Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Temperature transmitter for Pt100 thermometers (TMT127/187) and for thermocouples (TMT128/188)

iTemp TMT127/187 and 128/188

E direct www.e-direct.us

TMT187/188

TMT127/128

Approval: FM approved, UL recognized	**Accuracy:** < 0.08 % (Pt100)
Measuring range: fixed, selectable	**RTD sensors:** 3- or 4-wire

- Fixed measuring ranges for 3- and 4-wire resistance thermometer and thermocouples including linearization
- 2-wire technology, 4 to 20 mA analog output
- High accuracy in total ambient temperature range
- Fault indication on sensor short or open circuit
- Galvanic isolation
- For mounting in (Form B) sensor head
- Captive terminal screws
- Reverse polarity protected
- FM Certification
- UL 3111-1 approval
- Meets all EMC requirements*

Application
The temperature transmitters are avaliable as head mounted (hockey puck) (TMT187/188) or as DIN rail mounted (TMT127/128). The TMT187/188 temperature head transmitters can be installed in the Form B sensor head. They have a fixed measurement range and have a 4 to 20 mA analog output.

Input: TMT127/187 Pt100 RTD thermometer or TMT128/188 thermocouples

iTemp transmitters provide an installation-ready solution to improve the functionality of temperature measurement by increasing accuracy and reliability over direct-wired sensors.

This also reduces overall installation costs as compared to direct-wired sensors since low-cost, two-conductor 4 to 20 mA signal wire can be ran over long distances as opposed to expensive sensor wires.

Measurement principle
The TMT127/187 RTD temperature DIN rail and head transmitter is a 2-wire transmitter with a linear temperature proportional analog output and a 3- or 4-wire resistance thermometer input.

The TMT128/188 TC temperature DIN rail and head transmitter is a two wire transmitter with a linear temperature proportional analog output and thermocouple input.

*These devices meet all requirements listed in the standard IEC 61326 Amendment 1, 1998

Technical Datasheet
TD 009E/US/ae/10.09
US/INDD CS

Endress+Hauser
People for Process Automation

iTemp TMT187/188

Technical data

Input	
	TMT187: Pt100 (IEC 751 TMT188: Type E, J, K, N, R, S, T (IEC 584 / NIST Monograph 175)
Output	
■ Output signal	4 to 20 mA Transmission is linear to temperature and resistance
■ Max. load	($V_{power\ supply}$ -8 V)/0.022 A
■ Input current required	≤ 3.5 mA
■ Current limit	≤ 23 mA
■ Switch on delay	4 s (during power up I_a = 3.8 mA)
■ Response time	1 s
Failure signal (fault monitoring)	
■ Measurement range undercut	Linear drop to 3.8 mA
■ Exceeding measurement range	Linear rise to 20.5 mA
■ Sensor breakage/ sensor short circuit	≥ 21.0 mA
Electrical connection	
■ Power supply	U_b = 8 to 35 V, polarity protected
■ Galvanic isolation	U = 2 kV AC (in/out)
■ Allowable ripple	U_{ss} ≤ 5 V at U_b ≥ 13 V, $f_{max.}$ = 1kHz
■ Reference conditions	Calibration temperature 73 °F ±5 K (23 °C ± 5 K)
Accuracy	
■ Influence of power supply	≤ ±0.01 %/V deviation from 24 V [2]
■ Influence reference junction	Pt100 Class B (IEC 751)
■ Load influence	≤ ±0.02 %/100 Ohm [2]
■ Long term stability	≤ 0.1 K/year or ≤ 0.05%/year [1] (according to reference condition)
■ Temperature drift Pt100	T_d = ± (15 ppm/K x full scale value +200) +50 ppm/K x preset meas. range) x $\Delta\vartheta$
■ Temperature drift TC	T_d = ± (50 ppm/K x max. meas. range + 50 ppm/K x preset meas. range) x $\Delta\vartheta$
$\Delta\vartheta$ =	Deviation of ambient temperature from the reference operating condition
■ Pt100	0.2 K or 0.08 % [1]
■ Thermocouple type	E, J K and T: typ. 0.5 K N: typ. 1.0 K R and S: typ. 2.0 K

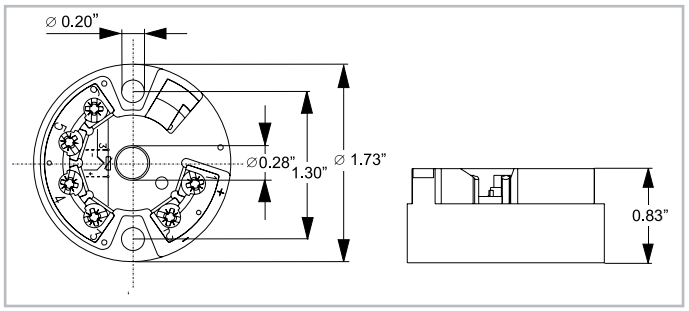
For installation notes, refer to control drawing #140500112

**For hazardous areas, see FM control drawing

[1] % is related to the measurement range (value to be applied is the greater one)

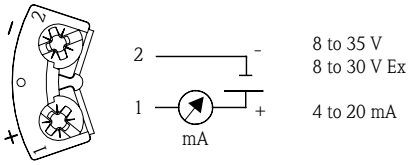
[2] Data is related to a measurement end value (FSD) of 20 mA

Dimensions (in inches)



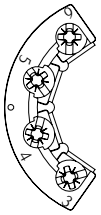
Electrical Connection

Power supply and current output

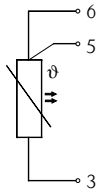


Sensor connection

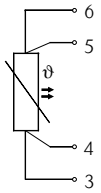
SETUP socket



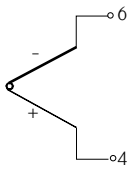
TMT187 3-wire RTD



TMT187 4-wire RTD



TMT188 TC



Operating conditions	
■ Ambient temperature	-40 to +185 °F (-40 to +85 °C)
■ Storage temperature	-40 to +212 °F (-40 to +100 °C)
■ Climate class	To IEC 60 654-1, Class C
■ Vibration protection	4 g/2 to 150 Hz to IEC 60 068-2-6
Certification	
■ FM approvals	IS/Class I/Div. 1/Groups A,B,C,D/ T4/T5/T6 Class I/Zone 0/Ex ia IIC/T4/T5/T6 NI/Class I/Div. 2/Groups A,B,C,D/ T4/T5/T6
■ UL recognized	UL 3111-1 c UL us

iTemp TMT127/128

Technical data

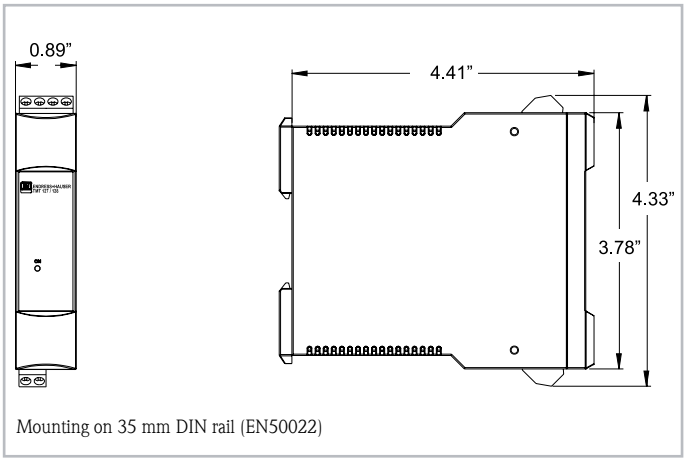
Input	
	TMT127: Pt100 (IEC 751 TMT128: Type E, J, K, N, R, S, T (IEC 584 / NIST Monograph 175)
Output	
■ Output signal	4 to 20 mA transmission is linear to temperature and resistance
■ Max. load	($V_{power\ supply}$ -8 V)/0.022 A
■ Input current required	≤ 3.5 mA
■ Current limit	≤ 23 mA
■ Switch on delay	4 s (during power up I_a = 3.8 mA)
■ Response time	1 s
Failure signal (fault monitoring)	
■ Measurement range undercut	Linear drop to 3.8 mA
■ Exceeding measurement range	Linear rise to 20.5 mA
■ Sensor breakage/ sensor short circuit	≥ 21.0 mA
Electrical connection	
■ Power supply	U_b = 12 to 35 V, polarity protected
■ Galvanic isolation	U = 2 kV AC (in/out)
■ Allowable ripple	U_{ss} ≤ 3 V at U_b ≥ 15 V, $f_{max.}$ = 1kHz
■ Reference conditions	Calibration temperature 73 °F ±5 K (23 °C ± 5 K)
Accuracy	
■ Influence of power supply	≤ ±0.01 %/V deviation from 24 V [2]
■ Influence reference junction	Pt100 Class B (IEC 751)
■ Load influence	≤ ±0.02 %/100 Ohm [2]
■ Temperature drift Pt100	T_d = ± (15 ppm/K x full scale value +200) +50 ppm/K x preset meas. range) x $\Delta\vartheta$
■ Temperature drift TC $\Delta\vartheta$ =	T_d = ± (50 ppm/K x max. meas. range + 50 ppm/K x preset meas. range) x $\Delta\vartheta$ Deviation of ambient temperature from the reference operating condition
■ Pt100	0.2 K or 0.08 % [1]
■ Thermocouple type	E, J K and T: typ. 0.5 K N: typ. 1.0 K R and S: typ. 2.0 K
Operating conditions	
■ Ambient temperature	-40 to +185 °F (-40 to +85 °C)
■ Storage temperature	-40 to +212 °F (-40 to +100 °C)

For installation notes, refer to control drawing #141001111

**For hazardous areas, see FM control drawing

[1] % is related to the measurement range (value to be applied is the greater one)
[2] Data is related to a measurement end value (FSD) of 20 mA

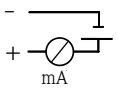
Dimensions (in inches)



Mounting on 35 mm DIN rail (EN50022)

Electrical connection

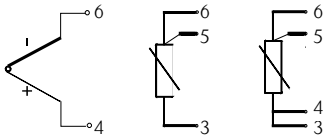
Power supply and current output

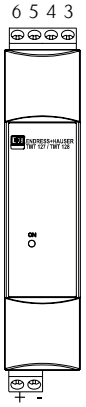


12 to 35 V
12 to 30 V Ex

4 to 20 mA

Sensor Connection





■ Climate class	To IEC 60 654-1, Class C
■ Vibration protection	4 g/2 to 150 Hz to IEC 60 068-2-6
Certification	
■ FM approvals	IS/Class I/Div. 1/Groups A,B,C,D/ T4/T5/T6 Class I/Zone 0/Ex ia IIC/T4/T5/T6 NI/Class I/Div. 2/Groups A,B,C,D/ T4/T5/T6
■ UL recognized	UL 3111-1 c UL us

NEMA 4X protective housing
Part No. RMA421A-VN
See Datasheet TD031E/US/ae

Measurement range for TMT127/187 (RTD) Pt100:

BA	–50 to	100 °C	LA	–40 to	140 °F
CA	–40 to	60 °C	LB	–40 to	200 °F
DA	–30 to	60 °C	MA	–20 to	400 °F
DB	–30 to	150 °C	NA	0 to	100 °F
EA	–20 to	20 °C	NB	0 to	200 °F
EB	–20 to	60 °C	NC	0 to	300 °F
EN	–10 to	40 °C	ND	0 to	500 °F
FC	0 to	50 °C	NE	0 to	750 °F
FE	0 to	100 °C	NF	0 to	900 °F
FG	0 to	150 °C	NH	0 to	1200 °F
FH	0 to	200 °C			
FI	0 to	250 °C			
FJ	0 to	300 °C			
FK	0 to	400 °C			
FL	0 to	500 °C			
FN	0 to	600 °C			

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

Measurement range for TMT128/188 (TC):

Type N –100 to 1300 °C

NAA	0 to	100 °C	
NAB	0 to	150 °C	
NAK	0 to	200 °C	
NAC	0 to	250 °C	
NAL	0 to	300 °C	
NAD	0 to	400 °C	
NAE	0 to	600 °C	
NAF	0 to	900 °C	
NAH	0 to	1200 °C	
NNA	0 to	100 °F	
NNB	0 to	200 °F	
NNC	0 to	300 °F	
NND	0 to	500 °F	
NNE	0 to	750 °F	
NNG	0 to	1000 °F	
NNI	0 to	1500 °F	

Type E –200 to 1000 °C

EAA	0 to	100 °C	
EAB	0 to	150 °C	
EAK	0 to	200 °C	
EAC	0 to	250 °C	
EAL	0 to	300 °C	
EAD	0 to	400 °C	
EAE	0 to	600 °C	
EAF	0 to	900 °C	
ENA	0 to	100 °F	
ENB	0 to	200 °F	
ENC	0 to	300 °F	
END	0 to	500 °F	
ENE	0 to	750 °F	
ENG	0 to	1000 °F	
ENI	0 to	1500 °F	

Type R –50 to 1768 °C

RAE	0 to	600 °C	
RAF	0 to	900 °C	
RAG	0 to	1000 °C	
RAH	0 to	1200 °C	
RAI	0 to	1400 °C	
RAJ	0 to	1600 °C	
RNG	0 to	1000 °F	
RNI	0 to	1500 °F	
RNK	0 to	2500 °F	
RNL	0 to	3200 °F	

Type J –200 to 1200 °C

JAA	0 to	100 °C	
JAB	0 to	150 °C	
JAK	0 to	200 °C	
JAC	0 to	250 °C	
JAL	0 to	300 °C	
JAD	0 to	400 °C	
JAE	0 to	600 °C	
JAF	0 to	900 °C	
JNA	0 to	100 °F	
JNB	0 to	200 °F	
JNC	0 to	300 °F	
JND	0 to	500 °F	
JNE	0 to	750 °F	
JNG	0 to	1000 °F	
JNI	0 to	1500 °F	

Type K –200 to 1372 °C

KAA	0 to	100 °C	
KAB	0 to	150 °C	
KAK	0 to	200 °C	
KAC	0 to	250 °C	
KAL	0 to	300 °C	
KAD	0 to	400 °C	
KAE	0 to	600 °C	
KAF	0 to	900 °C	
KAH	0 to	1200 °C	
KNA	0 to	100 °F	
KNB	0 to	200 °F	
KNC	0 to	300 °F	
KND	0 to	500 °F	
KNE	0 to	750 °F	
KNG	0 to	1000 °F	
KNI	0 to	1500 °F	

Type S –50 to 1768 °C

SAE	0 to	600 °C	SNG	0 to	1000 °F
SAF	0 to	900 °C	SNI	0 to	1500 °F
SAG	0 to	1000 °C	SNK	0 to	2500 °F
SAH	0 to	1200 °C	SNL	0 to	3200 °F
SAI	0 to	1400 °C			
SAJ	0 to	1600 °C			

Type T –200 to 400 °C

TJA	–50 to	200 °C
TAA	0 to	100 °C
TAB	0 to	150 °C
TAK	0 to	200 °C
TAC	0 to	250 °C
TAL	0 to	300 °C
TLA	–40 to	140 °F
TNA	0 to	100 °F
TNB	0 to	200 °F
TNC	0 to	300 °F
TND	0 to	500 °F

*1 Please add Meas. range code for Pt100 to Order No.
*2 Please add Meas. range code for thermocouple to Order No.

Product	Version	Order no.	Price/piece in $			we hereby order:	total price:
			1 to 5	6 to 15	16 to 35		
TMT187	**RTD head transmitter (std.)**						
	RTD 3-wire	TMT187-A31 _ _K*1	$88.00	$80.00	$72.00	pcs	$
	RTD 4-wire	TMT187-A41 _ _K*1	$88.00	$80.00	$72.00	pcs	$
	RTD head transmitter (FM version)						
	RTD 3-wire (FM IS Cl. I, Div. 1; NI Cl. I, Div. 2, Gr. A-D	TMT187-C31 _ _K*1	$105.00	$95.00	$85.00	pcs	$
	RTD 4-wire (FM IS Cl. I, Div. 1; NI Cl. I, Div. 2, Gr. A-D	TMT187-C41 _ _K*1	$105.00	$95.00	$85.00	pcs	$
TMT188	TC Head transmitter (Std.) for non-hazardous areas	TMT188-A_ _ _K*2	$88.00	$80.00	$72.00	pcs	$
	TC Head transmitter (FM IS Cl. I, Div. 1; NI Cl. I, Div. 2, Gr. A-D)	TMT188-C_ _ _K*2	$105.00	$95.00	$85.00	pcs	$
TMT127	**RTD rail mounted transmitter (std.)**						
	RTD 3-wire	TMT127-A31 _ _A*1	$112.00	$101.00	$91.00	pcs	$
	RTD 4-wire	TMT127-A41 _ _A*1	$112.00	$101.00	$91.00	pcs	$
	RTD rail mounted transmitter (FM version)						
	RTD 3-wire (FM IS Cl. I, Div. 1; NI Cl. I, Div. 2, Gr. A-D)	TMT127-C31 _ _A*1	$128.50	$116.00	$105.00	pcs	$
	RTD 4-wire (FM IS Cl. I, Div. 1; NI Cl. I, Div. 2, Gr. A-D)	TMT127-C41 _ _A*1	$128.50	$116.00	$105.00	pcs	$
TMT128	TC rail mounted transmitter (Std.) for non-hazardous areas	TMT128-A_ _ _A*2	$112.00	$101.00	$91.00	pcs	$
	TC rail mounted transmitter (FM version) FM IS Cl. I, Div. 1; NI Cl. I, Div. 2, Gr. A-D	TMT128-C_ _ _A*2	$128.50	$116.00	$105.00	pcs	$

Accessories	Protective housing for DIN rail unit	51002468	$114.00			pcs	$

Net excluding cost of shipping and taxes.
Acceptance per our Standard Terms and Conditions (find at 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

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

(For customers in the USA only)

Online Shop **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**

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.

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People for Process Automation