

Heat Metering Controller WMC

Installation and operating instructions



Read carefully before installation, commissioning and operation

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Safety instructions

A.1. - EC declaration of conformity

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

- EC low voltage directive 2006/95/EC
- EC electromagnetic compatibility directive 2004/108/EC

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

A.2. - General instructions

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

The valid accident prevention regulations, VDE regulations, the regulations of the local power utility, the applicable DIN-EN standards and the installation and operating instruction of the additional system components must also be observed. The controller does not under any circumstances replace any safety devices to be provided by the customer!

Installation, electrical connection, commissioning and maintenance of the unit may only be carried out by specialists who possess the appropriate training.

For the user: Make sure that the specialist gives you detailed information on the function and operation of the controller. Always keep these instructions in the vicinity of the controller.

A.3. - Explanation of symbols



Failure to observe these instructions can result in danger to life from electric voltage.



Failure to observe these instructions can result in serious damage to health such as scalding, or even life-threatening injuries.



Failure to observe these instructions can result in destruction of the unit or the system, or damage to the environment.



Information which is especially important for the function and optimal use of the unit and the system.

Description of controller

A.4. - Changes to the unit

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



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

A.5. - Warranty and liability

The controller has been manufactured and tested with regard to high quality and safety requirements. The unit is subject to the statutory guarantee period of two years from the date of sale.

The warranty and liability shall not include, however, any injury to persons or material damage that is attributable to one or more of the following causes:

- Failure to observe these installation and operating instructions
- Improper installation, commissioning, maintenance and operation
- Improperly executed repairs
- Unauthorised structural changes to the unit
- Installation of additional components that have not been tested together with the unit
- Any damage resulting from continued use of the unit despite an obvious defect
- Failure to use original spare parts and accessories
- Use of the device for other than its intended purpose
- Operation above or below the limit values listed in the specifications
- Force majeure

Description of controller

B.1. - Specifications

Electrical specifications:

Mains voltage	100 - 240VAC
Mains frequency	50 - 60Hz
Power consumption	0,5W - 2,5W
Internal fuse	T2A / 250V slow blow
Protection category	IP40
Protection class	II
Overvoltage Category	II
Degree of Pollution Category	II

mechanical relay 460VA for AC1 / 460W for AC3		3 (R1-R3)
0-10V output, tolerance 10%, 10 k Ω load or PWM output freq. 1 kHz, level 10 V		2
PT1000 sensor input measuring range -40°C to 300°C		6
VFS / RPS inputs 0°C-100°C (-25°C /120°C short term)		2
1 l/min - 12 l/min (VFS1-12)	0-0,6 bar	
2 l/min - 40 l/min (VFS2-40)	0-1 bar	
5 l/min - 100 l/min (VFS5-100)	0-1,6 bar	
10 l/min - 200 l/min (VFS10-200)	0-2,5 bar	
20 l/min - 400 l/min (VFS20-400)	0-4 bar	
	0-6 bar	
	0-10 bar	

Network connections

CAN Bus

Permissible cable length of sensors and appliances:

Collector and outdoor sensor	<30m
other PT1000 sensors	<10m
VFS/RPS Sensoren	<3m
CAN	<3m; for > = 3m, a shielded cable must be used
PWM / 0...10V	<3m
mechanical relay	<10m

Real Time Clock

RTC with 24 hour power reserve

Permissible ambient conditions:

Ambient temperature	
for controller operation	0°C...40°C
for transport/storage	0°C...60°C
Air humidity	
for controller operation	max. 85% rel. humidity at 25°C
for transport/storage	no moisture condensation permiddled

Other specifications and dimensions

Housing design	2-part, ABS plastic
Installation methods	Wall installation, optionally panel installation
Overall dimensions	163mm x 110mm x 52mm
Aperture installation	
dimensions	157mm x 106mm x 31mm
Display	Fully graphical display, 128 x 64 dots
Light diode	Multicolor red/green
Operation	4 entry keys

Description of controller

B.2. - Temperature resistance table for Pt1000 sensors

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

B.3. - About the controller

The Heat Metering Controller WMC facilitates efficient use and function control of your solar or heating system. The device is impressive most of all for its functionality and simple, almost self-explanatory operation. For each step in the input process the individual entry keys are assigned to appropriate functions and explained. The controller menu contains headwords for the measured values and settings, as well as help texts or clearly-structured graphics. The WMC can be used as a Heat Metering Controller for the various system variants.

Important characteristics of the WMC:

- Depiction of graphics and texts in a lighted display
- Simple viewing of the current measurement values
- Analysis and monitoring of the system by means of statistical graphics, etc.
- Individual configuration of special functions
- Extensive setting menus with explanations
- Menu block can be activated to prevent unintentional setting changes
- Resetting to previously selected values or factory settings
- A wide range of additional functions are available.

B.4. - Scope of supply

- WMC
- 3 screws 3,5x35mm and 3 plugs 6mm for wall installation
- 12 strain relief clips with 24 screws, replacement fuse 1x T2A / 250V
- Installation and instructions manual WMC

Additionally available:

- Pt1000 temperature sensor, immersion sleeves, overvoltage protection,
- Data Logger with Ethernet connection

B.5. - Disposal and pollutants

The unit conforms to the European RoHS directive 2011/65/EU for the restriction of the use of certain hazardous substances in electrical and electronic equipment.



The unit must not under any circumstances be disposed of with ordinary household refuse. Dispose of the unit only at appropriate collection points or ship it back to the seller or manufacturer.

Installation

C.1. - Electrical connection



Danger

Before working on the unit, switch off the power supply and secure it against being switched on again! Check for the absence of power!
Electrical connections may only be made by a specialist and in compliance with the applicable regulations.
Do not use the controller if the housing shows visible damage.



Caution

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



Caution

The customer must provide an all-pole disconnecting device, e.g. a heating emergency switch.



Caution

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



Caution

Controller and VFS sensor have to have the same ground potential. The VFS sensor uses a functional earth connector (PELV). The PE-connector of the controller has to be connected to the pipe system near the sensor.

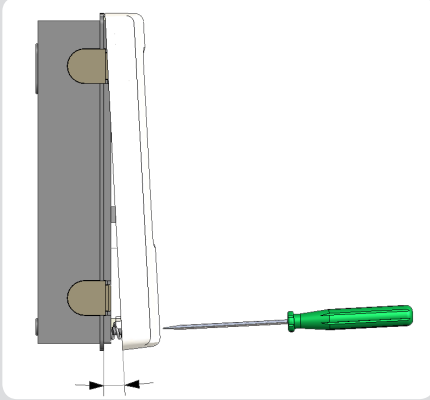
Installation

C.2. - Wall installation

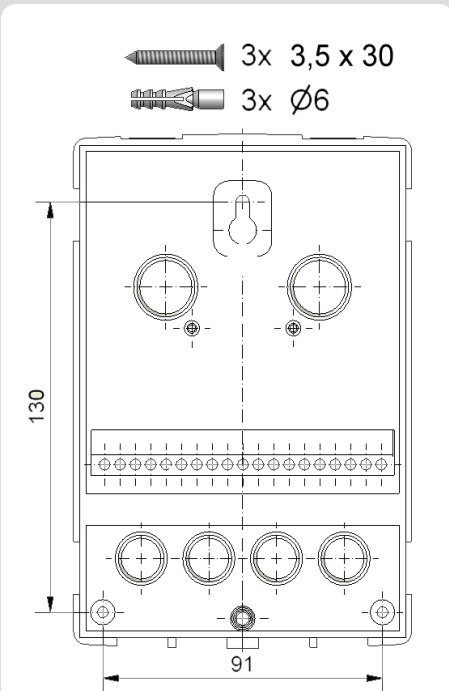


Install the controller only in dry areas and under the ambient conditions described under B.1 "Specifications".

C.2.1.



C.2.2.



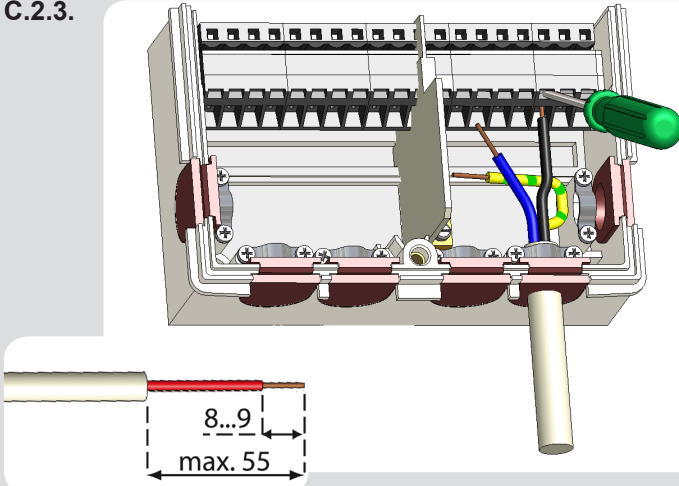
1. Unscrew cover screw completely
2. Carefully pull upper part of housing from lower part.
3. Set upper part of housing aside, being sure not to touch the electronics when doing so.
4. Hold the lower part of the housing up to the selected position and mark the 3 mounting holes. Make sure that the wall surface is as even as possible so that the housing does not become distorted when it is screwed on.
5. Using a drill and size 6 bit, drill 3 holes at the points marked on the wall and push in the plugs.
6. Insert the upper screw and screw it in slightly.
7. Fit the upper part of the housing and insert the other two screws.
8. Align the housing and tighten the three screws.



Controller must be inaccessible from the rear.

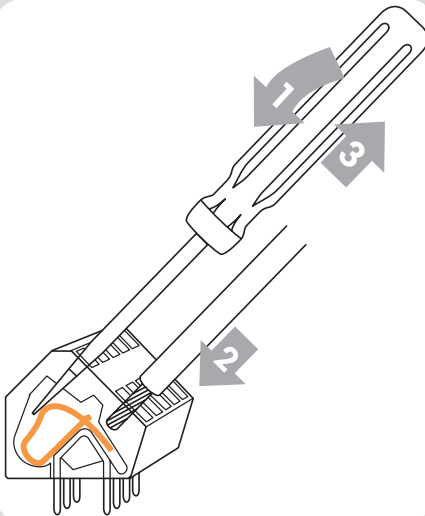
Installation

C.2.3.



1. Select necessary program/hydraulics
2. Strip cables by 55mmmax., insert, fit the strain relief devices, strip the last 8-9mm of the wires (Fig. „C.2.3.“)
3. Open the terminals using a suitable screwdriver (Fig. „C.2.4.“) and make electrical connections on the controller
4. Refit terminal connection cover and fasten screw.
5. Switch on mains voltage and place controller in operation.

C.2.4.



Instructions for clamps:

1. Insert screw driver into the upper hole. Push the lock clamp inside down.
Keep the screw driver in this position.
2. Insert cable into the lower opening.
3. Remove screw driver. The clamp will lock the cable.

Installation

C.3. - Installing the temperature sensors

The controller operates with Pt1000 temperature sensors which are accurate to the degree, thus ensuring optimal control of system functions.



The temperature sensor cables must be routed separately from mains voltage cables, and must not, for example, be routed in the same cable duct!



Caution

Sensor cables for S1 and S5 can be extended to a maximum of 30m using a cable with a cross-section of at least 0.75mm². Sensor cables for S2 to S4 and S6 can be extended to a maximum of 10m using a cable with a cross-section of at least 0.75mm². Make sure that there is no contact resistance!



Caution

Position the sensor precisely in the area to be measured!
Only use immersion, pipe-mounted or flat-mounted sensor suitable for the specific area of application with the appropriate permissible temperature range.



Caution

Connect the VFS sensors with the matching jacks.
To prevent damage to the Direct Sensors it is highly recommended to install them in to the return.
When installing the Vortex Flow Sensors (VFS), observe the correct flow direction!

Installation

D.1. - Terminal connection diagram



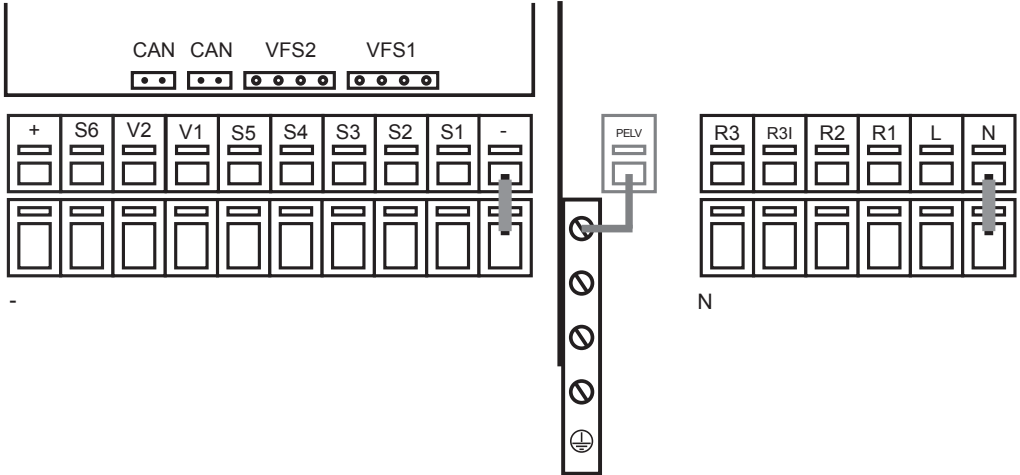
Caution

max. 12V



Danger

mains side
100-240VAC



Low voltage max. 12VAC/DC

Terminal:	Connection for:
S1	Temperature sensor 1
S2	Temperature sensor 2
S3	Temperature sensor 3
S4	Temperature sensor 4
S5	Temperature sensor 5

V1 / V2	-
S6	Temperature sensor 6
+	-

Connection of sensor earth to the grey lower terminal block.

Mains voltage 100-240VAC 50-60Hz

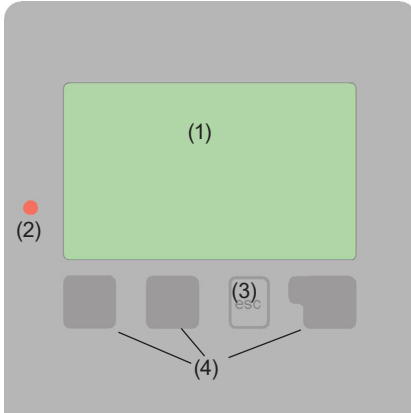
Terminal:	Connection for:
L	Mains phase conductor L
N	Mains neutral conductor N
R1	Relay 1
R2	Relay 2
R3I	Relay 3 (normally closed)
R3	Relay 3 (normally open)

The neutral conductors are connected to the lower blue terminals

The PE protective conductor must be connected to the PE metal terminal block!

Operation

E.1. - Display and input



Examples of display symbols:



Load pause (see Load time)



Warning / error message



New information available

More symbols can be found in the chapter „Special functions“

The display (1), with its extensive text and graphics mode, is almost self-explanatory, allowing easy operation of the controller.

To change from the overview to the settings menu, press the „esc“ key.

The green status LED (2) lights up when a relay is active, the red LED blinks when an error occurs.

Inputs are made with 4 buttons (3+4), which functions change context sensitive.

The „esc“ key (3) is always used to cancel or exit a menu.

If applicable there will be a request for confirmation as to whether the changes which have been made should be saved.

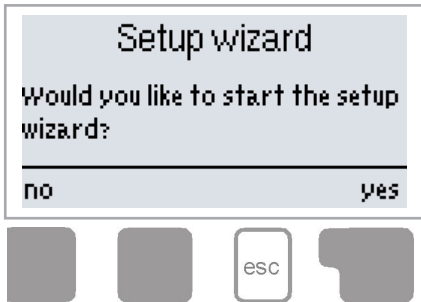
The function of each of the other three keys (4) is shown in the display line directly above the keys; the right-hand key is generally has a confirmation and selection function.

Examples of key functions:

+/-	= enlarge/shrink values
▼/▲	= scroll menu down/up
yes/no	= approve/reject
Info	= additional information
Back	= to previous screen
ok	= confirm selection
Confirm	= confirm setting

Operation

E.2. - Commissioning help



The first time the controller is turned on and after the language and time are set, a query appears as to whether you want to parametrise the controller using the commissioning help or not. The commissioning help can also be terminated or called up again at any time in the special functions menu. 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. Finally, menu „3.2. - Manual“ on page 16 should be used to test the switch outputs with the consumers connected, and to check the sensor values for plausibility. Then switch on automatic mode.



Caution

Observe the explanations for the the individual parameters on the following pages, and check whether further settings are necessary for your application.

E.3. - Free commissioning

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

- | | |
|-------------|---------------------------------|
| - Menu 8. | Language |
| - Menu 5.7. | Time and Date |
| - Menu 4. | Settings, all values |
| - Menu 5. | Special functions, if necessary |

Finally, menu „3.2. - Manual“ should be used to test the switch outputs with the consumers connected, and to check the sensor values for plausibility. Then switch on automatic mode.



Caution

Observe the explanations for the the individual parameters on the following pages, and check whether further settings are necessary for your application.

E.4. - Menu sequence and menu structure

VF51	42°C	11l/min	51	64°C
	0kWh	16.0kW	52	89°C
VF52	49°C	12l/min	53	0°C
	0kWh	31.1kW	54	0°C
Total heat out			55	0°C
	0kWh	47.1kW	56	0°C

The graphics or overview mode appears when no key has been press for 2 minutes, or when the main menu is exited by pressing “esc”.

The up and down buttons are used to scroll through the list of sensors and relays .

Exit main menu

1.Measurements

2.Statistics

▲ ▼ OK

You can enter the Main menu by pressing the „esc“ key.
The following menus are available:

1. Measurements

Current temperature values with explanations

2. Statistics

Function control of the system with operating hours, etc

3. Operating mode

Automatic mode, manual mode or switch unit off

4. Settings

Set parameters needed for normal operation

5. Special functions

Program selection, sensor calibration, clock, additional sensor, etc.

6. Menu lock

Against unintentional setting changes at critical points

7. Service Data

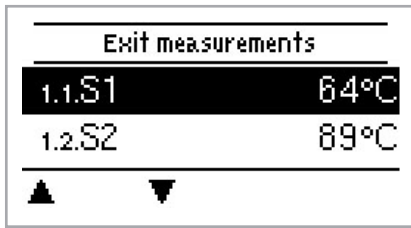
For diagnosis in the event of an error

8. Language

Language selection

Measurement values

1. - Measurement values



The menu "1. Measurement values" serves to display the currently measured temperatures.

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

Selecting "Overview" or "esc" exits the Info mode.

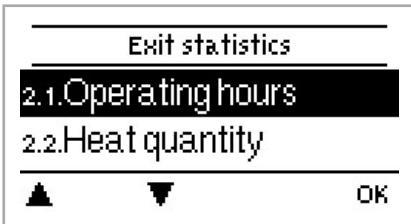


Caution

If "--" appears on the display instead of the measurement value, then there may be a defective or incorrect temperature sensor. If the cables are too long or the sensors are not placed optimally, the result may be small deviations in the measurement values. In this case the display values can be compensated for by making entries on the controller. Follow the instructions under „5.4. - Sensor calibration" on page 20. What measurement values are displayed depends on the selected program, the connected sensors and the specific device design.

Statistics

2. - Statistics



The menu "2. Statistics" is used for function control and long-term monitoring of the system.

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



Caution

For analysis of the system data it is essential for the time to be set accurately on the controller. Please note that the clock does not continue to run if the mains voltage is interrupted, and must therefore be reset. Improper operation or an incorrect time may result in data being deleted, recorded incorrectly or overwritten. The manufacturer accepts no liability for the recorded data!

2.1. - Operating hours

Display of operating hours of the solar pump connected to the controller; various time ranges (day-year) are available.

2.2. - Heat output

Display of the heat output of the system. See also „6.5. - Heat quantity" on page 17

2.3. - Graphic overview

This provides a clearly-organised display of the data listed under 2.1. - 2.2. as a bar graph. Various time ranges are available for comparison. The two left-hand keys can be used to page through the data.

2.4. - Message log

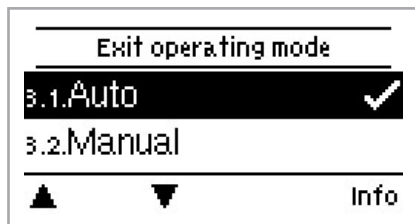
Display of the last 20 events occurring in the system with indication of date and time.

2.5. - Reset/clear

Resetting and deleting the individual analyses. The function "All statistics" clears all analyses but not the error messages.

Operating modes

3. - Operating modes



In menu "3. Operating modes" the controller can either be placed in automatic mode, switched off, or placed in a manual operating mode.

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

3.1. - Automatic

Automatic mode is the normal operating mode of the controller. Only automatic mode provides proper controller function taking into account the current temperatures and the parameters that have been set! After an interruption of the mains voltage the controller automatically returns to the last operating mode selected!

3.2. - Manual

The relay and thus the connected consumer are switched on and off by pressing a key, with no regard to the current temperatures and the parameters which have been set. The measured temperatures are also shown to provide an overview and function control.



When operating mode "Manual" is activated, the current temperatures and the selected parameters are no longer considered. There is a danger of scalding or serious damage to the system. The operating mode "Manual" may only be used by specialists for brief function tests or during commissioning!

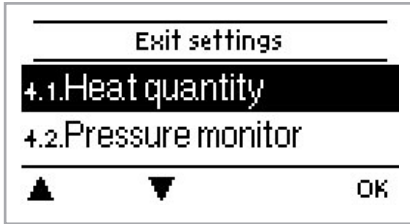
3.3. - Off



When the operating mode "Off" is activated, all controller functions are switched off. This can lead, for example, to overheating on the solar collector or other system components. The measured temperatures are still displayed to provide an overview.

Settings

4. - Settings



The necessary basic settings required for the control function are made in menu "4. Settings".



This does not under any circumstances replace the safety facilities to be provided by the customer!

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

4.1. - Heat quantity

4.1.1. - VFS (X)

4.1.1.1. - VFS Typ

The VFS type is set here.

4.1.1.2. - VFS - Position

This setting determines the position of the VFS sensor.



To prevent damage to the Vortex Flow Sensor it is strongly recommended to install it into the return flow. If it is necessary to install in the flow, it is imperative not to exceed the maximum temperatures of the sensor! (0° C to 100°C and -25°C to 120°C short term)

4.1.1.3. - Reference sensor

The reference sensor used for the heat metering is set here.

4.1.1.4. - Anti freeze type

Set the type of anti freeze used. If none is used, please set to 0.

4.1.1.5. - Glycole percentage

The amount of anti freeze agent in the system.

4.1.1.6. - Offset ΔT

Correction value for temperature difference

Since for the heat meter the collector and the storage temperature are used, a difference to the flow respectively return flow temperature can be compensated by changing Offset ΔT accordingly.

Example:

Displayed collector temp. 40°C, measured flow temperature 39°C, displayed storage temperature 30°C, measured return temperature 31°C = results in a correction value of -20% (displayed ΔT 10K, real ΔT 8K = -20% correction)

Settings

4.2. - Pressure monitor

The relay is switched on when the pressure drops below set minimum or exceeds the set maximum pressure.

4.2.1. - Pressure monitor

This menu is used to configure the system pressure monitoring via direct sensor. As soon as the set limits are exceeded, the relay is switched on.

4.2.2. / 4.2.3. - RPS1 / RPS2

4.2.2.1. / 4.2.3.1. - RPS Typ

Type of pressure sensor

This menu is used to determine the type of pressure sensor used.

Please note: If e.g. VFS1 is connected, RPS1 option is not shown.

4.2.2.2. / 4.2.3.2. - Pmin

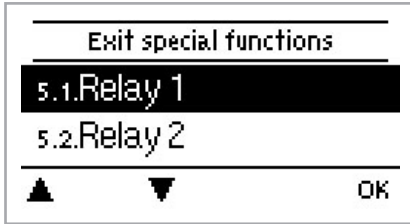
Minimum pressure. If this value is undershot, an error message is displayed and the relay is switched on.

4.2.2.3. / 4.2.3.3. - Pmax

Maximum pressure. If this value is exceeded, an error message is displayed and the relay is switched on.

Special functions

5. - Special functions



Menu "5. Special functions" is used to set basic items and expanded functions.



Other than the time all settings may only be made by a specialist.

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



The enumeration of the menus may vary from system to system.

5.1. - Relay functions 1-3

The here explained additional functions can be assigned to unused relays. Every additional function can only be used once. Pay special attention to the technical data of the relays („B.1. - Specifications" on page 5).

5.1.1. - Error message 1

The relay is switched on, when one or more protective function is active or a message is shown. This function can be inverted, so that the relay is always on and switches off when a protective function or a message is shown.

5.1.2. - Error message 2

See "5.1.1. - Error message 1"

5.1.3. - Pressure monitoring

A message is shown when the pressure drops below set minimum or exceeds the set maximum pressure. No relay is switched, for that see „4.2. - Pressure monitor" on page 18.

5.1.4. - Always on

Relay is always switched on.

Special functions

5.4. - Sensor calibration

Deviations in the temperature values displayed, for example due to cables which are too long or sensors which are not positioned optimally, can be compensated for manually here. The settings can be made for each individual sensor in steps of 0.8°C (temperature) resp. 0.2% of the measuring range of the VFS / RPS sensor (flow rate / pressure) per step.

Offset Sensor Settings range: -100 ... +100 / Default setting: 0



Caution

Settings sind nur in Sonderfällen bei Erstinbetriebnahme durch den Fachmann nötig. Falsche Messwerte können zu Fehlfunktionen führen.

5.5. - Commissioning

Starting the commissioning help guides you in the correct order through the basic settings necessary for commissioning, and provides brief descriptions of each parameter in the display.

Pressing the "esc" key takes you back to the previous value so you can look at the selected setting again or adjust it if desired. Pressing the "esc" more than once takes you back to the selection mode, thus cancelling the commissioning help.



Caution

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

5.6. - Factory settings

All of the settings that have been made can be reset, thus returning the controller to its delivery state.



Caution

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

5.7. - Time and date

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



Caution

For analysis of the system data it is essential for the time to be set accurately on the controller. Please note that the clock does not continue to run if the mains voltage is interrupted, and must therefore be reset.

5.8. - Daylight saving time

When this function is active, the controller's clock changes automatically to and from DST (DST, Daylight Savings Time).

5.9. - Eco display mode

When active, the displays backlight is switched off after 2 minutes of inactivity.

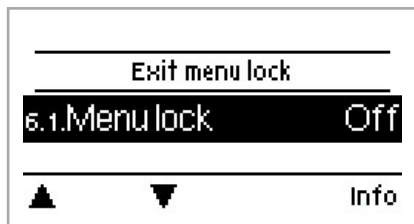


Caution

If a message is waiting, the backlight is not switched off.

Menu lock, Service values, languages

6. - Menu lock



Menu "6. Menu lock" can be used to secure the controller against unintentional changing of the set values.

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

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
- 5.7. Time & date
6. Menu lock
7. Service values

To lock the other menus, select "Menu lock on".

To enable the menus again, select "Menu lock off".

7. - Service values



The menu „7. - Service values“ can be used for remote diagnosis by a specialist or the manufacturer in the event of an error, etc.

8. - Languages

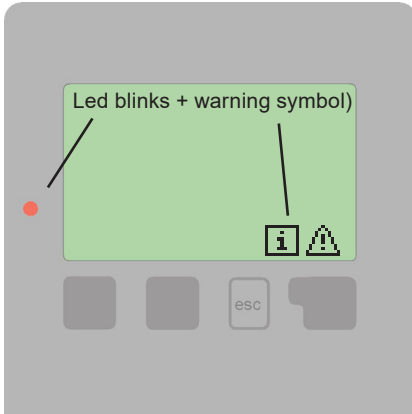


Menu "8. Language" can be used to select the language for the menu guidance. This is queried automatically during initial commissioning.

The choice of languages may differ, however, depending on the device design.

Malfunctions

Z.1. Malfunctions with error messages



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.



Danger

Do not try to deal with this yourself.
Consult a specialist in the event of an error!

Possible error messages:	Notes for the specialist:
Sensor x defective	Means that either the sensor, the sensor input at the controller or the connecting cable is/was defective. (Resistance table see „B.2. - Temperature resistance table for Pt1000 sensors“ on page 6)
Restart	Means that the controller was restarted, for example due to a power failure. Check the date&time!
Time & Date	This message appears automatically after a mains failure because the time & date have to be checked, and reset if necessary.

Malfunctions

Z.2 Replacing the fuse



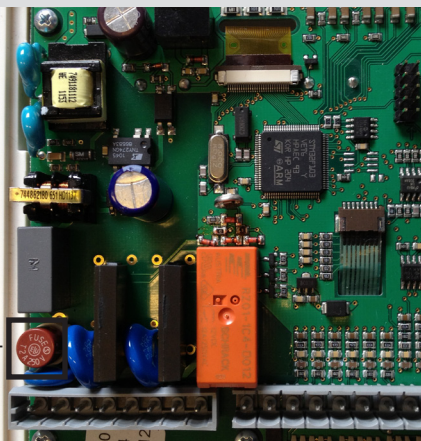
Repairs and maintenance may only be performed by a specialist. Before working on the unit, switch off the power supply and secure it against being switched on again! Check for the absence of power!



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

Z.2.1

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 that case, open the device as described under C, remove the old fuse and check it. Exchange the defective fuse for a new one, locate the external source of the error (e.g. pump) and exchange it. Then first recommission the controller and check the function of the switch outputs in manual mode as described under „3.2. - Manual“ on page 16

Maintenance

Z.3 Maintenance



In the course of the general annual maintenance of your heating system you should also have the functions of the controller checked by a specialist and have the settings optimised if necessary.

Performing maintenance:

- Check the date and time (see „5.7. - Time and date“ on page 20)
- Assess/check plausibility of analyses (see „2. - Statistics“ on page 15)
- Check the error memory (see „2.4. - Message log“ on page 15)
- Verify/check plausibility of the current measurement values (see „1. - Measurement values“ on page 15)
- Check the switch outputs/consumers in manual mode (see „3.2. - Manual“ on page 16)
- Possibly optimise the parameter settings

Useful notes/tips and tricks



The service values (see „7. - Service values“ on page 21) **include not only current measurement values and operating states**, but also all of the settings for the controller. Write down the service values at least once after commissioning has been successfully completed.



In the event of uncertainty as to the control response or malfunctions the service values are a proven and successful method for remote diagnosis. Write down the service values (see „7. - Service values“ on page 21.) at the time that the suspected malfunction occurs. Send the service value table with a brief description of the error to the specialist or manufacturer.



To protect against loss of data, record any analyses and data that are particularly important to you (see 2.) at regular intervals.

Hydraulic variant set:

Commissioned on:

Commissioned by:

Notes:

Your specialist dealer:

Manufacturer:

SOREL GmbH Mikroelektronik
Reme Str. 12
D - 58300 Wetter (Ruhr)

Tel. +49 (0)23 35 682 77 0
Fax +49 (0)23 35 682 77 10

www.sorel.de
info@sorel.de

Final declaration:

Although these instructions have been created with the greatest possible care, the possibility of incorrect or incomplete information cannot be excluded. Subject as a basic principle to errors and technical changes.

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