Housing for Temperature Sensors
omnigrad TA 20J

**Stainless steel housing for omnigrad M sensors.
4...20 mA, HART®, PROFIBUS PA® iTEMP® transmitters.
Loop powered 4-digit display.**

The TA 20J is specifically designed to host a 2-wire temperature transmitter in harsh environment conditions. The stainless steel construction allows a better resistance to corrosion and a good acceptance in the food and pharma applications where cleanability and tightness are very important issues. The TA 20J can be provided as stand alone housing or mounted on a RTD/TC sensor of the family omnigrad M. For use in combination with a head transmitter of the iTEMP® family (TMT18x) and/or the local 2-wire digital LCD display. The local temperature visualization is executed by means of a 4-digit digital display, in engineering units (Celsius or Fahrenheit).

Features and benefits
• Stainless steel 316L (1.4404) material
• Hygienic design
• Blind and window version
• For wall/pipe field mount
• Protection class IP66/IP67
• Includes iTEMP® transmitter (TMT18x)
• Fully programmable loop powered 4-digit display
• Different electrical connections
• For direct mounting on RTD and TC sensors of the family Omnigrad M

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The Power of Know How

Function and system design

Equipment architecture

The TA 20J allows the local visualization in engineering units the 4...20 mA current value. The optional 2-wire LCD digital display is usually connected in series with a 2-wire temperature "head-mounted" transmitter and both installed into the stainless steel housing. The TA 20J can be used as a connection head for temperature RTD or TC sensors, or as a junction housing in a remote application.

Housing

The TA 20J is a stainless steel housing (AISI 316L or DIN 1.4404) with a high protection grade IP66/IP67, suitable for temperature measurement applications. The TA 20J is suitable to host any temperature transmitter of the iTEMP® family TMT 18x (analog, HART®, PROFIBUS PA®) and/or a loop powered 4-digit LCD indicator. Available in blind or window version, the TA 20J housing can be mounted on a pipe or on a wall by means of special brackets or on the top of a temperature sensor of the series Omnigrad M. The TA 20J is suitable to fullfil all hygienic requirements of the food and pharmaceutical industries, and is supplied with different electrical connections: M20 x 1.5 mm, PROFIBUS PA® connector, ½" NPT+ skintop, etc.

Display

The LCD display uses a "series" connection to the 4...20 mA 2-wire loop and is powered through a little voltage drop. By means of 3 little keys (see figure 4) it's possible to modify the configuration: zero and span, decimal point, filter on the reading, measurement resolution and selection of the over-range functionality. Through the same 3 keys it is possible to execute the calibration of the A/D converter. All configuration parameters are stored in a non-volatile EEPROM. The display is designed to be mounted in the TA 20J stainless steel, window based housing by means of three screws on the top cover. The loop powered 4-digit LCD indicator allows to display the temperature measurement directly in engineering units (°C or °F).
EMC according to EN50081-1 and EN50082-2.
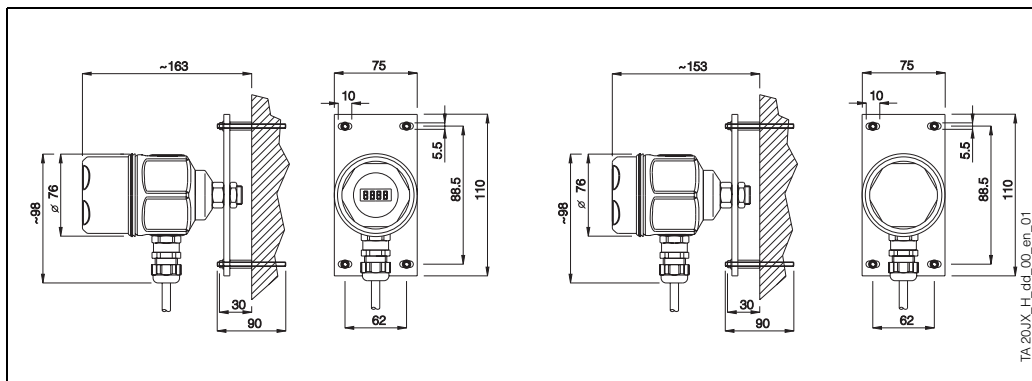
Installation

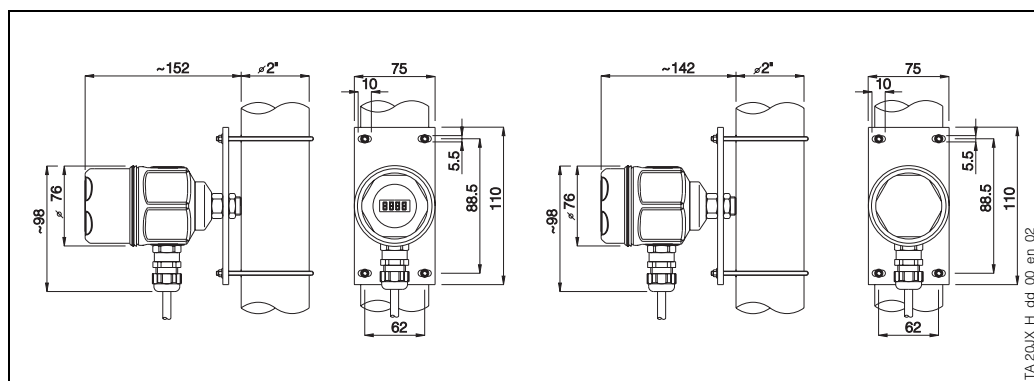*Fig. 1:   Overall dimensions for wall mounting*
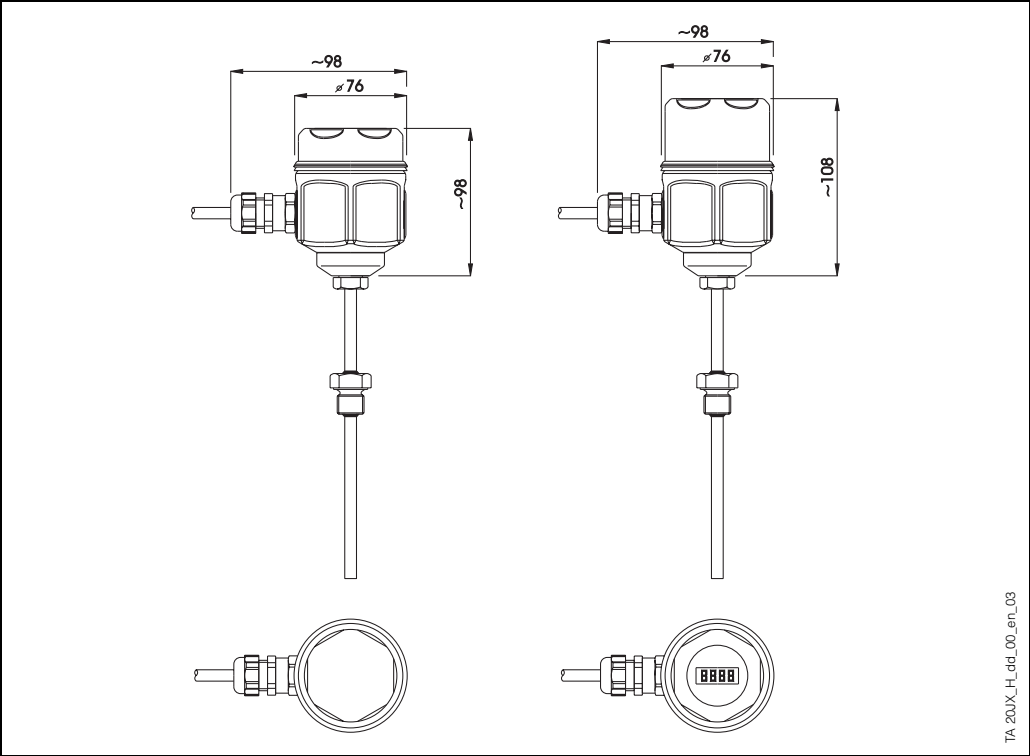

Fig. 2:   Overall dimensions for pipe mounting
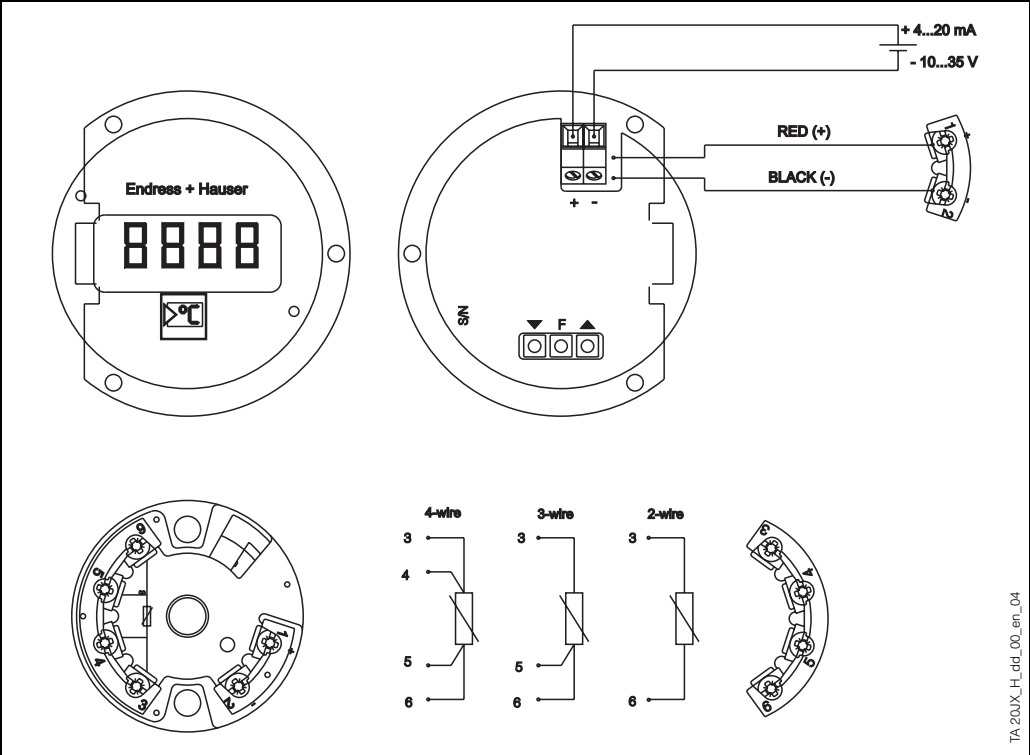
Fig. 3:   *Overall dimensions for compact version*

Fig. 4:   *Connection diagram*

Performances

Reference operating condition	23°C
Maximum measured error	0.1% of the programmed range +/-1 digit
Influence of ambient temperature (temperature drift)	100 ppm/°C ✳ meas. range
Input signal	4...20 mA
Loop drop out	Max 2.5 V (@22 mA)
Digits	4 digits 7-segments LCD display
Visible dimensions	33.4 x 13.2 mm
Display characteristics	TN positive transreflective, visual angle: h 6:00
Data storage	EEPROM
Storage period	10 years (not powered)
Mounting	3 holes, Ø 3 mm

Functionalities

Parameters	Zero, span, decimal point
Indication limits	-1999 to +9999
Programmable range	Free, within the indication limits
Decimal point position	0, 1, 2, 3 decimals
Functions and readings	Filter on measurement readings, over range limits, resolution
Filter on readings	Average on 1 to 8 measurement readings
Update of readings	0.25 to 2 s, according to the filter on readings
Over-load limits	3.6 to 22 mA
Resolution	Selectable from 1 to 10 points
Calibration points	Zero (4 mA) and span (20 mA), stored on EEPROM

Operating conditions

Ambient temperature	-20...70°C
Storage temperature	-30...80°C
Moisture	25 to 95% not condensating
Ingress protection	IP20
Electromagnetic compatibility	EMC according to EN50081-1 and EN50082-2 with instrument properly installed

Mechanical construction

Electrical loop connection	2 terminals, max wire section 1 mmq (AWG16)
Connection to transmitter	2 wires, max 0.5 mmq
Design, dimensions	Diameter: 59 mm
	Thickness: 20 mm
	Mounting diameter: 54 mm
Weight	650 g with display

Display configuration

Programming

The programming is executed through 3 keys mounted on the bottom of the display. The central key is the Enter (**F**) key. The lateral keys act as the up ▲ and down ▼ digit; they also act as selection of the parameters (see figure 4).

Key	Function
F	Access to the programming; move to the following parameter menu; saving of data and close of the programming
▼	Decreasing digit; selection/set-up of a parameter
▲	Increasing digit; selection/set-up of a parameter
▲ + ▼	"Escape"

Operation

Press the key **F** for more than 3 seconds to get access to the programming procedure. The display will visualize the "**dP**" function, which is the first programming section: **D**ecimal **P**oint. By pressing the ▲ (increase) and ▼ (decrease) keys it's possible to scroll all the other programming windows. At the end of the programming phase the modified parameters are stored automatically and retained also during the switch off of the instrument.

Programming procedure

Set-up of the decimal point (dP)
Press the ▲ and ▼ keys to select the decimal point position (from zero to 3 decimals). Press **F** to confirm.
Default = 1 decimal

Set-up of the engineering value related to the zero point (ZErO)
Press the ▲ and ▼ keys to select the engineering value zero (-1999 to 9999). Press **F** to confirm.
Default = 0.0

Set-up of the engineering value related to the span range (SPAn)
Press the ▲ and ▼ keys to select the engineering range value (-1999 +9999). Press **F** to confirm.
Default = 100.0

Set-up of the limit on the input current (Li)
This parameter allows to select the over-load limit of the visualization.
If Li = 0, when the current overcomes the 20 mA value, the display will indicate the **O**ver**L**oad message **OL** (**-OL** when the current is lower that 4 mA).
If Li = 1, the visualization will be extended of a 10% over the 4...20 mA range, before indicating the overload. In both cases, overcoming the display maximum readings (-1999 +9999), the overload message will be indicated.
Default = 1

Set-up of the filter (FiLt)

When the 4...20 mA is disturbed it is possible to select an higher value of FiLt in order to get a more stable and clear visualization on the display.

Press the key ▲ to increase the filter value on the input and the key ▼ to decrease the filter value. It's possible to set-up different values from 1 to 8; when FiLt = 1 no filter is applied on the input and the digital reading occurs every 250 ms.

In this case the updating period of the display will be 250 ms multiplied by the FiLt value.

Example: if FiLt = 5 the updating period of the display will be 1.25 s.

Default = 2

Set-up of resolution (riS)

This function allows to set-up the resolution of the display; when riS = 1 the display will indicate all the available digit in the scale, within the programmed range.

When riS = 2 the steps between two consecutive readings will be doubled: with riS = 2 it will not be possible to indicate odd numbers.

Selectable values for riS are: 1, 2, 5 and 10.

It is suggested to increase the resolution only if the set range is very large (example 10000 points) and/or if the 4...20 mA signal is quite unstable: on the contrary the maximum resolution is normally used.

Default = 1

Key	Function	Display
SCROLL ▲ or ▼	Set-up of the decimal point	**DP / 000.0**
	Set-up of the engineering value ZERO	**ZErO / 0.0**
	Set-up of the engineering range SPAN	**SPAn / 100.0**
	Set-up of the OverLoad limit	**Li / 0**
	Set-up of the input Filter	**FiLt / 1**
	Set-up of the Resolution	**riS / 1**
F	Allow to enter the programming window. Allow to exit the programming window and to save the modifications.	
▲	Increasing digit	**0 to 9**
▼	Decreasing digit	**9 to 0**
▲ + ▼	Exit the programming without saving	

Calibration

By pressing contemporary the ▲ + ▼ keys for more than 3 s, it is possible to access to the calibrating function where it is possible to calibrate the zero and the full scale of the A/D converter of the digital indicator.

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Warning! Entering this procedure and modifying the parameters means to change the factory calibration data: this function must be executed by specialised personnel only by using adequate instrumentation. A wrong calibration will affect and compromise the right functionality of the instrument itself.

Zero-point calibration

Inside the calibration window, select the ZERO point calibration (**C4**). Apply a 4 mA current to the instrument, wait for the stabilization of the signal and of the indication and press the key **F** until the indication **CAL** will appear on the display. After few seconds, the new engineering ZERO value will be indicated.

Exit the Zero-point calibration by pressing ▲ + ▼ keys together and proceed with the Full Scale calibration.

Full scale calibration
Inside the calibraion window, select the Full Scale calibration (**C20**) by pressing ▲ or ▼ keys, apply a 20 mA current to the instrument and proceed as for the Zero-point calibration.

Note! Please follow the mentioned sequence: first calibrate the Zero-point, then the Full Scale. It's important to respect the calibration sequence in order to avoid wrong indications.

Key	Function	Display
▲ + ▼	Access to the calibration	
Scroll ▲ or ▼	Zero-point calibration	C4 / 0000
	Full Scale calibration	C20 / 1000
F	Entering the calibration window	CAL
▲ + ▼	Exit the calibration windows (Zero-point and Full Scale)	

Ordering information

Product structure

TA 20J	Terminal head TA 20J				
	Stainless Steel AISI 316L / W1.4404 *Max temperature 130°C, protection class IP66/IP67* **Mounting versions**				
	A	Thermometer connection M24x1.5 mm			
	B	Thermometer connection 1/2" NPT			
	P	Pipe mounting, with bracket 2" pipe			
	W	Wall mounting, with bracket in st.steel			
	Y	Mounting to specification			
		Electrical connection			
		6	PROFIBUS connector - IP66		
		7	Harting HAN 7D connector - IP44		
		2	1/2" NPT + skintop electrical connection		
		5	M20 x 1.5mm electr.connection - IP66		
		9	Electrical connection to specification		
			Electronic type and display connection		
			W	Without electronics, no display	
			V	Without electronics, with display	
			A	PCP transm. TMT181-A, no display Adjusted ... to ...°C	
			B	PCP transm. TMT181-A, with display Adjusted ... to ...°C	
			H	HART® transm. TMT182-A, no display Adjusted ... to ...°C	
			J	HART® transm. TMT182-A, with display Adjusted ... to ...°C	
			L	PROFIBUS PA® trasm. TA184-A, no display	
			1	Built-in THT1- separ.pos., no display	
			2	Built-in THT1- separ.pos., with display	
				Display parameters	
				0	Without parameters
				1	Std. 0 to 100°C
				2	Scaling accord. to transm. range selected
				9	Scaling to requirements
TA20J-					Complete ordering code

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Supplementary documentation	❑ Temperature head transmitter iTEMP® Pt TMT 180	TI 088T/09/en
	❑ Temperature head transmitter iTEMP® PCP TMT 181	TI 070R/09/en
	❑ Temperature head transmitter iTEMP® HART TMT 182	TI 078R/09/en
	❑ Temperature head transmitter iTEMP® PA TMT 184	TI 079R/09/en

Subject to modification

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