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

Technical Information

Omnigrad S TMT142R

Compact RTD assembly
Temperature transmitter for for resistance thermometers, adjustable via HART® protocol

Application

The temperature assembly TMT142R from the Omnigrad S family is a compact resistance thermometer specifically designed to fulfill the requirements of different process industries such as the chemical, petrochemical and energy but even suitable to other general purpose applications.
The thermometer assembly TMT142R consists of a temperature RTD sensor insert (Pt 100) and an electronic two-wire temperature transmitter providing a 4 to 20 mA output, configurable via HART® protocol.
Thanks to the versatility of its product structure, the TMT142R is easily adaptable to various applications in many different industrial processes.

Your benefits

- HART® protocol for operating the device on site using handheld terminal (DXR375) or remotely via the PC
- Illuminated display, rotatable
- Operation, visualization and maintenance with PC, e.g. using FieldCare or ReadWin® 2000 operating software
- Pt 100 sensing element with class A accuracy (IEC 60751) or class1/3 DIN B
- Pt 100 wire wound for use in temperature range -200 to 600°C (-328 to 1112 °F)
- Single Pt 100 with 3 or 4 wires connection
- Undervoltage detection responds immediately, output of falsified measured values is prevented
- Highly accurate in entire operating temperature range
- Sensor monitoring:
  Failure conditioning, corrosion detection to NAMUR NE 89; Failure conditioning in event of sensor break or sensor short-circuit, adjustable to NAMUR NE 43
- EMC to NAMUR NE 21, CE
- Aluminum or stainless steel (optional) housing with IP67 or NEMA 4x ingress protection degree
- Calibration certificate can be ordered together with the assembly
- Output simulation
- Min./max. process value recorded
- Customized measuring range setup or expanded SETUP, see questionnaire
- Approvals: ATEX (EEx ia, EEx d and dust ignition-proof), CSA (IS, NI, XP and DIP)

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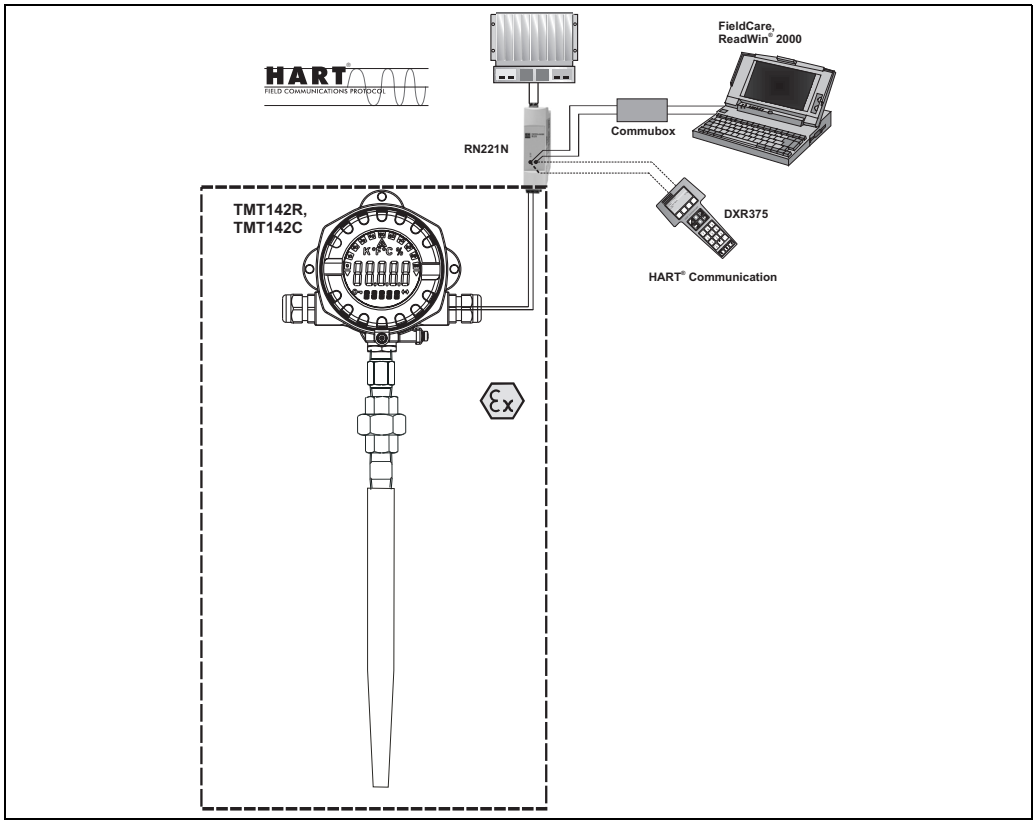
Function and system design

Measuring principle

In the RTD thermometer (Resistance Temperature Detector) the sensing element is an electric resistor with a 100 Ohm resistance value at 0°C (so called Pt 100, according to the IEC 60751 standard norm). The resistance value of a Pt 100 increases with temperature, depending on the physical characteristic of the used material (platinum). In the industrial thermometers, according to the standard IEC 60751, the thermal coefficient of the Pt 100 platinum sensors is $\alpha = 3.85*10^{-3}°C^{-1}$, in the range between 0°C to 100°C.

Measuring system



Example of an application of the compact thermometer

The Omnigrad S HART® TMT142R is a compact thermometer with a two-wire transmitter and an input for resistance thermometers in 3-wire or 4-wire connection, and an analog output. The LC display shows the current measured value digitally and as a bar graph with an indicator for limit value violation. The TMT142R can be operated via the HART® protocol using a handheld terminal (DXR375) or PC (FieldCare or ReadWin® 2000 operating software).
The sensor construction is based on the IEC 60751 standard, giving high reliability and performance in all the typical industrial environment conditions.
The Pt 100 sensing element is a wire wound type (WW) and is placed in tip of the sensor. The measuring probe (RTD replaceable insert) is installed in a thermowell.
Thanks to the spring load construction method, the sensing element is always in contact with the inner tip of the thermowell in order to guarantee the best heat transfer from the process to the sensing element. The transmitter housing is available either in coated aluminum or stainless steel (optional), with or without LC display. The fit between housing, thermowell and cable gland ensures a minimum IP65 (Ingress Protection) grade.
The thermowell can be either welded or made from bar-stock material. The thermowells are available in different forms and with many process connections: threads, flanges or weld-in types (see the paragraph “Thermowell”).

Corrosion detection
Sensor connection line corrosion can corrupt the measured value. For this reason, the device gives you the opportunity to detect corrosion for thermocouples and resistance thermometers with a 4-wire connection before measured value corruption takes place.

Input

Measured variable

Temperature (temperature linear transmission behavior)

Measuring range

The transmitter records different measuring ranges depending on the sensor connection and input signals (see 'Type of input').

Type of input

Input	Designation	Measuring range limits	Min. span
Resistance thermometer (RTD) to IEC 751 (α = 0.00385)	Pt100	-200 to 850 °C (-328 to 1562 °F)	10 K
to JIS C1604-81 (α = 0.003916) to DIN 43760 (α = 0.006180)	Pt100	-200 to 649 °C (-328 to 1200 °F)	10 K
to Edison Copper Winding No.15 (α = 0.004274) to SAMA (α = 0.003923) to Edison Curve (α = 0.006720)	Pt100	-100 to 700 °C (-148 to 1292 °F)	10 K
to GOST (α = 0.003911)	Pt100	-200 to 850 °C (-328 to 1562 °F)	10 K
to GOST (α = 0.004278)	Pt100 (Callendar - van Dusen)	-200 to 850 °C (-328 to 1562 °F)	10 K
	■ Type of connection: 3- or 4-wire connection ■ With 3-wire and 4-wire connection, sensor wire resistance to max. 50 Ω per wire ■ Sensor current: ≤ 0.3 mA		

Response time

Tests in water at 0.4 m/s (according to IEC 60751; 23 to 33°C step changes), without thermowell

- t50: 2.5 s
- t90: 7 s

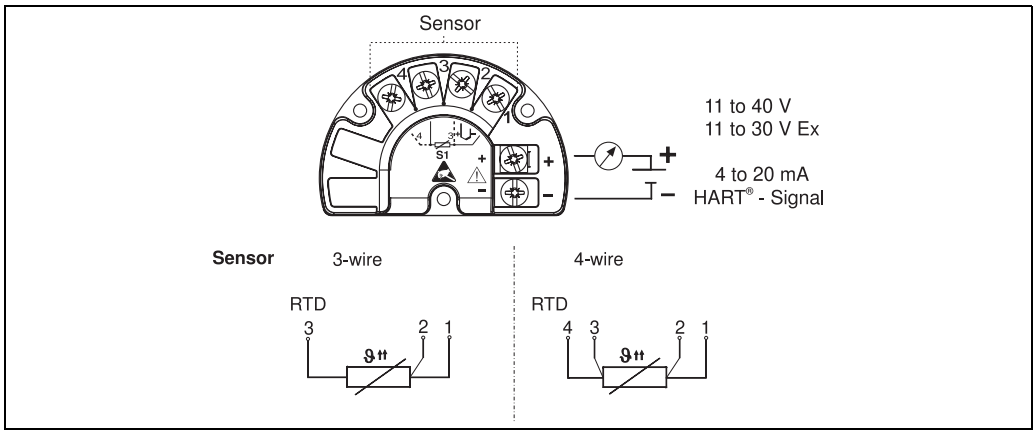
Self heating

Negligible

Output

Output signal	Analog 4 to 20 mA, 20 to 4 mA
Signal on alarm	■ Underranging: Linear drop to 3.8 mA ■ Overranging: Linear rise to 20.5 mA ■ Sensor break; sensor short-circuit: ≤ 3.6 mA or ≥ 21.0 mA (configurable 21.6 mA to 23 mA)
Load	Max. ($V_{power\ supply}$ – 11 V) / 0.022 A (current output)
Linearization/transmission behavior	Temperature linear, resistance linear, voltage linear
Filter	1st order digital filter: 0 to 60 s
Galvanic isolation	U = 2 kV AC (input/output)
Input current required	≤ 3.5 mA
Current limit	≤ 23 mA
Switch-on delay	4 s (during switch-on operation I_a= 4 mA)

Power supply

Electrical connection	
Supply voltage	U_b= 11 to 40 V (8 to 40 V without display), reverse polarity protection Warning! Power must be fed to the device from an 11 to 40 VDC power supply in accordance with NEC Class 02 (low voltage/current) with short-circuit power limit to 8 A/150 VA.
Cable entry	See "Product structure"
Residual ripple	Perm. residual ripple U_{ss} ≤ 3 V at U_b ≥ 13.5 V, $f_{max.}$ = 1 kHz

Accuracy

Response time

1 s per channel

Reference operating conditions

Calibration temperature: +25 °C ± 5 K (77 °F ± 9 °F)

Maximum measured error

Maximum error of the Pt 100 (WW) sensing element

■ Cl. A	$3\sigma = 0.30+0.0050\|t\|$	-200 to 600°C (-328 to 1112 °F)
■ Cl. 1/3 DIN B	$3\sigma = 0.10+0.0017\|t\|$	-50 to 250°C (-58 to 482 °F)
	$3\sigma = 0.30+0.0050\|t\|$	-200 to -50 / 250 to 600°C (-328 to -58/482 to 1112 °F)

(|t|=absolute value of the temperature in °C)

Transmitter maximum measured error

	Designation	Accuracy		
		digital		D/A
Resistance thermometer (RTD)	Pt100	0.2 K	0.1 K[1]	0.02%

1) Only with the "Advanced Electronics" option

Physical input range of the sensors	
10 to 400 Ω	Pt100

Repeatability

0.03% of the physical input range (15 Bit)
Resolution A/D conversion: 18 Bit

With the "Advanced Electronics" option:
0.015% of the physical input range (16 Bit)

Influence of supply voltage

≤ ±0.005%/V deviation from 24 V, related to the full scale value

Long-term stability

≤ 0.1 K/year or ≤ 0.05%/year
Data under reference conditions. % relates to the set span. The larger value applies.

Influence of ambient temperature (temperature drift)

Total temperature drift = input temperature drift + output temperature drift

Effect on the accuracy when ambient temperature changes by 1 K (1.8 °F)		
Input 10 to 400 Ω	0.002% of measured value	0.001% of measured value[1]
Input 10 to 2000 Ω	0.002% of measured value	0.001% of measured value[1]
Input -20 to 100 mV	typ. 0.002% of measured value (maximum value = 1.5 x typ.)	typ. 0.001% of measured value[1] (maximum value = 1.5 x typ.)
Input -5 to 30 mV	typ. 0.002% of measured value (maximum value = 1.5 x typ.)	typ. 0.001% of measured value[1] (maximum value = 1.5 x typ.)
Output 4 to 20 mA	typ. 0.002% of measured value (maximum value = 1.5 x typ.)	typ. 0.001% of span[1] (maximum value = 1.5 x typ.)

1) Only with the "Advanced Electronics" option

Typical sensor resistance change when process temperature changes by 1 K (1.8 °F):
Pt100: 0.4 Ω

Examples for calculating the accuracy:

- **Example 1 (without the "Advanced Electronics" option):**
  Input temperature drift $\Delta\vartheta$ = 10 K, Pt100, span 0 to 100 °C (32 to 212 °F)
  Maximum process value: 100 °C (212 °F)
  Measured resistance value: 138.5 . (see IEC751)
  Typ. influence in Ω: (0.002% of 138.5 Ω) * 10 = 0.0277 Ω
  Conversion Ω to °C: 0.0277 Ω / 0.4 Ω/K = 0.07 K
- **Example 2 (without the "Advanced Electronics" option):**
  Output temperature drift $\Delta\vartheta$ = 10 K (18 °F), measuring range 0 bis 100 °C (32 to 212 °F)
  Span: 100 K (180 °F)
  Typical influence: (0.002% of 100 K) * 10 = 0.02 K; (0.002% of 180 °F) * 10 = 0.036 °F
- **Example 3 (with the "Advanced Electronics" option):**
  Max. possible measured error $\Delta\vartheta$ = 10 K (18 °F), Pt100, measuring range 0 to 100 °C (32 to 212 °F)
  Measured error Pt100: 0.1 K (0.18 °F)
  Output measured error: 0.02 K (0.02% of 100 K); 0.04 °F (0.02% of 180 °F)
  Input temperature drift: 0.03 K (0.05 °F)
  Output temperature drift: 0.01 K * 1.5 = 0.015 K; (0.018 °F * 1.5 = 0.027 °F)
  Max. possible error (total of errors): 0.165 K (0.297 °F)

$\Delta\vartheta$ = deviation of ambient temperature from the reference operating condition

Total measuring point error = max. possible measured error + temperature sensor error

Installation

Installation instructions

Mounting location
Direct mounting on the temperature sensor or indirect mounting using mounting bracket (see 'Accessories').

Environment

Ambient temperature limits

- Without display: -40 to +85 °C (-40 °F to +185 °F)
- With display: -40 to +70 °C (-40 °F to +158 °F)

For use in hazardous areas, see Ex certificate

Note!
The display can react slowly for temperatures < -20 °C (< -4 °F).
Readability of the display cannot be guaranteed at temperatures < -30 °C (-22 °F).

Process temperature

The operating range depends on sensor and thermowell.

Storage temperature

- Without display: -40 to +100 °C (-40 °F to +212 °F)
- with display: -40 to +85 °C (-40 °F to +185 °F)

Operating height

Up to 2000 m above MSL

Climate class

As per IEC 60 654-1, Class C

Degree of protection

IP 67, NEMA 4x

Shock and vibration resistance

3g / 2 to 150 Hz as per IEC 60 068-2-6

Electromagnetic compatibility (EMC)

Interference immunity and interference emission as per EN 61 326-1 (IEC 1326) and NAMUR NE 210.08 to 2 GHz 10 V/m; 1.4 to 2 GHz 30 V/m to EN 61000-4-3

Condensation

Permitted

Installation category

I

Pollution degree

2

Maximum process pressure

Maximum pressure values at various temperatures are indicated in the Technical Information of the different thermowells (see TI documentation codes at the end of this document).

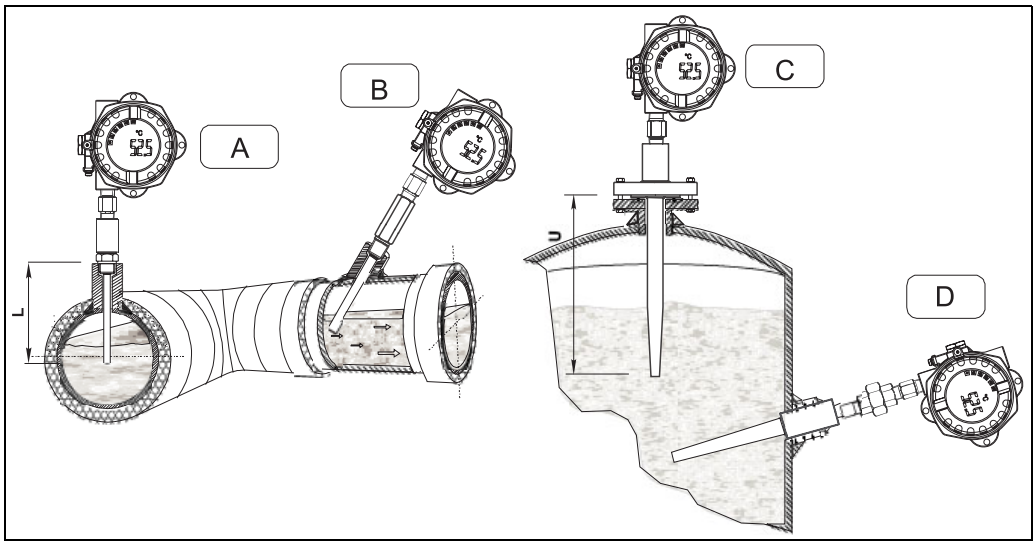
Maximum flow velocity

The maximum flow velocity depends on the insertion length, the mechanical strength of the thermowell, and on pressure and temperature of the measuring point.

Mechanical construction

Installation

The Omnigrad S resistance thermometer model TMT142R can be mounted on the wall of pipes or vessels or other plant parts. In the case of ATEX/FM/CSA certified components (transmitter + insert), please refer to the relevant documentation (see "Documentation").
The immersion length may have an effect on the accuracy of the measurement. If the immersion is too small, an error may be generated in the temperature detected due to the lower temperature of the process fluid near to the walls and the heat transfer, which takes place through the sensor shaft. The incidence of such an error is not negligible if there is a big difference between the process temperature and the ambient temperature. In order to avoid this source of inaccuracy,the thermowell should have a small diameter and the immersion length (L) should be, if possible, at least 100–150 mm.
In pipes of a small cross-section the axis line of the duct must be reached and if possible slightly exceeded by the tip of the thermowell (refer to fig. A and C). Another solution may be a tilted installation (see fig. Band D).



Examples of installation

In the case of two-phase flows, please pay special attention to the choice of the measurement point, as there may be fluctuations in the value of the detected temperature. With regard to corrosion, the base material of the wetted thermowells is important.
In case that the sensor components are disassembled and than re-mounted the proper assembling torque must be applied in order to guarantee the defined ingress protection.

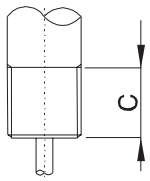
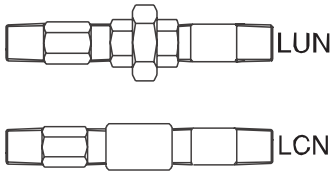
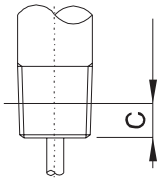
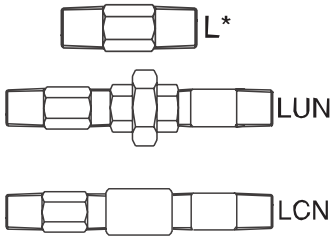
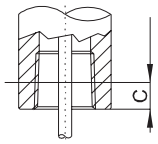
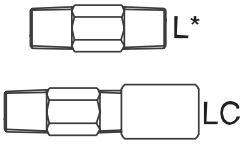
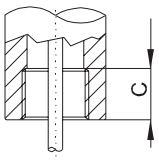
Housing

The housing of the TMT142R is a single compartment container.
Microcontroller controlled display in single chamber housing with illuminated LC display. Parameterization of measuring range, decimal point and offset of the display can be done comfortably using a PC with the PC software ReadWin® 2000. The display is continuously rear-illuminated and does not require additional wiring for power supply.

Extension neck

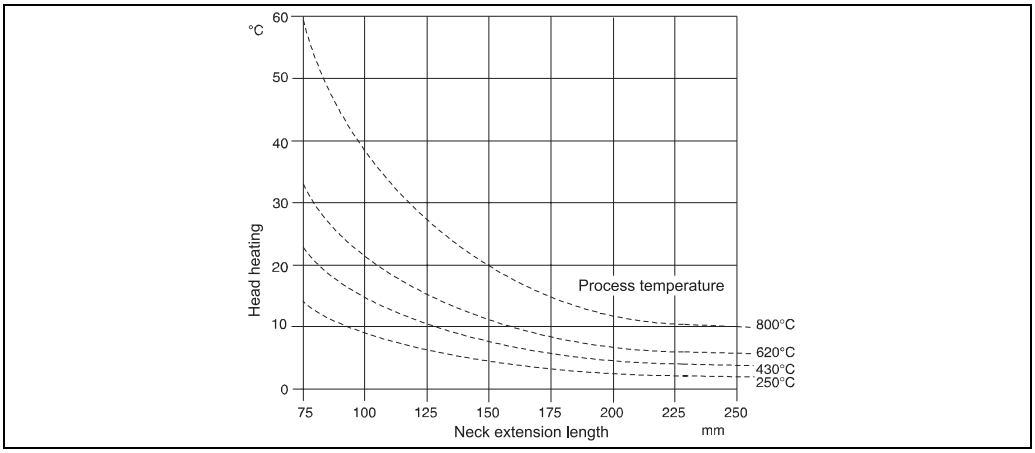
The function of the extension neck between the sensor and the transmitter (electronic with display) is to protect the transmitter from the overheating due to high process temperatures.
The extension neck consists of various couplings (nipples, union) suitable to adapt the temperature sensor to the different thermowells.
The neck material is usually stainless steel 316L/1.4404.
The standard lengths (N) and the extension neck versions are selectable amongst the following options:

- 52 mm (2.05") (only 1/2" NPT, Type L)
- 102 mm (4.02") (nipple+union, Type LU)
- 96 mm (3.78") (nipple+coupling, Type LC)
- 144 mm (5.67") (nipple+union+nipple, Type LUN)
- 138 mm (5.43") (nipple+coupling+nipple, Type LCN)

Process connection to thermowell: threads					
Type	Thread	Digit	C (mm)	Detail	Extension neck type
Male	G 1/2"	D	15		
	1/2" NPT	N	8		
	3/4" NPT	P	8.5		
Female	1/2" NPT	U	8		
	M24x1.5	5	16		

Caution!
* Extension necks available only with 1/2" NPT threads

Besides the standard neck options indicated it is possible to order a specific neck by entering the length in the order code.
The mechanical coupling situated in the upper part of the neck allows for orientation of the sensor head. As illustrated by the figure below, the length of the extension neck influences the temperature in the head. The extension neck length has to be chosen in such a way that the temperature within the head remains below the maximum permissible operating temperature.



Heating of the head due to the process temperature

Thermowell

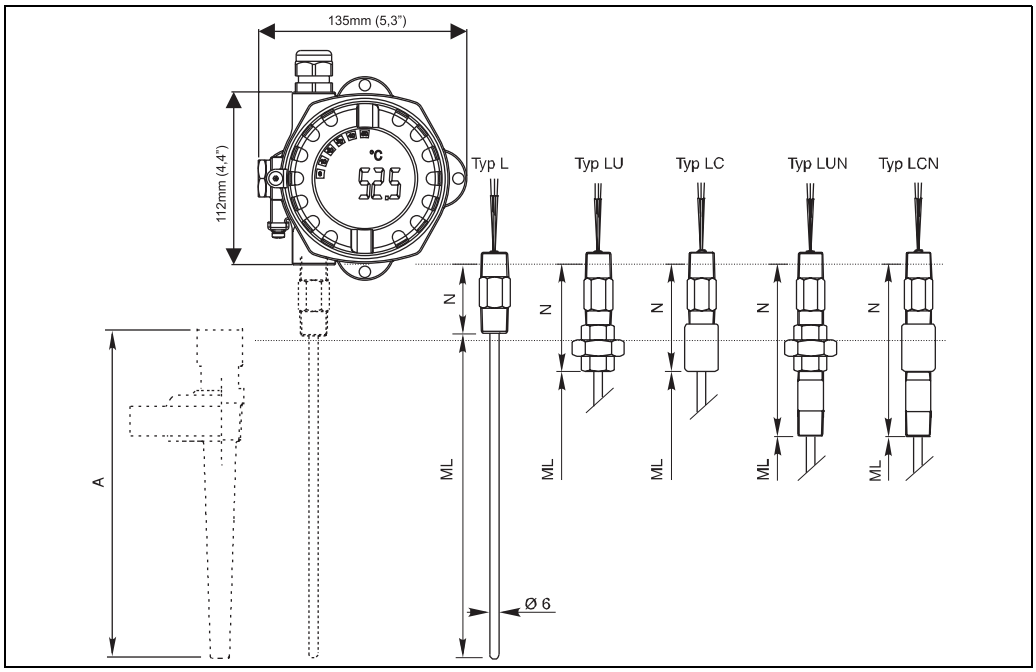
The thermowell already exists in the plant or has to be ordered separately. To this end the extension neck is available with different forms.In order to easily select the right mechanical fitting for the thermowell you are kindly requested touse the table list and the ML values described at the chapter “Probe”.

Probe

In the TMT142R compact thermometer the probe consists of a mineral oxyde insert which is inserted and fixed into the thermowell.
The length of the sensor is freely selectable inside the predefined lengths range (50 to 990 mm / 1.97" to 39").
Sensors exceeding the 990 mm (39") length are available on request.
The immersion length (ML) must be defined as a function of the type and length of the relevant thermowell.
In case of spare inserts to be ordered please read carefully the following table (table valid for standard thickness tip):

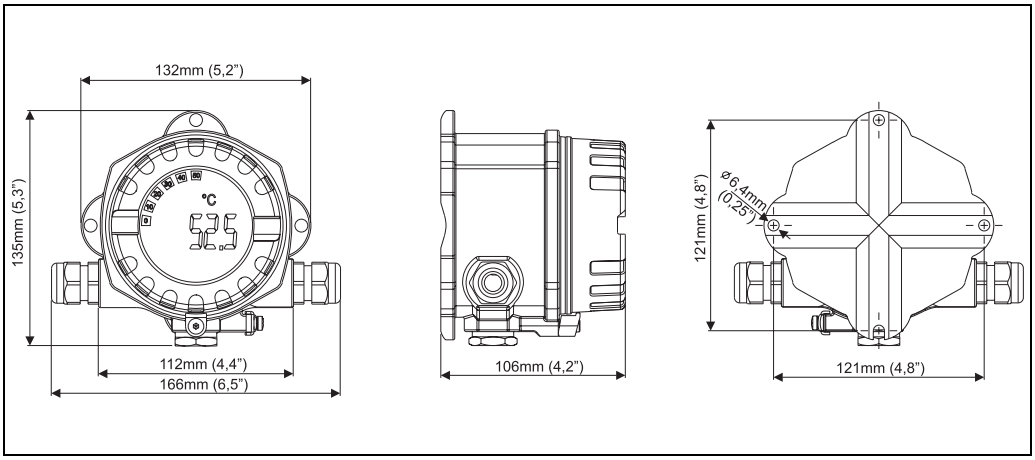
Thermowell type	ML	Thermowell type	ML	Thermowell type	ML
TW10*	ML = A - 8	TA535	ML = A - 8	TA560	ML = A - 11
TW11*	ML = A - 8			TA562	ML = A - 11
TW12*	ML = A - 8	TA540	ML = A - 10	TA565	ML = A - 11
TW13*	ML = A - 8	TA541*	ML = A - 10	TA566	ML = A - 11
TW10**	ML = A - 15			TA570	ML = A - 11
TW11**	ML = A - 15	TA550	ML = A - 11	TA571	ML = A - 11
TW12**	ML = A - 15	TA555	ML = A - 10	TA572	ML = A - 11
TW13**	ML = A - 15	TA556	ML = A - 10	TA575	ML = A - 11
TW15**	TW15**	TA557	ML = A - 10	TA576	ML = A - 10

Caution!
* TMT142R with connection to thermowell NPT female
** TMT142R with connection to thermowell metric female (M24x1.5)



System components

Design, dimensions of the connection head



Data in mm (data in Inches in brackets)

- Display rotatable in 90° stages

Weight

- 1.6 kg to 5 kg (3.5 to 11 lbs) (standard options with aluminum housing)
- 4.2 kg to 8 kg (9.4 to 17.6 lbs) (standard options with stainless steel housing)

Material

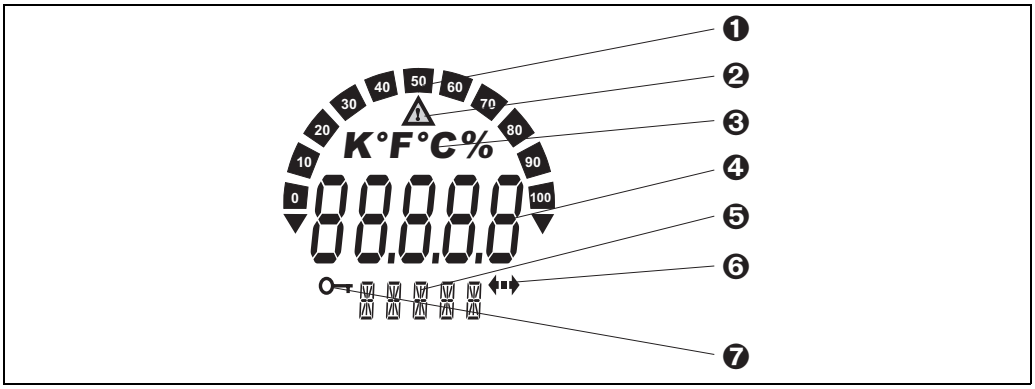
- Housing: die-cast aluminium housing AlSi10Mg with powder coating on polyester basis or stainless steel 1.4435 (AISI 316L)
- Sheathing: 1.4404 (AISI 316L)
- Nameplate: 1.4301 (AISI 304)

Terminals

Cables / wires up to max. 2.5 mm^2 (AWG 13) plus ferrule

Human interface

Display elements



LC display of the field transmitter (illuminated, can be rotated in 90 stages)

Item 1: Bar graph display in 0 % stages with indicators for overranging/underranging
Item 2: 'Caution' display
Item 3: Unit display K, °F, °C or %
Item 4: Measured value display (digit height 20.5 mm / 0.81 ")
Item 5: Status and information display
Item 6: 'Communication' display
Item 7: 'Programming disabled' display

Operating elements

No operating elements are present directly on the display. The device parameters of the field transmitter are configured using the DXR375 handheld terminal or a PC with Commubox FXA191 and operating software (e.g. FieldCare or ReadWin® 2000).

Remote operation

Configuration
see 'Operating elements'

Interface
HART® communication via transmitter power supply (e.g. RN221N; see 'Measuring system').

Configurable device parameters (selection)
Sensor type and type of connection, engineering units (°C/°F), measuring ranges, internal/external cold junction, compensation of wire resistance with 2-wire connection, failure mode, output signal (4 to 20/20 to 4 mA), digital filter (damping), offset, TAG+descriptor (8+16 characters), output simulation, customized linearization, recording of min./max. process value, analog output: channel 1 (C1)
Option: customized linearization

Certificates and approvals

CE mark

The device meets the statutory requirements of the EC directives. Endress+Hauser confirms successful testing of the device by affixing to it the CE mark.

Ex approval

Information about currently available Ex versions (ATEX, FM, CSA, etc.) can be supplied by your E+H Sales Center on request. All explosion protection data are given in a separate documentation which is available upon request.

Other standards and guidelines

- IEC 60529:
  Degrees of protection through housing (IP code)
- IEC 61010:
  Protection measures for electrical equipment for measurement, control, regulation and laboratory procedures
- IEC 1326:
  Electromagnetic compatibility (EMC requirements)
- NAMUR
  Association for Standards for Control and Regulation in the Chemical Industry

Ordering information

Questionnaire

Questionnaire Endress+Hauser iTEMP temperature transmitter
Customer specific setup / Kundenspezifische Einstellung

Standard setup / Standardeinstellung

Sensor 1 (S1)

TC ( ) B ( ) C ( ) D ( ) E ( ) J ( ) K ( ) L ( ) N ( ) R ( ) S ( ) T ( ) U

RTD **( ) Pt100** ( ) Pt500 ( ) Pt1000 ( ) Ni100 ( ) Ni500 ( ) Ni1000

( ) mV ( ) 10...400 Ohm ( ) 10...2000 Ohm

( ) 2 wire **( ) 3 wire** ( ) 4 wire

Unit / Einheit **( ) °C** ( ) °F ( ) K ( ) °R ( ) mV ( ) Ohm

Range / Messbereich (not / nicht PROFIBUS-PA)
Low scale / Anfang [,]
High scale / Ende [,]
Bitte beachten!: Messbereich und min. Spanne (s. Techn. Daten)
Note!: Range and min. span (s. Techn. data)

Bus address / Busadresse (only / nur PROFIBUS-PA) [ ] **[0...126]**

Expanded setup / Erweiterte Einstellung

Reference junction / Vergleichsstelle **( ) intern** ( ) extern [ ] [0...80°C; 32...176°F] (only / nur TC)

Compensation wire resistance / Kompensation Leitungswiderstand S1 [ ] [**0**...30 Ohm] (only / nur RTD 2 wire)

Failure mode / Fehlerverhalten ( ) ≤ 3,6 mA **( ) ≥ 21,0 mA** (not / nicht PROFIBUS-PA)

Output / Ausgang **( ) 4...20 mA** ( ) 20...4 mA (not / nicht PROFIBUS-PA)

Filter [ ] [**0**, 1, 2,..., 60s]

Offset S1 [,] [-10... **0**...+10 K/-18...0...+18 °F]

Line voltage filter/Netzspannungsfilter **( ) 50 Hz** ( ) 60 Hz

TAG [ ]
(8 char. TAG + 16 char. Descriptor)

DESCRIPTOR [ ]

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Product structure

TMT142R	Omnigrad S TMT142R RTD Thermometer

Approval

A	Non-hazardous area	
B	ATEX	II1G EEx ia IIC T4/T5/T6
D	CSA	IS, NI I/1+2/A-D
E	ATEX	II2GD EEx d IIC T6
G	CSA	XP, DIP I,II,III/1+2/A-D
H	ATEX	EEx d EEx ia
K	CSA	XP, DIP, IS, NI, I, II, III/1+2/A-D
L	ATEX	II 3G EEx nA IIC T4/T5/T6
M	ATEX	II 1/2GD EEx d IIC T6

Cable connection; Display

A	2xM20x1.5, on top; w/o display
B	2xM20x1.5, on top; + display
C	2x1/2"NPT, on top; w/o display
D	2x1/2"NPT, on top; + display
1	2xM20x1.5, sidewise; w/o display
2	2xM20x1.5, sidewise; + display
3	2x1/2"NPT, sidewise; w/o display
4	2x1/2"NPT, sidewise; + display

Configuration

A	Pt100; 3-wire, 0/100°C
B	Pt100; 4-wire, 0/100°C
C	Pt100; 3-wire, 32/212°F
D	Pt100; 4-wire, 32/212°F
Y	Special version, to be specified

Neck length N; type

1	52 mm; nipple type L
2	104 mm; nipple + union type LU
3	96 mm; nipple + coupl. type LC
4	156 mm; nipple + union + nipple type LUN
5	148 mm; nipple + coupl. + nipple type L
9	..... mm, as specified

Thermowell type

0	not needed
1	Bar stock
2	Pipe

Thermowell connection

D	Thread G1/2"
N	Thread 1/2"NPT-M
P	Thread 3/4"NPT-M
U	Thread M24x1.5-F
5	Thread 1/2"NPT-F
9	Special version, to be specified

Insert diameter; Material

3	6mm; 316L

RTD Class; Wiring

1	1x Pt100 A; 3-wire
2	1x Pt100 A; 4-wire
3	1x Pt100 1/3DIN B; 3-wire
4	1x Pt100 1/3DIN B; 4-wire
9	Special version, to be specified

TMT142R	⇐ Order code (part 1)

Insertion length ML		
	X	.... mm
	Y	.... mm, as specified
Factory test		
	A	0-100 °C, 1x RTD
	B	0-100 °C, 1x RTD loop
	E	0-100-150 °C, 1x RTD
	F	0-100-150 °C, 1x RTD loop
	0	not needed
	1	Inspection sensor
	2	Inspection RTD+TMT
TMT142R-		⇐ **Order code (complete)**

Customized options

Order No. 51003527	TAG print/configuration 8 char
Order No. 51003546	Descriptor print/configuration 16 char
Order No. 51002393	Metal TAG

Accessories

Optional accessories

Mounting bracket	■ Mounting bracket, stainless steel pipe 1.5-3", 316L Order No. 51007995
Cable gland	■ Cable gland M20x1.5 Order No. 51004949 ■ able gland NPT 1/2" D4-8.5, IP68 Order No. 51006845 ■ Cable entry adapter M20x1.5 to NPT 1/2" Order No. 51004387
Overvoltage protection	■ Surge arrester HAW569 Order code: HAW569-A11A for non-hazardous areas Order code: HAW569-B11A for Ex areas ATEX 2(1)G EEx ia IIC
Active barrier	■ Active barrier RN221 for non-hazardous areas or as Ex version Order code: RN221-... see "Documentation"

Documentation

❑FA brochure 'Temperature measuring technology' (FA006T/09/en)
❑Installation instructions, FieldCare configuration software (BA031S/04/a4)
❑Operating Instructions iTEMP® HART® TMT142 (BA191R/09/a3)
❑Operating Instructions 'Fieldgate FXA520' (BA258F/00/en)
❑Technical Information 'Fieldgate FXA520' (TI369F/00/en)
❑Supplementary Ex documentation:
ATEX II2G EEx d: XA048R/09/a3
ATEX II1/2D: XA049R/09/a3
ATEX II1G: XA050R/09/a3
ATEX EEx ia + EEx d: XA051R/09/a3
ATEX II3G: XA052R/09/a3
❑Technical Information 'Active barrier RN221' (TI073R/09/en)
❑Technical Information 'Surge arrester HAW569' (TI103R/09/en)

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