



Level



Pressure



Flow



Temperature



Liquid Analysis



Registration



Systems Components



Services



Solutions

# Sanitary temperature sensor with integrated transmitter easytemp™ TSM470F

**E-direct** www.e-direct.us



- Highly accurate all-in-one system
- Sensor and electronics potted to protect against condensation (NEMA 6P)
- 4 to 20 mA loop-powered signal reduces expensive direct wiring costs
- M12 plug-in microconnector simplifies installation
- Sanitary process connections

### Application

The easytemp™ TSM470F RTD transmitter provides a compact 4 to 20 mA solution for temperature measurement. Sanitary design meets 3-A sanitary standards. The TSM470F is polished to a Ra ≤ 32 µin (150 grit) finish. Measuring range from -40 to +200°F.

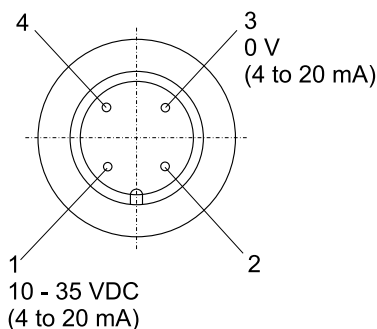
### Measurement principle

The compact transmitter consists of a complete 4-wire Pt 100, Class A sensor, Tri-Clamp® process connection, and built-in electronics and an M12 x 1 microconnector.

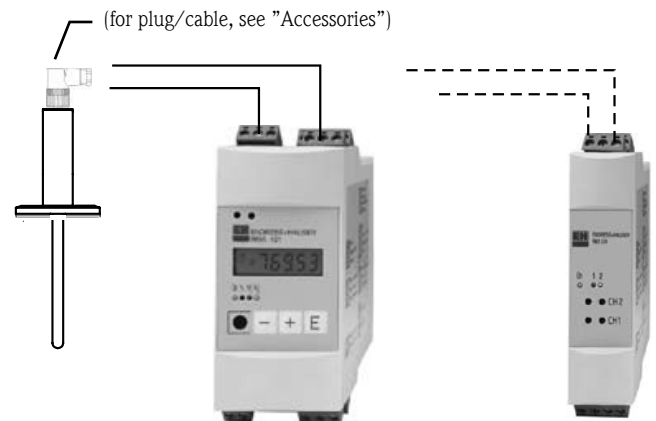
Tri-Clamp® is a registered trademark of Ladish & Co., Inc., Kenosha, USA

<b>Sensor and electronics in one compact unit</b>	
<b>Approval:</b> UL Recognized	<b>Output:</b> 4-20 mA

### Electrical connection



### Measurement system




Connect to an Endress+Hauser RMA421 to supply loop power, provide local display, and retransmit signal to a higher level controller. For power supply only, use Endress+Hauser RNS221.

# easytemp™ TSM470F

## Technical data

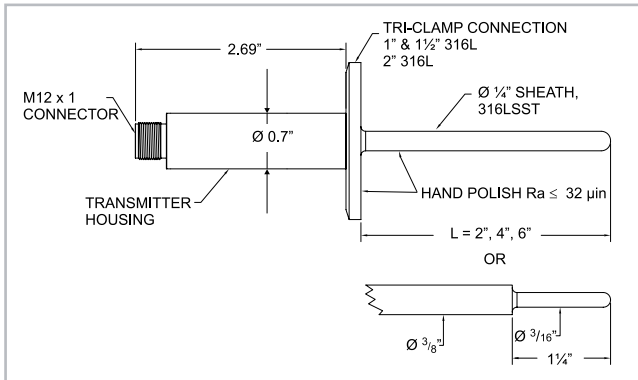
Sensor	
■ Sensing element	1 x Pt100, 4-wire connection
■ Tolerance	Class A to IEC 751
■ Process temperature	-40 to +200 °F
■ Material	316L
■ Sensor diameter	Ø ¼" sheath; Ø ⅜", reduced to ⅜" sheath
Process connection	
■ Version	1" to 2" Tri-Clamp
Transmitter housing	
■ Degree of protection	NEMA 6P Rated
■ Electrical connection	M12 x 1 plug-in microconnector (Use TSM 470A-VN plug connector, or 52010285 cable with plug)
■ Material	Stainless steel
Output values	
■ Output signal	Analog 4 to 20 mA, 20 to 4 mA - Undershooting measuring range: linear decrease to 3.8 mA - Exceeding measuring range: linear increase to 20.5 mA - Sensor break; Sensor short-circuit: ≤ 3.6 mA or ≥ 21.0 mA
■ Load	max. $(V_{\text{power supply}} - 10 \text{ V}) / 0.022 \text{ A}$
■ Induced current requirement	≤ 3.5 mA
■ Current limitation	≤ 23 mA
■ Switch-on delay	2 s
Power supply	
■ Supply voltage	$U_b = 10 \text{ to } 35 \text{ V}$
■ Residual ripple	Permitted residual ripple $U_{ss} \leq 3 \text{ V}$ at $U_b \geq 13 \text{ V}$ , $f_{\text{max}} = 1 \text{ kHz}$

Accuracy	
■ Response time	1 s
■ Reference operating conditions	73.4 °F, ±9 °F
■ Measuring error	0.1 K or 0.08 %
■ Influence of supply voltage	≤ ±0.01 %/V deviation from 24 V
■ Influence of ambient temperature (temperature drift)	$T_d = \pm(15 \text{ ppm/K} * (\text{full scale value} + 200) + 50 \text{ ppm/K} * \text{of set measuring range}) * \Delta\vartheta$ $\Delta\vartheta = \text{deviation of ambient temperature from the reference operating condition}$
■ Long term stability	≤ 0.1 K/year or 0.005 %/year
■ Influence of load	≤ ± 0.02 %/100 Ω
Environmental conditions	
■ Ambient temperature	-40 to +185 °F
■ Storage temperature	-40 to +212 °F
■ Climate class	as per EN 60 654-1, Class C
■ Condensation	permitted
■ Shock resistance	4 g/2 to 150 Hz as per IEC 60 068-2-6
■ Electromagnetic compatibility (EMC)	Shock resistance and interference emission as per IEC 1326 and NAMUR NE 21
Certification	
■ UL Recognized	UL 3111-1  US
■ 3-A	Meets 3-A sanitary standards

# easytemp™ TSM470F

## Dimensions in inches

TSM470F



## Measuring range

Code	Measuring range	Code	Measuring range
AA	0 to 100 °F	BD	-30 to +150 °C
AD	-40 to +140 °F	BE	-30 to +70 °C
AE	-40 to +200 °F	BG	-20 to +20 °C
BB	-40 to +60 °C	BH	-20 to +60 °C
BC	-30 to +60 °C	BI	-10 to +40 °C
		BK	0 to 50 °C
		BL	0 to 100 °C
		BM	0 to 150 °C

please add to order code



easytemp™ TSM470A-VN

Connector, unshielded, female, angled, M12 A-coded, 4-position. This connector is manufactured by Phoenix Contact.

Used with permission of Phoenix Contact.

# easytemp™ TSM470F

Many other models, versions and options are available. Please contact Endress+Hauser for more information.

\*1 please add code for measuring range - see previous page

Product	Version	Order no.	Price/piece in \$			we hereby order:	total price:
			1 to 5	6 to 15	16 to 35		
TSM470F	1" & 1½" Tri-clamp, ¼" tube, 2" insertion length	TSM470F-AB1A_ *1K	\$332.00	\$299.00	\$269.00	pcs	\$
	2" Tri-clamp, ¼" tube, 2" insertion length	TSM470F-AC1A_ *1K	\$339.00	\$305.00	\$275.00	pcs	\$

Accessories	Cable, 15 ft. PVC with M12x1 connector plug	52010285	\$11.50			pcs	\$
	Connector, unshielded, angled M12 w/4-wire terminals	TSM470A-VN	\$20.50			pcs	\$
	Configuration kit for USB interface	TXU10-BA	\$185.00			pcs	\$

Net excluding cost of shipping and taxes.

Acceptance per our Standard Terms and Conditions (find at [www.e-direct.us](http://www.e-direct.us)).

**Total price:**

FOB Greenwood, IN; shipped pre-paid; shipping charges and applicable taxes added to invoice.

\$ \_\_\_\_\_

E-direct catalog (free)

**Shipping method**

Ground

Priority One Day

Priority Two Day



E-direct  
Endress+Hauser, Inc.  
2350 Endress Place  
Greenwood, IN 46143

(For customers in the USA only)

Online Shop [www.e-direct.us](http://www.e-direct.us)

Order: by phone 888-EH DIRECT  
(343-4732)

by fax 800-321-7754

For special requests, e-mail us: [e-direct@us.endress.com](mailto:e-direct@us.endress.com)

**Warranty**

Should an instrument fail during the 1 year warranty period, a replacement unit will be provided.

**Delivery**

Shipment from receipt of order for quantities 1-3 within 2 business days.

**Endress+Hauser**

People for Process Automation