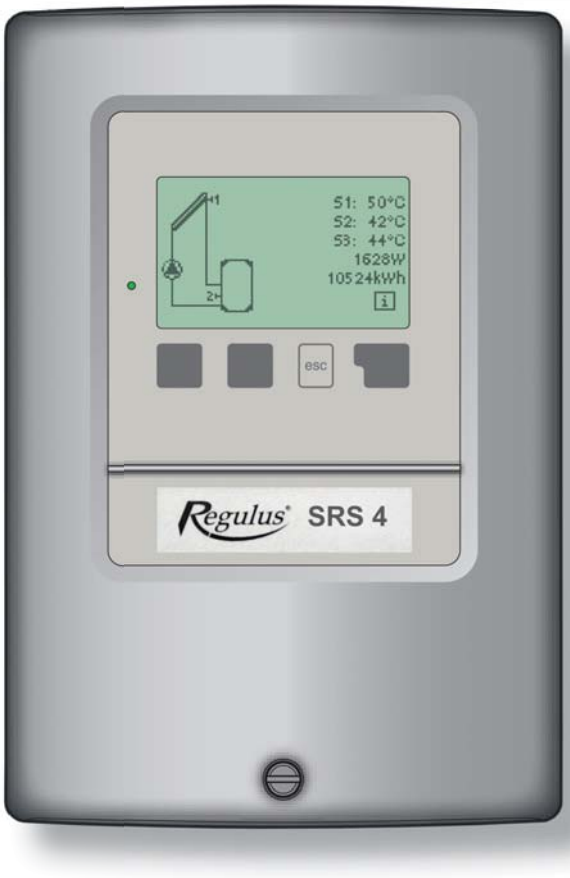
Instruction Manual

REGULUS SRS 4 Controller



CE

EN
v 1.1

Regulus

CONTENTS

General Instructions 3

Part A - Description and Installation

A 1 - Specification 4
A 2 - About the controller 5
A 3 - Scope of supply 5
A 4 - Explanation of symbols 5
A 5 - Hydraulic variants 6
A 6 - Wall installation 7
A 7 - Electrical wiring 8
A 8 - Flowmeter connection 9
A 9 - Installing the temperature sensors 9

Part B - Electric Wiring in Hydraulic Variants

B 1 - Solar system with storage tank 10
B 2 - Solar system with thermostat for storage tank heating or cooling 11
B 3 - Solar system with by-pass 12
B 4 - Solar system with return line preheating 13
B 5 - Solar system with thermally stratified storage tank 14
B 6 - Solar system with heat exchanger 15
B 7 - Solar system with 2 collector fields (East/West) 16
B 8 - Solar system with 2 pumps 17
B 9 - Solar system with 2 storage tanks and zone valve 18
B 10 - Solar system with 2 storage tanks / pumps 19
B 11 - Solar system with 2 storage tanks and heat exchange pump 20
B 12 - Solar system with pool 21
B 13 - Solar system with pool and storage tank 22
B 14 - Solar system + cooling 1 23
B 15 - Solar system + cooling 2 24
B 16 - Solar system + cooling 3 25
B 17 - Solar system + solid fuel boiler 26
B 18 - Solar system + zone valve + thermostat 27
B 19 - Temperature difference controller ΔT and termostat (no solar functions) 28
B 20 - Two temperature difference controllers 2×ΔT (no solar functions) 29
B 21 - Solar system with heat exchanger and thermally stratified storage tank 30
B 22 - Solar system with heat exchanger, 2 storage tanks and zone valve 31

Part C - Controller Use

C 1 - Display and input 32
C 2 - Menu structure 33
C 3 - Turning on for the first time 34
C 4 - Free commissioning 34

Part D - Parameter Settings

D 1 - Measurement values 35
D 2 - Statistics 36
D 3 - Display mode 37
D 4 - Operating mode 38
D 5 - Settings 39
D 6 - Protective functions 44
D 7 - Special functions 46
D 8 - Menu lock 52
D 9 - Service values 53
D 10 - Language 54

Part E - Defects and Maintenance

E 1 - Error and info messages 55
E 2 - Replacing the fuse 56
E 3 - Maintenance 56
E 4 - Useful hints and tricks 57
E 5 - Disposal 58

GENERAL INSTRUCTIONS

These installation and operating instructions contain basic instructions and important information regarding safety, installation, commissioning, maintenance and the optimal use of the unit. Therefore these instructions must be read completely and understood especially by the installation technician / solar specialist.
The installation shall be done in compliance with valid standards and rules. The controller does not under any circumstances replace any safety devices (e.g. safety valve, air vent valve etc.) to be installed into a solar circuit.
Installation of the unit may only be carried out by specialists who possess the appropriate training.

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

A - DESCRIPTION AND INSTALLATION

A 1 - Specification

Electric specification:

Mains voltage	230 V ~ ±10 %
Mains frequency	50-60 Hz
Power consumption	2 VA
Switched power	
Electronic relay R1	min. 20 W, max. 120 W for AC3
Mechanical relay R2	max. 460 VA for AC1 / 185 W for AC3 (AC1 - resistive load, AC3 - inductive load)
Mechanical relay R3	max. 460 VA for AC1 / 185 W for AC3 (AC1 - resistive load, AC3 - inductive load)
0-10V output	operating resistance 10kohm
PWM output	frequency 1kHz, voltage 10V
Internal fuse	2A slow-blow, 250 V
El. protection	IP40
Protection class	II
Sensor inputs	4× Pt1000 1× VFS flowmeter
Measuring range Pt1000	-40 °C to 300 °C
Mesuring range for temperature probe in VFS flowmeter	0 °C to 100 °C (short-time -25 °C to 120 °C)
Flowmeter measuring range	2 l/min to 40 l/min

Permissible ambient conditions:

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

Other specifications and dimensions:

Housing design	2-part, ABS plastic
Installation methods	wall installation, optionally panel installation
Overall dimensions	163 × 110 × 52 mm
Installation aperture dimensions	157 × 106 × 31 mm
Display	fully graphical display, 128 × 64 dots
Light diode	multicolour
Operation	4 entry keys

Optional temperature sensors:

Immersion sensor	Pt1000, with lead TT/S2 up to 180 °C
Immersion sensor	Pt1000, with lead TT/P4 up to 95 °C
Pipe-mounted sensor	Pt1000, pipe-mounted sensor TR/P4 up to 95 °C
Sensor leads	min. 2× 0,75 mm^2, extendable up to 30m max.
Flowmeter leads	extendable up to 2m max.

Temperature resistance table for Pt1000 sensors:

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

A 2 - About the controller

The REGULUS SRS 4 controller is designed to control solar systems with solar collectors for liquid heating. This model is designed for use with solar systems with 2 independent solar collector fields and 1 heat sink, or with 1 solar collector field and 2 heat sinks.

Heat sinks can be storage water heaters, pool heat exchangers and accumulation tanks for heating.

- both graphics and texts on a backlit display
- simple viewing of the current measurement values
- precise measurement of the solar heat quantity
- pump speed can be controlled by 0-10V output and PWM
- internal time backup
- analysis and monitoring of the system also in the graphic mode
- extensive setting menus with interactive explanations
- menu lock can be activated to prevent unintentional setting changes
- usual preset parameters in factory setting
- further measurement and switching applications using a temperature difference and a thermostat function

A 3 - Scope of supply

- SRS 4 Controller
- 3 screws 3.5 × 35 mm and 3 plugs 6mm for wall installation
- 6 strain relief clips with 12 screws
- Replacement fuse 2A slow-blow, 250 V
- Installation, wiring and operating instructions
- 4 Pt1000 temperature sensors for immersion sleeves, 2m, up to 180 °C
- VFS 2-40 flowmeter with 1.2m cable, G ¾" nut and 2 gaskets

A 4 - Explanation of symbols

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

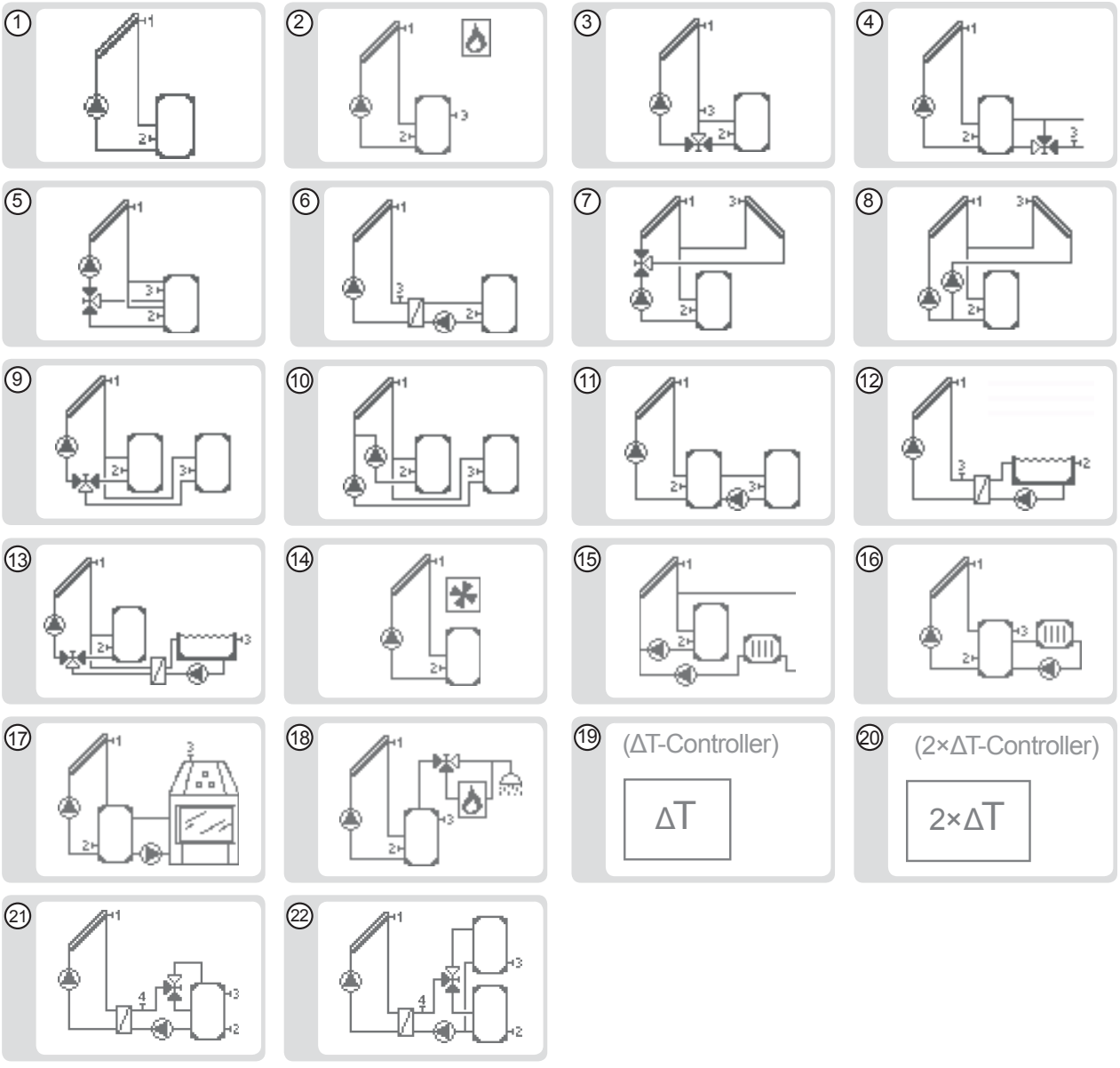
Failure to observe these instructions can result in serious damage to health such as scalding, or even life-threatening injuries.

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

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

A 5 - Hydraulic variants

1. Solar system with a storage tank
2. Solar system with a thermostat for storage tank heating or cooling
3. Solar system with a bypass
4. Solar system with a heating return pre-heating
5. Solar system with a thermally stratified storage tank
6. Solar system with a heat exchanger
7. Solar system with 2 collector fields (East/West)
8. Solar system with 2 collector fields and 2 pumps
9. Solar system with 2 storage tanks and a zone valve
10. Solar system with 2 storage tanks and 2 pumps
11. Solar system with two storage tanks and a heat exchange pump
12. Solar system with a pool
13. Solar system with a pool and storage tank
14. Solar system + cooling 1
15. Solar system + cooling 2
16. Solar system + cooling 3
17. Solar system + solid-fuel boiler
18. Solar system + zone valve + thermostat
19. One differential ΔT controller and 1 thermostat (no solar functions)
20. 2 temperature difference controllers 2×ΔT (no solar functions)
21. Solar system with heat exchanger and thermally stratified storage tank
22. Solar system with heat exchanger, 2 storage tanks and zone valve



A 6 - Wall installation

Install the controller only in dry areas and under the ambient conditions described in Chapter A 1.

Installation instructions:

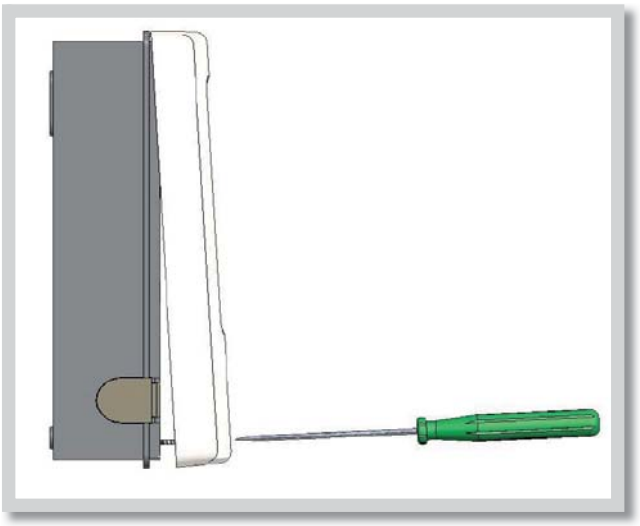


Fig. A 3.1.1

1. Unscrew cover screw completely.

2. Carefully pull upper part of housing from lower part.

3. Set upper part of housing aside, being sure not to touch the electronics when doing so.

4. Hold the lower part of the housing up to the selected position and mark the 3 mounting holes. Make sure that the wall surface is as even as possible so that the housing does not become distorted when it is screwed on.

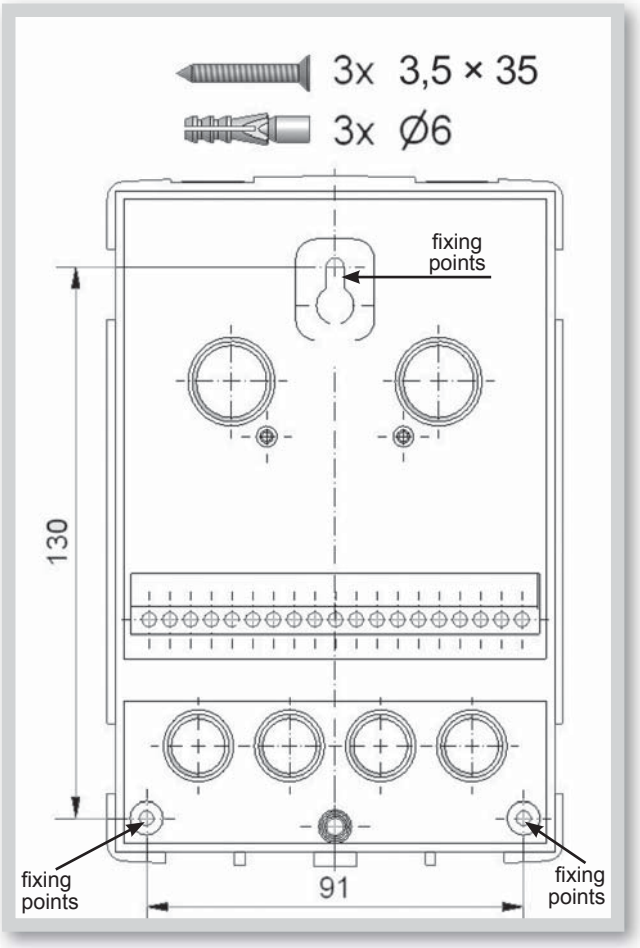


Fig. A 3.1.2

5. Using a drill and size 6 bit, drill 3 holes at the points marked on the wall and push in the plugs.

6. Insert the upper screw and screw it in slightly.

7. Fit the upper part of the housing and insert the other two screws.

8. Align the housing and tighten the three screws.

A 7 - Electrical wiring

Danger

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

Danger

The controller is not equipped with a mains switch. For this purpose please use e.g. a circuit breaker or just unplug the device. The cables being connected to the unit must not be stripped by more than 55 mm, and the cable jacket must reach into the housing just to the other side of the strain relief.

Danger

Relay R1 is only suitable for standard pumps (20-120VA) which are speed-controlled via the controller. The internal wiring of the controller is such that residual currents flow over relay R1 even when the relay is off! Therefore under no circumstances may valves, contactors or electronic pumps (low-energy) be operated on this output.

Wiring instructions:

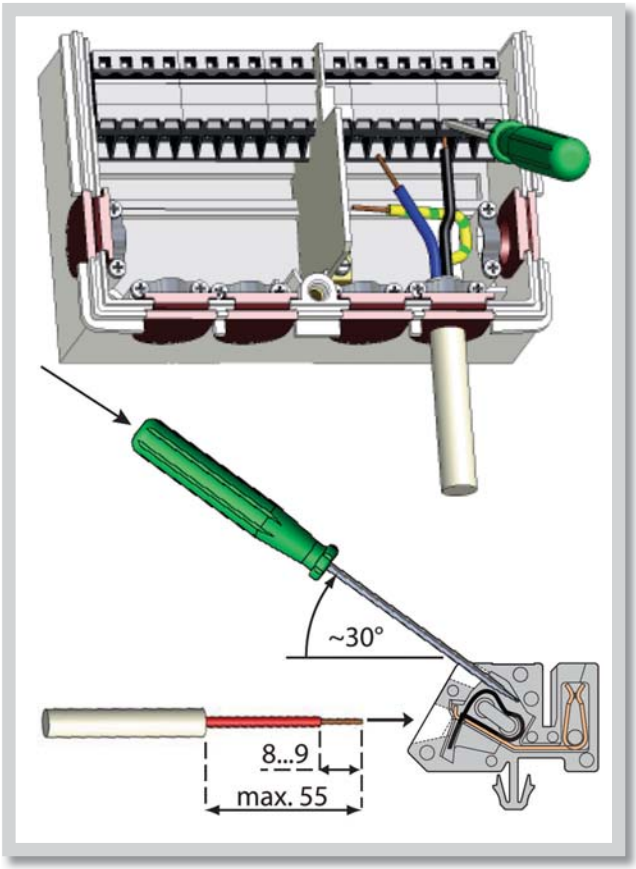


Fig. A 7.1

1. Make sure the circuit breaker is in off position and power supply is off.

2. Select a suitable hydraulic scheme (Chapters B1 to B15).

3. Open the controller.

4. Strip the cable by 55 mm max., insert and fit the cable strain relief. Strip the last 8-9 mm of all the wires (Fig. A 7.1).

5. Open the terminals using a flat screwdriver (Fig. A 7.1) and wire the leads following the diagrams (Chapter B1 - B22).

6. As an option, the temperature sensor can be wired to the terminal on the PCB (Fig. A 7.2).

7. Refit the upper housing part and fasten with screw.

8. Switch on mains voltage and place controller in operation.

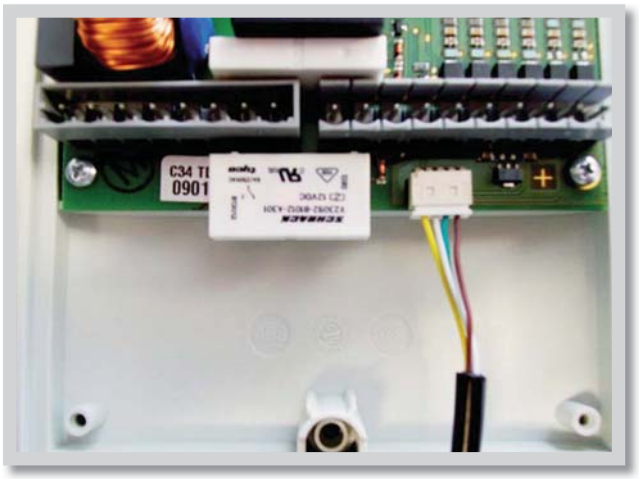


Fig. A 7.2

A 8 - Installing the flowmeter

Wire the sensor in the VFS flowmeter to the connector, see Fig. A 7.2.

The flowmeter shall be installed into the solar return line, take care of the right flow direction following the arrow on the flowmeter body.

A 9 - Installing the temperature sensors

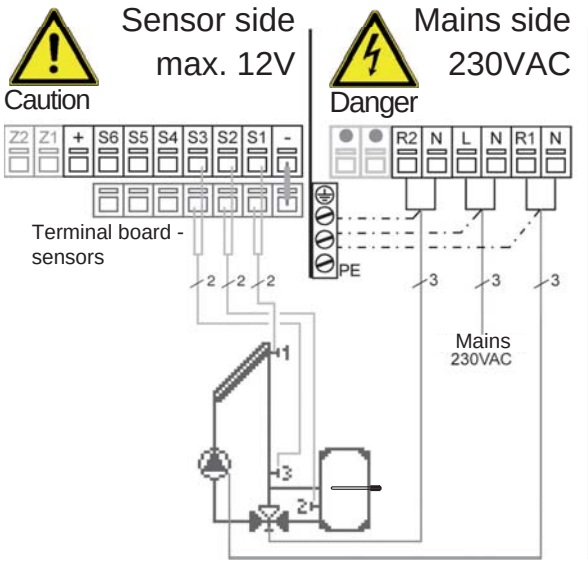
The controller operates with Pt1000 temperature sensors.
Max. sensor lead length is 30 m and its cross section at least 0.75 mm².
Make sure that the terminals of extension cables and sensors are properly tightened. Use only immersion or pipe-mounted sensors. For solar collectors, use sensors of a suitable temperature resistance (min. 180 °C) that are enclosed in the supply. The temperature sensor cables must be routed separately from mains voltage cables!

B - ELECTRIC WIRING IN HYDRAULIC VARIANTS

B 1 - Solar system with storage tank

Example: solar system with storage tank and el. heating rod with integrated thermostat.

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



The flowmeter shall be installed in the solar return line.

Danger

Take care of the right solar liquid flow direction and permitted temperature (0 °C to 100 °C, -25 °C to +120 °C short term). Flowmeter wiring - see Chap. A6

Low voltage - sensor connection

Terminal:	*connection for:*
S1 (2×)	sensor 1 collector
S2 (2×)	sensor 2 storage tank
S3 (2×)	sensor 3 (optional)
S4	sensor 4 inlet temp. (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper
R3	optional (chap.7.10.) - L
N	optional

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and VFS sensors and also with earth on the side of the mains voltage.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump L (speed)
N	pump N
R2	pump L (no speed control)
R1	pump N
PE	protective conductor (green-yellow)

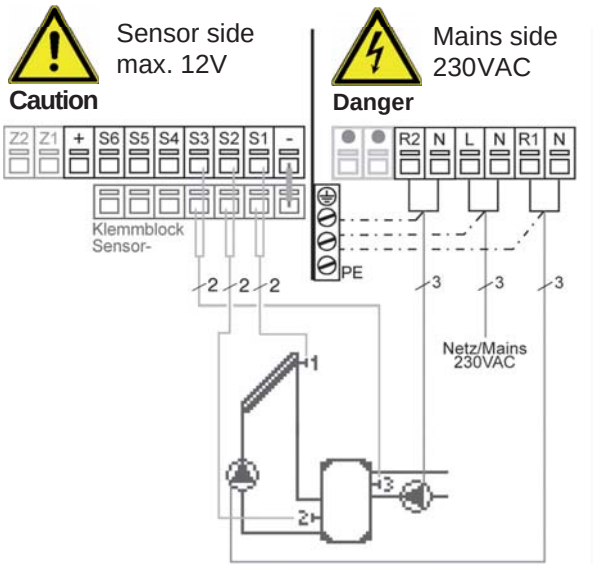
Caution

R1 output: speed control of a standard pump, min. power consumption 20 VA. The sensor in the flowmeter shall be wired to the terminal, see fig. A 7.2.

B 2 - Solar system with thermostat for storage tank heating or cooling

Example: solar system with storage tank heated with a gas boiler or el. heating rod, controller regulated.

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



The flowmeter shall be installed in the solar return line.

Danger

Take care of the right solar liquid flow direction and permitted temperature (0 °C to 100 °C, -25 °C to +120 °C short term). Flowmeter wiring - see Chap. A6

Low voltage - sensor connection

Terminal:	*connection for:*
S1 (2×)	sensor 1 collector
S2 (2×)	sensor 2 storage tank
S3 (2×)	sensor 3 (optional)
S4	sensor 4 inlet temp. (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper
R3	optional (chap.7.10.) - L
N	optional

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and VFS sensors and also with earth on the side of the mains voltage.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump L
N	pump N
R2	thermostat function L
N	thermostat function N
PE	protective conductor (green-yellow)

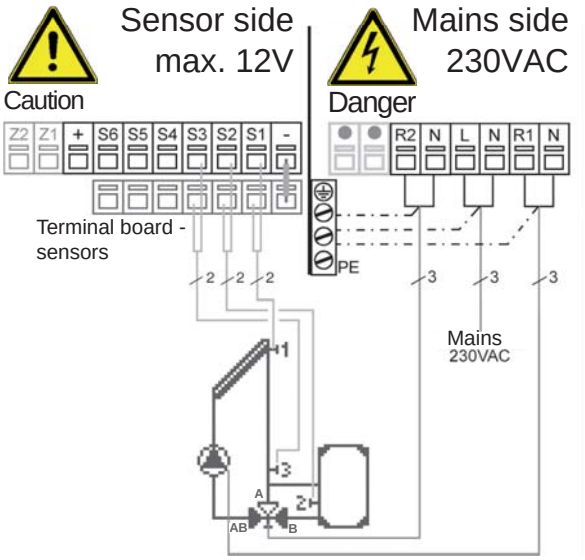
Caution

R1 output: speed control of a standard pump, min. power consumption 20 VA. The sensor in the flowmeter shall be wired to the terminal, see fig. A 7.2.

B 3 - Solar system with by-pass

Example: solar system with a long piping from pump station to storage tank.

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



The flowmeter shall be installed in the solar return line.

Danger

Take care of the right solar liquid flow direction and permitted temperature (0 °C to 100 °C, -25 °C to +120 °C short term). Flowmeter wiring - see Chap. A6

Low voltage - sensor connection

Terminal:	*connection for:*
S1 (2×)	sensor 1 collector
S2 (2×)	sensor 2 storage tank
S3 (2×)	sensor 3 bypass
S4	sensor 4 inlet temp. (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper
R3	optional (chap.7.10.) - L
N	optional

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and VFS sensors and also with earth on the side of the mains voltage.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump L
N	pump N
R2	zone valve L
N	zone valve N
PE	protective conductor (green-yellow)

Caution

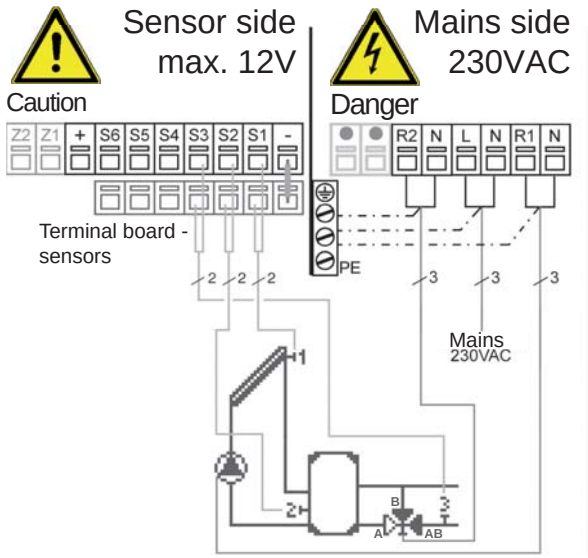
R1 output: for speed control of standard pumps, minimum load 20VA.
The sensor in the flowmeter shall be wired to the terminal, see fig. A 7.2

Note: Actuating direction of zone valve:

R2 off = valve closed = flow direction B-AB = flow to storage tank
R2 on = valve open = flow direction A-AB = flow via bypass

B 4 - Solar system with return line preheating

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



The flowmeter shall be installed in the solar return line.

Danger

Take care of the right solar liquid flow direction and permitted temperature (0 °C to 100 °C, -25 °C to
Flowmeter wiring - see chap. A6

Low voltage - sensor connection

Terminal:	*connection for:*
S1 (2×)	sensor 1 collector
S2 (2×)	sensor 2 storage tank
S3 (2×)	sensor 3 bypass
S4	sensor 4 inlet temp. (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper
R3	optional (chap.7.10.) - L
N	optional

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and VFS sensors and also with earth on the side of the mains voltage.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump L
N	pump N
R2	zone valve L
N	zone valve N
PE	protective conductor (green-yellow)

Caution

R1 output: for speed control of standard pumps, minimum load 20VA.
The sensor in the flowmeter shall be wired to the terminal, see fig. A 7.2

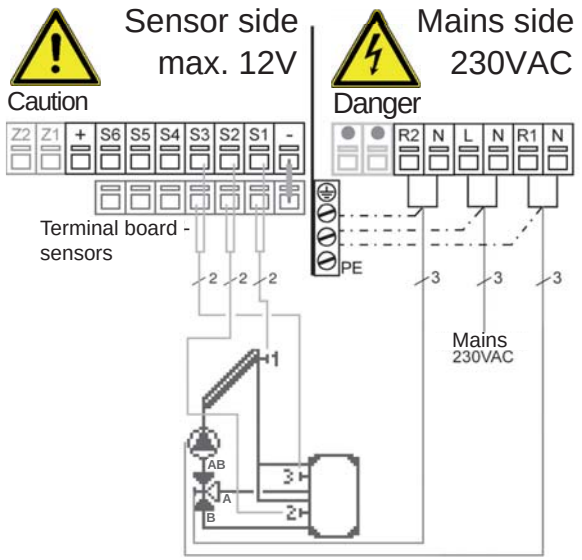
Pozn.: Zapojení zónového ventilu na zpátečce:

R2 vyp. = ventil uzavřen = průtok B - AB = bez dohřevu
R2 zap = ventil otevřen = průtok A - AB = průtok do zásobníku

B 5 - Solar system with thermally stratified storage tank

Example: Heat gained from the solar system is stored either to the upper or to the lower tank part, depending on the temperature achievable from the solar system.

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



The flowmeter shall be installed in the solar return line.

Danger

Take care of the right solar liquid flow direction and permitted temperature (0 °C to 100 °C, -25 °C to +120 °C short term). Flowmeter wiring - see Chap. A6

Low voltage - sensor connection

Terminal:	*connection for:*
S1 (2×)	sensor 1 collector
S2 (2×)	sensor 2 storage tank lower
S3 (2×)	sensor 3 storage tank upper
S4	sensor 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper
R3	optional (chap.7.10.) - L
N	optional

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and VFS sensors and also with earth on the side of the mains voltage.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump L
N	pump N
R2	zone valve L
N	zone valve N
PE	protective conductor (green-yellow)

Caution

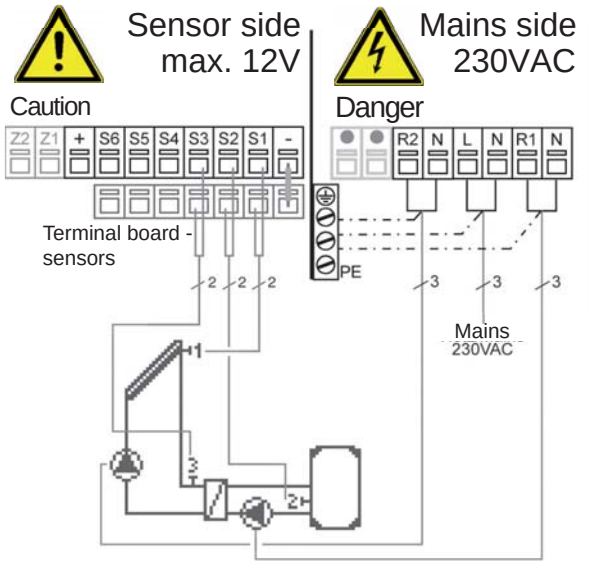
R1 output: for speed control of standard pumps, minimum load 20VA.
The sensor in the flowmeter shall be wired to the terminal, see fig. A 7.2

Note: Actuating direction of zone valve:

R2 off = valve closed = flow direction AB-B = flow to storage tank lower (sensor 2)
R2 on = valve open = flow direction AB-A = flow to storage tank upper (sensor 3)

B 6 - Solar system with heat exchanger

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



The flowmeter shall be installed in the solar return line.

Danger

Take care of the right solar liquid flow direction and permitted temperature (0 °C to 100 °C, -25 °C to +120 °C short term). Flowmeter wiring - see Chap. A6

Low voltage - sensor connection

Terminal:	*connection for:*
S1 (2×)	sensor 1 collector
S2 (2×)	sensor 2 primary circuit return line
S3 (2×)	sensor 3 secondary circuit return line
S4	sensor 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper
R3	optional (chap.7.10.) - L
N	optional

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and VFS sensors and also with earth on the side of the mains voltage.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	secondary pump L
N	secondary pump N
R2	primary pump L
N	primary pump N
PE	protective conductor (green-yellow)

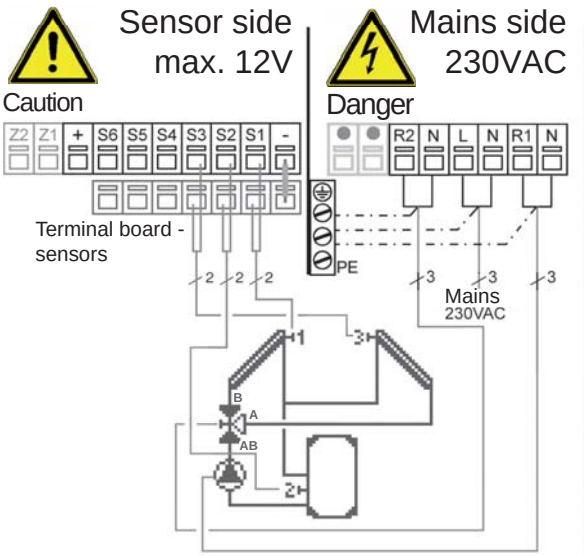
Caution

R1 output: for speed control of standard pumps, minimum load 20VA.
The sensor in the flowmeter shall be wired to the terminal, see fig. A 7.2

B 7 - Solar system with 2 collector fields (East/West)

Example: Heat gained from the solar system is stored either to the upper or to the lower tank part, depending on the temperature achievable from the solar system.

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



The flowmeter shall be installed in the solar return line.

Danger

Take care of the right solar liquid flow direction and permitted temperature (0 °C to 100 °C, -25 °C to +120 °C short term). Flowmeter wiring - see Chap. A6

Low voltage - sensor connection

Terminal:	*connection for:*
S1 (2×)	sensor 1 collector 1
S2 (2×)	sensor 2 storage tank
S3 (2×)	sensor 3 collector 2
S4	sensor 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper
R3	optional (chap.7.10.) - L
N	optional

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and VFS sensors and also with earth on the side of the mains voltage.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump L (speed)
N	pump N
R2	zone valve L
N	zone valve N
PE	protective conductor (green-yellow)

Caution

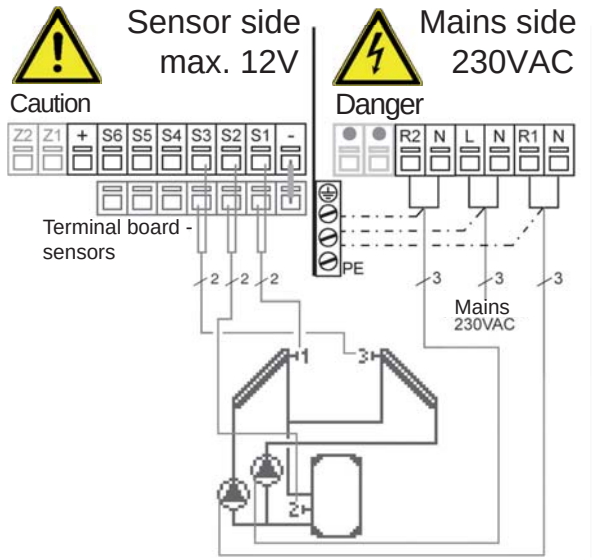
R1 output: for speed control of standard pumps, minimum load 20VA.
The sensor in the flowmeter shall be wired to the terminal, see fig. A 7.2

Note: Actuating direction of zone valve:

R2 off = valve closed = flow direction AB-B = flow from collector field 1 (sensor S1)
R2 on = valve open = flow direction AB-A = flow from collector field 2 (sensor S3)

B 8 - Solar system with 2 collector fields and 2 pumps

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



The flowmeter shall be installed in the solar return line.

Danger

Take care of the right solar liquid flow direction and permitted temperature (0 °C to 100 °C, -25 °C to +120 °C short term). Flowmeter wiring - see Chap. A6

Low voltage - sensor connection

Terminal:	*connection for:*
S1 (2×)	sensor 1 collector 1
S2 (2×)	sensor 2 storage tank
S3 (2×)	sensor 3 collector 2
S4	sensor 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper
R3	optional (chap.7.10.) - L
N	optional

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and VFS sensors and also with earth on the side of the mains voltage.

Mains voltage - 230V 50Hz

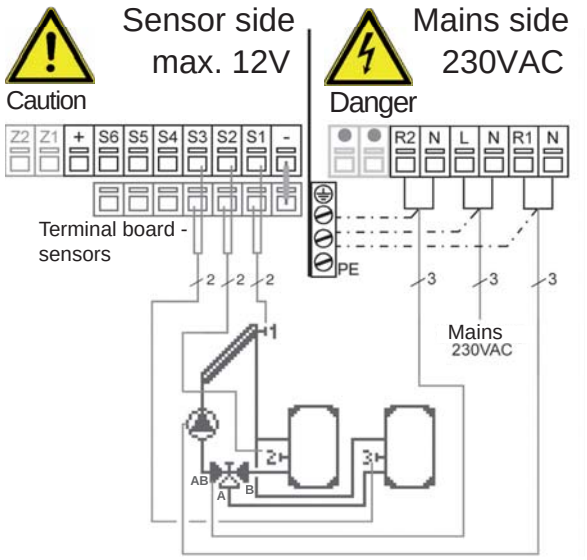
Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump (coll. 1) L
N	pump (coll. 1) N
R2	pump (coll. 2) L
N	pump (coll. 2) N
PE	protective conductor (green-yellow)

Caution

R1 output: for speed control of standard pumps, minimum load 20VA.
The sensor in the flowmeter shall be wired to the terminal, see fig. A 7.2

B 9 - Solar system with 2 storage tanks and zone valve

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



The flowmeter shall be installed in the solar return line.

Danger

Take care of the right solar liquid flow direction and permitted temperature (0 °C to 100 °C, -25 °C to +120 °C short term). Flowmeter wiring - see Chap. A6

Low voltage - sensor connection

Terminal:	*connection for:*
S1 (2×)	sensor 1 collector
S2 (2×)	sensor 2 storage tank 1
S3 (2×)	sensor 3 storage tank 2
S4	sensor 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper
R3	optional (chap.7.10.) - L
N	optional

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and VFS sensors and also with earth on the side of the mains voltage.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump L (speed)
N	pump N
R2	zone valve L
N	zone valve N
PE	protective conductor (green-yellow)

Caution

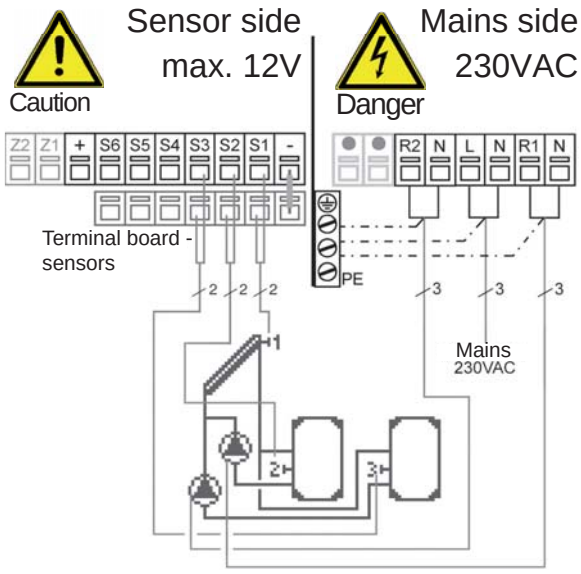
R1 output: for speed control of standard pumps, minimum load 20VA.
The sensor in the flowmeter shall be wired to the terminal, see fig. A 7.2

Note: Actuating direction of zone valve:

R2 off = valve closed = flow direction B-AB = storage tank 1 charging (sensor S2)
R2 on = valve open = flow direction A-AB = storage tank 3 charging (sensor S3)

B 10 - Solar system with 2 storage tanks and 2 pumps

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



The flowmeter shall be installed in the solar return line.

Danger

Take care of the right solar liquid flow direction and permitted temperature (0 °C to 100 °C, -25 °C to +120 °C short term). Flowmeter wiring - see Chap. A6

Low voltage - sensor connection

Terminal:	*connection for:*
S1 (2×)	sensor 1 collector
S2 (2×)	sensor 2 storage tank 1
S3 (2×)	sensor 3 storage tank 2
S4	sensor 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper
R3	optional (chap.7.10.) - L
N	optional

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and VFS sensors and also with earth on the side of the mains voltage.

Mains voltage - 230V 50Hz

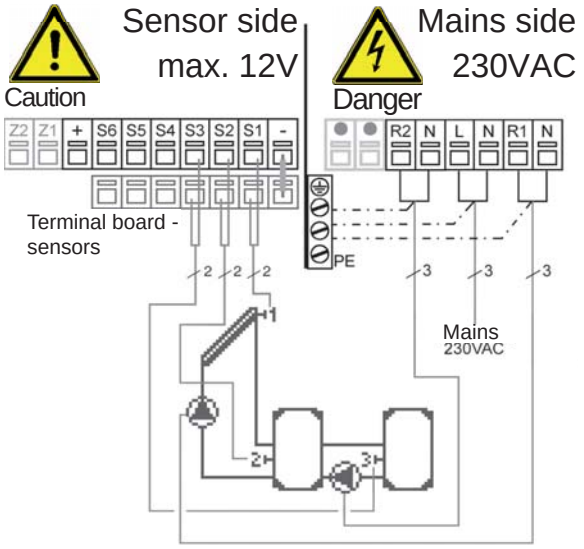
Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump (tank 1) L
N	pump (tank 1) N
R2	pump (tank 2) L
N	pump (tank 2) N
PE	protective conductor (green-yellow)

Caution

R1 output: for speed control of standard pumps, minimum load 20VA.
The sensor in the flowmeter shall be wired to the terminal, see fig. A 7.2

B 11 - Solar system with 2 storage tanks and heat exchange pump

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



The flowmeter shall be installed in the solar return line.

Danger

Take care of the right solar liquid flow direction and permitted temperature (0 °C to 100 °C, -25 °C to +120 °C short term). Flowmeter wiring - see Chap. A6

Low voltage - sensor connection

Terminal:	*connection for:*
S1 (2×)	sensor 1 collector
S2 (2×)	sensor 2 storage tank 1
S3 (2×)	sensor 3 storage tank 2
S4	sensor 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper
R3	optional (chap.7.10.) - L
N	optional

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and VFS sensors and also with earth on the side of the mains voltage.

Mains voltage - 230V 50Hz

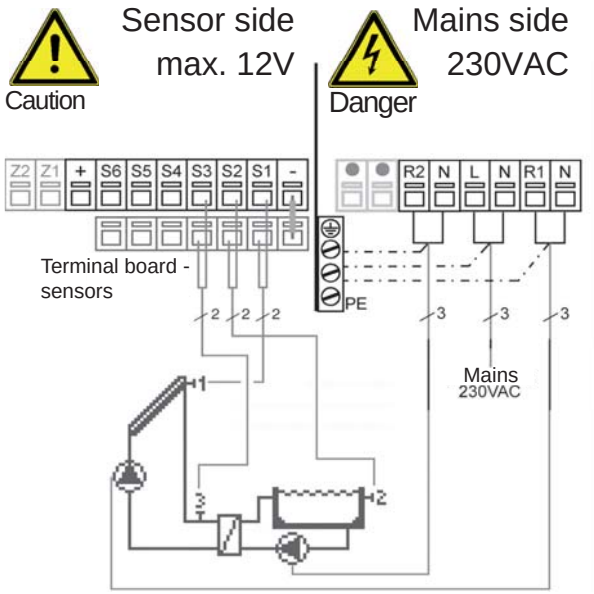
Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump L (speed)
N	pump N
R2	pump (tank 2) L
N	pump (tank 2) N
PE	protective conductor (green-yellow)

Caution

R1 output: for speed control of standard pumps, minimum load 20VA.
The sensor in the flowmeter shall be wired to the terminal, see fig. A 7.2

B 12 - Solar system with a pool

Sensor connection - max. 12V **Mains voltage - 230V 50Hz** Electric wiring



The flowmeter shall be installed in the solar return line.

Danger

Take care of the right solar liquid flow direction and permitted temperature (0 °C to 100 °C, -25 °C to +120 °C short term). Flowmeter wiring - see Chap. A6

Low voltage - sensor connection

Terminal:	*connection for:*
S1 (2×)	sensor 1 collector
S2 (2×)	sensor 2 pool
S3 (2×)	sensor 3 solar return line
S4	sensor 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper
R3	optional (chap.7.10.) - L
N	optional

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and VFS sensors and also with earth on the side of the mains voltage.

Mains voltage - 230V 50Hz

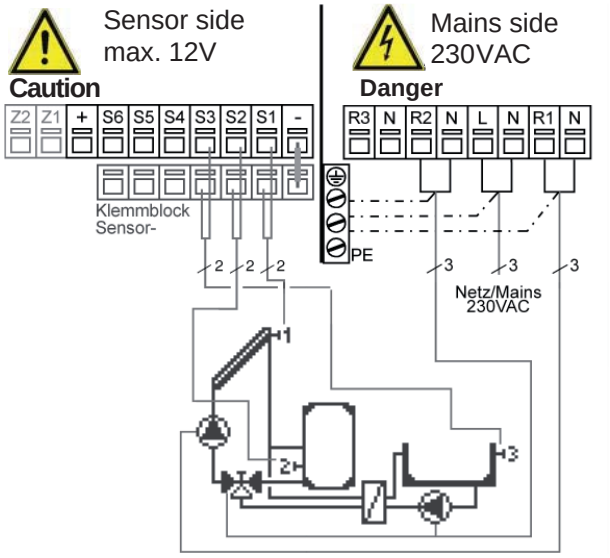
Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump L (speed)
N	pump N
R2	pool pump L
N	pool pump N
PE	protective conductor (green-yellow)

Caution

R1 output: for speed control of standard pumps, minimum load 20VA.
The sensor in the flowmeter shall be wired to the terminal, see fig. A 7.2

B 13 - Solar system with pool and storage tank

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



The flowmeter shall be installed in the solar return line.

Danger

Take care of the right solar liquid flow direction and permitted temperature (0 °C to 100 °C, -25 °C to +120 °C short term). Flowmeter wiring - see Chap. A6

Low voltage - sensor connection

Terminal:	*connection for:*
S1 (2×)	sensor 1 collector
S2 (2×)	sensor 2 storage tank
S3 (2×)	sensor 3 pool
S4	sensor 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper
R3	optional (chap.7.10.) - L
N	optional

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and VFS sensors and also with earth on the side of the mains voltage.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump L (speed)
N	pump N
R2	pool pump + 3-way valve L
N	pool pump + 3-way valve N
PE	protective conductor (green-yellow)

Caution

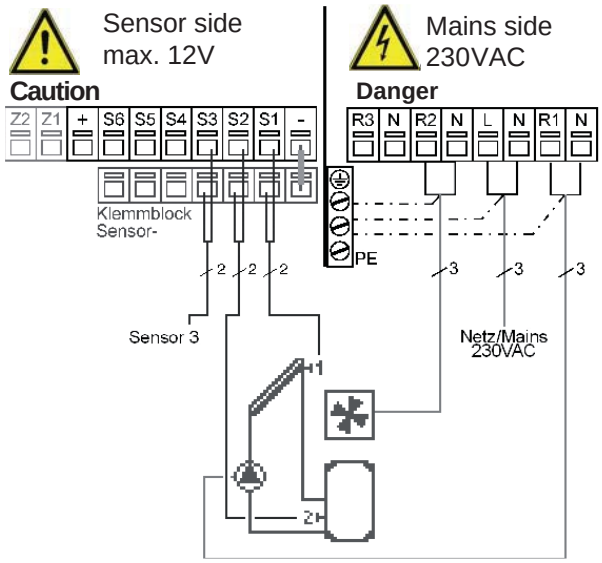
R1 output: for speed control of standard pumps, minimum load 20VA.
The sensor in the flowmeter shall be wired to the terminal, see fig. A 7.2

Note: Actuating direction of zone valve:

R2 off = valve closed = flow direction B-AB = storage tank charging (sensor S2)
R2 on = valve open = flow direction A-AB = pool heating (sensor S3)

B 14 - Solar system + cooling 1

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



Low voltage - sensor connection

Terminal:	*connection for:*
S1	sensor 1 collector
S2	sensor 2 storage tank
S3	sensor 3 (optional)
S4	sensor 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and 0...10V PWM.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump L
N	pump N
R2	cooling L
N	cooling N
R3	optional (chap. 7.10.) L
N	optional
PE	protective conductor (green-yellow)

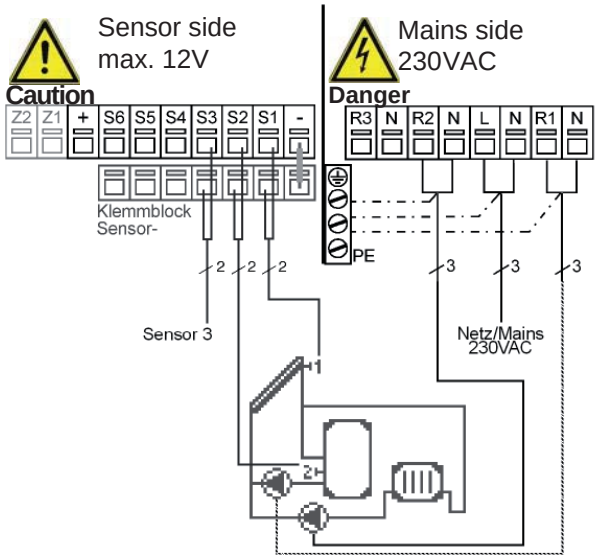
Description of cooling function - see 6.4.1.

Caution

R1 output: for speed control of standard pumps, minimum load 20VA. The sensor in the VFS flowmeter(optional accessory) shall be wired to the terminal, see fig. A 7.2.

B 15 - Solar system + cooling

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



Low voltage - sensor connection

Terminal:	*connection for:*
S1	collector 1 collector
S2	collector 2 storage tank
S3	collector 3 (optional)
S4	collector 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and 0...10V PWM.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump L
N	pump N
R2	cooling pump L
N	cooling pump N
R3	optional (chap. 7.10.) L
N	optional
PE	protective conductor (green-yellow)

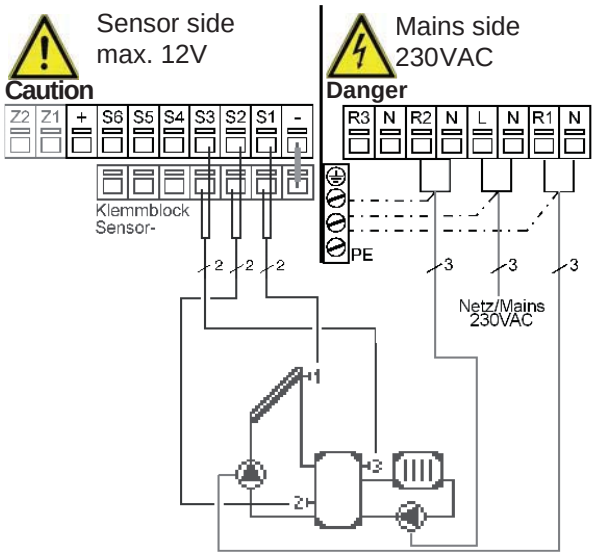
Description of cooling function - see 6.4.1.

Caution

R1 output: for speed control of standard pumps, minimum load 20VA. The sensor in the VFS flowmeter(optional accessory) shall be wired to the terminal, see fig. A 7.2.

B 16 - Solar system + cooling 3

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



Low voltage - sensor connection

Terminal:	*connection for:*
S1	collector 1 collector
S2	collector 2 storage tank lower
S3	collector 3 storage tank upper
S4	collector 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and 0...10V PWM.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump L
N	pump N
R2	cooling pump L
N	cooling pump N
R3	optional (chap. 7.10.) L
N	optional
PE	protective conductor (green-yellow)

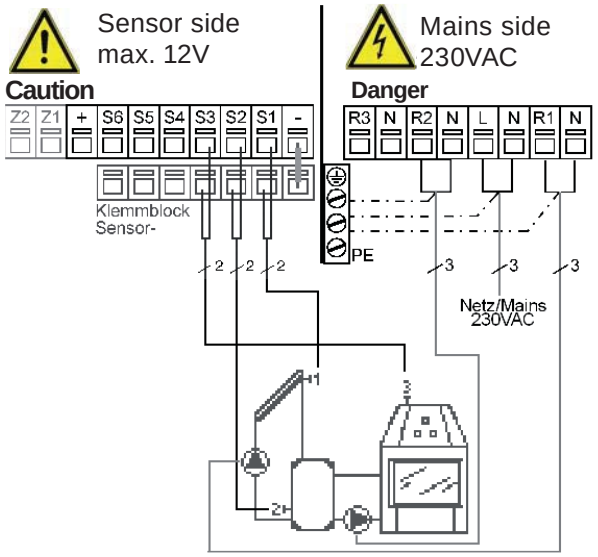
Description of cooling function - see 6.4.1.

Caution

R1 output: for speed control of standard pumps, minimum load 20VA. The sensor in the VFS flowmeter(optional accessory) shall be wired to the terminal, see fig. A 7.2.

B 17 - Solar system + solid fuel boiler

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



Low voltage - sensor connection

Terminal:	*connection for:*
S1	sensor 1 collector
S2	sensor 2 storage tank
S3	sensor 3 boiler
S4	sensor 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and 0...10V PWM.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump L
N	pump N
R2	boiler pump L
N	boiler pump N
R3	optional (chap.7.10.) - L
N	optional
PE	protective conductor (green-yellow)

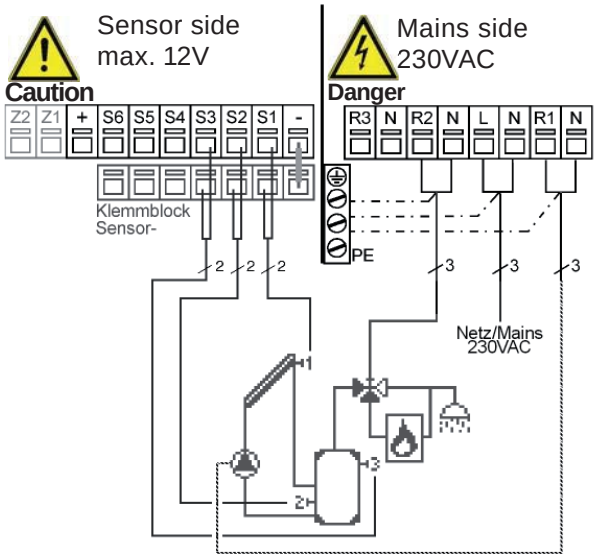
Description of cooling function - see 6.4.1.

Caution

R1 output: for speed control of standard pumps, minimum load 20VA. The sensor in the VFS flowmeter(optional accessory) shall be wired to the terminal, see fig. A 7.2.

B 18 - Solar system + zone valve + thermostat

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



Low voltage - sensor connection

Terminal:	*connection for:*
S1	sensor 1 collector
S2	sensor 2 storage tank lower
S3	sensor 3 storage tank upper
S4	sensor 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and 0...10V PWM.

Mains voltage - 230V 50Hz

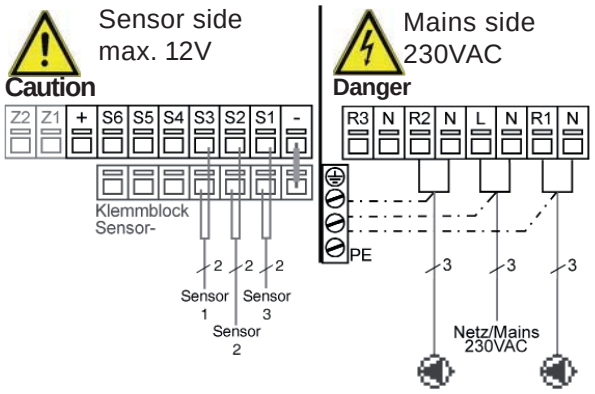
Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump L
N	pump N
R2	valve L
N	valve N
R3	optional (chap.7.10.) - L
N	optional
PE	protective conductor (green-yellow)

Caution

R1 output: for speed control of standard pumps, minimum load 20VA. The sensor in the VFS flowmeter(optional accessory) shall be wired to the terminal, see fig. A 7.2.

B 19 - Temperature difference controller ΔT and thermostat (no solar functions)

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



The flowmeter shall be installed in the solar return line.

Danger

Take care of the right solar liquid flow direction and permitted temperature (0 °C to 100 °C, -25 °C to +120 °C short term). Flowmeter wiring - see Chap. A6

Low voltage - sensor connection

Terminal:	*connection for:*
S1 (2×)	sensor 1 (control)
S2 (2×)	sensor 2 (reference)
S3 (2×)	sensor 3 (thermostat)
S4	sensor 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper
R3	optional (chap.7.10.) - L
N	optional

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and VFS sensors and also with earth on the side of the mains voltage.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump 1 L
N	pump N
R2	pump 2 L
N	pump 1 N
PE	protective conductor (green-yellow)

Caution

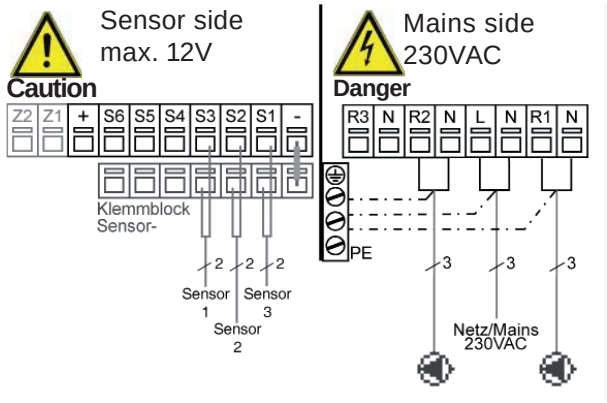
R1 output: for speed control of standard pumps, minimum load 20VA. The sensor in the VFS flowmeter shall be wired to the terminal, see fig. A 7.2.

Controller switching function:

If temperature at S1 is higher than at S2, R1 pump relay switches.
The thermostat function works with sensor 3 and switches relay R2.

B 20 - Two temperature difference controllers 2×ΔT (no solar functions)

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



The flowmeter shall be installed in the solar return line.

Danger

Take care of the right solar liquid flow direction and permitted temperature (0 °C to 100 °C, -25 °C to +120 °C short term). Flowmeter wiring - see Chap. A6

Low voltage - sensor connection

Terminal:	*connection for:*
S1 (2×)	sensor 1 (control)
S2 (2×)	sensor 2 (reference)
S3 (2×)	sensor 3 (thermostat)
S4	sensor 4 inlet temperature (optional)
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper
R3	optional (chap.7.10.) - L
N	optional

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and VFS sensors and also with earth on the side of the mains voltage.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump 1 L
N	pump N
R2	pump 2 L
N	pump 1 N
PE	protective conductor (green-yellow)

Caution

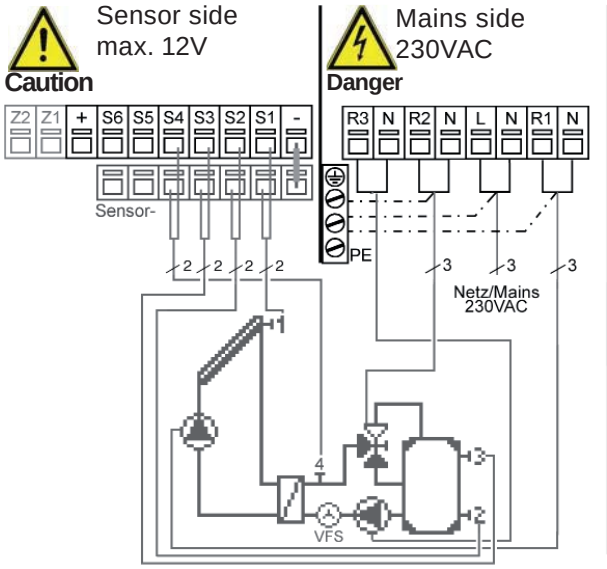
R1 output: for speed control of standard pumps, minimum load 20VA. The sensor in the VFS flowmeter shall be wired to the terminal, see fig. A 7.2.

Controller switching function:

If temperature at S1 is higher than that at S2, R1 pump relay switches.
If temperature at S2 is higher than that at S3, R2 pump relay switches.

B 21 - Solar system with heat exchanger and thermally stratified storage tank

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



Note: Actuating direction of zone valve:
R2 on = valve open = flow direction A-AB = storage tank upper charging (sensor S3)
R2 off = valve closed = flow direction B-AB = storage tank lower charging (sensor 2)

Low voltage - sensor connection

Terminal:	*connection for:*
S1	sensor 1 collector
S2	sensor 2 storage tank lower
S3	sensor 3 storage tank upper
S4	sensor 4 secondary circuit inlet
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and 0...10V PWM.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump 1 L
N	pump 1 N
R2	zone valve L
N	zone valve N
R3	pump 2 L
N	pump 2 N
PE	protective conductor (green-yellow)

R1 output: for speed control of standard pumps, minimum load 20VA. The sensor in the VFS flowmeter (optional accessory) shall be wired to the terminal, see fig. A 7.2.

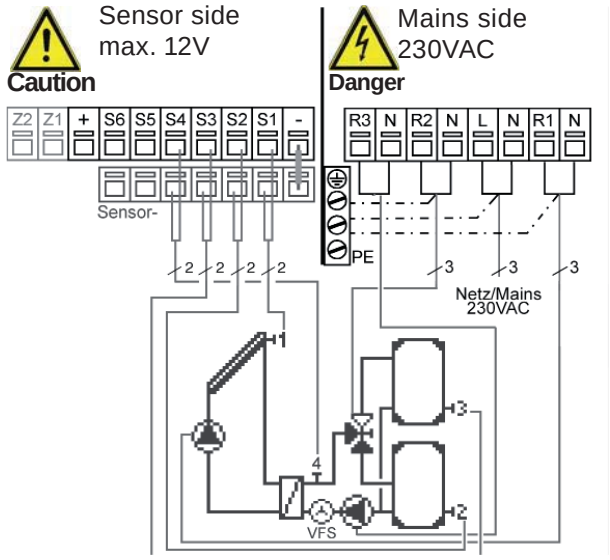
Mains voltage - 230V 50Hz
These values are preset for this variant:

5.6.	**ΔT R1:**	ΔT 12 °C / ΔT - off 7 °C
5.10.	**Sensor priority**	S3
7.9.	**Speed control**	V4
7.10	**Relay 3**	R3 is switched on together with R1, with 30s delay

The flowmeter temperature sensor shall be installed in the return line.

B 22 - Solar system with heat exchanger, 2 storage tanks and zone valve

Sensor connection - max. 12V **Mains voltage - 230V 50Hz**



Note: Actuating direction of zone valve:
R2 on = valve open = flow direction A-AB = storage tank upper charging (sensor S3)
R2 off = valve closed = flow direction B-AB = storage tank lower charging (sensor 2)

Low voltage - sensor connection

Terminal:	*connection for:*
S1	sensor 1 collector
S2	sensor 2 storage tank 1
S3	sensor 3 storage tank 2
S4	sensor 4 secondary circuit inlet
S5	free
S6	0..10V / PWM (chap.7.9.2)
+	free
-	sensor terminal board jumper

The polarity of the sensors is freely selectable.

The „-“ terminal is wired to the common terminal board of sensors S1 to S4 and 0...10V PWM.

Mains voltage - 230V 50Hz

Terminal:	*connection for:*
L	mains conductor L
N	mains conductor N
R1	pump 1 L
N	pump 1 N
R2	zone valve L
N	zone valve N
R3	pump 2 L
N	pump 2 N
PE	protective conductor (green-yellow)

R1 output: for speed control of standard pumps, minimum load 20VA. The sensor in the VFS flowmeter (optional accessory) shall be wired to the terminal, see fig. A 7.2.

Mains voltage - 230V 50Hz

These values are preset for this variant:

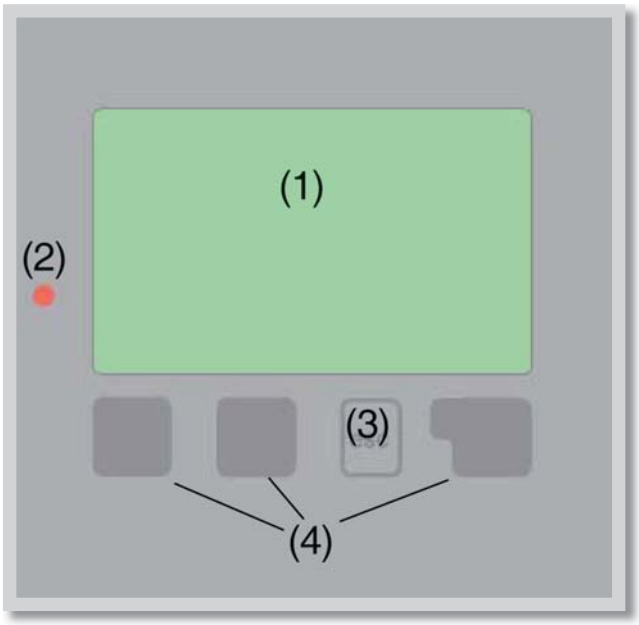
5.6. ΔT R1:	ΔT 12 °C / ΔT - off 7 °C
5.10. Sensor priority	S3
7.9. Speed control	V4
7.10 Relay 3	R3 is switched on together with R1, with 30s delay

The flowmeter temperature sensor shall be installed in the return line.

C - Controller Use

C 1 - Display and input

The display (1) shows graphic and text info on the hydraulic variant, set and measured values and other text info.



The LED lamp (2):

lights up green -	if a relay is closed and the controller works right
lights up red -	if the controller is set to automatic operation and all relays are open
flashes slowly red -	if manual operation mode is set
flashes quickly red -	if an error occurred

Examples of display symbols:

- pump (rotates in operation)
- valve (direction of flow black)
- collector
- storage tank
- pool
- temperature sensor
- warning/error message
- new information available

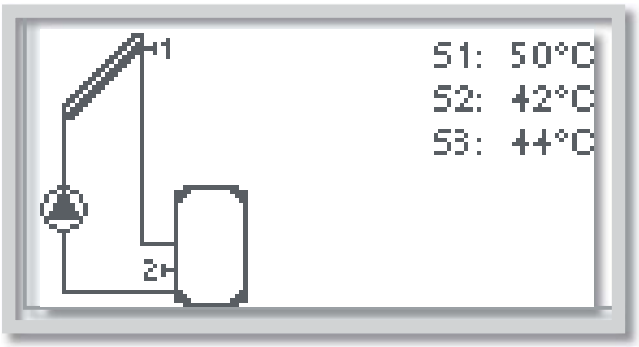
Entries are made using four keys ***(3+4)***, which are assigned to different functions depending on the situation.

The ***„esc" key (3)*** is used to cancel an entry or to exit a menu.
If applicable there will be a request for confirmation as to whether the changes should be saved.
The function of each of the other three keys ***(4)*** is shown in the display line directly above the keys;
the right-hand key generally has a confirmation and selection function.

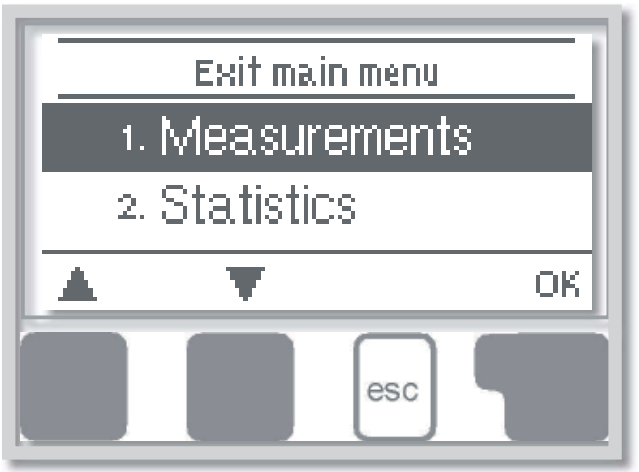
Examples of key functions:

+/-	increase/decrease values
▼/▲	scroll menu up/down
yes/noE	confirm/reject
Info	additional information
Back	to previous screen

C 2 - Menu structure

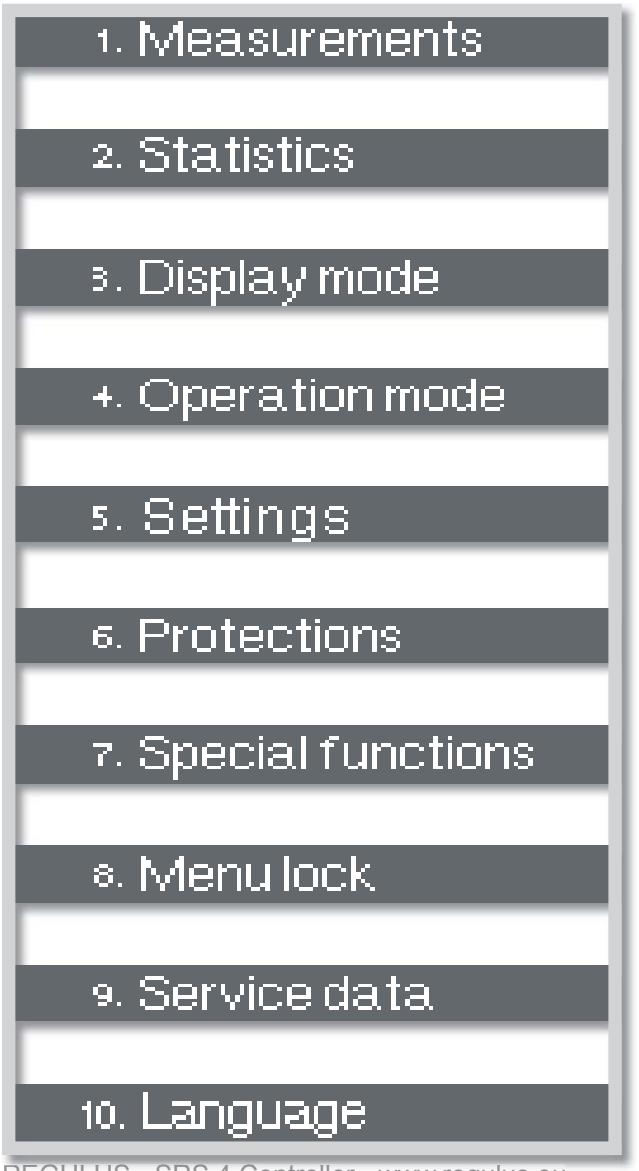


The graphics or overview mode appears when no key has been pressed for 2 minutes, or when the main menu is exited by pressing ***„esc“***.



Pressing any key ***(4)*** in graphics or overview mode takes you directly to the main menu.

The following menu items are then available for selection there:



1. Current temperature values with explanations

2. Function control of the system with operating hours etc.

3. Select graphics mode or overview mode

4. Automatic mode, manual mode or switch unit off

5. Set parameters needed for normal operation

6. Solar and frost protection, recooling, antiseizing protection

7. Commissioning help, program selection, sensor calibration, clock etc.

8. Lock against unintentional setting changes

9. For diagnosis in the event of an error

10. Language selection

C 3 - Turning on for the first time

The first time the controller is turned on, language and clock need to be set.
After that a query appears as to whether you want to parameterize the controller using the commissioning help or not. The commissioning help can also be terminated or called up again at any time in the special functions menu. The commissioning help guides you through the necessary basic settings in the correct order, and provides brief descriptions of each parameter in the display.

Pressing the ***„esc"*** key takes you back to the previous value so you can look at the selected setting again or adjust it if desired. Pressing the ***„esc"*** more than once takes you back step by step to the selection mode, thus cancelling the commissioning help. Finally, menu 4.2 under operating mode ***„Manual"*** should be used to test the switch outputs with the consumers connected, and to check the sensor values for plausibility. Then switch on automatic mode.

C 4 - Free commissioning

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

- Menu 10. Language (see D 10)
- Menu 7.2 Time and date (see D 7.2)
- Menu 7.1 Program selection (see D 7.1)
- Menu 5 Settings, all values (see D 5)
- Menu 6 Protective functions if modifications are necessary (see D 6)
- Menu 7 Special functions if additional changes are necessary (see D 7)

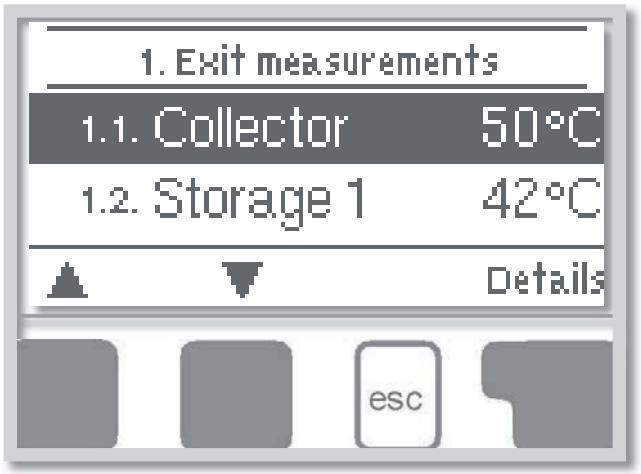
Finally, menu 4.2 under operating mode ***„Manual"*** should be used to test the switch outputs with the consumers connected, and to check the sensor values for plausibility. Then switch on automatic mode.

Caution

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

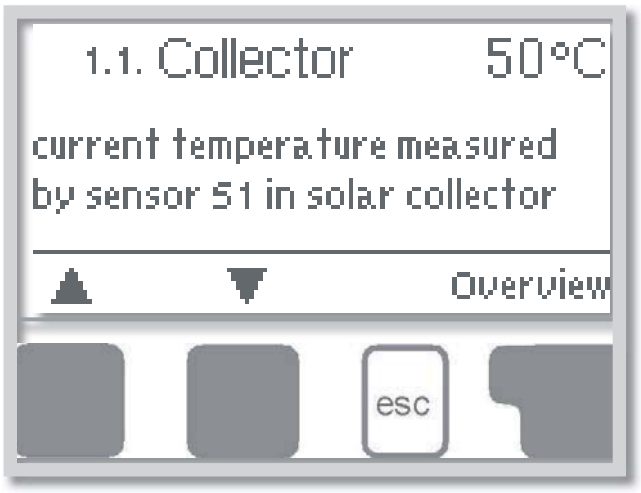
D - Parameter Settings

D 1 - Measurements



Menu **„1. Measurements"** serves to display the currently measured temperatures.
What measurement values are displayed depends on the selected program and the specific controller model.

The menu is closed by pressing ***„esc"*** or selecting ***„Exit measurements"***.



Selecting ***„Details"*** leads to a brief help text explaining the measurement values.

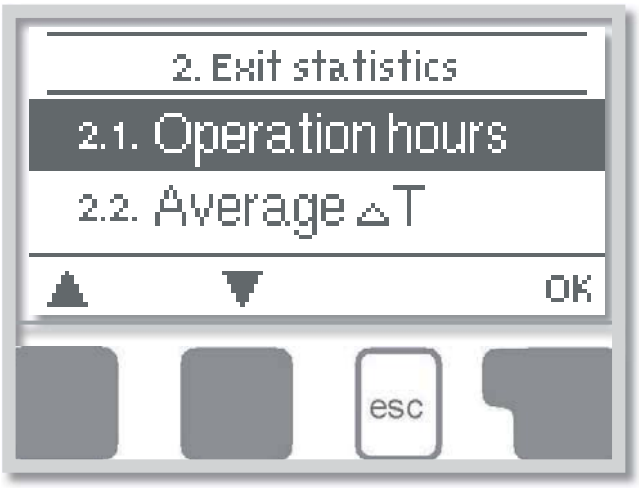
Selecting ***„Overview"*** or ***„esc"*** exits the Info mode.

Caution

*If **„Error"** appears on the display instead of the measurement value, then there may be a defective temperature sensor or its wiring.*

If the cables are too long or the sensors are not placed optimally, the result may be small deviations in the measurement values. In this case the display values can be compensated for using the function of sensor compensation - see Chapter D 7.3.

D 2 - Statistics



Menu **„2. Statistics"** is used for function control and long-term monitoring of the system.

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

Caution

For analysis of the system data it is essential that time is set accurately on the controller.

Caution

Please note that the clock does not continue to run if the mains voltage is interrupted, and must therefore be reset. Incorrect time set in Regulus SRS 4 controller may result in data being deleted, recorded incorrectly or overwritten.

D 2.1 - Operating hours menu 2.1
Display of operating hours of the solar pump connected to the controller; various time spans are available (last day, week, month, year).

D 2.2 - Average (temperature difference) ΔT menu 2.2
Display of the average temperature difference between the reference sensors of the solar system and a consumer (with the pump switched on).

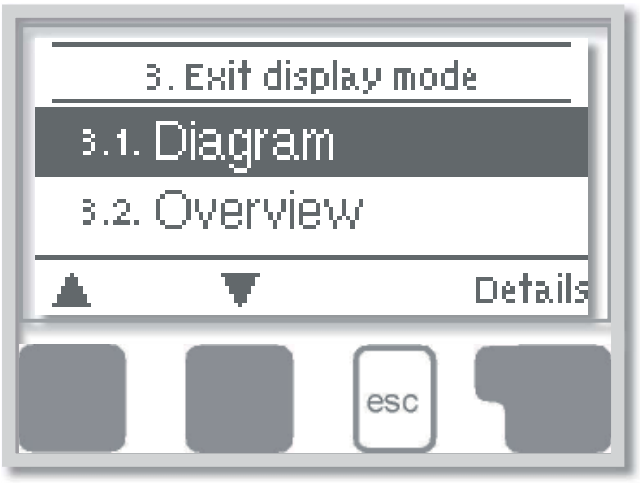
D 2.3 - Heat supplied menu 2.3
Display of the approximate heat quantity supplied by the solar system. (Settings see D 7.7)

D 2.4 - Bar graphs menu 2.4
This function provides a clearly-organized display of operating hours, average ΔT and heat output as a bar graph. Various time ranges are available. The two left-hand keys can be used to page through the data

D 2.5 - Message log menu 2.5
Display of the last 10 events occurring in the system with indication of date and time. Errors (e.g. collector alarm) and operating states (e.g. anti-legionella function on) are displayed.

D 2.6 - Reset / clear menu 2.6
Resetting and deleting the individual analyses of Regulus SRS 3 controller. The function „All statistics" clears all analyses but not the error messages.

D 3 - Display mode



Menu **„3. Display mode”** is used to define the controller's display for normal operation. This display appears whenever two minutes go by without any key being pressed. The main menu appears again when a key is pressed.

The menu is closed by pressing ***„esc”*** or selecting ***„Exit display mode”***.

D 3.1 - Diagram menu 3.1

In graphics mode, the selected hydraulic systems are depicted with the measured temperatures and operating states of the connected valves and pumps.

D 3.2 - Overview menu 3.2

In overview mode, the measured temperatures and operating states of the connected consumers are shown in text form. No hydraulic system is shown.

D 3.3 - Alternating menu 3.3

In alternating mode the diagram mode and then the overview mode are active for 5 seconds at a time.

D 4 - Operating mode

In menu **„4. Operation mode"** the controller can either be switched to automatic mode, switched off, or switched to a manual operating mode.
The menu is closed by pressing ***„esc"*** or selecting ***„Exit operation mode"***.

Danger

Never select other mode than automatic without reason. *Long-term operation in another mode can lead to overheating of the solar collector, storage tank and shortening the lifetime of the solar liquid or other system components!*

D 4.1 - Automatic menu 4.1

Caution

Automatic mode is the normal operating mode of the SRS 4 controller.
Only automatic mode provides proper controller function taking into account the current temperatures and the parameters that have been set!

D 4.2 - Manual menu 4.2

Danger

The manual mode is intended to be used by a technician when commissioning or checking the system. The relay and thus the connected pump, valve or heating rod are switched on and off by pressing a key, with no regard to the current temperatures and the parameters which have been set. The measured temperatures are also shown. Long-term operation in manual mode in current operation can lead to system damage or overheating of water in the storage tank!

D 4.3 - Off menu 4.3

Danger

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

D 4.4 - Fill system menu 4.4

Caution

*This special operating mode is intended only for the filling procedure for a special **„Drain Master System"** with a fill level contact. It is not used in Regulus solar systems. However, if you activate it, be sure to terminate the function when finished!*

After an interruption of the mains voltage the controller automatically returns to the last operating mode selected!

D 5 - Settings

The necessary basic settings required for the control function are made in menu **„5. Settings"**.

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

Caution

Various settings can be made depending on the selection of hydraulic variant 1-22. An overview of the variants is shown in Table 5.14.
Often more conditions must be met simultaneously for the relay to switch, as it is obvious from the Table 5.14. (E.g. ΔT between a collector and storage tank, Min. / max. collector temperature and max. storage tank temperature). When only one condition is met, the relay does not switch (e.g. ΔT might be reached but the collector temperature is still below T1min).

D 5.1 - Tmin S1 menu 5.x = sensor S1 switch-on temperature
If this value is exceeded at sensor S1 and the other conditions as in Table 5.14 are also met, then the controller switches the associated pump and/or valve on. If the temperature at sensor S1 drops below this value by 5 °C, then the pump and/or the valve are switched off again.
Setting range: 0-99 °C / default setting: 20 °C

D 5.2 - Tmin S2 menu 5.x = sensor S2 switch-on temperature
If this value is exceeded at sensor S2 and the other conditions as in Table 5.14 are also met, then the controller switches the associated pump and/or valve on. If the temperature at sensor S2 drops below this value by 5 °C, then the pump and/or the valve are switched off again.
Setting range: 0-99 °C / default setting: 40 °C

D 5.3 - Tmin S3 menu 5.x = sensor S3 switch-on temperature
If this value is exceeded at sensor S3 and the other conditions as in Table 5.14 are also met, then the controller switches the associated pump and/or valve on. If the temperature at sensor S3 drops below this value by 5 °C, then the pump and/or the valve are switched off again.
Setting range: 0-99 °C / default setting: 20 °C

D 5.4 - Tmax S2 menu 5.x = sensor S2 switch-off temperature
If this value is exceeded at sensor S2, then the controller switches the associated pump and/or valve off. If sensor S2 temperature falls below this value again and the other conditions as in Table 5.14 are also met, then the controller switches the pump and/or valve on again.
Setting range: 0-99 °C / default setting: 60 °C

Danger

Temperature values which are set too high will allow higher solar heat accumulation but it shall be checked that all system components are resistant to high temperature and scalding protection is provided. Regulus solar systems are safe for heating water up to 95 °C.

D 5.5 - Tmax S3 menu 5.x = sensor S3 switch-off temperature
If this value is exceeded at sensor S3, then the controller switches the associated pump and/or valve off. If sensor S3 temperature falls below this value again and the other conditions as in Table 5.14 are also met, then the controller switches the pump and/or valve on again.
Setting range: 0°-99 °C / default setting: 60 °C

Danger

Temperature values which are set too high will allow higher solar heat accumulation but it shall be checked that all system components are resistant to high temperature and scalding protection is provided. Regulus solar systems are safe for heating water up to 95 °C.

D 5.6 - ΔT R1 **menu 5.x** = switching temperature difference for R1 relay
If the temperature difference between the reference sensors exceeds the value of ΔT R1 and the other conditions as in Table 5.14 are also met, then the controller switches the pump on. When the temperature difference drops to one third of ΔT R1, then the pump is switched off again,
Setting range: 4-20 K / Default settings: 10 K

***1)** Setting the temperature difference too big will lead to switching the circulation pump on and off due to uselessly high temperature difference between a collector and storage tank which could lead to a mild reduction of annual solar yield. It may also cause more frequent solar pump switching on and off (so called cycling). Selecting the right ΔT will depend on the size of the solar system, length of the solar piping and quality of pipe insulation. Generally spoken, the shorter the distance between a collector and a tank and the better pipe insulation, the lower value of ΔT can be selected, and vice versa.*

***2)** Setting the temperature difference too small may lead to solar pump operating even under unfavorable conditions (no or little sunshine). Solar system then remains in operation even with minimum gain and the pump power consumption may be higher than the solar gains.*

For most current solar systems the values of ΔT between 8 and 12 K are used.
Situations described in 1) and 2) may occur also if the sensors are improperly located or their compensation set to a wrong value.

Please refer to special rules described in Chapter D 7.9 when switching pumps with controlled speed.

D 5.7 - ΔT R2 **menu 5.x** = switching temperature difference for R2 relay
If the temperature difference between the reference sensors exceeds the value of ΔT R2 and the other conditions as in Table 5.14 are also met, then the controller switches the pump on. When the temperature difference drops below one third of ΔT R2, then the pump is switched off again.
Setting range: 4-20 K / Default setting: 10 K

***1)** Setting the temperature difference too big will lead to switching the circulation pump off even when the sun is still shining. Temperature increase in the collector will make the pump start again. The pump will then keep switching on and off.*

***2)** The right ΔT value depends on the number and type of solar collectors and the flow rate of solar liquid set. If a too small temperature difference is set, the pump may run permanently. This may be caused by placing sensors differently in a collector and in a tank, improperly set sensor compensation… Even a small difference between the measured and real temperature will influence the controller.*

D 5.8 - Tnast S3 **menu 5.x** = thermostat function at sensor S3
The thermostat switches on at the Tset S3 temperature and switches off at (Tset S3 + hysteresis).

Example: In hydraulic variant 2 the storage tank shall be backup-heated to a temperature that does not fall below 50 °C. R2 connects to the heat source pump.
Set Tset S3 = 50 °C, hysteresis = 8 °C. If the temperature in the storage tank falls below 50 °C, R2 switches on and stays on until the tank heats up to 50 + 8 = 58 °C.

Setting range: Tset 0-99 °C / default setting: 60 °C

D 5.9 - Hysteresis **menu 5.x** = Hysteresis for thermostat function at sensor S3
Hysteresis value for backup heating on (see D 5.8 Tsetpoint S3 above).
The same hysteresis value will be used when the Energy saving mode is active (see D 5.16).
Setting range: Hysteresis -20 to 20 °C / default setting: 10 °C

D 5.10 - Priority sensor menu 5.x = charging priority in systems with two storage tanks
A setting must be made as to which storage tank (storage tank sensor) has priority for charging and will be charged first.

A) The higher priority storage tank is always charged first.

B) After the desired temperature (TmaxSx) is reached in the higher priority storage tank, charging is diverted to the lower priority storage tank.

C) If the collector temperature does not enable charging the higher priority tank, and at the same time the temperature in the higher priority tank is above Tpriority, then charging is diverted to the lower priority tank.
Note: Tpriority (=lower temperature limit for absolute priority, only the priority storage tank is charged below this limit)

D) Until the priority tank reaches the desired temperature, charging of the lower-priority storage tank is interrupted at regular intervals to check whether the temperature increase at the collector can enable charging of the higher-priority storage tank.

Setting range for sensor (storage tank): S2 or S3 / default setting: S2

Example: Setting:	Priority sensor = **S2**	Tpriority = 40 °C
	Charging interruption = 10 min	Increase = 3 °C/min
	T maxS2 = 60 °C	ΔT R1 = 10 °C

If the temperature at S2 is below 60 °C…..…… **S2** storage tank (higher priority) is charged

A) If the temperature at S2 is above 60 °C…..…… **S3** storage tank (lower priority) is charged

B) Temperature difference between collector and S2 tank…. S1-S2 < ΔT R1
and at the same time S2 > 40 °C……..…… S3 storage tank (lower priority) is charged

C) After 10 min. (Charging interruption) the solar pump(s) stop and the temperature increase is measured. If Increase > 3 °C/min., Interruption time is extended until the switching condition S1-S2 < ΔT R1 for S2 storage tank is met.
If the increase is less than 3 °C/min……S3 storage tank is charged

D 5.11 - Tpriority - Priority switching temperature menu 5.x = lower temperature limit for absolute priority
Charging the lower-priority tank is possible only after this temperature (Tpriority) is reached in the higher-priority storage tank.
Setting range: 0-90 °C / default setting: 40 °C

D 5.12 - Charging interruption menu 5.x = interruption of charging into the lower priority storage tank
The charging of the lower-priority storage tank is interrupted (solar pump stopped) after this settable time in order to check whether the collector has reached a temperature level that allows charging in the higher-priority storage tank. If not, charging the lower-priority storage tank continues until the next interruption.
Setting range: 5-90 min / default setting: 10 min

D 5.13 - Increase menu 5.x = temperature increase during charging interruption

The temperature increase is measured during interruption in charging to the lower-priority storage tank.
If the temperature increase is higher than this setting (Increase),the interruption time is extended until the switching condition (S1-S2 < ΔT R1) for higher priority storage tank is met.
If the temperature increase does not reach the value set (Increase), the interruption is terminated and the lower-priority tank continues being charged.
Setting range: 1-10 °C / min / default setting: 3 °C / min

- *If the S2 temperature is below 40 °C, only the S2 (higher priority) storage tank is charged.*
- *If the S2 temperature is over 60 °C, only the S3 (lower priority) storage tank is charged.*
- *If the S2 temperature is between 40 and 60 °C and the condition S1-S2 < ΔT R1 is met (collector heat output is sufficient), the S2 (higher priority) storage tank is charged.*
- *If the S2 temperature is between 40 and 60 °C and the condition S1-S2 < ΔT R1 is not met (collector heat output is not sufficient), charging is diverted to S3 (lower priority) storage tank and the collector is checked at regular intervals whether the temperature increase is sufficient. If yes, charging returns to the priority storage tank (S2).*

D 5.14 - Thermostat periods menu 5.x

Set the desired periods of time when the thermostat should be active. 2 periods can be set per day, settings can also be copied to other days. Outside the set times the thermostat is switched off.
Setting range: od 00:00 to 23:59 / default setting: 06:00 to 22:00

D 5.15 - Party function menu 5.x

With the party function the storage temperature is heated up once to the set temperature (Tset) regardless of the thermostat timer. The party mode is enabled by pressing the ***„esc“*** key for 3 seconds in the main menu. While this mode is active, the system heats up to the set value Tset S3 (or Tmin S3 in energy saving mode), unattached to preset thermostat times. The mode is ended once the required temperature is reached.
The Party function is not available in the Menu, it is turned on pressing and holding Esc key for 3 s.
*In the **„Energy Saving Mode”** the Party function heats up to the **„Tmin”** S3 temperature.*

D 5.16 - Energy saving mode menu 5.x

The energy saving mode sets the temperature limit when the additional storage tank heating (e.g. with a heating rod) via R2 is switched on. In any case, this additional heating can be switched on during thermostat operation only.
- If solar heat is available, additional heating is switched on when ***Teco S3*** is reached and heats up to ***Teco + hysteresis***.
- When no solar heat is available, additional heating is switched on when ***Tset S3*** is reached and heats up to ***Tset S3 + ysteresis***, i.e. like in normal mode.

Additional heating mode. Setting range: ON, OFF / default setting: OFF

D 5.17 - Teco S3 Minimum temperature S3 in Energy saving mode

If the temperature at sensor S3 falls below this value and the thermostat function is active (see 5.14), additional heating via relay R2 is switched on. Additional heating is on until ***Teco + hysteresis*** is exceeded.
Setting range: 0 °C - 99 °C / default setting: 20 °C

Example: Limitation of additional heating temperature in storage tank with el. heating rod.
Hydraulic variant ***B18 Solar system + zone valve + thermostat*** shall be selected.
Relay switching the el. heating rod shall be wired to R2.

1) With the default setting valid, i.e.energy saving mode off (Tset S3 = 50 °C, hysteresis = 10 °C, thermostat operation period = 06:00 to 22:00), the el. heating rod heats the storage tank to a temperature between 60 °C (on) and 70 °C (off) during the period from 6:00 to 22:00, independent of solar heat.

2) If the ***Energy saving mode*** (5.16) is active and ***Teco*** = 20 °C, then:
If solar heat is available, then between 6:00 and 22:00 el. heating rod heats the storage tank to 20 °C(on) - 30 °C (off).
If no solar heat is available, then the el. heating rod heats the storage tank to 60 °C (on) - 70 °C (off) between 6:00 and 22:00, like in normal mode.

D 5.19 - Control logic table for Regulus SRS4 Controller:

The table lists the settings corresponding to the specific programs (hydraulic variants). The reference sensors are labeled S1, S2, S3. The relays are labeled R1. R2. Select a column with the desired hydraulic variant. All the condition listed in that column must be fulfilled for the relay to switch.
Example: Hydraulic variant No. 5. The following conditions must be fulfilled at the same time for R1 relay to switch: Tmin S1, Tmax S2, Tmax S3, ΔT R1, conditions Priority, Tpriority.

Hydraulic variant No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Tmin S1	S1 =>R1+R2	S1 =>R1	S1 =>R1	S1 =>R1	S1 =>R1	S1 =>R2	S1 =>R1	S1 =>R1	S1 =>R1	S1 =>R1+R2	S1 =>R1	S1 =>R1	S1 =>R1	S1 =>R1	S1 =>R1	S1 =>R1	S1 =>R1	S1 =>R1	S1 =>R1	S1 =>R1	S1 =>R1	S1 =>R1
Tmin S2				S2 =>R2							S2 =>R2									S2 =>R2		
Tmin S3							S3 =>R1+R2	S3 =>R2									S3 =>R2				S3 =>R1+R2	S3 =>R1+R2
Teco S3		S3 =>R2																S3 =>R2				
Tmax S2	S2 =>R1+R2	S2 =>R1	S2 =>R1+R2	S2 =>R1	S2 =>R1	S2 =>R1+R2	S2 =>R1+R2	S2 =>R1+R2	S2 =>R1	S2 =>R1	S2 =>R1	S2 =>R1+R2	S2 =>R1	S2 =>R1	S2 =>R1	S2 =>R1	S2 =>R1+R2	S2 =>R1	S2 =>R1	S2 =>R1	S2 =>R1+R2	S2 =>R1+R2
Tmax S3				S3 =>R2	S3 =>R1+R2				S3 =>R1+R2	S3 =>R2	S3 =>R2		S3 =>R1+R2							S3 =>R2		
Δ T R1	S1/ S2 =>R1+R2	S1/ S2 =>R1	S1/ S2 =>R1 S3/ S2 =>R2	S1/ S2 =>R1	S1/ S2 =>R1 S1/ S3 =>R1+R2	S1/ S2 =>R2 S3>S2 =>R1	S1/ S2 =>R1 S3/ S2 =>R1+R2	S1/ S2 =>R1	S1/ S2 =>R1 S1/ S3 =>R1+R2	S1/ S2 =>R1	S1/ S2 =>R1	S1/ S2 =>R1 S3/ S2 =>R2	S1/ S2 =>R1 S1/ S3 =>R1+R2	S1/ S2 =>R1	S1/ S2 =>R1	S1/ S2 =>R1	S1/ S2 =>R1	S1/ S2 =>R1	S1/ S2 =>R1	S1/ S2 =>R1	S1/ S2 =>R1 S1/ S3 =>R1+R2	S1/ S2 =>R1 S1/ S3 =>R1+R2
Δ T R2				S2/ S3 =>R2				S3/ S2 =>R2		S1/ S3 =>R2	S2/ S3 =>R2						S2/ S3 =>R2			S2/ S3 =>R2		
Tset S3		S3 =>R2														S3 =>R2		S3 =>R2	S3 =>R2			
Hysteresis		S3 =>R2														S3 =>R2		S3 =>R2	S3 =>R2			
Priority					S2 or S3 =>R1/ R2				S2 or S3 =>R1/ R2	S2 or S3 =>R1/ R2			S2 or S3 =>R1/ R2									
Tpriority					S2 or S3 =>R1/ R2				S2 or S3 =>R1/ R2	S2 or S3 =>R1/ R2			S2 or S3 =>R1/ R2									

D 6 - Protective functions

Menu **„6. Protections"** can be used to activate and set various protective functions.

Danger

These functions do not under any circumstances replace safety elements in solar systems!

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

D 6.1 - Antiblock protection menu 6.1 / 6.1.1 - 6.1.2

Pump seizing protection using regular short turning on a pump or a valve. Seizing may occur after prolonged inactivity of valves or pumps. If this protection is activated, then the controller switches the relay in question and the connected consumer on every day at 12:00 or on Sundays at 12:00 (for weekly settings) for 5 seconds in order to prevent the pump and/or the valve from sticking after an extended stationary period.
Setting range: Antiblock R1: daily, weekly, off / default setting: daily
Setting range: Antiblock R2: daily, weekly, off / default setting: daily

D 6.2 - Frost protection menu 6.2 / 6.2.1 - 6.2.2

Frost protection prevents freezing of collectors and solar system filled with water instead of antifreeze fluid. In order to save energy, please leave it off for Regulus solar systems.
A two-stage frost protection function is available. In stage 1 the controller switches the pump on for 1 minute every hour if the collector temperature drops below the set value ***„Frost stage 1"***. If the collector temperature drops further to the set value ***„Frost stage 2"***, the controller switches the pump on continuously. If the collector temperature then exceeds the value ***„Frost stage 2"*** by 2 °C, then the pump switches off again.
Frost protection setting range: on, off / default setting: off
Frost protection stage 1 setting range: from -25 °C to 10 °C or off / default setting: 7 °C
Frost protection stage 2 setting range: from -25 °C to 8 °C or off / default setting: 5 °C

Caution

This function causes energy loss via the collector!
As Regulus solar systems are filled with antifreeze fluid, the antifreeze protection shall remain off.

D 6.3 - System protection menu 6.3 / 6.3.1 - 6.3.5

If ***„SProt Ton"*** is exceeded at the collector, the pump is switched off. The collector is let at high temperature. The pump is activated again when the temperature drops below ***„SProt TOff"***.
Automatic shutdown - settings range: On / Off / Default: on
Settings range: SProt Ton 60 °C to 150 °C / Default: 120 °C
Settings range: SProt Toff 50 °C to Ton -5 °C / Default: 115 °C
Collectors do not get cooled and stay heated. This may result in limited lifetime of the solar fluid. If you use this function, please check your solar fluid regularly.

D 6.4 - Collector protection

If ***„CP Ton"*** is exceeded at the collector sensor, the pump is switched on in order to cool the collector down. The pump turns off when the collector temperature falls below ***„CP Toff"*** or the temperature ***„CP Tmax storage"*** is exceeded in the storage or pool. In systems with 2 storage tanks only the lower-priority tank or pool is used for collector cooling.
Collector protection - Setting range: On, Off / default setting: Off
Settings range: CP Ton 60 °C to 150 °C / Default: 110 °C
Settings range: CP Toff 50 °C to CP Ton -5 °C / default setting: 100 °C
Settings range: CP Tmax storage 0 °C to 140 °C / default setting: 90 °C
When collector protection is active, the storage or pool may get heated to a high temperature!

D 6.4.1 menu 6.4.1

The hydraulic variants are set in menu (7.1)

Hydraulic Variant 14. Solar + cooling 1:

If ***„CProt Ton"*** is exceeded at S1 (collector), the cooler at R2 is switched on until the temperature drops to ***„CProt Toff"***. If the storage tank exceeds ***„CProt Tmax storage"***, the pump at R1 is switched off.

Hydraulic Variant 15. Solar + cooling 2:

If ***„CProt Ton"*** is exceeded at S1 (collector), the cooler at R2 is switched on. If the temperature exceeds ***„Tmax storage"***, R1 is switched off with R2 still running to keep on cooling. If the temperature at S1 drops below ***„CProt Toff"***, cooling is switched off.

Hydraulic Variant 16. Solar + cooling 3:

If ***„CProt Ton"*** is exceeded at S1 (collector), the pump at R1 is switched on and transfers heat to the storage tank. If the storage temperature exceeds ***„Tmax storage"***, the pump at R1 is switched off. If the temperature at S3 exceeds the value ***„Tset S3"***, cooling at R2 starts and keeps cooling until the temperature drops below ***„Tset S3" - „hysteresis"***.

D 6.5 - Col.- Alarm menu 6.5

If this temperature is exceeded at the collector sensor when the solar pump is on, a warning is triggered. A red LED starts flashing and a warning message is shown in the display.

Setting range: Collector alarm off, on / default setting: off

Setting range: Col. alarm 60 °C to 300 °C / Default setting: 150 °C

D 6.6 - Recooling menu 6.6

At the end of a sunny day the temperature in a storage tank may easily reach high values. In order to prevent further temperature increase the next day, excess energy can be released into the air via collectors under cloudy conditions or after sunset.

If the temperature in the storage tank exceeds the value ***„Recool Tsetpoint"*** and the collector is at least by 20 °C cooler than the storage tank, the solar pump starts. The storage tank is then cooled down until the ***„Recool Tsetpoint"*** is reached. In systems with two storage tanks the setting applies to both storage tanks.

Setting range: Recooling off, on / default setting: off

Setting range: Recooling Tsetpoint from 0 °C to 99 °C / default setting: 70 °C

This function enables to release excess heat from the storage tank considerately and without solar fluid overheating, via piping and collectors into the ambient air. It is recommended to keep activated. Combinable with protective solar function.

D 6.7 - Anti-Legionella menu 6.7

With the ***„AL function"*** activated the controller makes it possible to heat the storage tank up once at certain intervals the (***„AL frequency"***) to a higher temperature (***„AL Tsetpoint S2"***), assuming that the energy source allows this.

Setting range: AL function: On or Off / default setting: Off

Setting range: AL Tsetpoint S2: from 60 °C to 99 °C / default setting: 70 °C

Setting range: AL frequency: from 1 to 28 days / default setting: 7 days

AL function: Shows the last time the AL function was active.

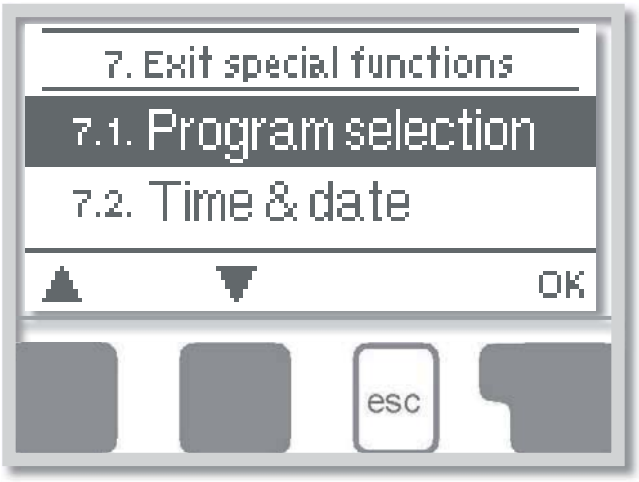
*The anti-Legionella function is switched off at delivery. This function is only relevant for storage tanks where sensor 2 is installed. Whenever heating-up has been carried out with the anti-Legionella function switched on, an information message with the date appears on the display. During the anti-Legionella function the storage tank is heated up over the set value **„Tmax S2"**! To provide complete protection against Legionella bacteria, the function must be applied to all the tanks and sufficient energy must be available for safe heating the system up to the necessary temperature. This protection is efficient only where a high temperature is present, that is why the circulation pump shall be switched on at the same time, ensuring piping protection as well.*

D 6.8 - Pump protection menu 6.8

The Pump protection function can be used to reveal defects that hinder flow. Damage to the system, e.g. dry running, can be prevented this way. When the pump starts, the controller checks the flow for one minute using the VFS flowmeter. If the measured flow rate is below the flowmeter min. flow rate (cf. chap. 7.7), the pump turns off for 5 minutes. If the flow rate sinks during the pump running (not at switch-on), the pump does not switch off and a warning message is shown on the display.

Setting range: Pump protection: on, off / default setting: off

D 7 - Special functions



Menu **„7. Special functions"** is used to set basic items and expanded functions.

Danger *Of all special functions, users may set the time. Other settings are for experts only.*

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

D 7.1 - Program selection menu 7.1

The suitable hydraulic variant for the specific application is selected and set here (see Chapter A2 Hydraulic variants). The associated diagram can be displayed by pressing ***„info"***.
Setting range: Program selection 1-20 / default setting: 1

Caution *Normally the program selection is made only once during initial commissioning by the specialist. Incorrect program selection can lead to wrong operation and unpredictable errors.*

D 7.2 - Time & date menu 7.2

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

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

D 7.3 - Sensor calibration menu 7.3 / 7.3.1 - 7.3.3

Deviations in the temperature values displayed, for example due to cables which are too long or sensors which are not positioned optimally, can be compensated for manually here. The settings can be made for each individual sensor in steps of 0.5 °C.
Setting range: Offset S1...S3 -50 °C to +50 °C / default setting: 0 °C

Caution *Settings are only necessary in special cases at the time of initial commissioning by the specialist. Incorrect measurement values can lead to wrong operation and unpredictable errors.*

D 7.4 - Commissioning help menu 7.4

Starting the commissioning help guides you in the correct order through the basic settings necessary for commissioning, and provides brief descriptions of each parameter in the display.
Pressing the ***„esc"*** key takes you back to the previous value so you can look at the selected setting again or adjust it if desired. Pressing the ***„esc"*** more than once takes you back to the selection mode, thus cancelling the commissioning help. (see also C3 Commissioning help).

Caution *May only be started by a specialist during commissioning! Observe the explanations for the individual parameters in these instructions, and if further settings are necessary for your application, set them after the help is finished.*

D 7.5 - Reset to default settings menu 7.5

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

Caution *The entire parameterization, analyses, etc. of the controller will be lost irrevocably. The controller must then be commissioned and set once again.*

D 7.6 - Expansions menu 7.6

This menu can only be selected and used if additional options or expansions have been built into the controller. The associated supplementary installation, mounting and operation instructions are then included with the specific expansion.

D 7.7 - Heat quantity menu 7.7

One of the heat metering methods can be activated in this menu. Either with a fixed flow rate, or a more precise method using a value measured by VFS (Vertex Flow Sensor). Set the type of the antifreeze fluid. Solar fluid used in Regulus systems is of propylene type.
Further set the concentration of antifreeze fluid used in the system. Solar fluid used in Regulus systems has a 50 % concentration.
Position of the VFS flowmeter - for heat calculation the temperature needs to be measured on both flow and return collector lines. One of these sensors is a part of a VFS flowmeter. For this purpose the position of the flowmeter shall be set in the controller. As there are lower temperature in the return line, it is recommended to be placed on the solar return line. If the set value is then the S4 sensor is supposed to be located on the return line.

Flowmeter type: VFS - Setting range: Off, flow (?), 12, 20, 40, 100, 200 l/min. / default setting: Off
Antifreeze type: - Setting range: Ethylene / Propylene / default setting: Ethylene
Glycol portion: - Setting range: 0-60 % / default setting: 40 %
Position of VFS: - Setting range: return / flow / default setting: return

Place the flowmeter into the solar return line. Only this will ensure keeping temperatures within the permitted range (permanent 0 °C to 100 °C, short term -25 °C to +120 °C).

If the flowmeter is not used for heat measurement, then the antifreeze fluid flow rate shall be read from a mechanical flowmeter (in a pump station) and this value entered as the ***„flow”*** (?) parameter. The flowmeter shows a flow rate in liters/min. In order to get the value in liters/hour, multiply the number by 60 (e.g. 4 l/min equals to 240 l/h).
Further also a deviation value for heat metering can be set by modifying ***„∆T Offset”***. Calculation of heat metering is based on the data on the temperature in the collector and storage tank and the fluid flow rate. For a proper calculation, the temperature of the feed and return lines of the solar system shall be used. The temperatures of the tank sensor and of the solar return line are usually almost identical. Possible deviations of these temperatures can be compensated using the value ΔT Offset.

Example: *Displayed collector temp. 40° C, displayed storage temp. 30° C, temperature difference is 40-30=10 °C. Measured flow temp. 39° C, measured return temp. 31° C, temperature difference is 93-31=8 °C. This means an offset of -20 % shall be set (Displayed ΔT 10K, actual ΔT 8K which is by 20 % less => -20 % correction value).*

Flow rate - Setting range: 10-5000 l/h / default setting: 500 l/h
∆T Offset - Setting range: -50 % to +50 % / default setting: 0 %

Remember that the hydraulic variant does not change. Settings in this menu are used for heat calculation only and should be set according to the real system. Resulting data are only approximate!

D 7.8 - Start aid function menu 7.8 / 7.8.1 - 7.8.3

With some evacuated tube collectors, it may occur that the sensor is not always located ideally inside the collector where the solar fluid is warmed up even from a weak sunshine. This function turns the solar pump on for a while which helps moving the heated solar liquid to the sensor for real temperature check.

When the start help is activated, the following sequence is carried out:
If the temperature at the collector sensor increases by the value specified under ***„Increase"*** within one minute, then the solar pump is switched on for the set ***„Purging time"*** so that the medium to be measured can be moved to the collector sensor. If this still does not result in a normal switch-on condition, then the start help function is subject to a 5-minute lockout time.
Start help setting range: on, off / default setting: off
Purging time setting range: 2-30 sec. / default setting: 5 sec.
Increase setting range: 1 °C - 10 °C / default setting: 3 °C / min.

In Regulus tube collectors the sensor sheath is placed in optimum position inside the collector and the start help function is not needed.

D 7.9 - Pump speed control menu 7.9

If the speed control is activated, the SRS3 makes it possible to vary the speed of standard pumps at relay R1.

This function should only be activated by a specialist. Depending on the pump and pump stage used, the minimum speed should not be set too low, because otherwise the pump or the system may be damaged. The information provided by the relevant manufacturer must also be observed! If in doubt, the min. speed and the pump stage should generally be set to high rather than too low.

D 7.9.1 - Variants of speed control menu 7.9.1

Off: There is no speed control. The connected pump is only switched on or off with full speed.

V1 Variant - There is no speed control. The connected pump is only switched on or off with full speed:
The pump starts at max. speed. After the purging time (D 7.9.2) the controller switches to the set max. speed (D 7.9.4).
If the temperature difference ∆T between the reference sensors (collector and storage tank) is less than the set value, then the speed is decreased by one stage after the ***Sweep time*** (D 7.9.3) elapses. If the temperature difference between the reference sensors is greater than the set value, then the speed is increased by one stage after the ***Sweep time*** (D 7.9.3) elapses.
If the controller has adjusted the speed of the pump down to the smallest stage and the ∆T between the reference sensors is less than 1/3 of the desired ∆T, the pump is switched off.

V2 Variant - Control to the set ΔT, starts from min. speed:
The pump starts at max. speed. After the purging time (D 7.9.2) the controller switches to the set min. speed (D 7.9.5).
If the temperature difference ∆T between the reference sensors (collector and storage tank) is greater than the set value, then the speed is increased by one stage after the ***Sweep time*** (D 7.9.3) elapses.
If the temperature difference between the reference sensors is less than the set value, then the speed is decreased by one stage after the ***Sweep time*** (D 7.9.3) elapses. If the controller has adjusted the speed of the pump down to the smallest stage and the ∆T between the reference sensors is less than 1/3 of the desired ∆T, the pump is switched off.

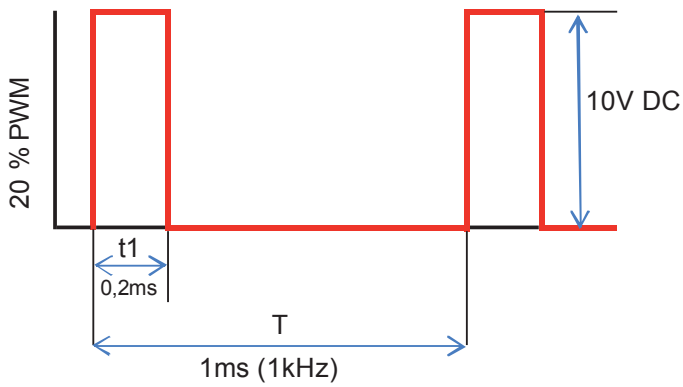
V3 Variant - Control to a constant collector temperature, starts from min. speed:
The pump starts at max. speed. After the purging time (D 7.9.2) the controller switches to the set min. speed.
If the temperature at the collector sensor is greater than the ***Setpoint*** (D 7.9.6), then the speed is increased by one stage after the ***Sweep time*** (D 7.9.3) expires.
If the temperature at the reference sensor (collector) is less than the Setpoint, then the speed is decreased by one stage after the ***Sweep time*** (D 7.9.3) expires. If the controller has adjusted the speed of the pump down to the smallest stage and the ∆T between the reference sensors is less than 1/3 of the required ∆T, the pump is switched off.
Setting range: V1, V2, V3, off / default setting: off

V4 Variant - for 2 storage tanks
When the valve is set toward the primary storage, speed control works as in V3 (see above). When the valve is set toward the secondary storage, speed control works as in V2.
Setting range: V1, V2, V3, off / default setting: off

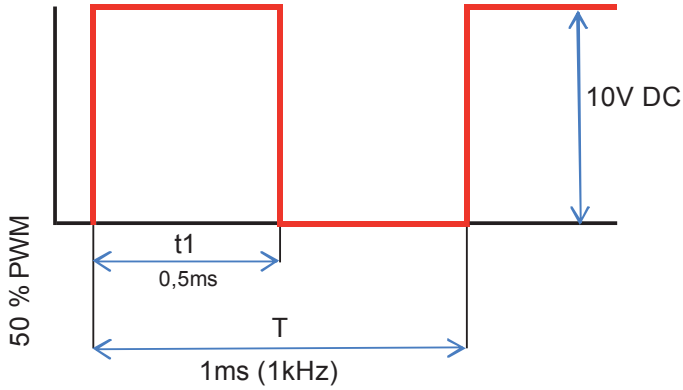
D 7.9.1.1 - Pump type menu 7.9

Setting the type of the circulation pump.
Setting range: standard. PWM, 0-10 V / default setting: standard

SRS4 controller can control speed of standard pumps by sinusoid modulation. The speed of low-energy pumps can be controlled by pulse modulation 0-10V or by PWM. In this menu parameters for speed control are set. The settings of ***„Min.speed"*** and ***„Max.speed"*** have an effect on the shape of the control signal sent by the controller. The output signal appears on S6 terminals.



Technical data for PWM:
20 % to 100 %, 1kHz per 10kohm working resistance



Technical data 0-10V:
0-10V … 2V to 10V (20 % to 100 %)
10kohm working resistance
10V = 100 % speed
5V = 50 % speed
2V = 20 % speed
0V = Off

Caution

Together with the control by PWM/0-10V signal also the R1 relay is controlled. That is why a low-energy pump with PWM/0-10V and a standard pump can be used together.

Caution

If a low-energy pump shall be used, use the R3 relay to power it (230 V). Set the R3 output following the instructions in chap. 7.10 in such a way that the R3 relay switches simultaneously with R1.

Danger

Never use the R1 output to power supply a low-energy pump!

D 7.9.2 - Purging time menu 7.9.2

During this time the pump starts up at its full speed (100 %) to ensure reliable starting. Only after this purging time will SRS4 control the pump speed.
Setting range: from 5 to 600 seconds / default setting:

D 7.9.3 - Sweep time menu 7.9.3

With speed control it is necessary to let the system react to a preceding speed change before making another change. Otherwise quick speed changes may occur followed by big temperature fluctuations. Longer sweep time should be set for systems with less collectors and long pipes from collectors to a storage tank. Shorter sweep time then for larger systems with a shorter distance to a storage tank. The meaning of the parameter is described above (D 7.9.1).
Setting range: Sweep time 1-15 min. / default setting: 4 min.

D 7.9.4 - Max. speed menu 7.9.4

The maximum starting speed of the pump at relay R1 is specified here.
Setting range: 70-100 % / default setting: 100 %

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

D 7.9.5 - Min. speed menu 7.9.5

The minimum starting speed of the pump at relay R1 is specified here.
Setting range: from 30 to max. speed -5 % / default setting: 50 %

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

D 7.9.6 - Setpoint menu 7.9.6

This value is the control setpoint for variant 3. If the value at the collector sensor drops below the Setpoint, the speed is reduced. If it rises above the Setpoint, the speed is increased.
Setting range: 0 - 90 °C / default setting: 60 °C

When adjusting the min. speed, also the Sweep time shall be adjusted!
Setting the Sweep time: The Sweep time shall be long enough for the solar pump to move the solar medium at min. speed round the solar system (the liquid runs one round).
Set the Variant 3 of speed control and the Setpoint (7.9.6) to 0 °C. Set the ***Sweep time*** *(7.9.3) to 15 min. and the Purging time (7.9.2) to 5 sec. After starting the system, wait for the temperature to stabilize, for about 15 min. At the 15th minute the speed will increase. Measure time from that moment and follow the temperature at the collector sensor. It will start sinking after a while. Wait for another 15 minutes and note down the collector temperature each minute. The time needed for the collector temperature to calm down after the speed change is the min. time to be set as the Sweep time.*

D 7.9.7 - U0 pump / PWM0 pump

In order for the controller to identify a pump cable defect and distinguish it from a preset pump off state, a minimum voltage should be set that will cause a low energy pump switch off.
Setting range: 0-1.5 V / default setting:

Set the parameter ***„U0 pump / PWM0 pump“*** *according to the documentation to the low-energy pump. Some pumps accept the zero tension on 0-10V/PWM terminals as a data cable defect.*

D 7.10 - Relay 3 menu 7.10

The output of R3 relay is set here. Default setting: Off

Protective functions
R3 is on when protective functions are active. Menus 7.10.2 - 7.10.7 are used to set which protective function shall switch R3 on. The switching function of R3 can be inverted, i.e. the relay is on until the selected function gets activated.
Setting range: 7.10.2 Collector protection, 7.10.3 System protection, 7.10.4 Frost protection, 7.10.5 Recooling, 7.10.6 Anti-Legionella, 7.10.7 Col.- Alarm, 7.10.8 Pump protection
default setting: off

Booster
This special operation mode is intended for a filling procedure only, for a special ***„Drain master System"*** with solar fluid level contact. This is not used in Regulus solar systems. If you activate it anyway, it shall be deactivate after filling is finished.
Setting range: 0-120 s / default setting: 60 s

Text info
R3 is on if a text info appears on the display. The function of R3 switching can be inverted and then the relay remains on until the text info appears on the display.
Setting range: 7.10.2 Inversion: on/off / default setting: off

Relé 1
R3 is on together with R1. The function of R3 switching can be inverted and then the relay is on as long as R1 is off.
R3 relay can switch on with a ***„sweep time"*** delay and switch off with the ***„sweep time off"*** delay.
Setting range:
7.10.2 Inversion: on/off / default setting: off
7.10.2 Sweep time: 0-120 s, default setting: 30 s
7.10.2 Sweep time off: 0-12 s / default setting: 0 s

Relé 2
R3 is on together with R2. The function of R3 switching can be inverted and then the relay is on as long as R2 is off.
R3 relay can switch on with a ***„sweep time"*** delay and switch off with the ***„sweep time off"*** delay.
Setting range:
7.10.2 Inversion: on/off / default setting: off
7.10.2 Sweep time: 0-120 s, default setting: 30 s
7.10.2 Sweep time off: 0-12 s / default setting: 0 s

D 8 - Menu lock

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

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

The menus listed below remain completely accessible despite the menu lock being activated, and can be used to make adjustments if necessary:

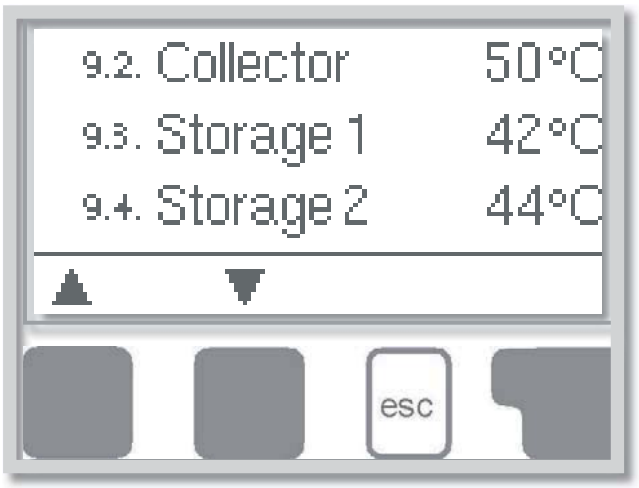
- D 1 - Measurement values
- D 2 - Statistics
- D 3 - Display mode
- D 7.2 - Time&date
- D 8 - Menu lock
- D 9 - Service values

To lock the other menus, select ***„Menu lock on"***. To enable the menus again, select ***„Menu lock off"***.
Setting range: on, off/default setting: off

Caution

It is advisable to keep the lock activated in order to prevent unintentional changes by a user.

D 9 - Service values



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

Caution

Kindly note down data from the Service values Menu at the time when an alarm or error occurs, e.g. into the following table.

The menu can be closed at any time by pressing ***„esc"***.

9.1.	
9.2.	
9.3.	
9.4.	
9.5.	
9.6.	
9.7.	
9.8.	
9.9.	
9.10.	
9.11.	
9.12.	
9.13.	
9.14.	
9.15.	
9.16.	
9.17.	
9.18.	
9.19.	
9.20.	
9.21.	
9.22.	
9.23.	
9.24.	
9.25.	
9.26.	
9.27.	
9.28.	
9.29.	
9.30.	

9.31.	
9.32.	
9.33.	
9.34.	
9.35.	
9.36.	
9.37.	
9.38.	
9.39.	
9.40.	
9.41.	
9.42.	
9.43.	
9.44.	
9.45.	
9.46.	
9.47.	
9.48.	
9.49.	
9.50.	
9.51.	
9.52.	
9.53.	
9.54.	
9.55.	
9.56.	
9.57.	
9.58.	
9.59.	
9.60.	

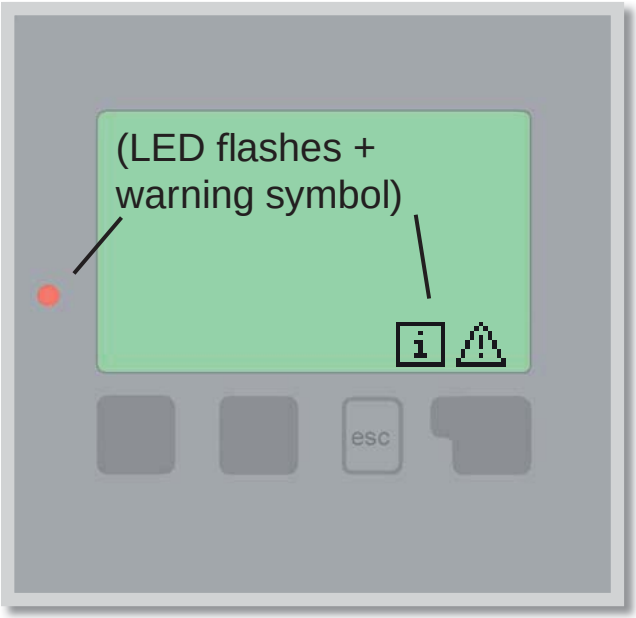
Note: ADC1 to 3 are internal data of temperature transducer 1 to 3.

D 10 - Language

Menu **„10. Language”** can be used to select the language for the menu guidance. This is queried automatically during initial commissioning. The controller involves English, German, Italian, Polish and Czech language versions.

E - Defects and Maintenance

E 1 - Error and info messages



If the controller detects a malfunction, the red light flashes and the warning symbol also appears in the display. If the error is no longer present, the warning symbol changes to an info symbol and the red light no longer flashes.

To obtain more detailed information on the error, press the key under the warning or info symbol. Do not try to deal with this yourself. Consult a specialist in the event of an error!

Possible error messages:	**Notes for the specialist:**
Sensor x defective	Means that either the sensor, the sensor input at the controller or the connecting cable is/was defective. (Resistance table see chap. A 1)
Collector alarm	Means that the collector has risen/rose above the temperature set under menu 6.3.1 (chap. D 6.3)
Night circulation	Means that the solar pump is/was in operation between 23:00 and 04:00. (Exception see D 6.4)
Restart	Means that the controller was restarted, for example due to a power failure. Check the date&time!
Time&date	This message appears automatically after a mains failure because the time&date have to be checked, and reset if necessary.

E 2 - Replacing the fuse

Caution

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

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

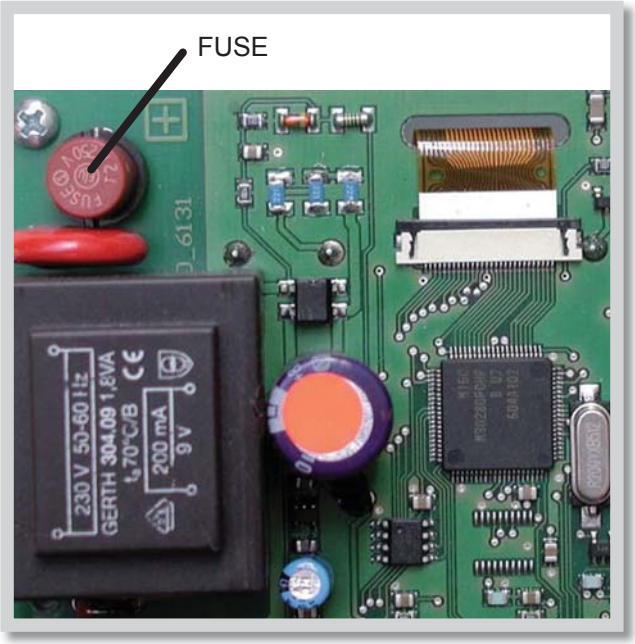


Fig. 3.1.1

If the mains voltage is switched on and the controller still does not function or display anything, then the internal device fuse may be defective. In that case, disconnect the device, open it, remove the old fuse and check it. Exchange the defective fuse for a new one, locate the external source of the error (e.g. pump) and exchange it. Then first recommission the controller and check the function of the switch outputs in manual mode as described under D 4.2.

E 3 - Maintenance

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

Performing maintenance:

- Check the date and time (see D 7. 2)
- Assess/check plausibility of analyses (see D 7.4)
- Check the error memory (see D 7.5)
- Verify/check plausibility of the current measurement values (see D 6)
- Check the switch outputs/consumers in manual mode (see D 9.2)
- Or also optimize the parameter settings

E 4 - Useful hints and tricks

Instead of setting the flow rate for the system using a flow rate limiter, it is better to adjust the flow rate using the switch on the pump and by means of the „max. speed" setting on the controller (see D 7.9.4). This saves electricity!

The service values (see D 9) include not only current measurement values and operating states, but also all of the settings for the controller. Write the service values down just once after commissioning has been successfully completed.

In the event of uncertainty as to the control response or malfunctions the service values are a proven and successful method for remote diagnosis. Write the service values down (see D 9) at the time that the suspected malfunction occurs. Send the service value table by fax or e-mail with a brief description of the error to the specialist.

In program 1 ***„Solar system with storage tank"*** the mechanical relay R2 switches together with the speed-controlled output R1. Relay output R2 can be used to operate larger loads up to 460VA (pumps, valves or auxiliary relays).

In program 13 ***„Solar system with storage tank and pool"*** the charging of the pool, e.g. for winter operation, can be switched off using a simple function. To do this, simply press and hold the ***„esc"*** key down for several seconds on the diagram/overview screen. A message appears on the display as soon as the pool is switched off or when the pool is switched on again.

Programs 14 + 15 ***„Universal ΔT controller"*** are suitable, for example, for hydraulic variants with solid-fuel boiler, follow-on storage tank charging, storage tank heat exchange, heating circuit return raising, etc.

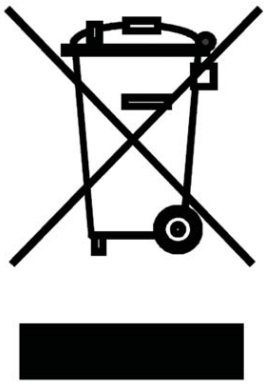
The Operating hours displayed in the ***„Analysis"*** menu are solar operating hours. This therefore only takes into account hours in which the solar pump is active. In the universal programs 14 + 15 the times refer to relay R1.

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

In order to ensure precise heat measurement, the S4 sensor (solar circuit inlet) should be placed into a sheath. If that is not possible and a contact sensor on a pipe needs to be used, possible deviations can be modified using ***„Sensor calibration"*** (chap. D 7.3).

IMPORTANT INFORMATION ON DISPOSAL IN COMPLIANCE WITH THE EUROPEAN DIRECTIVE 2002/96/ES

European Directive 2002/96/EC requires that the equipment bearing this symbol on the product and/or its packaging must not be disposed of with unsorted municipal waste. The symbol indicates that this product should be disposed of separately from regular household waste streams. It is your responsibility to dispose of this and other electric and electronic equipment via designated collection facilities appointed by the government or local authorities. Correct disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about the disposal of your old equipment, please contact your local authorities, waste disposal service, or the shop where you purchased the product.



WEEE registration number: 02771/07-ECZ

03/2011

REGULUS spol. s r.o.
Do Koutů 1897/3
143 00 Praha 4
http://www.regulus.eu
E-mail: sales@regulus.cz