

# Sheet metal pad type thermocouple

## Model : R990 series

Spec. sheet no. RD09-10

### Service intended

Normally, when it comes to install thermocouple for measuring temperature on the surface of boiler or heat-exchanger, commonly used method was welding them with high temperature by attaching a metal plate or knife-edge type pad which has its thickness over 3 mm. This procedure can only be applied if the tube has the enough strength to endure high temperature welding process. However, this welding process can't be performed if the tubes are filled with water or oil inside because it may cause the damage to the tube and breakage of thermal-capacity, response time will be delayed and be difficult to measure exact temperature changes. To overcome these issues, R990 series are suitable for performing resistant welding by using spot-welding machine with under 3.2 mm O.D sheath and sheet metal pad, therefore, user can tightly install the pad along the curved surface of the tube, even if the user is not an expert welding operator. Furthermore, due to its compact size and low thermal-capacity, R990 series can offer fast response time without delay even if the measuring temperature fluctuates. Most of all, since R990 series does not cause any thermal-effect, it can be installed on the tubes which carry water or oil inside without expecting any damages to the tube or welded area.



### Application

- Boiler tube skin temperature
- Heater tube and heater exchangers tube skin temperature
- Other various tube wall temperature measurement.

### Standard feature

#### Element type

K, E, J, T, N

#### Accuracy

Standard : 0.75 % (for reading temp.)

Special : 0.4 % (for reading temp.)

#### Sheath outer diameters

1.0, 1.6, 3.2 and 4.8 mm

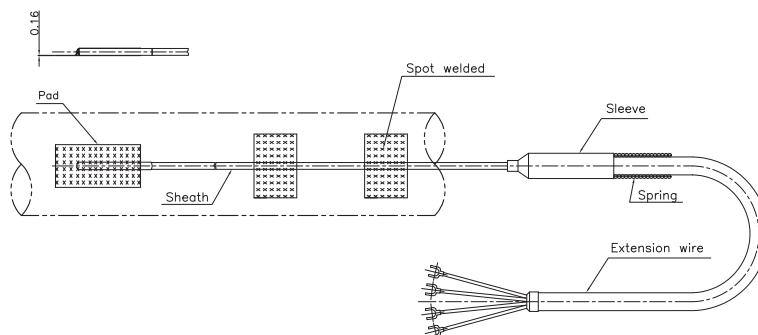
(\*Double element is not 1.0 and 1.6 mm sheath outer diameter)

3.2 mm (Standard)

#### Pad and clip material

316L SS

### Standard product drawing



## Main order

## Ordering information

### 1. Base model

- R991** Sheet metal pad type thermocouple (Single element)  
**R992** Sheet metal pad type thermocouple  
 (Double (Duplex) element)

### 2. Head type

- A** Explosion proof and ungrounded  
**B** Explosion proof and grounded  
**C** General (Weatherproof) and ungrounded  
**D** General (Weatherproof) and grounded  
**P** Non head and ungrounded  
**Q** Non head and grounded

### 3. Element

- K** K (0.75)  
**J** J (0.75)  
**T** T (0.75)  
**E** E (0.5)  
**N** N (0.75)  
**1** K (0.4)  
**2** J (0.4)  
**3** T (0.4)  
**4** E (0.4)  
**5** N (0.4)  
**Z** Other

### 4. Sheath material

- 1** 316SS  
**2** Inconel 600  
**3** 310SS  
**4** 446SS  
**5** 347SS  
**6** 321SS  
**7** 316L SS  
**9** Other

### 5. Sheath outer diameter (mm)

- \* **A** 1.0  
 \* **B** 1.6  
**C** 2.3  
**D** 3.2  
**E** 4.8  
**Z** Other

\* (Double element is not for 1.0 and 1.6 sheath outer diameter)

### 6. Welded pad type

- 7** Sheet metal type

### 7. Conduit connection

- 1** ½" PF (Only for weatherproof head)  
**2** ½" PT (Only for weatherproof head)  
**3** ½" NPT  
**4** ¾" PF (Only for weatherproof head)  
**5** ¾" PT (Only for weatherproof head)  
**6** ¾" NPT  
**7** None  
**8** M20 x 1.5P  
**9** Other

### 8. Mounting type

- X** Refer to connection type (11<sup>th</sup> character)

### 9. Connection type

- XX** Refer to insert length table (12<sup>th</sup> and 13<sup>th</sup> character)

### 10. Insert length

- X** Refer to insert length table (14<sup>th</sup> character)

### 11. Option

- 0** None  
**1** Accessories (Spot welding machine)  
**2** Epoxy coated ALDC head  
**3** Head material : 304SS  
**4** Head material : 316SS  
**5** Accessories and epoxy coated ALDC head  
**6** Accessories and head material : 304SS  
**7** Accessories and head material : 316SS

1	2	3	4	5	6	7	8	9	10	11
R992	P	K	1	D	7	9	X	XX	X	4

Sample  
ordering code



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**Mounting, connection type and insert length table - 11<sup>th</sup> thru 14<sup>th</sup> characters**

11 <sup>th</sup> character		12 <sup>th</sup> character		13 <sup>th</sup> character		14 <sup>th</sup> character	
Code	Mounting	Code	Connection size and connector material	Code	Connection type	Code	Insert length (m)
A	None	A	None	A	None	A	2
	Fixed thread lag length	B	1/8" and 304SS	B	PT	B	3
B	80 mm	C	1/4" and 304SS	C	NPT	C	4
C	100 mm	D	3/8" and 304SS	D	PF	D	5
D	150 mm	E	1/2" and 304SS	E	NPS	E	6
E	200 mm	F	3/4" and 304SS	F	UNF	F	7
F	Other	G	1" and 304SS	G	BSPT	G	8
	Fixed flange lag length	H	1 1/4" and 304SS	H	BSPF	H	9
G	80 mm	J	1 1/2" and 304SS	J	MM	J	10
H	100 mm	K	2" and 304SS	K	B16.5 Class 150 RF	K	15
J	150 mm	L	3" and 304SS	L	B16.5 Class 150 FF	L	20
K	200 mm	M	7/16" and 304SS	M	B16.5 Class 300 RF	M	25
L	Other	N	1/2" and 316SS	N	B16.5 Class 300 FF	N	30
M	Movable thread	P	3/4" and 316SS	O	Sanitary	P	35
N	Movable flange	Q	5/8" and 316SS	P	B16.5 Class 600 RF	Q	40
P	Compression fitting	R	1/2" and 316SS	Q	B16.5 Class 600 FF	R	45
	Union and nipple length	S	3/4" and 316SS	R	JIS 5K RF	S	50
Q	100 mm length	T	1" and 316SS	S	JIS 5K FF	1	70
R	150 mm length	U	1 1/4" and 316SS	T	JIS 10K RF	2	80
S	Other	V	1 1/2" and 316SS	U	JIS 10K FF	3	90
	Nipple length	W	2" and 316SS	V	JIS 20K RF	4	100
T	50 mm	X	3" and 316SS	W	JIS 20K FF	5	110
U	100 mm	Y	7/16" and 316SS	X	B16.5 Class 1,500 RTJ	6	120
V	150 mm	Z	Other	Y	B16.5 Class 2,500 RTJ	Z	Other
W	Other			Z	Other		
X	Fixed thread						
Z	Other						

■ Note for 14<sup>th</sup> character, please choose a code of next higher length if applicable length is not.  
Actual length shall be specified.

## Compact spot-welding machine

### Specification

Model	THS-2500 (JAPAN)
Input power	AC220 V 3 phase 50/60 Hz
Max. short circuit current	2500A
Operating frequency	8 KHz
Control method	Primary current control secondary voltage control
Electrical parameters	Current 0.20 ~ 2.50 KA
	Voltage 0.20 ~ 4.00 V
Rated capacity	5.7 KVA
Control method	Primary current control secondary voltage control
Cooling method	Air cooling
Outer dimensions	182(W) x 302(H) x 429(D)
Weight	18 kg

