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ABB MEASUREMENT & ANALYTICS | DATA SHEET

## **SensyTemp TSHY (HY R)**

Resistance thermometer for the food and beverage industries



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## Measurement made easy

For insertion in pipelines and vessels

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### Fast response

- Halftime < 2,5 s

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### Various designs

- Sensor smooth, with threaded compression fitting or welded flange

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### Corrosion-resistant

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

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### Hygienic

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

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### Selectable transmission of measured values

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

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### 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-7E

#### HY R-7E

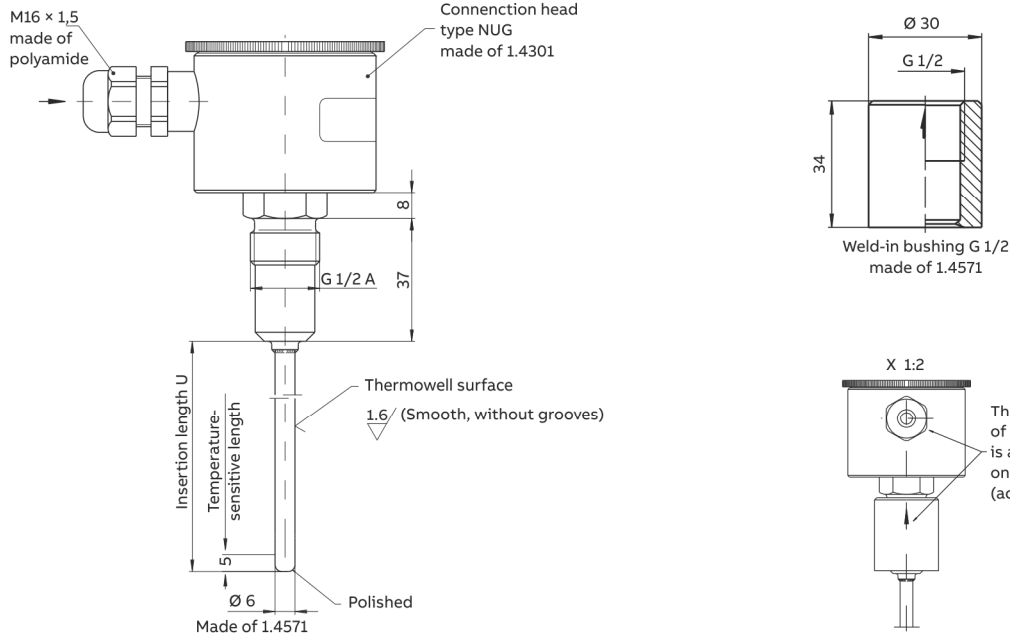


Figure 3: Dimensions HY R-7E in mm

### SensyTemp HY R-2E with G ¼ A thread

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

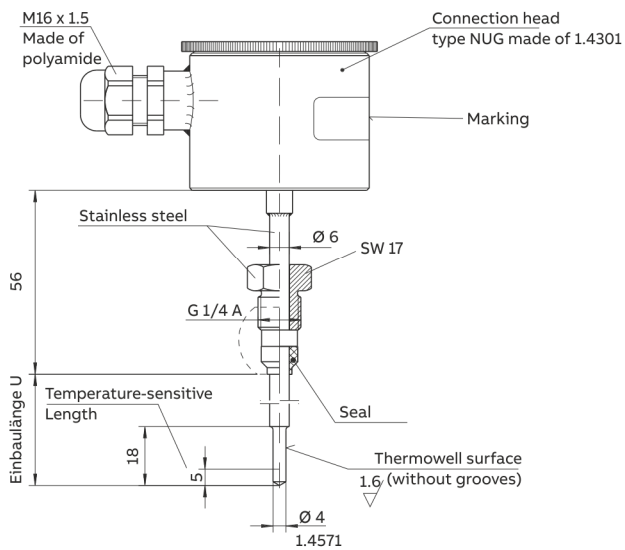


Figure 4: Dimensions HY R-2E with G ¼ A thread in mm

## 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,  $v = 0,4$  m/s

	HY R-1E / R-5E / R-7E	HY R-1E mit SR	HY R-2E
t <sub>0,5</sub>	< 2.5 s	5.0 s	2.0 s
t <sub>0,9</sub>	< 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<sub>s</sub> = 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

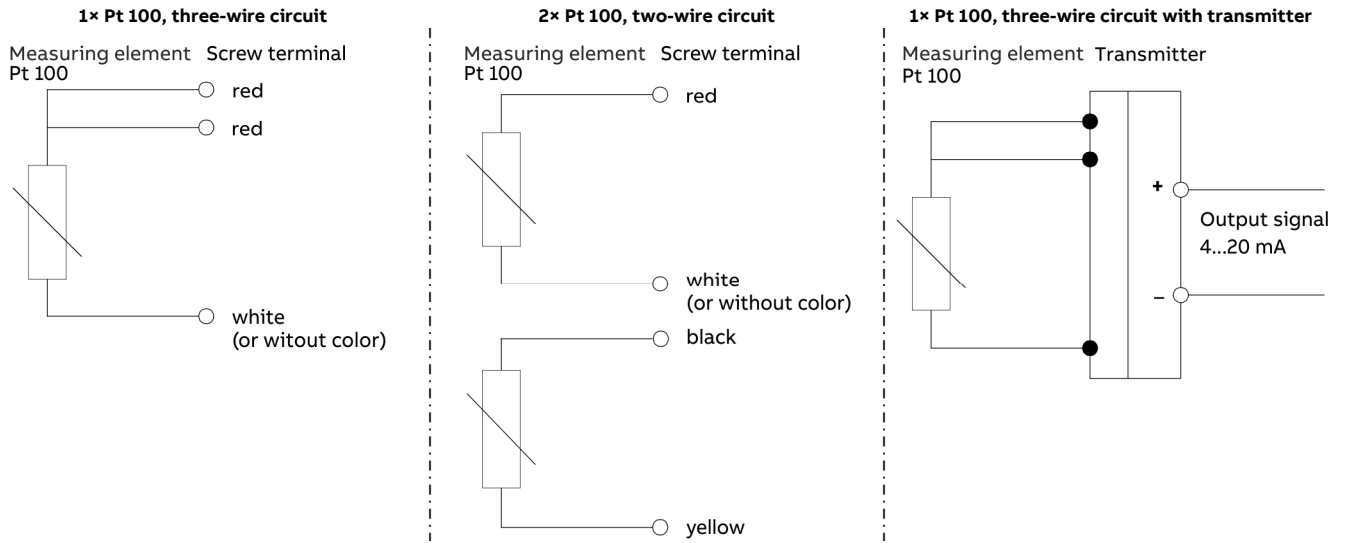


Figure 5: Connection diagram



## Ordering Information

<b>Temperature sensor TSHY (SensyTemp HY R-1E)</b>				<b>Catalog No.</b>
Sensor smooth, without threaded compression fitting				
<b>1× Pt 100, EN 60751, Class A, Three-wire circuit</b>				
Sensor nominal length	N = 100 mm			7963706
	N = 250 mm			7963705
	N = 450 mm			7963704
<b>2× Pt 100, EN 60751, Class B, Two-wire circuit</b>				
Sensor nominal length	N = 100 mm			7963703
	N = 250 mm			7963702
	N = 450 mm			7963701
<b>1× Pt 100, EN 60751, Class A, Three-wire circuit with transmitter 4 to 20 mA</b>				
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
<b>Temperature sensor TSHY (SensyTemp HY R-2E)</b>				
Sensor with fixed spherical welded bushing M12 × 1,5				
<b>1× Pt 100, EN 60751, Class A, Three-wire circuit</b>				
Insertion length	U = 20 mm			7963710
	U = 60 mm			7963711
<b>2× Pt 100, EN 60751, Class B, Two-wire circuit</b>				
Insertion length	U = 20 mm			7963714
	U = 60 mm			7963715
<b>1× Pt 100, EN 60751, Class A, Three-wire circuit with transmitter 4 to 20 mA</b>				
Insertion length	U = 20 mm	Measuring range*		7963712
	U = 60 mm	Measuring range*		7963713
<b>Temperature sensor TSHY (SensyTemp HY R-5E)</b>				
Sensor with fixed flange for "inline" mounting				
<b>1× Pt 100, EN 60751, Class A, Three-wire circuit</b>				
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
<b>2× Pt 100, EN 60751, Class B, Two-wire circuit</b>				
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
<b>1× Pt 100, EN 60751, Class A, Three-wire circuit mit Messumformer 4 to 20 mA</b>				
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			
<b>1× Pt 100, EN 60751, Class A, Three-wire circuit</b>			
Insertion length	U = 50 mm	238380	
	U = 100 mm	7958106	
	U = 250 mm	7958107	
<b>1× Pt 100, EN 60751, Class A, Three-wire circuit with transmitter 4 to 20 mA</b>			
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.
<b>Mounting material for the TSHY (SensyTemp HY R-1E) sensor</b>		
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
<b>Thermowell with spherical bushing M12 × 1.5, made of 1.4571, clamp. ring made of VA</b>		
Insertion length	U = 50 mm	7963729
	U = 180 mm	7963730
<b>Mounting material for the TSHY (SensyTemp HY R-7E) sensor</b>		
Weld-in bushing G ½ made of 1.4571		7958116



## Trademarks

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

Sales



Service



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