

USER MANUAL

PRODUCT NAME : TEMPERATURE SENSOR

MODEL : R100, R200, R300, R400, R600, R700, R900 SERIES



WISE[®] WISE Control Inc.
www.wisecontrol.com

Instructions for proper and safe operation

For the right use and safety of this product, please read through this manual prior to use.

Handling error may cause device trip, injury, or disaster.

WARNING

1. For the safety, fixing work shall be done by the authorized with instrument or electrical
2. Use the device within the rated in/out value as written in the specification.
Otherwise, the device may fall in trouble.
3. Fix this product to the place under the environment written in the specification.
Otherwise, it may fall in trouble.
4. As for wiring, follow the internal wiring rules and the electric facility technology standard.
5. Be sure to shut off the power before wiring.
Otherwise, the device may fall in trouble.
6. Both ends of a cable shall be the solderless terminal coated with an insulator.
7. Do not disassemble this product at all costs.
Otherwise, it may fall in trouble.
8. Use a proper protection tube to fix this product to a tube.
9. Select the protection tube according to the process condition.
Please remember the owner is liable for wrong protection tube selection.
10. A head o-ring subject to aged deterioration or change may lose its sealing performance,
so it must be exchanged regularly, preferably every 5 years.

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1. Generals

Our thermocouple, thermoresistor, and protection tube are precisely customized at your request. Please test and store these products at a suitable place and meet the requirements of all kinds of documents, test reports, and instruction manual to keep them in optimum condition during use.

2. Application

The temperature sensor is used for measuring the temperature for various processes and the reading values will be utilized for indication, recording, or control of control panels or progress control systems. The temperature sensor can be directly inserted into a tube for use without any protection tube and you may select a protection tube according to the progress.

3. Warranty

We are not liable for any damage or failure of this product which was caused by your own modification, change, or repair against this manual and the warranty will be no longer valid.

4. Nameplate

4. 1 IEC Explosionproof Grade

| | |
|--|---|
| < Flameproof Enclosure > | |
| 1 | TYPE : ETR Series |
| 2 | Ex d IIC T6 Gb (Tamb = -20°C to +60°C) |
| 3 | IECEX KGS 05.0001/02 Cable entry : See Installation Instruction Document |
| 4 | Tag No. |
| 5 | Do not open when an explosive atmosphere may be present |
| < Intrinsically Safe Circuit > | |
| 1 | TYPE : ETR10 Series |
| 2 | Ex ia IIC T6 ...T1 Ga/Gb (Tamb = -20°C to +60°C) |
| 3 | IECEX KTL 12.0001X Ui = 30V , Ii = 100mA Pi = see the instruction manual Ci = 0.1nF, Li = 0.01mH |
| 4 | Tag No. |
| 199, Sanggal-dong, Giheung-gu, Youngin-si, Gyeonggi-do, Korea WISE CONTROL INC. | |

| | |
|--|-----------------|
| 1. Type | 4. Tag No. |
| 2. Explosionproof Grade and Allowable Temp | 5. Warning Text |
| 3. Explosionproof Certificate No. | |

4. 2 ATEX Explosionproof Grade

< Flameproof Enclosure >

1. TYPE : ETR Series
 2. II 2G Ex d IIC T6 Gb
 3. (Tamb = -20°C to +60°C)
 4. LCIE 06 ATEX 6072X/02
 5. Cable entry : See Installation Instruction Document
 6. Tag No.
 7. Do not open when an explosive atmosphere may be present

8. CE 0081
 9.

< Intrinsically Safe Circuit >

1. TYPE : ETR10 Series
 2. KEMA 09ATEX0006X
 3. II 1/2 G Ex ia IIC T6 ...T1 Ga/Gb
 4. (Tamb = -20°C to +60°C)
 5. Ui = 30V , li = 100mA
 6. Pi = see the instruction manual
 7. Ci = 0.1nF, Li = 0.01mH
 8. Tag No.
 9. 199.Sanggal-dong,Giheung-gu,Youngin-si,Gyeonggi-do,Korea
 WISE CONTROL INC.

8. CE 0344
 7.

| | |
|-------------------------------------|----------------------|
| 1. Type | 6. Tag No. |
| 2. CE Certification Mark | 7. CE Mark |
| 3. Explosionproof Grade | 8. Certification No. |
| 4. Allowable Temp. | 9. Warning Text |
| 5. Explosionproof Certification No. | |

4. 3 KGS Explosionproof Grade

1. Ex d II C T6 IP65
 2. (Tamb = -20°C to +60°C)
 3. Tag No.
 4. Do not open when energized !

| | |
|-------------------------|-----------------|
| 1. Explosionproof Grade | 3. Tag No. |
| 2. Allowable Temp. | 4. Warning Text |

5. User's Responsibility

A user should select the temperature sensor or thermowell by considering the possible various safety conditions when mounting for the corrosive, abrasive fluids or fluids with the flow rate and pressure. WISE may support the user's selection but is not responsible for such selection.

6. Product Refund and Packing

6. 1 When you are returning our products for recalibration or repair, be sure to use the original or its equivalent packing method along with the relevant documents.
6. 2 Make sure the product is not exposed to moisture, dust, or other contaminants during transportation.
6. 3 Make sure the product is not exposed to vibration or shock during transportation.
6. 4 Product damage during transportation shall be recorded by writing and all the losses from installation delay may be charged upon the transportation company for compensation.

7. Maintenance

7. 1 Maintenance

In general, temperature sensors are maintenance free.

If you need to perform maintenance activities, maintenance may only be performed by skilled personnel, and WISE CONTROL can assist in maintenance.

7. 2 Repair

Repairs must only be carried out by WISE CONTROL or parts manufacturer

7. 3 Calibration

We recommend that you regularly recalibrate temperature sensor.

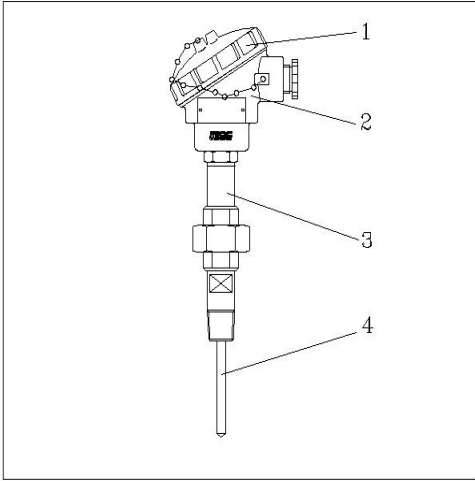
WISE CONTROL can be carried out calibration.

8. Fault

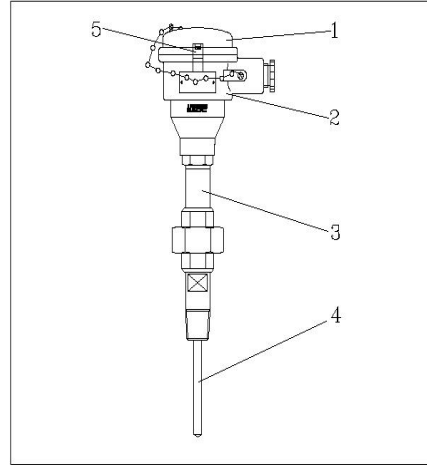
| Fault | Causes | Correction |
|--------------------------------------|--|---|
| No signal, erroneous measured values | Too high temperature or over temperature | Replacement of the sensor with suitable type |
| | Caused by chemical attack | Use of a thermowell |
| Fluctuating temperature signal | Reference junction temperature or voltage not constant | Remain constantly temperature or supply voltage |
| Response time too long | Incorrect installation location | Reselect installation location or depth inside medium in line |
| | Unsuitable thermowell size | Reselect thermowell dimension possible for the process line. |
| Corrosion | Wrong selected material of insertion parts or thermowell | Change to suitable material in the process |

9. Appearance and Function

9.1 Temperature Sensor Appearance

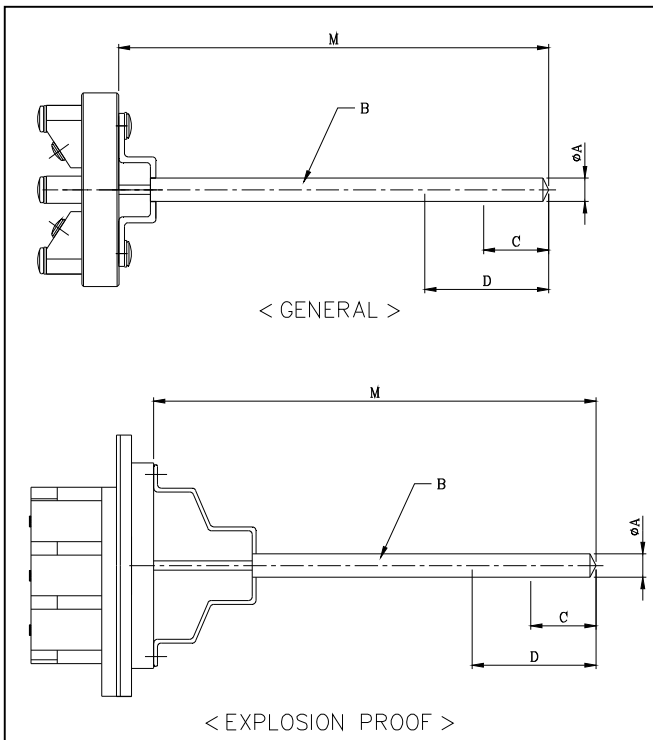


- 1. COVER
- 2. HEAD (WEATHER PROOF)
- 3. UNION NIPPLE
- 4. SHEATH



- 1. COVER
- 2. HEAD (EXPLOSION PROOF)
- 3. UNION NIPPLE
- 4. SHEATH
- 5. 커버고정장치 (LOCKING DEVICE)

9.2 Measuring Insert Appearance



- A : Measuring Insert O.D.
- B : Inorganic Insulating Sheath (MgO Filled)
- C : Temp. Sensor Length
- D : Unbendable Length (100mm)
- M : Measuring Insert Length

9.3 Function

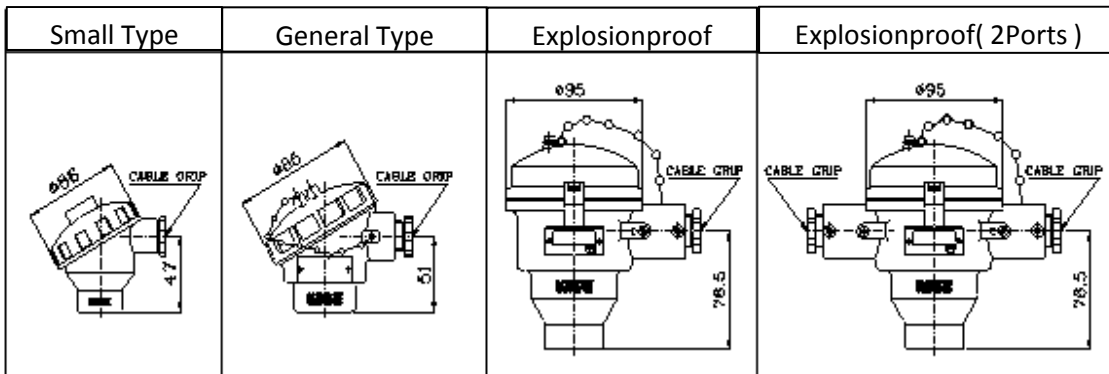
The process temperature shall be measured by the temperature sensor, R1 or R2. Please choose one according to the temperature condition, High, Middle, or Low.

The temperature measuring element is a temperature sensor under EN60584 (thermocouple) or EN60751 (thermoresistor) Standard.

The temperature sensor may be manufactured either with or without the transmitter.

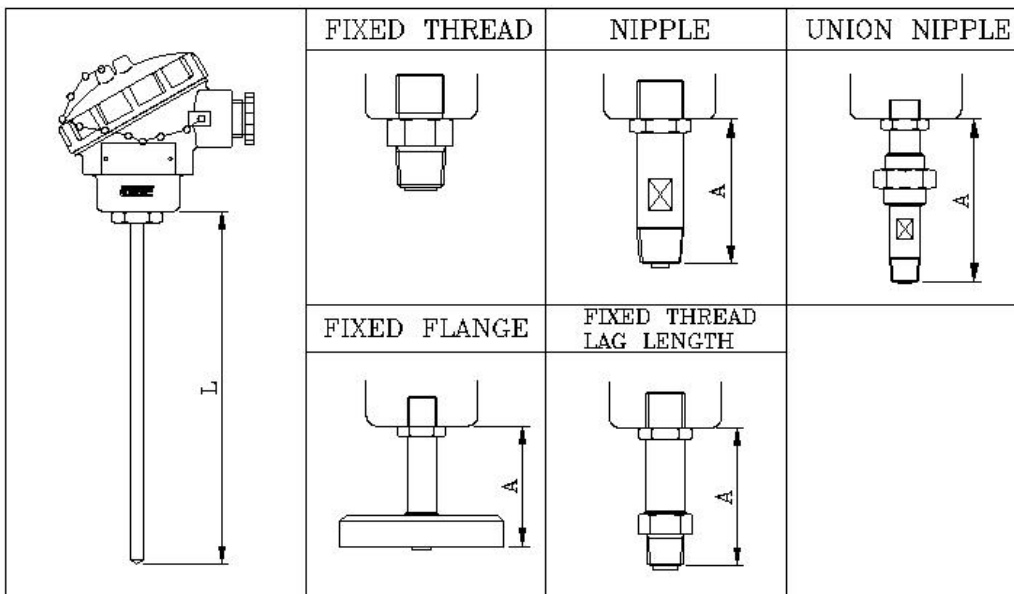
10. Temperature Sensor Series

10.1 Head (Terminal Box)

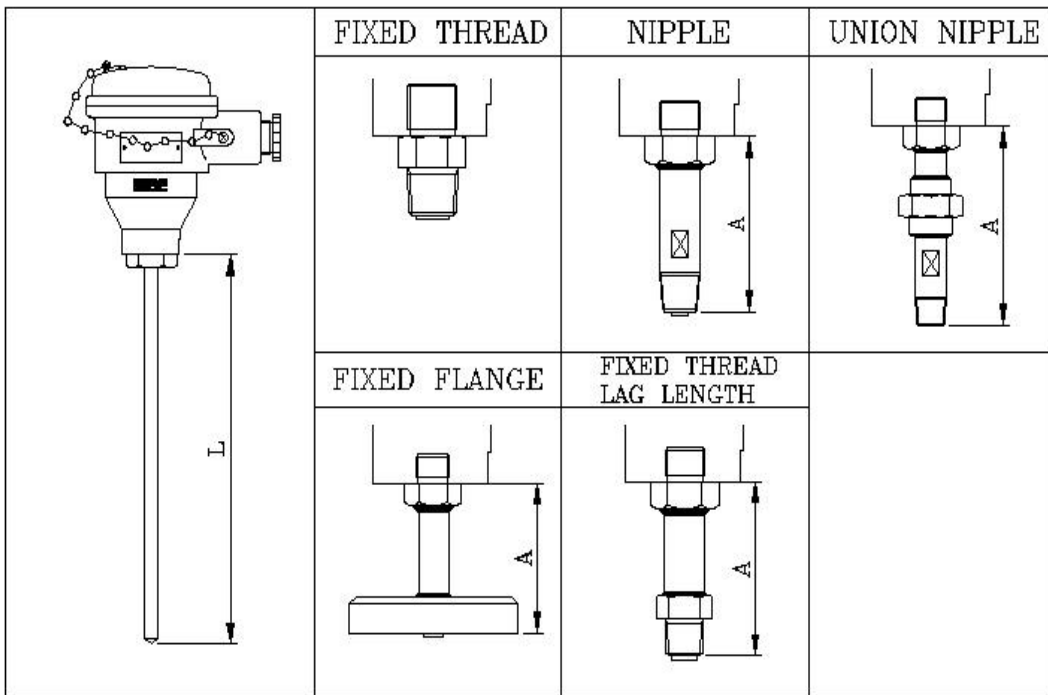


10.2 Connection Part Type

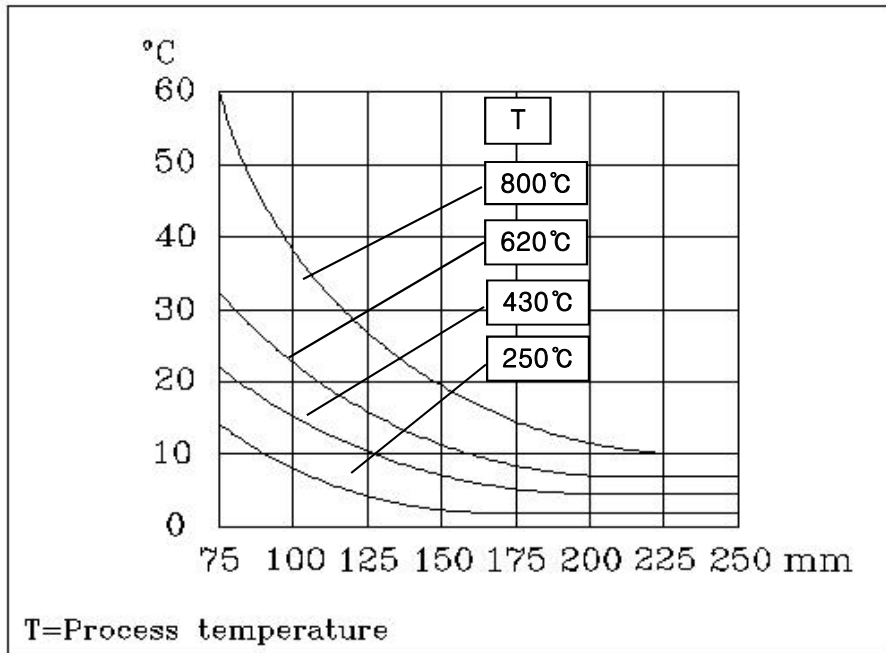
10.2.1 General Head



10.2.2 Explosionproof Head



10.2.3 Relation between Connection Length (mm) and Head Temp.



11. Protection Tube

11.1 Generals

The protection tube is designed to protect the temperature sensor from tube velocity, pressure, or corrosion and prevent tube fluid from being spilled to the outside during sensor exchange.

The protection tube shall be selected by the user (customer) according to the process.

Of course, we can give you advice to help your selection but we are not liable for it.

11.2 Protection Tube Type

11.2.1 By Connection Methods

- 1) Thread type
- 2) Flange type
- 3) Welding type

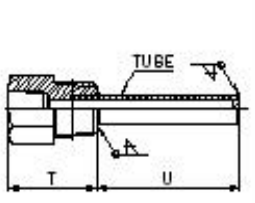
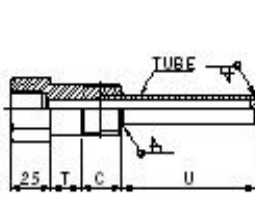
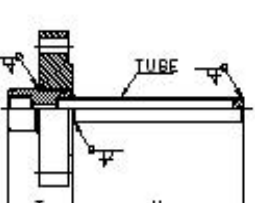
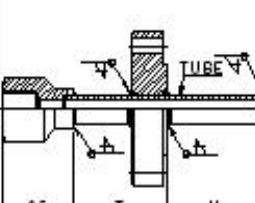
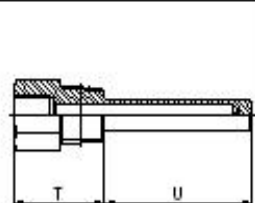
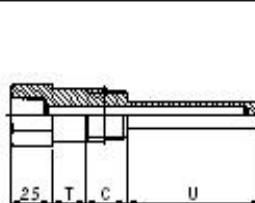
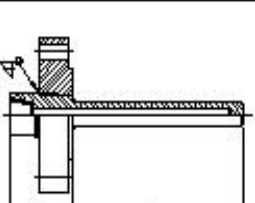
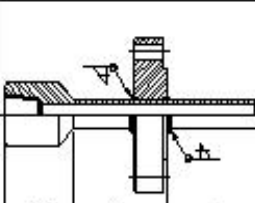
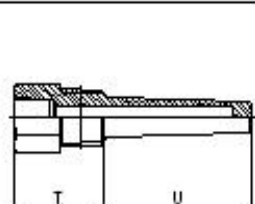
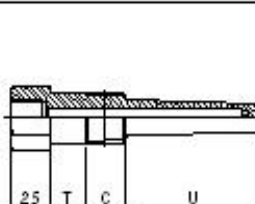
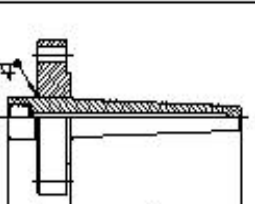
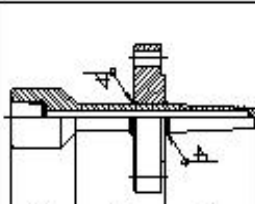
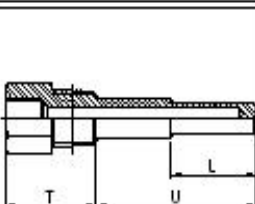
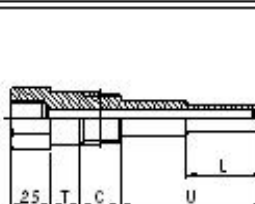
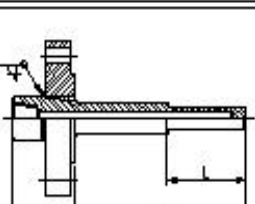
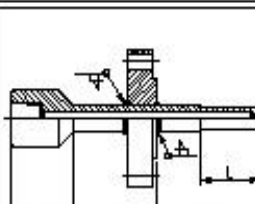
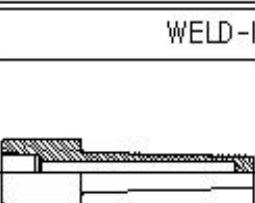
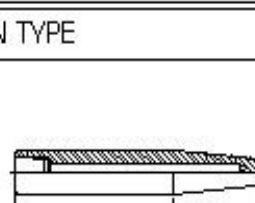
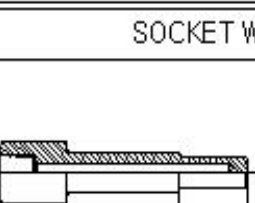
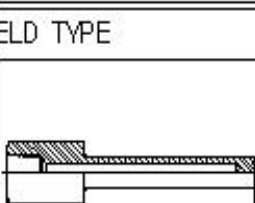
11.2.2 By Materials

- 1) End Close Type - Where there is neither fluid flow nor pressure
- 2) Drilled Bar Type

11.2.3 By Protection Tube Appearances

- 1) Straight Type
- 2) Taper Type
- 3) Step Type

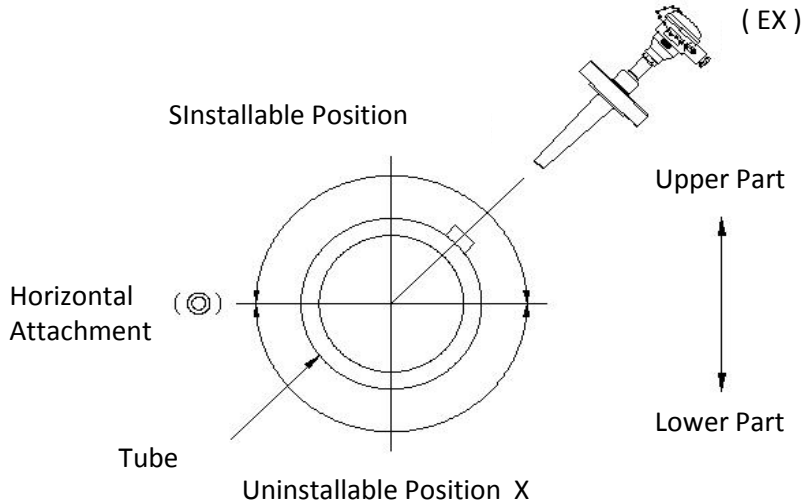
11.3 Protection Tube Layout

| | THREAD TYPE | | FLANGE TYPE | |
|------------------------------------|---|---|--|---|
| | PLANE TYPE | LAG TYPE | PLANE TYPE | LAG TYPE |
| CLOSED END TUBE STRAIGHT TYPE |  |  |  |  |
| | A5000 | A5001 | A5100 | A5101 |
| DRILLED BAR STOCK STRAIGHT TYPE |  |  |  |  |
| | A6000 | A6001 | A6100 | A6101 |
| DRILLED BAR STOCK TAPER TYPE |  |  |  |  |
| | A6010 | A6011 | A6110 | A6111 |
| DRILLED BAR STOCK STEP TYPE |  |  |  |  |
| | A6020 | A6021 | A6120 | A6121 |
| DRILLED BAR STOCK WELD TYPE | WELD-IN TYPE | | SOCKET WELD TYPE | |
| |  |  |  |  |
| | A6310 | A6311 | A6320 | A6300 |

12. Temperature Sensor (Protection Tube) Installation Position

12.1 Attachment

1. The tube temperature sensor shall be installed as follows for anti-sweating.



2. The subject fluid shall be stored at a place available for temperature detection.

3. The whole temperature sensing part shall be submerged in the subject fluid.

4. Avoid tube vibration line for installation.

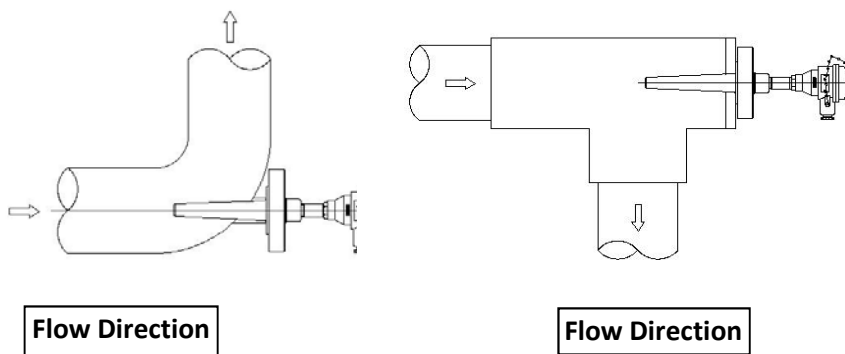
5. Minimize the effect of the natural frequency and make the inserting length as short as possible (50~60mm).

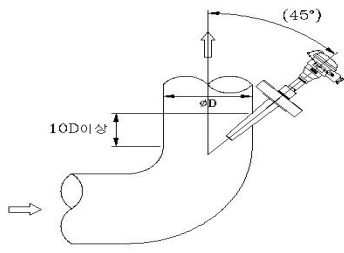
6. In case of screw type connector, use a sealant for connection.

7. To install the sensor at a place having fluid flow, make the temperature sensing part against the flow. If infeasible, taper it or make a right angle for installation in worst cases.

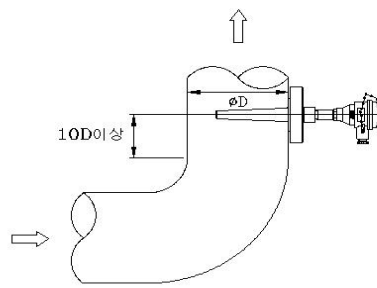
12.2 Attachment Condition

a) To Bent Tube



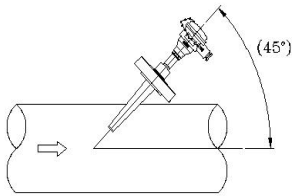


Taper

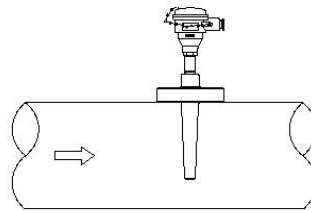


Right Angle

b) To Straight Tube

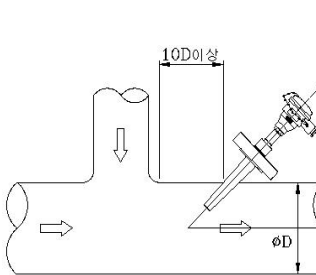


Taper

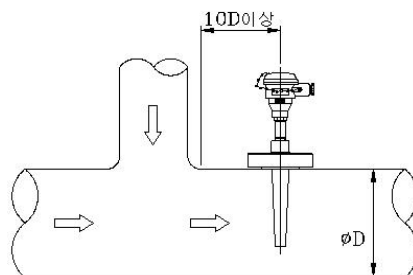


Right Angle

c) To T Confluent Tube

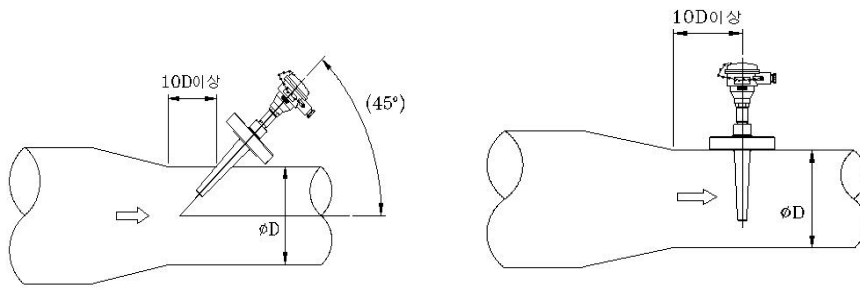


Taper



Right Angle

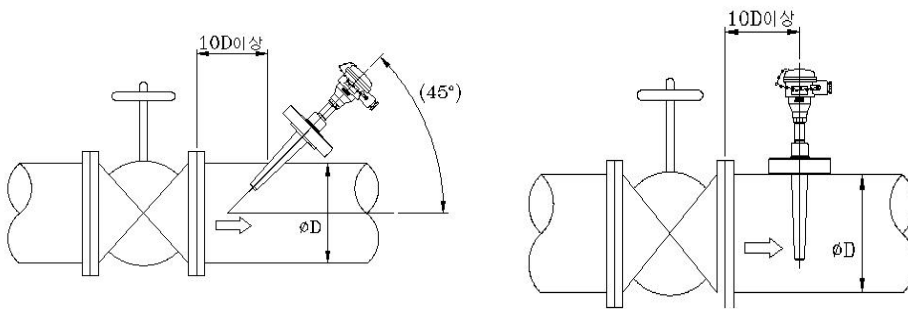
d) To Decreasing Tube



Taper

Right Angle

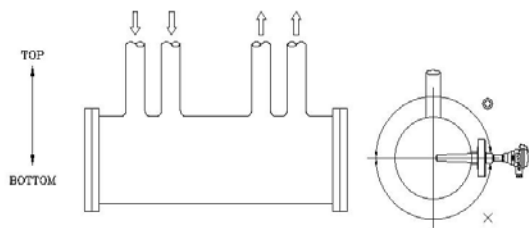
e) To Other Device



Taper

Right Angle

f) To Header



* Use inserting length less than 300mm.

Inserting Length vs. Velocity and Attachment Condition

| Velocity | Length for Right Angle or Taper | Length for Flow Direction |
|----------|---------------------------------|---------------------------|
| < 4m/s | 150 ~ 200mm | 150 ~ 300mm |
| < 2.5m/s | 150 ~ 300mm | 150 ~ 400mm |
| < 0.3m/s | 150 ~ 2000mm | |

13. Connection

13.1 Extension Wire and Cable

- 1) The extension wire shall have the same specification with the thermocouple sensor.
- 2) Choose the extension wire thickness in consideration of voltage drop.
- 3) The extension wire shall be strong enough to damage or cutting from the surrounding environment.
- 4) The thermoresistor cable shall be suitable for two-wire, three-wire, or four-wire and one end of the shielding wire shall be grounded.

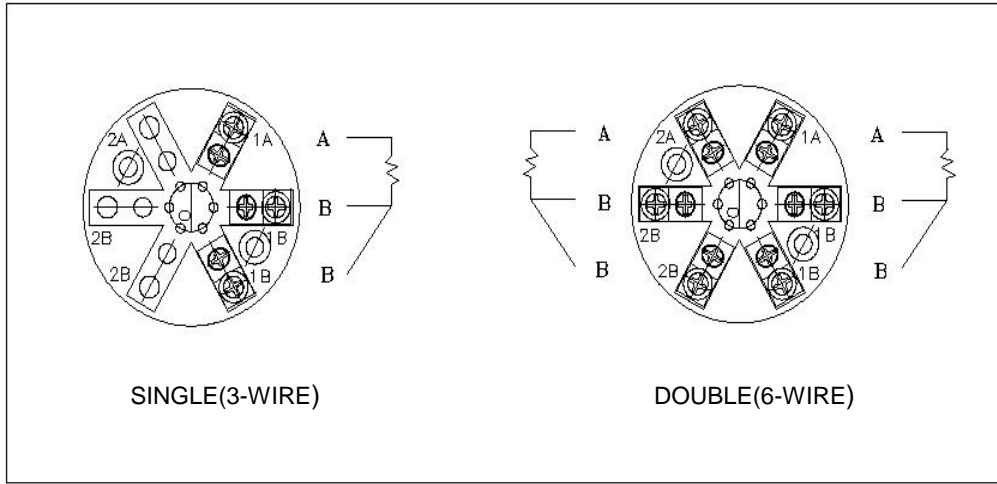
13.2 Connection

- 1) Be sure to shut off the power prior to explosionproof grade product connection.
- 2) Be sure to check the polarity of the thermocouple prior to connection and discriminate terminal A/B/B (for three-wire) for thermoresistor.
- 3) If necessary, connect a ground wire to the head.
- 4) Use a solderless terminal to attach the extension wire or cable end to the terminal block and fasten it firmly with screws.
- 5) In case of explosionproof grade, the cover shall not open during operation and you must fasten the cover locking device without fail.

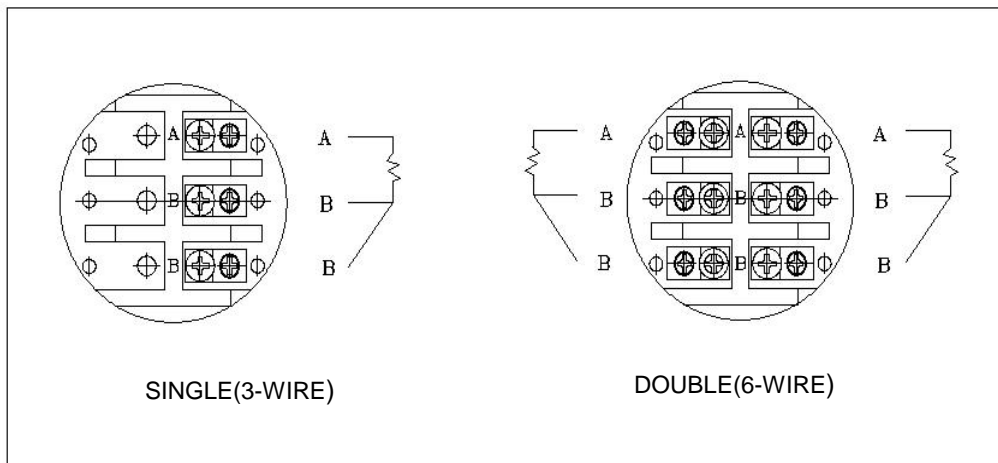
13.3 Temperature Sensor Terminal Connection

13.3.1 thermoresistor

General

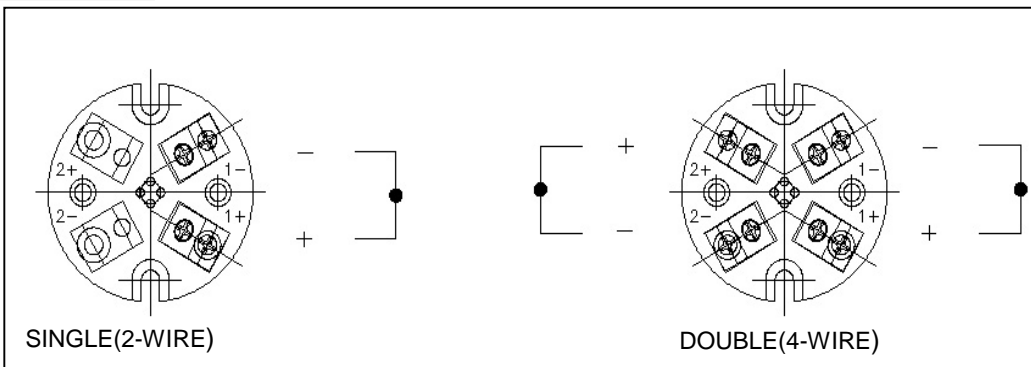


Explosionpro

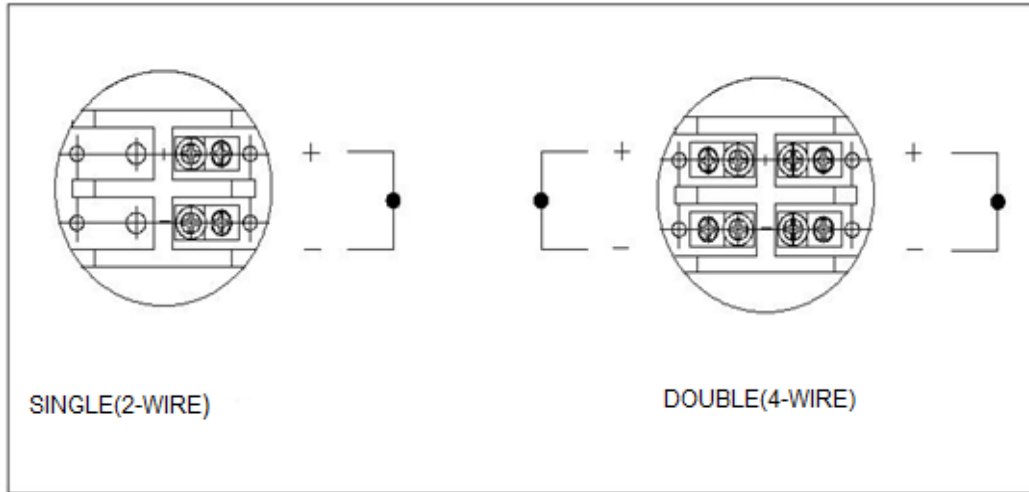


13.3.2 Thermocouple

General Head



Explosionpro



13.3.3 Terminal Box and Fastening Screw Size

| | General | Explosionproof |
|------------------------|---------|----------------|
| O.D. | 50mm | 67.5mm |
| Connection Screw Pitch | 40mm | 60.5mm |
| Screw Size | M4×0.7P | M3×0.5P |