

# Instruction Manual

**ITEM: BIMETAL THERMOMETER**

**MODEL : 190 SERIES**



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# Instructions for proper and safe operation

Please read instructions carefully prior to using the instrument for proper and safe operations.

Mishandling could cause device malfunctions and result in disastrous injuries or accidents.

## WARNING

1. Do not exceed the temperature range allowed.

2. Do not apply excessive load, vibration or impact.

Damaged or ruptured product may cause temperature measurement deviations.

3. Please use within the specified temperature ranges.

Exceeding the temperature range may cause disruption in nearby area

due to failure of or damage to the temperature indicator.

4. Please be careful not to bend thermometer stem.

A bent stem STEM may interfere with the normal operation to cause temperature deviation.

5. Please always follow the mounting tips in the manual in cases of field installation.

6. Do not make any modifications to the product or to add more functions.

※ Please consult with us for any repair.

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## **1. Overview**

This thermometer using bimetal is most commonly used in general industry since it is able to measure temperature immediately after on-site installation.

Please read the user manual carefully and thoroughly before using the product for proper and safe operations.

## **2. Applications**

It indicates specific temperature to be used in process control and to determine the temperature in the pipe for more stable operation.

## **3. Characteristics**

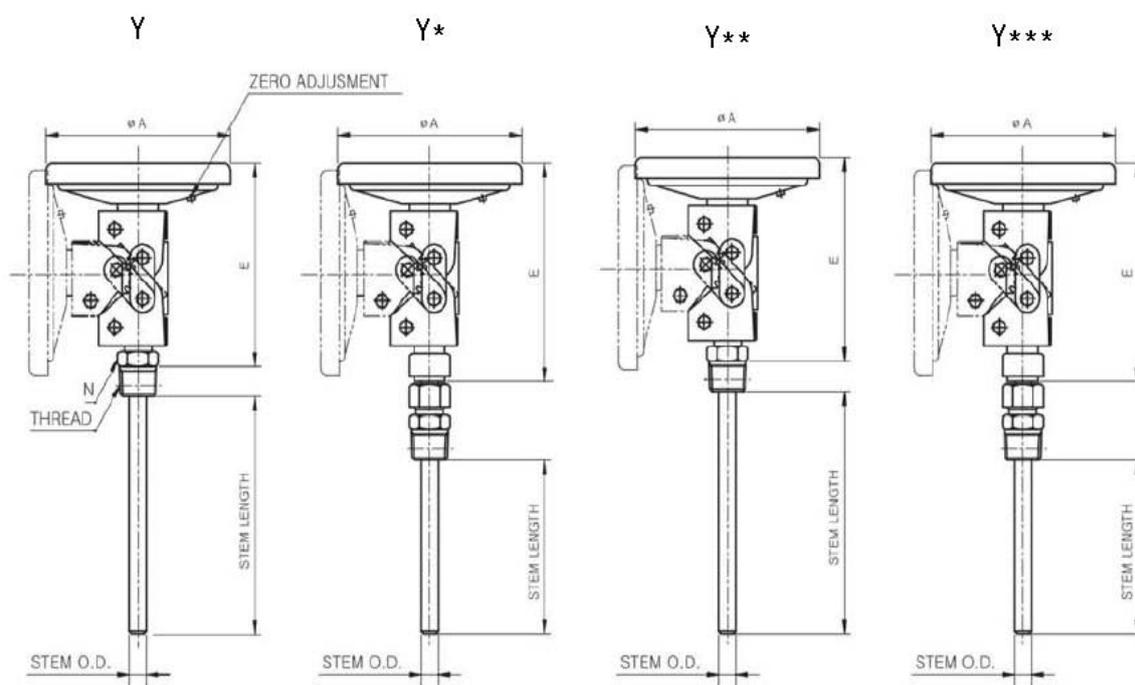
Bimetal thermometer demonstrates the following characteristics:

- 1) Its general measurement range is from  $-50^{\circ}\text{C}$  to  $600^{\circ}\text{C}$  with approximately  $\pm 2\%$  accuracy. Please do not use outside of the specified range.
- 2) Its accuracy may depend on thermometer design, measuring environment, proper insertion, accurate calibration or bimetallic thermal stability.
- 3) Response rate may depend on thermometer design and conditions of its use.
- 4) Simple structure provides easy maintenance and deterioration due to aging is minimal.

#### 4. Specifications and standards

- 1) Indicator size : 75mm, 100mm, 125mm, 150mm
- 2) Indicator accuracy :  $\pm 2.0\%$ ( or  $\pm 1.0\%$  ) of Full Scale
- 3) Accuracy :  $\pm 2.0\%$  of Full Scale
- 4) Maximum temperature range :  $-50^{\circ}\text{C} \sim 600^{\circ}\text{C}$
- 5) Liquid end material : 304 Stainless Steel, 316 Stainless Steel
- 6) Contact area size : 3/8", 1/2", 3/4" PT or NPT
- 7) Temperature sensor filling material : Bimetal
- 8) Temperature sensor length : Direct connection

#### 5. Exterior dimensions

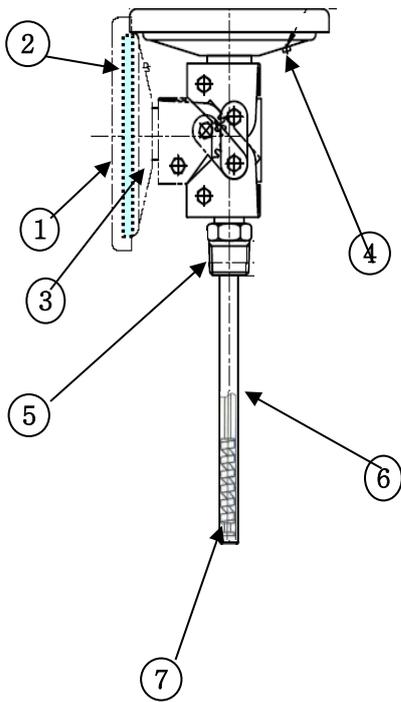


Dimensions( mm )

DIAL SIZE	AVAILABLE CODE	A	E
75	Y	86.5	101
	Y*	86.5	99
100	Y	111	105
	Y*	111	103
125	Y	138	103
	Y*	138	101
150	Y**	169.5	132
	Y***	169.5	130

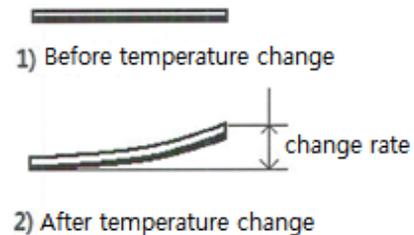
## 6. Names of parts and principles of operation

### A. T190 Bimetal Thermometer



No.	PART NAME	DESCRIPTION
1	Cover	Stainless Steel
2	Window	Glass
3	Case	Stainless Steel
4	Zero Adjustment	Stainless Steel
5	Gauge Connection	Stainless Steel
6	Stem or Bulb	Stainless Steel
7	Element	Bimetal

### B. Bimetal



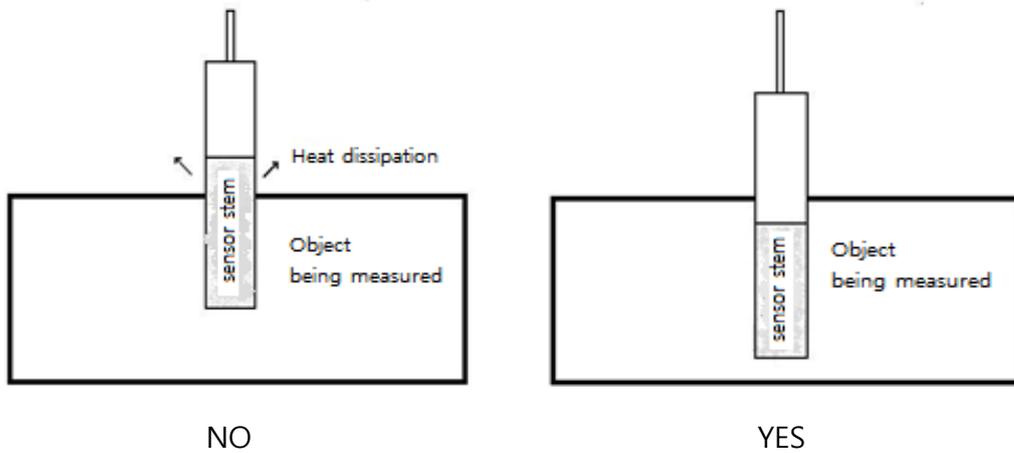
Operation principle: Bimetal composed of two metal of different expansion ratio in temperature change is used. The temperature sensing part (⑥ in Fig. A) has spiral bimetal (Fig. B) which will expand to indicate any temperature change.

There are T and L types that are operating in the same principle.

Bimetal used in thermometer is shown in Fig. B.

## 7. Installation

- 1) Please make sure of any damage present or condition the product is in prior to installation.
- 2) Temperature deviation may occur depending on how deep the sensor is inserted. Make sure to insert the temperature sensor completely in order to detect accurate temperature.



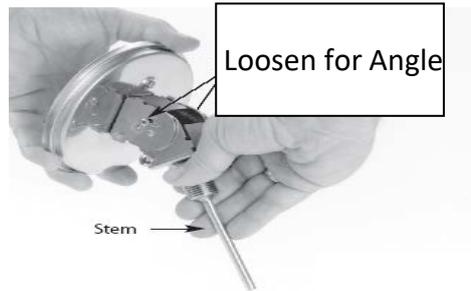
- 3) This product is sensitive to vibrations and physical impact.
- 4) Please install the thermometer away from any vibration or physical impact, if there is possibility of vibration or impact near its installation area.
- 5) It is recommended to use thermowell for maintenance.  
\*Please refer to thermowell manual for its installation and use.
- 6) Use proper wrench to install.



- 7) Do not hold the casing and turn. It may cause defect. Please make sure the internal bellows is not twisted.



- 8) To bend the thermometer properly, unscrew a bolt below the casing in order to bend it in desired angle.



- 9) Inspect the installation area to check for moisture, vibration, dust or corrosive gas.  
10) Avoid installing in the area which might exceed the specified temperature range.  
11) Please protect it from lightning or steam.  
12) Avoid installing in direct sun light.

## 8. Operation instructions

- 1) Use in 75% of maximum capacity for commercial use.
- 2) Never use in temperature range in excess of specification.
- 3) Avoid sudden temperature changes.
- 4) Check if there is vibration, pulsation or heat in the piping line and use products with capillary or select proper oil type if necessary.

Remote reading thermometer



Direct reading thermometer with oil filled



- 5) One or two regular inspections in 6 month are recommended to check contact operation or attempt.
- 6) In case of large deviation of indicator, dismount it to inspect.
- 7) Main causes are wearing of parts, corrosion or distortion due to external vibration and/or impact. In this case, the removal of the cause, adjustment, replacement is necessary.