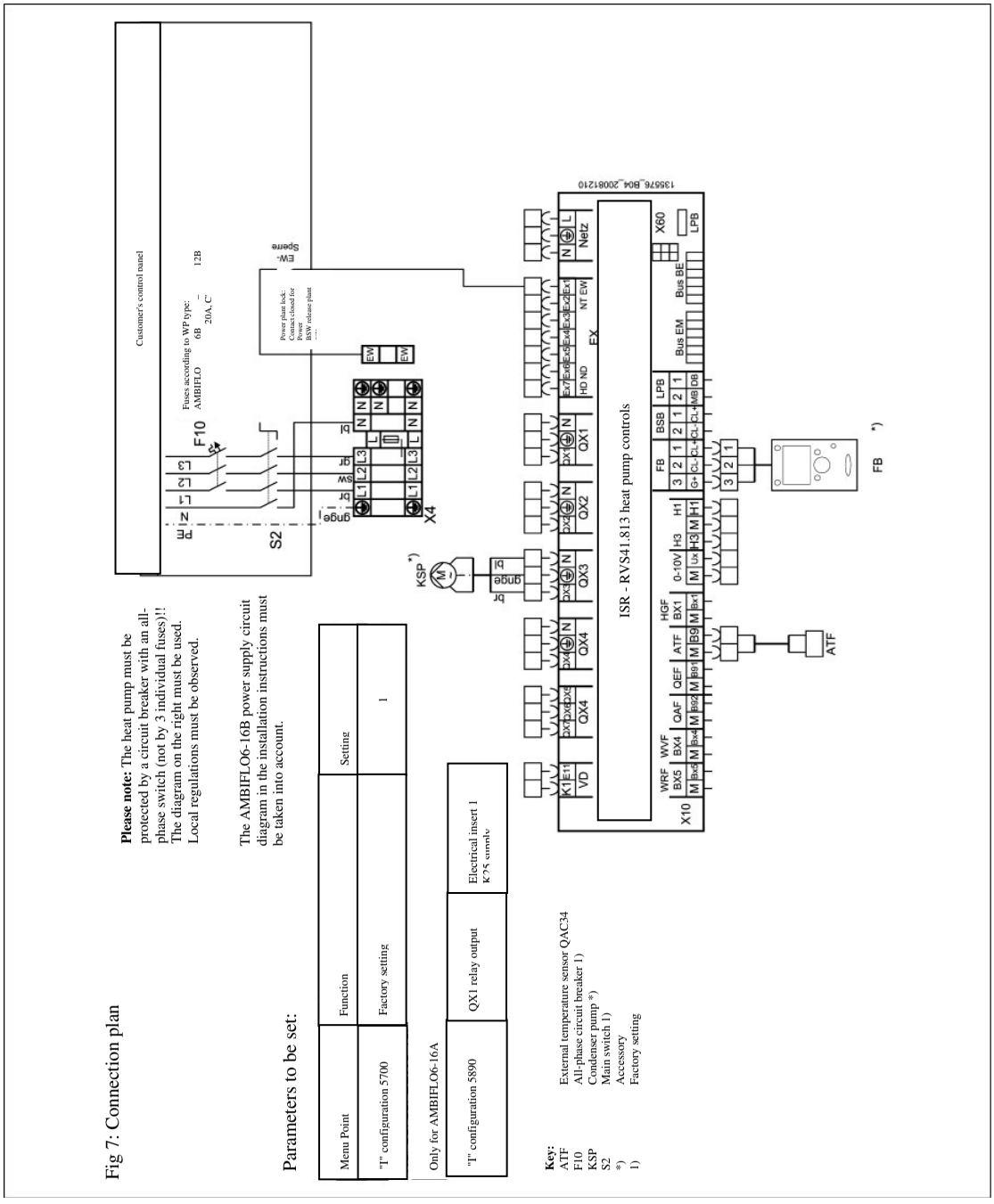


AMBIFLO20A power connection, provided that the energy provider allows all consumers (scroll condenser, controls, etc.) to be operated at a single tariff and that the heat pump is not locked at the power plant lock for all phases.

AMBIFLO20A power connection, provided that the energy provider allows for separate supplies (scroll condenser and additional heating) and/or the WP tariff is locked for all phases at the power plant lock.

Power plant lock: contact open = power plant lock active
Low-tariff: contact closed = low tariff release
Low pressure = shown as pressure-free
High pressure = shown without overpressure





Further examples of applications (mixer heating circuits, connection to solar heating system, etc.) may be found in the software and hydraulics manuals.

4. Prior to installation

4.1 Transport

Upon delivery of the heat pump, it must be checked for transport damage and complete delivery according to the order confirmation. Where material is damaged or missing, the transport company must be immediately notified in writing.

Care must be exercised during transport, set-up and preparation or when handling the unit so as not to cause damage.

Please ensure that load cables, straps or chains cannot damage the heat pump.

Please note! The heat pump may not be tilted by more than 15° from its vertical axis.

For transport purposes, the heat pump is fixed on a pallet at the factory and covered in film to protect it against scratches. The packaging may only be removed once the heat pump has reached its final location.

Transport notes
To avoid transport damage, the packaged heat pump, together with its wooden pallet, must be transported to its final installation site by pallet truck or push cart.

- Secure the heat pump on the push cart to prevent sliding
- Do not use the components or pipes of the cooling circuit, the heating system and the heat source for transport purposes or lifting of the unit.
- Take the weight of the heat pump into full account when lifting the unit.
- To avoid any damage to the water pipes and electrical wiring, please note their position and protect them accordingly
- Only lift and transport the heat pump by holding on to the base of the unit.

4.2 Installation site

The pump must be installed with care and accuracy.

Please ensure that you have obtained the necessary permits to operate the heat pump.

Once it reaches its final installation site, the heat pump must be carefully unpacked and taken off the pallet, taking care not to subject it to any shocks.

Both the air inlet and outlet must be kept clean and must not be subject to blockage or infiltration by snow, leaves, vegetation, implements or any other item likely to restrict the air flow through the unit. The prescribed minimum distances must be observed to ensure the air flow is not obstructed and to give access for maintenance (see page 9).

The air inlet must be protected against ingress from corrosive substances such as ammonia, chlorinates, etc.

Prior to installation

The AMBIflo heat pump is very quiet in operation, however, in the knowledge that noise perception is very subjective, the pump should not be set up near a window, bedroom or leisure site (terrace, swimming pool deck, etc.). A sufficient distance to the adjoining properties should be observed. It is not recommended to set up the pump in a wall niche (possible echo or air blockage).

Instructions for outdoor installation

The heat pump should be placed on a flat/level and firm surface with the correct load carrying capacity. It is advisable to supply a foundation such as concrete or a slab, taking the potential depth of any snow into account, so that the base of the pump will never be subject to snow.

The flow and return pipes should cover as short a distance as possible and must be well insulated to avoid heat loss. The condensation water outlet must be insulated and protected against frost and the water should be channelled into a closed outlet via a siphon with a minimum height of 100 mm. The outlet pipe must not have any constrictions and must have a sufficient gradient to ensure an easy flow. The control unit must be installed indoors (temperature range +5°C to +40°C).

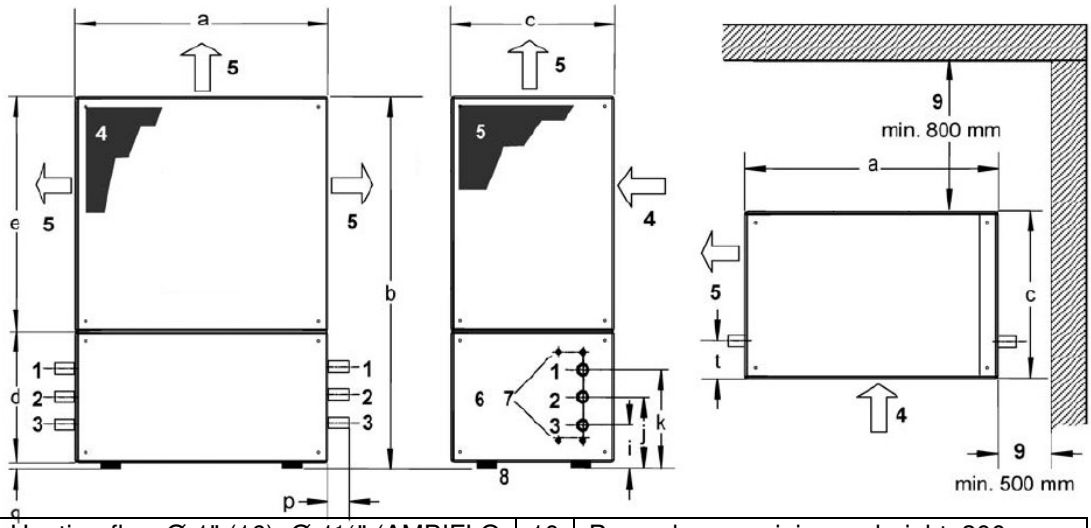
The wall apertures for the flow and return pipes, as well as the electrical cables must be constructed according to the regulations. Electrical cables, in particular, must be flexible, with mains voltage (230 or 400V) and low voltage (sensor and control) cables shielded from each other.

4.3 Outdoor installation

Base
The base should project approx 50 mm beyond all sides of the heat pump and be sufficiently high enough to account for snow and water ingress.

Prior to installation

Fig. 3: Dimensions of air inlet

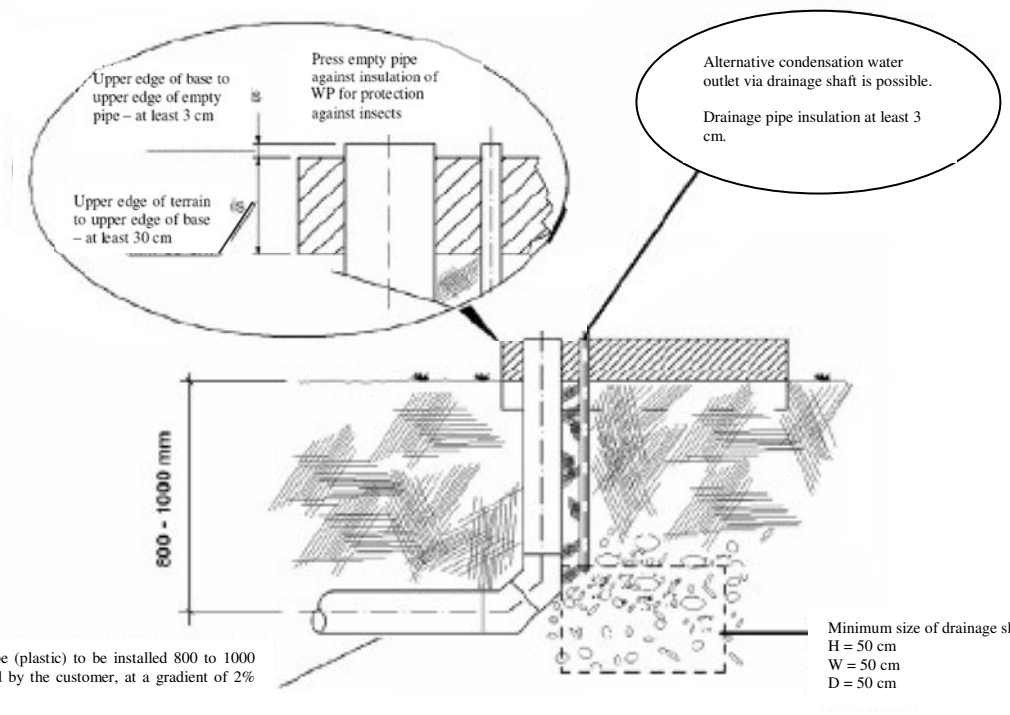


1	Heating flow Ø 1" (16), Ø 1¼" (AMBIFLO 20) flexible. The hydraulic and electrical connections can all be located on the left or right of the heat pump.	10	Pump base, minimum height 300 mm, taking the depth of local snow falls into account
2	Heating flow Ø1" (16), Ø 1¼" (20) flexible.	12	Wall aperture with seal tilted towards the inside (made of PE, internal diameter 150 mm)
3 4	Condensation water outlet Ø ¾", flexible Air inlet (ZA AMBIFLO accessory)	13	Control unit for wall installation (included in delivery), siphon for condensation water at a minimum height of 100 mm.
5 6 7 8	Air outlet (ZA AMBIFLO accessory), either right or left Internal electrical control panel Hydraulic and electrical connections, electrical cables – extra-low voltage shielded from 400V and 230V cables. Adjustable legs, absorbing structure-borne noise		A minimum distance of 800 mm must be maintained at the front of the heat pump for maintenance purposes. A minimum distance of 700 mm (o 500 mm for Set AAS) must be kept at the back (on the suction side). A minimum distance of 500 mm is required on the free side opposite the air outlet, while a minimum distance of 2 000 mm is required on the outlet side.
9	Protective roof (ZA AMBIFLO accessory)		

Table 1: Dimensions

AMBIflo	Width a	Height without protective roof b	Depth c	Bottom height d	Top height without protective roof e	Pump base			Legs q
						a1	c1	h1	
16	1195	1675	750	575	1060	1295	850	300	40
20	1195	1695	880	670	975	1295	980	300	50
AMBIFLO accessory: incl. 2 weather protection grids, control panel cover and protective roof									

Fig 4



Water-tight empty pipe (plastic) to be installed 800 to 1000 mm below the ground by the customer, at a gradient of 2% towards the building.

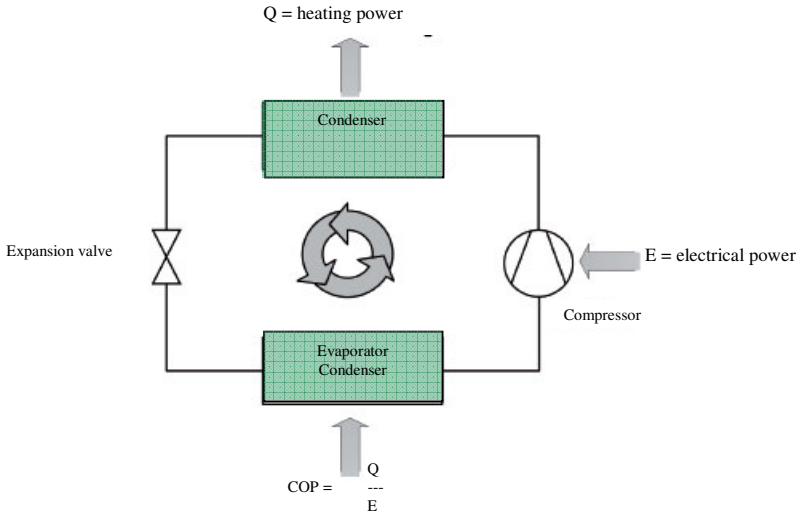
Only 45° brackets should be used.

4.4 Function and construction of an air/water heat pump

The high-quality AMBIFLO air/water heat pump removes heat from the outdoor environment, channelling it to the heating system at a higher temperature level. The heat pump can be installed in newly constructed or existing heating systems, taking into account the capacity limitations (see Technical Data).

Operating method of the heat pump

Fig 5. Diagram of a heat pump



Optimised defrosting
When the outdoor temperature drops below 7°C, frost will form on the air/heat exchanger's evaporator. This will result in the formation of ice and will consequently reduce heat exchange and thus the degree of efficiency of the heat pump.

To remove this frost or ice, the evaporator must be defrosted. This is done at AMBIFLO by reversing the cooling circuit, but this is not a cost-effective process, as during defrosting the heat pump provides no energy, but still consumes power. As the frost formation depends on the humidity level of the air, however, it is always necessary.

Instead of putting the device through a defrosting process at regular intervals, AMBIFLO determines the correct defrosting time by using advanced logic, with various performance parameters being defined in the cooling circuit. Thanks to this process, defrosting is rarely necessary in winter – a great advantage.

Low-noise operation
The AMBIFLO air/water heat pump has very low sound emissions when installed outdoors. This is possible thanks to the high-performance fan, the very advantageous air-channelling process, the triple bearings of the mobile mechanical components as well as the sound-proof insulation of the cover.

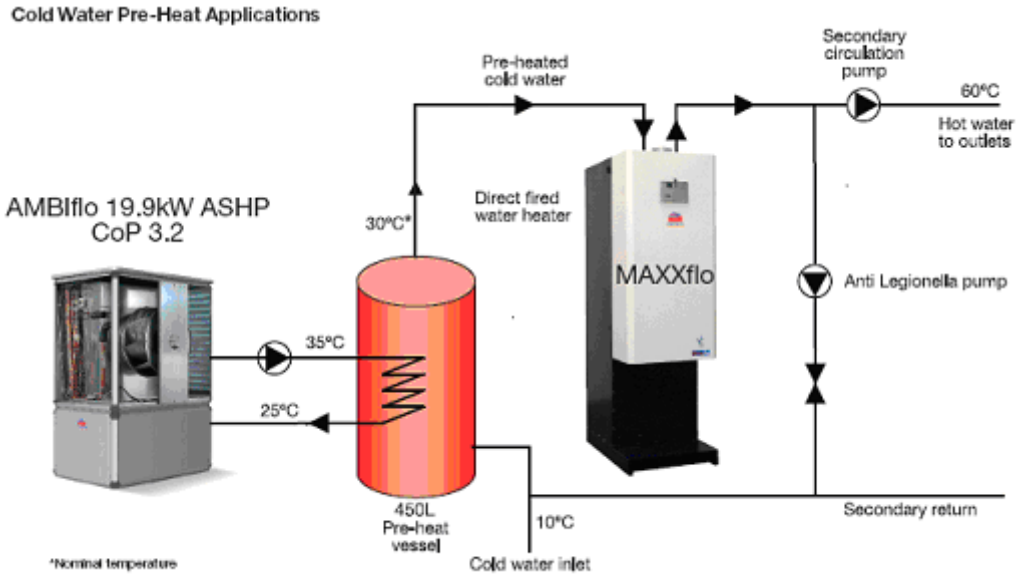
General notes

The pipes and air channels should be kept as short as possible and the pipe guides should be such that the loss of pressure and heat can be kept as low as possible. Poor or wrongly dimensioned pipes can cause damage to the heat pump.

Systems with a buffer storage tank must have a flow volume via the heat distributor that is lower than the flow volume of the charging circuit (heat pump store) to prevent any reflux via the buffer store. This would have an adverse effect on the economic efficiency of the system and adversely affect the smooth functioning of the heat pump.

Prior to installation

4.5 AMBIFLO application example



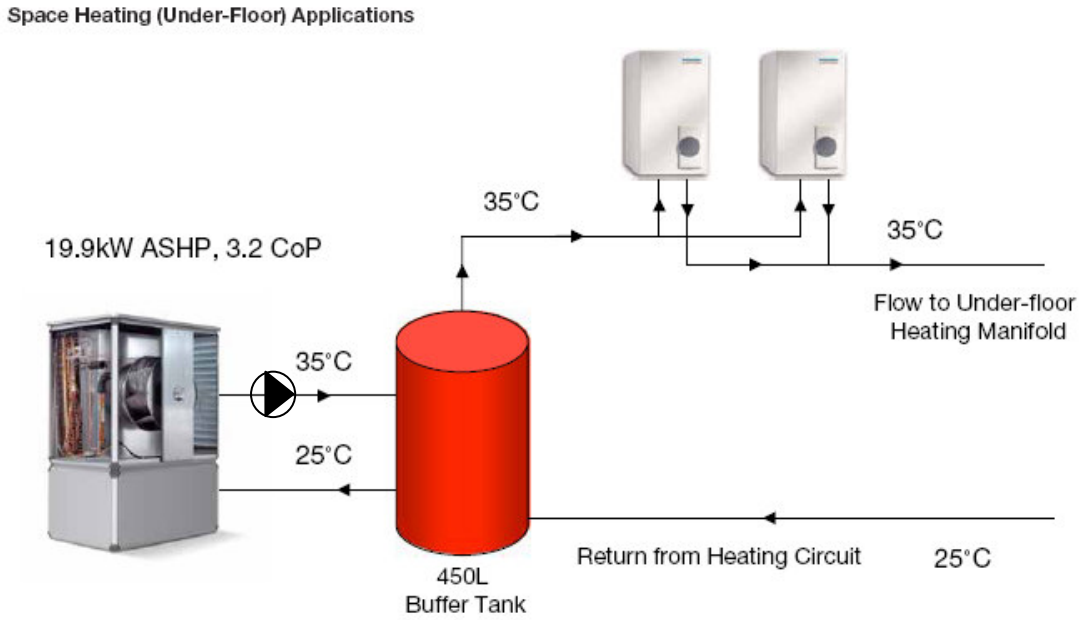


Fig 7: Connection plan

Please note: The heat pump must be protected by a circuit breaker with an all-phase switch (not by 3 individual fuses)!!
The diagram on the right must be used.

Local regulations must be observed.

The AMBIFLO16B power supply circuit diagram in the installation instructions must be taken into account.

Customer's control panel

Fuses according to WP type:

AMBIFLO 16B 25A,

Power plant lock:
Contact closed for BSW release Power plant gate

Parameters to be set:

Menu point	Function	Setting
"I" configuration 5700	Factory setting	1
Only for AMBIFLO6-16A		
"I" configuration 5890	QX1 relay output	Electrical insert 1 K25 supply

Network

ISR - RVS41.813 heat pump controls

Key:

ATF	External temperature sensor QAC34
F10	All-phase circuit breaker 1)
KSP	Condenser pump *)
S2	Main switch 1)
*)	Accessory
1)	Factory setting

Further examples of applications (mixer heating circuits, connection to solar heating system, etc.) may be found in the software and hydraulics manuals.

5. Assembly

5.1 Heat pump roof

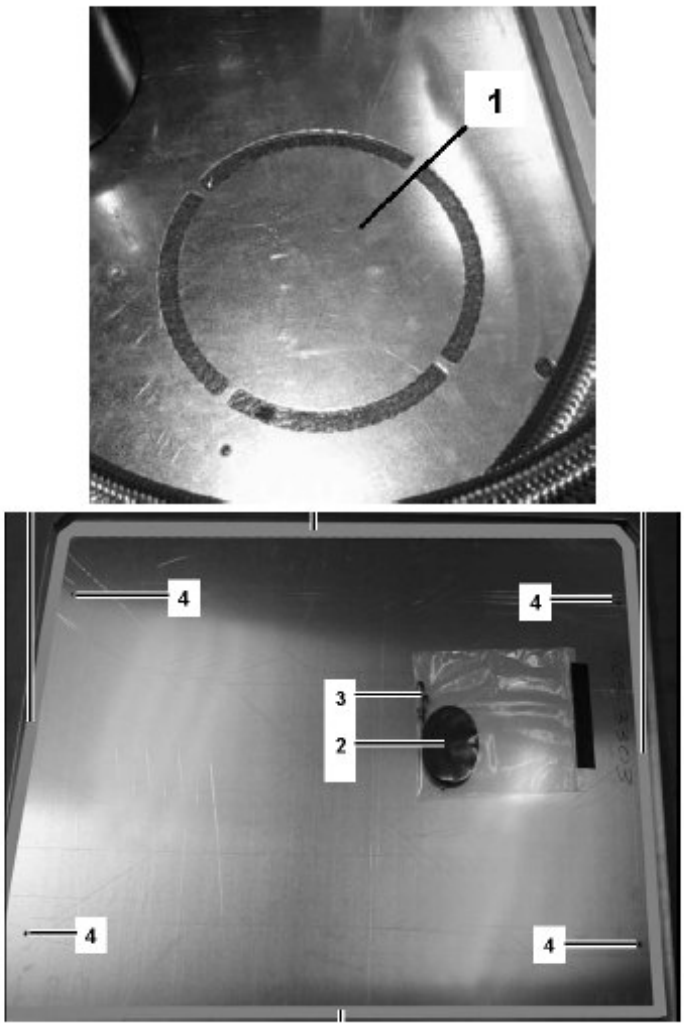
Pre-rolled opening for air/water heat pump installed outdoors

There is a pre-rolled opening (1) at the bottom of the pump system, behind the electrical control panel, through which the pipes pass into the ground. Where a heat pump is installed outdoors, we recommend that you use this duct. The heating pipes, the condensate connection and the electrical cables all pass through this opening. Please also take into account the plan for the base with the necessary aperture.

Assembly of the heat pump roof

- The metal roof is to be fixed to the lower edge of the metal all around the circumference, using the sealing tape (2) provided. This prevents the formation of cooling bridges / condensation water.
- Remove the screws on the roof of the heat pump cover.
- Turn the metal roof and fix it to the top of the cover using the screws (3) provided. Make use of the existing 4 holes (4).

Fig. 8



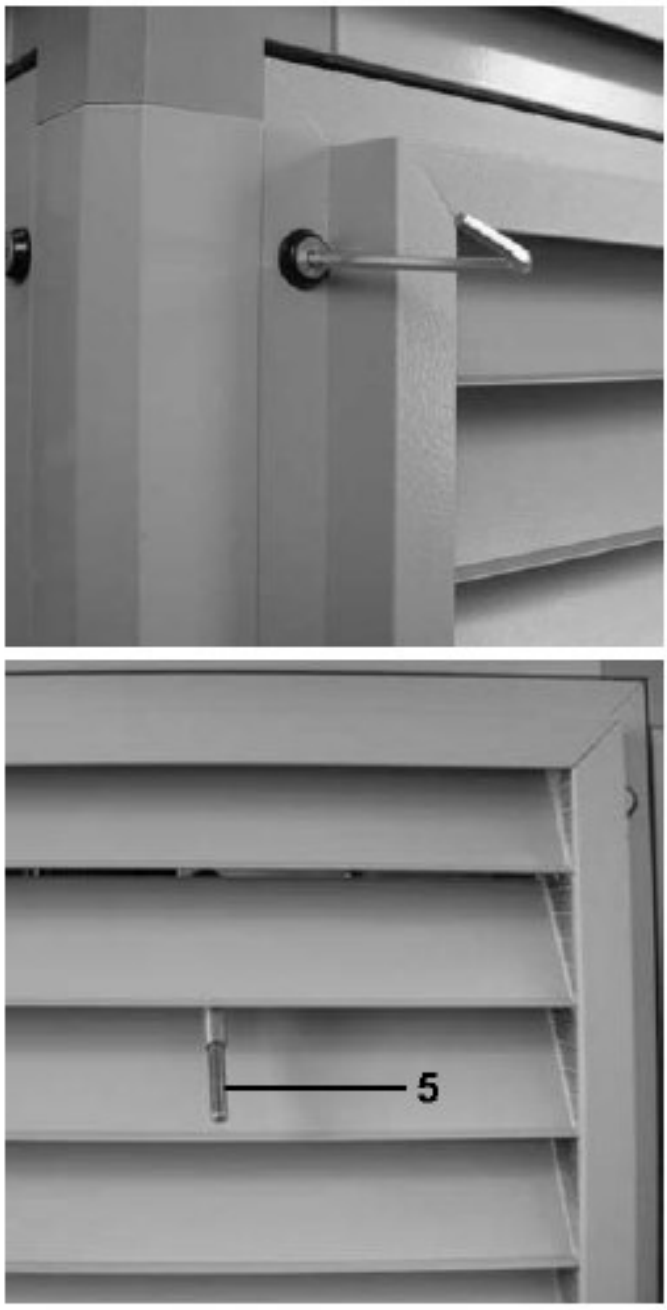
5.2 Weather protection grid

The two weather protection grids (on the inlet and outlet side) must be fixed to the interior frame of the cover. This can be done with the aid of an Allen key (Size 3) or a battery-driven screw driver.

The outlet side may be on the left or right. The outlet grid must be used when the system is installed outdoors.

Where the weather protection grid is to installed (outdoor installation), the air sensor (5) must be pulled out of the grid.

Fig. 9



6. Installation

All transport safety devices must be removed before operation. The regulations and diagrams must be carefully followed.

The accessories must be installed by an expert (heating system technician) according to the instructions for installation included.

The noise emanating from a heat pump of this type is very low, due to the three-step, sound-absorbing bearings used for the movable components and the sound insulation cover. The effective sound level also partially depends on the sound proofing or reflection of the surrounding materials, as well as the possibility of having the sound Range as structure-borne noise.

Pipes and electrical cables must be attached to the wall and not to the heat pump. All these connections must be joined to the heat pump via flexible connections so that they can swing freely, especially when the condenser or fan starts up. This is the only way in which the transmission of structure-borne noise can be avoided.

6.1 Hydraulic connections to the heating system

The pipes may be installed on the left or right side and are connected inside the heat pump. The pipes must be such that any loss of pressure at nominal power will not exceed the pressure available, as this would result in a reduction in the capacity of the heat pump. The heating circuit pipes should not be over tightened. The pipes must also be sufficiently insulated to avoid unnecessary heat loss or the formation of condensation, which could damage the pipes or the installation.

The system must be thoroughly flushed before being connected to the heat pump.

Condensation outlet
The condensation outlet should be as close as possible to the connection of the heat pump. To avoid having environmental air or waste air sucked into the heat pump, the condensation outlet must be connected to the heat pump via an air-tight syphon at a minimum height of 100 mm. The condensation outlet may not be constricted and must have at least a 2% incline along its entire length, so that the water can run off easily.

Exchanging the hydraulic and electrical connections
The pipes are normally connected to the left of the heat pump. Where the right side is preferred, these panels (1 and 2) can be exchanged for the panels on the opposite side. The pipes and cables inside the heat pump are pulled over to the other side and slotted through the aperture in panel 1 (fig. 10).

Fig. 10

6.2 Accumulator

When the heat pump is operated with a buffer storage tank, Andrews Water Heaters accumulators of the Solar series are recommended.

6.3 Electrical connection (general)

Risk of electrocution! All electrical work associated with the installation may only be carried out by a person trained as an electrician!
- Power supply 1/N/PE: AC 230 V +6% -10%, 50 Hz
- Power supply 3/N/PE: AC 400 V +6% -10%, 50 Hz

During installation, the IEE and local regulations for England and Wales, or alternatively the relevant regulations for all other countries must be observed. The power supply may have a maximum tolerance of 2% for current intensity and 10% for voltage. The heat pump may not be connected if the difference between the phases exceeds 2%. Any operation outside the abovementioned limit values will result in the warranty being nul and void. Where necessary, the local power supplier should be contacted.

All electrical connections must be carried out in such a way as to guarantee correct polarity. An accessible plug or a permanent connection should be used.

It is recommended to place a main switch before the AMBIFLO to switch off all poles and to ensure a contact opening width of at least 3 mm. All connected components must be in accordance with the IEE and the connection cables should not be subjected to tensile stress.

Cable grips
All electrical cables must be placed into the cable grips of the control unit and connected in accordance with the circuit diagram.

Circulation pumps
The permitted current load per pump output will be $I^{N\ max}$ = 2A (max. current consumption 6A).

Connecting the sensors / components

Risk of electrocution! The circuit diagram must be taken into account! Accessories should be installed and connected in accordance with the instructions included. Plug in the mains and check the grounding.

Installation

The outdoor temperature sensor is enclosed. See circuit diagram for connection instructions.

Cable replacement
All electrical cables, with the exception of the main power supply cable, must be replaced with Andrews Water Heaters special cables, where required. Only cables of the type H05VV-F are to be used when replacing the main power supply cable.

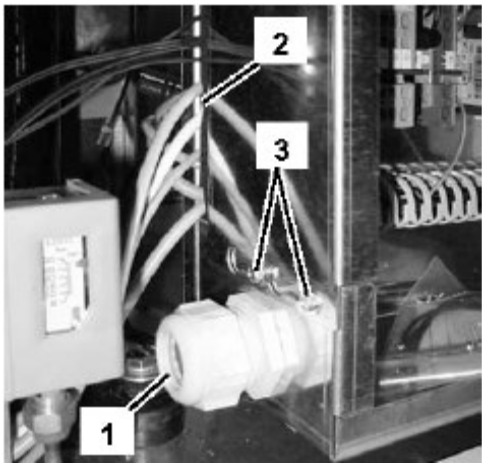
Contact safety
Once the AMBIFLO has been opened, the cover panels must be replaced, using the appropriate screws, to ensure contact safety.

Notes on electrical controls
The internal cabling for the heat pump has been carried out at the factory in accordance with the electrical circuit diagram accompanying the device.

The heat pump has been equipped with a power supply, containing the components listed below:

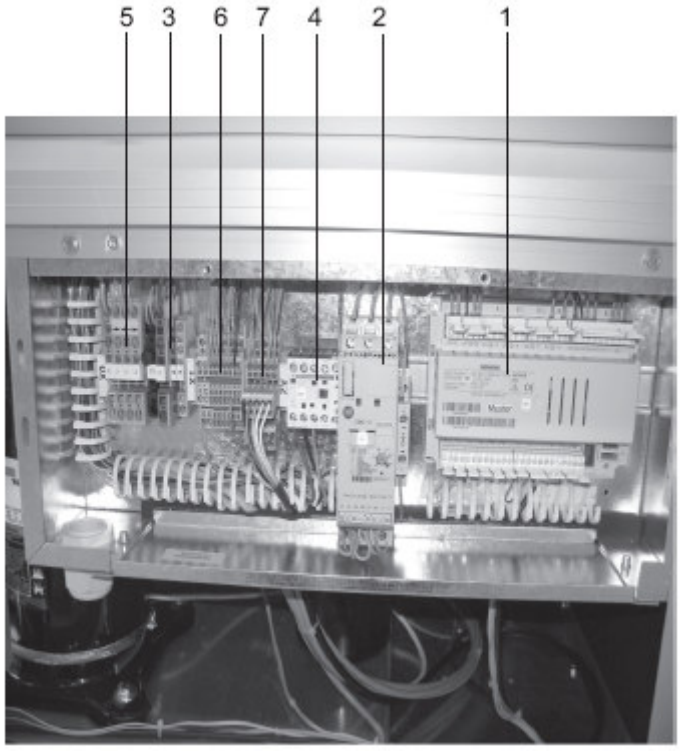
- Externally, an automatic safety switch or a 3-phase insert fuse with a neutral wire must be provided, designed according to the technical specifications.
- The low-voltage cables (control unit) may not be channelled through the same cable ducts as the power supply cables.
- The outdoor temperature sensor of the control unit must be attached to the outside wall of the building, where it may not be affected by either the afternoon sun or any other foreign heat source (open window, chimney, etc.). The preferred alignment should be north or north/east.
- In the event of remote control, the room inlet must be located in a reference room (for example the living room), where it cannot be influenced by any external heat sources (such as chimneys, the sun, a fireplace, heaters or air ducts).

Cable connections
1. Insertion of 3 x 400V power cable
2. Insertion of low-voltage / sensor cable
3. Fastening screws



Loosen the screws (3) and push the metal cover forwards. This facilitates the insertion of the low-voltage cables (2). Once the cables have been inserted, push the cover back again and refasten the screws (3).

Fig. 11 Electricity box



1. RVS heat pump control unit
2. Smooth starter and alternating current relay
3. 230V microfuse
4. Electrical contactor
5. 3x400V main power supply
6. Power plant lock / flow monitor
7. Fan connection

7. Commissioning

Danger! An accredited heating technician must commission the system! The heating technician will check the leak-tightness of the pipes, the proper function of all control and safety devices and measure the combustion values. There is a risk of considerable injury to persons or damage to objects or the environment in the event of improper execution!

All systems must be commissioned by an authorised customer service centre, failing which the contractually stipulated warranty will expire. The customer service centre will only handle the commissioning process, but not the connection of the heat pump or any other work.

Our participation in the commissioning process does not mean that we take any responsibility for the type of planning and the installation of the system. Our participation will be restricted to the technical functionality of our product.

7.1 Preparation by the customer

The following points must be checked before commissioning:

1. The heat pump is electrically and hydraulically complete and has been duly connected.
2. All external components required for operation, such as circulation pumps, three-way valves, sensors, etc. have been fully and duly connected.
3. The hydraulic connections have been fully and duly connected.
4. All sensors have been properly wired up, shielded and are in the correct place according to the relevant system diagram.
5. The heating system has been professionally set up and flushed, filled, vented and checked for leaks according to the regulations.
6. Check the safety valves on the water pipes.
7. Check the mains voltage and frequency.
8. Connect the fuses according to the values given on the identification plate and in the technical data sheets.

Please note! The fuse for the compressor must cover all wires (do not use 3 individual fuses)!

9. Check the torque of the screws used to attach the electrical conductors.
10. Connect the terminals of the heat pump control unit (inputs and outputs) according to the terminal plan for the object in question.
11. Check the water filling level and pressure of the evaporator and condenser.
12. Open the check valves in the water circuits.

7.2 Commissioning (by customer services)

The device can be switched on once all the above mentioned points have been observed.

The presence of the following persons is required during commissioning:

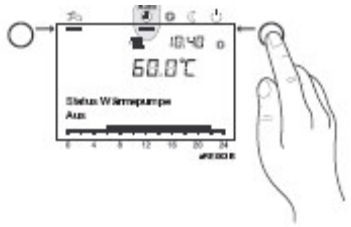
- The planner, who must specify the operating parameters.
- The technician, who is responsible for the functionality and settings of the hydraulic system.
- The system operator (the customer or his representative), who is familiarised with the system and trained in the operation thereof during the commissioning process.

Where commissioning is requested without all these conditions being met, Andrews Water Heaters will take no responsibility for any system operating problems. The system is then operated at the user's own risk and responsibility. The following points must be observed or checked:

1. Hydraulic circuits: Check concurrence with the documentation provided.
2. Check the electrical connections and fuses.
3. Check the terminal allocation at the heat pump control unit.
4. Configure the control unit parameters according to the presettings given under Prog. No. 5700.
5. Carry out inlet and outlet tests and check whether the water circuits have been vented and filled with water at the correct pressure.
6. Commission the heat pump and check the operating values (according to the "Technical Data"):

- The current consumption of the compressor may not exceed the values given in the "Technical Data" table.
- Check the temperature values in the heating circuit.
- Check the hot water flow (using the temperature difference between the water inlet and outlet at the condenser)

$$\text{Flow volume } (m^3/h) = \frac{\text{Heating capacity (kW)} \times 0.86}{\text{Flow volume } (m^3/h) = \text{Temp.difference } (\text{°C})}$$



7. Use the operating mode button for heating operation on the control unit to select the operating mode "Automatic operation" Auto .

8. Set the desired room temperature, using the rotary button of the control unit.

7.3 Temperatures for heating and Domestic Hot Water

When setting the temperatures for the heating and Domestic Hot Water systems, the information in the "Programming" section must be taken into account.

It is recommended that the Domestic Hot Water temperature be set to 45°C.

7.4 Programming the necessary parameters

The control parameters normally do not need changing (application example). Only the date/time and possibly the timer programmes will have to be set.

The parameter settings are described in the "Programming" section.

7.5 Instructing the operator

Instruction
The operator must be duly instructed in the operation of the heating system and the function of the protective devices. In particular, the following must be pointed out to him:

- The state of the cover is to be checked.
- The fastening of the outer cover is to be checked.
- To protect the paintwork, no objects should be leaned against or placed on top of the device.
- The external parts of the heat pump can be wiped down with a moist cloth and a commercial cleaning agent (use a non-abrasive cleaning agent with a solvent!).
- Controls to be carried out by the operator himself:
  - Pressure check at the manometer
  - Leaks in the hot water circuit.

An authorised service centre must be entrusted with the maintenance work (oxidation products may form when oxygen penetrates into the heating circuit).

- The mains cable between the heat pump and the switch cabinet may not be torn or worn or have any other kind of damage that could adversely affect the insulation. An authorised service centre is responsible for maintenance work.
- Inspections and cleaning at regular intervals may only be carried out by accredited gas technicians.

Documentation
- Any documentation pertaining to the heating system is handed over with the instructions to store it in the room in which the heat pump has been installed.
- The commissioning checklist requires confirmation of receipt and a legally valid signature by the operator: only components tested in accordance with the relevant standards have been used. All components have been fitted according to the manufacturer's instructions. The overall system is in accordance with the standards.

7.6 Checklist for commissioning

1.	Have all cables and connections been checked for leaks?			
2.	Have all hot water circuit pipes been bled?			
3.	Has the operating pressure been checked?		mbar	.....
4.	Do the pumps run freely?			
5.	Fill up the heating system			
6.	Water additives used			.....
7.	Has the current consumption of the condenser been measured?		mA	.....
8.	Temperatures:	in the heating circuit	°C	.....
9.	Check flow:	hot water flow	m^3/h	.....

Commissioning

10.	Only for new constructions	Construction to be dried out		
11.	Functional test	Heating system		
		Domestic Hot Water system		
12.	Programming	Time / date		
		Comfort target value for heating circuit ½	°C	.....
		Nominal target value for Domestic Hot Water	°C	.....
		Automatic daily time program	o'clock	.....
13.	Leak-tightness tested during operation?			
14.	Operator instructed?			
15.	Documents handed over?			

All components used have been checked and labelled in accordance with the relevant standards. All system components have been fitted according to the manufacturer's instructions. The total system is in accordance with the standards.

Date /
signature

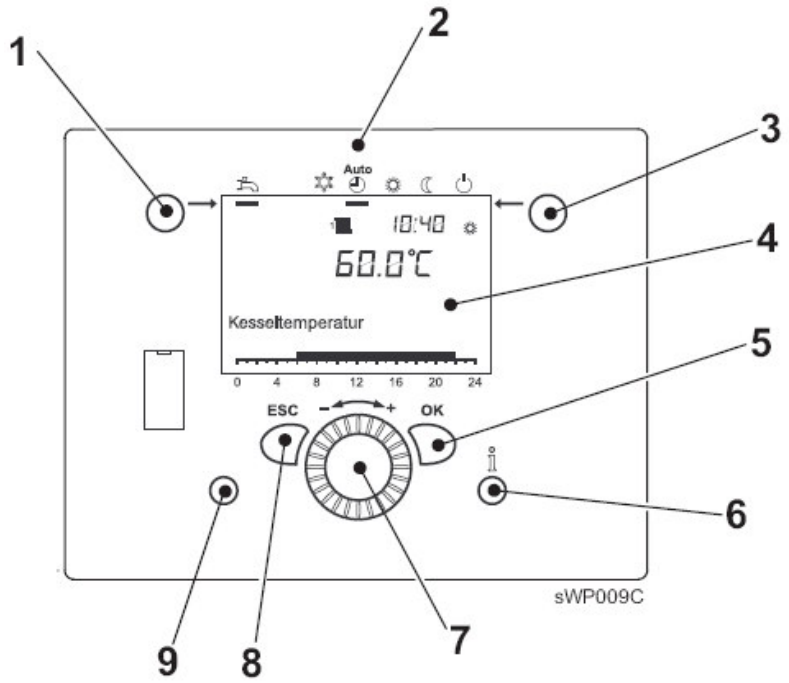
Company
stamp

.....

8. Operation

8.1 Operating elements

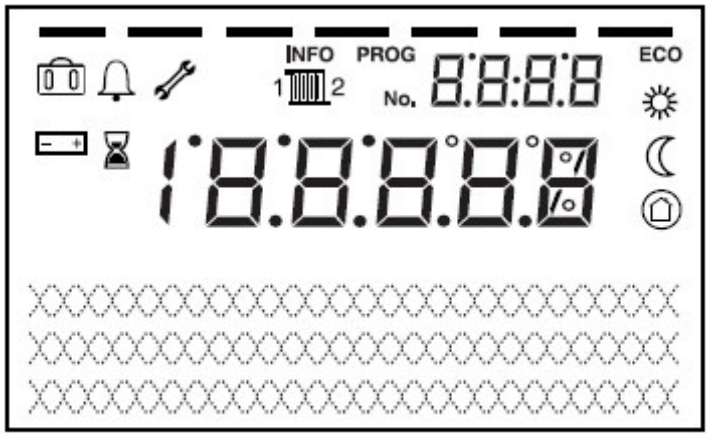
Fig. 12: Operating elements



1. Operating mode button for Domestic Hot Water system
2. Control unit
3. Operating mode button for heating system
4. Display
5. OK button (acknowledgement)
6. Information button
7. Turning button
8. ESC button (termination)
9. No function

8.2 Indicators

Fig. 13: Display symbols



Meaning of the symbols shown	
Heating to comfort target value	Maintenance message
Heating to reduced target value	Error message
Heating to frost protection target value	INFO Information level active
Current process	PROG Settings level active
Holiday function active	ECO Heating switched off (summer/winter automatic switch or automatic heat limit active)
Reference to heating circuit 1 or 2	

8.3 Switching off the heating system

The user can switch between the operating modes for the heating system by using the operating mode button for the heating system. The setting selected is shown by a bar underneath the relevant operating mode symbol.

Automatic operation

The following conditions apply to automatic operation Auto :

- Heating operation according to the time program
- Temperature target values or according to the time program
- Protective functions (system frost protection, overheating protection) active
- Summer/winter automatic switch (automatic switching between heating operation and summer operation once a specific environmental temperature has been reached)
- Automatic daily heat limit switch (automatic switching between heating operation and summer operation once the environmental temperature exceeds the target value).

Permanent operation

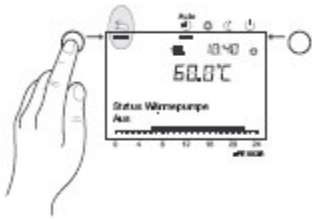
The following conditions apply to permanent operation or :

- Heating operation without timer program
- Protection functions active
- Summer/winter automatic switch not active during permanent operation with comfort target value
- Automatic daily heat limit switch not active during permanent operation with comfort target value.

Safety operation

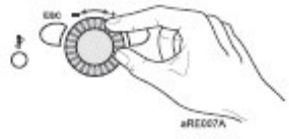
The following conditions apply during safety operation ⏻:
- No heating operation
- Temperature depends on frost protection
- Protective functions active
- Summer/winter automatic switch active
- Automatic daily heat limit switch active

8.4 Setting the Domestic Hot Water system



- Switched on: The Domestic Hot Water will be produced according to the switch program selected.
- Switched off: The Domestic Hot Water system has been deactivated.

8.5 Setting the indoor target values

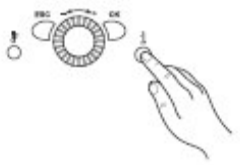


-Comfort target value ☼.
The comfort target value must be set directly on the turning button, i.e. either higher (+) or lower (-).

- Reduced target value ☾. The reduced target value is set as follows:
  - Press the acknowledgement button (OK).
  - Select a heating circuit.
  - Select a parameter reduced target value.
  - Set the reduced target value using the turning button.
  - Press the acknowledgement button (OK) again.

Return to the basic display from the programming or information level by pressing the operating mode button for the heating circuit.

8.6 Displaying information



Various temperatures and messages can be called up by pressing the information button, including the following:
- indoor and outdoor temperature
- error or maintenance messages.

Where there are no errors or maintenance messages, this information will not be shown.

8.7 Error messages

If the error symbol 🔔 appears on the display, a system fault has occurred. Further information may be obtained by pressing the information button (see Error Code Table).

Step		Function
1		Calling up further information on the error message (see Error Code Table).

8.8 Maintenance messages

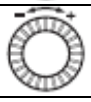
When the maintenance symbol  appears on the display, there is either a maintenance message or the system is in special operating mode. Further information can be called up by pressing the information button (see Maintenance Code Table).

Step		Function
1		Calling up further information on the maintenance message (see Maintenance Code Table).

The maintenance message has not been activated as a factory setting.

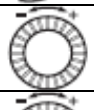
8.9 Acknowledging the message

The end user has the option of acknowledging a maintenance message. The message will then be deleted in the entire system

Step		Function
1		Calling up the end user settings level
2		Calling up maintenance/service. 
3		Calling up the acknowledgement message (Prog. No. 7010) 
4		Selecting parameter "1" (acknowledgement) 
5	Heating circuit operating mode button	Quitting the programming mode.

8.10 Manual operation

Activating manual operation. During manual operation, the boiler is set to the target value for manual operation. All pumps are switched on. Further requirements such as Domestic Hot Water, for example, are ignored!

Step		Function
1		Calling up the end user setting level.
2		Calling up maintenance/service. 
3		Calling up manual operation (Prog. No. 7140). 

Step		Function
4		Selecting the "On" parameter. 
5	Heating circuit operating mode button	Quitting the programming mode.

9. Programming

Programming must take place after installation.

9.1 Programming procedure

The selection of the setting levels and menu points for end users and heating technicians is to be carried out in accordance with the following diagram:

Fig. 14: Selection of the setting levels and menu points

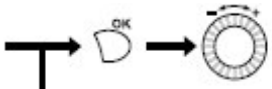
Basic display

Press

Press the information button for **approx. 3 seconds** until the words "End User" appear on the display

Setting levels:

- End user (E)
- Commissioning (I) incl. end user (E)
- Technician (F) incl. end user (E) and maintenance technician (I)
- OEM includes all other setting levels and has been protected with a password

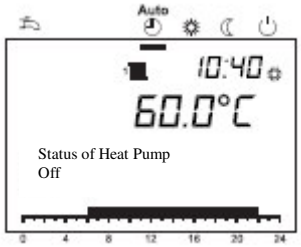


Menu points:
Time and date
Operating unit
Radio
Timer program for heating circuit 1
Timer program 4
Holiday heating circuit 1
Heating circuit 1
Cooling circuit 1
Heating circuit P
Heat pump
Solar
Buffer storage
Domestic Hot Water tank
Configuration
Faults
Maintenance/service
Input/output test
Status
Producer diagnosis
Consumer diagnosis

Depending on the selection of the setting level and the program, not all menu points may be visible!

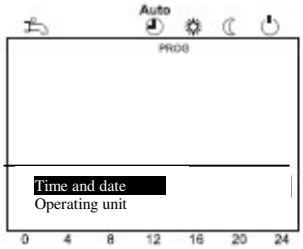
9.2 Adjusting parameters

Settings that are not directly changed via the control panel must be carried out within the setting level. The basic programming process will be shown below, using the time and date settings.

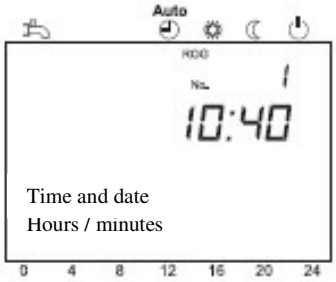


Basic display

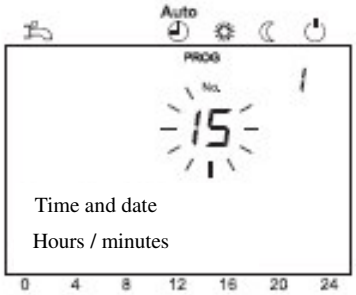
Press OK



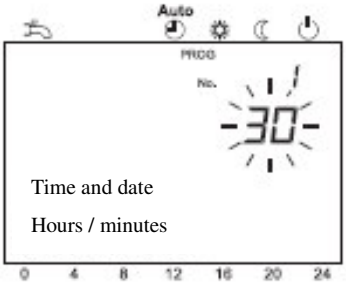
Use to select the "Time and date" menu point.
Confirm selection with OK



Use to select the "Hours / Minutes" menu point.
Confirm selection with OK

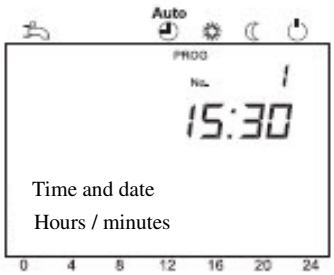


Use to set the hours (e.g. 15h00)
Confirm selection with OK

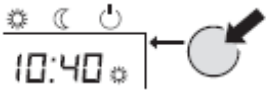


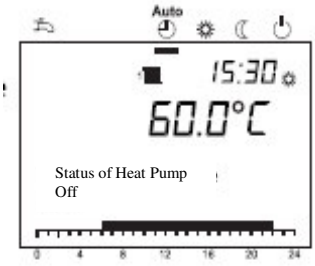
Use to set the minutes (e.g. 30 minutes)

Confirm selection with OK



Press heating circuit operating mode button to return to the basic display





By pressing the ESC button, you can return to the previous menu point without adopting previously changed values. If no new settings are entered within a period of 10 minutes, the basic display will automatically be called up, without any previously changed values being adopted.

9.3 Table of settings

- Not all the parameters shown on the display are given in the settings table.
-Depending on the system configuration, not all the parameters shown in the settings table will also be shown on the display.
-To view the setting levels for the end user (E), maintenance technician (I) or technical expert (F), please press the OK button, followed by the info button for about 3 seconds. Select the desired level using the rotary button and confirm by pressing the OK button.

Table 2: Parameter settings

Function	**Prog. No.**	**Setting level** [1)]	**Standard value**
Time and date			
Hours / minutes	1	E	00h00 (h, min)
Day / month	2	E	01.01 (day.month)
Year	3	E	2004 (year)
Start of summer time	5	E	25.03 (day.month)
End of summer time	6	E	25.10 (day.month)
Operating unit This parameter is only visible on the indoor device!			
Language	20	E	German
Info Temporary / permanent	22	F	Temporary
Display contrast	25	E	-
Operating lock Off / On	26	F	Off
Programming lock Off / On	27	F	Off
Save basic settings for operating unit No / Yes This parameter is only visible on the indoor device!	30	F	No
Activate basic settings for operating unit No / Yes	31	F	No
For use as Indoor device 1 / Indoor device 2 / Indoor device P / Operating device / Service device This parameter is only visible on the indoor device!	40	I	Indoor device 1

Function	Prog. No.	Setting level [1]	Standard value
Allocation of indoor device 1 Heating circuit 1 / heating circuits 1 and 2 This parameter is only visible on the indoor pump, as the boiler control unit is permanently programmed!	42	I	Heating circuit 1
Operation of heating circuit 2 Jointly with heating circuit 1 / Independently	44	I	Jointly with heating circuit 1
Operation of heating circuit P Jointly with heating circuit 1 / Independently	46	I	Jointly with heating circuit 1
Effect of presence button None / heating circuit 1 / heating circuit 2 / Jointly	48	I	None
This parameter is only visible on the indoor pump	54	F	0.0°C
Adjustment of room sensor This parameter is only visible on the indoor pump	70	F	-
Pump version			
Timer program for heating circuit 1			
Presetting Mon – Sun Mon-Sun / Mon-Fri / Sat-Sun / Mon / Tue / Wed / Thu / Fri / Sat / Sun	500	E	Mon – Sun
1st phase on	501	E	06h00 (h/min)
1st phase off	502	E	22h00 (h/min)
2nd phase on	503	E	24h00 (h/min)
2nd phase off	504	E	24h00 (h/min)
3rd phase on	505	E	24h00 (h/min)
3rd phase off	506	E	24h00 (h/min)
Standard values No / Yes	516	E	No
Timer program for heating circuit 2 Parameter only visible when heating circuit 2 exists!			
Presetting Mon – Sun Mon-Sun / Mon-Fri / Sat-Sun / Mon / Tue / Wed / Thu / Fri / Sat / Sun	520	E	Mon – Sun
1st phase on	521	E	06h00 (h/min)
1st phase off	522	E	22h00 (h/min)
2nd phase on	523	E	24h00 (h/min)
2nd phase off	524	E	24h00 (h/min)
3rd phase on	525	E	24h00 (h/min)
3rd phase off	526	E	24h00 (h/min)
Standard values No / Yes	536	E	No
Timer program 3 / heating circuit P			
Presetting Mon – Sun Mon-Sun / Mon-Fri / Sat-Sun / Mon / Tue / Wed / Thu / Fri / Sat / Sun	540	E	Mon – Sun
1st phase on	541	E	06h00 (h/min)
1st phase off	542	E	22h00 (h/min)
2nd phase on	543	E	24h00 (h/min)
2nd phase off	544	E	24h00 (h/min)

Function	Prog. No.	Setting level [1)]	Standard value
3rd phase on	545	E	24h00 (h/min)
3rd phase off	546	E	24h00 (h/min)
Standard values No / Yes	556	E	No
Timer program 4 / Domestic Hot Water system			
Presetting Mon – Sun Mon-Sun / Mon-Fri / Sat-Sun / Mon / Tue / Wed / Thu / Fri / Sat / Sun	560	E	Mon – Sun
1st phase on	561	E	00h00 (h/min)
1st phase off	562	E	05h00 (h/min)
2nd phase on	563	E	24h00 (h/min)
2nd phase off	564	E	24h00 (h/min)
3rd phase on	565	E	24h00 (h/min)
3rd phase off	566	E	24h00 (h/min)
Standard values No / Yes	576	E	No
Timer program 5			
Presetting Mon – Sun Mon-Sun / Mon-Fri / Sat-Sun / Mon / Tue / Wed / Thu / Fri / Sat / Sun	600	E	Mon – Sun
1st phase on	601	E	06h00 (h/min)
1st phase off	602	E	22h00 (h/min)
2nd phase on	603	E	24h00 (h/min)
2nd phase off	604	E	24h00 (h/min)
3rd phase on	605	E	24h00 (h/min)
3rd phase off	606	E	24h00 (h/min)
Standard values No / Yes	616	E	No
Holiday heating circuit 1			
Start	642	E	--.-- (day.month)
End	643	E	--.—(day.month)
Operating level Frost protection / Reduced	648	E	Frost protection
Holiday heating circuit 2 Parameter only visible when heating circuit 2 exists!			
Start	652	E	--.-- (day.month)
End	653	E	--.—(day.month)
Operating level Frost protection / Reduced	658	E	Frost protection
Holiday heating circuit P Parameter only visible when heating circuit P exists!			
Start	662	E	--.-- (day.month)
End	663	E	--.-- (day.month)
Operating level Frost protection / Reduced	668	E	Frost protection

Function	Prog. No.	Setting level [1)]	Standard value
Heating circuit 1			
Comfort target value	710	E	21.0°C
Reduced target value	712	E	19.0°C
Frost protection target value	714	E	10.0°C
Reference line for gradient	720	E	0.8
Reference line for shift	721	F	0.0
Reference line for adaptation Off / On	726	F	Off
Summer / winter heating limit	730	E	18.0°C
Daily heating limit	732	F	-3°C
Minimum feed target value	740	F	8°C
Maximum feed target value	741	F	55°C
Room influence	750	I	20%
Indoor temperature limit	760	F	1°C
Rapid heat increase	770	F	---°C
Rapid heat reduction Off / To target value for reduction / to target value for frost protection	780	F	Up to reduced target value
Maximum optimisation for switch-on	790	F	0 min
Maximum optimisation for switch-off	791	F	0 min
Start of reduced rise	800	F	---°C
End of reduced rise	801	F	-15°C
Overheating protection for pump circuit Off / On	820	F	Off
Mixer excess	830	F	2°C
Drive type 2-point / 3-point	832	F	3-point
Switch difference 2-point	833	F	2°C
Drive operating time	834	F	120 s
Screed function Off / functional heating / screed heating / functional and screed heating / manual	850	F	Off
Screed target value manual	851	F	25°C
Screed daily value current	856	F	0
Screed daily value reached	857	F	0
Reduction to prevent overheating Off / heating operation / permanent	861	F	Off
With buffer storage No / Yes	870	F	Yes
With pre-controls / feeder pump No / Yes	872	F	Yes
Operating mode switch None/safety operation/ reduced/ comfort/automatic	900	F	Safety operation
Heating circuit 2 Parameter only visible when heating circuit 2 exists!			

Function	**Prog. No.**	**Setting level** [1)]	**Standard value**
Comfort target value	1010	E	21.0°C
Reduced target value	1012	E	19.0°C
Frost protection target value	1014	E	10.0°C
Reference line for gradient	1020	E	0.8
Reference line for shift	1021	F	0.0
Reference line for adaptation Off / On	1026	F	Off
Summer / winter heating limit	1030	E	18.0°C
Daily heating limit	1032	F	-3°C
Minimum feed target value	1040	F	8°C
Maximum feed target value	1041	F	55°C
Room influence	1050	I	20%
Indoor temperature limit	1060	F	1°C
Rapid heat increase	1070	F	---°C
Rapid heat reduction Off / To target value for reduction / to target value for frost protection	1080	F	Up to reduced target value
Maximum optimisation for switch-on	1090	F	0 min
Maximum optimisation for switch-off	1091	F	0 min
Start of reduced rise	1100	F	---°C
End of reduced rise	1101	F	-15°C
Overheating protection for pump circuit Off / On	1120	F	Off
Mixer elevation	1130	F	2°C
Drive type 2-point / 3-point	1132	F	3-point
Switch difference 2-point	1133	F	2°C
Drive operating time	1134	F	120 s
Screed function Off / functional heating / screed heating / functional and screed heating / manual	1150 1151	F F	Off 25°C
Screed target value manual	1156	F	0
Screed daily value current	1157	F	0
Screed daily value reached	1161	F	Always
Reduction to prevent overheating Off / heating operation / permanent	1170	F	Yes
With buffer storage No / Yes	1172	F	Yes
With pre-controls / feeder pump No / Yes	1200	F	Safety operation
Operating mode switch None/safety operation/reduced/comfort/automatic			
Heating circuit P Parameter only visible when heating circuit P exists!			

Function	**Prog. No.**	**Setting level** [1)]	**Standard value**
Operating mode Safety mode / automatic / reduced / comfort	1300	E	Automatic
Comfort target value	1310	E	21.0°C
Reduced target value	1312	E	19.0°C
Frost protection target value	1314	E	10.0°C
Reference line for gradient	1320	E	0.8
Reference line for shift	1321	F	0.0
Reference line for adaptation Off / On	1326	F	Off
Summer / winter heating limit	1330	E	18.0°C
Daily heating limit	1332	F	-3°C
Minimum feed target value	1340	F	8°C
Maximum feed target value	1341	F	55°C
Room influence	1350	I	20%
Indoor temperature limit	1360	F	1°C
Rapid heat increase	1370	F	---°C
Rapid heat reduction Off / To target value for reduction / to target value for frost protection	1380	F	To reduced target value
Maximum optimisation for switch-on	1390	F	0 min
Maximum optimisation for switch-off	1391	F	0 min
Start of reduced rise	1400	F	---°C
End of reduced rise	1401	F	-15°C
Overheating protection for pump circuit Off / On	1420	F	Off
Screed function Off / functional heating / screed heating / functional	1450	F	Off
and screed heating / manual	1451	F	25°C
Screed target value manual	1455	F	0°C
Screed daily value current	1456	F	0
Screed daily value reached	1457	F	0
Reduction to prevent overheating Off / heating operation / permanent	1461	F	Always
With buffer storage No / Yes	1470	F	Yes
With pre-controls / feeder pump No / Yes	1472	F	Yes
Operating mode switch None/safety operation/reduced/comfort/automatic	1500	F	Safety operation
Domestic Hot Water			
Nominal target value	1610	E	55°C
Reduced target value	1612	F	44°C
Release 24h / day / timer programs for heating circuits / timer program 4 / Domestic Hot Water system / low-tariff / timer program 4 / Domestic Hot Water system or low-tariff	1620	I	Timer program 4 / domestic hot water circuit

Function	Prog. No.	Setting level [1)]	Standard value
Charging process Absolute/Sliding/None/MK sliding, PK absolute	1630 1640	I F	Absolute Off
Legionnella function Off / periodic / weekday fixer	1641	F	3
Legionella effect periodic	1642	F	Monday
Legionella effect weekday Mon/Tue/Wed/Thu/Fri/Sat/Sun	1644	F	--h—
Legionella function time	1645	F	60°C
Legionella function target value	1646	F	60
Legionella function period	1647	F	On
Legionella effect circulation pump Off / On	1660	I	Timer program 3 / heating circuit pump
Circulation pump release Timer program 3/heating circuit P/Domestic Hot Water release/timer program 4/Domestic Hot Water system	1661	F	On
Circulation pump fixed-cycle operation Off/on	1663	F	45°C
Circulation target value			
Hx pump			
H1 Domestic Hot Water system charging priority No / yes	2008	F	Yes
H1 overheating reduction Off / on	2010	F	On
H1 with buffer storage tank No / yes	2012	F	Yes
H1 precontrol / feeder pump No / yes	2014	F	Yes
H1 cooling requirement No / yes	2015	F	Yes
H2 Domestic Hot Water system charging priority No / yes	2033	F	Yes
H2 overheating reduction Off / on	2035	F	On
H2 with buffer storage tank No / yes	2037	F	Yes
H2 precontrol / feeder pump No / yes	2039	F	Yes
H2 cooling requirement No / yes	2040	F	Yes
H3 Domestic Hot Water system charging priority No / yes	2044	F	Yes
H3 overheating reduction Off / on	2046	F	On
H3 with buffer storage tank No / yes	2048	F	Yes
H3 precontrol / feeder pump No / yes	2050	F	Yes

Function	Prog. No.	Setting level [1)]	Standard value
H3 cooling requirement No / yes	2051	F	Yes
Swimming pool			
Target value for solar heating	2055	E	26°C
Target value for generator heating	2056	E	22°C
Solar charging priority No / yes	2065	F	No
With solar incorporation No / yes	2080	F	Yes
Preliminary control unit / feeder pump			
Precontrol / feeder pump In front of buffer tank / after buffer tank	2150	I	After buffer store
Heat pump			
Condensation pump controls	2801	I	Parallel compressor operation
Temp. requirem. / parallel compressor operation	2802	I	10 s
Lead time for condensation pump	2803	I	30 s
Trailing time for condensation pump	2819	I	15 s
Lead time for source	2820	I	45 s
Trailing time for source	2840	I	4°C
Switch difference in reflux temperature	2880	I	Addition to heat pump operation
Use of electrical lead time function			
Replacement / Addition to heat pump operation	2881	I	30 min
	2882	I	250°C/min
Cut-off time for electrical lead time	2883	I	10
Release integral for electrical lead time	2884	I	+ 5°C
Reset integral for electrical lead time	2886	F	On
Release of electrical lead time under TA			
Compensation for heat deficit	2893	F	3
Off / on / only for screed function Number of	2910	F	---
Domestic Hot Water system charging attempts	2911	F	Released
Release above TA	2912	F	On
For forced buffer charging			
Locked / released	2951	F	10°C
Charging of buffer store	2952	F	2.5°C
Off / on	2954	F	15°C
Defrost release below TA	2963	I	180 min
Switch difference for defrosting	2964	I	15 min
Evaporator temperature for end of defrosting process	2965	F	0 min
	2966	F	5 s
Forced defrosting interval	3006	F	Passive cooling off
Maximum defrosting period			
Evaporator drainage period	3010	F	See technical data in installation manual
Evaporator cooling period			
During compressor operation			
Passive cooling off / passive cooling on			
Maximum fan speed / Q-pump			

Function	Prog. No.	Setting level [1)]	Standard value
Cascade			
Release integral for generator sequence	3530	F	100 °C min
Reset integral for generator sequence	3531	F	20 °C min
Turn-on delay	3533	F	5 min
Automatic change in generator sequence	3540	F	500 h
Automatic exclusion of generator sequence None / first / last / first and last	3541	F	None
Additional generator			
Release when below outdoor temperature	3700	F	---
Release when above outdoor temperature	3701	F	---
Trailing time	3705	F	10 min
Switch integral	3720	F	50 °C / min
Switch difference off	3722	F	15 °C
Locking time	3723	F	30 min
Solar			
Temperature difference ON	3810	F	8 °C
Temperature difference OFF	3811	F	4 °C
Min. charging temp. for Domestic Hot Water tank	3812	F	30 °C
Min. charging temp. for buffer	3815	F	30 °C
Min. charging temp. for swimming pool	3818	F	--- °C
Charging priority for storage tank None / Domestic Hot Water tank / buffer store	3822 3825	F F	Domestic Hot Water tank
Relative priority of charging time	3826	F	--- min
Relative priority of waiting time	3827	F	5 min
Parallel operation of waiting time	3828	F	--- min
Delay in secondary pump	3830	F	60 s
Collector start function	3831	F	10 min
Minimum operating period for collector pump	3834	F	20 s
Collector start for gradient	3840	F	--- min/°C
Collector start for frost protection	3850	F	--- °C
Collector overheating protection	3860	F	80 °C
Evaporation from heating body	3870	F	110
Minimum pump speed	3871	F	40%
Maximum pump speed	3880	F	100%
Anti-freeze None / ethylene glycol / propylene glycol / ethylene and propylene glycol	3881	F	Propylene glycol
Anti-freeze concentration	3884	F	50%
Pump flow			200 l/h
Buffer storage tank			
Forced charging for heating – minimum	4709	I	40 °C
Forced charging for heating – maximum	4710	F	50 °C
Forced charging time	4711	I	... (h/min)
Forced charging period – maximum	4712	I	4 h

Function	Prog. No.	Setting level [1)]	Standard value
Automatic generator lock None / with B4 / with B4 and B42/B41	4720	F	With B4
Automatic generator lock SD	4721	F	5°C
Temperature difference between buffer and heating circuit	4722	F	-3°C
Coating protection Off / permanent	4739 4750	F F	Off 80°C
Maximum charging temperature	4755	F	60°C
Recooling temperature	4756	F	Off
Recooling of Domestic Hot Water / heating circuits Off / on	4757	F	Off
Recooling of collector Off / summer / permanent	4760	F	With B4
Charging sensor for electrical insert With B4 / with B42/B41	4761	F	No
Forced charging – electrical No / yes	4783	F	Yes
With solar integration No / yes			
Domestic Hot Water tank Parameters depend on hydraulic system!			
Charging Once a day / several times a day	5010	F	Several times a day
Increase in feeder target value	5020	F	0°C
Transfer excess	5021	F	4°C
Charging type With B3/with B3 & B31/with B3, legio B3 & B31	5022	I	With B3
Maximum charging temperature	5050	F	70°C
Recooling temperature	5055	F	80°C
Recooling of generator / heating circuits Off / on	5056 5057	F F	Off Off
Recooling of collector Off / summer / permanent	5060	F	Replacement
Electrical insert for operating mode Replacement / summer / permanent / cooling	5061	F	Domestic Hot Water release
Electrical insert release 24 h a day / Domestic Hot Water release / timer program 4 / Domestic Hot Water system	5085 5090	F F	On No
Overheating reduction Off / on	5092	F	Yes
With buffer store No / yes	5093	F	Yes
With precontrol / feeder pump No / yes	5130	F	Always
With solar integration No / yes			
Transfer strategy Always / Domestic Hot Water release			

Function	Prog. No.	Setting level [1)]	Standard value
Comparative temperature switch-over Domestic Hot Water sensor B3 / Domestic Hot Water sensor B31	5131	F	Domestic Hot Water sensor B3
Configuration			
Presetting	5700	I	---
Heating circuit 1 Off / on	5710	I	On
Use of mixer 1 None / heating / cooling / heating and cooling	5712	I	Heating and cooling
Heating circuit 2 Off / on	5715	I	Off
Domestic Hot Water actuator Q3 None / feeder pump / by-pass valve	5731	I	Bypass valve
Domestic Hot Water separator switch Off / on	5736	I	Off
Heat source Salt solution / water / air	5800	I	Air
Heating circuit range at TA -10°C	5810	I	8°C
Solar actuator Feeder pump / by-pass valve	5840	I	Bypass valve
External solar exchanger Jointly / Domestic Hot Water tank / buffer tank	5841	I	Jointly
Combination tank No / yes	5870	I	No
Relay output QX1 None / process reversal valve Y22 / hot gas temperature K31 / electrical insert 1 feed K25 / Electrical insert 2 feed K26 / By-pass valve for cooling source Y28 / feeder pump Q14 / Cascade pump Q25 / Generator lock valve Y4 / Electrical insert for Domestic Hot Water system K6 / circulation pump Q4 / Collector pump Q5 / Solar pump ext. exchanger K9 / Solar actuator buffer K8 / Solar actuator swimming pool K18 / Electrical insert buffer K16 / H1 pump Q15 / H2 pump Q18 / H3 pump Q19 / heating circuit pump P Q20 / By-pass valve for cooling Y21 / Air dehumidifier K29 / Heat requirement K27 / Cooling requirement K28 / Alarm output K10 / Timer program 5 K13 / Heating circuit pump 1 Q2 / Domestic Hot water actuator Q3 / Source pump Q8/fan K19 / Condenser pump Q9 / Compressor step 1 K1 / Additional generator control K32	5890	I	None
Relay output QX5 Parameter, see relay output QX1 (Prog. No. 5890)!	5895	I	None
Relay output QX6 Parameter, see relay output QX1 (Prog. No. 5890)!	5896	I	None
Function of input H1 BA switch-over for heating circuits and Domestic Hot Water system / BA switch-over for heating circuits / BA-switch-over for heating circuit 1 / BA switch-over for heating circuit 2 / BA switch-over for heating circuit P / Error or alarm message / Minimum feed target value / Heat requirement 10 V / Dew point monitor / Feed target value increase hygro / Cooling requirement / Cooling requirement 10V / Pressure measurement 10V / Relative humidity 10V / Indoor temperature 10V / Release for swimming pool / Switch-on command for heat pump Step 1	5950	I	BA switch for heating circuits and domestic hot water system
Effect of contact H1 Open-circuit contact / closed-circuit contact	5951	I	Closed-circuit contact

Function	Prog. No.	Setting level [1)]	Standard value
Function value for contact H1	5952	I	55°C
Voltage value 1 H1	5953	I	0
Function value 1 H1	5954	I	0
Voltage value 2 H1	5955	I	10
Function value 2 H1	5956	I	100
Function input H3	5960	I	BA switch-over heat. circ./drink. water
Parameter, see function input H1 (Prog. No. 5950)!			
Effect of contact H3	5961	I	Closed-circuit contact
Open-circuit contact / closed-circuit contact	5962	I	
Function value of contact H3	5963	I	
Voltage value 1 H3	5964	I	30°C
Function value 1 H3	5965	I	0
Voltage value 2 H3	5966	I	0
Effect of input EX1	5981	F	10
Open-circuit contact / closed-circuit contact			100
Effect of input EX2	5983	F	Open-circuit contact
Open-circuit contact / closed-circuit contact			
Function of input EX3	5984	I	Closed-circuit contact
None / EW lock E6 / low tariff E5 / overload source E14 / pressure monitor source E26 / flow monitor source E15 / flow monitor consumer E24 / defrosting manual E17 / collective fault heat pump E20 / fault smooth starter E25 / low-pressure monitor E9 / high-pressure monitor E10 / overload of compressor 1 E11 / error or alarm message	5985	F	None
Effect of input EX3			
Open-circuit contact / closed-circuit contact	5987	F	
Effect of input EX4			Open-circuit contact
Open-circuit contact / closed-circuit contact	6020	I	
Function of expansion module 1			Open-circuit contact
No / multifunctional / cooling circuit 1 / heating circuit 2 / solar pump for Domestic Hot Water / heating circuit 1 / heating circuit / cooling circuit 1	6021	I	None
Function of extension module 2	6030	I	
Parameter, see extension module 1 (Prog. No. 6020)!	6031	I	None
Relay output QX21	6032	I	None
Parameter, see relay output QX1 (Prog. No. 5890)!			None
Relay output QX22			
Parameter, see relay output QX1 (Prog. No. 5890)!			
Relay output QX23			
Parameter, see relay output QX1 (Prog. No. 5890)!			

Function	Prog. No.	Setting level [1]	Standard value
Sensor input BX21	6040	I	None
None / buffer tank sensor B4 / buffer tank sensor B41 / collector sensor B6 / Domestic Hot Water sensor B31 / cooling agent sensor liquid B83 / domestic hot water circulation sensor B39 / swimming pool sensor B13 / solar feed sensor B63 / solar reflux sensor B64 / buffer tank sensor B42 / section feed sensor B10 / cascade reflux sensor B70 / special temperature sensor 1 / special temperature sensor 2 / Domestic Hot Water sensor B3 / hot gas sensor B81			
Sensor input BX22	6041	I	None
Parameter, see sensor input BX21 (Prog. No. 6040)!			
Input function H2	6046	I	BA switch for heating circuits + Domestic Hot Water system
BA switch-over heating circuits + Domestic Hot Water system / BA switch-over heating circuit 1 / BA switch-over heating circuit 2 / BA switch-over heating circuit P / error or alarm message / minimum feed target value / heat requirement 10V / dew point monitor / feed target value increase hygro / cooling requirement / cooling requirement 10V / pressure measurement 10V / relative indoor humidity 10V / indoor temperature 10V / release for swimming pool / switch-on command for heat pump step 1	6047 6048 6049 6050 6051 6052	I I I I I I	Closed-circuit contact 55 °C 0 0
Effect contact H2	6071	I	10
Open-circuit contact / closed-circuit contact			100
Minimum feed target value H2	6072	I	Standard
Voltage value 1 H2	6075	I	0...10V
Function value 1 H2	6097	F	100 °C
Voltage value 2 H2	6098	F	NTC
Function value 2 H2	6100	F	
Signal logic output UX	6110	F	0 °C
Standard / inverted	6120	F	0.0 °C
Signal output UX	6200	I	20 h
0...10V / PWM	6201	I	On
Temperature value 10V UX	6212	I	No
Sensor type of collector	6213	I	
NTC / PT1000	6215	I	-
Adjustment of collector sensor	6217	I	-
Adjustment of outdoor sensor	6220	F	-
Time constant for building			-
System frost protection			
Off / on			
Save sensor			
No / yes			
Delete sensor			
No / yes			
Control number of generator 1			
Control number of generator 2			
Control number of tank			
Control number of heating circuits			
Software version			
LPB system			

Function	Prog. No.	Setting level [1)]	Standard value
Device address	6600	I	1
Segment address	6601	F	0
Bus feed function Off / automatic	6604	F	Automatic
Bus feed status Off / on	6605	F	On
Summer switch-over Local / central	6621	F	Local
Operating mode switch-over Local / central	6623	F	Central
Domestic Hot Water allocation Local heating circuits / all heating circuits in segment / all heating circuits in system	6625	F	All heating circuits in system
TA limit for external generator taken into account No / yes	6632	F	Yes
Clock operation Autonomous / slave without remote setting / slave with remote setting / master	6640	I	Autonomous
Outdoor temperature - supplier	6650	F	0
Errors			
Reset alarm relay No / yes	6710	I	No
Reset heat pump No / yes	6711	I	No
Feed temperature 1 alarm	6740	F	--- min
Feed temperature 2 alarm	6741	F	--- min
Domestic Hot Water charge alarm	6745	F	--- min
Feed temperature cooling 1 alarm	6746	F	--- min
Time stamp for error history 1	6800	F	
Error code for error history 1		F	
Time stamp for error history 2	6802	F	
Error code for error history 2		F	
Time stamp for error history 3	6804	F	
Error code for error history 3		F	
Time stamp for error history 4	6806	F	
Error code for error history 4		F	
Time stamp for error history 5	6808	F	
Error code for error history 5		F	
Time stamp for error history 6	6810	F	
Error code for error history 6		F	
Time stamp for error history 7	6812	F	
Error code for error history 7		F	
Time stamp for error history 8	6814	F	
Error code for error history 8		F	
Time stamp for error history 9	6816	F	

Function	Prog. No.	Setting level [1)]	Standard value
Error code for error history 9		F	
Time stamp for error history 10	6818	F	
Error code for error history 10		F	
Errors			
Reset alarm relay	6710	I	No
No / yes			
Reset heat pump	6711	I	No
No / yes			
Feed temperature 1 alarm	6740	F	--- min
Feed temperature 2 alarm	6741	F	--- min
Domestic Hot Water charge alarm	6745	F	--- min
Feed temperature cooling 1 alarm	6746	F	--- min
Time stamp for error history 1	6800	F	
Error code for error history 1		F	
Time stamp for error history 2	6802	F	
Error code for error history 2		F	
Time stamp for error history 3	6804	F	
Error code for error history 3		F	
Time stamp for error history 4	6806	F	
Error code for error history 4		F	
Time stamp for error history 5	6808	F	
Error code for error history 5		F	
Time stamp for error history 6	6810	F	
Error code for error history 6		F	
Time stamp for error history 7	6812	F	
Error code for error history 7		F	
Time stamp for error history 8	6814	F	
Error code for error history 8		F	
Time stamp for error history 9	6816	F	
Error code for error history 9		F	
Time stamp for error history 10	6818	F	
Error code for error history 10		F	
Maintenance / service			
Heat pump time interval	7070	I	---
Heat pump time since service	7071	I	0 months
Max Starts Comp1 / operating hour	7072	I	4
Actual Starts Comp1 / operating hour	7073	I	0
Range Condens Max / week	7076	I	25
Actual Range Condens Max / week	7077	I	0
Range Condens Min / week	7078	I	10
Actual Range Condens Min / week	7079	I	0
Range Evaporator Max / week	7080	I	10

Function	Prog. No.	Setting level [1)]	Standard value
Act Range Evaporator Max / Week	7081	I	0
Range Evaporator Min / Week	7082	I	10
Act Range Evaporator Min / Week	7083	I	0
Domestic Hot Water Tank Time Interval	7090	I	-- months
Domestic Hot Water Tank Since Service	7091	I	0 months
Domestic Hot Water Tank Feed Temp Heat Pump	7092	I	45℃
Minimum	7093	I	20℃
Act Domestic Hot Water Feed Temperature Heat Pump	7119	F	Locked
Eco-function	7120	E	Off
Locked / released			
Eco operation	7141	E	Off
Off / on			
Emergency operation	7142	F	Manual
Off / on			
Emergency operation for function start	7150	I	---℃
Manual / Automatic	7152	E	No
Simulation of outdoor temperature			
Trigger defrost			
No / yes			
Input/output test			
Relay test	7700	I	No test
No test / everything off / relay output QX23 Module 1 / relay output QX21 Module 1 / relay output QX22 Module 1 / relay output QX1 / relay output QX2 / relay output ZX3 / relay output QX4 / relay output QX5 / relay output QX6 / relay output QX23 Module 2 / relay output QX21 Module 2 / relay output QX22 Module 2 / relay output QX7 / relay output QX8	7710	I	
Output test UX	7711	I	
Voltage signal UX	7714		
PWM signal P1	7730	I	-
Outdoor temperature B9	7775	I	-
Source of input temperature B91	7777	I	-
Sensor temperature B92, B84	7820	I	-
Sensor temperature BX1	7823	I	-
Sensor temperature BX4	7824	I	-
Sensor temperature BX5	7830	I	-
Sensor temperature BX21 Module 1	7831	I	
Sensor temperature BX22 Module 1	7832	I	
Sensor temperature BX21 Module 2	7833	I	
Sensor temperature BX22 Module 2	7840	I	-
Voltage signal H1	7841	I	-
Contact state H1			
Open / closed	7845	I	
Voltage signal H2	7846	I	Open
Contact state H2			
Open / close			

Function	Prog. No.	Setting level [1)]	Standard value
Voltage signal H3	7854	I	
Contact state H3 Open / closed	7855	I	Open
Input EX1 0 V / 230 V	7911	I	0 V
Input EX2 0 V / 230 V	7912	I	0 V
Input EX3 0 V / 230 V	7913	I	0 V
Input EX4 0 V / 230 V	7914	I	0 V
Input EX5 0 V / 230 V	7915	I	0 V
Input EX6 0 V / 230 V	7916	I	0 V
Input EX7 0 V / 230 V	7917	I	0 V
Status			
Status of heating circuit 1	8000	I	-
Status of heating circuit 2	8001	I	-
Status of heating circuit P	8002	I	-
Status of Domestic Hot Water	8003	I	-
Status of cooling circuit 1	8004	I	-
Status of heat pump	8006	I	-
Status of solar pump	8007	I	-
Status of buffer tank	8010	I	-
Status of swimming pool	8011	I	-
Status of additional generator	8022	I	-
Time stamp for status history 1	8050	I	-
Status code for status history 1	8051	I	-
Time stamp for status history 2	8052	I	-
Status code for status history 2	8053	I	-
Time stamp for status history 3	8054	I	-
Status code for status history 3	8055	I	-
Time stamp for status history 4	8056	I	-
Status code for status history 4	8057	I	-
Time stamp for status history 5	8058	I	-
Status code for status history 5	8059	I	-
Time stamp for status history 6	8060	I	-
Status code for status history 6	8061	I	-
Time stamp for status history 7	8062	I	-
Status code for status history 7	8063	I	-
Time stamp for status history 8	8064	I	-
Status code for status history 8	8065	I	-

Function	Prog. No.	Setting level [1)]	Standard value
Time stamp for status history 9	8066	I	-
Status code for status history 10	8067	I	-
Time stamp for status history 10	8068	I	-
Status code for status history 10	8069	I	-
Cascade diagnosis			
Priority / status of generator 1 Missing / faulty / manual operation active / Generator lock active /chimney-sweep function active/Domestic Hot Water system separation switch active / outdoor temperature limit active / not released / released	8100	I	
Priority / status of generator 2 Parameter, see priority/status gener. 1 (Prog.No.8100)	8102	I I	
Priority / status of generator 3 Parameter, see priority/status gener. 1 (Prog.No.8100)	8104	I	
Priority / status of generator 4 Parameter, see priority/status gener. 1 (Prog.No.8100)	8106	I I	
Priority / status of generator 5 Parameter, see priority/status gener. 1 (Prog.No.8100)	8108	I	
Priority / status of generator 6 Parameter, see priority/status gener. 1 (Prog.No.8100)	8110	I I	
Priority / status of generator 7 Parameter, see priority/status gener. 1 (Prog.No.8100)	8112	I	
Priority / status of generator 8 Parameter, see priority/status gener. 1 (Prog.No.8100)	8114	I I	
Priority / status of generator 9 Parameter, see priority/status gener. 1 (Prog.No.8100)	8116	I	
Priority / status of generator 10 Parameter, see priority/status gener. 1 (Prog.No.8100)	8118	I I	
Priority / status of generator 11 Parameter, see priority/status gener. 1 (Prog.No.8100)	8120	I	
Priority / status of generator 12 Parameter, see priority/status gener. 1 (Prog.No.8100)	8122	I I	
Priority / status of generator 13 Parameter, see priority/status gener. 1 (Prog.No.8100)	8124		
Priority / status of generator 14 Parameter, see priority/status gener. 1 (Prog.No.8100)	8126		
Priority / status of generator 15 Parameter, see priority/status gener. 1 (Prog.No.8100)	8128		
Priority / status of generator 16 Parameter, see priority/status gener. 1 (Prog.No.8100)	8130		
Cascade feed temperature	8138		
Cascade feed target value	8138		

Function	Prog. No.	Setting level [1)]	Standard value
Cascade reflux temperature	8140	I	
Cascade reflux target value	8141	I	
Current generator sequence switch	8150	I	
Generator diagnosis			
Compressor 1 K1	8400	E	-
Off / on			
Electrical insert 1 – feeder	8402	E	-
Off / on			
Electrical insert 2 – feeder	8403	E	-
Off / on			
Source buffer Q8 / fan K19	8404	E	-
Off / on			
Speed of source pump	8405	F	
Condenser pump Q9	8406	I	-
Off / on			
Reflux temperature for heat pump	8410	E	- °C
Target value for heat pump	8411	E	- °C
Feed temperature for heat pump	8412	E	- °C
Hot gas temperature 1	8415	I	- °C
Hot gas temperature max	8416	F	- °C
Cooling agent temperature – liquid	8420	I	- °C
Temperature range for condenser	8425	I	- °C
Temperature range for evaporator	8426	I	- °C
Source input temperature	8427	E	- °C
Source input min	8428	I	- °C
Source output temperature	8429	E	- °C
Source output min	8430	I	- °C
Remaining down-time for Step 1 – min	8440	I	--- min
Remaining operating time for Step 1 – min	8442	I	--- min
Remaining time for source restriction temp – min	8444	I	--- min
Operating hours of compressor 1	8450	E	0 h
Start counter for compressor 1	8451	E	0
Locking period for heat pump	8454	F	0 h
Counter for number of heat pump locks	8455	F	0
Operating hours for electrical feeder	8456	F	0 h
Start counter for electrical feeder	8457	F	0
Fan speed	8469	F	
Fan K19	8470	I	
Off / on			
Process reversal valve	8471	I	
Off / on			
Evaporator temperature	8475	I	
Temperature difference defrosting – actual value	8477	I	
Temperature difference defrosting – target value	8478	I	

Function	Prog. No.	Setting level [1)]	Standard value
Remaining time for defrost locking	8480	I	
Remaining time for forced defrosting	8481	I	
Number of defrosting attempts	8485	I	
Defrosting status heat pump off, TA defrosting release off/ locked/ monitor ice /preheat for defrosting/ defrosting active/drain/cool down evaporator/fault/forced defrosting/defrosting stabilisation/defrosting with fan/ defrosting with compressor /forced defrosting of fan /forced defrosting of compressor	8487	I	WP off, TA release off
Speed of collector pump 1	8505	F	
Speed of solar pump ext. defrost	8506	F	
Speed of solar pump buffer	8507	F	
Speed of solar pump swimming pool	8508	F	
Collector temperature 1	8510	F	- °C
Collector temperature 1 max	8511	I	200 °C
Collector temperature 1 min	8512	I	-28 °C
dT collector 1 / Domestic Hot Water system	8513	I	0 °C
dT collector 1 / buffer	8514	I	0 °C
dT collector 1 / swimming pool	8515	I	0 °C
Solar feed temperature	8519	I	
Solar reflux temperature	8520	I	
Daily output of solar energy	8526	E	
Total output of solar energy	8527	E	
Operating hours to achieve solar output	8530	E	00h00
Operating hours to achieve collector overheating	8531	F	00h00
Consumer diagnosis			
Outdoor temperature	8700	E	- °C
Outdoor temperature minimum	8701	I	- °C
Outdoor temperature maximum	8702	I	- °C
Outdoor temperature with absorption	8703	I	- °C
Outdoor temperature mixed	8704	I	- °C
Relative humidity indoors	8720	I	
Indoor temperature	8721	I	
Dew point temperature	8722	I	
Heating circuit pump Q2 Off / on	8730	I	-
Heating circuit mixer open Y1 Off / on	8731	I	-
Heating circuit mixer closed Y2 Off / on	8732	I	-
Room temperature 1	8740	E	- °C
Room target value 1	8741	E	- °C
Feed temperature 1	8743	E	- °C

Function	Prog. No.	Setting level [1)]	Standard value
Lead time target value 1	8744	E	- °C
Cooling circuit pump Q24	8751	I	-
Cooling circuit mixer open Y23	8752	I	-
Cooling circuit mixer closed Y24	8753	I	-
By-pass valve cooling Y21	8754	I	-
Lead time temperature cooling 1	8756	E	- °C
Lead time target value cooling 1	8757	E	- °C
Heating circuit pump Q6 Off / on	8760	I	-
Heating circuit mixer open Y5 Off / on	8761	I	-
Heating circuit mixer closed Y6 Off / on	8762	I	-
Room temperature 2	8770	E	- °C
Room target value 2	8771	E	- °C
Lead time temperature 2	8773	E	- °C
Lead time target value 2	8774	E	- °C
Room temperature P	8800	E	- °C
Room target value P	8801	E	- °C
Lead time target value P	8803	E	- °C
Domestic Hot Water pump Q3 Off / on	8820	I	-
Electrical insert for Domestic Hot Water system K6 Off / on	8821	I	-
Domestic Hot Water temperature 1	8830	E	- °C
Domestic Hot Water target value		E	- °C
Domestic Hot Water temperature 2	8832	E	- °C
Domestic Hot Water circulation temperature	8835	I	
Operating hours for Domestic Hot Water pump	8840	F	0 h
Start counter for Domestic Hot Water pump	8841	F	0
Operating hours for electrical unit (Domestic Hot Water system)	8842	F	0 h
	8843	F	0
Start counter for electrical unit (Domestic Hot Water system)	8900	I	
	8901	I	
Swimming pool temperature	8950	I	
Swimming pool target value	8951	I	
Section feed temperature	8957	I	
Section feed time target value	8970	I	
Section feed target value – cooling	8980	E	- °C
Electrical insert for buffer	8981	I	- °C
Buffer tank temperature 1	8982	E	- °C
Buffer tank target value 1	8983	I	- °C
Buffer tank temperature 2	8990	F	0 h
Buffer tank temperature 3			
Operating hours for electrical buffer			

Function	**Prog. No.**	**Setting level** [1)]	**Standard value**
Start counter for electrical buffer	8991	F	0
Lead time target value H1	9000	I	- °C
Lead time target value H2	9001	I	- °C
Lead time target value H3	9004	I	- °C
Water pressure H1	9005	I	
Water pressure H2	9006	I	
Water pressure H3	9009	I	
Relay output QX1 Off / on	9031	I	
Relay output QX2 Off / on	9032	I	
Relay output QX3 Off / on	9033	I	
Relay output QX4 Off / on	9034	I	
Relay output QX5 Off / on	9035	I	
Relay output QX6 Off / on	9036	I	
Relay output QX7 Off / on	9037	I	
Relay output QX8 Off / on	9038	I	
Relay output QX21 Module 1 Off / on	9050	I	
Relay output QX22 Module 2 Off / on	9051	I	
Relay output QX22 Module 3 Off / on	9052	I	
Relay output QX21 Module 1 Off / on	9053	I	
Relay output QX22 Module 2 Off / on	9054	I	
Relay output QX23 Module 3 Off / on	9055	I	
Info option  Display of the info values depends on the operating state!			
Error message Maintenance Relay test Current screed target value Current screed value achieved Room temperature Status of heat pump Status of solar heating			

Status of buffer tank Status of Domestic Hot Water Status of swimming pool Status of heating circuit 1 Status of cooling circuit 1 Status of heating circuit 2 Status of heating circuit P			
1) E = end user, I = maintenance, F = technical expert			

Parameters with the program numbers (Prog. No.) 1 to 54 are individual parameters of the operating unit and the indoor system and can therefore be set independently on both devices. All parameters from Prog. No. 500 on are stored in the controller and are therefore identical. The value entered last is the valid value.

9.4 Explanations of the parameter list

Time and date (1 + 3)	Time and date The controller has a year clock with options to set the time, day, month and year. Time and date must be correctly set to ensure that heating programs work in the way they were programmed.
Summer time (5-6)	The start of summer time can be set with Prog. No. 5; the end of summer time is defined with Prog. No. 6. The time is adjusted on the Sunday after the date set.
Language (20)	**Operating unit** The language for the menu interface can be changed with Prog. No. 20
Information (22)	Temporary: info display changes after 8 minutes in basic display state Permanent: Info display is permanently shown after call-up with the info button.
Fault display (23)	The number determines whether only the fault code or the fault code with text is shown in the event of a fault.
Operation lock (26)	When the lock is active, the following operating elements are locked: - Operating buttons for heating and Domestic Hot Water operation - Rotary button (comfort target value for indoor temperature) - Presence button (only for indoor system)
Programming lock (27)	When the lock is active, the parameters may be shown but not changed - Temporary lock: Press the OK and ESC buttons at the same time for at least 3 seconds. The lock is active after leaving the programming level - Permanent lock: First temporary lock, then set Prog. No. 27 to "Off".

Save basic settings of to operating unit (30) 	The control parameters are written to / saved in the indoor system (only available for the indoor system) **Caution**! The parameters of the indoor unit are overwritten! This makes it possible to save the individual programming of the indoor unit controller.
Activate basic settings of operating unit (31) 	The parameters saved in the operating unit or the indoor system are written to the controller. **Caution**! The parameters in the controller are overwritten! The factory settings are stored in the controller. - Activate Prog. No. 31 at the operating unit: The controller is reset to the **factory settings**. - Activate Prog No. 31 at the indoor system: The individual programming of the indoor unit is written to the controller.
Use as (40)	- Indoor system 1/2/P: This setting determines for which heating circuit the indoor system, at which the setting is made, shall the used. When **Indoor Unit 1** was selected, additional heating circuits can be allocated to the indoor system by using Prog. No. 42. When **Indoor Unit 2/P** was selected, only the respective heating circuit can be operated. - Operating unit: This setting is intended for plain operation without indoor functions and is not required in connection with this controller. - Service device: This setting is used, for example, to save or store controller settings.
Allocation Indoor Unit 1 (42)	When the Indoor Unit 1 (Prog. No. 40) setting was selected, Prog. No. 42 must be used to define whether the indoor unit is allocated to Heating Circuit 1 or to both heating circuits.
Operation heating circuit 2/heating circuit P (44, 46)	When Indoor Unit 1 or the operating unit (Prog. No. 40) was selected, Prog. No. 44 or 46 must be used to define whether the heating circuits heating circuit 2 and heating circuit P are to be controlled on the operating unit jointly with Heating Circuit 1, or whether they are to be controlled independently of Heating Circuit 1.
Effect of preference button (48)	The effect of the presence button on the heating circuits is defined with Prog. No. 48.
Correction of indoor sensor (54)	Prog. No. 54 can be used to correct the display of the temperature value transmitted by the indoor sensor.
Device version (70)	Display of the current device version.
	**Timer programs** The Timer Programs 1 and 2 are always allocated to the respective heating circuits (1 and 2) and are only shown when these heating circuits are present and also switched on in the configuration menu (Prog. No. 5710 and 5715).

	The Timer Program 3 can be used for the Heating Circuit P, the domestic hot water and the circulation pump, depending on the setting. It is always displayed. The Timer Program 4 can be used for domestic hot water and for the circulation pump, depending on the setting. It is always displayed.
Preselection (500, 520, 540, 560) 	Selection of week days or week blocks. The week blocks (Mo-Su, Mo-Fr and Sa-Su) are setting aids. The times set there are only copied to the respective week days and can thereafter be changed for these individual week days as required. The heating program is determined by the times on the individual week days. When a time in a day group is changed, all 3 switch-on and switch-off phases of the day group are automatically taken over.
Heating phases (501 to 506, 521 to 526, 541 to 546 and 561 to 566) 	Up to 3 heating phases can be set per heating circuit. They are active on the days selected under **Preselection** (Prog. No. 500, 520, 540, 560). The system heats in all heating phases up to the comfort target value selected. Outside the heating phases, it only heats up to the reduced target value. The timer programs are only active in the "Automatic" operating mode.
Standard values (516, 536, 556, 576)	Sets the standard values specified in the setting table. **Holiday programs** The holiday program can be used to set the heating circuits during a specific holiday period to a selectable operating level. The holiday program can be used to set the heating circuits for up to 8 holiday periods to a selectable operating level.
Start of holidays (642, 652, 662)	Enter the start of the holidays
End of holidays (643, 653, 663)	Enter the end of the holidays
Operating level (648, 658, 668) 	Selects the operating level (reduced target value or frost protection) for the holiday program. A holiday period ends on the last day at 0:00. The holiday programs are only active in the "Automatic" operating mode.

	Heating circuits
Operating mode (1300)	This Prog. No. can be used to select the operating mode for the Pump Circuit P. The operating mode for Heating Circuits 1 and 2 is directly set on the operating unit.
Comfort target value (710, 1010, 1310)	Sets the comfort target value.
Reduced target value (712, 1012, 1312)	Sets the desired indoor temperature during the reduction heating phase. When no indoor sensor is available or when the indoor effect is switched off (Prog. No. 750), this value is used to calculate the feed temperature that would result in the set indoor temperature. The heating circuit remains switched off until the feed temperature has dropped to the value that would make the indoor temperature drop below the frost protection temperature.
Frost protection value (714, 1014, 1314)	Sets the maximum comfort target value.
Maximum comfort target value (716, 1016, 1316)	The heating characteristic is used to determine the feed target temperature to control the heating circuit based on the outside temperature. The incline of the characteristic determines by how much the feed temperature changes per degree change of the outside temperature. Determining the heating characteristic incline: Enter the lowest calculated outside temperature for the climate zone (e.g. -12 °C for Frankfurt) in the chart. Enter the maximum feed temperature of the heating circuit at which it is theoretically still possible to achieve 20 °C inside temperature at -12 °C outside temperature (e.g. horizontal line at 60 °C). The intersection of both lines provides the value of the heating characteristic incline.
Characteristic incline (720, 1020, 1320)	**Determining the heating characteristic incline** Enter the lowest calculated outside temperature for the climate zone into the diagram (see Figure 15) (e.g. vertical line at -10 °C). Enter the maximum feed temperature of the heating circuit (e.g. horizontal line at 40 °C). The intersection of both lines provides the value of the heating characteristic incline.

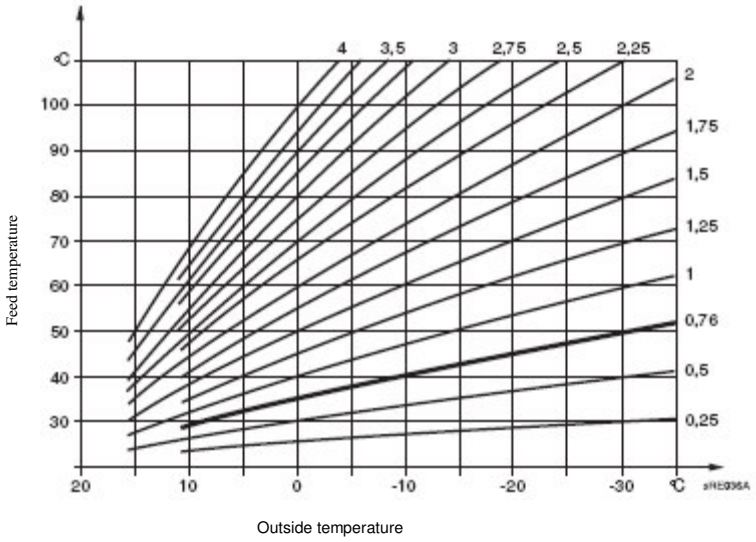
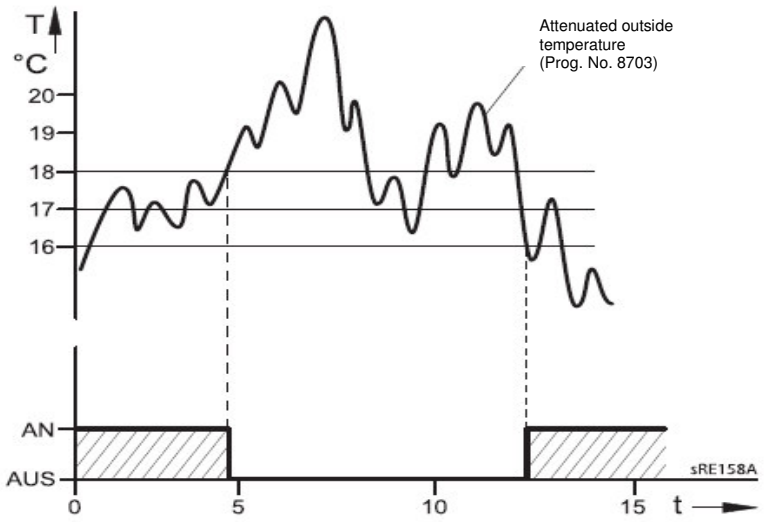
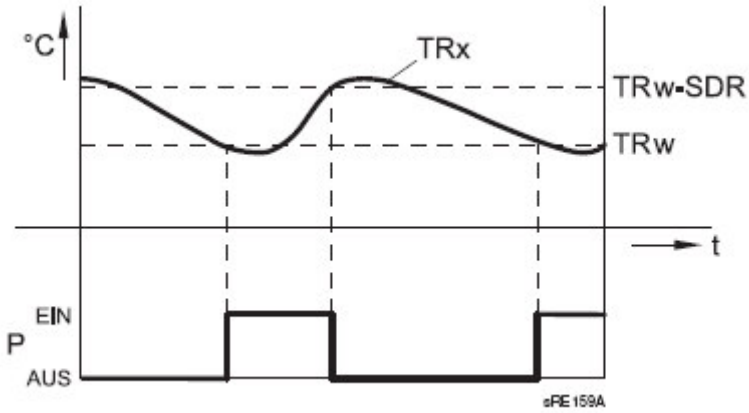
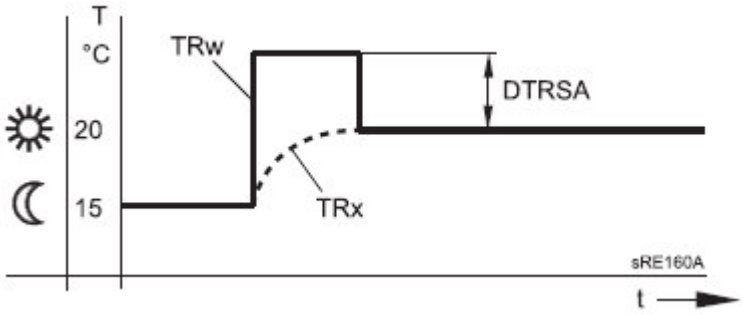
	Figure 15: Heating characteristic diagram 
Shift of characteristic (721, 1021, 1321)	Correction of the heating characteristic by parallel shift when the inside temperature is generally too high or too low.
Adaptation of characteristic (726, 1026, 1326)	Automatic adaptation of the heating characteristic to the current situation, which obviates a correction of the heating characteristic incline. An indoor sensor must be connected for automatic adaptation of the heating characteristic. The value for the indoor effect (see Prog. No. 750, 1050, 1350) must be between 1% and 99%. Possible heating element valves in the main room (place of installation of the indoor sensor) must be opened completely.
Summer / winter heating limit (730, 1030, 1330)	The heating circuit switches to summer mode as soon as the average of the outside temperatures in the last 24 hours exceeds this value by 1 °C. The heating circuit switches back to winter mode as soon as the average of the outside temperatures in the last 25 hours falls 1 °C below this value.

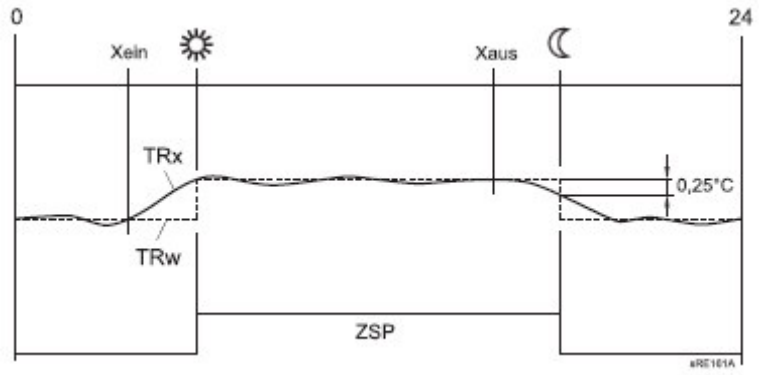
	Figure 16: Summer / winter heating limit  SWHG summer / winter heating limit T Temperature t Time
Daily heating limit (732, 1032, 1332)	The daily heating limit function switches off the heating circuit when the current outside temperature increases so that its difference to the current operating level (reduced or comfort target value) is equal to the difference set here. The heating again switches on when the current outside temperature falls below the temperature difference set minus 1 °C. This function is not active in the "**Permanent nominal temperature**" operating mode.
Feed target value limits Minimum (740, 1040, 1340) Maximum (741, 1041, 1341)	Sets an area for the feed target value. When the feed target temperature has reached one of the limit values, it is not permitted to exceed or fall below the respective limit value, even if the heat demand increases or drops.

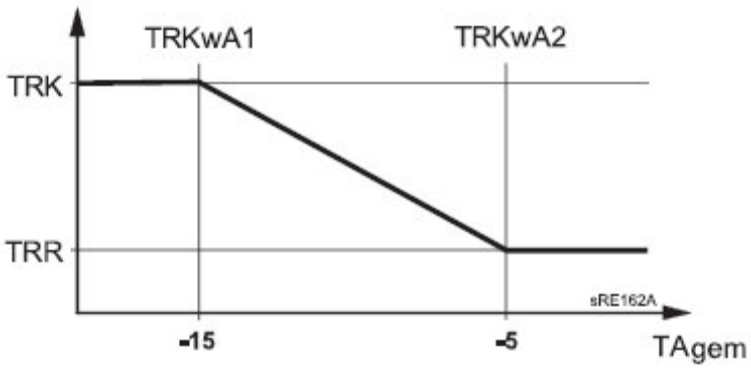
Indoor effect (750, 1050, 1350)	The feed temperature is calculated as a function of the outside temperature using the heating curve. This control type assumes that the heating characteristic is set correctly, because with this setting, the controller does not make use of the indoor temperature. When an RGT or RGB indoor device is connected and the setting for the "Indoor effect" is between 1% and 99%, the deviation of the indoor temperature from the target value is registered and taken into account for the control of the temperature. External heat sources can in this way be considered and the indoor temperature can be more steadily maintained. The effect of the deviation can be set in percent. The better suited the main room (room temperature not distorted, permanent place of installation, etc.), the higher the value can be set and the more the indoor temperature is considered. When the main room (place of installation of the indoor sensor) contains heating element valves, they must be completely opened. - Setting for weather control with indoor effect: 1% -99% - Setting for pure weather control: ---% - Setting for pure indoor control : 100%
Indoor temperature limitation (760, 1060, 1360)	The switching difference set here switches the heating circuit pump on and off as a function of the indoor temperature. The switching-off point for the pump is set as a difference to the set target indoor temperature. The switching-on point is 0.25 °C below the set indoor target value. This function is only possible with an RGT or RGB indoor device and active "indoor effect". An indoor sensor must be connected. This function only applies for pump heating circuits. Figure 17: Room temperature limitation  TRx Indoor temperature actual value RTw Indoor temperature target value P Pump t Time

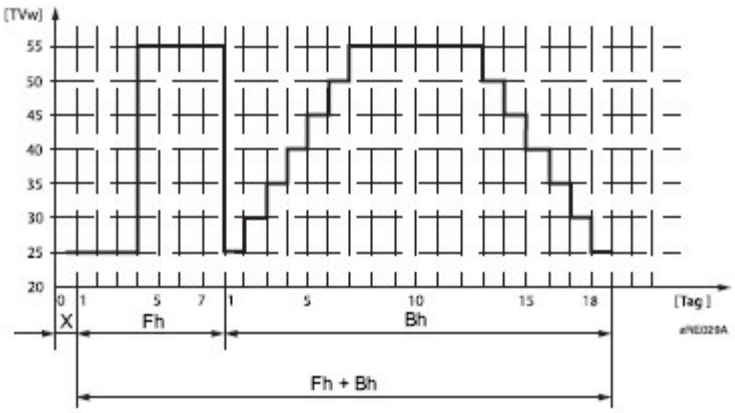
Fast heating-up (770, 1070, 1370)	The fast-heating-up function becomes active when the indoor target value switches from protection level or reduced level to comfort level. During fast-heating-up function, the indoor target value is increased by the value set here. The actual indoor temperature increases to the new threshold in a relatively short period, due to this setting. The fast-heating-up function is terminated when the indoor temperature measured by an RGT/RGTF or RGB indoor device has increased to 0.25 °C below the comfort target value. Without an indoor sensor or indoor effect, fast heating-up is performed according to an internal calculation in which the indoor target value is used as a basis. The duration of the fast-heating-up function and the effect on the feed temperature therefore depends on the outside temperature. Figure 18: Fast heating-up  TRw Indoor temperature target value TRx Indoor temperature current value DTRSA Indoor temperature target value increase
Fast reduction (780, 1080, 1380)	The fast-reduction function becomes active when the indoor target value switches from the comfort level to another operating level (options are reduced level or protection level). During the fast-reduction function, the heating circuit pump is switched off. In mixer circuits, the mixing valve is closed as well. During the fast-reduction function, no heat request is sent to the heat generator. The fast-reduction function is possible with or without indoor sensor: With indoor sensor, the function switches off the heating circuit until the indoor temperature has dropped to the reduced target value or the frost protection target value. The heating circulation pump is again switched on and the mixing valve is released when the indoor temperature has dropped to the reduced target value or the frost protection target value. Without an indoor sensor, the fast-reduction function switches off the heading as function of the outside temperature and the building time constant (Prog. No. 6110) until the temperature has theoretically dropped to the reduced target value or the frost protection target value.

Duration of the fast-lowering function when lowering by **2 °C**, in hours:							
Mixed outside temperature	**Building time constant (configuration, Prog. No. 6110)**						
	0 h	2 h	5 h	10 h	15 h	20 h	50 h
15 °C	0	3.1	7.7	15.3	23		
10 °C	0	1.3	3.3	6.7	10	13.4	
5 °C	0	0.9	2.1	4.3	6.4	8.6	21.5
0 °C	0	0.6	1.6	3.2	4.7	6.3	15.8
-05 °C	0	0.5	1.3	2.5	3.8	5	12.5

-10 °C	0	0.4	1	2.1	3.1	4.1	10.3
-15 °C	0	0.4	0.9	1.8	2.6	3.5	8.8
-20 °C	0	0.3	0.8	1.5	2.3	3.1	7.7
Duration of the fast-lowering function when lowering by **4 °C**, in hours:							
Mixed outside temperature	**Building time constant (configuration, Prog. No. 6110)**						
	0 h	2 h	5 h	10 h	15 h	20 h	50 h
15 °C	0	9.7	24.1				
10 °C	0	3.1	7.7	15.3	23		
5 °C	0	1.9	4.7	9.3	14	18.6	
0 °C	0	1.3	3.3	6.7	10	13.4	
-05 °C	0	1	2.6	5.2	7.8	10.5	26.2
-10 °C	0	0.9	2.1	4.3	6.4	8.6	21.5
-15 °C	0	0.7	1.8	3.6	5.5	7.3	18.2
-20 °C	0	0.6	1.6	3.2	4.7	6.3	15.8

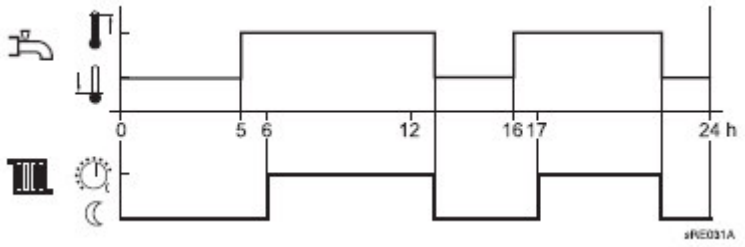
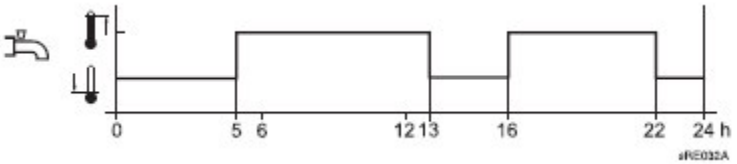
Switch-on optimisation max. (790, 1090, 1390) Switch-off optimisation max. (791, 1091, 1391)	The switch-on and switch-off time optimisation is a timer function that is possible with or without an indoor device. When an indoor device is present, the switching of the operating level is shifted relative to the programmed time so that the building dynamics (heating-up and cooling-down time) is taken into account. The desired temperature level is therefore reached at the time programmed. If this is not the case (too early or too late), a new switching time is calculated that is used next time. When no indoor device is present, the earlier switching time is calculated based on the outside temperature and the building time constant (Prog. No. 6110). The optimisation time (shift forwards) can be limited here to a maximum value. When the optimisation time = 0, the function is switched off. Figure 19: Switch-on and switch-off optimisation  Xein Switch-on time shifted forwards Xaus Switch-off time shifted forwards ZSP Time switching program TRw Indoor temperature target value TRx Indoor temperature actual value

Reduced-increase start (800, 1100, 1400) Reduced-increase end (801, 1101, 1401)	When little heating power is required, the reduced indoor target value at cold outside temperatures can be increased. The increase depends on the outside temperature. The lower the outside temperature, the more the reduced target value for the indoor temperature is increased. The start of the increase and the end point can be set. Between these two points the increase of the reduced target value to the comfort target value is linear. Figure 20: Reduced increase  TRwA1 Reduced-increase start TRwA2 Reduced-increase end TRK Comfort target value TRR Indoor temperature reduced target value TAgem Mixed outside temperature
Overheating protection for pump heating circuit (820, 1120, 1420)	This function prevents overheating of the pump heating cycle by switching the pump on and off when the feed temperature is higher than the feed temperature required according to the characteristic (e.g. when there is increased demand by other consumers).
Drive type (832, 1132)	- 2-point: The controller controls the drive with only one relay output. A signal at the output opens the addressed valves. When the signal is not present, the valve automatically closes. - 3-point: The controller controls the drive with two relay outputs. One dedicated output is used for opening and one for closing of the controlled valve.
Switching difference 2-point (833, 1133)	The "Switching difference 2-point" for the 2-point drive might have to be adjusted. The switching difference has no meaning for the 3-point drive.
Drive runtime (843, 941, 1134)	In mixer circuits, a kick of the mixer drive is initiated after the pump kick (pump is off). The mixer is moved in the OPEN and then in the CLOSED direction. The time during which the control signal acts in the OPEN direction corresponds to the drive runtime.

Screed function (850, 1150, 1450)	The screed function is used for controlled drying of screed screeds. - Off: The function is switched off. - Function heating (Fh): Part 1 of the temperature profile is automatically executed. - Covering-readiness heating (Bh): Part 2 of the temperature profile is automatically executed. - Function and covering-readiness heating: The whole temperature profile is automatically executed. - Manual: The screed target value is manually maintained. Figure 21: Temperature profile for screed drying function  X Starting day Fh Function heating Bh Covering-readiness heating **Important!** The relevant regulations and standards of the screed manufacturer must be considered. Correct function is only possible with a correctly installed system (hydraulics, electrics and settings). Deviations may lead to damage of the screed. The screed function can be prematurely terminated by setting **0-Off**.
Manual screed target value (851, 1151, 1451)	Sets the temperature to the value that is manually selected when the screed function is active (see Prog. No. 850).
Current screed target value (1455)	Current target value of the screed function.
Current screed day (856, 1156, 1456)	Current day of the screed function.
Fulfilled screed day (857, 1157, 1457)	Days of the screed function already passed.

Over-temperature reduction (861, 1161, 1461)	Surplus heat can be reduced by generating less heat in the indoor heating system when the over-temperature reduction is activated on Input H1 or H3 or when the maximum temperature in the system is exceeded. - Off: The function is switched off - Heating operation: The function is limited to a reduction during the heating times - Always: The function is generally released.
With buffer storage unit (870, 1170, 1470)	This parameter determines whether the heating circuit can also be fed by a buffer tank or only by a heat generator. The function further determines whether the feed pump kicks in after a heat request. - No: The heating circuit is supplied from the boiler. - Yes: The heating circuit can be supplied from a buffer tank.
With preregulator / feed pump (872, 1172, 1472, 5092)	This parameter determines whether a zone feed pump kicks in after a heat request by the heating circuit. The feed pump relates to the segment in which the controller is located (LPB bus system) and that is controlled by a preregulator. - No: The heating circuit is supplied without a preregulator/feed pump. - Yes: After the preregulator, the heating circuit is supplied by a feed pump.
Operating mode switching (900, 1200, 1500)	The parameter determines whether external switching with H1/H2/H3 switches from the comfort target value to the frost protection target value or the reduced target value.
	Domestic Hot Water
Nominal target value (1610)	Sets the nominal target value for the Domestic Hot Water temperature.
Reduced target value (1612)	The reduced target value for the Domestic Hot Water is set at Prog. No. 1612.

Release
(1620)
	- 24 h day: The Domestic Hot Water temperature is permanently maintained at the Domestic Hot Water temperature target value, independently of the timer programs.
	- Timer programs heating circuits: The Domestic Hot Water temperature is switched between the Domestic Hot Water temperature target value and the Domestic Hot Water temperature reduced target value as a function of the timer switching programs. The switching point is shifted forward in time.
	  - When there is one release per day, the time shift is 2.5 hours.
	  - When there are several releases per day, the time shift is 1 our (see Figure 22).

	Figure 22: Release as a function of the timer switching programs of the heating circuits (example)  - Timer Program 4: The Domestic Hot Water temperature is switched between the Domestic Hot Water temperature target value and the Domestic Hot Water temperature reduced target value, independently of the timer switching programs of the heating circuits. The Timer Switching Program 4 is used for this purpose (see Figure 23). Figure 23: Release according to the Timer Switching Program 4 (example  - Low tariff: Released when the low-tariff input (E5) is active. - Timer Program 4/Domestic Hot Water warming or low tariff: Released when the Domestic Hot Water Program 4 is set to the nominal target value or the low-tariff input (E5) is active.
Charging process (1630)	This function ensures that the boiler power is primarily available for the Domestic Hot Water when there are simultaneous demands for indoor heating and Domestic Hot Water. - Absolute priority: Mixer and pump heating circuits are blocked until the Domestic Hot Water has been heated up. - Sliding priority: When the boiler power is no longer sufficient to heat the Domestic Hot Water, the mixer and pump heating circuits are restricted. - No priority: The Domestic Hot Water is supplied in parallel to the indoor heating function. - Mixer heating circuit sliding, pump heating circuit absolute: The pump heating circuits are blocked until the Domestic Hot Water has been heated up. When the boiler power is no longer sufficient, the mixer heating circuit is restricted as well.
Legionella function (1640)	Function for killing legionella germs by heating to the legionella function target value set (see Prog. No. 1645). - Off: Legionella function switched off - Periodical: Legionella function is periodically repeated, depending on the value set (Prog. No. 1641). - Fixed day of the week: Legionella function is activated on a specific day of the week (Prog. No. 1642).
Legionella function, periodic (1641)	Sets the interval for the legionella function, periodic (recommended setting when the Domestic Hot Water is also heated by a solar heating system).

Legionella function, week day (1642)	Sets the weekday for the fixed weekday legionella function (factory setting).
Legionella function, fixed time (1644)	Sets the switch-on time for the legionella function. When "---" is entered, the legionella function is performed at the first release of the Domestic Hot Water treatment.
Legionella function target value (1645)	Sets the temperature target value for killing the germs.
Legionella function period (1646) 	This function sets the period for which the legionella function target value is active to kill the germs. When the colder tank temperature exceeds the **legionella function target value** - 1 °C, the **legionella function target value** is deemed as fulfilled and the timer runs out. When the tank temperature falls (by more than the switching difference +2 °C) below the required **legionella function target value** before the end of the period, the period must be restarted. When no period is set, the legionella function is fulfilled as soon as the **legionella function target value** has been reached.
Legionella function circulation pump (1647) 	- On: The circulation pump is switched on when the legionella function is active. **Caution**! When the legionella function is active, there is a risk of scalding at the taps.
Circulation pump release (1660)	- Timer Program 3: The circulation pump is released as a function of the Timer Program 3 (see Prog. No. 556) - Domestic Hot Water release: The circulation pump is released when the Domestic Hot Water treatment is released. - Timer Program 4: The circulation pump is released as a function of the Timer Program 4 of the local controller.
Circulation pump cycle mode (1661)	Within the release time, the circulation pump is switched on for 10 min and then switched off for 20 min.
Circulation pump target value (1663)	When the value falls below the circulation target value (standard value: 45 °C), the circulation pump is switched on for 10 min within the release time. When the circulation target value is reached, but at the earliest after 10 min, the pump is switched off. This function requires that a sensor is connected in the circulation reflux (input BX, Prog. No. 5930-5933).
	Hx pump
H1/H2/H3 Domestic Hot Water system feed process (2008, 2033, 2044)	Determines whether the pump connected to the Input H1/H2/H3 is to be used for priority Domestic Hot Water charging.
H1/H2/H3 over-temperature reduction (2010, 2035, 2046)	Determines whether the pump connected to the Input H1/H2/H3 is to be used for over-temperature reduction (see Prog. No. 861, 1161, 1461).
H1/H2/H3 with buffer tank (2012, 2037, 2048)	Determines whether the pump connected to the Input H1/H2/H3 is to be used for supplying the heating circuit.

H1/H2/H3 preregulator/ feed pump (2014, 2039, 2050)	Determines whether the heating circuit is supplied from the preregulator / with a feed pump.
	Swimming pool
Target value solar heating (2055)	The swimming pool is heated to the target value set here when solar energy is used.
Target value generator heating (2056)	The swimming pool is heated to the target value set here when generator heating is used.
Charging priority solar (2065)	Determines whether swimming pool heating with solar charging has priority or not.
With solar integration (2080)	Determines whether the swimming pool heating may be performed by solar heating or not.
	Preregulator / feed pump
Preregulator/feed pump (2050)	- Before the buffer tank: The preregulator/feed pump is hydraulically arranged before the buffer tank when a buffer tank is present. - After the buffer tank: The preregulator/feed pump is hydraulically arranged after the buffer tank when a buffer tank is present.
	Heat pump
Control condenser pump (2801)	- Temperature request: The condenser pump runs as soon as a valid temperature request is available. - Parallel compressor operation: The condenser pump runs when the compressor is in operation or the electrical unit in the feed is switched on.
Lead time condenser pump (2802) 	The condenser pump must be operated before the compressor is operated, so that the sensors can measure the correct temperature. The value must be smaller or equal the "Lead time source" (Prog, No. 2819).
Trailing time condenser pump (2803) 	After the compressor has been switched off, the condenser pump continues running for the set trailing time. When the heat pump has a fault, the condenser pump switches off until the fault has been removed. The system frost protection, the heat pump frost protection as well as the electrical heating unit K25 can still activate the condenser pump when they are active.
Lead time source (2819) 	Before the operation of the compressor, the source pump/fan must be operated to ensure that the evaporator is perfused and the sensors can measure the correct temperature. The value must be lager or equal to the "Lead time condenser" (Prog. No. 2802).

Trailing time source (2820)	After the compressor has been switched off, the source pump/fan continues running for the trailing time set.
Switching difference reflux pump (2840) 	For systems without buffer or combined tank When the reflux temperature exceeds the target value by half a switching difference, the controller requests the operation of the heat pump. When the reflux target value falls below 30 °C, the switching difference is reduced, so that the switch-on point moves closer to the target value. The switch-on point is equivalent to the reflux target value when the reflux target value is 20 °C. The calculation of the reflux temperature target value is described under Prog. No. 5810.
Use of electrical feed (2880)  	- Replacement: When emergency operation is activated, the electrical unit is immediately released and maintains the current target value. The "Locking time electrical feed" (Prog. No. 2881) and the "Release electrical feed below outside temperature" (Prog. No. 2884) are not taken into account. When the heat pump can not complete a domestic hot water charging, the electrical unit is not switched on and the domestic hot water charging is terminated. - Supplement heating circuit , Domestic Hot Water system, heating circuit +Domestic Hot Water system: When the electrical unit in the feed has been released for supporting the heat pump (supplements the compressor), the timer set in Prog. No. 2881 starts running as soon as the compressor is switched on. After the locking time has expired, the calculation of the release integral starts (Prog. No. 2882). When the release integral has been accumulated, the electrical unit is released in addition to the compressor. The setting determines whether it is only released for heating (heating circuit), only for domestic hot water (Domestic Hot Water system) charging or both. When the compressor had to be switched off during Domestic Hot Water system charging due to maximum switch-off temperature, high pressure or hot gas problems, the electrical unit completes the Domestic Hot Water system charging after the number of charging attempts (Prog. No. 2893) has been reached. During an emergency operation, the electrical unit is released as well. - Ending the Domestic Hot Water system charging: The electrical unit in the feed is only used to complete the Domestic Hot Water system charging, not to support the compressor. During emergency operation, the electrical unit is also released. During the electrical-feed lock, the electrical unit in the feed part is also locked.
Locking time electrical feed (2881)	The electrical unit may be operated at the earliest after the locking time set here has expired since the start of the compressor.
Release integral electrical feed (2882)	Only active when Prog. No. 2880 is set to "Supplement heat pump operation" After the "Locking time electrical feed" has expired, the controller starts to add up a possible heat deficit. The electrical unit (K25) is only released when the heat deficit has reached the value set here.
Reset integral electrical feed (2883)	When the actual value is higher than the switch-off point, the controller starts to calculate a reset integral based on the surplus heat. The electrical unit (K25) is switched off when the surplus heat has reached the reset integral defined here.

Release of electrical feed below TA (2884)	The electrical unit is only released when the damped outside temperature (TA) is below the temperature set here. This setting is only considered when the electrical unit is used as "Supplement to the heat pump operation" (Prog. No. 2880).
Compensation heat deficit (2886)	This function compensates for heat surpluses and deficits. They can occur in the following situations: - Minimum running and stand-still times of the compressor - When the temperature requirements are low, the feed temperature may be below the requested target value but the reflux temperature may not fall below the switch-on point. It is necessary to switch on the heat pump in this situation to ensure that no heat deficit occurs. The controller continuously compares the feed target value with the feed current value and integrates the existing surpluses and deficits. The differences are compensated by increasing the compressor operating times and the compressor standstill times. The controller shows an appropriate status message when the compressor does not switch on or off due to a heat surplus/deficit. The setting (On/Off) has no effect on systems with a buffer or combination tank.
Number of Domestic Hot Water system charging attempts (2893)	Determines how often Domestic Hot Water system charging or a buffer tank forced charging may be terminated until either the electrical unit in the feed part or in the Domestic Hot Water tank completes the charging.
Release above TA (2910)	The heat pump is only released when the mixed outside temperature is above the value set here. Below this outside temperature, the heat required must be provided by another heat source (binary operation). This approach prevents a bad efficiency ratio and inefficient operation of the heat pump.
For buffer tank forced charging (2911)	- Locked: The heat pump is not used for forced charging of the buffer tank. - Released: The heat pump may be used for forced charging of the buffer tank.
Complete charging of buffer tank (2012)	- Off: The heat pump is locked until the buffer tank has been completely charged by another heat source. It is only releases when there is not enough energy available to cover the current heat requirements (Command line 4720 "Automatic generator lock". - On: The heat pump is released for complete changing of the buffer tank.
Defrosting release below TA (2951)	The release of the defrosting function is only possible when the source inlet temperature (SEF/B91) is below the release temperature set here. The automatic defrosting function is not active above this outside temperature.
Switching difference defrosting (2952)	After the end of the defrosting stabilisation period, this switching difference and the registered "Temperature difference defrosting actual value" (8477) are used to calculate the new "Temperature difference defrosting target value" (8478).

Evaporator temperature defrost-end (2954)	Defrosting by process reversal are successfully completed when the evaporation temperature has reached the temperature set here.
Time to forced defrosting (2963)	Forced defrosting takes place when the heat pump has in operation without defrosting for the time specified here. This function also requires that the source temperature (QEFF/B91) is below the release temperature set (2951).
Defrosting period, max (2964)	The controller terminates the defrost function and tries again after the pre-heating phase and after a defrost lock when the evaporator can not be successfully defrosted by defrosting by process reversal within this time. When an electrical unit is installed in the feed part or in the buffer/combination tank, it is switched on for support. Thereafter, the system switches directly to defrosting mode. The number of defrosting attempts is limited to three attempts.
Dripping-off period evaporator (2965)	The system waits for the "Dripping-off period evaporator" set here after successful defrosting by process reversal before the heat pump can resume heating. The heat pump resumes operation only after this period.
Cooling-down period evaporator (2966)	The "Cooling-down period evaporator" (2966) determines how long the ventilator remains switched off when the heating operation is resumed after "Dripping-off period evaporator". This function prevents evaporation ("steam cloud") of the incoming outside air.
During compressor operation (3006)	Determines whether passive cooling may take place when the compressor is in operation (e.g. for Domestic Hot Water system charging). - Passive cooling off: Passive cooling is blocked during compressor operation. - Passive cooling on: Passive cooling is released during compressor operation.
Max. rotation speed fan/source pump (3010)	Limits the top end of the control range for the rotation speed of the fan/source pump. During heating operation, this setting determines a constant rotation speed.
	Cascade
Release integral generator sequence (3530)	A variable is calculated from temperature and time. When it exceeds the limit value defined here, an additional boiler is switched on.
Reset integral generator sequence (3531)	When this limit value is exceeded, the additional boiler is switched off.
Switch-on delay (3533)	The switch-on delay prevents too frequent switching-on and switching-off (cycling) of the boiler and ensures a stable operating state.
Automatic generator sequence switching (3540)	The generator sequence determines the order of main and additional boilers and thereby the capacity utilisation of the boilers in a cascade. After the time set has elapsed, the order of the boilers is altered. The boiler with the next-higher device address becomes the main boiler.

Automatic generator sequence exclusion (3541)	- None: After expiry of the time set in Prog. No. 3540, the boiler sequence is changed. - First: The boiler with the first address works as main boiler. The order of all the other boilers is changed after the time set in Prog. No. 3540 has expired. - Last: The boiler with the last address always remains the last boiler. The order of all other boilers is changed after expiry of the time set in Prog. No. 3540. **Additional generator** An additional generator can be operated either independently, e.g. in a zone, or as supplement to the main generator (e.g. heat pump). The control of the additional generator is based on the "collected" section feed target values and the state of the internal main generate or the cascade.
Release below/above outside temperature (3700/ 3701)	The operation of the additional generator is only released when the mixed outside temperature is above the temperature limit set. The additional generator can so be locked within a selected outside temperature range to achieve bivalent operation using the additional generator and the heat pump.  The setting "---" must be selected in the appropriate two command lines to ensure that the additional generator is always released.
Trailing time (3705)	When a heat deficit is registered before the expiry of the trailing time, the release is retained. When the trailing time set expires before the section feed temperature falls before the section feed target value, the release is switched off.
Switching integral (3720)	This value is calculated from the temperature curve and the time. When the limit value set is exceeded, the additional generator is switched on.
Switching difference off (3722)	When the section feed temperature rises to the value of the switch-off difference plus the feed target value, the release is immediately and independently of the switching integral of the additional generator (K32) switched off and the heat request (K27) is terminated after the expiry of the trailing time.
Locking time (3723)	The locking time allows the heat pump to reach a stable operating condition before the additional generator is allowed to switch on. The additional generator is only released after the locking time has expired. The locking time starts as soon as a value feed target value is available. The calculation of the release integral only starts after the expiry of the locking time.  The locking time is not considered when the heat pump has a fault or is locked or when the additional generator has to complete a Domestic Hot Water charge. The function can be switched off.
	Solar
Temperature difference ON (3810) Temperature difference OFF (3811)	These functions determine the switch-on and switch-off point of the collector pump. They are based on the temperature difference between the collector temperature and the storage tank temperature.

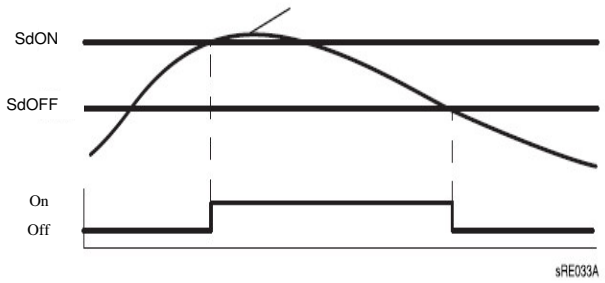
Charging temperature min. Domestic Hot Water system storage tank (3812)	The storage tank charging process requires that a specific collector temperature is reached, in addition to the temperature difference. Figure 24: Charging controller (dT)  Tkol Collector temperature On/Off Charging ON or OFF SdOn Temperature difference ON SdOff Temperature difference OFF
Charging temperature min. buffer tank (3815) Charging temperature min. swimming pool (3818)	The storage tank / buffer tank / swimming pool charging process requires that a specific collector temperature is reached, in addition to the temperature difference.
Charging priority storage tank (3822)	The charging sequence for the integrated storage tanks can be defined by settings for the charging process when the system includes several heat exchangers. - None: Each storage tank is alternately charged until its temperature has increased by 5 °C until each target value has reached the level A, B or C (Table 1). When all target values have been reached, the target values of the next level are approached. - Domestic Hot Water tank: The Domestic Hot Water tank is charged with priority on each level (A, B or C) when solar charging is used. Additional consumers on the same level are only charged thereafter. When the target values have been reached, the target values of the next level are approached. Charging the Domestic Hot Water tank again has priority. - Buffer tank: The buffer tank is charged with priority on each level (A, B or C) when solar charging is used. Once the target values have been reached, the target values of the next level are approached. Charging the buffer tank again has priority.

Table 3: Storage tank target values

Level	**Domestic Hot Water storage tank**	**Buffer tank**	**Swimming pool**[1)]
A	Nominal target value (Prog. No. 1610)	Buffer tank target value (drag pointer)	Target value solar heating (Prog. No. 2055)
B	Charging temperature maximum (Prog. No. 5050)	Charging temperature maximum (Prog. No. 4750)	Target value solar heating (Prog. No. 2055)
C	Storage tank temperature maximum (Prog. No. 5051)	Storage tank temperature maximum (Prog. No. 4751)	Swimming pool temperature maximum (Prog. No. 2070)
1) When the charging priority for the swimming pool is activated (Prog. No. 2065), the swimming pool is charged before the other tanks are charged.			

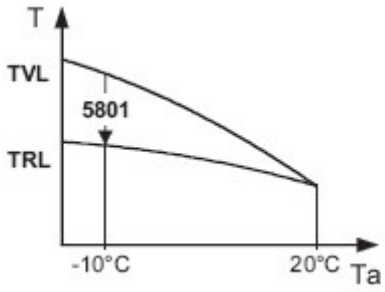
Charging time relative priority (3825)	When the preferred storage tank can not be charged according to the charging plan, the priority is transferred to the next storage tank or the swimming pool for the time set here.
Waiting time relative priority (3826)	The transfer of the priority is delayed by the time set here.
Waiting time parallel operation (3827)	The use of solar charging pumps in parallel mode is possible when the solar capacity is sufficient. The next storage tank can so be charged in parallel with the storage tank currently charged according to the priority order. This value can be used to delay the addition of storage tanks in parallel mode or to make it follow a stepwise function.
Delay secondary pump (3828)	The operation of the secondary pump of the heat exchanger can be delayed to ensure that possibly present cold water is first flushed out by the pump in the primary circuit.
Collector start function (3830) 	Periodic switching-on of the pump is possible when the temperature of the collector cannot be correctly measured when the pump is switched off (e.g. vacuum tubes). The temperature of the collector can not be measured correctly when the pump is switched off. It is therefore necessary to switch it on from time to time.
Minimum operating time collector pump (3851)	The collector pump is periodically switched on for the time set here.
Collector start function gradient (3834)	The collector pump is switched on as soon as the temperature at the collector sensor increases. The higher the value set here, the higher this temperature increase must be.
Collector frost protection (3840)	The collector pump is activated when there is a risk of frost to prevent freezing of the collector.
Collector overheating protection (3850)	The charging of the storage tank is continued to dissipate heat when there is a risk of overheating the collector. Charging of the tank is stopped when the storage tank safety temperature has been reached.
Evaporation heat transfer fluid (3860)	This pump protection function prevents overheating of the collector pump when there is a risk that the heat transfer fluid will evaporate due to the high collector temperature.
Pump rotation speed limitations (3870, 3871)	Enter the minimum and maximum solar pump rotation speed in percent.
Frost protection agent (3880)	Specify the frost protection agent used.
Frost protection agent concentration (3881)	Specify the frost protection agent concentration to measure the solar energy yield.

Pump flow (3884)	Enter the flow of the built-in pump to calculate the pumped volume for the yield measurement. **Buffer tank** Forced charging Forced charging of the buffer tank can be triggered during the low-tariff period to save electricity costs. The operation of the heat pump is continued until the forced charging target value (heating/cooling) in the buffer tank is reached or until forced charging is no longer released. Forced charging can either be triggered by the low-tariff input E5 or Prog. No. 4711. When forced charging is terminated because the heat pump had to be switched off, it will be resumed as soon as the buffer tank temperature has dropped by 5 °C. Forced charging must still be released at this time, otherwise the controller will wait for the next trigger for forced charging.
Forced charging for heating min/max (4709/ 4710)	The drag pointer used for forced charging for heating can be limited towards the upper and lower temperature range. The drag pointer collects the maximum values of the heating circuit temperature requests and stores them. Every day at midnight, the drag pointer value is reduced by 10%.
Forced charging target value heating max. (4710)	Sets the target value (°C) for forced charging for heating.
Forced charging time (4711)	Forced charging starts every day at the time set here (00:00-24:00).
Forced charging duration max (4712)	Forced charging is terminated when the desired target value has not been reached after the period specified here.
Automatic generator lock (4720)	The automated generator lock is used for hydraulic separation of heat generator and buffer tank. The heat generator is only used when the buffer tank can no longer provide the current heat requirements. The following settings are possible: - None: The automatic generator lock is deactivated. - With B4: The automatic generator lock is triggered by the buffer tank B4. - With B4 and B42/41: The automatic generator lock is triggered by the buffer tanks B4 and B41/42.
Automatic generator lock SD (4721)	The heat generator is locked when the temperature in the buffer tank is higher than the boiler target value + auto generator lock SD.
Temperature difference buffer/heating circuit (4722)	The heat required by the heating circuit is taken from the buffer tank when the temperature difference between the buffer tank and the heating circuit temperature request is sufficiently large. The heat generator is locked.

Layer protection (4739)	The buffer layer protection function facilitates a hydraulic balance between the consumers and the generator without additional stop valves to the buffer tank. When the function is active, the water volume at the consumer side is adapted to ensure that as little cold water as possible is mixed in from the buffer tank.  This function requires that a section feed sensor B10 is connected.
Charging temperature maximum (4750) 	The buffer tank is charged with solar energy until the charging temperature maximum is reached. The collector overheating protection function can reactivate the collector pump until the maximum storage temperature has been reached.
Cool-down temperature (4755)	The collector overheating protection function can reactivate the collector pump until the maximum storage temperature has been reached.
Cool-down Domestic Hot Water system/heating circuits (4756)	Two functions are available to cool down the buffer tank to the cool-down temperature. The energy can be discharged through heat consumption by indoor heating or into the Domestic Hot Water system tank. This function can be separately set for each heating circuit.
Cool-down collector (4757)	When the temperature of the buffer tank is too high, it can be cooled down by dissipating heat to the environment through the collector surface. - Off: Cooling-down is deactivated. - Summer: Cooling-down is only active in summer. - Always: Cooling down is always active.
Charging sensor electrical unit (4760)	This function determines the sensor that is to be used for charging with the electrical unit. - B4: The electrical unit is switched in and off by the sensor B4. - B42/B41: The electrical unit is switched on by the sensor B41 and switched off by the sensor B42.
Forced charging with electrical unit (4761)	The electrical unit can handle forced charging when forced charging is triggered and no other heat generator in the system is activated within one minute. - No: The electrical unit K16 is not used for forced charging. - Yes: When no other heat generator handles forced charging, the electrical unit K16 will handle forced charging.
With solar contribution (4783)	Determines whether the buffer tank can be charged by solar energy.
	Domestic Hot Water tank
Charging (5010)	Determines whether the Domestic Hot Water tank is charged once or several times per day.
Feed target value excess (5020)	The boiler target value for changing the Domestic Hot Water tank comprises of the Domestic Hot Water target value and the feed target value excess.

Transfer excess (5021)	Energy from the buffer tank can be transferred to the Domestic Hot Water tank. This requires, that the current buffer tank temperature is higher than the current temperature in the Domestic Hot Water tank. This temperature difference is set here.
Charging type (5022)	Storage tank charging can be controlled with one or with two sensors. It is further possible to implement the charging with one sensor and the legionella function with two sensors (3rd setting).
Charging temperature maximum (5050) 	This setting limits the maximal charging temperature for the connected tank of the solar heating unit. The collector pump switches off when this Domestic Hot Water charging value is exceeded. The collector overheating protection function (see Prog. No. 3850) can re-activate the collector pump until the tank safety temperature has been reached.
Cool-down temperature (5055)	Sets the temperature for cooling down the Domestic Hot Water tank.
Cool-down boiler/heating circuit	Cooling-down through heat consumption by the indoor heating (see Prog. No. 860, 1160, 1460).
Cool-down collector (5057)	Cooling-down by radiating heat from the collector surface to the environment.
Electrical unit operating mode (5060) 	- Replacement: The electrical heating unit takes over the charging of Domestic Hot Water as soon as the heat pump has a fault or is switched off or the Domestic Hot Water charging by the heat pump has terminated. - Summer: When all heating circuits have switched to summer mode, the electrical heating unit performs the Domestic Hot Water charging from the next day onwards. The heat pump remains switched off during the summer operation. The Domestic Hot Water provision is only performed by the heat pump when at least one heating circuit has switched to heating mode. In heating mode, the electrical unit is operated in the same way as described under "Replacement". - Always: Domestic Hot Water charging is always performed by the electrical heating unit. The Domestic Hot Water operating button also affects the electrical heating unit. Domestic Hot Water charging requires that the operating mode button for Domestic Hot Water is switched on.
Electrical unit release (5061)	- 24 h/day: Permanent release of the electrical unit - Domestic Hot Water release: Release of the electrical unit as a function of the Domestic Hot Water release (see Prog. No. 1620) - Timer Program 4: Release of the electrical unit by the Timer Switching Program 4 of the local controller.
Electrical unit control (5062)	- External thermostat: The storage tank temperature is controlled with an external thermostat without set-point control by the controller. - Domestic Hot Water sensor: The storage tank temperature is controlled by an external thermostat with set-point control by the controller.

Over-temperature reduction (5085)	Over-temperature reduction can be initiated by the following functions: Storage tank temperature maximum, automatic push, charging preference time push, over-temperature reduction, active inputs H1, H2 H3 or EX2, cooling-down of storage tank, solid boiler over-temperature reduction. When over-temperature reduction is activated, the excess energy can be reduced by heat consumption of the indoor heaters. This can be separately set for each heating circuit.
With buffer tank (5090)	- No: The Domestic Hot Water tank is directly supplied form the boiler. - Yes: The Domestic Hot Water tank is supplied from the buffer tank.
With preregulator/feed pump (5092)	- No: The Domestic Hot Water tank is supplied without preregulator/feed pump. - Yes: The Domestic Hot Water tank is supplied by the preregulator/ with the feed pump.
With solar contribution (5093)	This function determines whether the Domestic Hot Water tank is to be supplied with solar energy.
Transfer strategy (5130)	Transfer is permitted either always or only at set Domestic Hot Water release times.
Reference temperature transfer (5131)	The respective Domestic Hot Water sensor can be used for the reference temperature for transfer.
	Configuration
Default setting (5700) 	Sets the codes for the hydraulic system. The code information are provided in the appropriate application example. The relevant sensors must be connected when programming the scheme. When sensors are programmed at a later stage, "---" is shown. However, the settings are still valid.
Heating Circuit 1,2 (5710, 5715) 	The heating circuits can be switched on or off with this setting. When they are switched off, the parameter for these circuits are not shown. This setting only affects heating circuits directly and not the operation!
Use of Mixer 1 (5712)	Defines the use of Mixer 1 (Y1 / Y2). The parameter is only effective in a 4-wire system.
Domestic Hot Water actuator Q3 (5731)	- None: Domestic Hot Water charging from Q3 is deactivated. - Charging pump: Domestic Hot Water charging by connection a feed pump to Q3/Y3. - Switching valve: Domestic Hot Water charging by connecting a switching valve to Q3/Y3.

Domestic Hot Water separating circuit (5736)	The Domestic Hot Water separating circuit can only be used with a boiler cascade. - Off: The Domestic Hot Water separating circuit is switched off. Any boiler can supply the Domestic Hot Water tank. - On: The Domestic Hot Water separating circuit is switched on. The Domestic Hot Water is only provided by the boiler specified. The Domestic Hot Water separating circuit requires that the Domestic Hot Water actuator Q3 is set to "Switching valve" in Prog. No. 5731.
Heat source (5800)	- Brine: E.g. when geothermal heat is used. - Water: E.g. when ground water, sea water or river water are used. - Air: The heat source "air" is not supported.
Range heating circuit for outside temperature -10°C (5810)	The heat pump is controlled by using the reflux temperature. The entry in this command line specifies the range at an outside temperature of -10 °C. It is used to calculate the value for the current, mixed outside temperature. The feed temperature target value is reduced by the value set at an outside temperature of -10 °C. At an outside temperature of 20 °C, no reduction takes place. Figure 25  TVL Feed temperature TRL Reflux temperature Ta Outside temperature **Important**! Instead of entering the correct range at -10 °C, the range can be set to 0. This requires that the reflux temperature target value is set. This option is only available for systems without mixer circuit. Prog. No. 5810 is only affective when neither the buffer tank nor a mixer heating circuit are present. The parameter has no effect in cooling mode. The cooling characteristic must be set to the reflux target value when the reflux temperature is used for control.
Solar actuator 5840)	The solar heating system can operated with feed pumps instead of a collector pump and switching valves.

External solar heat exchanger (5841)	- Jointly: Use the solar heat exchanger for the Domestic Hot Water and buffer tank. - Domestic Hot Water tank: Use the solar heat exchanger for the Domestic Hot Water tank. - Buffer tank: Use the solar heat exchange for the buffer tank.
Combination storage tank (5870)	This setting activates functions that are specific for the combination storage tank. The buffer tank electrical heating unit, for example, can be used for heating as well as for Domestic Hot Water. - No: No combination storage tank is available. - Yes: A combination storage tank is available.
Relay outputs QX1/ QX2/ QX3/ QX4/ QX5/ QX6 (5890-5896)	- No: Relay outputs deactivated - Process reversal valve Y22: The process reversal valve is required for the defrosting function of the heat pump. (For AMBIFLO permanently set to QX7) - Hot-gas temperature K31: The relay is activated when the connected hot-gas temperature sensor B81 exceeds the "Target value hot gas temperature". It is deactivated when the temperature is by at least one switching difference below the target value. The effect of the contact can be configured (for AMBIFLO permanently set to QX7). - Electrical Unit Feed 1/2 or K25/K26: The relay is used to switch an electrical heating unit in the feed part (K25 or K26) or the first stage of a two-step electrical heating unit (for AMBIFLO set to QX1).  **Important**! Electrical units must be equipped with a safety thermostat. - Switching valve cooling source Y28: Has no function for AMBIFLO - Feed pump Q14: For connecting a feed pump - Generator locking valve Y4: For connecting a switching valve for hydraulic uncoupling of the heat generator from the rest of the system. - Electrical unit Domestic Hot Water system K6: For connecting an electrical heating unit to load the Domestic Hot Water tank.  **Important**! Electrical units must be equipped with a safety thermostat. - Circulation pump Q4: The connected pump is used as Domestic Hot Water circulation pump (see Prog. No. 1660). - Collector pump Q5: For connecting a recirculation pump when using a solar collector. - Solar pump external heat exchanger K9: This value must be set when an external heat exchanger is used.  The option "External solar heat exchanger" must be selected with Prog. No. 5841 when a Domestic Hot Water tank and a buffer tank are used.

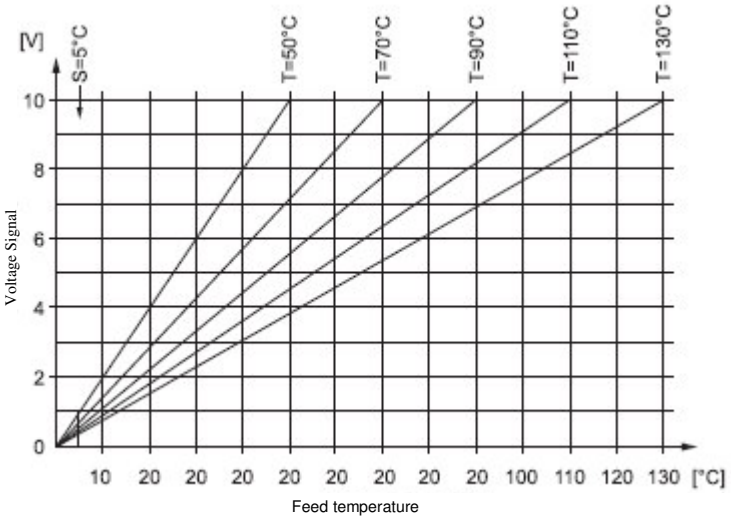
- Solar actuator buffer K8: When several heat exchangers are connected, the buffer tank must be selected at the appropriate relay output and the type of the solar actuator must be defined with Prog. No. 5840.
- Solar actuator swimming pool K18: When several heat exchangers are connected, the swimming pool must be selected at the appropriate relay output and the type of the solar actuator must be defined with Prog. No. 5840.
- Electrical unit buffer K16: The relay is used for controlling an electrical heating unit in the buffer tank.

Important! Electrical heating units must be equipped with a safety thermostat.

- H1/H2/H3 pump Q15/Q18/Q19: For connecting a pump at Input H1/H2/H3 for an additional consumer.
- Heating circuit pump heating circuit P: For activating the pump heating circuit P.
- Switching valve cooling Y21:
  Is not relevant for AMBIFLO.
- Air dehumidifier K29:
  Is not relevant for AMBIFLO.
- Heat request K27: As soon as there is a heat request in the system, Output K27 is activated.
- Cooling request K28:
  Not relevant for AMBIFLO.
- Alarm output K10: The alarm relay signals a fault as soon as it occurs. The contact is closed with a delay of 2 minutes. The contact opens without delay once there is no more alarm message pending.

The alarm relay can be reset without removing the fault (see Prog. No. 6710).

- Timer Program 5 5K13: The relay is controlled according to the settings in Timer Program 5.
- Heating circuit pump heating circuit 1 Q3: The relay is used for controlling the heating circuit pump Q2.
- Domestic Hot Water actuator Q3: Controls a connected Domestic Hot Water system charging pump or switching valve, depending on the hydraulic system.
- Source pump Q8 / fan K19: Source pump for brine/water or water/water heat pumps. Fan for air/water heat pumps (for AMBIFLO permanently set to QX4).
- Condenser pump Q9: The relay is used for controlling the condenser pump (for AMBIFLO permanently set to QX3).
- Compressor Stage 1 K1: The relay is used for controlling the 1st compressor stage (for AMBIFLO permanently set to QX8).
- Additional generator control K32: Relay for controlling an additional generator.

Function Input H1/H2/H3 (5950, 5960, 6046)	- Operating mode switching heating circuits and Domestic Hot Water system: Switches the operating mode of the heating circuits to reduced mode or protection mode (Prog. No. 900, 1200, 1500) and locking of Domestic Hot Water charging when the contact H1/H2/H3 is closed. - Operating mode switching heating circuit 1 or KKP: Switches the operating mode of the heating circuits to protective mode or reduced mode. Locking of Domestic Hot Water charging is only possible with the setting "**Operating mode switching heating circuits and Domestic Hot Water system**". - Faults/alarm message: Closing the inputs H1/H2/H3 leads to a controller-internal fault message that can also be reported by a relay output that was programmed as alarm output or in the remote management system. - Minimal feed target value: The boiler is continuously controlled according to the value set in Prog. No. 5952/5962 when this contact is closed. - Heat request 10 V: This function can be used to allow defined heat requests by external controllers (see Figure 26). Figure 26: Heat request (examples)  - Dew point monitor: A dew point monitor can be connected to Input H1 to detect formation of condensate. Closing of this contact switches off the cooling for the period "locking time dew point monitor" (Prog. No. 946). - Feed target value increase hygrostat: A hygrostat can be connected to Input H1 to prevent the formation of condensate due to excessive air humidity. Closing of the contact triggers an increase of the feed temperature target value (Prog. No. 947). - Cooling request: - Cooling request 10V: - Pressure measurement 10V: - Relative air humidity 10V: - Indoor temperature 10V:

	- Release swimming pool: Activation triggers charging the swimming pool by the heat generator. - Switching command heat pump level 1/2: - Impulse counting: The basic device provides two impulse counting inputs for connecting externally installed electrical counters, heat counters or volume flow counters. The impulses are connected to the multifunctional low-voltage inputs H1 and H3. The configuration of the input Hx in the "Configuration" menu is limited to activating the counter function: Function Input Hx: Impulse counting. The application, i.e. the "Energy counter" menu must be used to determine for which type of counting (electricity, heat) the input is used. The "Effect contact Hx" parameter is not relevant for impulse counting. The Input H2 on the extension module can not be used as impulse counting input.
Effect contact H1/H3/H2 (5951, 5961, 6047)	This function can be used to configure the contacts as normally closed contacts (must be opened to activate the function) or normally open contacts (must be closed to activate the function).
Voltage Value 1 H1/H3/H2 (5953, 5963, 6049)	TECHEM function: The following value must be set: 0.5 V.
Function Value 1 H1/H2/H2 (5954, 5964, 6050)	TECHEM function: The following value must be set: -9 °C.
Voltage Value 2 H1/H3/H2 (5955, 5965, 6051)	TECHEM function: The following value must be set: 9.5 V.
Function Value 2 H1/H2/H2 (5956, 5966, 6052)	TECHEM function: The following value must be set: +9 °C.
Function Input EX1-4 (5980-5984)	- None: No function - EW lock E6: Accepts an external locking signal (e.g. from energy supplier) for the heat pump and locks it. When the locking signal occurs for air/water heat pumps during defrosting, the controller first completes the defrosting process before locking the heat pump. - Low-tariff E5: The low-tariff signal provided by the energy supplier can be accepted by the Ex input. As soon as the input is activated, forced charging of the tanks is triggered. The time for forced tank charging can also be set to a fixed value in the command lines 4711 and 4712. - Overload source E14: Accepts the overload message of the source pump / the fan. As soon as the contact closes, the controller switches off the heat pump. The minimum standstill period must have expired before the heat pump can be re-operated. When the overload source signals several times within the defined "Period for fault repeat", the controller locks the heat pump. It can then only be re-operated by unlocking. - Pressure monitor source E26: Accepts the signal of a source pressure monitor of the source. The heat pump is switched off when the contact closes for at least 3 seconds while the source pump is running and predefined monitoring function is active (always or only during heating mode) and the lead time has expired.

	After expiry of the "Minimum standstill period", the heat pump is restarted. When the flow monitor is again triggered during the "Duration fault repeat", the heat pump is switched to fault mode and can only be re-operated after unlocking. - Flow monitor source E15: Accepts the signal of a flow monitor of the source. The source pump is switched off when the contact closes for at least the delay set (2895) while the source pump is running and the predefined monitoring (always or only during heating mode) is active and the lead time has expired. After expiry of the "Minimum standstill period", the heat pump is restarted. When the flow monitor is again triggered during the "Duration fault repeat", the heat pump is switched to fault mode. - Flow monitor consumer E24: Accepts the signal of a flow monitor of the consumer. The flow monitor is only works with the condenser pump. The compressor does not start when the monitor signal is pending after the lead time and the delay set (2895) have expired. After expiry of the "Minimum standstill period", the heat pump is restarted. When the flow monitor is again triggered during the "Duration fault repeat", the heat pump is switched to fault mode. It can only be re-operated after unlocking. - Defrosting, manual E17: Activation of the appropriately defined Ex input triggers manual defrosting of the heat pump. - Collective fault WP E20: Accepts a collective fault and sets the heat pump to fault mode. The collective fault must be removed and the "Minimum standstill period" (2843) must have expired in order to re-start the heat pump. - Fault soft starter E25: Accepts fault messages of the compressor soft starter. When a fault is pending, the controller switches off the compressor. When the fault message is removed, the heat pump is again released. For WGB 2N permanently set to EX5. - Low pressure monitor E9: Input of a low pressure controller. For AMBIFLO permanently set to EX6. - High pressure monitor E10: Input of a high pressure controller. For AMBIFLO permanently set to EX7. - Overload Compressor 1 E11: Input of an overload protection signal (230 V) at the compressor. Fault/alarm message: Input of an external fault/alarm signal (230 V).
Effect of input EX3 (5985)	This function determines whether the input works with normally-closed or normally-open signals.
Function Extender Module 1 / Extender Module 2 (6020/6021)	Determines the functions that are controlled through the Extender Modules 1 and 2.
Relay output QX21-QX23 (6030-6032)	See Prog. No. 5890.

Programming

Sensor input BX21/BX22 (6040, 6041)	The configuration of the sensor inputs BX21 and BX22 allows more functions in addition to the basic functions; - None: Sensor inputs BX21/BX22 deactivated. - Buffer tank sensor B4: Upper buffer tank sensor - Buffer tank sensor B41: Lower buffer tank sensor - Collector sensor B6: First solar collector sensor in a collector field. - Domestic Hot Water sensor B31: Second Domestic Hot Water sensor that is used for full charging for the legionella function - Cooling liquid sensor B83: No function for AMBIFLO. - Domestic Hot Water system circulation sensor B39: Sensor for the reflux line of the Domestic Hot Water circulation - Swimming pool sensor B13: Swimming pool sensor - Solar feed sensor B63: This sensor is required for solar yield measurements. - Solar reflux sensor B64: This sensor is required for solar yield measurements - Buffer tank sensor B42: Middle buffer tank sensor - Section feed sensor B10: Joint feed sensor for cascades - Cascade reflux sensor B70: Joint reflux sensor for cascades - Special temperature sensor 1,2: No function - Domestic Hot Water sensor B3: Upper Domestic Hot Water sensor - Hot gas sensor B81: Permanently set to BX1.
Signal logic output UX (6071)	The voltage signal can be inverted to be able to control also pumps or receivers of temperature requests with inverted signal logic.
Temperature value 10 V UX (6075)	Determines the maximum temperature request that corresponds to a voltage 10V.
Sensor type collector (6097)	Selects the sensor type used for measuring the collector temperature.
Correction of collector sensor 1 (6098)	Sets the correction value for collector sensor 1.
Time constant building (6110)	Sets the correction value for the outside sensor.
System frost protection (6120)	The value set here affects the response speed of the feed target value as a function of the building type when the outside temperature is fluctuating. Example values: - 40 for buildings with thick walls or outside insulation - 20 for normal buildings - 10 for light buildings

Programming

Store sensors (6200)	The sensor states can be stored with Prog. No. 6200. This happens automatically. When the system is changed (removal of a sensor), the status of the sensor terminals must be newly saved.
Delete sensor (6201)	This setting deletes all sensors connected. The sensors are newly read with the function "Store sensors" (Prog. No. 6200) or they are automatically read at midnight when the controller has been in operation for at least 2 hours at that time.
Control numbers generator 1 / storage tank / heating circuit (6212, 6213, 6215, 6217)	The basic device generates a control number for the identification of the system configuration. It is based on the numbers listed in Table 4.

Table 4: Control numbers generator 1 (Prog. No. 6212)

Solar						
A collector field with sensor **B6** and a collector pump **Q5**	Two collector fields with sensors **B6**, **B61** and collector pumps **Q5**, **Q16**	Storage tank loading pump for buffer tank **K8**	Solar switching valve for buffer tank **K8**	Solar charging pump for swimming pool **K18**	Solar switching valve for swimming pool **K18**	External solar heat exchanger, solar pump **K9** Domestic Hot Water system=Domestic Hot Water tank P=Buffer tank
0	No solar					
1						*
3						Domestic Hot Water system/P
5		X				
6			X			
8		X				Domestic Hot Water system+P
9			X			Domestic Hot Water system/P
10		X				Domestic Hot Water system
11			X			Domestic Hot Water system
12		X				P
13			X			P
14				X		
15					X	
17				X		Domestic Hot Water system/P
18					X	Domestic Hot Water system/P
19		X		X		
20			X		X	
22		X				Domestic Hot Water system/P
23			X		X	Domestic Hot Water system/P

Solar						
24		X		X		Domestic Hot Water system
25			X		X	Domestic Hot Water system
26		X		X		P
27			X		X	P
	31					*
	33					Domestic Hot Water system/P
	35		X			
	37	X				Domestic Hot Water system+P
	38		X			Domestic Hot Water system/P
	39	X				Domestic Hot Water system
	40		X			Domestic Hot Water system
	41		X			P
	42				X	
	44			X		Domestic Hot Water system/P
	45				X	Domestic Hot Water system/P
	46		X		X	
	48	X		X		Domestic Hot Water system+P
	49		X		X	Domestic Hot Water system/P
	50	X		X		Domestic Hot Water system
	51		X		X	Domestic Hot Water system
	52		X		X	P

Table 5: Control number generator 2 (Prog. No 6213)

Heat pump	
0	No heat pump
10	Brine/water heat pump, 1 stage
11	Brine/water heat pump, 2 stages
14	Brine/water heat pump, 1 stage, with passive cooling
15	Brine/water heat pump, 2 stages, with passive cooling
18	Brine/water heat pump, 1 stage, with process reversal valve
19	Brine/water heat pump, 2 stages, with process reversal valve
22	Brine/water heat pump, 1 stage, with process reversal valve and passive cooling
23	Brine/water heat pump, 2 stages, with process reversal valve and passive cooling
30	Water/water heat pump, 1 stage
31	Water/water heat pump, 2 stages
34	Water/water heat pump, 1 stage, with passive cooling
35	Water/water heat pump, 2 stages, with passive cooling
38	Water/water heat pump, 1 stage, with process reversal valve
39	Water/water heat pump, 2 stages, with process reversal valve
42	Water/water heat pump, 1 stage, with process reversal valve and passive cooling
43	Water/water heat pump, 2 stages, with process reversal valve and passive cooling
50	Air/water heat pump, 1 stage, with process reversal valve

Heat pump	
51	Air/water heat pump, 2 stages, with process reversal valve
60	Heat pump, 1 stage, for external monitoring
61	Heat pump, 2 stages, for external monitoring

Table 6: Control number buffer tank (Prog. No. 6215)

Buffer tank		Domestic Hot Water tank	
0	No buffer tank	00	No Domestic Hot Water tank
1	Buffer tank	01	Electrical unit
2	Buffer tank, solar connection	02	Solar connection
4	Buffer tank, generator valve	04	Charging pump
5	Buffer tank, solar connection, generator valve	05	Charging pump, solar connection
		13	Switching valve
		14	Switching valve, solar connection
		16	Preregulator, no heat exchanger
		17	Preregulator, 1 heat exchanger
		19	Intermediate circuit, no heat exchanger
		20	Intermediate circuit, 1 heat exchanger
		22	Charging pump/intermediate circuit, no heat exchanger
		23	Charging pump/intermediate circuit, 1 heat exchanger
		25	Switching valve, intermediate circuit, no heat exchanger
		26	Switching valve, intermediate circuit, 1 heat exchanger
		28	Preregulator/intermediate circuit, no heat exchanger
		29	Preregulator/intermediate circuit, 1 heat exchanger

Table 7: Control number heating circuit (Prog. No. 6217)

Heating circuit P		Heating circuit P		Heating circuit 1	
0	No heating circuit	00	No heating circuit	00	No heating circuit
1	Heating circuit pump	02	Heating circuit pump	01	Circulation with boiler pump
		03	Heating circuit pump, mixer	02	Heating circuit pump
				03	Heating circuit pump, mixer
				05-07	Heating/cooling, 2-wire, joint distribution
				80-10	Only cooling, 2-wire
				12	Heating/cooling, 4-wire, joint distribution
				14-16	Heating/cooling, 2-wire, joint distribution

Heating circuit P		Heating circuit P		Heating circuit 1	
				20-27	Heating/cooling, 2-wire, separate distribution
				30-38	Heating/cooling, 4-wire, separate distribution
				40-42	Only cooling, 4-wire

Software version (6220)	Displays the current software version
	LPB system
Device address/segment address (6220)	The two-segment LPB address of the controller consists of the 2-digit segment number and the 2-digit device number.
Bus feed function (6604)	- Off: The power supply of the bus system is not managed by the controller. - Automatic: The power supply of the bus system bus system is automatically switched on and off by the controller according to the power requirements.
Bus feed status (6605)	- Off: The power supply of the bus system by the controller is currently not active. - On: The power supply of the bus system by the controller is currently active.
Summer switching (6621)	- Local: The local heating circuit is switched in and off as a function of Prog. No. 730, 1030 or 1330. - Central: Either the heating circuits in the segment or in the whole system are switched on or off, depending on the settings in Prog. No. 6620.
Operating mode switching (6623)	- Local: The local heating circuit is switched on and off. - Central: Either the heating circuits in the segment or in the whole system are switched on or off, depending on the settings in Prog. No. 6620
Domestic Hot Water allocation (6625)	This setting is only required when the Domestic Hot Water provision is controlled by the heating circuit timer program (see Prog. No. 1620 and 5061) - Local heating circuits: The Domestic Hot Water is only provided for the local heating circuit. - All heating circuits in the segment: The Domestic Hot Water is provided for all heating circuits in the segment. - All heating circuits in the system: The Domestic Hot Water is provided for all heating circuits in the system. All settings consider controllers for Domestic Hot Water provision that are currently in holiday mode.

TA limit ext generator taken into account (6693)	Additional generators connected via the LPB bus can be locked or released according to their own parameters, based on the external temperature (e.g. air/ water heat pump). This status is distributed via LPB. In a cascade, the master thus knows whether an additional generator (slave) is available according to the capacity limits (outdoor temperature) or not and can add another generator accordingly. - Yes: The ecobit of the external generator is taken into account and the cascade is regulated according to the generators available. - No: The Ecobit of the external generator is not taken into account
	**Please note!** Where an LMU control unit (slave) has been connected as a further generator, this parameter must be set to "No"!
Clock operator (6640)	This setting determines the effect of the system time on the time setting of the control unit. The following settings are possible: - Autonomous: the time can be set at the control unit. The control unit time is not adjusted to the system time. - Slave without remote control: the time cannot be set at the control unit. The control unit time is automatically adjusted to the system time at regular intervals - Slave with remote control: the time can be set at the control unit. At the same time, the system time adjusted, as the change is taken over by the master. The control unit time is nevertheless adjusted to the system time at regular intervals. - Master: The time can be set at the control unit. The control unit time is specified for the system. The system time is adjusted.
Outdoor temperature supplier (6650)	The LPB system requires only a single outdoor temperature sensor. This delivers the signal to the control unit via the LPB without a sensor. The display will first show the segment number, followed by the device number.
	Error When the symbol  appears on the display, an error has occurred and the corresponding error message can be called up via the information button.
Reset alarm relay (6710)	This setting is used to reset the output relay QX, which has been programmed as an alarm relay.
Reset heat pump (6711)	Heat pump error messages are reset, using this Prog. No. The preset switch-on delay for faults is thus bridged, which means that waiting times during commissioning / error search are avoided. This function should not be used during normal operation.
Temperature alarms (6740-6746) (6800-6818)	Setting the time, after which an error message will be triggered in the event of recurring differences between the temperature target value and the actual temperature value. Error memory of the last 10 errors that have occurred.
Error history / error codes (6800 to 6819)	The last 10 error messages, their error codes and the time when they occurred are stored in the error memory.

Table 8: Error messages

No.	Error text	Place	Manual acknowledgement	Heat pump operation
10	External sensor	B9	No	Yes
26	General feeder sensor	B10	No	Yes
30	Feeder sensor 1	B1	No	Yes
31	Feeder sensor cooling 1	B16	No	Yes
32	Feeder sensor 2	B12	No	Yes
33	Feeder sensor for heat pump	B21	No	Yes
35	Source switch-on sensor	B91	No	No (param.)
36	Hot gas sensor 1	B81	No	Yes
37	Hot gas sensor 2	B82	No	Yes
38	Feeder sensor for precontrols	B15	No	Yes
39	Evaporator sensor	B84	No	No (AMBIFLO)
44	Reflux sensor for heat pump	B71	No	Yes
45	Source output sensor	B92	No	No (param.)
46	Reflux sensor for cascade	B70	No	Yes
48	Cooling agent sensor for liquids	B83	No	Yes
50	Domestic Hot Water sensor 1	B3	No	Yes
52	Domestic Hot Water sensor 2	B31	No	Yes
54	Domestic Hot Water precontrol sensor	B35	No	Yes
57	Domestic Hot Water circulation sensor	B39	No	Yes
60	Room sensor 1		No	Yes
65	Room sensor 2		No	Yes
68	Room sensor P		No	Yes
70	Buffer store sensor 1	B4	No	Yes
71	Buffer store sensor 2	B41	No	Yes
72	Buffer store sensor 3	B42	No	Yes
73	Collector sensor 1	B6	No	Yes
74	Collector sensor 2	B61	No	Yes
76	Special sensor 1	BX	No	Yes
81	LPB short-circuit / comm		No	Yes
82	LPB address conflict		No	Yes
83	BSB short-circuit		No	Yes
84	BSB address conflict		No	Yes
85	Radio communication		No	Yes
98	Expansion module 1		No	Yes
99	Expansion module 2		No	Yes
100	Two time masters		No	Yes
102	Inadequate clock function reserves		No	Yes
105	Maintenance message		No	Yes
106	Source temperature too low		Yes	No
107	Hot gas compressor 1		Yes	No
108	Hot gas compressor 2		Yes	No

No.	Error text	Place	Manual acknowledgement	Heat pump operation
117	Water pressure too high	H1	No	Yes
118	Water pressure too low	H1	No	No
121	Feeder temp. for heating circuit 1 too low		No	Yes
122	Feeder temp. for heating circuit 2 too low		No	Yes
126	Domestic Hot Water charge monitoring		No	Yes
127	Legionella temperature		No	Yes
134	Collective fault in heat pump	E20	No	No
138	Control sensor for heat pump missing		No	No
146	Sensor/actuator configuration		No	Yes
171	Alarm contact 1 active		No	Yes
172	Alarm contact 2 active	H2	No	Yes
174	Alarm contact 4 active	H3	No	Yes
176	Water pressure 2 too high	H2	No	Yes
177	Water pressure 2 too low	H2	No	No
178	Temp. monitor for heating circuit 1		No	Yes
179	Temp. monitor for heating circuit 2		No	Yes
201	Frost alarm	B21	Yes	No
204	Fan overloaded	E14	Yes	No
208	Flow monitor	LPB	---	---
217	Sensor error	LPB	---	---
218	Pressure monitor	LPB	---	---
222	High pressure during heat pump operation	E10	Yes	No
223	High pressure during heating circuit start-up	E10	Yes	No
224	High pressure during Domestic Hot Water system start	E10	Yes	No
225	Low pressure	E9	Yes	No
226	Compressor 1 overloaded	E11	Yes	No
227	Compressor 2 overloaded	E12	Yes	No
241	Feeder sensor result	B63	No	Yes
242	Reflux sensor result	B64	No	Yes
243	Swimming pool sensor	B13	No	Yes
247	Defrosting fault		Yes	No
320	Domestic Hot Water system charging temperature sensor	B36	No	Yes
321	Domestic Hot Water system consumer sensor	B38	No	Yes
322	Water pressure 3 too high	H3	No	Yes
323	Water pressure 3 too low	H3	No	No
324	BX same sensor		No	Yes
325	BX/E-mod same sensor		No	Yes
327	E-module same function		No	Yes
329	E-module/M-group same function		No	Yes
330	BX1 no function		No	Yes
331	BX2 no function		No	Yes
332	BX3 no function		No	Yes

No.	Error text	Place	Manual acknowledgement	Heat pump operation
333	BX4 no function		No	Yes
334	BX5 no function		No	Yes
335	BX21 no function		No	Yes
336	BX22 no function		No	Yes
339	Collector pump Q5 missing		No	Yes
340	Collector pump Q16 missing		No	Yes
341	Collector sensor B6 missing		No	Yes
343	Solar integration missing		No	Yes
344	Solar buffer K8 missing		No	Yes
345	Solar swimming pool K18 missing		No	Yes
350	Buffer address error		No	Yes
351	Precontrol/feeder pump address error		No	Yes
352	Hyd. switch address error		No	Yes
353	Cascade sensor B10 missing		No	Yes
354	Special sensor 2	BX	No	Yes
355	Asymmetrical alternating current	E21-23	Yes	No
356	Flow monitor for consumers	E24	Yes	No
357	Feeding temperature KK n achieved		No	Yes
358	Smooth starter	E25	No	No
360	Process valve Y22 missing		No	Yes
361	Source inlet B91 missing		No	Yes
362	Source outlet B92 missing		No	Yes
363	Evaporator sensor B84 missing		No	Yes
365	Domestic Hot Water pump Q34 missing		No	Yes
366	Indoor temperature sensor Hx		No	Yes
367	Indoor humidity sensor Hx		No	Yes

	Maintenance / service
Heat pump time interval (7070)	Setting of the time interval (months) when the heat pump needs to be serviced
Heat pump time since last service (7071)	Shows the time since the last service. Where this value is above the setting given under Prog. No. 7070, the symbol will be displayed, along with the following message: - 17: Heat pump time interval - Reset: This value may be reset.
Maximum Starts Comp1/Oper. Hour (7072)	Setting for the maximum number of starts of Compressor 1 per operating hour permitted
Actual Starts Comp1/Oper. Hour (7073)	Average number of starts of Compressor 1 per operating hour determined over the past 6 weeks. Where this value is above the setting given under Prog. No. 7072, the symbol will be displayed, along with the following message: - 8: Too many starts of Compressor 1 - Reset: This value may be reset.

Range Condens Mx/Week (7076)	Setting for the number of times that the maximum temperature range for the condenser may be exceeded within 7 days.
Actual Range Condens Mx/Week (7077)	Number of times the maximum temperature range for the condenser has been exceeded within 7 days. Where this value is above the setting shown under Prog. No. 7076, the symbol will appear, along with the following message: - 13: Range Condens Max - Reset: This value may be reset
Range Condens Min/Week (7078)	Shows how many times the minimum temperature range for the condenser may fall short within 7 days.
Actual Range Condens Min/Week (7079)	Number of times the minimum temperature range for the condenser has fallen short within 7 days. Where this value is above the setting shown under Prog. No. 7078, the symbol will appear, along with the following message: - 14 Range Condens Min - Reset: This value may be reset
Range Evaporator Max/Week (7080)	Shows how many times the maximum temperature range for the evaporator may be exceeded within 7 days.
Actual Range Evaporator Max/Week (7081)	Number of times the maximum temperature range for the evaporator has been exceeded within 7 days. Where this value is above the setting shown under Prog. No. 7080, the symbol will appear, along with the following message: - 15: Range Evaporator Max - Reset: This value may be reset
Range Evaporator Min/Week (7082)	Shows how many times the minimum temperature range for the evaporator may fall short within 7 days.
Actual Range Evaporator Min/Week (7083)	Number of times the minimum temperature range for the evaporator has fallen short within 7 days. Where this value is above the setting shown under Prog. No. 7082, the symbol will appear, along with the following message: - 16: Range Evaporator Min - Reset: This value may be reset
Domestic Hot Water Store Time Interval (7090)	Setting for time interval (months) at which the Domestic Hot Water tank must be serviced.
Domestic Hot Water Store Since Maintenance (7091)	Time expired (months) since the last service. Where this value is above the setting shown under Prog. No. 7090, the symbol will appear, along with the following message: - 11: Domestic Hot Water tank time interval - Reset: This value may be reset.
Domestic Hot Water Charge. Temp HP Minimum (7092)	Minimum temperature to which the Domestic Hot Water tank must be charged by the heat pump without the charging process being interrupted.

Actual Domestic Hot Water Charge. Temp. HP (7093)	The control unit records the Domestic Hot Water temperature at which the heat pump discontinued charging last time, i.e. when it reached the limit for high pressure, hot gas or the maximum switch-off temperature. Where this value lies below the settings shown under Prog. No. 7092, the symbol will appear, along with the following message: - 12: Domestic Hot Water system – heat pump charging temperature too low - Reset: This value cannot be reset. Once the minimum Domestic Hot Water system charging temperature has been reached next time, this value will be recorded. If this temperature is not reached, the record will remain.
	Eco-operation During transitional periods, the heat requirements can be covered by ecological heat sources such as solar and wood. Conventional heat sources such as the heat pump and electrical inserts are locked. The "eco-function" control line can be used to release or lock this option. The "eco-operation" control line can be used by the customer to turn off the heat pump or electrical insert for any period he wishes.
Eco-function (7119	- *Locked:* Eco-operation is not possible. - *Released:* Eco-operation can be activated.
Eco-operation (7120)	- *Off:* The heat pump is not locked when eco-function is active. - *On:* The heat pump is locked when eco-function is active.
Emergency Operation (7141)	Where the heat pump does not function properly, emergency operation can be maintained. For the heating system, this will be either via an electrical heating insert in the feeder or the buffer tank. For the Domestic Hot Water system, emergency operation takes place via the electrical heating insert in the Domestic Hot Water tank. - *Off:* Emergency operation has been switched off - *On:* Emergency operation has been switched on
Emergency Operation Function Mode (7142)	- *Manual*: Emergency operation can only be switched on an off at the programming level, using Prog. No. 7141. - *Automatic*: As soon as a fault has occurred in the heat pump, emergency operation will switch on automatically. It switches itself off again once the fault has been repaired and the system reset, where necessary. Emergency operation can also be switched on and off via Prog. No. 7141.
Simulation Outdoor Temperature (7150)	Simulates an outdoor temperature within the range -50°C ... 50°C to facilitate commissioning and the search for errors.
Trigger Defrosting (7152)	The defrosting function of the heat pump can be manually triggered via this control line.
Input/Output Tests (7700 to 7917)	Tests to check the function of the connected components
Status Queries (8000 to 8010)	This function can be used to query the status of the system selected.

The following messages are possible for the **heating circuit**:

End user (information level)	**Commissioning, technician**
Monitor addressed	Monitor addressed
Manual operation active	Manual operation active
Screed function active	Screed function active
Heating operation restricted	Overheating protection active Restricted, boiler protection Restricted, Domestic Hot Water system priority Restricted, buffer
Forced reduction	Forced reduction – buffer Forced reduction – Domestic Hot Water system Forced reduction – generator Trailing time active
Comfort heating operation	Switch-on optimisation + rapid heating system Switch-on optimisation Rapid heating system Comfort heating operation
Reduced heating operation	Switch-off optimisation Reduced heating operation
Frost protection active	Indoor frost protection active Lead time frost protection active System frost protection active
Summer operation	Summer operation
Off	Daily eco-system active Reduced reduction Reduced frost protection Indoor temperature limit Off

The following messages are possible for the **Domestic Hot Water system:**

End user (information level)	**Commissioning, technician**
Monitor addressed	Monitor addressed
Manual operation active	Manual operation active
Frost protection active	Frost protection active
Recooling active	Recooling via collector Recooling via generator Recooling via heating circuit
Charging lock active	Discharging protection active Charging time restriction active Charging locked
Forced charging active	Enforcement, maximum storage temperature Enforcement, maximum charging temperature Enforcement, Legionella target value Enforcement, nominal target value

End user (information level)	Commissioning, technician
Charging of electrical insert	Electrical charging, Legionella target value Electrical charging, nominal target value Electrical charging, reduced target value Electrical charging, frost protection target value Electrical insert released
Push active	Push, Legionella target value
Charging active	Charging, Legionella target value Charging, nominal target value Charging, reduced target value
Trailing time active	Trailing time active
Charged, max. storage temperature	Charged, maximum charging temperature
Charged, maximum charging temperature	Charged, maximum loading temperature
Charged, Legionella temperature	Charged, Legionella temperature
Charged, nominal temperature	Charged, nominal temperature
Charged, reduced temperature	Charged, reduced temperature
Off	Off

The following messages are possible for the **heat pump:**

End user (information level)	Commissioning, technician
Emergency operation	Emergency operation
Fault	Fault
Locked, external	Locked, external
Restriction time active	High-pressure restriction during heat pump operation Restriction of flow monitor Restriction of pressure monitor Restriction of hot gas compressor 1 Restriction of hot gas compressor 2 Restriction of maximum switch-off temperature Restriction of minimum switch-off temperature Minimum compressor down-time active Compensation for excess heat
Frost protection active	Frost protection of heat pump
Defrosting active	Forced defrosting active Drainage Defrosting active
Heating operation	Cooling of evaporator Minimum compressor operating time active Compensation for heat deficit Prewarming for defrosting Restriction of condensation range – maximum Restriction of condensation range – minimum Restriction of evaporator range - maximum

End user (information level)	Commissioning, technician
	Restriction Range Evaporator Min Compressor 1 and electrical unit on Compressor 1 and 2 on Compressor 1 on Compressor 2 on
Passive cooling operation	Passive cooling operation
Frost protection active	System frost protection active
Off	Lead time active Trailing time active Released, evaporator ready No heat requirement

The following messages are possible for the **solar** function:

End user (information level)	Commissioning, technician
Manual operation active	Manual operation active
Fault	Fault
Collector frost protection active	Collector frost protection active
Recooling active	Recooling active
Max. storage temp. reached	Max. storage temperature achieved
Vaporisation protection active	Vaporisation protection active
Overheating protection active	Overheating protection active
Max. charging temperature reached	Max. charging temperature reached
Charging of Domestic Hot Water	Charging of Domestic Hot Water
Charging of buffer tank	Charging of buffer tank
Charging of swimming pool	Charging of swimming pool
Insufficient radiation	Minimum charging temperature not reached Temperature difference insufficient Radiation insufficient

The following messages are possible for the **buffer tank**:

End user (information level)	Commissioning, technician
Frost protection active	Frost protection active
Charging of electrical insert	Electrical charging, emergency operation Electrical charging, source protection Electrical charging, defrosting
Charging restricted	Charging locked Restricted, Domestic Hot Water system takes priority
Charging active	Forced charging active * Partial charging active Charging active
Recooling active	Recooling via collector Recooling via Domestic Hot Water system / heating circuits

*Programming**

End user (information level)	Commissioning, technician
Charged	Charged, max. storage temperature Charged, maximum charging temperature Charged, target temperature for forced charging Charged, target temperature * Partially charged, target temperature Charged, minimum charging temperature

Diagnosis for source/consumer (8310 to 8980)	Display of various target and actual values and counter static for diagnostic purposes.

10. Maintenance

Risk of electrocution! The power supply to the device must be switched off before the cover components are removed.

Once the cover has been removed, any person working on the device when the power supply has been switched on must be a trained electrician!

10.1 Maintenance work

Maintenance of the heat pump must be carried out by specially trained technicians. Maintenance work includes the following:

- cleaning the outside of the heat pump
- checking the connections of the components carrying water and cooling agent for possible leaks
- checking safety valves for proper functioning
- checking the operating pressure and topping up the water / salt solution where necessary
- bleeding the heating system and resetting the gravity lock.

Maintenance and cleaning of the heat pump is recommended at annual intervals. Especially in the case of new buildings, it also makes sense to have the heating reference values optimised by an expert during the second winter of operation, as the initial humidity in the building will have evaporated by now, with less heating being required.

The inlets and outlets must be kept free from dust or other foreign bodies. There may be no obstacles (such as leaves, vehicles or building rubble) near the inlets and outlets.

Please note! Work on the inside of the machine is carried out under conditions of full liability. Any intervention required to restore the function of the device must therefore be carried out by an authorised service centre with the required skills.

All warranty claims will be null and void if maintenance work on the heat pump has been carried out by persons or companies not authorised to do so by Andrews Water Heaters.

To ensure optimal operation, we recommend that you conclude a maintenance contract.

10.2 Contact protection

Risk of electrocution! To ensure safe contact, all parts of the device with screw-type connections, especially cover components, must be duly replaced once work on the pump has been completed!

10.3 Faults

Error messages

The heat pump functions optimally, as long as the various parameters do not deviate from the intended values. Where one or several of these parameters should fall outside the limits, the control unit will display the corresponding error in plain text, with the heat pump stopping where this is necessary to protect the various components. The various error messages are described in the "Fault removal" table.

With some faults, the heat pump will be released for operation again (automatic acknowledgement) once the intended state has again been reached. Generally speaking, the heat pump can also be manually reinstated.

Maintenance

To ensure optimal operation, we recommend that you take out a maintenance contract.

Operating faults displayed by heat pump control unit
Errors or operating faults are always handled by the heat pump controller and resetting may take place automatically (automatic reset function).

The cause of the fault and the further procedure to be followed are displayed when the information button on the controller operating unit is pressed. Depending on the type of fault, a manual reset function can be used to reset the heat pump and to restore its operation. Where the same fault occurs repeatedly, or where resetting is not possible, the relevant contact person (technician) must be called in.

Operating faults
The procedure to be followed when an operating fault occurs that is not displayed by the heat pump control unit is set out below.

Please note! Work on the inside of the machine is carried out under conditions of full liability. Any intervention required to restore the function of the device must therefore be carried out by an authorised service centre with the required skills.

The control unit display remains empty (no display)
- Are the fuses in order? - Have wiring checked by a technician.
The heat pump does not heat.
- Check the fuses. - Power plant lock active? - No request (check the operating mode, time and timer program). - Check the sensor connections and sensor values. - Functional check of the circulation pumps. - Check the control unit settings. - Carry out a RESET (switch off power supply to heat pump, e.g. via the fuse box (control fuse)).
Domestic Hot Water does not become warm
- Check the operating mode. - Check the Domestic Hot Water timer program. - Check the target and actual values for the Domestic Hot Water temperature. - Functional check of the bypass valve (or the Domestic Hot Water charging pump) - Power plant lock or external lock signal active?
Room temperature does not correspond to the desired value
- Check the room temperature target values. - Setting the operating mode. - Heating graph (steepness and parallel shift properly set?) - Check the connections and the display value of the outdoor temperature sensor.
Heating system does not function properly.
- Check the parameters on the heat pump control unit. - Check the inputs (temperature sensor and thermostat states). - Check the outputs (pump connections, etc.).

Fault removal
The error messages displayed as a result of operating faults are described and explained below.

Table 9: Fault removal of smooth starter

Fault	Cause	Removal, steps to be taken
Motor does not start	LED OFF	- Check the control current connections and the power source for the mains connection (SMC-3)
	LED ON	- Check whether the interrupt switch is on - Check whether the power supply is on - Check the motor connection type and the settings for DIP switch 15
	LED flashes 1. Overload 2. Overheat 3. Phase reversal 4. Phase failure, no load 5. Phase asymmetry 6. Short-circuit in thyristor	 - Reset the device - Triggered by overheating. Wait for the device to cool down. Check the operating time against the data provided in the pump specifications. - Check the phase sequence of the mains connection - Check the network and load connections of the SMC-3, the switches and the motor for existing power supply. - Check whether all phases have power (a fault is triggered when there is asymmetry > 65% for 3 seconds). - Carry out a flow check on all power pins (L1-T1, L2-T2, L3-T3). Cut all network and load connections before measuring! The thyristor measurement should be > 10kΩ.
Motor starts, but starting process is terminated before the correct speed has been reached	LED ON	- Check whether the interrupt switch is on. - Check whether the power supply is on.
	LED flashes 1. Overload 2. Overheat 3. Phase failure, no load 4. Phase asymmetry 5. Short-circuit in thyristor	 - Reset the device - Triggered by overheating. Wait for the device to cool down. Check the operating time against the data provided in the pump specifications. - Check the network and load connections of the SMC-3, the switches and the motor for existing power supply. - Check whether all phases have power (a fault is triggered when there is asymmetry > 65% for 3 seconds). - Carry out a flow check on all power pins (L1-T1, L2-T2, L3-T3). Cut all network and load connections before measuring! The thyristor measurement should be > 10kΩ.

Fault	**Cause**	**Removal, steps to be taken**
Motor stops unexpectedly and can no longer be started	LED ON	- Check whether the interrupt switch is on. - Check whether the power supply is on.
	LED flashes 1. Overload 2. Overheat 3. Phase failure, no load 4. Phase asymmetry	 - Reset the device - Triggered by overheating. Wait for the device to cool down. Check the operating time against the data provided in the pump specifications. - Check the network and load connections of the SMC-3, the switches and the motor for existing power supply. - Check whether all phases have power (a fault is triggered when there is asymmetry > 65% for 3 seconds).

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Space for notes

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