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Temperature Transmitter / Switch OMNI-T

- **Analog output 4..20 mA or 0..10 V**
- **Two programmable switches (push-pull)**
- **Backlit graphical LCD-Display (transreflective), can be read in sunlight and in the dark**
- **Programmable parameters via rotatable, removable ring (programming protection)**
- **Full metal housing with non-scratch, chemically resistant glass**
- **Physical unit in the display (selectable)**
- **Rotatable electronic head for best reading position**
- **Tropical model optionally available**
- **High temperature model (200 °C) optionally available**
- **Connection to USB interface for setting parameters**
- **IP 67**

Characteristics

The primary sensor consists of a platinum resistance sensor using thin film technology, which provides a very good response time, thanks to the lance diameter of 4 mm.

With these sensors, switching points can be set on the spot for where process values are exceeded or fallen short of. This setting can be carried out via the display, even without the process. The present values, or error messages from the measuring point, are visible at all times, and all important parameters can be displayed locally (this saves time during installation, commissioning, and troubleshooting during the process). The analog current signal can be evaluated from large distances, and the present values can be made available there. The sensor is configured to your requirements. It is therefore ready for immediate use, without programming. If you wish to change parameters, you can set the device directly at the sensor, by means of the programming ring.

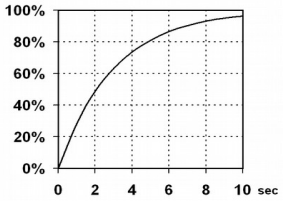
The entire family of OMNI sensors is made up in a modular way, by means of a building-block system (hardware and software). A 16-bit microcontroller with a 12-bit A/D converter and a 12-bit D/A converter ensures the necessary processing speed and accuracy. The signal is displayed with the unit of measure by a backlit LCD graphical display, and is converted into a 0/4..20 mA signal. Two switching points with push-pull output can be programmed across the whole range. The hysteresis of the switching points can be set separately in value and direction (min., max. switching value).
Exceeding or falling short of switching points, and error messages, are indicated by a flashing red LED visible from a long distance, together with a message in the display.

Further parameters can be modified by means of a code:

- Signal filter
- Unit (°C, °F ...) incl. automatic conversion of the values
- Output 0 or 4..20 mA
- Value assignment of 0/4 and 20 mA (setting of zero point and range).

By turning the programming ring to right or left, it is simple to modify the parameters (e.g. switching point, hysteresis...). To protect from unintended programming, it can be removed, turned through 180 ° and replaced, or completely removed.

Technical data

Sensor	platinum resistance sensor	
Process connection	male thread G 1/4 A.. G1/2 A, union nut G 3/4 or Tri-clamp connection	
Metering range	0..100 °C	standard range
	0..200 °C	extended range for lance shape with gooseneck
Measurement accuracy	±1 % FS	
Reproducibility	±0.1 % FS	
Dynamics	measuring cycle 31.25 ms, display cycle 0.5 sec.	
Dynamic (τ)	3 s 	
Operating pressure	Lance shape	PN 25
	Compact construction	PN 100
Medium temperature	same as metering range	
Ambient temperature	-20..+70 °C	
Storage temperature	-20..+80 °C	
Materials medium-contact	1.4571	
Materials, non-medium-contact	1.4305, hardened mineral glass, samarium-Cobalt,	
Supply voltage	18..30 V DC	
Power consumption	< 1 W	
Analog output	0/4..20 mA 0/2..10 V via a 500 Ohm resistance to 0 V	
Switching outputs S1 and S2	transistor output "push-pull" (short circuit proof and reverse polarity protected) I_{out} = 100 mA max. per output	

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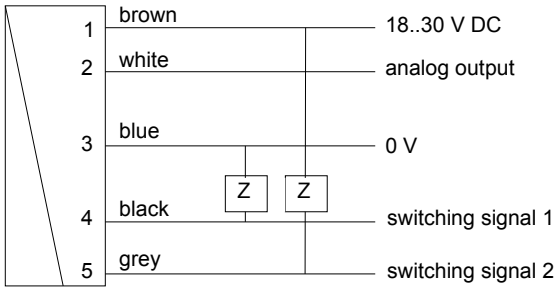
Product Information

OMNI-T

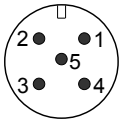
Display	backlit graphical LCD-Display (transreflective), extended temperature range -20..+70 °C, 32 x 16 pixels, background illumination, displays value and unit, flashing LED signal lamp with simultaneous message on the display.
Ingress protection	IP 67
Weight	approx. 0.35 kg
Conformity	CE

Wiring

Z = Load



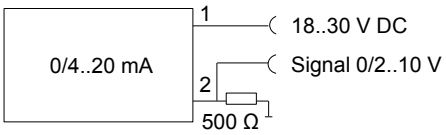
connection example PNP NPN



Round plug connector M12x1

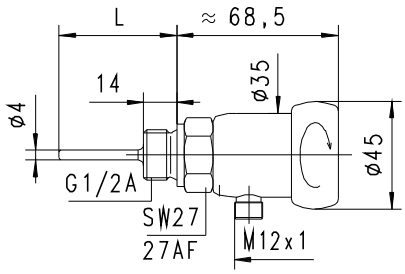
The switching outputs are self-configuring, depending on whether they are connected as PNP or NPN switches (push-pull).

It is recommended to use shielded wiring.
Conversion of a 0/4..20 mA output into a 0/2..10 V output:



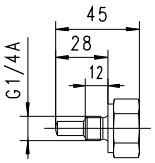
True 0..10 V output can also be ordered.

Dimensions

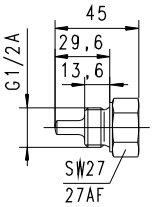


Lance type	Length X	Screw-in thread
..050..	50	G ½ A
..100..	100	G ½ A
..150..	150	G ½ A
..200..	200	G ½ A

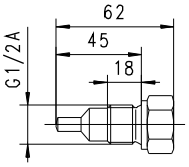
Compact sensor



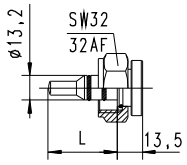
Screw-in sensor G ¼
Type ..028..



Screw-in sensor G ½
Type ..029..



Screw-in sensor G ½
Type ..045..



Sensor with union nut for
T-piece G ⅜..G ½
Type ..031.. (L = 31 mm)
or
T-piece G ¾..G 2
Type ..037.. (L = 37 mm)

"Gooseneck" option for higher temperatures
(available for lance and compact shape)

Handling and operation

Installation

Sensors with screw-in threads are screwed into a T-piece or a nozzle in the pipework, using a suitable flat seal (e.g. Klingerit). Sensors with a union nut are mounted in a T-piece (see separate product information). Use only a hexagonal spanner to tighten.
It should be ensured that the sensor tip is located fully in the medium, and does not push against the wall of the pipe. The upper part of the sensor with the connector outputs can be turned steplessly in order to align the cable outlet.

Operation and programming

The annular gap of the programming ring can be turned to positions 1 and 2. The following actions are possible:

Set to 1 = continue (STEP)
Set to 2 = modify (PROG)

Neutral position between 1 and 2

The ring can be removed to act as a key, or turned through 180 ° and replaced to create a programming protector.
Operation is by dialog with the display messages, which makes its use very simple.
Starting from the normal display (currently measured value with unit), if 1 (STEP) is repeatedly selected, then the display shows the following information in this order:

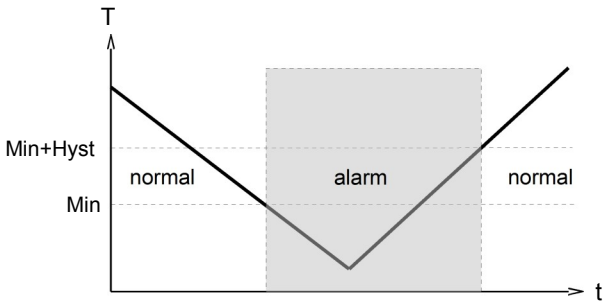
Display of the parameters, using position 1

- Switching value S1 (switching point 1 in the selected unit)
- Switching characteristic of S1
  (MIN = monitoring of minimum value, hysteresis greater than switching value,
  MAX = monitoring of maximum value, hysteresis less than switching value)
- Hysteresis 1 (hysteresis value of S1 in the set unit)
- Switching value S2
- Switching characteristic of S2
- Hysteresis 2
- Code:
- After entering the code 111, further parameters can be defined:
- Filter (settling time of the display and output)
- Units: e.g. ° C or ° F
- Output: 0..20 mA or 4..20 mA
- 0/4 mA (temperature corresponding to 0/4 mA)
- 20 mA (temperature corresponding to 20 mA)

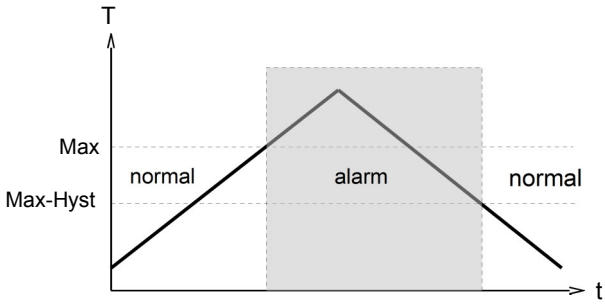
Edit, using position 2

If the currently visible parameter is to be modified:
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the next digit is then reached.
- If there is no action within 30 seconds, the device returns to the normal display range without accepting the modification.
- Leaving the parameter by turning to position 1 means that the modification is accepted

The limit switches S1 and S2 can be used to monitor minima or minima or maxima.
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



The change to the alarm state is indicated by the integrated red LED and a cleartext in the display.
While in the normal state, the switching outputs are at the level of the supply voltage; in the alarm state they are at 0 V, so that a wire break would also be displayed as an alarm state at the signal receiver.

Simulation mode
To simplify commissioning, the sensor supports a simulation mode for the analog output. It is possible to create a programmable value in the range 0..26.0 mA at the output (without modifying the process variable). This allows the wiring run between the sensor and the downstream electronics to be tested during commissioning. This mode is accessed by means of **Code 311**.

Zero point alignment
Zero point alignment by customer: Immerse the lance completely into ice/water at 0 °C; after 5 minutes use **Code 211** to carry out the automatic zero point correction. The sensor shifts the complete characteristic curve, based on the new zero point.

Overload display
Overload of the switching outputs, e.g. because of a short circuit, is detected, indicated on the display, and the affected switching output is set to high impedance. After the short circuit has been corrected, the switching output continues to function.

Default setting
After setting the configuration parameters, they can be reset to factory values at any time, by means of **Code 989.**

Ordering code

	1.	2.	3.	4.	5.	6.
OMNI-T -		**K**		**S**		

Option = ❍

1.	**Metering range**				
	100	range 0..100 °C			
	200	range 0..200 °C			
2.	**Connection material**				
	K	stainless steel 1.4571			
3.	**Connection size**				
	008	connection G $^{1}/_{4}$ A			
	013	connection for T-piece			
	015	connection for G $^{1}/_{2}$A			
4.	**Electronic connection**				
	S	for round plug connector M12x1, 5-pole			
5.	**Process connection**				
	050	lance length	50 mm Ø 4 mm	●	●
	100		100 mm Ø 4 mm	●	●
	150		150 mm Ø 4 mm	●	●
	200		200 mm Ø 4 mm	●	●
	028	sensor length	28 mm (G $^{1}/_{4}$ A)	●	
	029		29.6 mm (G $^{1}/_{2}$ A)	●	
	045		45 mm (G $^{1}/_{2}$ A)	●	
	031	sensor for	T-piece G $^{3}/_{8}$..G $^{1}/_{2}$	●	
	037		T-piece G $^{3}/_{4}$..G 2	●	
6.	**Option**				
	H	model with gooseneck for metering range 0..200 °C		❍	●

Options

- 10 V output
- Range -20..+200 °C

Accessories

- T-piece type TS-2... Thread G $^{3}/_{8}$..G 2
- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Device configurator ECI-1