Operating Manual
Installation Instructions

Electronic Digital Thermometer SIKA SolarTemp 850

Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Safety Instructions</td>
<td>2</td>
</tr>
<tr>
<td>2 Instrument Description</td>
<td>3</td>
</tr>
<tr>
<td>3 Description of Measurement System</td>
<td>4</td>
</tr>
<tr>
<td>4 Connection Diagram</td>
<td>5</td>
</tr>
<tr>
<td>4.1 Sensor Connection</td>
<td>5</td>
</tr>
<tr>
<td>4.2 Transmitter Output Connection</td>
<td>6</td>
</tr>
<tr>
<td>5 Installation and Start-Up of the SolarTemp</td>
<td>7</td>
</tr>
<tr>
<td>5.1 Measurement Cycle</td>
<td>7</td>
</tr>
<tr>
<td>5.2 Reference Measurement</td>
<td>7</td>
</tr>
<tr>
<td>6 Installation of the Measurement System</td>
<td>8</td>
</tr>
<tr>
<td>6.1 Example of Installing a High-Temperature Exhaust Sensor</td>
<td>8</td>
</tr>
<tr>
<td>6.2 Example for a Cable Installation</td>
<td>11</td>
</tr>
<tr>
<td>6.2.1 Rules for the Laying of Teflon Cables</td>
<td>11</td>
</tr>
<tr>
<td>7 Display</td>
<td>12</td>
</tr>
<tr>
<td>7.1 Error Messages</td>
<td>12</td>
</tr>
<tr>
<td>8 Maintenance</td>
<td>12</td>
</tr>
<tr>
<td>9 Decommissioning and Disposal</td>
<td>12</td>
</tr>
<tr>
<td>10 Technical Data</td>
<td>13</td>
</tr>
<tr>
<td>10.1 SolarTemp 850</td>
<td>13</td>
</tr>
<tr>
<td>10.2 SolarTemp 850 with Transmitter Output (optional)</td>
<td>13</td>
</tr>
<tr>
<td>11 Approvals</td>
<td>14</td>
</tr>
</tbody>
</table>
1 Safety Instructions

△ These operating instructions are designed for qualified machine personnel.
△ Always read these operating instructions carefully prior to installing and starting up the thermometer.
△ The figures in the operating manual are examples and can be different depending on the situation at the location.

Intended use
The electronic digital thermometer SolarTemp 850 is a local temperature measuring instrument which has been designed for measuring and displaying temperatures. The operational safety of the supplied thermometer is only guaranteed if it is operated according to its intended use. The specified limit values (see “Technical Data”) should never be exceeded. Prior to installation, ensure whether the material of the SolarTemp 850 and its attached sensor are suitable for the medium temperature which is to be measured (see “Technical Data”).

Attention:

△ If the thermometer is to be used in applications with high pressures and/or high temperatures, high medium flow rates or corrosive and abrasive media, the thermometer immersion tube has to be additionally protected by a protective tube in accordance with DIN 43772.
△ The measuring accuracy can be significantly influenced by the installation conditions of the temperature sensor, e. g. by installation depth or heat conduction via the material at the screw-in position.
△ Always observe the specified degree of protection for the instrument.
△ Never open the display housing, otherwise the degree of protection (IP65) cannot be guaranteed.
△ Never remove the protective tube of the temperature sensor during operation.
△ Never touch the temperature sensor or any connected components while the medium being measured is subject to high temperatures.
△ For easy reading it is highly recommended to install the display at eye level with a 6 o’clock viewing angle. This especially applies to the remote thermometer.
△ Never expose the thermometer to improper mechanical stress, i. e. never use it as a handle, a foothold, or for any other purpose it is not intended for.

If problems or questions arise, please contact your supplier or SIKA directly:

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2 Instrument Description

The electronic digital thermometer SolarTemp 850 made by SIKA is a measuring instrument with extremely low power consumption.

It can optionally be equipped with an additional 4…20 mA transmitter output. This transmitter electronics is working totally independent of any other electronics included.

A solar cell being integrated in the display unit powers the SolarTemp 850. The digital thermometer functions at an illumination level of merely 50 lux and can therefore be used in almost every situation.

The SolarTemp 850 updates the displayed measurement value every 3 s, thus ensuring that the viewer is always provided with the current measurement value, even “in passing”.

<table>
<thead>
<tr>
<th>No.</th>
<th>Component description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LCD indicator</td>
</tr>
<tr>
<td>2</td>
<td>Solar cell</td>
</tr>
<tr>
<td>3</td>
<td>Sensor connection M12x1, female</td>
</tr>
<tr>
<td>4</td>
<td>Transmitter output connection M12x1, male</td>
</tr>
<tr>
<td>5</td>
<td>Connection plate</td>
</tr>
</tbody>
</table>

SIKA Dr. Siebert & Kühn GmbH & Co. KG – Struthweg 7-9 – 34260 Kaufungen – Germany
Tel +49 5605 803 0 – Fax +49 5605 803 54 – info@sika.net – www.sika.net
3 Description of Measurement System

Electronic measuring system for local temperature measurements

SIKA SolarTemp 850 and resistance thermometer with connection cable in combination with a transmitter signal (optional)

<table>
<thead>
<tr>
<th>No.</th>
<th>Component description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Thermo well</td>
</tr>
<tr>
<td>7</td>
<td>Thread with copper seal</td>
</tr>
<tr>
<td>8</td>
<td>Screw coupling</td>
</tr>
<tr>
<td>9</td>
<td>Connection cable</td>
</tr>
<tr>
<td>10</td>
<td>Pt1000 double element</td>
</tr>
</tbody>
</table>
4 Connection Diagram

4.1 Sensor Connection

The SolarTemp850 can be connected to a temperature sensor. The sensor connection (3) is clearly marked with SENSOR.

SolarTemp 850 with M12 x 1 female sensor connection

It is equipped with a double PT1000 / 2 wire system with a 4-pole plug.

**Anschlussbild/Connection diagramm:**

Sensor:
2x PT 1000/B/2

1 (rot)  2 (rot)  3 (weiss)  4 (weiss)
1 (red)  2 (red)  3 (white)  4 (white)

1x Pt1000 for the display  1x Pt1000 for the transmitter

M12 x 1 female sensor connection
4.2 Transmitter Output Connection

The integrated digital transmitter can optionally be supplied by a 2-wire loop voltage and provides a 4-20 mA analogue signal. This ensures a constant monitoring of the process.

The connection of the transmitter is equipped with a reverse polarity protection to prevent damage to the instrument even in the event of an accidental reverse voltage.

The transmitter output connection (4) is clearly marked with TRANSM.

Note: The transmitter output signal has to match the particular application. SIKA offers two standard options:

a) 4...20 mA \( \triangleq \) 0...650 °C
b) 4...20 mA \( \triangleq \) 0...300 °C

A customer-specific scaling is available on request. Please note that the required setup can only be done during the production process in the factory.
5 Installation and Start-Up of the SolarTemp

The SolarTemp 850 properly works irrespective of its installation position. Make sure that the sensor of the thermometer is being immersed with a length of at least 20 mm into the medium to be measured.

The LCD segment has been optimised to a so-called 6 o’clock viewing angle. The viewing angle is the direction from which the display will have the maximum contrast and readability. Viewing direction is specified as positions of a clock face. A 6 o’clock viewing angle thus is best viewed from the front and below the normal to the display. Plug the temperature sensor to the connection marked SENSOR (3).

As soon as enough light is available (min. 50 lux), the SolarTemp 850 will start up and carry out a self-test.

During the start-up process, the display will show the following series of digits and characters for approx. 8 sec: "-188.8" and then "U x.x".

Having completed the start-up process, the instrument will show the actual measurement value. Simultaneously, the correct functioning of the temperature sensor is being checked. The first valid measurement value is available after approx. 6 sec.

Optional mode of operation: Plug in the connection for 4…20 mA transmitter output signal and properly connect to your external measuring device.

5.1 Measurement Cycle
The instrument produces current measurements in intervals of 3 seconds.

5.2 Reference Measurement
Having completed a measurement, the instrument carries out an internal adjustment by means of a reference resistor. If the measured temperature value is not correctly displayed, e. g. due to insufficient illumination, the instrument will carry out a self-test in order to provide stable and accurate operation again.
6 Installation of the Measurement System

Place of installation: Choose the optimum site for installation of the device in accordance with the technical data provided in this operating manual.

6.1 Example of Installing a High-Temperature Exhaust Sensor

Loosen connection nut and remove measurement insert.

Prepare thermo well for installation.

Copper seal DIN 7603
Measurement insert
Thermowell

Arrange copper seal, measurement insert and thermo well.

Screw thermo well together with copper seal into exhaust pipe.
Firmly tighten thermo well.

Carefully fit in measurement insert as far as it will go.

Loosely screw on connection nut.
Level measurement insert in direction of first attachment point.

Firmly tighten connection nut.

Installed cable sensor in measuring point
6.2 Example for a Cable Installation

6.2.1 Rules for the Laying of Teflon Cables

The device comes with a special, very robust teflon cable. In order to ensure proper functioning, the following rules for the laying of teflon cables have to be observed:

- The cable must never touch surfaces warmer than 200 °C.
- The cable must not be pulled over sharp edges.
- The bending radius of the cable must not be smaller than 20 mm.
- The cable must not be fixed under tensile loading.
- The cable must be firmly fixed and it must not vibrate.
- Do not step on the plug.

Lay sensor cable along cooling water pipeline (example).

Lay sensor cable.
7 Display

The SolarTemp is equipped with a large 4-digit digital display which allows the reading of the measuring value even from a larger distance.

The microprocessor of the SolarTemp 850 permanently checks the plausibility of the sensor signal. In the event of an error, the result is shown on the digital display:

7.1 Error Messages

<table>
<thead>
<tr>
<th>Error Messages</th>
<th>Causes</th>
<th>Error Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SEn</td>
<td>error in sensor</td>
<td>defective sensor/defective cable</td>
</tr>
<tr>
<td>2. Lo</td>
<td>not enough light</td>
<td>luminous intensity too low</td>
</tr>
</tbody>
</table>

Note
The high-quality solar cells energizing the SolarTemp 850 are designed for artificial light. When being used under daylight conditions, a loss of power may occur. In case the luminous intensity falls below the minimum level of 50 lux for a short time, the device can no longer produce correct values. The readings on the display will switch between error message “Lo” and the indication of an invalid measuring value. For troubleshooting make sure enough light is provided. The device will return to a fault-free working mode with its next self-adjustment. This may take up to 15 seconds.

8 Maintenance

The SolarTemp 850 is maintenance free.

9 Decommissioning and Disposal

Disassemble the thermometer and remove it from its measuring position.

According to the Waste Electrical and Electronic Equipment Directive (WEEE Directive) never dispose of the thermometer in domestic waste as indicated on the type plate by the symbol of a crossed out wheelie bin.

SIKA offers you a free service to ensure the correct disposal. Simply return the used thermometer to our main plant at Kaufungen/Germany freight paid. Find our full address below or under www.sika.net.
10 Technical Data

10.1 SolarTemp 850

Reading range  
Resolution  
Accuracy  
Housing  
Dimensions  
Protection class  
Ambient temperature  
Solar cell / Luminous intensity  
Measurement cycle  
Digital display

-60 °C to +650 °C
1 K
Class 1 in accordance with DIN EN 13190
Metal housing
170 mm x 150 mm
IP65
+5 °C to +60 °C
≥ 50 lux
3 sec
4-digit, 7-segment display, height: 25.4 mm

10.2 SolarTemp 850 with Transmitter Output (optional)

Additional/modified technical data for transmitter version

Linearity deviation  
Loop voltage  
Output signal  
Possible scalings  
Load  
Sensor break  
Short circuit  
EMC

< 0.1 % FS
15...26 V DC, reverse polarity protected
4...20 mA
≜ 0 ... 650 °C
≜ 0...300 °C
Ra = (Ub - 15 V) / 21 mA
> 21 mA
< 3.6 mA
According to GL Directives for the implementation of type examination tests, test requirements for electrical/electronic instruments and systems
## 11 Approvals

The SolarTemp 850 was type approved by the following institutions.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Certificate No.</th>
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<tbody>
<tr>
<td>Germanischer Lloyd</td>
<td>58 698 - 08 HH</td>
</tr>
<tr>
<td>Lloyd's Resister EMEA</td>
<td>08 / 20039 (E1)</td>
</tr>
<tr>
<td>Det Norske Veritas AS</td>
<td>A-13599</td>
</tr>
<tr>
<td>BUREAU VERITAS Marine Division</td>
<td>20892/B0 BV</td>
</tr>
<tr>
<td>American Bureau of Shipping</td>
<td>14-HG1177491-PDA</td>
</tr>
<tr>
<td></td>
<td>08-HG354691/1-PDA (without transmitter)</td>
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