

## Brief introduction

Temperature Probes with Terminal Head : RTD sensor SUP-WZPK and TC sensor SUP-WRNK.

Temperature probes are mainly used for measuring temperatures in fluids and gasses. A decisive selection criterion is the reliable sealing feature of this installation type with vacuum and with overpressure. The application areas are, among others, in the air conditioning technology and refrigeration engineering as well as the HVAC, kiln and apparatus engineering sector.

Protection tubes made of various materials protect the measuring insert against chemical influences and mechanical damage. The appropriate protection tube material is selected according to the conditions on site.



## Highlights:

- Temperature range from -200 to 450 °C for RTD, 600°C to 1600°C.
- With built-in measuring insert
- Available with transmitter
- Tolerance class: Class A

## TC principle

A thermocouple is a closed loop circuit that consists of two dissimilar metal wires welded together at both ends. When a temperature difference exists between the two junctions, thermal electromotive force (EMF) is generated and an electric current flows in the closed circuit. The direction and magnitude of the EMF generated depend upon the temperature of the two junctions and upon the materials making up the thermocouple and are not affected by the size or length of the thermocouple wire. Temperature can be measured by knowing beforehand the change of EMF per degree change of temperature for a certain thermocouple.

## RTD principle

Generally, electrical resistance of metal varies, depending on the temperature. Platinum in particular is more linear and has a larger temperature coefficient than most other metals. It is therefore, most suitable for temperature measurements. Platinum has excellent properties chemically and physically. Industrial high purity elements are readily obtained for long term use as a resistance elements for temperature measurements. The characteristics are specified in JIS and other foreign standards; thus, it permits a highly accurate temperature measurement.

## Technical parameters:

Tolerance of RTD to temperature and applicable standard table

| Standard<br>Type                         | IEC 751 |                          | JIS C 1604 |                          |
|------------------------------------------|---------|--------------------------|------------|--------------------------|
|                                          | Class   | Tolerance °C             | Class      | Tolerance °C             |
| Pt100<br>(R(100°C)/R<br>(0°C)<br>=1.3851 | A       | $\pm(0.15+0.002   t   )$ | A          | $\pm(0.15+0.002   t   )$ |
|                                          | B       | $\pm (0.3+0.005   t   )$ | B          | $\pm (0.3+0.005   t   )$ |

RTD operating temperature range

| Symbol | Division               | Operating temp range °C |
|--------|------------------------|-------------------------|
| L      | For low temperature    | -200-+100               |
| M      | For medium temperature | 0-350                   |
| H      | For high temperature   | 0-500                   |

| TC tolerance and applicable standard |              |       |               |     |              |         |               |            |         |               |
|--------------------------------------|--------------|-------|---------------|-----|--------------|---------|---------------|------------|---------|---------------|
|                                      | JIS C1605    |       |               |     | IEC 584-2    |         |               | ASTM E230  |         |               |
|                                      | Temp Range   | Class | Tolerances °C |     | Temp Range   | Classes | Tolerances °C | Temp Range | Classes | Tolerances °C |
| SN SK                                | -40°C-+375°C | 1     | ±1.5          | N K | -40°C-+375°C | 1       | ±1.5          | +0°C-+1260 | STD     | ±2.2°C-±0.75% |

|  |                |   |                |  |                |   |                |            |     |              |
|--|----------------|---|----------------|--|----------------|---|----------------|------------|-----|--------------|
|  | +375°C-+100°C  |   | ±0.004<br>  t  |  | +375°C-+100°C  |   | ±0.004<br>  t  | °C         |     |              |
|  | -40°C-+333°C   | 2 | ±2.5           |  | -40°C-+333°C   | 2 | ±2.5           |            | SP  | ±1.1°C-±0.4% |
|  | +333°C-+1200°C |   | ±0.0075<br>  t |  | +333°C-+1200°C |   | ±0.0075<br>  t |            |     |              |
|  | -167°C-+40°C   | 3 | ±2.5           |  | -167°C-+40°C   | 3 | ±2.5           | -200°C-0°C | STD | ±1.1°C-±2%   |
|  | -200°C--167°C  |   | ±0.015<br>  t  |  | -200°C--167°C  |   | ±0.015<br>  t  |            |     |              |

|    |               |   |                |   |               |   |                |             |     |              |
|----|---------------|---|----------------|---|---------------|---|----------------|-------------|-----|--------------|
|    | -40°C-+375°C  | 1 | ±1.5           |   | -40°C-+375°C  | 1 | ±1.5           |             | STD | ±1.7°C-±0.5% |
|    | +375°C-+800°C |   | ±0.004<br>  t  |   | +375°C-+800°C |   | ±0.004<br>  t  | +0°C-+870°C |     |              |
| SE | -40°C-+333°C  | 2 | ±2.5           | E | -40°C-+333°C  | 2 | ±2.5           |             | SP  | ±1°C-±0.4%   |
|    | +333°C-+900°C |   | ±0.0075<br>  t |   | +333°C-+900°C |   | ±0.0075<br>  t |             |     |              |

|    |               |   |                |   |               |   |                |             |     |               |
|----|---------------|---|----------------|---|---------------|---|----------------|-------------|-----|---------------|
|    | -167°C-+40°C  | 3 | ±2.5           |   | -167°C-+40°C  | 3 | ±2.5           | -200°C-0°C  | STD | ±1.7°C-±1%    |
|    | -200°C--167°C |   | ±0.015<br>  t  |   | -200°C--167°C |   | ±0.015<br>  t  |             |     |               |
| SJ | -40°C-+375°C  | 1 | ±1.5           | J | -40°C-+375°C  | 1 | ±1.5           | +0°C-+760°C | STD | ±2.2°C-±0.75% |
|    | +375°C-+750°C |   | ±0.004<br>  t  |   | +375°C-+750°C |   | ±0.004<br>  t  |             |     |               |
|    | -40°C-+333°C  | 2 | ±2.5           |   | -40°C-+333°C  | 2 | ±2.5           |             | SP  | ±1.1°C-±0.4%  |
|    | +333°C-+750°C |   | ±0.0075<br>  t |   | +333°C-+750°C |   | ±0.0075<br>  t |             |     |               |
| ST | -40°C-+125°C  | 1 | ±0.5           | T | -40°C-+125°C  | 1 | ±0.5           | +0°C-+370°C | STD | ±1°C-0.75%    |
|    | +125°C-+350°C |   | ±0.004<br>  t  |   | +125°C-+350°C |   | ±0.004<br>  t  |             |     |               |
|    | -40°C-+133°C  | 2 | ±1.0           |   | -40°C-+133°C  | 2 | ±1.0           |             | SP  | ±5°C-0.4%     |

|                   |   |                |  |                   |   |                |                |         |                |
|-------------------|---|----------------|--|-------------------|---|----------------|----------------|---------|----------------|
| +133°C-+350<br>°C |   | ±0.0075<br>  t |  | +133°C-+3<br>50°C |   | ±0.0075<br>  t |                |         |                |
| -67°C-+40°C       | 3 | ±1.0           |  | -67°C-+40<br>°C   | 3 | ±1.0           | -200°C<br>-0°C | ST<br>D | ±1°C-±1<br>.5% |
| -200°C--67°C      |   | ±0.015<br>  t  |  | -200°C--6<br>7°C  |   | ±0.015<br>  t  |                |         |                |

| Components material of TC |                                                          |                                                 |
|---------------------------|----------------------------------------------------------|-------------------------------------------------|
| Symbol                    | Positive polarity                                        | Negative polarity                               |
| N                         | Alloy consisting mainly of nickel, chromium and silicone | Alloy consisting mainly of nickel, and silicone |
| K                         | Alloy consisting mainly of nickel and chromium           | Alloy consisting mainly of nickel and aluminum  |
| E                         | Alloy consisting mainly of nickel and chromium           | Alloy consisting mainly of nickel and copper    |
| J                         | Iron                                                     | Alloy consisting mainly of nickel and copper    |
| T                         | Copper                                                   | Alloy consisting mainly of nickel and copper    |

| Operating temperature range (in air) |   |                   |   |   |   |
|--------------------------------------|---|-------------------|---|---|---|
| Sheath<br>OD(mm)                     | N | K                 | E | J | T |
| 0.25                                 | - | 500* <sup>1</sup> | - | - | - |
| 0.5                                  |   | 600* <sup>1</sup> | - | - | - |

|     |                    |                    |                    |                    |     |     |     |
|-----|--------------------|--------------------|--------------------|--------------------|-----|-----|-----|
| 1.0 | 900* <sup>3</sup>  | 650                |                    | 900* <sup>3</sup>  | 650 | 450 | 300 |
| 2.0 | 1200* <sup>3</sup> | 650                |                    | 1200* <sup>3</sup> | 650 | 450 | 300 |
| 3.0 | 1260* <sup>3</sup> | 750                |                    | 1260* <sup>3</sup> | 750 | 650 | 350 |
| 5.0 | 1260* <sup>3</sup> | 800                |                    | 1260* <sup>3</sup> | 800 | 750 | 350 |
| 6.0 | 1260* <sup>3</sup> | 1000* <sup>1</sup> | 900* <sup>2</sup>  | 1260* <sup>3</sup> | 800 | 750 | 350 |
| 8.0 | -                  | 1050* <sup>1</sup> | 1000* <sup>2</sup> | -                  | 800 | 750 | 350 |



SPE-ST100 PT100

SPE-ST300 K/S/E/J/T/R/B/N

Measuring range:

Cold junction length L1: 100mm (standard)

Sensor diameter R: 6mm (standard)

Thread type M: M20\*1.5 (standard)

Fitting length L2: 30mm (standard)

Output: 4-20mA, 1-5V (with transmitter)

Installation: flange, clamp, direct insertion, Screw base

Connection head length L3: 88mm (standard)

Connection head length L4: 91mm (standard)



## SUP-WZP variants

### Application

The resistance thermometer is specially suited to temperature measurement in machinery, power stations and plants in gaseous or liquid media like air, steam, water and oil.

### Highlights

- High flexibility through user-specific insertion lengths and variable process connections
- Fast response time
- Different types of thermocouples

## Technical parameters:

TCR (temperature coefficient of resistance): 3850ppm/K

Temperature range:-50 to 500℃

Wire material: Platinum nickel plating

Stability:  $R_0 \leq 0.04\%$  (500℃, 1000hours)

Vibration resistance rating: at least 40ga (10-2000HZ)

Insulation resistance:  $>100M\ \Omega$  under 20 ℃,  $>2M\ \Omega$  under 500 ℃

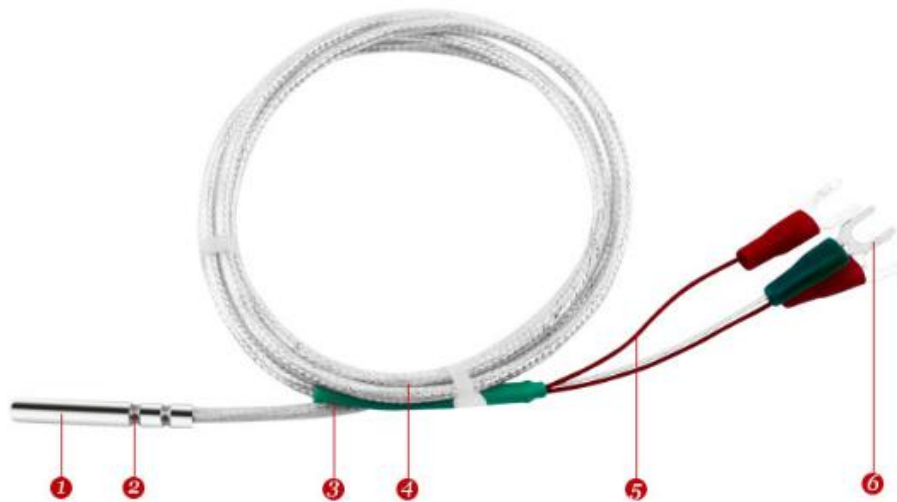
Natural coefficient: 0.4K/mW under 0 ℃

Response time: water@2m/s  $t_{0.5}=0.05s$   $t_{0.9}=0.15s$

Air@2m/s  $t_{0.5}=0.05s$   $t_{0.9}=0.15s$

Size: L\*R\*Cable length=4\*30\*1, 4\*30\*2, 4\*30\*3, 4\*30\*5...





- 1: 304L sensor
- 2: Junk ring
- 3: Temperature and flame retardant coating
- 4: PTFE shielded cable
- 5: MM connecting cable
- 6: Terminal

## Sensor:



Measure range: -50 to 200℃ (standard)  
Sensor diameter (R): 4MM (standard)  
Sensor length (L): 30MM (standard)  
Cable length: 1M/3M/5M  
Tolerance class: Class A (standard)

## SUP-WZP variants

### Order Code

Basic type

A SUP-WZP variants

Operating temperature

C1 -50~200°C

C2 -50~100°C

C3 0~200°C

C4 -50~400°C

Sensor diameter

D1 1m

D2 2m

D3 6m

D4 8m

D5 10m

Cable length

E1 1m

E2 2m

E3 3m

E4 4m

E5 5m

Sensor length

F1 30mm

F2 60mm

F3 100mm

F4 200mm

Order code:

Order example: A C1 D1 E1 F1

SUP-WZP RTD&SUP-WRNTC

## Order Code

Basic type

A SUP-WZP RTD

B SUP-WRN TC

Operating temperature in ° C

C -50~200℃

D Other

Fitting length

E 50mm

F 100mm (standard)

G 200mm

H 500mm

Tolerance class according

I Class A(standard)

J Class B

Process connection

K M20\*1.5 (standard)

L G1/4

M G1/2

N Other

Sensor diameter

O 4mm

P 6mm

Q 8mm

Temperature transmitter

R With temperature transmitter(4-20ma output)

T Without temperature transmitter

Order code:

Order example: A C F I K P R