

Operating manual

Sunny Scout 1328

Microcontroller-controlled temperature difference controller for solar thermal systems

Explanation of the graphic symbols



Attention!
Symbol indicates possible dangers and errors



Attention 230V~ voltage!
Symbol indicates risks posed by lethally high voltages.



List



Please note!



Information for handling / special features




Implementation / procedure



Test / check

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1 Application area / device features

1.1 Application area

The Sunny Scout 1328 controllers are high-performance microprocessor-controlled units for controlling the functions of solar thermal systems. The Sunny Scout 1328 controls solar power systems equipped with one collector and one storage tank.

The controllers are designed for use in dry rooms as well as residential, business and commercial applications. Prior to commissioning the device, make sure to verify that the intended use complies with the applicable regulations.

1.2 Device features

The Sunny Scout 1328 controller is equipped with the following features:

- Operating menu with graphic symbols
- Automatic display of the temperature values
- No manual operation needed
- Extensive functions for system monitoring that display symbols to indicate errors and faults. Additionally LED indicators.
- Storage of all values even during a prolonged mains power supply outage
- Various protective functions, such as system protection, collector protection, anti-freeze and flow monitoring

Available accessories:

- Temperature sensor PT1000
- Sensor connection box
- Immersion sleeves

2 Safety instructions

- Always completely disconnect the device from the operating voltage before performing installation or wiring work on the electrical equipment. Never mix up the connections of the protective low voltage areas (sensors) with the 230V connections. Otherwise, the device will be destroyed. The device and the connected sensors may carry deadly voltages.
- Solar power systems can reach high temperatures. Such temperatures pose a risk of burns! Exercise caution when installing the temperature sensors!
- Mount the **Sunny Scout 1328 controller in a position where it will not be subjected to excessive operating temperatures (> 50°C)** by any external heat sources. For safety reasons, the system may only remain in manual operation for testing purposes. In this operating mode, the system does not monitor for maximum temperatures and sensor functions. If there is any recognisable damage to the controller, cables or the connected pumps and valves, the system must not be started.



All installation and wiring work must only be carried out on the controller when the device is disconnected from the power supply. The Sunny Scout 1328 must only be connected and commissioned by qualified personnel. In doing so, the applicable safety regulations must be observed.



The controller must only be installed in dry and non-explosive areas. Mounting the controller on an inflammable surface is prohibited

3 Mounting the device

3.1 Opening the device

Prior to opening the device, make sure to disconnect the mains voltage and ensure that it cannot be switched back on again.

3.2 Wall mounting

Secure the controller on the wall. Tighten all screws only as tight as necessary to prevent damage to the lower part of the housing.

3.3 Connections

The following points must be followed for the 230V connections:



- In case of a fixed mains connection, there must be a switch installed outside the controller that can disconnect the device from the mains power supply. This switch is not required if the mains supply is connected using a cable and an earthed mains plug.
- The controllers are designed to operate using a 230V/50Hz. The pumps and valves to be connected must be designed for this voltage!
- All protective conductors must be connected to terminals marked with PE.
- The neutral conductor terminals (N) are electrically connected and are not switched!
- The switching output (A1) is electronic 230V~ N/O contact. If potential-free contacts are required, the appropriate corresponding accessories are available.

3.4 Temperature sensor connection

The Sunny Scout 1328 devices use PT1000 precision platinum temperature sensors.

Mounting / wiring the temperature sensors:



- Mount the sensors on the collector and the storage tank. Ensure proper heat transfer and use heat-conducting paste if necessary.
- Cross-sections for cable extensions (shielded):
 - up to 15m 2 x 0.5mm²,
 - up to 50m 2 x 0.75mm².The shield is connected to the earth (PE)
- Connect the temperature sensors according to the system diagram. The polarity of both conductors for the temperature sensors is irrelevant.
- Sensor cables must be laid separately from 230V wires.
- Sensor connection boxes equipped with surge protection should be used for collector sensors and cable extensions.



4 Short descriptions and device operation

4.1 Display layout

During actual operation, these symbols are **only displayed for selection once** depending on the menu position.



- ◀ Active menu in the menu levels
- ◀ Allocation of the current display
- ◀ Current measured values, times or controller states: here 60,5C°.
- ◀ Measuring point
- ◀ Controller state/messages

Display symbols

All possible display symbols are shown below.



4.2 Operating the device

The controller is equipped with a micro button that can be operated through a small hole in the right side of the housing using a suitable tool.

Briefly pressing the button switches the controller from the "Info" menu to the "Basic Setup" menu. Here, you can scroll through and select the variables and information by pressing the button once.

To change the selected variable, the button must be pressed for approximately 2 seconds until the value flashes. This value is increased up to the end of the range by pressing the button again. Afterwards, the value jumps to the smallest value that can also be increased again.

To store a value, the button must be pressed again for approximately 2 seconds.

5 Menu structure

5.1 "Info" menu

The following measured values are displayed automatic in the Info menu:

| Display e.g. | Meaning | Can be reset |
|--------------|---|--------------|
| 75 °C | Displays current collector temperature | No |
| 52 °C | Displays current storage tank temperature | No |



Settings and changes in this menu must only be carried out by a specialised technician. Incorrect settings can damage or adversely affect the function of the solar power system.

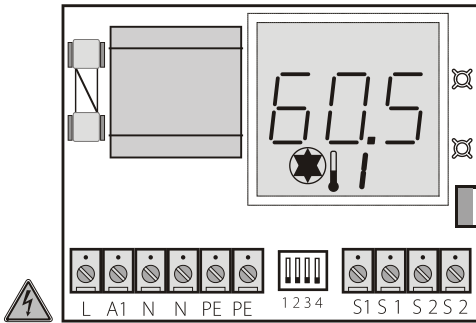
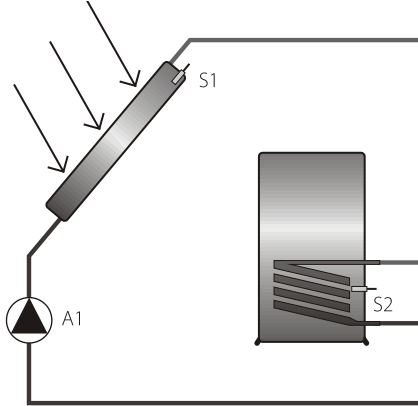
5.4 "Basic Setup" menu

The hydraulic diagrams and additional functions are displayed in the Basic Setup menu. Settings must only be changed by a specialised technician.

| Display e.g. | Meaning | Value range | Factory setting | Current setting |
|-----------------------------|---|-------------------|-----------------|-----------------|
| max 65 °C | Storage tank: Maximum permissible temperature | 15 – 95°C | 60°C | |
| dT max 7 K | Storage tank: Switch-on difference | 3 – 40K | 10K | |
| dT min 3 K | Storage tank: Switch-off difference | 2 – 35K | 5K | |
| Tmin | Absolute treshold - Minimum temperature at which temp. difference is analysed | 5..90 | 10°C | |
| on | Manually switching on / off the switching output A1 (pump 1) | 0 = off 1 = on | 0 | |
| RES | Reset the values to the factory setting | | | |
| V1.1 | Software release Menü „Info“ | | | |

6 System diagram

1 collector, 1 storage tank



230V connections

| | |
|----|---|
| L | Mains phase |
| N | Neutral conductor - mains and outputs |
| A1 | Solar circuit pump (switching output 1) |

Sensor connections

| | |
|----|--------------------|
| S1 | Collector sensor |
| S2 | Lower storage tank |

Switch positions:

Temp. diff. controller: all=off
 Heating: 1=on
 Cooling: 1 and 3=on
 Anti-freeze: 2=on
 RPM-control: 4=on

7 Controller functions

7.1 General controller functions

7.1.1 Temperature difference

The controller compares the temperatures of the various measuring points and optimally charges the storage tank. If the collector temperature exceeds the storage tank temperature, the solar circuit pump is switched on. Monitoring and protection functions ensure safe operation.

7.1.2 Thermostat

- Cooling

If the measured temperature exceeds the target value, output A1 is switched on until the measured temperature falls below the target value - hysteresis (e.g. 60°C - 10K).

- Heating

If the measured temperature falls below the target value, output A1 is switched on until the measured temperature reaches the target value + hysteresis (e.g. 60°C + 10K).

7.1.3 RPM control

The output A1 can be operated using an RPM control.
Minimum - 30 %

7.2 Protective functions

The controller is equipped with the following protective functions.

7.2.1 Anti-freeze protection

This function must be activated if the water or glycol mixture can freeze. If the temperature of the collector sensor drops below 5°C, the solar circuit pump is activated and heats the solar circuit using the heat exchanger in the storage tank.

7.2.3 System protection

If the collector temperature exceeds 130°C, the solar circuit pump is switched off to protect the system components.

If the collector temperature drops below 120°C, the solar circuit pump is switched on. This function is always activated.

7.2.3 Pump blocking protection

If the solar power system is out of commission for an extended period of time due to poor weather, for example, the solar circuit pump may "seize". To prevent this, the controller switches the pump on for 30 seconds after 10 days.

8 System monitoring

8.1 Sensor monitoring

The connected sensors and sensor cables are monitored for interruptions and short-circuits. Errors are indicated by the Δ symbol. You can find the error source by scrolling up or down the Info menu.

8.2 Flow monitoring

The controller is programmed to display a message if the flow is interrupted, e.g. pump fault or if vapour is in the system. This message, however, does not switch off the pump.

9 Troubleshooting

System faults are distinguished into two general categories:

- Faults that are automatically detected by the controller and therefore can be displayed using error messages
- Faults that the controller cannot detect

9.1 Faults with error messages



| LED's | Display | Meaning | Measures |
|-------------------------|---------|--|--|
| LED green is on | | ■ Power on | - |
| LED green flashes | | ■ Pump is ON | - |
| LED red flashes: 1 x | | ■ Collector sensor cable is interrupted | |
| LED red flashes: 2 x | | ■ Short-circuit in the collector sensor cable | <ul style="list-style-type: none"> 🔧 Check wiring / replace it 🔧 Check sensor resistance and replace sensor if necessary |
| LED red flashes: 3 x | | ■ Storage sensor cable is interrupted | |
| LED red flashes: 4 x | | ■ Short-circuit in the storage sensor cable | |
| LED red is on | | <ul style="list-style-type: none"> ■ no flow ■ Error in the pump connection ■ Pump defective ■ Air in the system | <ul style="list-style-type: none"> 🔧 Check cable 🔧 Replace pump 🔧 Deaerate the system |



Faults that affect the 230V/A mains power supply must only be remedied by a specialist!

9.2 Faults without error messages

Faults and malfunctions that cannot be displayed as well as possible causes and their error source can be identified using the following table. If you cannot remedy the fault using the description below, contact the supplier or installer.

| Problem | Possible causes | Measures |
|---|--|---|
| Display does not function  | <ul style="list-style-type: none"> ■ 230V mains voltage not available | <ul style="list-style-type: none"> ✎ Switch on or connect controller ✎ Check the connection's main fuse |
| | <ul style="list-style-type: none"> ■ Defective fuse inside the device | <ul style="list-style-type: none"> ✎ Check the fuse*, replace with a new type 2A/T, if necessary. ✎ Check the 230V components for short-circuits |
| | <ul style="list-style-type: none"> ■ Defect device | <ul style="list-style-type: none"> ✎ Contact the supplier |
| Output is not switched on | <ul style="list-style-type: none"> ■ Switch-on condition is not fulfilled. | <ul style="list-style-type: none"> ✎ Wait until switch-on condition is satisfied. |
| "Pump" symbol rotates, but the pump is not on  | <ul style="list-style-type: none"> ■ Connection to the pump interrupted. | <ul style="list-style-type: none"> ✎ Check the cable leading to the pump |
| | <ul style="list-style-type: none"> ■ Pump is blocked. | <ul style="list-style-type: none"> ✎ Free the pump |
| | <ul style="list-style-type: none"> ■ No voltage present at the switching output. | <ul style="list-style-type: none"> ✎ Contact the supplier. |
| Temperature display strongly fluctuates at short intervals | <ul style="list-style-type: none"> ■ Sensor cables are installed near the 230V cables | <ul style="list-style-type: none"> ✎ Relocate sensor cables, shield sensor cables |
| | <ul style="list-style-type: none"> ■ Long sensor cables extended without shielding | <ul style="list-style-type: none"> ✎ Shield sensor cables |
| | <ul style="list-style-type: none"> ■ Defect device | <ul style="list-style-type: none"> ✎ Contact the supplier |

10 Specifications

Housing

| | |
|------------------------------------|--|
| Material | 100% recyclable ABS housing for wall mounting |
| Dimensions W x H x D in mm, weight | 95 x 75 x 50; approx. 130 g |
| Protection class | IP20 according to DIN 40050, IEC 529, VDE 0470, EN 60529 |

Electrical specifications

| | |
|---|---|
| Operating voltage | AC 230 Volts, 50Hz, -10 – +15% |
| Radio interference level | N according to VDE 0875 |
| Max. cable cross-section 230V connections | 2.5 mm ² fine-wire/single wire |
| Temperature sensor measuring range | PT1000, 1 kΩ at 0°C -30°C .. +250°C |
| Rated impulse voltage | 4 kV according to EN 60730/DIN, VDE 0631, IEC 60664/IEC |
| Output Voltage | 230V~ |
| Power - switching output | 1 A / approx. 230VA for cos φ = 0,7-1,0 |
| Fuse protection | Fine-wire fuse 5 x 20mm, 2A/T (2 amperes, delayed-action fuse) |

Miscellaneous

| | |
|-----------------------|-------------|
| Operating temperature | 0 – 50°C |
| Storage temperature | -10 – +65°C |
| Humidity | max. 60 % |



Subject to change in accordance with technical advances!

11 Resistance table PT1000

The temperature sensors can be checked for proper function using the following temperature resistance table and an ohmmeter:

| Temperature in °C | Resistance in Ohm | Temperature in °C | Resistance in Ohm |
|-------------------|-------------------|-------------------|-------------------|
| -30 | 882 | 60 | 1232 |
| -20 | 921 | 70 | 1271 |
| -10 | 960 | 80 | 1309 |
| 0 | 1000 | 90 | 1347 |
| 10 | 1039 | 100 | 1385 |
| 20 | 1077 | 120 | 1461 |
| 30 | 1116 | 140 | 1535 |
| 40 | 1155 | 200 | 1758 |
| 50 | 1194 | | |

12 Warranty conditions

The Sunny Scout 1328 controllers are carefully produced and tested on an automatic testing station. If any failures occur, first check if there are any operation / setting or system errors. Furthermore, check the pump and temperature sensor connections.

PROZEDA GmbH provides a 2-year warranty starting at the date of purchase and according to the following conditions.

- a) The warranty comes into effect if the purchased good exhibits a material or quality defect. If the defect is caused by improper handling, by exceeding the permitted values stated in the specifications, improper wiring, invalid technical modifications to the device performed by the buyer or by another company other than PROZEDA GmbH, the warranty shall be void.
- b) The warranty requires a written notice that describes the defect in detail as well as a copy of the customer invoice.
PROZEDA GmbH can choose to fulfil the guarantee, at its own discretion, by one of the following measures
 - Repair (reconditioning) or
 - Delivery of a fully functional replacement productThe device shall be repaired within 1 month after PROZEDA GmbH has received it.
If the device is not repaired within the two repairs attempts, the buyer is entitled to delivery of a fully functional replacement product.
If a replacement product is delivered, a new warranty that corresponds to these conditions shall come into effect.
- c) Any further warranty (redhibitory action, reduction of price) is excluded.

Warranty claims may only be submitted by the customer and are non-transferable. If a defect occurs during the warranty period, please contact the supplier / installer. When returning the device for warranty service, please make sure to send a description of the error and, if possible, the system diagram along with the wiring diagram.

13 Declaration of conformity

We, Prozeda GmbH, declare under our sole responsibility that the Sunny Scout type 1328 product complies with the following standards:

DIRECTIVE 2004/108/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 12.2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC

Law on the electromagnetic compatibility of equipment (EMC) of 26 February 2008

DIRECTIVE 2006/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 December 2006 on the approximation of the laws of the Member States concerning electrical equipment for use within certain voltage limits

DIN EN 61326-1, VDE 0843-20-1:2006-10 Electrical measurement, control and laboratory use - EMC requirements - Part 1: General requirements (IEC 61326-1:2005); German version EN 61326 -1:2006

DIN EN 61326-2-2, VDE 0843-20-2-2:2006-10 Electrical measurement, control and laboratory use - EMC requirements - Part 2-2: Particular requirements - Test, operating conditions and performance requirements for portable test, measurement and monitoring equipment for use in low voltage power supply systems (IEC 61326-2-2:2005); German version EN 61326-2-2:2006