

# DeltaSol<sup>®</sup> Pool

**RESOL<sup>®</sup>**

Manual for the  
specialized craftsman

**Mounting**  
**Connection**  
**Operation**  
**Troubleshooting**



48004111

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

en-US/CA

Manual

[www.resol.com](http://www.resol.com)

## Safety advice

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

## Instructions

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

## Information about the product

### Proper usage

The solar controller is designed for use in solar thermal systems and heating systems in compliance with the technical data specified in this manual. Improper use excludes all liability claims.

### CE 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.



#### Note

Strong electromagnetic fields can impair the function of the controller.

- Make sure the controller as well as the system are not exposed to strong electromagnetic fields.

## 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 the system installer or qualified personnel named by the system installer.

## Description of symbols

**WARNING!** Warnings are indicated with a warning triangle!



→ **They contain information on how to avoid the danger described.**

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

- **WARNING** means that injury, possibly life-threatening injury, can occur.
- **ATTENTION** means that damage to the appliance can occur.



#### Note

Notes are indicated with an information symbol.

- Arrows indicate instruction steps that should be carried out.

## Disposal

- Dispose of the packaging in an environmentally sound manner.
- Dispose of old appliances 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.

**Subject to technical change. Errors excepted.**

The RESOL DeltaSol® Pool is a controller for heating a swimming pool by means of solar collectors and optimized operation of the filter system.

Backup heating of the swimming pool is adapted to solar gain and pool demand, thus saving expensive energy. Furthermore, the controller is equipped with a functionality control which shows if the system operates normally.

The controller has many additional pool functions such as: additional filter runtime, maximum limitation of flow temperature and a flushing function.

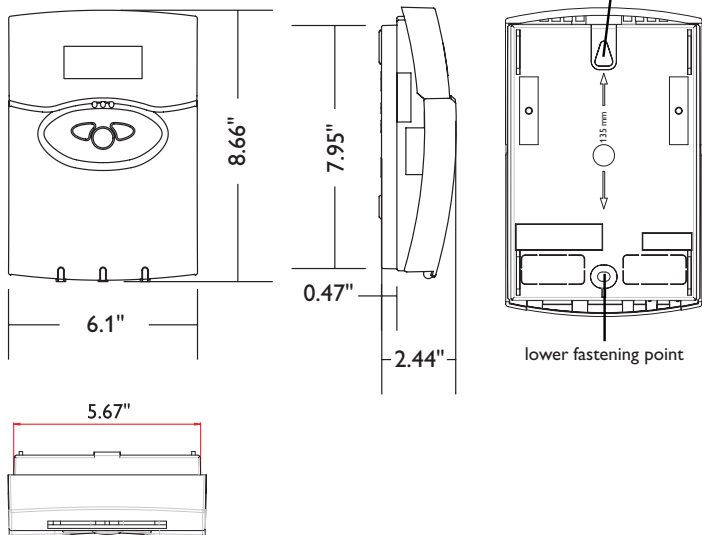
The DeltaSol® Pool can easily be connected to other modules via the RESOL VBus®.

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## 1 Overview

- Controller for heating a swimming pool by means of solar collectors and optimized operation of the filter system
- Solar operating hours counter and energy metering
- 13 sensor inputs
- 7 relay outputs
- Functionality control
- RESOL VBus®



### Technical data

**Inputs:** 10 sensor inputs for Pt1000, 1 x CS10, 1 x impulse and 1 digital input

**Outputs:** 6 semiconductor relays, 1 dry contact relay

#### Switching capacity:

1 (1) A 240 V~ (semiconductor relay)

2 (1) A 24 V/240 V~ (dry contact relay)

**Total switching capacity:** 4 A 240 V~

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

**Supply connection:** type Y attachment

**Standby:** 1,83 W

**Mode of operation:** type 1.B.C.Y action

**Rated impulse voltage:** 2.5 kV

**Data interface:** RESOL VBus®

**VBus® current supply:** 30 mA

**Functions:** solar operating hours counter and energy metering, function control, filter runtime monitoring, maximum flow temperature limitation, cooling function, collector emergency shutdown, pump monitoring. Add-on backup heating of the swimming pool depending on the need and on the power of the solar collectors

**Housing:** plastic, PC-ABS and PMMA

**Mounting:** wall mounting, mounting into patch panels is possible

**Indication / Display:** 4-line LC text display

**Operation:** 3 push buttons at the front

**Ingress protection:** IP 20 / EN 60529

**Protection class:** II

**Ambient temperature:** 0 ... 40 °C / 32 ... 104 °F

**Pollution degree:** 2

**Dimensions:** 156 x 227 x 62 mm / 8.9" x 6.1" x 2.4"

## 2 Installation

### 2.1 Mounting

#### **WARNING! Electric shock!**



Upon opening the housing, live parts are exposed.

→ **Always disconnect the controller from power supply before opening the housing!**

#### **ATTENTION! ESD damage!**

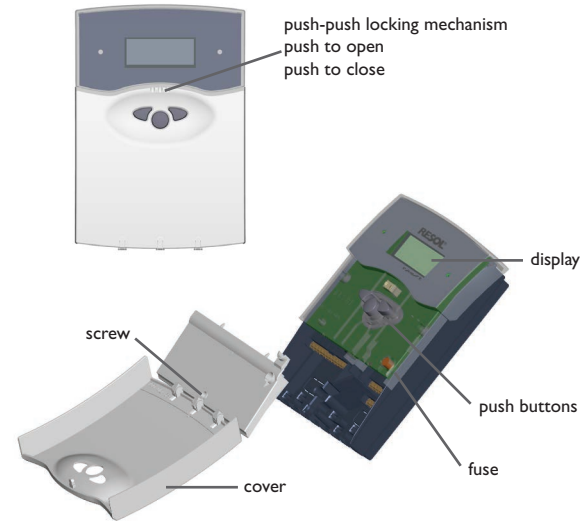


Electrostatic discharge can lead to damage to electronic components!

→ **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!**

The unit must only be located in dry interior locations. It is not suitable for installation in hazardous locations and should not be placed close to any electromagnetic fields. The controller must additionally be supplied from a double-pole switch with contact gap of at least 0.12". Please pay attention to separate routing of sensor cables and mains cables.

- Open the front cover by pushing it. Unscrew the crosshead screw from the cover and remove it along with the front cover from the housing.
- Mark the upper fastening point on the wall and drill and fasten the enclosed wall plug and screw leaving the head protruding.
- Hang the housing from the upper fastening point and mark the lower fastening point through the hole in the terminal box (centres 5.3"). Drill and insert the lower wall plug.
- Hang the housing from the upper fastening point and attach with the lower screw.
- Carry out connection in accordance with the terminal allocation.
- Insert cover and attach with the cross-head screw. Close the front cover properly.



## 2.2 Electrical connection

### WARNING! Electric shock!

Upon opening the housing, live parts are exposed.

→ Always disconnect the controller 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

It must be possible to disconnect the device from the mains at any time.

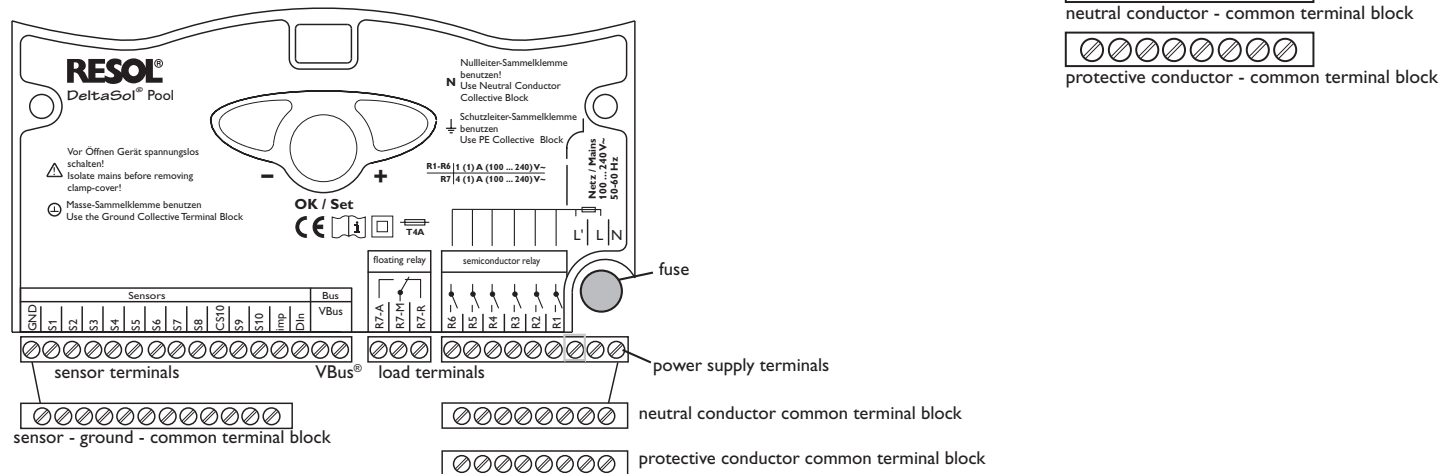
→ Install the mains plug such that it is accessible at any time.

→ If this is not possible, install a switch that can be accessed.

### Note:

Connecting the device to the power supply must always be the last step of the installation!

**Do not use the device if it is visibly damaged!**



## 2.2.1 Actuators (pumps, valves, etc.)

The controller is equipped with 7 relays to which **loads** (actuators) such as pumps, valves and auxiliary relays can be connected:

• **Relays R1 ... R6** are semiconductor relays:

R1 ... 6 = normally open R1 ... R6

N = neutral conductor N (common terminal bloc)

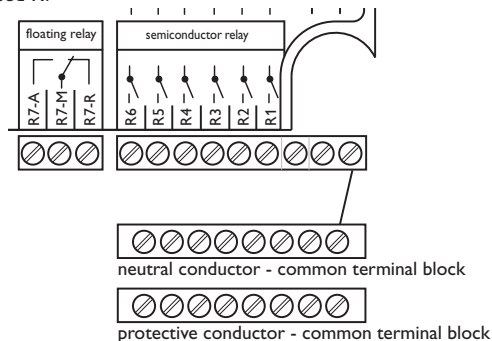
PE = protective conductor PE (common terminal bloc)

• **Relay R7** is a potential-free (dry contact) relay with changeover contact:

R7-M = center contact R7

R7-A = normally open R7

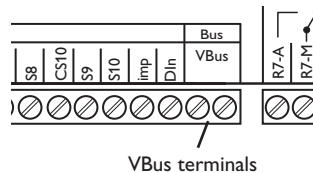
R7-R = normally closed R7



## 2.2.2 Data communication/bus

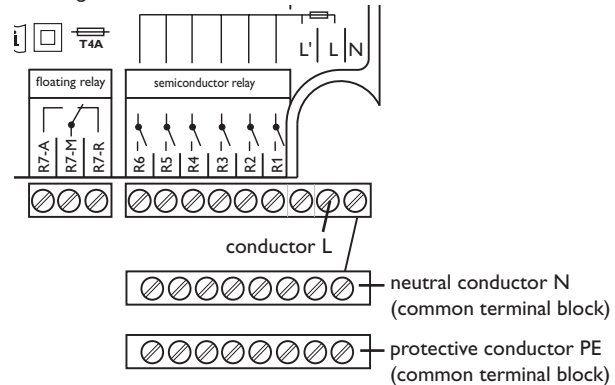
The controller is equipped with the RESOL **VBus**® for data transfer with and energy supply to external modules. The connection is carried out at the two terminals marked **VBus**® (either polarity). One or more RESOL VBus® modules can be connected via this data bus:

- RESOL WMZ calorimeter
- RESOL large display
- RESOL Datalogger



## 2.2.4 Power supply

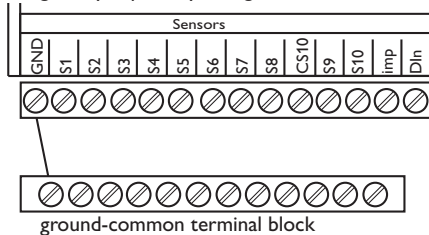
The power supply to the controller must be carried out via an external power switch (last step!) and the supply voltage must be 100 ... 240 V~ (50 ... 60 Hz). Flexible cables must be attached to the housing with the enclosed strain relief and the corresponding screws or be run into the controller housing in a cable conduit or trunking.



## 2.2.3 Sensors

The controller is equipped with 13 sensor inputs in total. The ground connection for the sensors has to be carried out via the ground terminal block (GND).

- **Temperature sensors** have to be connected to the terminals S1 ... S10 and GND (either polarity).
- The **irradiation sensor (CS10)** is to be connected to the terminals CS10 and GND with correct polarity. Connect the terminal GND of the sensor to the terminal GND of the controller (ground terminal block), and the terminal CS of the sensor to the terminal CS10 of the controller.
- A flowmeter can be connected to the terminals Imp and GND (either polarity).
- An external message signal can be connected to the digital input Din. When the signal contact closes the input Din, the message "Imessage ext." is generated. This signal is treated like an error, which means that the control lamp flashes red and the message relay is possibly energized.



### 3 Basic system

#### Sensor allocation

| S1         | S2     | S3     | S4      | S5                | S6 | S7 | S8 | CS10        | S9 | S10 | Imp       | Din   |
|------------|--------|--------|---------|-------------------|----|----|----|-------------|----|-----|-----------|---|
| T-absorber | T-pool | T-flow | T-outd. | T-return<br>(WMZ) |    |    |    | irradiation |    |     | flow rate | release<br>filter system<br>switch-extra filter runtime |

#### Abbreviations sensors

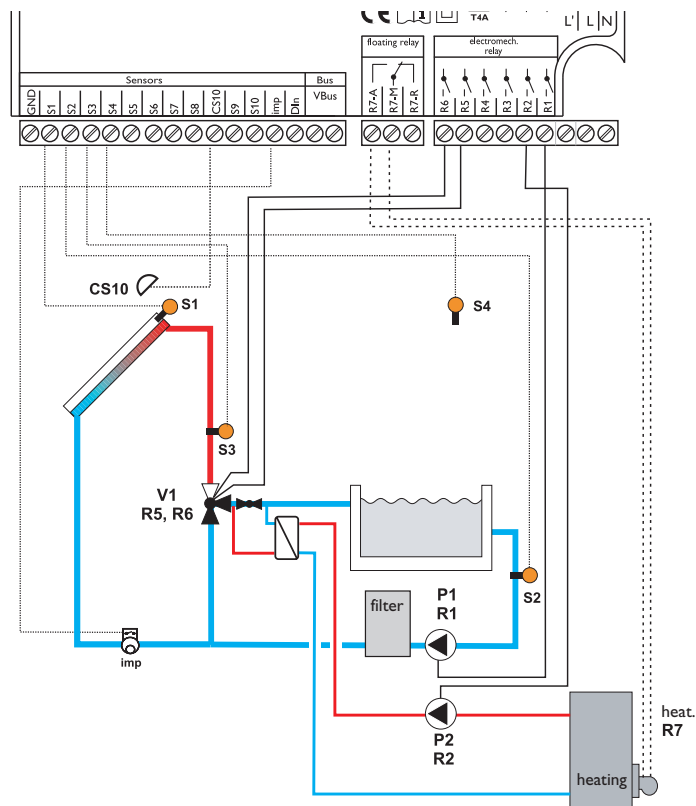
| sensor      | description               |
|-------------|---------------------------|
| T-absorber  | absorber temperature      |
| T-pool      | swimming pool temperature |
| T-flow      | flow temperature          |
| T-outd.     | outdoor temperature       |
| T-return    | return temperature        |
| irradiation | solar irradiation         |
| flow rate   | flow rate                 |

#### Relay allocation

| R1          | R2                       | R3           | R4              | R5                           | R6                | R7                                   |
|-------------|--------------------------|--------------|-----------------|------------------------------|-------------------|--------------------------------------|
| filter pump | pump (P2) backup heating | signal relay | operating relay | valve (V1) open (solar pump) | valve (V1) closed | demand backup heating potential-free |

#### Abbreviations - relays

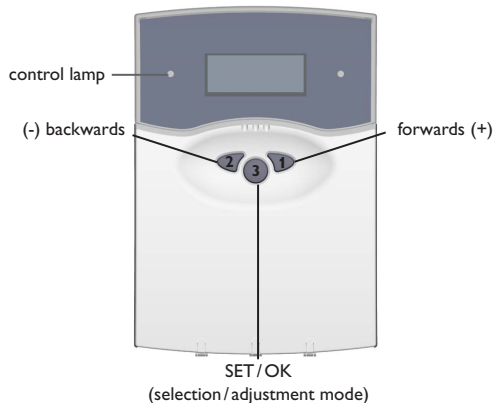
| relay | description                          |
|-------|--------------------------------------|
| R1    | filter pump                          |
| R2    | pump (P2) afterheating               |
| R3    | signal relay                         |
| R4    | operation                            |
| R5    | valve (V1) open (solar pump)         |
| R6    | valve (V1) closed                    |
| R7    | backup heating demand potential-free |





## 4 Operation and function

### 4.1 Buttons for adjustment



The controller is operated via the 3 push buttons below the display. The forward-button (1) is used for scrolling forward through the menu or to increase the adjustment values. The backward-button (2) is similarly used for scrolling backwards and reducing values. Button 3 is used for selection of the menu lines and for confirmation.

- Briefly press button 3 in order to get to the main menu
- Select the requested menu using buttons 1 and 2.
- Briefly press button 3, the selected submenu is then shown on the display. By selecting the menu line “back”, the display returns to the former menu level.
- Press buttons 1, 2 and 3 to scroll until the chosen menu line is reached.
- Briefly press button 3 in the respective menu line to modify adjustment values, adjust the requested value by pressing the buttons 1 and 2 (for large intervals, keep the button pressed).
- Briefly press button 3 in order to finish the adjustment.
- To save the change, answer the security inquiry “Save?” by choosing “yes” or “no” (buttons 1 and 2) and confirm with button 3.

**When button 3 is pressed for 2 seconds, the display changes back to the main menu.**

### 4.2 Control lamp

The controller is equipped with a red-/green control lamp. The following control and system status are signaled:

- green: automatic operation
- red flashing: malfunction of the system
- green flashing: manual mode

### 4.3 Menu structure

|                     |
|---------------------|
| Mainmenu            |
| 1. Status           |
| 2. WMZ              |
| 3. Balances         |
| 4. Manual operation |
| 5. Adj. values      |
| 6. User code        |
| 7. Expert           |

The clear-text display shows a 4-line part of the selected menu.

Adjustment and control of the controller are carried out via the menu. When the controller is commissioned, the display level is in the status menu. In the first line of each submenu you will find the option “back”, by means of which it is possible to get to the former menu level. In the following diagrams you will find the complete menu contents; since some of the menu points depend on the system, option or message, in some cases not all of the shown text lines are indicated.

*STATUS* is shown on the display in the initial state. A selection can be made between 7 submenus.



#### Note:

The choice of adjustment values and options depends on different functions and the user code. Some only appear in the display if they are available for the adjusted system parameters.

## 4.4 User code

### 1. Expert **Code 0077**

All menus and adjustment values are shown and all values can be altered.



#### Note:

After the menu point “user code” has been chosen, enter the user code!

If you do not enter the expert user code, the expert menu will not be displayed.

## 4.5 Menu overview

### Main menu

Status

WMZ

Balance values

Manual operation

Adj. values

User code

Expert

### WMZ

back

WMZ1

WMZ module

Options

### Adjust. values

back

Poolmax.

$\Delta T$  on

$\Delta T$  off

Min.on

Min.off

Filter min.

### Expert

back

Adj. values

Options

Sensors

Language

### Options

back

Flow max.

CS on

After heat.

AH sol. opt.

Col. Sec.

Col. Min.

Signal relay

Operat. relay

Circulation

Pool cool.

Extra circ.

Ext. on/off

Pump monitor

Reset

## 5 Commissioning

control lamp

(-) backwards

forwards (+)



SET / OK

(selection / adjustment mode)

Adjust date and time in the *Status* menu.

## 6 Functions and options

### Maximum pool temperature

Adj. values./Poolmax.

adjustment range: 10.0... 40.0 °C

factory setting: 30.0 °C

Adjust the maximum pool temperature, in °C.

When the adjusted swimming pool temperature is reached, the solar system switches off. The circulation function will not be suppressed.

### Switch-on difference

Adj. values./ $\Delta T_{on}$

adjustment range: 3.5... 20.0 K

factory setting: 5.0 K

Adjust the switch-on difference for the solar circuit, in Kelvin.

### Switch-off difference

Adj. values./ $\Delta T_{off}$

adjustment range: 0.5... 19.5 K

factory setting: 3.0 K

Adjust the switch-off difference, in Kelvin. The switch-off difference must be by at least 0.5 K smaller than the switch-on difference  $\Delta T_{on}$ .

### Minimum runtime

Adj.values/Min.on

adjustment range: 1 ... 10 min

factory setting: 2 min

Adjust the minimum runtime, in minutes.

Period of time during which the system has to run at least after the switch-on condition has been fulfilled. The minimum switch-on will not be interrupted by the swimming pool maximum temperature limitation.

### Minimum break time

Adj.values/Min.off

adjustment range: 1 ... 10 min

factory setting: 2 min

Adjust the minimum break time, in minutes.

Period of time during which the system has to stand still at least after the switch-off condition has been fulfilled.

### Minimum filter runtime

Adj.values/Circ.min.

adjustment range: 0 ... 16 h

factory setting: 5 h

Adjust the minimum runtime of the filter pump, in hours.

The pump will be switched on every day for this period of time. This adjustment value is variable and has to be passed through until the reference point (07:00 p.m.).

Example: When the filter runtime is adjusted to 5 hours, the filter pump has to start at 02:00 p.m. and continuously run until 07:00 p.m.

The minimum filter runtime will also be maintained in the case of a sensor fault.

### Switch-on delay

Expert/Adj.values/t- $\Delta$ Ton

adjustment range: 0 ... 300 s

factory setting: 20 s

Adjust the  $\Delta$ Ton time.

The switch-on condition has to be fulfilled for this period of time for solar loading to start.

### Flow maximum limitation

Expert/Options/Flowmax.

and adjust:

Expert/Adj.values/T-FLmax.

adjustment range: 30 ... 90 °C

factory setting: 40 °C

Expert/Adj.values/ $\Delta$ T-FLsec.

adjustment range: 0.2 ... 10.0 K

factory setting: 2.0 K

Adjust the maximum limitation of the flow.

If this function is activated, solar loading is stopped when the maximum flow temperature has been exceeded. The pool will be loaded again, if the flow temperature falls by  $\Delta$ T flowmax. below the maximum flow temperature.

The adjustable minimum difference between switch-on temperature and switch-off temperature (hysteresis) avoids that the controller switches on and off again at too low temperature differences.

### Manual operation

Manualoperation/Allrelays

or:

Manualoperation/Relay1etc

Each relay can be set into on-/off-/or automatic mode. During normal operation the relay is in automatic mode.

### CS

Expert/Options/CSon

and adjust:

Expert/Adj.values/CSon

adjustment range: 100 ... 700 W/qm

factory setting: 300 W/qm

The pool will be loaded if the adjusted irradiation threshold (CS-Bypass) at the irradiation sensor is exceeded or if there is a temperature difference caused by high absorber temperatures. "CS on" can be activated; the irradiation threshold is adjustable (100-700 W/m<sup>2</sup>).

## Energy metering

WMZ/Options/WMZ

selection:

WMZ “Yes” or “No”

Heat quantity measurement is possible with the difference between flow and return temperature, and with the flow rate indicated by the flowmeter.

If “WMZ” is selected, flow temperature, return temperature, flow rate and heat quantity will be displayed.

WMZ/WMZ module “Yes” or “No”

It is possible to use an additional WMZ module. Flow temperature, return temperature, flow rate and heat quantity will also be displayed.

WMZ/WMZ1/Expert

WMZ/WMZ1/Expert/Sen.Flow

adjust to “3”

WMZ/WMZ1/Expert/Sen.return

adjuste.g. to “5”

If you select the “Expert” submenu, you can further choose between:

- Sensor flow/return: here you can re-allocate the sensors, if you do not use the sensors which have already been pre-allocated.

## Energy metering with and without flowmeter

WMZ/WMZ1/Expert/Flowmeter

selection “Yes”

If a flowmeter is used (“Yes”), a pulser is used for measuring the flow rate.

WMZ/WMZ1/Expert/Vol/puls.

adjustment range: 0,5 ... 100,0 l

factory setting: 1,0 l

- Adjust volume/pulse (in l)

WMZ/WMZ1/Expert/Flowmeter.

selection “No”

WMZ/WMZ1/Expert/Relay

When no flowmeter has been selected (“No”), a flow rate value has to be entered as well as the relay which is to be used for the heat quantity measurement.

## Antifreeze type

WMZ/WMZ1/Expert/Antifreetype

adjust e.g. to “1”

### • Antifreeze type:

0 for water;

1 for propylene glycol;

2 for ethylene glycol;

3 for Tyfocor LS®

## Adjusting the antifreeze concentration

WMZ/WMZ1/Expert/Antifreeze

adjustment range: 20 ... 70 Vol %

factory setting: 40 %

Adjust the ratio of the water/glycol mixture.

## Backup heating

Expert/Options/Afterheat.

and adjust to:

Expert/Adj.values/AHon

adjustment range: 10.0 ... 39.7 °C

factory setting: 24.0 °C

Expert/Adj.values/AHoff

adjustment range: 24.3 ... 40.0 °C

factory setting: 24.5 °C

When the temperature falls below the minimum temperature (AH on), backup heating is switched on and heats the pool until it reaches the desired temperature (AH off).

The value “AH on” has to be by 0.3 K smaller than the value “AH off”.

## Backup heating optimisation

Expert/Options/AHsol.opt.

and adjust:

Expert/Adj.values/AHsol.on

adjustment range: 2.0 ... 20.0 K

factory setting: 2.0 K

Expert/Adj.values/AHsol.off

adjustment range: 1.0 ... 19.7 K

factory setting: 1.5 K

Expert/Adj.values/ΔTAH.Solar

adjustment range: 0.3 ... 20.0 K

factory setting: 1.0 K

The function starts when the pool is being loaded. Solar loading means that pool loading is only carried out for energy supply and not for cooling purposes etc.

Backup heating is suppressed when the temperature difference between flow and pool (AH solar on) is reached. If the temperature difference falls below the value “AH solar off”, the optimisation function switches off. The adjustable minimum difference between switch-on temperature and switch-off temperature (hysteresis) avoids that the controller switches on and off again at too low temperature differences.

## Circulation function

Expert/Options/Circulation  
and adjust:

Expert/Adj.values/Circ.time  
adjustment range: 1 ... 10 min  
factory setting: 1 min

When the solar thermal system has been off for 1 hour, it is switched on for 1 ... 10 minutes (the water of the swimming pool circulates through the pipes; this allows the pool temperature to be detected during system standstill). If the flow emergency shutdown is active, the circulation function is suppressed.

Adjust the circulation runtime, in minutes.

Expert/Adj.values/Circ.start  
factory setting: 07:00  
Expert/Adj.values/Circ.stop  
factory setting: 19:00

Beginning and end of circulation (clock time).

## Absorber emergency shutdown

Expert/Options/Abs.max.  
and adjust to:

Tcol.sec.  
adjustment range: 60 ... 160 °C  
factory setting: 130 °C

Absorber emergency shutdown temperature, adjustable between 60 and 160 °C.

If the adjusted temperature threshold (Tcol. sec.) is exceeded, the pool will no longer be loaded by the absorber.

$\Delta T_{col.sec.}$   
adjustment range: 2 ... 50 K  
factory setting: 10 K

The adjustable minimum difference between switch-on temperature and switch-off temperature (hysteresis) avoids that the controller switches on and off again at too low temperature differences.

## Absorber minimum limitation

This function makes sure that solar loading will start only if the absorber temperature reaches the adjusted value.

Expert/Options/Abs.min.  
and adjust:

Expert/Adj.values/TColmin  
adjustment range: -25 ... +90 °C  
factory setting: 10 °C  
Expert/Adj.values/ $\Delta T_{Colmin}$   
adjustment range: 0.3 ... 10.0 K  
factory setting: 5.0 K

The adjustable minimum difference between switch-on temperature and switch-off temperature (hysteresis) avoids that the controller switches on and off again at too low temperature differences.

## Pool cooling function

Expert/Options/Poolcool.  
and adjust:

Expert/Adj.values/ $\Delta T_{Cool}$   
adjustment range: 0.5 ... 10.0 K  
factory setting: 2.0 K

If the maximum pool temperature is exceeded by the adjusted value ( $\Delta T_{Cool}$ ), heat is diverted, provided that the absorber is by at least  $\Delta T_{Cool}$  on colder than the pool. Cooling is switched off when the value  $\Delta T_{Cool}$  Off is reached.

Expert/Adj.values/ $\Delta T_{Coolon}$   
adjustment range: 1.8 ... 10.0 K  
factory setting: 3.0 K  
Expert/Adj.values/ $\Delta T_{Cooloff}$   
adjustment range: 0.3 ... 9.7 K  
factory setting: 1.5 K

The adjustable minimum difference between switch-on temperature and switch-off temperature (hysteresis) avoids that the controller switches on and off again at too low temperature differences.

## Filter pump monitoring

Expert/Options/Pumpmonitor  
selection "Yes" or "No"

When flowmeter is used and when the the filter pump is switched on, this option monitors whether there is a flow rate in the solar circuit. If the controller does not receive any pulse after 2 minutes, the filter pump will be switched-off and an error message will be generated.

### en **Extra filter runtime**

Expert/Options/Extracirc.

and adjust:

Expert/Adj.values/Extracirc.

adjustment range: 1 ... 20 h

factory setting: 2 h

This option is used for switching on an extra runtime of the filter pump (in h) if necessary (e.g. in the case of polluted pool water).

As soon as a contact is detected at the Din input, the filter pump starts and remains switched-on for the adjusted period of time (extra runtime). The filter minimum runtime will not be influenced by this function.

### **External release**

Expert/Options/Ext.on/off

The external release function is used for releasing the pump for solar loading (e.g. for preventing the controller from switching on the pump during pump maintenance.) The Din input must be closed to deblock the controller (solar loading, afterheating).

### **Sensors:**

Expert/Sensors

Adjust the sensor type for the solar irradiation sensor (A to E).

Expert/Sensors/CS-type

Expert/Sensors/CSadjust

Expert/Sensors/CSoffset

Expert/Sensors/Sensor1 etc.

Adjust the sensor offset.

An offset (-5K ... +5K, in 0.1 K steps) can be allocated to each sensor in order to match the sensors with each other.

### **Operating relay:**

Expert/Options/Operat.relay

selection: "Yes" or "No".

The operating relay option can be selected. If the operating relay is selected ("Yes"), it is energised when the pool is being loaded.

### **Reset:**

Expert/Options/Reset

selection: "Yes" or "No".

The reset option can be selected. When the reset option is selected ("Yes"), the controller settings are set back to the factory settings.

### **Language:**

Expert/Language/English

Language choice: German, English, French, Castellano, Italiano.

## 7 Messages

### **Sensor fault**

!SensorFaulty

>Absorber

In the case of a sensor fault, an error message is generated:

### **Sensor defective.**

Furthermore, the defective sensor will be recognised (absorber sensor, pool sensor or flow temperature sensor).

### **Signal relay (error message)**

Expert/Options/Signalrelay

!SensorFaulty

!Pump

!RTC

!EEPROM

This function is switched on (option WMZ), when the controller detects a fault. In this case, the signal relay is energized (e.g. for signal lights).

These errors are:

- sensor defective
- pump defective
- real-time-clock (RTC) defective
- storage module (EEPROM) defective

Please note that a message caused by one of the plausibility controls does not activate the relay.

**Messages**

The following states can be displayed:

| display         | description  |
|-----------------|--|
| EverythingOK    | normal operation of the system, no malfunction     |
| Controller.off  | controller is switched off                         |
| >Contr.ext.off  | controller has been switched off by the operator   |
| !Pump.faulty!   | pump is defective                                  |
| !Sensor.faulty  | sensor is defective                                |
| >Absorber       | identification of the defective sensor             |
| >Pool           | see above.   |
| >Flow           | see above  |
| WMZ.off         | WMZ (heat quantity measurement) is deactivated     |
| !Sensor.faulty  | sensor is defective                                |
| >Flow           | identification of the defective sensor             |
| >Return         | see above  |
| !EEPROM         | EEPROM defective                                   |
| !RTC            | RTC defective                                      |
| Solar.on        | solar loading is active                            |
| Solar.off       | solar loading is switched off                      |
| Min.on          | minimum runtime is active                          |
| Min.off         | minimum break time is active                       |
| Solar.CSon      | CS irradiation sensor option is active             |
| Solar.Poolmax.  | maximum swimming pool temperature has been reached |
| Solar.Flowmax.  | flow emergency shutdown is active                  |
| Solar.Cooling   | cooling is active                                  |
| Circ.on         | filter pump is switched on                         |
| Circ.off        | filter pump is switched off                        |
| Circ.min.on     | filter pump minimum runtime is activated           |
| Circulation     | circulation option is activated                    |
| Circ.time       | indication of the filter pump runtime              |
| AH.on           | backup heating option is activated                 |
| AH.off          | backup heating option is deactivated               |
| Afterheat.on    | backup heating is active                           |
| Afterheat.off   | backup heating is not active                       |
| Afterheat.Solar | backup heating is active during solar loading      |
| TAbsor.         | display of absorber temperature                    |

| display     | description                                |
|-------------|--|
| Tpool       | display of pool temperature                |
| TFlow       | display of flow temperature                |
| Toutd.      | display of outdoor temperature             |
| Intens.     | display of irradiation intensity           |
| Relays      | display of the individual relay status     |
| Sensors     | display of the temperatures at each sensor |
| Time        |  |
| Date        |  |
| Version1.00 |  |

**8 Balance values****Balance values**

The values shown on the left can be balanced.

Balance/Poolmax

Balance/Colmax

Balance/Flowmax

Balance/B-rel1

Balance/B-rel2

Balance/B-rel3

Balance/B-rel4

Balance/B-rel5

Balance/B-rel6

Balance/B-rel7

Balance/Oper.days

Operating hours of the individual relays.

## 9 Troubleshooting

The defective sensor (swimming pool sensor; flow temperature sensor; absorber sensor) is indicated on the display. The solar thermal system will be switched off or not put into operation.

### WARNING! Electric shock!



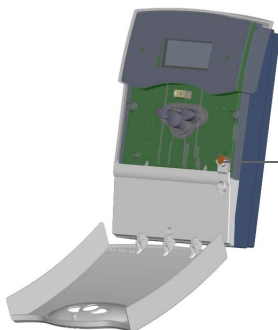
Upon opening the housing, live parts are exposed.

→ **Always disconnect the controller from power supply before opening the housing!**



In the case of a malfunction, a message is shown on the display of the controller:



control lamp



fuse

Operating control lamp flashes red. The symbol  and the  are shown.

Sensor fault. An error code instead of a temperature is shown on the sensor display channel.

888.8

- 88.8

Cable is broken. Check the cable.

Short-circuit. Check the cable.

Disconnected Pt1000 temperature sensors can be checked with an ohmmeter. In the following table, the resistance values corresponding to different temperatures are listed.

| °C  | Ω    | °C  | Ω    |
|-----|------|-----|------|
| -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 |

Resistance values of the Pt1000 sensors

Control lamp off

Check the power supply. Is it disconnected?

no

yes

The fuse of the controller could be blown. It can be replaced after the front cover has been removed (spare fuse is enclosed in the fuse holder).

Check the supply line and reconnect it.



### 10.1 Sensors and measuring instruments



#### Temperature sensors

The product range includes high-precision platinum temperature sensors, flatscrew sensors, outdoor temperature sensors, indoor temperature sensors, cylindrical clip-on sensors, also as complete sensors with immersion sleeve.



#### Overvoltage protection device

In order to avoid overvoltage damage at collector sensors (e.g. caused by local lightning storms), we recommend the overvoltage protection RESOL SP10.

### 10.2 VBus® accessories



#### Smart Display SD3 / Large Display GA3

The RESOL Smart Display is designed for simple connection to RESOL controllers with RESOL VBus®. It is used for visualizing data issued by the controller: collector temperature, tank temperature and energy yield of the solar thermal system. The use of high-efficiency LEDs and filter glass assures a high optical brilliance and good readability. An additional power supply is not required. One module is required per controller.

The RESOL GA3 is a completely mounted large display module for visualization of collector- and tank temperatures as well as the heat quantity yield of the solar system via one 6-digit and two 4-digit 7-segment-displays. An easy connection to all controllers with RESOL VBus® is possible. The front plate is made of antireflective filterglass and is printed with a light-resistant UV-lacquering. The universal RESOL VBus® allows the parallel connection of 8 large displays as well as additional VBus® modules.



### AM1 Alarm module

The AM1 Alarm module is designed to signal system failures. It is to be connected to the VBus® of the controller and issues an optical signal via the red LED if a failure has occurred. The AM1 also has a dry contact relay output, which can e. g. be connected to a building management system (BMS). Thus, a collective error message can be issued in the case of a system failure. Depending on the controller and the sensors connected, different fault conditions can be signaled, e. g. sensor failures, excess or negative system pressure as well as errors in the flow rate, such as a dry run of the pump.

The AM1 Alarm module ensures that occurring failures can be immediately recognised and repaired, even if the system and the controller are difficult to access or located in a remote place. Thus, the reliability and the stable yield of the system are ensured.



### DL2 Datalogger

This additional module enables the acquisition and storage of large amounts of data (such as measuring and balance values of the solar system) over a long period of time. The DL2 can be configured and read-out with a standard internet browser via its integrated Web interface. For transmission of the data stored in the internal memory of the DL2 to a PC, an SD card can be used. The DL2 is appropriate for all controllers with RESOL VBus®. It can be connected directly to a PC or router for remote access and thus enables comfortable system monitoring for yield monitoring or for diagnostics of faults.

## 10.3 Interface adapters



### VBus®/USB interface adapters

The new VBus®/USB interface adapter is the interface between the controller and a personal computer. With its standard mini-USB port it enables a fast transmission of system data for processing, visualizing and archiving via the VBus®. A full version of the RESOL ServiceCenter software is included.



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**Important note**

The texts and drawings of 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.

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