DeltaTherm® PV MAX

beginning with firmware version 1.00

Power-to-Heat controller

for the direct control of an electric heater

Manual for the specialised craftsman

Installation
Operation
Functions and options
Troubleshooting

VBus.net

The Internet portal for easy and secure access to your system data – www.vbus.net

Thank you for buying this RESOL product.
Please read this manual carefully to get the best performance from this unit. Please keep this manual safe.

11214463

en
Manual
www.resol.com

Safety advice

Please pay attention to the following safety advice in order to avoid danger and damage to people and property.

Danger of electric shock:

- When carrying out works, the device must first of all be disconnected from the mains.
- It must be possible to disconnect the device from the mains at any time.
- Do not use the device if it is visibly damaged!

The device must not be used by children or persons with reduced physical, sensory or mental abilities or without any experience and knowledge. Make sure that children do not play with the device!

Only connect accessories authorised by the manufacturer to the device.

Make sure that the housing is properly closed before commissioning the device.

Set the code to the customer code before handing over the controller to the customer.

Target group

These instructions are exclusively addressed to authorised skilled personnel.

Only qualified electricians are allowed to carry out electrical works.

Initial commissioning must be effected by authorised skilled personnel.
Authorised skilled personnel are persons who have theoretical knowledge and experience with the installation, commissioning, operation, maintenance, etc. of electric/electronic devices and hydraulic systems and who have knowledge of relevant standards and directives.

Instructions

Attention must be paid to the valid local standards, regulations and directives!

Subject to technical change. Errors excepted.

Information about the products

Proper usage

The controller is designed for using excess PV current for the control of up to 3 electric immersion heaters as well as for the control of a heat pump and/or a wallbox in compliance with the technical data specified in this manual.

Any use beyond this is considered improper.

Proper usage also includes compliance with the specifications given in this manual.

Improper use excludes all liability claims.

Note

Strong electromagnetic fields can impair the function of the device.

➔ Make sure the device as well as the system are not exposed to strong electromagnetic fields.

EU Declaration of conformity

The product complies with the relevant directives and is therefore labelled with the CE mark. The Declaration of Conformity is available upon request, please contact the manufacturer.

Scope of delivery

The scope of delivery of this product is indicated on the packaging label.

Storage and transport

Store the product at an ambient temperature of 0 … 40 °C and in dry interior rooms only.

Transport the product in its original packaging only.

Cleaning

Clean the product with a dry cloth. Do not use aggressive cleaning fluids.

Data security

We recommend regular backups of the data stored on the device via MicroSD card.

Decommissioning

1. Disconnect the device from the power supply.
2. Dismount the device.

Disposal

- Dispose of the packaging in an environmentally sound manner.
- At the end of its working life, the product must not be disposed of as urban waste. Old appliances must be disposed of by an authorised body in an environmentally sound manner. Upon request we will take back your old appliances bought from us and guarantee an environmentally sound disposal of the devices.

Description of symbols

Warnings are indicated with a warning symbol!

Signal words describe the danger that may occur, when it is not avoided.

WARNING **means that injury, possibly life-threatening injury, can occur.**

➔ It is indicated how to avoid the danger described.

ATTENTION **means that damage to the appliance can occur.**

➔ It is indicated how to avoid the danger described.

Note
Notes are indicated with an information symbol.

➔ Texts marked with an arrow indicate one single instruction step to be carried out.

1. Texts marked with numbers indicate several successive instruction steps to be carried out.

DeltaTherm® PV MAX

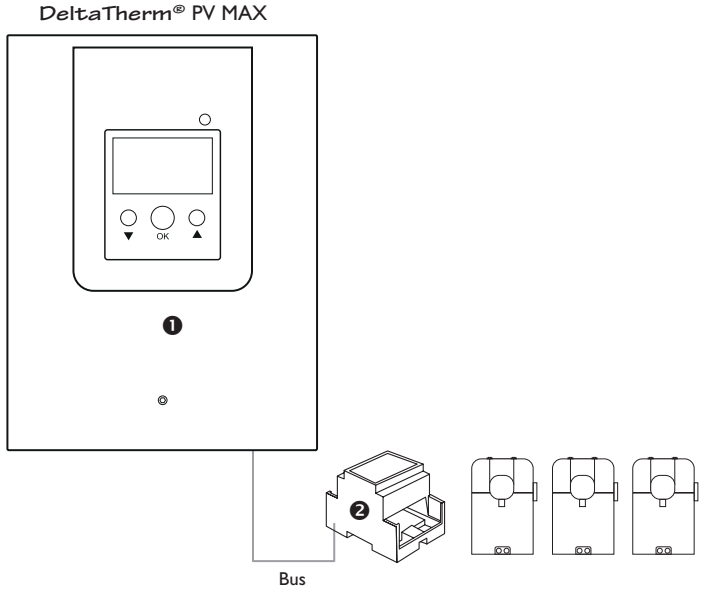
Whether in new or existing buildings, the DeltaTherm® PV MAX combines Power-to-Heat and heating control. It detects excess PV current reliably and calculates the power available. Furthermore, it distributes the current available in a modulating manner to up to 3 electric immersion heaters with a total power of 9000 W, controls an SG-ready heat pump and a charging station for electric vehicles as needed. Numerous optional functions can be activated with extension modules.

The following electric immersion heaters with thermal cut-out are suitable:

- single-phase electromechanical electric immersion heaters up to 3 kW with an operating voltage of 230 V~
- three-phase electromechanical electric immersion heaters up to 9 kW with an operating voltage of 400 V~ and with outgoing neutral conductor

Electronically controlled electric immersion heaters are not suitable.

❶ Controller with power unit
❷ Sensor module and current sensors



Upon delivery, the controller cover is connected to the housing with a PE conductor.

Contents

1 DeltaTherm® PV MAX

- **Increase in self-consumption**
- **Household current priority**
- **Stepless control of up to 3 electric immersion heaters**
- **Control of a heat pump**
- **Control of a wallbox**
- **Suitable for all grid-connected PV systems**
- **Internal backup heating with mains current (optional)**
- **Smart Remote access (optional)**
- **Access to the VBus.net visualisation portal via LAN**

Technical data controller with power unit (DeltaTherm® PV MAX)

Inputs: 5 Pt1000 temperature sensors (2 of them convertible to switch), 1 analogue input for Grundfos Direct Sensor™ or FRH humidity sensor

Outputs: 3 outputs for electric immersion heaters (variable power control up to 9 kW), 2 potential-free extra-low voltage relays and 2 PWM outputs (convertible to 0-10 V)

Switching capacity:

13 A 230 V~ (output for immersion heater)

0.9 A 30 V ⎓ (potential-free relay)

Total switching capacity:

3 x 13 A 230 V~

Power supply: 3-phase with PE and neutral conductor (3/N/PE 230 V~, 50 Hz)

Supply connection: type X attachment

Standby: 5.48 W

Mode of operation: type 1.B.C action

Rated impulse voltage: 2.5 kV

Data interface: VBus®, MicroSD card slot, LAN/RJ45 (10/100 Base TX Ethernet, Auto MDIX)

VBus® current supply: 35 mA

Functions: control of 3 electric immersion heaters, backup heating with mains current, control of a heat pump / wallbox, numerous optional functions, Smart Remote

Housing: sheet metal, powder-coated

Mounting: wall mounting

Indication / Display: graphic display, operating control LED

Operation: 3 buttons

Ingress protection: IP 20 / EN 60529

Protection class: I

Ambient temperature: 0 … 40 °C

Degree of pollution: 2

Overvoltage category: 2

Maximum altitude: 2000 m above MSL

Relative humidity: 10 … 90 %

Dimensions: approx. 226 x 302 x 84 mm

Weight: 4.2 kg

Technical data sensor module (DeltaTherm® E sensor / sensor XL)

Inputs: 3 voltage inputs and 3 current inputs for SW16 (DeltaTherm® E sensor) / SW24 (DeltaTherm® E sensor XL) current sensors

Power supply: 100 – 240 V~ (50 – 60 Hz)

Supply connection: type Y attachment

Standby: < 1 W

Rated impulse voltage: 1.0 kV

Data interface: VBus®

Functions: energy measuring unit

Housing: plastic, PC (UL 94 V-0)

Mounting: DIN rail in the domestic distribution board

Indication / Display: 2 operating control LEDs

Ingress protection: IP 20 / EN 60529

Protection class: II

Ambient temperature: 0 … 40 °C

Degree of pollution: 2

Dimensions: 71 x 90 x 58 mm

Technical data SW16 (Ø 16 mm) / SW24 (Ø 24 mm) current sensor

Nominal current:

SW16: 70 A / 23.3 mA (current ratio 3000:1)

SW24: 300 A / 100 mA (current ratio 3000:1)

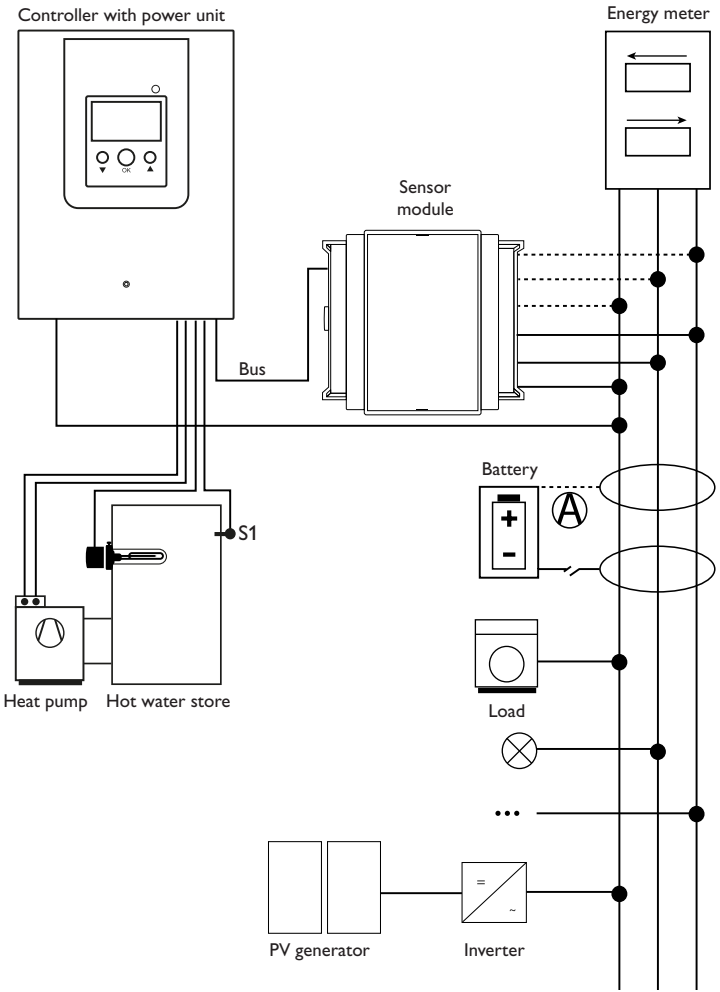
Nominal voltage output: 0.333 V~

Insulation voltage: 600 V~

Frequency range: 50 … 400 Hz

Ambient temperature: -15 … +60 °C

2 System overview



Sensors		
S1	Temperature store	1/GND
S2	optional	2/GND
S3	optional	3/GND
S4	Smart Remote	9/10
S5	Smart Remote	11/12

Output		
Out1	Immersion heater 1	Out1/N/⏚
Out2	Immersion heater 2	Out2/N/⏚
Out3	Immersion heater 3	Out3/N/⏚
R4	optional	R4/R4
R5	optional	R5/R5

The control unit consists of the controller with power unit and the sensor module.

The sensor module measures the current flow directly at the energy meter. If the power generated is high enough, the excess current can be used for electrically heating the water in the store. If the store maximum temperature is reached (S1), loading will stop.

Using a battery is possible in this system, but correct functioning cannot be guaranteed in all cases. The PV current is used with the following priorities:

1. Direct consumption
2. Charging the battery
3. Loading a hot water store
4. Grid feed-in

For this purpose, the sensor modules and the battery have to be arranged as shown in the illustration. The current sensor Ⓐ of the battery must not detect the current consumption of the controller and the loads controlled by the controller.

Different optional functions can be activated, see page 33.

3 Installation

3.1 Mounting

WARNING! **Electric shock!**
Upon opening the housing, live parts are exposed!
➔ **Always disconnect the device from power supply before opening the housing!**

Note
Upon delivery, the controller cover is connected to the housing with a PE conductor.

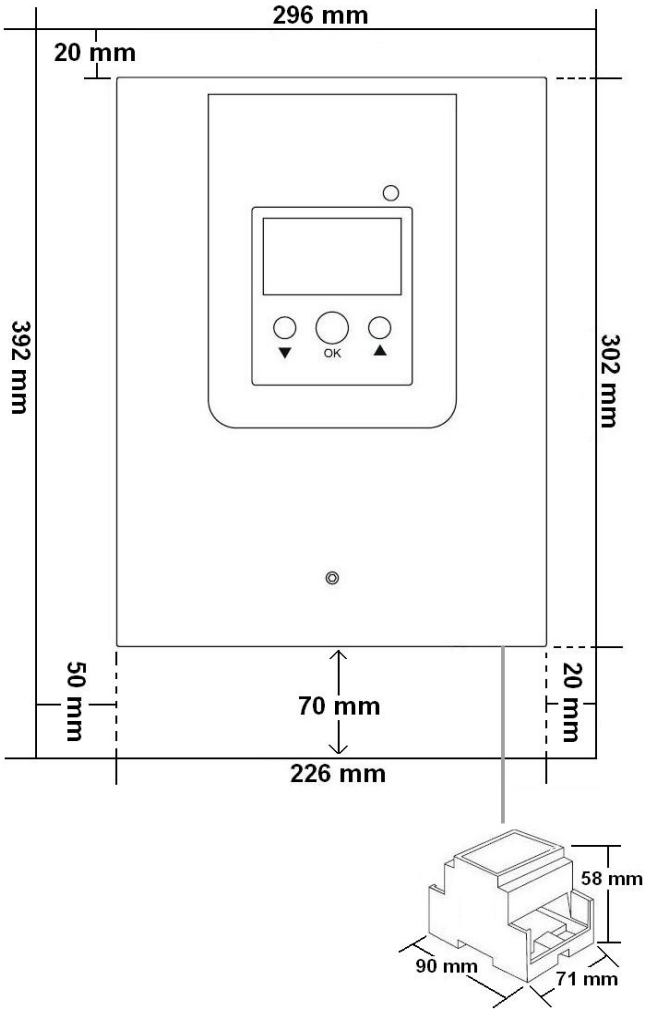
Note
Strong electromagnetic fields can impair the function of the device.
➔ Make sure the device as well as the system are not exposed to strong electromagnetic fields.

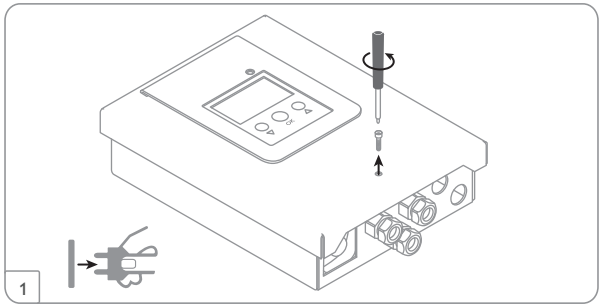
The devices must only be located in dry and dust-free interior rooms.
If the device is not equipped with a mains connection cable and a plug, the device must additionally be supplied from a double pole switch with contact gap of at least 3 mm or must be equipped with a disconnecting device (fuse) in accordance with the required installation regulations.
Please pay attention to separate routing of sensor cables and mains cables.

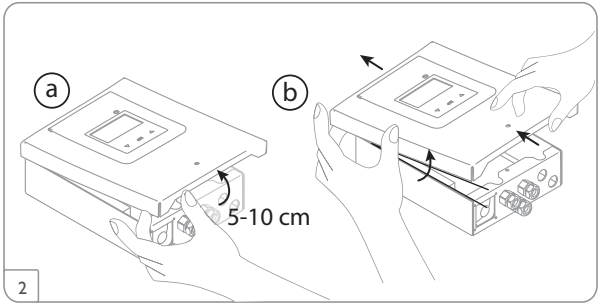
In order to mount the device to the wall, carry out the following steps:

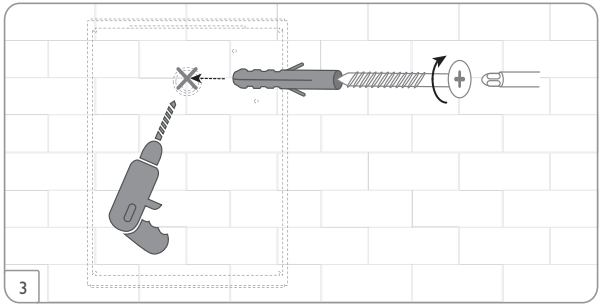
1. Unscrew the screw from the cover
2. Lift the lower edge of the cover about 5 – 10 cm, then push the cover upwards to remove it from the housing. Disconnect the PE conductor from the cover.
3. Mark the upper fastening point on the wall. Drill and fasten the enclosed wall plug and screw leaving the head protruding.
4. Hang the housing from the upper fastening point and mark the lower fastening points (centres 105 mm).
5. Insert lower wall plugs.
6. Fasten the housing to the wall with the lower fastening screws and tighten.
7. Carry out the electrical wiring in accordance with the terminal allocation and re-establish the PE connection at the cover (see page 10).
8. Put the cover on the housing.
9. Attach with the fastening screw.

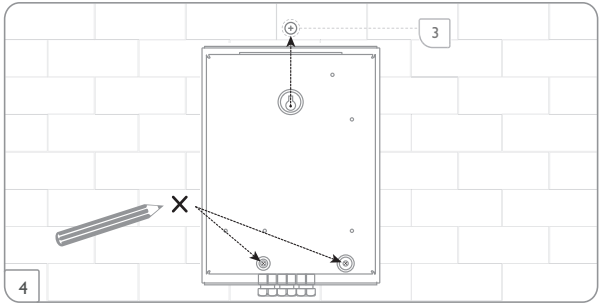
Dimensions and minimum distances

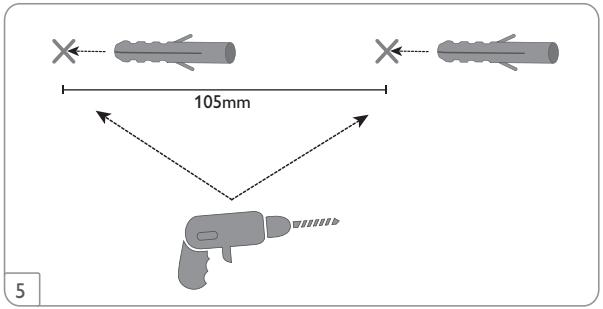


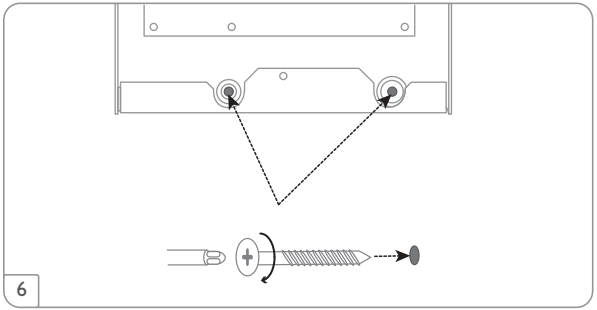

1


a
b
5-10 cm
2


3


3
4


105mm
5


6

Step-by-step installation:

ATTENTION! **Damage by overheating!**

Commissioning the immersion heater in a system electrically connected, but not hydraulically filled can lead to damage caused by overheating!

➔ **Make sure the hydraulic system is filled and ready for operation.**

1. Make sure the store is filled and ready for operation.
2. Mount the sensor module on a DIN rail in the domestic distribution board as close as possible to the energy meter. Make sure that no load is installed between the sensor module and the energy meter.
3. Connect the current sensors and the conductors of the sensor module in phase directly at the energy meter (see page 15).
4. Connect the sensor module with the conntroller by means of the bus (SM) (see page 11 and page 14).
5. Re-establish the PE connection at the cover and put the cover on the housing.
6. Establish the power supply of the controller (see page 10).
7. Run the commissioning menu (see page 26).
8. Carry out the desired adjustments in the **Load** menu (see page 31).

3.2 Electrical connection

WARNING! **Electric shock!**

Upon opening the housing, live parts are exposed!

➔ **Always disconnect the device from power supply before opening the housing!**

WARNING! **Electric shock!**

Stresses and strains on the cables can lead to short-circuit or electric shock!

➔ **Route the cables in conduits directly underneath the housing!**

➔ **Install the cable conduit such that the fan is not covered!**

ATTENTION! **Overheating!**

Covering the fan can lead to damage caused by overheating!

➔ **Take care not to cover the fan!**

ATTENTION! **ESD damage!**

Electrostatic discharge can lead to damage to electronic components!

➔ **Take care to discharge properly before touching the inside of the device! To do so, touch a grounded surface such as a radiator or tap!**

Note

Route cables carrying low voltage separately from cables carrying more than 50 V!

Note

The connection to the power supply must always be the last step of the installation!

Do not use the devices if they are visibly damaged!

The controller is supplied with power via a mains cable. The power supply of the device must be 3 x 230 V~, 50 Hz. The cross section of the cable must be 2.5 mm².

WARNING! **Risk of damage and injury by fire hazard!**

Missing or incorrect fusing can lead to fires.

➔ **Connect the device to an external 3xB16A circuit breaker using a 5x2.5mm² cable!**

ATTENTION! **Damage by overheating!**

The use of electric immersion heaters without a thermal cut-out can lead to damage by overheating!

➔ **Only use single-phase electromechanical electric immersion heaters up to 3 kW or three-phase electromechanical electric immersion heaters up to 9 kW with a thermal cut-out!**

➔ **Do not use electronically controlled electric immersion heaters!**

➔ **Pay attention to the manual of the electric immersion heater!**

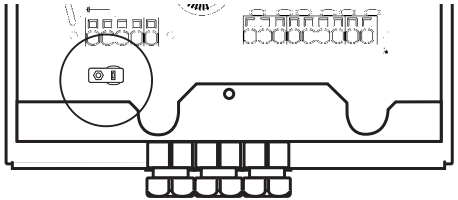
Note

Use a cable with a cross section of 3 x 2.5 mm² / 5 x 2.5 mm² for connecting the electric immersion heaters, see page 12.

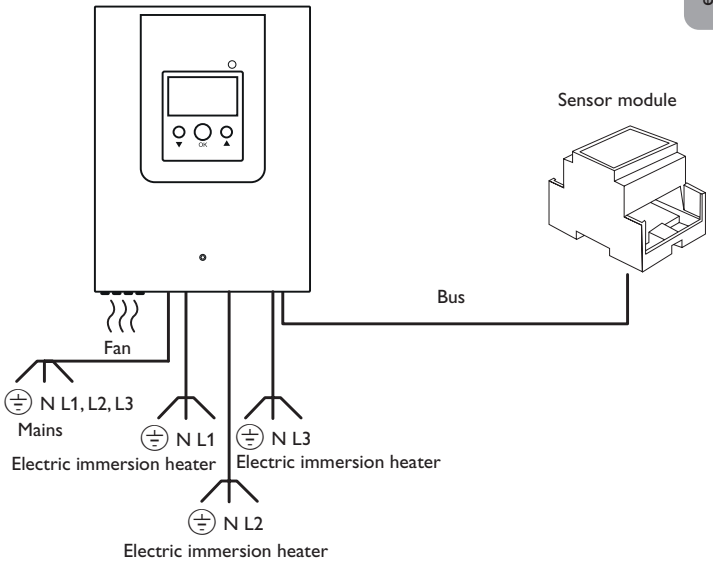
The cable length must not exceed 5 m.

Note

In order to reduce EMC interferences, connect the crimped end of the enclosed yellow-green PE cable to the housing of the controller (see figure). Connect the open end of the PE cable to the earth potential separately from the mains connection.



Controller with power unit



WARNING! **Electric shock!**

Without the PE connection, the housing could be live!

➔ **Always re-establish the PE connection at the cover before putting the cover on the housing!**

3.2.1 Connection of the immersion heater 1/2/3

ATTENTION! Damage by overheating!

The use of electric immersion heaters without a thermal cut-out can lead to damage by overheating!

- ➔ **Only use single-phase electromechanical electric immersion heaters up to 3 kW or three-phase electromechanical electric immersion heaters up to 9 kW with a thermal cut-out!**
- ➔ **Do not use electronically controlled electric immersion heaters!**
- ➔ **Pay attention to the manual of the electric immersion heater!**

ATTENTION! Damage to the device!

The use of electric immersion heaters with a thermostat can lead to damage to the device!

- ➔ **If electric immersion heaters with thermostat are used, set the maximum temperature at the thermostat higher than the maximum temperature in the immersion heater menu!**
- ➔ **Pay attention to the manual of the electric immersion heater!**

➔ Use a cable with a cross section of 3 x 2.5 mm²/5 x 2.5 mm² and a maximum length of 5 m for connecting the electric immersion heaters.

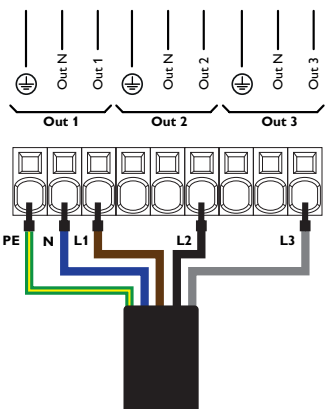
ATTENTION! Damage to the device!

Using a cable longer than 5 m can lead to damage to the device!

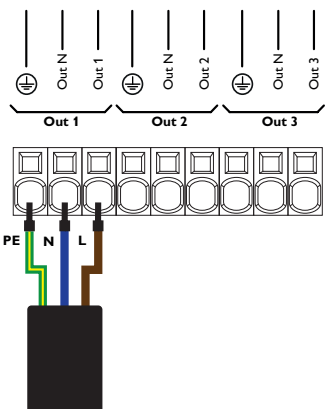
- ➔ **Make sure the cable length does not exceed 5 m.**

Connection electric immersion heater

9 kW



3 kW



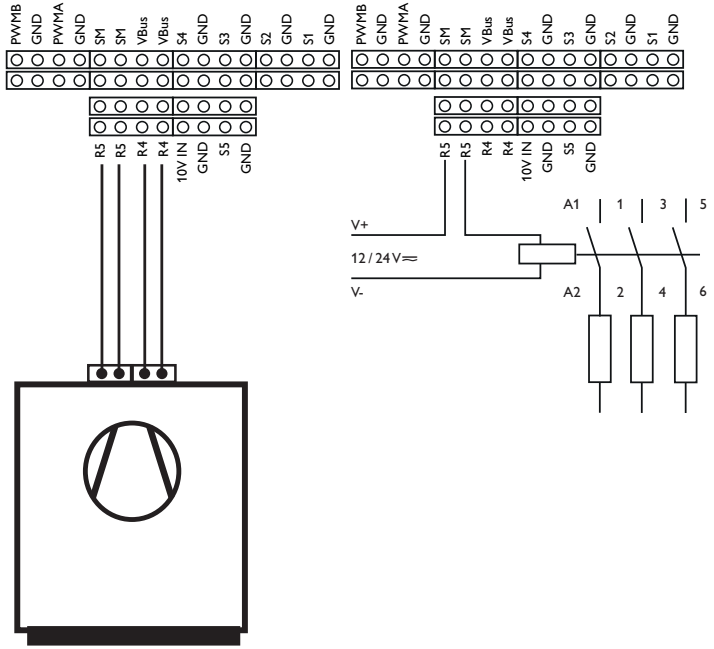
Note

When a three-phase immersion heater is connected, the terminals for the common neutral and PE conductors can be freely selected.

3.2.2 Loads with control input

1 or 2 relays can be used for activating a load with control input (e.g. heat pump). This allows the operating modes switch-on recommendation (1 control input) or definite start-up command (2 control inputs) to be triggered at the load.

The 0-10 V/PWM output can be configured and also be assigned as a control signal.



Note

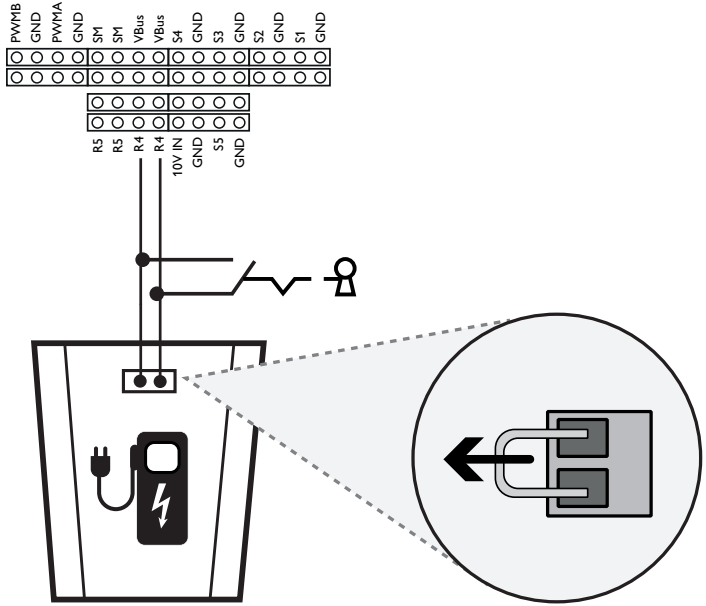
In the **Load** menu, the relays 4 and 5 for external loads can be adjusted. As an external load usually has a high power consumption, it must be controlled by means of an auxiliary relay with a flyback diode. Relays 4 and 5 are potential-free relays.

3.2.3 Loads with key switch

Activation of loads with contacts for a key switch (e.g. wallbox) is possible with relay R4 or R5. In order to ensure manual activation of the load independent of the controller, the key switch must be installed in parallel to the load.

Note

Remove the wire link located at the wallbox inputs.

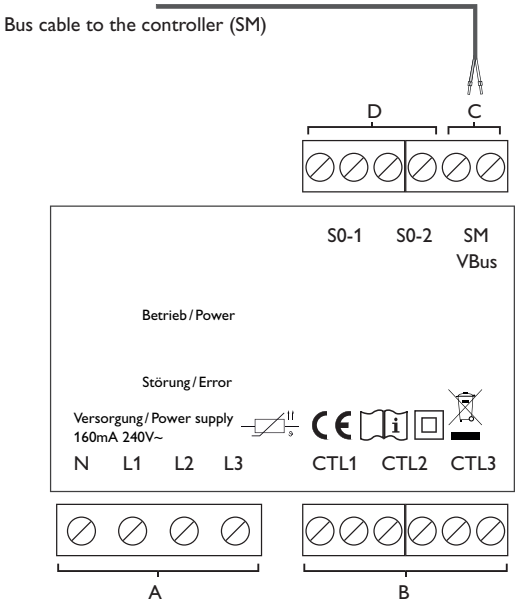


3.2.4 Sensor module

WARNING! **Electric shock!**

Touching live cables can lead to electric shock!

➔ **Make sure all cables have been isolated from any power source before carrying out electrical works!**



C

Data communication / Bus

The connection is to be carried out at the terminals marked **SM** (either polarity). The connection to the controller is to be carried out at the terminals marked SM (7/8).

The bus cable can be extended with a two-wire cable. The cross section must be at least 0.5 mm² and the cable can be extended up to 50 m in the case of a single connection.

Note

Route cables carrying low voltage separately from cables carrying more than 50 V.

D

Digital S0 impulse outputs (no function)

A

Power supply:

Neutral conductor N
Conductor 1 L1
Conductor 2 L2
Conductor 3 L3

B

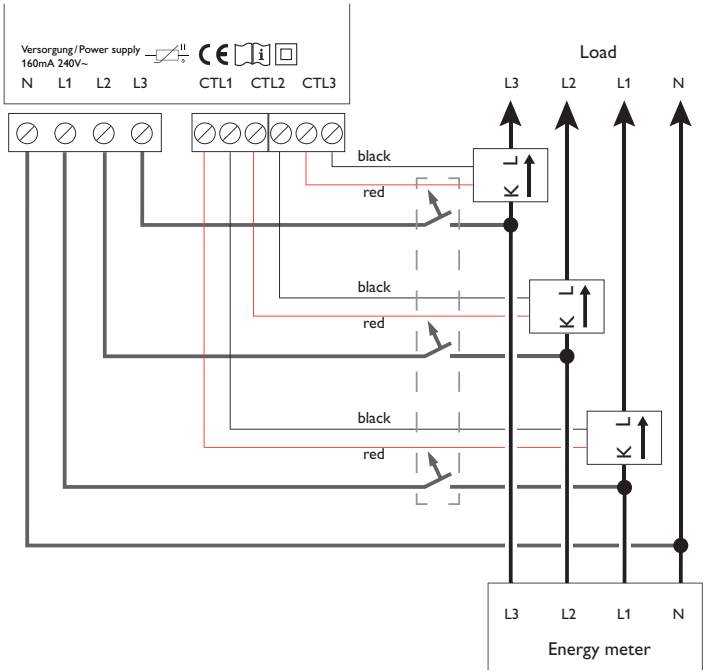
SW16/SW24 current sensors:

Current sensor CTL1
Current sensor CTL2
Current sensor CTL3

Three-phase connection

1. Connect the current sensors and the conductors of the sensor module in phase directly at the energy meter. The arrow indicated on the current sensors must point in the direction of the loads.
2. Make sure that no load is installed between the energy meter and the current sensors.

The sensor module adds up the power values of all 3 phases. All 3 phases have to be connected to the sensor module.

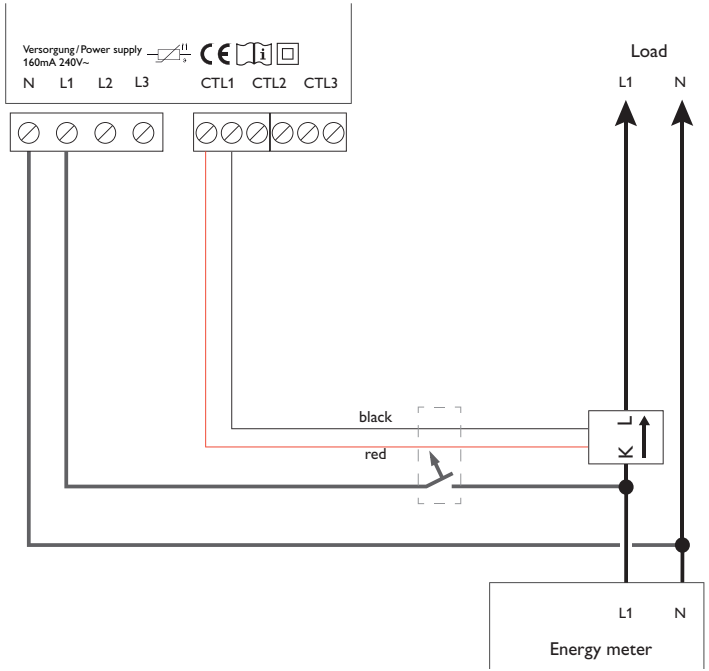


Note
The 3 phases have to be protected by means of a three-phase 16 A circuit-breaker (not included with the device).

Single-phase connection

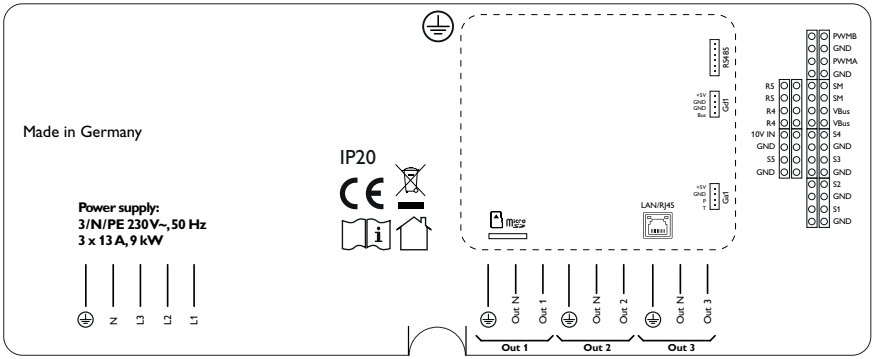
Note
For buildings with a single-phase power supply only.
For three-phase building connections, all current sensors have to be connected.

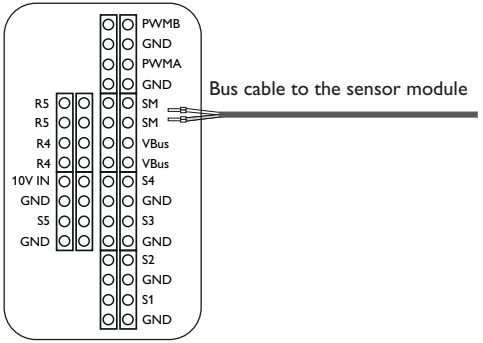
1. Connect the current sensor and the conductor L1 of the sensor module directly at the energy meter. The arrow indicated on the current sensor must point in the direction of the loads.
2. Make sure that no load is installed between the energy meter and the current sensor.



Note
The phase has to be protected by means of a single-phase 16 A circuit-breaker (not included with the device).

Controller with power unit





Note:
It must be possible to disconnect the device from the mains at any time.
➔ Install the mains plug so that it is accessible at any time.
➔ If this is not possible, install a switch that can be accessed.

Power supply of the controller	
Conductor L1, L2, L3	
Neutral conductor N	
Protective earth conductor ⏚	

Connection immersion heater 1 / immersion heater 2 / immersion heater 3 (see fig. page 12)	
Out 1 / Out 2 / Out 3	
Out N	
Protective earth conductor ⏚	

0-10 V switching input	Terminals
no function	10V IN / GND

Temperature sensors	Terminals
S1 = temperature store (above the electric immersion heater)	S1 / GND
S2 = temperature store	S2 / GND
S3 = temperature store	S3 / GND
S4	temperature / switch (optional)	S4 / GND
---	---	---
S5	temperature / switch (optional)	S5 / GND
Ga1	temperature and flow rate / pressure	
Gd1	no function	

Outputs		Terminals
R4	optional	R4 / R4
R5	optional	R5 / R5
PWMA / PWMB		PWMA / GND, PWMB / GND
RS485	no function	

Bus terminals
The controller is equipped with the **VBus®** for data communication. The connection is to be carried out at the terminal marked **VBus** (either polarity). The sensor module is to be connected to **SM**.

SM = sensor module	SM / SM
VBus = e.g. Datalogger	VBus / VBus

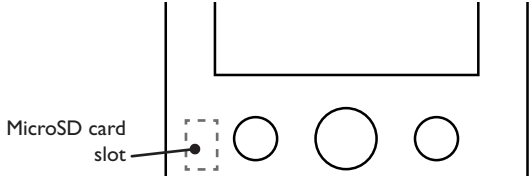
Note
For more details about the commissioning procedure see page 26.

3.2.5 MicroSD card slot of the controller

The controller is equipped with a MicroSD card slot.

With a MicroSD card, the following functions can be carried out:

- Store measurement and balance values onto the MicroSD card. After the transfer to a computer, the values can be opened and visualised, e.g. in a spreadsheet.
- Prepare adjustments and parameterisations on a computer and transfer them via the MicroSD card.
- Store adjustments and parameterisations on the MicroSD card and, if necessary, retrieve them from there.



Note
For more information about using a MicroSD card, see page 39.

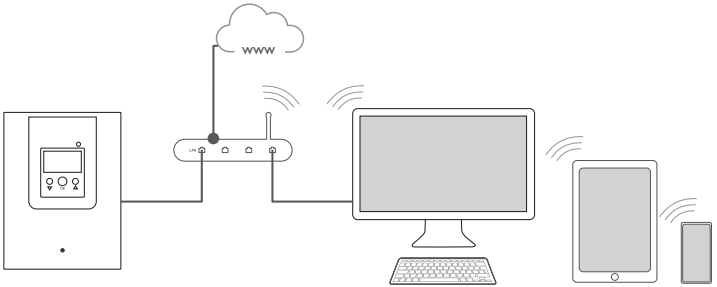
A MicroSD card is included with the controller.

3.2.6 LAN interface

The device can be connected to a router by using a network cable (CAT5e, RJ45 or similar).

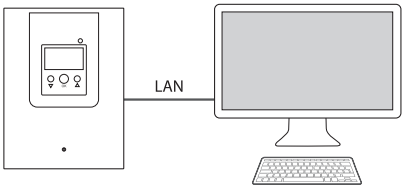
➔ Connect the network cable to the LAN connector of the router and to the LAN connector of the device.

For more information about network applications see page 42.



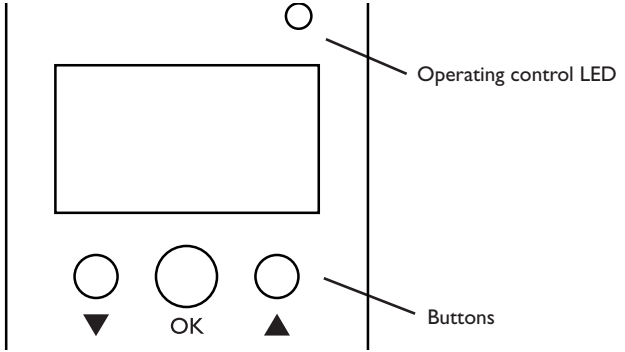
The LAN connector supports transfer rates of up to 100 MBit per second.

Alternatively, the Web interface can be accessed by directly connecting a computer to the device. For this purpose, the DeviceDiscoveryTool can be used, see page 42.



4 Operation and function of the controller

4.1 Buttons



The controller is operated via the 3 buttons below the display:

Left button (▼) - scrolling downwards / reducing adjustment values
Centre button (OK) - confirming / selecting
Right button (▲) - scrolling upwards / increasing adjustment values

4.2 Operating control LED

The controller is equipped with a bicolour operating control LED indicating the following states:

Colour	Permanently shown	Flashing
Green	Everything OK	Manual operation of the immersion heater
Red	Bus defective / no communication with the sensor module	Sensor line break, sensor short circuit, parameterisation mode active

4.3 Parameterisation mode

After the installer code is entered (see page 41), the controller changes to the parameterisation mode.

Note
In parameterisation mode, the control process stops and the message **Control stopped – Parameterisation active** is indicated.
The LED flashes red.

1. In order to carry out adjustments in the menu, press the centre button (OK).

The controller changes to the main menu in which adjustments on the installer level can be made.

2. In order to save the adjustments made, select the menu item **Save** in the main menu and confirm with **Yes**.

➔ In order to cancel the parameterisation process and to discard adjustments made, select the menu item **Save** in the main menu and confirm with **No**.

The controller will leave the installer level and restart.

Note
If no button is pressed for 60 min, the controller will leave the installer level and restart. The adjustments made will not be saved.

4.4 Selecting menu points and adjusting values

During normal operation of the controller, the display shows the status menu.

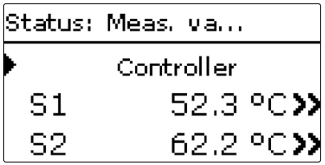
If no button is pressed for 1 min, the display illumination switches off. After 3 more minutes, the controller switches to the status menu.

➔ In order to scroll through a menu or to adjust a value, press buttons ▲ and ▼ .

➔ To open a submenu or to confirm a value, press the centre button (OK).

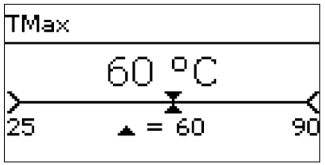
➔ To enter the previous menu, scroll upwards by pressing button ▲ or scroll downwards by pressing button ▼ until **back** is indicated.

➔ Press the centre button (OK).



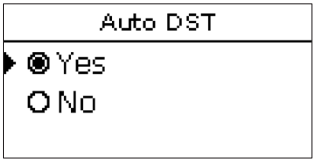
If the symbol ❯❯ is shown behind a menu item, pressing the centre button (OK) will open a new submenu.

Values and options can be changed in different ways:



Numeric values can be adjusted by means of a slide bar. The minimum value is indicated to the left, the maximum value to the right. The large number above the slide bar indicates the current adjustment. By pressing buttons ▼ and ▲, the upper slide bar can be moved to the left or to the right.

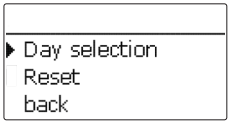
Only after the adjustment has been confirmed by pressing the centre button (OK) will the number below the slide bar indicate the new value. The new value will be saved if it is confirmed by pressing the centre button (OK) again.



If only one item of several can be selected, they will be indicated with radio buttons. When one item has been selected, the radio button in front of it is filled.

4.5 Adjusting the timer

When the **Timer** option is activated, a timer is indicated in which time frames for the function can be adjusted.



In the **Day selection** channel, the days of the week are available individually and as frequently selected combinations.

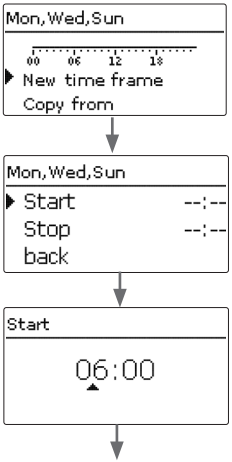
If more than one day or combination is selected, they will be merged into one combination for the following steps.

The last menu item after the list of days is **Continue**. If Continue is selected, the timer menu opens, in which the time frames can be adjusted.

Adding a time frame:

In order to add a time frame, proceed as follows:

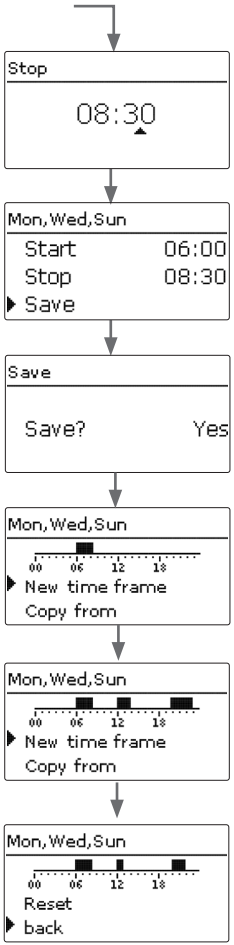
1. Select **New time frame**.



2. Adjust **Start** and **Stop** for the desired time frame.

The time frames can be adjusted in steps of 5 min.

3. In order to save the time frame, select **Save** and confirm the security enquiry with **Yes**.



4. In order to add another time frame, repeat the previous steps.

6 time frames can be adjusted per day or combination.

5. Select **back** in order to get back to the day selection.

Copying a time frame:

In order to copy time frames already adjusted into another day / another combination, proceed as follows:

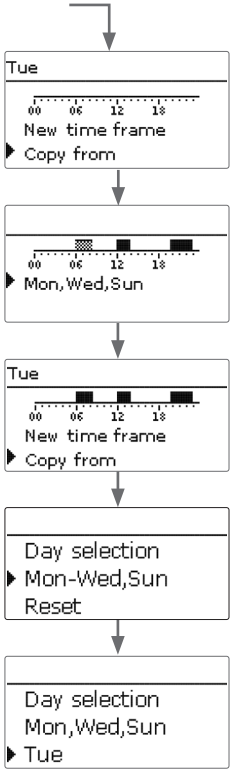
1. Choose the day / the combination into which the time frames are to be copied and select **Copy from**.

A selection of days and / or combinations with time frames will appear.

2. Select the day or combination from which the time frames are to be copied.

All time frames adjusted for the selected day or combination will be copied.

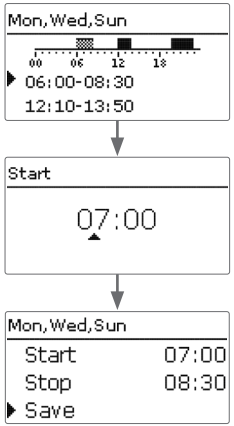
If the time frames copied are not changed, the day or combination will be added to the combination from which the time frames have been copied.



Changing a time frame:

In order to change a time frame, proceed as follows:

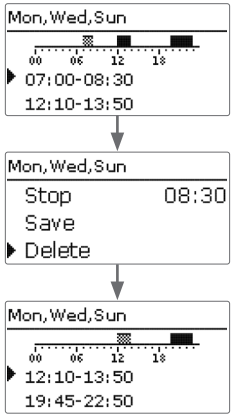
1. Select the time frame to be changed.
2. Make the desired change.
3. In order to save the time frame, select **Save** and confirm the security enquiry with **Yes**.



Removing a time frame:

In order to delete a time frame, proceed as follows:

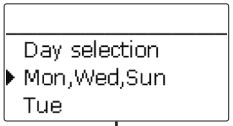
1. Select the time frame that is to be deleted.
2. Select **Delete** and confirm the security enquiry with **Yes**.

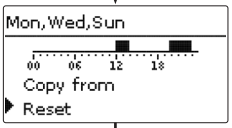


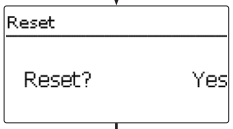
Resetting the timer:

In order to reset time frames adjusted for a certain day or combination, proceed as follows:

1. Select the desired day or combination.

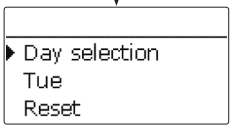






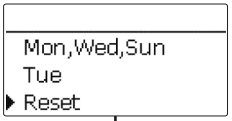
2. Select **Reset** and confirm the security enquiry with **Yes**.

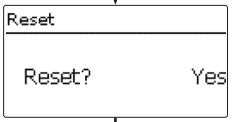
The selected day or combination will disappear from the list, all its time frames will be deleted.



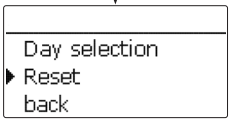
In order to reset the whole timer, proceed as follows:

➔ Select **Reset** and confirm the security enquiry with **Yes**.



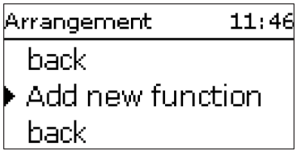


All adjustments made for the timer are deleted.

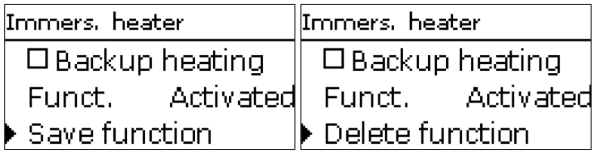


4.6 Adjusting loads and optional functions

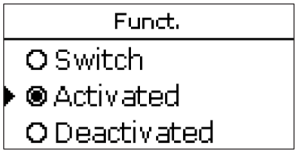
In the **Add new function** menu, different preprogrammed loads and optional functions can be selected. When a load or an optional function is selected, a submenu will open in which all adjustments required can be made. When a load / optional function has been adjusted and saved, it will appear in the **Load** or **Arrangement** menu respectively above the menu item **Add new function.**



At the end of each function submenu, the menu items **Funct.** and **Save function** are available. In order to save a function, select **Save function** and confirm the security enquiry by selecting **Yes**. In functions already saved, the menu item **Delete function** will appear instead. In order to delete a function already saved, select Delete function and confirm the security enquiry by selecting Yes.



With the menu item **Funct.** a function already saved can be temporarily deactivated or re-activated respectively. In this case, all adjustments will remain stored.



By selecting **Switch**, the function can be activated or deactivated respectively by means of an external potential-free switch.

If **Switch** is selected, the channel **Sensor** appears, in which a sensor input can be defined as a switch.

For loads, the additional selection option **Smart Remote** is available, see page 38.

4.7 Output submenu

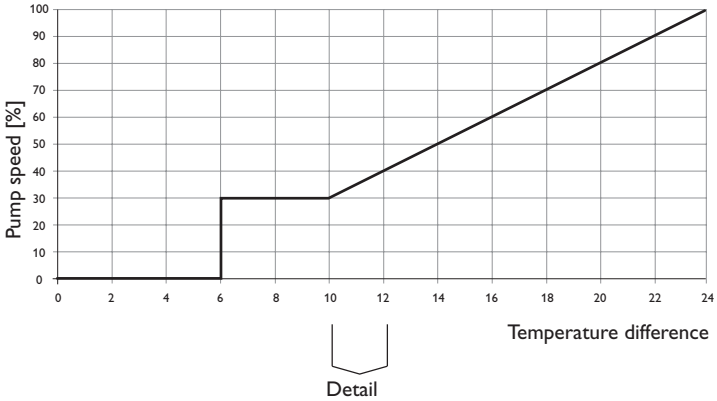
The **Output** submenu is available in almost all loads and optional functions. Therefore, it will not be explained in the individual function descriptions.

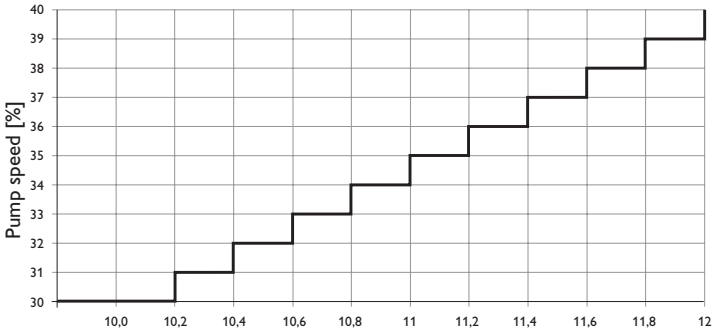
In this submenu, relays and / or signal outputs can be allocated to the function selected. All adjustments required for the outputs can be made in this menu.

All controller and module (if connected) outputs available will be displayed. If **-** is selected, the function will run normally in the software but will not operate an output. Relay and signal outputs can be activated separately. Depending on the adjustments made, the following results are possible:

Adjustments				**Result**	
Relay option	PWM/0-10 V option	Speed control		Behaviour of the relay output	Behaviour of the signal output
Yes	Yes	Yes	→	On/Off	Modulating
Yes	No	Yes	→	Burst control	-
Yes	No	Yes	→	On/Off	-
Yes	No	No	→	On/Off	-
Yes	Yes	Yes	→	On/Off	Modulating
Yes	Yes	Yes	→	On/Off	Modulating
Yes	Yes	No	→	On/Off	0 % / 100 %
No	Yes	Yes	→	-	Modulating
No	Yes	No	→	-	0 % / 100 %

Adjustment channel	Description	Adjustment range / selection	Factory setting
Relay	Relay option	Yes, No	No
Relay	Relay selection	system dependent	system dependent
PWM/0-10 V	PWM/0-10 V option	Yes, No	No
Output	Signal output selection	system dependent	system dependent
Signal	Signal type	PWM, 0-10 V	PWM
Profile	Curve	Solar, Heating	Solar
Speed	Speed control	Yes, No	system dependent
Min.	Minimum speed	20 … 100 %	30 %
Max.	Maximum speed	20 … 100 %	100 %
Inverted	Inverted switching option	Yes, No	No
Blocking protection	Blocking protection option	Yes, No	No
Manual mode	Operating mode	Max., Auto, Min., Off	Auto





Speed control

In the **Speed** adjustment channel, the speed control for the output can be activated or deactivated respectively. If **Yes** is selected, the channels **Min.** and **Max.** will appear.

In the **Min.** adjustment channel, a relative minimum speed for a pump connected can be allocated to the output

In the **Max.** adjustment channel, a relative maximum speed for a pump connected can be allocated to the output.

If the temperature difference reaches or exceeds the switch-on temperature difference, the pump switches on at 100 % speed for 10 s. Then, the speed is reduced to the minimum pump speed value. If the temperature difference exceeds the adjusted set value by 1/10 of the rise value, the pump speed increases by one step (1 %).

Relay option

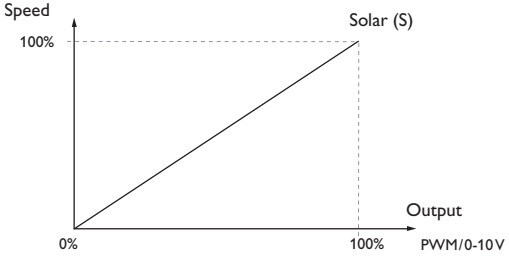
If the **Relay** option is activated, a relay can be allocated to the output selection.

PWM/0-10 V option

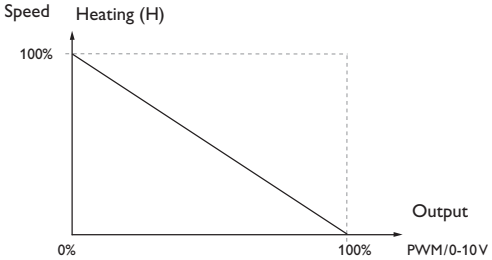
If the **PWM/0-10 V** option is activated, a PWM/0-10 V output can be allocated to the output selection.

In the **Signal** channel, a selection between a PWM or a 0-10 V signal can be made. In the **Profile** channel, characteristic curves for solar and heating pumps can be selected.

Signal characteristic: PWM; Profile: Solar



Signal characteristic: PWM; Profile: Heating



Blocking protection

In order to protect the pumps against blocking after standstill, the controller is equipped with a blocking protection option. This option can be activated in the output selection submenu. The **Blocking protection** option can be adjusted in the **Basic settings / Blocking protect.** menu (see page 37).

Manual mode

In the **Manual mode** adjustment channel, the operating mode of the output can be selected. The following options are available:

Off = Output is switched off (manual mode)
Min. = Output is active at minimum speed (manual mode)
On = Output is active at 100 % speed (manual mode)
Auto = Output is in automatic mode

Note

After service and maintenance work, the operating mode must be set back to Auto. In manual mode the control logic is suspended.

4.8 Sensor configuration

Some sensors must be registered and configured in the **Basic settings / Sensors** menu (see page 38).

In some functions, the **Sensor config.** channel is available for sensor selection, in which sensors not used and not registered can be selected. The selected sensor input will automatically be set to the sensor type required for the function. Registering the sensor in the **Basic settings / Sensors** menu is then no longer necessary.

Note

If a sensor is used as the temperature sensor of a function, the sensor types **Switch**, and **None** will not be available for the corresponding input.

4.9 Commissioning

When the hydraulic system is filled and ready for operation, connect the controller to the mains.

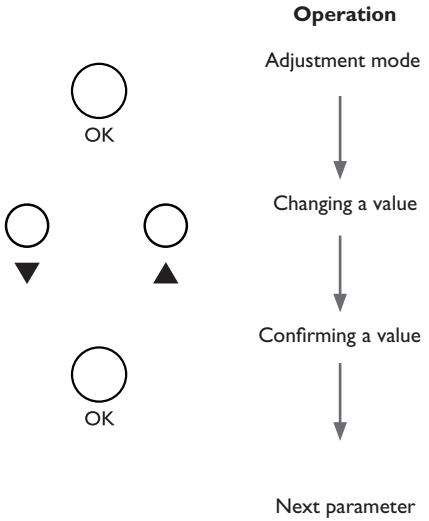
The controller has to be connected to the sensor module by means of the bus (SM).

The controller runs an initialisation phase in which the operating control LED glows red.

When the controller is commissioned or when it is reset, it will run a commissioning menu after the initialisation phase. The commissioning menu leads the user through the most important adjustment channels needed for operating the system.

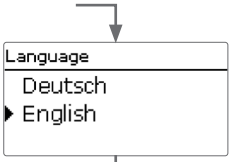
Commissioning menu

The commissioning menu consists of the channels described in the following. In order to make an adjustment, adjust the desired value with buttons ▼ and ▲ and confirm with the centre button (OK). The next channel will appear in the display.



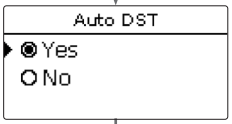
1. Language:

➔ Adjust the desired menu language.



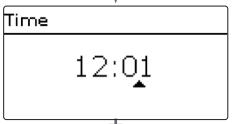
2. Daylight savings time adjustment:

➔ Activate or deactivate the automatic daylight savings time adjustment.



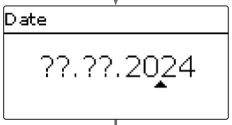
3. Time:

➔ Adjust the clock time. First of all adjust the hours, then the minutes.

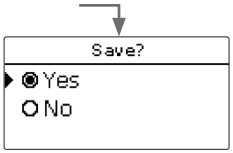


4. Date:

➔ Adjust the date. First of all adjust the year, then the month and then the day.



5. Save adjustments:



A security enquiry will appear. If the security enquiry is confirmed, the adjustments will be saved.

➔ In order to confirm the security enquiry, select **Yes**.

➔ In order to reenter the commissioning menu channels, select **No**.

If **Yes** is selected, the controller shows the main menu in which further adjustments can be made.

6. Carrying out further adjustments:

➔ Carrying out Load adjustments (see page 31).

➔ Carrying out Optional functions adjustments (see page 33).

➔ Carrying out Sensor adjustments (see page 38).

➔ Carrying out Module adjustments (see page 39).

These adjustments can also be made or changed in the main menu after commissioning.

7. Completing the commissioning menu:

➔ In order to complete the commissioning, select the menu item **Save?** in the main menu and confirm the security enquiry with **Yes**.

➔ In order to reenter the main menu channels, select **No**.

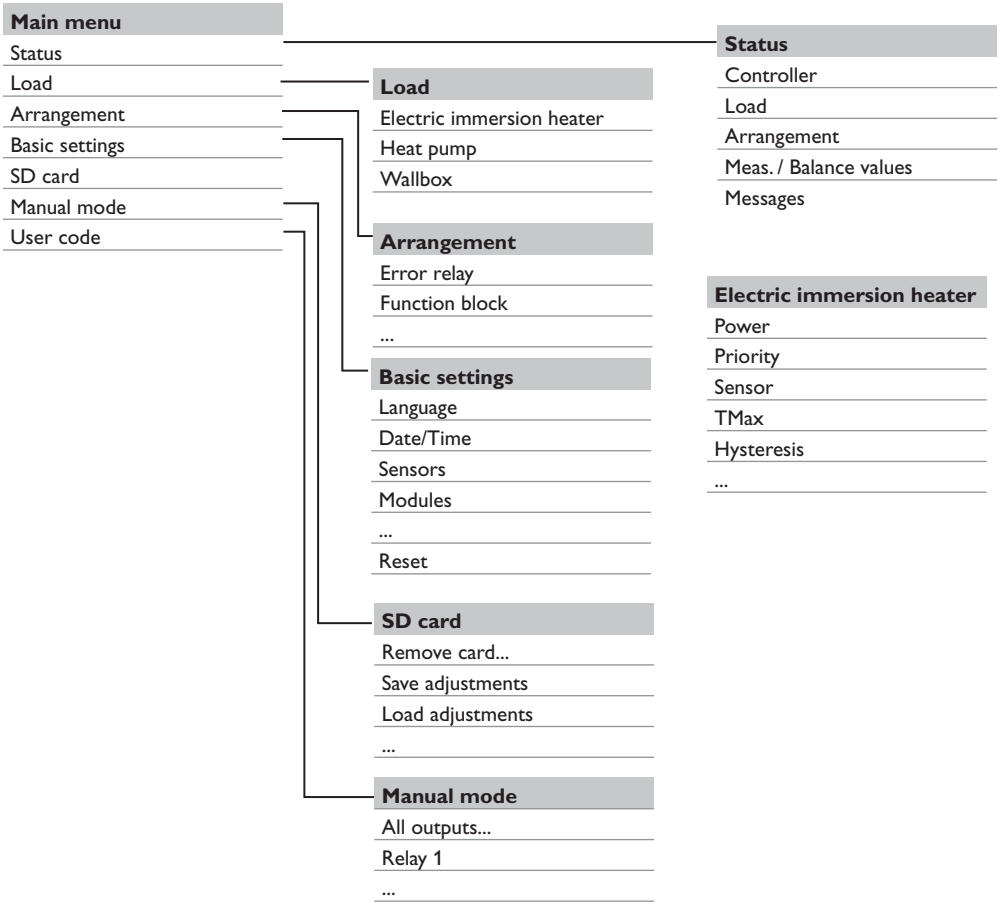
If the security enquiry has been confirmed, the controller will be ready for operation.

Note

The adjustments carried out during commissioning can be changed anytime in the corresponding adjustment channel.

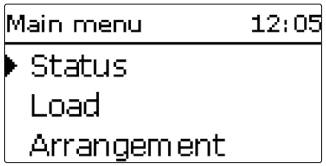
Set the code to the customer code before handing over the controller to the customer (see page 41).

5 Menu structure



The menu items and adjustment values selectable are variable depending on adjustments already made.

6 Main menu



In this menu, the different menu areas can be selected.

The following menus are available:

- Status
- Load
- Arrangement
- Basic settings
- SD card
- Manual mode
- User code

The following chapters describe the individual menus.

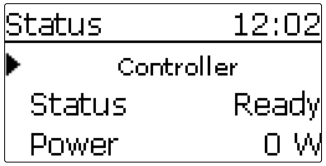
7 Status

In the status menu of the controller, the status messages for every menu area can be found.

At the end of each submenu, the menu item **Adj. values** can be found. If this one is selected, the corresponding menu opens.

➔ In order to get back to the status menu, select **back**.

7.1 Controller



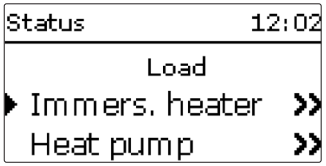
This menu indicates status messages based on all loads.

The **Power** is the sum of all switched power values (adjusted values) of the loads for automatic mode or mains operation.

The **Excess** is the remaining power which is fed into the grid. Negative values mean that mains current is used.

Display	Description
Ready	No load in operation, excess too low
Off	No load in operation, at least 1 load ready and outside the timer / 1 immersion heater in Max. temp.
On	At least 1 load in operation (Excess)
Use of mains	At least 1 load in mains operation / backup heating
Error	Sensor / sensor module defective
Deactivated	All loads deactivated / no load configured
SR off	Remote access off, all loads off

7.2 Loads



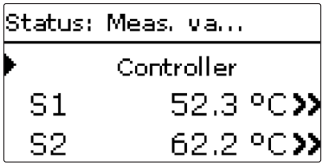
This menu indicates all current values of the loads (power, temperatures).

Display	Description
Status	Functional state
Ready	No load in operation, excess too low
Heating / Operation	Load in operation (Excess)
Backup heating / Mains oper.	Load in backup heating / mains operation
Max. temp.	Maximum temperature exceeded (immersion heater)
Error	Sensor defective (immersion heater)
Off	Load outside timer / remote access off / heat pump and / or wallbox in minimum break time
Power	Heating power / charging power
Store	Store temperature (immersion heaters)
Heating / Operation	Operating hours of the heating / operation
Backup heating / Mains oper.	Operating hours of the backup heating / mains operation

7.3 Arrangement

This menu shows all status information of all activated optional functions of the arrangement.

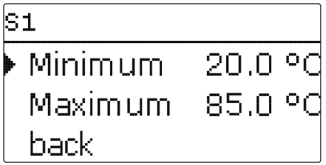
7.4 Measured / Balance values



This menu shows all current measurement values as well as a range of balance values.

Display	Description
S1 … S5	Temperature S1 … S5
S4, S5	Switching state S4, S5
Ga1	Temperature and flow rate / pressure
Output A / B	Operating status 0-10 V/PWM output
R1 … R5	Operating status relays 1… 5
Excess W	Excess power in W

When a line with a measurement value is selected, another submenu will open.



If, for example, **S1** is selected, a submenu indicating the minimum and maximum values will open.

7.5 Messages

This menu shows error and warning messages.
During normal operation, the message **Everything OK** is indicated.
A message consists of a short text about the fault condition.

Display	Description
!Sensor module	Bus communication interrupted (sensor module)
!Sensor fault	Sensor defective
!Fan	Fan defective
!Module error	Extension module not recognised

In case of an error, the control LED starts flashing red and a message is indicated in the status display. In case of a sensor or fan error, the system will switch off and a message will appear on the display.
If the bus communication is defective, the control LED is red.
After the error has been removed, the error message will disappear.

7.6 Network

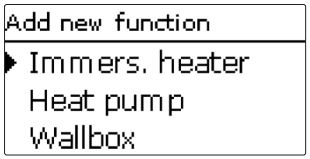
This menu shows network-related information.

Display	Description
Update?	Update possible
MAC	MAC address
IP	IP address
Token	Token for VBus.net
Reset	Reset of network configuration

Update? is only displayed if **Later** or **Never** has been selected in the update enquiry. For more information about the update, see page 45.

Note
The menu item **Reset** resets the network configuration. All adjustments of the device remain stored.

8 Loads



In this menu, up to 5 loads can be activated and adjusted.

- Immersion heater (1 … 3)
- Heat pump
- Wallbox

The kind and number of loads offered depends on the previous adjustments.

Note
The following menu items are available in all load menus and will therefore not be explained in the individual load descriptions.

The parameter **Power** can be used for adjusting the switch-on threshold of the heat pump and of the wallbox and the nominal power of the electric immersion heater respectively. This value must correspond to the power consumption of the load. If a sufficiently high power is available as excess power for operating the load, the load switches on or is activated for operation respectively.

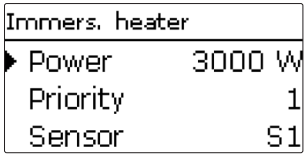
When the **Timer** option is activated, a timer is indicated in which time frames for load operation can be adjusted.

The parameter **Priority** can be used for defining the priority of each load (1 = highest priority, 6 = lowest priority). If the conditions for operating the load with the highest priority are not met, the load next in priority is operated. If the excess power falls below 0 or below the reserve respectively during operation, or if the conditions of a load of higher priority are met, loads of less priority switch off one after the other.

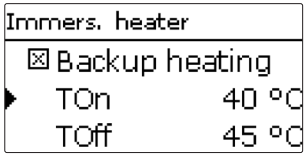
Each load can be reheated or operated with mains current (submenu **Backup heating** or **Mains oper.** respectively). When the **Timer** option is activated, a timer is indicated in which time frames for the function can be adjusted.

Note
For information on timer adjustment see page 20.
For each load, time frames are preset.

8.1 Electric immersion heater



If excess power is available, the electric immersion heater can be operated. The sensor selected monitors the temperature at the electric immersion heater. If the adjusted maximum temperature is reached or exceeded, the electric immersion heater switches off. If the temperature exceeds the maximum temperature by the adjusted hysteresis, the electric immersion heater switches on again. If the sensor is defective, the electric immersion heater switches off. Furthermore, a priority can be allocated to the electric immersion heater (see above). Mains operation is also possible (see above). For this purpose, time frames as well as a switch-on and a switch-off temperature can be adjusted.

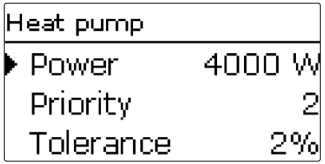


Load /Add new function / Immers. heater (1 … 3)

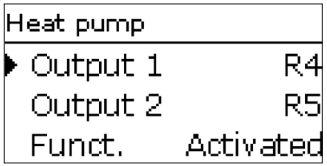
Adjustment channel	Description	Adjustment range / selection	Factory setting
Power	Switch-on threshold	0 … 3000W	3000W
Priority	Priority of the load	1 … 5	-
Sensor	Reference sensor	S1 … S5	S1
TMax	Maximum temperature	25 … 90 °C	60 °C
Hysteresis	Re-energise hysteresis	1 … 10 K	5 K
Timer	Timer option	Yes, No	No
Backup heating	Operation of the load with mains current	Yes, No	No
TOn	Switch-on temperature	20 … 85 °C	40 °C
TOff	Switch-off temperature	25 … 89 °C	45 °C
Timer	Timer option	Yes, No	No
Output	Output indication	-	-
Funct.	Activation / Deactivation	Activated, Deactivated, Switch, Smart Remote (optional)	Activated
Sensor	Sensor input selection	-	-

Note
For information on timer adjustment see page 20.
Timer factory settings:
Excess operation Mon – Sun, 09:00 – 15:00
Backup heating: Mon – Sun, 19:00 – 22:00

8.2 Heat pump



If the adjusted power is available as excess power, the heat pump can be operated. For this purpose, the power plus an adjustable **Tolerance** must be available without any interruption for the adjusted monitoring period. The parameter **tMin on** can be used for adjusting a minimum runtime for which the heat pump remains switched on, even if the required excess falls below the adjusted power. The parameter **tMin off** can be used for adjusting a minimum break time for which the heat pump remains switched off after the operation has ended, even if the required excess plus the tolerance is available again. Furthermore, up to 2 outputs can be allocated to the heat pump which enable the operating modes switch-on recommendation (1 relay) or definite start-up command (2 relays). A priority can also be allocated (see above). Mains operation is also possible (see above). For this purpose, time frames can be adjusted.

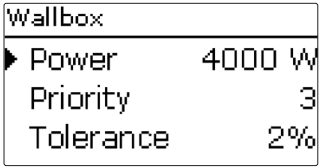


Load /Add new function / Heat pump

Adjustment channel	Description	Adjustment range / selection	Factory setting
Power	Switch-on threshold	0 … 30000W	4000W
Priority	Priority of the load	1 … 5	-
Tolerance	Tolerance related to the power	0 … 100 %	2 %
Monitoring	Monitoring period	0 … 1800 s	300 s
tMin on	Minimum switch-on time	0 … 1800 s	600 s
tMin off	Minimum switch-off time	0 … 1800 s	600 s
Timer	Timer option	Yes, No	No
Mains oper.	Operation of the load with mains current	Yes, No	No
Timer	Timer option	Yes, No	Yes
Output 1, 2	Output selection submenu		
Relay	Relay option	Yes, No	Yes
Relay	Relay selection	R1 … R5	-
PWM/0-10 V	PWM/0-10 V option	Yes, No	No
Output	Signal output selection	A, B	A
Signal	Signal type	0-10 V, PWM	0-10V
Profile	Curve	Solar, Heating	Solar
Inverted	Inverted switching option	Yes, No	No
Manual mode	Operating mode of the output	On, Auto, Off	Auto
Funct.	Activation / Deactivation	Activated, Deactivated	Activated
Sensor	Sensor input selection	-	-

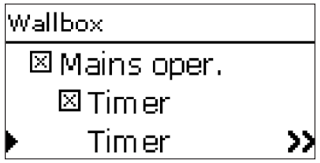
Note
For information on timer adjustment see page 20.
Timer factory settings:
Excess operation Mon – Sun, 09:00 – 15:00
Mains operation: Mon – Sun, 19:00 – 22:00

8.3 Wallbox



If the adjusted power is available as excess power, the wallbox can be operated. For this purpose, the power plus an adjustable **Tolerance** must be available without any interruption for the adjusted monitoring period. The parameter **tMin on** can be used for adjusting a minimum runtime for which the wallbox remains switched on, even if the required excess falls below the adjusted power. The parameter **tMin off** can be used for adjusting a minimum break time for which the wallbox remains switched off after the operation has ended, even if the required excess plus the tolerance is available again. Furthermore, outputs as well as a priority can be allocated

to the wallbox (see above). Mains operation is also possible (see above). For this purpose, time frames can be adjusted.



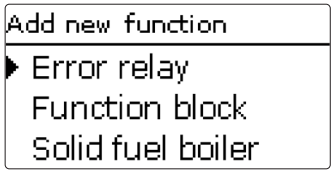
Load /Add new function/Wallbox

Adjustment channel	Description	Adjustment range / selection	Factory setting
Power	Switch-on threshold	0 … 30000W	4000W
Priority	Priority of the load	1 … 5	-
Tolerance	Tolerance related to the power	0 … 100%	2%
Monitoring	Monitoring period	0 … 1800 s	300 s
tMin on	Minimum switch-on time	0 … 1800 s	600 s
tMin off	Minimum switch-off time	0 … 1800 s	600 s
Timer	Timer option	Yes, No	No
Mains oper.	Operation of the load with mains current	Yes, No	No
Timer	Timer option	Yes, No	Yes
Output 1, 2	Output selection submenu		
Relay	Relay option	Yes, No	Yes
Relay	Relay selection	R1 … R5	-
PWM/0-10 V	PWM/0-10 V option	Yes, No	No
Output	Signal output selection	A, B	A
Signal	Signal type	0-10 V, PWM	0-10V
Profile	Curve	Solar, Heating	Solar
Inverted	Inverted switching option	Yes, No	No
Manual mode	Operating mode of the output	On, Auto, Off	Auto
Funct.	Activation / Deactivation	Activated, Deactivated	Activated
Sensor	Sensor input selection	-	-

Note
For information on timer adjustment see page 20.
Timer factory settings:
Excess operation Mon – Sun, 09:00 – 15:00
Mains operation: Mon – Sun, 19:00 – 22:00

9 Arrangement

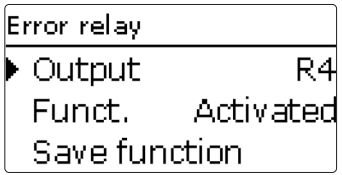
9.1 Optional functions



In this menu, optional functions can be selected and adjusted for the arrangement. The kind and number of optional functions offered depends on the previous adjustments.

Note
For further information about adjusting optional functions, see page 22.

Error relay



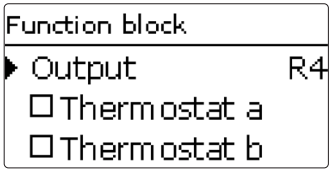
This function can be used for operating an output in case of an error. Thus, e.g. a signalling device can be connected in order to signal errors.

If the error relay function is activated, the allocated output will operate when a fault occurs. If the flow rate monitoring and/or pressure monitoring function is additionally activated, the allocated output will also operate in case of a flow rate or pressure error.

Arrangement / Opt. functions / Add new function / Error relay

Adjustment channel	Description	Adjustment range / selection	Factory setting
Output	Output selection	system dependent	system dependent
Funct.	Activation / Deactivation	Activated, Deactivated, Switch	Activated
Sensor	Switch input selection	-	-

Function block



In addition to the pre-defined optional functions, function blocks consisting of thermostat functions, timer, differential, reference output and flow rate functions are available. With the help of these function blocks, further components and functions respectively can be controlled.

To each function block, sensors and outputs available can be allocated.

Within a function block the functions are interconnected (AND gate). This means that the switching conditions of all the activated functions have to be fulfilled for switching the allocated output. As soon as one condition is not fulfilled, the output will switch off.

Thermostat function

The switching condition for the thermostat function is considered fulfilled when the adjusted switch-on temperature (Th-(x) on) is reached.

The switching condition for the thermostat function is considered unfulfilled when the adjusted switch-off temperature (Th-(x) off) is reached.

Allocate the reference sensor in the **Sensor** channel.

Adjust the maximum temperature limitation with (Th-(x) off) > (Th-(x) on) and the minimum temperature limitation with (Th-(x) on) > (Th-(x) off). The temperatures cannot be set to an identical value.

ΔT function

The switching condition for the Δ function is considered fulfilled when the adjusted switch-on temperature (ΔTOn) is reached.

The switching condition for the ΔT function is no longer considered fulfilled when the adjusted switch-off temperature (ΔTOff) is reached.

The ΔT function is equipped with a speed control function. A set temperature difference and a minimum speed can be adjusted. When the set temperature difference is exceeded, pump speed control starts. For every deviation by 1/10 of the adjusted rise value, the pump speed will be adjusted by 1 %.

Reference output

Up to 5 Reference outputs can be selected. Whether the reference outputs are to be switched in series (AND), in parallel (OR), in series + inverted (NAND) or in parallel + inverted (NOR) can be adjusted in the **Mode** channel.

OR mode

If at least one of the reference outputs is switched on, the switching condition for the reference output function is considered fulfilled.

If none of the reference outputs is switched on, the switching condition for the reference output function is considered unfulfilled.

NOR mode

If none of the reference outputs is switched on, the switching condition for the reference output function is considered fulfilled.

If at least one of the reference outputs is switched on, the switching condition for the reference output function is considered unfulfilled.

AND mode

If all reference outputs are switched on, the switching condition for the reference output function is considered fulfilled.

If at least one of the reference outputs is switched off, the switching condition for the reference output function is considered unfulfilled.

NAND mode

If at least one of the reference outputs is switched off, the switching condition for the reference output function is considered fulfilled.

If all reference outputs are switched on, the switching condition for the reference output function is considered unfulfilled.

Flow rate

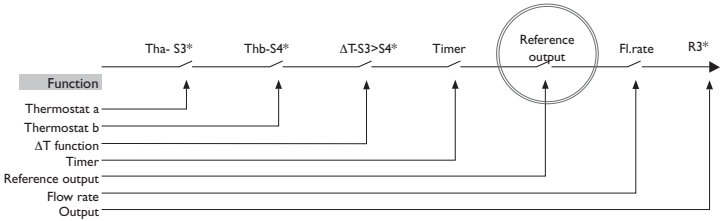
If the adjusted switch-on flow rate is exceeded, the switching condition for the flow rate function is considered fulfilled.

If the flow rate falls below the adjusted switch-off value, the condition for the flow rate function is no longer considered fulfilled.

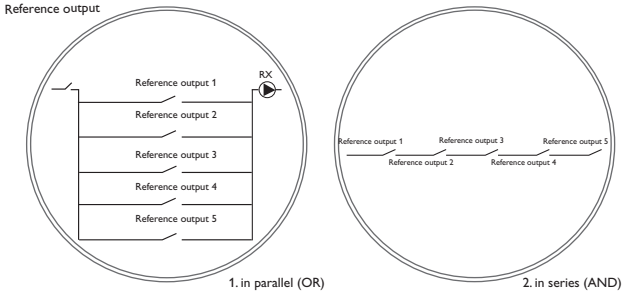
The flow rate sensor for this function can be selected.

Note

For information on timer adjustment see page 20.



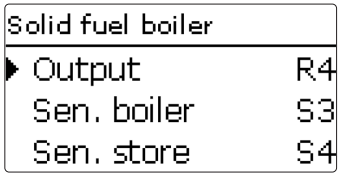
* exemplary selection, sensors and outputs can be freely selected

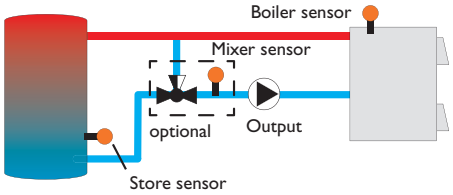


Arrangement / Opt. functions / Add new function / Function block

Adjustment channel	Description	Adjustment range / selection	Factory setting
Output	Output selection	system dependent	system dependent
Thermostat a	Thermostat function a	Yes, No	No
Th-a on	Switch-on temperature thermostat a	-40 … +250 °C	+40 °C
Th-a off	Switch-off temperature thermostat a	-40 … +250 °C	+45 °C
Sensor	Sensor thermostat a	system dependent	system dependent
Thermostat b	Thermostat function b	Yes, No	No
Th-b on	Switch-on temperature thermostat b	-40 … +250 °C	+40 °C
Th-b off	Switch-off temperature thermostat b	-40 … +250 °C	+45 °C
Sensor	Sensor thermostat b	system dependent	system dependent
ΔT function	Differential function	Yes, No	No
ΔTOn	Switch-on temperature difference	1.0 … 50.0 K	5.0 K
ΔTOff	Switch-off temperature difference	0.5 … 49.5 K	3.0 K
ΔTSet	Set temperature difference	3 … 100 K	10 K
Sen. source	Heat source sensor	system dependent	system dependent
Sen. sink	Heat sink sensor	system dependent	system dependent
Rise	Rise value	1.0 … 20.0 K	20.0 K
Timer	Timer function	Yes, No	No
Ref. output	Reference output function	Yes, No	No
Mode	Reference output mode	OR, AND, NOR, NAND	OR
Output	Reference output 1	all outputs	-
Output	Reference output 2	all outputs	-
Output	Reference output 3	all outputs	-
Output	Reference output 4	all outputs	-
Output	Reference output 5	all outputs	-
Flow rate	Flow rate function	Yes, No	No
Fl. on	Switch-on flow rate	1.0 … 999.0 l/min	8.0 l/min
Fl. off	Switch-off flow rate	0.5 … 998.5 l/min	7.5 l/min
Sen. flow rate	Flow rate sensor	Ga1	-
Funct.	Activation / Deactivation	Activated, Deactivated, Switch	Activated
Sensor	Switch input selection	-	-

Solid fuel boiler





This function can be used for transferring heat from a solid fuel boiler to a store.

The allocated output is energised when all switch-on conditions are fulfilled:

- the temperature difference between the allocated sensors has exceeded the switch-on temperature difference
- the temperature difference between the allocated sensors has not fallen below the switch-off temperature difference
- the temperature at the solid fuel boiler sensor has exceeded the minimum temperature
- the temperature at the store sensor is below the maximum temperature
- one of the adjusted time frames is active (if the **Timer** option is selected)

When the set temperature difference is exceeded, pump speed control starts. For every deviation by 1 / 10 of the adjusted rise value, the pump speed will be adjusted by 1 %.

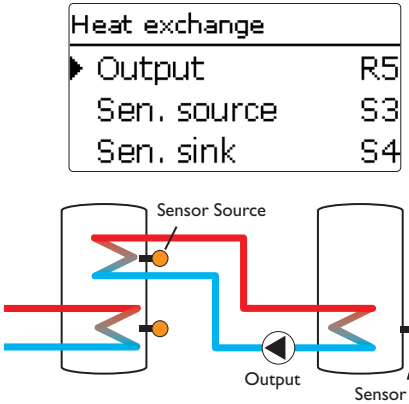
If the **Target temp.** option is activated, the pump speed control logic will change. The controller will remain at the minimum pump speed until the temperature at the allocated sensor exceeds the adjusted target temperature.

The **Mixer** option can be used to keep the boiler return temperature above **TMin boiler**. The mixer will be controlled with the adjustable interval.

Arrangement / Opt. functions / Add new function / Solid fuel boiler

Adjustment channel	Description	Adjustment range / selection	Factory setting
Output	Output selection	system dependent	system dependent
Sen. boiler	Solid fuel boiler sensor selection	system dependent	system dependent
Sen. store	Store sensor selection	system dependent	system dependent
ΔTOn	Switch-on temperature difference	2.0 … 30.0 K	6.0 K
ΔTOff	Switch-off temperature difference	1.0 … 29.0 K	4.0 K
ΔTSet	Set temperature difference	3.0 … 40.0 K	10.0 K
Rise	Rise value	1.0 … 20.0 K	20.0 K
TStoremax	Maximum temperature	10 … 95 °C	60 °C
TMin boiler	Minimum temperature	10 … 95 °C	60 °C
Target temperature	Target temperature option	Yes, No	No
Targ. temp.	Target temperature	30 … 85 °C	65 °C
Sensor	Target temperature reference sensor	system dependent	system dependent
Mixer	Mixer option	Yes, No	No
Mixer closed	Output selection mixer closed	system dependent	system dependent
Mixer open	Output selection mixer open	system dependent	system dependent
Sensor	Mixer sensor allocation	system dependent	system dependent
ΔTOpen	Temperature difference mixer open	0.5 … 30.0 K	5.0 K
ΔTClosed	Temperature difference mixer closed	0.0 … 29.5 K	2.0 K
Interval	Mixer interval	1 … 20 s	4 s
Funct.	Activation / Deactivation	Activated, Deactivated, Switch	Activated
Sensor	Switch input selection	-	-

Heat exchange



This function can be used for transferring heat from a heat source to a heat sink.

The allocated output is energised when all switch-on conditions are fulfilled:

- the temperature difference between the allocated sensors has exceeded the switch-on temperature difference
- the temperature difference between the allocated sensors has not fallen below the switch-off temperature difference
- the temperature at the heat source sensor has exceeded the minimum temperature
- the temperature at the heat sink sensor is below the maximum temperature
- one of the adjusted time frames is active (if the **Timer** option is selected)

If the temperature difference exceeds the adjusted set value by 1/10 of the rise value, the pump speed increases by one step (1 %).

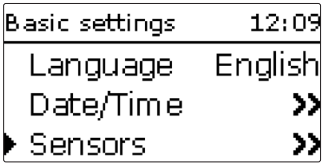
When the **Timer** option is activated, a timer is indicated in which time frames for the function can be adjusted.

Note
For information on timer adjustment see page 20.

Arrangement / Opt. functions / Add new function / Heat exchange

Adjustment channel	Description	Adjustment range / selection	Factory setting
Output	Output selection	system dependent	system dependent
Sen. source	Heat source sensor selection	system dependent	system dependent
Sen. sink	Heat sink sensor selection	system dependent	system dependent
ΔTOn	Switch-on temperature difference	1.0 … 30.0 K	6.0 K
ΔTOff	Switch-off temperature difference	0.5 … 29.5 K	4.0 K
ΔTSet	Set temperature difference	1.5 … 40.0 K	10.0 K
TMax	Maximum temperature of the store to be loaded	10 … 95 °C	60 °C
TMin	Minimum temperature of the store to be discharged	10 … 95 °C	10 °C
Timer	Timer function	Yes, No	No
Rise	Rise value	1.0 … 20.0 K	20.0 K
Funct.	Activation / Deactivation	Activated, Deactivated, Switch	Activated
Sensor	Switch input selection	-	-

10 Basic settings



In this menu, all basic parameters for the controller can be adjusted.

Adjustment channel	Description	Adjustment range / selection	Factory setting
Language	Selection of the menu language	Deutsch, English	Deutsch
Date/Time	Date/Time submenu		
Date	Adjustment of the date	01.01.2001 … 31.12.2050	01.01.2024
Time	Adjustment of the current time	00:00 … 23:59	-
Auto DST	Daylight savings time selection	Yes, No	Yes
Sensors	Sensors submenu (see page 38)	-	-
Modules	Modules submenu (see page 39)	-	-
Variant	Sensor module with Smart Remote (see page 38)		
Smart Remote	Smart Remote selection (see page 38)	Yes, No	No
Sensor 1	Switch input selection	-	-
Sensor 2	Switch input selection	-	-
Reserve	Reserve not used for loads	0 … 9000W	100W
Delay	Delay for switching loads on and off	1 … 10 s	2 s
Blocking protection	Blocking protection submenu	-	-
Starting time	Starting time blocking protection	00:00 … 23:59	12:00
Runtime	Blocking protection runtime	1 … 30 s	10 s
Reset	back to factory setting	Yes, No	No

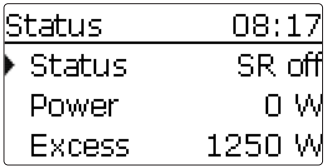
The **Reserve** is an adjustable excess power which is fed into the grid and not used for the loads. The reserve can be used, e.g. in large PV systems, in order to start operating the loads at a later point in time. This reduces power peaks at noon. If the system is additionally equipped with a battery, the reserve can be increased in order to give priority to the battery.

The **Delay** is an adjustable waiting time. After this time has elapsed, loads are switched on or off. The delay prevents loads with small switching thresholds from being switched on and off too often.

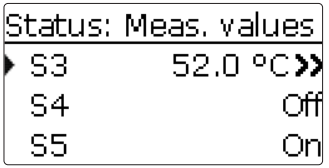
In order to protect the pumps against blocking after standstill, the controller is equipped with a **blocking protection option** (see page 25).

Note
The menu item **Reset** resets the device to the factory settings. The network configuration remains stored.

10.1 Smart Remote



The **Smart Remote** function is used for remote access to the controller via a 4-state signal.



The sensor inputs **Sensor 1** and **Sensor 2** (Switch) can be used as digital switching inputs. The switching states are **On** (contact closed) and **Off** (contact open).

Mode	Sensor 1	Sensor 2
SR off	On	Off
Normal operation	Off	Off
SR Plus	Off	On
SR on	On	On

The **Smart Remote** function can be activated when the power control is carried out via the **Sensor module** variant.

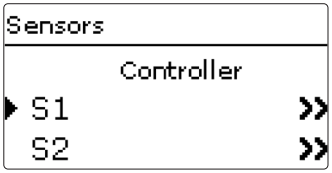
In the **SR off** operating status, the load is switched off regardless of the excess measured. The internal backup heating is blocked.

During **normal operation**, the automatic control is carried out depending on the excess measured and with optional internal backup heating.

In the **SR Plus** operating status, the load is operated at nominal power regardless of the timer and the excess measured. Operation is stopped when the switch-off temperature of the internal backup heating is reached at the allocated sensor. Without internal backup heating, operation is stopped when the store maximum temperature is reached at the allocated sensor.

In the **SR on** operating status, the load is operated at nominal power regardless of the timer and the excess measured until the store maximum temperature is reached at the allocated sensor.

10.2 Sensors



In this submenu, the type of the sensor connected can be adjusted for each individual input. The following types can be selected:

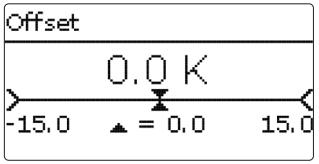
- S1 … S3: Pt1000, None
- S4, S5: Switch, Pt1000, None
- Ga1: RH, RPS, VFS, None

ATTENTION! System damage!

Selecting the wrong sensor type will lead to unwanted control behaviour. In the worst case, system damage can occur!

➔ **Make sure that the right sensor type is selected!**

If **Pt1000** is selected, the channel **Offset** will appear, in which an individual offset can be adjusted for each sensor.



Note

If a sensor is used as the temperature sensor of a function, the sensor types **Switch**, and **None** will not be available for the corresponding input.

ATTENTION! Damage to the device!

Sensor inputs which have been set to the sensor type switch can only be used for connecting potential-free switches.

➔ **Make sure no voltage is applied!**

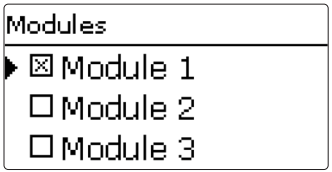
If **switch** is selected, the **inverted** option will appear and can be used for inverting the behaviour of the switch.

Note
When Grundfos Direct Sensors™ are used, connect the sensor ground common terminal block to PE (see page 16).

Basic settings / Sensors

Adjustment channel	Description	Adjustment range / selection	Factory setting
S1 … S5	Sensor input selection	-	-
Type	Sensor type selection	Switch (S4 and S5 only), Pt1000, None	Pt1000
Offset	Sensor offset	-15.0 … +15.0 K	0.0 K
Inverted	Inverted switching option (only if Type = Switch)	Yes, No	No
Ga1	Analogue Grundfos Direct Sensor™ or FRH humidity sensor	-	-
Type	Sensor type	RPS, VFS, RH, None	None
Max.	Maximum pressure (if Type = RPS)	0.0 … 16.0 bar	6 bar
Min.	Minimum flow rate (if Type = VFS)	1 … 399 l/min	2 l/min
Max.	Maximum flow rate (if Type = VFS)	2 … 400 l/min	40 l/min
Offset	Sensor offset	-15.0 … +15.0 K	0.0 K

10.3 Modules



In this menu, up to 5 external modules can be registered.

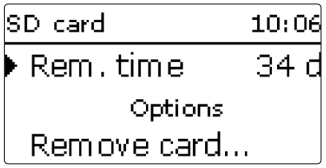
All modules connected and acknowledged by the controller are available.

If a module is registered, all its sensor inputs and relay outputs will be available in the corresponding controller menus.

Imputs/Modules / Modules

Adjustment channel	Description	Adjustment range / selection	Factory setting
Module 1 … 5	Registering external modules	-	-

11 MicroSD card



The controller is equipped with a MicroSD card slot for MicroSD memory cards.

Note
The MicroSD card used must be formatted in FAT32.

1. To safely remove the MicroSD card, always select the menu item **Remove card...** before removing the card.
2. Wait until **Remove card** is displayed.

WARNING! **Electric shock!**
Upon opening the housing, live parts are exposed!
➔ **Always disconnect the device from power supply before opening the housing!**

ATTENTION! **ESD damage!**
Electrostatic discharge can lead to damage to electronic components!
➔ **Take care to discharge properly before touching the inside of the device! To do so, touch a grounded surface such as a radiator or tap!**

Note:
The MicroSD card slot will only be accessible after the housing is opened.

In order to insert or remove the SD card, proceed as follows:

1. Disconnect the device from the power supply.
2. Unscrew the screw from the cover
3. Lift the lower edge of the cover about 5 – 10 cm, then push the cover upwards to remove it from the housing. Disconnect the PE conductor from the cover.
4. Insert the MicroSD card into the slot or remove the MicroSD card from the slot, respectively.
5. Re-establish the PE connection at the cover and put the cover on the housing.

WARNING! **Electric shock!**

Without the PE connection, the housing could be live!

➔ **Always re-establish the PE connection at the cover before putting the cover on the housing!**

6. Attach with the fastening screw.
7. Establish the power supply.

Starting the logging

➔ Adjust the desired logging type and interval.

Logging will start immediately.

Completing the logging process

➔ In order to stop the logging, remove the MicroSD card from the device. To do so, follow the instructions described above.

When **Linear** is adjusted in the logging type adjustment channel, data logging will stop if the capacity limit is reached. The message **Card full** will be displayed.

If **Cyclic** is adjusted, the oldest data logged onto the card will be overwritten as soon as the capacity limit is reached.

Note:
Because of the increasing size of the data packets, the remaining logging time does not decrease linearly. The data packet size can increase, e.g. with the increasing operating hours value.

Storing controller adjustments

➔ To store the controller adjustments on the MicroSD card, select the menu item **Save adjustments**.

While the adjustments are being stored, first **Please wait...**, then **Done** will be indicated on the display. The controller adjustments are stored as a .SET file on the MicroSD card.

Loading controller adjustments

1. To load controller adjustments from a MicroSD card, select the menu item **Load adjustments**.

The File selection window will appear.

2. Select the desired .SET file.

While the adjustments are being loaded, first **Please wait...**, then **Done** will be indicated on the display.

SD card

Adjustment channel	Description	Adjustment range / selection	Factory setting
Rem. time	Remaining logging time	-	-
Options			
Remove card...	Safely remove card	-	-
Save adjustments	Save adjustments	-	-
Load adjustments	Load adjustments	-	-
Logging int.	Interval for data logging	00:01 … 20:00 (mm:ss)	01:00
Logging type	Logging type	Cyclic, Linear	Linear

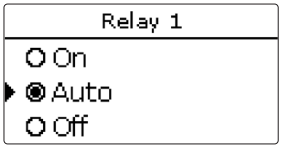
12 Manual mode

In this menu, the operating mode of all outputs in the controller and in modules connected can be adjusted.

ATTENTION! **Damage by overheating!**
The manual mode > 0 % of the electric immersion heater in a system electrically connected, but not hydraulically filled can lead to damage caused by overheating!
➔ **Make sure the hydraulic system is filled and ready for operation.**

In the **All outputs...** menu, all outputs can be simultaneously switched off (Off) or set to automatic mode (Auto):

Off = Output is switched off (manual mode)
Auto = Output is in automatic mode



The operating mode can be selected for each individual output, too. The following options are available:

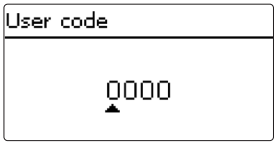
Off = Output is switched off (manual mode)
On = Output is active at 100 % speed (manual mode)
Auto = Output is in automatic mode

Note
After service and maintenance work, the relay mode must be set back to **Auto**. In manual mode the control logic is suspended.

Manual mode

Adjustment channel	Description	Adjustment range / selection	Factory setting
All outputs...	Selection operating mode of all relays	On, Auto, Off	Off
Relay 1 … 5	Operating mode of relay	On, Auto, Off	Auto
Output A … B	Operating mode of signal output	On, Auto, Off	Auto
Fan	Manual mode selection for the fan	On, Auto, Off	Auto

13 User code



The access to some adjustment values can be restricted via a user code (customer).

1. Installer **0262** (Factory setting)
All menus and adjustment values are shown and all values can be altered.

2. Customer **0000**
The installer level is not shown, adjustment values can be changed partly.

For safety reasons, the user code should generally be set to the customer code before the controller is handed to the customer!

➔ In order to restrict the access, enter 0000 in the **User code** menu item.

14 Connection to VBus.net

For the connection to VBus.net, an Internet connection via the router via LAN as well as a VBus.net account are required.

For easier commissioning, the commissioning assistant can be used.

Note
In order to enable VBus.net access, the device must have unrestricted access to the ports 80 and 1194 / 1195.

In order to access the device via VBus.net, proceed as follows:

1. Note down the alphanumeric 8-10-digit code (Token) indicated on the side of the housing.
2. Enter VBus.net into the address bar of the browser and click **Sign up**.
3. Wait for the confirmation e-mail (check spam folder if necessary).
4. Click **Add new device**.
5. Enter the alphanumeric 8-10-digit code (Token).

Alternatively, the commissioning assistant can be used:

- Scan the QR code on the last page of the manual by means of any mobile device and follow the instructions.
- On VBus.net select the commissioning assistant and enter the alphanumeric 8-10-digit code (Token).

15 Finding the device in the network

15.1 DeviceDiscoveryTool

The DeviceDiscoveryTool is a software that helps find the device via the local network. There are different possibilities to start the DeviceDiscoveryTool:

• Starting the tool from the hard disk after having downloaded it from https://www.resol.de/de/software

• Starting the tool from VBus.net (under Tools)

Starting the DeviceDiscoveryTool

In order to start the DeviceDiscoveryTool, proceed as follows:

1. Open the folder **discovery-tool-xxx**.
2. Start **discovery-tool Setup xxx**.
3. Confirm all following dialogues with **OK**.
4. Click **Start/Programs/discovery-tool**.
5. Click **Find devices**.

The device will be displayed.

6. Click the **Open Web interface** button of the corresponding device.

A new window with the Web interface will open.

7. Enter the password, see page 46.

Note
The password can be found on the side of the housing (**Web-Interface**).

16 Web interface

The Web interface is integrated in the device and runs on an Internet browser.

Note
If display problems occur, update the Internet browser or use a different browser.

16.1 Menu

All main menus and the **Login** menu item are displayed in the bar at the top of the Web interface.

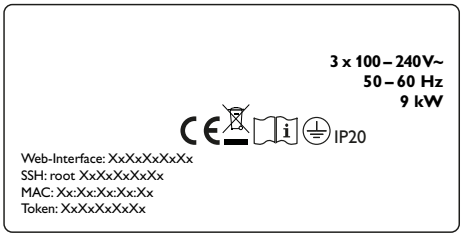
Note
The menu structure may change in later firmware versions.

Note
The indicated information and setting possibilities depend on the user mode selected, see page 44.

In order to use the Web interface to its full extent, a login is required. In order to log in, proceed as follows:

1. Click **Login** on the menu bar.

The **Login** window appears. The password can be found on the side of the housing (**Web-Interface**) or on the last page of this manual.



2. Enter the password into the **Password** field.
3. Click the **Login** button.

16.2 Menu overview

Main menu	Submenu	Function
Home	-	-
Status	Status	Displaying general device information Displaying the logging status Displaying the connection status Displaying remote access over Internet Displaying LAN information
Data	Live	Displaying current controller data in form of a table
	Filters	Configuring filters for data download
	Download	Exporting data
	Erase	Erasing data stored
Configuration	General	Changing general configuration Carrying out a VBus specifications update Carrying out a firmware update
	Date and time	Changing date and time configuration
	Logging	Adjusting logging interval and type
	Network	Changing LAN configuration
	Remote access	VBus.net access over local network Configuring remote access over Internet
	Users	Changing the password
About	General	Order DeltaTherm® PV MAX open-source software
	Powered by	Display the open source applications and libraries used
	History	Display firmware updates
Login/Logout	-	Log in or log out

16.3 Displaying status information

In order to display status information, proceed as follows:

➔ Click the **Status** main menu.

The following information is displayed in **Status**:

- General device information
- Logging status
- Connection status
- Remote access over Internet
- Network configuration

16.4 Changing the Web interface language

The Web interface can be displayed in different languages.

➔ Click the flag to select the language.

- Deutsch
- English
- French
- Spanish
- Italian

The language is then changed for this session.

16.5 Changing the device name

Note
Choose a descriptive device name to facilitate identifying the device in the network.

In order to change the device name, proceed as follows:

1. In the **Configuration** main menu, select the **General** submenu.
2. In the **General Configuration** menu, enter the device name in the **Device name** field.

Permitted characters are: letters, numbers, underscores, hyphens.

Special characters are not allowed.

3. Click **Save configuration**.

16.6 Configuring logging settings

In the **Logging** submenu, the logging interval and the logging type can be adjusted.

In order to configure the logging interval, proceed as follows:

1. In the **Configuration** main menu, select the **Logging** submenu.
2. Adjust the desired value in the **Logging interval** field.
3. Click **Save configuration**.

Note
The smaller the logging interval, the more memory capacity is used.

The logging type determines how the DL2 Plus Datalogger behaves when its internal memory capacity is fully used.

The log mode configuration can be set as follows:

- Cyclic (factory setting): When the memory capacity is fully used, the oldest data are overwritten.

• Linear: When the memory capacity is fully used, data logging stops.

In order to configure the logging type, proceed as follows:

1. In the **Configuration** main menu, select the **Logging** submenu.
2. In the **Logging type** dropdown menu, select the desired value.
3. Click **Save configuration**.

16.7 Displaying live data

In the live data display, the values of the controller are displayed and refreshed automatically every 20 seconds. In order to display live data, proceed as follows:

➔ In the **Data** main menu, select the **Live** submenu.

16.8 Configuring a filter

The filter determines which data are to be displayed.

An existing filter can be edited or a new filter can be created.

In order to create a new filter, proceed as follows:

1. In the **Data** main menu, select the **Filters** submenu.
2. Click the symbol + and select a filter number for the filter slot in the drop-down menu.
3. Click **Add**.
4. In the **General** menu, enter the desired filter name in the **Name** field.
5. In the **Preferred units** menu, select the desired units for the display.
6. In the **Fields** menu, select the data for the display.

In order to enable public access to the filter, activate the menu item **Public access** in the **General** menu.

In order to display the filter created in the **Data** submenu, activate the menu item **Show in menu bar**.

➔ Click **Save configuration**.

In order to edit an existing filter, proceed as follows:

1. In the **Data** main menu, select the **Filters** submenu.
2. Select the desired filter and click the symbol ✎.

A view of the data filter appears.

3. Edit the filter as described before.
4. Click **Save configuration**.

16.9 Exporting data

In order to copy logged data onto a computer, proceed as follows:

1. In the **Data** main menu, select the **Download** submenu.
2. In the **File format** dropdown menu, click the desired format.

For the download, further adjustments such as file format, filter, sieve interval, time zone, range of data to be downloaded and language can be made.

3. Click **Start download**.
4. Save the file in a folder of choice.

16.10 Erasing data

In order to erase logged data, proceed as follows:

1. In the **Data** main menu, select the **Erase** submenu.
2. In order to erase all logged data, confirm the erase notification by clicking **Erase all**.

16.11 Configuring the user mode

The user mode of the Web interface can be changed from standard user to expert and vice versa. In the expert mode, additional information and settings are available, such as: LAN configuration, LAN information, firmware updates, etc.

In order to adjust the user mode, proceed as follows:

1. In the **Configuration** main menu, select the **General** submenu.
2. Activate the expert mode in the **Expert mode** menu item.
3. Click **Save configuration**.

16.12 Configuring date and time settings

The date and time configuration determines where the device obtains its date and time information.

The device receives the date and time configuration automatically via the adjustable time zone (factory setting UTC). Settings can also be carried out manually.

In order to adjust date and time manually, proceed as follows:

1. In the **Configuration** main menu, select the **Date and time** submenu.
2. Tick the **Set date / time** field.
3. Adjust the date in the date field.
4. Adjust the time in the time field.
5. Click **Save configuration**.

16.13 Carrying out updates

If the device is connected to the Internet, it automatically checks for available updates once a week. If an update is available, it will be downloaded. Updates available are indicated during login.

➔ In order to start the update query manually, click on the **Query updates** button in the **Configuration** main menu, **General** submenu.

16.13.1 Carrying out a VBus® specifications update

In order to make sure that the controller can be read out with its full functional range, VBus® specification updates are provided on the Internet.

The update can be carried out over the Internet or via a computer connected to the device.

If the device is connected to the Internet, it will find and upload the update file automatically.

1. In order to carry out the update, click **Install**.
2. Refresh the Web interface after the update has been carried out.

An update can also be installed via a computer connected to the device.

In order to carry out the update, proceed as follows:

1. Download the **vbus_specification.cbor** update file onto the computer.
2. In order to upload the update file, click **Select**.
3. Select the update file and confirm the selection.

After the upload has been completed, the update file appears in the Web interface.

4. In order to carry out the update, click **Install**.
5. Refresh the Web interface after the update has been carried out.

➔ If no update is to be carried out, click **Discard**.

16.13.2 Carrying out a firmware update

The firmware is the internal software of the device.

Note
Previous configurations will not be affected by a firmware update.
The installation of a firmware update has to be confirmed manually.

ATTENTION! Damage to the device!

➔ The power supply and the network connection to the device must not be disconnected during the update process, as this can cause damage to the device!

If the device is connected to the Internet, it automatically checks for available updates. If an update is available, it will be downloaded. Updates available are displayed on the display of the device as well as in the Web interface. The installation of an update has to be confirmed manually.

Update via the device

If an update is available, an enquiry will appear on the display of the device. The following selection can be made:

- **Never:** The update will not be carried out, the enquiry will be deactivated.
- **Later:** The enquiry will be postponed to a later point in time.
- **Now:** The update will run immediately.

Update via the Web interface

An update can also be confirmed in the Web interface of the device.

➔ In order to confirm the update, select the **Configuration** main menu and click the **General** submenu.

➔ In the **Firmware update** are, click the **Install** button.

Manual updates

If an update file is available, it can be carried out by means of a computer via the Web interface.

In order to carry out firmwares updates, proceed as follows:

1. In the **Configuration** main menu, select the **General** submenu.
2. In the **Firmware update** area, click the menu item **Upload**.
3. Click the **Select** button and select the update file.
4. Under **Version uploaded**, click the **Install** button.

Besides the firmware, source codes and compiler scripts of the open source applications and libraries are downloaded.

The **Upload** menu item can be used to install an older firmware version, e.g. to downgrade the device.

If the device is not connected to a router and if no IP address has been assigned to the device, the device can be updated by means of the DeviceDiscoveryTool.

In order to find the device by means of the DeviceDiscoveryTool, proceed as follows:

1. Connect the device to the computer using a network cable.
2. Find the device in the network using the DeviceDiscoveryTool (seepage 42).

The DeviceDiscoveryTool assigns a local IP address to the device.

3. Carry out the firmware update manually as described above.

16.14 Network configuration

The network configuration determines where the device obtains its IP information from for the LAN connection.

The network configuration can be set as follows:

- **Dynamic (DHCP)**: The IP information is automatically assigned to the device by the DHCP server.
- **Static:** The user manually assigns IP information to the device.

Note
Consult the system administrator before changing the factory settings!

In order to configure the network, proceed as follows:

1. In the **Configuration** main menu, select the **Network** submenu.
2. In the **Address type** dropdown menu, select the desired value.

If the **Static Address type** is selected, further input fields appear.

3. Click **Save configuration**.
4. Restart the device.

The menu item **IP recovery** can be used for automatically retrieving a new IP address for the device in case that the previous one is lost. In order to adjust the automatic IP address configuration, proceed as follows:

1. Activate **IP recovery**.
2. Click **Save configuration**.

As soon as the remote access over Internet has been enabled, the device will check every 15 min if a connection to the VBus.net server exists. If VBus.net does not answer, a network-side restart is carried out. After the restart, the time starts running from 0 on in **Device uptime**. A restart can take up to 90 s.

16.15 Configuring the remote access

ATTENTION! Third-party access!

When the default remote access password is not changed, third parties may gain unauthorised access to the controller connected.

➔ **Change and note down the remote access password and keep it in a suitable place.**

The remote access password is required whenever a controller is to be accessed via the RPT Parameterisation Tool.

In order to change the remote access password, proceed as follows:

1. In the **Configuration** main menu, select the **Remote access** submenu.
2. Enter the new password into the **VBus password** field.

The factory setting for the remote access password is **vbus**.

3. Click **Save configuration**.

VBus access over local network and **Remote access over Internet** are activated by default.

➔ In order to deactivate the **VBus access over local network** and/or the **Remote access over Internet**, click the corresponding toggle button.

16.16 Changing the password

In order to change the user password of the Web interface, proceed as follows:

1. In the **Configuration** main menu, select the **Users** submenu.
2. Under **Change password** click the toggle button.
3. Enter the current password into the **Password** field.

The default password can be found on the side of the housing (**Web-Interface**).

4. Enter the new password into the **New password** field.
5. Enter the new password into the **Confirm new password** field.
6. Click **Save configuration**.

17 Ordering software

For an expense allowance of EUR 50,-, a DVD containing the source code and the compiler scripts of the open source applications and libraries can be ordered. These are network-specific parts of the software.

Please send your order to:

RESOL – Elektronische Regelungen GmbH

Heiskampstraße 10

45527 Hattingen

GERMANY

Please name the version number of the firmware in your order. It can be found in the Web interface, main menu **About**, submenu **General**, bottom area (e.g.: "1.0 (200805241128)"). Per order, only one version number can be named.

The source code and the compiler scripts of the open source applications and libraries can also be downloaded free of charge.

In order to download the source codes and compiler scripts from the Web interface of the device, proceed as follows:

1. In the **Configuration** main menu, select the **General** submenu.
2. Under **Firmware update**, click **Download firmware**.

Besides the firmware, source codes and compiler scripts of the open source applications and libraries are downloaded.

The firmware can also be downloaded from the RESOL website. Besides the firmware, source codes and compiler scripts of the open source applications and libraries are downloaded.

18 Troubleshooting

WARNING! **Electric shock!**

Upon opening the housing, live parts are exposed!

➔ **Always disconnect the device from power supply before opening the housing!**

18.1 Troubleshooting network / Web interface

Problem	Solution
The user password is not available.	When the user password is not available, the device has to be reset to its factory settings in order to regain access to the Web interface. The password can be found on the side of the housing (**Web-Interface**).
The device is not found by the DeviceDiscoveryTool.	Check the following points in order to find and eliminate the error. ➔ Check if the power supply to the device is established. ➔ Check if the network cable is properly connected at both ends! ➔ Check if the firewall software of the computer inhibits the connection to the device. ➔ Switch off the firewall software and use the DeviceDiscoveryTool to find the device. ➔ When the device has been found, the firewall software has to be reconfigured. ➔ Activate the firewall software! ➔ Check if an IP address is assigned to the device. An IP address has to be assigned to the device by a router.

18.2 Troubleshooting device

If a malfunction occurs, a message will appear on the display of the controller (see „7.5“ on page 30).

The operating control LED flashes red and an error is indicated in the status menu.

Is the message **!Sensor fault** indicated in the **Status / Messages** menu?

- no → Is the message **!Fan** indicated in the **Status / Messages** menu?
  - yes → Check fan (connection); replace it, if necessary.
- yes → Sensor fault. An error code instead of a temperature is shown on the sensor display channel.

Short circuit or line break. Disconnected temperature sensors can be checked with an ohmmeter. Please check if the resistance values correspond with the table.

°C	Ω Pt1000	°C	Ω Pt1000
-10	961	55	1213
-5	980	60	1232
0	1000	65	1252
5	1019	70	1271
10	1039	75	1290
15	1058	80	1309
20	1078	85	1328
25	1097	90	1347
30	1117	95	1366
35	1136	100	1385
40	1155	105	1404
45	1175	110	1423
50	1194	115	1442

Operating control LED is permanently red.

Is the message **!Sensor module** indicated in the **Status / Messages** menu?

yes

The **error** LED of the sensor module is flashing red?

no

The **operating** LED of the sensor module is flashing red?

no

Check / establish power supply of the sensor module.

yes

o.k.

yes

Check the bus cable from the controller to the sensor module / establish the connection.

The display is permanently off.

Press the any button. Display illuminated?

no

Check the power supply of the controller. Is it disconnected?

yes

Establish the power supply.

no

The 16 A fuse of the power supply is defective.

yes

Controller has been in standby, everything OK

The **error** LED of the sensor module is flashing red.

Operating control LED of the controller is permanently red?

no

Is the message **!Sensor module** indicated in the **Status / Messages** menu?

yes

Check the bus cable from the controller to the sensor module / establish the connection.

yes

Check / establish power supply of the sensor module.

Heating power too low or no heating power available.

Is **Max. temp.** indicated in the status menu?

no

Is **Power red.** indicated in the status menu?

yes

Is a fan speed < 2800 indicated in the **Controller** status menu?

no

A temperature threshold has been exceeded in the controller / cooling element. As soon as the device has cooled down, it will heat with the heating power available.

yes

Check / clean fan.

yes

Is the store maximum temperature exceeded?

no

A temperature threshold has been exceeded in the controller / cooling element. As soon as the device has cooled down, it will heat with the heating power available.

19 Index

Optionales Zubehör | Optional accessories | Accessoires optionnels | Accesorios opcionales | Accessori opzionali:
www.resol.de/4you

Distributed by:

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info@resol.com

Important note

The texts and drawings in this manual are correct to the best of our knowledge. As faults can never be excluded, please note:

Your own calculations and plans, under consideration of the current standards and directions should only be basis for your projects. We do not offer a guarantee for the completeness of the drawings and texts of this manual - they only represent some examples. They can only be used at your own risk. No liability is assumed for incorrect, incomplete or false information and / or the resulting damages.

Note

The design and the specifications can be changed without notice.

The illustrations may differ from the original product.