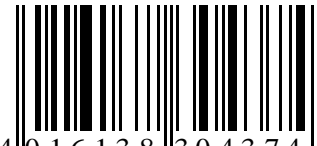


STAINLESS STEEL-TEMPERATURE PROBE FOR SENSOR SWITCHING MODULE



4 0 1 6 1 3 8 3 0 4 3 7 4
Ordering No. 15 65 97



Characteristic features

- ▶ Temperature probe in stainless steel housing
- ▶ protection tube 6x40 mm for submerged sleeve
- ▶ PUR connection cable, shielded

Typical areas of application

- ▶ Heating and solar systems
- ▶ Building instrumentation
- ▶ Industrial applications

Application areas

Universal, temperature probe for general use, e.g. heating and solar systems or for industrial applications. The protection tube of stainless steel grade 1.4571 is mechanically robust and suitable for food grade applications. The material is resistant against many type of chemicals. Because of the small outside dimension of 6 mm, direct mounting in submerged sleeves is possible, which ensures good thermal contact to the medium.

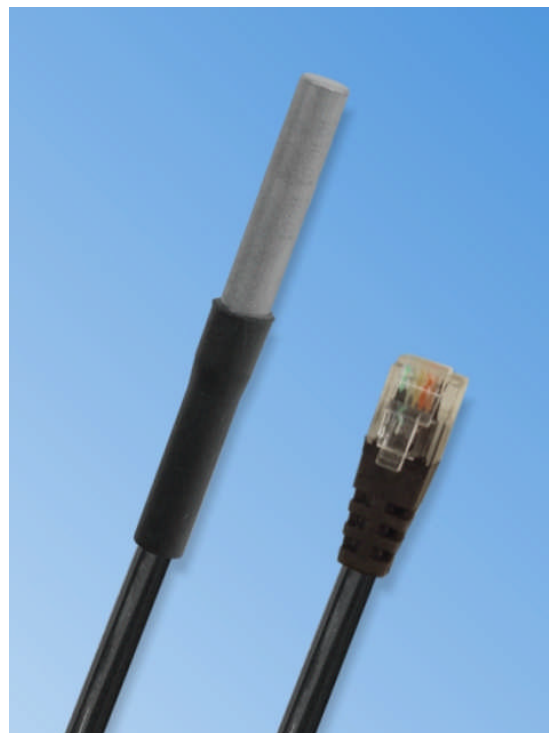
This temperature probe, together with Universal sensor switching module 156503/17/30, results into a thermostat for universal applications.

Resistance table

The precise NTC probe is suitable for many applications, in which temperature is to be measured with high precision. As a closely tolerated NTC is used as sensor element, normally it should be possible to interchange the sensor without re-calibration. The resistance value of the probe is directly dependent on temperature. The high slope of impedance curve enables a simple evaluation circuit. With the integrated parallel resistance, the exponential resistance curve S-form of NTC is pre-linearised. The curve has maximum slope in the range of about 20°C.

The following table further gives the relationship of resistance with respect to temperature. The tolerance on resistance value is approx. $\pm 2\%$. You can get the detailed characteristic with intermediate values on request.

Temperature	Resistance
-40° C	96.4 kOhm
0° C	72.9 kOhm
10° C	62.2 kOhm
20° C	50.9 kOhm
30° C	40.1 kOhm
40° C	30.6 kOhm
60° C	17.0 kOhm
80° C	9.29 kOhm
100° C	5.17 kOhm



Technical data

Temperature measurement	
Measuring range	-40..80°C (100° C short time)
Sensor element	NTC SEMI 833
Resistance range	5 ... 96 kΩ (47.54kΩ at 23.0°C)
Tolerance	$\pm 2\%$ of resistance value
Linearisation	With integrated parallel resistance (100k)
General	
Probe tube dimensions	$\varnothing 6 \times 40$ mm
Probe material	Stainless steel 1.4571
Cable material	Polyurethane, oil resistant
Connection	RJ12-plug, 6-pole
Cable gland	M16
Cable length	1 m
Guarantee	24 months
Scope of supply	Measuring probe with documentation
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Application notes



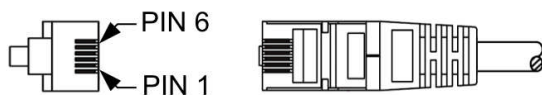
The continuous application temperature should not exceed 80° C, because the plastic connection cable can become brittle and the insulation can be defective. However, the temperature probe can be used up to 100°C for short time. In cold condition under -15°C, the cable should not be moved otherwise cold breakage can appear.

For special applications or critical application areas, the suitability of probe materials (housing and cable) should be checked by the user before installation.

The probe housing is electrically connected to operating ground. Ground currents or balancing currents are not allowed due to EMC reasons. In case of unfavourable material combinations, electro-corrosive effects are possible on contact with water or other electrolytes.

RJ12-plug connector configuration

The probe housing is connected to Pin 6. The sensor is connected between Pin 5 and 4. and is potential free. In case of Universal sensor-switching module, Pin 5 is connected to the device body and Pin 4 is input to measuring amplifiers. For measuring probe, Pin 1,2 and 3 are not occupied (in sensor-switching module these are live terminals!)



View of contacts on the plug

Pin	Function	Description
1,2,3		Unoccupied
4	SENS	NTC sensor connection 2 (input)
5	GND	NTC sensor connection 1 (GND)
6	SHLD	Shielding and probe housing

Connection for Universal sensor switching module (156503,-17,-30)



The applicable safety regulations should be followed! Connection and mounting operation should be carried out by only trained personnel after switching off the voltage. The plug connector is brought out through the hole in the housing and properly secured through cable gland. The plug connector of the probe is inserted at the right RJ12 socket "ANALOG INPUT" (see sketch).

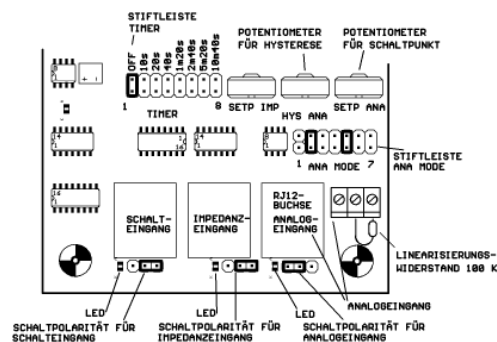
Configuration of jumpers

The operating mode for the temperature probe is adjusted at the pin strip "ANA MODE". The shorting jumpers are placed between position 2 and 5 of the pin strip.

The switching behaviour of the device is decided by the jumper connections below the analog input socket: In the right position, the relay switches ON if the value of temperature exceeds the adjusted switching point. In the left position, as shown in sketch, the switching behaviour is reversed, i.e. the relay switches ON if the temperature of the probe goes below the adjusted switching point. The switching behaviour of the device can be observed at the light emitting diode (LED). In active condition (= relay closed), the LED glows.



Since the three inputs of the module are "OR" connected, the jumper connections "Switching polarity" of the two other unused inputs must be kept in inactive position (see sketch). The associated LEDs below the input socket may not glow. If this is not ensured, the relay shall be always in ON condition!



Adjustment of switching point

The adjustment of switching point for analog input is done by a trim potentiometer "SETP ANA" which is on the right edge of the PCB. The adjustment is done through comparative measurement at the desired switching point.

The adjustment range is right from approx. -40° C (left end position of the potentiometer, i.e. anticlockwise direction) up to approx. 100° C (right end position). The middle position of the potentiometers is at approx. 25°C.

The hysteresis (difference between ON and OFF switching point) can be adjusted by the trim potentiometer "HYS ANA". The setting is to be done with a suitable screwdriver.

Adjustment of time delay

Finally, adjustment of time delay is carried out by placing the jumper connection of the pin strip "TIMER" at the desired position. With this, the configuration is complete and the device is ready for use.