



Level



Pressure



Flow



Temperature

Liquid  
Analysis

Registration

Systems  
Components

Services



Solutions

## Technical Information

# Easytemp<sup>®</sup> TSM187

Compact thermometer with screw-in thread  
for challenging applications

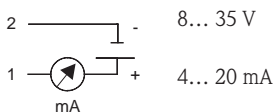
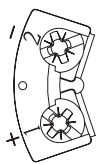


- Various measuring ranges selectable
- 2-wire technology, 4... 20 mA
- High accuracy of sensor and electronics
- Replaceable mineral insulated insert
- Replaceable electronics

<b>Measuring ranges (selectable):</b> <ul style="list-style-type: none"> <li>■ -30... +170 °C (-22... +338 °F)</li> <li>■ 0... +100 °C (32... +212 °F)</li> <li>■ 0... +200 °C (32... +392 °F)</li> <li>■ 0... +300 °C (32... +572 °F)</li> </ul>	<b>Accuracy:</b> ≤ 0.08%, Pt100 class A
	<b>Response time:</b> ≤ 18 s (T <sub>50</sub> ); ≤ 55 s (T <sub>90</sub> )
<b>Immersion lengths:</b> mm: 120, 160, 250, 400 (Ø 9) Inch: 4.7, 6.3, 9.9, 15.8 (Ø 0.35)	<b>Operating conditions:</b> <ul style="list-style-type: none"> <li>■ 50 bar at +20 °C (725 PSI at +68 °F)</li> <li>■ 1 bar at +400 °C (14.5 PSI at +752 °F)</li> </ul>

### Electrical connection

Supply voltage and current output



### Application

The TSM187 compact thermometer range covers a wide variety of market needs worldwide. Typical application can be found in the chemical and pharmaceutical industry, food, water and waste water and power plants. Preferred applications are in vessels or in pipes, where requirements are short response time mechanical strength.

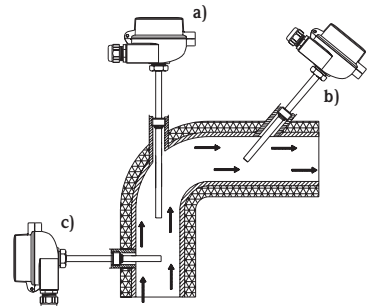
### Function

The compact thermometer assembly includes a replaceable insert in mineral insulated cable which is protected by a thermowell with process connection G $\frac{1}{2}$ ". The terminal head is according to DIN 43729, form B, and is thermally uncoupled by a extension neck. The built-in head transmitter converts the resistance value into a temperature linear 4...20 mA analog output signal.

### Application example

Pipe installation:

- a) at elbows, against the flow
- b) in smaller pipes, leant against the flow
- c) perpendicular to the flow



### Ordering information

<b>TSM187</b>	<b>Compact thermometer TSM187, RTD</b> Head transmitter: TMT187; replaceable mineral (MgO) insulated insert with diameter 6 mm (0.24"), 1.4404/SS316L Sensor type: 1xPt100 class A 4-wire; process connection G $\frac{1}{2}$ "	
	<b>Immersion length</b>	
	<b>A</b>	120 mm
	<b>B</b>	160 mm
	<b>C</b>	250 mm
	<b>D</b>	400 mm
	<b>Measuring range TMT187</b>	
	<b>DD</b>	4... 20 mA; -30... 170 °C
	<b>FE</b>	4... 20 mA; 0... 100 °C
	<b>FH</b>	4... 20 mA; 0... 200 °C
	<b>FI</b>	4... 20 mA; 0... 300 °C
<b>TSM187-</b>		← order code

# Easytemp® TSM187

## Technical data

Sensor	
■ Sensing element	Platinum resistance element, 1x Pt100 (100 $\Omega$ at 0 °C)
■ Measuring range	-30... 170 °C (-22... 338 °F), 0... 100 °C (32... 212 °F), 0... 200 °C (32... 392 °F), 0... 300 °C (32... 572 °F)
■ Accuracy	Class A acc. to IEC 751: -50... +250 °C
■ Wiring	4-wire connection, MgO isolated
■ Insulation resistance	$\geq 100 \text{ M}\Omega$ , test voltage 250 V at ambient temperature
■ Sheat diameter	6 mm (0.24")
■ Response time	$T_{50}/18 \text{ s}$ ; $T_{90}/55 \text{ s}$ ; according to IEC 751
■ Operating conditions	50 bar at +20 °C (725 PSI at +68 °F) 1 bar at +400 °C (14.5 PSI at +752 °F)

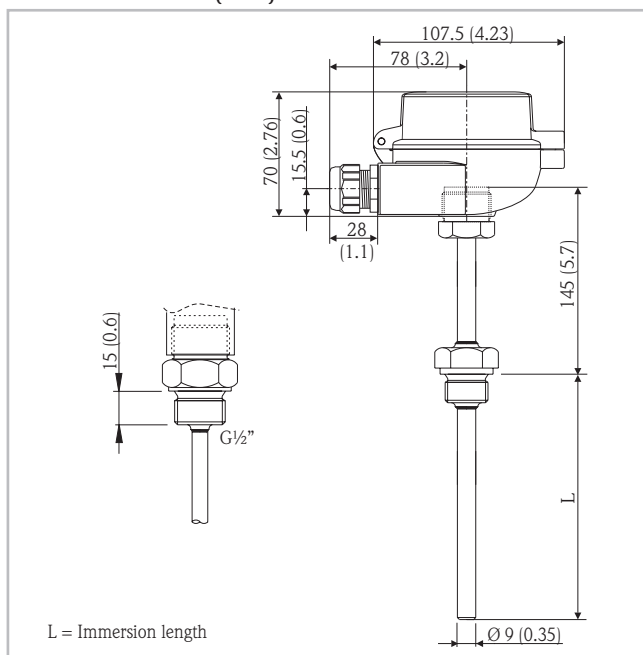
Thermowell	
■ Shape	DIN 43772 form 2G
■ Diameter	9 mm (0.36")
■ Material	SS 316Ti/1.4571

Process connection	
■ Shape	DIN 43772 form 2G
■ Material	SS 316Ti/1.4571
■ Thread	G $\frac{1}{2}$ "

Terminal head	
■ Type	DIN 43729 form B
■ Protection class	IP 66/68
■ Cable entry	M20x1.5
■ Material	Aluminum, polyester powder coated

Electronics (replaceable)	
<b>Output</b>	
■ Output signal	4... 20 mA, temperature and resistance linear
■ Max. load	( $V_{\text{power supply}} - 8 \text{ V}$ )/0.022 A
■ Min. current consumption	$\leq 3.5 \text{ mA}$
■ Current limit	$\leq 23 \text{ mA}$
■ Switch on delay	4 s (during power up $I_a = 3.8 \text{ mA}$ )
■ Response time	1 s
<b>Signal on alarm</b>	
■ Under ranging	Linear drop to 3.8 mA
■ Over ranging	Linear rise to 20.5 mA
■ Sensor break/ Sensor short circuit	$\geq 21 \text{ mA}$

## Dimensions in mm (inch)



## Electronics (replaceable)

<b>Electrical connection</b>	
■ Supply voltage	$U_b = 8... 35 \text{ V}$ , reverse polarity protection
■ Galvanic isolation	$\bar{U} = 3.75 \text{ kV}$
■ Residual ripple	$U_{ss} \leq 5 \text{ V}$ at $U_b \geq 13 \text{ V}$ , $f_{\text{max}} = 1 \text{ kHz}$
■ Reference operating conditions	Calibration temperature: +23 °C (73 °F) $\pm 5 \text{ K}$ (9 °F)
<b>Accuracy</b>	
■ Influence of supply voltage	$\leq \pm 0.01 \text{ \%}/\text{V}$ deviation from 24 V
■ Influence of load	$\leq \pm 0.02 \text{ \%}/100 \Omega$
■ Temperature drift	$T_d = \pm (15 \text{ ppm/K} * \text{max. meas. range} + 50 \text{ ppm/K} * \text{preset meas. range}) * \Delta \theta$
■ Pt100	0.2 K or 0.08 %
<b>Environment conditions</b>	
■ Ambient temperature	-40... +85 °C (-58... +185 °F)
■ Climate class	As per IEC 60 654-1, class C
■ Shock and vibration resistance	4g / 2 to 150 Hz as per IEC 60 068-2-6
■ EMC	Shock resistance and interference emission as per IEC 61326 and NAMUR NE 21

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People for Process Automation

## Technical Information

# Easytemp<sup>®</sup> TSM487

Compact thermometer with screw-in thread for universal applications

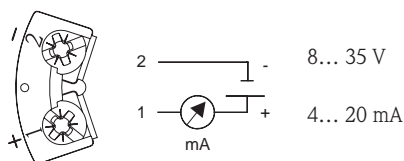


- Various measuring ranges selectable
- 2-wire technology, 4... 20 mA
- High accuracy of sensor and electronics
- Fiberglass insulated insert
- Replaceable electronics

<b>Measuring ranges (selectable):</b> <ul style="list-style-type: none"> <li>■ -30... +170 °C (-22... +338 °F)</li> <li>■ 0... +100 °C (32... +212 °F)</li> <li>■ 0... +200 °C (32... +392 °F)</li> </ul>	<b>Accuracy:</b> $\leq 0.08\%$ , Pt100 class A
	<b>Response time:</b> $\leq 3.5 \text{ s } (T_{50}); \leq 8 \text{ s } (T_{90})$
<b>Immersion lengths:</b> mm: 50, 100, 150, 250 (Ø 6) Inch: 2, 3.9, 5.9, 9.8 (Ø 0.24)	<b>Operating conditions:</b> 20 bar at +20 °C (290 PSI at +68 °F)

### Electrical connection

Supply voltage and current output



### Application

The TSM487 compact thermometer is used for universal applications. Preferred applications are in vessels or in pipes, where no high process pressures and no extreme temperatures appear.

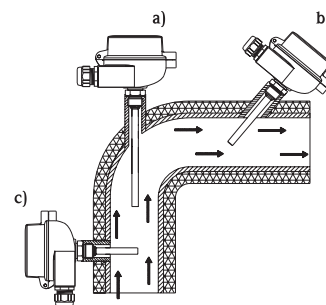
### Function

The compact thermometer assembly includes a fiberglass insulated insert which is protected by a thermowell with process connection G $\frac{1}{2}$ ". The terminal head is according to DIN 43729, form B, and is made of aluminum. The built-in head transmitter converts the resistance value into a temperature linear 4...20 mA analog output signal.

### Application example

Pipe installation:

- a) at elbows, against the flow
- b) in smaller pipes, leant against the flow
- c) perpendicular to the flow



### Ordering information

<b>TSM487</b>	<b>Compact thermometer TSM487, RTD</b> Head transmitter: TMT187; non-replaceable insert in fiberglass insulation with diameter 6 mm (0.24"), 1.4404/SS316L Sensing element: 1xPt100 class A 4-wire; process connection G $\frac{1}{2}$ "	
	<b>Immersion length</b>	
	<b>A</b>	50 mm
	<b>B</b>	100 mm
	<b>C</b>	150 mm
	<b>D</b>	250 mm
	<b>Measuring range TMT187</b>	
	<b>DD</b>	4... 20 mA; -30... 170 °C
	<b>FE</b>	4... 20 mA; 0... 100 °C
	<b>FH</b>	4... 20 mA; 0... 200 °C
<b>TSM487-</b>		← <b>order code</b>

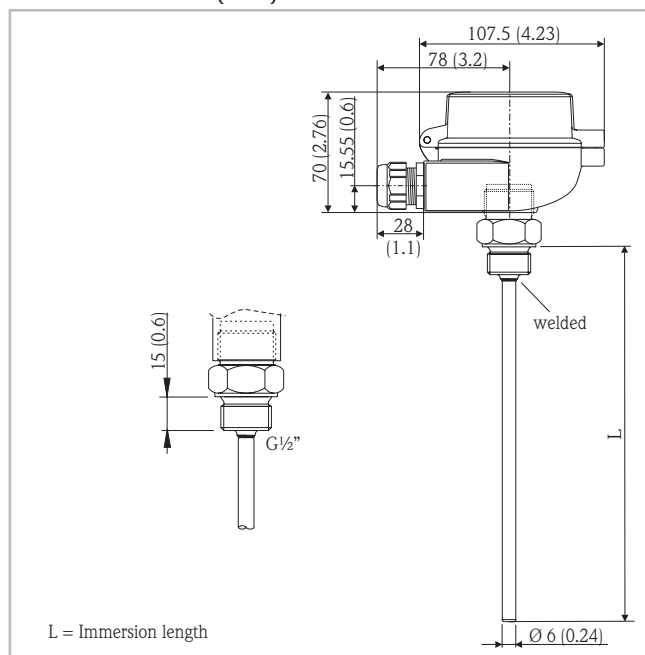
# Easytemp® TSM487

## Technical data

Sensor	
■ Sensing element	Platinum resistance element, 1x Pt100 (100 $\Omega$ at 0 °C)
■ Measuring range	-30... 170 °C (-22... 338 °F), 0... 100 °C (32... 212 °F), 0... 200 °C (32... 392 °F)
■ Accuracy	Class A acc. to IEC 751: -50... +250 °C
■ Wiring	4-wire connection, fiberglass insulated insert
■ Insulation resistance	$\geq 100 \text{ M}\Omega$ , test voltage 250 V at ambient temperature
■ Response time	$T_{50}/3.5 \text{ s}$ ; $T_{90}/8 \text{ s}$ ; according to IEC 751
■ Operating conditions	20 bar at +20 °C (290 PSI at +68 °F)
■ Sheat material	SS 316L/1.4404
Process connection	
■ Shape	DIN 43772 form 2G
■ Material	SS 316L/1.4404
■ Thread	G $\frac{1}{2}$ "
Terminal head	
■ Type	DIN 43729 form B
■ Protection class	IP66/68
■ Cable entry	M20x1.5
■ Material	Aluminum, polyester powder coated

Electronics (replaceable)	
Output	
■ Output signal	4... 20 mA, temperature and resistance linear
■ Max. load	( $V_{\text{power supply}} - 8 \text{ V}$ )/0.022 A
■ Min. current consumption	$\leq 3.5 \text{ mA}$
■ Current limit	$\leq 23 \text{ mA}$
■ Switch on delay	4 s (during power up $I_a = 3.8 \text{ mA}$ )
■ Response time	1 s
Signal on alarm	
■ Under ranging	Linear drop to 3.8 mA
■ Over ranging	Linear rise to 20.5 mA
■ Sensor break/ Sensor short circuit	$\geq 21 \text{ mA}$
Electrical connection	
■ Supply voltage	$U_b = 8... 35 \text{ V}$ , reverse polarity protection
■ Galvanic isolation	$\hat{U} = 3.75 \text{ kV}$
■ Residual ripple	$U_{ss} \leq 5 \text{ V}$ at $U_b \geq 13 \text{ V}$ , $f_{\text{max.}} = 1 \text{ kHz}$
■ Reference operating conditions	Calibration temperature: +23 °C (73 °F) $\pm 5 \text{ K}$ (9 °F)

## Dimensions in mm (inch)



## Electronics (replaceable)

Accuracy	
■ Influence of supply voltage	$\leq \pm 0.01 \% / \text{V}$ deviation from 24 V
■ Influence of load	$\leq \pm 0.02 \% / 100 \Omega$
■ Temperature drift	$T_d = \pm (15 \text{ ppm/K} * \text{max. meas. range} + 50 \text{ ppm/K} * \text{preset meas. range}) * \Delta \theta$
■ Pt100	0.2 K or 0.08 %
Environment conditions	
■ Ambient temperature	-40... +85 °C (-58... +185 °F)
■ Climate class	As per IEC 60 654-1, class C
■ Shock and vibration resistance	4g / 2 to 150 Hz as per IEC 60 068-2-6
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