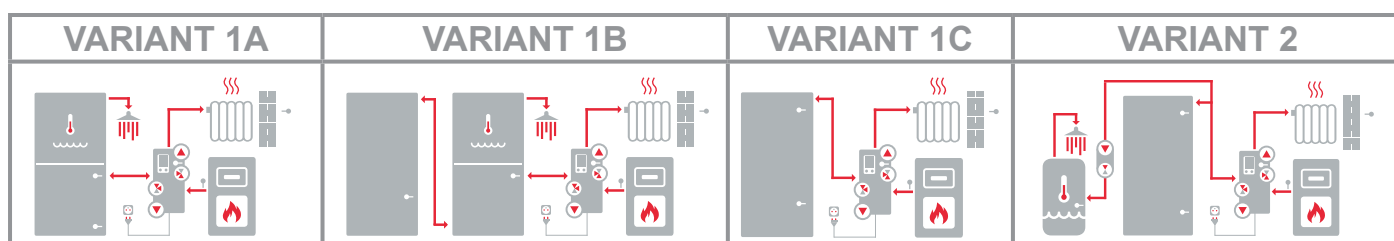




Installation and Operation Manual BIO MIX W-PWM 1F TRS6K LOAD UNIT

EN

BIO MIX W-PWM 1F TRS6K



CONTENTS

A.	Safety Instructions	3
B.	Introduction, Description	3
	B.1. Load Unit Components	4
	B.2. Load Unit Data	5
	B.3. Pressure Drop Graph	6
	B.4. Dimensions	7
C.	Load Unit Installation	7
	C.1. Hydraulic Connection of the Load Unit	10
	C.2. Overview of Basic Hydraulic Variants	11
	C.2.1. Variant 1, Option A	11
	C.2.2. Variant 1, Option B	14
	C.2.3. Variant 1, Option C	16
	C.2.4. Variant 2	18
D.	Accessory Installation	20
	D.1. RC Caleon & RC Caleon WIFI Room Units	21
	D.2. Room Temperature Sensor	22
	D.3. Electric Heating Element for DHW Afterheating	23
	D.4. Electric Heating Element for DHW Afterheating	24
	D.5. DHW Recirculation Pump	26
	D.6. Heat Transfer Pump	27
	D.7. Temperature Sensor in Thermal Store	28
	D.8. Using a Backup Power Supply	28
E.	System Settings	29
	E.1. Controller Operation	29
	E.2. Setup Wizard	30
	E.3. Free Commissioning	33
	E.4. General Settings	34
	E.5. Adjusting Temperatures & Time Programs	34
	E.6. Auxiliary Heat Source (el. heating element)	39
	E.7. DHW Recirculation Pump	40
	E.8. Complete Controller Menu	41
F.	Servicing, Maintenance	68
	F.1. Overall Electrical Wiring Diagram of the Load Unit	68
	F.2. Status Indication and Error Messages	69
	F.3. Replacing the Controller Fuse	70
	F.4. Servicing & Maintenance of Hydraulic Components	71
G.	Legislation	72
	G.1. Declaration of Conformity	72
	G.2. Controller Disposal	72

A. Declaration of Conformity

- The hydraulic connection of the load unit must be carried out by a person qualified according to the applicable standards and regulations.
- Any interventions in the electrical installation must be carried out by a person qualified according to the applicable standards and regulations.
- Before starting work on the wiring (e.g. when connecting accessories to the controller), the load unit and the connected electrical equipment (e.g. electric heating element) must be disconnected from the power supply!
- The BIO MIX W-PWM 1F TRS6K load unit is in no way a replacement for the safety components of the heating system, hot water system and boiler. These safety elements must always be installed in accordance with the applicable standards and regulations. The diagrams published in this manual represent wiring examples and may not be complete. Carry out the actual installation according to the heating design and ensure that all prescribed safety features are fitted.
- Any tampering with the controller, adjusting the controller or connecting accessories must be done in accordance with the instructions in this manual. Only accessories recommended in this manual may be connected to the controller.

B. INTRODUCTION, DESCRIPTION

BIO MIX W-PWM 1F TRS6K Load Unit includes a complete hydraulic and electrical connections for the installation of a heating system with a solid fuel boiler. The load unit has a complete electrical installation and is fitted with a power cord with a plug. All you need to do is connect the boiler, the heating system, a thermal store(s) (depending on the selected hydraulic variant), then place the sensors and plug the load unit into a socket. Then select the corresponding hydraulic variant in the controller using the setup wizard and set other required parameters. The basic connection diagram can be upgraded with optional accessories.

For more information on optional accessories see the Chapters ***“Overview of Basic Hydraulic Variants”***, ***“Accessory Installation”*** and ***“System Settings”***.

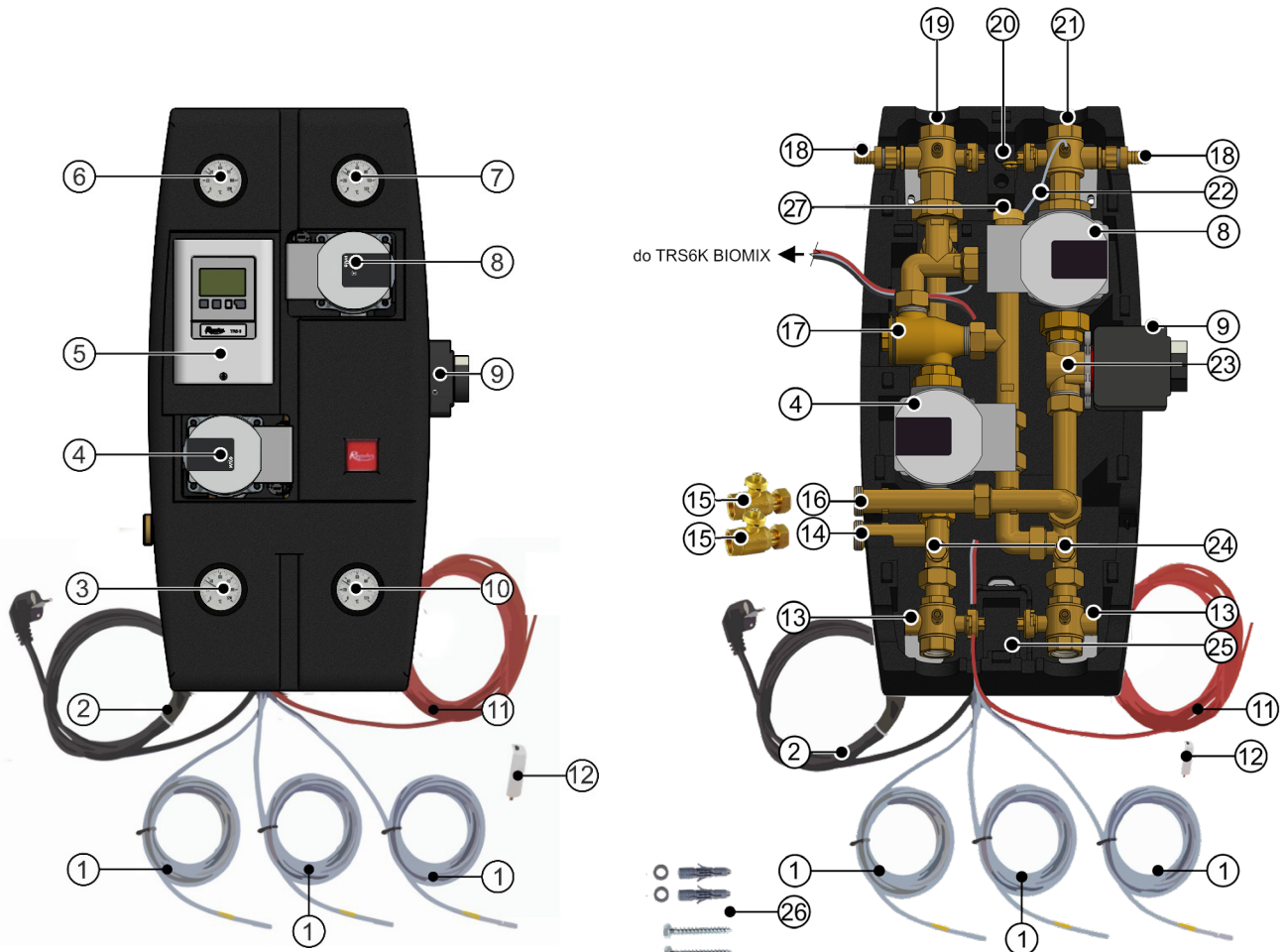
The Load Unit involves

- TRS6 BIOMIX controller with hydraulic variant selection for smart control of the entire system
- Two Wilo Para 25/8 iPWM1 circulation pumps with continuous performance control via PWM signal for boiler circuit and heating system
- TSV3BM load valve with automatic bypass balancing to protect the boiler against low temperature corrosion by keeping min. temperature of return water above the flue condensation temperature
- Motorised three-way mixing valve including actuator to maintain the required temperature in the heating circuit
- Two ball valves and two drain valves for shutting off and draining the heating system
- Check valve located downstream from the ball valve on the return line from the heating system
- Two ball valves to shut off the boiler circuit
- Automatic air vent valve on the bypass to the load valve
- Lever for ball valves, placed inside the insulation
- 3m power cord, 1.5 mm² cable cross section
- Three Pt 1000 temperature sensors with 4 m cable
- Pt 1000 heating circuit temperature sensor (factory-installed in a sheath in the load unit)
- 10 m cable for the outdoor temperature sensor (the sensor itself is enclosed)
- Four thermometers
- Two mini drain valves to drain the load unit
- Outlets to connect optional accessories (e.g. a pressure switch)

The Load Unit delivery includes a package containing:

- Mounting kit for an easy installation of the load unit on a wall
- Two DN 20 ball valves to be installed at the thermal store inlet/outlet
- Pt1000 outdoor temperature sensor to be installed on the northern wall of the building

B.1. LOAD UNIT COMPONENTS



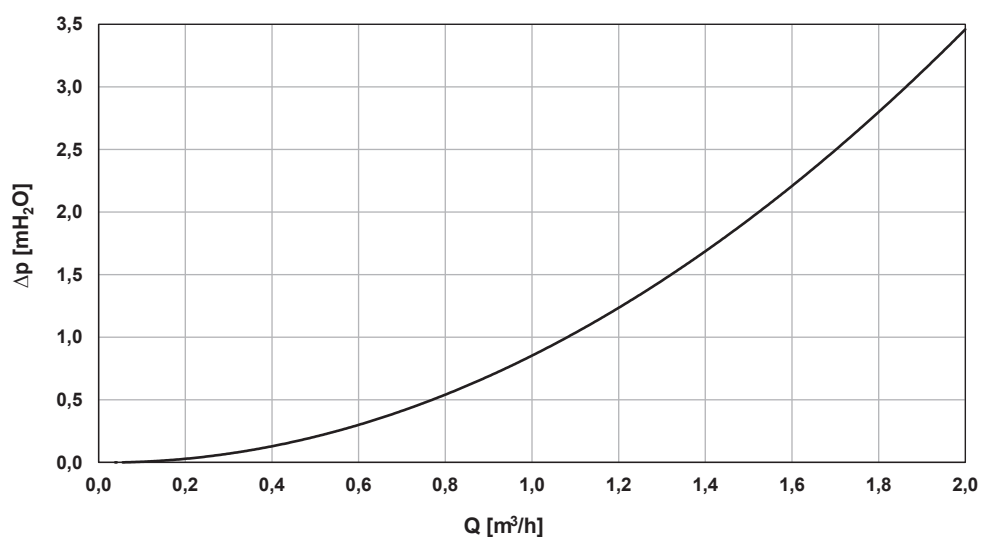
- 1 – 4m cable with Pt 1000 temperature sensor
- 2 – Power cord
- 3 – Boiler return line thermometer
- 4 – Wilo Para 25/8 iPWM1 boiler pump
- 5 – TRS6 BIOMIXK Controller
- 6 – Return heating water thermometer
- 7 – Heating water flow thermometer
- 8 – Wilo Para 25/8 iPWM1 heating circuit pump
- 9 – Mixing valve actuator
- 10 – Boiler flow thermometer
- 11 – 10m cable for outdoor temperature sensor
- 12 – Pt 1000 outdoor temperature sensor
- 13 – G 1" Fu x G 1" F x G 1/2" F ball valve w. free outlet and sheath for temperature sensor
- 14 – G 1" F return line from thermal store
- 15 – DN 20 ball valve to be mounted on pos. 14 and 16 (included in the enclosed package)
- 16 – G 1" F outlet to thermal store
- 17 – TSV3BM load valve
- 18 – G 1/2" M drain valve with hose tail
- 19 – G 6/4" Fu x G 1" F x G 1/2" F ball valve w. check valve and sheath for temperature sensor
- 20 – Handle for ball valves
- 21 – G 6/4" Fu x G 1" F x G 1/2" F ball valve w. heating circuit temperature sensor
- 22 – Pt 1000 heating circuit temperature sensor (connected to TRS6K BIOMIX controller from the factory)
- 23 – LK 840 mixing valve
- 24 – Mini drain valves
- 25 – Wiring box
- 26 – Installation kit (8.4 stainless steel washer DIN 125A/A2, 2 pcs, 10mm wall plug, 2 pcs, 8x60 hex head screw, 2 pcs)
- 27 – Automatic air vent valve

B.2. LOAD UNIT DATA

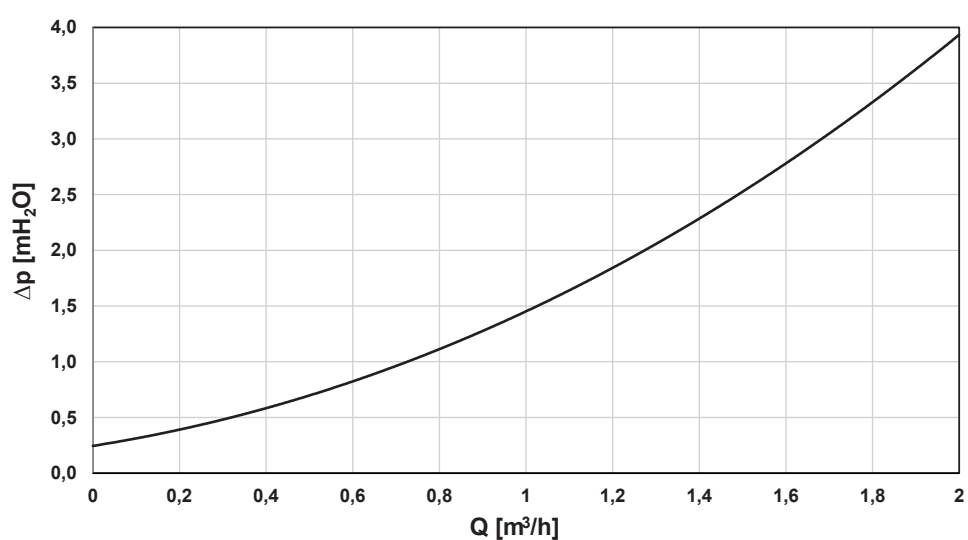
Technical Data	
Fluid working temperature	5-95 °C
Max. working pressure	6 bar
Min. working pressure	0.5 bar
Ambient temperature	5-40 °C
Max. relative humidity	max. 80 %, non condensing
Max. temperature of sheath sensors	95 °C
Min. return water temperature to boiler	55 °C - code 17499
	65 °C - code 21255
	70 °C - code 21259
Mixing valve actuator run time	120 s
Max. boiler output at flow of 1.7 m³/h	40 kW at Δt 20 °C
	20 kW at Δt 10 °C
Max. heating system output at flow of 1.7 m³/h	40 kW at Δt 20 °C
	20 kW at Δt 10 °C
Insulation material	EPP RG 60 g/l
Overall dimensions (H x W x D)	640 x 350 x 231 mm
Total weight	19.0 kg
Electric Data	
Load Unit power supply	230 V, 50 Hz (power cord)
Load Unit max. power input	155 W (basic connection, no accessories)
IP rating of BIO MIX Load Unit	IP20
Inner fuse of TRS6K BIOMIX controller	T2A / 250V slow blow
Backup of TRS6K BIOMIX controller clock operation	24 hours
Max. permitted cable length for Pt 1000 sensors	10 m
Max. permitted length of CAN cable to Caleon unit (standard cable)	3 m
Max. permitted length of CAN cable to Caleon unit (shielded twisted cable)	50 m

B.3. PRESSURE DROP GRAPH

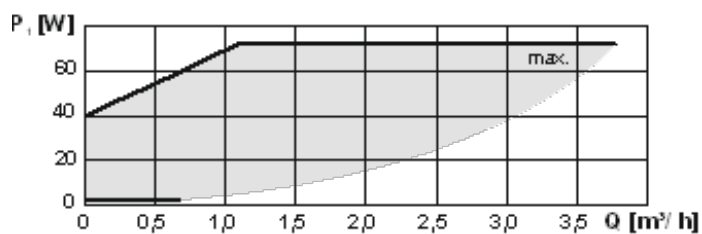
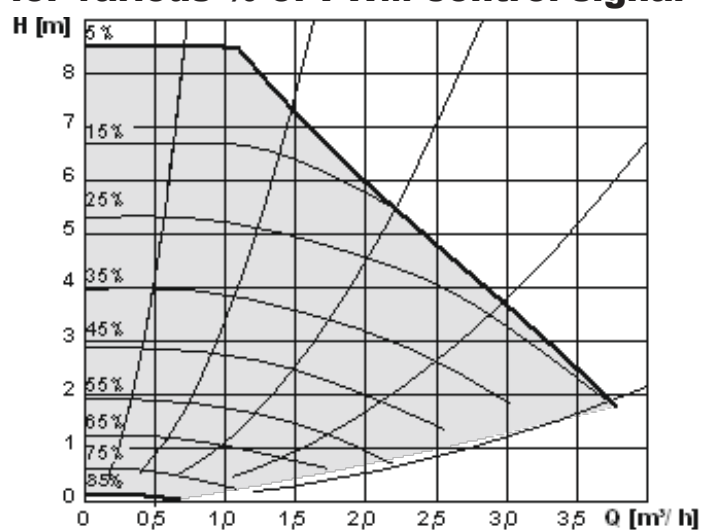
**BOILER
SIDE**



**HEATING
CIRCUIT**

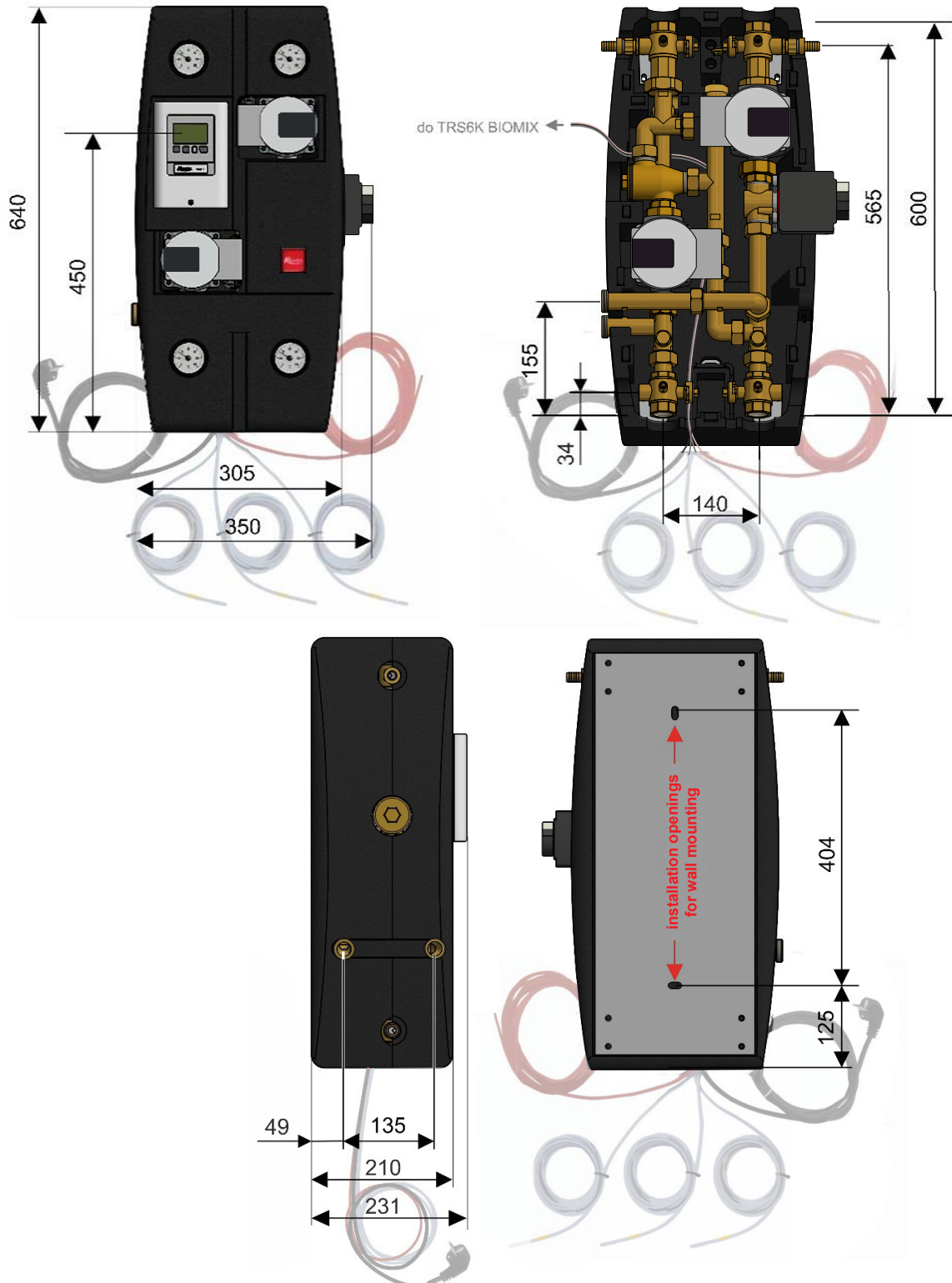


PERFORMANCE CURVES FOR WILO PARA 25/8 iPWM1 PUMP for various % of PWM control signal



B.4. DIMENSIONS

Note: The dimensional diagram of the open load unit is rotated for illustrative purposes, the outlets for the thermal store connection are mutually aligned (see side view).



C. LOAD UNIT INSTALLATION

The load unit is designed for wall mounting. It shall be mounted in the selected position using the enclosed installation kit. Choose the right installation height that will enable comfortable handling the controller. Two mounting holes in the sheet metal in the rear section of the insulation are used for wall mounting, see dimension diagram below.

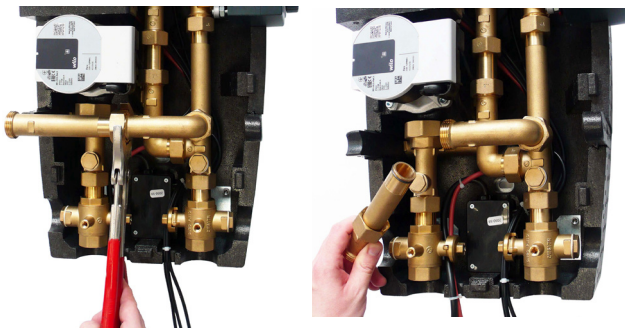
Note: In the basic version, the thermal store is supposed to be connected on the left side of the load unit. If necessary, the load unit can be converted to be connected to a thermal store on the right side. The conversion procedure is described on the following page.

Procedure for conversion of the load unit to connect the thermal store from the right

1 Remove the top part of insulation.

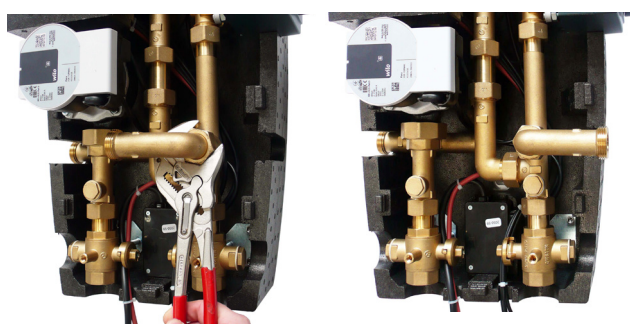
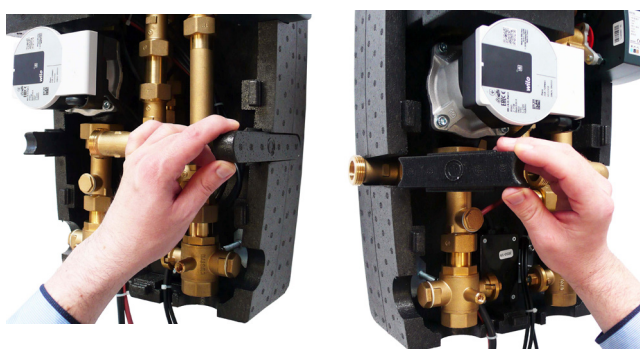


2 Loosen the nut and remove the extension for the outlet to the thermal store (this will be used in step 8).



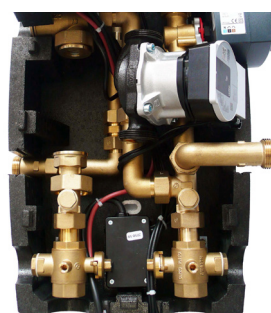
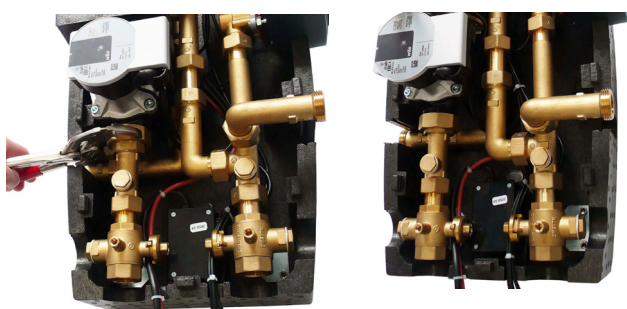
3 On the right and left side of the insulation body there are insulated passage points for connecting the thermal store; take out the insulation pieces from both the passage points.

4 Loosen the nut and turn the elbow to the right.

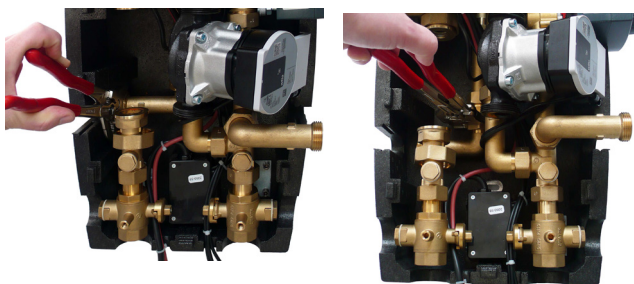


5 Take out the insulation piece for the boiler pump. Loosen the nuts at both the discharge and suction ports of the pump so that you can easily handle the pump.

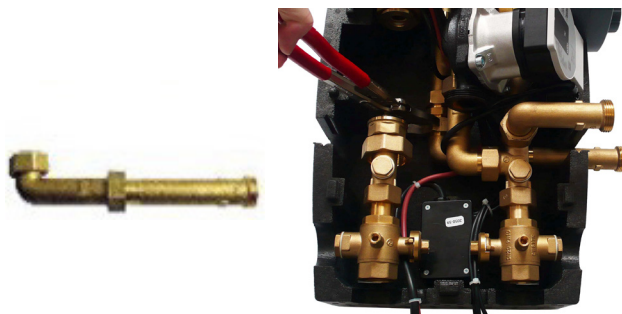
6 Move the pump to the side to allow free access to the elbow.



- 7** Loosen the elbow and take it out of the load unit.



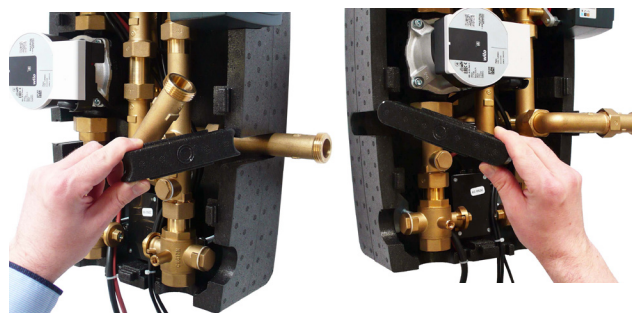
- 8** Assemble the elbow with the extension removed in step 3 and re-install it to same location so that the outlet now points to the right.



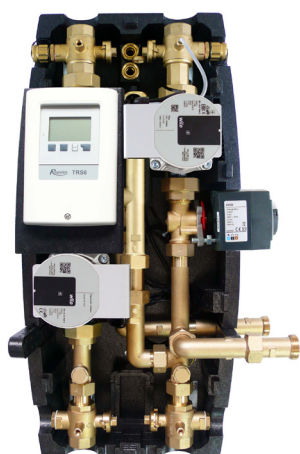
- 9** Mount the pump back to its original place, tighten both nuts and return back the pump insulation piece.



- 10** Replace all the remaining pieces of insulation to their original places.



- 11** The load unit should now look like this.



- 12** Reinstall the top part of the insulation.



C.1. HYDRAULIC CONNECTION OF THE LOAD UNIT

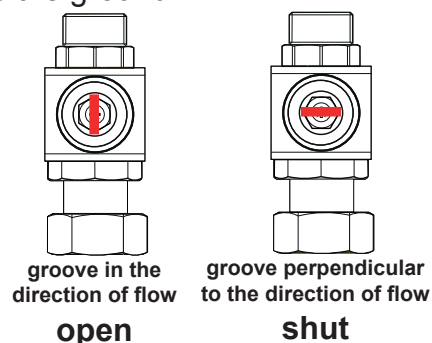
HOW TO PROCEED:

Make hydraulic connections of the boiler, heating system, thermal store(s) or hot water tank(s) with the load unit, respecting the selected hydraulic variant (see the following pages) → Fill and air bleed the system → Perform a pressure test → Place temperature sensors to the respective sheaths depending on the selected hydraulic variant → Mount the outdoor temperature sensor on a north-facing wall about 1.5-3m above the ground.

HOW TO CONNECT PIPING

The load unit has two side outlets from ball valves for connecting optional accessories (plugged) from ball valves 11, which are connected with the boiler remain connected with the boiler even when the ball valves are closed.

Before starting operation, make sure all ball valves are in the open position (the open/closed position on ball valves inside the load unit is shown by the groove position).



Piping connections			Inner hydraulic connection
Pos.	Description	Conn.	Key to components
1	Return from heating system	G 1" F	Ball valve w. drain valve
2	Outlet to heating system		
3	Flow from boiler	G 1" F	Load valve
4	Return to boiler		
5	Outlet to thermal store w. ball valve (enclosed)	G 1" F	Mixing valve w. actuator
6	Return from thermal store w. ball valve (enclosed)		
7	Ball valve w. integrated check and drain valves*		Ball valve w. outlet to connect optional accessories
8	Ball valve w. integrated drain valve*		
9	Load valve		Ball valve w. integrated check and drain valves
10	Mixing valve w. actuator		
11	Ball valve w. outlet to connect optional accessories	G 1/2" F (plugged from the factory)	Automatic air vent valve
12	Automatic air vent valve		

C.2. OVERVIEW OF BASIC HYDRAULIC VARIANTS

These basic diagrams can be extended with accessories that can always be found after the respective diagram on the following pages.

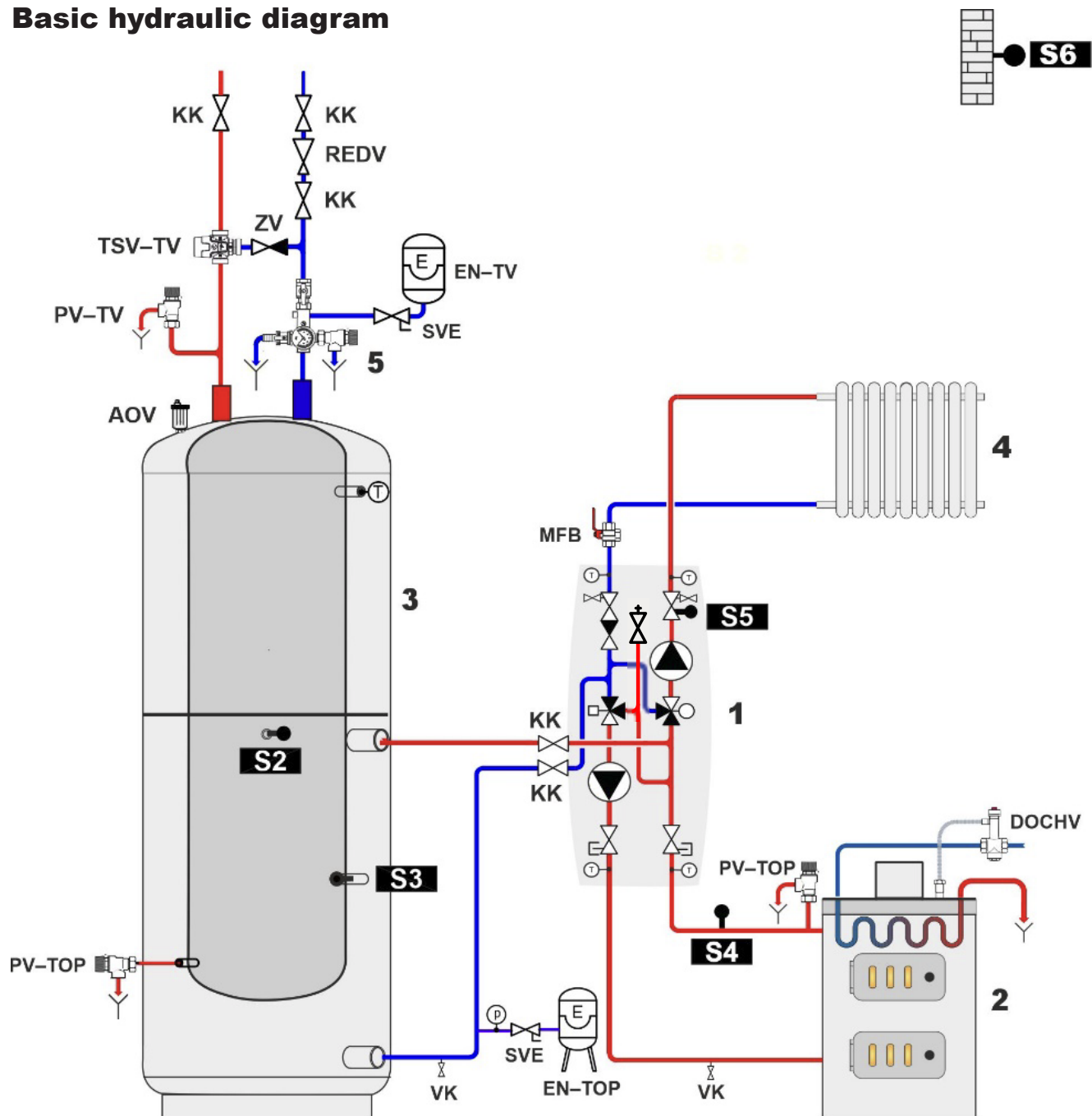
C.2.1. Variant 1, Option A

A system with a solid fuel boiler w. manual stoking, one heating circuit and a combination thermal store. The BIO MIX Load Unit ensures DHW and space heating and heat storage in the combination thermal store. It is recommended to use a Caleon room unit or a room temperature sensor for a more precise control of the room temperature. To ensure DHW heating also in periods when the boiler is extinguished, it is recommended to install an electric heating element fitted with an adjustable and a safety thermostat for DHW afterheating in the upper section of the thermal store.

Locations of temperature sensors

- S1 – not connected, a room temperature sensor may be connected (optional accessories)
- S2 – upper temperature sensor in a combination thermal store (under the separating metal sheet)
- S3 – lower temperature sensor in a combination thermal store
- S4 – temperature sensor at the outlet from a solid-fuel boiler
- S5 – heating water temperature sensor (in a sheath inside the load unit)
- S6 – outdoor temperature sensor (installed on a north-facing wall about 1.5-3 m above the ground)



Basic hydraulic diagram



DESCRIPTION


KK	ball valve	1	RegulusBIO Load Unit
ZV	check valve	2	boiler
VK	drain valve	3	combination thermal store with DHW
REDV	pressure reducing valve (5 bar)	4	heating system
SVE	expansion vessel service valve	5	safety kit*
DOCHV	thermal safety relief valve (e.g. BVTS)	*the safety kit involves a test valve, check valve, drain valve, safety valve, pressure gauge and outlet to connect an expansion vessel	
TSV TV	anti-scald valve		
PV-TOP	heating system safety valve		
EN-TV	DHW expansion vessel		
EN-TOP	heating system expansion vessel		
AOV	automatic air vent valve		
MFB	Magnet Filterball		
PV-TV	DHW safety valve		

OPTIONAL ACCESSORIES FOR HYDRAULIC VARIANT 1, OPTION A

Caleon Room Unit		OR	Room Temperature Sensor
For comfortable and more precise room temperature control		For more precise room temperature control	
	Caleon room unit w. touchscreen and temperature sensor (code 17150).		Room temperature sensor in ABB TIME design (code 16167).
	Caleon Wifi room unit enables also control over the Internet from a mobile phone app (code 18126). For installation description see Chapter D.1.		For installation description see Chapter D.2.

El. heating element for DHW afterheating

Hot water always available.

	To ensure DHW heating also in periods when the boiler is extinguished, it is recommended to install an electric heating element fitted with an adjustable and a safety thermostat – preferably the ETT M model. The temperature is set directly on the element using the control knob and thanks to its power cord with an el. plug no professional electrician is needed for wiring. For installation description see Chapter D.3.



El. heating element for space heating

OR

DHW recirculation pump

Warm even when the boiler is extinguished

Controlled hot water recirculation

	To ensure thermal comfort even after the boiler is extinguished and heat from the thermal store is exhausted, an electric heating element for space heating can be used that is equipped with both an adjustable and a safety thermostat, and with a contactor, e.g. ETT L model. For installation description see Chapter D.4.		The controller is able to switch the DHW recirculation pump following a time schedule. It is recommended to use the DHW pump station with anti-scald valve, code 17893. For installation description see Chapter D.5.

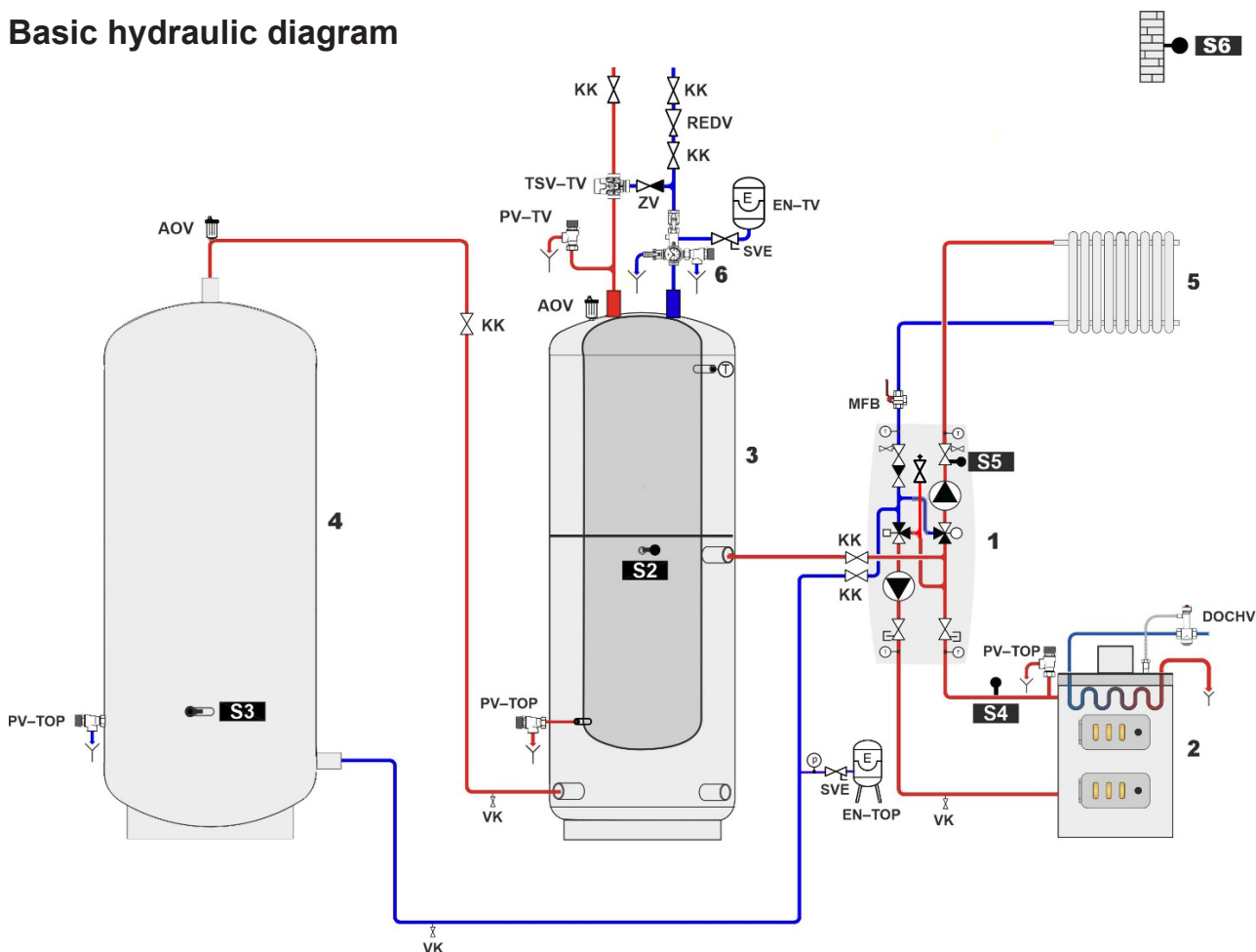
C.2.2. Variant 1, Option B

A system with a solid fuel boiler w. manual stoking, one heating circuit, a combination thermal store and a thermal store. The BIO MIX Load Unit ensures DHW and space heating and heat storage in the combination and standard thermal stores. It is recommended to use a Caleon room unit or a room temperature sensor for a more precise control of the room temperature. To ensure DHW heating also in periods when the boiler is extinguished, it is recommended to install an electric heating element fitted with an adjustable and a safety thermostat for DHW afterheating in the upper section of the combination thermal store.

Locations of temperature sensors

- S1 – not connected, a room temperature sensor may be connected (optional accessories)
- S2 – upper temperature sensor in a (combination) thermal store (under the separating metal sheet)
- S3 – lower temperature sensor in a thermal store
- S4 – temperature sensor at the outlet from a solid-fuel boiler
- S5 – heating water temperature sensor (in a sheath inside the load unit)
- S6 – outdoor temperature sensor (installed on a north-facing wall about 1.5-3m above the ground)

Basic hydraulic diagram






DESCRIPTION



KK	ball valve	AOV	automatic air vent valve
ZV	check valve	MFB	Magnet Filterball
VK	drain valve	PV-TV	DHW safety valve
REDV	pressure reducing valve (5 bar)	1	RegulusBIO Load Unit
SVE	expansion vessel service valve	2	boiler
DOCHV	thermal safety relief valve (e.g. BVTS)	3	combination thermal store with DHW
TSV TV	anti-scald valve	4	thermal store
PV-TOP	heating system safety valve	5	heating system
EN-TV	DHW expansion vessel	6	safety kit*
EN-TOP	heating system expansion vessel		

*the safety kit involves a test valve, check valve, drain valve, safety valve, pressure gauge and outlet to connect an expansion vessel

OPTIONAL ACCESSORIES FOR HYDRAULIC VARIANT 1, OPTION B

Caleon Room Unit		OR	Room Temperature Sensor
For comfortable and more precise room temperature control		For more precise room temperature control	
	Caleon room unit w. touchscreen and temperature sensor (code 17150).		Room temperature sensor in ABB TIME design (code 16167). For installation description see Chapter D.2.
	Caleon Wifi room unit enables also control over the Internet from a mobile phone app (code 18126). For installation description see Chapter D.1.		

El. heating element for DHW afterheating	
Hot water always available.	
	<p>To ensure DHW heating also in periods when the boiler is extinguished, it is recommended to install an electric heating element fitted with an adjustable and a safety thermostat – preferably the ETT M model.</p> <p>The temperature is set directly on the element using the control knob and thanks to its power cord with an el. plug no professional electrician is needed for wiring.</p> <p>For installation description see Chapter D.3.</p>

El. heating element for space heating		OR	DHW recirculation pump	
Warm even when the boiler is extinguished		Controlled hot water recirculation		
	<p>To ensure thermal comfort even after the boiler is extinguished and heat from the thermal store is exhausted, an electric heating element for space heating can be used that is equipped with both an adjustable and a safety thermostat, and with a contactor, e.g. ETT L model.</p> <p>For installation description see Chapter D.4.</p>		<p>The controller is able to switch the DHW recirculation pump following a time schedule.</p> <p>It is recommended to use the DHW pump station with anti-scald valve, code 17893.</p> <p>For installation description see Chapter D.5.</p>	

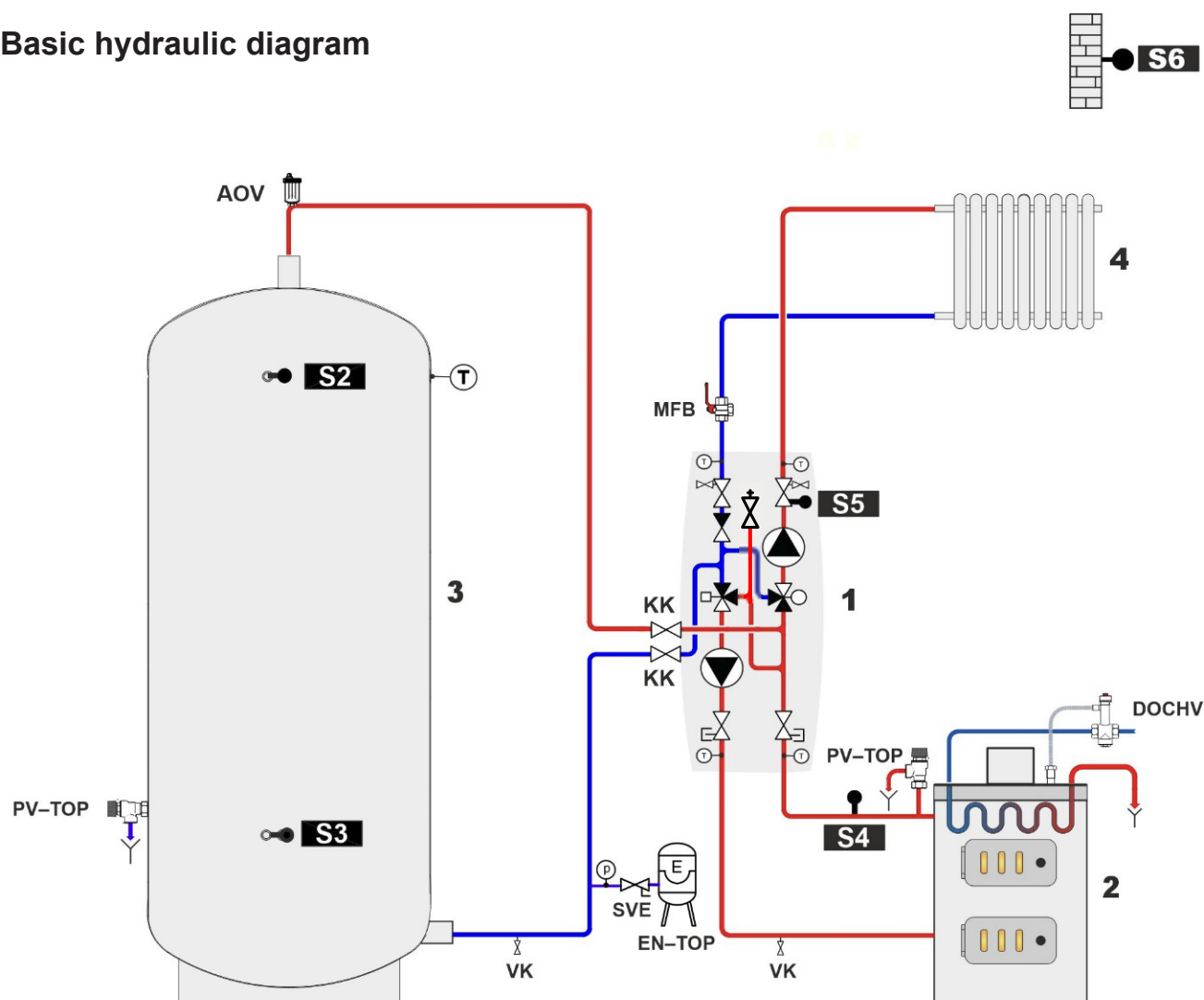
C.2.3. Variant 1, Option C

A system with a solid fuel boiler w. manual stoking, one heating circuit and a thermal store. The BIO MIX Load Unit ensures space heating and heat storage in the thermal store. It is recommended to use a Caleon room unit or a room temperature sensor for a more precise control of the room temperature.

Locations of temperature sensors

- S1 – not connected, a room temperature sensor may be connected (optional accessories)
- S2 – upper temperature sensor in a thermal store
- S3 – lower temperature sensor in a thermal store
- S4 – temperature sensor at the outlet from a solid-fuel boiler
- S5 – heating water temperature sensor (in a sheath inside the load unit)
- S6 – outdoor temperature sensor (installed on a north-facing wall about 1.5-3m above the ground)



Basic hydraulic diagram




DESCRIPTION

KK	ball valve	1	RegulusBIO Load Unit
ZV	check valve	2	boiler
VK	drain valve	3	thermal store
SVE	expansion vessel service valve	4	heating system
DOCHV	thermal safety relief valve (e.g. BVTS)		
PV-TOP	heating system safety valve		
EN-TOP	heating system expansion vessel		
AOV	automatic air vent valve		
MFB	Magnet Filterball		

OPTIONAL ACCESSORIES FOR HYDRAULIC VARIANT 1, OPTION C

Caleon Room Unit		OR	Room Temperature Sensor
For comfortable and more precise room temperature control		For more precise room temperature control	
	Caleon room unit w. touchscreen and temperature sensor (code 17150).		Room temperature sensor in ABB TIME design (code 16167).
	Caleon Wifi room unit enables also control over the Internet from a mobile phone app (code 18126). For installation description see Chapter D.1.		For installation description see Chapter D.2.

El. heating element for space heating	
Warm even when the boiler is extinguished	
	To ensure thermal comfort even after the boiler is extinguished and heat from the thermal store is exhausted, an electric heating element for space heating can be used that is equipped with both an adjustable and a safety thermostat, and with a contactor, e.g. ETT L model. For installation description see Chapter D.4.

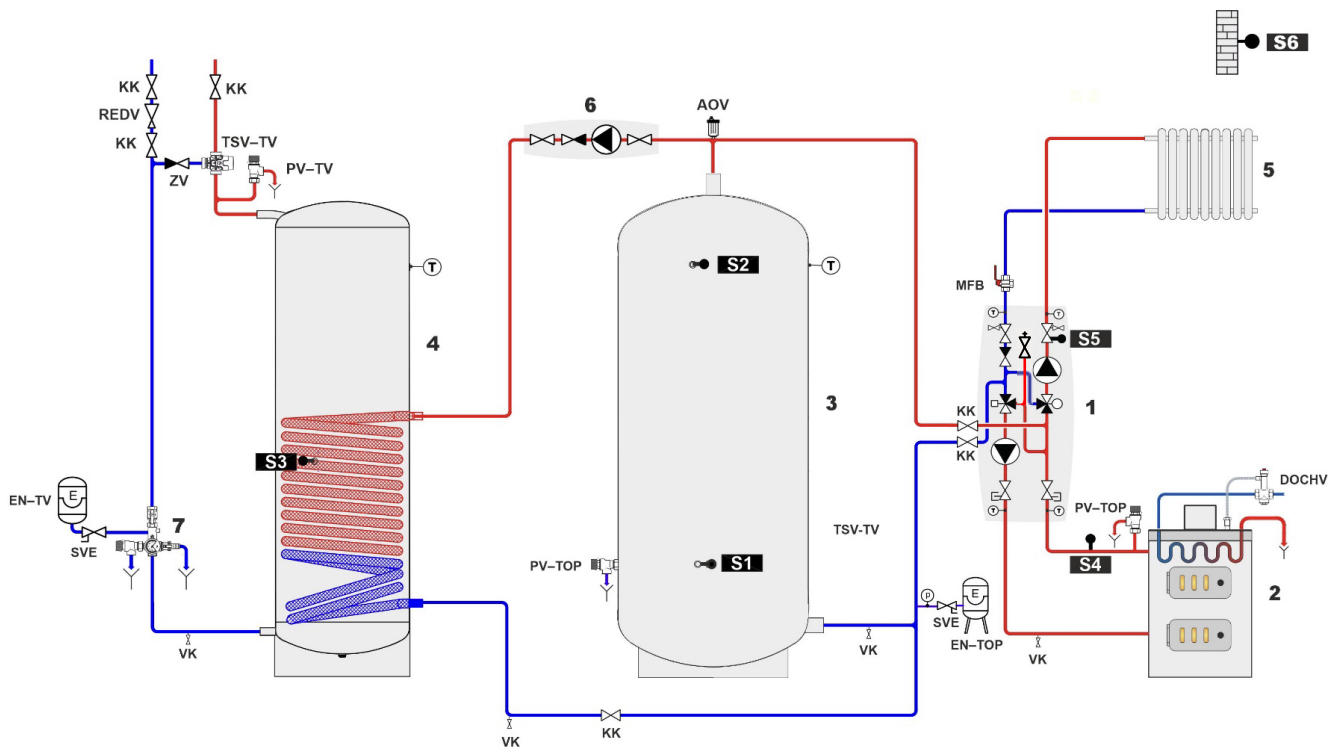
C.2.4. Variant 2

A system with a solid fuel boiler w. manual stoking, one heating circuit, a thermal store and a hot water storage tank. The BIO MIX Load Unit ensures space and DHW heating and heat storage in the thermal store. It is recommended to use a Caleon room unit or a room temperature sensor for a more precise control of the room temperature. To ensure DHW heating also in periods when the boiler is extinguished, it is recommended to install an electric heating element fitted with an adjustable thermostat in the hot water storage tank.

Locations of temperature sensors

- S1 – lower temperature sensor in a thermal store (shall be ordered separately, code 9109)
- S2 – upper temperature sensor in a thermal store
- S3 – temperature sensor in a hot water storage tank
- S4 – temperature sensor at the outlet from a solid-fuel boiler
- S5 – heating water temperature sensor (in a sheath inside the load unit)
- S6 – outdoor temperature sensor



Basic hydraulic diagram



DESCRIPTION



KK	ball valve	1	RegulusBIO Load Unit
ZV	check valve	2	boiler
VK	drain valve	3	combination thermal store
REDV	pressure reducing valve (5 bar)	4	hot water storage tank
SVE	expansion vessel service valve	5	heating system
DOCHV	thermal safety relief valve (e.g. BVTS)	6	heat exchange pump station
TSV TV	anti-scald valve	7	safety kit*
PV-TOP	heating system safety valve	*the safety kit involves a test valve, check valve, drain valve, safety valve, pressure gauge and outlet to connect an expansion vessel	
EN-TV	DHW expansion vessel		
EN-TOP	heating system expansion vessel		
AOV	automatic air vent valve		
MFB	Magnet Filterball		
PV-TV	DHW safety valve		

NECESSARY ACCESSORIES FOR HYDRAULIC VARIANT 2

Temperature sensor for thermal store	
	<p>Lower temperature sensor for thermal store (to be ordered separately, code 9109).</p> <p>For installation description see Chapter D.7.</p>
Heat transfer pump station	
	<p>A heat transfer pump station ensures heating of the hot water storage tank (by drawing heat from the thermal store). To be ordered separately.</p> <p>The recommended item is e.g. CSE OTS ZV W-SC (code 17979).</p> <p>For installation description see Chapter D.6.</p>

OPTIONAL ACCESSORIES

The following accessories are also recommended for hydraulic variant 2:

Caleon Room Unit	
For comfortable and more precise room temperature control	
	<p>Caleon room unit w. touchscreen and temperature sensor (code 17150).</p> <p>Caleon Wifi room unit enables also control over the Internet from a mobile phone app (code 18126).</p> <p>For installation description see Chapter D.1.</p>
El. heating element for DHW afterheating	
Hot water always available.	
	<p>To ensure DHW heating also in periods when the boiler is extinguished, it is recommended to install an electric heating element fitted with an adjustable and a safety thermostat – preferably the ETT M model.</p> <p>The temperature is set directly on the element using the control knob and thanks to its power cord with an el. plug no professional electrician is needed for wiring.</p> <p>For installation description see Chapter D.3.</p>

D. ACCESSORY INSTALLATION

If you do not intend to install any accessories, proceed directly to the controller settings.

INSTRUCTIONS FOR ELECTRICAL WIRING AND ACCESSORY SETTINGS

Electrical wiring of the accessories must be carried out by a person qualified according to the applicable standards and regulations.

Safety warning



Before working on the unit, switch off the power supply and secure it against being switched on again! The controller is not equipped with a mains switch. To switch the unit off, either unplug the power cord from a power outlet, or use a circuit breaker. Check for the absence of power! Do not use the controller if the housing shows visible damage.

General instructions for connecting accessories



Low-voltage cables such as temperature sensor cables must be routed separately from mains voltage cables. Connect temperature sensor cables only to the left-hand side of the controller, and mains voltage cables and relay cables only to its right-hand side.

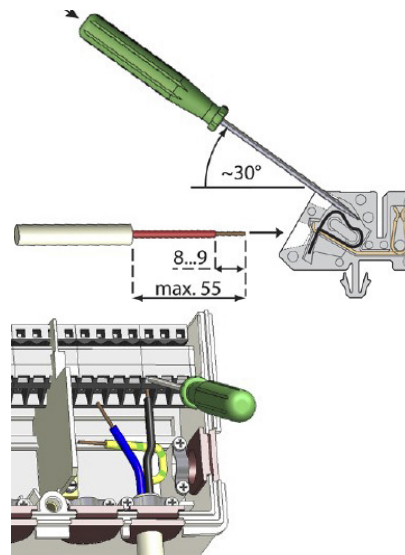
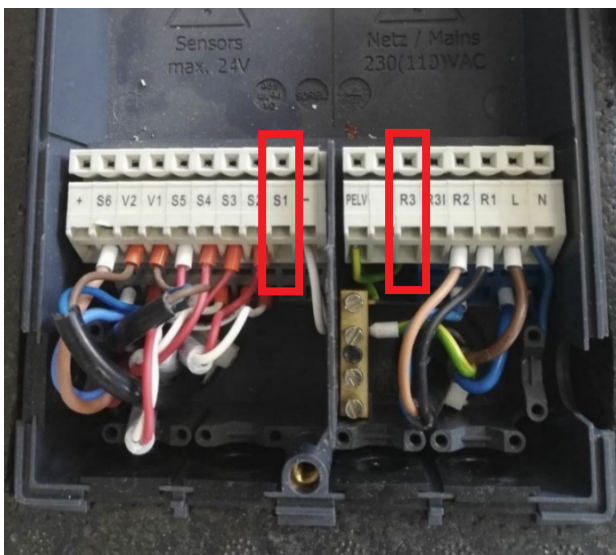


The cables being connected to the unit must not be stripped by more than 55 mm, and the cable jacket must reach into the housing to the other side of the grommet.

How to proceed:

Accessory cables are connected to free terminals S1 or R3 (see photo below) or CAN according to the wiring diagram of the selected accessory.

1. Unplug the power cord from the power outlet before starting work.
2. Remove the top section of the load unit insulation and release the controller from the insulation piece so that you have clear access to the controller. Unscrew the front cover of the controller.
3. Remove the outer insulation of the cable (in the length of 55 mm max.), run it through the opening in the rear part of the controller and fit the cable clamp.
4. Strip the last 8-9 mm of all cable cores.
5. Open the connectors with a flat-blade screwdriver and connect the wires according to the appropriate diagram.
6. Close the controller and screw the cover back.
7. Plug the power cord into a power socket and put the controller into operation.
8. Run commissioning of TRS6K BIOMIX controller following the setup wizard and then set the desired accessories in the controller menu following instructions in the chapter Accessory Installation.



ACCESSORY INSTALLATION

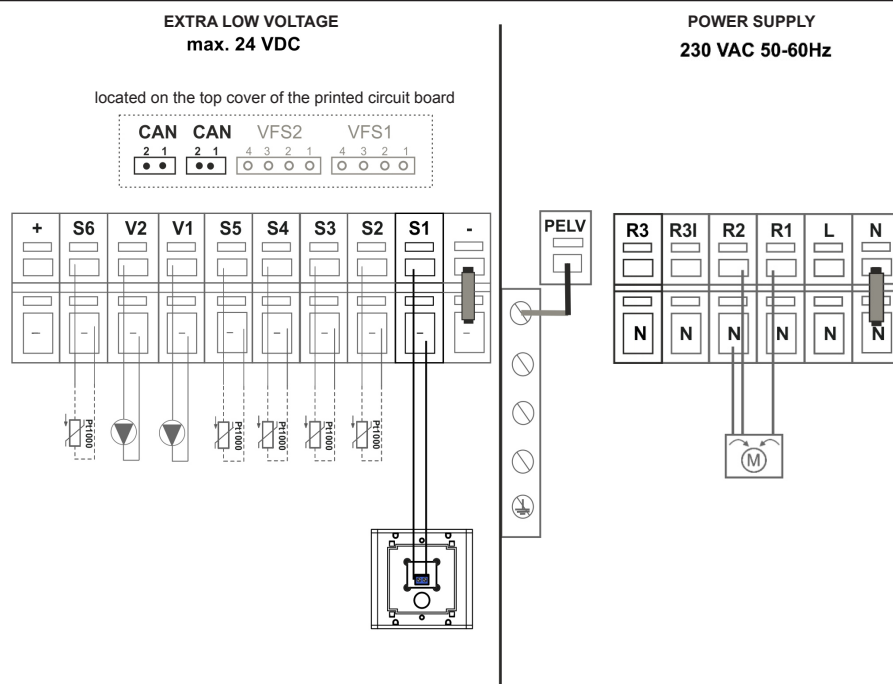
D.1. RC CALEON & RC CALEON WIFI ROOM UNITS

Description	The Caleon unit is equipped with a colour touch screen that allows you to easily perform all user settings. It includes a room temperature sensor that allows for more precise control. It displays temperature and humidity in the room as well as the outside temperature (the reading is taken from the outdoor sensor). The unit is offered in a basic version (code 17150) or with integrated WiFi module (code 18126), which allows control via the internet from a mobile phone app.
Intended for variants	All variants
Installation	It shall be installed on a wall in a reference room at a height of 1.2 to 1.6 m above the floor, out of direct sunlight and far enough away from the windows. It must not be installed near heat sources.
Settings in controller	In parameter 5.1.19.5. select the local RC Caleon unit. If the Caleon room unit selection is not present, there is probably a fault in the connection between the room unit and the load unit controller. For other settings of the room unit please consult the Manual for RC Caleon.
Connecting terminals	+ – and CAN
El. wiring	Four-core cable (2 for power supply, 2 for CAN bus). Up to 3 m a standard cable can be used (typically JYTY 4Dx1), over 3 m a shielded twisted-pair cable shall be used (typically J-Y(St)Y 2x2x0.8). Alternatively, the power supply can be solved by a 24V source located in the room. The unit will then be connected with the controller using a two-core cable. Up to 3 m a standard cable can be used (typically JYTY 2Dx1), over 3 m a shielded twisted-pair cable shall be used.
Wiring diagram	<p>EXTRA LOW VOLTAGE max. 24 VDC located on the top cover of the printed circuit board</p> <p>CAN CAN VFS2 VFS1</p> <p>terminating resistor</p> <p>PELV</p> <p>Wiring diagram</p> <p>Connect the shield of the communication cable to the metal PE terminal block in the controller.</p>

D.2. ROOM TEMPERATURE SENSOR

Description	<p>The room temperature sensor allows for more precise control of the room temperature.</p> <p>It shall be ordered separately, code 16167, and it is an alternative to the Caleon room unit.</p>
Intended for variants	1 (options A, B, C)
Installation	It shall be installed on a wall in a reference room at a height of 1.2 to 1.6 m above the floor, out of direct sunlight and far enough away from the windows. It must not be installed near heat sources.
Settings in controller	After connecting the room sensor, no further controller settings are needed, just select the desired room temperatures in menu 5.1.19.2 and 5.1.19.3 and, if necessary, the time program in menu 3.3.
Connecting terminal	S1
El. wiring	<p>permissible conductor cross section – 0.5-1.5 mm²</p> <p>! Max. permitted cable length for the Pt 1000 room temperature sensor is 10 m!</p>

Wiring diagram



D.3. ELECTRIC HEATING ELEMENT FOR DHW AFTERHEATING

Description	<p>It is used for hot water heating when the boiler is extinguished and the hot water supply is depleted. If DHW is heated by a boiler, the built-in thermostat switches off the heating element. Heating elements are available in various designs and outputs, the current assortment can be found on our website: https://www.regulus.eu/en/ett-g-6-4-for-hw-storage-tanks-and-thermal-stores.</p> <p>The recommended model is ETT M that is equipped with an integrated adjustable and safety thermostat and a power cord w. el. plug.</p>
Intended for variants	1 (options A, B) 2
Installation	Into the E1 connection of a hot water storage tank or a DUO/ HSK combination thermal store.
Settings in controller	<p>The heating element is not controlled by the controller so it does not require any settings in the controller.</p> <p>The desired temperature is set by the thermostat knob on the heating element.</p>
Connecting terminals	The heating element does not connect to the controller terminals.
El. wiring	<p>The ETT M heating element is equipped with a power cord with el. plug.</p> <p>Thus no professional electrician is needed for wiring.</p>

TIP 1: If you use a combination thermal store (variant 1 A, B) and a heating element for heating system water, this heating element can be used also for DHW heating under certain conditions. More information in Chapter D.4. Electric Heating Element for Space Heating, TIP 1.

TIP 2: For DHW heating also other heating elements from our offer can be used that are equipped with an adjustable and a safety thermostat.

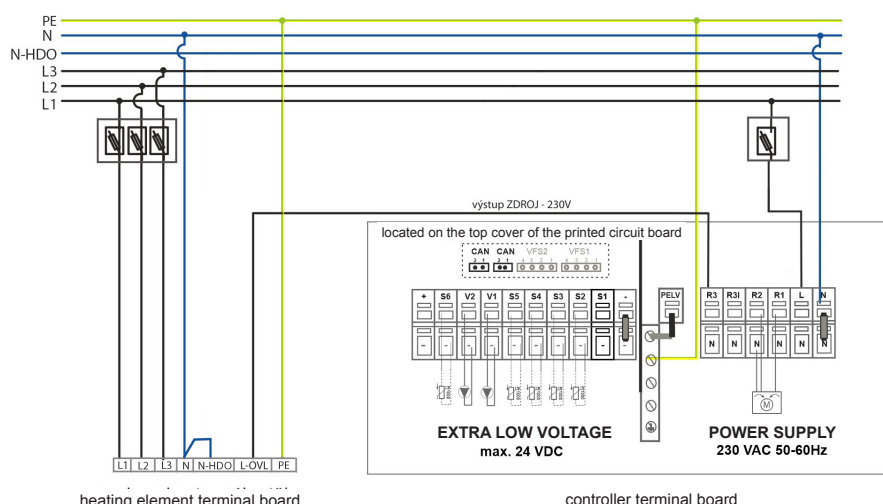
Ripple control, single-phase or 3-phase wiring can be also used, as well as heating elements of a higher output. However, those require installation by a professional electrician.

D.4. ELECTRIC HEATING ELEMENT FOR SPACE HEATING

Description	<p>To ensure thermal comfort even after the boiler is extinguished and heat from the thermal store is exhausted, an electric heating element for space heating can be used. The electric heating element is switched by the controller only when needed. Its operation can be blocked by Ripple control, by a time program, or when the boiler is on. During the operation of the heating element the heating temperature can be reduced automatically.</p> <p>It is recommended to use electric heating elements equipped with both an adjustable and a safety thermostat, with a contactor, permitting blocking by Ripple control, e.g. ETT L series.</p> <p>Heating elements are available in various designs and outputs, the current assortment can be found on our website: https://www.regulus.eu/en/ett-g-6-4-for-hw-storage-tanks-and-thermal-stores.</p>
Intended for variants	1 (options A, B, C)
Installation	Into the E2/E3 connection of a DUO/HSK combination thermal store or into any connection of a thermal store.
Settings in controller	<p>The heating element for space heating comes preset from the factory and no further adjustments are needed. Just set the same or higher temperature with the thermostat knob than the heating circuit temperature set in the controller (menu 5.1.10.).</p> <p>If needed, set also conditions for blocking the heating element (ECO function) in menu 5.8.6.</p>
Connecting terminal	R3 (Only the contactor control can be connected to the terminal, never connect the power supply of the heating element directly).
EI. wiring	<p>The electric heating element shall be wired to a terminal box or electrical enclosure, 3/N/PE AC 400/230 V, fixed wiring. The wire marked N-HDO is intended to control the heating element with Ripple control. If Ripple control is not used, both the centre blue wires (N and N-HDO) shall be joined together in the terminal box or electrical enclosure. The wire marked OVLÁDÁNÍ (L-OVL) is intended to control the heating element from a heating system controller. This wire shall be connected with the controller R3 outlet.</p>
Wiring diagram	<p>Wiring diagram of ETT L heating element with blocking by Ripple control:</p> <p>The diagram illustrates the wiring for the ETT L heating element. It shows the connection between the heating element terminal board and the controller terminal board. The heating element terminal board has terminals for PE, N, N-HDO, L3, L2, L1, L1, L2, L3, N, N-HDO, L-OVL, and PE. The controller terminal board has terminals for CAN, CAN, VPS2, VPS1, S6, V2, V1, S5, S4, S3, S2, S1, PELV, R3, R3I, R2, R1, L, N, and N. The diagram shows the connection of the heating element to the controller and the power supply. The power supply is 230 VAC 50-60Hz. The controller is labeled 'výstup ZDROJ - 230V' and 'located on the top cover of the printed circuit board'. The controller also has an 'EXTRA LOW VOLTAGE max. 24 VDC' section.</p>

Wiring diagram of ETT L heating element without blocking by Ripple control:

Wiring diagram



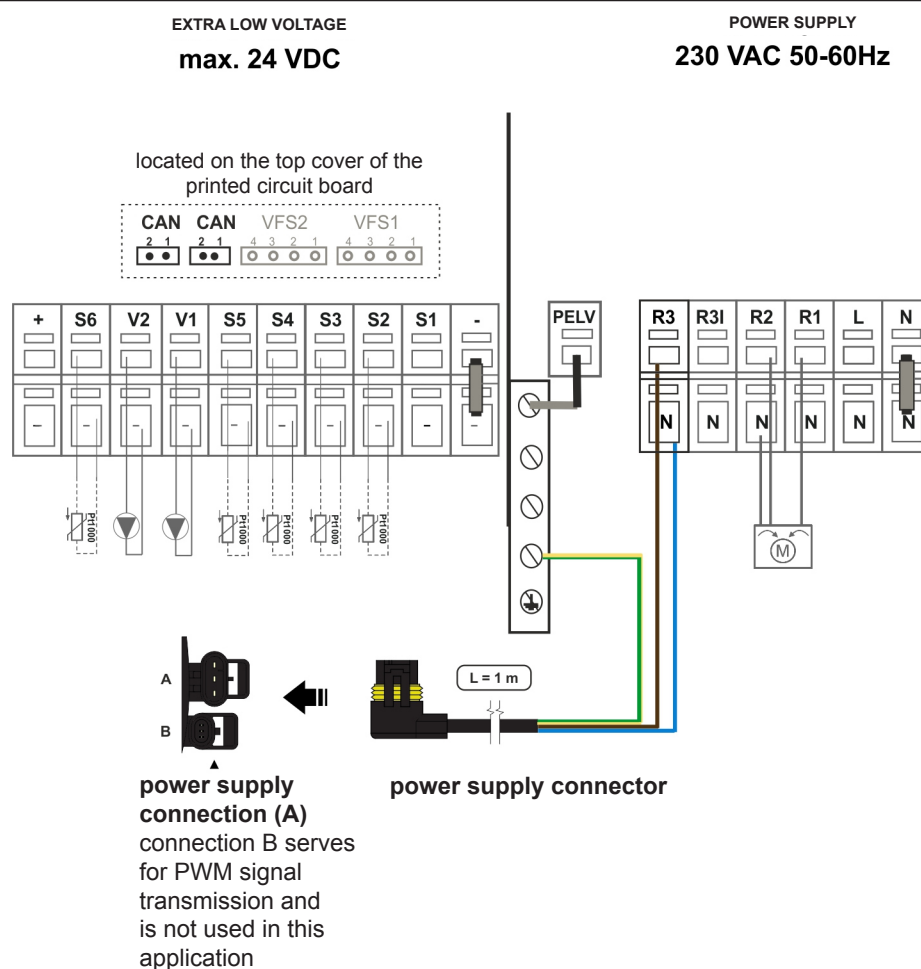
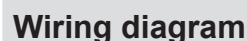
TIP 1: The heating element can be used also for DHW heating in combination thermal stores (variants 1A and 1B), supposed the terminal S1 is not occupied by an optional room temperature sensor (Caleon room unit can be used).

Place the temperature sensor (code 9109 – to be ordered separately) into the sheath for a DHW sensor and connect it to S1 terminals of the controller. In menu 5.3.8. assign a DHW sensor to S1, in menu 5.8.1. activate DHW thermostat, in menu 5.3.7. set blocking space heating during DHW heating, and set the desired DHW temperature (5.3.3., 5.3.4.) or a time program in menu 3.5. and 3.6.

TIP 2: If the output of 1 heating element is not sufficient for space heating, it is possible to install two elements and connect the control of both to the terminal R3. Switching of the second heating element can be delayed by means of a time relay.

D.5. DHW RECIRCULATION PUMP

Description	<p>If you do not intend to control a heating element for space heating by the controller, the controller can be used for switching hot water recirculation following a time program.</p> <p>It is recommended to use a pump station for DHW recirculation with integrated anti-scald valve CSE TVMIX ZV G 3/4M (code 17893 – to be ordered separately).</p>
Intended for variants	1 (options A, B)
Installation	The cold water supply for the anti-scald valve must also be connected to the hot water outlet and recirculation pipes.
Settings in controller	<p>For variant 1, options A, B:</p> <ul style="list-style-type: none"> • In parameter 7.9.9.1. select Off • In parameter 7.9.15.1. select On <p>Set the recirculation time program in menu 5.23.6.</p>
Connecting terminal	Terminal R3
El. wiring	The pump is powered by the controller and switched ON/OFF.



D.6. HEAT TRANSFER PUMP

Description	<p>Hot water heating in an external HW storage tank is ensured by pumping hot water from the thermal store to an integrated heat exchanger in the HW storage tank. Heat transfer is controlled by the TRS6K controller integrated in the BIO load unit.</p> <p>For hot water pumping it is necessary to install a circulation pump and a check valve that will prevent gravity circulation. It is recommended to install a pump station – e.g. CSE OTS ZV W-SC, code 17979. It involves a pump, a check valve, two ball valves and a thermometer in a neat insulation.</p>
Intended for variants	2 (mandatory accessory)
Function	<p>If the temperature in the HW storage tank drops below the set DHW temperature by the temperature difference, the controller will check if the temperature in the thermal store is higher by the set difference than the temperature in the hot water storage tank. If yes, the heat transfer pump will switch on and keep running until the desired temperature set for the HW storage tank is reached or the temperature difference between the thermal store and the HW storage tank drops below the preset value.</p>
Installation	Following the diagram below.
Settings in controller	<p>Parameters of heat transfer to a hot water storage tank will be set automatically after the Variant 2 is selected during commissioning. The desired hot water temperature in the HW storage tank can be set in param. 5.6.2. (default 60°C). Switch-on and switch-off temperature difference can be set in param. 5.6.1. (default 8 / 4°C). For a detailed description of all parameters see the chapter Heat Transfer in controller menu 5.6.</p>
Connecting terminal	Terminal R3
El. wiring	The pump is connected to TRS6K BIOMIX controller.
Wiring diagram	<p>EXTRA LOW VOLTAGE max. 24 VDC</p> <p>POWER SUPPLY 230 VAC 50-60Hz</p> <p>located on the top cover of the printed circuit board</p> <p>CAN CAN VFS2 VFS1</p> <p>2 1 2 1 4 3 2 1 4 3 2 1</p> <p>Wiring diagram</p> <p>power supply connector</p> <p>L ≈ 3,0 m</p>

D.7. TEMPERATURE SENSOR IN THERMAL STORE

Description	<p>The lower temperature sensor in the thermal store is used for speed control of the boiler circulation pump. The controller adjusts the speed of the boiler circulation pump to the boiler output with the aim to keep optimal temperature distribution in the thermal store and at the same time to avoid boiler overheating.</p> <p>To be ordered separately, code 9109.</p>
Intended for variants	2 (mandatory accessory)
Function	The controller controls the speed of the boiler pump depending on the difference between the temperature at the boiler flow and at the lower sensor in the thermal store to keep the set temperature difference.
Installation	Into the lower part of the thermal store.
Settings in controller	The S1 sensor of the temperature in the lower part of the thermal store shall be set in menu 5.11.6.
Connecting terminal	S1
El. wiring	<p>Permissible conductor cross section – 0,5 - 1,5 mm²</p> <p>!Max. permitted cable length for the Pt 1000 room temperature sensor is 10 m!</p>
Wiring diagram	



If you decide not to install the sensor, the system will work but the temperature distribution in the thermal store and the boiler pump control will not be as optimal as with the sensor installed. The temperature difference between the upper thermal store sensor and boiler sensor will be used for control. In such a case, the upper thermal store sensor must not be placed in a supply pipe to the thermal store but it is advisable to place it into the upper part of the thermal store, however a bit lower. If an electric heating element for space heating is installed, the sensor shall be placed above it. It is recommended to set a lower DT value in param. 5.6.1.

D.8. USING A BACKUP POWER SUPPLY

If a backup power supply is needed, the type PG 600 or another UPS with a smooth sine-wave output shall be used.

E. SYSTEM SETTINGS

To set up the system correctly, we recommend using the Setup Wizard when starting the controller for the first time. Then it is advisable to browse through the following chapters and make further setting adjustments if needed.

E.1. CONTROLLER OPERATION

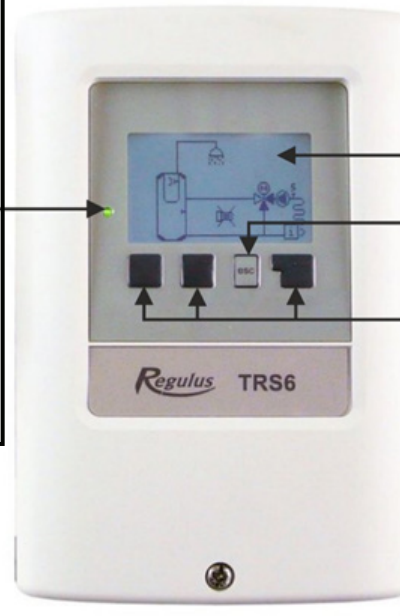
The LED light is used to indicate the status:

it is lit green – a relay is switched on and the Controller works correctly

it is lit red – Auto mode is set and all relays are off

it flashes slowly red – Manual mode is set

it flashes fast red – an error is present ⚠



The display shows in text and graphical mode the hydraulic variant, desired and measured values and other text information.
The hydraulic variant displayed is just an example!

The „esc“ key (c) is used to cancel an entry or to exit a menu.

The keys are assigned context functions; their actual function is shown in the display right above the respective key; the right-hand key generally has a confirmation and selection function. Possible functions of keys:

+/-	increase / decrease values
▼/▲	scroll down / up menu
Yes/No	confirm / reject
Info	further information
Back	to previous
OK	confirm selection

The graphics mode appears if no key is pressed for 2 minutes or after exiting the main menu with “esc”. The temperature overview appears when you press the left button. Tapping the button again leads back to the graphic overview. Pressing the “esc” key in the graphics mode takes you directly to the main menu.

Before plugging the pump station into a power socket for the first time, make sure that:

- the entire heating system is completely pressurized and air bled
- all safety elements of the system are installed and put into operation
- all temperature sensors are installed in their installation positions
- all valves and stopcocks are open that shall be opened during operation of the heating system



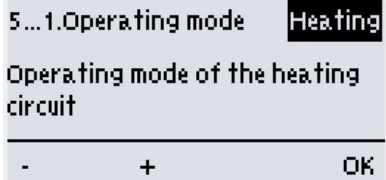

After the load unit is plugged into a power socket, the TRS6 BIOMIX controller automatically starts in the mode of language, date and time settings selection. You will then be asked about running the Setup Wizard. Commissioning procedure with the Setup Wizard is described in the SETUP WIZARD chapter. Either a simple heating curve can be set (see menu 5.1.5. Heating curve), or a split one (see the chapter SETTING A SPLIT HEATING CURVE). A simple heating curve is sufficient supposed a room temperature sensor or a Caleon room unit is installed.

E.2. SETUP WIZARD

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

The setup wizard can be repeatedly accessed in menu 7. Special functions ►7.12. Commissioning at any time.

HOW TO PROCEED

<p>1. The controller offers hydraulic variants: 1.Combi+HC+SFB or 2.ThSt+HC+SFB+heat transf. Select the appropriate variant for your system and press the Info button.</p>	
<p>2. The selected hydraulic variant 1 or 2 appears on the display; confirm it by pressing the OK key. After confirming, please wait for the controller to load the settings (this may take several seconds).</p>	
<p>3. Leave the Operating mode as “Heating”, confirm by pressing OK button.</p>	
<p>4. S/W transition is recommended to be left at the values of 18 °C (for Day mode) and 12 °C (for Night mode). Confirm by pressing OK button.</p>	

5. Heating curve

You can choose between a “simple” and a “split” heating curve.

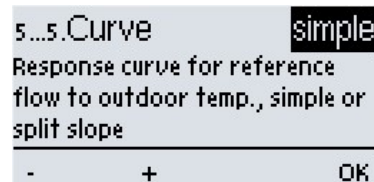
If you wish to set a “simple” heating curve, proceed to menu 5.1.5. Heating curve. A simple heating curve is sufficient supposed a room temperature sensor or a Caleon room unit is installed.

If you wish to set a “split” heating curve, proceed as described in the chapter SETTING A SPLIT HEATING CURVE. A split heating curve is recommended in case when no room temperature sensor / no Caleon room unit are installed.

SETTING A SIMPLE HEATING CURVE

5. Heating curve

Select the heating curve “simple” and confirm by pressing **OK** button.



6. Heating curve inclination

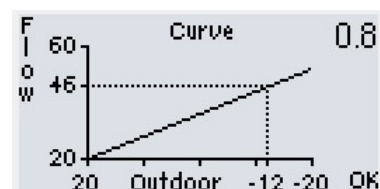
The default inclination is 0.8 which corresponds to the outlet temperature of 46 °C at the outdoor temperature of -12 °C.

The inclination can be modified using the up/down arrows.

Heating system	Curve inclination	Temperature drop at -12 °C
Underfloor heating	0.,6	40/35
Low-temperature radiators	1.1	55/45
High-temperature radiators	1.6	70/55

If the temperature drop is set for a lower outdoor temperature than -12 °C (e.g. -15, -18 °C), select the value of the curve inclination slightly lower than shown in the table.

After setting confirm by pressing **OK** button.



(illustrative example for underfloor heating)

7. It is recommended to keep the default values for the following 5 screens under current conditions.

Day correction (**+5 °C**). Confirm by pressing **OK** button.

Night correction (**-2 °C**). Confirm by pressing **OK** button.

Temperature increase (**0 °C**). Confirm by pressing **OK** button.

Frost protection **On**. Confirm by pressing **OK** button.

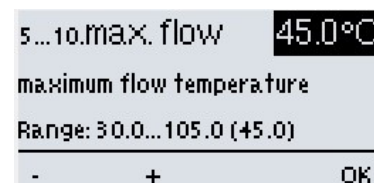
The min. temperature of heating circuit should be left at the default value of **15 °C**.

Confirm by pressing **OK** button.

8. Max. temperature of heating water.

Set the max. temperature of the heating circuit using the +/- buttons. Then press **OK**.

It is recommended to keep the default values for the following 5 screens under current conditions.



9. Discharge protection, leave Off. Confirm by pressing **OK** button.

10. Save and leave. Confirm by pressing **YES**.

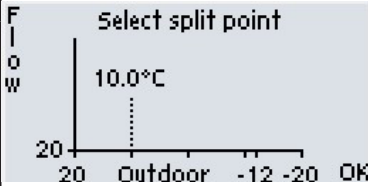
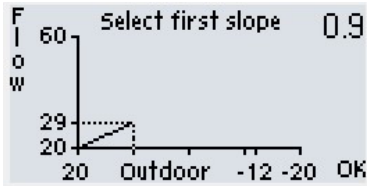
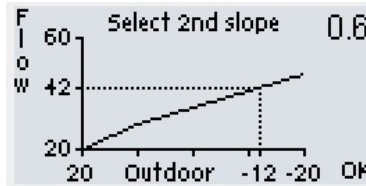
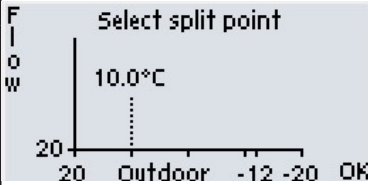
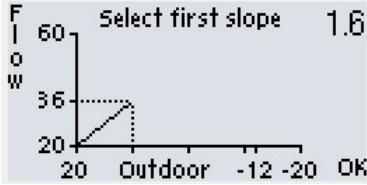
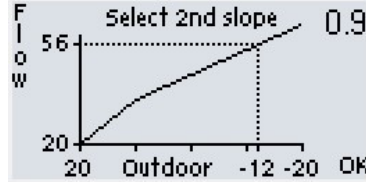
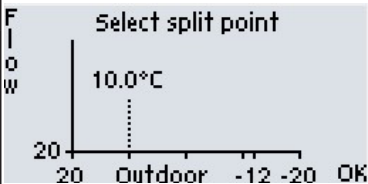
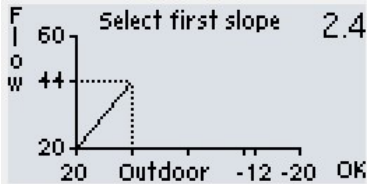
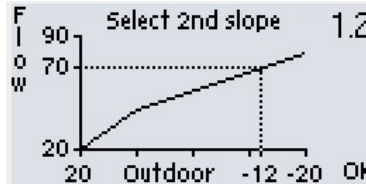
Having finished the initial setting, use the menu 4.1 in the “Manual” mode to test the switched outputs with the consumers connected, and to check the sensor values for plausibility. **Only after checking proper operation of all connected consumers and sensors in the Manual mode, switch the controller back to automatic mode.**

SETTING A SPLIT HEATING CURVE

Heating curve

Select the type **"split"** and confirm by pressing **OK** button.

Typical values for underfloor heating (design temperature drop 42 °C / 35 °C), low-temperature radiators (design temperature drop 55 °C / 45 °C) and high-temperature radiators (design temperature drop 70 °C / 55 °C) are shown here as examples. Enter the appropriate values depending on your heating system type.

HEATING SYSTEM TYPE	STEP 1	STEP 2	STEP 3
UNDERFLOOR HEATING (design temperature drop 42 °C / 35 °C)	Use the - / + buttons to set the slope change point of the curve to 10 °C and press the OK button. 	Use the - / + buttons to set the slope of the first curve section to the value of 0.9 and press the OK button. 	Use the - / + buttons to set the slope of the second curve section to the value of 0.6 and press the OK button. 
LOW-TEMP. RADIATORS (design temperature drop 55 °C / 45 °C)	Use the - / + buttons to set the slope change point of the curve to 10 °C and press the OK button. 	Use the - / + buttons to set the slope of the first curve section to the value of 1.6 and press the OK button. 	Use the - / + buttons to set the slope of the second curve section to the value of 0.9 and press the OK button. 
HIGH-TEMP. RADIATORS (design temperature drop 70 °C / 55 °C)	Use the - / + buttons to set the slope change point of the curve to 10 °C and press the OK button. 	Use the - / + buttons to set the slope of the first curve section to the value of 2.4 and press the OK button. 	Use the - / + buttons to set the slope of the second curve section to the value of 1.2 and press the OK button. 

Having set the split heating curve, continue in settings following the controller setting procedure.



After finishing the setup wizard, set the output of the heating circuit circulation pump in menu 7.2.6. PWM max.

E.3. FREE COMMISSIONING

If you decide not to use the commissioning help, you should do the necessary settings in the following sequence:

- menu 10. Language
- menu 3.1. Time and Date
- menu 7.1. Program Selection
- menu 5. Settings, all values.
- menu 6. Protection Functions (if any adjustments necessary)
- menu 7. Special Functions (if any adjustments necessary)

Note: The setup wizard can be accessed in menu 7.12. at any time.

Finally, the mode menu 4.1. “Manual” should be used to test the switched outputs with the consumers connected, and to check the sensor values for plausibility. Only after checking proper operation of all connected consumers and sensors in the Manual mode, switch on automatic mode.



Consider the explanations for the individual parameters on the following pages and check if further settings are necessary for your application.

E.4. GENERAL SETTINGS

3.1. Time & Date

In the event of a power failure, check the time on the controller. If the power failure lasts more than 24 hours, the clock in the controller will stop.

3.2. Daylight saving time

Setting of an automatic change to and from DST.

4. Operating Mode of the Controller

Leave the automatic mode here. Manual mode is for service purposes only.

6.1. Seizing Protection

If the anti-seizing protection is activated, the controller switches gradually all outputs at 12:00 noon for 5 seconds to prevent seizing of the pump/valve after long periods of inactivity.

7.12. Commissioning

This will launch the setup wizard.

7.13. Factory Settings

After resetting to the factory settings, it is advisable to launch the setup wizard.

8.1. Menu Lock

Securing the controller against unintentional changing the set values. Unlock by simple switching off this function.

10. Language

This is used to select the language for the menu guidance. The following languages can be set: German, English, French, Italian, Spanish, Czech, Polish, Russian or Dutch..

E.5. ADJUSTING TEMPERATURES & TIME PROGRAMS

Heating water settings

3.3. Heating Circuit (time program)

This menu is used to set the Day (comfort) and Night (setback) mode times for the heating circuit. The factory set time period for Night mode is from 22:00 to 6:00.

Note: increasing (decreasing) the heating water temperature by 3 °C in systems with radiators will usually result in a room temperature increase (drop) by 1 °C approx.

Heating water temperatures for time program in 3.3. can be set in menu:

5.1.6. Day Correction

The value by which the heating water flow temperature is increased.

5.1.7. Night Correction

The value by which the heating water flow temperature is decreased.

If you do not wish to use the time program, set the corrections in 5.1.6. and 5.1.7. to 0.

Room temperature settings

(Only with a room unit or sensor installed)

Room temperatures for time program 3.3 can be set in menus:

5.1.19.2. Room Reference (Day)

The desired room temperature for day mode.

5.1.19.3. Room Reference (Night)

The desired room temperature for night mode.

5.1.15. Room hysteresis

Hysteresis for switching on the heating circuit again when the room temperature drops.

Switching from the Summer mode is controlled by the outdoor temperature.

This can be set only when "Summer + room" is selected in menu 5.1.14.

5.1.19.1. Room Controller

This value is used to appoint the amount of influence the room temperature has on the reference flow temperature, as a percentage. With higher percentage, the flow temperature is more influenced by the indoor temperature which limits overheating or underheating of a building. Lower percentage is suitable for a reference room that is more exposed to sunshine or fitted with a fireplace – other rooms in the building could suffer from underheating.

Flow temperature correction is possible only within the limits of the Min. (5.1.9.) and Max. (5.1.10.) Flow temperature.

Temporary comfort boost

A special time program to boost the flow temperature. It can be used e.g. for a faster transition from the night to the day temperature.

3.4. Heating Circuit Comfort (time program)

Setting time periods for each day with a higher flow temperature.

The temperature increase can be set in menu 5.1.8.

5.1.8. Comfort boost

The value of further flow temperature increase, independent of other time programs.

Heating circuit

5.1.1. Operating mode of the heating circuit

It is recommended to keep the Heating mode setting.

5.1.2. Summer/Winter day

Here the outdoor temperature is set for automatic transition between the Winter and Summer modes in the Day mode. (Note: the Summer mode will switch off heating.)

5.1.3. Summer/Winter night

Here the outdoor temperature is set for automatic transition between the Winter and Summer modes in the Night mode.

5.1.5. Heating curve

According to the heating system type, the heating curve slope can be set depending on the outdoor temperature. Should overheating or underheating occur, the flow temperature can be modified using the Day correction (5.1.6.) or Night correction (5.1.7.).

If at certain outdoor temperatures the building suffers from overheating and at other outdoor temperatures underheating occurs, it will be necessary to change the curve slope or use a split curve.

The slope of 0.6 is usually set for underfloor heating, 1.1 for low-temperature radiators and 1.6 for high-temperature radiators.

For more info on the split curve, consult Chapter 5.1.5. of the complete Instruction Manual for the controller.

5.1.9. Minimum flowu (Tmin)

The minimum flow temperature kept while the heating circuit is on.

5.1.10. Maximum flow (Tmax)

When this temperature is exceeded, the heating circuit pump will be switched off.

5.1.14. Heating circuit off

Summer = the heating circuit will be shut off when the summer mode conditions are reached (5.1.2. a 5.1.3.).

Summer + room = the heating circuit will be shut off when the summer mode conditions or the desired room temperature are reached

5.1.18. Overload protection (thermal store cooling)

This function permits thermal store cooling after the critical temperature (5.1.18.2.) is exceeded. While in the active protection mode, the controller will mix heating water to the max. HC temperature (5.1.10.) until the temperature drops by 5 °C.

5.1.23. Fast boiler loading

If the quick heat function is not activated and the water in the system is cold, the load valve returns a significant portion of the heated water back to the boiler. This ensures a minimum temperature of water entering the boiler, but at the same time only a small amount of heated water enters the heating system. However, because the pump draws a much larger quantity of water into the heating system, a significant proportion of the heating water is also drawn from the cold thermal store. The heating water is then lukewarm and fails to heat the house sufficiently. Moreover, the temperature rise in the heating system is slow because the water in the thermal store is also heated (by the return water from the heating system) at the same time as the house is heated. The quick heat function prevents these phenomena and therefore prevents the simultaneous heating of water in the thermal store, thus allowing better use of the heat for heating the house as a priority.

Detailed description of the action: the quick heat function closes the mixing valve (optionally also stops the circulation pump 5.1.24.) to the heating system until the desired heating water temperature (optionally also fixed temperature 5.1.25.) is reached at the upper sensor of the thermal store. This prevents cold water from being pumped out of the thermal store.

Meanwhile, the heated water from the boiler gradually fills the pipes and the upper part of the thermal store. When the temperature at the upper sensor of the thermal store reaches the set value, the heating system pump is activated and pumps the heated water into the heating system.

As soon as cold water reaches the upper sensor of the thermal store, the system pump stops again and the process repeats. Only water heated by the boiler enters the system and is mixed to the desired temperature by the heating system mixing valve. More significant heating of the thermal store starts to occur as soon as the boiler output exceeds that of the heating system.

TIP: By placing the sensor from the upper part of the thermal store (S2) to the outlet pipe from the load unit to the thermal store (instead of into the thermal store), hot water does not enter the thermal store and in case of quick heat, space heating gets priority over the DHW heating.

However, the condition is that a sensor must also be installed in the lower part of the thermal store and the boiler pump control must be set towards this sensor. If a heating element is used for space heating, it shall have both a safety and an adjustable thermostat (it is recommended to set it to the maximum temperature required for heating).

6.2. Frost protection

If the outdoor temperature drops below 1 °C and the heating circuit is turned off, the frost protection will keep the min. flow temperature at the value set by (5.1.9.).

Warning: Switching the frost protection function off or setting the minimum flow temperature too low can lead to severe damage to the system!

6.3. Protection against cold water circulation through heating circuit

If the discharge protection is active (6.3.1.=On) and the temperature at the thermal store sensor or heating water temperature drops below the min. temperature of the heating circuit (6.3.2.), the mixing valve of the heating circuit will close and the circulation pump will stop. This will prevent insufficiently warm water from useless circulating in the heating circuit.

7.2.6. PWM maximum

Setting the head of the heating circuit pump. The lower is the set PWM value, the higher is the pump head – see the values in the table.

Head [m]	8.4	8	7	6	5	4	3	2	1
PWM maximum [%]	5	7	13	18	27	35	44	55	68

Boiler settings

5.11.1. Max. temperature of hot water storage tank (Storage tank Tmax))

Max. temperature at the storage tank sensor (5.11.6.). Above this value, the boiler pump remains always off.

5.11.2. Min. boiler temperature (Tmin SF)

Min. temperature at the boiler sensor (5.11.5.) to switch the boiler pump on. If the temperature is below this value, the boiler pump is always off.

5.11.3. Max. boiler temperature (Tmax SF)

Max. temperature at the boiler sensor (5.11.5.) for the boiler pump to run permanently. Above this value, the boiler pump remains on until the max. temperature in the hot water storage tank is reached.

5.11.4. Temperature difference to switch the boiler on/off (ΔT Solid fuel boiler)

Temperature difference between the (combination) thermals store and boiler flow temperature. Settings for switching the boiler pump on (ΔT SF on) and off (ΔT SF off).

5.11.5. Boiler sensor

Temperature sensor placed at the boiler outlet.

5.11.6. Storage sensor

Temperature sensor of a (combination) thermal store.

DHW heating

Anti-scald valve

The boiler heats water in the combination thermal store to a very high temperature. As a protection against scalding (and to reduce heat loss in DHW piping) an anti-scald valve shall be always installed at the hot water outlet (variant 1, options A, B). The valve limits the max. DHW temperature to the value set by the knob directly on the valve.

It is recommended to always install an anti-scald valve also at the outlet from the HW storage tank (variant 2) despite the fact that the desired DHW temperature is set in the menu. Many users set a high temperature in the HW storage tank in order to increase the hot water capacity in the storage tank despite interrupted heating.

El. heating element for DHW afterheating

An electric heating element plugged in an el. socket can be used to heat DHW in the periods when the boiler is out. The desired temperature is set by a knob directly on the heating element.

Under certain conditions, the installed heating element for space heating can be used to heat also DHW. For more info see the TIP1 in the Chapter D4. ELECTRIC HEATING ELEMENT FOR SPACE HEATING.

System configuration (variants 1)

In systems with a combination thermal store (variant 1, options A, B) DHW is heated automatically after the boiler starts up, no adjustments in the controller are needed.

System configuration (variants 2)

In systems with a separate hot water storage tank (variant 2) DHW is heated by heat transferred from the thermal store. When the temperature difference (5.6.1.) between the thermal store temperature and the HW storage tank temperature is reached, the controller will start the heat transfer pump. The heat transfer pump will stop as soon as the max. temperature of HW storage tank (5.6.2.) is reached. If the min. temperature of the thermal store (5.6.3.) is not reached at its sensor, the heat transfer pump will not start.

5.6.1. Temperature difference for switching the pump on/off

5.6.2. Max. temperature of the hot water storage tank

5.6.3. Min. temperature of the thermal store

E.6. AUXILIARY HEAT SOURCE (EL. HEATING ELEMENT) OPTIONAL ACCESSORY (NOT REQUIRED)

For Variant 1 (options A, B, C) only

Menu for an aux. heat source (el. heating element) is available when the system configuration “**1 (Combi+HC+SF)**” is selected. The auxiliary heat source is switched on when there is a demand to heat up the thermal store (a request from a heating circuit).

Switching of the el. heating element is controlled by a time program (5.8.9.) or by a request from the heating circuit thermostat (5.8.2.). If the thermostat is switched off, the auxiliary heat source will never be switched on!

5.8.2. Heating circuit thermostat

The aux. heat source will be activated only if there is a request for thermal store heating for a heating circuit.

5.8.3. Temperature to switch on an aux. heat source (TH Set)

The aux. heat source will switch on when the temperature at the reference sensor, depending on the active request, drops below this value (in case of an active request, the reference sensor is the DHW sensor – see 5.3.8., in case of an active request for thermal store charging, the reference sensor is the thermal store sensor – see 5.1.16.).

5.8.4. Switch-on delay

The aux. heat source switch-on delay.

5.8.6. Ecomode

This mode permits either blocking (**Shutdown** mode) or lowering the switch-on temperature of the aux. heat source from TH Set to Teco temperature (**Decrease** mode) in case when the boiler is active.

5.8.7. Reduced switch-on temperature to start an aux. heat source (Teco)

The temperature for switching on an auxiliary heat source when the option **Decrease** is selected (in the Energy Saving Mode 5.8.6.).

5.8.8. Heating circuit compensation

The heating water temperature reduction when the option **Decrease** is selected (in the Energy Saving Mode 5.8.6.) and the aux. heat source was switched on.

5.8.9. Heating element periods

This is intended to block the heating element outside of the preset time program.

E.7. DHW RECIRCULATION PUMP

OPTIONAL ACCESSORY (NOT REQUIRED)

This cannot be used together with an electric heating element controlled by the controller. If you require using both a circulation pump and an electric heating element, you can either use an el. heating element controlled by its integrated adjustable thermostat, or control the circulation pump by an external time switch.

In order to activate the output to a circulation pump at the R3 terminal, it is necessary to set the menu 7.9.9.1. to Off and 7.9.15.1. to On. The circulation pump can be controlled by a time program (7.9.15.7.) or according to temperature (7.9.15.2.). For control by temperature it is necessary to retrofit a contact temperature sensor on the pipe (code 9789) and set 7.9.15.4. = S1. In this configuration, the room sensor cannot be installed, however it is still possible to install the Caleon room unit.

5.23.6. Circulations periods

For each weekday, three time intervals can be specified when the DHW recirculation pump function is active. (If a temperature sensor is installed, the function will be switched on only if the temperature conditions are met.)

5.23.1. Min. DHW recirculation temperature (Tmin)

The circulation pump will switch on when the temperature at the reference sensor (5.23.3) drops below this value.

5.23.2. Hysteresis for switching off the pump

If the temperature at the reference sensor (5.23.3.) reaches the set value of Tmin (5.23.1.) + hysteresis, the DHW circulation pump will be shut down.

5.23.3. Circulation sensor in the DHW recirculation piping

Selection of the reference temperature sensor for recirculation.

5.23.4. Circulation pause time

Pause time before the circulation pump is started again.

E.8. COMPLETE CONTROLLER MENU

In this chapter you will find an overview of all functions of the BIO MIX controller. The controller is factory preset for the most common heating system configurations with the BIO MIX load unit.

Some functions may require the purchase of additional accessories or may not be usable.

List of controller menu chapters:

1. Measurement Values

2. Statistics

- 2.1. Today
- 2.2. 28 days
- 2.3. Operating Hours
- 2.5. Graphic Overview
- 2.6. Error Messages
- 2.7. Reset/Clear

3. Periods

- 3.1. Time & Date
- 3.2. Daylight saving time
- 3.3. Heating Circuit (time program)
- 3.4. Heating Circuit Comfort (time program)
- 3.5. Hot water enable (time program)
- 3.6. DHW heating - comfort (time program)

4. Operating Mode of the Controller

- 4.1. Manual

5. Settings

- 5.1. Settings heating circuit (Heating circ.)
- 5.2. Settings heating circuit 2 (not available)
- 5.3. Settings Domestic Hot Water (DHW)
- 5.4. 14 day reference value (14 day ref. val.)
- 5.5. Differential thermostat (Difference)
- 5.6. Heat pumping (Heat transfer)
- 5.7. General auxiliary heat source (Thermostat)
- 5.8. Aux. heat source (Heating element)
- 5.11. Solid fuel boiler (function of SF boiler)
- 5.12. Solar
- 5.17. Gas boiler (Burner)

- 5.22. Return flow increase (Return preheating)

- 5.23. Circulation (DHW recirculation)

- 5.24. Space dehumidifying (Dehumidifier)

6. Protective Functions

- 6.1. Seizing Protection
- 6.2. Frost Protection
- 6.3. Quick Heat & Discharge Protection

7. Speciální funkce

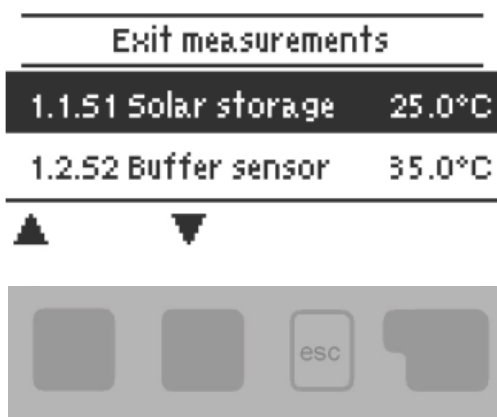
- 7.1. Program selection
- 7.2. Pump settings V1 (heating circuit pump)
- 7.3. Speed control V1 (not available)
- 7.4. Pump settings V2 (boiler pump)
- 7.5. Speed control V2 (boiler pump)
- 7.6. Sensor Calibration
- 7.7. Relay 1 (setting the R1 output)
- 7.8. Relay 2 (settings for R2 output)
- 7.9. Relay 3 (settings for R3 output)
- 7.10. Signal V1 (settings for V1 output) – heating circuit pump
- 7.11. Signal V2 (settings for V2 output) – boiler pump
- 7.12. Commissioning
- 7.13. Factory Settings
- 7.14. Eco Display Mode
- 7.15. Network

8. Menu Lock

9. Service values

10. Language

1. Measurement Values

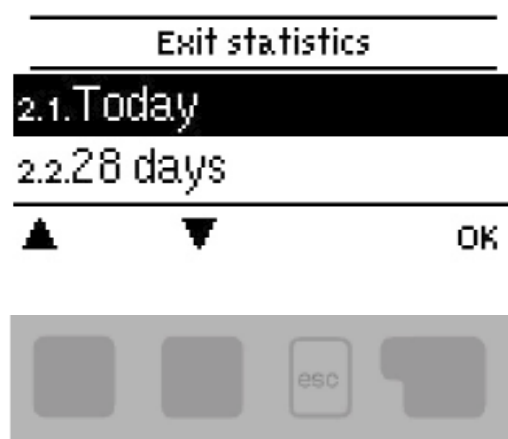


Menu “1. Measurement Values” is intended to display the current measured temperatures. The selected program and the specific controller model determine which measurement values are displayed. The menu is closed by pressing “esc” or selecting “Exit measurements”.



If “---” appears on the display instead of the measurement value, there may be a defective temperature sensor or its connection with the controller. If the cables are too long or the sensors are not placed well, small deviations in the measurement values may occur. In this case, the display values can be compensated by adjustments in the controller - see “Sensor calibration”, chap. 7.6. The selected program, connected sensors and the settings determine which measurement values are displayed.

2. Statistics



Menu “2. Statistics” is intended for function control and long-term monitoring of the system.

The menu is closed by pressing “esc” or selecting “Exit statistics”.



For system data statistics it is essential for the time to be set accurately on the controller. Please note that the clock will stop if the mains voltage is interrupted, and afterward must be reset. Incorrect time may result in data being cleared, recorded incorrectly or overwritten.

2.1. Today

In the graphical overview the characteristics of the flow temperatures, DHW and outdoor temperatures for the present day are shown from 0 to 24 h. The right button changes the unit of time (days) and the two left buttons scroll through the diagram

2.2. 28 days

Display of the operating hours of the controller outputs, where different time ranges (last day, week, month, year) are available.

2.3. Operating hours

Display of the operating hours of the controller outputs, where different time ranges (last day, week, month, year) are available.

2.5. Graphic overview

This results in a clear illustration of the data from 2.1. to 2.2. as a bar graph. Different time ranges are available for comparison. You can page through with the two left keys.

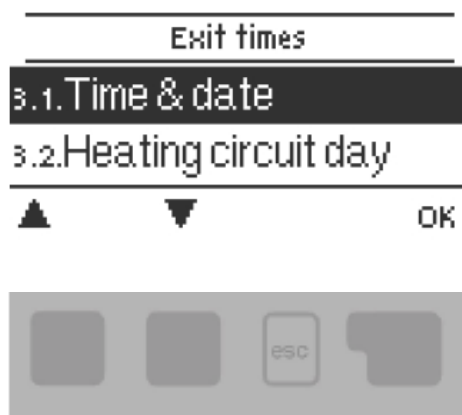
2.6. Error Messages

Display of the last 10 errors in the system with indication of date and time.

2.7. Reset/Clear

Resetting and clearing the selected statistics. Selecting “All statistics” clears everything except for the error log.

3. Periods



Menu 3. Periods contains settings for time, date and operating times for the heating circuit.

The menu is closed by pressing “esc” or selecting “Exit periods”.



The associated temperature reference values are specified in Menu 5. Settings.

3.1. Time & Date

This menu is used to set the current time and date.



For system data statistics it is essential for the time to be set accurately on the controller. Please note that the clock will stop if the mains voltage is interrupted, and afterward must be reset. Incorrect time may result in data being cleared, recorded incorrectly or overwritten.

3.2. Daylight saving time

Setting of an automatic change to and from DST (Daylight Saving Time).

3.3. Heating Circuit (time program)

This menu is used to select the daytime (Comfort) mode times for the heating circuit; three time periods can be specified for each weekday and copied to the following days.



Unspecified times are automatically considered to be night-time (setback) mode. The set times are only taken into account in the “Automatic” heating circuit operating mode.

3.4. Heating Circuit Comfort (time program)

This menu can be used to select a time range for each day of the week in which the heating circuit is supplied with a comfort temperature increased by the value set in menu 5.1.8. This period can be used e.g. for quick heating in the morning after a longer operation in the night (setback) mode.

3.5. Hot water enable (time program)

In this menu, the approval times for the DHW heating to temperatures set in menu 5.3.3 (DHW reference) are selected. For every weekday 3 periods can be determined and copied in the following days.

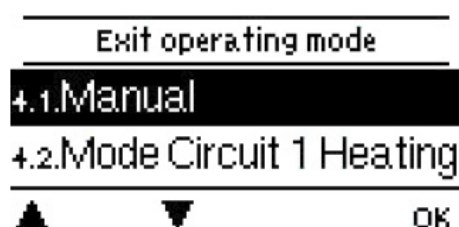
3.6. DHW heating - comfort (time program)

This menu used to select a time range for each day of the week in which the DHW is heated to comfort temperature set in menu 5.3.4 (DHW comfort).



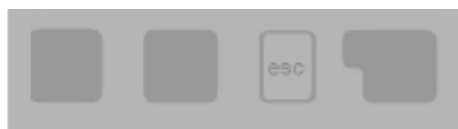
In times that are not set in menu 3.5 and 3.6, DHW is heated to temperatures set in menu 5.3.2 (Hot water minimum)

4. Operating Mode of the Controller



Menu “4. Operating Mode” can be used to switch the controller to automatic mode, turn it off, or switch to manual mode.

The menu is closed by pressing “esc” or selecting “Exit operating mode”.



4.1. Manual

In Manual mode, the individual relay outputs and the connected consumers can be checked for proper functioning and correct assignment.

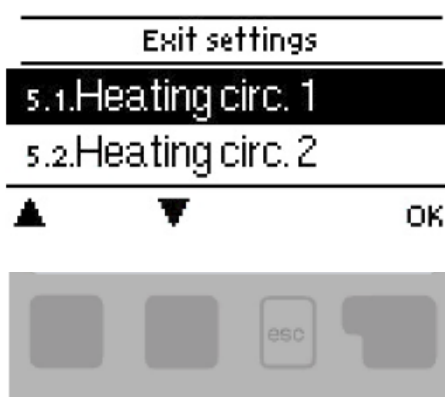
The relays and thus the connected consumers are switched on and off by pressing a key, with no regard to the current temperatures and set parameters.

The controller displays current measured temperatures.



The Manual mode may only be used by specialists during commissioning or function checks. Activating Manual mode during normal operation may result in a system damage or overheated water in the HW storage tank!

5.Settings



In Menu “5. Settings” the system parameters are set.

The menu is closed by pressing “esc” or selecting “Exit settings”.



By no means does the controller replace any safety elements in a heating circuit, DHW circuit, solar circuit and in electric devices of a heating system!

5.1. Settings heating circuit (Heating circ.)

5.1.1. Operating mode

Heating = automatic operating mode for a heating circuit following the preset desired temperatures, periods and heating curves. A heating circuit is switched on if all currently set temperature and time conditions for heating are met.

Cooling = operating mode for a heating circuit following the preset desired temperatures, periods and heating curves. A heating circuit is switched on if all currently set temperature and time conditions for cooling are met.

Heating/cooling = automatic heating and cooling operating when the transition between a heating and cooling modes is done by an external switch set in menu 5.1.19 (Room unit) to sensor type = season.

Ref. value = a special operating mode for a heating circuit, keeping a constant flow temperature set in menu 5.1.4. The controller ignores all other set desired temperatures, periods and heating curve.

Ref. value = a special operating mode for a heating circuit, keeping a constant flow temperature set in menu 5.1.4. The controller ignores all other set desired temperatures, periods and heating curve.

5.1.2. Summer/Winter day

If this temperature is exceeded at the outdoor sensor in the day period (comfort mode) of the heating circuit, the controller will turn off the heating circuit and switch to the Summer mode. When the outdoor temperature drops below this value, the heating circuit will be turned on again and switched to Winter mode.

5.1.3. Summer/Winter night

If this temperature is exceeded at the outdoor sensor in the night period (setback mode) of the heating circuit, the controller will turn off the heating circuit and switch to the Summer mode. When the outdoor temperature drops below this value, the heating circuit will be turned on again and switched to Winter mode.

5.1.4. Heating circuit refer.



This menu is available only when the operating mode Ref. value is set in menu 5.1.1.

This is the fixed heating water temperature for the operating mode Ref. value set in menu 5.1.1.

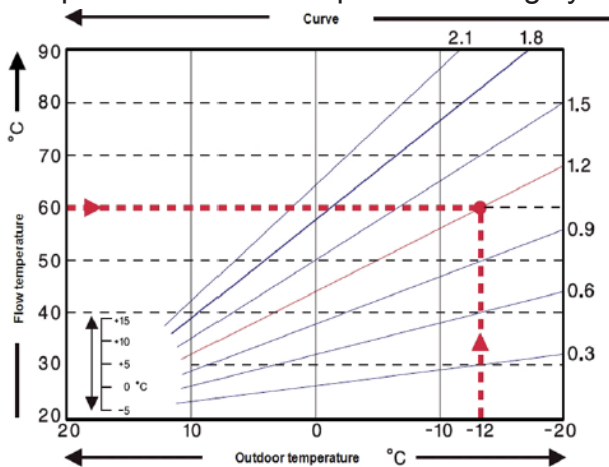
5.1.5. Heating curve

The weather compensating curve is used to control the heat dissipation of the heating circuit relative to the outdoor temperature. The curve can be set either as simple, or as split that is divided by a slope change point into two parts. The simple curve can be set using one parameter. The split one needs to be set in 3 steps.

Setting a split curve is more precise but also more complicated. First, a standard slope is set, then the slope change point and finally the slope after the slope change point. When setting the curve, the slope and calculated flow temperatures are shown for -12°C outdoor temperature.

The graph shows the influence of the selected slope of a simple curve (in the form of a straight line) on the calculated reference flow temperature. The correct curve is determined by defining the intersection point of the calculated max. flow temperature and min. outdoor temperature.

The right selection of a heating curve has a principal influence on a comfortable and efficient operation of a heating circuit. Its setting shall be done exclusively by an expert and based on the parameters of the specific heating system and its designed temperature drop.



Example:

Max. designed flow temperature is 60°C for -12°C outdoor temperature.

Then, the curve with 1.2 slope shall be selected in the controller.



The following settings (5.1.6. to 5.1.8.) can be used to apply a parallel shift of the heating curve for Day, Night and Comfort Temperature Boost modes.

5.1.6. Day correction

The Day correction causes a parallel shift of the heating curve during daytime operating hours. The value represents “by how many $^{\circ}\text{C}$ ” the heating circuit will be hotter/colder in the Day mode. Positive values mean a higher temperature, negative values a lower temperature.

5.1.7. Night correction

The Night correction causes a parallel shift of the heating curve during nighttime operating hours. The value represents “by how many $^{\circ}\text{C}$ ” the heating circuit will be hotter/colder in the Night mode. Positive values mean a higher temperature, negative values a lower temperature.

5.1.8. Comfort boost

The comfort temperature boost is a value added to / subtracted from the set day correction following a separate time schedule (3.4. Heating Circuit Comfort). The value of temperature increase / reduction is independent of the periods and Day/Night corrections.

In this manner it is possible to carry out e.g. quick heating up after night operating hours through a steeper heating water temperature rise, or on the contrary, a quicker temperature drop during a faster transition to night operating hours.

5.1.9. Minimum flow (T_{\min})

The minimum flow temperature kept while the heating circuit is on. In addition to that, the minimal flow temperature is the reference flow temperature for the frost protection function (6.2.) when the heating circuit is off.

5.1.10. Maximum flow (Tmax)

The maximum flow temperature. When exceeded, the heating circuit pump will be switched off and not started again until the temperature falls below this value.



Limiting the max. flow temperature does not replace a high limit thermostat that shall be connected to the pump power cable in systems that require safe limiting the max. flow temperature (e.g. underfloor heating, pipes or devices of lower temperature resistance etc.).

5.1.11. Switch on hysteresis for aux. heat source (Reference/actual -)

If the flow temperature or thermal store temperature drops below the desired flow temperature by the given value, the request for an auxiliary heat source will be activated after 1 minute.



Heat request for an aux. heat source is started when the flow temperature is continuously below reference temperature for 1 minute.



The request only works if a heat source is activated in the respective menu, not blocked and set for the heating circuit request (HC request).

5.1.12. Switch-off hysteresis for aux. heat source (Reference/actual +)

If the flow temperature or thermal store temperature exceeds the desired flow temperature by the given value, the request for an auxiliary heat source will be de-activated after 1 minute.

5.1.13. Switching off heating circuit pump (Version)

FL = the circulation pump is shut down if the reference temperature is exceeded.

S/W = in the winter mode it is shut down at Tmax, in the summer mode the heating circuit pump is shut down in general.

5.1.14. Heating circuit off

Summer = the heating circuit will be shut off when the summer mode conditions are reached (threshold temperature exceeded, see 5.1.2. and 5.1.3.)

Summer + room = the heating circuit will be shut off when the summer mode conditions are exceeded or the desired room temperature reached

5.1.15. Room hysteresis

Available only when the function HC off = Summer + room is activated (in menu 5.1.14.). Hysteresis for switching on the heating circuit again. If the room temperature drops below the desired value by the set hysteresis, the heating circuit will be switched on again.

5.1.16. Thermal store sensor (Buffer sensor)

Choosing a thermal store (buffer) sensor for a proper operation of the heating circuit. Or it may be a boiler flow sensor in systems with a boiler and no thermal store.



This selection is required for a proper functioning of heat sources. The source shall be activated with HC request enabled (the heat source is started when there is a heat request for a heating circuit).

5.1.17. Thermal inertia of a building

Thermal inertia of a building indicates how fast the calculated desired heating water temperature (following the heating curve) is influenced by a change in outdoor temperature. The heavier the building design, the more slowly can be the heating water temperature modified through the outdoor temperature. The value of thermal inertia indicates the delay with which the given outside temperature change is reflected in the calculation.

0 = No correction applied, all changes are immediate

1 = 1 = 15 minutes delay, 2 = 60 minutes, 3 = 120 minutes, 4 = 300 minutes

5.1.18. Overload protection (thermal store cooling)

If this function is activated and the temperature at the thermal store sensor exceeds “Max. buffer” (an adjustable threshold, displayed after the function is turned on), the heating circuit pump will start at max. speed, disregarded of the actual mode of the heating circuit. While in the active protection mode, the controller will mix heating water to the max. HC temperature (5.1.10.). As soon as the temperature in the thermal store drops below “Max. buffer” minus 5 °C, the heating circuit will return to its original mode.

5.1.19. Room Controller

This value is used to appoint the amount of influence the room temperature has on the reference flow temperature, as a percentage. For every degree the room temperature deviates from the reference room temperature, the percentage of the calculated reference flow temperature set here is added to or subtracted from the reference flow temperature. So the flow temperature is being adjusted following the real indoor temperature which reduces inefficient overheating of a building (or underheating e.g. in case of intensive ventilation). Flow temperature correction is possible only within the limits of the Min. (5.1.9.) and Max. (5.1.10.) flow temperature.

Example:

The desired room temperature: 25 °C, current measured temperature: 20 °C (the difference is 5 °C); the outdoor temperature is 0 °C

The calculated flow temperature following the heating curve is 40 °C. The room unit is set to 10%, 10% of the calculated temperature 40 °C makes 4 °C. The difference between the desired and current room temperature is multiplied by this value, i.e. $4 \times 5 \text{ °C} = 20 \text{ °C}$.

The required flow temperature shall be then increased by 20 °C, from 40 to 60 °C. If the Max. Flow parameter (5.1.10.) is set to 50 °C, the required flow temperature will be increased only to this value.

Room Reference (Day)

The desired room temperature for day mode.

Room Reference (Night)

The desired room temperature for night mode.



In the modes Ref, val. and 14 day ref. val. (menu 5.1.1.) the room unit has no influence.

Sensor type

The room controller is set here:

RC20 = the room unit has a direct influence on the flow temperature depending on the difference between the desired and real room temperature (please select if you use RC20, RC21 or Caleon room unit).

Contact = room thermostat with potential-free contact, contact open = Heating Circuit function turned off; contact closed = Heating Circuit function turned on.

Season = a seasonal switch connected (for the selected mode **heating/cooling**), contact open = cooling mode; contact closed = heating mode

Thermostat

Input terminal where a thermostat, seasonal input or a room unit's switch-over input is connected.

If you use Caleon room unit, here you should select the unit with the appropriate ID (ID for Caleon units can be found in menu 7.15. Network).

5.1.21. PV contact 1

This sensor input could be used as a PV-contact to signal overflow from a Photovoltaic System. If the PV-Contact set in this menu is closed, the heating circuit is set to Daytime mode.



For info on the operation and wiring of the PV contact please consult the technical manual of your PV system.

5.1.22. PV contact 2

This adds information on the condition of Smart grid from the electricity provider. When combined with the PV contact 1, the effect on the heating circuit is following:

PV1 open, PV2 open = heating circuit off

PV1 closed, PV2 open = heating circuit in Night mode

PV1 closed, PV2 closed = heating circuit in Day mode

PV1 open, PV2 closed = heating circuit in automatic mode following time program

5.1.23. Quick Heat from Boiler to Heating System

Special function for fast heat up of a heating system when heating the entire thermal store is prevented (only its upper section is heated), so that the heat from the boiler is used primarily for space heating. The activated function closes the mixing valve (optionally also stops the circulation pump 5.1.24) in the heating system until the desired heating water temperature is reached at the thermal store upper sensor (optionally also a fixed temperature 5.1.25 as an option).

5.2. Settings heating circuit 2 (not available)

5.3. Settings Domestic Hot Water (DHW)



By no means does the controller replace any safety elements!

5.3.1. Operating mode

Auto = automatic DHW heating mode using the preset time program and temperatures

Off = DHW heating is off

5.3.2. Hot water minimum

Min. DHW temperature outside the preset periods (see 3.5). If the temperature at the DHW sensor drops below this value, heat request for DHW is activated.



The request only works if a heat source is activated in the respective menu, it is not blocked and if this source is set for the DHW request.

5.3.3. DHW reference

The request only works if a heat source is activated in the respective menu, it is not blocked and if this source is set for the DHW request



The request only works if a heat source is activated in the respective menu, it is not blocked and if this source is set for the DHW request.

5.3.4. DHW comfort

The desired (min.) DHW temperature in the preset DHW Comfort periods (see 3.6). If the temperature at the DHW sensor drops below this value, heat request for DHW is activated.



The request only works if a heat source is activated in the respective menu, it is not blocked and if this source is set for the DHW request.

5.3.5. DHW hysteresis

The temperature hysteresis (difference) for DHW heating to be switched off. If the DHW temperature exceeds the currently desired temperature (one of the temperatures set in 5.3.2. to 5.3.4. following time programs set in 3.5. and 3.6.) + hysteresis set here, the heat request for DHW is deactivated.

5.3.6. Buffer DHW load

The DHW heating from the thermal store is turned on at an active heat request for DHW and if the temperature at the thermal store sensor is at least 8°C higher than at the DHW sensor. The DHW heating from the thermal store is shut down if the temperature difference between the thermal store and HW storage tank is less than 4 °C or if the temperature at the DHW sensor has reached the desired value and no DHW heat request is present.

5.3.7. DHW priority

If this function is activated, the reference flow temperature during a DHW heating will be set to the minimum flow temperature (5.1.9). Reducing the output of the heating circuit can bring substantially shorter time of DHW heating up.

5.3.8. DHW sensor

Here the DHW sensor is selected.

5.3.9. PV contact

This sensor input could be used as a PV-contact to signal overflow from a Photovoltaic System. If the PV-Contact is closed, the mode of DHW heating is changed to „comfort“ (the desired DHW temperature will be set to the value of 5.3.4 DHW Comfort).



For information about the operation and the connection of PV contact, refer to the technical description of your PV system.

5.4. 14 day reference value (14 day ref. val.)



The menu is available only if the mode 14 day ref. val. is set in menu 5.1.1.

Setting the program for heating circuit mode 14 day ref. val. In this menu, the start date and time for the program can be set together with the desired temperatures for the next 14 days.

5.5. Differential thermostat (Difference)



The menu is available only if the differential thermostat is assigned to an output in menu 7. Special functions.

A differential thermostat that will switch on the output as soon as the switch-on temperature difference between sensors 5.5.2. and 5.5.3. is reached and switch it off if the switch-off temperature difference between sensors 5.5.2. and 5.5.3. is not reached any more.

5.5.1. Temperature difference for switching on/off (ΔT DF on / ΔT DF off)

Temperature difference between a source sensor 5.5.2. and consumer sensor 5.5.4. for switching on (ΔT on) and off (ΔT off) the respective controller output.

5.5.2. Heat source sensor (DF-Source)

Temperature sensor for a heat source (e.g. a solar collector) – a higher temperature is expected than at the consumer sensor.

5.5.3. Min. source temperature (Diff. Tmin)

Min. temperature at the heat source sensor that will permit the differential thermostat function. If the temperature Diff. Tmin is not reached at the heat source sensor, the differential thermostat output contacts will not close.

5.5.4. Consumer sensor (DF-Drain)

Temperature sensor for a consumer (e.g. a thermal store) – a lower temperature is expected than at the source sensor.

5.5.5. Max. temperature of a heat consumer (Tmax DF-Drain)

Max. temperature at the heat consumer sensor for switching off the differential thermostat function. If the temperature at the consumer sensor is higher than DF-Drain, the differential thermostat output contacts will not close.

5.6. Heat transfer



The menu is available only if the heat transfer function is assigned to an output in menu 7. Special functions.

The function of heat transfer between two hot water storage tanks that will switch on the output if the switch-on temperature difference between sensors 5.6.4. and 5.6.5. is reached and switch it off if the switch-off temperature difference between sensors 5.6.4. and 5.6.5. is not reached any more.

5.6.1. Temperature difference for pump switch on/off (ΔT Heat transfer)

Temperature difference between a source sensor 5.6.4. and consumer sensor 5.6.5. for switching on (ΔT on) and off (ΔT off) the heat transfer pump.

5.6.2. Max. temperature in hot water storage tank (HT Tmax)

Max. temperature at the consumer sensor for switching off the heat transfer function.

5.6.3. Min. temperature in thermal store (HT Tmin)

Min. temperature at the heat source sensor that will permit heat transfer. If the temperature of HT Tmin is not reached at the source sensor, the heat transfer pump will not switch on.

5.6.4. Heat source sensor (thermal store)

The temperature sensor for a heat source (e.g. a thermal store) – a higher temperature is expected than at the consumer sensor.

5.6.5. Heat consumer sensor (hot water storage tank)

Temperature sensor for a heat consumer (e.g. a hot water storage tank) – a lower temperature is expected than at the source sensor.

5.7. General auxiliary heat source (Thermostat)



The menu is available only if the Auxiliary heat source function is assigned to an output in menu 7. Special functions.

Settings are identical with 5.8. Aux. heat source (heating element).

5.8. Aux. heat source (heating element)



The menu is available only if the Auxiliary heat source function is assigned to an output in menu 7. Special functions.

Switching an aux. heat source if there is a heat request to charge a thermal store (a request from a heating circuit) or a request for DHW heating.

5.8.1. DHW thermostat

The Aux. heat source function will be activated only if there is a request for DHW heating (the measured DHW temperature has dropped below the currently desired temperature following the preset DHW temperatures and periods – see menu 5.3.).

5.8.2. Heating circuit thermostat

The Aux. heat source function will be activated only if there is a request for thermal store heating for a heating circuit.



The aux. heat source switching is influenced by the time programs and method of switching – either following a request from DHW or following a request from the heating circuit. In case both the thermostats (5.8.1. and 5.8.2.) are switched off, the aux. heat source will never be switched on!

5.8.3. Temperature to switch on an aux. heat source (TH Set)

Preset temperature to switch on an aux. heat source (e.g. an electric heating element). The heat source will switch on when the temperature at the reference sensor (depending on the active request) drops below this value. In case of an active request, the reference sensor is the DHW sensor (5.3.8.), in case of an active request for thermal store charging, the reference sensor is the thermal store (buffer) sensor (5.1.16.).

5.8.4. Switch-on delay

The aux. heat source switch-on delay. If all other switch-on conditions are met, the heat source will switch on after the time set here expires.

5.8.5. Switch-off hysteresis

The aux. heat source switch-off hysteresis. If the temperature at the reference sensor exceeds the preset temperature (5.8.3. TH Set) + hysteresis, the aux. heat source will be switched off.

5.8.6. Ecomode

The Energy Saving Mode for an aux. heat source in case when solid fuel boiler or solar charge is active. Either Shutdown (the aux. source will turn off completely) or Decrease options are available. In the Decrease mode, the temperature Teco (5.8.7.) is used instead of TH Set (5.8.3.).

5.8.7. Decreased switch on temperature for aux. heat source (Teco)

The set temperature for switching on an auxiliary heat source when the option Decrease is selected and the Energy Saving Mode for an aux. heat source (5.8.6.) is active.

5.8.8. Heating compensation (HC compensation)

The desired heating water temperature reduction when the option Decrease is selected and the Energy Saving Mode for an aux. heat source (5.8.6.) is active.

5.8.9. Heating rod periods

Time program for a heating element. For each weekday, three periods can be specified when the aux. source function is active. The source will be switched on in these periods only when the demand for switching from either DHW or a heating circuit is met and at the same time, the desired temperature is not reached.

5.8.10. Anti Legionella

Switching on protection against Legionella bacteria (this function makes sense only for a hot water storage tank). When this function is on, the controller will increase the desired temperature for DHW heating in the preset time intervals to the temperature 5.8.10.2. AL Tref using an auxiliary heat source.

This temperature will be kept by the controller at both the optional sensors (5.8.10.5., 5.8.10.6.) during the period set by parameter 5.8.10.3. AL residence time. After the set period expires, the date and time of the last AL heat is saved to parameter 5.8.10.4. Last AL heat.

5.11. Solid fuel boiler (function)



The menu is available only if the Solid fuel boiler function is assigned to an output in menu 7. Special functions.

Switching on the solid fuel boiler pump when the difference between the boiler sensor and storage sensor (typically a thermal store or a hot water storage tank) is exceeded.

5.11.1. Max. temperature of storage tank (Solid fuel boiler Tmax)

Maximum temperature at the storage sensor (5.11.6.) to stop the boiler pump. If the storage tank temperature is above this value, the boiler pump remains stopped disregarded of the other conditions.

5.11.2. Min. temperature of solid fuel boiler (Solid fuel boiler Tmin)

Min. temperature at the boiler sensor (5.11.5.) to switch the boiler pump on. If the temperature is below this value, the boiler pump remains stopped disregarded of the other conditions.

5.11.3. Max. temperature of solid fuel boiler (Solid fuel boiler Tmax)

Maximum temperature at the boiler sensor (5.11.5.) for the boiler pump to remain permanently on. If the boiler temperature is above this value, the boiler pump remains on even if the temperature difference is not met. When the max. storage temperature (5.11.1.) is reached, the pump is switched off again.

5.11.4. Temperature difference to switch the boiler on/off (ΔT Solid fuel boiler)

Switching temperature difference between the boiler sensor 5.11.5. and storage sensor 5.11.6. – to switch on (ΔT SF on) and off (ΔT SF off) the boiler pump.

5.11.5. Boiler sensor

Boiler temperature sensor – a higher temperature is expected than at the storage sensor.

5.11.6. Storage sensor

Storage temperature sensor (e.g. a thermal store) – a lower temperature is expected than at the boiler sensor.

5.12. Solar



The menu is available only if the Solar function is assigned to an output in menu 7. Special functions.

Switching on the solar pump when the difference between the solar collector sensor and solar tank sensor (typically a thermal store or a hot water storage tank) is exceeded.

5.12.1. Minimum temperature at solar collector (Tmin St.)

Minimum temperature at the solar collector sensor (5.12.6.) to switch on the solar pump. If the temperature at the solar collector sensor is below this temperature, the solar pump remains stopped disregarded of the other conditions.

5.12.2. Temperature difference for switching solar on/off (ΔT Solar)

Temperature difference between a solar collector sensor 5.12.6. and a storage tank sensor 5.12.7. for switching on (ΔT Solar on) and off (ΔT Solar off) the solar pump.

5.12.3. Maximum temperature at storage tank (Tmax)

Maximum temperature at the solar tank sensor (5.12.7.) to start the solar pump. If the solar tank temperature is above this value, the solar pump remains stopped disregarded of the other conditions.

5.12.4. Starting aid



This function is not used for Regulus solar collectors.

For some solar thermal systems, in particular for evacuated 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”.



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.

5.12.5. Protective Functions

Protective functions for solar thermal system. The description of other protective functions can be found in Chap. 6. Protective Functions.

5.12.5.1. 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. If the value “**AS Ton**” on the collector has been exceeded for 1 min., the pump will be turned off and not turn on again in order to protect the solar thermal system components from overheating. The pump is turned on again when the collector temperature drops below the value “**AS Toff**”.



With the system protection on, there are increased stagnation temperatures in the solar collector and therefore an increased pressure in the system. The operating manuals from the system components must be observed.

5.12.5.2. Collector protection

The collector protection prevents the collector from overheating. A forced switching of the pump makes sure that the collector is cooled through the storage. If the value “**KS Ton**” is exceeded on the collector, the pump will be turned on in order to cool the collector. The pump is shut down if the collector temperature drops below “**KS Toff**” or the value “**KS Tmax Sp.**” (5.12.5.2.3.) on the solar storage is exceeded.



System protection has priority over collector protection! Even if the switch requirements for the collector protection are present, the solar circulation pump is turned off once “**AS T on**” is reached. As default, the values from the system protection (depending on the maximum temperature of the storage or other components) are higher than the collector protection.

5.12.5.3. Recooling

At the end of a sunny day the temperature in a storage tank may easily reach high values. In order to prevent further temperature increase the next day, excess energy can be released into the air via collectors under cloudy conditions or after sunset. If the temperature in the storage tank exceeds the value “**Return cooling Tref**” and the collector is at least by 20 °C cooler than the storage tank, the solar pump starts. The storage tank is then cooled down until the “**Return cooling Tref**” is reached.



Energy is lost through the collector through this function! The recooling should only be activated in cases of exception, with low heat consumption, for example during holidays.

5.12.5.4. Frost Protection

A 2-level frost protection function can be activated. In level 1, the controller turns on the pump every hour for 1 minute if the collector temperature is below the set value “**Frost Level 1**”. If the collector temperature continues to decrease to the set value “**Frost Level 2**”, the controller will turn on the pump without disruption. If the collector temperature exceeds the value “**Frost level 2**” by 2 °C, the pump will turn off again.



Energy is lost through the collector through this function! Regulus solar thermal system use antifreeze fluid only and the frost protection is off.

5.12.5.5. Collector alarm

If the “Collector Tmax” temperature at the collector sensor is exceeded when the solar pump is turned on, a warning or error notification is triggered. There is a corresponding warning in the display.

5.12.6. Collector sensor

The temperature sensor placed at a solar collector – a higher temperature is expected than at the storage sensor.

5.12.7. Storage sensor

Temperature sensor for a solar tank (e.g. a thermal store) – a lower temperature is expected than at the collector sensor.

5.17. Gas boiler (Burner)



The menu is available only if the Burner function is assigned to an output in menu 7. Special functions.

Switching on the boiler when there is a request to charge a thermal store (demanded by a heating circuit), or to heat up DHW.

5.17.1. DHW request

The Boiler (Burner) function will be activated only when there is an active demand for DHW heating (the measured DHW temperature has dropped below the currently desired value following the set DHW temperatures and periods – see menu 5.3.).

5.17.2. HC request

The Boiler (Burner) function will be activated only when there is an active demand for charging the heating circuit's thermal store.



The boiler switching is influenced by the time programs and method of switching – either following a request from DHW or following a request from the heating circuit. In case both the thermostats (5.17.1. and 5.17.2.) are switched off, the boiler will never be switched on!

5.17.3. Burner sensor

An optional boiler temperature sensor for switching off the boiler when the max. temperature is reached (see 5.17.9.).

5.17.4. Delay

Boiler switching delay. If all other switch-on conditions are met, the boiler will switch on after the period of time set here expires.

5.17.5. Ecomode

A boiler economy mode when heating by a solid fuel boiler or solar collectors is active. This function can be operated in 2 different variants: Shutdown, when the boiler is completely switched off, or Decrease. In the Decrease mode, the boiler is switched on only if the temperature at the optional boiler sensor drops below Teco (5.17.6.).

5.17.6. Decreased temperature for boiler switching (Teco)

The preset switch-on temperature for the boiler when the Decrease option is selected and the boiler Eco mode is active (see 5.17.5.).

5.17.7. Decreased temperature of heating circuit (HC offset)

The desired HC temperature offset if the Decrease option is selected and the boiler Eco mode is active (see 5.17.5.).

5.17.9. Max. boiler temperature (Tmax)

Maximum boiler temperature measured by the optional boiler sensor (5.17.3.). If this temperature at the set sensor is exceeded, the boiler is shut down. The boiler will be started again when the temperature drops below the value Tmax. Switching off the boiler by the max. temperature can be disabled by selecting the Off option.

5.17.10. Boiler time program

Time program of the boiler. For each weekday, three time intervals can be specified when the boiler function is enabled. The boiler can be switched on in these intervals only if the switch-on request by either DHW or heating circuit is met.

5.17.11. Protection against Legionella

Protective function against Legionella.

The settings are identical with the settings of protective functions for aux. heat sources (see 5.8.10.).

5.22. Return flow increase (return preheating)



The menu is available only if the Return flow increase function is assigned to an output in menu 7. Special functions.

The return flow increase will be switched on when the difference between the storage sensor (e.g. thermal store) and the return flow sensor is exceeded.

5.22.1. Max. temperature in storage tank (Tmax)

Max. temperature at the storage sensor (5.22.4.) to stop the return flow increase. If the storage temperature is above this value, the function remains stopped disregarded of the other conditions.

5.22.2. Temperature difference to switch on and off the return flow increase (Δt on / Δt off)

A temperature difference between the storage sensor (5.22.4.) and the heating return flow sensor (5.22.3.) to switch on (Δt on) and off (Δt off) the return flow increase function.

5.22.3. Return flow sensor

Teplotní čidlo umístěné na topné zpátečce – je očekávána nižší teplota než na čidle zásobníku.

5.22.4. Storage sensor

Temperature sensor for a storage tank (e.g. a thermal store) – a higher temperature is expected than at the heating return flow sensor.

5.23. Circulation (DHW recirculation)



The menu is available only if the DHW circulation function is assigned to an output in menu 7. Special functions.

Switching on the DHW recirculation pump when the temperature in the recirculation piping drops below the min. value.

5.23.1. Min. DHW recirculation temperature (T_{min})

The min. DHW recirculation temperature to switch on the circulation pump. The circulation pump will switch on when the temperature at the reference sensor (5.23.3.) drops below this value.

5.23.2. Hysteresis for switching off the pump

Hysteresis for switching off the circulation pump. If the temperature at the reference sensor reaches the set value (5.23.1. T_{min}) + hysteresis, the DHW circulation pump will be shut down.

5.23.3. Circulation sensor

Temperature sensor in the DHW recirculation piping.

5.23.4. Circulation pause time

Pause time before the circulation pump is started again after it was shut down, when also the requirement **T_{min} + Hysteresis** is met. Intended to prevent frequent starting of the circulation pump.

5.23.6. Circulation periods

Time program of the DHW circulation pump. For each weekday, three time intervals can be specified when the DHW circulation pump function is enabled. The function will be switched on in these intervals only if the switch-on condition for DHW recirculation is met.

5.24. Room dehumidifier (Dehumidifier)



The menu is available only if the Dehumidifier function is assigned to an output in menu 7. Special functions. A special room unit Caleon needs to be connected to the controller.

Switching on dehumidifying operation in the selected operating mode when the max. humidity set here is exceeded.

5.24.1. Operating mode

The operating mode of the dehumidifier function can be set here.

Summer = Dehumidifier is active only in the HC summer mode (see 5.1.2. and 5.1.3.).

Summer+Circ. = Dehumidifier is active only in the summer mode or if the HC circulation pump is running in winter mode.

Year round = Dehumidifier is active all year round disregarded of the heating circuit mode.

5.24.2. Reference humidity

Max. humidity to switch on the dehumidifier function. The function will be switched on depending on the active operating mode if the actual humidity is higher than the set value.

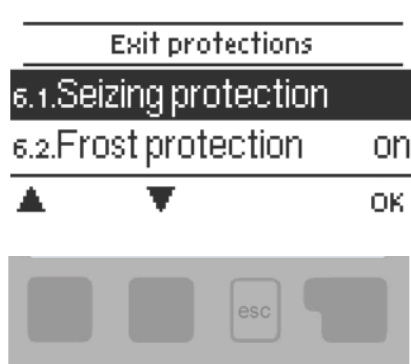
5.24.3. Hysteresis to switch off the dehumidifier

Hysteresis to switch off the dehumidifier. If the humidity drops below the value set (5.24.2. Reference humidity) by the dehumidifier hysteresis value, the function will be switched off.

5.24.4. Time program of the Dehumidifier

Time program of the Dehumidifier. For each weekday, three time intervals can be specified when the Dehumidifier function is enabled. The function will be switched on in these intervals only if the switch-on condition for Dehumidifier is met.

6. Protective Functions



In Menu 6. Protections the system protective functions are set and activated.

The menu is closed by pressing "esc" or selecting "Exit protections".



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

6.1. Seizing Protection

If the anti-seizing protection is activated, the controller switches gradually all outputs at 12:00 noon for 5 seconds to prevent seizing of the pump/valve after long periods of inactivity.

6.2. Frost Protection

If the outdoor temperature at the respective sensor drops below 1 °C and the heating circuit is turned off, the frost protection will turn on the heating circuit and set the reference flow temperature at the minimum flow temperature (see 5.1.9.). As soon as the outdoor temperature exceeds 1 °C, the heat circuit is switched off again.



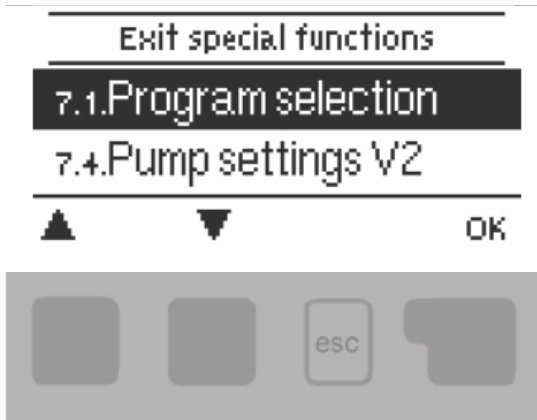
Switching the frost protection function off or setting the minimum flow temperature too low can lead to severe damage to the system.

6.3. Protection against cold water circulation through heating circuit

If the discharge protection is active and the temperature at the thermal store sensor or heating water temperature drops below the min. temperature of the heating circuit (6.3.2.) decreased by 5 °C hysteresis, the mixing valve of the heating circuit will close and the circulation pump will stop. This will prevent insufficiently warm water from useless circulating in the heating circuit.

The heating circuit pump will start again when the thermal store temperature exceeds the temperature set in 6.3.2.

7. Special Functions



In Menu 7. Special Functions the basic controller settings and expanded functions are set.

The menu is closed by pressing “esc” or selecting “Exit Special Functions”.



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

7.1. Program selection

Here the appropriate hydraulic variant is selected (see D.2. Hydraulic Variant). The respective diagram is displayed by pressing “info”.



The program selection normally occurs only once during commissioning by a specialist. An incorrect program selection may lead to unpredictable errors.



When the hydraulic variant is changed, other settings will be reset to default values.

7.2. Pump settings V1 (heating circuit circulation pump)

Do not change this setting, it is intended for the pump integrated in BIO MIX pump station. If necessary, only the max. head of the pump may be adjusted (7.2.6.).

7.2.1. Signal type (default is “PWM”)

The type of pump speed control is set here:

0-10V: permits to change the speed of a high efficiency pump controlled by a 0-10V signal

PWM: permits to change the speed of a high efficiency pump controlled by a PWM signal

7.2.2. Pump (default profile is “Heat”)

A selection from the preset control profiles for the pump. The settings can still be changed manually after a profile has been selected.

7.2.3. Output Signal (default profile is “inverted”)

This menu determines the type of the outgoing control signal. Solar pumps (normal profile) perform at their highest power when the signal is also at its maximum. Heating pumps (inverted profile) on the other hand are set to the highest power when the control signal is at the lowest.

7.2.4. PWM / 0-10V off (default setting is “98%”)

The control signal value for the pump to be turned off (required by pumps with cable break detection, their control signal value must not be zero).

7.2.5. PWM / 0-10V on (default setting is “87%”)

The control signal value for the pump to start and run at a minimum speed.

7.2.6. PWM / 0-10V max. (default setting is “7%”)

Setting the head of the heating circuit pump. The lower the PWM value, the higher the head – see the values in the table.

Head [m]	8,4	8	7	6	5	4	3	2	1
PWM maximum [%]	5	7	13	18	27	35	44	55	68

7.2.7. Show signal

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

7.3. Speed control V1 (not available)

7.4. Pump settings V2 (boiler circulation pump)

The default settings are identical with Pump settings V1 (menu 7.2).

Do not change this setting, it is intended for the pump integrated in BIO MIX pump station.

It is not recommended to limit the head of the pump, as this could cause boiler overheating.

The controller controls the pump automatically at optimum speed.

7.5. Speed control V2 (boiler circulation pump)

Do not change this setting, it is intended for the pump integrated in BIO MIX pump station.

It is not recommended to limit the speed of the pump, as this could cause boiler overheating.

The controller controls the pump automatically at optimum speed.

7.5.1. Variants of speed control (default setting is “M1”)

Off: There is no speed control.

M1: Speed control set to ΔT , starts from the max. speed:

After the purging time the controller keeps the pump at the set max. speed. If the temperature difference ΔT between the reference sensors is smaller than the set value (in the settings for a solid fuel boiler or solar thermal system), then the speed is decreased by one step after the Sweep time expires. If the temperature difference between the reference sensors is greater than the set value, then the speed is increased by one step after the Sweep time expires. If the controller has adjusted the speed of the pump down to the smallest stage and the ΔT between the reference sensors is below the desired ΔT off, the pump is switched off.

M2: Speed control set to ΔT , starts from the min. speed:

After the purging time the controller switches to the set min. speed. If the temperature difference ΔT between the reference sensors is greater than the set value (in the settings for a solid fuel boiler or solar thermal system), then the speed is increased by one step after the Sweep time expires. If the temperature difference ΔT between the reference sensors is below the set value, then the speed is decreased by one step after the Sweep time expires. If the controller has adjusted the speed of the pump down to the smallest stage and the ΔT between the reference sensors is below the desired ΔT off, the pump is switched off.

M3: Speed control set to a constant heat source temperature, starts from the min. speed.

After the purging time the controller switches to the set min. speed. If the temperature at the heat source reference sensor is higher than the Setpoint, then the speed is increased. If the temperature at the source reference sensor is less than the Setpoint, then the speed is decreased.

7.5.2. Purging time (default setting is “8s”)

During this time the pump runs at its full speed (100 %) to ensure reliable starting. Only after this purging time does the pump run with speed control and switches to the max. or min. speed, depending on the variant set (M1-M3).

7.5.3. Sweep time (default setting is “4min”)

In the process of speed control a certain delay before any speed change is needed in order to avoid quick speed changes and subsequent large temperature oscillations.

7.5.4. Max. speed (default setting is “100%”)

The maximum speed of the pump for speed control variants is determined here.

It is not recommended to limit the head of the pump, as this could cause boiler overheating.

The controller controls the pump automatically at optimum speed.



The indicated percentages are informative values that may vary to a greater or lesser extent depending on the system, pump and pump stage.

7.5.5. Min. speed (default setting is “10%”)

The minimum speed of the pump for speed control variants is determined here.



The indicated percentages are informative values that may vary to a greater or lesser extent depending on the system, pump and pump stage. 100% is the maximum possible power of the controller.

7.5.6. Setpoint (default setting is “60 °C”)

This value is the control setpoint for speed control M 3 (see Chap. 7.5.1.) If this value undershot at the collector sensor, the speed is reduced. When it is exceeded, the speed is increased.

7.5.7. ΔT setting (default setting is “10 °C”)

Temperature difference for pump speed control.

7.6. Sensor Calibration

If e.g. the cables are too long or the sensors are not placed well, small deviations in the measurement values may occur. In this case, the compensation can be set for each sensor separately in 0.5 °C steps.



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

7.7. Relay 1 (setting the R1 output)

In the RegulusBIO load unit the mixing valve (opening) is connected to the R1 output.

For this reason keep the R1 setting at 7.7.2.

7.7.2. Mixer opens

Here the separate parameters of mixing valve control can be adjusted.

7.7.2.2. Direction (default setting is “right”)

The direction of the mixing valve rotation when opening – right or left. Keep the default value.

7.7.2.3. Valve Turn Time (default setting is “2s”)

Shift time of the mixing valve at the Open command. Then the valve stops and a Pause (7.7.2.4.) starts. Depending on the temperature change, the controller controls further valve reaction. The shorter the shift time, the more precise is the control to the desired temperature, but slower, and vice versa.

7.7.2.4. Pause factor (default setting is “1.0”)

The calculated pause time of the mixer is multiplied with the value set here. If the pause factor is “1”, the normal pause time is used, “0.5” will use half the normal pause time, “4” would quadruple the pause time. The value is individual for different mixing systems (actuator speed, thermal inertia of the system, flow rate, valve authority etc.). Setting a too short pause could cause instability and oscillation of mixing.

7.7.2.5. Increase (default setting is “0”)

If the temperature drops very fast, this value is subtracted from the measured flow temperature so that the mixer's reaction is stronger. If the measured temperature does not drop any more, the measured value is used again. The measurement occurs once every minute.



These settings are only necessary in special cases at the time of initial commissioning by the specialist. Incorrect measurement values can lead to unpredictable errors and wrong functioning of the heating system.

7.8. Relay 2 (settings for R2 output)

In the RegulusBIO load unit the mixing valve (closing) is connected to the R2 output.

For this reason keep the R2 setting at 7.8.3.

7.9. Relay 3 (settings for R3 output)

Items 7.9.1. to 7.9.3. are reserved for outputs R1 and R2 in the BIO MIX load unit (do not assign them to R3 output).

For variant 3 the option “Heat transfer” (7.9.7.) is pre-defined and cannot be changed.

For other variants the options for setting the output R3 are following:

7.9.6. Difference

Difference thermostat settings are described in Chap. 5.5.

7.9.7. Heat transfer

Heat transfer settings are described in Chap. 5.6.

Preset option for Variant 2.

7.9.8. Thermostat

Thermostat settings are described in Chap. 5.7.

7.9.9. Heating element

Heating element settings are described in Chap. 5.8.

7.9.10. Solid fuel boiler

Solid fuel boiler settings are described in Chap. 5.11.

7.9.11. Solar

Solar circuit settings are described in Chap. 5.12.

7.9.12. Gas boiler (Burner)

Gas boiler settings are described in Chap. 5.17.

7.9.14. Return flow increase

Return flow increase settings are described in Chap. 5.22.

7.9.15. Circulation

DHW recirculation settings are described in Chap. 5.23.

7.9.16. Error messages

The relay will close when an error occurs. This function can be reversed, which means that the relay will be closed normally and open when an error occurs.

The Controller error conditions are:

Collector protection

System protection

Frost Protection

Recooling

Anti Legionella

Message – a relay is activated when an informative message is displayed.

7.9.17. Dehumidifier

Dehumidifier settings are described in Chap. 5.24.

7.9.18. Parallel operation

The function switches parallel to the set signal output – both the outputs switch in parallel. The function can be inverted, so the output switches contrary to the set signal output.

7.9.18.2. Parallel to

Here, the output can be selected, which this function should be activated parallel to. Every available signal output can be selected.

7.9.18.3. Delay

In this menu, it is set how long to wait after switching the signal output until the parallel operated relay switches as well.

7.9.18.4. Followup time

In this menu, it is set how long the parallel-operated relay continues to operate after the set signal output has been deactivated.

7.9.20. Always on

The output is permanently switched on.

7.10. Signal V1 (settings for V1 output – heating circuit pump)

In the RegulusBIO load unit the boiler pump is connected to the V1 output. Do not change this setting.

7.11. Signal V2 (settings for V2 output – boiler circulation pump)

In the RegulusBIO load unit the boiler pump is connected to the V2 output. Do not change this setting.

7.12. Commissioning

The commissioning help guides you through the necessary basic settings in the correct order, 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 the “esc” more than once takes you back step by step to the selection mode, thus cancelling the commissioning help (see also E.2.).



May be launched by an expert during commissioning only! Observe the explanations for the individual parameters and check whether further settings are necessary for your application.

7.13. Factory Settings

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



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

7.14. 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.



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

7.15. Network

The CAN bus setup menu requires the installation of a datalogger (not included) for data logging and internet access. For internet access for setting common user parameters (temperatures, time programs, etc.) we recommend using the more user-friendly Caleon WiFi.

7.15.1. 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 and the data logger.

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

Note:

The address of the datalogger and controller can be found on the address label located on the datalogger. For tips and help on establishing a connection, refer to the datalogger manual or the Sorel Connect service manual.

To remove access rights, select a user from the list and select **<delete user>**.

7.15.2. Ethernet

Settings for Ethernet connection to data logger and controller.

7.15.2.1. MAC address

The physical MAC address of the controller.

7.15.2.2. 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 (DCHP), you will have to make the required network settings manually!**

7.15.2.3. IP address

IP address of the controller.

7.15.2.4. Subnet

Subnet mask – see the network router settings.

7.15.2.5. Gateway

IP address of the network gateway (router).

7.15.2.6. DNS server

IP address of the DNS server for translation of domain names.

7.15.4. CAN bus ID

ID of the controller on the CAN bus, for connecting a CALEON room unit.

7.15.5. Sensor reading interval

Interval for reading sensors connected to the CAN bus (e.g. temperature and humidity sensors inside the CALEON room unit).

8. Menu Lock



Menu „8. Menu lock” can be used to secure the controller against unintentional changing the set values.

The menu is closed by pressing “esc” or selecting “Exit menu lock”.



The menu lock represents a feature securing the controller against unintentional changing the set values.

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**
- 3. Times**
- 8. Menu lock**

To block the other menus, select “Menu lock on”. To enable the menus again, select “Menu lock off”.

9. Service values

The menu “9. Service values” can be used for remote diagnosis by a specialist in the event of an error etc.



Enter the values into the table when an error occurs.

The menu can be closed by pressing “esc”.

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10. Language

10. Language

10.1.Deutsch

10.2.English

10.3.Français

▲ ▼ OK



Menu “10. Language” is used to select the language for the menu guidance. This is queried automatically during initial commissioning.

F. SERVICING, MAINTENANCE

F.1. OVERALL ELECTRICAL WIRING DIAGRAM OF THE LOAD UNIT

Mechanical relay

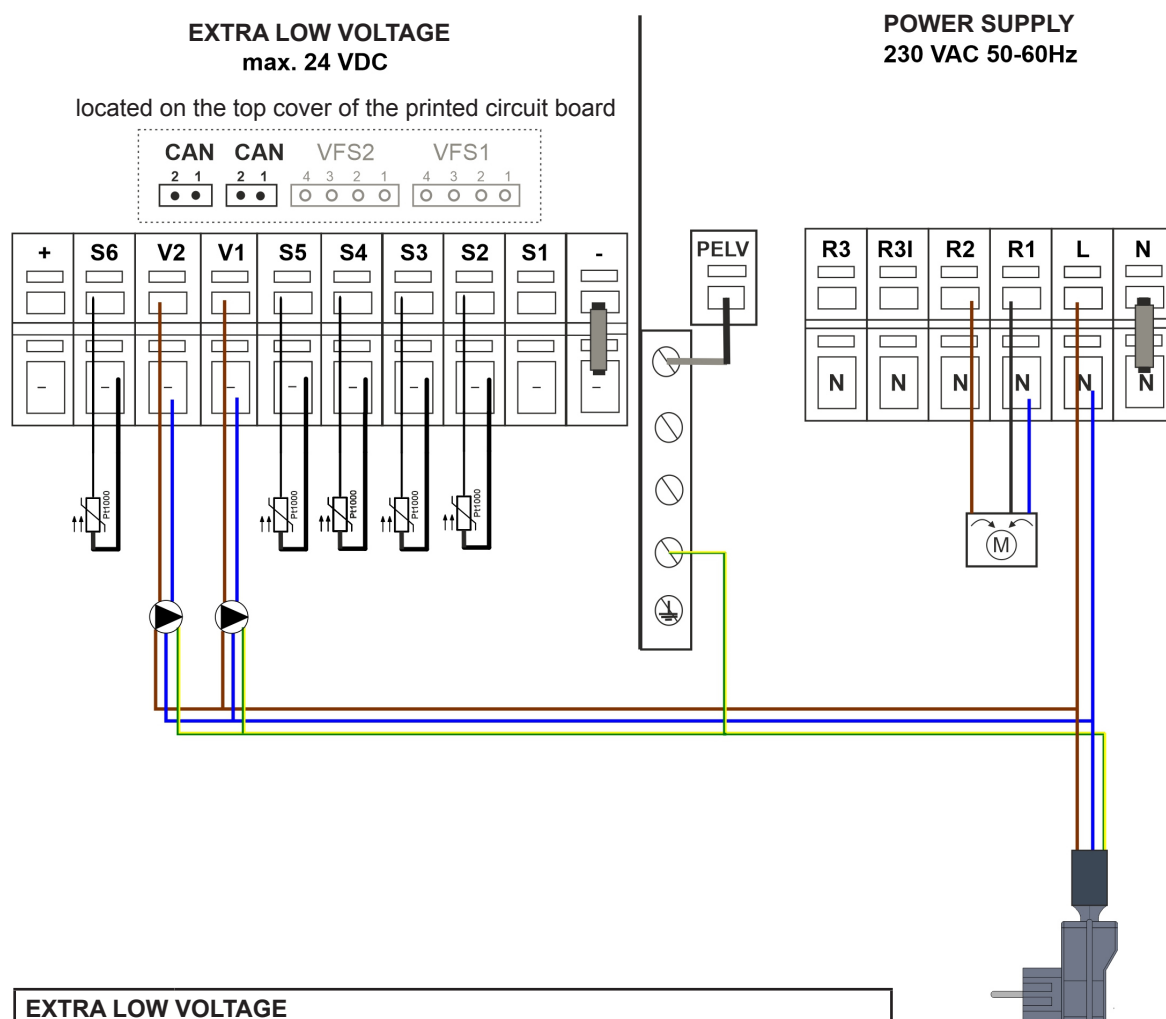
R1, R2, R3 terminals of TRS6K BIOMIX controller

460 VA (AC1), 460 W (AC3)

PWM output

V1, V2 terminals of TRS6K BIOMIX controller

1kHz; 10V



EXTRA LOW VOLTAGE

TERMINAL

-	GND jumper for sensors, V1&V2 outputs and power supply
S1	temperature sensor 1
S2	temperature sensor 2
S3	temperature sensor 3
S4	temperature sensor 4
S5	temperature sensor 5
S6	temperature sensor 6 (outdoor)
V1	PWM output for Wilo Para pumps
V2	PWM output for Wilo Para pumps
+	24V power supply (e.g. for Caleon room units)

POWER SUPPLY

TERMINAL

CONNECTION

N	neutral N
L	outer live L
R1	relay 1 for mixing valve actuator (opening, HC temperature increase)
R2	relay 2 for mixing valve actuator (closing, HC temperature decrease)
R3I	relay 3 (NC opening contact)
R3	relay 3 (NO closing contact)

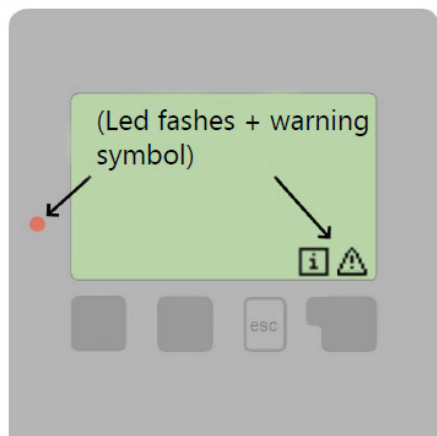
ON PRINTED CIRCUIT BOARD

CAN1	connection of CAN bus (1=high, 2=low) for Caleon room units
CAN2	connection of CAN bus (1=high, 2=low) for Caleon room units
VFS1	not used in Regulus systems
VFS2	not used in Regulus systems

F.2. STATUS INDICATION AND ERROR MESSAGES

The status is signalled by the LED light that

- is lit green – when a relay is switched on
- is lit red - when Auto mode is set and all relays are off
- flashes slowly red – when Manual mode is set
- flashes fast red - when an error is present



If the controller detects a malfunction, the red light flashes and the warning symbol also appears in the display. If the error is no longer present, the warning symbol changes to an info symbol and the red light no longer flashes. To obtain more detailed information on the error, press the key under the warning or info symbol.

Possible error messages: Meaning	
Sensor X defective	Means that either the sensor, sensor entrance on the controller or the connecting wire is defective.
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 power supply disruption, because the time & date must be examined and, if applicable, adjusted.
Max. flow reached	The max. heating circuit temperature has been reached.
Frequent on/off	A relay switches frequently, i.e. opens and closes more than 5 times in 5 minutes.

F.3. REPLACING THE CONTROLLER FUSE

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 such a case check the fuse and, if needed, replace it.

Repairs and maintenance may only be performed by a qualified specialist!

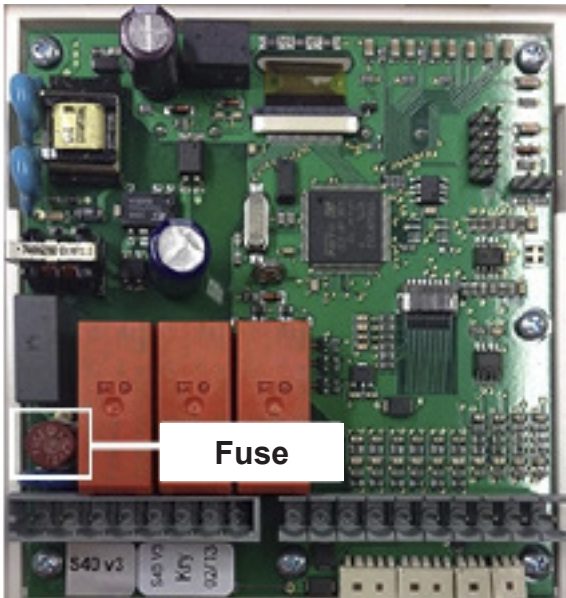
Safety warning



Before working on the unit, switch off the power supply and secure it against being switched on again! The Controller is not equipped with a power switch. It can be switched off e.g. by a circuit breaker in the electrical enclosure. Check for the absence of power! The unit may not be put into operation if there is visible damage.



Only use the supplied spare fuse or a fuse of the same design with the following specifications: T2A 250V..



Disconnect the device from the mains, open it, remove the old fuse and check it. If it is defective, replace it with a new one. Locate and repair the source of the error (e.g. a defective pump).

Then first recommission the controller and check the function of the switch outputs in manual mode as described in Chap. 4.1.

CONTROLLER MAINTENANCE





Performing maintenance:

- Check date & time (Chap. 3.1.)
- Assess/check plausibility of statistics (Chap. 1.)
- Check the error memory (Chap. 2.6.)
- Check the switch outputs in manual mode (Chap. 4.1.)

F.4. SERVICING & MAINTENANCE OF HYDRAULIC COMPONENTS

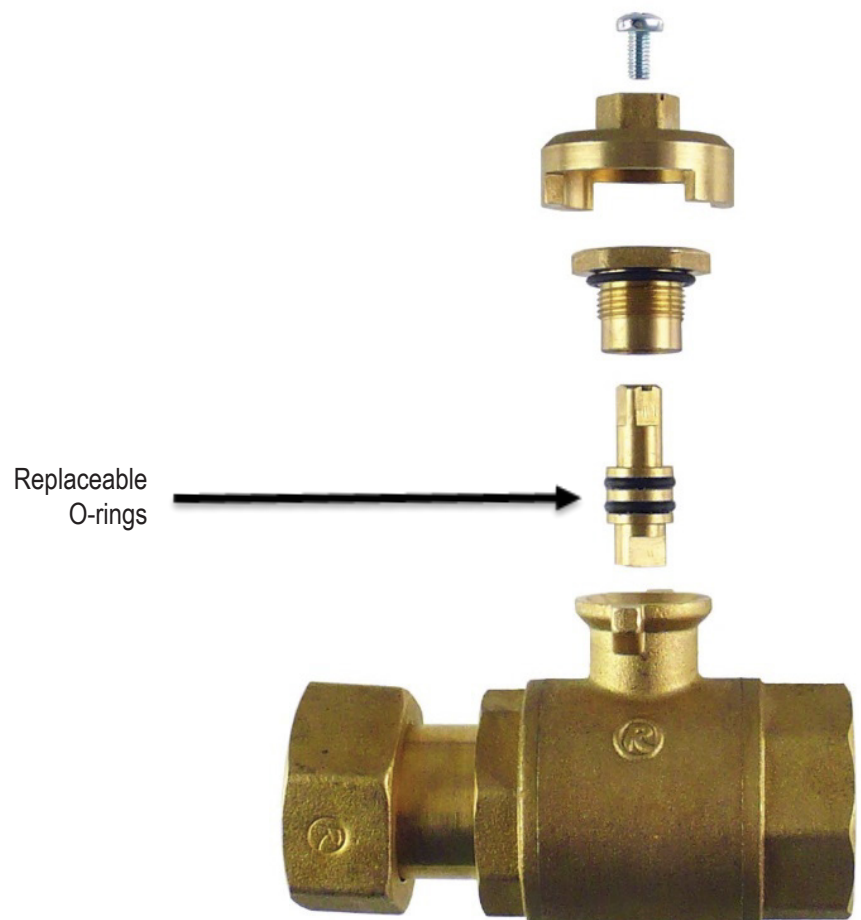
BOILER AND HEATING CIRCUIT PUMPS

The operating status and possible pump faults are displayed by LED indication directly on the pump.

LED indication	State description and possible fault reasons
 green is lit	– pump is running in trouble-free operation
 red is lit	– rotor is blocked – electric motor winding defect
 flashing red	– power supply lower/higher than permitted – electric short circuit in pump – pump overheated
 flashing red and green	– unforced fluid circulation through the pump – pump speed lower than desired – air in pump

BALL VALVES

The ball valves are equipped with a control shaft with two O-rings with dimensions of 8.7 x 1.8 mm. These rings can be easily replaced by closing the tap, removing the control element with stop ends and loosening the packing nut with a # 21 wrench without the need to drain the system.



G. LEGISLATION

G.1. DECLARATION OF CONFORMITY

By affixing the CE mark to the unit the manufacturer declares that he has issued the Declaration of Conformity for TRS6 K BIOMIX Controller and it conforms to the following relevant safety regulations:

- EC low voltage directive 2014/35/EC (LVD)
- EC electromagnetic compatibility directive 2014/30/EC (EMC)

G.2. CONTROLLER DISPOSAL

IMPORTANT INFORMATION ON PROPER DISPOSAL OF E-WASTE AS REQUIRED BY THE EC DIRECTIVE 2002/96/EC (WEEE)

Do not dispose of this product as unsorted municipal waste. Please dispose of this product by returning it to the point of sale or to your local municipal collection point for recycling.

Respecting these rules will help to preserve, protect and improve the quality of the environment, protect human health and utilize natural resources prudently and rationally.

The crossed out wheeled bin with marking bar, printed either in the Manual or on the product itself, identifies that the product must be disposed of at a recycling collection site.



WEEE registration number:
02771/07-ECZ