Датчики температуры TH14, TH15

Техническая информация

По вопросам продаж и поддержки обращайтесь:

Алматы (7273)495-231
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Владикавказ (8672)28-90-48
Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89
Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Коломна (4966)23-41-49
Кострома (4942)77-07-48
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Курган (3522)50-90-47
Липецк (4742)52-20-81
Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Ноябрьск (3496)41-32-12
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37
Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Саранск (8342)22-96-24
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
Тверь (4822)63-31-35
Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Улан-Удэ (3012)59-97-51
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Чебоксары (8352)28-53-07
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Чита (3022)38-34-83
Якутск (4112)23-90-97
Ярославль (4852)69-52-93

Россия +7(495)268-04-70
Казахстан +7(7172)727-132
Киргизия +996(312)96-26-47

эл.почта: ehr@nt-rt.ru || сайт: https://endcounters.nt-rt.ru/

Technical Information
RTD TH13, TH14 and TH15

RTD assemblies in thermowells with spring loaded insert and enclosure for process industry

Application

The temperature sensors are RTD assemblies installed in barstock thermowells and designed for use in all types of process industries, including harsh environments, due to their rugged design.

Among other applications the sensors can be used in process industries such as:
- Chemicals & petrochemical
- Power plants, refineries and offshore platforms

Head Transmitter

All ransmitters are available with enhanced accuracy and reliability compared to directly wired sensors. Easy customizing by choosing one of the following outputs and communication protocols:

- Analog output 4 to 20 mA
- HART®
- PROFIBUS® PA
- FOUNDATION Fieldbus™
- Bluetooth® connectivity (optional)

Field Transmitter

Temperature field transmitters with HART® or FOUNDATION Fieldbus™ protocol for highest reliability in harsh industrial environments. Backlit display with large measured value, bargraph and fault condition indication for ease of reading.

Your benefits

- High flexibility due to modular assembly with standard terminal heads and customized immersion length
- Improved Galvanic Isolation on most devices (2 kV)
- Simplified Model Structure: Competitively priced, offers great value. Easy to order and reorder. A single model number includes sensor and transmitter assembly for a complete point solution
- All iTEMP transmitters provide long term stability ≤ 0.05 % per year
- Fast response time with reduced/tapered tip form
- iTHERM StrongSens: unsurpassed vibration resistance (> 60g) for ultimate plant safety

Function and system design

Measuring principle

These resistance thermometers use a Pt100 temperature sensor according to IEC 60751. This temperature sensor is a temperature-sensitive platinum resistor with a resistance of 100 Ω at 0 °C (32 °F) and a temperature coefficient is $\alpha = 0.003851\ °C^{-1}$.

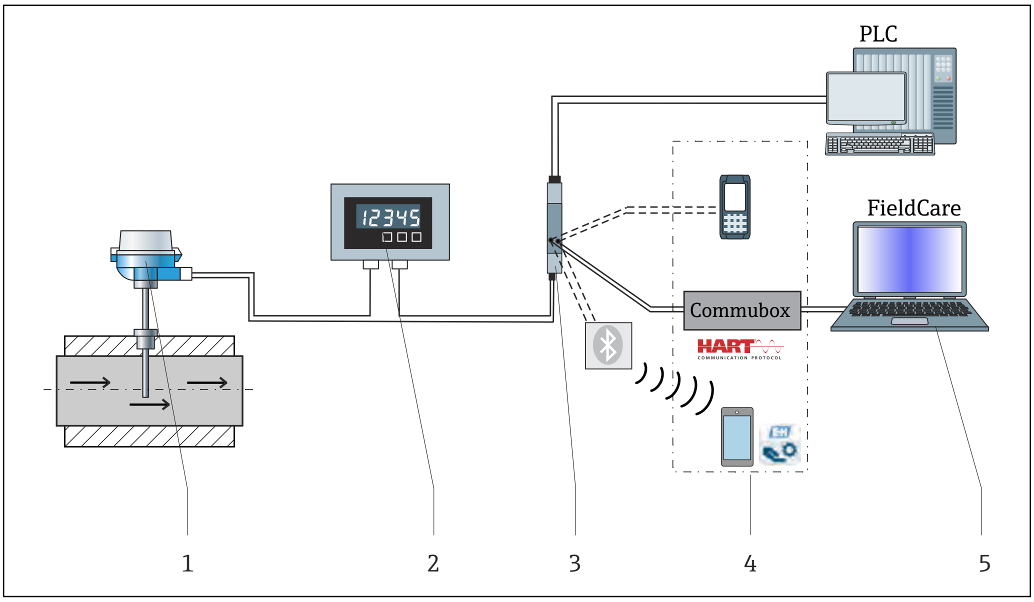
There are generally two different kinds of platinum resistance thermometers:
- **Wire wound (WW)**: Here, a double coil of fine, high-purity platinum wire is located in a ceramic support. This is then sealed top and bottom with a ceramic protective layer. Such resistance thermometers not only facilitate very reproducible measurements but also offer good long-term stability of the resistance/temperature characteristic within temperature ranges up to 600 °C (1 112 °F). This type of sensor is relatively large in size and it is comparatively sensitive to vibrations.
- **Thin film platinum resistance thermometers (TF)**: A very thin, ultrapure platinum layer, approx. 1 μm thick, is vaporized in a vacuum on a ceramic substrate and then structured photolithographically. The platinum conductor paths formed in this way create the measuring resistance. Additional covering and passivation layers are applied and reliably protect the thin platinum layer from contamination and oxidation even at high temperatures.

The primary advantages of thin-film temperature sensors over wire wound versions are their smaller sizes and better vibration resistance. A relatively low principle-based deviation of the resistance/temperature characteristic from the standard characteristic of IEC 60751 can frequently be observed among TF sensors at high temperatures. As a result, the tight limit values of tolerance category A as per IEC 60751 can only be observed with TF sensors at temperatures up to approx. 300 °C (572 °F). For this reason, thin-film sensors are generally only used for temperature measurements in ranges below 400 °C (932 °F).

Measuring system

offers a complete portfolio of optimized components for the temperature measuring point – everything you need for the seamless integration of the measuring point into the overall facility. This includes:
- Power supply unit/barrier
- Display units
- Overvoltage protection

For more information, see the brochure 'System Components - Solutions for a Complete Measuring Point' (FA00016K)



1 Example of application, measuring point layout with additional components

1 Installed thermometer with HART® communication protocol
2 RIA15 loop powered process display - It is integrated in the current loop and displays the measuring signal or HART® process variables in digital form. The process display unit does not require an external power supply. It is powered directly from the current loop. More information on this can be found in the Technical Information.
3 Active barrier RN42 - The RN42 (17.5 V_{DC}, 20 mA) active barrier has a galvanic isolated output for supplying voltage to loop powered transmitters. The universal power supply works with an input supply voltage of 24 to 230 V AC/DC, 0/50/60 Hz, which means that it can be used in all international power grids. More information on this can be found in the Technical Information.
4 Communication examples: HART® handheld communicator FieldXpert, Commubox FXA195 for intrinsically safe HART® communication with FieldCare via the USB interface, Bluetooth® technology with SmartBlue App.
5 FieldCare is a FDT-based plant asset management tool from more details see section 'accessories'.

Equipment architecture

The single and duplex element RTDs are designed to measure temperature in a variety of process and laboratory applications. These RTDs are specifically designed for use in two different process temperature ranges and they will provide accurate and repeatable temperature measurement through a broad range of −200 to 600 °C (−328 to 1 112 °F). Low range thin film RTDs −50 to 200 °C (−58 to 392 °F) are constructed using silver plated copper internal leads, PTFE wire insulations with potting compounds to resist moisture penetration. High range RTDs −200 to 600 °C (−328 to 1 112 °F) are constructed with nickel internal leads inside swaged MgO insulated cable to allow higher temperature measurements at the RTD element and to provide higher temperature lead protection along the sheath.

Input

Measured variable

Temperature (temperature-linear transmission behavior)

Measuring range

Construction	Model code (class and type of sensor)	max. range
Low temperature range	TH13-_ _ _ _ _(A/C/E/G/J/L) _ _ _ _ _	−50 to 200 °C (−58 to 392 °F)
	TH14-_ _ _ _ _(A/C/E/G/J/L) _ _ _ _ _	
	TH15-_ _ _ (A/C/E/G/J/L) _ _ _ _ _	
High temperature range	TH13-_ _ _ _ _(B/D/F/H/K/M) _ _ _ _ _	−200 to 600 °C (−328 to 1 112 °F)
	TH14-_ _ _ _ _(B/D/F/H/K/M) _ _ _ _ _	
	TH15-_ _ _ (B/D/F/H/K/M) _ _ _ _ _ _	

Construction	Model code (class and type of sensor)	max. range
Pt100 thin-film, iTHERM StrongSens, vibration-resistant > 60g	TH13-_ _ _ _ _ (S/T/U/V) _ _ _ _ _	−50 to +500 °C (−58 to +932 °F)
	TH14-_ _ _ _ _ (S/T/U/V) _ _ _ _ _	
	TH15-_ _ _ (S/T/U/V) _ _ _ _ _ _	

Options J, K, L, M are duplex platinum elements of two sensors inside the same sheath.

Output

Output signal

Generally, the measured value can be transmitted in one of two ways:

- Directly-wired sensors - sensor measured values forwarded without a transmitter.
- Via all common protocols by selecting an appropriate iTEMP temperature transmitter. All the transmitters listed below are mounted directly in the terminal head or as field transmitter and wired with the sensory mechanism.

Family of temperature transmitters

Thermometers fitted with iTEMP transmitters are an installation-ready complete solution to improve temperature measurement by significantly increasing accuracy and reliability, when compared to direct wired sensors, as well as reducing both wiring and maintenance costs.

4 to 20 mA head transmitters
They offer a high degree of flexibility, thereby supporting universal application with low inventory storage. The iTEMP transmitters can be configured quickly and easily at a PC. offers free configuration software which can be downloaded from the Website. More information can be found in the Technical Information.

HART® head transmitters
The transmitter is a 2-wire device with one or two measuring inputs and one analog output. The device not only transfers converted signals from resistance thermometers and thermocouples, it also transfers resistance and voltage signals using HART® communication. Swift and easy operation, visualization and maintenance using universal device configuration tools like FieldCare, DeviceCare or FieldCommunicator 375/475. Integrated Bluetooth® interface for the wireless display of measured values and configuration via E+H SmartBlue (app), optional. For more information, see the Technical Information.

PROFIBUS® PA head transmitters
Universally programmable head transmitter with PROFIBUS® PA communication. Conversion of various input signals into digital output signals. High accuracy over the complete ambient temperature range. The configuration of PROFIBUS PA functions and of device-specific parameters is performed via fieldbus communication. For more information, see the Technical Information.

FOUNDATION Fieldbus™ head transmitters
Universally programmable head transmitter with FOUNDATION Fieldbus™ communication. Conversion of various input signals into digital output signals. High accuracy over the complete ambient temperature range. All transmitters are released for use in all important process control systems. The integration tests are performed in"System World". For more information, see the Technical Information.

Advantages of the iTEMP transmitters:
- Dual or single sensor input (optionally for certain transmitters)
- Pluggable display (optionally for certain transmitters)
- Unsurpassed reliability, accuracy and long-term stability in critical processes
- Mathematical functions
- Monitoring of the thermometer drift, sensor backup functionality, sensor diagnostic functions
- Sensor-transmitter matching for dual sensor input transmitters, based on Callendar-Van-Dusen-coefficients (CvD).

Galvanic isolation

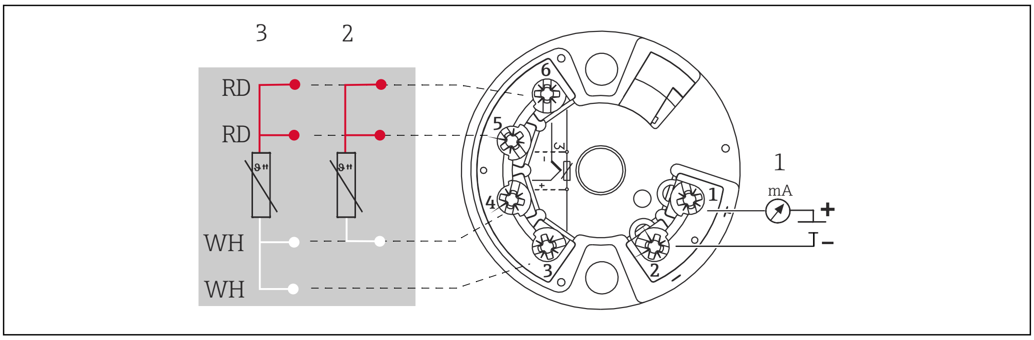
Galvanic isolation o iTEMP transmitters

Transmitter type	Sensor
TMT162 HART® Field transmitter	
TMT71	
TMT72 HART®	
TMT82 HART®	U = 2 kV AC
TMT84 PA	
TMT85 FF	
TMT142B	

Power supply

Terminal assignment

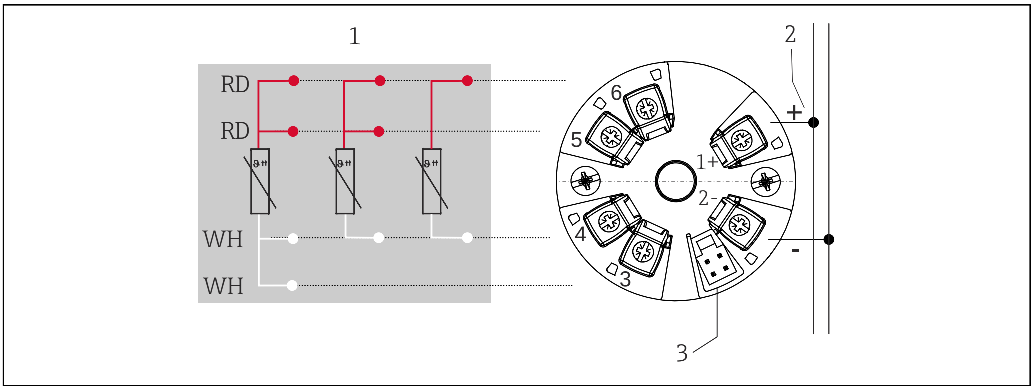
Type of sensor connection



A0045600

2 Head mounted transmitter TMT18x (single input)

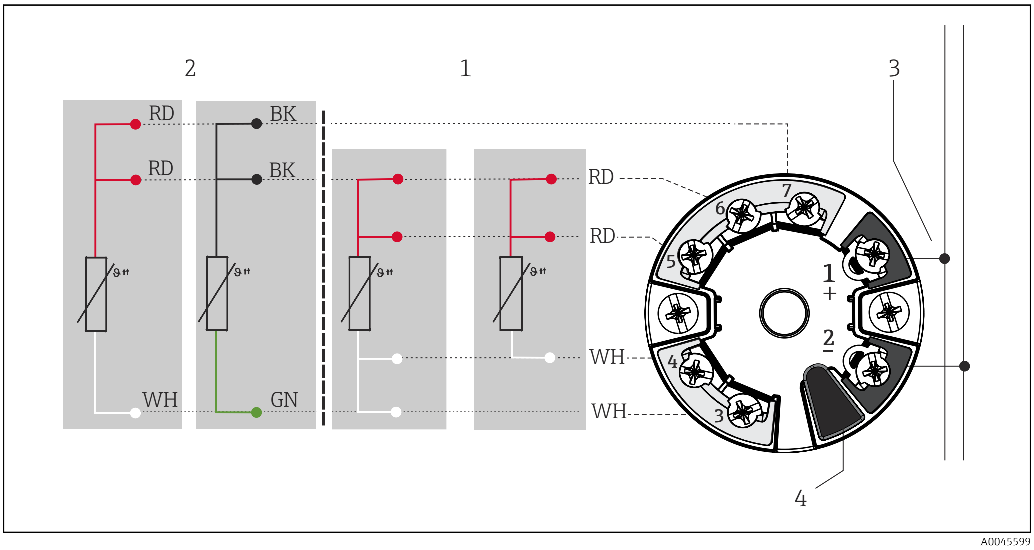
1 *Power supply head transmitter and analog output 4 to 20 mAor bus connection*
2 *3-wire*
3 *4-wire*



A0047173

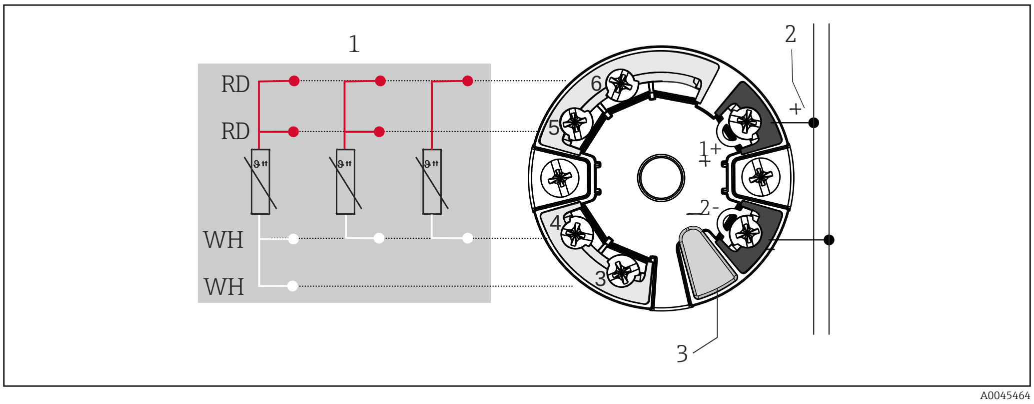
3 Head mounted transmitter TMT31 (single input)

1 *RTD sensor input: 4-, 3- and 2-wire*
2 *Power supply*
3 *CDI interface*



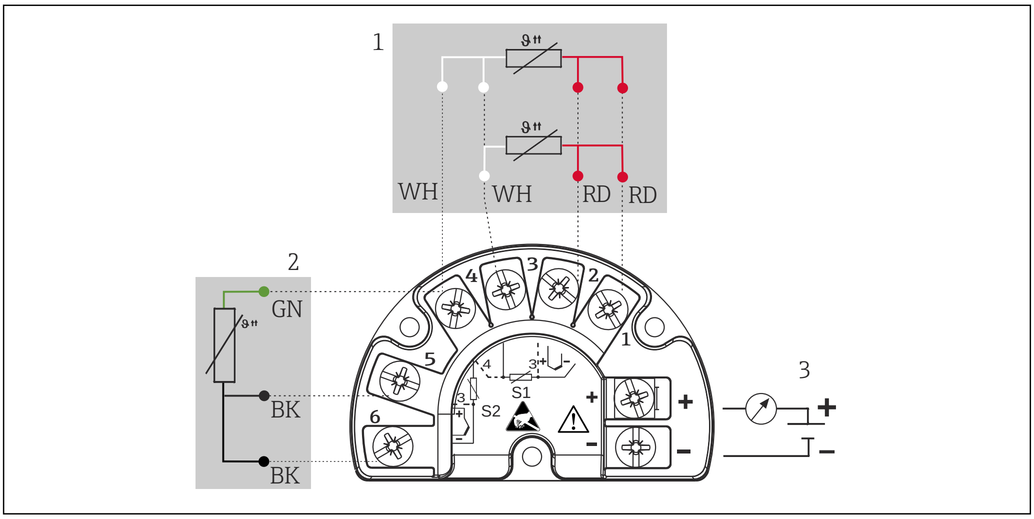
4 *Head mounted transmitter TMT8x (dual input)*

1 *Sensor input 1, RTD, 4- and 3-wire*
2 *Sensor input 2, RTD, 3-wire*
3 *Bus connection and supply voltage*
4 *Display connection*



5 *Head mounted transmitter TMT7x (single input)*

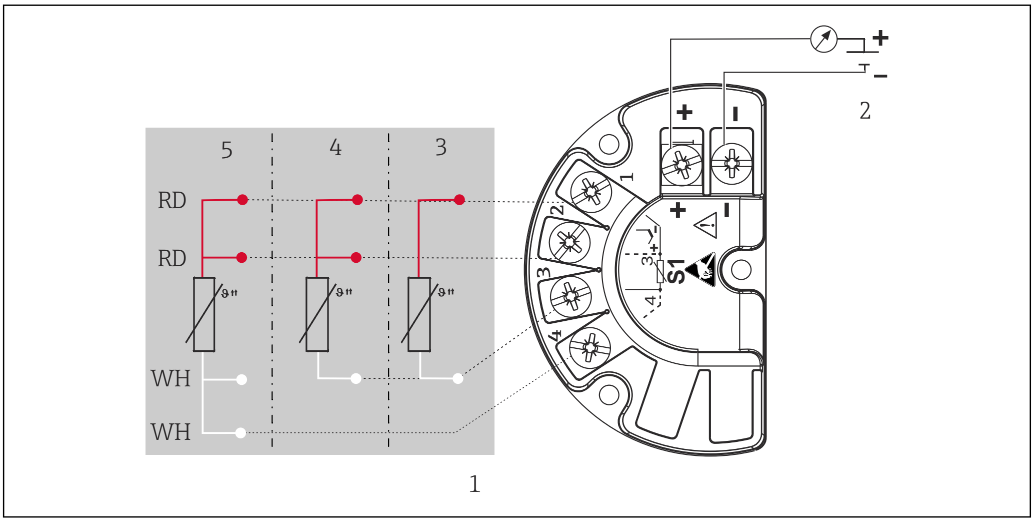
1 *Sensor Input*
2 *Bus connection and supply voltage*
3 *Display connection*



A0045732

6 *Field mounted transmitter TMT162 (dual input)*

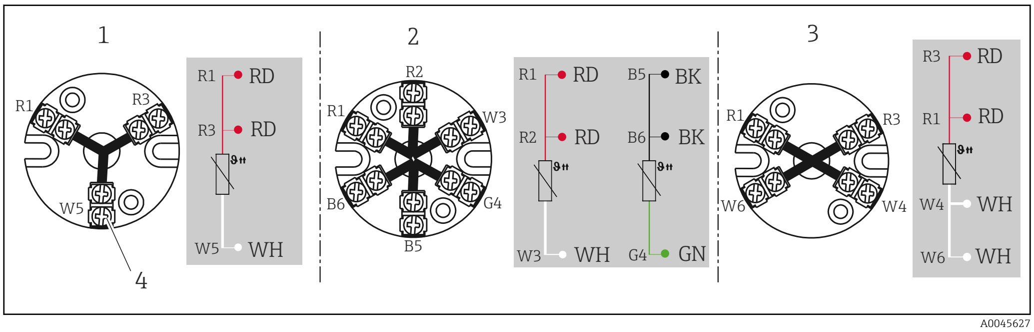
1 *Sensor 1*
2 *Sensor 2 (not TMT142B)*
3 *Power supply field transmitter and analog output 4 to 20 mAor bus connection*



A0045733

7 *Field mounted transmitter TMT142B (single Input)*

1 *Sensor input RTD*
2 *Power supply field transmitter and analog output4 to 20 mA, HART®-Signal*
3 *2-wire*
4 *3-wire*
5 *4-wire*



8 *Terminal block mounted*

1 *3-wire single*
2 *2 x 3-wire single*
3 *4-wire single*
4 *Outside screw*

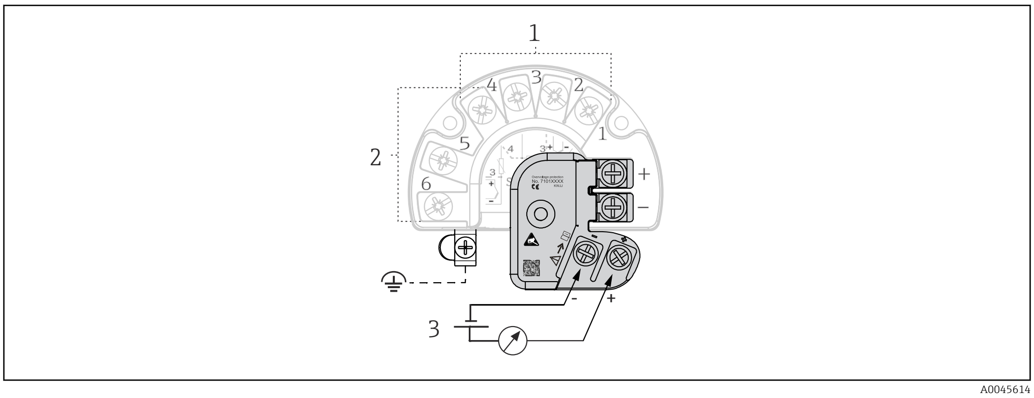
The blocks and transmitters are shown as they sit inside the heads in reference to the conduit opening.

Integrated overvoltage protection

The integrated overvoltage protection module can be ordered as an optional extra [1]. The module protects the electronics from damage from overvoltage. Overvoltage occurring in signal cables (e.g. 4 to 20 mA, communication lines (fieldbus systems) and power supply is diverted to ground. The functionality of the transmitter is not affected as no problematic voltage drop occurs.

Connection data:

Maximum continuous voltage (rated voltage)	U_C = 42 V_{DC}
Nominal current	I = 0.5 A at $T_{amb.}$ = 80 °C (176 °F)
Surge current resistance ▪ Lightning surge current D1 (10/350 µs) ▪ Nominal discharge current C1/C2 (8/20 µs)	 ▪ I_{imp} = 1 kA (per wire) ▪ I_n = 5 kA (per wire) I_n = 10 kA (total)
Temperature range	−40 to +80 °C (−40 to +176 °F)
Series resistance per wire	1.8 Ω, tolerance ±5 %



9 *Electrical connection of the overvoltage protection*

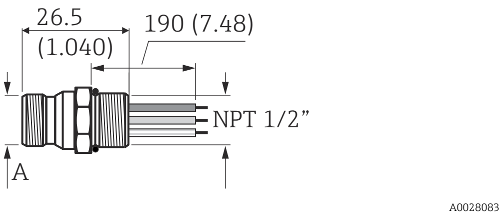
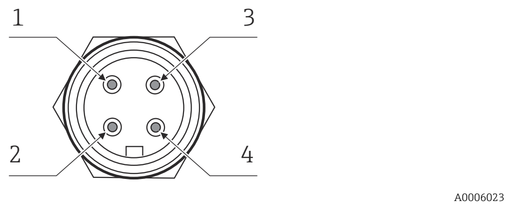
1 *Sensor 1*
2 *Sensor 2*
3 *Bus connection and supply voltage*

1) Available for the field transmitter with HART® 7 specification

Grounding

The device must be connected to the potential equalization. The connection between the housing and the local ground must have a minimum cross-section of 4 mm^2 (13 AWG) . All ground connections must be secured tightly.

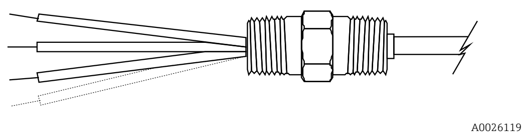
Fieldbus connector

<table>
<tr><th>Type (dimensions in mm (in))</th><th colspan="2">Specification</th></tr>
<tr><td rowspan="2">Fieldbus connector to PROFIBUS® -PA or FOUNDATION Fieldbus™

A M12 on PROFIBUS® -PA connector or 7/8-16 UNC on FOUNDATION Fieldbus™ connector</td><td colspan="2">▪ Ambient temperature:
−40 to 150 °C (−40 to 300 °F)
▪ Degree of protection IP 67
Wiring diagram:
</td></tr>
<tr><td>PROFIBUS® -PA
Pos. 1: grey (shield)
Pos. 2: brown (+)
Pos. 3: blue (-)
Pos. 4: not connected</td><td>FOUNDATION Fieldbus™
Pos. 1: blue (-)
Pos. 2: brown (+)
Pos. 3: not connected
Pos. 4: ground (green/ yellow)</td></tr>
</table>

Wire specifications

24 AWG, 19 strand silver plated copper with 0.025 mm (0.010 in) PTFE extruded outer.

Electrical connection
Flying leads, standard 3" for wiring in terminal head, head mounted transmitter or terminal block mounted
Flying leads, 5½" for wiring with TMT162 or TMT142 assemblies

Design of leads	
Flying leads 3" or 5½" with brass crimped sleeves	

Performance characteristics

Response time

63% response time per ASTM E644

RTD assembly TH15 without thermowell

Construction	RTD Ø ¼"
High temperature range	3 s
Low temperature range	9 s

Response time for the sensor assembly without transmitter.

Response time examples for RTD assemblies with thermowell TH13 and TH14

Construction	Stepped thermowell	Tapered thermowell	¾" straight thermowell
High temperature range	20 s	25 s	30 s
Low temperature range	25 s	30 s	35 s

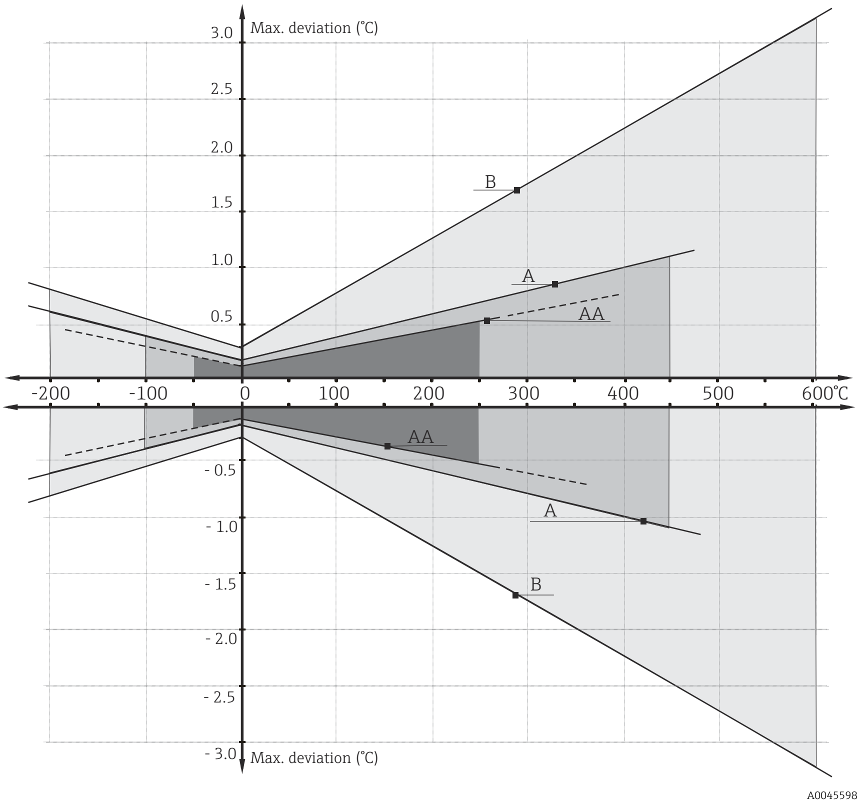
Response times for RTD assemblies with thermowell are provided for general design guidance without transmitter.

When the temperature of a process media changes, the output signal of a RTD assembly follows this change after a certain time delay. The physical cause is the time related to heat transfer from the process media through the thermowell and the insert to the sensor element (RTD). The manner in which the reading follows the change in temperature of the assembly over time is referred to as the response time. Variables that influence or impact the response time are:

- Wall thickness of thermowell
- Spacing between RTD insert and thermowell
- Sensor packaging
- Process parameters such as media, flow velocity, etc.

Accuracy

RTD corresponding to IEC 60751

Class	max. Tolerances (°C)	Temperature range	Characteristics
RTD max. error type TF - range: −50 to +500 °C (−58 to +932 °F)			
Cl. AA, former 1/3 Cl. B	± (0.1 + 0.0017 · $\lvert t \rvert$ [1])	0 to +150 °C (+32 to +302 °F)	
Cl. A	± (0.15 + 0.002 · $\lvert t \rvert$ [1])	−30 to +300 °C (−22 to +572 °F)	
Cl. B	± (0.3 + 0.005 · $\lvert t \rvert$ [1])	−50 to +500 °C (−58 to +932 °F)	
RTD max. error type WW - range: −196 to +600 °C (−321 to +1 112 °F)			
Cl. AA, former 1/3 Cl. B	± (0.1 + 0.0017 · $\lvert t \rvert$ [1])	−50 to +250 °C (−58 to 482 °F)	
Cl. A	± (0.15 + 0.002 · $\lvert t \rvert$ [1])	−100 to +450 °C (−148 to +842 °F)	
Cl. B	± (0.3 + 0.005 · $\lvert t \rvert$ [1])	−196 to +600 °C (−321 to +1 112 °F)	
RTD max. error type StrongSens - range: −50 to +500 °C (−58 to +932 °F)			
Cl. AA, former 1/3 Cl. B	± (0.1 + 0.0017 · $\lvert t \rvert$ [1])	0 to +200 °C (+32 to +392 °F)	
Cl. A	± (0.15 + 0.002 · $\lvert t \rvert$ [1])	−30 to +300 °C (−22 to +572 °F)	

1) $\lvert t \rvert$ = absolute value °C

For measurement errors in °F, calculate using equations above in °C, then multiply the outcome by 1.8.

Transmitter specifications

	TMT82 HART®/ TMT84 PA / TMT85 FF	TMT180 Pt100 PCP	TMT181 multifunctional PCP	TMT182 HART®	TMT162 HART® Field transmitter	TMT142
Measurment accuracy	± typ. 0.25 °C (0.45 °F)	0.2 °C (0.36 °F), optional 0.1 °C (0.18 °F) or 0.08% [1]	0.5 °C (0.9 °F) or 0.08% [1]		≤ 0.105 °C (0.19 °F)	0.2 °C (0.36 °F)
Sensor current	I ≤ 0.3 mA	I ≤ 0.6 mA		I ≤ 0.2 mA	I ≤ 0.3 mA	

1) % is related to the adjusted measurement range (the larger value applies)

Transmitter long-term stabiltiy

≤ 0.1 °C (0.18 °F)/year or ≤ 0.05% / year

Data under reference conditions; % relates to the set span. The larger value applies.

Insulation resistance

Insulation resistance between terminals and probe sheath, test voltage 250 V.

- ≥ 100 MΩ at 25 °C (77 °F)
- ≥ 10 MΩ at 300 °C (572 °F)

Self heating

RTD elements are not self-powered and require a small current be passed through the device to provide a voltage that can be measured. Self-heating is the rise of temperature within the element itself, caused by the current flowing through the element. This self-heating appears as a measurement error and is affected by the thermal conductivity and velocity of the process being measured; it is negligible when an iTEMP temperature transmitter is connected.

Calibration specifications

The manufacturer provides comparison temperature calibrations from −20 to +300 °C (−4 to +573 °F) on the ITS-90 (International Temperature Scale). Calibrations are traceable to standards maintained by the National Institute of Standards and Technology (NIST). Calibration services are in conformance with ASTM E220. The report of calibration is referenced to the serial number of the RTD assembly.

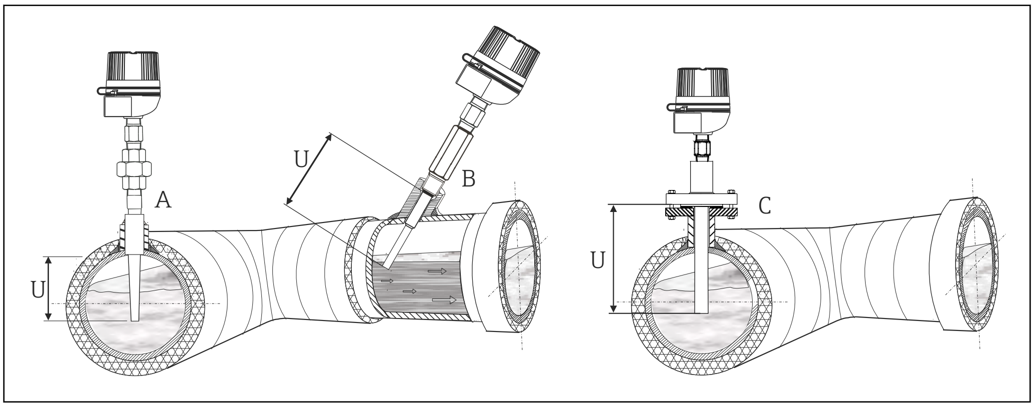
Three point calibrations are provided, given that the specified temperatures are within the recommended range and the minimum length requirements are met as specified. The minimum length is based on overall length 'x' of the spring loaded insert.

Installation

Orientation

No restrictions for installation orientation.

Installation instructions



10 *Examples for pipe installation - In pipes with a small cross section the sensor tip should reach or extend slightly past the center line of the pipe (=U).*

A TH13 assembly socket weld installation
B Threaded, tilted installation of TH13 assembly
C Flange installation of TH14 assembly

Immersion

Minimum immersion per ASTM E644, ΔT ≤ 0.05 °C (0.09 °F)

For temperature assemblies with themowell (TH13 and TH14) the minimum immersion is the depth to which the thermowell is immersed in the medium, measured from the tip. To minimize errors from ambient temperature the following minimum immersion lengths are recommended:

Construction	Minimum Immersion (in)
Stepped thermowell	2½"
Tapered thermowell	4½"
¾" straight thermowell	4"
Weld in thermowell	4½"

Environment

Ambient temperature range

Terminal head	Temperature in °C (°F)
Without mounted head transmitter	Depends on the terminal head used and the cable gland or fieldbus connector, see 'Terminal heads' section
With mounted head transmitter	−40 to 85 °C (−40 to 185 °F) SIL mode (HART 7 transmitter): −40 to 70 °C (−40 to 158 °F)
With mounted head transmitter and display	−20 to 70 °C (−4 to 158 °F)
With mounted field transmitter	▪ Without display: −40 to 85 °C (−40 to 185 °F) ▪ With display and/or integrated overvoltage protection module: −40 to +80 °C (−40 to +176 °F) ▪ SIL mode: −40 to +75 °C (−40 to +167 °F)

Shock and vibration resistance

Sensor type	Vibration resistance for the sensor tip
iTHERM StrongSens Pt100 (TF)	> 600 m/s² (60g)
Thin-film (TF) and Wire wound (WW) standard sensors	30 m/s² (3g)

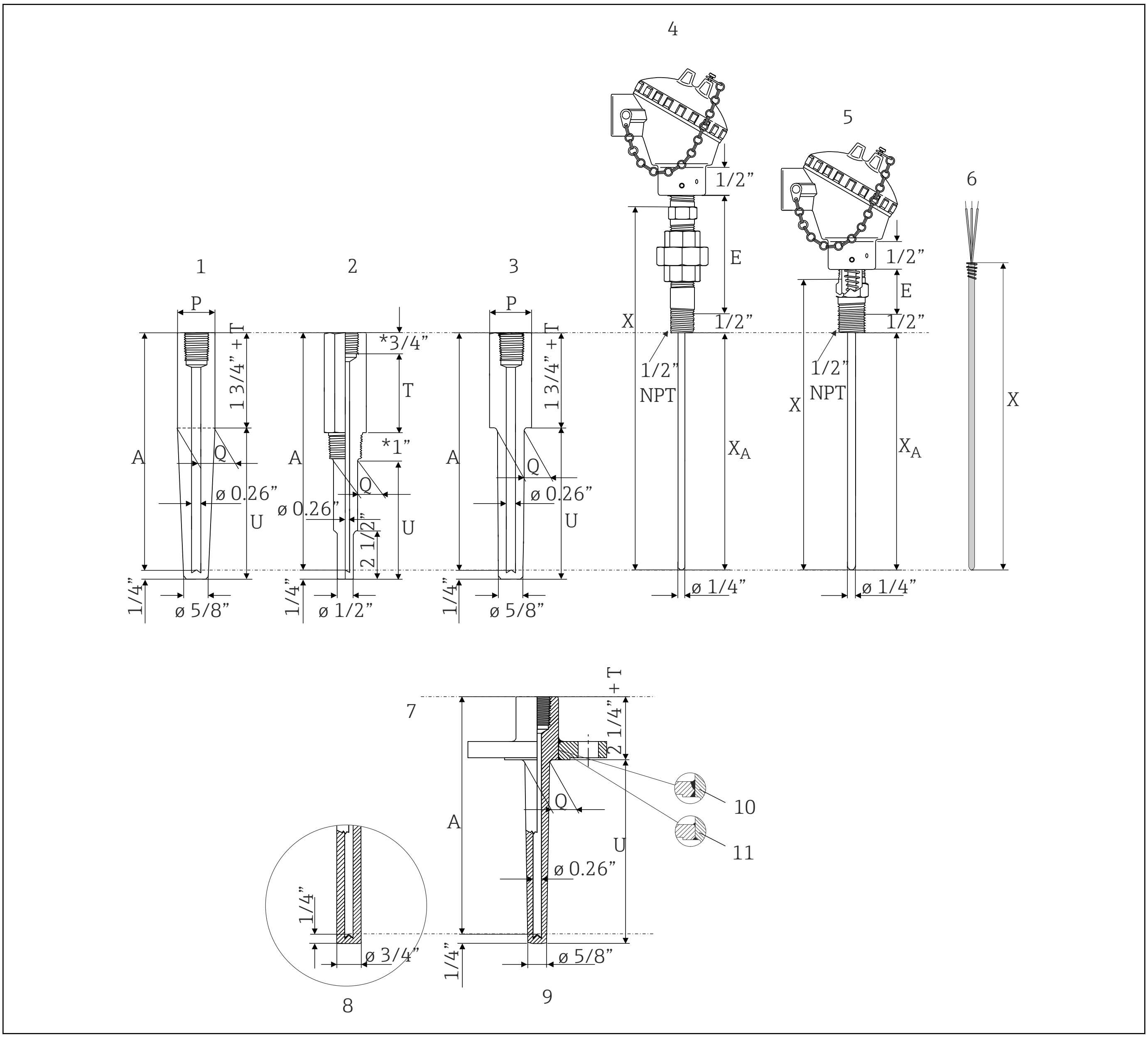
Process

Thermowells are used in measuring the temperature of a moving fluid in a pipe, where the stream exerts an appreciable force. The limiting value for the thermowells is governed by the temperature, the pressure and the speed of the medium, the immersion length, the materials of the thermowells and the medium, etc. Calculations for stress and vibration of thermowells can be done according to ASME PTC 19.3-2016 standard, please consult

Mechanical construction

Design, dimensions

All dimensions in inches. For the values related to this graphic please refer to the tables and equations below.



11 *Dimensions of the sensor assemblies.*

- 1 *TH13 weld-in thermowell (tapered)*
- 2 *TH13 threaded thermowell (stepped)*
- 3 *TH13 socket weld thermowell (tapered)*
- 4 *TH15 extension, nipple-XP-union-nipple (NUN), without thermowell*
- 5 *TH15 extension hex nipple without thermowell*
- 6 *Spring loaded insert (TU111 or TS212)*
- 7 *TH14 flange thermowell (tapered)*
- 8 *Straight flange thermowell tip*
- 9 *Tapered flange thermowell tip*
- 10 *Full penetration weld thermowell*
- 11 *Standard weld thermowell*
- E *Extension length*
- P *Pipe size*
- Q *Thermowell root diameter*
- T *Lag dimension*
- U *Thermowell immersion length*

XA Immersion length RTD sensor
A Drill depth of thermowell
X Overall insert length

The spring travel of the insert is ½".

Tolerance of XA length = +/- ¼".

All thermowells are marked with a material ID, CRN (Canadian Registration Number) and heat number.

Dimensions of TH13						
U	**E**	**T**	**Process connection**	**Shape of Thermowell**	**Ø Q1**	**Ø Q2**
63.5 mm (2.5 in) 114.3 mm (4.5 in) 190.5 mm (7.5 in) 266.7 mm (10.5 in) specified length50.8 to 609.6 mm (2 to 24 in) in ½" increments	Material: Steel or 316 Hex nipple = 25.4 mm (1 in) Nipple Union Nipple (NUN) = 101.6 mm (4 in) 177.8 mm (7 in)	76.2 mm (3 in) or specified length 25.4 to 152.4 mm (1 to 6 in) in ½" increments	½" NPT	Stepped	16 mm (⅝ in)	12.7 mm (½ in)
				Straight	16 mm (⅝ in)	16 mm (⅝ in)
			¾" NPT	Stepped	19.05 mm (¾ in)	12.7 mm (½ in)
				Straight	19.05 mm (¾ in)	19.05 mm (¾ in)
				Tapered	22.3 mm (⅞ in)	16 mm (⅝ in)
			1" NPT	Stepped	22.3 mm (⅞ in)	12.7 mm (½ in)
				Straight	22.3 mm (⅞ in)	22.3 mm (⅞ in)
				Tapered	26.9 mm (1 1/16 in)	16 mm (⅝ in)
			¾" Socket weld	Stepped	19.05 mm (¾ in)	12.7 mm (½ in)
				Straight	19.05 mm (¾ in)	19.05 mm (¾ in)
				Tapered	22.3 mm (⅞ in)	16 mm (⅝ in)
			1" Socket weld	Stepped	22.3 mm (⅞ in)	12.7 mm (½ in)
				Straight	25.4 mm (1 in)	25.4 mm (1 in)
				Tapered	25.4 mm (1 in)	16 mm (⅝ in)
			¾" weld in	Tapered	26.6 mm (1.050 in)	16 mm (⅝ in)
			1" weld in	Tapered	33.4 mm (1.315 in)	16 mm (⅝ in)
Immersion length RTD sensor = Thermowell drilled length XA = A = U + 38.1 mm (1.5 in) + T Insert overall length X = A + E						
P = Pipe size ▪ Nom. ¾"; Dia. = 1.050" ▪ Nom. 1"; Dia. = 1.315"						

Dimensions of TH14 **Flange rating: ASME B16.5**						
U	**E**	**T**	**Flange size**	**Shape of thermowell**	**Ø Q1**	**Ø Q2**
50.8 mm (2 in) 101.6 mm (4 in) 177.8 mm (7 in) 254 mm (10 in) specified length 50.8 to 609.6 mm (2 to 24 in) in ½" increments	Material: Steel or 316SS Hex nipple = 25.4 mm (1 in) Nipple Union Nipple (NUN) = 101.6 mm (4 in) 177.8 mm (7 in)	specified length 25.4 to 254 mm (1 to 10 in) ½" increments	1"	Stepped	19.05 mm (¾ in)	12.7 mm (½ in)
				Straight	19.05 mm (¾ in)	19.05 mm (¾ in)
				Tapered	22.3 mm (⅞ in)	16 mm (⅝ in)
			1 ½" and larger	Stepped	19.05 mm (¾ in)	12.7 mm (½ in)
				Straight	19.05 mm (¾ in)	19.05 mm (¾ in)

Dimensions of TH14 Flange rating: ASME B16.5						
U	**E**	**T**	**Flange size**	**Shape of thermowell**	**Ø Q1**	**Ø Q2**
				Tapered	26.9 mm (1¹⁄₁₆ in)	16 mm (⅝ in)
Immersion length RTD sensor - Thermowell drilled length XA = A = U + 50.8 mm (2 in) + T Insert overall length X = A + E						

Dimensions of TH15 (without thermowell)		Extension E
Immersion length	RTD sensor XA	Hex nipple = 25.4 mm (1 in) Nipple Union Nipple (NUN) = 101.6 mm (4 in) 177.8 mm (7 in)
	101.6 mm (4 in) 152.4 mm (6 in) 228.6 mm (9 in) 304.8 mm (12 in) 355.6 mm (14 in) specified length 4 to 101.6 mm (41 to 1 041.4 in) in ½" increments	
	Spring travel of the insert = ½"	

Weight

From 1 to 5.5 lbs

Material

Process connections, thermowells and enclosures.

The temperatures for continuous operation specified in the following table are only intended as reference values for use of the various materials in air and without any significant compressive load. The maximum operation temperatures are reduced considerably in some cases where abnormal conditions such as high mechanical load occur or in aggressive media.

Material name	Short form	Recommended max. temperature for continuous use in air	Properties
AISI 316L/1.4404 1.4435	X2CrNiMo17-12-2 X2CrNiMo18-14-3	650 °C (1 200 °F) 1)	▪ Austenitic, stainless steel ▪ High corrosion resistance in general ▪ Particularly high corrosion resistance in chlorine-based and acidic, non-oxidizing atmospheres through the addition of molybdenum (e.g. phosphoric and sulfuric acids, acetic and tartaric acids with a low concentration) ▪ Increased resistance to intergranular corrosion and pitting ▪ Compared to 1.4404, 1.4435 has even higher corrosion resistance and a lower delta ferrite content
AISI 316/1.4401	X2CrNiMo17-12-2	650 °C (1 200 °F) 1)	▪ Austenitic, stainless steel ▪ High corrosion resistance in general ▪ Particularly high corrosion resistance in chlorine-based and acidic, non-oxidizing atmospheres through the addition of molybdenum (e.g. phosphoric and sulfuric acids, acetic and tartaric acids with a low concentration)

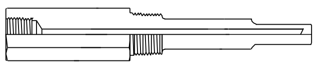
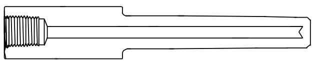
Material name	Short form	Recommended max. temperature for continuous use in air	Properties
AISI A105/1.0460	C22.8	450 °C (842 °F)	▪ Heat-resistant steel ▪ Resistant in nitrogen-containing atmospheres an atmospheres that are low in oxygen; not suitable for acids or other aggressive media ▪ Often used in steam generators, water and steam pipes, pressure vessels
AlloyC276/2.4819	NiMo16Cr15W	1 100 °C (2 012 °F)	▪ A nickel-based alloy with good resistance to oxidizing and reducing atmospheres, even at high temperatures ▪ Particularly resistant to chlorine gas and chloride as well as to many oxidizing mineral and organic acidsed

1) Can be used to a limited extent up to 800 °C (1472 °F) for low compressive loads and in non-corrosive

Process connection

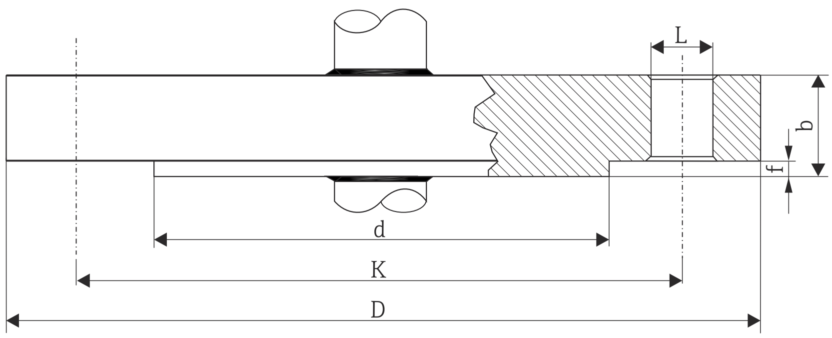
The process connection is the means of connecting the thermometer to the process. The following process connections are available:

TH13

Thread	Version	
 A0026110	NPT thread	NPT 1/2"
		NPT 3/4"
		NPT 1"
 A0026111	NPS for socket weld	NPS 3/4"
		NPS 1"
 A0026108	NPS for weld-in	NPS 3/4"
		NPS 1"

TH14

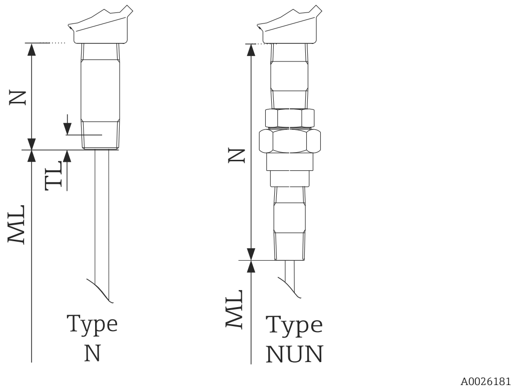
Flange



A0010471

For detailed information on the flange dimensions refer to the following flange standard: ANSI/ASME B16.5	The flange material must be the same as of the stem of the thermowell.

TH15

Type		Thermowell connection	Extension neck lengths in mm (in)
	Type N	½" NPT external thread	25.4 mm (1 in)
	Type NUN	½" NPT external thread	101.6 mm (4 in) 177.8 mm (7 in)

Housing

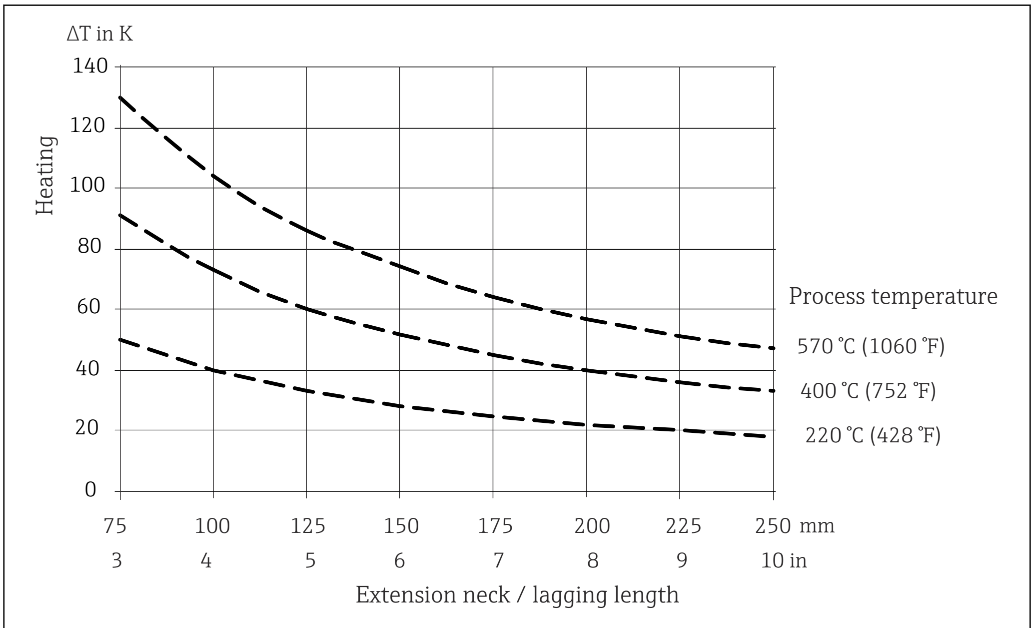
Terminal heads

All terminal heads have an internal shape and size in accordance with DIN EN 50446, flat face and a thermometer connection with a ½" NPT thread. All dimensions in mm (in). Specifications without head transmitter installed. For ambient temperatures with head transmitter installed, see the 'Environment' section.

As a special feature, offers terminal heads with optimized terminal accessibility for easy installation and maintenance.

Some of the specifications listed below may not be available on this product line.

As illustrated in the following diagram, the length of the extension neck can influence the temperature in the terminal head. This temperature must remain within the limit values defined in the "Operating conditions" section.



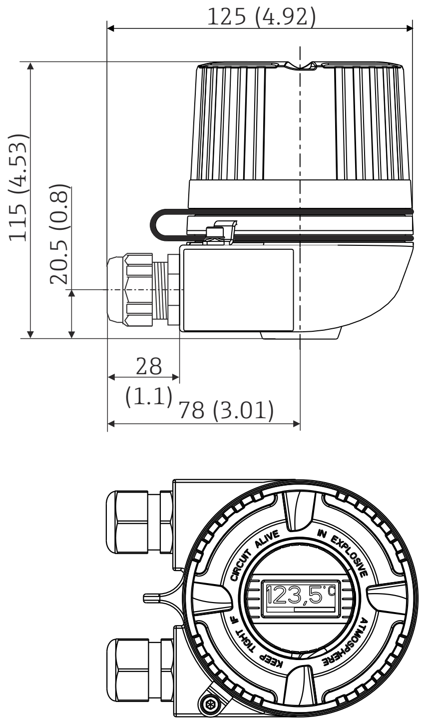
12 *Heating of the terminal head as a function of the process temperature. Temperature in terminal head = ambient temperature 20 °C (68 °F)+ ΔT*

The diagram can be used to calculate the transmitter temperature.

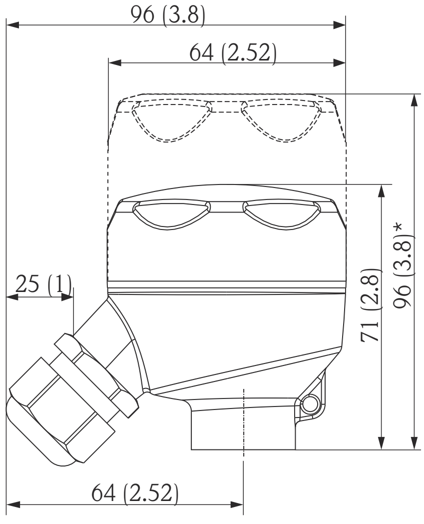
Example: At a process temperature of 220 °C (428 °F) and with a lagging length of 100 mm (3.94 in), the heat conduction is 40 K (72 °F). The transmitter temperature is therefore 40 K (72 °F) plus the ambient temperature, e.g. 25 °C (77 °F): 40 K (72 °F) + 25 °C (77 °F) = 65 °C (149 °F).

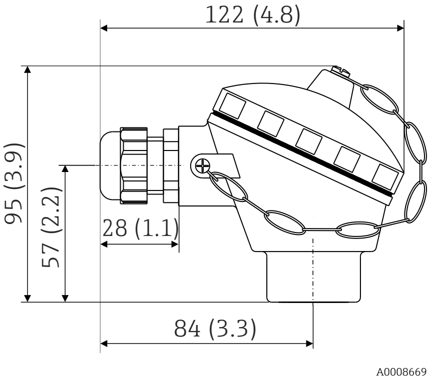
Result: The temperature of the transmitter is o.k., the length of the lagging is sufficient.

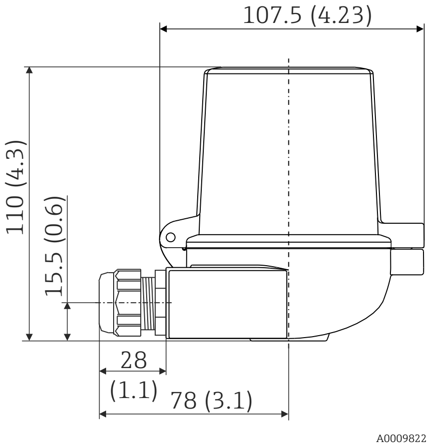
TA30H with display window in cover	Specification

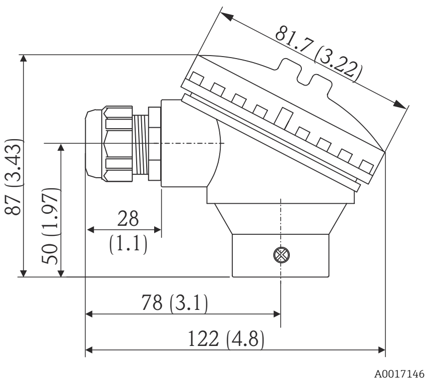
	▪ Flameproof (XP) version, explosion-protected, captive screw cap, available with one or two cable entries
	▪ Degree of protection: IP 66/68, NEMA Type 4x encl.
	Ex-version: IP 66/67
	▪ Temperature: −50 to +150 °C (−58 to +302 °F) for rubber seal without cable gland (observe max. permitted temperature of cable gland!)
	▪ Material:
	  ▪ Aluminum; polyester powder coated
	  ▪ Stainless steel 316L without coating
	  ▪ Klüber Syntheso Glep 1 dry-film lubricant
	▪ Display window: single-pane safety glass according to DIN 8902
	▪ Thread: ½" NPT, ¾" NPT, M20x1.5, G½"
	▪ Extension neck/thermowell connection: M20x1.5 or ½" NPT
	▪ Color of aluminum head: blue, RAL 5012
	▪ Color of aluminum cap: gray, RAL 7035
	▪ Weight:
	  ▪ Aluminum approx. 860 g (30.33 oz)
	  ▪ Stainless steel approx. 2 900 g (102.3 oz)
	▪ Head transmitter optionally available with TID10 display
	ℹ If the housing cover is unscrewed: Before tightening, clean the thread in the cover and housing base and lubricate if necessary (Recommended lubricant: Klüber Syntheso Glep 1)

TA30R (optionally with display window in cover)	Specification

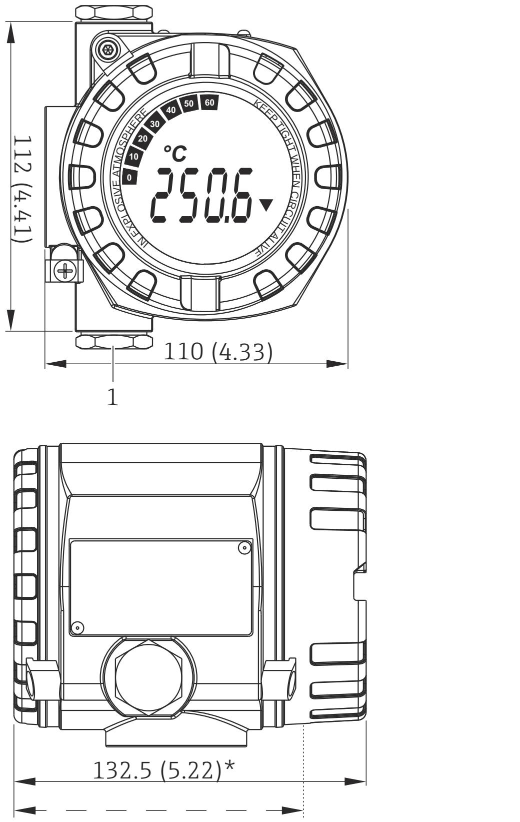

* Dimensions of version with display window in cover
	▪ Degree of protection - standard version: IP69K (NEMA Type 4x encl.)
	Degree of protection - version with display window: IP66/68 (NEMA Type 4x encl.)
	▪ Temperature: −50 to +130 °C (−58 to +266 °F) without cable gland
	▪ Material: stainless steel 316L, abrasive-blasted or polished
	Seals: silicone, optional EPDM for applications free from paint-wetting impairment substances
	Display window: polycarbonate (PC)
	▪ Cable entry thread ½" NPT and M20x1.5
	▪ Weight
	  ▪ Standard version: 360 g (12.7 oz)
	  ▪ Version with display window: 460 g (16.23 oz)
	▪ Display window in cover optionally for head transmitter with display TID10
	▪ Protection armature connection: M24x1.5 or ½" NPT
	▪ Ground terminal: internal as standard
	▪ Available with 3-A marked sensors
	▪ Not allowed for Class II and III applications

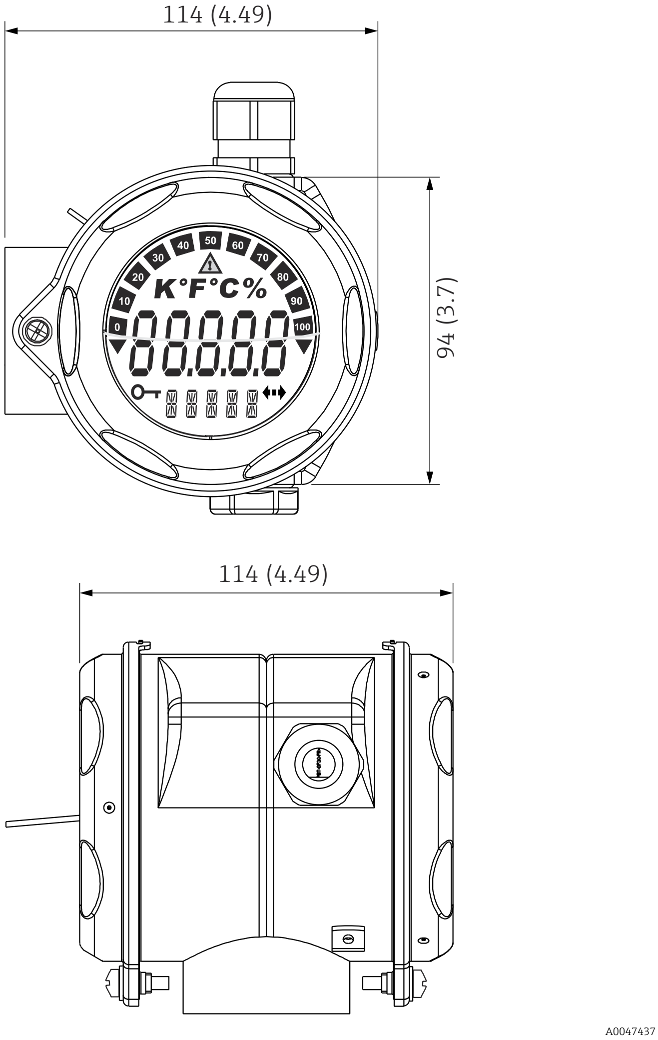
TU401	Specification
	▪ Protection class: IP65 (NEMA Type 4x encl.) ▪ Temperature: −40 to 130 °C (−40 to 266 °F) silicone, up to 100 °C (212 °F) rubber seal without cable gland (observe max. permitted temperature of the cable gland!) ▪ Material: aluminum alloy with polyester or epoxy coating, rubber or silicone seal under the cover ▪ Cable entry: ½" NPT, ¾" NPT or plug 7/8" FF ▪ Protection armature connection: M24x1.5, G 1/2" or NPT 1/2" ▪ Head color: blue, RAL 5012 ▪ Cap color: gray, RAL 7035 ▪ Weight: 300 g (10.58 oz)

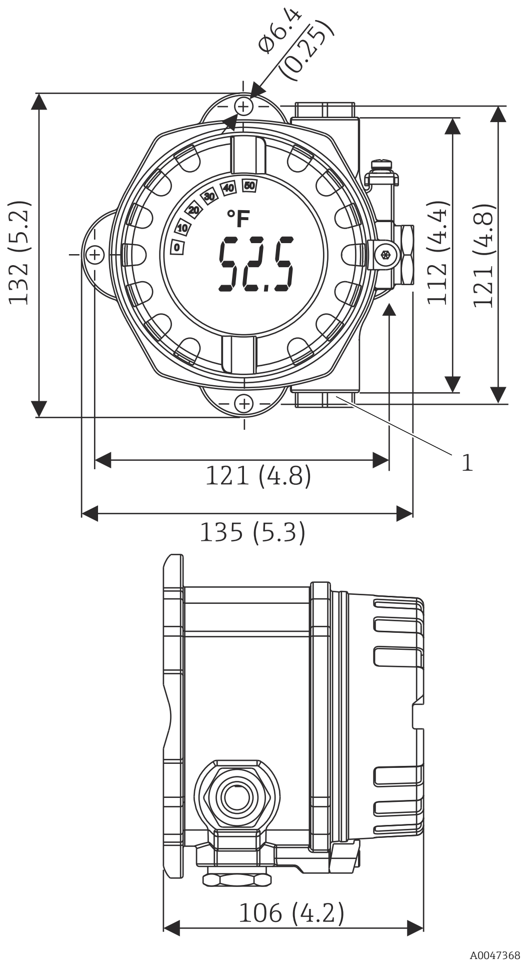
TU401 (TA30D style)	Specification
	▪ Available with one or two cable entries ▪ Protection class: IP66/68 (NEMA Type 4x encl.) ▪ Temperature: −50 to +150 °C (−58 to +302 °F) without cable gland ▪ Material: aluminum, polyester powder coated Seals: silicone ▪ Threaded cable entry: G ½", ½" NPT and M20x1.5 ▪ Protection armature connection: M24x1.5 ▪ Two head transmitters can be mounted. In the standard version, one transmitter is mounted in the terminal head cover and an additional terminal block is installed directly on the insert. ▪ Head color: blue, RAL 5012 ▪ Cap color: gray, RAL 7035 ▪ Weight: 390 g (13.75 oz) ▪ Ground terminal, internal and external ▪ With 3-A symbol

TU401 (TA30S style)	Specification
	▪ Degree of protection: IP65 (NEMA Type 4x encl.) ▪ Temperature: −40 to +85 °C (−40 to +185 °F) without cable gland ▪ Material: polypropylene (PP), FDA-compliant, seals: O-ring EPDM ▪ Cable entry thread: ¾" NPT, ½" NPT) or or plug 7/8" FF ▪ Protective assembly connection: ½" NPT ▪ Color: white ▪ Weight: approx. 100 g (3.5 oz) ▪ Ground terminal: only internal via auxiliary terminal ⚠ CAUTION **Potential electrostatic charging hazard** ▶ Not recommended for use in hazardous (classified) locations.

Field transmitters

Temperature field transmitter iTEMP TMT162	Specification
 *1 Instrument connection for direct mounting assembly* * Dimensions without display = 112 mm (4.41 in)	▪ Separate electronics compartment and connection compartment ▪ Protection class: IP67, NEMA type 4x ▪ Material: Die-cast aluminum housing AlSi10Mg with powder coating on polyester base or stainless steel 316L ▪ Display rotatable in 90° increments ▪ Cable entry: 2x ½" NPT ▪ Brilliant backlit display with ease of visibility in bright sunshine or pitch darkness ▪ Gold plated terminals to avoid corrosion and additional measurement errors ▪ SIL certification as per IEC 61508:2010 (HART-protocol)

Temperature field transmitter iTEMP TMT162 for hygienic applications	Specification
 * Dimensions without display = 112 mm (4.41 in)	▪ Material: Stainless steel 1.4435 (AISI 316L) for hygienic applications (T17 housing) ▪ Separate electronics compartment and connection compartment ▪ Display rotatable in 90° increments ▪ Cable entry: 2 x ½" NPT ▪ Degree of protection (IP69K) ▪ Brilliant backlit display with ease of visibility in bright sunshine or pitch darkness ▪ Gold plated terminals to avoid corrosion and additional measurement errors

<table>
<tr><th>Temperature field transmitter iTEMP TMT142B</th><th>Specification</th></tr>
<tr><td>

1 *Instrument connection for direct mounting assembly*</td><td>

- Protection class: IP66/67, NEMA type 4x
- Material: Die-cast aluminum housing AlSi10Mg with powder coating on polyester base or stainless steel 316L
- Display rotatable in 90° increments
- Integrated Bluetooth® interface for wireless measured value display and parameter configuration, optional
- Brilliant backlit display with ease of visibility in bright sunshine or pitch darkness
- Gold plated terminals to avoid corrosion and additional measurement errors

</td></tr>
</table>

По вопросам продаж и поддержки обращайтесь:

Алматы (7273)495-231
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Владикавказ (8672)28-90-48
Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89
Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Коломна (4966)23-41-49
Кострома (4942)77-07-48
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Курган (3522)50-90-47
Липецк (4742)52-20-81
Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Ноябрьск (3496)41-32-12
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37
Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Саранск (8342)22-96-24
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
Тверь (4822)63-31-35
Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Улан-Удэ (3012)59-97-51
Уфа (347)229-48-12
Хабаровск (4212)92-98-04
Чебоксары (8352)28-53-07
Челябинск (351)202-03-61
Череповец (8202)49-02-64
Чита (3022)38-34-83
Якутск (4112)23-90-97
Ярославль (4852)69-52-93

Россия +7(495)268-04-70
Казахстан +7(7172)727-132
Киргизия +996(312)96-26-47

эл.почта: ehr@nt-rt.ru || сайт: https://endcounters.nt-rt.ru/