

DeltaSol® BX L

RESOL®

Manual for the
specialized craftsman

Installation
Operation
Functions and options
Troubleshooting



48006840

Thank you for buying this RESOL product.

Please read this manual carefully to get the best performance from this unit. Please keep this manual carefully.

en-US/CA

Manual

www.resol.com

Safety advice

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

Target group

These instructions are exclusively addressed to authorized skilled personnel.

Only qualified electricians should carry out electrical works.

Description of symbols

WARNING! Warnings are indicated with a warning triangle!



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

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

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



Note

Notes are indicated with an information symbol.

- Arrows indicate instruction steps that should be carried out.

Information about the product

Proper usage

The solar controller is designed for use in 2-tank and 3-tank solar thermal systems in compliance with the technical data specified in this manual.

Improper use excludes all liability claims.



Note

Strong electromagnetic fields can impair the function of the controller.

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

Disposal

- Dispose of the packaging in an environmentally sound manner.
- Dispose of old appliances in an environmentally sound manner: Upon request we will take back your old appliances bought from us and guarantee an environmentally sound disposal of the devices.

Contents

1	Overview	3
2	Installation	4
2.1	Mounting	4
2.2	Electrical connection	4
2.3	Data communication / Bus	5
2.4	SD memory card slot	6
2.5	Overview of basic system layouts	6
2.6	System layouts	7
3	Operation and function	35
3.1	Buttons	35
3.2	Selecting menu points and adjusting values	35
3.3	Menu structure	35
3.4	Shortcut	36
3.5	Indications and system monitoring display	36
3.6	Further indications	38
4	Status menu	38
5	Initial commissioning	38
6	Functions and options	41
6.1	Status level	41
6.2	Adjustment channels	43
6.3	Overview of options and their parameters	42
7	User code and short menu - Adjustment values	64
8	Messages	64
9	Troubleshooting	65
9.1	Miscellaneous	66
10	Accessories	68
10.1	Sensors and measuring instruments	68
10.2	Interface adapters	69
10.3	Visualization modules	69
11	Index	70

1 Overview

- Extra large graphic display
- 4 relay outputs
- 5 sensor inputs
- Data logging onto SD card
- Thermal disinfection
- Time-controlled thermostat function
- RESOLVBus®
- Energy-saving switch-mode power supply

Included:

- 1 x DeltaSol® BX L
- 1 x accessory bag
- 3 x screw and wall plug
- 8 x strain relief and screws
- 1 x manual



Note

For more information about accessories, see p. 55



Technical data

Housing: plastic, PC-ABS and PMMA

Protection type: IP 20 / EN 60529

Protection class: I

Ambient temp.: 0 ... 40 °C [32 ... 104 °F]

Dimensions:

204 x 170 x 47 mm [8.03" x 6.69" x 1.85"]

Mounting: wall mounting, also suitable for mounting into patch panels

Display: System-Monitoring-Display for system visualization, 16-segment display, 7-segment display, 9 symbols, control lamp (directional pad) and background illumination

Operation:

7 push buttons at the front of the housing

Functions: Controller for multi-tank solar thermal systems. Functions such as: ΔT control, pump speed control, energy metering, operating hours counter for the solar pump, evacuated evacuated tube collector function, thermostat function, vertical tank loading, priority logic, heat dump function, thermal disinfection function, function control according to BAFA guidelines.

Inputs: 5 inputs for Pt1000 temperature sensors, 1 V40 impulse input

Outputs: 3 semiconductor relays, 1 standard relay

Interfaces: RESOLVBus®, SD card slot

Power supply: 100 ... 240 V~, 50 ... 60 Hz

Switching capacity per relay:

1 (1) A 100 ... 240 V~ (semiconductor relay)

2 (1) A 100 ... 240 V~ (standard relay)

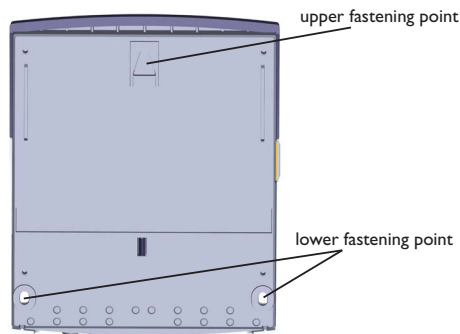
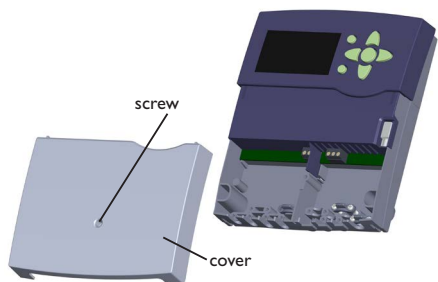
Total switching capacity: 4 A

Standby power consumption: < 1W

Mode of operation: type 1.Y

2 Installation

2.1 Mounting



WARNING! Electric shock!



Upon opening the housing, live parts are exposed.

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



Note

Strong electromagnetic fields can impair the function of the controller.

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

The unit must only be located in dry interior rooms. The controller must additionally be supplied from a double pole switch with contact gap of at least 3 mm [0.12"].

Please pay attention to separate routing of sensor cables and power supply cables.

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

- Unscrew the cross-head screw from the cover and remove it along with the cover from the housing
- Mark the upper fastening point on the wall. Drill and fasten the enclosed wall plug and screw leaving the head protruding
- Hang the housing from the upper fastening point and mark the lower fastening points (centers 150 mm [5.9"])
- Insert lower wall plugs
- Fasten the housing to the wall with the lower fastening screws and tighten
- Carry out the electrical wiring in accordance with the terminal allocation, see chap. 2.2
- Put the cover on the housing
- Attach with the fastening screw

2.2 Electrical connection

ATTENTION! ESD damage!



Electrostatic discharge can lead to damage to electronic components!

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



Note

The pump speed must be set to 100 % when auxiliary relays or valves are connected.

WARNING! Electric shock!

Upon opening the housing, live parts are exposed.

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

The controller is supplied with power via a power supply cable. The power supply of the device must be 100 ... 240 V~ (50 ... 60 Hz).

The controller is equipped with 4 relays in total to which loads such as pumps, valves, etc. can be connected:

- The relays R1 ... R3 are semiconductor relays, designed for pump speed control:

Conductor R1...R3

Neutral conductor N

Protective conductor \oplus

- Relay 4 is a standard relay

Conductor R4

Neutral conductor N

Protective conductor \oplus

**Note**

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

Depending on the product version, power supply cables and sensor cables are already connected to the device. If that is not the case, please proceed as follows:

Connect the **temperature sensors** (S1 to S5) to the corresponding terminals with either polarity:

S1 = Sensor 1 (collector sensor)

S2 = Sensor 2 (e.g. tank sensor bottom)

S3 = Sensor 3 (e.g. collector sensor collector 2)

S4 = Sensor 4 (e.g. tank sensor tank 2)

S5 = Sensor 5 (e.g. tank sensor tank 3)

A **V40** flowmeter can be connected to the terminals V40 and GND (either polarity).

The **power supply connection** is at the terminals:

Neutral conductor N

Conductor L

Conductor L' (L' is not connected with the power supply cable. L' is a fused contact permanently carrying voltage)

Protective conductor \oplus

**Note**

The connection depends on the system layout selected, see chap. 2.6, page 7.

**Note**

For more details about initial commissioning, see chap. 5, page 39.

WARNING! Electric shock!

L' is a fused contact permanently carrying voltage.

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

2.3 Data communication / Bus

The controller is equipped with the RESOLVBus® for data transfer with and energy supply to external modules. The connection is carried out at the two terminals marked "VBus" and "VBus/GND" (either polarity). One or more RESOLVBus® modules, depending on their current consumption and the current supply of the controller, can be connected via this data bus, such as:

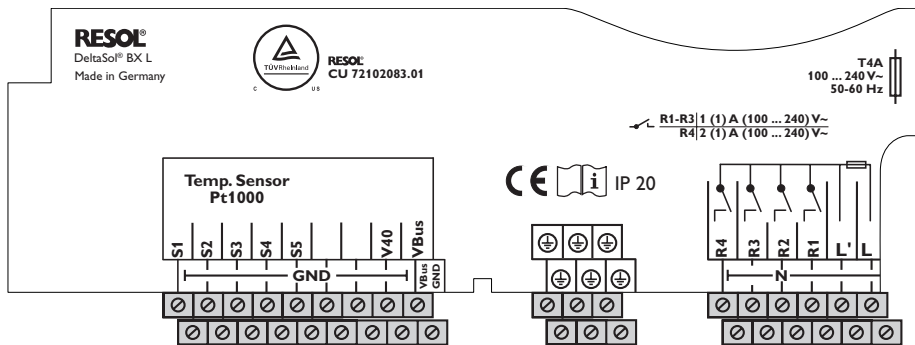
- RESOL GA3 Large Display module / Smart Display SD3
- RESOL AM1 Alarm module
- RESOL DL2 Datalogger

Furthermore, the controller can be connected to a PC via the RESOLVBus®/USB or VBus®/LAN interface adapter (not included with the DeltaSol® BX L).

With the **RESOL ServiceCenter Software (RSC)**, measured values can be read, processed and visualized.

**Note**

For more information about accessories, see p. 68.



2.4 SD memory card slot



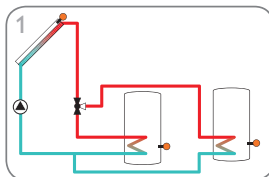
The controller is equipped with an SD card slot for storing system data onto an SD card. The values can be opened and visualized, e. g. in a spreadsheet programme.

A standard SD card is not included with the *DeltaSol*® BX L, but can also be purchased at RESOL.

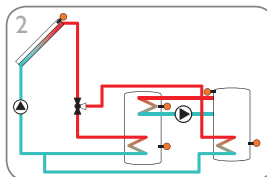
For more information about using an SD card, see page 61, "SD card".

Standard SD and SD-HC cards can be used.

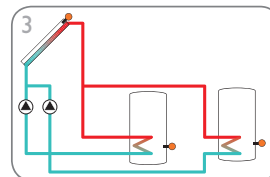
2.5 Overview of basic system layouts



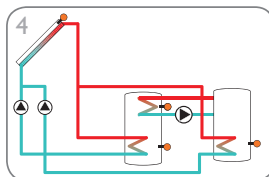
2-tank system with valve logic, 1 pump, 3 sensors and 3-port valve (page 7)



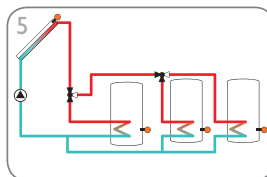
2-tank solar system with valve logic and heat exchange control (page 10)



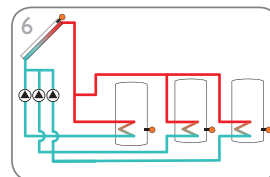
2-tank solar system with pump logic (page 13)



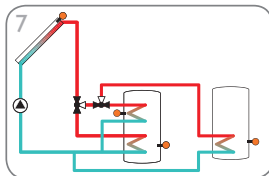
2-tank solar system with pump logic and heat exchange control (page 16)



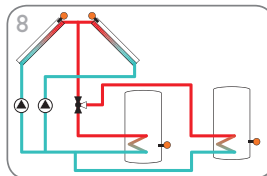
3-tank solar system with valve logic and heat exchange control (page 19)



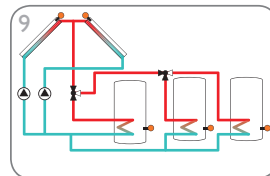
3-tank solar system with pump logic and heat exchange control (page 22)



Solar system with vertical tank loading and 2 tanks (page 25)



Solar system with east-/west collectors and 2 tanks (valve logic) (page 28)



3-tank solar system with east-/west collectors (page 31)

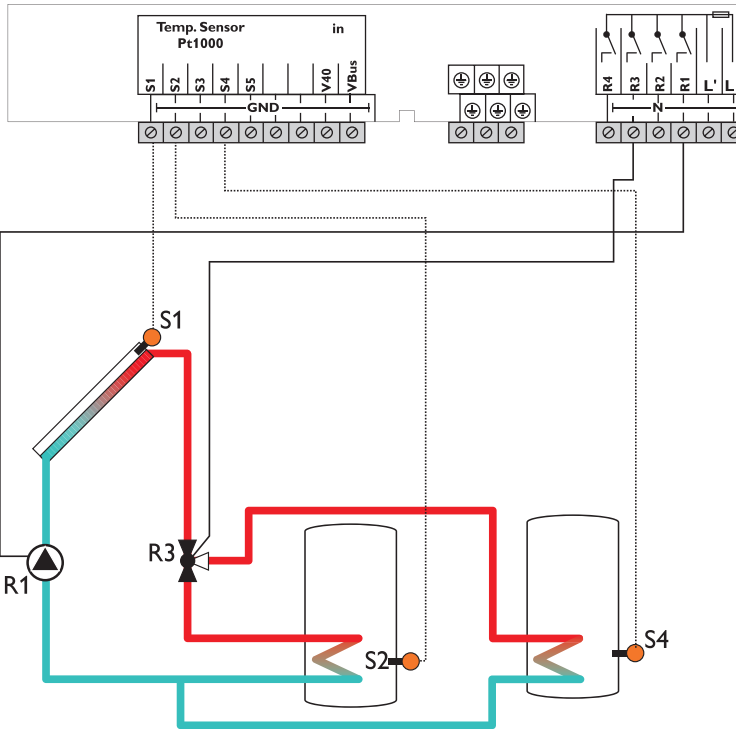
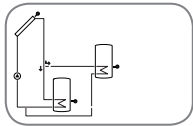
2.6 System layouts

System 1

2-tank system with valve logic, 1 pump, 3 sensors and 3-port valve

The controller compares the temperature at sensor S1 to the temperatures at sensors S2 and S4. If the measured temperature differences are higher than the adjusted switch-on temperature differences, the

pump (R1) will be activated and the corresponding tank will be loaded up to the adjusted maximum temperature via the valve (R3). Tank 1 is loaded with priority.



Sensor/terminal	Designation	Description
S1	TCOL	Temperature collector
S2	TST1B	Temperature tank 1 bottom
S3		Optional sensor for measurement purposes or options
S4	TST2B	Temperature tank 2 bottom
S5		Optional sensor for measurement purposes or options
V40		

Relay	Description
R1	Solar pump
R2/R4	optional: Thermal disinfection Parallel relay Heat dump
R3	3-port valve tank 1/2

Note: 3-port valve normally open - tank 1 (S2)

Adjustment channels

Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
ARR			1		System	43
ROSA			0000	5	ROSA number	60
LOAD1 >					Loading 1	
	DT1O		6.0 K [12.0 °Ra]		Switch-on temperature difference 1	44
	DT1F		4.0 K [8.0 °Ra]		Switch-off temperature difference 1	44
	DT1S		10.0 K [20.0 °Ra]		Set temperature difference 1	44
	RIS1		2 K [4 °Ra]		Rise 1	44
	S1MAX		60 °C [140 °F]		Tank maximum limitation 1	44
	SMXS1		2		Sensor tank max 1	44
LOAD2 >					Loading 2	
	DT2O		6.0 K [12.0 °Ra]		Switch-on temperature difference 2	44
	DT2F		4.0 K [8.0 °Ra]		Switch-off temperature difference 2	44
	DT2S		10.0 K [20.0 °Ra]		Set temperature difference 2	44
	RIS2		2 K [4 °Ra]		Rise 2	44
	S2MAX		60 °C [140 °F]		Tank maximum limitation 2	44
	SMXS2		4		Sensor tank max 2	44
	LST2		ON		Loading tank 2	45
COL >					Collector	
	CEM		130 °C [270 °F]		Collector emergency temperature	46
	OCCO*		OFF		Collector cooling option	46
		CMAX	110 °C [230 °F]		Collector maximum temperature	46
	OCMN		OFF		Collector minimum limitation option	46
		CMIN	10.0 °C [50.0 °F]		Minimum collector temperature	46
	OTCO		OFF		Evacuated evacuated tube collector function option	46
		TCST	07:00		Evacuated tube collector starting time	47
		TCEN	19:00		Evacuated tube collector ending time	47
		TCRU	30 s		Evacuated tube collector runtime	47
		TCIN	30 min		Evacuated tube collector standstill interval	47
	OCFR		OFF		Collector frost protection option	47
		CFR O	4.0 °C [40.0 °F]		Antifreeze temperature collector on	47
		CFR F	5.0 °C [42.0 °F]		Antifreeze temperature collector off	48
		FRPST	1		Antifreeze tank selection	48
LLOGI >					Loading logic	
	LOGIC		PRIO		Priority logic	48

Adjustment channels

Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
	PRI01		1		Priority logic tank 1	48
	OSTS		OFF		Tank set option	50
		TST1	45 °C [120 °F]		Set tank temperature tank 1	50
		TST2	45 °C [120 °F]		Set tank temperature tank 2	50
	tLB		2 min		Loading break time	48
	tRUN		15 min		Circulation runtime	48
	PSPEE		OFF		Pause speed option	51
	PDELA		OFF		Pump delay option	51
COOL >					Cooling functions	
	OSYC*		OFF		System cooling	51
	OSTC		OFF		Tank cooling	52
	OHDP*		OFF		Heat dump	52
ODTFT >					ΔT function option	54
OTH >					Thermostat function option	56
PUMP >					Speed	
	PUMP1		OnOF		Speed variant pump 1	45
	PUMP2		OnOF		Speed variant pump 2	45
	PUMP3		OnOF		Speed variant pump 3	45
MAN >					Manual mode	
	MAN1		Auto		Manual mode 1	56
	MAN2		Auto		Manual mode 2	56
	MAN3		Auto		Manual mode 3	56
	MAN4		Auto		Manual mode 4	56
BLPR >			OFF		Blocking protection	56
OTDIS >			OFF		Thermal disinfection option	57
OPARR >			OFF		Parallel relay option	58
OHQM >			OFF		Energy metering option	58
DATE>					Enter date	60
LANG >			dE		Language	61
UNIT >			°C		Unit	60
OSDC >					SD card option	61
CODE			0000		User code	64
RESET			OFF		Factory setting	

* are blocked against each other

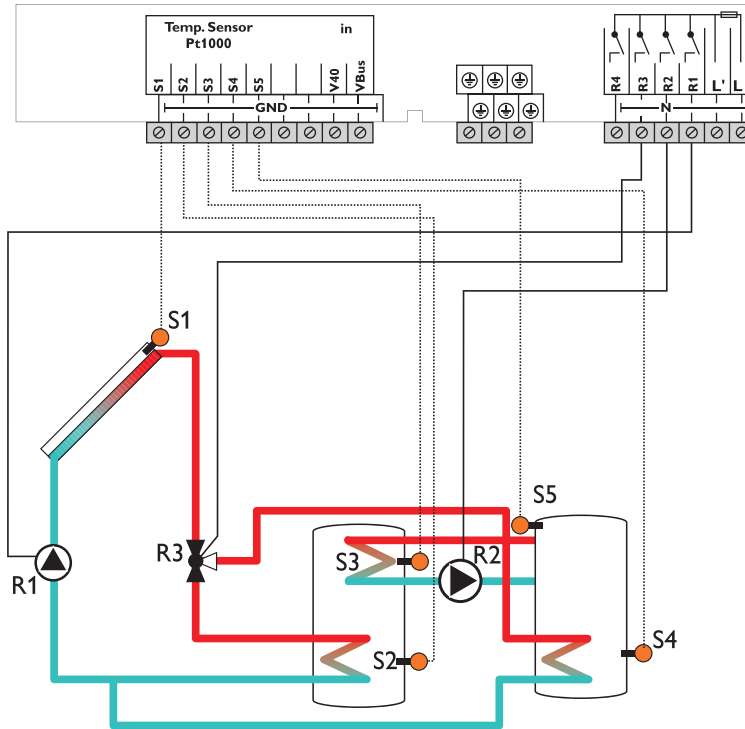
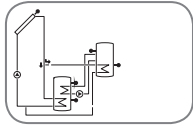
System 2

2-tank solar system with valve logic and heat exchange control

The controller compares the temperature at sensor S1 to the temperatures at sensors S2 and S4. If the measured temperature differences are higher than the adjusted switch-on temperature differences, the

pump (R1) will be activated and the corresponding tank will be loaded up to the adjusted maximum temperature via the valve (R3). Tank 1 is loaded with priority. Heat exchange from tank 2 to tank 1 (R2) is

possible with another temperature differential function (S3-heat sink/S5-heat source).



Sensor/terminal	Designation	Description
S1	TCOL	Temperature collector
S2	TST1B	Temperature tank 1 bottom
S3	TST1T	Temperature tank 1 top
S4	TST2B	Temperature tank 2 bottom
S5	TST2T	Temperature tank 2 top
V40		optional: flowmeter

Relay	Description
R1	Solar pump
R2	Heat exchange pump
R3	3-port valve tank 1/2
R4	optional: Thermal disinfection Parallel relay Heat dump

Note: 3-port valve normally open - tank 1 (S2)

Adjustment channels

Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
ARR			1	2	System	43
ROSA			0000	16	ROSA number	60
LOAD1 >					Loading 1	
	DT1O		6.0 K [12.0 °Ra]		Switch-on temperature difference 1	44
	DT1F		4.0 K [8.0 °Ra]		Switch-off temperature difference 1	44
	DT1S		10.0 K [20.0 °Ra]		Set temperature difference 1	44
	RIS1		2 K [4 °Ra]		Rise 1	44
	S1MAX		60 °C [140 °F]		Tank maximum limitation 1	44
	SMXS1		2		Sensor tank max 1	44
LOAD2 >					Loading 2	
	DT2O		6.0 K [12.0 °Ra]		Switch-on temperature difference 2	44
	DT2F		4.0 K [8.0 °Ra]		Switch-off temperature difference 2	44
	DT2S		10.0 K [20.0 °Ra]		Set temperature difference 2	44
	RIS2		2 K [4 °Ra]		Rise 2	44
	S2MAX		60 °C [140 °F]		Tank maximum limitation 2	44
	SMXS2		4		Sensor tank max 2	44
	LST2		ON		Loading tank 2	45
COL >					Collector	
	CEM		130 °C [270 °F]		Collector emergency temperature	46
	OCCO*		OFF		Collector cooling option	46
		CMAX	110 °C [230 °F]		Collector maximum temperature	46
	OCMN		OFF		Collector minimum limitation option	46
		CMIN	10.0 °C [50.0 °F]		Minimum collector temperature	46
	OTCO		OFF		Evacuated tube collector function option	46
		TCST	07:00		Evacuated tube collector starting time	47
		TCEN	19:00		Evacuated tube collector ending time	47
		TCRU	30 s		Evacuated tube collector runtime	47
		TCIN	30 min		Evacuated tube collector standstill interval	47
	O CFR		OFF		Collector frost protection option	47
		CFR O	4.0 °C [40.0 °F]		Antifreeze temperature collector on	47
		CFR F	5.0 °C [42.0 °F]		Antifreeze temperature collector off	48
		FRPST	1		Antifreeze tank selection	48
LLOGI >					Loading logic	
	LOGIC		PRIO		Priority logic	48
	PRIO1		1		Priority logic tank 1	48
	OSTS		OFF		Tank set option	50
		TST1	45 °C [120 °F]		Set tank temperature tank 1	50
		TST2	45 °C [120 °F]		Set tank temperature tank 2	50

Adjustment channels

Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
	tLB		2 min		Loading break time	48
	tRUN		15 min		Circulation runtime	48
	PSPEE		OFF		Pause speed option	51
	PDELA		OFF		Pump delay option	51
COOL >					Cooling functions	
	OSYC*		OFF		System cooling	51
	OSTC		OFF		Tank cooling	52
	OHDP*		OFF		Heat dump	52
DT4 >					Heat exchange	
	DT4O		6.0 K [12.0 °Ra]		Switch-on difference	52
	DT4F		4.0 K [8.0 °Ra]		Switch-off difference	52
	DT4S		10.0 K [20.0 °Ra]		Set difference	53
	RIS4		2 K [4 °Ra]		Rise	53
	MAX4O		60.0 °C [140.0 °F]		Switch-on temperature (maximum limitation)	53
	MAX4F		58.0 °C [136.0 °F]		Switch-off temperature (maximum limitation)	53
	MIN4O		5.0 °C [40.0 °F]		Switch-on temperature (minimum limitation)	53
	MIN4F		10.0 °C [50.0 °F]		Switch-off temperature (minimum limitation)	53
OTH >					Thermostat function option	56
PUMP >					Speed	
	PUMP1		OnOF		Speed variant pump 1	45
	PUMP2		OnOF		Speed variant pump 2	45
	PUMP3		OnOF		Speed variant pump 3	45
MAN >					Manual mode	
	MAN1		Auto		Manual mode 1	56
	MAN2		Auto		Manual mode 2	56
	MAN3		Auto		Manual mode 3	56
	MAN4		Auto		Manual mode 4	56
BLPR >			OFF		Blocking protection	56
OTDIS >			OFF		Thermal disinfection option	57
OPARR >			OFF		Parallel relay option	58
OHQM >			OFF		Energy metering option	58
DATE>					Enter date	60
LANG >			dE		Language	61
UNIT >			°C		Unit	60
OSDC >					SD card option	61
CODE			0000		User code	64
RESET			OFF		Factory setting	

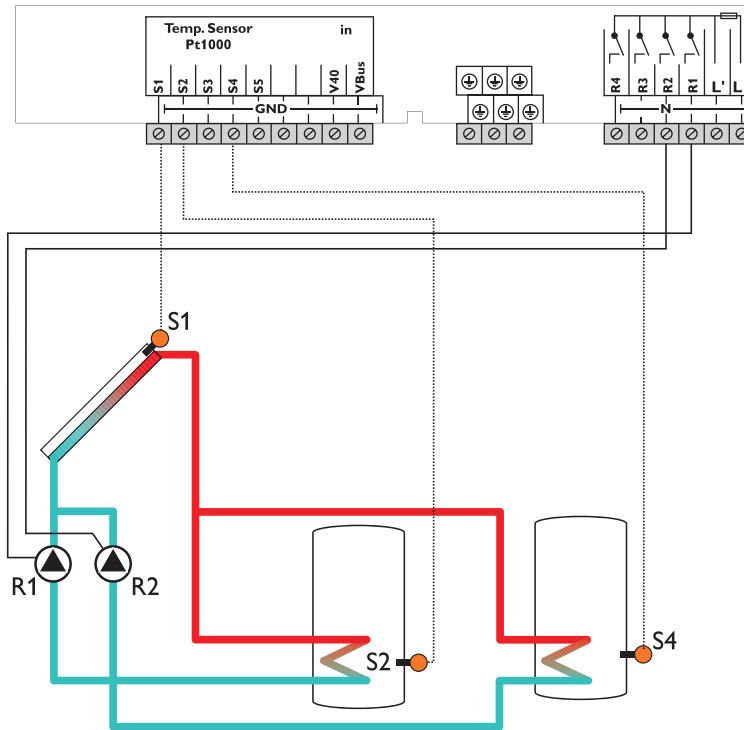
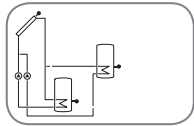
* are blocked against each other

System 3

2-tank solar system with pump logic

The controller compares the temperature at sensor S1 to the temperatures at sensors S2 and S4. If the measured temperature differences are higher than the adjusted switch-on temperature differences, the

pump (R1 and/or R2) will be activated and the corresponding tank will be loaded up to the adjusted maximum temperature at most.



Sensor/terminal	Designation	Description
S1	TCOL	Temperature collector
S2	TST1B	Temperature tank 1 bottom
S3		Optional sensor for measurement purposes or options
S4	TST2B	Temperature tank 2 bottom
S5		Optional sensor for measurement purposes or options
V40		

Relay	Description
R1	Solar pump tank 1
R2	Solar pump tank 2
R3	optional:
R4	Thermal disinfection Parallel relay Heat dump

Adjustment channels

Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
ARR			1	3	System	43
ROSA			0000	6	ROSA number	60
LOAD1 >					Loading 1	
	DT1O		6.0 K [12.0 °Ra]		Switch-on temperature difference 1	44
	DT1F		4.0 K [8.0 °Ra]		Switch-off temperature difference 1	44
	DT1S		10.0 K [20.0 °Ra]		Set temperature difference 1	44
	RIS1		2 K [4 °Ra]		Rise 1	44
	S1MAX		60 °C [140 °F]		Tank maximum limitation 1	44
	SMXS1		2		Sensor tank max 1	44
LOAD2 >					Loading 2	
	DT2O		6.0 K [12.0 °Ra]		Switch-on temperature difference 2	44
	DT2F		4.0 K [8.0 °Ra]		Switch-off temperature difference 2	44
	DT2S		10.0 K [20.0 °Ra]		Set temperature difference 2	44
	RIS2		2 K [4 °Ra]		Rise 2	44
	S2MAX		60 °C [140 °F]		Tank maximum limitation 2	44
	SMXS2		4		Sensor tank max 2	44
	LST2		ON		Loading tank 2	45
COL >					Collector	
	CEM		130 °C [270 °F]		Collector emergency temperature	46
	OCCO*		OFF		Collector cooling option	46
		CMAX	110 °C [230 °F]		Collector maximum temperature	46
	OCMN		OFF		Collector minimum limitation option	46
		CMIN	10.0 °C [50.0 °F]		Minimum collector temperature	46
	OTCO		OFF		Evacuated tube collector function option	46
		TCST	07:00		Evacuated tube collector starting time	47
		TCEN	19:00		Evacuated tube collector ending time	47
		TCRU	30 s		Evacuated tube collector runtime	47
		TCIN	30 min		Evacuated tube collector standstill interval	47
	OCFR		OFF		Collector frost protection option	47
		CFR O	4.0 °C [40.0 °F]		Antifreeze temperature collector on	47
		CFR F	5.0 °C [42.0 °F]		Antifreeze temperature collector off	48
		FRPST	1		Antifreeze tank selection	48
LLOGI >					Loading logic	
	LOGIC		PRIO		Priority logic	48
	PRIO1		1		Priority logic tank 1	48

Adjustment channels						
Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
	OSTS		OFF		Tank set option	50
		TST1	45 °C [120 °F]		Set tank temperature tank 1	50
		TST2	45 °C [120 °F]		Set tank temperature tank 2	50
	OSE		OFF		Spread function option	50
		DTSE	20 K [40 °Ra]		Spread difference	50
		SLSTR	3		Tank spread function	50
	tLB		2 min		Loading break time	48
	tRUN		15 min		Circulation runtime	48
	PSPEE		OFF		Pause speed option	51
	PDELA		OFF		Pump delay option	51
COOL >					Cooling functions	
	OSYC*		OFF		System cooling	51
	OSTC		OFF		Tank cooling	52
	OHDP*		OFF		Heat dump	52
ODTFT >					ΔT function option	54
OTH >					Thermostat function option	56
PUMP >					Speed	
	PUMP1		OnOF		Speed variant pump 1	45
	PUMP2		OnOF		Speed variant pump 2	45
	PUMP3		OnOF		Speed variant pump 3	45
MAN >					Manual mode	
	MAN1		Auto		Manual mode 1	56
	MAN2		Auto		Manual mode 2	56
	MAN3		Auto		Manual mode 3	56
	MAN4		Auto		Manual mode 4	56
BLPR >			OFF		Blocking protection	56
OTDIS >			OFF		Thermal disinfection option	57
OPARR >			OFF		Parallel relay option	58
OHQM >			OFF		Energy metering option	58
DATE>					Enter date	60
LANG >			dE		Language	61
UNIT >			°C		Unit	60
OSDC >					SD card option	61
CODE			0000		User code	64
RESET			OFF		Factory setting	

* are blocked against each other

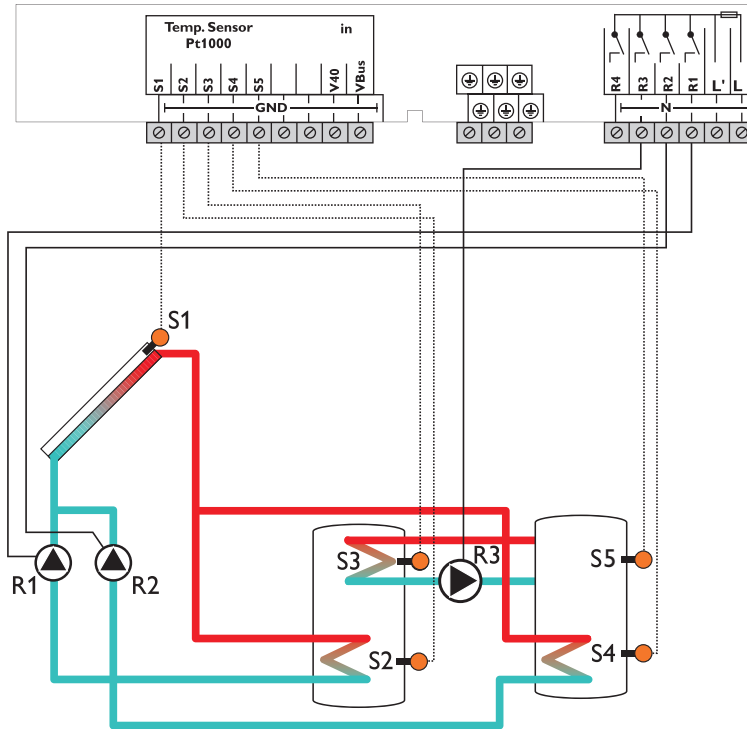
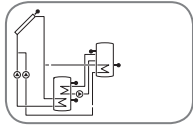
System 4

2-tank solar system with pump logic and heat exchange control

The controller compares the temperature at sensor S1 to the temperatures at sensors S2 and S4. If the measured temperature differences are higher than the adjusted switch-on temperature differences, the pump

(R1 and/or R2) will be activated and the corresponding tank will be loaded up to the adjusted maximum temperature. Tank 1 is loaded with priority.

Heat exchange from tank 2 to tank 1 (R3) is possible with another temperature differential function (S3 - heat sink/S5 - heat source).



Sensor/terminal	Designation	Description
S1	TCOL	Temperature collector
S2	TST1B	Temperature tank 1 bottom
S3	TST1T	Temperature tank 1 top
S4	TST2B	Temperature tank 2 bottom
S5	TST2T	Temperature tank 2 top
V40		optional: flowmeter

Relay	Description
R1	Solar pump tank 1
R2	Solar pump tank 2
R3	Heat exchange pump
R4	optional: Thermal disinfection Parallel relay Heat dump

Adjustment channels

Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
ARR			1	4	System	43
ROSA			0000	17	ROSA number	60
LOAD1 >					Loading 1	
	DT1O		6.0 K [12.0 °Ra]		Switch-on temperature difference 1	44
	DT1F		4.0 K [8.0 °Ra]		Switch-off temperature difference 1	44
	DT1S		10.0 K [20.0 °Ra]		Set temperature difference 1	44
	RIS1		2 K [4 °Ra]		Rise 1	44
	S1MAX		60 °C [140 °F]		Tank maximum limitation 1	44
	SMXS1		2		Sensor tank max 1	44
LOAD2 >					Loading 2	
	DT2O		6.0 K [12.0 °Ra]		Switch-on temperature difference 2	44
	DT2F		4.0 K [8.0 °Ra]		Switch-off temperature difference 2	44
	DT2S		10.0 K [20.0 °Ra]		Set temperature difference 2	44
	RIS2		2 K [4 °Ra]		Rise 2	44
	S2MAX		60 °C [140 °F]		Tank maximum limitation 2	44
	SMXS2		4		Sensor tank max 2	44
	LST2		ON		Loading tank 2	45
COL >					Collector	
	CEM		130 °C [270 °F]		Collector emergency temperature	46
	OCCO*		OFF		Collector cooling option	46
		CMAX	110 °C [230 °F]		Collector maximum temperature	46
	OCMN		OFF		Collector minimum limitation option	46
		CMIN	10.0 °C [50.0 °F]		Minimum collector temperature	46
	OTCO		OFF		Evacuated tube collector function option	46
		TCST	07:00		Evacuated tube collector starting time	47
		TCEN	19:00		Evacuated tube collector ending time	47
		TCRU	30 s		Evacuated tube collector runtime	47
		TCIN	30 min		Evacuated tube collector standstill interval	47
	OCFR		OFF		Collector frost protection option	47
		CFR O	4.0 °C [40.0 °F]		Antifreeze temperature collector on	47
		CFR F	5.0 °C [42.0 °F]		Antifreeze temperature collector off	48
		FRPST	1		Antifreeze tank selection	48
LOGI >					Loading logic	
	LOGIC		PRIO		Priority logic	48
	PRIO1		1		Priority logic tank 1	48
	OSTS		OFF		Tank set option	50
		TST1	45 °C [120 °F]		Set tank temperature tank 1	50
		TST2	45 °C [120 °F]		Set tank temperature tank 2	50
		OSE	OFF		Spread function option	50

Adjustment channels

Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
		DTSE	20 K [40 °Ra]		Spread difference	50
		SLSTR	3		Spread function option	50
	tLB		2 min		Loading break time	48
	tRUN		15 min		Circulation runtime	48
	PSPEE		OFF		Pause speed option	51
COOL >					Cooling functions	
	OSYC*		OFF		System cooling	51
	OSTC		OFF		Tank cooling	52
	OHDP*		OFF		Heat dump	52
DT4 >					Heat exchange	
	DT4O		6.0 K [12.0 °Ra]		Switch-on difference	52
	DT4F		4.0 K [8.0 °Ra]		Switch-off difference	52
	DT4S		10.0 K [20.0 °Ra]		Set difference	53
	RIS4		2 K [4 °Ra]		Rise	53
	MAX4O		60.0 °C [140.0 °F]		Switch-on temperature (maximum limitation)	53
	MAX4F		58.0 °C [136.0 °F]		Switch-off temperature (maximum limitation)	53
	MIN4O		5.0 °C [40.0 °F]		Switch-on temperature (minimum limitation)	53
	MIN4F		10.0 °C [50.0 °F]		Switch-off temperature (minimum limitation)	53
OTH					Thermostat function option	56
PUMP >					Speed	
	PUMP1		OnOF		Speed variant pump 1	45
	PUMP2		OnOF		Speed variant pump 2	45
	PUMP3		OnOF		Speed variant pump 3	45
MAN >					Manual mode	
	MAN1		Auto		Manual mode 1	56
	MAN2		Auto		Manual mode 2	56
	MAN3		Auto		Manual mode 3	56
	MAN4		Auto		Manual mode 4	56
BLPR >			OFF		Blocking protection	56
OTDIS >			OFF		Thermal disinfection option	57
OPARR >			OFF		Parallel relay option	58
OHQM >			OFF		Energy metering option	58
DATE>					Enter date	60
LANG >			dE		Language	61
UNIT >			°C		Unit	60
OSDC >					SD card option	61
CODE			0000		User code	64
RESET			OFF		Factory setting	

* are blocked against each other

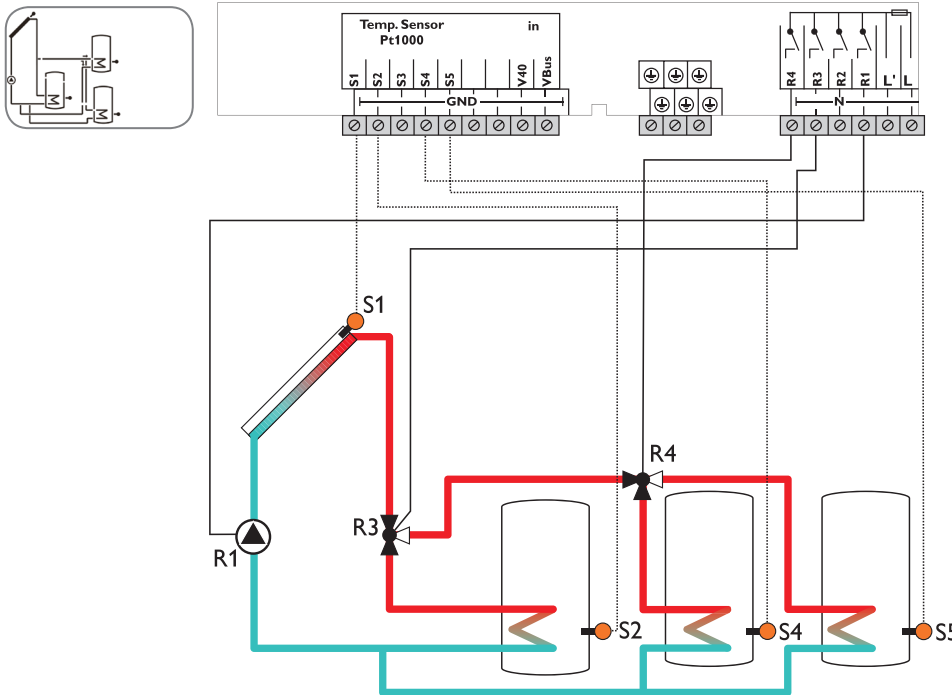
System 5

3-tank solar system with valve logic and priority logic

The controller compares the temperature at sensor S1 to the temperatures at sensors S2, S4 and S5. If the measured temperature differences are higher than the adjusted switch-on temperature differences, the

pump (R1) will be activated and the corresponding tank will be loaded up to the adjusted maximum temperature via the valves (R3, R4). In this system, the desired tank sequence can be adjusted. Depending on

the valve type used, the corresponding valve logic has to be selected.



Sensor/terminal	Designation	Description
S1	TCOL	Temperature collector
S2	TST1B	Temperature tank 1 bottom
S3		Optional sensor for measurement purposes or options
S4	TST2B	Temperature tank 2 bottom
S5	TST3B	Temperature tank 3 bottom
V40		Optional sensor for measurement purposes or options

Relay	Description
R1	Solar pump tank 1
R2	
R3	Valve tank 1/2, 3
R4	Valve tank 2/3

Valve logic	1	2	3	4

Flow direction when the valve is normally open

Adjustment channels

Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
ARR			1	5	System	43
ROSA			0000	225	ROSA number	60
VLOG			1		Valve logic	60
LOAD1 >					Loading 1	
	DT1O		6.0 K [12.0 °Ra]		Switch-on temperature difference 1	44
	DT1F		4.0 K [8.0 °Ra]		Switch-off temperature difference 1	44
	DT1S		10.0 K [20.0 °Ra]		Set temperature difference 1	44
	RIS1		2 K [4 °Ra]		Rise 1	44
	S1MAX		60 °C [140 °F]		Tank maximum limitation 1	44
	SMXS1		2		Sensor tank max 1	44
LOAD2 >					Loading 2	
	DT2O		6.0 K [12.0 °Ra]		Switch-on temperature difference 2	44
	DT2F		4.0 K [8.0 °Ra]		Switch-off temperature difference 2	44
	DT2S		10.0 K [20.0 °Ra]		Set temperature difference 2	44
	RIS2		2 K [4 °Ra]		Rise 2	44
	S2MAX		60 °C [140 °F]		Sensor tank max 2	44
	LST2		ON		Loading tank 2	45
LOAD3					Loading 3	
	DT3O		6.0 K [12.0 °Ra]		Switch-on temperature difference 3	44
	DT3F		4.0 K [8.0 °Ra]		Switch-off temperature difference 3	44
	DT3S		10.0 K [20.0 °Ra]		Set temperature difference 3	44
	RIS3		2 K [4 °Ra]		Rise 3	44
	S3MAX		60 °C [140 °F]		Sensor tank max 3	44
	LST3		ON		Loading tank 3	45
COL >					Collector	
	CEM		130 °C [270 °F]		Collector emergency temperature	46
	OCCO*		OFF		Collector cooling option	46
		CMAX	110 °C [230 °F]		Collector maximum temperature	46
	OCCMN		OFF		Collector minimum limitation option	46
		CMIN	10.0 °C [50.0 °F]		Minimum collector temperature	46
	OTCO		OFF		Evacuated tube collector function option	46
		TCST	07:00		Evacuated tube collector starting time	47
		TCEN	19:00		Evacuated tube collector ending time	47
		TCRU	30 s		Evacuated tube collector runtime	47
		TCIN	30 min		Evacuated tube collector standstill interval	47
	OCCFR		OFF		Collector frost protection option	47
		CFR O	4.0 °C [40.0 °F]		Antifreeze temperature collector on	47

Adjustment channels						
Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
		CFR F	5.0 °C [42.0 °F]		Antifreeze temperature collector off	48
		FRPST	1		Antifreeze tank selection	48
LLOGI >					Loading logic	
	LOGIC		PRIO		Priority logic	48
	PRIO1		1		Priority logic tank 1	48
	OSTS		OFF		Tank set option	50
		TST1	45 °C [120 °F]		Set tank temperature tank 1	50
		TST2	45 °C [120 °F]		Set tank temperature tank 2	50
		TSTS3	45 °C [120 °F]		Set tank temperature tank 3	50
	tLB		2 min		Loading break time	48
	tRUN		15 min		Circulation runtime	48
	PSPEE		OFF		Pause speed option	51
	PDELA		OFF		Pump delay option	51
COOL >					Cooling functions	
	OSYC*		OFF		System cooling	51
	OSTC		OFF		Tank cooling	52
	OHDP*		OFF		Heat dump	52
OTH >					Thermostat function option	56
PUMP >					Speed	
	PUMP1		OnOF		Speed variant pump 1	45
	PUMP2		OnOF		Speed variant pump 2	45
	PUMP3		OnOF		Speed variant pump 3	45
MAN >					Manual mode	
	MAN1		Auto		Manual mode 1	56
	MAN2		Auto		Manual mode 2	56
	MAN3		Auto		Manual mode 3	56
	MAN4		Auto		Manual mode 4	56
BLPR >			OFF		Blocking protection	56
OTDIS >			OFF		Thermal disinfection option	57
OPARR >			OFF		Parallel relay option	58
OHQM >			OFF		Energy metering option	58
DATE >					Enter date	60
LANG >			dE		Language	61
UNIT >			°C		Unit	60
OSDC >					SD card option	61
CODE			0000		User code	64
RESET			OFF		Factory setting	

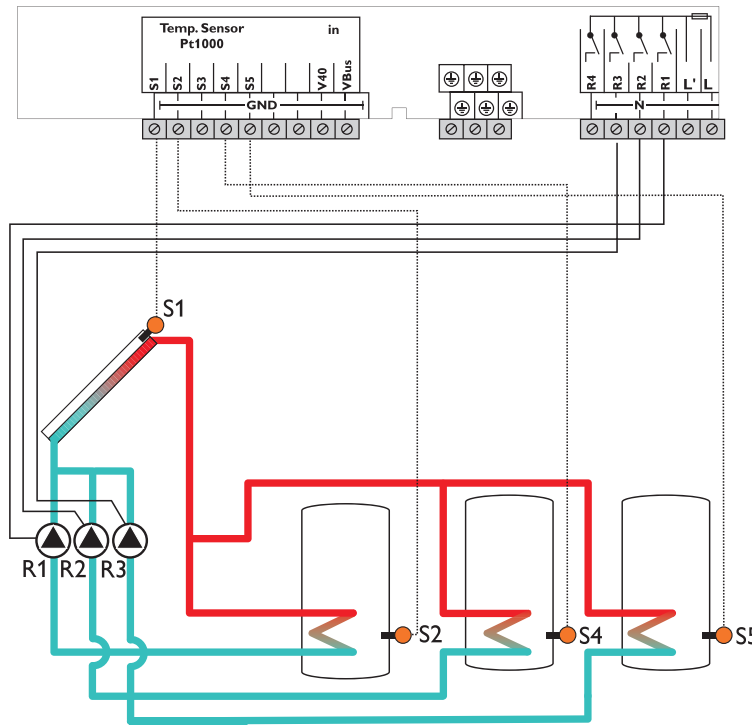
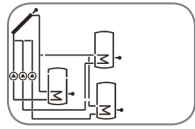
* are blocked against each other

System 6

3-tank solar system with pump logic and priority logic

The controller compares the temperature at sensor S1 to the temperatures at sensors S2, S4 and S5. If the measured temperature differences are higher than the adjusted switch-on temperature differences, the pump

(R1, R2 and/or R3) will be activated and the corresponding tank will be loaded up to the adjusted maximum temperature at most. Priority loading or parallel loading can be carried out in this system.



Sensor/terminal	Designation	Description
S1	TCOL	Temperature collector
S2	TST1B	Temperature tank 1 bottom
S3		Optional sensor for measurement purposes or options
S4	TST2B	Temperature tank 2 bottom
S5	TST3B	Temperature tank 3 bottom
V40		Optional sensor for measurement purposes or options

Relay	Description
R1	Solar pump tank 1
R2	Solar pump tank 2
R3	Solar pump tank 3
R4	optional: Thermal disinfection Parallel relay Heat dump

Adjustment channels						
Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
ARR			1	6	System	43
ROSA			0000	226	ROSA number	60
LOAD1 >					Loading 1	
	DT1O		6.0 K [12.0 °Ra]		Switch-on temperature difference 1	44
	DT1F		4.0 K [8.0 °Ra]		Switch-off temperature difference 1	44
	DT1S		10.0 K [20.0 °Ra]		Set temperature difference 1	44
	RIS1		2 K [4 °Ra]		Rise 1	44
	S1MAX		60 °C [140 °F]		Tank maximum limitation 1	44
	SMXS1		2		Sensor tank max 1	44
LOAD2 >					Loading 2	
	DT2O		6.0 K [12.0 °Ra]		Switch-on temperature difference 2	44
	DT2F		4.0 K [8.0 °Ra]		Switch-off temperature difference 2	44
	DT2S		10.0 K [20.0 °Ra]		Set temperature difference 2	44
	RIS2		2 K [4 °Ra]		Rise 2	44
	S2MAX		60 °C [140 °F]		Tank maximum limitation 2	44
	LST2		ON		Loading tank 2	45
LOAD3 >					Loading 3	
	DT3O		6.0 K [12.0 °Ra]		Switch-on temperature difference 3	44
	DT3F		4.0 K [8.0 °Ra]		Switch-off temperature difference 3	44
	DT3S		10.0 K [20.0 °Ra]		Set temperature difference 3	44
	RIS3		2 K [4 °Ra]		Rise 3	44
	S3MAX		60 °C [140 °F]		Tank maximum limitation 3	44
	LST3		ON		Loading tank 3	45
COL >					Collector	
	CEM		130 °C [270 °F]		Collector emergency temperature	46
	OCCO*		OFF		Collector cooling option	46
		CMAX	110 °C [230 °F]		Collector maximum temperature	46
	OCMN		OFF		Collector minimum limitation option	46
		CMIN	10.0 °C [50.0 °F]		Minimum collector temperature	46
	OTCO		OFF		Evacuated tube collector function option	46
		TCST	07:00		Evacuated tube collector starting time	47
		TCEN	19:00		Evacuated tube collector ending time	47
		TCRU	30 s		Evacuated tube collector runtime	47
		TCIN	30 min		Evacuated tube collector standstill interval	47
	OCFR		OFF		Collector frost protection option	47
		CFR O	4.0 °C [40.0 °F]		Antifreeze temperature collector on	47
		CFR F	5.0 °C [42.0 °F]		Antifreeze temperature collector off	48
		FRPST	1		Antifreeze tank selection	48
LLOGI >					Loading logic	

Adjustment channels

Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
	LOGIC		PRIO		Priority logic	48
	PRIO1		1		Priority logic tank 1	48
	PRIO2		2		Priority logic tank 2	48
	OSTS		OFF		Tank set option	50
		TST1	45 °C [120 °F]		Set tank temperature tank 1	50
		TST2	45 °C [120 °F]		Set tank temperature tank 2	50
		TSTS3	45 °C [120 °F]		Set tank temperature tank 3	50
	OSE		OFF		Spread function option	50
		DTSE	20 K [40 °Ra]		Spread difference	50
		SLSTR	1		Reference tank	50
		SLSTA	2		Absorption tank	50
	tLB		2 min		Loading break time	48
	tRUN		15 min		Circulation runtime	48
	PSPEE		OFF		Pause speed option	51
COOL >					Cooling functions	
	OSYC*		OFF		System cooling	51
	OSTC		OFF		Tank cooling	52
	OHDP*		OFF		Heat dump	52
OTH >					Thermostat function option	56
PUMP >					Speed	
	PUMP1		OnOF		Speed variant pump 1	45
	PUMP2		OnOF		Speed variant pump 2	45
	PUMP3		OnOF		Speed variant pump 3	45
MAN >					Manual mode	
	MAN1		Auto		Manual mode 1	56
	MAN2		Auto		Manual mode 2	56
	MAN3		Auto		Manual mode 3	56
	MAN4		Auto		Manual mode 4	56
BLPR >			OFF		Blocking protection	56
OTDIS >			OFF		Thermal disinfection option	57
OPARR >			OFF		Parallel relay option	58
OHQM >			OFF		Energy metering option	58
DATE >					Enter date	60
LANG >			dE		Language	61
UNIT >			°C		Unit	60
OSDC >					SD card option	61
CODE			0000		User code	64
RESET			OFF		Factory setting	

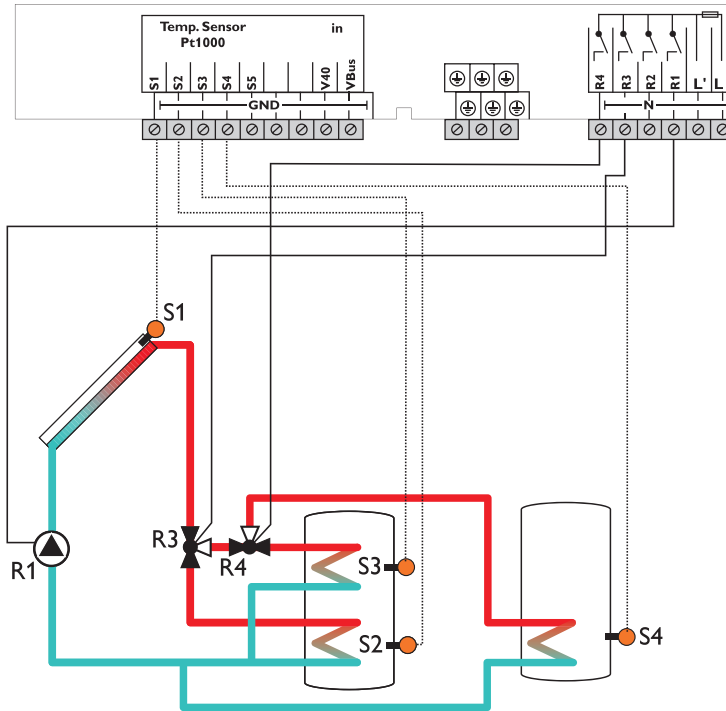
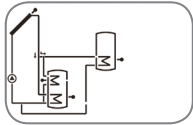
* are blocked against each other

System 7

Solar system with vertical tank loading and 2nd tank

The controller compares the temperature at sensor S1 to the temperatures at sensors S2, S3 and S4. If the measured temperature differences are higher than the adjusted switch-on temperature differences, the pump (R1) will be activated (see speed control) and

the corresponding tank or tank zone will be loaded up to the adjusted maximum temperature via the valves (R3, R4). Depending on the valve type used, the corresponding valve logic has to be selected.

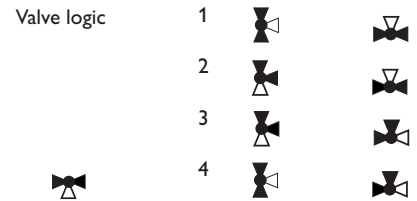


Note

A solar system with vertical tank loading is implemented as a 2-tank system. (tank bottom = tank 1; tank top = tank 2; additional tank = tank 3)

Sensor/terminal	Designation	Description
S1	TCOL	Temperature collector
S2	TST1B	Temperature tank 1 bottom (tank 1)
S3	TST1T	Temperature tank 1 top (tank 2)
S4	TST3B	Temperature tank 2 bottom (tank 3)
S5		Optional sensor for measurement purposes or options
V40		

Relay	Description
R1	Solar pump tank 1
R2	optional: Thermal disinfection Parallel relay Heat dump
R3	Valve tank 1, 2 / 3
R4	Valve tank 2 / 3



Flow direction when the valve is normally open

Adjustment channels

Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
ARR			1	7	System	43
ROSA			0000	227	ROSA number	60
VLOG			1		Valve logic	
LOAD1 >					Loading 1	
	DT1O		6.0 K [12.0 °Ra]		Switch-on temperature difference 1	44
	DT1F		4.0 K [8.0 °Ra]		Switch-off temperature difference 1	44
	DT1S		10.0 K [20.0 °Ra]		Set temperature difference 1	44
	RIS1		2 K [4 °Ra]		Rise 1	44
	S1MAX		60 °C [140 °F]		Tank maximum limitation 1	44
	SMXS1		2		Sensor tank max 1	44
LOAD2 >					Loading 2	
	DT2O		6.0 K [12.0 °Ra]		Switch-on temperature difference 2	44
	DT2F		4.0 K [8.0 °Ra]		Switch-off temperature difference 2	44
	DT2S		10.0 K [20.0 °Ra]		Set temperature difference 2	44
	RIS2		2 K [4 °Ra]		Rise 2	44
	S2MAX		60 °C [140 °F]		Tank maximum limitation 2	44
	LST2		ON		Loading tank 2	45
LOAD3 >						
	DT3O		6.0 K [12.0 °Ra]		Switch-on temperature difference 3	44
	DT3F		4.0 K [8.0 °Ra]		Switch-off temperature difference 3	44
	DT3S		10.0 K [20.0 °Ra]		Set temperature difference 3	44
	RIS3		2 K [4 °Ra]		Rise 3	44
	S3MAX		60 °C [140 °F]		Tank maximum limitation 3	44
	SMXS3		4		Sensor tank max 3	44
	LST3		ON		Loading tank 3	45
COL >					Collector	
	CEM		130 °C [270 °F]		Collector emergency temperature	46
	OCCO*		OFF		Collector cooling option	46
		C MAX	110 °C [230 °F]		Collector maximum temperature	46
	OCMN		OFF		Collector minimum limitation option	46
		C MIN	10.0 °C [50.0 °F]		Minimum collector temperature	46
	OTCO		OFF		Evacuated tube collector function option	46
		TCST	07:00		Evacuated tube collector starting time	47
		TCEN	19:00		Evacuated tube collector ending time	47
		TCRU	30 s		Evacuated tube collector runtime	47
		TCIN	30 min		Evacuated tube collector standstill interval	47
	OCFR		OFF		Collector frost protection option	47
		CFR O	4.0 °C [40.0 °F]		Antifreeze temperature collector on	47

Adjustment channels						
Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
		CFR F	5.0 °C [42.0 °F]		Antifreeze temperature collector off	48
		FRPST	1		Antifreeze tank selection	48
LLOGI >					Loading logic	
	LOGIC		PRIO		Priority logic	48
	PRIO1		2		Priority logic tank 1	48
	PRIO2		1		Priority logic tank 2	48
	OSTS		OFF		Tank set option	50
		TST1	45 °C [120 °F]		Set tank temperature tank 1	50
		TST2	45 °C [120 °F]		Set tank temperature tank 2	50
		TSTS3	45 °C [120 °F]		Set tank temperature tank 3	50
	tLB		2 min		Loading break time	48
	tRUN		15 min		Circulation runtime	48
	PSPEE		OFF		Pause speed option	51
	PDELA		OFF		Pump delay option	51
COOL >					Cooling functions	
	OSYC*		OFF		System cooling	51
	OSTC		OFF		Tank cooling	52
	OHDP*		OFF		Heat dump	52
OTH >					Thermostat function option	56
PUMP >					Speed	
	PUMP1		OnOF		Speed variant pump 1	45
	PUMP2		OnOF		Speed variant pump 2	45
	PUMP3		OnOF		Speed variant pump 3	45
MAN >					Manual mode	
	MAN1		Auto		Manual mode 1	56
	MAN2		Auto		Manual mode 2	56
	MAN3		Auto		Manual mode 3	56
	MAN4		Auto		Manual mode 4	56
BLPR >			OFF		Blocking protection	56
OTDIS >			OFF		Thermal disinfection option	57
OPARR >			OFF		Parallel relay option	58
OHQM >			OFF		Energy metering option	58
DATE >					Enter date	60
LANG >			dE		Language	61
UNIT >			°C		Unit	60
OSDC >					SD card option	61
CODE			0000		User code	64
RESET			OFF		Factory setting	

* are blocked against each other

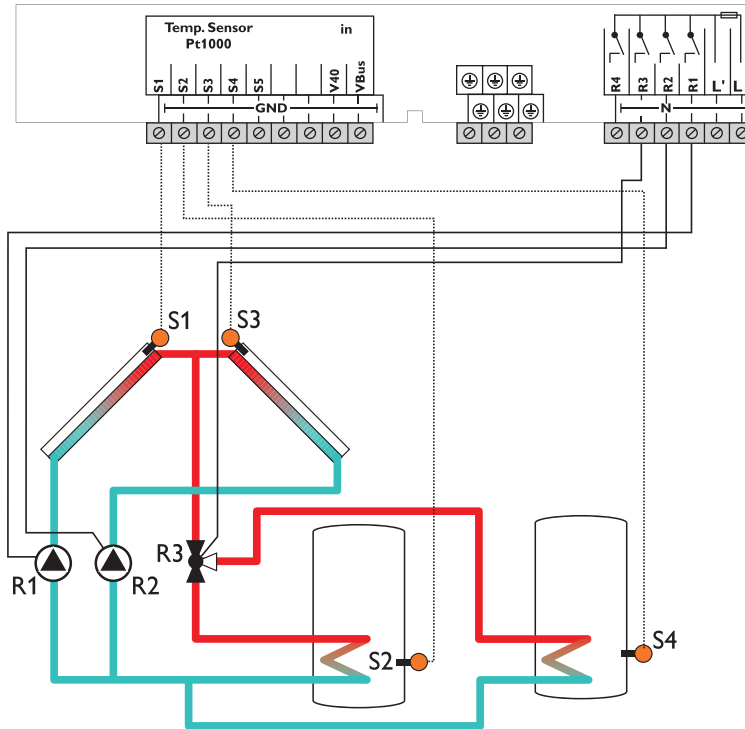
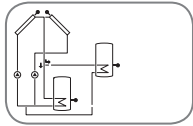
System 8

Solar system with east-/west collectors and 2 tanks (valve logic)

The controller compares the temperatures at the collector sensors S1 and S3 to the temperatures at S2 and S4. If one of the measured temperature differ-

ences is higher than the adjusted switch-on temperature differences, the corresponding pump (R1, R2) or both pumps will be activated and the corresponding tank

will be loaded up to the adjusted maximum temperature via the valve (R3).



Note: 3-port valve normally open - tank 1 (S2)

Sensor/terminal	Designation	Description
S1	TCOL1	Temperature collector 1
S2	TST1B	Temperature tank 1 bottom
S3	TCOL2	Temperature collector 2
S4	TST2B	Temperature tank 2 bottom
S5		Optional sensor for measurement purposes or options
V40		

Relay	Description
R1	Solar pump collector 1
R2	Solar pump collector 2
R3	3-port valve tank 1/2
R4	optional: Thermal disinfection Parallel relay Heat dump

Adjustment channels

Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
ARR			1	23	System	43
ROSA			0000	29	ROSA number	
LOAD1 >					Loading 1	
	DT1O		6.0 K [12.0 °Ra]		Switch-on temperature difference 1	43
	DT1F		4.0 K [8.0 °Ra]		Switch-off temperature difference 1	43
	DT1S		10.0 K [20.0 °Ra]		Set temperature difference 1	43
	RIS1		2 K [4 °Ra]		Rise 1	43
	S1MAX		60 °C [140 °F]		Tank maximum limitation 1	44
	SMXS1		2		Sensor tank max 1	44
LOAD2 >					Loading 2	
	DT2O		6.0 K [12.0 °Ra]		Switch-on temperature difference 2	43
	DT2F		4.0 K [8.0 °Ra]		Switch-off temperature difference 2	44
	DT2S		10.0 K [20.0 °Ra]		Set temperature difference 2	44
	RIS2		2 K [4 °Ra]		Rise 2	44
	S2MAX		60 °C [140 °F]		Tank maximum limitation 2	44
	SMXS2		4		Sensor tank max 2	44
	LST2		ON		Loading tank 2	45
COL 1 >					Collector 1	
	CEM1		130 °C [270 °F]		Collector emergency temperature 1	46
	OCCO1*		OFF		Collector cooling option 1	46
		CMAX1	110 °C [230 °F]		Maximum collector temperature 1	46
	OCCI1		OFF		Collector minimum limitation option 1	46
		CMIN1	10.0 °C [50.0 °F]		Minimum collector temperature 1	46
	OTCO1		OFF		Evacuated tube collector function option 1	46
		TCST1	07:00		Evacuated tube collector starting time 1	47
		TCEN1	19:00		Evacuated tube collector ending time 1	47
		TCRU1	30 s		Evacuated tube collector runtime 1	47
		TCIN1	30 min		Evacuated tube collector standstill interval 1	47
	O CFR		OFF		Collector frost protection option	47
		CFR O	4.0 °C [40.0 °F]		Antifreeze temperature collector on	47
		CFR F	5.0 °C [42.0 °F]		Antifreeze temperature collector off	47
		FRPST	1		Antifreeze tank selection	47
COL 2 >					Collector 2	
	CEM2		130 °C [270 °F]		Collector emergency temperature 2	46
	OCCO2*		OFF		Collector cooling option 2	46
		CMAX2	110 °C [230 °F]		Maximum collector temperature 2	46
	OCCI2		OFF		Collector minimum limitation option 2	46
		CMIN2	10.0 °C [50.0 °F]		Minimum collector temperature 2	46
	OTCO2		OFF		Evacuated tube collector function option 2	46
		TCST2	07:00		Evacuated tube collector starting time 2	46

Adjustment channels

Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
		TCEN2	19:00		Evacuated tube collector ending time 2	46
		TCRU2	30 s		Evacuated tube collector runtime 2	46
		TCIN2	30 min		Evacuated tube collector standstill interval 2	46
LLOGI >					Loading logic	
	LOGIC		PRIO		Priority logic	48
	PRIO1		1		Priority logic tank 1	48
	OSTS		OFF		Tank set option	48
		TST1	45 °C [120 °F]		Set tank temperature tank 1	48
		TST2	45 °C [120 °F]		Set tank temperature tank 2	48
	tLB		2 min		Loading break time	48
	tRUN		15 min		Circulation runtime	48
	PSPEE		OFF		Pause speed option	51
	PDELA		OFF		Pump delay option	51
COOL >					Cooling functions	
	OSYC*		OFF		System cooling	51
	OSTC		OFF		Tank cooling	51
	OHDP*		OFF		Heat dump	51
OTH >					Thermostat function option	56
PUMP >					Speed	
	PUMP1		OnOF		Speed variant pump 1	45
	PUMP2		OnOF		Speed variant pump 2	45
	PUMP3		OnOF		Speed variant pump 3	45
MAN >					Manual mode	
	MAN1		Auto		Manual mode 1	56
	MAN2		Auto		Manual mode 2	56
	MAN3		Auto		Manual mode 3	56
	MAN4		Auto		Manual mode 4	56
BLPR >			OFF		Blocking protection	56
OTDIS >			OFF		Thermal disinfection option	57
OPARR >			OFF		Parallel relay option	58
OHQM >			OFF		Energy metering option	58
DATE>					Enter date	58
LANG >			dE		Language	61
UNIT >			°C		Unit	60
OSDC >					SD card option	61
CODE			0000		User code	64
RESET			OFF		Factory setting	

* are blocked against each other

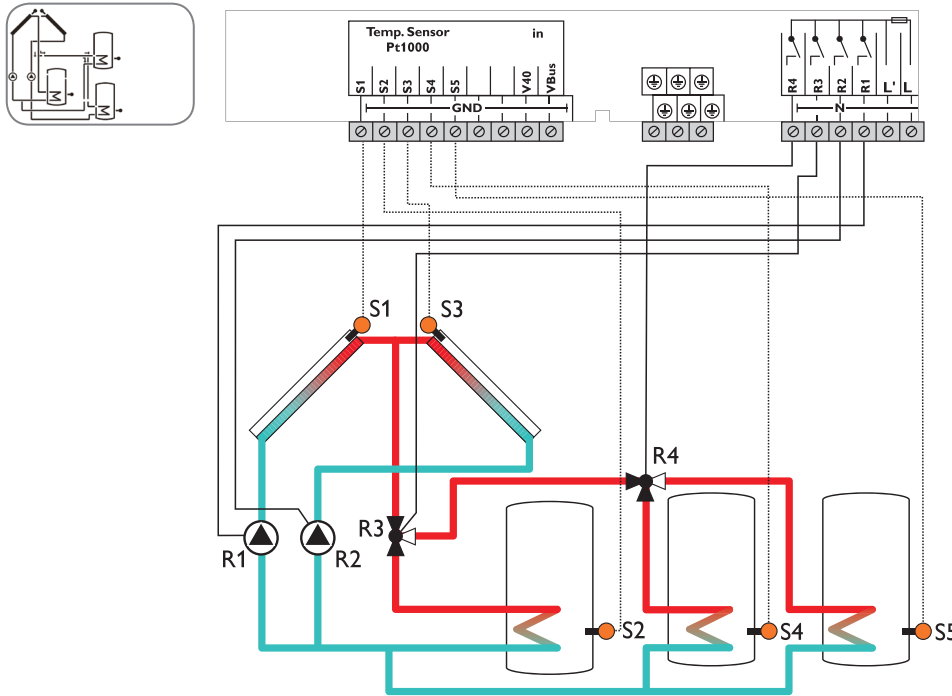
System 9

3-tank solar system with east-/west collectors

The controller compares the temperatures at the collector sensors S1 and S3 to the tank temperatures at the sensors S2, S4 and S5. If one of the measured

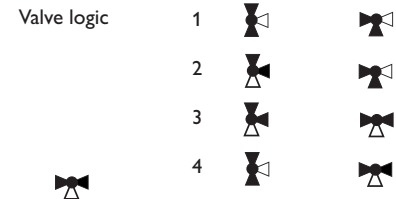
temperature differences is higher than the adjusted switch-on temperature differences, the corresponding pump (R1, R2) will be activated and the correspond-

ing tank will be loaded up to the adjusted maximum temperature via the valves R3, R4. In this system, one of the tanks can be loaded with priority.



Sensor/terminal	Designation	Description
S1	TCOL	Temperature collector 1
S2	TST1B	Temperature tank 1 bottom
S3	TCOL2	Temperature collector 2
S4	TST2B	Temperature tank 2 bottom
S5	TST3B	Temperature tank 3 bottom
V40		optional: flowmeter

Relay	Description
R1	Solar pump tank 1
R2	Solar pump tank 2
R3	Valve tank 1/2, 3
R4	Valve tank 2/3



Flow direction when the valve is normally open

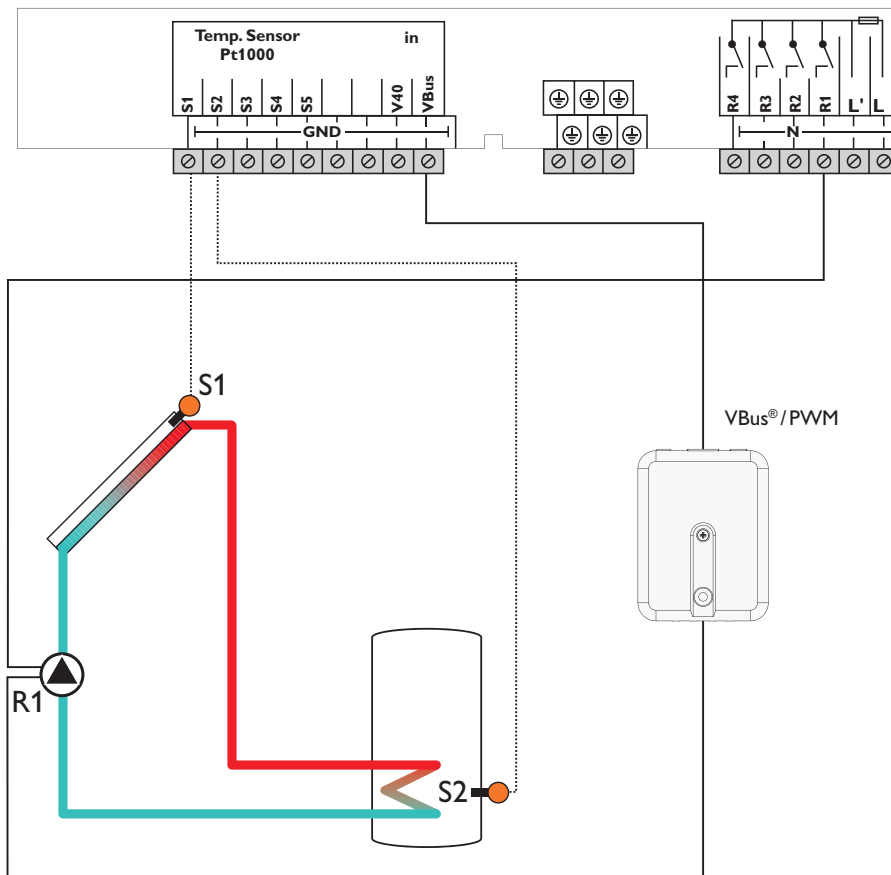
Adjustment channels						
Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
ARR			1	9	System	43
ROSA			0000	228	ROSA number	60
VLOG			1		Valve logic	
LOAD1 >					Loading 1	
	DT1O		6.0 K [12.0 °Ra]		Switch-on temperature difference 1	44
	DT1F		4.0 K [8.0 °Ra]		Switch-off temperature difference 1	44
	DT1S		10.0 K [20.0 °Ra]		Set temperature difference 1	44
	RIS1		2 K [4 °Ra]		Rise 1	44
	S1MAX		60 °C [140 °F]		Tank maximum limitation 1	44
LOAD2 >					Loading 2	
	DT2O		6.0 K [12.0 °Ra]		Switch-on temperature difference 2	44
	DT2F		4.0 K [8.0 °Ra]		Switch-off temperature difference 2	44
	DT2S		10.0 K [20.0 °Ra]		Set temperature difference 2	44
	RIS2		2 K [4 °Ra]		Rise 2	44
	S2MAX		60 °C [140 °F]		Tank maximum limitation 2	44
	LST2		ON		Loading tank 2	45
LOAD3 >					Loading 2	
	DT3O		6.0 K [12.0 °Ra]		Switch-on temperature difference 3	44
	DT3F		4.0 K [8.0 °Ra]		Switch-off temperature difference 3	44
	DT3S		10.0 K [20.0 °Ra]		Set temperature difference 3	44
	RIS3		2 K [4 °Ra]		Rise 3	44
	LST3		ON		Loading tank 3	45
COL 1 >					Collector	
	CEM		130 °C [270 °F]		Collector emergency temperature	46
	OCCO*		OFF		Collector cooling option	46
		CMAX	110 °C [230 °F]		Collector maximum temperature	46
	OCMN		OFF		Collector minimum limitation option	46
		CMIN	10.0 °C [50.0 °F]		Minimum collector temperature	46
	OTCO		OFF		Evacuated tube collector function option	46
		TCST	07:00		Evacuated tube collector starting time	47
		TCEN	19:00		Evacuated tube collector ending time	47
		TCRU	30 s		Evacuated tube collector runtime	47
		TCIN	30 min		Evacuated tube collector standstill interval	47
	O CFR		OFF		Collector frost protection option	47
		CFR O	4.0 °C [40.0 °F]		Antifreeze temperature collector on	47
		CFR F	5.0 °C [42.0 °F]		Antifreeze temperature collector off	48
		FRPST	1		Antifreeze tank selection	48
COL 2 >					Collector 2	
	CEM2		130 °C [270 °F]		Collector emergency temperature 2	46
	OCCO2*		OFF		Collector cooling option 2	46
		C MAX2	110 °C [230 °F]		Maximum collector temperature 2	46

Adjustment channels						
Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
	OCMI2		OFF		Collector minimum limitation option 2	46
		CMIN2	10.0 °C [50.0 °F]		Minimum collector temperature 2	46
	OTCO2		OFF		Evacuated tube collector function option 2	46
		TCST2	07:00		Evacuated tube collector starting time 2	46
		TCEN2	19:00		Evacuated tube collector ending time 2	46
		TCRU2	30 s		Evacuated tube collector runtime 2	46
		TCIN2	30 min		Evacuated tube collector standstill interval 2	46
LLOGI >					Loading logic	
	LOGIC		PRIO		Priority logic	48
	PRIO1		1		Priority logic tank 1	48
	PRIO2		2		Priority logic tank 2	48
	OSTS		OFF		Tank set option	50
		TST1	45 °C [120 °F]		Set tank temperature tank 1	50
		TST2	45 °C [120 °F]		Set tank temperature tank 2	50
		TSTS3	45 °C [120 °F]		Set tank temperature tank 3	50
	tLB		2 min		Loading break time	48
	tRUN		15 min		Circulation runtime	48
	PSPEE		OFF		Pause speed option	51
	PDELA		OFF		Pump delay option	51
COOL >					Cooling functions	
	OSYC*		OFF		System cooling	51
	OSTC		OFF		Tank cooling	52
PUMP >					Speed	
	PUMP1		OnOF		Speed variant pump 1	45
	PUMP2		OnOF		Speed variant pump 2	45
	PUMP3		OnOF		Speed variant pump 3	45
MAN >					Manual mode	
	MAN1		Auto		Manual mode 1	56
	MAN2		Auto		Manual mode 2	56
	MAN3		Auto		Manual mode 3	56
	MAN4		Auto		Manual mode 4	56
BLPR >			OFF		Blocking protection	56
OHQM >			OFF		Energy metering option	58
DATE >					Enter date	60
LANG >			dE		Language	61
UNIT >			°C		Unit	60
OSDC >					SD card option	61
CODE			0000		User code	
RESET			OFF		Factory setting	

* are blocked against each other

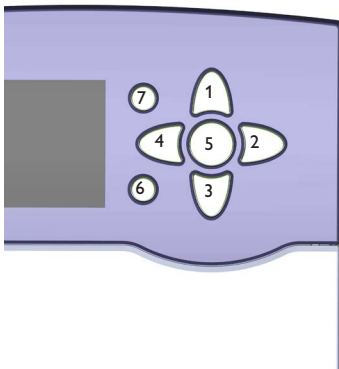
Electrical connection of a high-efficiency pump (HE pump)

Speed control of a HE pump is possible via a PWM signal. In addition to the relay connection, the pump must also be connected to the controller via the VBus®/PWM interface adapter. In the PUMP adjustment channel, ADAP has to be selected.



3 Operation and function

3.1 Buttons



The controller is operated via the 7 buttons next to the display. They have the following functions:

Button 1 - scrolling upwards

Button 3 - scrolling downwards

Button 2 - increasing adjustment values

Button 4 - reducing adjustment values

Button 5 - confirming

Button 6 - menu button for changing between the status and the menu level

Button 7 - escape button for changing into the previous menu

3.2 Selecting menu points and adjusting values

During normal operation of the controller, the display is in the status level.

In order to leave the status level and access the menu level, press button 6.

The display indicates the level with the selectable menu. In order to change the parameters of a menu item, select the menu item and press button 5. The display changes to the adjustment level. The adjustment channels are characterized by the indication **SET**.

- Select the desired channel by pressing the buttons 1 and 3
- Confirm the selection with button 5, **SET** starts flashing (adjustment mode)
- Adjust the value, the function or the option using the buttons 2 and 4
- Confirm the selection with button 5, **SET** permanently appears, the adjustment has been saved.

If no button has been pressed within a couple of minutes, the adjustment is cancelled and the previous value is retained.

3.3 Menu structure

Status level

TCOL

TST1B

...

Menu level

ARR

LOAD1

LOAD2

LOAD3

COL

COL1

COL2

LLOGI

...

Adjustment level

DT O

DT F

DT S

RIS

S MAX

SMXS

...

The menu structure of the controller consists of 3 levels: the status level, the menu level and the adjustment level.

The status level consists of different display channels which indicate display values and messages.

The menu level consists of different menu items each of which is divided into sub-menus and adjustment channels. Each of these menu items represents a function or option which can be selected. If a function or option is selected, the controller changes to the adjustment level in which the corresponding parameters of the function or option are available.

In order to activate or deactivate a function, it must be selected in the menu level. The display changes to the adjustment menu in which all adjustments required can be carried out.

During normal operation of the controller, the display is in the status level.



Note

Some of the menu items depend on the selected system and the adjusted options. Therefore, they are only displayed if they are available.



Note

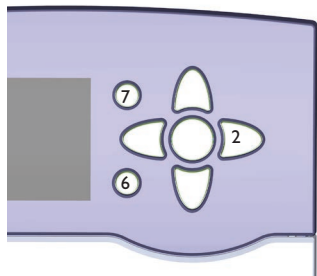
The abstract from the menu structure shown on page 35 is for information on the structure of the controller menu and is therefore not complete.

Menu level

If it is possible to jump into a sub-level, **PUSH** is indicated below the menu item. Use button (5) to access the menu. In order to leave the menu, press button (7).

If an option is deactivated, it will appear in the menu level with the addition **OFF**.

3.4 Shortcut



The controller is equipped with a shortcut that enables a quick access to the **MAN** menu (manual mode).

→ In order to access the **MAN** menu, press buttons (6) and (7) at the same time, then press button (2).

3.5 Indications and system monitoring display

The system monitoring display consists of 3 areas: channel display, tool bar and system screen.

Channel display



The channel display consists of 2 lines. The upper display line is an alphanumeric 16-segment display. In this line, mainly channel names and menu items are displayed. In the lower 7-segment display, channel values and the adjustment parameters are displayed.

Temperatures and temperature differences are indicated with the unit (°C / °F or K / °R respectively).

Tool bar

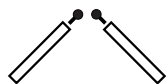
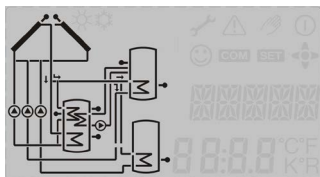


The additional symbols in the tool bar indicate the current system state.

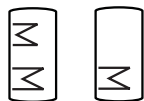
Symbol	normal	flashing
	Relay active	
	Maximum tank limitation active / maximum tank temperature exceeded	Collector cooling function active System cooling, tank cooling active
	Antifreeze function activated	Collector minimum limitation active Antifreeze function active
		Collector emergency shutdown
		Sensor fault
		Manual mode active
		Tank emergency shutdown active
		Adjustment channel is being changed (set mode)
	SD card is being used	SD card is full
	Indication of the buttons available in the menu item	
	Normal operation	

System screen in the system monitoring display

The system selected is indicated in the system monitoring display. It consists of several system component symbols which are – depending on the current status of the system – either flashing, permanently shown or “hidden”.



Collectors with collector sensor



Tanks 1, 2 and 3 with heat exchanger



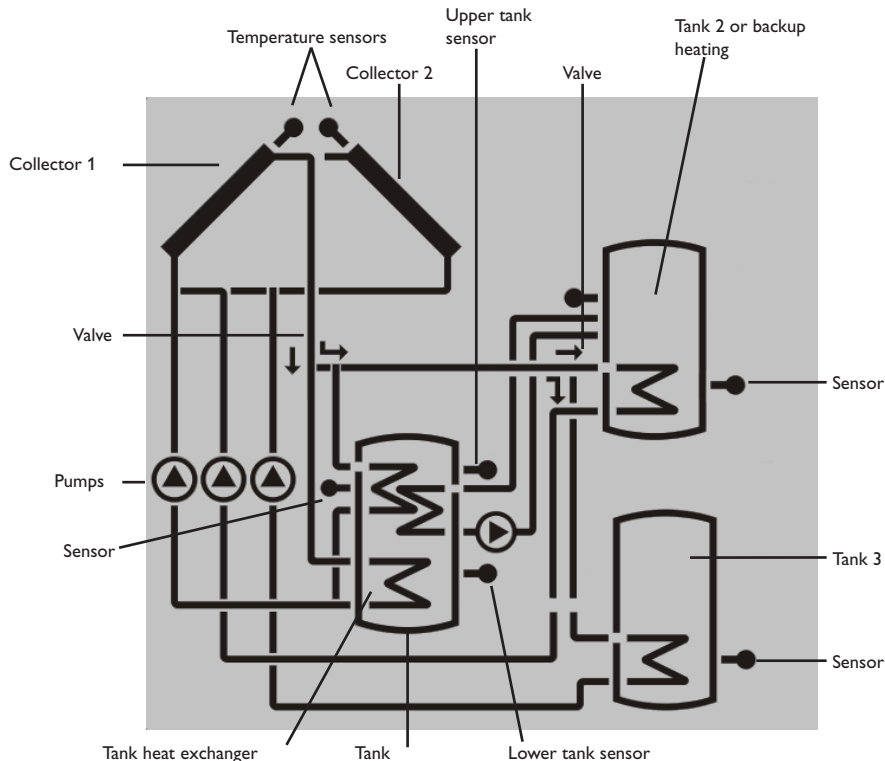
3-port valves
Only the flow direction or current switching position are indicated.



Temperature sensor



Pump



3.6 Further indications

Fault indication

If the controller detects a malfunction, the directional pad flashes red and the symbols of the warning triangle and the wrench are additionally displayed.

Smiley

If the controller operates faultlessly (normal operation), a smiley is displayed.

4 Status menu

During normal operation of the controller, the display is in the status level. This one indicates the measurement values shown in the table.

In addition to the display values, possible error messages are indicated in the status menu (see page 64).

Display	Description
S5	Temperature sensor 5
DTS1	Temperature heat source ΔT function
DTS2	Temperature heat sink ΔT function
SENTH	Temperature thermostat function
TFHQM	Temperature flow energy metering
TRHQM	Temperature return energy metering
n1 %	Speed relay 1
n2 %	Speed relay 2
n3 %	Speed relay 3
h R1	Operating hours relay 1
h R2	Operating hours relay 2
h R3	Operating hours relay 3
h R4	Operating hours relay 4
L/h	Flow rate
kWh	Heat quantity in kWh
MWh	Heat quantity in MWh
TDIS	Temperature thermal disinfection
CDIS	Countdown of monitoring period (thermal disinfection)
DDIS	Countdown of heating period (thermal disinfection)
TIME	Time
DATE	Date

Display	Description
---------	-------------

BLPR1	Blocking protection R1
BLPR2	Blocking protection R2
BLPR3	Blocking protection R3
BLPR4	Blocking protection R4
DTFCT	Differential function active
THERM	Thermostat function active
TCOL	Temperature collector
TCOL1	Temperature collector 1
TST1B	Temperature tank 1 bottom
TSTT	Temperature tank top
S3	Temperature sensor 3
TST2B	Temperature tank 2 bottom
TST3B	Temperature tank 3 bottom
TST2T	Temperature tank 2 top
S4	Temperature sensor 4
TCOL2	Temperature collector 2

5 Initial commissioning

When the hydronic system is filled and ready for operation, connect the controller to the power supply.

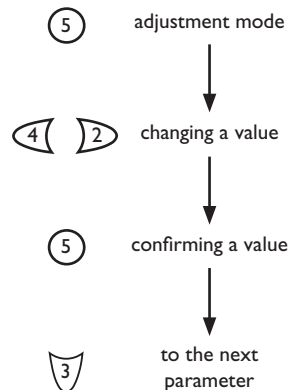
The controller runs an initialization phase in which all symbols are indicated in the display. The directional pad flashes red.

When the controller is commissioned for the first time or when it is reset, it will run a commissioning menu after the initialization phase. The commissioning menu leads the user through the most important adjustment channels needed for operating the system and starts with the indication of the BX L version number.

Commissioning menu

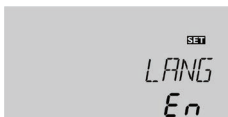
The commissioning menu consists of the channels described in the following. In order to make an adjustment, push button **5**. The set symbol flashes and the adjustment can be made. Confirm the adjustment with button **5**. Push button **3**, the next channel will appear in the display.

button navigation



1. Language:

→ Adjust the desired menu language.



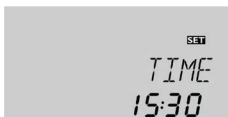
2. Unit:

→ Adjust the desired unit.



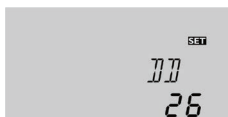
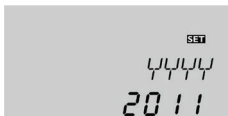
3. Time:

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



4. Date:

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



5. System:

→ Adjust the desired system.



6. ROSA:

→ Enter the 4-digit number given by the RESOL On-line Service Assistant.



Note

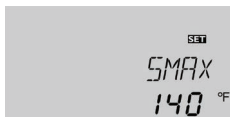
If the desired system layout has been selected in the ARR channel, the ROSA channel can be skipped.

7. Valve logic:

→ Adjust the valve variant of the 3-port valves

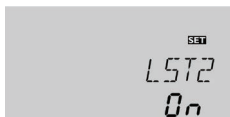
8. Maximum tank temperature:

→ Adjust the maximum tank temperature
In 3-tank systems, the adjustment has to be carried out for **S2MAX** and **S3MAX** as well.



9. Loading tank 2 and tank 3

→ Switch on or off the "loading tank 2" / "loading tank 3" option.



10. Pump control type:

→ Adjust the type of pump control for **PUMP1**.
Carry out this adjustment for PUMP2, PUMP3 if needed.



11. Minimum speed:

→ Adjust the minimum speed of the pump PUMP1.
For systems with 3 pumps, the adjustments must also be carried out for PUMP2, PUMP3



12. Maximum speed:

→ Adjust the maximum speed of the pump PUMP1.
For systems with 2 or 3 pumps, the adjustments must also be made for PUMP2, PUMP3.



→ **Complete the commissioning menu by pressing button 5:**

The controller is then ready for operation and normally the factory settings will give close to optimum operation.



Note

The valve variant can only be adjusted in systems with two 3-port valves (ARR 5,7,9).



Note

"Loading tank 3" can only be adjusted if a 3-tank system or vertical tank loading has been selected in the sub-channel **ARR**.



Note

The minimum speed can only be adjusted if burst control (PULS) or speed control via an adapter (ADAP) has been selected in the sub-channel **PUMP1,2,3**.



Note

The maximum speed can only be adjusted if burst control (PULS) or speed control via an adapter (ADAP) has been selected in the sub-channel **PUMP1,2,3**.



6 Functions and options

6.1 Status level



Note

The values and adjustment channels shown depend on the selected system, the functions and options and will only be displayed in the expert level.

Display of collector temperatures



TCOL (1, 2)

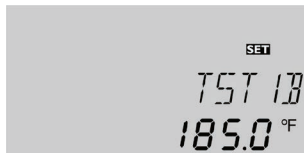
Collector temperature

Display range: -40.0 ... +260.0 °C [-40.0 ... 500.0 °F]

Displays the current collector temperature.

- **TCOL** : Collector temperature (1-collector system)
- **TCOL1** : Collector temperature 1 (2-collector system)
- **TCOL2** : Collector temperature 2 (2-collector system)

Display of tank temperatures



TST1 (2, 3)B, TST1 (2)T

Tank temperatures

Display range: -40.0 ... +260.0 °C [-40.0 ... 500.0 °F]

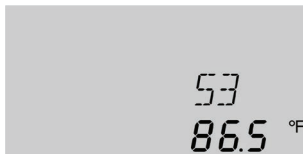
Displays the current tank temperature.

- **TST1T** : Temperature tank 1 top
- **TST1B** : Temperature tank 1 bottom
- **TST2T** : Temperature tank 2 top
- **TST2B** : Temperature tank 2 bottom

in 3-tank systems only:

- **TST3B** : Temperature tank 3 bottom

Display of temperatures at S3, S4 and S5



S3, S4, S5

Sensor temperatures

Display range: -40.0 ... +260.0 °C [-40.0 ... 500.0 °F]

Indicates the current temperature at the corresponding additional sensor (without control function).

- **S3** : Temperature sensor 3
- **S4** : Temperature sensor 4
- **S5** : Temperature sensor 5

Display of further temperatures



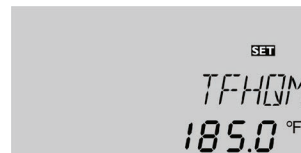
Note

Only if temperature sensors are connected, will S3, S4 and S5 be displayed.



Note

For heat exchange etc., S3/S5 are used as heat source / heat sink sensor respectively.



DTS1, DTS2, SENTH,

TFHQM, TRHQM

Further measured temperatures

Display range: -40.0 ... +260.0 °C [-40.0 ... 500.0 °F]

Indicates the current temperature at the corresponding sensor. The display of these temperatures depends on the system selected.

- **DTS1** : Temperature heat source ΔT function
- **DTS2** : Temperature heat sink ΔT function
- **SENTH** : Temperature thermostat function
- **TFHQM** : Temperature flow (HQM)
- **TRHQM** : Temperature return (HQM)

Display of flow rate



L/H

Flow rate

Display range: 0 ... 9999 l/h

Indicates the flow rate in the solar system during energy metering.

During heat quantity balancing, the fixed flow rate value adjusted is indicated.

Display of speed



N1% , N2% , N3%

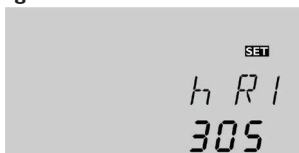
Current pump speed

Display range: 30 ... 100%

20 ... 100% if ADAP is adjusted

Indicates the current speed of the corresponding pump.

Operating hours counter



HR (1, 2, 3, 4)

Operating hours counter

The operating hours counter accumulates the solar operating hours of the relay (h R1 / h R2 / h R3 / h R4). Full hours are displayed.

The accumulated operating hours value can be set back to 0. As soon as one operating hours channel is selected, the symbol **SET** is displayed.

→ In order to access the RESET mode of the counter, press the set button **(S)**.

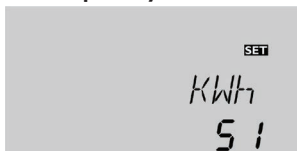
The **SET** symbol flashes and the security enquiry appears.

→ Confirm the security enquiry by selecting "Yes"

→ Confirm the reset with the set button **(S)** in order to finish the reset.

In order to interrupt the RESET process, do not press any button for about 5 s. The display returns to the display mode.

Display of heat quantity



kWh/MWh:

Heat quantity in kWh / MWh

Indicates the heat quantity produced in the system. For this purpose, the energy metering option has to be activated.

The flow rate as well as the values of the reference sensors S1 (flow) and S4 (return) are used for calculating the heat quantity supplied. It is shown in kWh in the channel **kWh** and in MWh in the channel **MWh**. The overall heat quantity results from the sum of both values.

The accumulated heat quantity value can be set back to 0. As soon as one of the display channels of the heat quantity is selected, the **SET** symbol is displayed.

→ In order to access the RESET mode of the counter, press the set button **(S)**.

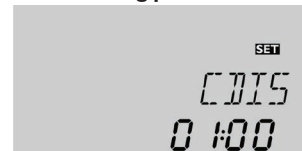
The **SET** symbol flashes and the security enquiry appears.

→ Confirm the security enquiry by selecting "Yes"

→ Confirm the reset with the set button in order to finish the reset.

In order to interrupt the RESET process, no button should be pressed for about 5 s. The display returns to the display mode.

Display of monitoring period



CDIS

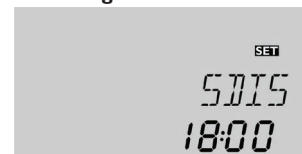
Countdown of the monitoring period

Display range:

0 ... 30:0 ... 24 (dd:hh)

If the thermal disinfection option (**OTDIS**) is activated and the monitoring period is in progress, the remaining time of the monitoring period is displayed as **CDIS** (in hours and minutes), counting backwards.

Display of starting time



SDIS

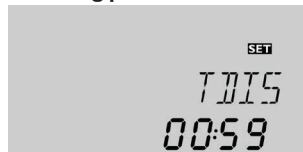
Starting time

Display range:

0:00 ... 24:00 (o'clock)

If the thermal disinfection option (**OTDIS**) is activated and starting delay time has been adjusted, the adjusted delay time is displayed (flashing) in this channel.

Display of heating period



TDIS

Heating period

Display range:

0:00 ... 23:59 (hh:mm)

If the thermal disinfection option (**OTDIS**) is activated and the heating period is in progress, the remaining time of the heating period is displayed (in hours and minutes) in this channel, counting backwards.

Display of time



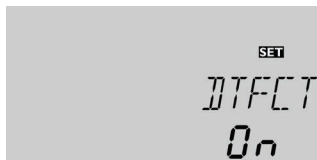
TIME

Time

Adjust the current clock time.

The following display channels are only indicated when the corresponding function is active.

Display ΔT function active



DTFCT

ΔT function active

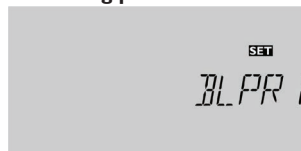
Display thermostat function active



THERM

Thermostat function active

Display of blocking protection time



BLPR(2, 3, 4)

Blocking protection active

In order to protect the pumps against blocking after standstill, the controller is equipped with a blocking protection function. When the blocking protection is activated, this function switches on the relays one after another every day at 12:00 a.m. for 10 s at 100%.

6.2 Adjustment channels



Note

If the controller is commissioned for the first time, the commissioning menu will start. Selecting a new system subsequently will reset all other adjustments to the factory settings.

Selecting the system



ARR

System

Adjustment range: 1 ... 9

Factory setting: 1

Selection of the appropriate system. Each system has pre-programmed options and adjustments which can be activated or changed respectively if necessary. Select the system first (see chap. 3).

ΔT control



LOAD(1, 2, 3) / DT(2, 3) 0

Switch-on temperature diff.

Adjustment range: 1.0 ... 50.0 K [2.0 ... 90.0 °Ra]

in steps of 0.5 K [1.0 °Ra]

Factory setting: 6.0 K [12.0 °Ra]

The controller works as a standard differential controller. If the switch-on difference is reached, the pump is activated. When the temperature difference reaches or falls below the adjusted switch-off temperature difference, the respective relay switches off.



LORD(1, 2, 3) / DT(2, 3) F

Switch-off temperature diff.

Adjustment range: 0.5 ... 49.5 K [1.0 ... 89.0 °Ra]

in steps of 0.5 K [1.0 °Ra]

Factory setting: 4.0 K [8.0 °Ra]



Note

The switch-on temperature difference must be at least 0.5 K [1.0 °Ra] higher than the switch-off temperature difference. The set temperature difference must be at least 0.5 K [1.0 °Ra] higher than the switch-on temperature difference.

Speed control



LORD(1, 2, 3) / DT(2, 3) S

Set temperature difference

Adjustment range: 1.5 ... 50.0 K [3.0 ... 90.0 °Ra]

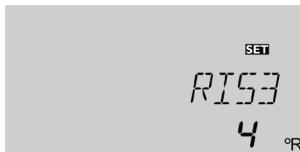
in steps of 0.5 K [1.0 °Ra]

Factory setting: 10.0 K [20.0 °Ra]



Note

To enable speed control, the corresponding relay has to be set to “Auto” (adjustment channel **MAN**) and the pump control type has to be set to Puls, or ADAP (adjustment channel **PUMP**).



LORD(1, 2, 3) / RIS(1, 2, 3)

Rise

Adjustment range: 1 ... 20 K [2 ... 40 °Ra]

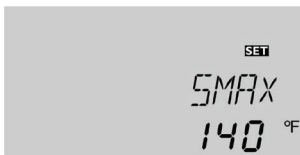
in steps of 1 K [2 °Ra]

Factory setting: 2 K [4 °Ra]

When the switch-on temperature difference is reached, the pump is activated at 100% speed for 10 s. Then, the speed is reduced to the minimum pump speed value.

If the temperature difference reaches the adjusted nominal value (**DT S**), the pump speed increases by one step (10 %). The response of the controller can be adapted via the parameter “Rise”. If the difference increases by the adjustable rise value **RIS**, the pump speed increases by 10 % until the maximum pump speed of 100 % is reached. If, at decreasing temperatures, the temperature difference decreases by the adjustable rise value **RIS**, the pump speed decreases by 10 %.

Maximum tank temperature



LORD(1, 2, 3) / S(2, 3) MAX

Maximum tank temperature

Adjustment range: 4 ... 95 °C [40 ... 200 °F]

in steps of 1 °C [2 °F]

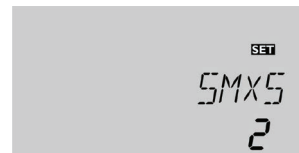
Factory setting: 60 °C [140 °F]

If the tank temperature reaches the adjusted maximum temperature, the tank will no longer be loaded in order to avoid damage caused by overheating. The ☀ symbol is shown on the display if the tank temperature exceeds the maximum value.

The corresponding reference sensor can be chosen, see “Sensor maximum tank temperature”.

Switch-on hysteresis -2 K [-4 °Ra]

Sensor maximum tank temperature



LORD(1, 2) / SMAXS(2)

Sensor tank maximum temp.

Adjustment range:

1st tank: S2, S3

2nd tank: S4, S5

Tank being loaded vertically: S2, S3

Factory setting:

1st tank: S2

2nd tank: S4

Sensor allocation for the tank maximum limitation. The maximum limitation always refers to the sensor selected.

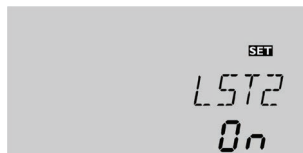
If e. g. S3 is selected, the differential control will still be carried out using S1 and S2. The temperature at S2 can exceed the adjusted limit temperature, the system will not switch off. If the value at S3 reaches the limit temperature, the system will be switched off.



Note

In 3-tank systems, the reference sensor can only be selected for the numerically 1st tank.

Loading tank 2 and tank 3



LOAD2 (3) / LST2 (3)

Loading tank 2, 3

Selection: ON / OFF

Factory setting: ON

In a multi-tank system, the second tank or the third tank can be switched off for loading by means of the parameter LST2 or LST3 respectively.

If the parameter is set to OFF, the system runs like a 2-tank, or a 1-tank system respectively. The representation in the display remains the same.

Pump control



PUMP / PUMP1 (2, 3)

Pump control

Selection: OnOF, Puls, ADAP

Factory setting: OnOF

With this parameter, the pump control type can be adjusted. The following types can be selected:

Adjustment for standard pump without speed control:

- OnOF : Pump on / pump off

Adjustment for a standard pump with speed control:

- PULS : Burst control via semiconductor relay

Adjustment for a high-efficiency pump (HE pump) with speed control via adapter:

- ADAP : Pump on / pump off; the corresponding relay (R1 ... 3) remains switched on for one hour after the switch-off condition has been fulfilled.

Speed control can be carried out via an adapter, e. g. the VBus®/PWM interface adapter.



Note

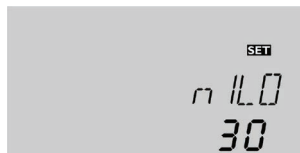
With the factory setting, speed control is not possible.



Note

For more information about connecting HE pumps, see page 34.

Minimum speed



PUMP1 (2, 3) / n1 (2, 3) LO

Speed control

Adjustment range: 30 ... 100 %;

20 ... 100 % if ADAP is adjusted

in steps of 5%

Factory setting: 30 %

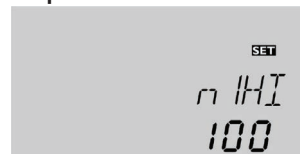
In the adjustment channel **n1(2,3)LO**, a relative minimum speed for connected pumps can be allocated to the outputs R1, R2 and R3.



Note

When loads which are not speed-controlled (e. g. valves) are used, the value of the corresponding relay (n1, n2, n3) must be set to 100% or the pump control type must be set to OnOF in order to deactivate pump speed control.

Maximum speed



PUMP1 (2, 3) / n1 (2, 3) HI

Speed control

Adjustment range: 30 ... 100 %;

20 ... 100 % if ADAP is adjusted

in steps of 5%

Factory setting: 100 %

In the adjustment channel **n1(2,3)HI**, a relative maximum speed for connected pumps can be allocated to the outputs R1, R2 and R3.



Note

When loads which are not speed-controlled (e. g. valves) are used, the value of the corresponding relay (n1, n2, n3) must be set to 100% or the pump control type must be set to OnOF in order to deactivate pump speed control.

Collector emergency shutdown



COL(1,2) / CEM(1,2)

Collector temperature limitation

Adjustment range: 80 ... 200 °C [170 ... 390 °F]

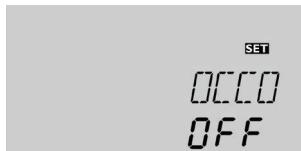
in steps of 1 °C [2 °F]

Factory setting: 130 °C [270 °F]

Switch-on hysteresis: -10 K [-20 °Ra]

When the collector temperature exceeds the adjusted collector emergency temperature (**CEM** / **CEM1** / **CEM2**), the solar pump (R1 / R2) is switched off in order to protect the system components against overheating (collector emergency shutdown). If the maximum collector temperature is exceeded, Δ is displayed (flashing).

Collector cooling



COL(1,2) / DCCO(1,2)


Selection: OFF / ON

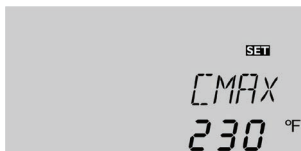
Factory setting: OFF

This function is used for keeping the system temperatures and consequently the thermal load as low as possible.

When the tank temperature exceeds the adjusted maximum tank temperature, the solar system is switched off. If the collector temperature increases to the adjusted maximum collector temperature, the

solar pump is activated until the collector temperature falls below the maximum collector temperature. The tank temperature may then exceed the maximum temperature, but only up to 95 °C [200 °F] (emergency shutdown of the tank).

If the collector cooling is active,  is displayed (flashing).



COL(1,2) / DCCO(1,2) / CMAX(1,2)

Collector maximum temp.

Adjustment range: 70 ... 160 °C [150 ... 320 °F]

in steps of 1 °C [2 °F]

Factory setting: 110 °C [230 °F]

Switch-on hysteresis: -5 K [-10 °Ra]



Note

This function is only available, if the system cooling function and the heat dump function are deactivated.

Minimum collector limitation



COL(1,2) / DCCO(1,2)

Collector minimum temp.

Selection: ON / OFF

Factory setting: OFF




COL(1,2) / DCCO(1,2) / CMIN(1,2)

Collector minimum temp.

Adjustment range: 10.0 ... 90.0 °C [50.0 ... 190.0 °F]

in steps of 0.5 °C [1.0 °F]

Factory setting: 10.0 °C [50.0 °F]

The minimum collector temperature is the minimum switch-on temperature which must be exceeded for the solar pump (R1 / R2 / R3) to switch on. The minimum temperature prevents the pump from being switched on too often at low collector temperatures. If the collector temperature falls below the adjusted minimum temperature,  is displayed (flashing).

Evacuated tube collector function

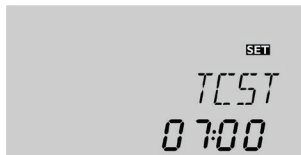


COL / DTCC(1,2)

Evacuated tube collector function

Selection: ON / OFF

Factory setting: OFF



COL / OTCO (1, 2) / TCST (1, 2)

Starting time

Adjustment range: 00:00 ... 23:30

in steps of 01:00

Factory setting: 07:00



COL / OTCO (1, 2) / TCEN (1, 2)

Ending time

Adjustment range: 00:30 ... 23:30

in steps of 00:30

Factory setting: 19:00



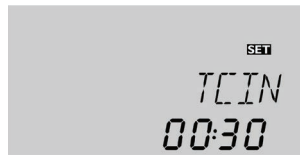
COL / OTCO (1, 2) / TCRU (1, 2)

Runtime

Adjustment range: 30 ... 500 s

in steps of 5 s

Factory setting: 30 s



COL / OTCO (1, 2) / TCIN (1, 2)

Standstill interval

Adjustment range: 5 ... 60 min

in steps of 00:01

Factory setting: 30 min

This function helps overcome the non-ideal sensor position with some evacuated tube collectors.

This function operates within an adjusted time frame, beginning at **TCST** and ending at **TCEN**. It activates the collector circuit pump for an adjustable runtime (**TCRU**) between adjustable standstill intervals (**TCIN**) in order to compensate for the delayed temperature measurement.

If the runtime **TCRU** is set to more than 10 s, the pump will be run at 100 % for the first 10 s of the runtime. For the remaining runtime, the pump will be run at the adjusted minimum speed **nLO**.

If the collector sensor is defective or the collector is blocked, this function is suppressed or switched off.

2-collector systems

In 2-collector systems, the evacuated tube collector function is available for each collector field (**OTCO2**).

If one of the collector fields is being loaded, the heat transfer fluid flows through the inactive field and only the corresponding relay is energized.

Multi-tank systems

If the evacuated tube collector function is activated, the speed of the solar pump will decrease to the minimum speed **nLO** during the loading break time. The solar loading of the subordinate tank will continue.

In 2-collector systems, the collector field which has

been active before the loading break time remains active during the loading break time, unless the evacuated tube collector function of the inactive field becomes active.

Antifreeze function

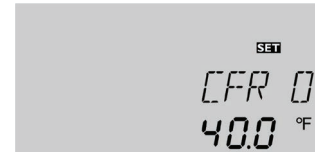


COL (1) / OCFR

Antifreeze function

Selection: ON / OFF

Factory setting: OFF



COL (1) / OCFR / CFR 0

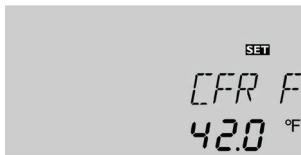
Antifreeze temperature on

Adjustment range:

-40.0 ... +9.0 °C [-39.0 ... +48.0 °F]

in steps of 0.5 °C [1.0 °F]

Factory setting: +4.0 °C [+40.0 °F]



COL (1) / DCFR / CFR F

Antifreeze temperature off

Adjustment range:

-39.0 ... +8.0 °C [-39.0 ... +48.0 °F]

in steps of 0.5 °C [1.0 °F]

Factory setting: +5.0 °C [+42.0 °F]



COL (1) / DCFR / FRPST

Tank sensor selection

(in 2- and 3-tank systems only)

Selection: 1, 2, 3

Factory setting: 1

The antifreeze function activates the loading circuit between the collector and the tank when the collector temperature falls below the adjusted temperature **CFR O**. This will protect the fluid against freezing or coagulating. If **CFR F** is exceeded, the solar pump will be switched off again. The antifreeze function will be suppressed if the tank temperature of the selected tank falls below 5 °C [42 °F]. In 2-tank systems, the function will in this case be switched to the 2nd tank. In a system with vertical tank loading it will be switched to the upper tank zone. If the temperature of the 2nd or 3rd tank (or of the upper tank zone respectively) also falls below 5 °C [42 °F], the system will be switched off.



Note

This function can only become active if the tank temperature is higher than the collector temperature.



Note

Since this function uses the limited heat quantity of the tank, the antifreeze function should be used in regions with few days of temperatures around the freezing point.

Priority logic



LLOGI/LOGIC

Priority logic

Selection:

Prio, SuLA, StUF, PAR, bLO

Factory setting: PRIO

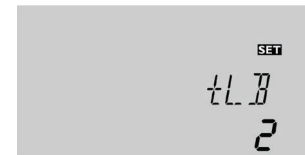


LLOGI/PRIO1 (2, 3)

Priority

Adjustment range: 1, 2, 3

Factory setting: 1



LLOGI / TLB

Loading break time

Adjustment range: 1 ... 30 min

in steps of 1 min

Factory setting: 2 min



LLOGI / TRUN

Oscillating loading runtime

Adjustment range: 1 ... 30 min

in steps of 1 min

Factory setting: 15 min

Priority logic can be used in 2-tank systems, 3-tank systems or systems with vertical tank loading and determines how the heat is divided between the tanks. Different types of priority logic are adjustable:

1. Tank sequence control (PRIO)
2. Successive loading (SuLA)
3. Progressive loading (StUF)
4. Parallel loading (PAR)
5. Loading in blocks (bLO)

1. In tank sequence control (PRIO), a priority (1 = highest priority) is assigned to the tank (PRIO1 = tank 1, PRIO2 = tank 2; the priority of the 3rd tank is determined by the priority of the first 2 tanks).

The priority tank will be loaded if its switch-on conditions are fulfilled and if it is not blocked. If the priority tank is not blocked but its switch-on conditions are not fulfilled, the tank sequence control starts provided that the switch-on conditions of the subordinate tank are fulfilled. If a subordinate tank can be loaded, it will be loaded for the oscillating loading time t_{RUN} . After the loading time has ended, the pump is switched off for the adjustable loading break t_{LB} . If during this time the priority tank can be loaded, it will be loaded. If the priority tank has reached its maximum temperature, the subordinate tank next in priority will be loaded. If the switch-on conditions for the first subordinate tank are not fulfilled, but the switch-on conditions for the last subordinate tank are fulfilled, the tank sequence control will start working on both subordinate tanks. If the first subordinate tank has also reached its maximum temperature, the last subordinate tank will be loaded up to its maximum temperature, if possible, without tank sequence control.

2. In successive loading (SuLA), the priority tank will be loaded up to its maximum temperature first. Only when the priority tank is fully loaded, will the subordinate tank(s) next in priority be loaded.

3. In progressive loading (StUF), the tank with the lowest temperature is loaded first. As soon as the temperature of the tank being loaded exceeds the temperature of the next tank by 5 K, loading switches to the cooler tank. If the temperature of that tank is by 5 K higher than the temperature of the third tank, loading switches to the third tank. From then on, progressive loading will continue in a loop, as long as there is a sufficient temperature difference between the tank being loaded and the collector.

4. In parallel loading (PaR), all tanks with a sufficient temperature difference to the collector are loaded in parallel up to their maximum temperatures.

This option is only available if each tank has its own pump (ARR = 3, 4, 6).



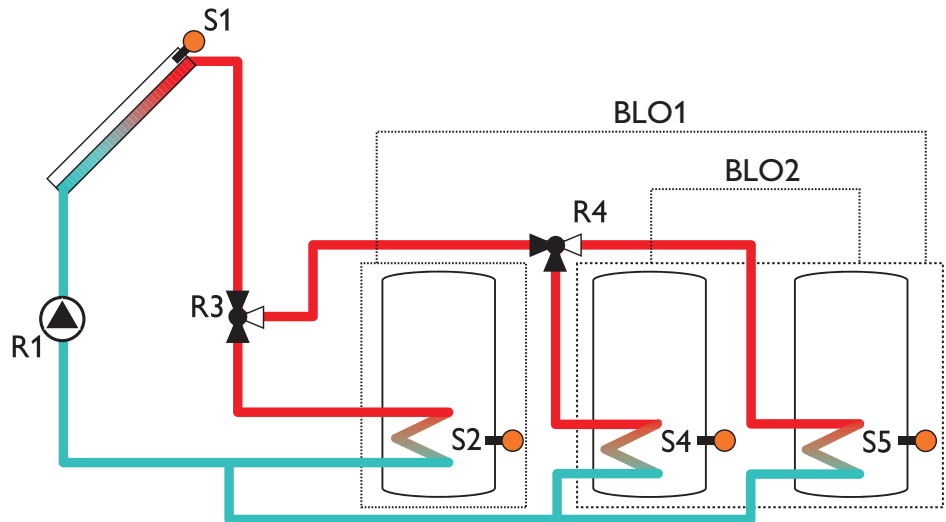
LL06/LOGIC/BL01 (2)

Loading in blocks

Selection:

PRIO, SuLA, StUF

Factory setting: PRIO



5. In systems with 3 tanks or 2 tanks and vertical tank loading, **BL0** loading is possible. This means that 2 tanks are combined to one. The **PRIO1...3** adjustment determines the loading priority and which tanks are being combined. Tanks with the same PRIO adjustment are combined. This common value is used as the loading priority of the combined tank.

In the channel **BL01**, the loading type of the combined tank, in relation to the single remaining tank, can be adjusted.

In the channel **BL02**, the loading type of the two individual tanks of the combined tank can be adjusted.

Tank set option

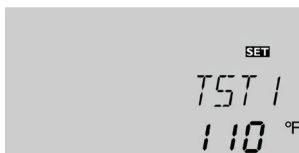


LLOGI / OSTS

Tank set option

Selection: ON / OFF

Factory setting: OFF



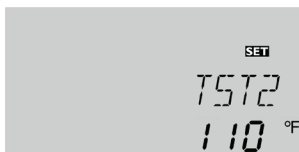
LLOGI / TST1

Set temperature tank 1

Adjustment range: 4 ... 85 °C [38 ... 184 °F]

in steps of 1 °C [2 °F]

Factory setting: 45 °C [110 °F]



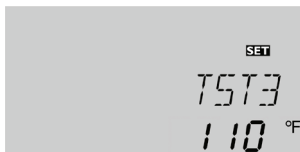
LLOGI / TST2

Set temperature tank 2

Adjustment range: 4 ... 85 °C [38 ... 184 °F]

in steps of 1 °C [2 °F]

Factory setting: 45 °C [110 °F]



LLOGI / TST3

Set temperature tank 3

Adjustment range: 4 ... 85 °C [38 ... 184 °F]

in steps of 1 °C [2 °F]

Factory setting: 45 °C [110 °F]

Additionally, the following options can be activated:

Tank set option OSTS: With this function, a set temperature can be adjusted for each tank.

If the selected priority tank reaches its set temperature, the subordinate tanks will be loaded successively up to their set temperatures. After that, the priority tank is loaded up to its maximum temperature, then tank 2 and then tank 3.

Spreaded loading option

(only in ARR 3, 4, 6 with differing priority)



LLOGI / PRIO / OSE

Spreaded loading option

Selection: ON / OFF

Factory setting: OFF

Spreaded loading option OSE: In 2- and 3-tank systems with 2 or 3 pumps, a spreaded loading option can be activated:

As soon as the adjustable spread difference **DTSE** between the collector and the reference tank is reached, the absorption tank will be loaded in parallel

unless it is blocked. If the temperature difference falls by 2 K [4 °Ra] below **DTSE**, the absorption tank will no longer be loaded.



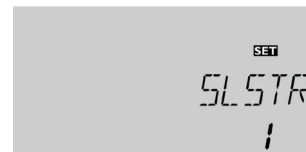
LLOGI / PRIO / DTSE

Temperature diff. spreaded loading

Adjustment range: 20 ... 90 K [40 ... 160 °Ra]

in steps of 1 K [2 °Ra]

Factory setting: 40 K [70 °Ra]

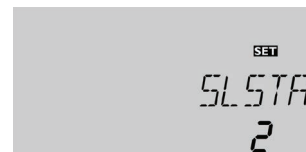


LLOGI / PRIO / SLSTR

Reference tank

Adjustment range: 1, 2, 3

Factory setting: 1



LLOGI / PRIO / SLSTR

Absorption tank

Adjustment range: 1, 2, 3

Factory setting: 2



Note

If the tank set option is activated along with the spreaded loading function, the spreaded loading function will only be active until the set temperature of the selected tank is reached.



Note

The absorption tank can only be selected in 3-tank systems with 3 pumps.

Pause control



LLOGI / PSPREE

Pause speed

Selection: ON / OFF

Factory setting: OFF

If the pause speed is activated, the relay of the tank which has been loaded last remains switched on during the loading break time. Speed is determined by the value adjusted in **nLO**.



LLOGI / PDELA

Pump delay

Selection: ON / OFF

Factory setting: OFF

This function takes into account the actuation times of valves and switches on the pump with a delay.

If the pump delay is activated, the corresponding relay for the valve will be energized first. The pump(s) will be activated with the delay time (200s).



Note

In systems with pump logic, the parameter **PDELA** is not available.

Cooling functions

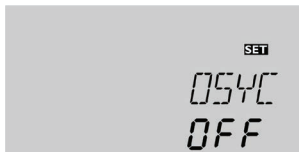
Different cooling functions can be activated: system cooling, tank cooling and heat dump.



Note

If the temperature at the tank sensor reaches 95 °C [200 °F], all cooling functions will be blocked. The switch-on hysteresis is -2 K [-4 °Ra].

System cooling



COOL / OSYCF

System cooling option

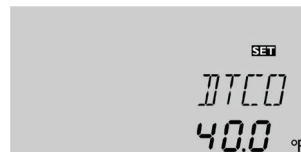
Adjustment range: OFF/ON

Factory setting: OFF



Note

This function will only be available if the collector cooling function and the heat dump function are deactivated.



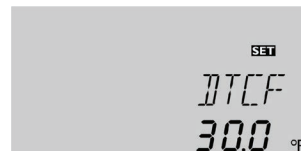
COOL / DTCD

Switch-on temperature diff.

Adjustment range: 1.0 ... 30.0 K [2.0 ... 60.0 °Ra]

in steps of 0.5 K [1.0 °Ra]

Factory setting: 20.0 K [40.0 °Ra]



COOL / DTDF

Switch-off temperature diff.

Adjustment range: 0.5 ... 29.5 K [1.0 ... 59.0 °Ra]

in steps of 0.5 K [1.0 °Ra]

Factory setting: 15.0 K [30.0 °Ra]

The system cooling function aims to keep the solar system operational for a longer time. The function overrides the maximum tank temperature to provide thermal relief of the collector field and the heat transfer fluid on hot days.

If the tank temperature is higher than the adjusted maximum tank temperature and the switch-on temperature difference DTCD is reached, the solar system remains activated or is switched on. Solar loading is continued until either the temperature difference falls below the adjusted value **DTDF** or the collector emergency shutdown temperature CEM is reached.

If the system cooling function is active, ☀ is shown on the display (flashing).

Tank cooling



COOL / OSTC

Tank cooling option

Selection: OFF / ON

Factory setting: OFF

When the tank cooling function is activated, the controller aims to cool down the tank during the night in order to prepare it for solar loading on the following day.

If the adjusted maximum tank temperature (**S1MAX** / **S2MAX** / **S3MAX**) is exceeded and the collector temperature falls below the tank temperature, the system will be reactivated in order to cool down the tank.

Reference temperature differences are **DT1 (2, 3) O** and **DT1 (2, 3) F**.

Heat dump



COOL / OHDP

Heat dump

Selection: ON / OFF

Factory setting: OFF



COOL / OTCL

Overtemperature collector

Adjustment range: 70 ... 160 °C [150 ... 320 °F]
in steps of 1 °C [2 °F]

Factory setting: 110 °C [230 °F]



COOL / OTPUM

Pump or valve logic

Selection: ON / OFF

Factory setting: OFF



COOL / HDREL

Heat dump relay

Selection: system dependent

Factory setting: 3/4

If the heat dump function **OHDP** is activated, the selected relay is energized with 100%, if the collector temperature reaches the adjusted collector overtemperature **OTCL**. If the collector temperature falls by 5 K [10 °Ra] below the adjusted collector overtemperature **OTCL**, the relay will be switched off.

A selection can be made between pump logic and valve logic (**OTPUM ON** = pump logic, **OTPUM OFF** = valve logic). If pump logic is selected, the relay for solar loading switches off and the relay for heat dump remains switched on.

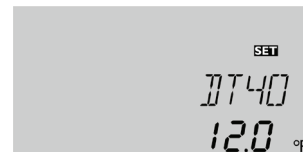
The relay for the heat dump function can be selected in the **HDREL** channel.



Note

The adjustable value **OTCL** is locked against the collector emergency temperature **CEM** by 10 K [20 °Ra]. The heat dump function will only be available if the collector cooling function and the system cooling function are deactivated.

Heat exchange function



DT4 / DT4O

Switch-on temperature diff.

Adjustment range: 1.0 ... 30.0 K [2.0 ... 60.0 °Ra]
in steps of 0.5 K [1.0 °Ra]

Factory setting: 6.0 K [12.0 °Ra]

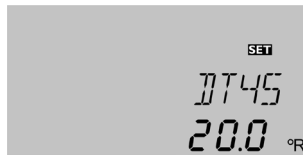


DT4 / DT4F

Switch-off temperature diff.

Adjustment range: 0.5 ... 29.5 K [1.0 ... 59.0 °Ra]
in steps of 0.5 K [1.0 °Ra]

Factory setting: 4.0 K [8.0 °Ra]



DT4/DT45

Set temperature difference

Adjustment range: 1.5 ... 50.0 K [3.0 ... 90.0 °Ra]

in steps of 0.5 K [1.0 °Ra]

Factory setting: 10.0 K [20.0 °Ra]



DT4/RIS4

Rise

Adjustment range: 1 ... 20 K [2 ... 40 °Ra]

in steps of 1 K [2 °Ra]

Factory setting: 2 K [4 °Ra]

The heat exchange function is used for transporting heat from tank 2 to tank 1.

The reference sensor (heat source) for the heat exchange function for tank 2 is sensor S5 (TST2T). The reference sensor (heat sink) for tank 1 (TST1T) is S3. It is used as a reference sensor for the differential function and for the maximum limitation.

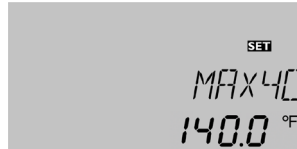
Additionally, minimum and maximum temperature limitations and the corresponding switch-on and switch-off differences can be set for the independent temperature differential control. Both switch-on and switch-off temperature differences **DT40** and **DT4F** as well as the set temperature difference **DT4S** and rise **RIS4** are valid.



Note

The heat exchange function is only available in arrangement 2 and 4.

Maximum temperature limitation for the heat exchange



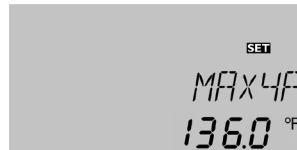
DT4/MAX40

Switch-on temperature

Adjustment range: 0.5 ... 95.0 °C [31.0 ... 200.0 °F]

in steps of 0.5 °C [1.0 °F]

Factory setting: 60.0 °C [140.0 °F]



DT4/MAX4F

Switch-off temperature

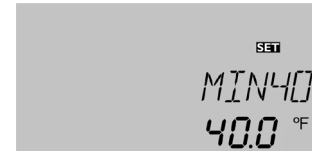
Adjustment range: 0.0 ... 94.5 °C [30.0 ... 199.0 °F]

in steps of 0.5 °C [1.0 °F]

Factory setting: 58.0 °C [136.0 °F]

If the adjusted value **MAX40** is exceeded, the relay will be switched off. If the temperature falls below the adjusted value **MAX4F**, the relay will be energized.

Minimum temperature limitation for the heat exchange



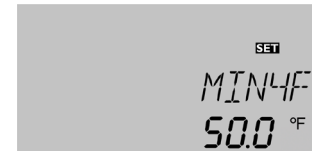
DT4/MIN40

Switch-on temperature

Adjustment range: 0.0 ... 94.5 °C [30.0 ... 199.0 °F]

in steps of 0.5 °C [1.0 °F]

Factory setting: 5.0 °C [40 °F]



DT4/MIN4F

Switch-off temperature

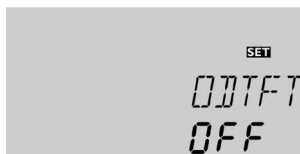
Adjustment range: 0.5 ... 95.0 °C [31.0 ... 200.0 °F]

in steps of 0.5 °C [1.0 °F]

Factory setting: 10.0 °C [50.0 °F]

If the temperature falls below the adjusted value **MIN40**, the relay will be switched off. If the adjusted value **MIN4F** is exceeded, the relay will be energized.

ΔT function



00TFT

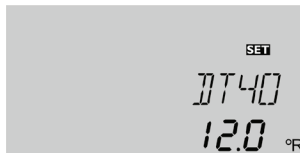
ΔT function
Selection: ON / OFF
Factory setting: OFF

The optional ΔT function uses the sensors S3 (heat source) and S5 (heat sink) to switch the adjustable relay.



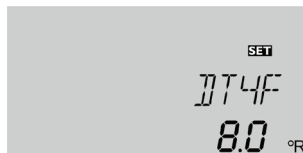
Note

The optional ΔT function is available in arrangement 1 and 3 only.



00TFT/0T40

Switch-on difference
Adjustment range: 1.0 ... 50.0 K [2.0 ... 90.0 °Ra]
in steps of 0.5 K [1.0 °Ra]
Factory setting: 6.0 K [12.0 °Ra]



00TFT/DT4F

Switch-off difference
Adjustment range: 0.5 ... 49.5 K [1.0 ... 89.0 °Ra]
in steps of 0.5 K [1.0 °Ra]
Factory setting: 4.0 K [8.0 °Ra]

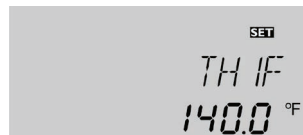
The switch-on and switch-off differences **DT40** and **DT4F** are valid for this function.

Minimum limitation for the ΔT function



DT4/TH10

Switch-on temperature
Adjustment range: 0.0 ... 95.0 °C [30.0 ... 200.0 °F]
in steps of 0.5 °C [1.0 °F]
Factory setting: 65.0 °C [150.0 °F]

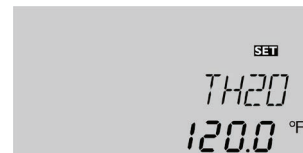


DT4/TH1F

Switch-off temperature
Adjustment range: 0.0 ... 95.0 °C [30.0 ... 200.0 °F]
in steps of 0.5 °C [1.0 °F]
Factory setting: 60.0 °C [140.0 °F]

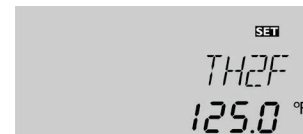
If the adjusted value **TH10** is exceeded, the relay will be switched on. If the temperature falls below the adjusted value **TH1F**, the relay will be switched off.

Maximum limitation for the ΔT function



DT4/TH20

Switch-on temperature
Adjustment range: 0.0 ... 95.0 °C [30.0 ... 200.0 °F]
in steps of 0.5 °C [1.0 °F]
Factory setting: 45.0 °C [120.0 °F]



DT4/TH2F

Switch-off temperature
Adjustment range: 0.0 ... 95.0 °C [30.0 ... 200.0 °F]
in steps of 0.5 °C [1.0 °F]
Factory setting: 50.0 °C [125.0 °F]

If the temperature falls below the adjusted value **TH20**, the relay will be switched on. If the temperature exceeds the adjusted value **TH2F**, the relay will be switched off.



DDTFT / DTREL

Relay

Selection: System 1: R2, R4

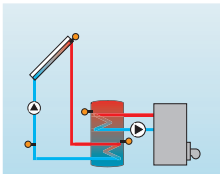
System 3: R3, R4

Factory setting: 4

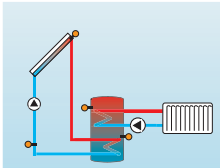
The relay for the ΔT function can be selected.

Freely adjustable thermostat function

Backup heating



Use of surplus energy



The thermostat function works independently from the solar operation and can be used for using surplus energy or for backup heating.

• **AH O < AH F**

thermostat function for backup heating

• **AH O > AH F**

thermostat function for using surplus energy

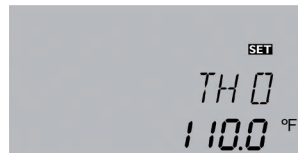


OTH

Thermostat function

Adjustment range: ON / OFF

Factory setting: OFF



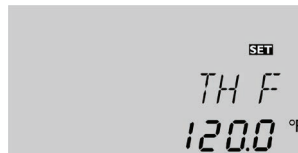
OTH / TH O

Thermostat switch-on temp.

Adjustment range: 0.0 ... 250.0 °C [30 ... 480 °F]

in steps of 0.5 °C [1.0 °F]

Factory setting: 40.0 °C [110.0 °F]



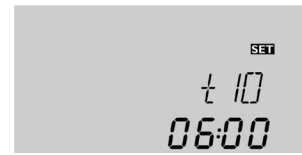
OTH / TH F

Thermostat switch-off temp.

Adjustment range: 0.0 ... 250.0 °C [30 ... 480 °F]

in steps of 0.5 °C [1.0 °F]

Factory setting: 45.0 °C [120.0 °F]



OTH / T10

Switch-on time 1

Adjustment range: 00:00 ... 23:45

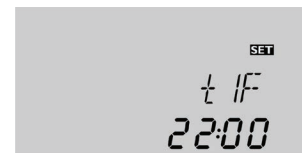
Factory setting: 06:00

in steps of 15 min

In order to block the thermostat function for a certain period, there are three time frames t1 ... t3. The switch-on and switch-off times can be adjusted in steps of 15 minutes. If the switch-on and the switch-off times are identical, the time frame is inactive.

If the thermostat should run from 06:00 a.m. and 09:00 a.m. only, adjust t1O to 06:00 a.m. and t1F to 09:00 a.m.

The first time frame is factory set from 06:00 to 22:00. If the switch-on and switch of times of a frame are set to an identical value, the time frame is inactive. If all time frames are set to 00:00, the thermostat function is solely temperature dependent.



OTH / T1F

Switch-off time 1

Adjustment range: 00:00 ... 23:45

Factory setting: 22:00



OTH/T2 (3) 0

Switch-on time 2 (3)

Adjustment range: 00:00 ... 23:45

Factory setting: 00:00

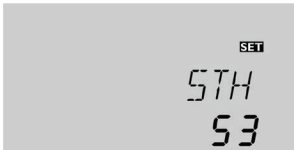


OTH/T2 (3) F

Switch-off time 2 (3)

Adjustment range: 00:00 ... 23:45

Factory setting: 00:00



OTH/STH

Thermostatic backup heating sensor

Selection: S3, S5

Factory setting: S3 / S5

Depending on the system selected, the sensor for the thermostatic backup heating can either be selected or is pre-set.



OTH/RTH

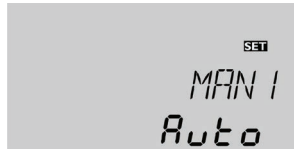
Thermostatic backup heating relay

Selection:

Factory setting: R3

Depending on the system selected, the relay for the thermostatic backup heating can either be selected or is pre-set.

Manual mode



MAN / MAN1 (2, 3):

Adjustment range:

Auto, ON, OFF, nLO, nHI

Factory setting: Auto



MAN / MAN4

Adjustment range:

Auto, ON, OFF

Factory setting: Auto

For control and service work, the operating mode of the controller can be manually adjusted. For this pur-

pose, select the adjustment value **MAN**. The following adjustments can be carried out:

Auto : relay in automatic mode

ON : relay is switched on

OFF : relay is switched off

nLO : relay is switched with adjusted minimum speed

nHI : relay is switched with adjusted maximum speed

The controller is equipped with a shortcut that enables a quick access to the MAN menu (manual mode).

→ In order to access the MAN menu, press buttons 6 and 7 at the same time, then press button 2.



Note

Always adjust the operating mode back to "Auto" when the control and service work is completed. Otherwise normal operation will not be possible.

Blocking protection



BLPR1 (2, 3)

Adjustment range: ON / OFF

Factory setting: ON

In order to protect the pumps against blocking after standstill, the controller is equipped with a blocking protection function. This function switches on the relays one after another every day at 12:00 a.m. for 10 s at 100%.

Option: Thermal disinfection (OTDIS)



OTDIS

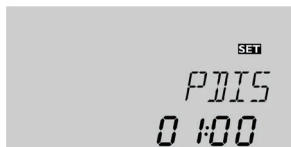
Thermal disinfection function

Adjustment range: ON / OFF

Factory setting: OFF

This function helps to contain the spread of Legionella in the upper DHW tank zone by systematically activating the backup heating.

Reference sensor for the thermal disinfection is the numerically first free sensor! Reference relay is the numerically first free relay!



OTDES / PDIS

Monitoring period

Adjustment range:

0 ... 30:0 ... 24 (dd:hh)

Factory setting: 01:00

For thermal disinfection, the temperature in the upper DHW tank zone has to be monitored. This protection is ensured when, during the monitoring period, the disinfection temperature is continuously exceeded for the entire disinfection period.

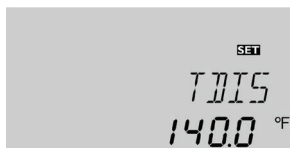


OTDIS / DDIS

Disinfection period

Adjustment range: 00:00 ... 23:59

Factory setting: 01:00



OTDIS / TDIS

Disinfection temperature

Adjustment range: 0 ... 95 °C [30 ... 200 °F]

in steps of 1 °C [2 °F]

Factory setting: 60 °C [140 °F]

If the thermal disinfection function is activated, the monitoring period starts as soon as the temperature at the reference sensor falls below the disinfection temperature.

When the monitoring period ends, the reference relay activates the backup heating. The disinfection period starts to count as soon as the temperature at the allocated sensor exceeds the disinfection temperature.

If the temperature at the reference sensor exceeds the disinfection temperature by more than 5K, the reference relay switches off until the temperature has fallen below a value of 2K [4 °Ra] above the disinfection temperature.

Thermal disinfection can only be completed when the disinfection temperature is exceeded for the duration of the disinfection period without interruption.

If the disinfection conditions have been fulfilled by solar loading before the monitoring period ends, thermal disinfection is considered complete and a new monitoring period begins.



Note

If the thermal disinfection option OTDIS is activated, the display channels TDIS and CDIS will be displayed. TDIS will be displayed regardless of the temperature measured at the reference sensor.

Due to the flexible control logic, the exact time of thermal disinfection is not predictable. In order to set a fixed time for the disinfection, the starting delay can be used.

Thermal disinfection with starting delay



OTDIS / SDIS

Starting time

Adjustment range:

0:00 ... 24:00

Factory setting: 00:00

full hours only

When a starting time for thermal disinfection with starting delay is adjusted, backup heating activation will be delayed until that time, even after the monitoring period has ended.

If the monitoring period ends, for example, at 12:00 o'clock, and the starting time has been set to 18:00, the reference relay will be energized with a delay of 6 hours at 18:00 instead of 12:00 o'clock.

If, before the delay time has elapsed, the disinfection conditions are fulfilled by solar loading, thermal disinfection is considered complete and a new monitoring period begins.

If the starting time is adjusted to 00:00 (factory setting), the delay function is inactive.

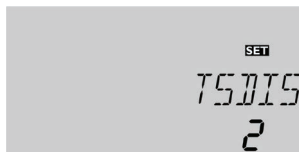
When thermal disinfection is activated, different display channels appear depending on the current status of the function (see also p. 42):

CDIS - countdown of the monitoring period

DDIS - countdown of the disinfection period

TDIS - substitutes TSTT during the disinfection period

SDIS - displays the adjusted starting time (flashing) during the delay time after the monitoring period has ended



OTDIS / TSDIS

Sensor thermal disinfection

Adjustment range: 2,3,4,5

Factory setting: system dependent

For this function, free sensors at an appropriate position can be selected.



OTDIS / RDIS

Relay thermal disinfection

Adjustment range: 2, 3, 4

Factory setting: system dependent

The relay for the thermal disinfection function can be selected.

Parallel relay



OPARR / PARRE

Parallel relay

Adjustment range 2, 3, 4

Factory setting: 2



With this function, e. g. a valve can be controlled in parallel to the pump via a separate relay **PARRE**.

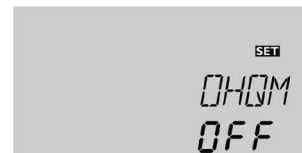
If solar loading takes place (R1 and/or R2) or if a solar function is active, the relay selected will be energized. The parallel relay can also be energized inversely (**INVER**).



Note

If R1 and/or R2 are in the manual mode, the selected parallel relay will not be energized.

Energy metering



OHQM

Energy metering

Adjustment range: OFF/ON

Factory setting: OFF



OHQM / FTYPE

Flow rate detection type

Selection: 1,2

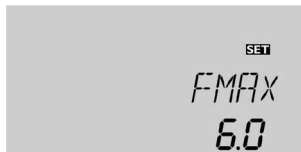
Factory setting: 1

The energy metering can be carried out in 2 different ways (see below): without flowmeter (using a fixed flow rate value) or with a V40 flowmeter.

- ➔ Enable the energy metering option in the channel OHQM
- ➔ Select the type of flow rate detection in the channel FTYPE

Flow rate detection type:

- 1 : fixed flow rate value
- 2 : V40



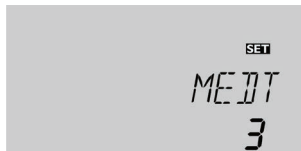
OHQM / FMAX

Flow rate in l/min

Adjustment range: 0.5 ... 100.0

in steps of 0.1

Factory setting: 6.0



OHQM / MEDT

Heat transfer fluid

Adjustment range: 0 ... 3

Factory setting: 3

Energy metering with fixed flow rate value

The energy metering calculation (estimation) uses the difference between the flow and return temperatures and the entered flow rate (at 100 % pump speed).

- ➔ Adjust 1 in the channel FTYPE
- ➔ Read the flow rate (l/min) and adjust it in the channel FMAX.
- ➔ Adjust the antifreeze type and concentration of the heat transfer fluid in the channels MEDT and MED%.



Note

FMAX cannot be selected in systems with 2 solar pumps (ARR 3, 4, 6, 8, 9).



Note

The energy metering calculation (estimation) uses the difference between the flow and return temperatures and a flow rate value calculated from the entered flow rate (at 100 % pump speed) and the current pump speed.



OHQM / MED%

Antifreeze concentration in vol. %

(MED% is "hidden" when MEDT 0 or 3 is used)

Adjustment range: 20 ... 70 %

in steps of 1 %

Factory setting: 45 %

Antifreeze type:

- 0 : water
- 1 : propylene glycol
- 2 : ethylene glycol
- 3 : Tyfocor® LS / G-LS



OHQM / FIMP

Pulse rate

Adjustment range: 0.5 ... 99.0

in steps of 0.1

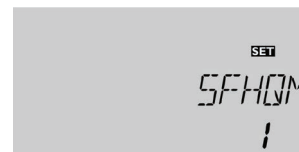
Factory setting: 1.0

Energy metering with V40 flowmeter

The energy metering calculation uses the difference between the flow and return temperatures and the volume flow transmitted by the flowmeter.

- ➔ Adjust 2 in the channel FTYPE
- ➔ In the channel FIMP, adjust the impulse rate corresponding to the V40 flowmeter used.
- ➔ Adjust the antifreeze type and concentration of the heat transfer fluid in the channels MEDT and MED%.

HQM sensors

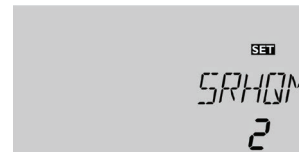


OHQM / SFHQM

Flow sensor

Adjustment range: 1, 3, 5

Factory setting: 1



OHQM / SRHQM

Return sensor

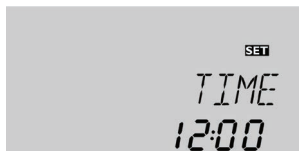
Adjustment range: 2, 3, 5

Factory setting: 2

For this function, free sensors at an appropriate position can be selected as flow and return sensors.

- ➔ In the channel SFHQM, select the flow sensor.
- ➔ In the channel SRHQM, select the return sensor.

Time and date

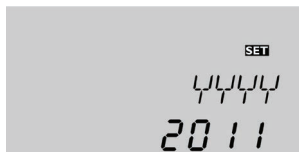


DATE/TIME

Time

Adjustment range: 00:00 ... 23:59

Factory setting: 12:00



DATE/YYYY

Year

Adjustment range: 2010 ... 2099

Factory setting: 2010

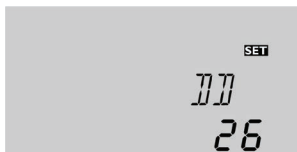


DATE/MM

Month

Adjustment range: 01 ... 12

Factory setting: 03



DATE/DD

Day

Adjustment range: 01 ... 31

Factory setting: 15

The date and time can be entered. Both are required for the thermostat function.

ROSA



ROSA

ROSA numbers

Adjustment range: 0000 ... 9999

In the ROSA channel, the 4-digit number given by the RESOL Online Service Assistant can be entered.

The following table shows the numbers available for the BX L with the corresponding system layouts.

System	ROSA number
ARR1	5
ARR2	16
ARR3	6
ARR4	17
ARR5	225
ARR6	226
ARR7	227
ARR8	29
ARR9	228

Valve logic



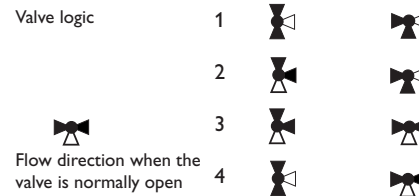
VLOG

Valve logic

Adjustment range: 1, 2, 3, 4

Factory setting: 1

In this adjustment channel the valve logic can be adjusted.



Temperature unit



UNIT

Temperature unit

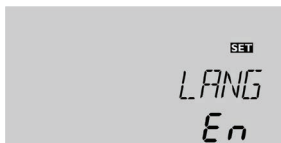
Adjustment range: °C, °F

Factory setting: °C

In this adjustment channel the temperature unit can be chosen.

The unit can be switched between °C and °F during operation.

Language



LANG

Language

Adjustment range: dE, En, ES, Fr

Factory setting: En

In this adjustment channel, the menu language can be chosen.

- dE : German
- En : English
- ES : Spanish
- Fr: French

SD card

If an SD card is used, **COM** is shown on the display. If the SD card is full, **COM** is flashing.



OSDC

SD card

Selection: ON / OFF

Factory setting: OFF

Starting the logging

➔ Insert the SD card into the slot

Logging will start immediately.

➔ Adjust the desired logging interval LOGI

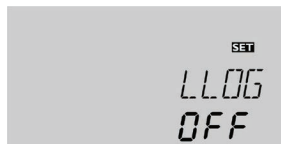


OSDC / LOGI

Logging interval

Adjustment range: 1 ... 1200 s

Factory setting: 60 s



OSDC / LLOG

Linear logging

Selection: ON / OFF

Factory setting: OFF

When **LLOG** is activated, data logging will stop if the capacity limit is reached. The message **CFULL** will be displayed.

When **LLOG** (linear logging) is deactivated, the oldest data logged onto the SD card will be overwritten as soon as the capacity limit is reached.



OSDC / REMC

Safely remove card

Adjustment range: ON / OFF

Factory setting: OFF

Completing the logging process

➔ Select the menu item **REMC**

➔ After **-REM** is displayed remove the card from the slot



OSDC / FORM

Format card

Formatting the SD card

➔ Select the menu item **FORM**

➔ During the formatting process, **--FORM** will be displayed.

The content of the card will be deleted and the card will be formatted with the FAT 16 file system.

Messages possible	Description
FSYS	File system error
CTYP	Card type is not supported
WRIT	Error during writing
NOCRD	No card in slot
LOGG	Logging is possible
WRITP	Card is write-protected
CFULL	Card full
RTIME	Remaining logging time in days
REMC	Safely remove card command
-REM	Card is being removed
FORM	Formatting SD card command
-FORM	Formatting in progress
LOGI	Logging interval in seconds
LLOG	Linear logging



Note

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

6.3 Overview of options and their parameters

In the following, the additional options and parameters are listed.

The options and parameters displayed depend on the system as well as on the options and functions which

have been selected. Some of the options and parameters will only be displayed, if they are available with the individual adjustments.

Channels	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
Channel						
COOL >					Cooling functions	
	OSYC*		OFF		System cooling	51
	DTCO		20 K [40 °Ra]		Switch-on difference system cooling	51
	DTCF		15 K [30 °Ra]		Switch-off difference system cooling	51
	OSTC		OFF		Tank cooling	52
	OHDP*		OFF		Heat dump	52
	OTCL		110 °C [230 °F]		Overtemperature collector	52
	OTPUM		OFF		Pump or valve logic	52
ODTFT >					ΔT function option	54
	DT4O		6.0 K [12.0 °Ra]		ΔT function switch-on difference	54
	DT4F		4.0 K [8.0 °Ra]		ΔT function switch-off difference	54
	RIS4		2 K [4 °Ra]		ΔT function rise	55
	TH1O		65.0 °C [150.0 °F]		Thermostat function 1 switch-on temperature	55
	TH1F		60.0 °C [140.0 °F]		Thermostat function 1 switch-off temperature	55
	TH2O		45.0 °C [120.0 °F]		Thermostat function 2 switch-on temperature	55
	TH2F		50.0 °C [125.0 °F]		Thermostat function 2 switch-off temperature	55
	DTREL		4		ΔT function relay	55
OTH >					Thermostat function option	
	THNHE		40 °C [110 °F]		Thermostatic backup heating switch-on temperature	55
	THNHA		45 °C [120 °F]		Thermostatic backup heating switch-off temperature	55
	STH		3/5		Thermostatic backup heating sensor	56
	RTH				Thermostatic backup heating relay	
	t1O		06:00		Thermostatic backup heating switch-on time 1	55
	t1F		22:00		Thermostatic backup heating switch-off time 1	55
	t2O		00:00		Thermostatic backup heating switch-on time 2	56
	t2F		00:00		Thermostatic backup heating switch-off time 2	56
	t3O		00:00		Thermostatic backup heating switch-on time 3	56
	t3F		00:00		Thermostatic backup heating switch-off time 3	56
PUMP >					Speed	
	PUMP1		OnOF		Speed variant pump 1	45

Channels						
Channel	Sub channel 1	Sub channel 2	Factory setting	Change to	Description	Page
	n1LO		30 %		Minimum speed	45
	n1HI		100 %		Maximum speed	45
	PUMP2		OnOF		Speed variant pump 2	45
	n2LO		30 %		Minimum speed	45
	n2HI		100 %		Maximum speed	45
	PUMP3		OnOF		Speed variant pump 3	45
	n3LO		30 %		Minimum speed	45
	n3HI		100%		Maximum speed	45
OTDIS >					Thermal disinfection option	57
	PDIS		01:00		Monitoring period (interval)	57
	DDIS		01:00		Disinfection period	57
	TDIS		60 °C [140 °F]		Disinfection temperature	57
	SDIS		00:00		Starting time	57
	TSDIS		3		Temperature sensor for disinfection	58
	OTDIS		ON		Deactivation Thermal disinfection	58
OPARR >					Parallel relay option	58
	PARRE		2		Parallel relay	58
	INVER		OFF		Inversion	58
OHQM >					Energy metering option	58
	FTYPE		1		Flow rate detection type	58
	FMAX		6 l/min		Adjustable maximum flow rate	59
	FIMP		1 l/Imp		Pulse rate	59
	MEDT		1		Antifreeze type	59
	MED%		40		Antifreeze concentration	59
	SFHQM		1		Sensor flow HQM	59
	SRHQM		4		Sensor return HQM	59
DATE>					Enter date	60
	TIME		12:00		Time	60
	YYYY		2010		Year	60
	MM		03		Month	60
	DD		15		Day	60
LANG >			dE		Language	61
MAN >			Auto		Manual mode	56
BLPR >			OFF		Blocking protection	43
UNIT >			°C		Unit	60
OSDC >					SD card option	61
CODE			0000		User code	64
RESET			OFF		Factory setting	

* are blocked against each other

7 User code and short menu - Adjustment values

CODE

The access to some adjustment values can be restricted via a user code (customer). For safety reasons, the user code should generally be set to the customer code before the controller is handed to the customer!

1. Expert **0262** (Factory setting)

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

2. Customer **0000**

The expert level is not shown, adjustment values can be changed partly (see below)

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

The display changes to the status level. If the adjustment channel is selected afterwards, the short menu shown below will be available. The short menu suits the selected system.

➔ In order to authorize the access, enter 0262 in the menu item **CODE**.

Channel	Factory setting	Adjustment range	Designation
TIME	12:00	00:00 ... 23:59	Time
DT1O	6	1.0 ... 50.0 K [2.0 ... 90.0 °Ra]	Switch-on temperature difference tank
DT1F	4	0.5 ... 49.5 K [1.0 ... 89.0 °Ra]	Switch-off temperature difference tank
DT1S	10	1.0 ... 50.0 K [2.0 ... 90.0 °Ra]	Set temperature difference tank
S1MAX	60	4 ... 95 °C [40 ... 200 °F]	Tank maximum limitation
DT2O	6	1.0 ... 50.0 K [2.0 ... 90.0 °Ra]	Switch-on temperature difference tank 1
DT2F	4	0.5 ... 49.5 K [1.0 ... 89.0 °Ra]	Switch-off temperature difference tank 1
DT2S	10	1.0 ... 50.0 K [2.0 ... 90.0 °Ra]	Set temperature difference tank 1
S2MAX	60	4 ... 95 °C [40 ... 200 °F]	Tank maximum limitation tank 1
LST2	On	On/OFF	Loading tank 2 on
DT3O	6	1.0 ... 50.0 K [2.0 ... 90.0 °Ra]	Switch-on temperature difference tank 2
DT3F	4	0.5 ... 49.5 K [1.0 ... 89.0 °Ra]	Switch-off temperature difference tank 2
DT3S	10	1.5 ... 50.0 K [3.0 ... 90.0 °Ra]	Set temperature difference tank 2
S3MAX	60	4 ... 95 °C [40 ... 200 °F]	Tank maximum limitation tank 2
LST3	On	On/OFF	Loading tank 3 on
MAN1	Auto	Auto/ON/OFF/n LO/n HI	Manual operation pump 1
MAN2	Auto	Auto/ON/OFF/n LO/n HI	Manual operation pump 2
MAN3	Auto	Auto/ON/OFF/n LO/n HI	Manual operation pump 3
MAN4	Auto	Auto/On/OFF	Manual operation pump 4
CODE	0000	0000/0262	User code

8 Messages

In the case of an error, the directional pad flashes red and a message is indicated in the status display. A warning triangle is additionally indicated. If more than one error or fault condition has occurred, only the one with the highest priority will be displayed as a message in the status display.

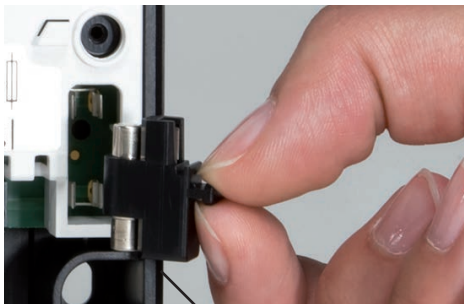
In the case of a sensor error, the corresponding relay is switched off, and a message appears on the display marked by an E. Additionally, a corresponding value for the error type assumed is indicated.

After the error has been removed, the error message disappears.

Error message	Value	Description	Solution
ES1 ... 5	-88.8	Short circuit at sensor 1...7	Check the cable
	888.8	Broken cable at sensor 1 ... 7	
PARAM		Remote parametrization	Do not parametrize the controller via the push buttons during remote parametrization

9 Troubleshooting

If a malfunction occurs, a message will appear on the display of the controller.



fuse



WARNING! Electric shock!



Upon opening the housing, live parts are exposed!

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

The controller is protected by a fuse. The fuse holder (which also holds the spare fuse) becomes accessible when the cover is removed. To replace the fuse, pull the fuse holder from the base.

Directional pad flashes red. The symbol  is indicated on the display and the symbol  flashes.

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

888.8

Cable is broken.
Check the cable.

- 88.8

Short circuit.
Check the cable.

Disconnected Pt1000 temperature sensors can be checked with an ohmmeter. Please check the resistance values correspond with the table.

°C	°F	Ω			°C	°F	Ω		
		Pt500	Pt1000	KTY			Pt500	Pt1000	KTY
-10	14	481	961	1499	55	131	607	1213	2502
-5	23	490	980	1565	60	140	616	1232	2592
0	32	500	1000	1633	65	149	626	1252	2684
5	41	510	1019	1702	70	158	636	1271	2778
10	50	520	1039	1774	75	167	645	1290	2874
15	59	529	1058	1847	80	176	655	1309	2971
20	68	539	1078	1922	85	185	664	1328	3071
25	77	549	1097	2000	90	194	634	1347	3172
30	86	559	1117	2079	95	203	683	1366	3275
35	95	568	1136	2159	100	212	693	1385	3380
40	104	578	1155	2242	105	221	702	1404	3484
45	113	588	1175	2327	110	230	712	1423	3590
50	122	597	1194	2413	115	239	721	1442	3695

The directional pad is permanently off.

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

no

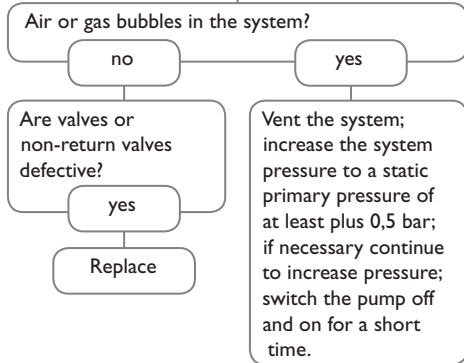
The fuse of the controller could be blown. The fuse holder (which holds the spare fuse) becomes accessible when the cover is removed. The fuse can then be replaced.

yes

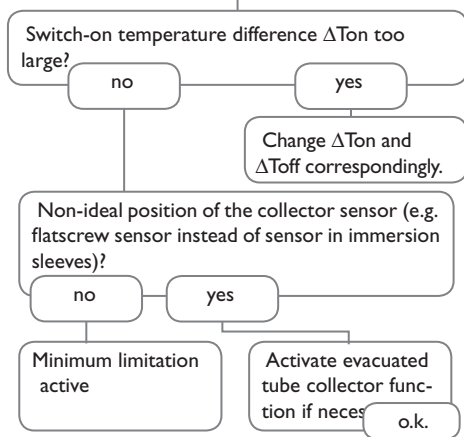
Check the supply line and reconnect it.

9.1 Miscellaneous

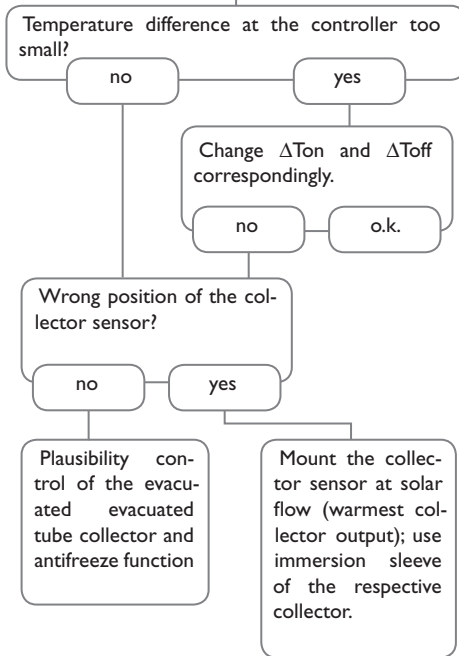
Pump is overheated, but no heat transfer from the collector to the tank, flow and return have the same temperature; perhaps also bubbling in the lines.



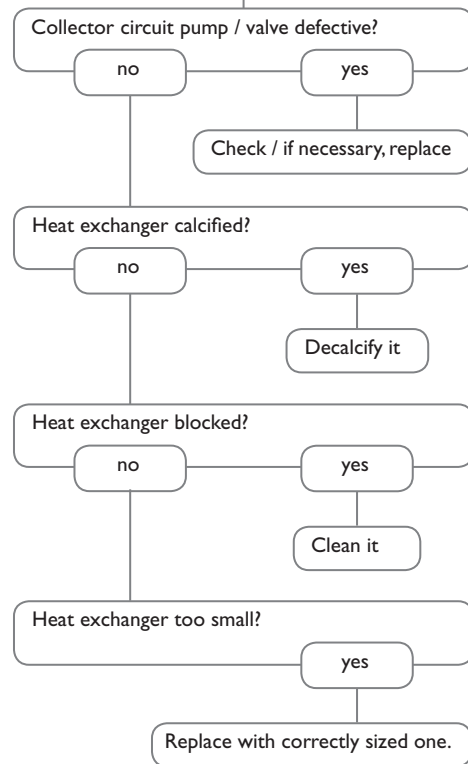
Pump starts up very late.

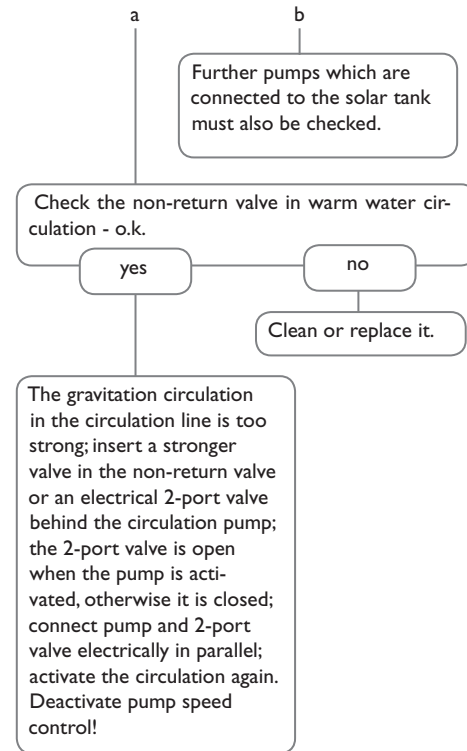
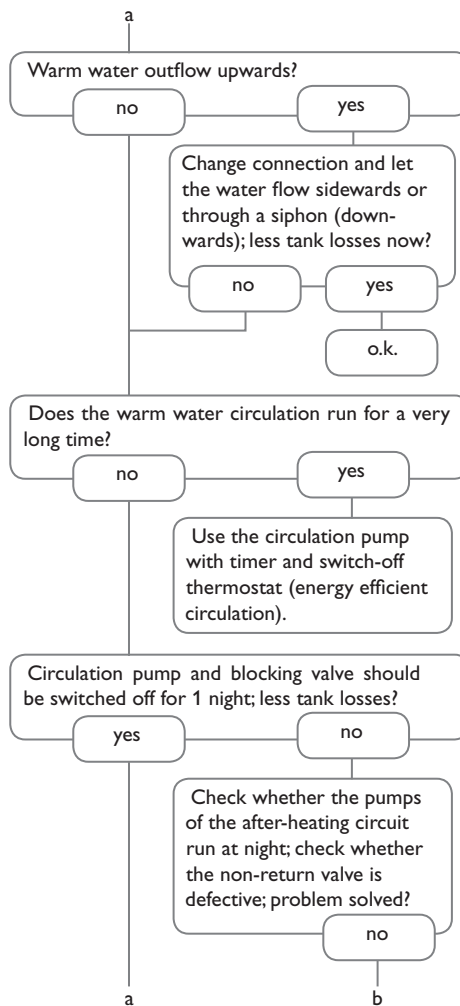
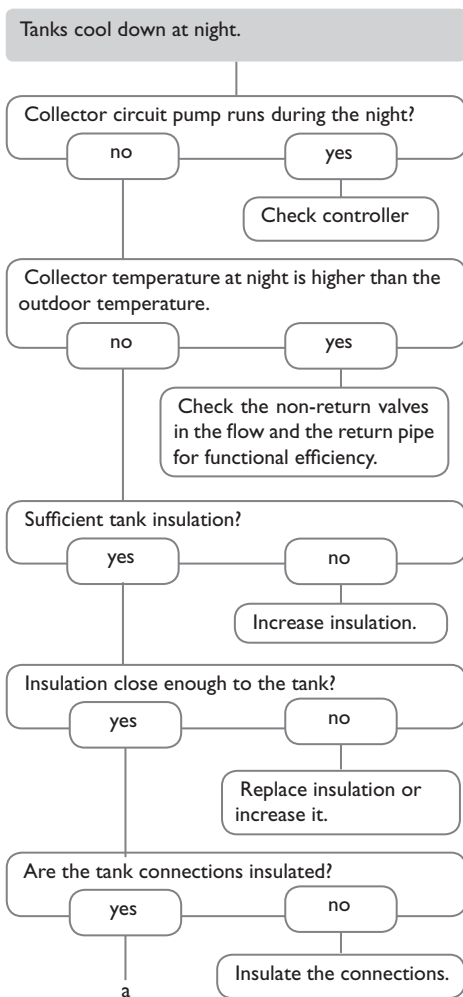


Pump starts for a short moment, switches off, switches on again, etc.

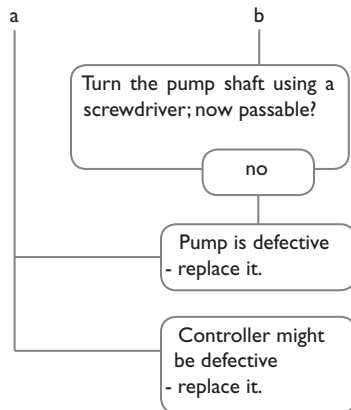
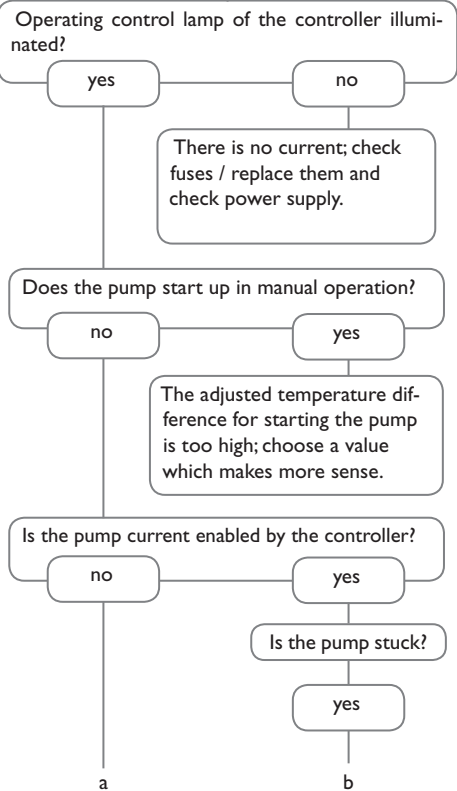


The temperature difference between tank and collector increases enormously during operation; the collector circuit cannot dissipate the heat.





The solar circuit pump does not work, although the collector is considerably warmer than the tank.



10 Accessories

10.1 Sensors and measuring instruments



Temperature sensors

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



Overvoltage protection device

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

RESOL SP10

Article no.: **180 110 70**



V40 flowmeter

The RESOL V40 is a measuring instrument for detecting the flow of water or water/glycol mixtures. After a specific volume has passed, the V40 reed switch sends an impulse to the calorimeter. The heat quantity used is calculated by the calorimeter using these impulses and the measured temperature difference with the help of pre-defined parameters (glycol type, concentration, heat capacity, etc.).

RESOL V40 Article no.: **280 011 00**

10.2 Interface adapters



Interface adapters

VBus®/USB and VBus®/LAN

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

The VBus® / LAN interface adapter is designed for the direct connection of the controller to a PC or router. It enables easy access to the controller via the local network of the owner. Thus, controller access, system parametrization and data charting can be effected from every workstation of the network. The

VBus®/LAN interface adapter is suitable for all controllers equipped with a RESOL VBus®. A full version of the RESOL ServiceCenter software is included.

RESOL VBus®/USB Article no.: **180 008 50**
RESOL VBus®/LAN Article no.: **180 008 80**

10.3 Visualization modules



Smart Display SD3 / Large Display GA3

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

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

RESOL SD3 °F Article no.: **180 007 77**
RESOL SD3 °C Article no.: **180 004 90**

RESOL GA3 °F
RESOL GA3 °C

Article no.: **180 007 87**
 Article no.: **180 006 50**



AM1 Alarm module

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

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

RESOL AM1 Article no.: **180 008 70**

11 Index

A

Antifreeze function 47

B

Blocking protection time, display channel 43

C

Collector cooling 46

Collector emergency shutdown 46

Collector temperatures, display channel 41

Cooling functions 51

D

ΔT control 43

Disinfection period, display channel 43

F

Flow rate, display channel 41

Further temperatures, display channel 41

H

Heat dump 52

Heat exchange function / solid fuel boiler / return preheating 52

Heat quantity, display channel 42

Energy metering 58

HQM sensors 59

L

Language 61

Loading tank 2 45

M

Manual mode 56

Maximum speed 45

Maximum tank temperature 44

Maximum temperature limitation 53, 54

Minimum collector limitation 46

Minimum speed 45

Minimum temperature limitation 53, 54

Monitoring period, display channel 42

O

Operating hours counter 42

P

Parallel relay 58

Pause control 51

Priority logic 48

Pump control 45

S

SD card 61

Selecting the system 43

Sensor maximum tank temperature 44

Speed 42

Speed control 44

Spreaded loading option 50

Starting time, display channel 42

Tank cooling 52

Tank set option 50

Tank temperatures, display channel 41

System cooling 51

T

Temperatures at S3, S4 and S5, display channel 41

Thermal disinfection (OTDIS) 57

Thermal disinfection with starting delay 57

Thermostat function 55

Time and date 60

Time, display channel 43

Evacuated evacuated tube collector function 46

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info@resol.com

Important note

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

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

Note

The design and the specifications can be changed without notice.

The illustrations may differ from the original product.

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