

ABB MEASUREMENT & ANALYTICS | DATA SHEET

SensyTemp TSHY (HY R)

Resistance thermometer for the food and beverage industries



Measurement made easy

For insertion in pipelines and vessels

Fast response

- Halftime < 2,5 s

Various designs

- Sensor smooth, with threaded compression fitting or welded flange

Corrosion-resistant

- Sensor and connection head made of stainless steel, IP 66

Hygienic

- Materials permissible for use with food, surface polished smooth, mounting suitable for CIP (Cleaning In Place)

Selectable transmission of measured values

- Pt 100 signal or 4 to 20 mA with installed transmitter

High operational reliability

- Components have long-term stability and are maintenance-free, environment-resistant and vibration-resistant

General description

The temperature sensors TSHY (SensyTemp HY R) have been designed, in terms of construction, choice of materials and mounting, specially for use in the food and beverage industries.

Several designs are available for mounting at measuring junctions. The hygienic conditions are complied with as well as the requirement of reliable cleaning using the CIP method.

Another special feature is the halftime of < 2.5 seconds. With this short halftime, the measurement and control tasks on the large- surface heat exchangers in these industries with their short reaction times are performed reliably.

The measured value can be transmitted as a Pt 100 signal or by the installed transmitter as a 4 to 20 mA current signal. A programmable or HART®-compatible transmitter can be integrated upon request.

Designs

SensyTemp HY R-1E

The typical feature of the HY R-1E sensor is its smooth polished sensor tube with 6 mm external diameter. The HY R-1E sensor is variable in terms of the selectable process connector. For applications where the sensor is exposed to the medium, the immersion depth can be determined individually. A minimum immersion depth of at least 3 to 5 times the thermowell diameter should be observed. The immersion depth must not be less than the length of the temperature-sensitive part.

Due to the additional thermowell with weld-in type spherical bushing the temperature sensor can be exchanged and calibrated without the need to open the product chamber. Both the thermowell and the spherical bushing are made of stainless steel and, thus, meet all hygienic requirements and resist to process pressures up to 40 bars. Thermowells are available with insertion lengths of 50 mm and 180 mm.

The following connection options are possible for direct exposure of the HY R-1E sensor to the medium, i.e. without using a thermowell (Dimensions see **SensyTemp HY R-1E** on page 5):

- **Threaded compression fitting G ¼A**
Made of 1.4571, with stainless steel clamping ring. For general industrial mounting. Pressure-resistant up to 40 bar.
- **Spherical bushing M12 × 1,5**
Made of 1.4571, with stainless steel clamping ring. For general industrial mounting. Pressure-resistant up to 40 bar.
- **Spherical bushing M12 × 1,5**
Made of 1.4571, PEEK clamping ring. Hygienic design. The shape of the PEEK clamping ring prevents an angular gap between the thermowell and the bushing. Pressure resistant up to 10 bar.
- **Weld-on bushing M12 × 1,5**
Made of 1.4435, PEEK clamping ring. Hygienic mounting without gap. Pressure-resistant up to 10 bar.
- **Collar-type bushing M12 × 1,5**
Made of 1.4404. PEEK clamping ring. Hygienic mounting without gap. Pressure-resistant up to 10 bar.

... Designs

SensyTemp HY R-2E

The typical features of the HY R-2E sensor are its fixed insertion length and the small dimensions of the temperature-sensitive sensor tube and the high pressure resistance up to 140 bar.

It is possible to choose between the insertion lengths 20 and 60 mm. The spherical welded bushing is fixed by a collar welding onto the sensor tube.

An additional PEEK ring prevents the formation of an annular gap between the sensor tube and the welded bushing. The HY R-2E sensor thus meets the highest hygiene and cleaning requirements.

Dimensions see **SensyTemp HY R-2E and SensyTemp HY R-5E** on page 5.

SensyTemp HY R-5E (inline)

The typical feature of the HY R-5E sensor is the flange which is welded to the sensor tube. The flange allows inline mounting in connection with housings of make "APV-Rosista" or "Tuchenhagen".

With inline technology, measuring junctions for various process variables are standardized. This technology, which has been specially developed for the food and beverage industries, also meets the highest hygiene and cleaning requirements.

Dimensions see **SensyTemp HY R-2E and SensyTemp HY R-5E** on page 5.

SensyTemp HY R-7E

The typical features of the HY R-7E sensor are its fixed insertion length and the metal-type sealing system. In conjunction with the appropriate welded bushing this design ensures sealing without clearance volume and in compliance with the hygienic requirements of food applications. No additional seal is required.

When the system is mounted properly, the temperature sensor's cable gland is aligned with the mark on the bushing circumference.

A tightening moment of 30 to 50 Nm should be applied. The sealing system is pressure-resistant up to 10 bar. Various insertion lengths are available.

Dimensions see **SensyTemp HY R-7E** on page 6.

SensyTemp HY R-2E with G ¼ A thread

Note

This sensor is intended to be used as a spare part for existing systems with spherical welded bushing, with G ¼ thread and PTFE seal.

Since this type has been replaced with the welded bushing M12 × 1.5 with PEEK seal, the welded sphere G ¼ is not included in the scope of delivery.

If the welded sphere should be defective, please use type M12 × 1.5 with PEEK seal.

Dimensions see **SensyTemp HY R-2E with G ¼ A thread** on page 6.

Ordering Information

| HY R-2E with threaded compression fitting G ¼ A and PTFE seal | Catalog No. |
|---|-------------|
| 1 × Pt 100, EN 60751, Class A | |
| Insertion length U = 20 mm | 239064 |
| Insertion length U = 60 mm | 239065 |
| 1 × Pt 100, EN 60751, Class A, with transmitter | |
| Insertion length U = 20 mm, Measuring range* | 239066 |
| Insertion length U = 60 mm, Measuring range* | 239067 |

* Transmitter measuring range (plain text)

-10 to 40 °C; 0 to 100 °C; 50 to 100 °C; 50 to 150 °C; 70 to 120 °C;
0 to 150 °C; 0 to 200 °C

Special measuring range span ≥ 40 K available on request

Dimensions

SensyTemp HY R-1E

HY R-1E

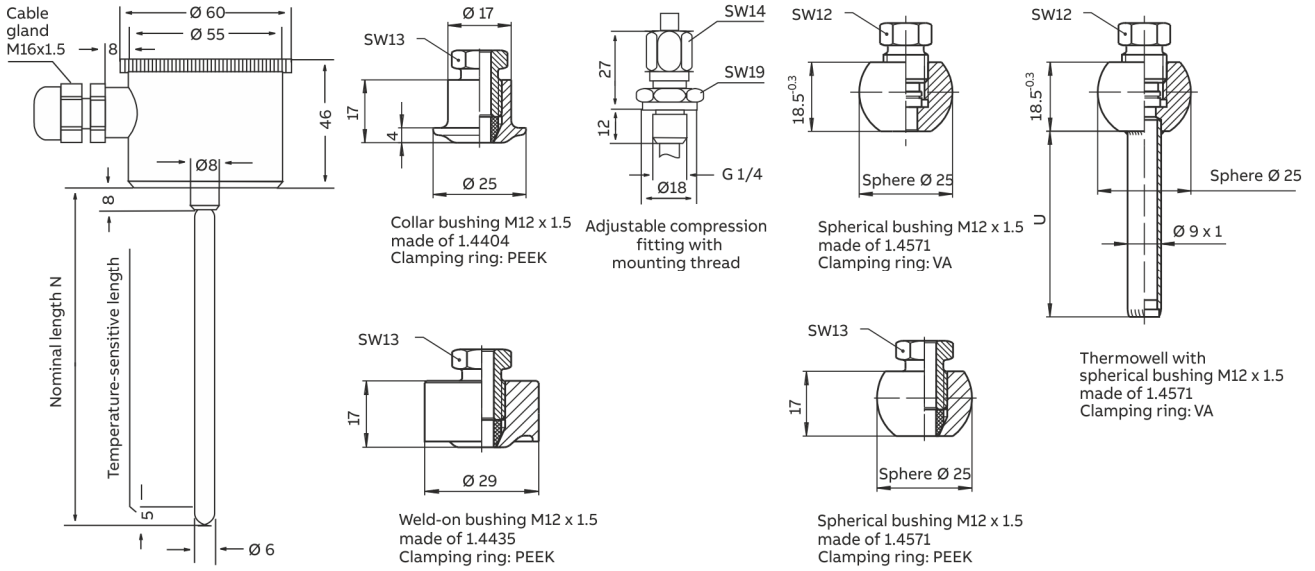


Figure 1: Dimensions HY R-1E in mm

SensyTemp HY R-2E and SensyTemp HY R-5E

HY R-2E

HY R-5E with flange for housing by APV Rosista

HY R-5E with flange for Varivent housing by Tuchenhausen

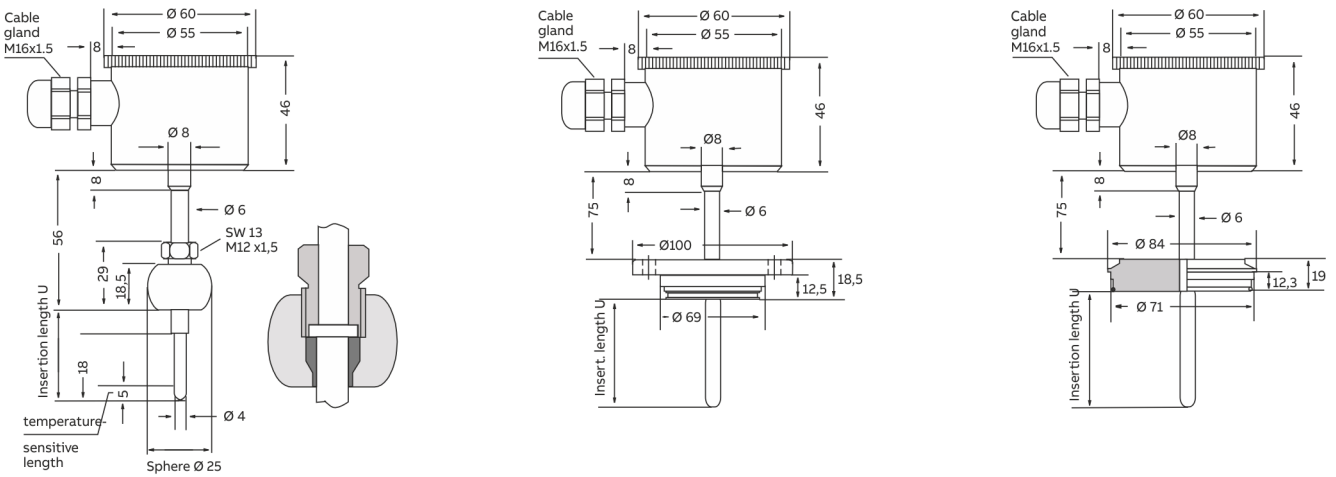


Figure 2: Dimensions HY R-1E and HY R-5E in mm

... Dimensions

SensyTemp HY R-7E

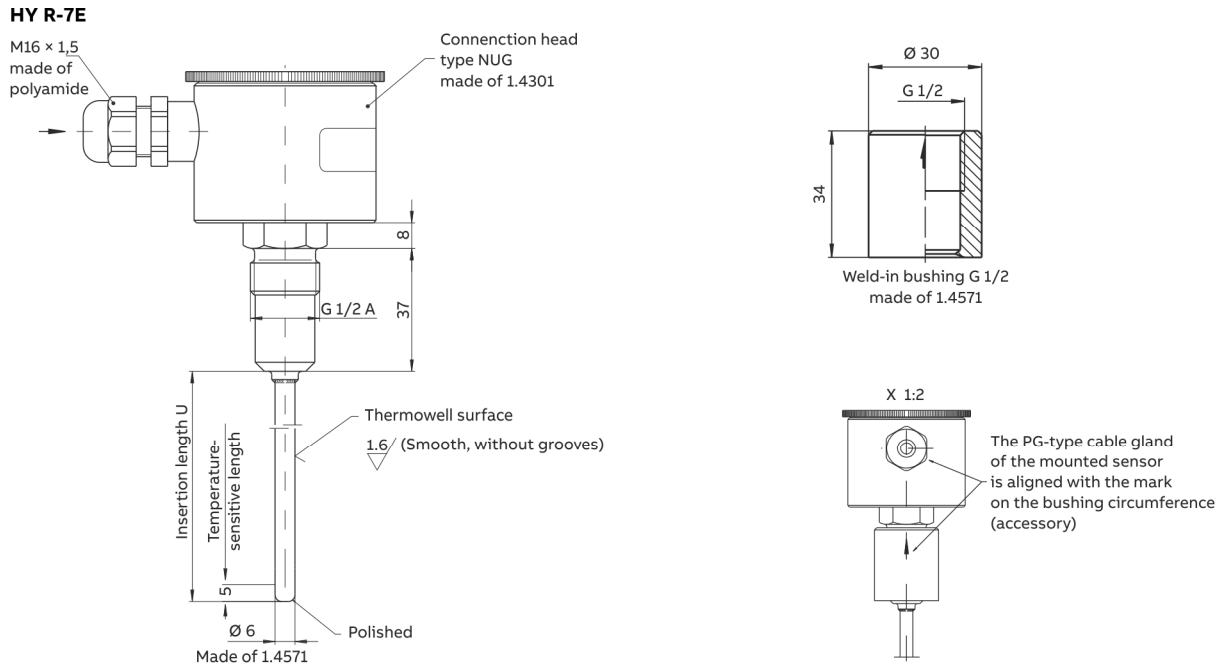


Figure 3: Dimensions HY R-7E in mm

SensyTemp HY R-2E with G ¼ A thread

HY R-2E with G 1/4 A thread

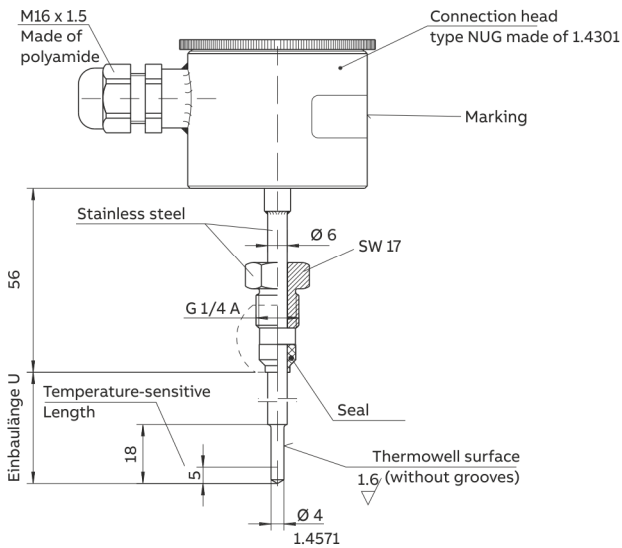


Figure 4: Dimensions HY R-2E with G ¼ A thread in mm

Specification

Temperature sensor

Resistance element

- 1× Pt 100, EN 60751, Class A, three-wire circuit
or
- 2× Pt 100, EN 60751, Class B, two-wire circuit

Measuring range

Temperature: -50 to 250 °C

Pressure:

- for HY R-1E: see details about compression fitting on **SensyTemp HY R-1E** on page 3
- for HY R-2E: Max. 140 bar
- for HY R-5E: in accordance with the pressure class of the housing

Response time

Acc. to VDE/VDI 3511, media water, $v = 0,4 \text{ m/s}$

| | HY R-1E / R-5E / R-7E | HY R-1E mit SR | HY R-2E |
|------------------|-----------------------|----------------|---------|
| t _{0,5} | < 2.5 s | 5.0 s | 2.0 s |
| t _{0,9} | < 5.2 s | 11.4 s* | 3.4 s |

* This value can be reduced to 6 s by using heat-conductive paste.

Insulation voltage

Max. 250 V DC

Fühlerrohr

- For HY R-1E: Smooth without compression fitting
- For HY R-2E: With fixed insertion length, spherical welded bushing
- For HY R-5E: With fixed insertion length and weld-on flange
- For HY R-7E: With fixed insertion length, metal sealing system

Length: In accordance with order details or **Dimensions** on page 5,

Diameter: 6 or 6 / 4 mm

Material: Stainless steel 1.4571 (AISI 316-TI)

Connection head

- Stainless steel 1.4301 (AISI 304) with screwed lid, sealable;
- IP rating IP 66;
- Cable gland M16 × 1.5 for cable diameter 3.5 to 8.0 mm;
- Screw terminals for the connection cable

Transmitter

Design TSHY (SensyTemp HY R)

Installation design, suitable for the connection head of the HY R temperature sensor.

Only possible in connection with a single winding.

Input

Pt100 (EN 60751), three-wire circuit, fixed ranges

Output

4 to 20 mA, temperature linear

Power supply

U_s = 10.5 to 30 V DC, polarity safe

Climatic conditions

- Ambient temperature:
-40 to 85 °C
- Relative humidity:
≤ 100 % (condensation possible)

Characteristics at rated conditions

(Percentage referred to the measuring span)

Measurement deviation (upper-range value):

- Nominal value 0 °C:
≤ 0.15 % or 0.15 K
- Nominal value < or > 0 °C:
≤ 0.2 % or 0.2 K

Deviation of linearity:

< 0.10 %

Electromagnetic compatibility

According to NAMUR NE 21

CE conform

Electrical connections

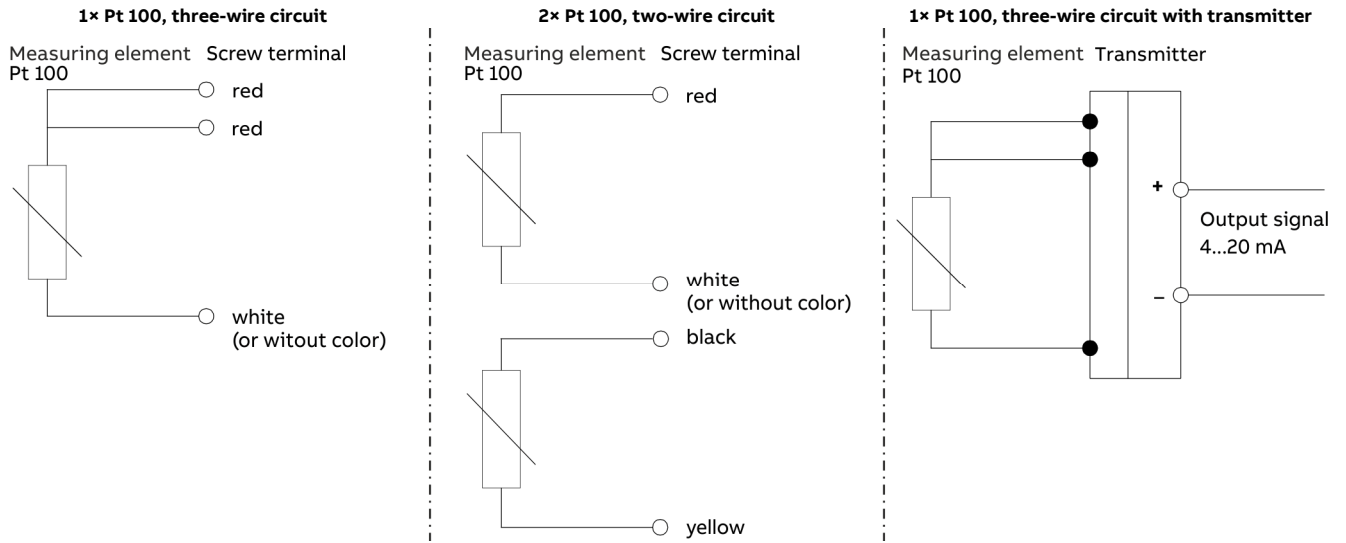


Figure 5: Connection diagram

Ordering Information

| Temperature sensor TSHY (SensyTemp HY R-1E) | | | | Catalog No. |
|---|------------------|------------------------------|------------------|--------------------|
| Sensor smooth, without threaded compression fitting | | | | |
| 1× Pt 100, EN 60751, Class A, Three-wire circuit | | | | |
| Sensor nominal length | N = 100 mm | | | 7963706 |
| | N = 250 mm | | | 7963705 |
| | N = 450 mm | | | 7963704 |
| 2× Pt 100, EN 60751, Class B, Two-wire circuit | | | | |
| Sensor nominal length | N = 100 mm | | | 7963703 |
| | N = 250 mm | | | 7963702 |
| | N = 450 mm | | | 7963701 |
| 1× Pt 100, EN 60751, Class A, Three-wire circuit with transmitter 4 to 20 mA | | | | |
| Sensor nominal length | N = 100 mm | Measuring range -10 to 40 °C | | 7958188 |
| | N = 100 mm | Measuring range 0 to 100 °C | | 7958189 |
| | N = 100 mm | Measuring range 50 to 100 °C | | 7958190 |
| | N = 100 mm | Measuring range 50 to 150 °C | | 7958191 |
| | N = 100 mm | Measuring range 70 to 120 °C | | 7958192 |
| | N = 100 mm | Measuring range 0 to 150 °C | | 7958219 |
| | N = 100 mm | Measuring range 0 to 200 °C | | 7958218 |
| | N = 100 mm | Measuring range* | | 7963709 |
| | N = 250 mm | Measuring range* | | 7963708 |
| | N = 450 mm | Measuring range* | | 7963707 |
| Temperature sensor TSHY (SensyTemp HY R-2E) | | | | |
| Sensor with fixed spherical welded bushing M12 × 1,5 | | | | |
| 1× Pt 100, EN 60751, Class A, Three-wire circuit | | | | |
| Insertion length | U = 20 mm | | | 7963710 |
| | U = 60 mm | | | 7963711 |
| 2× Pt 100, EN 60751, Class B, Two-wire circuit | | | | |
| Insertion length | U = 20 mm | | | 7963714 |
| | U = 60 mm | | | 7963715 |
| 1× Pt 100, EN 60751, Class A, Three-wire circuit with transmitter 4 to 20 mA | | | | |
| Insertion length | U = 20 mm | Measuring range* | | 7963712 |
| | U = 60 mm | Measuring range* | | 7963713 |
| Temperature sensor TSHY (SensyTemp HY R-5E) | | | | |
| Sensor with fixed flange for "inline" mounting | | | | |
| 1× Pt 100, EN 60751, Class A, Three-wire circuit | | | | |
| Flange for Varivent housing DN 40 to 125 by Tuchenhausen; | Insertion length | U = 25 mm | | 7963723 |
| Flange for case DN 40 to 125 by APV-Rosista; | Insertion length | U = 25 mm | | 7963724 |
| 2× Pt 100, EN 60751, Class B, Two-wire circuit | | | | |
| Flange for Varivent housing DN 40 to 125 by Tuchenhausen; | Insertion length | U = 25 mm | | 7963725 |
| Flange for case DN 40 to 125 by APV-Rosista; | Insertion length | U = 25 mm | | 7963726 |
| 1× Pt 100, EN 60751, Class A, Three-wire circuit mit Messumformer 4 to 20 mA | | | | |
| Flange for Varivent housing DN 40 to 125 by Tuchenhausen; | Insertion length | U = 25 mm | Measuring range* | 7963727 |
| Flange for case DN 40 to 125 by APV-Rosista; | Insertion length | U = 25 mm | Measuring range* | 7963728 |

* Measuring range of the head mounted transmitter (clear text): -10 to 40 °C, 0 to 100 °C, 50 to 100 °C, 50 to 150 °C 70 to 120 °C, 0 to 150 °C, 0 to 200 °C

... Ordering Information

| Temperature sensor TSHY (SensyTemp HY R-7E) | | Catalog No. | |
|---|------------|-----------------------------|--------|
| with fixed insertion length and metal-type conical nipple | | | |
| 1× Pt 100, EN 60751, Class A, Three-wire circuit | | | |
| Insertion length | U = 50 mm | 238380 | |
| | U = 100 mm | 7958106 | |
| | U = 250 mm | 7958107 | |
| 1× Pt 100, EN 60751, Class A, Three-wire circuit with transmitter 4 to 20 mA | | | |
| Insertion length | U = 50 mm | Measuring range 0 to 100 °C | 238376 |
| | U = 50 mm | Measuring range* | 238374 |
| | U = 100 mm | Measuring range* | 238375 |
| | U = 250 mm | Measuring range* | 241664 |

* Measuring range of the head mounted transmitter (clear text): -10 to 40 °C, 0 to 100 °C, 50 to 100 °C, 50 to 150 °C 70 to 120 °C, 0 to 150 °C, 0 to 200 °C

Other versions on request

| Accessories | | Catalog No. |
|---|------------|-------------|
| Mounting material for the TSHY (SensyTemp HY R-1E) sensor | | |
| Spherical bushing M12 x 1.5, made of 1.4571, clamping ring made of PEEK | | 7963731 |
| Spherical bushing M12 x 1.5, made of 1.4571, clamping ring made of VA | | 7962518 |
| Weld-on bushing M12 x 1.5, made of 1.4435, clamping ring made of PEEK | | 239904 |
| Collar bushing M12 x 1.5, made of 1.4404, clamping ring made of PEEK | | 240604 |
| Adjustable threaded compression fitting G 1/4A, made of stainless steel, clamping ring made of VA | | 7962519 |
| Thermowell with spherical bushing M12 × 1.5, made of 1.4571, clamp. ring made of VA | | |
| Insertion length | U = 50 mm | 7963729 |
| | U = 180 mm | 7963730 |
| Mounting material for the TSHY (SensyTemp HY R-7E) sensor | | |
| Weld-in bushing G ½ made of 1.4571 | | 7958116 |



Trademarks

HART is a registered trademark of FieldComm Group, Austin, Texas, USA

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Service



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