

Thermometer HIGtemp TRH 30H

RTD Assembly with Protection Thermowell and Replaceable Mineral Insulated Insert
Hygienic Process Connection



TRH 30H

Features and Areas of Application

The thermometer HIGtemp TRH 30H is supplied with RTD (Pt100 IEC 60751 class A, 1/3 DIN B, 1/10 DIN B, Pt500 or Pt1000) encapsulated in a replaceable mineral insulated MgO cable insert, allowing its removal during process for maintenance, since it's protected by an external thermowell.

All process connections made available for this model are perfectly hygienic and using the standards for clamp, dairy fitting 11851, Varivent, SMS or others according to customers request. Can be selected with neck length and a reduced tip, for faster response.

As a special feature can be supplied with a head with built in display for temperature indication, standard in aluminium or in special version in SS316L.

Are available also as standard options a wide range of sensor configurations single or double and other connection heads in polypropylene or SS316L FDA approved materials or polyamide, allowing the use of TRH 30H temperature assembly in almost industrial environmental with hygienical requirements.

If selected, can be supplied with a temperature transmitter, fully configurable via PC software with 2 wire technology, 4...20mA output, programmed for application range with HART digital communication and ATEX compliance protocol.

High reliability, rugged and attending customised construction, HIGtemp TRH 30H has high quality/price ratio.

Ideal for temperature measurement in food and beverages production, pharmaceutical industry, cosmetics, among other branches where temperature measurement is required with high demands of functionality, performance and aseptically CIP/SIP compliance.

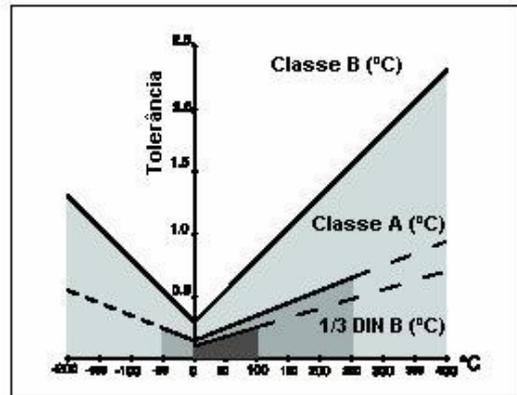
RTD's General Information

The measuring principle of a RTD (*Resistance Temperature Detector*) is based on a sensor with electric resistance variable according to temperature changes. Considering a Pt100, this sensor has a resistance of 100Ω at 0°C, increasing the resistance with temperature increase, due to its platinum coefficient, used in this type of sensor. With excellent linearity, allows the temperature probes based in this type of sensor the most common in industry, ruled by DIN EN 60751 for a coefficient $\alpha = 3.85 \cdot 10^{-3} \text{ } ^\circ\text{C}^{-1}$, calculated between 0 and 100°C.

The sensor element is available in two versions - Thin-film (TF) or ceramic (Wire Wound), this last one with a wide measuring range, higher long term stability and better accuracy. The thin-film elements have faster response. Regarding accuracy, Delta Sensor has available as standard, sensors class A, or with better accuracy, sensors class 1/3 DIN B e 1/10 DIN B, having the last two a reduced measuring range (refer table at page bottom).

Thin-film Type

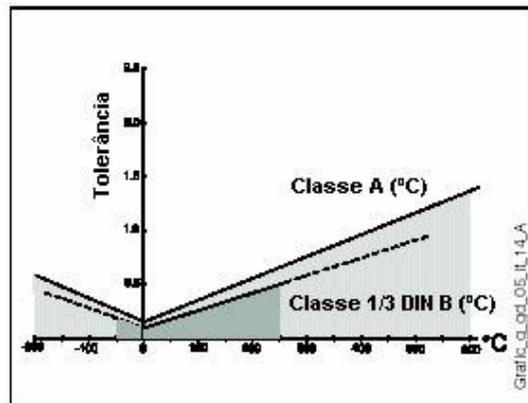
- Class A
 - $3\alpha = 0.15 + 0.0020|t|$ -50...250°C
 - $3\alpha = 0.30 + 0.0050|t|$ 250...400°C
- Class 1/3 DIN B
 - $3\alpha = 0.10 + 0.0017|t|$ 0...100°C
 - $3\alpha = 0.15 + 0.0020|t|$ -50...0 / 100...250°C
 - $3\alpha = 0.30 + 0.0050|t|$ 250...400°C



Ceramic Type

- Class A
 - $3\alpha = 0.15 + 0.0020|t|$ -200...600°C
- Class 1/3 DIN B
 - $3\alpha = 0.10 + 0.0017|t|$ -50...250°C
 - $3\alpha = 0.15 + 0.0020|t|$ -200...-50 / 250...500°C

(|t| = Absolute temperature value in °C)



In case of vibrations, the Thin-film (TF) sensor may offer advantages, but its behaviour depends of intensity, direction and vibration main harmonic.

The most common configurations are for simplex elements, 2, 3 and 4 wires and with redundancy, duplex elements with 4 or 6 wires. The 4 wires configuration for simplex elements is the one that grants higher accuracy, because the errors caused by cores for signal transmission, are completed compensated. With 3 wires for simplex configuration or 6 wires duplex, the associated error is almost null. When using 3 or 4 wires simplex or duplex, the EN 60751 sensor specifications must comply temperature thermometer assembly.

Temp Deg C	Classe B		Classe A		1/3 DIN B		1/10 DIN B	
	± Deg C	± Ohms	± Deg C	± Ohms	± Deg C	± Ohms	± Deg C	± Ohms
-200	1.30	0.56	0.55	0.24	0.44	0.19	0.13	0.06
-100	0.80	0.32	0.35	0.14	0.27	0.11	0.08	0.03
0	0.30	0.12	0.15	0.06	0.10	0.04	0.03	0.01
100	0.80	0.30	0.35	0.13	0.27	0.10	0.08	0.03
200	1.30	0.48	0.55	0.20	0.44	0.18	0.13	0.05
300	1.80	0.64	0.75	0.27	0.60	0.21	0.18	0.07
400	2.30	0.79	0.95	0.33	0.77	0.28	---	---
500	2.80	0.93	1.15	0.38	0.93	0.31	---	---
600	3.30	1.08	1.35	0.43	---	---	---	---
650	3.60	1.13	1.45	0.46	---	---	---	---
700	3.80	1.17	---	---	---	---	---	---
800	4.30	1.28	---	---	---	---	---	---
850	4.80	1.34	---	---	---	---	---	---

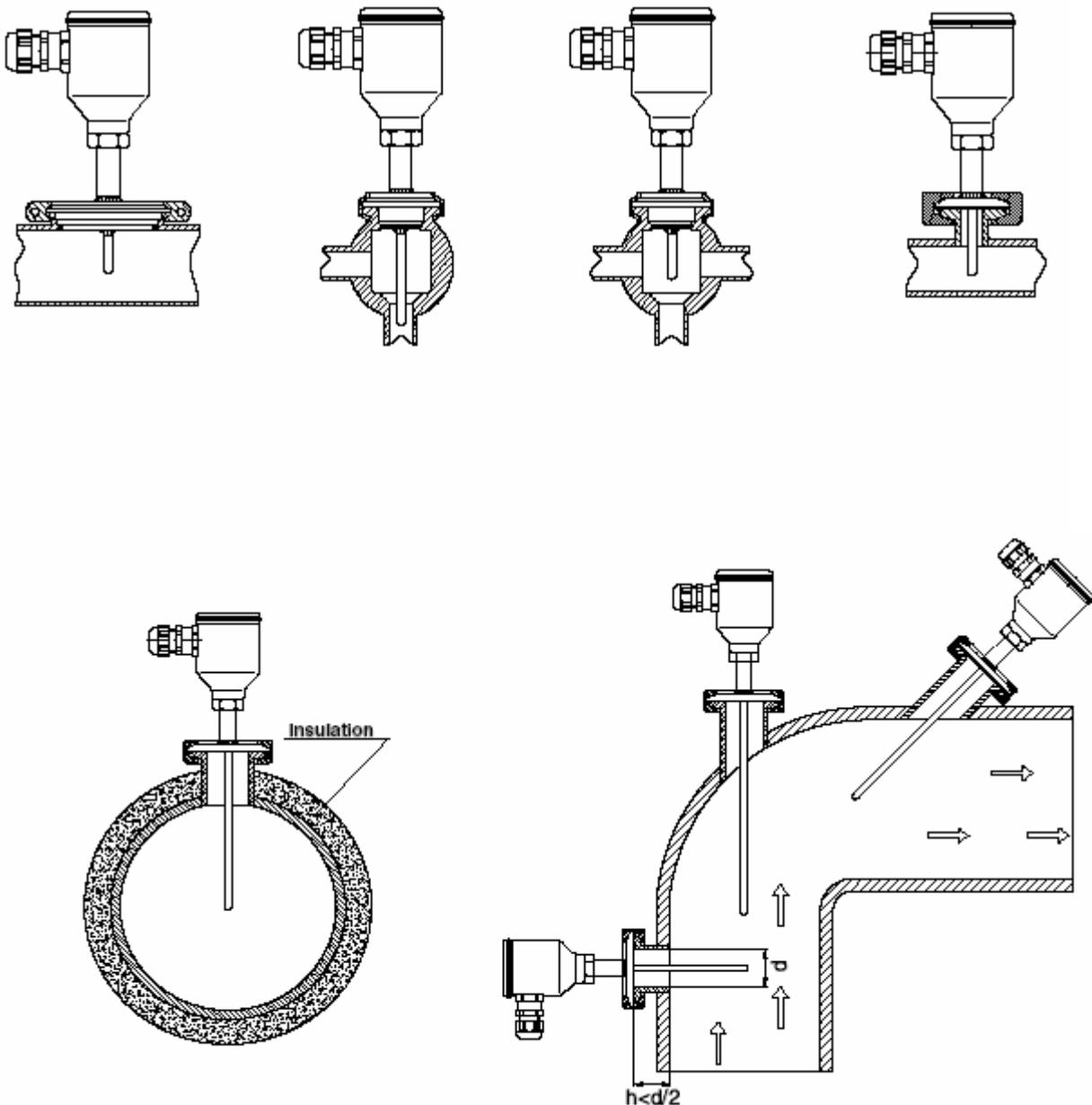
Installation

The temperature thermometers HIGtemp TRH 30H are suitable for pipes, tanks or other parts of the process where required hygienic process connections are needed. The interface components, in the process side, like couplings and o-rings, are customer responsibility and they are not supplied as standard with the instrument. Nevertheless and if required all parts for the correct installation of HIGtemp TRH 30H, could be supplied in separate.

If the immersion length is small, an additional error may occur and might not be negligible, if there is a big difference between process temperature and ambient temperature. The temperature dissipation happens between process connection and immersed length.

To minimise this error is recommendable as a rule of thumb, the immersion length should be at least 10 times the thermowell diameter. Considering the HIGtemp assemblies, the sensor element is installed at 15-20mm at end of the tip. According that is recommendable to select an immersion length of 100 for a temperature thermowell of 6mm. If this is not possible, should be selected a diameter or immersion length to comply with the rule.

Whenever was possible, the immersion length should be slightly greater the pipeline diameter. By other side an appropriate thermal insulation could compensate a reduced immersed length. Other possibility to grant a correct measurement is to mount the assembly with an angle (shown below on drawing). In that case the HIGtemp TRH 30H should be mounted against fluid flow.



Please pay attention to measuring point if you are measuring a two phased fluid.

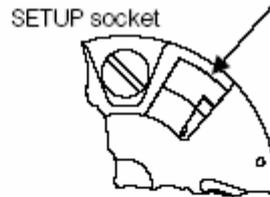
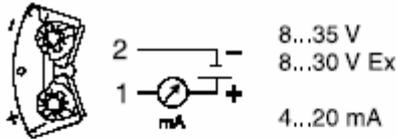
If the measuring fluid has a low temperature and the environment contains high relative humidity, than a plastic temperature head should be used.

Electrical Connections

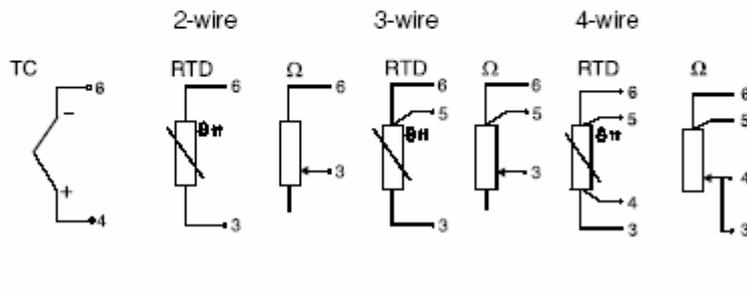
As shown below, most common electrical connections used on temperature assembly HIgTemp TRH 30H. Can be installed a temperature transmitter or a ceramic terminal block. May be fitted both, per request. In any case these electrical wiring connections should be followed.

Next using the universal temperature transmitter TMT 180, input type RTD, TMT187, input Pt100, fixed range (not PC programmable) and types TMT 181/ TMT 182 (HART), universal input. Please refer to product technical information, for all relevant technical data.

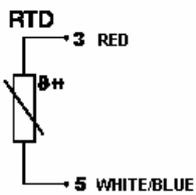
Power supply and current output



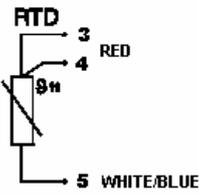
Sensor connection



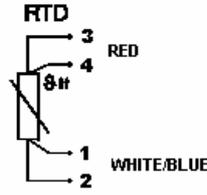
Or with ceramic terminal block, single or double RTD input.



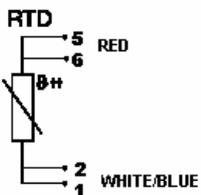
**2 WIRES
SINGLE**



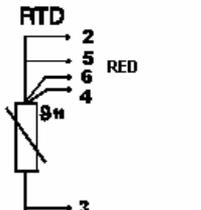
**3 WIRES
SINGLE**



**4 WIRES
SINGLE**



**2 WIRES
DOUBLE**



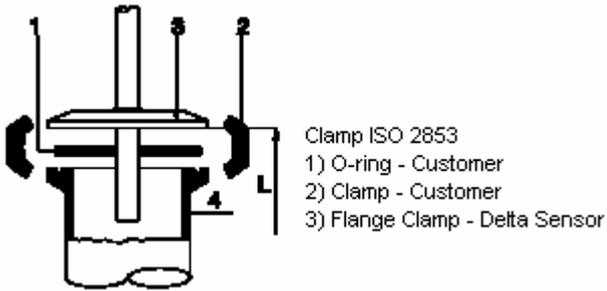
**3 WIRES
DOUBLE**

Technical Data

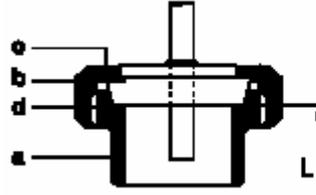
Sensor Element	Pt100 single class A DIN EN 60751 type Thin-film 2, 3 and 4 wires, P100 single class A DIN EN 60751 type Wire Wound 3 and 4 wires and double with 4 and 6 wires, Pt100 single 1/3 DIN B, Pt100 single 1/10 DIN B type Wire Wound 3 and 4 wires, Pt500 and Pt1000 single type Thin-film 3 and 4 wires.
Temperature range	From -50° up to +400°C with mineral insulated cable MgO, SS316L braided. For range of -200°C up to +500°C, please contact us.
Materials	Wet parts and neck length in SS 316L/1.4404. Other materials on request. Housings in aluminium with or without digital display, polyamide, polypropylene FDA approved or SS 316L type DIN form B, to fit a ceramic block or a temperature transmitter. ATEX IIC EEx d Zone 2 compliant temperature aluminium heads with or without digital display available on request.
Dimensions	Immersion: Standard diameters of 6mm, 8mm, 9mm, 10mm and immersion length up 800mm. Reduced tip for diameters greater than 6mm Neck: standard lengths of 75mm, 120mm and 150mm Other sizes and lengths on request. Head type DIN form B or type D. Types A, or Mignon available under request.
Temperature Transmitter	Model TMT 180 signal input RTD 2,3 or 4 wires, PC programmable and factory preconfigured for temperature range from 0 to 100°C or other to be specified. Output signal 4...20mA, 2 wire technology, galvanic isolation. Please refer to technical documentation for all details. Model TMT 187 signal input Pt100 2, 3 or 4 wires, fixed range and factory preconfigured for temperature range from 0 to 100°C, Pt100 3 wires or other to be specified, with ATEX II1G EEx ia IIC T4/T5/T6 approval. Output signal 4...20mA, 2 wire technology, galvanic isolation. Please refer to technical documentation for all details. Model TMT 181 universal input 2,3 or 4 wires, PC programmable and factory preconfigured for temperature range from 0 to 100°C or other to be specified, with ATEX II1G EEx ia IIC T4/T5/T6 approval. Output signal 4...20mA, 2 wire technology, galvanic isolation. Please refer to technical documentation for all details. Model TMT 182 universal input 2,3 or 4 wires, PC/HART programmable and factory preconfigured for temperature range from 0 to 100°C or other to be specified, with ATEX II1G EEx ia IIC T4/T5/T6 approval. Output signal 4...20mA, 2 wire technology, galvanic isolation. Please refer to technical documentation for all details.
Ingress Protection	IP65 with aluminium and SS316L temperature heads. IP66 polyamide and polypropylene temperature heads.
Insulation Resistance	Greater than 2000Mohm, at 500Vdc room temperature.

Process Connections

To weld, spherical to weld-on, Clamp ISO 2852, Varivent, SMS, Diary 11851



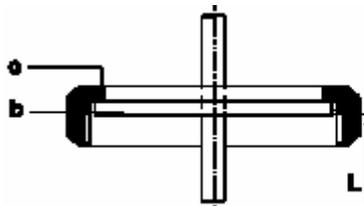
Clamp ISO 2853
 1) O-ring - Customer
 2) Clamp - Customer
 3) Flange Clamp - Delta Sensor



Diary fitting DIN 11851
 a) Thread - Customer
 b) Conic Coupling - Delta Sensor
 c) Coupling Nut - Delta Sensor
 d) O-ring - Customer

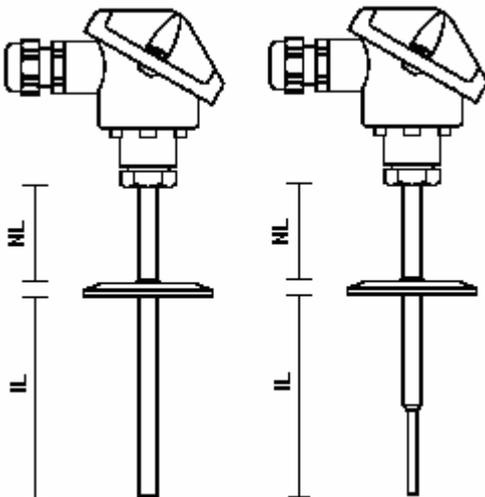


Varivent Connection



Hygienic Flange SMS
 a) Conical Coupling - Delta Sensor
 b) Conical Nut - Customer

Technical Drawings



* Cable glands not included as standard. When ordering please request.

Additional Information

Maintenance

The HIgTemp RTD assemblies don't require specific maintenance.

Factory Quality Protocol

This factory quality protocol is supplied with every unit. This acts as an inspection report that shows compliance with DIN EN60751 essential points. One measurement point is issued for the effect.

Calibration Certificate

If required, can be issued a calibration certificate, ordered in a separate position and conducted by an independent and accredited entity.

Other Certificates/Protocols

Transmitter with ATEX certificate ATEX EExia IIC, when ordering according **options W0, W2 or W3, field 090, of product structure**. Others to issue as special request in separate.
Materials compliance protocol EN10204-3.1, ordered in a separate position.
Materials compliance protocol for roughness inspection, options Ra<1.5um, Ra<0.8um or Ra<0.5um, ordered in a separate position.

Accessories

As accessories or spare parts, are available the replaceable mineral insulated inserts, and wide range of protecting tubes, terminal blocks, connection heads, PC programming temperature transmitters and interface kit with software.

Delivery Time

For small quantities (less than 20 pieces) with standard options, the delivery time is from 6 up to 10 working days, or express manufacturing (72h) with feasibility according configuration and required quantities.

How to Order

Order Code Description

TRH 30H- Temperature Thermometer Type HIgtemp Model TRH 30H

010 Type of Sensor RTD

- A1 Sensor Pt100 single, Class A IEC751, 3 wires $d > 4,7\text{mm}$
- A2 Sensor Pt100 single, Class A IEC751, 3 wires $d < 4,7\text{mm}$
- A3 Sensor Pt100 single, fast response, Class A IEC751, 3 wires, $d \geq 6,0\text{mm}$
- A4 Sensor Pt100 single, Class A IEC751, 3 wires $d \geq 10,0\text{mm}$
- B1 Sensor Pt100 single, Class A IEC751, 4 wires $d > 4,7\text{mm}$
- B2 Sensor Pt100 single, Class A IEC751, 4 wires $d < 4,7\text{mm}$
- B3 Sensor Pt100 single, fast response, Class A IEC751, 4 wires $d \geq 6,0\text{mm}$
- B4 Sensor Pt100 single, Class A IEC751, 4 wires $d \geq 10,0\text{mm}$
- C1 Sensor Pt100 double, Class A IEC751, 4 wires $d > 4,7\text{mm}$
- C2 Sensor Pt100 double, Class A IEC751, 6 wires $d > 4,7\text{mm}$
- D1 Sensor Pt100 single, 1/3 DIN B, 3 wires $d > 4,7\text{mm}$
- D2 Sensor Pt100 single, 1/3 DIN B, 4 wires $d > 4,7\text{mm}$
- E1 Sensor Pt100 single, 1/10 DIN B, 3 wires $d > 4,7\text{mm}$
- E2 Sensor Pt100 single, 1/10 DIN B, 4 wires $d > 4,7\text{mm}$
- F1 Sensor Pt500 single, fast response, Class A IEC751, 3 wires $d \geq 6,0\text{mm}$
- F2 Sensor Pt500 single, fast response, Class A IEC751, 4 wires $d \geq 6,0\text{mm}$
- G2 Sensor Pt1000 single, fast response, Class A IEC751, 4 wires $d \geq 6,0\text{mm}$
- G1 Sensor Pt1000 single, fast response, Class A IEC751, 3 wires $d \geq 6,0\text{mm}$
- K1 Sensor Pt100 single, 2 wires $d > 4,7\text{mm}$
- K2 Sensor Pt100 single, 2 wires $d < 4,7\text{mm}$
- K3 Sensor Pt100 single fast response, 2 wires $d \geq 6,0\text{mm}$
- K4 Sensor Pt100 single, 2 wires $d \geq 10,0\text{mm}$
- Y9 RTD sensor special version on request

020 Shape of Tip

- S Straight, standard response
- R Reduced 30mm, faster response (for immersion length $IL \geq 50\text{mm}$)
- Y Shape of tip special version on request

030 Neck Length NL (50mm to 220mm)

- 1 75mm Neck length
- 3 120mm Neck length
- 4 150mm Neck length
- X Neck length to specification
- Y Neck length special version on request

040 Process Immersion Length IL (100mm to 800mm)

- 2 100mm Immersion length
- 3 150mm Immersion length
- 4 200mm Immersion length
- 5 250mm Immersion length
- 6 300mm Immersion length
- 7 350mm Immersion length
- 8 400mm Immersion length
- X Immersion length to specification
- 9 Special version Immersion length on request

Order Code Description

050 Thermowell diameter and material, Insert (Price per 10mm)

- S6** Diam. 6mm in SS316L, replaceable mineral insulated RTD insert with diam. 3mm in SS316L
- B4** Diam. 6mm in SS316L, replaceable mineral insulated RTD insert with diam. 4,5mm in SS316L
- S8** Diam. 8mm in SS316L, replaceable mineral insulated RTD insert with diam. 4,5mm in SS316L
- C6** Diam. 9mm in SS316L, replaceable mineral insulated RTD insert with diam. 6mm in SS316L
- S0** Diam. 10mm in SS316L, replaceable mineral insulated RTD insert with diam. 6mm in SS316L
- Y9** Special version of thermowell and insert type on request

060 Process Connection

- C2** Clamp 1 1/2" AISI 316L
- C3** Clamp 2" AISI 316L
- H1** Diary flange DIN 11851 DN25 in SS316L
- H2** Diary flange DIN 11851 DN40 in SS316L
- H3** Diary flange DIN 11851 DN50 in SS316L
- S1** SMS DN25 in SS316L
- S2** SMS DN38 in SS316L
- S3** SMS DN51 in SS316L
- S9** Hygienic flange type "Collared sleeve" DN25 to weld-on and PEEK o-ring (only available for 6mm thermowells)
- S8** Spherical accessory in SS316Ti to weld on process (only available for 6mm thermowells)
- V0** Varivent DN25 in SS316L
- V1** Varivent DN40 in SS316L
- V2** Varivent DN50 in SS316L
- Y9** Hygienic process connection special version on request

070 Terminal Block

- S** Not included, free end wires for temperature transmitter connection
- B** Up to 6 terminals type B
- E** Up to 6 terminals type B, ATEX EExe
- Y** Terminal block special version on request

080 Head Type

- B1** Aluminium type B, IP65, cable entry M20x1.5
- B2** Aluminium type B, IP65, EExd, cable entry M20x1.5
- B3** Aluminium type B, IP65, EExd with display, cable entry M20x1.5
- B4** SS316L type B, IP66, cable entry M20x1.5
- B5** Polyamide type head form DIN B, IP66, cable entry M20x1.5
- B6** Polypropylene PP type B, FDA approved, IP66, cable entry M20x1.5
- D1** Aluminium type D, with LCD display, cable entry M20x1.5
- D3** Aluminium type D, with LED display, cable entry M20x1.5
- Y9** Head type special version on request

090 Temperature Transmitter

- A0** Without temperature transmitter
- A3** PC programmable, type TMT 180, input Pt100 2/3/4 wires, galvanic isolation, output 4...20mA, factory preconfigured to 0...100°C
- W5** PC programmable, type TMT 180, input Pt100 2/3/4 wires, galvanic isolation, output 4...20mA, factory preconfigured according customer specification
- W0** Fixed range, type TMT 187, ATEX EExia IIC, input Pt100, galvanic isolation, output 4...20mA, factory preconfigured according customer specification
- W2** PC programmable, ATEX EExia IIC, type TMT 181, universal input, galvanic isolation output 4...20mA, factory preconfigured according customer specification
- W3** PC programmable, ATEX EExia IIC, type TMT 182, universal input, galvanic isolation output 4...20mA HART, factory preconfigured according customer specification
- W4** PC programmable, type TMT 182, universal input, galvanic isolation output 4...20mA HART, factory preconfigured according customer specification
- Y9** Special version on request

Selection Example:

Temperature Assembly type RTD Pt100 3 wires standard response, with replaceable mineral insulated insert for process temperature from 0 to 130°C, CIP cleaning compliant assembly, thermowell in SS316L with standard diameter of 10mm and 200mm long, neck length of 75mm, process connection by clamp ISO 2852 1 1/2" (038), head in SS 316L with built in temperature transmitter 4...20mA factory configured from 0 to 150°C.

Order Code: TRH 30H-A1S14S0C2SB4A3

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Delta Sensor

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de Sistemas Industriais, Lda



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