

SC ACS 160-225

DESCRIPTION

The **SC ACS 160-225** is a floor-standing module for the instantaneous production of domestic hot water for large applications.

The function of the module is to heat domestic hot water by exchanging energy from a buffer tank.

The advantage of using the module is to produce domestic hot water in large volumes, with a primary temperature of 48°C (with DHW 45°C).

This allows the use of several energy sources, such as solar energy, heat pumps, biomass, etc.

The module has been designed integrating the most advanced hydraulic and electronic control technologies ensuring the production of DHW up to 220 l/min per module.

ENGLISH

CONTENTS OF KIT

Description	Q.ty
1 DHW mixer in packing	1
2 Instruction manual	1
3 Circulation pump assembling instructions	1
4 DHW return pump assembling instructions	1
5 Fuse	1



At the end of its life, the product should be not be disposed of as solid urban waste, but rather it should be handed over to a differentiated waste collection centre.

GENERAL SAFETY INFORMATION AND PRECAUTIONS

READ THIS MANUAL THOROUGHLY BEFORE PERFORMING ANY WORK ON THE PRODUCT.

The manufacturer reserves the right to modify the product without notice for the purpose of introducing technical improvements or to facilitate production, installation and positioning. The illustrations in this manual may therefore differ slightly from the actual product. The safety of the product and the accuracy of the instructions provided are nevertheless guaranteed.

This manual forms an integral part of the product itself and must be kept in a safe place in order to avoid damage and to permit rapid consultation throughout the working life of the product.

Ideally, this manual should be kept with the product where it can be consulted whenever needed. The manual should always accompany the product if sold or transferred to a new owner, or stay with it if the owner moves house and leaves it behind, so that the next user can consult it.

GENERAL SAFETY INFORMATION

INSTALLATION

Disconnect the product from the mains power supply before commencing any work on it.

The product must be installed in conformity to the laws and standards applicable in the country of installation.

The manufacturer's responsibility ends with the supply of the product. The product must be installed in accordance with industry standards and with these instructions, adopting best professional practices, by suitably qualified persons working for a company that will assume full responsibility for the completed installation

The manufacturer cannot be held responsible for consequences deriving from the unauthorised modification of the product or from the use of non-original spare parts.



Do not expose the product to the elements. It is not designed for use outdoors

ELECTRICAL CONNECTIONS

The controller must be installed and connected by authorized staff according to applicable regulations.

Connect the power supply to the control unit complete with bipolar switch fuses (power 230Vac 50Hz). It is essential to connect the proper grounding.



The product must be connected to the mains power supply via an earth leakage breaker in accordance with applicable standards. Correct functioning is only guaranteed provided the product is used with a pump for which it is designed. The manufacturer cannot be held responsible for the consequences of improper uses.

WATER CONNECTIONS

After delivery of the product, ensure the tightening of all nuts fixing the pipes.

Be especially careful when you are connecting the piping kit to the hydraulic module, and avoid to bend the copper pipes.

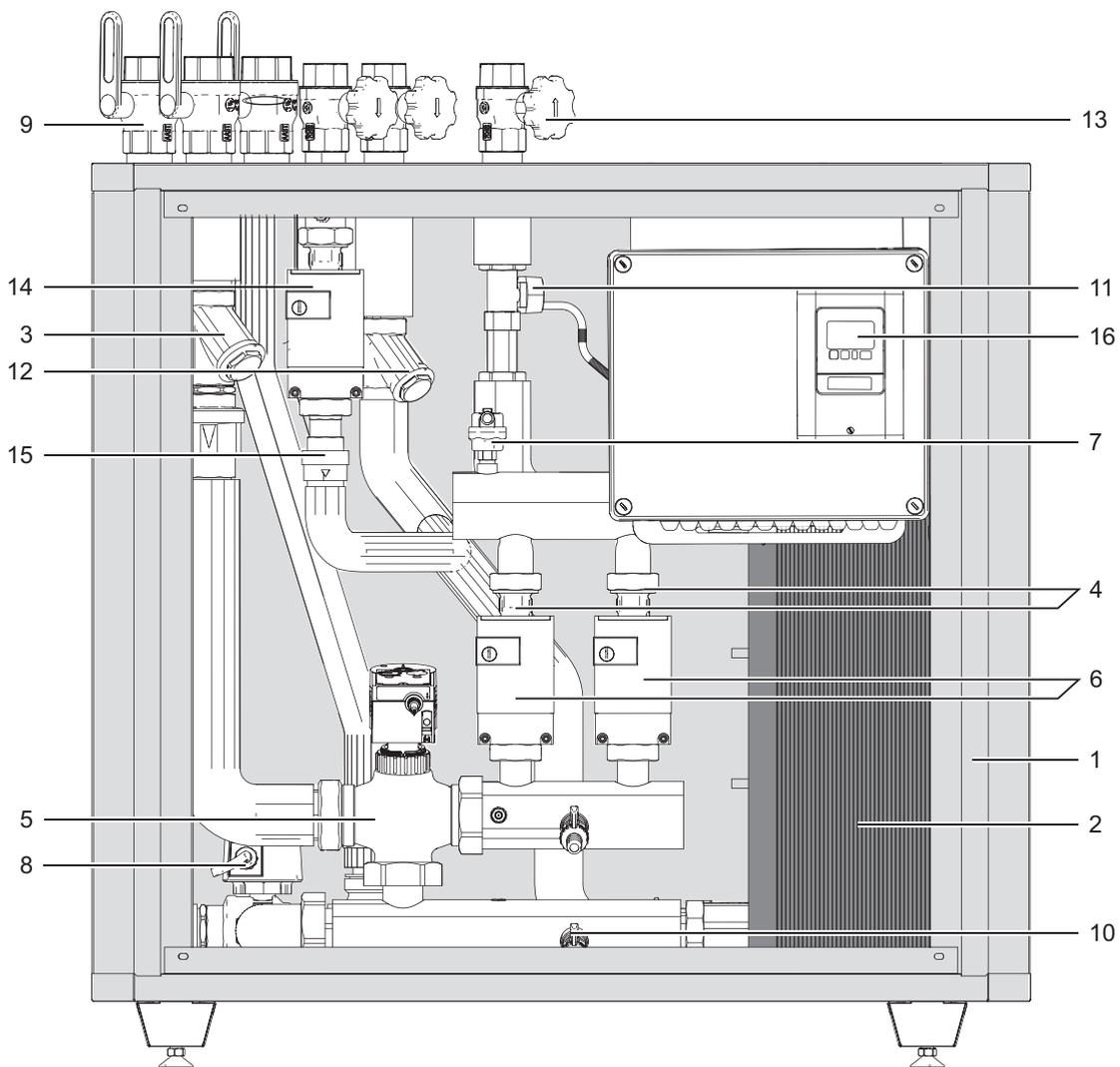


Installation, connections and testing must be done by qualified staff who works in accordance with the standards and follows the instruction manual. All piping should be insulated in accordance with the law.

It is essential to respect the following precautions when using the product:

- Do not touch hot parts of the product such as the water inlet and outlet pipes. Contact with hot parts can cause painful burns.
- Do not splash water or any other liquid over the product.
- Do not rest any objects on top of the product.
- Do not expose the product to steam from a cooking hob.
- Do not allow children or inexperienced persons to operate the product.
- Do not touch the product when barefoot or wet.
- Do not pull on the electrical cables.
- Wear protective gloves and safety shoes before handling the product.
- Before carrying out components, empty the water from the system and close the shut-off valves.

MAIN COMPONENTS



1 Cabinet in painted steel sheet, ventilation slots for internal electronic components, and inspection access on all four sides

2 AISI 316 stainless steel brazed plate heat exchanger

Primary circuit

3 Filter

4 Non-return valve

5 Primary circuit mixer valve with servomotor (220 V AC, 3 positions)

6 High efficiency modulating pumps (1) and (2) installed in parallel

7 Automatic vent valve

8 Double return diverter valve

9 Primary circuit shut-off ball valve

10 Filling/drain cock, 1/2" M

Secondary circuit

11 Digital flow and temperature meter, 5-100 l/min – 10-200 l/min

12 Filter

13 Anti-pressure surge ball valve

14 Circulation pump

15 Non-return valve

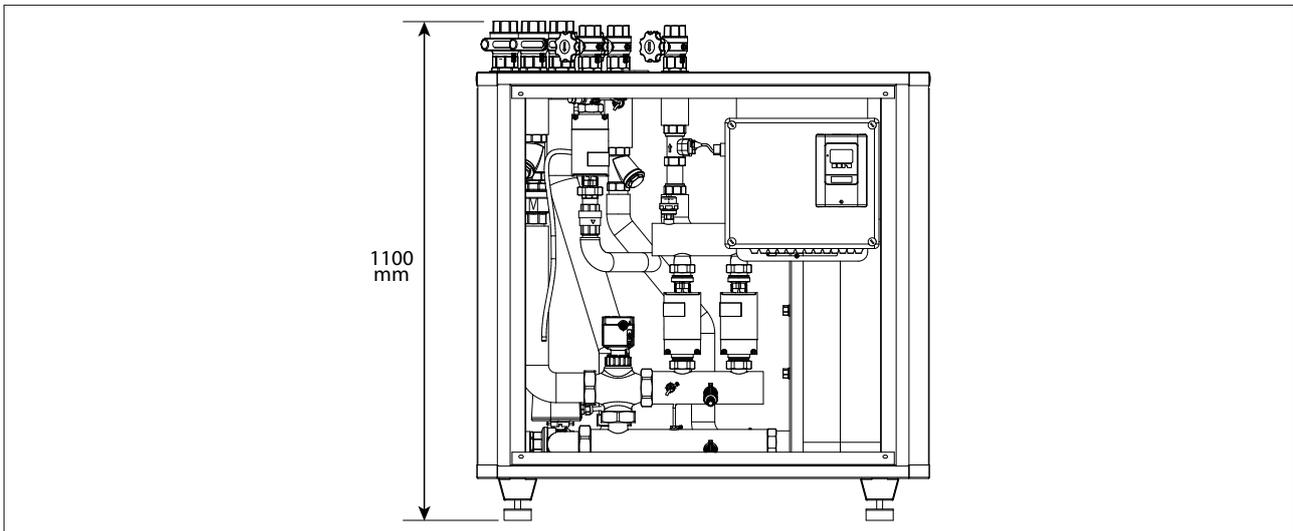
Electric control panel

16 Main switch; controller.

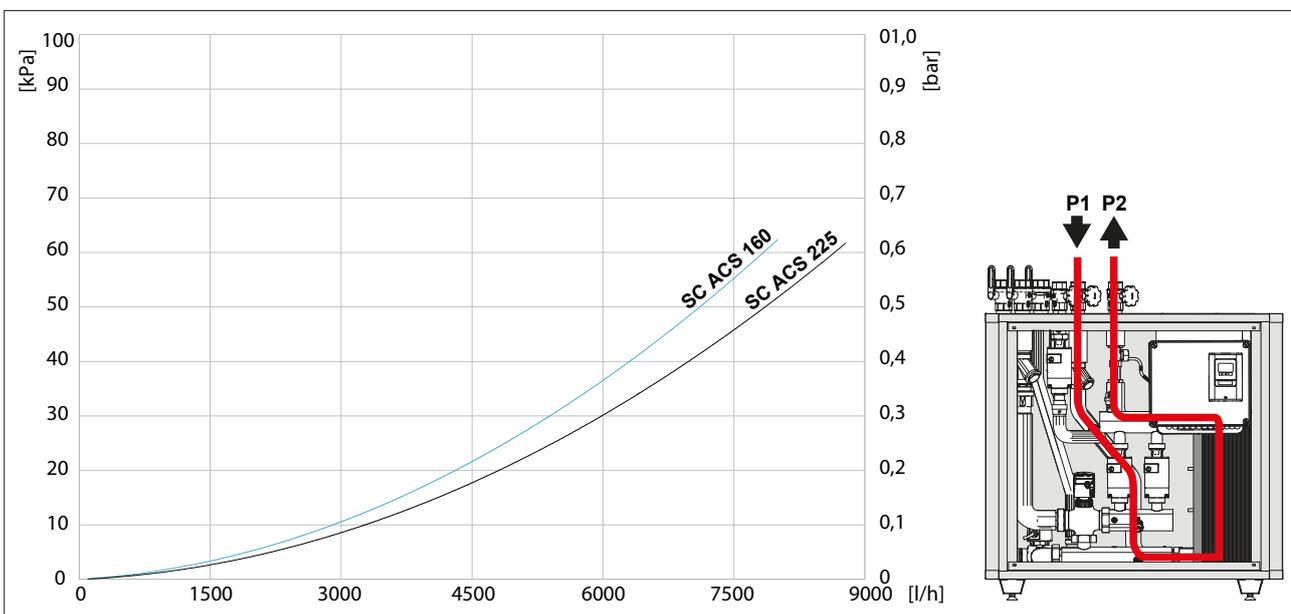
TECHNICAL SPECIFICATIONS

DESCRIPTION		SC ACS 160	SC ACS 225	
DHW Flow (min-max)		10÷200	10÷200	l/min
DHW production	T prim. 55°C - ΔT sec. 10÷45°C	100	150	l/min
	T prim. 60°C - ΔT sec. 10÷45°C	135	187	l/min
	T prim. 65°C - ΔT sec. 10÷45°C	165	220	l/min
Maximum flow-rate primary		8000	10500	l/h
Maximum power exchanged		403	537	kW
Maximum secondary flow rate		225	225	l/min
Maximum operating temperature		90	90	°C
Maximum operating pressure, primary circuit		10	10	bar
Maximum operating pressure, secondary circuit		10	10	bar
Consumption		410	770	W
Power supply voltage		230	230	V
Index of protection		40	40	IP
Primary circuit pumps		Wilo STRATOS PARA 25/1-8	Wilo STRATOS PARA 25/1-12	
Overall dimensions (b x h x p)		900 x 1000 x 500		mm
Overall dimensions (b x h x p)		1050 x 1225 x 580		mm

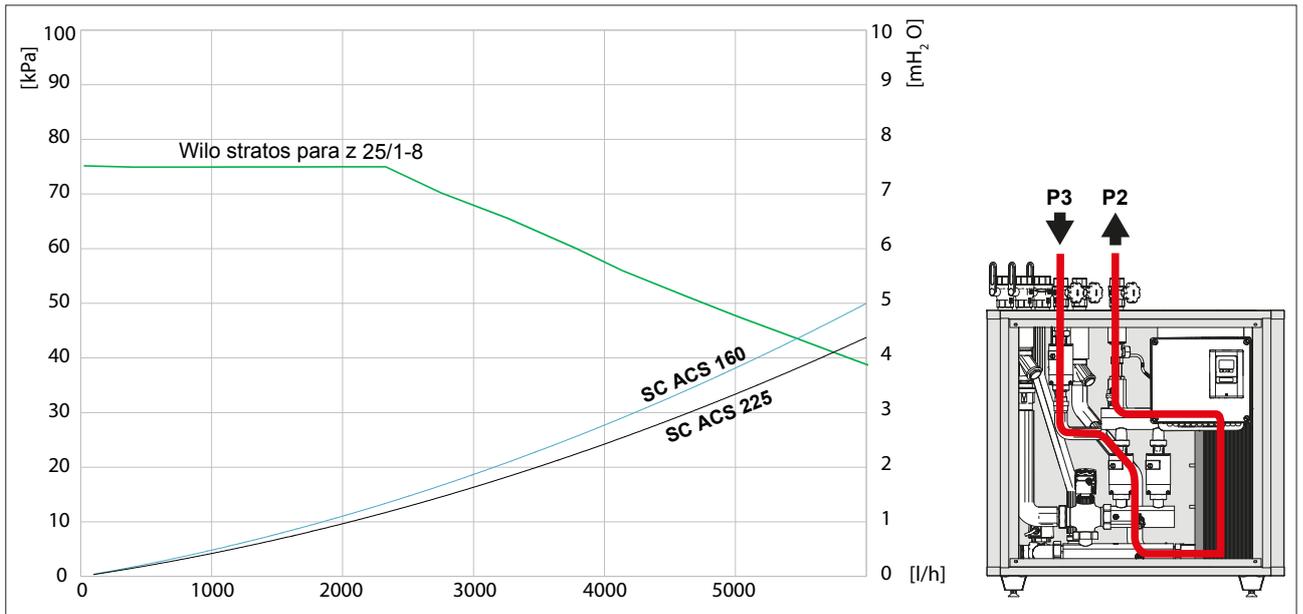
Height with external tubes SC ACS 160 - SC ACS 225



SECONDARY CIRCUIT PRESSURE LOSS P1-P2

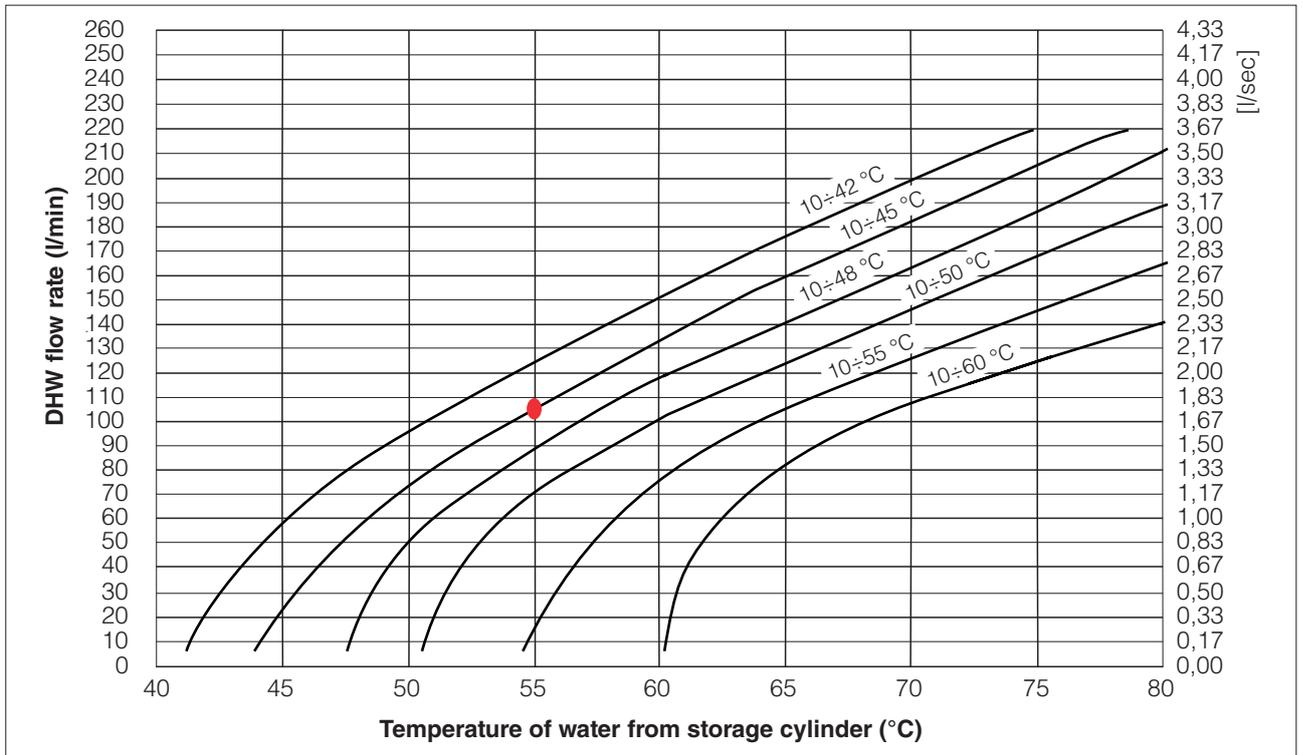


DHW RETURN PRESSURE LOSS P3-P2

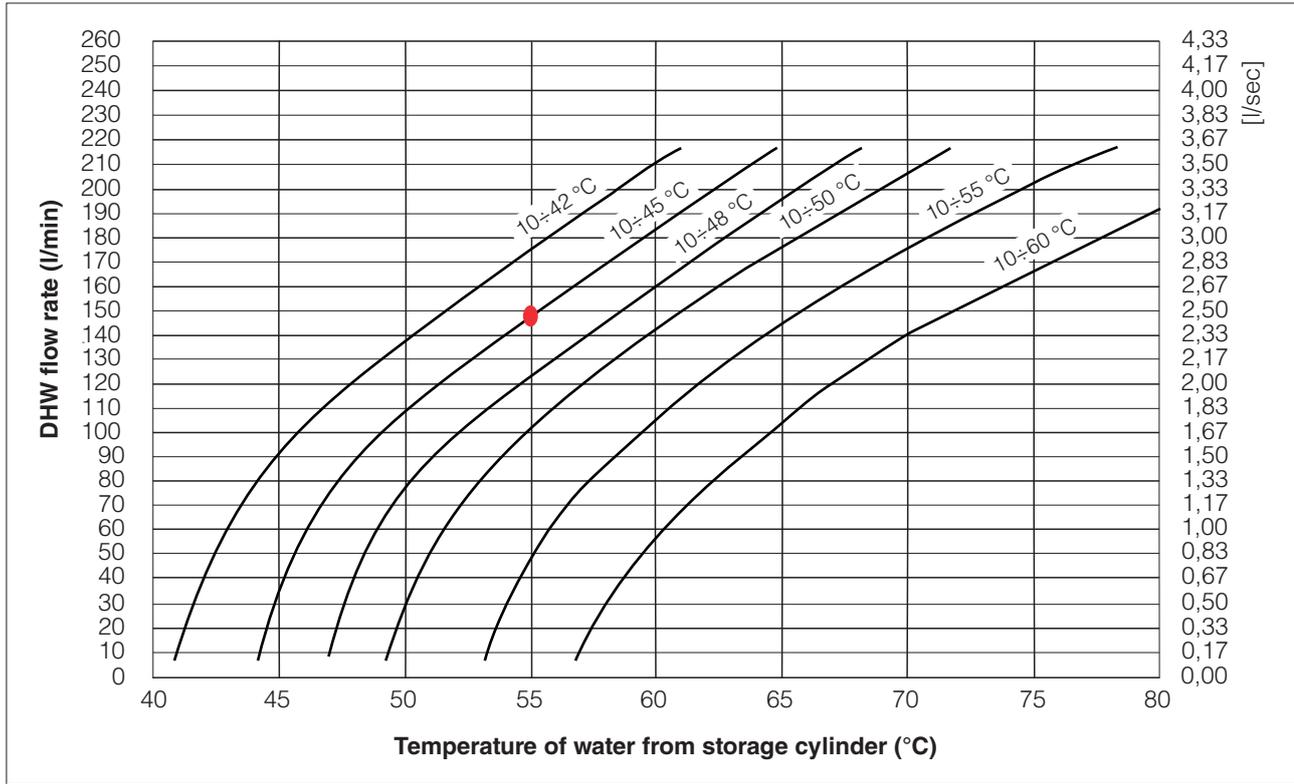


PERFORMANCE CHARTS

SC ACS 160

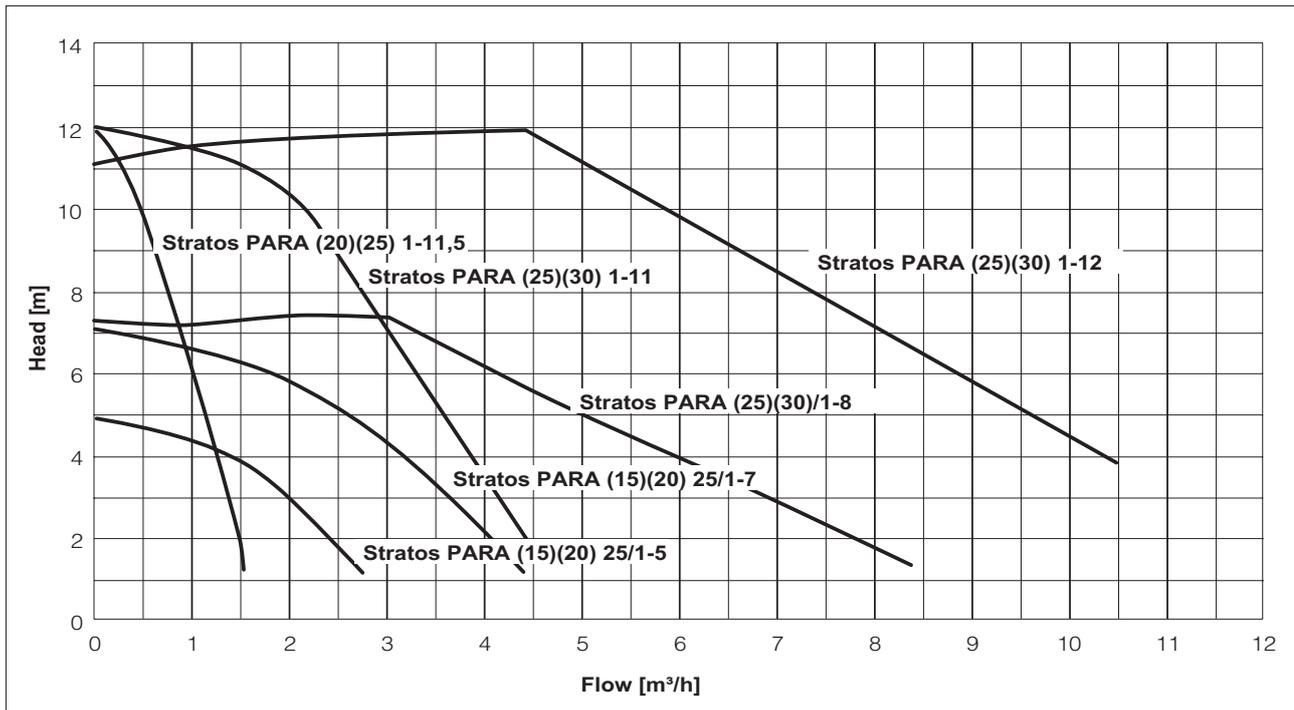


SC ACS 225

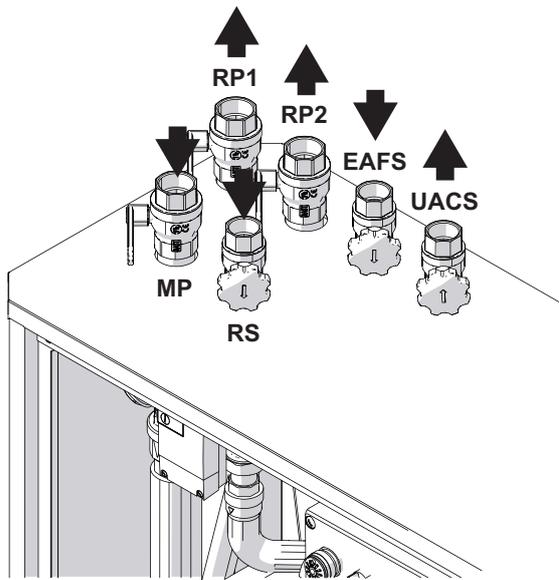


NB: The proper working of the module is assured if the supply temperature of the primary circuit is at least 3°C greater than the DHW temperature set.

PRIMARY CIRCUIT PUMP CHARACTERISTICS



DIMENSIONS AND FITTINGS

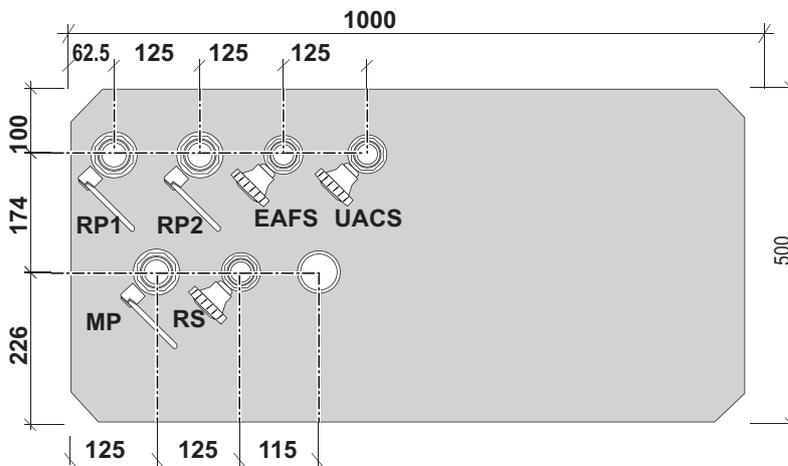


	SC ACS 160-225
RP1 Primary outlet 1 (bottom of storage cylinder)	1 1/2"
RP2 Primary outlet 2 (middle of storage cylinder)	1 1/2"
MP Primary inlet	1 1/2"
RS DHW circulation inlet	1 1/4"
EAFS Domestic cold water inlet	1 1/4"
UACS Domestic hot water outlet	1 1/4"

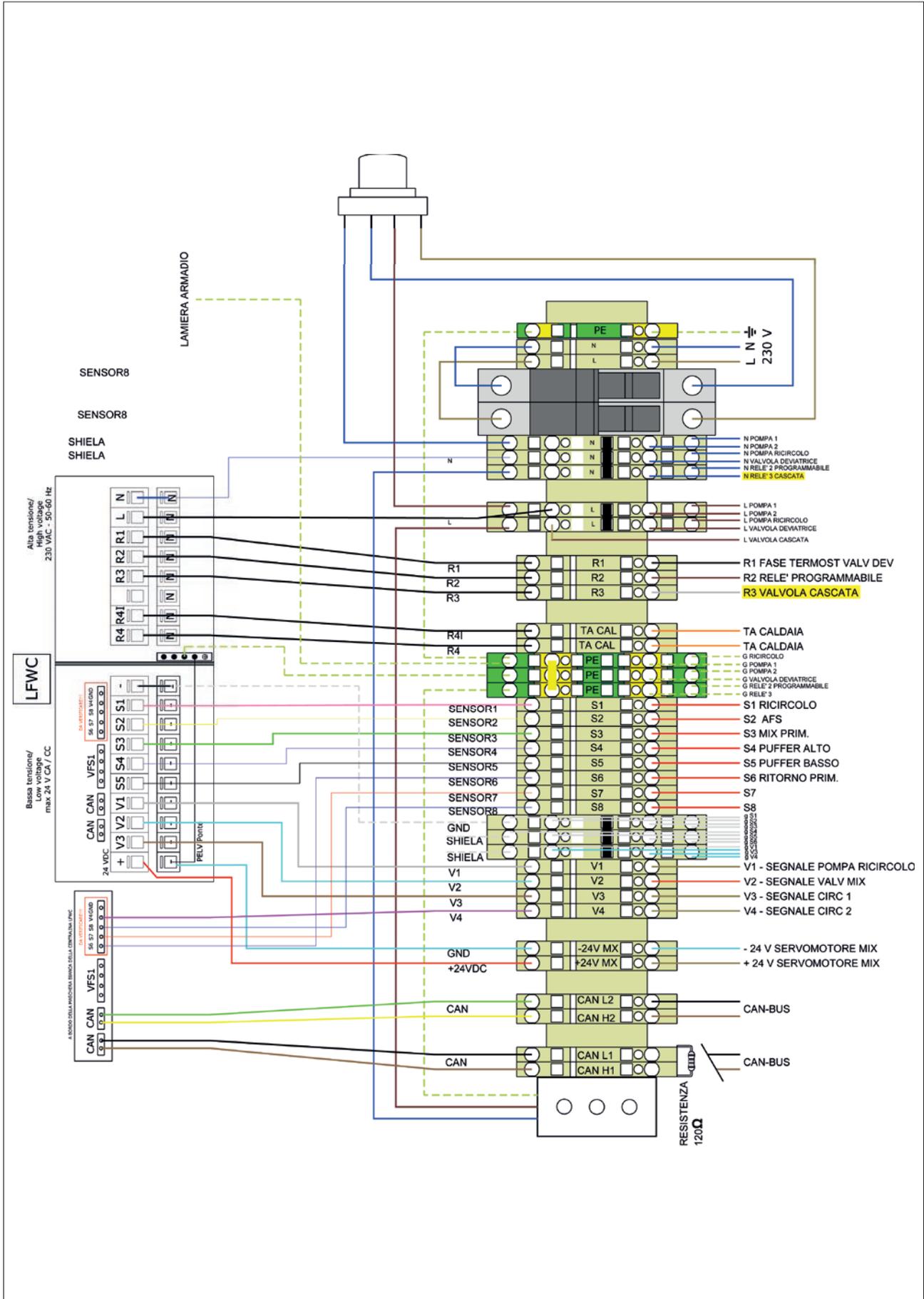
Dimensions:

Height	1140 mm
Width	1000 mm
Depth	500 mm

Install the unit with at least 50 cm free access all around it to permit inspection and maintenance.



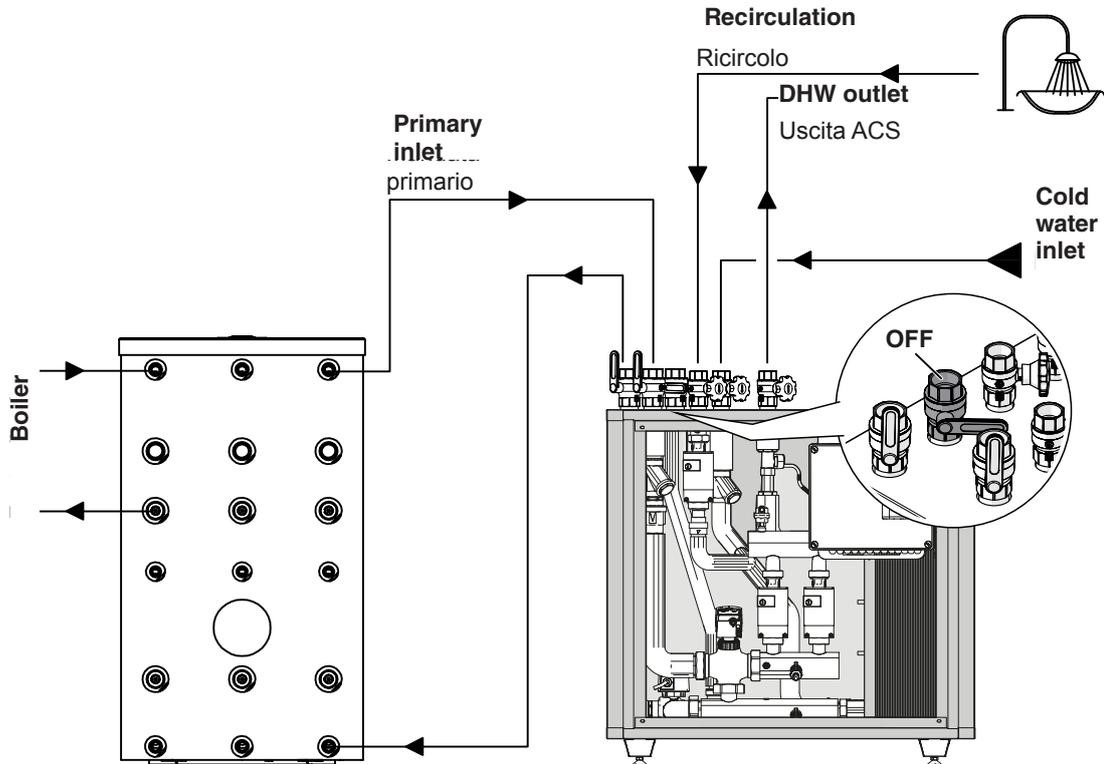
WIRING DIAGRAM



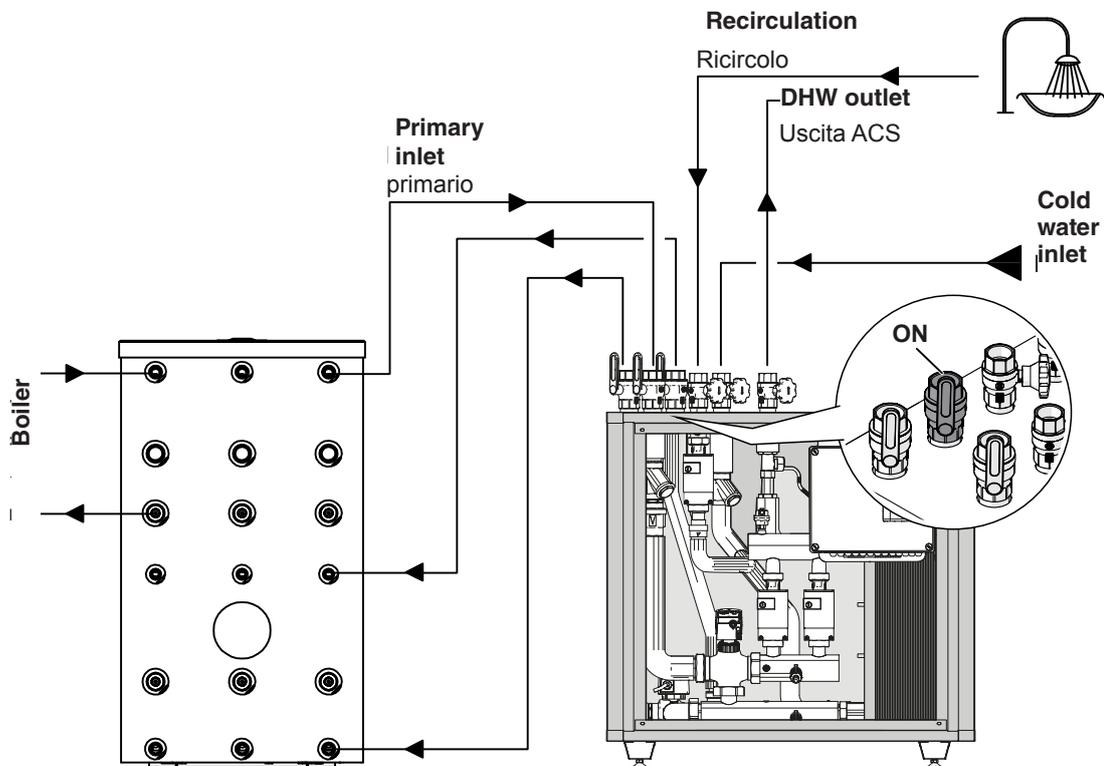
ENGLISH

SYSTEM SCHEMATIC

Single return variant

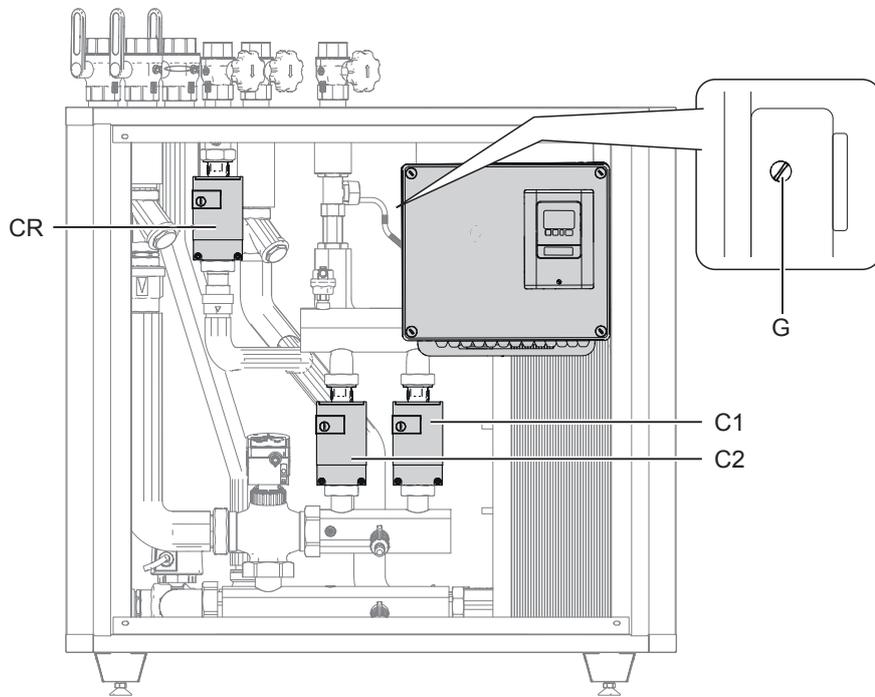


Double return variant



CONTROL PANEL

- The controller incorporates an illuminated display with a synoptic that identifies the unit's active functions and instant temperatures.
- In the event of a malfunction in either of the DHW pumps, the unit automatically adjusts itself to deliver up to 60% of the hot water requested.
- The unit is designed to make replacement of the controller as easy as possible. The controller is located inside the IP55 electrical control panel.



Legend

- G Main switch
- C1 Pump 1
- C2 Pump 2
- CR Circulation pump

INSTALLATION

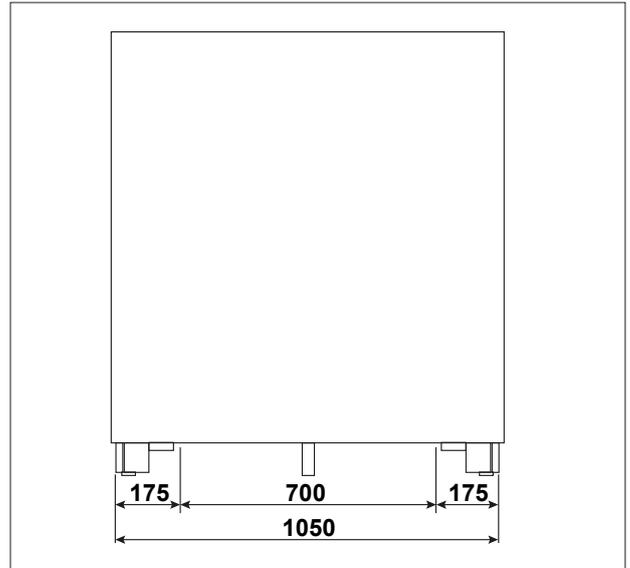
HANDLING

The customer is responsible for providing suitable equipment for unloading and moving the unit, for checking the number of pieces delivered and for verifying the integrity of all material.

The unit is delivered on a pallet. Use a pallet jack or forklift truck to move the unit. Make sure that the load is perfectly secure in order to avoid the risk of tipping presented by the unit's weight distribution and high centre of gravity.

Take care to avoid impacts. Move the unit to its place of installation before removing the packing.

-  It is strictly necessary to keep a distance of 175 mm from the short sides of the pallet (as shown in the figure) in order to avoid possible damage to the product.



PRELIMINARY CHECKS

First of all, carefully remove the outer packing, then:

- Remove the cardboard box, by pulling it upwards.
- Remove the protective nylon sheet.
- Disassemble and remove the protective wooden cage using a lever to remove the staples.
- Separate the mixer from the pallet by loosening the feet (1) and sliding off the bracket (2) securing the mixer to the pallet.

Check that the unit is complete and undamaged. If any defect or damage is detected, do not install or attempt to repair the product but return it to the retailer.

Dispose of packaging in compliance with applicable law.

-  The product is supplied by the manufacturer completely screwed. The transport or a long stock may not grant the seal. Please check the seal before the filling of the system.

-  Make sure that the installation position provides easy visibility of and access to the safety valves.

-  Connect the safety valves to a drain in conformity to applicable standards.

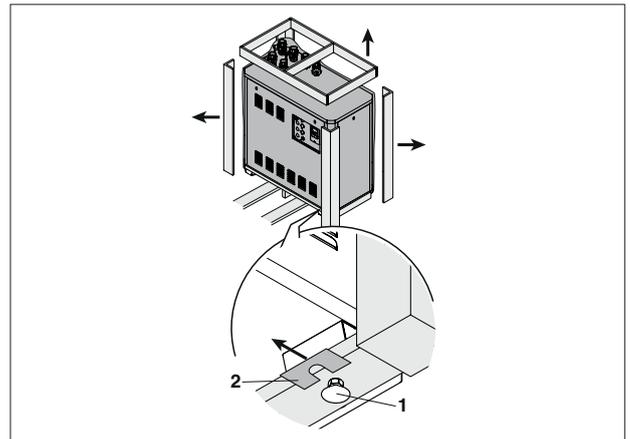
-  Install the product as near as practical to the storage cylinder.

-  Disconnect the product from the mains power supply before commencing any work on it.

-  The product must be installed in conformity to the laws and standards applicable in the country of installation.

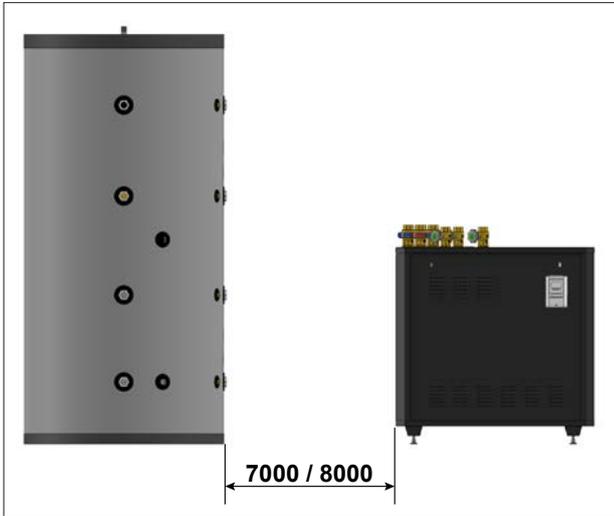
-  The manufacturer's responsibility ends with the supply of the product. The product must be installed in accordance with industry standards by suitably qualified persons working for a company that will assume full responsibility for the completed installation.

INSTALLATION AND PUTTING INTO SERVICE

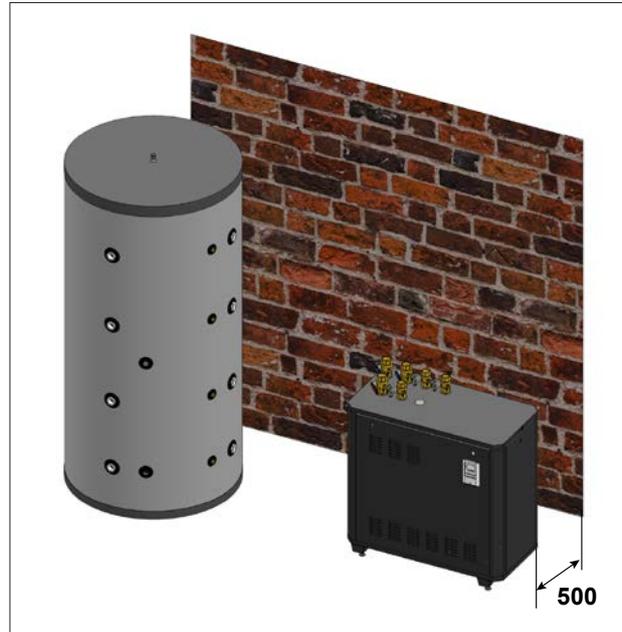


POSITIONING

-  The distance of the module from the storage cylinder must be at maximum 7/8 m.



-  The distance of the module from wall must be at minimum 0,5 m.



Bear in mind the following before installing the product:

- The product is designed to mix domestic hot water from a storage cylinder. Any other use, or any use incompatible with the product's technical specifications, is considered improper.
- Do not connect the product directly to a boiler, it already includes a self-sufficient regulation.
- The product is not designed to be operated by children or persons with limited physical, psychological, sensorial or mental capacities.
- If the piping needed to connect the product to the water system is damaged, it must be replaced by a suitably qualified person.
- The installation must comply with all applicable laws and standards.

-  Installation and connection of the product must be performed by an authorised, specialist company. The company installing the product assumes all responsibility for ensuring that the installation and functioning of the product conform to applicable standards.

-  The product must be stored in a dry place where it is not subject to frost. The product must be installed where it is protected against splashes of water. Ambient temperature in the place of installation must not exceed 40°C during functioning of the product.

-  It is advisable to install the product as near as practically possible to the storage cylinder, in order to avoid unnecessary heat loss from the connecting pipes. The product must be placed on a surface that is flat and stable, as far as possible, and levelled up by means of the adjustable feet provided.

-  Adjust the feet to level the unit and eliminate all stresses.

-  Connect the system pipes respecting the connections.

-  Tighten the fittings only after having installed all the pipes.

-  Avoid the coupling of materials that can create potential differences with consequent electrochemical corrosion.

-  It is absolutely avoid to intervent on the connections already present in the device!

WATER CONNECTIONS

The connection to the sanitary water network must follow the prescriptions of the current legislation.

-  The domestic cold water supply must be fitted with a safety valve conforming to DIN 4753 part 1. The operating pressure of this valve must be equal to the unit's maximum operating pressure.
-  If the pressure of the water supply reaches 10 bar, install a pressure reducer downstream from the water meter.
-  We recommend the installation of a suitably sized potable water expansion vessel.
-  The domestic cold water supply must be fitted with a suitable water filter. Provide an expansion tank, suitably sized, in order to avoid over-pressure due to water hammer and thermal expansion.

In presence of water with hardness above 15° Fr, is prescribed an appropriate treatment of the heating water, in order to avoid limescale problems. It should be noted that even a small quantity of limescale, could reduce the performances of the domestic side.

The materials of construction are in compliance with the Directive 98/83 EC.

Despite the fittings are mounted at the factory, it is advisable to monitor all screw connections. Equally important is to do a pressure test during the operation.

Exceeding above listed limits may cause damages to module and impair warranty terms consequently

-  Values in excess of those specified in the table alongside can damage the product and automatically invalidate the warranty. It is therefore important to analyse the water to ensure that all values are within the limits given in the table.

WATER PARAMETER	UNIT OF MEASURE	MIN/MAX PERMISSIBLE VALUE FOR COPPER-BRAZED HEAT EXCHANGERS
PH		7-9 (indicative of saturation)
Saturation index (delta PH)		-0.2<0<+0.2
Total hardness	°Fr	7-15
Conductivity	µS/cm	10...500
Solid substances	mg/l	<30
Free chlorine	mg/l	<0.5
Hydrogen sulphide	mg/l	<0.05
Ammonia	mg/l	<2
Bicarbonate	mg/l	<300
Bicarbonate/Hydrogen sulphide	mg/l	>1.0
Sulphur	mg/l	<1
Nitrate	mg/l	<100
Nitrite	mg/l	<0.1
Sulphate	mg/l	<100
Manganese	mg/l	<0.1
Dissolved iron	mg/l	<0.2
Free, aggressive carbon dioxide	mg/l	<20

On completion of all transport or handling operations, always check the tightness of the water fitting ring nuts. Take particular care when connecting the unit to the water supply. When tightening a fitting, always hold the opposite fitting steady with a second tool to avoid damage.

Connect up the pipes according to the legend on the unit itself and according to the instructions given in this manual. It is recommended to minimize the length of the connection pipes to the buffer storage.

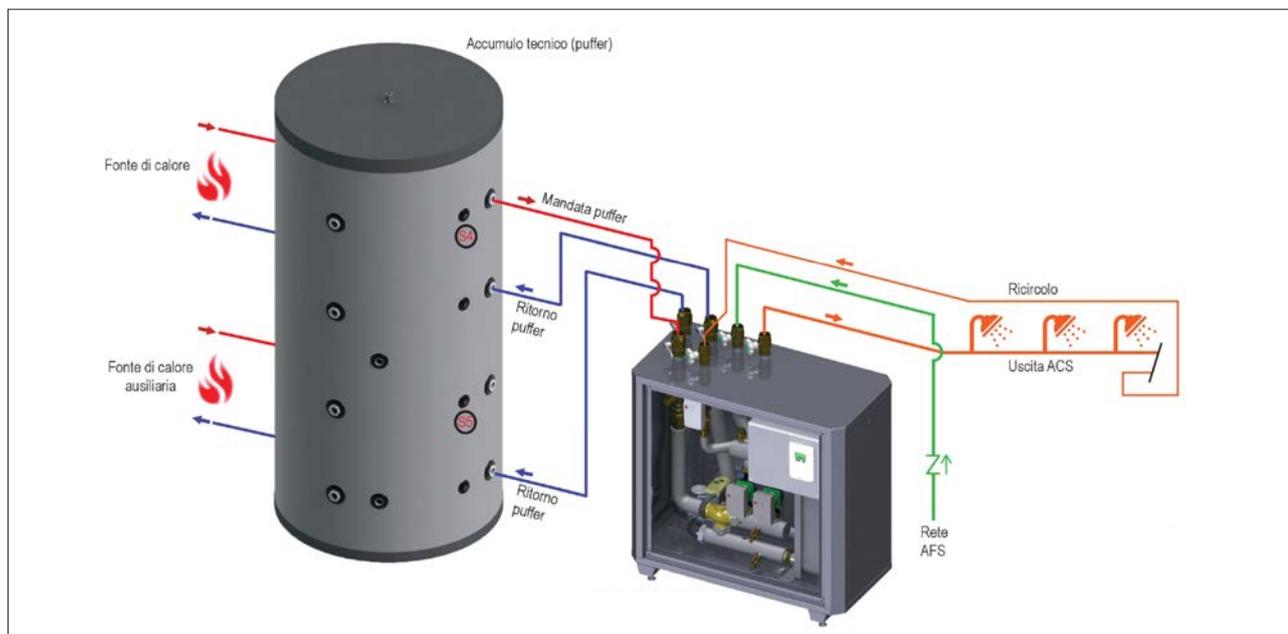
The following materials are recommended for the construction of the piping system: steel or copper for the primary circuit; galvanised steel, copper or hot water compatible plastic for the secondary circuit. Galvanised pipes and fittings must only be used in the secondary (DHW) circuit, and care must be taken to avoid electrochemical corrosion.

-  Do not install the unit in gravity feed hot water systems!
-  Make sure that the installation position provides easy visibility of and access to the safety valves.
-  Connect the safety valves to a drain in conformity to applicable standards.
-  Make sure that no obstacles are present between the safety valve and the unit.
-  The diameter of the drain pipe must not be smaller than that of the safety valve's drain fitting. The drain pipe should be no longer than 2 metres and should have no more than two bends in it. If this length has to be exceeded, increase the diameter of the pipe. Never exceed 4 metres and 3 bends.
-  Do not install filters or other restrictions.
-  Make sure that the pipes are watertight before securing them in place.
-  Check that all threaded fittings on the unit are tightened to the correct tightening torque (in case they have worked loose during transport).
-  Make sure that the unit is disconnected from the mains power supply before opening the casing of the control panel!

SAFETY WARNINGS

-  The unit can become hot enough to cause burns if touched.
-  In the event of a power failure, the motorised control valve could remain in the open position, causing the whole system to become hot enough to cause burns if touched.
-  Water in the unit can be very hot and under pressure. Therefore, before performing any work, always drain the unit and close the shut-off valves on the primary and secondary circuits.
-  The unit must be installed and put into service in strict conformity to all laws and standards applicable in the place of installation, and according to best professional practices.

EXAMPLE OF INSTALLATION



SYSTEM VARIANT WITH SINGLE RETURN TO STORAGE CYLINDER

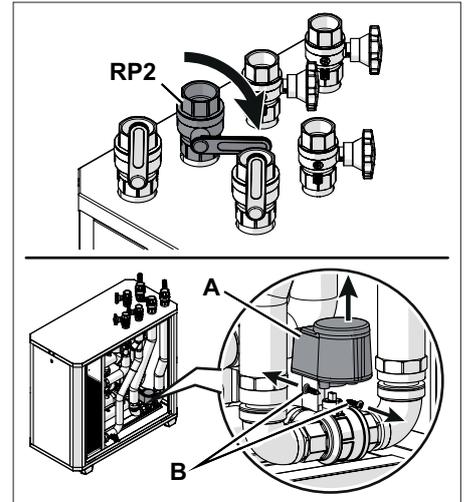
 The following procedure must be completed before putting the system into service.

Proceed as follows to disable the return to the middle of the storage cylinder.

- Close cock RP2 (primary return to middle of storage cylinder);

 We recommend that you screw a 1 ½" M plug into the RP2 fitting.

- Identify the diverter valve with servomotor at the rear of the mixer;
- Loosen the two lock screws with a screwdriver;
- Remove the servomotor by pulling it upwards and place it to the side of the valve.



ELECTRICAL CONNECTIONS

The product must be installed and all electrical connections made by suitably qualified personnel in conformity to applicable standards. The controller's mains power cable must be connected to a fused, two-pole switch (power supply 230 VAC, 50 Hz). The product must be correctly connected to ground.

 The unit must be connected to the mains power supply via an earth leakage breaker in accordance with applicable standards. The manufacturer cannot be held responsible for the consequences of improper uses.

 Electrical connections must only be made by qualified personnel.

 Never under any circumstances dispose of the controller with ordinary household refuse. Dispose of the controller only at designated collection points or return it to the dealer or manufacturer.

 The manufacturer declines all responsibility for damage caused by failing to ground the product adequately or by failure to respect the wiring diagrams provided in this manual.

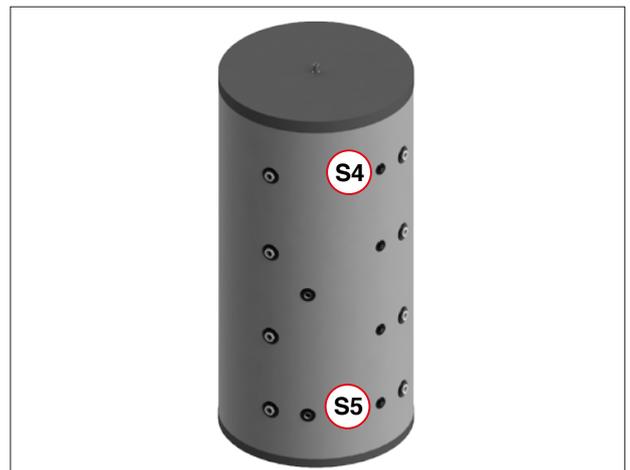
PRIMARY CIRCUIT FILLING PROCEDURE

 Fill and bleed the primary circuit with the water at ambient temperature.

- Set the controller for operation in manual mode (see parameter 4.2).
- Set to ON: R3, V2, V3 and V4 which respectively allow you to open the mixing valve and put it into operation primary side circulators.
- Open the vent valve.
- Pump water around the circuit for 2 minutes.
- Switch on relay R1 to open the storage tank middle valve (double return variant)
- Pump water around the circuit for 2 minutes.
- Close the vent valve.
- Set the controller for operation in automatic mode (see parameter 4.1).

All BIG T-FAST ie versions are supplied with S4 temperature probe (puffer high) already wired to the electrical panel, to be connected to the puffer.

S5 PROBE POSITIONING (ONLY WITH DIVERTER KIT)
If BIG T-FAST ie is equipped with a diverter valve primary return kit, it is necessary to connect S5 probe (low puffer) supplied and already wired to the electrical panel, in the lower part of the puffer.



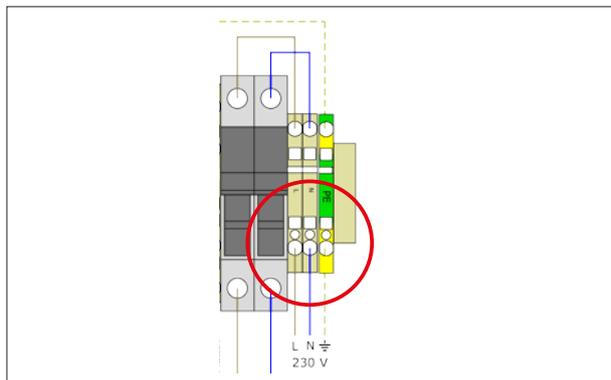
PUTTING INTO SERVICE

- ⚠ Provide electrical protections on the power supply line as per current legislation.

Circuit filling and putting into service must only be done by qualified personnel.

Fill and bleed the primary and secondary circuits and check for leaks before putting the unit into service.

- Check that the ring nuts of all the water fittings are tight.
- Open the cold water and hot water shut-off valves slowly in order to avoid pressure surges.
- Fill the system and check it for water tightness.
- All fittings are assembled in the factory. It is nevertheless advisable to check their tightness after installing the product. It is also necessary to test the product for water tightness at operating pressure when putting it into service.
- Power on the unit.
- Bleed the system as follows:
 - Open a hot water tap near the unit.
 - Bleed the primary (storage cylinder) circuit by means of the vent valve normally located at the highest point in the circuit.
 - Continue until all the air has been bled from the system.



- ⚠ Persistent water circulation noises from the pump indicate that there is still air in the circuit.

- Close the unit's inspection doors.

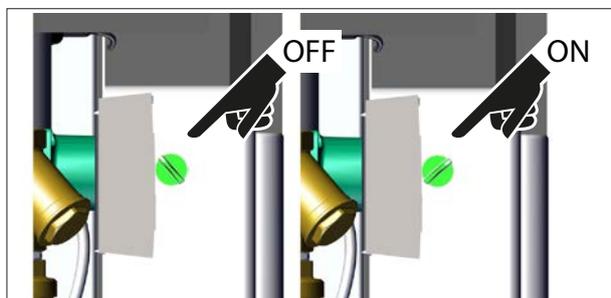
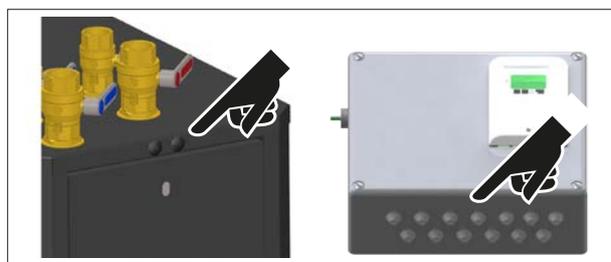
- ⚠ Before starting the product, it is necessary to connect the pre-wired temperature probe S4 to the puffer (see the CONNECTIONS section).

- ⚠ Connect electrically the module to the 230 VAC mains: Use the terminals indicated in the figure.

- It is advisable to pass the power cable through the appropriate holes in the cabinet, and through the cable glands of the electrical panel.

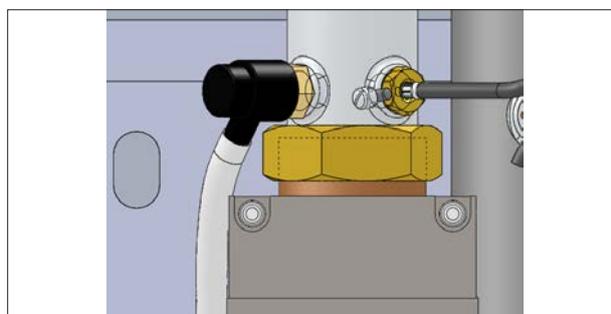
- Proceed with the venting of the primary and recirculation circuits (if presents) as follows:
 - power up the module by activating the selector;

- from the control unit (for more details on the operation of the control unit read the next section carefully);
- access menu 3, OPERATING MODE and press OK, then activate MANUAL FUNCTION in menu 3.2;
- use the <or> selector to move to function V3 (1st primary circulator) and activate by pressing the OK key. Leave the circulator active for at least 20 seconds to eliminate the residual air inside the circuit;
- use the <or> selector to move to function V4 (2nd primary circulator) and repeat the operation as described above;
- repeat the last 2 points at least 2 times for the complete elimination of the air;
- in the presence of a recirculation kit, from the same menu activate V1 (recirculation circulator). Repeat the procedure as above.



The recirculation kit, not as the primary circuit, requires a manual venting operation, by acting on the special valve located above the circulator. The same is connected to a drainage tube. It is advisable to carry out the bleeding operations by slightly opening the valve and using a suitable container to avoid splashing water against the electrical parts of the BIG T-FAST.

- ⚠ The module is unable to fully vent the recirculation circuit, authorized personnel must vent manually all the recirculation branches in the building.



- Exit the manual mode and reactivate the AUTOMATIC FUNCTION.
- The vent on the side of the buffer storage takes place by means of a suitable device located on the rear of the same.
- Set an appropriate adjustment in the control unit (see the next par.).

- ⚠ The connections of the electrical devices inside the module are already made by the manufacturer. The connection to the electrical network must be made using a special cable (not supplied by the manufacturer), following the instructions provided.

- ⚠ Any intervention on the electrical parts of the device must be carried out in compliance with the regulations in force.

USE AND FUNCTIONS OF THE CONTROLLER

EU-Conformity

By affixing the CE mark to the unit the manufacturer declares that the LFWC conforms to the following relevant safety regulations:

- EU low voltage directive 2014/35/EU
- EU electromagnetic compatibility directive 2014/30/EU conforms.

Conformity has been verified and the corresponding documentation and the EU declaration of conformity are kept on file by the manufacturer.

General instructions. Please read carefully!

These installation and operating instructions contain basic instructions and important information regarding safety, installation, commissioning, maintenance and the optimal use of the unit. Therefore these instructions must be read and understood completely by the installation technician/specialist and by the system user before installation, commissioning and operation of the unit.

This unit is an automatic, electrical Fresh Water Controller. Install the unit only in dry areas and under the ambient conditions described in "Specifications".

The valid accident prevention regulations, VDE regulations, the regulations of the local power utility, the applicable DIN-EN standards and the installation and operating instruction of the additional system components must also be observed.

Changes to the Unit

- Changes, additions to or conversion of the unit are not permitted without written permission from the manufacturer.
- It is likewise forbidden to install additional components that have not been tested together with the unit.
- If it becomes clear that safe operation of the unit is no longer possible, for example because of damage to the housing, turn the Unit off immediately.
- Any parts of the unit or accessories that are not in perfect condition must be exchanged immediately.
- Use only original spare parts and accessories from the manufacturer.
- Markings made on the unit at the factory must not be altered, removed or made illegible.
- Only the settings described in these instructions may be set using the Unit.



Changes to the unit can compromise the safety and function of the unit or the entire system.

ABOUT THE CONTROLLER

The Fresh Water Controller LFWC facilitates efficient use and function control of your Fresh water system possible while its handling is intuitive. After every input step the suitable functions are matched to the keys and explained in a text above. In the menu 'measurement values and settings' are help text and graphics in addition to key words.

The LFWC can be used for the various system variants.

Important characteristics of the LFWC are:

- Depiction of graphics and texts using a lit display.
- Simple viewing of the current measurement values.
- Statistics and system monitoring by means of statistical graphics
- Extensive setting menus with explanations.
- Menu block can be activated to prevent unintentional setting changes.
- Resetting to previously selected values or factory settings.

MAIN CHARACTERISTICS:

- PWM output for pump speed control
- Backlit display showing text and graphic content
- Simple viewing of current measurement values
- Analysis and monitoring of the system by means of statistical graphs, etc.
- Extensive setting menus with explanations
- Menu lock: activated to prevent unintentional alteration of settings

CONTROLLER TECHNICAL SPECIFICATIONS

Electrical specifications:

Power supply	100 ... 240VAC, 50 ... 60 Hz		
Power consumption / standby	0,5 W - 2,5 W/ 0,5 W		
Internal fuse	2A slow blow 250V		
Protection Class	IP40 / II		
Sensor inputs	5 + 3 nel box	Pt1000 temperature sensor	-40 °C ... 300 °C
Sensor inputs flow	1	Grundfos Direct Sensor	0 °C-100 °C (-25 °C /120 °C short term) VFS type; in l/min 1 - 12, 2 - 40,

5 - 100, 10 - 200

Mechanical relay	R1 - R4	460VA for AC1 / 460W for AC3
0-10V/PWM output	V1,V2 (0-10V/PWM) V3,V4 (PWM), for 10 k Ω working resistance 1 kHz, level 10 V	

Max. cable length:

Pt1000 sensor	< 10m
Flow sensors	< 3m
CAN	<3m; at> = 3m, a shielded twisted pair cable must be used. Isolate shielding and connect it to the protective conductor of only one of the devices.
0-10V/PWM	< 3m
Mechanical relay	< 10m

Interface:

Fieldbus	CAN
----------	-----

Permissible Ambient Conditions:

for controller operation	0 °C - 40 °C, max. 85 % rel. humidity at 25 °C
for transport/storage	0 °C - 60 °C, no moisture condensation permitted

INSTALLING THE TEMPERATURE SENSORS

The controller operates with Pt1000 temperature sensors which are accurate to 1 °C, ensuring optimal control of system functions.

 If desired, the sensor cables can be extended to a maximum of 30 m using a cable with a cross-section of at least 0.75 mm². Ensure there is no contact resistance! Position the sensor precisely in the area to be measured! Only use immersion, pipe-mounted or flat-mounted sensors suitable for the specific area of application with the appropriate permissible temperature range.

 Low-voltage cables such as temperature sensor cables must be routed separately from mains voltage cables. Feed temperature sensor cables only into the left-hand side of the unit, and mains voltage cables only into the right-hand side.

POSITIONING OF S4 PROBE

They are supplied with S4 temperature probe (high puffer) already wired to the electrical panel, to be connected to the puffer, as shown in fig. 6.

S5 PROBE POSITIONING (ONLY WITH DIVERTER KIT)

If BIG T-FAST ie is equipped with a diverter valve primary return kit, the S5 probe (low puffer) must be connected in supplied and already wired to the electrical panel, in the lower part of the puffer, as shown in fig. 6.

Temperature resistance table for Pt1000 sensors

°C	-20	-10	0	10	20	30	40	50	60	70	80	90	100
Ω	922	961	1000	1039	1077	1116	1155	1194	1232	1270	1308	1347	1385

 The controller must only be installed, put into service, repaired and changed by trained and qualified technical personnel.

 Before the unit can be put into service, the controller must be fitted and default settings programmed by specialist personnel as required by local and national legislation and standards and in accordance with the safety precautions and instructions given in this manual.

 Specialist personnel working on the controller must read this manual before proceeding.

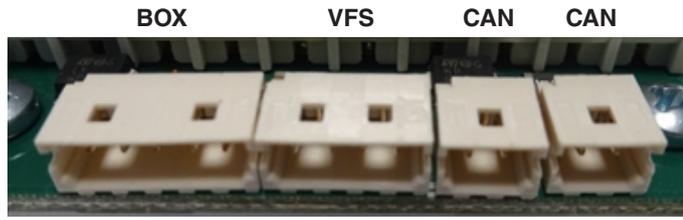
 The controller requires no special maintenance.

 Read and understand all the precautions and instructions contained in this manual before operating the controller. Take care to follow all the safety precautions. If in doubt, consult a specialist.

 The product is not designed to be operated by children or persons with limited physical, psychological, sensorial or mental capacities. If such persons are allowed to operate the product, they must be instructed and supervised by a person responsible for their safety.

 Make sure that children never play with the unit.

ON THE CONTROLLER



CAN		CAN		VVX		BOX	
1	CAN high	1	CAN high	4	+ Power supply	5	S6 Storage transfer
2	CAN low	2	CAN low	3	GND	4	S7 Solar
				2	l/min	3	S8 not used (optionally)
				1	Temp. °C	2	V4 additional pump PWM signal
						1	GND

DISPLAY AND PROGRAMMING

With its clear graphic and text interface, the display (1) provides intuitive guidance on the operation of the controller.

The LED (2) lights up green when a relay is switched on. The LED (2) lights up red when operating mode „Off“ is set. The LED (2) flashes quickly red when an error is present.

Entries are made using 4 keys (3+4), to which contextual functions are assigned. The "esc" key (3) is used to cancel an entry or to exit a menu. If applicable, a request for confirmation appears to save the made changes.

The function of the other 3 keys (4) is shown in the display right above the keys. The right-hand key generally has a confirmation and selection function.

Examples of key functions:

- +/- = increase/decrease values
- ↑/↓ = scroll menu up/down
- Yes/no = agree / reject
- About = further information
- Back = to the previous display
- Ok = confirm selection
- Confirm = confirm setting

(1) (2) (3) (4)

- Pump (rotates when active)
- Mixer (black when active)
- Valve (direction of flow black)
- Flow sensor
- Thermostat
- Collector
- Storage / buffer
- Hot water storage tank
- Temperature Sensors
- Heat exchanger
- Cascade

Further symbols can be found in the special functions.

MENU SEQUENCE AND MENU STRUCTURE

Schematic or overview mode will appear if no key is pressed for a period of 2 minutes, or if "esc" is pressed to exit the main menu.

64°C 123.7kW
50l/min
100% 60°C
73°C 19°C 10°C
+3.9°C

Exit main menu
1. Measurements
2. Statistics
OK

esc

Pressing any key in schematic or overview mode, the main menu reappears. The following menus are available:

1. Measured values	Measured sensor values
2. Statistics	Operating hours counters
3. Display mode	Selection of schematic mode or overview mode
4. Operating mode	Automatic mode, manual mode, or controller Off
5. Settings	Management of parameters required for normal operation
6. Special functions	Program selection, sensor calibration, clock, additional sensor, etc.
7. Menu lock	Lock entry against unintentional changes at critical points
8. Service data	Operating values
9. Language	Language selection

SETUP WIZARD

The first time the controller is switched on, once the language and the clock are set, a prompt will appear asking whether or not the setup wizard is required. The wizard can be called up again at a later time if needed, from the special functions menu. The wizard will guide the user through the basic settings in the correct sequence, providing a brief description of each parameter displayed. Pressing "esc" once, the screen returns to the previous value, so that it is always possible to go back or make changes. Pressing "esc" repeatedly, the steps of the selection procedure can be undone one by one, without confirming the wizard input. Finally, accessing parameter 4.2 and selecting "Manual" mode, the installer can test the various outputs with the components connected, and verify whether or not the readings from the sensors are reliable. This done, automatic mode can be re-activated.



Observe the indications for individual parameters given on the following pages, and check whether or not further settings are needed for the particular application.

Setup wizard

The setup wizard can be accessed in menu 6.18. at any time.

1. Set language and time
2. Commissioning help / setup wizard
 - a) select or
 - b) skip

The setup wizard guides through the necessary basic settings in the correct order. Jeder Parameter wird im Reglerdisplay. Pressing the "esc" key takes you back to the previous setting.

Free programming

With free commissioning the settings should be made in the following order:

- Menu 9. Language
- Menu 3. Operating hours
- Menu 4. Settings, all values
- Menu 5. Protection Functions (if any adjustments necessary).
- Menu 6. Special Functions (if any adjustments necessary).

In menu operating mode "3.2. Manual", test the switch outputs with the consumers connected and check the sensor values for plausibility. Then set to automatic mode.



Observe the indications for individual parameters given on the following pages, and check whether or not further settings are needed for the particular application.

CALIBRATION OF TAP SUPPORT

If the tap support is switched on in the circulation menu or in the commissioning assistant, a calibration is automatically started after the commissioning help, which is repeated once a week (Sunday at 03:00 o' clock) if not tapped. If the weekly calibration is not completed successfully after 10 minutes, it will be cancelled automatically and the controller continues to work with the "old" values. During commissioning, the calibration must not be interrupted.

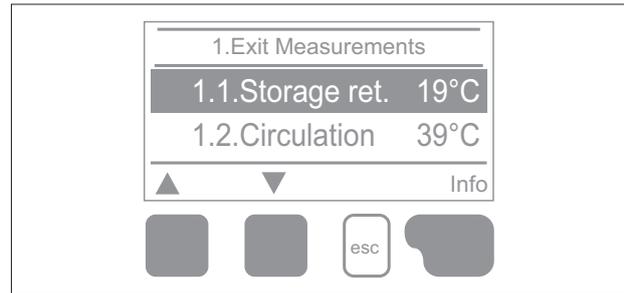
Calibration procedure:

During the calibration process a text is shown that the flow rate is measured and no tapping is allowed. After confirmation the circulation pump is switched off and the controller is waiting until the flow rate has dropped to 0 L/min. Afterwards only the circulation pump is switched on and after another 60 seconds the flow rate is measured. The display shows a "Please wait" sign. After another minute, the flow rate is measured again, and the two flow rates are compared. Then the controller waits another 60 seconds and then compares the measured values. If the results are identical (+- 1L/min), the result is saved. This repeats itself until the values match or the process is interrupted by the maximum runtime of 10 minutes.

MEASUREMENT VALUES

Serve to display the current measured temperatures.

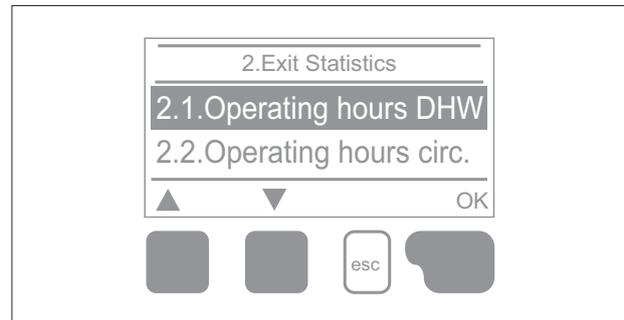
⚠ If ,error' appears on the display instead of the measurement value, there may be a defective or incorrect temperature sensor.



STATISTICS

Serve for function control and long-term monitoring of the system.

⚠ For time-dependent functions such as circulation and anti-legionella and the evaluation of system data, it is essential that the time is accurately set on the controller. Please note that the clock continues to run for about 24 hours if the mains voltage is interrupted, and afterward must be reset. Improper operation or an incorrect time may result in data being cleared, recorded incorrectly or overwritten. The manufacturer accepts no liability for the recorded data!



Operating hours

Display of operating hours of the relays connected to the controller.

Heat quantity

Display of the consumed heat quantity from the system in kWh.
This is an indicative value.

Graphic overview

This results in a clear illustration of the data as a bar graph. Different time ranges are available for comparison. You can page through with the two left keys.

Notifications

Display of the last 20 errors in the system with indication of date and time.

Reset / Clear

Resetting and clearing the selected statistics. Selecting ,all statistics' clears everything except the messages.

3. OPERATING MODE

Auto

The automatic mode is the normal mode of the controller. A correct controller function under consideration of the current temperatures and the set parameters is only present in automatic mode! After an interruption of the mains voltage, the controller automatically returns to the last operating mode selected.

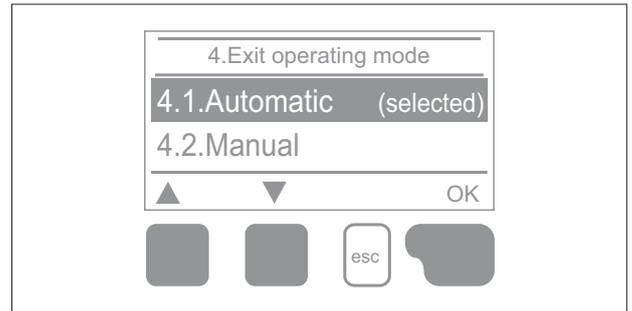
Manual

The individual relay outputs, v outputs and the connected consumers can be checked for proper functioning and correct assignment.

 The operating mode 'Manual' may only be used by specialists for brief function tests, e.g. during commissioning! Function in manual mode: The relays and thus the connected consumers are switched on and off by pressing a key, with no regard to the current temperatures and set parameters. At the same time, the current measurement values of temperature sensors are also shown in the display for the purposes of function control.

Off

 If the operating mode "off" is enabled, all control functions are turned off. The measured temperatures are displayed for the overview.



4. SETTINGS

 By no means does the controller replace the safety appliances on site!

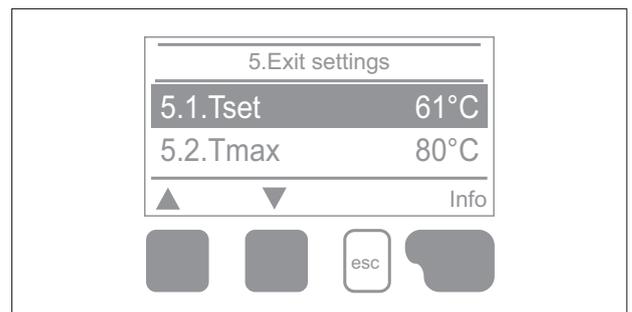
Tset

Setpoint temperature at the flow sensor. The LFWC controller operates on the condition that the hot water temperature/tap temperature measured at the flow sensor is adjusted as quickly as possible and kept constant.

Tmax

Maximum hot water tap temperature measured at the flow sensor. Exceeding this limit will cause the pump to be switched off. If the temperature falls below the set temperature, the pump is released again.

 Temperature values which are set too high can lead to scalding or damage to the system. Scalding protection must be provided by the customer!



Flow sensor

Selection of the flow sensor.

Circulation

If the circulation has been selected and activated in the menu Special functions/Signal V2, the following settings can be made: See "Circulation" on page 17

Storage Heating

See "Storage Heating" on page 18

Additional Pump

See "Additional Pump" on page 18

Solar

See "Solar" on page 19

Comfort

If the comfort function is activated, the primary pump rinses through the heat exchanger every 15 minutes for 5 seconds, so that hot water is available as fast as possible during the tapping process.

PROTECTIVE FUNCTIONS

The 'Protective functions' can be used by specialists to activate and set various protective functions.

 By no means does the controller replace the safety appliances on site!

Anti Legionella

With the help of the anti legionella function (hereinafter referred to as: "AL", the system can be heated up at selected times in order to free it of legionella.

In the delivery state, the anti legionella function is switched off.

As soon as it has heated up with "AL" turned on, information with the date will be shown in the display.

This anti legionella function does not offer any secure protection against legionella, because the controller requires an adequate added amount of energy and the temperatures cannot be monitored in the entire storage area and the connected pipe system.

During the operation of the anti legionella function, if applicable, the storage is heated above the set value "Tmax", which may lead to scalding and system damage.

Limescale Protection

To prevent the accumulation of limescale, the circulation pump can continue to rinse the heat exchanger after a tapping for max. 30 seconds or till the hot water sensor drops below Tset.

Discharge protection

This protection function is for the case that the necessary primary temperature cannot be guaranteed at all times.

When no storage sensor is connected:

If the setpoint temperature is not reached after 60 seconds, the currently measured temperature -3°C is used as new setpoint temperature.

Once the pump in the primary circuit stops, the setpoint temperature is raised to the set Tset again.

When the storage sensor is connected:

If the temperature at the storage sensor is smaller than Tset -5°C, the target temperature is lowered to the currently measured storage temperature -5°C.

In both cases, Circ. Tmin is set to the new setpoint - Circ. Hysteresis -5 K. Here too, the newly calculated value for Circ. Tmin will not be lower than 0 °C, and not higher than the set circ. Tmin.

Seizing Protection

If the anti-seizing protection is activated (daily, weekly, off), the controller switches the heat pump and the mixer on/off at 12:00 noon for 5 seconds to prevent seizing of the pump/valve after long periods of inactivity.

6. SPECIAL FUNCTIONS

Used to set basic items and expanded functions.

 The settings in this menu should only be changed by a specialist.

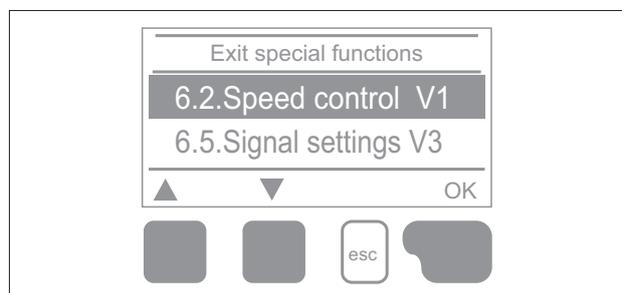
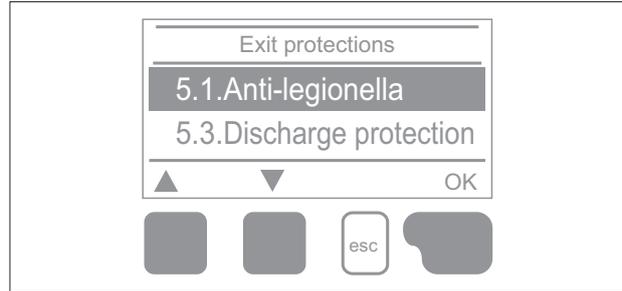
Press "esc" or select "Exit special functions" to exit the menu.

Speed control

 If the speed control is activated, itLFWC offers the possibility through a special internal electronic system to change the speed of pumps depending on the process. To run analyses on system data, time must be set correctly in the controller. The clock will stop and must be reset if power to the controller is cut off for more than about 24 hours. With the exception of the clock, all settings must be entrusted solely to expert service technicians.

Max. Speed

The maximum speed of the pump is determined here in %. During the setting, the pump runs in the respective speed and the flow can be determined.



Min. Speed

The minimum speed of the pump is determined here. During the setting, the pump runs in the respective speed and the flow can be determined.



The specified percentages are variables, which may deviate more or less strongly depending on the system, pump and pump level. 100% is the maximum possible power of the controller.

Signal Settings

Settings from the 0-10V or the PWM pump can be made in this menu.



When this menu is selected, you may receive a request to save the speed settings.

Type of pump/ Type of signal

The type of speed controlled pump used can be set here.

0-10V: Control of special pumps (e.g. high efficiency pumps) through a 0-10V signal.

PWM: Control of special pumps (e.g. high efficiency pumps) through a PWM signal.

Pump/ Profile

In this menu, the preset profiles for the pump can be selected or under "manual" all settings can be done personally. The settings can still be changed after a profile has been selected.

Output Signal

In this menu, the type of pump is set: heating pumps have the greatest output with a small input signal, solar pumps in contrast have very little output with a small input signal. Solar = normal, heating = inverted.

PWM / 0-10V off

This signal / this voltage is emitted if the pump is turned off (pumps with cable break detection require a minimal voltage / a minimum signal).

PWM / 0-10V on

This voltage / this signal requires the pump in order to turn on and to run at a minimum speed.

PWM / 0-10V max.

With this value, the maximum voltage level / maximum frequency can be specified for the highest speed of the energy saving pump, which is used, for example, during the flushing or manual operation.

Show signal

Represents the set pump signal in a graphic and text overview.

Relay functions for free relays

Free, i.e. in the hydraulic variant unused relays, can be assigned to various additional functions. Every additional function can only be assigned once. All special functions, which function values can be preset and changed also appear in the menu "Settings" as soon as they have been activated or assigned.

In order to change the assignment of a relay, the previously assigned additional function must be switched off.

Please pay special attention to the relay's technical information See " Specifications " on page 5.

Circulation

All required settings for the circulation are done here.

Activate function.



Circulation settings are only available if the "Circulation" function is set under Special functions for relays. (Correctly set by the controller by automatic detection).

Circulation mode of circulation

Continuous operation: The circulation pump is continuously switched on.

Requirement: The circulation pump is switched on as soon as a tapping process is started and remains switched on until the circulation temperature (circulation Tmin + hysteresis) is reached at the circulation sensor.

Time: The circulation pump is switched on when it is released and the circulation temperature falls below the set minimum temperature and remains switched on until the circulation target temperature (circulation Tmin + hysteresis) is reached at the circulation sensor.

Requirement + time: The circulation pump is switched on when it is released and the set minimum circulation temperature is undershot or as soon as a tapping process is started. It remains switched on until the circulation target temperature (circulation Tmin + hysteresis) is reached at the circulation sensor.

Circ. Tmin.

Minimum temperature

If this value is undershot and the circulation is approved or there is a request through a tapping process, the circulation pump is started.

Circ. Hysteresis

Switch-off hysteresis of the circulation pump. If the Circ. Tmin value is exceeded by the value set here, the circulation pump will be shut down.

Circ. max. Flow rate

Maximum flow rate of the circulation pump. The circulation pump is switched off if the flow sensor detects more than the value set here during a tapping process.



This value is set by the calibration.

Circ. Periods

Period where the circulation pump is enabled.

In this menu, the operating times for circulation are selected, whereby 3 periods can be defined for each day of the week and copied to the following days.



The setting value Circ. Period only appears in the menu if the circulation variant "Periods" or "Request+Time" has been selected.



In periods not defined circulation is inactive. The set periods are only used in the operation mode "Time".

Tap support

To ensure a constant temperature even with small amount of tap water, the circulation pump can be used as support pump. Not only does the circulation pump switch on under normal conditions, but also when a small tapping occurs. When a storage sensor is connected, tap support is only switched on when the min. storagetemp is reached at the storage sensor.

Min. Storagetemp

Tap support is deactivated when the storage temperature drops below „Min. Storagetemp“.

Tap support calibration

For information about the function and calibration procedure, See " Calibration of Tap Support " on page 11.

Storage Heating

To heat up the storage on demand, the necessary parameters can be set here. Activate or deactivate function.

Minimum storage temperature

If this value falls below this value at the associated storage sensor outside the enable times for heating, the heating is nevertheless started.

Storage target temperature

If this value falls below this value at the associated storage sensor during the enabling times for heating, the heating is started.

Switch-off hysteresis for storage heating (Sp-Hysteresis)

The storage target temperature is calculated from Tmin or Tset storage at the given operating time plus the hysteresis set here. If the target temperature at the corresponding storage sensor is reached, storage heating is switched off.

Heating times

Enable period for storage heating. In this menu, the operating times for storage heating are selected, whereby 3 periods can be defined for each day of the week and copied to the following days.

Storage stratification

The stratification function switches a valve that directs the return flow either to the central or lower storage zone depending on the temperature.

In this menu, the temperature difference between storage sensor and return flow sensor is set. If the return flow temperature exceeds the storage temperature by the value set here, the system loads into the central storage zone. If no storage sensor is connected, a storage tank temperature of 25 °C is set.

Activate or deactivate function

ΔT return storage

Temperature difference for the storage tank stratification via a zone valve. If the temperature in the primary return flow exceeds the corresponding storage tank temperature by the temperature difference set here, the valve switches on to stratify in the upper storage tank zone. If the temperature drops below this temperature, the valve is switched off again. When no storage sensor is connected, a temperature of 25°C is assumed.

AL-heating

With this function, a relay switches a boiler to anti-legionella mode as needed. The relay switches on when an anti-legionella heating starts. The relay switches off when the AL-heating was completed successfully or if the enable time for the AL-heating is exceeded. Activate or deactivate function.

Error Messages

The relay is switched on if one or several of the set protective functions are activated. This function can be inverted so that the relay is turned on (Duration on) and then turned off again if a protective function is activated.

Error message

Activate or deactivate function

The additional function error message activates the relay for certain events and only deactivates again when the information message to each event was read.

Additional Pump

A second pump in the primary circuit is switched on to support the primary pump. When the measured flow rate exceeds "flow rate on", and if this conditions is met throughout the period "delay", the relay is switched on. Activate or deactivate function.

Flow on

Adjustable flow rate in l/h, at which the additional pump is switched on.

Flow off

Adjustable flow rate in l/h, at which the additional pump is switched off.

Delay

The additional pump is switched on with a delay of the time set here.

Primary Mixer

When this function is activated, water is mixed in the primary circuit by a mixer via the primary return. As a result, less energy is drawn from the storage tank at high storage tank temperatures, depending on the flow rate, since energy is mixed from the return flow.

Primary flow min.

Setpoint temperature at mixing valve at min. flow rate.

Primary flow max.

Setpoint temperature at mixing valve at max. flow rate.

Turn Time

Length of turn time.

Pause Factor

Adjustment of mixer pause time.

Increase

Influence of fast temperature rises.

Solar

This function adds a solar circuit which is controlled by the collector and storage temperature. Switch solar function on or off.

Tmin Collector

Enable/start temperature at sensor X:

If this value on the specified sensor is exceeded and the other conditions are fulfilled, the controller will turn on the affiliated pump or the valve. If the temperature on the sensor falls 5 °C below this value, the pump or the valve will be turned off again.

ΔT Solar

Switch on/switch off temperature difference for sensor X:

If the temperature difference ΔT Solar between the reference sensors is exceeded and the other conditions are fulfilled, the controller will turn on the pump/valve on the corresponding relay. If the temperature difference falls to ΔT Off, the pump/valve will be turned off again.

Tmax Storage

Switch off temperature at sensor X:

If this value is exceeded at the specified sensor, the controller turn off the affiliated pump or the valve. If this value on the sensor is undershot and the other conditions are fulfilled, the controller will turn on the pump or the valve.



Temperature values which are set too high can lead to scalding or damage to the system. Scalding protection must be provided by the customer!

Starting aid

For some solar systems, in particular for vacuum tube collectors, the measurement recording on the collector sensors may be too slow or imprecise, because the sensor is often not on the warmest spot. With an activated starting aid, the following procedure occurs: If the temperature on the collector sensor increases within a minute by the value defined under "increase", the solar circulation pump will be turned on for the set "purging time" so that the medium to be measured is transported to the collector sensor. If there is still no normal switching condition through this, there will be a 5 minute block time for the start wizard function.



This function should only be activated by a technician if problems occur with the measurement recording. Observe in particular the instructions from the collector manufacturer.

The menus "Purging time" and "Increase" are only displayed when the starting aid function is set to "On".

Purging time

If the temperature on the collector sensor increases within a minute by the value defined under "increase", the solar circulation pump will be turned on for the set "purging time" so that the medium to be measured is transported to the collector sensor. If the set ΔT is not reached, a 5-minute circulation pause time for the starting aid function will apply.

Increase

If the temperature at the collector reaches within a minute the value defined, the solar pump is turned on for the duration of the purging time.

System protection

Priority protection function

The system protection should prevent an overheating of the components installed in the system through the forced shut down of the solar circulation pump. Activate or deactivate function

SP Ton/off

If the value "SP Ton" is exceeded at the collector, the pump is switched off after 60 seconds and will not be switched on again, in order to protect the collector e.g. from steam hammering. The pump will only be switched on again, when the collector temperature falls below "SP Toff".

Parallel operation V1/V2

Switches the selected relay in parallel with the 0-10 V / PMW output V1/V2.
Switch parallel operation on, off or inverted.

Delay

The assigned relay switches on the delay set here later than V1/V2.

Follow-up time

The assigned relay switched on for the time set here longer than V1/V2.

Always on

The selected relay is always switched on.
Activate or deactivate "Always on"

 For high-efficiency pumps with 0-10 V / PWM signal input, the power supply can be made via the additional functions "always on" or "parallel operation V1/V2" on relays.

Settings of the cascade function

Activation of the cascade function

The controller of the cascade for fresh water systems is a special function that is activated via the hidden menu.

 In order to access the cascade function in the menu, press the ESC button for 10 seconds upon switching on. Upon the next powering on the function will remain visible when it was activated.

 For cascade mode, all controllers of the cascade must be connected using the supplied CAN bus cable. For this purpose, the controllers are looped, i.e. serial connection from one controller to the next with a terminator linked at the beginning (1.controller) and at the end (2. controller).

Activating the function

The cascade function is activated by assigning a free relay within the special functions to the cascade.

 There must always be one relay assigned, even if there is no shift valve connected to this relay for the cascade; this may be the case if the cascade is operating with a fixed base station.

Select a free relay in the menu "Special functions" and confirm the cascade function, e.g. relay 3. When this function is activated, all the required parameters can be set.

Fixed base station

If the cascade operates with a fixed base station, you can set this control as the base. This station will then always be in operation or on standby.

 If a controller has no shutoff valve, nevertheless a relay must be assigned to activate the function. In this controller the setting "fixed base" has to be activated.

DF Station+

Here the upper flow limit is set in % of the DF sensor. If this limit is exceeded, an additional station from the cascade is requested.

 If the currently running station does not reach the set tapping temperature despite 100% speed of the primary pump, a further station is automatically requested!

DF Station-

Here the bottom flow limit is set in % of the flow sensor. If the flow falls below this limit, the station will switch itself off. If it is the base station, this bottom limit will be ignored.

Delay

This parameter sets the delay that will elapse after deactivation or activation of the device before it is activated again or a new request is sent. The value to be set here depends primarily on the run time of the used cascade valves (opening and closing time).

Function description

Situation 1. Switching on a station

Example: Set DF+ Value 70%, flow regulator maximum 40 l/min

If the value measured by the flow controller exceeds 28 l/min the next regulator with a closed valve will be searched in the list. It receives a request to open its valve. If after a set delay the flow is still too high, another station is added. The closing of the valve of the newly added station is being prevented during the set delay.

Situation 2. Switching off a station

Example: Set DF- Value 40%, flow regulator maximum 40 l/min

If the flow sensor detects less than 16 l/min and if this station was not just switched on (delay time pending), the valve is closed.

Process description

The controllers cyclically exchange CAN messages. This ensues at least every 10 seconds. The cycle is shortened when the flow changes or new settings that have to be transmitted are detected. Each controller builds a list of the entire cascade network. The controllers are consecutively numbered. Each controller recognizes the flow rate and the valve status

of all controllers within the network.

The total flow rate is calculated and displayed in each controller next to the icon for the valve.

The sensor values S1 to S6 are exchanged through CAN. First it is verified whether a local sensor is connected and if this is the case, it will be used and its value transmitted through the CAN bus to the connected controller. If not, a value from the CAN bus will be used.

Special features

- 1 The circulation pump is not controlled by the cascade. If there is a circulation pump connected, all the necessary settings must be made using the controller the pump is connected to.



If the fresh water cascade is operated with a circulation pump, the correct hydraulic integration of the circulation pump must be ensured. In such a case the circulation pump must be connected hydraulically outside of the cascade.

- 2 If no fixed base is set, the cascade stations will rotate base operation. The entire duration of each station is recorded in order to ensure an even distribution of operating times.

Signal V2

With this function, the PWM / 0-10 V output 2 can also be used to control an additional high-efficiency pump. If a pump function is activated (e. g. circulation, solar, additional pump,...), additional settings for pump settings V2 and speed control V2 can be set or adjusted. Please pay attention to the technical information for the PWM/0-10V outputs.

Pressure Monitoring

In this menu, the system pressure monitoring can be activated through a direct sensor. Once the set pressure conditions are exceeded, a message is generated and the LED flashes red.

RPS-Type

Type of pressure sensor

In this menu, you can adjust which pressure sensor is being used. Please note: If e.g. VFS1 is connected, RPS1 option is not shown.

Pmin

Minimum pressure. If this pressure is not met, the controller emits an error notification and the red LED flashes.

Pmax

Maximum pressure in the system. If this pressure is exceeded, the controller emits an error message and the red LED flashes.

Sensor Calibration

Deviations in the temperature values displayed, for example. due to cables which are too long or sensors which are not positioned optimally can be compensated for manually here. The settings can be made for each individual sensor in steps of 0.5 °C.



Settings are only necessary in special cases at the time of initial commissioning by the specialist. Incorrect measurement values can lead to unpredictable errors.

Commissioning

Starting commissioning help guides you in the correct order through the basic settings necessary for commissioning, and provides brief descriptions of each parameter in the display. Pressing the "esc" key takes you back to the previous value so you can look at the selected setting again or adjust it if desired. Pressing "esc" more than once takes you back to the selection mode, thus cancelling the commissioning help.



May only be started by a specialist during commissioning! Observe the explanations for the individual parameters in these instructions, and check whether further settings are necessary for your application.

Factory Settings

All settings can be reset, returning the controller to its delivery state.



All of the controller's parametrization, statistics, etc. will be lost irrevocably. The controller must then be commissioned once again.

Time & Date

Serve to set the current time and date.

For time-dependent functions such as circulation and anti-legionella and the evaluation of system data, it is essential that

the time is accurately set on the controller. Please note that the clock continues to run for about 24 hours if the mains voltage is interrupted, and afterward must be reset. Improper operation or an incorrect time may result in data being cleared, recorded incorrectly or overwritten. The manufacturer accepts no liability for the recorded data!

Daylight saving time

If this function is activated, the controller automatically changes to winter time or summer time (DST, Daylight Savings Time).

Eco Display Mode

In Eco Display Mode the backlight of the display is switched off if no buttons are pushed for 2 minutes.



If a message exists, the backlight does not switch off until the message has been scanned by the user.

Temperature unit

In this menu you can select between the temperature units °C and °F.

Network

If necessary, the network settings of the connected data logger must be set.

Access Control

This menu lets you give up to 4 users access to the data logger. The users that are registered then have access to the controller or respectively the data logger.

To add a user in the list, select <add user>. Leave the now visible menu open and connect to the address of the connector or respectively the data logger. Your user name is going to appear in this menu and can be selected and confirmed with 'OK'.

Note: You can find the address of the connector or respectively the data logger on the address sticker on the outside of the casing. Pointers and help on how to establish a connection you can find in the enclosed connect instructions or the instructions of the data logger. Select a user with 'OK' to grant access.

To revoke access again, choose one of the users from your list and choose <remove user>.

Ethernet

The data logger's Ethernet connection settings can be set using this menu.

MAC Address

Displays the individual MAC address of the data logger.

Auto-Configuration (DHCP)

If auto-configuration is activated, the data logger requests IP addresses and network parameters from a DHCP server that assigns an IP address, subnet mask, gateway IP and DNS server IP. If you deactivate the auto configuration (DHCP), you will have to make the required network settings manually!

IP-Address

Please refer to the router configuration for the IP address to be set.

Subnet Mask

Please refer to the router configuration for the subnet mask to be set.

Gateway

Please refer to the router configuration for the gateway to be set.

DNS-Server

Please refer to the router configuration for the DNS server to be set.

CAN bus ID

Here you can see the ID of the controller on the CAN bus.

7. MENU LOCK

Secure the controller against unintentional changing and compromise of basic functions.

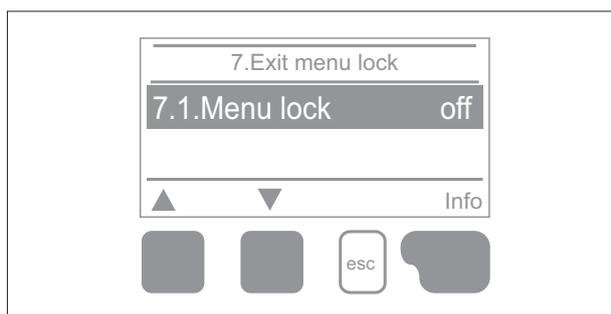
Menu lock active = "On"

Menu lock off = "Off"

In addition, the "Simple" menu view can be used to hide menu items that are not necessary for the daily use of the controller after commissioning. The menu item "Menu lock on/off" is also hidden when the "Simple" menu view is selected!

The menus listed below remain completely accessible despite the menu lock being activated, and can be used to make adjustments if necessary:

1. Measurement values
2. Statistics
4. Settings
6. Special Functions
7. Menu lock
9. Language

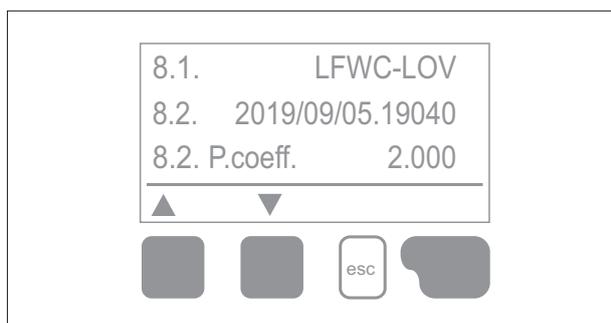


8. SERVICE VALUES

Serve for remote diagnosis by a specialist or the manufacturer in the event of errors, etc.

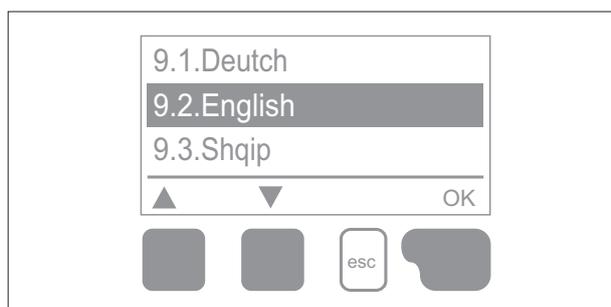


Enter the values into the table when an error occurs.



9. LANGUAGE

To select the menu language. During initial commissioning and longer power interruptions, the query is made automatically.

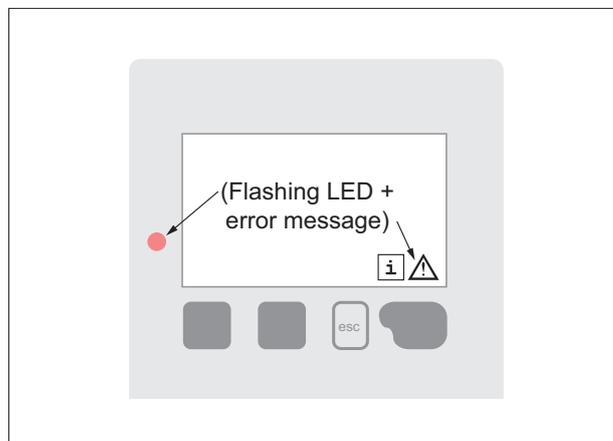


MALFUNCTIONS

MALFUNCTIONS AND ERROR MESSAGES

If the controller detects a problem, the red LED flashes and a warning symbol appears on the display. If the malfunction resolves itself, the warning symbol becomes an information symbol and the red LED stops flashing. To view details of the error, press the key under the warning or information symbol.

 End users must not attempt to resolve malfunctions in person. Always refer malfunctions to specialist personnel!



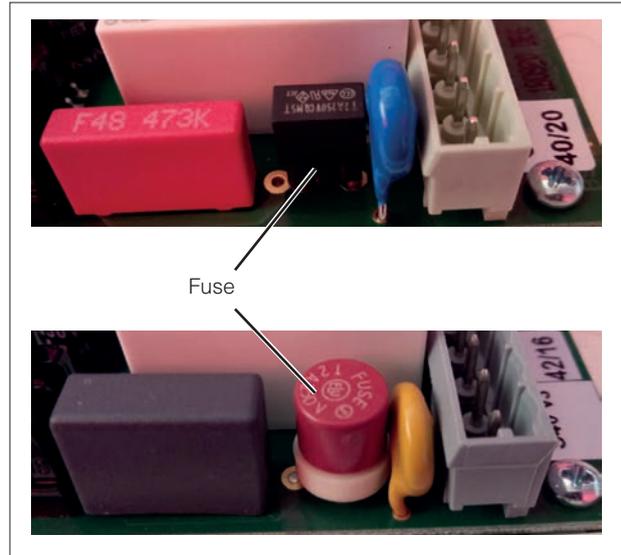
Possible error messages	Note for service personnel
Sensor x defective	Means that either the sensor, sensor entrance on the controller or the connecting wire was defective (See " Temperature Resistance Table for Pt1000 Sensors " on page 9).
Restart	Means that the controller was restarted, for example, due to a power outage. Check date & time!
Time & Date	This display appears automatically after a longer network disruption, because the time & date must be examined and, if applicable, adjusted.
Frequent on / off	A relay was switched on and off more than 5 times within 5 minutes.
Anti-legionella failed	Anti-legionella failed appears if at least anti-legionella Tsoll -5 °C could not be held at the antilegionella sensor for the set exposure time.
Primary pump defect	Is displayed if flow is recognized but Tset is not reached and the flow temperature did not rise up 3 K in 3 seconds. This message may also appear if the heat exchanger is calcified.
Anti-legionella error storage temperature	Is displayed if temperature of storage is lower than anti-legionella Tset.
Anti-legionella residence time	Is displayed if anti-legionella Tset - 5K is not present during the hole anti legionella residence time.
Anti-legionella error tapping	Is displayed if during anti legionella heating the measured flow is bigger than the calibrated circulation flow.
Station of cascade added.	Shown the added station with CAN-ID.
Sensor error cascade	Is shown if one cascade station detects an sensor error.
Cascade Set point undershoot.	Is displayed if Tset for tapping is not reached after 10 seconds while the cascade valve is open. This means a request of another station.

REPLACING THE CONTROLLER FUSE

- ⚠️ Replace the fuse with the one contained into the document envelope.
- ⚠️ Repairs and maintenance may only be performed by a specialist. Before working on the unit, switch off the power supply and secure it against being switched on again! Check for the absence of power!
- ⚠️ Only use the supplied spare fuse or a fuse of the same design with the following specifications: T2A 250V

If the mains voltage is switched on and the controller still does not function or display anything, then the internal device fuse may be defective. In that case, open the device as described under 3.1, remove the old fuse and check it.

Exchange the defective fuse for a new one, locate the external source of the error (e.g. pump) and exchange it. Then first recommission the controller and check the function of the switch outputs in manual mode.



MAINTENANCE

- ⚠️ In the course of the general annual maintenance of your heating system, the functions of the controller should also be checked by a specialist and the settings should be optimized if necessary.

Performing maintenance:

- Check the date and time See " Time & Date " on page 22
- Assess/check plausibility of statistics See " Statistics " on page 12
- Check the error memory See " Notifications " on page 12
- Verify/check plausibility of the current measurement values See " Measurement values " on page 12
- Check the switch outputs/consumers in manual mode See " Manual " on page 13
- Possible optimization of the parameters setting **(only on customers request)**

DEFAULT PARAMETER SETTINGS TABLE

NOTE	MENU DESCRIPTION	DESCRIPTION	SETTINGS RANGE	DEFAULT SC ACS 160	DEFAULT SC ACS 225	NOTE
	4. SETTINGS					
	4.1	T set DHW	30 ÷ 85 °C	45 °C	45 °C	
	4.2	T max DHW	55 ÷ 95 °C	55 °C	55 °C	
	4.13	VFS type	1-12, 1-20, 2-40, 5-100, 10-200, 20-400l /min	10-200 l/min	10-200 l/min	
RECIRCULATION	4.14	Rercirculation	-	-	-	
	4.14.1	Rercirculation	Request / Periods / Request+Periods / Contin.function.	REQUEST	REQUEST	
	4.14.2	T min rercirculation	10 ÷ 85 °C	35 °C	35 °C	
	4.14.3	Recirculation hysteresis	1 ÷ 30 °C	5 °C	5 °C	
	4.14.4	Max portata ricircolo	off ÷ 100 l/min	25 l/min	25 l/min	
	4.14.5	Max recirculation flow	-	Period recirc. settings	Period recirc. settings	
	4.16.6	Draw-off support	-	OFF	OFF	
IF 6.12.2.1 ON	4.15	Thermostat	-	-	-	
	4.15.1	T min storage	10 ÷ 85 °C	50 °C	50 °C	
	4.15.2	T set storage	45 ÷ 95 °C	55°C	55°C	
	4.15.3	Hysteresis	1 ÷ 30 °C	5 °C	5 °C	
	4.15.4	Thermostat periods	-	Period therm. settings	Period therm. settings	
SEE 6.9	4.16	Zone valve	-	-	-	
	4.16.1	DT return storage	1 ÷ 20 °C	3 °C	3 °C	
	4.17	Additional pump	-	-	-	
	4.17.1	Flow rate ON	20 ÷ 200 l/min	50 l/min	70 l/min	
	4.17.2	Flow rate Off	10 ÷ 60 l/min	30 l/min	40 l/min	
	4.17.3	Delay	1 ÷ 60 s	3 s	3 s	
MIXING VALVE	4.18	Primary mixer	-	-	-	
	4.18.1	Primary flow MIN	46 ÷ 64 °C	48°C	48°C	
	4.18.2	Primary flow MAX	51 ÷ 90 °C	65 °C	65 °C	
	4.18.3	Direction	-	open = right	open = right	
	4.18.4	Turn time	0.5 ÷ 5.0 s	1 s	1 s	
	4.18.5	Pause factor	0.1 ÷ 4.0 s	1 s	1 s	
	4.18.6	Mixer run time	5 ÷ 300 s	20 s	20 s	
KIT CASCDE	4.20	Cascade	-	-	-	
	4.20.1	Fix base station	-	off	off	
	4.20.2	Station ON flux	10 ÷ 99%	50%	50%	
	4.20.3	Station OFF flux	10 ÷ 90%	20%	20%	
	4.20.4	Delay	1 ÷ 120 s	6 s	6 s	
	5. ANTI-LEGIONELLA					

NOTE	MENU DESCRIPTION	DESCRIPTION	SETTINGS RANGE	DEFAULT SC ACS 160	DEFAULT SC ACS 225	NOTE
IF 6.10.4.1 ON	5.1	Anti-legionella	-	-	-	
	5.1.1	Anti-legionella function	on / off	off	off	
	5.1.2	Anti-legionella Temp.	60-99°C	70°C	70°C	
	5.1.3	Anti-legionella resid. time	1-120min	15min	15min	
	5.1.4	Anti-legionella cycle	-	never	never	
	5.1.5	Anti-legionella times	-	antileg period settings	antileg period settings	
	5.1.6	Start manually	yes/no	No	No	
	5.2	Limescale protection	-	-	-	
	5.2.1	Limescale protection	on / off	off	off	
	5.3	Setpoint auto reg.	-	-	-	
	5.3.1	Setpoint auto reg.	on / off	off	off	
	5.4	Sizing protection	-	-	-	
	5.4.1	Sizing R1	Daily/weekly/off	off	off	
	5.4.2	Sizing R2	Daily/weekly/off	off	off	
	5.4.3	Sizing R3	Daily/weekly/off	off	off	
	5.4.4	Sizing V1	Daily/weekly/off	off	off	
	5.4.5	Sizing V2	Daily/weekly/off	off	off	
	6. SPECIAL FUNCTIONS					
PRIMARY CIRCULATION	6.1	v1 signal	-	-	-	
	6.1.1	Signal type	0-10V/PWV	PWM	PWM	
	6.1.2	Signal setting	-	MANUAL	MANUAL	
	6.1.3	Output signal	Normal/inverted	INVERTED	INVERTED	
	6.1.4	PWM off	0-15%	98%	98%	
	6.1.5	PWM on	2-50%	87%	87%	
	6.1.6	PWM max	50-100%	7%	7%	
	6.1.7	show signal	-	-	-	
	6.2	V1 speed	-	-	-	
	6.2.2	Purging type	6-600 s	8 s	8 s	
	6.2.3	Regulation time	1-15 min	1 min	1 min	
	6.2.4	MAX speed	15-100%	100%	100%	
	6.2.5	MIN speed	10-95%	10%	10%	
	MENU' DESCRIPTION	DESCRIPTION	SETTINGS RANGE	DEFAULT SC ACS 160	DEFAULT SC ACS 225	
	6. SPECIAL FUNCTIONS					
	6.3	v2 signal	-	-	-	
	6.3.1	Signal type	0-10V/PWV	0-10V	0-10V	
	6.3.2	Signal setting	-	MANUAL	MANUAL	
	6.3.3	Output signal	Normal/Inverted	NORMAL	NORMAL	
	6.3.4	0-10V off	0.-1.5V	3.5 V	3.5 V	
	6.3.5	0-10V on	0.0-5.0V	3.5 V	3.5 V	
	6.3.6	0-10V max	5.0-10.0V	9.5 V	9.5 V	
	6.3.7	show signal	-	-	-	
	6.5	V3 signal	-	-	-	
	6.5.1	Signal setting	-	MANUAL	MANUAL	
	6.5.2	Output signal	Normal/Inverted	INVERTED	INVERTED	
	6.5.3	PWM off	0-15%	98%	98%	
	6.5.4	PWM on	2-50%	87%	87%	
	6.5.5	PWM max	50-100%	7%	7%	
	6.5.8	show signal	-	-	-	

NOTE	MENU DESCRIPTION	DESCRIPTION	SETTINGS RANGE	DEFAULT SC ACS 160	DEFAULT SC ACS 225	NOTE
	6.6	V3 speed	-	-	-	
	6.6.1	MAX speed	15-100%	100%	100%	
	6.6.2	MIN speed	10-95%	25%	25%	
	6.7	v4 signal	-	-	-	
	6.7.1	Signal type	-	MANUAL	MANUAL	
	6.7.2	Signal setting	Normal/Inverted	INVERTED	INVERTED	
	6.7.3	Output signal	0-15%	98%	98%	
	6.7.4	PWM on	2-50%	87%	87%	
	6.7.5	PWM max	50-100%	7%	7%	
	6.7.6	show signal	-	-	-	
ZONE VALVE	6.9	Relay 1	-	-	-	
	6.9.1	recirculation	-	-	-	
	6.9.2	thermostat	-	-	-	
	6.9.3	Zone valve	-	-	-	
	6.9.3.1	Zone valve	on/off	off	off	
	6.9.3.2	DT return storage	1 ÷ 20 °C	3 °C	3 °C	
	6.9.4	Anti-legionella	-	-	-	
	6.9.5	Error message	-	-	-	
	6.9.6	Additional pump	-	-	-	
	6.9.7	solare	-	-	-	
	6.9.8	Parallel operat. V1	-	-	-	
	6.9.9	Parallel operat V2 V2	-	-	-	
	6.9.10	Always on	-	-	-	
	6.9.11	Cascade	-	-	-	
	6.10	Relay 2	-	-	-	
	6.10.1	recirculation	-	-	-	
	6.10.2	thermostat	-	-	-	
	6.10.3	Zone valve	-	-	-	
	6.10.4	Anti-legionella	-	-	-	
	6.10.4.1	Ant-ilegionella	on/off	off	off	
	6.10.5	Error message	-	-	-	
	6.10.6	Additional pump	-	-	-	
	6.10.7	solar	-	-	-	
	6.10.8	Parallel operat. V1	-	-	-	
	6.10.9	Parallel operat V2 V2	-	-	-	
	6.10.10	Always on	-	-	-	
	6.10.11	Cascade	-	-	-	
KIT CASCADE	6.11	Relay 2	-	-	-	
	6.11.1	recirculation	-	-	-	
	6.11.2	thermostat	-	-	-	
	6.11.3	Zone valve	-	-	-	
	6.11.4	Anti-legionella	-	-	-	
	6.11.5	Error message	-	-	-	
	6.11.6	Additional pump	-	-	-	
	6.11.7	solar	-	-	-	
	6.11.8	Parallel operat. V1	-	-	-	
	6.11.9	Parallel operat V2 V2	-	-	-	

NOTE	MENU DESCRIPTION	DESCRIPTION	SETTINGS RANGE	DEFAULT SC ACS 160	DEFAULT SC ACS 225	NOTE
	6.11.10	Always on	-	-	-	
	6.11.11	Cascade	-	-	-	
	6.11.11.1	Cascade	on/off	off	off	
	6.11.11.2	Fix base station	on/off	on	on	
	6.11.11.3	Station ON flux	10-99	50%	50%	
	6.11.11.4	Station OFF flux	10-90%	20%	20%	
	6.11.11.5	Delay	1-120s	6s	6s	
	6.12	Relay 4	-	-	-	
	6.12.1	recirculation	-	-	-	
	6.12.2	thermostat	-	-	-	
	6.12.2.1	thermostat	-	on	on	
	6.12.2.2	T min storage	10-85°C	50°C	50°C	
	6.12.2.3	T set storage	45-95°C	55°C	55°C	
	6.12.2.4	Hysteresis	1-30°C	5°C	5°C	
	6.12.2.5	Thermostat periods	-	-	-	
	6.12.3	Zone valve	-	-	-	
	6.12.4	Anti-legionella	-	-	-	
	6.12.5	Error message	-	-	-	
	6.12.6	Additional pump	-	-	-	
	6.12.7	solar	-	-	-	
	6.12.8	Parallel operat. V1	-	-	-	
	6.12.9	Parallel operat V2 V2	-	-	-	
	6.12.10	Always on	-	-	-	
	6.12.11	Cascade	-	-	-	
	DESCRIZIONE MENU'	DESCRIPTION	SETTINGS RANGE	DEFAULT SC ACS 160	DEFAULT SC ACS 225	NOTE
	6. SPECIAL FUNCTIONS					
RECIRCULATION	6.13	Signal V1	-	Recirculation	Recirculation	
	6.13.1	Recirculation	-	-	-	
	6.13.1.1	Recirculation	on/off	on	on	
	6.13.1.2	Contin. Recirc. Function	Request / Periods / Request+Periods / Contin.function.	Request	REquest	
	6.13.1.3	Recirculation Tmin	10-85°C	35°C	35°C	
	6.13.1.4	Recirculation hysteresis	-	5 °C	5 °C	
	6.13.1.5	Max flow recirculation	-	25 l/min	25 l/min	
	6.13.1.6	Recirculation period	-	-	-	
	6.13.1.7	Tap support	-	off	off	
	6.13.2	thermostat	-	-	-	
	6.13.3	Zone valve	-	-	-	
	6.13.4	Anti-legionella	-	-	-	
	6.13.5	Errore message	-	-	-	
	6.13.6	Additional pump	-	-	-	
	6.13.7	Primary mixer	-	-	-	
	6.13.8	Solar	-	-	-	

NOTE	MENU DESCRIPTION	DESCRIPTION	SETTINGS RANGE	DEFAULT SC ACS 160	DEFAULT SC ACS 225	NOTE
	6.13.9	Always on	-	-	-	
	6.13.10	Cascade	-	-	-	
MIXING VALVE	6.14	Signal V2	-	-	-	
	6.14.1	Recirculation	-	-	-	
	6.14.2	thermostat	-	-	-	
	6.14.3	Zone valve	-	-	-	
	6.14.4	Anti-legionella	-	-	-	
	6.14.5	Errore message	-	-	-	
	6.14.6	Additional pump	-	-	-	
	6.14.7	Primary mixer	-	-	-	
	6.14.7.1	Primary mixer	-	on	on	
	6.14.7.2	Primary flow Min	46-64°C	48°C	48°C	
	6.14.7.3	Primary flow Max	51-90°C	65°C	65°C	
	6.14.7.4	Direction	right/left	right	right	
	6.14.7.5	Turn time	0.5-5.0s	1s	1s	
	6.14.7.6	Pausa factor	0.1-4.0s	1.0s	1.0s	
	6.14.7.7	Mix run time	5-300s	20s	20s	
	6.14.8	Solar	-	-	-	
	6.14.9	Always on	-	-	-	
	6.14.10	Cascade	-	-	-	
	6.15	Signal V2	-	-	-	
	6.15.1	Recirculation	-	-	-	
	6.15.2	thermostat	-	-	-	
	6.15.3	Zone valve	-	-	-	
	6.15.4	Anti-legionella	-	-	-	
	6.15.5	Errore message	-	-	-	
	6.15.6	Additional pump	-	-	-	
	6.15.6.1	Additional pump	on/off	on	on	
	6.15.6.2	Flow rate on	20-200l/min	50l/min	70l/min	
	6.15.6.3	Flow rate off	10-60l/min	30l/min	40l/min	
	6.15.6.4	Delay	1-60s	3s	3s	
	6.15.7	Primary mixer	-	-	-	
	6.15.8	Solar	-	-	-	
	6.15.9	Always on	-	-	-	
	6.15.10	Cascade	-	-	-	
	6.16	Pressure sensor	-	off	off	
	6.17	Sensor calibration	-	-	-	
	6.17.1	Calibration S1	-100 - 100	0	0	
	6.17.2	Calibration S2	-100 - 100	0	0	
	6.17.3	Calibration S3	-100 - 100	0	0	
	6.17.4	Calibrazione S4	-100 - 100	0	0	
	6.17.5	Calibration S5	-100 - 100	0	0	
	6.17.6	Calibration S6	-100 - 100	0	0	
	6.17.7	Calibration S7	-100 - 100	0	0	
	6.17.8	Calibration S8	-100 - 100	0	0	
	6.17.9	VFS1 Temperature	-100 - 100	0	0	

NOTE	MENU DESCRIPTION	DESCRIPTION	SETTINGS RANGE	DEFAULT SC ACS 160	DEFAULT SC ACS 225	NOTE
	6.17.10	VFS1 constant flow rate	-100 - 100	0	0	
	6.18	Commissioning	yes/no	-	-	
	6.19	Factory setting	yes/no	-	-	
	6.20	Time& Date	-	-	-	
	6.21	Daylight saving	yes/no	Si	Si	
	6.22	ECOmode display	on/off	on	on	
	6.23	temperatura unit	°C/°F	°C	°C	
	6.24	Network	-	-	-	
	7. MENU' LOCK					
	7.1	Menù lock	on/off	on	on	
	7.2	expert mode	expert/simple	simple	simple	
Control unit software: 1330572V						

CHECKS

On completion of the installation, perform the checks listed in the table below.

DESCRIPTION	OK
All automatic or manual filling pumps removed.	
Safety valve calibrated to 6 bar, and flow open.	
Drain pipe from safety valve routed suitably.	
Expansion vessel correctly located and pre-charged to 2.5 bar	
Non-return valves activated as gravity brakes	

RIELLO S.p.A.

Via Ing. Pilade Riello, 7
37045 - Legnago (VR)

The manufacturer strives to continuously improve all products. Appearance, dimensions, technical specifications, standard equipment and accessories are therefore liable to modification without notice.