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- D** Festwertregler
Montage- und Bedienungsanleitung
- GB** Constant temperature controller
Installation and operating instructions
- FR** Régulateur à valeur constante
Notice de montage et d'utilisation
- NL** Vaste waarde regelaar
Montage- en bedieningshandleiding
- IT** Regolatore di temperatura costante
Istruzioni per il montaggio e l'uso

1	Introduction	22		
2	Appearance of the controller	23		
3	Initial controller setup	24		
3.1	Step 1 - Language selection	24		
3.2	Step 2 - Hydraulic scheme selection	24		
3.3	Step 3 - Opening of the mixing valve	24		
4	Graphic LCD display	25		
4.1	Description and design of the main display	25		
5	Description of symbols on the display	26		
5.1	Controller mode symbols	26		
5.2	Temperature and other data symbols	26		
5.3	Symbols for notices and warnings	26		
6	Display for help, notices and warnings	27		
7	Menu entry and navigation	27		
8	Menu structure and description	28		
8.1	Temperature settings	29		
8.2	Operation mode	29		
8.3	Manual mode	30		
9	Heating or cooling operation mode selector	30		
10	Basic settings	30		
11	Data overview	31		
12	Controller parameter	31		
12.1	Basic parameters	32		
12.2	Controller parameters and auxiliary tools	32		
12.3	Service parameters	34		
13	Factory settings	38		
14	Operation mode by sensor Failure	39		
15	Controller installation	39		
16	Controller's electric connection	39		
17	Technical data	40		
18	Disposal of old electrical & electronic equipment	41		
19	Hydraulic schemes	21		

Controllers FWR, FWR+ are modern designed, microprocessor-driven devices made with digital and SMT technology.

The controller are provided as a constant temperature controller with actuator designed for heating applications. The most common use is to control the return temperature in the boiler. Controller FWR+ besides controlling the actuator also controls the circulating pump.

Note: For initial setup see Initial controller setup, page 24.

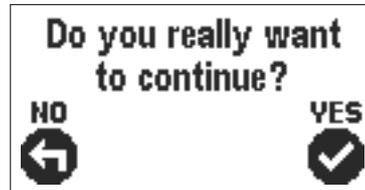
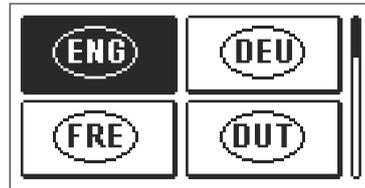


1. Graphic display
2. Clutch for manual operation.
3. Button ← Return back.
4. Button − Move to left, decreasing.
5. Button ✓ Menu entry, confirmation of selection.
6. Button + Move to right, increasing.
7. Button ? Help.
8. LED indication - valve rotation right.
9. LED indication red - fault, error.
10. LED indication - valve rotation left.

Constant temperature controllers are equipped with an innovative solution, which allows initial setup of the controller in only three steps.

When you connect the controller to the power supply for the first time, the software version is shown. Next, the first step appears on the screen.

Step 1 - Language selection

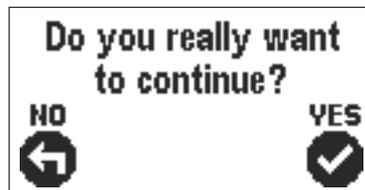
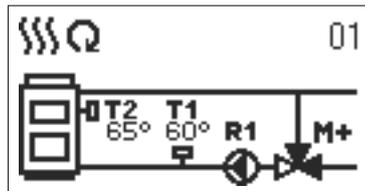


Using buttons **-** and **+** you select the required language.

Press the button **✓** to confirm the selected language. After selecting the language, the controller requires confirmation of the selection by pressing the button **✓**.

If you accidentally selected the wrong language, go back to reset the language by pressing button **←**.

Step 2 - Hydraulic scheme selection



Next, you select a hydraulic scheme for the controller function. Move between schemes by means of buttons **-** and **+**.

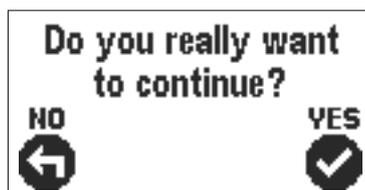
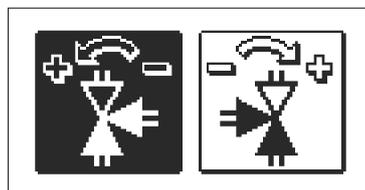
Confirm the selected scheme by pressing the button **✓**.

After you selected the scheme, the controller requires confirmation of the selection by pressing the button **✓**.

If you accidentally selected the wrong scheme, go back to reset the scheme by pressing button **←**.

Note: Selected hydraulic scheme can be later changed with service parameter S1.1.

Step 3 - Opening of the mixing valve



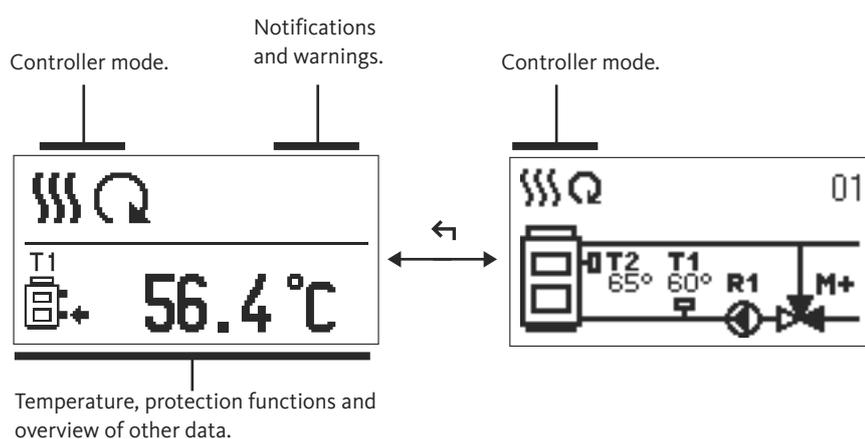
Press icon which indicates the proper direction of mixing valve opening direction. Between icons you can move with buttons **-** and **+**.

After you selected the correct direction, the controller requires confirmation of the selection by pressing the button **✓**.

If you accidentally selected the wrong mixing valve opening direction, go back to reset the the selection by pressing button **←**.

Note: Selected mixing valve opening direction can be later changed with service parameter S1.4.

All important data of controller operation are shown on the graphic LCD display.



Display of information on the screen:

The controller mode, notifications and warnings are displayed in the upper third of the display. For switching between basic display and display of the hydraulic scheme use the button \leftarrow .

To check the temperature and other data, use buttons $-$ and $+$. The number of sensors and other data, which can be listed on the display, depends on the selected hydraulic scheme and controller settings.

Note: If you would like to have a specific data display to appear after you stop using the keyboard then select the desired data with buttons $-$ and $+$. Confirm the selected screen by pressing the button \checkmark for 2 seconds.

Note: When you press the button \leftarrow for 2 seconds, then the display of the temperature will change from one to two rows and vice versa. On the two line temperature display, the measured temperature is displayed in the first row and the required or calculated temperature in the second row.

5

Description of symbols
on the display

5.1

Controller mode symbols

Symbol	Description
	Heating
	Cooling
	Automatic mode
	Stand by
	Manual mode

5.2

Temperature and other
data symbols

Symbol	Description
	Measured temperature
	Set point or calculated temperature
	Supply temperature
	Boiler temperature
	Stand- pipe temperature
	Stand- pipe temperature
	Boiler return temperature
T1, T2	Temperature measured by the sensor T1, T2

5.3

Symbols for notices
and warnings

Symbol	Description
	<p>Notifications</p> <p>In case of exceeding the maximum temperature or activation of protection function, the controller indicates the event with flashing symbol on the display. If the maximum temperature is no longer exceeded or if the protection function is turned off, a lited symbol indicates a recent event. Press ? to open the screen to check notifications.</p>
	<p>Warning</p> <p>In the event of sensor failure, the controller indicates the failure with flashing symbol on the display. If the issue is resolved or no longer present, a lited symbol indicates a recent event. Press ? to open the screen to check warnings.</p>

By pressing the button  the screen for help, messages and warnings will be opened in which the following icons are available.



Short manual

Short manual for use of the controller.



Controller version

Overview of controller type and software version.



Notifications

Log of exceeded maximum temperatures and activated protection functions.

By pressing the buttons  and  move through the list of notifications.

Press  to exit the list.

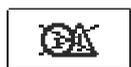


Warnings

Log of sensors, pump or flow meter failures.

By pressing the buttons  and  move through the list of warnings.

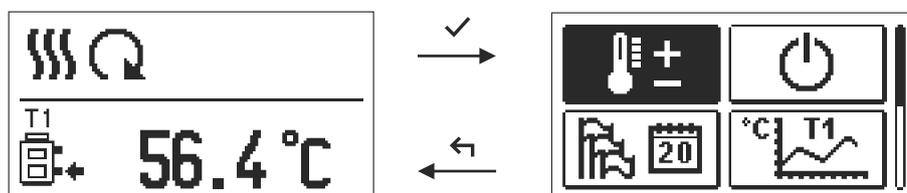
Press  to exit the list.



Delete warning and notification logs

By pressing the button  will erase notification and warning log. All sensors that are not connected will be deleted from the list of failures.

Note: Failures of sensors that are required for controller operation can not be deleted.

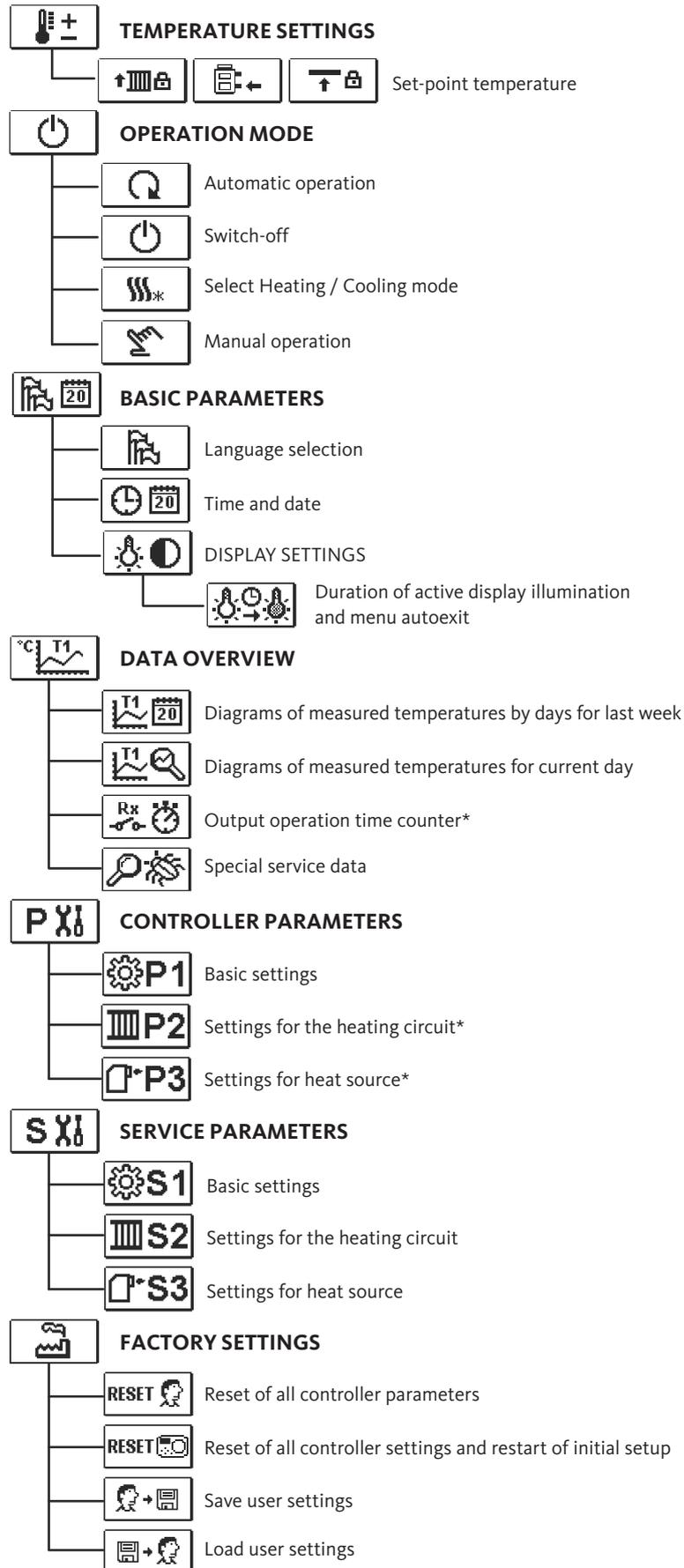


To enter the menu, press the button .

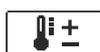
Move around the menu using the buttons  and , with the button  you confirm your selection.

By pressing the button  you return to the previous screen.

Note: If some time no button is pressed, the backlight turns off or is reduced according to the setting.

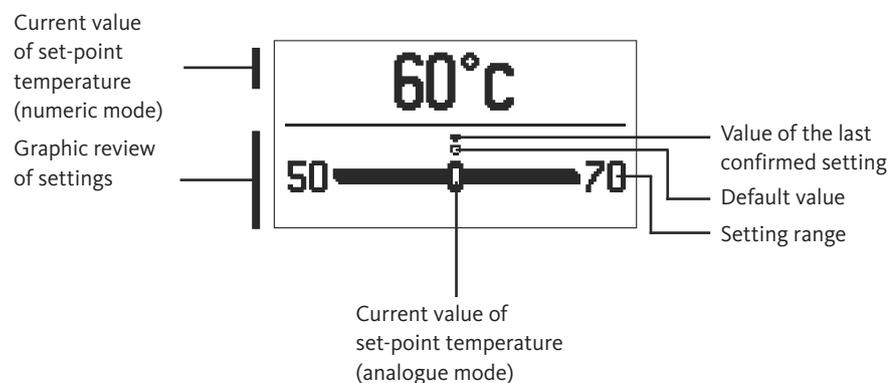


* Not available



In the menu only the temperatures are displayed, where you can set the set-point temperature by the selected hydraulic scheme.

By pressing buttons **-** , **+** and **✓** you choose the required temperature, and a new window opens:



Set the set-point temperature with buttons **-** , **+** and confirm with button **✓** .
Exit the settings by pressing the button **↶** .



In this menu the operating mode of the controller is selected.

Select the operation mode with buttons **-** , **+** and confirm with button **✓** .
Exit the settings by pressing the button **↶** .



Automatic operation



Controller switch-off



Heating or cooling operation mode selector



Manual mode

8.3 Manual mode

```

R1= AUTO   T1= 56 °C
M+= AUTO   T2= 75 °C
M-= AUTO
  
```

This mode is used for testing the system or in case of malfunction. Every output can be manually activated or deactivated.

Move with the buttons **-** and **+** between the individual outputs R1, M- or M+. The output, which you want to change is selected by pressing the button **✓**.

ON, OFF or AUTO starts flashing. Now the output can be changed using the buttons **-** and **+**. The setting is confirmed by pressing the button **✓**. Exit the setup menu with the **←** button.

9 Heating or cooling operation mode selector



Heating operation mode is active.



Cooling operation mode is active.

10 Basic settings

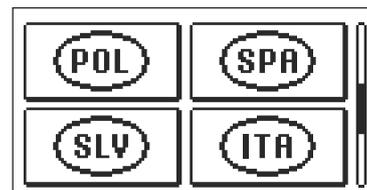
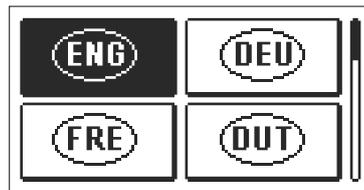


The menu is intended for language, time, date and display settings

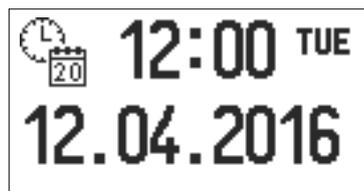


Language selection

The required user language is selected by pressing buttons **-**, **+** and confirmed with button **✓**. Exit settings by pressing the button **←**.



Time and date



You set the exact time and date in the following manner:

By pressing buttons **-** and **+** move among individual data. By pressing button **✓** you select data that you want to change. When data flashes, change it by pressing buttons **-**, **+** and confirm it with the button **✓**.

Exit the settings by pressing the button **←**.

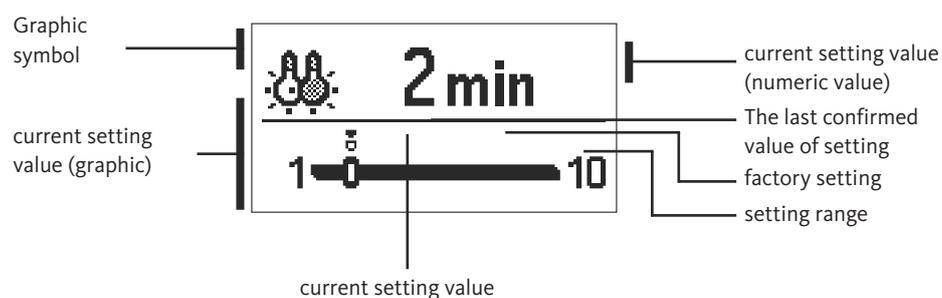


The following settings are available:



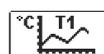
Time of active screen illumination and autoexit from menu to the main screen.

By pressing buttons **-** , **+** and you select and confirm required setting.
A new window opens:

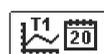


You change settings by pressing buttons **-** and **+** and confirm by pressing button **✓** .
Exit the settings by pressing button **←** .

Note: The change of settings is carried out when you confirm it by pressing button **✓** .



In this menu there are icons to access the following data on controller performance:



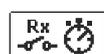
DIAGRAMS OF MEASURED TEMPERATURES BY DAYS FOR LAST WEEK

The graphical representation of the temperature profile in days, for each sensor.
There are records of the temperatures for the last week of operation.



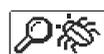
DIAGRAMS OF MEASURED TEMPERATURES FOR CURRENT DAY

Detailed graphic overview of temperature in current day for each sensor.
How often are temperatures logged is set with parameter P1.3.



OUTPUT'S OPERATION TIME COUNTERS*

Counters of controller's outputs operation time.



SPECIAL SERVICE DATA

Intended for diagnostics for technical service.

Note:

To view the sensor-diagrams move with buttons **-** and **+** between the sensors.

By pressing the button **✓** the date of displayed temperature begins to flash.

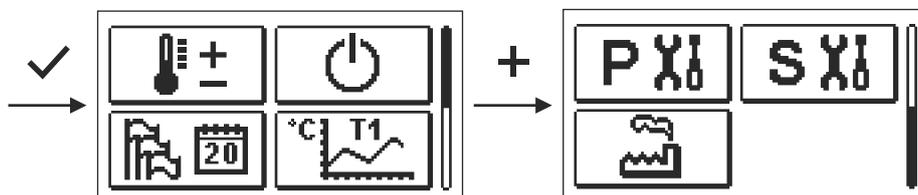
Use buttons **-** and **+** to move between days.

Return to the temperature selection by pressing the button **✓** .

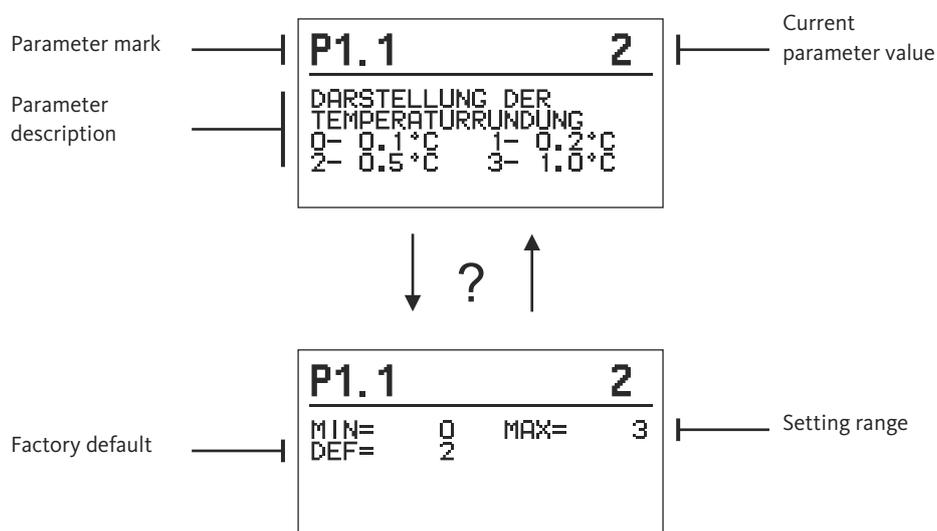
The range of the temperature display on the graph can be changed with the the button **?** .

Exit the diagram overview by pressing the button **←** .

All additional settings and adjustments of controller performance are carried out by means of parameters. User-, Service- and parameters are found on the second menu screen.



P The basic parameters are listed in one group **P1** - basic parameters. Content of basic parameters is displayed as follows:



The setting is changed by pressing the button **✓**.

The value will start blinking and can be changed with the **+** and **-**. The setting is confirmed by pressing the button **✓**.

Move with buttons **+** and **-** to other parameters and repeat the procedure.

Exit the parameter settings by pressing the button **←**.

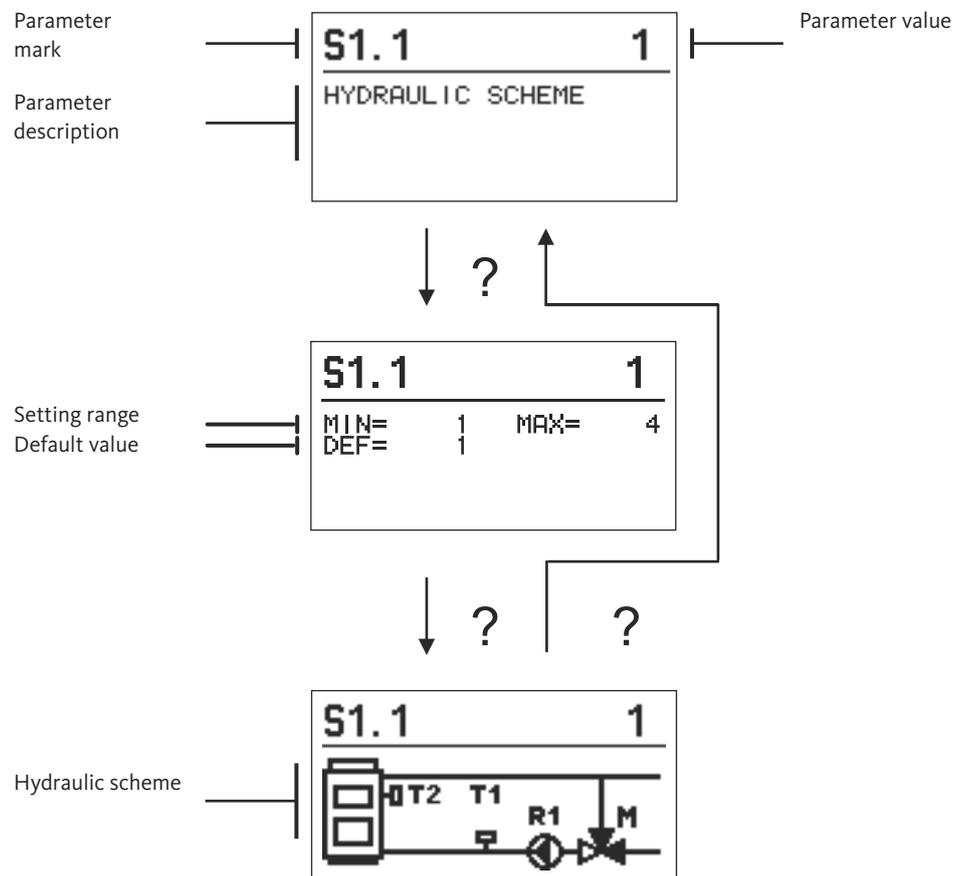


Basic parameters:

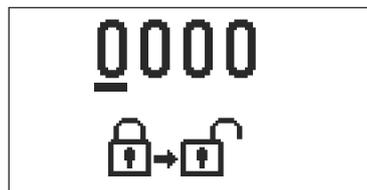
Parameter	Function	Parameter description	Setting range	Default value
P1.1	TEMPERATURE ROUND UP	You set the accuracy of displayed temperatures.	0- 0.1 °C 1- 0.2 °C 2- 0.5 °C 3- 1 °C	2
P1.2	AUT. SHIFT OF CLOCK TO SUMMER/WINTER TIME	With the help of a calendar, the controller carries out the automatic changeover between summer and winter time.	0- NO 1- YES	1
P1.3	PERIOD OF TEMPERAT. LOGGING	By setting this field you define how often the measured temperatures are saved.	1 - 30 min	5
P1.4	TONES	By setting this field you define sound signals of the controller.	0- OFF 1- KEYPAD 2- ERRORS 3- KEYPAD AND ERRORS	1
P1.5	ADVANCED TEMPERATURE SCREEN	Advanced screen means that while checking temperatures you can see measured and required or calculated temperature.	0- NO 1- YES	1



Service parameters are arranged in groups **S1** - Basic parameters, **S2** - Parameters for the heating circuit. With service parameters it is possible to activate or select many additional functions and adaptations of controller performance. When you select the required parameter group in the menu, a new screen opens:



The setting is changed by pressing the button . Because the parameters are factory locked, a new screen appears. Here you have to enter the unlock code.



By pressing buttons **+** and **-** you mark the number which you want to modify and press the button .

When the number flashes you can modify it by pressing buttons **+**, **-** and confirm it by pressing button .

When the correct code is inserted, the controller unlocks the parameters for editing and returns to the selected group of parameters.

Return back from unlocking by pressing button .

Note: Factory set code is "0001".

Modify the value of the unlocked parameter by pressing buttons **+** and **-**. The setting is confirmed by pressing the button **✓**. By pressing buttons **+**, **-** you can move to another parameter and repeat the procedure.
exit parameter settings by pressing the button **←**.

Warning: Change of service and functional parameters must be carried out only by a properly qualified expert.



Basic parameters:

Parameter	Function	Parameter description	Setting range	Default value
S1.1	HYDRAULIC SCHEME	Selection of hydraulic scheme.	01 - 04	01
S1.2	CODE FOR UNLOCKING THE SERVICE SETTINGS	This setting enables the change of code which is necessary to unlock the service settings. WARNING! Keep new code on a safe place. Without this code is impossible to change service settings.	0000 ÷ 9999	0001
S1.4	ACTUATOR OPENING DIRECTION	Setting of actuator turning direction - valve opening.	0- RIGHT 1- LEFT	0
S1.5	DISPLAY ORIENTATION	Setting of display orientation.	0 - REGULAR 0° 1 - ROTATED 180°	0
S1.9	ANTI-BLOCK FUNCTION FOR PUMP AND VALVE	All outputs that haven't been activated in the last week are activated on Friday at 20:00 for 60 seconds.	0- OFF 1- ON	0
S1.17	SENSOR T1 CALIBRATION	Correction of displayed measured temperature for sensor T1.	-5 ÷ 5 K	0
S1.18	SENSOR T2 CALIBRATION	Correction of displayed measured temperature for sensor T2.	-5 ÷ 5 K	0



Parameters for mixing circuit:

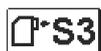
Parameter	Function	Parameter description	Setting range	Default value
S2.1	MIN. SETPOINT TEMPERATURE IN HEATING MODE	Setting of minimal allowed setpoint temperature in heating mode. Setpoint temperature cannot be adjusted lower as with this parameter.	5 ÷ 70 °C	50 °C
S2.2	MAX. SETPOINT TEMPERATURE IN HEATING MODE	Setting of maximal allowed setpoint temperature in heating mode. Setpoint temperature cannot be adjusted higher as with this parameter.	10 ÷ 95 °C	70 °C
S2.3	MIN. SETPOINT TEMPERATURE IN COOLING MODE	Setting of minimal allowed setpoint temperature in cooling mode. Setpoint temperature cannot be adjusted lower as with this parameter.	10 ÷ 25 °C	15 °C
S2.4	MAX. SETPOINT TEMPERATURE IN COOLING MODE	Setting of maximal allowed setpoint temperature in cooling mode. Setpoint temperature cannot be adjusted higher as with this parameter.	15 ÷ 35 °C	30 °C
S2.7	BACKLASH OF MIXING VALVE	Setting of mixing valve running time to compensate the backlash of actuator and mixing valve assembly, which occurs by change of rotation direction.	0 ÷ 5 Sek	1
S2.8	MIXING VALVE P - CONSTANT	Setting of mixing valve position correction intensity. Smaller value means shorter movements, higher value means longer movements.	0,5 ÷ 2,0	1
S2.9	MIXING VALVE I - CONSTANT	Setting of mixing valve control frequency - how often mixing valve position is being controlled. Smaller value means low frequency, higher value means higher frequency.	0,4 ÷ 2,5	1
S2.10	MIXING VALVE D - CONSTANT	Sensitivity of mixing valve for stand-pipe temperature changes. Smaller value means low sensitivity, higher value means high sensitivity.	0,4 ÷ 2,5	1
S2.13	BOILER CIRCULATION PUMP - TIME OF BOILER TEMPERATURE INCREASE (SECONDS)	This function is used in regulation of return in solid fuel boiler. In the set time, the regulator determines temperature increase of the boiler by 2°C. If an increase in the boiler is determined, the regulator activates the circular pump.	30 ÷ 900 seconds	300
S2.14	BOILER CIRCULATION PUMP OPERATION 1. STANDARD 2. PERMANENT	The setting informs us about the operation of the circular pump of the boiler: 1-STANDARD means that the pump is operating according to the minimum set temperature of the system, and when the difference between the boiler and return line. 2-PERMANENT means that the pump is operating continuously when boiler temperature is higher than the set minimum set temperature of the boiler. This mode is used for pellet boilers when there is no sensor available in the thermal storage.	1- STANDARD 2- PERMANENT	1

S2 **Wartungseinstellungen für den Mischerkreis:**

Parameter	Function	Parameter description	Setting range	Default value
S2.15	BOILER CIRCULATION PUMP - SWITCH-OFF DELAY (SECONDS)	Setting of delayed circulation pump switch-off when there is no requirement for heating.	30 ÷ 900 seconds	300
S2.16	BOILER CIRCULATION PUMP - SHUTDOWN DIFFERENCE T2-T1 (°C)	This setting determines the difference between sensors T2 and T1 which shuts down circular pump of the boiler.	2.0 ÷ 8.0 °C	3.0
S2.19	INITIAL VALVE MOVEMENT FROM OPEN POSITION (SECONDS)	Setting of initial valve movement duration when moving from open position. With this setting the valve is moved to its control range and immediate controller respond at startup of system.	0 ÷ 30 seconds	15
S2.20	INITIAL VALVE MOVEMENT FROM CLOSED POSITION (SECONDS)	Setting of initial valve movement duration when moving from closed position. With this setting the valve is moved to its control range and immediate controller respond at startup of system.	0 ÷ 30 seconds	15

S3 **Parameters for heat source:**

Parameter	Function	Parameter description	Setting range	Default value
S3.1	SYSTEM PROTECTION IN HEATING MODE - SENSOR T2	Setting of controller respond in case if T2 sensor is installed. If T2 temperature is lower as parameter S3.2, the controller fully closes the valve. If T2 is higher as parameter S3.3, the controller fully opens the valve. 0 - Sensor T2 is not used for system protection. 1- Only minimal temperature is respected for system protection (parameter S3.2). 2- Only maximal temperature is respected for system protection (parameter S3.3). 3- Minimal and maximal temperature is respected for system protection (parameter S3.2 in S3.3).	0- WITHOUT 1- TMIN 2- TMAX 3- TMIN IN TMAX	3
S3.2	MIN. SYSTEM TEMPERATURE IN HEATING MODE	Setting of minimal temperature at which the controller fully closes the valve.	0,0 ÷ 3,0	55 °C
S3.3	MAX. SYSTEM TEMPERATURE IN HEATING MODE	Setting of maximal temperature at which the controller fully opens the valve.	0,0 ÷ 3,0	90 °C



Parameters for heat source:

Parameter	Parameterbezeichnung	Beschreibung des Parameters	Einstellungsbereich	Übernommener Wert
S3.4	SYSTEM PROTECTION IN COOLING MODE - SENSOR T2	Setting of controller respond in case if T2 sensor is installed. If T2 temperature is lower as parameter S3.5, the controller fully closes the valve. If T2 is higher as parameter S3.6, the controller fully opens the valve. 0 - Sensor T2 is not used for system protection. 1- Only minimal temperature is respected for system protection (parameter S3.5). 2- Only maximal temperature is respected for system protection (parameter S3.6). 3- Minimal and maximal temperature is respected for system protection (parameter S3.5 in S3.6).	0- WITHOUT 1- TMIN 2- TMAX 3- TMIN IN TMAX	3
S3.5	MIN. SYSTEM TEMPERATURE IN COOLING MODE	Setting of minimal temperature at which the controller fully closes the valve.	10 ÷ 30 °C	15
S3.6	MAX. SYSTEM TEMPERATURE IN COOLING MODE	Setting of maximal temperature at which the controller fully opens the valve.	20 ÷ 40 °C	30



In the menu there are software tools to help with setting the controller. Restoring the controller settings are made through the selection of:

**RESET OF ALL CONTROLLER PARAMETERS**

Restores all settings of parameters P1, S1 (except S1.1) and S2.

**RESET OF ALL CONTROLLER SETTINGS AND RESTART INITIAL SETUP**

Restores all parameters to default values and starts the initial setup.

**SAVE USER'S SETTINGS**

Save current parameter values as user's settings.

**LOAD USER'S SETTINGS**

Load previously saved user's settings.

Note: Before performing of the commands stated above, the controller requires a confirmation of the selected command.

Stand pipe temperature sensor isn't connected or has a malfunction.
Mixing valve opens.

Operation mode by
sensor Failure

14

TABLE: Resistance values for temperature sensors type Pt-1000

Temp. [°C]	Resist. [Ω]						
-20	922	35	1136	90	1347	145	1555
-15	941	40	1155	95	1366	150	1573
-10	961	45	1175	100	1385	155	1592
-5	980	50	1194	105	1404	160	1611
0	1000	55	1213	110	1423	165	1629
5	1020	60	1232	115	1442	170	1648
10	1039	65	1252	120	1461	175	1666
15	1058	70	1271	125	1480	180	1685
20	1078	75	1290	130	1498	185	1703
25	1097	80	1309	135	1515	190	1722
30	1117	85	1328	140	1536	195	1740

Install the regulator inside in a dry place, where it is not exposed to any strong electromagnetic fields.

Controller installation

15

Warning:

Each project with constant temperature controller needs to base exclusively on customer design and calculations and needs to be in compliance with valid rules and regulations. Pictures, diagrams and text in this manual are intended solely as an example and the manufacturer does not accept any responsibility for them. If you use content of this manual as a base for your project, then you carry also full responsibility for it. Responsibility of publisher for unprofessional, wrong and false information and consecutive damage are explicitly excluded. We retain the right for technical errors, mistakes, changes and corrections without prior notice.

Installation of controlling devices should be done by an expert with suitable qualifications or by an authorised organisation. Before you deal with the main wiring, make sure that the main switch is switched off.

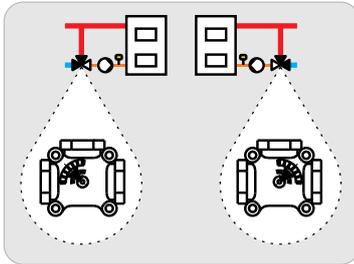
You have to follow the rules for low-voltage installations IEC 60364 and VDE 0100, law prescriptions for prevention of accidents, law prescriptions for environmental protection and other national regulations.

Controller's electric
connection

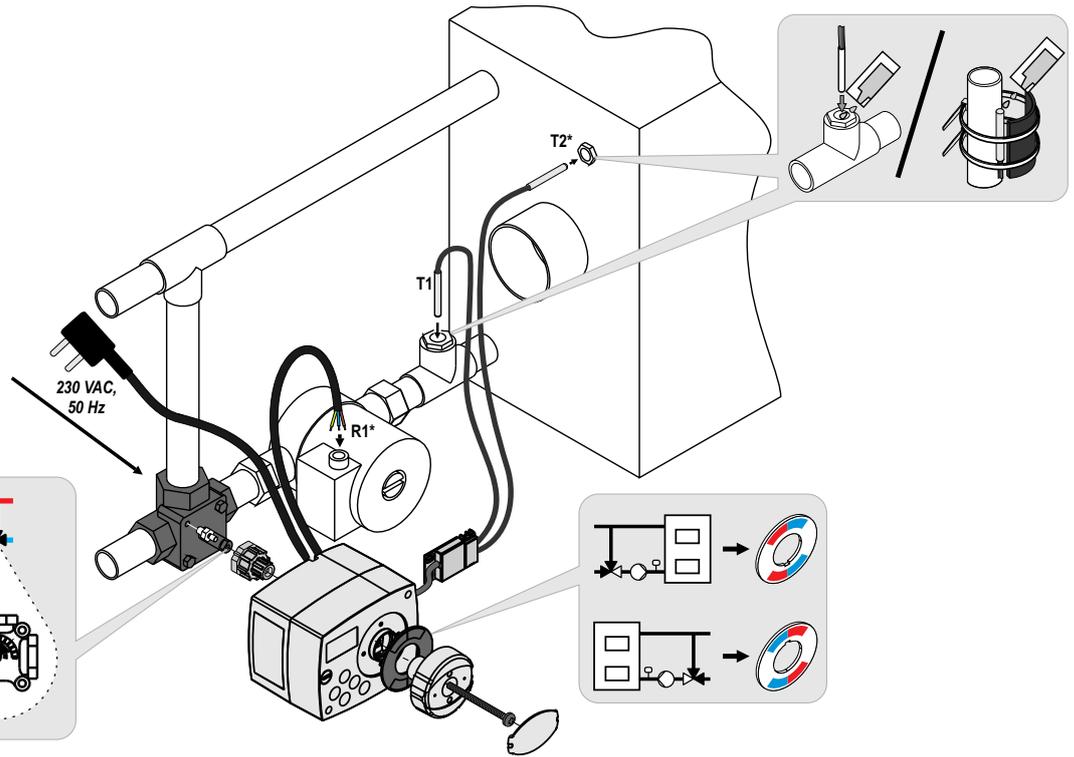
16

Controller's electric connection

	
ASCAVMSA	Esbe, Seltron, Somatherm, Acaso, Afriso, IVAR, PAW, Hora, BRV, IMIT, Barberi, LK Armatur, Vexve, Olymp, Hoval
ASCAVMSC	Centra DR/ZR
ASCAVMSD	Centra DRU
ASCAVMSF	Siemens VBI / VBF / VBG / VCI
ASCAVMSF	Meibes, Wita
ASCAVMSG	Esbe VRG
ASCAVMSH	FIRST Rotomix
ASCAVMSI	Honeywell V544... V543...
ASCAVMSJ	PAW K32, K33, K34
ASCAVMSK	Danfoss HRB3
ASCAVMSU	Lovato HV3, MK3



* FWR+



Technical data

General technical data - controller

Dimensions (w x h x d)102 x 84 x 94 mm
 Weight~800 g
 Housing.....PC - thermoplastic

Power supply230 V ~ , 50 Hz
 Consumption0,5 VA
 Degree of protectionIP42 acc. to EN 60529
 Safety class.....I acc. to EN 60730-1

Permissible ambient temperature5 °C to +40 °C
 Permissible relative humiditymax. 85 % rH at 25 °C
 Storage temperature.....-20 °C to +65 °C

Accuracy of the installed cloc.....± 5 min / year

Program class.....A
 Data storage without power supply.....min. 10 years

Technical characteristics - sensors

Temperature sensor type.....Pt1000
 Sensor resistance.....1078 Ohm at 20 °C
 Temperature scope of use-25 ÷ 150 °C, IP32
 Min. cross-sectional area of sensor cables0.3 mm²
 Max. length of sensor cablesmax. 10 m

Discarding old electrical and electronic equipment (valid for EU member states and other European countries with organized separate waste collection).

This symbol on the product or packaging means the product cannot be treated as a household waste and it has to be disposed of separately via designated collection facilities for old electrical and electronic equipment (OEEA). The correct disposal and separate collection of your old appliance will help prevent potential negative consequences for the environment and human health. It is a precondition for reuse and recycling of used electrical and electronic equipment.



For more detailed information about disposal of your old appliance, please contact your city office, waste disposal service or the shop where you purchased the product.

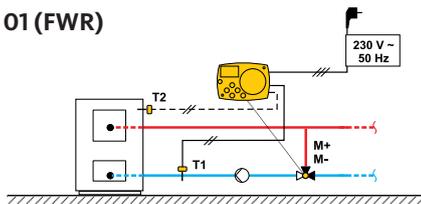
Disposal of old electrical & electronic equipment

18

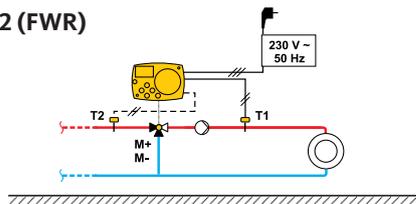
IMPORTANT

ATTENTION! Installation schemes show operation principles and do not include all auxiliary and safety elements! Observe the regulations in force when performing installations!

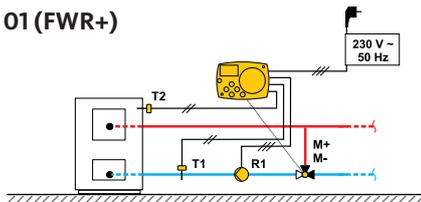
O1 (FWR)



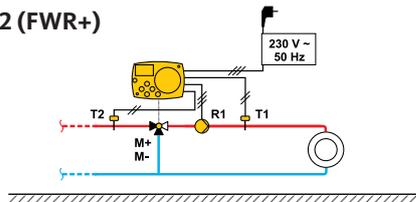
O2 (FWR)



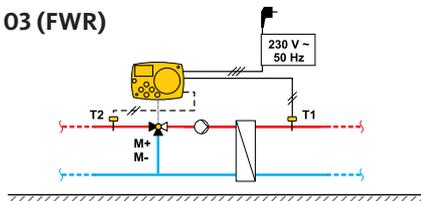
O1 (FWR+)



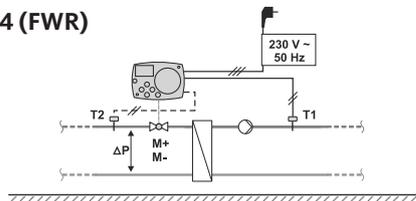
O2 (FWR+)



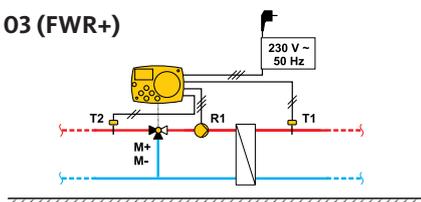
O3 (FWR)



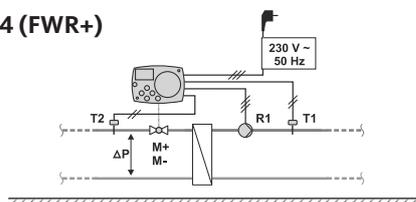
O4 (FWR)



O3 (FWR+)



O4 (FWR+)





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