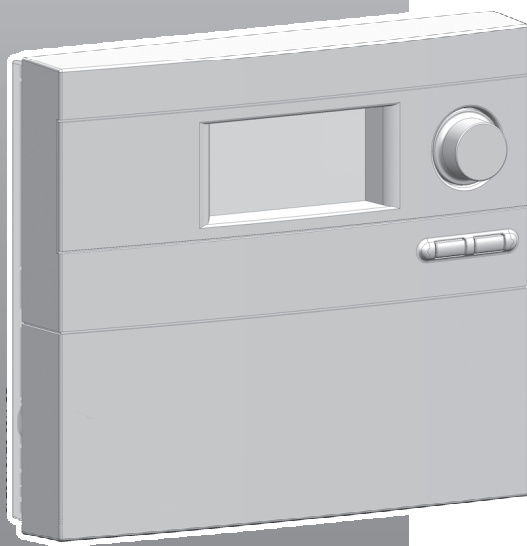


USER MANUAL

SOLAR THERMAL SYSTEM CONTROLLER

TDS 300



6 720 644 594 (2010/04)

**WORCESTER**
Bosch Group

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1 SAFETY INSTRUCTIONS AND EXPLANATION OF SYMBOLS

1.1 GENERAL SAFETY INSTRUCTIONS

ABOUT THIS MANUAL

This manual contains important information about the safe and correct installation and operation of the solar thermal system.

- ▶ Ask your heating engineer to provide you with all the technical documentation relating to the solar thermal system.
- ▶ Read this manual carefully and keep it for future reference.
- ▶ Always observe the safety instructions to prevent injury and damage to property.

INTENDED USE

The solar controller (referred to from now on as the controller) may only be used for operating solar thermal systems under the permissible ambient conditions (0 - 50 °C).

The programmer must not be used outdoors, in damp rooms or in rooms where easily combustible gas mixtures could form.

- ▶ Only operate the solar thermal system as intended and when the system is in proper working order.

DOMESTIC HOT WATER TEMPERATURE

The recommended DHW storage temperature is 60 °C. Where storage temperatures in excess of 60 °C may be achieved it is essential that the drawn hot water is controlled with a thermostatic blending valve.

DISPOSAL

- ▶ Dispose of packaging in an environmentally responsible manner.
- ▶ When replacing components, dispose of the old parts in an environmentally responsible manner.

1.2 SYMBOLS



Safety instructions in this document are identified by a warning-triangle symbol and are printed on a grey background.

Signal words indicate the seriousness of the hazard in terms of the consequences of not following the safety instructions.

- **Caution** indicates that minor damage to property could result.
- **Warning** indicates that minor personal injury or serious damage to property could result.
- **Danger** indicates that serious personal injury could result. In particularly serious cases, lives could be at risk.



Notes are identified by the symbol shown on the left. They are bordered by horizontal lines above and below the text.

Notes contain important information in cases where there is no risk of personal injury or damage to property.

2 DETAILS OF THE PRODUCT

2.1 EU DECLARATION OF CONFORMITY

The design and operation of this product conform to the applicable European directives and supplementary national requirements. Conformity has been demonstrated.

2.2 PRODUCT DESCRIPTION

DIAGRAM OF SOLAR THERMAL SYSTEM

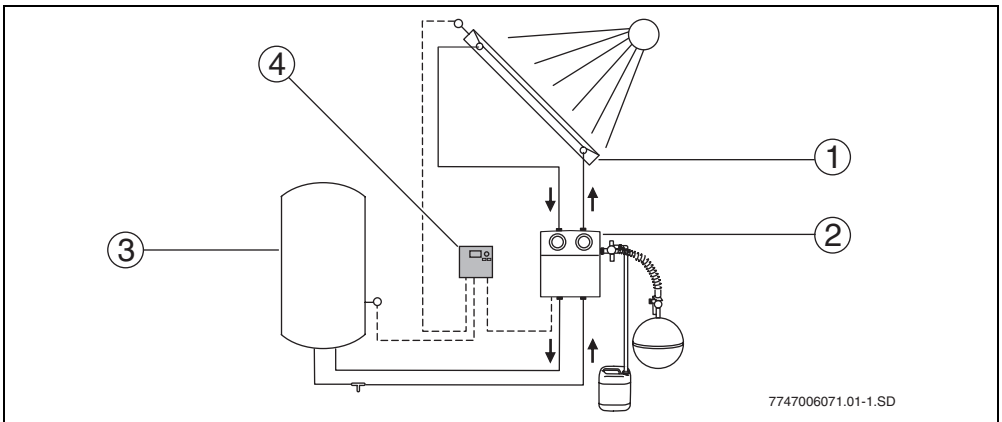


Fig. 1 System diagram

- 1 Collector array
- 2 Solar pumping station
- 3 Solar cylinder
- 4 Controller TDS 300

Main components of the solar thermal system	
Collector array	<ul style="list-style-type: none">• Consists of flat plate collectors or evacuated tube collectors
Solar pumping station	<ul style="list-style-type: none">• Consists of the pump together with safety valves and shut-off valves for the solar thermal circuit
Solar cylinder	<ul style="list-style-type: none">• Used for storing the collected solar energy• There are three different types:<ul style="list-style-type: none">– Domestic hot water cylinder (indirect)– Thermal store (to back up a domestic heating system)– Combination cylinder (for domestic heating back-up and for domestic hot water)
Controller TDS 300	<ul style="list-style-type: none">• Includes two temperature sensors

Tab. 1


OPERATING PRINCIPLE

When the set temperature difference between the collector array (→ Fig. 1, Item 1) and the solar storage cylinder (→ Fig. 1, Item 3) is exceeded, the pump in the solar pumping station is switched on.

The pump transports the heat transfer fluid through the collector array to the solar cylinder. There is a heat exchanger in the solar cylinder that transfers the free heat collected via the sun from the transfer medium to the water intended for washing or heating.

CONTROLLER

The controller is designed for use with a solar heating system. It can be mounted on a wall or is integrated in a solar thermal centre.

In normal operating mode, the display screen (→ Fig. 2) on the controller stays illuminated in green/yellow for 5 minutes after the last button was pressed (activated by pressing the rotary selector , for example).

The display shows the following:

- Pump and valve status (as simple schematic diagram not representative of actual system)
- System values (e.g. temperatures)
- Selected functions
- Fault messages

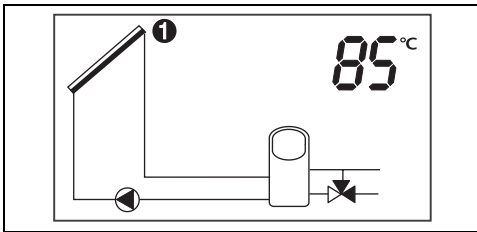


Fig. 2 Possible display indications

3 OPERATION

Your professional heating technician will set the solar thermal system when commissioning it, and it will run automatically.

- ▶ Have your heating engineer explain to you how the solar thermal system works, and how to operate it.
- ▶ Do not switch off the solar thermal system during long absences (e.g. when going on holiday). When installed according to the manufacturer's specifications, the solar heating system is intrinsically safe.
- ▶ After a power failure or a long absence, check the operating pressure on the pressure gauge of the solar thermal system (→ Section 5.4, page 19).



WARNING: Risk of damage to system if programmer settings are changed.

- ▶ Do not make any changes to any settings not described here.

3.1 ELEMENTS OF THE SOLAR PUMPING STATION

The main components of the solar pumping station are:

- Thermometers (→ Fig. 3, Item 1 and 3): The built-in thermometers display the temperatures of the solar return (blue) and flow (red).
- Pressure gauge (→ Fig. 3, Item 2): the pressure gauge indicates the system pressure. The safety valve above it opens and releases the excess fluid pressure via the blow-off pipe if the system pressure rises above 6 bar.

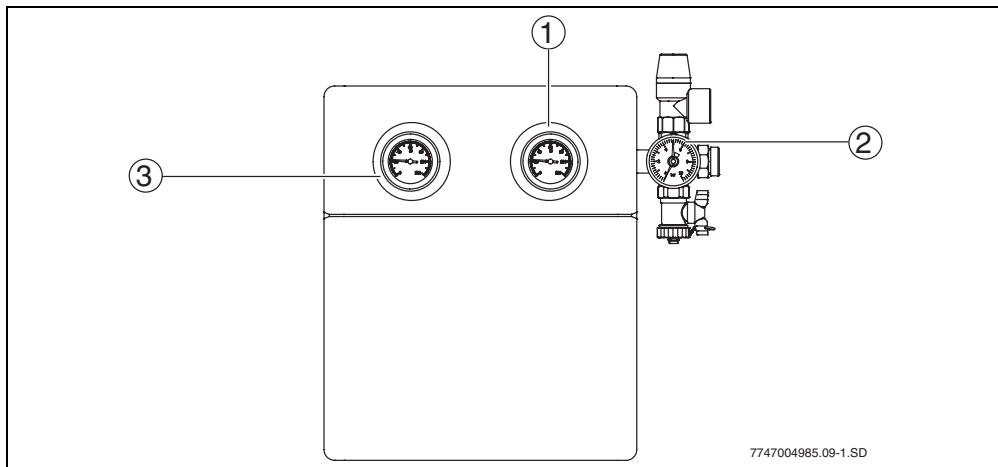


Fig. 3 Solar pumping station

- 1 Display of temperature for solar return
- 2 Pressure gauge and safety valve
- 3 Display of temperature for solar flow

3.2 CONTROLLER CONTROLS

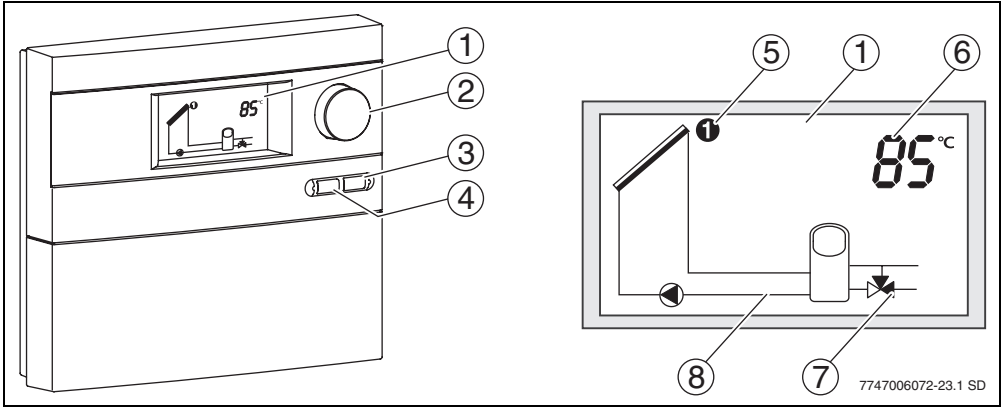


Fig. 4 controller and display

- 1 Display
- 2 Rotary selector
- 3 Back button
- 4 Menu button
- 5 Symbol for temperature sensor
- 6 Displays of temperatures, hours of operation, etc.
- 7 Valve symbol (black = open outlet)
- 8 Active circulation diagram


Control	Symbol	Functions
Rotary selector (can be turned and pressed)		<ul style="list-style-type: none"> Selecting system settings
Menu button		<ul style="list-style-type: none"> Opens the main menu
Back button		<ul style="list-style-type: none"> Returns display to collector temperature

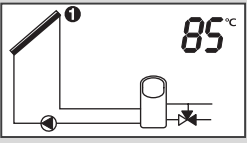
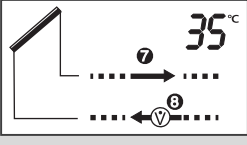
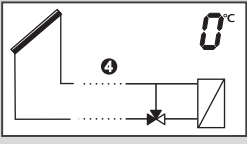
Tab. 2

SWITCHING OFF THE SYSTEM

- Disconnect the programmer from the mains power supply by means of the isolating device (e.g. mains plug).

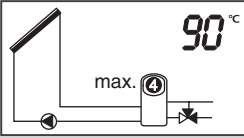
3.3 VIEW MODE - VIEWING SYSTEM SETTINGS

You can use the rotary selector  to view the following system data if the relevant components are installed and the supplementary functions have been activated by your heating engineer.

Display	Supplementary function	System data
	None	<ul style="list-style-type: none"> • Temperature (°C) • Hours of operation, cumulative (h) • Hours of operation, today (h/d) • Pump speed (%) • Pump and valve status
	Heat meter	<ul style="list-style-type: none"> • Flow temperature (°C) • Return temperature (°C) • Heat usage, cumulative (kWh) • Heat usage, today (kWh/d)
	Heat exchanger anti-icing system	<ul style="list-style-type: none"> • Flow temperature (°C) • Hours of operation, cumulative (h) • Hours of operation, today (h/d)
<div style="border: 1px solid black; padding: 5px;"> <p>Other functions</p> <p>Cooling function</p> </div>	<p>Other functions</p> <p>Shows other active functions. Possible indications (display flashes when function is active):</p> <ul style="list-style-type: none"> • Evacuated tube collector • S. Europe function • Thermal disinfection • Cooling function 	

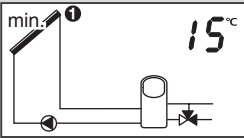
Tab. 3 Overview of system data

Status display



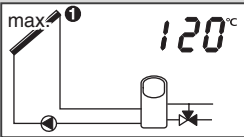
Cylinder maximum temperature

The cylinder maximum temperature is displayed if the set limit is exceeded.



Collector minimum temperature

The collector minimum temperature is displayed if the temperature drops below the set limit.



Collector maximum temperature

The collector maximum temperature is displayed if the set limit is exceeded.

Tab. 4 Status indications

3.4 MAIN MENU

The Main menu can be used to set the maximum temperatures for the heat consumers (solar cylinder, cylinder C, swimming pool).

Once the cylinder or swimming pool reaches the maximum temperature, charging of that heat consumer is stopped.

If no entry is made for more than 60 seconds, the programmer exits the main menu.



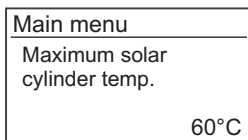
WARNING: Risk of scalding if maximum cylinder temperature is set to more than 60 °C and hot water thermostatic mixer is not fitted or set too high.






- ▶ Only set the maximum temperature of the solar cylinder to higher than 60 °C if a built-in thermostatic hot water mixer limits the outlet temperature to 60 °C.



If the domestic water supply is very hard, the maximum temperature of the solar cylinder should not be set higher than 60 °C.

- ▶ Press the **menu** button to switch to the Main menu.



- ▶ Turn the rotary selector  to select the energy consumer
- ▶ To change the maximum temperature, press the rotary selector  (temperature starts flashing).
- ▶ To change the setting, turn the rotary selector .
- ▶ To save the new setting, press the rotary selector .
- ▶ To exit the Main menu, press the Back button .



Setting range	Default setting	New setting
10 - 95 °C	60 °C	

4 FAULTS

4.1 FAULTS INDICATED ON THE DISPLAY

When indicating a fault, the display is back-lit in red. In addition, the type of fault is indicated by symbols. The individual fault messages can be retrieved using the rotary selector (by turning it). Fault messages continue to be displayed until the fault is rectified.

- If a fault occurs, contact a qualified heating engineer.

Indication / Type of fault		
Effect	Possible causes	Remedy
 Sensor failure S1 ...S8		
Associated components (pumps/valves) are switched off.	Temperature sensor not/ incorrectly connected.	Contact your heating engineer.
	Temperature sensor or sensor lead defective.	Contact your heating engineer.
 Sensor short circuit S1 ...S8		
Associated components (pumps/valves) are switched off.	Temperature sensor or sensor lead defective.	Contact your heating engineer.
“No fluid flow in solar systems”/“secondary system”		
The temperature difference between collector temperature sensor and bottom cylinder temperature sensor or between heat exchanger flow temperature sensor and bottom cylinder temperature sensor is too great.	Air in the system.	Contact your heating engineer.
	Pump is stalled.	Contact your heating engineer.
	Valves or shut-offs are closed.	Contact your heating engineer.
	Pipe clogged.	Contact your heating engineer.
“Therm. disinfection running time error”		
The thermal disinfection has not been carried out.	Target temperature not reached.	Contact your heating engineer.

Tab. 5 Possible faults indicated on the display

Indication / Type of fault		
Effect	Possible causes	Remedy
“Collector connections reversed”		
The collector temperature drops 15 K within 10 seconds of switching on.	Collector connections reversed.	Contact your heating engineer.
“Gravity fed circulation (at night) ”(Expert menu > Settings)		
The cut-in temperature differential for pump SP is reached between 22:00 and 06:00.	Gravity-feed restrictor opened manually or defective.	Contact your heating engineer.

Tab. 5 Possible faults indicated on the display

4.2 FAULTS NOT INDICATED ON THE DISPLAY

Type of fault		
Effect	Possible causes	Remedy
Pump not running even though conditions for switching on are met.		
The solar storage cylinder is not being supplied by the solar thermal system.	No power supply; fuse or power cable faulty.	Contact a qualified electrician.
	The temperature at the bottom of the cylinder is close to, or above the set maximum cylinder temperature.	When the temperature drops 3 K below the maximum cylinder temperature, the pump switches on.
	The collector temperature is close to, or above the set maximum collector temperature.	When the temperature drops 5 K below the maximum collector temperature, the pump switches on.
	There is no electrical power lead to the pump or it is not connected.	Contact your heating engineer.
	Cooling function active.	–
	The controller checks which cylinder can be charged (only in systems with two cylinders)	–
	Pump is faulty.	Contact your heating engineer.
The system animation on the display is running and the pump is “humming”.		
The solar storage cylinder is not being supplied by the solar thermal system.	The pump is stalled due to a mechanical blockage.	Contact your heating engineer.
Temperature sensor is displaying an incorrect figure.		
Pump is being activated/deactivated too early/too late.	Temperature sensor incorrectly fitted. Incorrect temperature sensor fitted.	Contact your heating engineer.

Tab. 6 Possible faults not indicated on the display

Type of fault		
Effect	Possible causes	Remedy
Domestic hot water is too hot.		
Risk of scalding	Cylinder temperature limit and hot water mixing valve are set too high.	Set the cylinder temperature limit lower, inform engineer if necessary.
Domestic hot water too cold (or domestic hot water flow volume too low).		
	Domestic hot water temperature is set too low on boiler control, on heating programmer or on hot water mixing valve.	Contact your heating engineer.

Tab. 6 Possible faults not indicated on the display

5 NOTES FOR THE USER

5.1 WHY IS REGULAR MAINTENANCE IMPORTANT?

Your solar domestic hot water system or domestic hot water and space heating system is virtually maintenance free.

However, we recommend that you have your system serviced at least every 2 years by your heating engineer. In that way you can ensure smooth and efficient operation and early detection and elimination of any possible damage.

5.2 IMPORTANT NOTES ON HEAT TRANSFER FLUIDS



WARNING: Risk of injury from contact with heat transfer fluid (water and propylene glycol mixture).

- ▶ If heat transfer fluid comes into contact with eyes: hold eyelids wide open and thoroughly rinse eyes with running water.
- ▶ Keep heat transfer fluid out of reach of children.

The heat transfer fluid is biodegradable.

Your engineer has been instructed to ensure, when commissioning the solar thermal system, that the heat transfer fluid provides protection against freezing at temperatures down to at least $-30\text{ }^{\circ}\text{C}$.

5.3 CHECKING THE SOLAR THERMAL SYSTEM

You can contribute to the smooth functioning of your solar thermal system by doing the following:

- Checking the temperature difference between flow and return and between the collector and cylinder twice a year,
- Checking the operating pressure for solar thermal stations
- Checking the heat quantity (if a calorimeter has been installed) and/or the operating hours.



Enter the values in the log on page 20 (which may also be copied).

The completed log can help qualified technicians when checking your solar thermal system and performing maintenance.

5.4 CHECKING OPERATING PRESSURE, WITH POSSIBLE RE-ADJUSTMENT



Pressure fluctuations in the solar thermal circuit due to temperature changes are normal and do not lead to faults in the solar thermal system.

- ▶ Check the system pressure on the pressure gauge (→ Fig. 3) when the system is cold (about 20 °C).

IF PRESSURE DROPS

A pressure drop can be caused by the following:

- There is a leak in the solar thermal circuit.
- An automatic air vent has expelled air or vapour.

If the pressure of the solar thermal system has dropped:

- ▶ Check whether heat transfer fluid has collected in the storage vessel under the solar pumping station.
- ▶ Call in a qualified heating engineer if the system pressure drops 0.5 bar below the level recorded in the commissioning log (→ Installation and servicing instructions for the solar station).

5.5 CLEANING THE COLLECTORS



DANGER: Risk of death by falling from roof

- ▶ Inspection, maintenance and cleaning work on the roof must only be carried out by qualified technicians.

Due to the self-cleaning effect when rain falls, the collectors do not usually need cleaning.

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SALES: 01905 752640
WEBSITE: worcester-bosch.co.uk

Worcester, Bosch Group
Cotswold Way, Warndon, Worcester WR4 9SW.
Tel. 0844 892 9900
Worcester, Bosch Group is a brand name of
Bosch Thermotechnology Ltd.
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