

Technical Documentation

TER series
temperature
transmitter



Wentes Instruments (Shanghai) Co., Ltd

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1、Product Information

1.1 Features&Performance

- Range: -200~1100 °C Multiple junction boxes to choose from
- CSA Certification
- Can have built-in 4-digit LED/LCD display

1.2 Application Industry

- petrochemical
- shipbuilding
- Mechanical Manufacturing
- energy

1.3 Detailed specifications

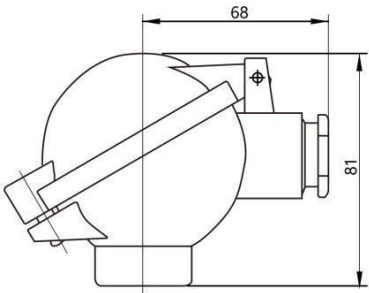
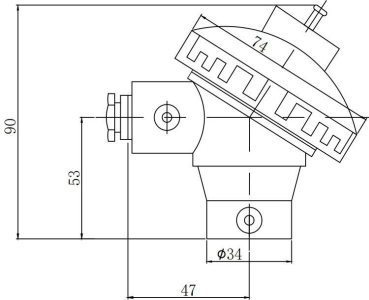
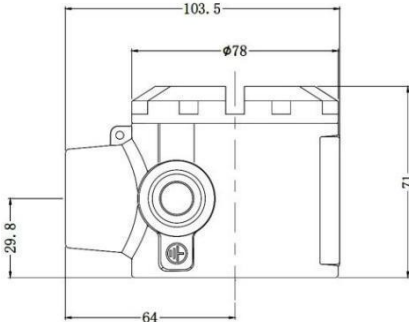
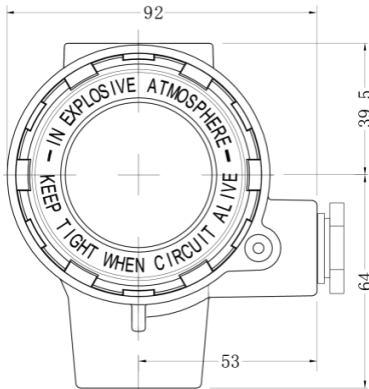
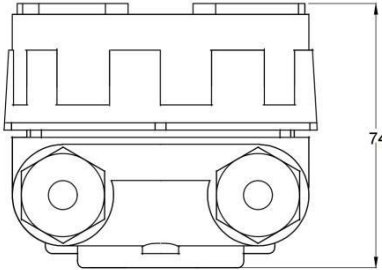
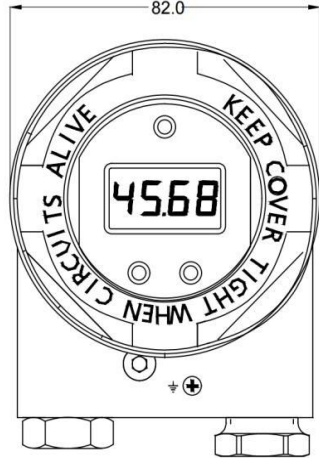
input signal	Pt100 or Pt1000	
sensor accuracy According to DIN EN 60751	Grade B	$\pm (0.3+0.005*t) ^\circ\text{C}$
	A-level	$\pm (0.15+0.002*t) ^\circ\text{C}$
	1/3B level	$\pm 1/3* (0.3+0.005*t) ^\circ\text{C}$
Quantity of thermal resistors	Single or double	
Thermal resistance wiring	2-wire, 3-wire or 4-wire	
output signal	Pt100, Pt1000 or 4-20mA (with transmitter)	
Probe diameter D	6mm	
Probe length EL	Shortest 50mm to longest 1000mm	
probe rod material	316SS or 316LSS	
Process thread	G1/2", M20*1.5, 1/2"NPT	
Neck diameter M	14mm	
Display unit	Please refer to our company's TTID product information	
junction box	Please refer to the table below	
Explosion-proof rating	Intrinsic safety Ex ia IIC T6 and explosion-proof Ex d IIC T6 are optional	
Temperature Transmitter	Thermal resistance input: TTIR;Universal input: TTIS;Equipped with HART protocol: TTHA	
Protection level	IP65 or IP67 (depending on the selected electrical junction box)	

junction box

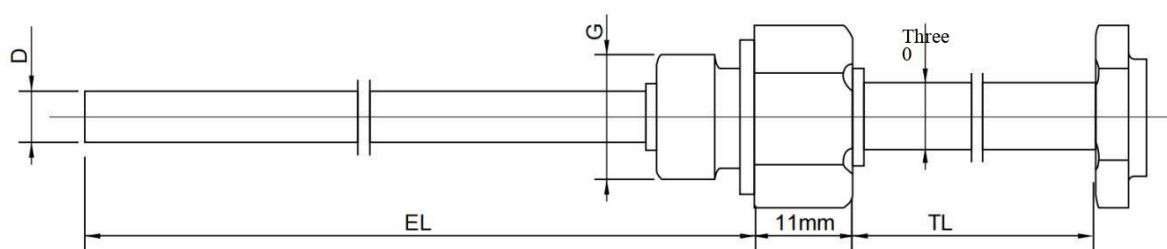
model	material	process interface	electrical interface	Protection level	Digital Display
BS	aluminum alloy	M24×1.5	M20*1.5 (Can be converted to	IP65	none
CS	aluminum	M24×1.5		IP67	none

	alloy		other interfaces through adapters)		
EX	aluminum alloy	M24×1.5		IP67	none
DX	aluminum alloy	M24×1.5		IP67	Can be equipped with display
DG	aluminum alloy	M20×1.5		IP67	Can be equipped with display

Dimension diagram of junction box (mm)

		
BS junction box	CS junction box	EX junction box
		
DX junction box	DG junction box	

Probe rod size diagram



2、 Safety Guidelines

Warning!

Electric shock can cause death or serious injury to personnel.

Be extremely careful when handling cables and wiring terminals. If the equipment/measurement system is installed in a high voltage environment, in the event of a malfunction or installation error, the terminals or equipment/measurement system itself will also carry high voltage.

2.1 purpose

- This device is a universal configurable field type temperature transmitter with one temperature sensor input, which can be connected to a thermistor (RTD), thermocouple (TC), resistance signal, and voltage signal.
- This equipment can be used in various situations without compromising the safety of personnel and the safety of the entire measurement system.
- Manufacturers are not responsible for damages caused by improper use or use for purposes other than those specified.

2.2 Installation, debugging, and operation

Please note the following points:

- This measuring equipment must be installed, wired, debugged, and maintained by authorized and qualified professionals (such as electricians), and must fully comply with the provisions of the Operating Manual, applicable standards, laws and regulations, and certificates (related to application conditions).
- Professional personnel must read the "Operation Manual" in advance, understand and comply with its provisions. If there are any parts that are not understood, they must be read

Operation Manual. The Operation Manual provides detailed information about this measuring equipment.

- Only with the explicit permission of the "Operation Manual" can modifications be made to this measuring equipment.
- Damaged equipment cannot be put into operation and must be marked as faulty equipment.

2.3 Operational Security

- The design and testing of this measuring equipment meet advanced safety requirements and have successfully passed factory testing, so you can use it with confidence. This device complies with relevant regulations and European standards.
- Please pay special attention to the technical parameters on the nameplate! The nameplate is located on the side of the casing.

Danger Zone

The nameplates of measuring equipment that can be used in hazardous areas have corresponding markings. When operating equipment in hazardous areas, relevant national safety regulations must be followed. The independent Ex explosion-proof document is an integral part of this operating manual and is provided with the equipment. The safety guidelines, rated parameters, and safety guidelines specified in this supplementary document must be followed. The document number (XA) of this document is also indicated on the nameplate.

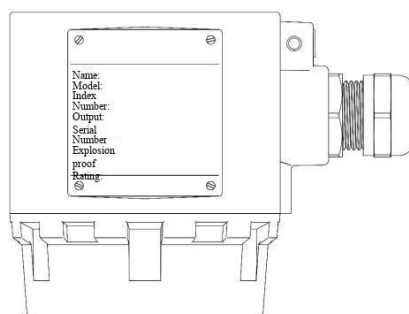
installation point

- ambient temperature
 - With display screen: $-40\sim+80\text{ }^{\circ}\text{C}$ ($-40\text{ }^{\circ}\text{F}\sim+176\text{ }^{\circ}\text{F}$)
 - No display screen: $-40\sim+85\text{ }^{\circ}\text{C}$ ($-40\text{ }^{\circ}\text{F}\sim+185\text{ }^{\circ}\text{F}$)
- When used in hazardous areas, please refer to the Ex explosion-proof certificate
- Climate grade: EN60654-1 Grade C
- Protection level: IP67, NEMA 4x (if wiring is preferred)
- Explosion proof rating: Ex d IIC T6 Gb

logo

- device identifier

Compare and check the information on the device nameplate against the measurement point requirements.



□ Equipment List

Temperature transmitter products on the order

The connection accessories are not provided together with the temperature transmitter, and customers need to provide their own connection accessories. Chinese operation manual

install

□ Warehouse acceptance, transportation, and storage ※ Warehouse acceptance

※ Warehouse acceptance inspection

After receiving the goods, check the following points: Is there any defect in the product or packaging?

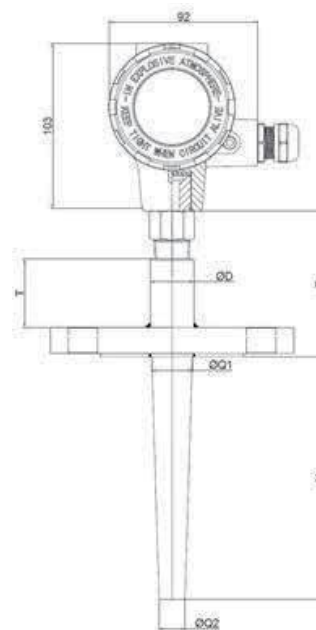
Are all delivered products complete?

□ Attention should be paid to the following points during transportation and storage:

When packaging the device, it should be ensured that it can withstand the impact force generated during storage and transportation.

Storage temperature range: -40~+85 °C

□ Installation conditions and dimensions



Flange connection size

General Information

□ Allowable environmental temperature range

terminal	Temperature °C (°F)
Without temperature transmitter	-40 ~ 130°C (-40 ~ 266°F)
Equipped with temperature transmitter	-40 ~ 85°C (-40 ~ 185°F)

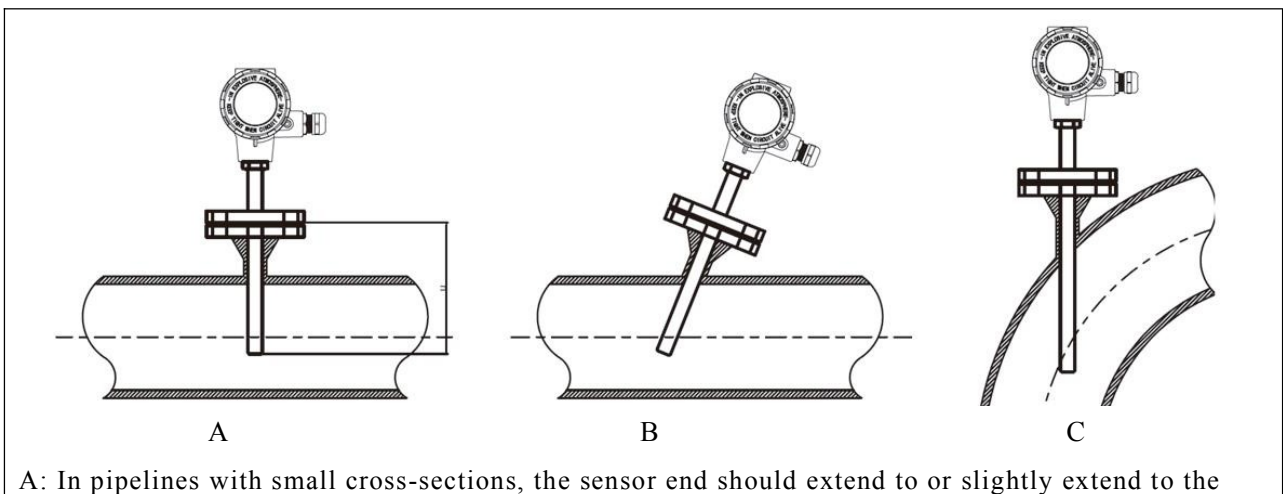
- Measurement range: $-50 \sim +650\text{ }^{\circ}\text{C}$ ($-58 \sim +1202\text{ }^{\circ}\text{F}$)
- Maximum allowable process pressure: 75bar (1088psi)
- Flow rate: The maximum flow rate (v) depends on the diameter $D1$ of the thermal protection sleeve and the immersion length U . For example, at $U=150$ millimeters (5.9 inches) and water temperature $T=50\text{ }^{\circ}\text{C}$ ($122\text{ }^{\circ}\text{F}$), $v=11$ meters/second (36 feet/second)

2.4 Installation Instructions

be careful!

- 1 Install the device according to local regulations.
- 2 To avoid sparks caused by any impact, friction, and installation, please use a fireproof wrench.
- 3 Connect the temperature sensor to the power supply or other external wires using appropriate cable glands and cable inlets.
- 4 Suitable cables, conduits, and wires must be used. Only approved cables can be used.

Installation Example



A: In pipelines with small cross-sections, the sensor end should extend to or slightly extend to the

The immersion depth of the thermal protection sleeve will directly affect the accuracy of temperature measurement. If the immersion depth is too shallow, the process connection of the system and the thermal conduction effect at the tank wall will cause measurement errors. Therefore, when installing sensors on pipelines, the immersion depth of the probe should be at least half of the pipe diameter.

- Installation point: pipeline, storage tank or other facilities.
- The immersion length should be at least 8 times the diameter of the thermal protection sleeve. For example, when the diameter of the thermal protection sleeve is 12mm (0.47in), the immersion depth of the sensor should be 96 (12 * 8) millimeters (3.8 inches). It is recommended to choose an immersion depth of 120 millimeters (4.72 inches) that meets the DIN43772 standard.
- Use a suitable open-end wrench for installation (refer to Figure A).

be careful!

When installing sensors in pipelines with smaller diameters for measurement, it is necessary to ensure that the end of the probe reaches or crosses the axis point of the pipeline (refer to Figure A). You can also consider the oblique insertion installation method (refer to Figure B and C).

When determining the immersion length of the sensor, it is necessary to comprehensively consider various technical indicators and process parameters of the sensor (such as medium flow rate, process pressure, etc.).

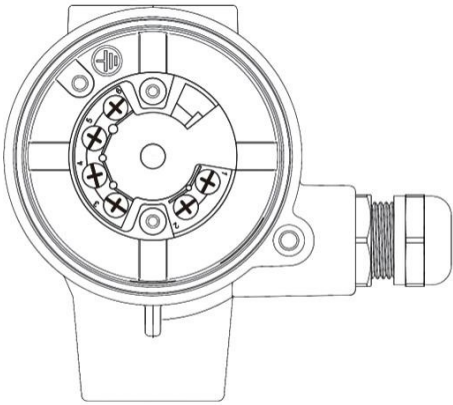
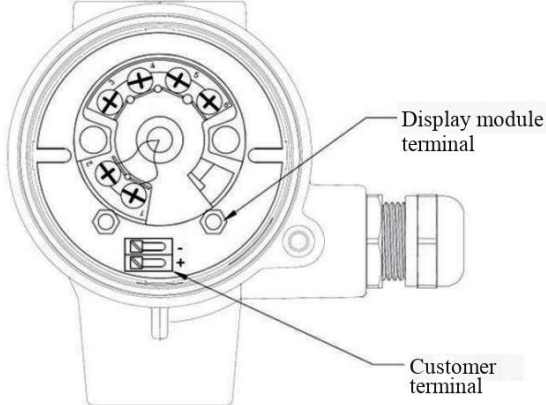
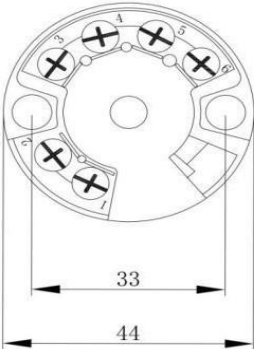
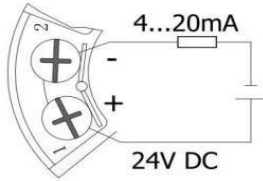
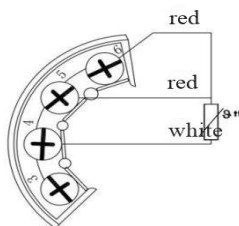
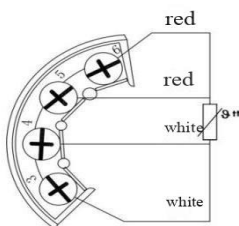
3、Wiring

warn!

Before installing or connecting the sensor, the power should be turned off. If this regulation is not followed, the sensor may be damaged. Connect the temperature transmitter or ceramic terminal block according to the following steps:

- 1 Open the cable gland and the top cover of the junction box.
- 2 Thread the cable through the opening on the cable gland.
- 3 Connect the cables as shown in the following diagram.
- 4 Tighten the cable gland again and close the upper cover.

4、Debugging

No display module	display module
	
	 power wiring  PT100 three wire system  PT100 four wire system

After installing the equipment, the final inspection should be carried out according to the following steps.

Equipment conditions and specifications	annotation
Are the devices and cables damaged (visually)?	-
Has the device been installed according to the specifications?	-
Electrical conditions	
Is the power supply voltage the same as the specifications indicated on the transmitter nameplate (optional)?	-
Are the power and signal lines connected correctly?	Refer to the wiring diagram
Have all screw terminals been tightened?	-
Have all cable entrances been installed, tightened, and sealed?	-
Has the terminal cover been installed and tightened?	

Once the device is powered on, it can operate

output

output signal
☐ Standard configuration: Pt100, A-level, 4-wire.
☐ Optional: 4-20Ma or 20-4Ma or withHART@-agreement.

performance characteristics

Reference assembly conditions
☐ Calibration temperature of Pt100 sensor 0 °C (32 °F) (freezing point)
☐ The ambient temperature of the temperature transmitter is 25 °C± 5 °C (77 °F± 9 °F)
Maximum measurement error
RTD shall comply with the requirements of IEC 60751
☐ Thin film (TF) - Measurement range: -50~400 °C, Class A: $\pm (0.15+0.002 \cdot t)$ from -50~400 °C
☐ Wire wound (WW) - Measurement range: -200~600 °C, Class A: $\pm (0.15+0.002 \cdot t)$ from -200~+600 °C

1) $|t|$ = absolute temperature °C, in the measurement error expressed in °F, use the above equation for conversion, convert to expressed in °C, and then multiply the output by 1.8.

5、Selection

series		
TER		
BS	B-type junction box	
CS	C-type junction box	
DX	Display junction box (optional explosion-proof NEPSI, ATEX, EAC or intrinsic safety ATEX) can be equipped with display	
EX	Explosion proof junction box (optional explosion-proof NEPSI, ATEX, EAC or intrinsically safe ATEX)	
DG	DG type junction box (optional explosion-proof NEPSI, ATEX, EAC or intrinsic safety ATEX) can be equipped with display	
YY	customer customization	
Temperature measurement range		
Y	Custom Example (-10~+50)	
0	Without display	
E	With display (only DG, DX junction box optional)	
sensor type		
00	Not equipped with sensors (selection completed, no need to choose later)	
P1	Pt100 platinum resistor	
J1	J-type thermocouple	
T1	T-type thermocouple	
N1	Type thermocouple	
E1	E-type thermocouple	
K1	K-type thermocouple	
P2	Double Pt100 Platinum Resistors	
J2	Double J-type thermocouple	
T2	Double T-shaped thermocouple	
N2	Double N-type thermocouple	
E2	Double E-type thermocouple	
K2	Double K-type thermocouple	
YY	customer customization	
sensor accuracy		
A1	Platinum Thermistor Class B	
A2	Platinum thermistor A-grade three wire system	
A3	Platinum thermistor A-grade four wire system	
A4	Platinum thermistor AA level four wire system	
A5	Thermocouple Class I	
A6	Thermocouple Class II	
YY	customer customization	
Extend neck size TL (mm)		
000	none	
050	50*14	
075	75*14	
100	100*14	
125	125*14	
150	150*14	
YYY	customer customization	
Probe length EL (mm)		
050	50	
100	100	

150	150
200	200
250	250
XXX	Length without mm is the code (with 50mm as the division)
999	1000
Probe diameter D (mm)	
6	6
Y	Customize
probe material	
S	316SS
L	316LSS
Y	Customize
processconnection	
A00	thread without process
M01	M12x1.5
M02	M20x1.5
G01	G1/4 55° pipe thread
G02	G1/2 55 pipe thread
N01	1/4NPT 60°pipe thread
N02	1/2NPT 60 pipe thread
F01	Flange connection. Please specify the flange standard and parameters.C
YYY	ustomize
transmitter	
X	No terminal, direct lead
W	ceramic terminal
R	TTIR transmitter accuracy 0.2%FS
S	TTIS intrinsically safe transmitter with 0.2%FS accuracy
A	TTHA intrinsically safe transmitter with 0.1%FS accuracy and Hart protocol
Y	Customize
Explosionproof label	
0	no explosion-proof requirement
3	XPS3 Exd I ICT6 Gb (NEPSI)
4	XPS4 II 1G Ex ia IIC T6 Ga (ATEX) Only intrinsically safe transmitters are available
5	XPS5 II 2G Ex db IIC T6 Gb (ATEX)
6	XPS6 IEx db IIC T6 Gb (EAC)
Y	Customize
accessories	
Y	Customize



Excellence Since 1953

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