Metallic protection tube thermocouple
Model : R110 series

Spec. sheet no. RD01-01

Service intended

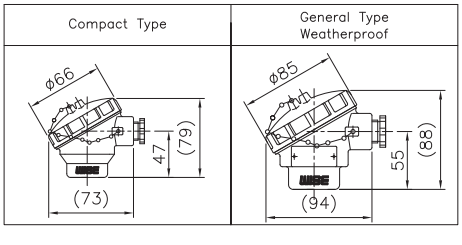
Protection tube type thermocouple is constructed with the insulator which insulates the element wire, and with the protection tube which protects the insulator.
To install this thermocouple on the process pipe or on the container, it normally attaches to a connector, a flange, or a compression fitting on the protection tube.
It can be manufactured as it is required for its use.
As its special features, it does not have any resistance issues with a lead wire, and its immediate response to a temperature change leads to a less error rate of temperature change in a broad range.

Standard features

Element
K, E, J, T

Head material
ALDC (Standard)
304SS (Not available compact type)
316SS (Not available compact type)

Head type



Tolerances on temperature reading
Class 2 (DIN/IEC584-2, BS/EN60584-2, JIS C1602)
Standard (ASTM E230 E988 ISA-MC96.1)

Tube and element wire size

Outer diameter (mm)	
Tube	Element wire
6.4	0.65
8.0	0.65 (1.0)
10.0	1.0 (1.6)
12.0	1.0 (1.6)
15.0	1.0, 1.6 (2.3)
17.3	1.6 (2.3) (3.2)
21.7	2.3 (3.2)

* ( ) standard

1. Base model

R111	Single element
R112	Double (Duplex) element

2. Head type

A	General (Weatherproof)
L	Compact (Small)

3. Element (Tolerance)

K	K (0.75)
J	J (0.75)
T	T (0.75)
E	E (0.5)
Z	Other

4. Tube material

0	304SS
7	316L SS
9	Other

5. Tube and element outer diameter (mm)

F0	6.4 and 0.65	**M1**	15.0 and 1.0
G0	8.0 and 0.65	**M2**	15.0 and 1.6
G1	8.0 and 1.0	**M3**	15.0 and 2.3
J1	10.0 and 1.0	**P2**	17.3 and 1.6
J2	10.0 and 1.6	**P3**	17.3 and 2.3
K1	12.0 and 1.0	**P4**	17.3 and 3.2
K2	12.0 and 1.6	**Q3**	21.7 and 2.3
		Q4	21.7 and 3.2

6. Conduit connection

1	½" PF
2	½" PT
3	½" NPT
4	¾" PF
5	¾" PT
6	¾" NPT
7	None
8	M20 x 1.5P
9	Other

7. Mounting type

X	Refer to mounting table (11th character)

8. Connection type

XX	Refer to mounting table (12th and 13th character)

9. Insert length

X	Refer to insert length table (14th character)

10. Option

0	None
1	Accessories
4	Epoxy coated ALDC head
5	Head material : 304SS (Only for weatherproof head)
6	Head material : 316SS (Only for weatherproof head)
7	Accessories and epoxy coated ALDC head
8	Accessories and head material : 304SS (Only for weatherproof head)
9	Accessories and head material : 316SS (Only for weatherproof head)

1	2	3	4	5	6	7	8	9	10	
R111	**A**	**K**	**1**	**G1**	**1**	**X**	**XX**	**X**	**0**	**Sample ordering code**

Mounting, connection type and insert length table - 11th thru 14th characters

11th character		12th character		13th character		14th character	
Code	Mounting	Code	Connection size and connector material	Code	Connection type	Code	Insert length (mm)
A	None	A	None	A	None	A	100
	Fixed thread lag length	B	⅛" and 304SS	B	PT	B	200
B	80 mm	C	¼" and 304SS	C	NPT	C	300
C	100 mm	D	⅜" and 304SS	D	PF	D	400
D	150 mm	E	½" and 304SS	E	NPS	E	500
E	200 mm	F	¾" and 304SS	F	UNF	F	600
F	Other	G	1" and 304SS	G	BSPT	G	700
	Fixed flange lag length	H	1¼" and 304SS	H	BSPF	H	800
G	80 mm	J	1½" and 304SS	J	MM	J	900
H	100 mm	K	2" and 304SS	K	B16.5 Class 150 RF	K	1,000
J	150 mm	L	3" and 304SS	L	B16.5 Class 150 FF	L	1,500
K	200 mm	M	7/16" and 304SS	M	B16.5 Class 300 RF	M	2,000
L	Other	N	⅛" and 316SS	N	B16.5 Class 300 FF	N	2,500
M	Movable thread	P	¼" and 316SS	O	Sanitary	P	3,000
N	Movable flange	Q	⅜" and 316SS	P	B16.5 Class 600 RF	Q	3,500
P	Compression fitting	R	½" and 316SS	Q	B16.5 Class 600 FF	R	4,000
	Union and nipple length	S	¾" and 316SS	R	JIS 5K RF	S	4,500
Q	100 mm length	T	1" and 316SS	S	JIS 5K FF	T	5,000
R	150 mm length	U	1¼" and 316SS	T	JIS 10K RF	U	6,000
S	Other	V	1½" and 316SS	U	JIS 10K FF	V	7,000
	Nipple length	W	2" and 316SS	V	JIS 20K RF	W	8,000
T	50 mm	X	3" and 316SS	W	JIS 20K FF	X	9,000
U	100 mm	Y	7/16" and 316SS	X	B16.5 Class 1,500 RTJ	Y	10,000
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 14th character, please choose a code of next higher length if applicable length is not.
Actual length shall be specified.

Memo

Sheathed thermocouple
Model : R120 sereis (R series)

Spec. sheet no. RD01-02

Service intended

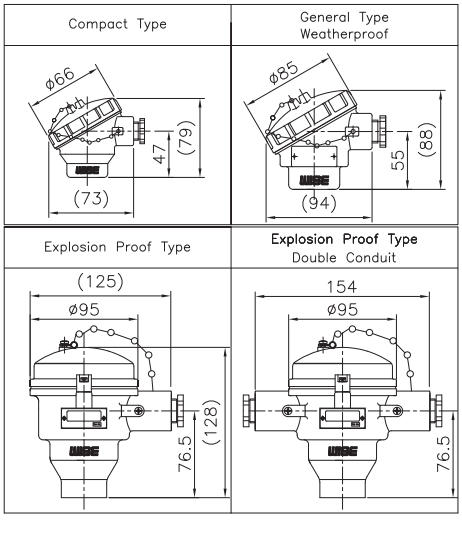
Sheath type thermocouple generally shares the similar principle of protection tube type thermocouple.
However, it has a different construction.
It is filled with inorganic insulating material between the thin wire and the metal sheath, and it shares the same body as one.
Inside the thin stainless steel pipe, thermocouple element is located, and then stainless pipe is filled with a MgO.
Normally, thermocouple is used with a thermowell.
The advantages over protection tube types are ; it has a faster response time, it has a broader temperature range (-200 ~ 1,600 ℃), longer life, it can be bended to install according to its required installation site condition, a better mechanical strength, and a better internal pressure control.

Explosion proof type General type

Standard features

Element
K, E, J, T, N

Head type



Tolerances on temperature reading
Class 1, Class 2 (DIN/IEC584-2, BS/EN60584-2, JIS C1602)
Special, Standard (ASTM E230 E988 ISA-MC96.1)

Head material
ALDC (Standard)
304SS (Not available compact type)
316SS (Not available compact type)

Hot junction shape
Grounded
Ungrounded

Sheath outer diameters
1.0, 1.6, 2.3, 3.2, 4.8, 6.4, 8.0, 9.5 and 12.7 mm
Double element is not available for 1.0 and 1.6 mm sheath outer diameter

Certificates
KCS Ex d IIC T6

1. Base model

R121	Single element
R122	Double (Duplex) element

2. Head & tip shape type

A	General (Weatherproof) and ungrounded
B	General (Weatherproof), ungrounded and spring - loaded
C	General (Weatherproof) and grounded
D	General (Weatherproof), grounded and spring - loaded
E	General (Weatherproof) and exposed
F	Explosion proof and ungrounded
H	Explosion proof and grounded
K	Explosion proof and exposed
L	Compact (Small) and ungrounded
M	Compact (Small) and grounded
N	Compact (Small) and exposed
P	Explosion proof (Double conduit) and ungrounded
Q	Explosion proof (Double conduit) and grounded
R	Explosion proof (Double conduit) and exposed

3. Element (Tolerance)

K	K (0.75)
J	J (0.75)
T	T (0.75)
N	N (0.75)
E	E (0.5)
B	B (0.5)
1	K (0.4)
2	J (0.4)
3	T (0.4)
4	E (0.4)
5	N (0.4)
R	R (0.25)
S	S (0.25)
Z	Other

4. Sheath material

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

5. Sheath outer diameter (mm)

A9	1.0
B9	1.6
C9	2.3
D9	3.2
E9	4.8
F9	6.4
G9	8.0
H9	9.5
L9	12.7

6. Conduit connection

1	½" PF
2	½" PT
3	½" NPT
4	¾" PF
5	¾" PT
6	¾" NPT
7	None
8	M20 x 1.5P
9	Other

7. Mounting type

X	Refer to mounting table (11th character)

8. Connection type

XX	Refer to mounting table (12th and 13th character)

9. Insert length

X	Refer to insert length table (14th character)

10. Option

0	None
1	Accessories
4	Epoxy coated ALDC head
5	Head material : 304SS (Only for weatherproof head)
6	Head material : 316SS (Not available for explosion proof-double conduit type)
7	Accessories and epoxy coated ALDC head
8	Accessories and head material : 304SS (Only for weatherproof head)
9	Accessories and head material : 316SS

1	2	3	4	5	6	7	8	9	10	
R121	**A**	**K**	**1**	**F9**	**1**	**X**	**XX**	**X**	**0**	**Sample ordering code**

Mounting, connection type and insert length table - 11th thru 14th characters

11th character		12th character		13th character		14th character	
Code	Mounting	Code	Connection size and connector material	Code	Connection type	Code	Insert length (mm)
A	None	A	None	A	None	A	100
	Fixed thread lag length	B	⅛" and 304SS	B	PT	B	200
B	80 mm	C	¼" and 304SS	C	NPT	C	300
C	100 mm	D	⅜" and 304SS	D	PF	D	400
D	150 mm	E	½" and 304SS	E	NPS	E	500
E	200 mm	F	¾" and 304SS	F	UNF	F	600
F	Other	G	1" and 304SS	G	BSPT	G	700
	Fixed flange lag length	H	1¼" and 304SS	H	BSPF	H	800
G	80 mm	J	1½" and 304SS	J	MM	J	900
H	100 mm	K	2" and 304SS	K	B16.5 Class 150 RF	K	1,000
J	150 mm	L	3" and 304SS	L	B16.5 Class 150 FF	L	1,500
K	200 mm	M	7/16" and 304SS	M	B16.5 Class 300 RF	M	2,000
L	Other	N	⅛" and 316SS	N	B16.5 Class 300 FF	N	2,500
M	Movable thread	P	¼" and 316SS	O	Sanitary	P	3,000
N	Movable flange	Q	⅜" and 316SS	P	B16.5 Class 600 RF	Q	3,500
P	Compression fitting	R	½" and 316SS	Q	B16.5 Class 600 FF	R	4,000
	Union and nipple length	S	¾" and 316SS	R	JIS 5K RF	S	4,500
Q	100 mm length	T	1" and 316SS	S	JIS 5K FF	T	5,000
R	150 mm length	U	1¼" and 316SS	T	JIS 10K RF	U	6,000
S	Other	V	1½" and 316SS	U	JIS 10K FF	V	7,000
	Nipple length	W	2" and 316SS	V	JIS 20K RF	W	8,000
T	50 mm	X	3" and 316SS	W	JIS 20K FF	X	9,000
U	100 mm	Y	7/16" and 316SS	X	B16.5 Class 1,500 RTJ	Y	10,000
V	150 mm	Z	Other	Y	B16.5 Class 2,500 RTJ	Z	Other
W	Other			Z	Other		
X	Fixed thread						
Z	Other						

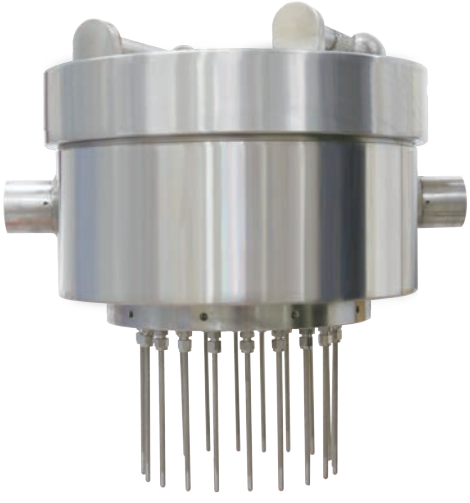
- Note for 14th character, please choose a code of next higher length if applicable length is not. Actual length shall be specified.
- Note for *Y code (Oil sealing type), only available with spring-loaded head type.

Memo

Cool-down and leak detector
Model : R190 (RL series)

Spec. sheet no. RD01-03

Service intended
R190 series are explosion proof temperature sensors with a high accuracy and a high reliability for cryogenic industries such as LNG tank terminal and oxygen generator. The temperature sensors are available as RTD depending on the usage, and it can be designed according to user's request. Furthermore, these sensors can be manufactured according to the requested specification of flange or thread for required measuring points.



Standard features

Junction box
316SS

Element
Pt 100Ω at 0℃

Sheath material
316L SS

Sheath outer diameter
3.2, 4.8 and 6.4 mm

Temperature range
-200 ~ 100 ℃

Maximum measuring points
15 points

Tolerances on temperature reading
Class A : ± (0.15 + 0.002 l t l)
Class B : ± (0.3 + 0.005 l t l)

Certificates
KCS Ex d IIC T6

1. Base model

R190 Cool-down and leak detector

2. Junction box

H Explosion proof type
Z Other

3. Element (Tolerance)

Q Pt 100Ω (B)
9 Pt 100Ω (A)

4. Sheath material

1 316L SS
9 Other

5. Sheath outer diameter (mm)

D 3.2
E 4.8
F 6.4

6. Measuring point

01 1
02 2
03 3
04 4
05 5
06 6
07 7
08 8
09 9
10 10
11 11
12 12
13 13
14 14
15 15

7. Conduit connection

1 ½" PF
2 ½" PT
3 ½" NPT
4 ¾" PF
5 ¾" PT
6 ¾" NPT
7 None
8 M20 x 1.5P
9 Other

8. Connection type

XX Refer to insert length table (12th and 13th character)

9. Insert length

X Refer to insert length table (14th character)

10. Option

0 None
1 Accessories

1	2	3	4	5	6	7	8	9	10
R190	**H**	**Q**	**1**	**F**	**12**	**1**	**XX**	**X**	**1**

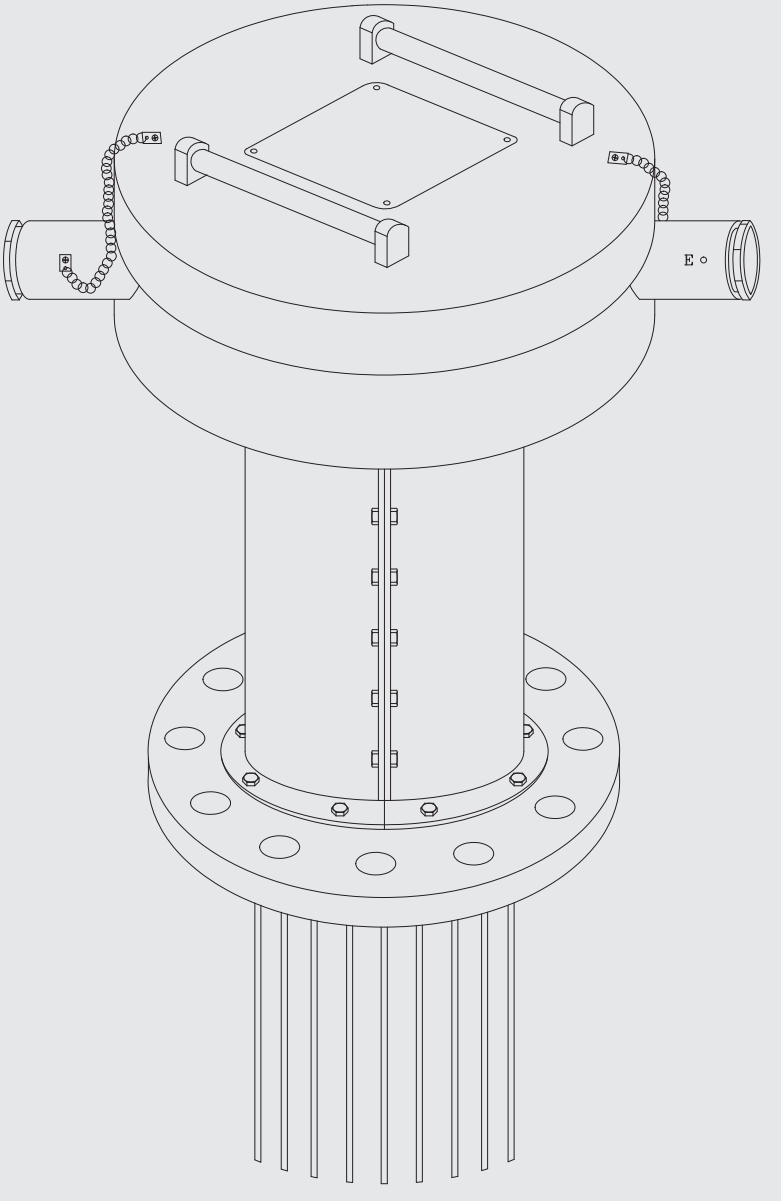
Sample ordering code

Mounting, connection type and insert length table - 12th thru 14th characters

12th character		13th character		14th character	
Code	Connection size and connector material	Code	Connection type	Code	Insert length (m)
A	None	A	None	A	2
B	⅛" and 304SS	B	PT	B	3
C	¼" and 304SS	C	NPT	C	4
D	⅜" and 304SS	D	PF	D	5
E	½" and 304SS	E	NPS	E	6
F	¾" and 304SS	F	UNF	F	7
G	1" and 304SS	G	BSPT	G	8
H	1¼" and 304SS	H	BSPF	H	9
J	1½" and 304SS	J	MM	J	10
K	2" and 304SS	K	B16.5 Class 150 RF	K	15
L	3" and 304SS	L	B16.5 Class 150 FF	L	20
M	7/16" and 304SS	M	B16.5 Class 300 RF	M	25
N	⅛" and 316SS	N	B16.5 Class 300 FF	N	30
P	¼" and 316SS	O	Sanitary	P	35
Q	⅜" and 316SS	P	B16.5 Class 600 RF	Q	40
R	½" and 316SS	Q	B16.5 Class 600 FF	R	45
S	¾" and 316SS	R	JIS 5K RF	S	50
T	1" and 316SS	S	JIS 5K FF	Z	Other
U	1¼" and 316SS	T	JIS 10K RF		
V	1½" and 316SS	U	JIS 10K FF		
W	2" and 316SS	V	JIS 20K RF		
X	3" and 316SS	W	JIS 20K FF		
Y	7/16" and 316SS	X	B16.5 Class 1,500 RTJ		
Z	Other	Y	B16.5 Class 2,500 RTJ		
		Z	Other		

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

R190 : Standard product drawing



Heavy duty type resistance temperature detector
Model : R200

Spec. sheet no. RD02-01

Service intended

Among temperature sensors, it is the most stable and accurate sensor.
It has a better repeatability, and shows more dependable outputs than thermocouple.
It is possible to perform an area measuring, and has a better resistance against the containment . However, it has a slow response time due to its complexity of the resistance element and its big size. It is constructed with an insulated lead wire and with protection tube which is designed to protect the insulated lead wire.

Extended lead wire type

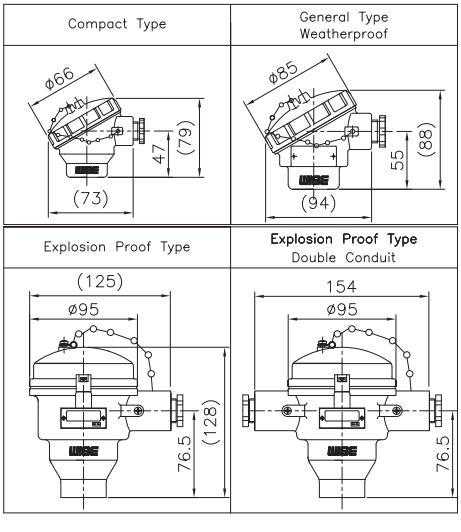
Head type

Standard features

Element

Film sensor
Pt 100Ω at 0 ℃
TCR : 3,850 ppm/k

Head type



Tolerances on temperature reading

Class A : ± (0.15 + 0.002 l t l)
Class B : ± (0.3 + 0.005 l t l)

Head material

ALDC (Standard)

Temperature range

Class A : -60 ~ 250 ℃
Class B : -60 ~ 250 ℃

Sheath material

316L SS

Sheath outer diameter

6.4, 8.0 mm

1. Base model

R201	Heavy duty type resistance temperature detector (Single element)
R202	Heavy duty type resistance temperature detector (Double (Duplex) element)

2. Head type

A	General (Weatherproof)
B	General (Weatherproof) and spring - loaded
F	Explosion proof
R	Extended lead wire
P	Explosion proof (Double conduit)

3. Tolerances on temperature reading

A	A class (-60 ~ 250 ℃)
B	B class (-60 ~ 250 ℃)

4. Sheath material

2	316L SS

5. Sheath outer diameter (mm)

F9	6.4
G9	8.0

6. Conduit connection

1	½" PF
2	½" PT
3	½" NPT
4	¾" PF
5	¾" PT
6	¾" NPT
7	None
8	M20 x 1.5P
9	Other

7. Lead wire length (m)

A	300 mm (Standard), Lead wire type only
B	1 (Lead wire type only)
C	2 (Lead wire type only)
D	3 (Lead wire type only)
E	4 (Lead wire type only)
F	5 (Lead wire type only)
G	Other

8. Mounting type

X	Refer to mounting table (12th character)

9. Connection type

XX	Refer to mounting table (13th and 14th character)

10. Insert length

X	Refer to insert length table (15th character)

11. Option

0	None
1	Accessories
4	Epoxy coated ALDC head
5	Head material : 304SS (Only for weatherproof head)
6	Head material : 316SS (Not available for explosion proof-double conduit type)
7	Accessories and epoxy coated ALDC head
8	Accessories and head material : 304SS (Only for weatherproof head)
9	Accessories and head material : 316SS

1	2	3	4	5	6	7	8	9	10	11	
R201	**A**	**P**	**1**	**F9**	**1**	**A**	**X**	**XX**	**X**	**0**	**Sample ordering code**

Mounting, connection type and insert length table - 12th thru 15th characters

12th character		13th character		14th character		15th character	
Code	Mounting	Code	Connection size and connector material	Code	Connection type	Code	Insert length (mm)
A	None	A	None	A	None	A	100
	Fixed thread lag length	B	⅛" and 304SS	B	PT	B	200
B	80 mm	C	¼" and 304SS	C	NPT	C	300
C	100 mm	D	⅜" and 304SS	D	PF	D	400
D	150 mm	E	½" and 304SS	E	NPS	E	500
E	200 mm	F	¾" and 304SS	F	UNF	F	600
F	Other	G	1" and 304SS	G	BSPT	G	700
	Fixed flange lag length	H	1¼" and 304SS	H	BSPF	H	800
G	80 mm	J	1½" and 304SS	J	MM	J	900
H	100 mm	K	2" and 304SS	K	B16.5 Class 150 RF	K	1,000
J	150 mm	L	3" and 304SS	L	B16.5 Class 150 FF	L	1,500
K	200 mm	M	7/16" and 304SS	M	B16.5 Class 300 RF	M	2,000
L	Other	N	⅛" and 316SS	N	B16.5 Class 300 FF	N	2,500
M	Movable thread	P	¼" and 316SS	O	Sanitary	P	3,000
N	Movable flange	Q	⅜" and 316SS	P	B16.5 Class 600 RF	Q	3,500
P	Compression fitting	R	½" and 316SS	Q	B16.5 Class 600 FF	R	4,000
	Union and nipple length	S	¾" and 316SS	R	JIS 5K RF	S	4,500
Q	100 mm length	T	1" and 316SS	S	JIS 5K FF	T	5,000
R	150 mm length	U	1¼" and 316SS	T	JIS 10K RF	U	6,000
S	Other	V	1½" and 316SS	U	JIS 10K FF	V	7,000
	Nipple length	W	2" and 316SS	V	JIS 20K RF	W	8,000
T	50 mm	X	3" and 316SS	W	JIS 20K FF	X	9,000
U	100 mm	Y	7/16" and 316SS	X	B16.5 Class 1,500 RTJ	Y	10,000
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 15th character, please choose a code of next higher length if applicable length is not. Actual length shall be specified.

Memo

Metallic protection tube resistance temperature detector
Model : R210 series

Spec. sheet no. RD02-02

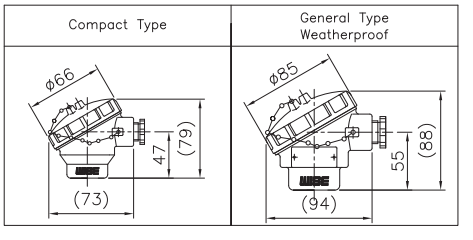
Service intended

Among temperature sensors, it is the most stable and accurate sensor.
It has a better repeatability, and shows more dependable outputs than thermocouple.
It is possible to perform an area measuring, and has a better resistance against the containment .
However, it has a slow response time due to its complexity of the resistance element and its big size.
It is constructed with an insulated lead wire and with protection tube which is designed to protect the insulated lead wire.

Standard features

Element
Pt 100 Ω at 0 ℃
TCR : 3,850 ppm/k

Head type



Tolerances on temperature reading
Class A : ± (0.15 + 0.002 l t l)
Class B : ± (0.3 + 0.005 l t l)

Head material
ALDC (Standard)
304SS (Not available compact type)
316SS (Not available compact type)

Temperature range
-200 ~ 250 ℃ (Mica type element)
-200 ~ 600 ℃ (Film type element)
- Class A (-90 ~ 300 °C)
- ClassB (-200 ~ 600 °C)

Protecting tube material
304SS and 316SS

Protecting tube outer diameter
6.4, 8.0 and 10 mm

1. Base model

R211 Metallic protection tube resistance temperature detector (Single element)

R212 Metallic protection tube resistance temperature detector (Double (Duplex) element)

2. Head type

A General (Weatherproof)

L Compact (Small)

3. Element (Tolerance)

P Pt 100 Ω (B)

9 Pt 100 Ω (A)

4. Tube material

0 304SS

1 316SS

9 Other

5. Protecting tube and sheath outer diameter (mm)

F9 6.4 (Double elements is not available)

G9 8.0

J9 10.0

6. Conduit connection

1 ½" PF

2 ½" PT

3 ½" NPT

4 ¾" PF

5 ¾" PT

6 ¾" NPT

7 None

8 M20 x 1.5P

9 Other

7. Mounting type

X Refer to mounting table (11th character)

8. Connection type

XX Refer to mounting table (12th and 13th character)

9. Insert length

X Refer to insert length table (14th character)

10. Option

0 None

1 Accessories

4 Epoxy coated ALDC head

5 Head material : 304SS (Only for weatherproof head)

6 Head material : 316SS (Only for weatherproof head)

7 Accessories and epoxy coated ALDC head

8 Accessories and head material : 304SS (Only for weatherproof head)

9 Accessories and head material : 316SS (Only for weatherproof head)

1	2	3	4	5	6	7	8	9	10	
R211	**A**	**P**	**1**	**F9**	**1**	**X**	**XX**	**X**	**0**	**Sample ordering code**

Mounting, connection type and insert length table - 11th thru 14th characters

11th character		12th character		13th character		14th character	
Code	Mounting	Code	Connection size and connector material	Code	Connection type	Code	Insert length (mm)
A	None	A	None	A	None	A	100
	Fixed thread lag length	B	⅛" and 304SS	B	PT	B	200
B	80 mm	C	¼" and 304SS	C	NPT	C	300
C	100 mm	D	⅜" and 304SS	D	PF	D	400
D	150 mm	E	½" and 304SS	E	NPS	E	500
E	200 mm	F	¾" and 304SS	F	UNF	F	600
F	Other	G	1" and 304SS	G	BSPT	G	700
	Fixed flange lag length	H	1¼" and 304SS	H	BSPF	H	800
G	80 mm	J	1½" and 304SS	J	MM	J	900
H	100 mm	K	2" and 304SS	K	B16.5 Class 150 RF	K	1,000
J	150 mm	L	3" and 304SS	L	B16.5 Class 150 FF	L	1,500
K	200 mm	M	7/16" and 304SS	M	B16.5 Class 300 RF	M	2,000
L	Other	N	⅛" and 316SS	N	B16.5 Class 300 FF	N	2,500
M	Movable thread	P	¼" and 316SS	O	Sanitary	P	3,000
N	Movable flange	Q	⅜" and 316SS	P	B16.5 Class 600 RF	Q	3,500
P	Compression fitting	R	½" and 316SS	Q	B16.5 Class 600 FF	R	4,000
	Union and nipple length	S	¾" and 316SS	R	JIS 5K RF	S	4,500
Q	100 mm length	T	1" and 316SS	S	JIS 5K FF	T	5,000
R	150 mm length	U	1¼" and 316SS	T	JIS 10K RF	U	6,000
S	Other	V	1½" and 316SS	U	JIS 10K FF	V	7,000
	Nipple length	W	2" and 316SS	V	JIS 20K RF	W	8,000
T	50 mm	X	3" and 316SS	W	JIS 20K FF	X	9,000
U	100 mm	Y	7/16" and 316SS	X	B16.5 Class 1,500 RTJ	Y	10,000
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 14th character, please choose a code of next higher length if applicable length is not. Actual length shall be specified.

Memo

Sheathed type resistance temperature detector
Model : R220 series (R series)

Spec. sheet no. RD02-03

Service intended

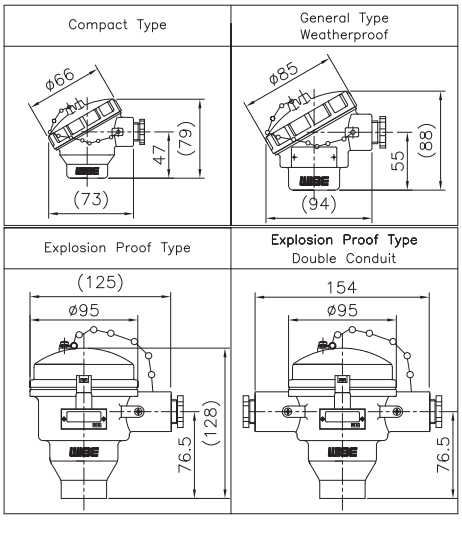
Sheathed type RTD is constructed in a way that monolithic resistance element is connected with MI cable (MgO compacted metal sheathed lead wires), and has a longer life and a fast response time.
High purity white gold resistance wire is used to perform with a better accuracy.
Except the end tip length of 60 mm, it could be bent 2 times more than its out diameter so can be used in the process pipe where it is not easy to install due to the obstacles exist around the installation site.

Explosion proof type | General type

Standard features

Element
Pt 100 Ω at 0 ℃
TCR : 3,850 ppm/k

Head type



Tolerances on temperature reading
Class A : ± (0.15 + 0.002 l t l)
Class B : ± (0.3 + 0.005 l t l)

Head material
ALDC (Standard)
304SS (Not available compact type)
316SS (Not available compact type)

Temperature range
-200 ~ 600 ℃ (Film type element)
- Class A (-90 ~ 300 °C)
- ClassB (-200 ~ 600 °C)

-200 ~ 600 ℃ (Ceramic type element)

Sheath material
316L SS

Sheath outer diameter
3.2, 4.8, 6.4 and 8.0 mm

Certificates
KCS Ex d IIC T6

1. Base model

R221	Sheathed type resistance temperature detector (Single element)
R222	Sheathed type resistance temperature detector (Double (Duplex) element)

2. Head type

A	General (Weatherproof)
B	General (Weatherproof) and spring - loaded
F	Explosion proof
L	Compact (Small)
P	Explosion proof (Double conduit)

3. Element (Tolerance)

Q	Pt 100 Ω (B)
9	Pt 100 Ω (A)

4. Sheath material

1	316SS
7	316L SS
9	Other

5. Sheath outer diameter (mm)

D9	3.2
E9	4.8
F9	6.4
G9	8.0

6. Conduit connection

1	½" PF
2	½" PT
3	½" NPT
4	¾" PF
5	¾" PT
6	¾" NPT
7	None
8	M20 x 1.5P
9	Other

7. Mounting type

X	Refer to mounting table (11th character)

8. Connection type

XX	Refer to mounting table (12th and 13th character)

9. Insert length

X	Refer to insert length table (14th character)

10. Option

0	None
1	Accessories
4	Epoxy coated ALDC head
5	Head material : 304SS (Only for weatherproof head)
6	Head material : 316SS (Not available for explosion proof-double conduit type)
7	Accessories and epoxy coated ALDC head
8	Accessories and head material : 304SS (Only for weatherproof head)
9	Accessories and head material : 316SS

1	2	3	4	5	6	7	8	9	10	
R221	**A**	**Q**	**1**	**F9**	**1**	**X**	**XX**	**X**	**0**	**Sample ordering code**

Mounting, connection type and insert length table - 11th thru 14th characters

11th character		12th character		13th character		14th character	
Code	Mounting	Code	Connection size and connector material	Code	Connection type	Code	Insert length (mm)
A	None	A	None	A	None	A	100
	Fixed thread lag length	B	⅛" and 304SS	B	PT	B	200
B	80 mm	C	¼" and 304SS	C	NPT	C	300
C	100 mm	D	⅜" and 304SS	D	PF	D	400
D	150 mm	E	½" and 304SS	E	NPS	E	500
E	200 mm	F	¾" and 304SS	F	UNF	F	600
F	Other	G	1" and 304SS	G	BSPT	G	700
	Fixed flange lag length	H	1¼" and 304SS	H	BSPF	H	800
G	80 mm	J	1½" and 304SS	J	MM	J	900
H	100 mm	K	2" and 304SS	K	B16.5 Class 150 RF	K	1,000
J	150 mm	L	3" and 304SS	L	B16.5 Class 150 FF	L	1,500
K	200 mm	M	7/16" and 304SS	M	B16.5 Class 300 RF	M	2,000
L	Other	N	⅛" and 316SS	N	B16.5 Class 300 FF	N	2,500
M	Movable thread	P	¼" and 316SS	O	Sanitary	P	3,000
N	Movable flange	Q	⅜" and 316SS	P	B16.5 Class 600 RF	Q	3,500
P	Compression fitting	R	½" and 316SS	Q	B16.5 Class 600 FF	R	4,000
	Union and nipple length	S	¾" and 316SS	R	JIS 5K RF	S	4,500
Q	100 mm length	T	1" and 316SS	S	JIS 5K FF	T	5,000
R	150 mm length	U	1¼" and 316SS	T	JIS 10K RF	U	6,000
S	Other	V	1½" and 316SS	U	JIS 10K FF	V	7,000
	Nipple length	W	2" and 316SS	V	JIS 20K RF	W	8,000
T	50 mm	X	3" and 316SS	W	JIS 20K FF	X	9,000
U	100 mm	Y	7/16" and 316SS	X	B16.5 Class 1,500 RTJ	Y	10,000
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 14th character, please choose a code of next higher length if applicable length is not. Actual length shall be specified.
- Note for *Y code (Oil sealing type), only available with spring-loaded head type.

Memo

Sanitary resistance temperature detector

Model : R231 single element
R232 double element

Spec. sheet no. RD02-04

Service intended

Sanitary RTDs can measure temperature from -50 to 200 °C. These sensors are available in Tri-clamp design with the immersion length from 50 to 250 mm. The wetted part of this assembly is polished to exceed No.4 minimum finish which is required by 3-A sanitary council standard #74-06.

Element

Pt 100 Ω at 0 ℃
TCR : 3,850 ppm/k

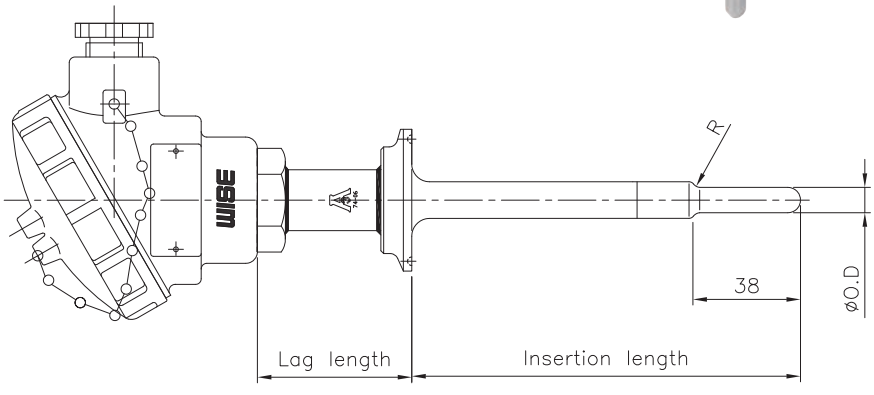
Tolerances on temperature reading

Class A : ± (0.15 + 0.002 l t l)
Class B : ± (0.3 + 0.005 l t l)
* t : Reading temperature (℃)

Element and lead wire configurations

Single element : 2, 3 and 4 wire
Double element : 4 and 6 wire

Outline drawing



Standard features

Head type

Weatherproof (304SS)

Process connection

Tri - clamp connection
1, 1½ and 2S

Stem material

304SS, 316SS

1. Base model

R231	Sanitary resistance temperature detector (Single element)
R232	Sanitary resistance temperature detector (Double (Duplex) element)

2. Head type

A	General (Weatherproof)
P	Other

3. Element (Tolerance)

Q	Pt 100 Ω (B)
9	Pt 100 Ω (A)

4. Insertion material

0	304SS
1	316SS
9	Other

5. Insertion outer diameter (mm)

F9	6.4
G9	8.0
J9	10.0
K9	12.0

6. Conduit connection

1	½" PF
2	½" PT
3	½" NPT
4	¾" PF
5	¾" PT
6	¾" NPT
7	None
8	M20 x 1.5P
9	Other

7. Lag length (mm)

G	80
H	100
J	150

8. Connection size and material

T	1S and 316SS
V	1½S and 316SS
W	2S and 316SS

9. Connection type

A	Tri - clamp

10. Insert length (mm)

A	100
B	200
C	300
D	400
E	500
F	600
G	700
H	800
J	900
K	1,000

11. Option

0	None
1	Accessories

1	2	3	4	5	6	7	8	9	10	11	
R231	**A**	**Q**	**1**	**F9**	**1**	**G**	**T**	**A**	**A**	**0**	**Sample ordering code**

Extension lead wire thermocouple and resistance temperature detector

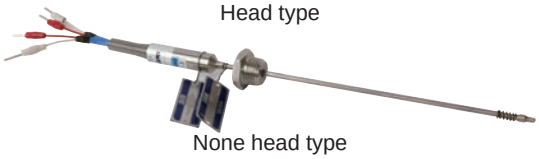
Model : R300 series

Spec. sheet no. RD03-01

Service intended

This type of detector does not use terminal head, rather it directly connects to an indicator or a transmitter. It is very useful where the distance between measuring parts and the location of its head is too far. The measuring parts and its head can be connected by using an extension wire. Extension wire can be selected according to its installation site condition, its protection shape of armored tube, and its wire covering material.

Head type



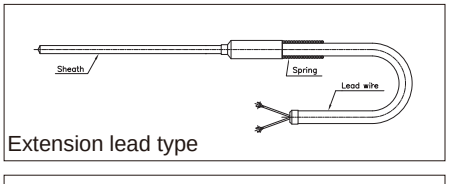
None head type

Standard features

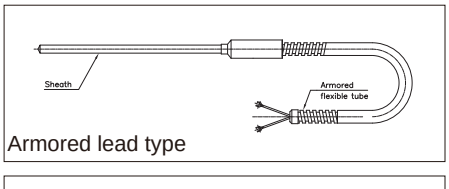
Element

Thermocouple : K, E, J, T, N, R, S, B
RTD : Pt 100 Ω at 0℃ (Ceramic and Mica type)

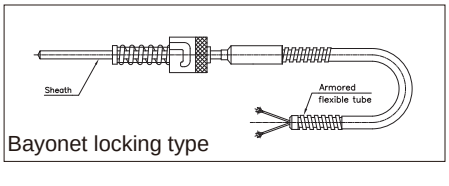
Basic outline drawing



Extension lead type



Armored lead type



Bayonet locking type

Tolerances on temperature reading

■ Thermocouple
Class 1, Class 2 (DIN/IEC584-2, BS/EN60584-2, JIS C1602)
Special, Standard (ASTM E230 E988 ISA-MC96.1)

■ R.T.D.
Class A : ± (0.15 + 0.002 l t l)
Class B : ± (0.3 + 0.005 l t l)

Sheath outer diameter

■ Thermocouple
1.0, 1.6, 2.3, 3.2, 4.8, 6.4, 8.0, 9.5 and 12.7 mm
* Double element is not available for 1.0 and 1.6 mm sheath outer diameter

■ R.T.D.
3.2, 4.8, 6.4 and 8.0 mm

Sensing element structure

Protection tube or sheathed

Protecting tube outer diameter

6.4, 8.0, 10.0, 12.0 and 15.0 mm

1. Base model

R311	Extension lead type single element
R312	Extension lead type double element
R321	Armored lead type single element
R322	Armored lead type double element
R331	Bayonet locking type single element
R332	Bayonet locking type double element

2. Head type

A	General (Weatherproof)
P	None head

3. Element (Tolerance)

K	K (0.75)	**3**	T (0.4)
J	J (0.75)	**4**	E (0.4)
T	T (0.75)	**5**	N (0.4)
N	N (0.75)	**R**	R (0.25)
E	E (0.5)	**S**	S (0.25)
B	B (0.5)	**Q**	Pt 100 Ω (B)
1	K (0.4)	**9**	Pt 100 Ω (A)
2	J (0.4)	**Z**	Other

4. Sheath or protecting tube material

0	304SS
1	316SS
2	Inconel 600
3	310SS
4	446SS
5	347SS
6	321SS
7	316L SS
9	Other

5. Sheath or protecting tube outer diameter (mm)

A9	1.0 (Sheath / Single TC only)
B9	1.6 (Sheath / Single TC only)
C9	2.3 (Sheath / TC only)
D9	3.2 (Sheath)
E9	4.8 (Sheath)
F9	6.4 (Sheath)
G9	8.0 (Sheath)
H9	9.5 (Sheath / TC only)
L9	12.7 (Sheath / TC only)
E8	4.8 (Tube / Not available for double RTD)
F8	6.4 (Tube)
G8	8.0 (Tube)
J0	10.0 (Tube)
K9	12.0 (Tube)
M9	15.0 (Tube)

6. Conduit connection

1	½" PF
2	½" PT
3	½" NPT
4	¾" PF
5	¾" PT
6	¾" NPT
7	None
8	M20 x 1.5P
9	Other

7. Lead wire length (m)

A	300 mm (Standard), Lead wire type only
B	1 (Lead wire type only)
C	2 (Lead wire type only)
D	3 (Lead wire type only)
E	4 (Lead wire type only)
F	5 (Lead wire type only)
G	Other

8. Mounting type

X	Refer to mounting table (12th character)

9. Connection type

XX	Refer to mounting table (13th and 14th character)

10. Insert length

X	Refer to insert length table (15th character)

11. Option

00	None
01	Accessories
1A	Epoxy coated ALDC head
1B	Head material : 304SS
1C	Head material : 316SS
1D	Accessories and epoxy coated ALDC head
1E	Accessories and head material : 304SS
1F	Accessories and head material : 316SS

1	2	3	4	5	6	7	8	9	10	11	
R311	**P**	**K**	**1**	**F9**	**1**	**A**	**X**	**XX**	**X**	**00**	**Sample ordering code**

Mounting, connection type and insert length table - 11th thru 14th characters

12th character		13th character		14th character		15th character	
Code	Mounting	Code	Connection size and connector material	Code	Connection type	Code	Insert length (mm)
A	None	A	None	A	None	A	100
	Fixed thread lag length	B	⅛" and 304SS	B	PT	B	200
B	80 mm	C	¼" and 304SS	C	NPT	C	300
C	100 mm	D	⅜" and 304SS	D	PF	D	400
D	150 mm	E	½" and 304SS	E	NPS	E	500
E	200 mm	F	¾" and 304SS	F	UNF	F	600
F	Other	G	1" and 304SS	G	BSPT	G	700
	Fixed flange lag length	H	1¼" and 304SS	H	BSPF	H	800
G	80 mm	J	1½" and 304SS	J	MM	J	900
H	100 mm	K	2" and 304SS	K	B16.5 Class 150 RF	K	1,000
J	150 mm	L	3" and 304SS	L	B16.5 Class 150 FF	L	1,500
K	200 mm	M	7/16" and 304SS	M	B16.5 Class 300 RF	M	2,000
L	Other	N	⅛" and 316SS	N	B16.5 Class 300 FF	N	2,500
M	Movable thread	P	¼" and 316SS	O	Sanitary	P	3,000
N	Movable flange	Q	⅜" and 316SS	P	B16.5 Class 600 RF	Q	3,500
P	Compression fitting	R	½" and 316SS	Q	B16.5 Class 600 FF	R	4,000
	Union and nipple length	S	¾" and 316SS	R	JIS 5K RF	S	4,500
Q	100 mm length	T	1" and 316SS	S	JIS 5K FF	T	5,000
R	150 mm length	U	1¼" and 316SS	T	JIS 10K RF	U	6,000
S	Other	V	1½" and 316SS	U	JIS 10K FF	V	7,000
	Nipple length	W	2" and 316SS	V	JIS 20K RF	W	8,000
T	50 mm	X	3" and 316SS	W	JIS 20K FF	X	9,000
U	100 mm	Y	7/16" and 316SS	X	B16.5 Class 1,500 RTJ	Y	10,000
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 15th character, please choose a code of next higher length if applicable length is not. Actual length shall be specified.
- Note for *Y code (Oil sealing type), only available with spring-loaded head type.

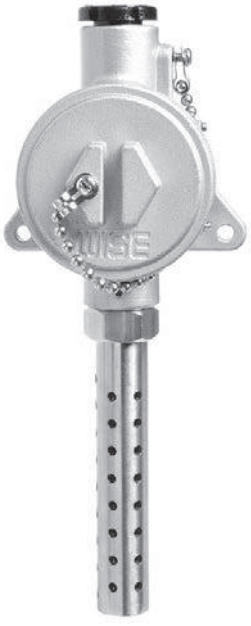
Memo

Resistance temperature detector for room and refrigerator
Model : R430

Spec. sheet no. RD04-01

Service intended
Model R430 temperature sensor incorporates a built-in platinum resistance which is suitable for indoor and ducting area use. Its application expands to buildings, storage rooms, and HVAC systems, and it delivers accurate detection and indication of current temperature.

- High reliable Pt 100 Ω output.
- Quick response and little hysteresis.
- Small and compact design.
- Good apperance and easy installation.
- Low cost sensing element.



Standard features

Head
Aluminium casting

Enclosure
Weatherproof : R430W
Explosion proof : R430E

Element
Pt 100 Ω at 0 ℃, 316L SS
TCR : 3,850 ppm/k

Protecting tube and shroud tube material
304SS (Tube type)
316L SS (Sheath type)

Protecting tube outer diameter
8 mm (Standard)

Shroud tube diameter and length
19 and 100 mm

Working temperature
-50 ~ 200 ℃

Tolerances on temperature reading
Class A : ± (0.15 + 0.002 l t l)
Class B : ± (0.3 + 0.005 l t l)

Main order

Ordering information

1. Base model

R430	RTD for room and refrigerator

2. Head type

W	Weatherproof
E	Explosion proof

3. Element

P	Pt 100 Ω (Tube type / B)
Z	Pt 100 Ω (Sheath type / B)
8	Pt 100 Ω (Tube type / A)
9	Pt 100 Ω (Sheath type / A)

4. Tube material

0	304SS, Tube type only
1	316L SS, Sheath type only

5. Tube outer diameter (mm)

F9	6.4
G9	8.0

6. Conduit connection

1	½" PF
2	⅜" PF

7. Mounting type

Z	Surface mounting

8. Connection type

AA	None

9. Tube length (mm)

A	100
B	Other

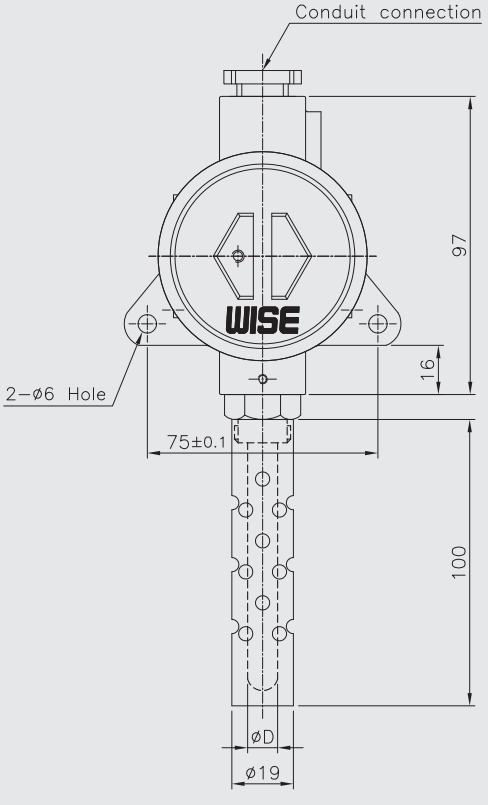
10. Option

0	None

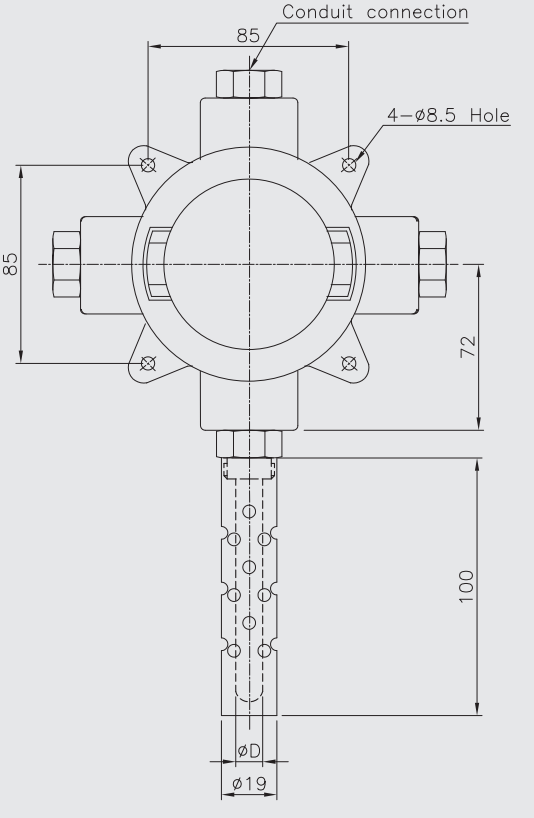
1	2	3	4	5	6	7	8	9	10	
R430	**W**	**P**	**0**	**G9**	**1**	**Z**	**AA**	**A**	**0**	**Sample ordering code**

R430 : Type of mounting

CODE W (Weatherproof)



CODE E (Explosion proof)



Memo

Multi point thermocouple and resistance temperature detector
Model : R500 series

Spec. sheet no. RD05-01

Service intended

This type of detector is designed to be used in a situation where the user wants to measure the distributed temperature of a reactor or a container. It can measure horizontally distributed temperature and also can measure the temperature in each depth of the container or the reactor. It is also designed to consider the size of nozzle, installation space and requirement and convenience of repairing and replacing. WISE Control Inc. can manufacture any types of multi point temperature sensors, and upon request of the customer, we can employ the requested material of protection tube, the material of sheath, size, measuring points and the method of attaching the sensor.
Especially, we can provide the temperature sensors without protection tube in a high pressure line by employing our own safety measures. The temperature sensors for junction box to connect the terminal can be manufactured in a both non-explosion proof and explosion proof type.

Standard features

Element

Thermocouple : K, E, J, T, N
R.T.D. : Pt 100 Ω at 0 ℃

Number of measuring temperature point

Possible to manufacture according to customer's required number of points within the allowed range of nozzle bore

Junction box material

Aluminium (Standard)
Stainless steel

Sheath outer diameter

■ Thermocouple
1.0, 1.6, 2.3, 3.2, 4.8, 6.4, 8.0, 9.5 and 12.7 mm
* Double element is not available for 1.0 and 1.6 mm sheath outer diameter

■ R.T.D.
3.2, 4.8, 6.4 and 8.0 mm

Tolerances on temperature reading

■ Thermocouple
Class 1, Class 2 (DIN/IEC584-2, BS/EN60584-2, JIS C1602)
Special, Standard (ASTM E230 E988 ISA-MC96.1)

■ R.T.D.
Class A : ± (0.15 + 0.002 l t l)
Class B : ± (0.3 + 0.005 l t l)

1. Base model

R511	Thermocouple single element
R512	Thermocouple double element
R521	RTD single element
R522	RTD double element

2. Head and stem type

0	General and protection tube
1	General and non - protection tube
2	Explosion proof and protection tube
3	Explosion proof and non - protection tube
9	Other

3. Head extension type and sealing location

0	Nipple and head
1	Nipple and flange
2	Union - Nipple and head
3	Union - Nipple and flange

4. Element (Tolerance)

K	K (0.75)	**1**	K (0.4)
J	J (0.75)	**2**	J (0.4)
T	T (0.75)	**3**	T (0.4)
N	N (0.75)	**4**	E (0.4)
E	E (0.5)	**5**	N (0.4)
Q	Pt 100 Ω (B)	**9**	Pt 100 Ω (A)
Z	Other		

5. Number of measuring temperature point

A	2	**J**	10
B	3	**K**	11
C	4	**L**	12
D	5	**M**	13
E	6	**N**	14
F	7	**P**	15
G	8	**Z**	Other
H	9		

6. Sheath outer diameter (mm)

0	1.6	**5**	1.6 / weld PAD
1	3.2	**6**	3.2 / weld PAD
2	4.8	**7**	4.8 / weld PAD
3	6.4	**8**	6.4 / weld PAD
4	8.0	**9**	8.0 / weld PAD

7. Sheath material

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

8. Protecting tube material

1	316SS
2	Inconel
3	310SS
4	446SS
5	347SS
6	321SS
7	Other

9. Process connection

XX	Refer to connection table (12 th and 13 th character)

10. Insert length

X	Refer to insert length table (14th character)

11. Option

0	None
1	Accessories

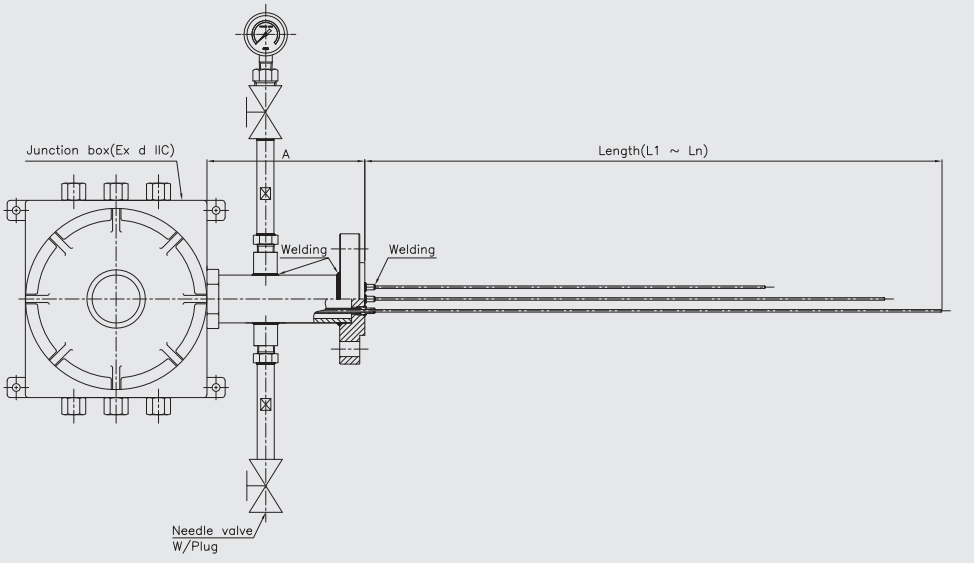
1	2	3	4	5	6	7	8	9	10	11	
R511	**0**	**3**	**K**	**J**	**3**	**1**	**1**	**XX**	**X**	**0**	**Sample ordering code**

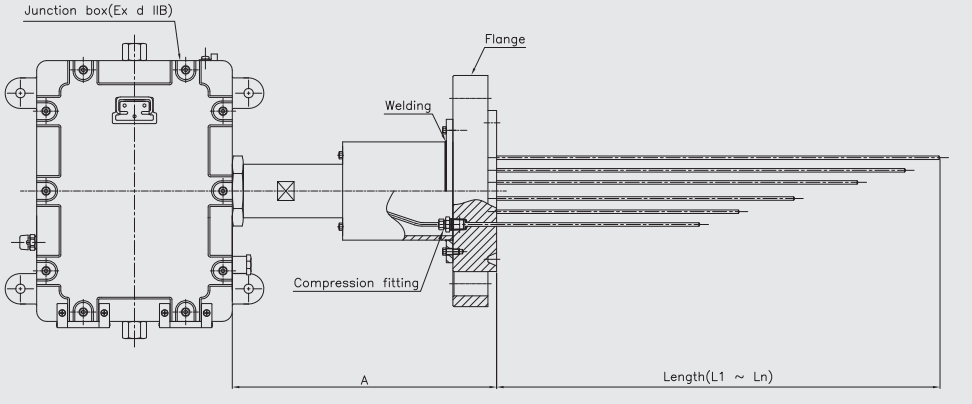
Mounting, connection type and insert length table - 12th thru 14th characters

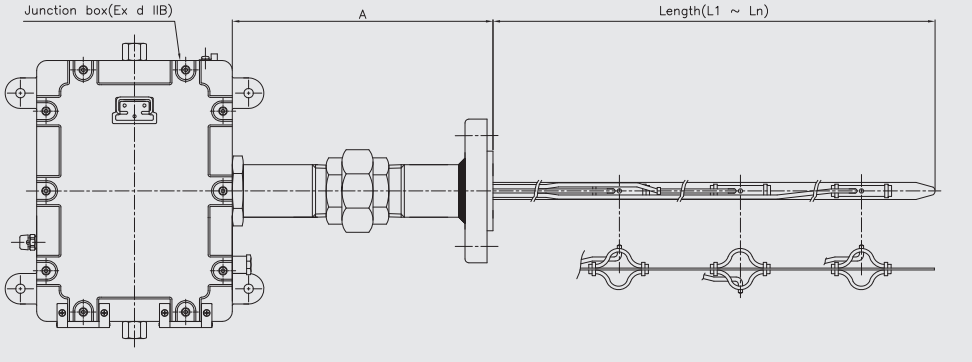
12th character		13th character		14th character	
Code	Connection size	Code	Connection type	Code	Insertion length (m)
0	1"	A	NPT	A	2
1	1¼"	B	PT	B	3
2	1½"	C	B16.5 Class 150 RF	C	4
3	2"	D	B16.5 Class 150 FF	D	5
4	2½"	E	B16.5 Class 300 RF	E	6
5	3"	F	B16.5 Class 300 FF	F	7
6	4"	G	B16.5 Class 600 RF	G	8
7	6"	H	B16.5 Class 600 FF	H	9
9	Other	I	B16.5 Class 600 RTJ	J	10
		J	B16.5 Class 900 RF	K	15
		K	B16.5 Class 900 FF	L	20
		L	B16.5 Class 1,500 RF	M	25
		M	B16.5 Class 1,500 FF	N	30
		N	B16.5 Class 1,500 RTJ	P	35
		P	B16.5 Class 2,500 RF	Q	40
		Q	B16.5 Class 2,500 FF	R	45
		R	B16.5 Class 2,500 RTJ	S	50
		S	JIS 10K RF	Z	Other
		T	JIS 10K FF		
		U	JIS 20K RF		
		V	JIS 20K FF		
		Z	Other		

■14th characters note : Please choose the longest among measuring points.

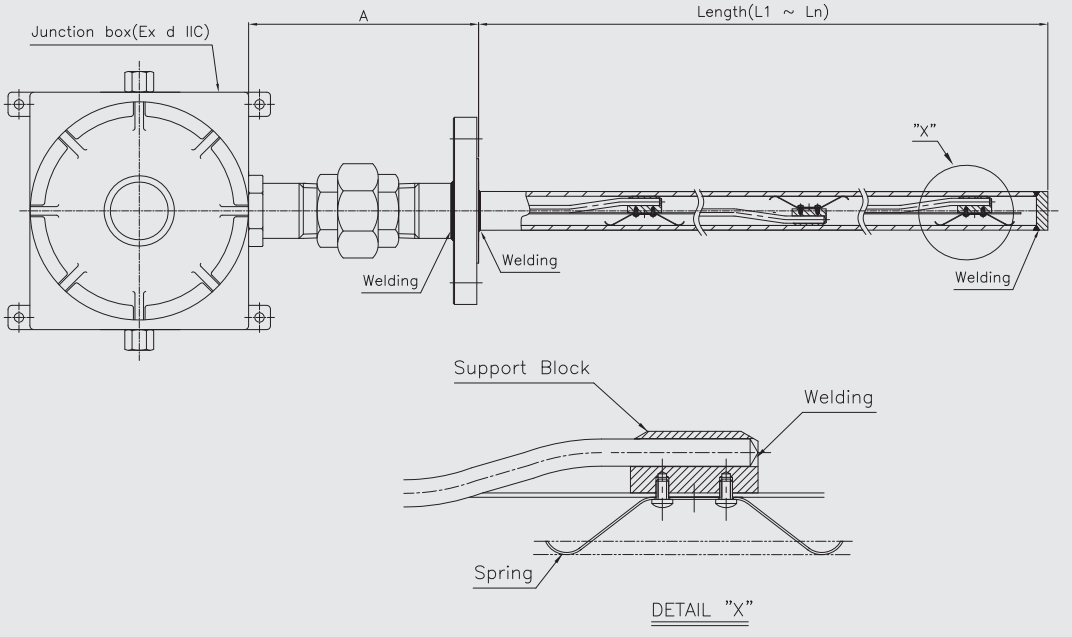
R500 : Standard product drawing (1/2)

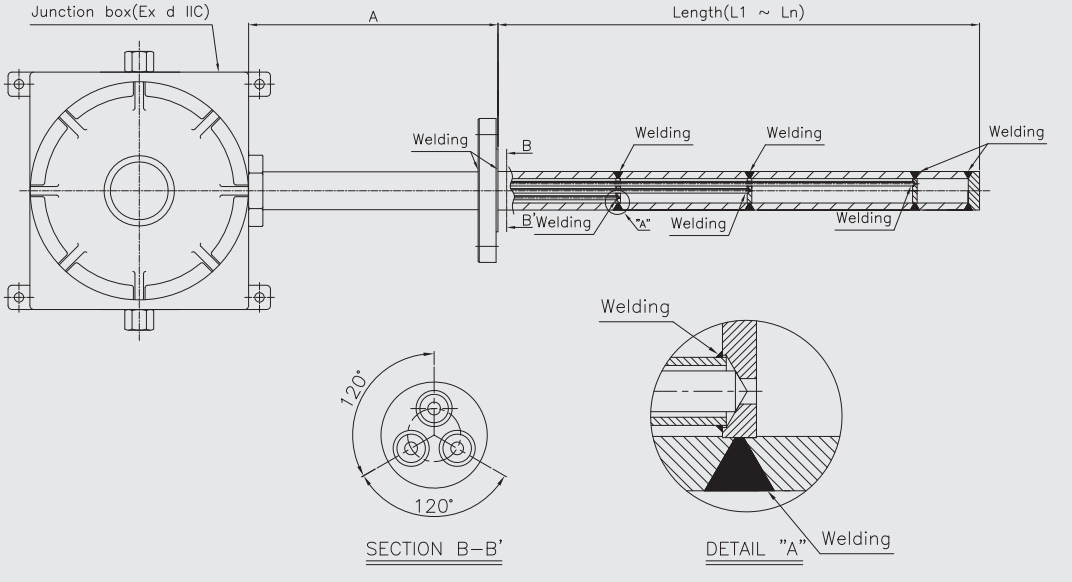






R500 : Standard product drawing (2/2)





Memo

Tube skin thermocouple and resistance temperature detector
Model : R600 series

Spec. sheet no. RD06-01

Service intended
This tube skin temperature sensor is designed to measure the surface temperature of a pipe or a tube used in a boiler, a furnace, a heat exchanger, and a reactor. It is constructed to resist against high temperature and a corrosive agents by tightly attaching the sensor to the measuring area by welding a knife edge pad or a plate weld pad. Furthermore, to protect the pad and the sheath from the heat expansion, it employs a coil shaped design.

Standard features

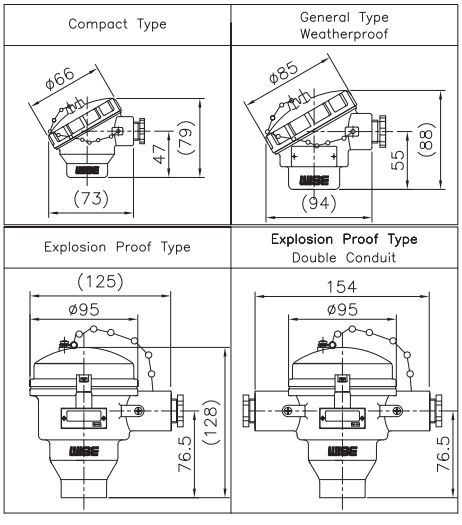
Element
Thermocouple : K, E, J, T, N
R.T.D. : Pt 100Ω at 0 ℃

Tolerances on temperature reading
■ Thermocouple
Class 1, Class 2 (DIN/IEC584-2, BS/EN60584-2, JIS C1602)
Special, Standard (ASTM E230 E988 ISA-MC96.1)

■ R.T.D.
Class A : ± (0.15 + 0.002 I t I)
Class B : ± (0.3 + 0.005 I t I)

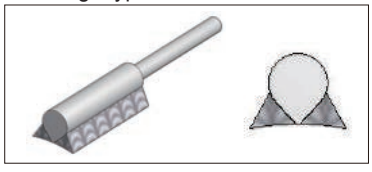
Sheath outer diameter
■ Thermocouple
1.0, 1.6, 2.3, 3.2, 4.8, 6.4, 8.0, 9.5 and 12.7 mm
⋆ Double element is not available for 1.0 and 1.6 mm sheath outer diameter

■ R.T.D.
3.2, 4.8, 6.4 and 8.0 mm

Head type


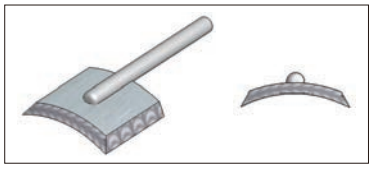
Head material
ALDC (Standard)
304SS (Not available compact type)
316SS (Not available compact type)

Tube skin type
knife edge type



⋆ Only available for 6.4, 8.0, 9.5 and 12.7 mm diameters of thermocouple

Pad type



1. Base model

R601	Head assembly, single element
R602	Head assembly, double element
R611	Extension lead wire, single element
R612	Extension lead wire, double element

2. Head type

C	General (Weatherproof)
H	Explosion proof
Q	None, extension lead wire
P	Explosion proof (Double conduit)
Z	Other

3. Element (Tolerance)

K	K (0.75)	**1**	K (0.4)
J	J (0.75)	**2**	J (0.4)
T	T (0.75)	**3**	T (0.4)
N	N (0.75)	**4**	E (0.4)
E	E (0.5)	**5**	N (0.4)
Q	Pt 100 Ω (B)	**9**	Pt 100 Ω (A)
Z	Other		

4. Sheath material

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

5. Sheath outer diameter (mm)

A	1.0	**F**	6.4
B	1.6	**G**	8.0
C	2.3	**H**	9.5
D	3.2	**L**	12.7
E	4.8		

6. Tube skin type

7	Plate
8	Knife edge (Only thermocouple and not available less than sheath outer diameter 6.4 mm)
9	Other

7. Conduit connection

1	½" PF
2	½" PT
3	½" NPT
4	¾" PF
5	¾" PT
6	¾" NPT
7	None
8	M20 x 1.5P
9	Other

8. Mounting type

X	Refer to mounting table (11th character)

9. Connection type

XX	Refer to connection table (12 th and 13 th character)

10. Insert length

X	Refer to insert length table (14th character)

11. Option

0	None
1	Accessories
4	Epoxy coated ALDC head
5	Head material : 304SS (Only for weatherproof head)
6	Head material : 316SS (Not available for explosion proof-double conduit type)
7	Accessories and epoxy coated ALDC head
8	Accessories and head material : 304SS
9	Accessories and head material : 316SS

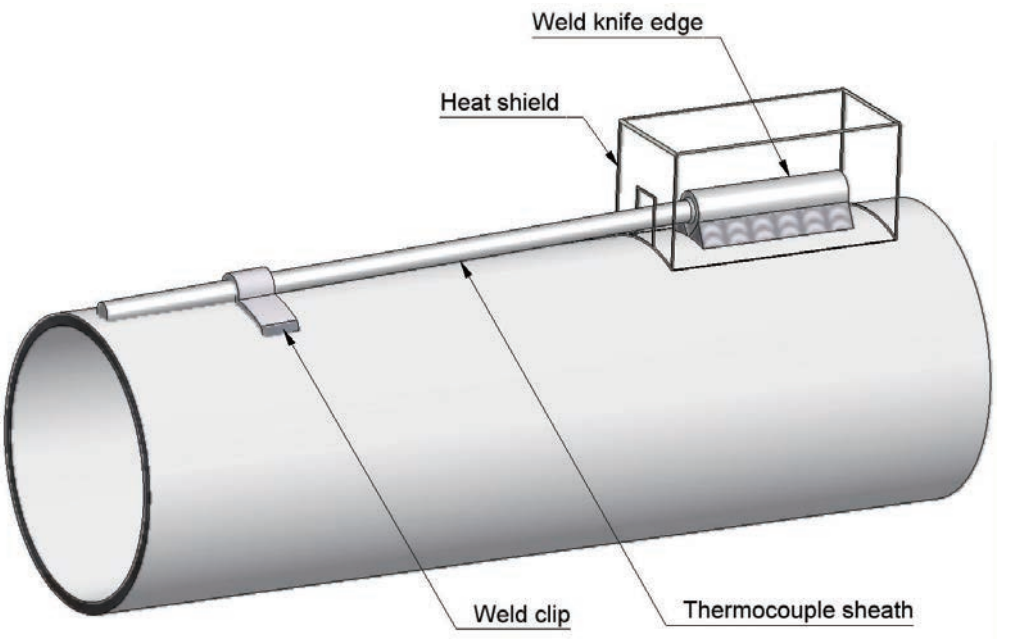
1	2	3	4	5	6	7	8	9	10	11	
R601	**H**	**K**	**1**	**G**	**7**	**2**	**X**	**XX**	**X**	**0**	**Sample ordering code**

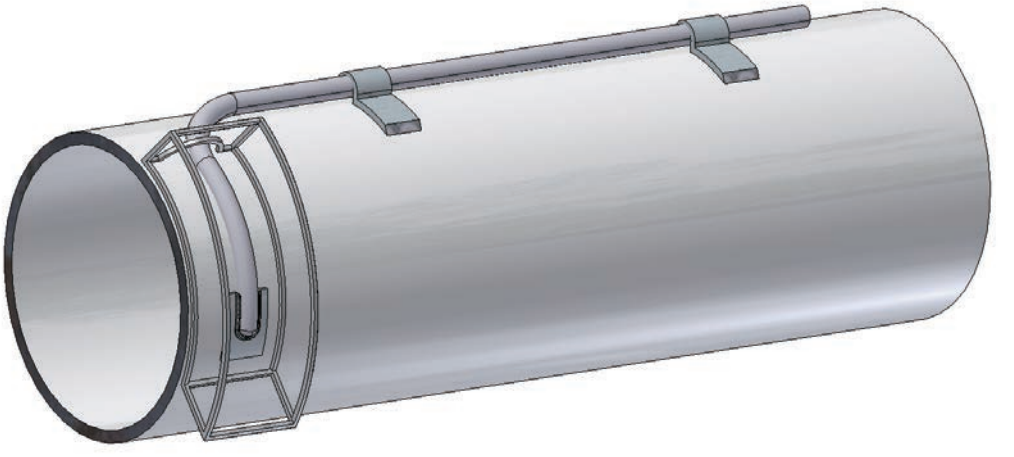
Mounting, connection type and insert length table - 11th thru 14th characters

11th character		12th character		13th character		14th 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	⅛" and 304SS	B	PT	B	3
B	80 mm	C	¼" and 304SS	C	NPT	C	4
C	100 mm	D	⅜" and 304SS	D	PF	D	5
D	150 mm	E	½" and 304SS	E	NPS	E	6
E	200 mm	F	¾" and 304SS	F	UNF	F	7
F	Other	G	1" and 304SS	G	BSPT	G	8
	Fixed flange lag length	H	1¼" and 304SS	H	BSPF	H	9
G	80 mm	J	1½" 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	⅛" and 316SS	N	B16.5 Class 300 FF	N	30
M	Movable thread	P	¼" and 316SS	O	Sanitary	P	35
N	Movable flange	Q	⅜" and 316SS	P	B16.5 Class 600 RF	Q	40
P	Compression fitting	R	½" and 316SS	Q	B16.5 Class 600 FF	R	45
	Union and nipple length	S	¾" and 316SS	R	JIS 5K RF	S	50
Q	100 mm length	T	1" and 316SS	S	JIS 5K FF	Z	Other
R	150 mm length	U	1¼" and 316SS	T	JIS 10K RF		
S	Other	V	1½" and 316SS	U	JIS 10K FF		
	Nipple length	W	2" and 316SS	V	JIS 20K RF		
T	50 mm	X	3" and 316SS	W	JIS 20K FF		
U	100 mm	Y	7/16" and 316SS	X	B16.5 Class 1,500 RTJ		
V	150 mm	Z	Other	Y	B16.5 Class 2,500 RTJ		
W	Other			Z	Other		
X	Fixed thread						
Z	Other						

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

R600 : Type of mounting





Non-metallic protection tube thermocouple
Model : R700 series

Spec. sheet no. RD07-01

Service intended

This thermocouple is the combination of a precious metal such as platinum and rhodium alloy with non - metallic materials such as alumina and ceramic which can withstand a high temperature.
It is mainly used in a furnace, kilns, and a production line of glass and ceramic.

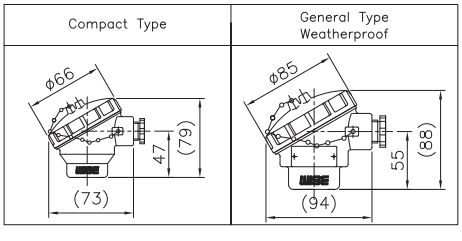
- Furnaces, kilns and ovens
- Furnaces with oxidizing and neutral atmosphere
- Glass, fiber and ceramic industries

Standard features

Element

- Type R (87 % Pt, 13 % Rh / Pt)
- Type S (90 % Pt, 10 % Rh / Pt)
- Type B (70 % Pt, 30 % Rh / 94 % Pt, 6 % Rh)
- Type K

Head type



Tolerances on temperature reading

"K" type : Class 2 (0.75 %)
Standard (0.75 %)
"R", "S" type : Class 2 (0.25 %)
Standard (0.5 %)
"B" type : Class 3 (0.5 %)
Standard (0.5%)

Head material

ALDC (Standard)
304SS (Not available compact type)
316SS (Not available compact type)

Element outer diameter

"K" type : 3.2 mm
"R", "S", "B" type : 0.5 mm

Protecting tube material and outer diameter

Material	Outer diameter (mm)
SSA - S (99.5 % Alumina)	8, 10, 13, 15, 17, 21, 25
HB (60 % Alumina - 40 % Silica)	8, 10, 13, 15, 17, 21, 25
GK - Sic (90 % SiC)	25, 30, 40

1. Base model

R701	Non-metalic protection tube thermocouple (Single element)
R702	Non-metalic protection tube thermocouple (Double (Duplex) element)

2. Head type

0	General (Weatherproof)
2	None

3. Element

K	K (0.75)
B	B (0.5)
R	R (0.25)
S	S (0.25)

4. Mounting type and extension length (mm)

A	None	**K**	Fixed flange 300
B	Support tube 100	**L**	Movable thread 100
C	Support tube 150	**M**	Movable thread 150
D	Support tube 300	**N**	Movable thread 300
E	Fixed thread 100	**P**	Movable flange 100
F	Fixed thread 150	**Q**	Movable flange 150
G	Fixed thread 300	**R**	Movable flange 300
H	Fixed flange 100	**Z**	Other
J	Fixed flange 150		

5. Outer protection tube outer diameter (mm)

00	8	**40**	21
10	10	**50**	25
20	13	**60**	30
25	15	**70**	40
30	17		

6. Outer protection tube material

0	316SS	**5**	Inconel
1	SSA - S (8 ~ 25 mm)	**6**	446SS
3	HB (8 ~ 21 mm)	**7**	Other
4	GK - Sic (25 ~ 40 mm)	**8**	310SS

7. Inner tube material

0	None
1	SSA - S
3	HB
5	Inconel
9	Other

8. Connection type

XX	Refer to connection table (12th and 13th character)

9. Insert length

X	Refer to insert length table (14th character)

10. Option

0	None
1	Accessories
4	Epoxy coated ALDC head
5	Head material : 304SS
6	Head material : 316SS
7	Accessories and epoxy coated ALDC head
8	Accessories and head material : 304SS
9	Accessories and& head material : 316SS

1	2	3	4	5	6	7	8	9	10	
R701	**0**	**K**	**B**	**00**	**7**	**0**	**XX**	**X**	**4**	**Sample ordering code**

Mounting, connection type and insert length table - 12th thru 14th characters

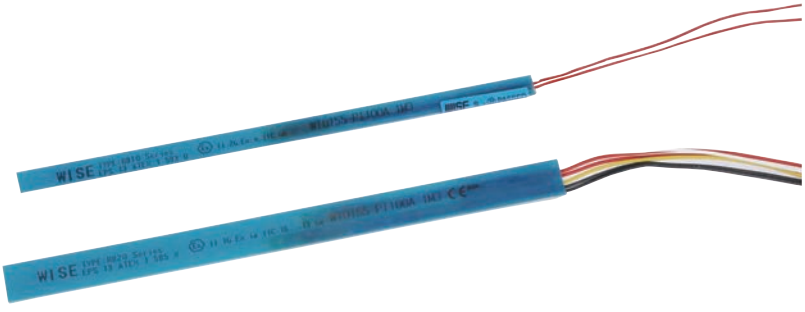
12th character		13th character		14th character	
Code	Connection size	Code	Connection type	Code	Insertion length (mm)
A	None	A	None	A	100
E	½" (15A)	B	PT	B	200
F	¾" (20A)	C	NPT	C	300
G	1" (25A)	D	PF	D	400
H	1¼" (32A)	K	B16.5 Class 150 RF	E	500
J	1½" (40A)	L	B16.5 Class 150 FF	F	600
K	2" (50A)	M	B16.5 Class 300 RF	G	700
L	2½" (65A)	N	B16.5 Class 300 FF	H	800
M	3" (80A)	P	B16.5 Class 600 RF	J	900
Z	Other	Q	B16.5 Class 600 FF	K	1,000
		R	JIS 5K RF	L	1,500
		S	JIS 5K FF	M	2,000
		T	JIS 10K RF	Z	Other
		U	JIS 10K FF		
		V	JIS 20K RF		
		W	JIS 20K FF		
		Z	Other		

Note : Please choose a code of next higher length if applicable length is not. Actual length shall be specified.

Memo

Increased safety type stator winding RTD
Model : R810 series

Spec. sheet no. RD08-01



Service intended
The purpose of the stator winding RTD is to mainly detect and prevent overheating of motors. It is inserted in between a stator and a slot to measure a temperature. Stator winding RTD uses the phenomenon of changing electric resistance to measure a temperature. Since it has high stability and sensitivity, it is used to measure a temperature precisely. Also, it is made of a nonmetallic material, and therefore it has a structure of protecting element. It is designed to get flexibility and endure vibration and high pressure.

Standard features

Body material
High temperature epoxy glass

Temperature limit
Class F : 155 ℃ (311 ℉)
Class H : 180 ℃ (356 ℉)

Lead wires
3 wire or 4 wire, copper, AWG #22 (With FEP or polyimide insulation)

Ambient temperature
Tamb = -40 ~ 80 ℃ : T6
Tamb = -40 ~ 95 ℃ : T5
Tamb = -40 ~ 130 ℃ : T4
Tamb = -40 ~ 180 ℃ : T3

Working temperature
-50 ~ 180 ℃

Standard
Explosive atmospheres. Equipment. General requirements
- IEC 60079-0 / EN 60079-0 : 2009

Electrical apparatus for explosive gas atmospheres. Increased safety "e"
- IEC 60079-7 / EN 60079-7 : 2007

Certificates
KCS Ex e IIC Gb
ATEX II 2G Ex e IIC Gb
IECEx Ex e IIC Gb

1. Base model

R811	RTD single element - 3 wire
R812	RTD double element - 6 wire
R813	RTD single element - 3 wire with shield wire
R814	RTD double element - 6 wire with shield wire
R815	RTD single element - 4 wire
R816	RTD double element - 8 wire
R817	RTD single element - 4 wire with shield wire
R818	RTD double element - 8 wire with shield wire

2. Explosion proof type

A	ATEX II 2G Ex e IIC Gb
B	IECEx e IIC Gb
C	KCS Ex e IIC Gb

3. Element

1	Platinum (0.00385 TCR), Class "AA" - EN 60751
2	Platinum (0.00385 TCR), Class "A" - EN 60751
3	Platinum (0.00385 TCR), Class "B" - EN 60751
0	Other

4. Temperature limited

F	Class F, 155 ℃ (311 ℉)
H	Class H, 180 ℃ (356 ℉)

5. Body thickness

A1	0.079" (2.0 mm)

6. Body length (mm)

1	6 (W) x 155 (L) - Single element
2	11 (W) x 155 (L) - Double element
0	Other - Min. 6 (W) ~ Max. 14 (W) x Min. 155 (L)

7. Lead wire insulation

F	FEP

8. Lead wire length (m)

L1	1
L2	2
L3	3
L4	4
L5	5
L6	6
L7	7
L8	8
L9	9
L0	Other (Min. 300 mm)

9. Lead wire color

E	EN code
K	KS code
Z	Other

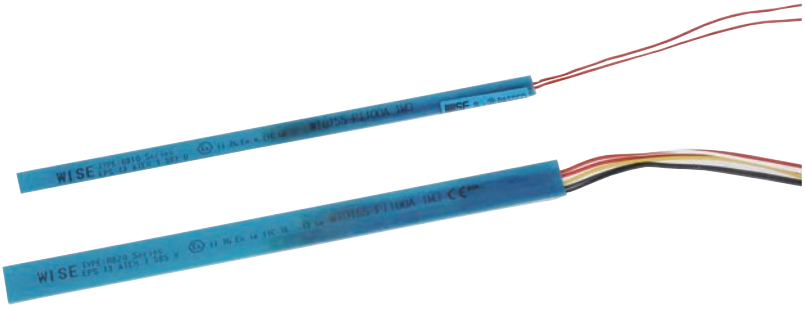
10. Option

T	Twisted type lead wire
Z	Other

1	2	3	4	5	6	7	8	9	10	
R811	**B**	**2**	**H**	**A1**	**1**	**F**	**L3**	**E**	**T**	**Sample ordering code**

Intrinsic safety type stator winding RTD
Model : R820 series

Spec. sheet no. RD08-02



Service intended
The purpose of the stator winding RTD is to mainly detect and prevent overheating of motors. It is inserted in between a stator and a slot to measure a temperature. Stator winding RTD uses the phenomenon of changing electric resistance to measure a temperature. Since it has high stability and sensitivity, it is used to measure a temperature precisely. Also, it is made of a nonmetallic material, and therefore it has a structure of protecting element. It is designed to get flexibility and endure vibration and high pressure.

Standard features

Body material
High temperature epoxy glass

Temperature limit
Class F : 155 ℃ (311 ℉)
Class H : 180 ℃ (356 ℉)

Lead wires
3 wire or 4 wire, copper, AWG #22 (With FEP or polyimide insulation)

Ambient temperature
Tamb = -40 ~ 80 ℃ : T6
Tamb = -40 ~ 95 ℃ : T5
Tamb = -40 ~ 130 ℃ : T4
Tamb = -40 ~ 180 ℃ : T3

Working temperature
-50 ~ 180 ℃

Standard
Explosive atmospheres. Equipment. General requirements
■ IEC 60079-0 / EN 60079-0 : 2009
Electrical apparatus for explosive gas atmospheres. Intrinsic safety "i"
■ IEC 60079-11 / EN 60079-11 : 2007

Certificates
KCS Ex ia IIC T6...T3
ATEX II 1G Ex ia IIC T6...T3 Ga
IECEx Ex ia IIC T6...T3 Ga

Main order — Ordering information

1. Base model

R821	RTD single element - 3 wire
R822	RTD double element - 6 wire
R823	RTD single element - 3 wire with shield wire
R824	RTD double element - 6 wire with shield wire
R825	RTD single element - 4 wire
R826	RTD double element - 8 wire
R827	RTD single element - 4 wire with shield wire
R828	RTD double element - 8 wire with shield wire

2. Explosion proof type

A	ATEX II 1G Ex ia IIC T6...T3 Ga
B	IECEx Ex ia IIC T6...T3 Ga
C	KCS Ex ia IIC T6...T3

3. Element

1	Platinum (0.00385 TCR), Class "AA" - EN 60751
2	Platinum (0.00385 TCR), Class "A" - EN 60751
3	Platinum (0.00385 TCR), Class "B" - EN 60751
0	Other

4. Temperature limited

F	Class F, 155 ℃ (311 ˚F)
H	Class H, 180 ℃ (356 ˚F)

5. Body thickness

A1	0.079" (2.0 mm)

6. Body length (mm)

1	6 (W) x 155 (L) - Single element
2	11 (W) x 155 (L) - Double element
0	Other - Min. 6 (W) ~ Max. 14 (W) x Min. 155 (L)

7. Lead wire insulation

F	FEP

8. Lead wire length (m)

L1	1
L2	2
L3	3
L4	4
L5	5
L6	6
L7	7
L8	8
L9	9
L0	Other (Min. 300 mm)

9. Lead wire color

E	EN code
K	KS code
Z	Other

10. Option

T	Twisted type lead wire
Z	Other

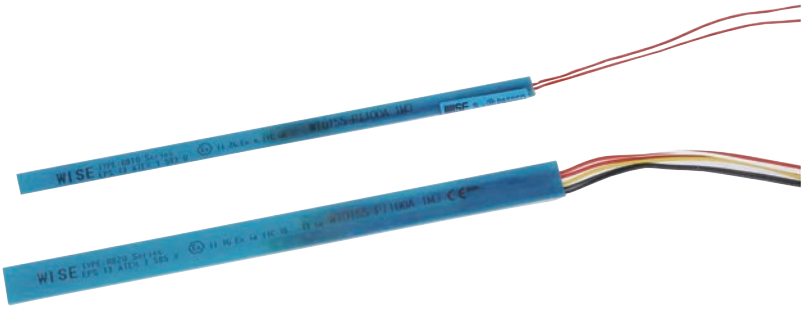
1	2	3	4	5	6	7	8	9	10	
R821	**A**	**2**	**H**	**A1**	**1**	**F**	**L3**	**K**	**T**	**Sample ordering code**

General type stator winding RTD
Model : R830 series

Spec. sheet no. RD08-03

Service intended

The purpose of the stator winding RTD is to mainly detect and prevent overheating of motors. It is inserted between a stator and a slot to measure a temperature. Stator winding RTD uses the phenomenon of changing electric resistance to measure a temperature. Since it has high stability and sensitivity, it is used to measure a temperature precisely. Furthermore, it is made of a nonmetallic material, and, therefore, it has a structure of protecting element. It is designed well enough to get flexibility and to endure vibration and high pressure.



Standard features

Body material
High temperature epoxy glass

Temperature limit
Class F : 155 ℃ (311 ℉)
Class H : 180 ℃ (356 ℉)

Lead wires
3 wire or 4 wire, copper, AWG #22 (With FEP or polyimide insulation)

Ambient temperature
Tamb = -50 ~ 180 ℃

Working temperature
-50 ~ 180 ℃

1. Base model

R831	RTD single element - 3 wire
R832	RTD double element - 6 wire
R833	RTD single element - 3 wire with shield wire
R834	RTD double element - 6 wire with shield wire
R835	RTD single element - 4 wire
R836	RTD double element - 8 wire
R837	RTD single element - 4 wire with shield wire
R838	RTD double element - 8 wire with shield wire

2. Explosion proof type

N	N/A

3. Element

1	Platinum (0.00385 TCR), Class "AA" - EN 60751
2	Platinum (0.00385 TCR), Class "A" - EN 60751
3	Platinum (0.00385 TCR), Class "B" - EN 60751
0	Other

4. Temperature limited

F	Class F, 155 ℃ (311 ℉)
H	Class H, 180 ℃ (356 ℉)

5. Body thickness

A1	0.079" (2.0 mm)

6. Body length (mm)

1	6 (W) x 155 (L) - Single element
2	11 (W) x 155 (L) - Double element
0	Other - Min. 6 (W) ~ Max. 14 (W) x Min. 155 (L)

7. Lead wire insulation

F	FEP
O	Other

8. Lead wire length (m)

L1	1
L2	2
L3	3
L4	4
L5	5
L0	Other (Min. 300 mm)

9. Lead wire color

E	EN code
K	KS code
Z	Other

10. Option

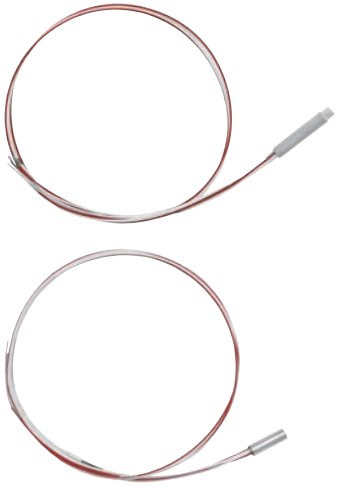
T	Twisted type lead wire
Z	Other

1	2	3	4	5	6	7	8	9	10	
R831	**N**	**2**	**H**	**A1**	**1**	**F**	**L3**	**K**	**T**	**Sample ordering code**

Coil End Temperature Detector and Bearing Temperature Sensor
Model : R840 series

Spec. sheet no. RD08-04

Service intended
Coil End Temperature Detector has its element covered in heat-resistance contraction tube and liquid silicone inside, which is engineered for fast response time and strong resistance to vibration.It is usually installed on motors or end part of generator stator.
Bearing temperature sensor feature a sensing tip constructed of stainless steel.
The bearing temperature sensor design also focuses the temperature sensitive portion of the sensor near the tip of the probe, providing improved accuracy in thermowells, bearings and other installations.



Standard features

Element
RTD : Pt 100 Ω at 0 °C(DIN) Film type

Body material
Coil End Temperature Detector : Teflon Bearing
Temperature Sensor : 304SS, 316SS, 316L SS

Body outer diameter and length
Coil End Temperature Detector : Min. 4 x Min. 25 mm
Bearing Temperature Sensor : Min. 3.2 x Min. 6.35 mm

Molding
Coil End Temperature Detector : Silicone filled
Bearing Temperature Sensor : Epoxy filled, Silicon filled

Standard
Explosive atmospheres.
Equipment - General requirements
IEC 60079-0 / EN 60079-0
Electrical apparatus for explosive gas atmospheres.
Increased safety " e "
IEC 60079-7 / EN 60079-7
Intrinsic safety " i "
IEC 60079-11 / EN 60079-11

Certificates
ATEX II 2G Ex e IIC Gb
IECEx Ex e IIC Gb
ATEX II 1G Ex ia IIC T6...T3 Ga
IECEx Ex ia IIC T6...T3 Ga

Tolerances on temperature reading
R.T.D.
Class A : ± (0.15 + 0.002 l t l)
Class B : ± (0.3 + 0.005 l t l)

Service Temperature (Ex e)
-40 °C ≤ Tservice ≤ 180 °C

Ambient Temperature
- Temperature class T6 : -40 °C < Tamb < 75 °C
  (1) One Pt100
  Ui = 30 V, Ii = 25 mA, Pi = 70 mW
  (2) Two Pt100
  Ui = 30 V, Ii = 15 mA (each Pt100),
  Pi = 50 mW (together)
- Temperature class T5 : -40 °C < Tamb < 95 °C
  (1) One Pt100
  Ui = 30 V, Ii = 55 mA, Pi = 630 mW
  (2) Two Pt100
  Ui = 30 V, Ii = 45 mA (each Pt100),
  Pi = 760 mW (together)
- Temperature class T4 : -40 °C < Tamb < 130 °C
  (1) One Pt100
  Ui = 30 V, Ii = 55 mA, Pi = 630 mW
  (2) Two Pt100
  Ui = 30 V, Ii = 50 mA (each Pt100),
  Pi = 1 W (together)
- Temperature class T3 : -40 °C < Tamb < 180 °C
  (1) One Pt100
  Ui = 30 V, Ii = 40 mA, Pi = 255 mW
  (2) Two Pt100
  Ui = 30 V, Ii = 30 mA (each Pt100),
  Pi = 260 mW (together)

Main order - Coil End Temperature Detector Ordering information

1. Base model

R841	RTD single element
R842	RTD double element
R843	RTD single element with shield wire
R844	RTD double element with shield wire

2. Certificates

A	ATEX II 2G Ex e IIC Gb
B	IECEx Ex e IIC Gb
Z	None

3. Element

Q	Pt 100 Ω (B), 3-wire
9	Pt 100 Ω (A), 3-wire
A	Pt 100 Ω (B), 4-wire
C	Pt 100 Ω (A), 4-wire
Z	Other

4. Body material

0	Teflon (Coil End Temperature Detector)

5. Body outer diameter and length (mm)

D0	4(D) x 40(L) - Single element
F0	6(D) x 40(L) - Double element
Z0	Other Min. 4(D) x Min. 25(L) - Single element (Coil end temperature detector)

6. Lead wire length (m)

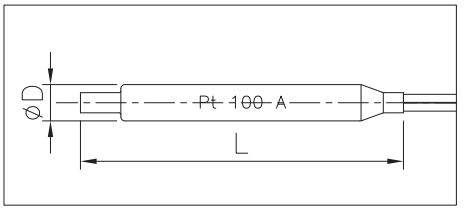
L1	1
L2	2
L3	3
L4	4
L5	5
L0	Other (Min. 300 mm)

7. Outer material of lead wire

A	PVC
B	Teflon (Standard)
Z	Other

8. Option

0	None



1	2	3	4	5	6	7	8	
R841	**A**	**9**	**0**	**D0**	**L2**	**B**	**0**	**Sample ordering code**

Main order - Bearing Temperature Sensor — Ordering information

1. Base model

R845	RTD single element
R846	RTD double element
R847	RTD single element with shield wire
R848	RTD double element with shield wire

2. Certificates

A	ATEX II 2G Ex e IIC Gb (Only Tip style E)
B	IECEx Ex e IIC Gb (Only Tip style E)
C	ATEX II 1G Ex ia IIC T6...T3 Ga
D	IECEx Ex ia IIC T6...T3 Ga
Z	None

3. Element

Q	Pt 100 Ω (B), 3-wire
9	Pt 100 Ω (A), 3-wire
A	Pt 100 Ω (B), 4-wire
C	Pt 100 Ω (A), 4-wire
Z	Other

4. Body material

0	304SS
1	316SS
2	316L SS

5. Product type

D8	Tip style A (Ex ia)
E8	Tip style B (Ex ia)
F8	Tip style C (Ex ia)
G8	Tip style D (Ex ia)
H8	Tip style E (Ex e)
	Min. 3.2 (D) x Min. 7 (L)mm - Single element
	(Bearing Temperature sensor)

6. Lead wire length (m)

L1	1
L2	2
L3	3
L4	4
L5	5
L0	Other (Min. 300 mm)

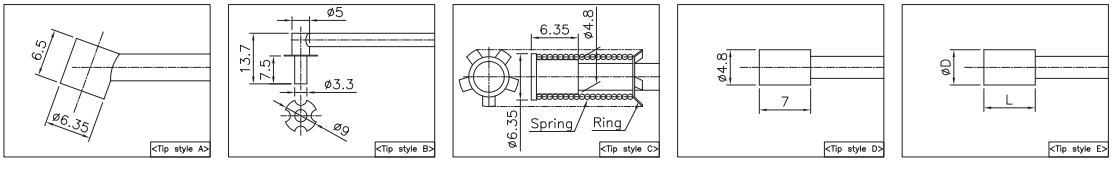
7. Outer material of lead wire

A	PVC
B	Teflon (Standard)
C	FEP + Outer shield (Ex ia)

8. Option

0	None

Tip style



1	2	3	4	5	6	7	8
R845	**A**	**9**	**0**	**D8**	**L2**	**B**	**B**

Sample ordering code

Memo

Head mounting type multi temperature transmitter
Model : R911 (with T900)

Spec. sheet no. RD09-01

Service intended
T900 series temperature transmitters are designed to fit into a standard molded terminal heads used on RTD and thermocouple assemblies to provide a 4-20 mA transmission signals. It is a cost effective solution for all temperature measuring process. It is accurate, durable and reliable. Numerous configurations for measurement in many deferent mediums are offered. Generally the transmitter produces a linear 4-20 mA output carried on a two-wire system. The transmitter is supplied factory calibrated, but also has zero and span potentiometers for a field adjustment.

Advantages
- Two wire 4-20 mA current output signals
- Universal input signals
  - RTD temperature sensor
  - T/C elements
  - mV, V, mA, DC signals
- Programmable function setting
  - Input signal type
  - Measuring range
  - Burnout Low/High setting
  - mA output offset
- Excellent accuracy and a long term stability
- Low cost effective

Specification

Electrical specification
Excitation voltage : 18 ~ 30 V DC
(Noise range:20 mVp-p)
Load resistance max : 600 Ω with 24 V
Influence of excitation : 0.01 % FSO/V
Reverse polarity : Protected
Shock resistance : No change in performance after 20Gs
Vibration : 0.1 g max.
Response time (10 ~ 90 %) : ±500 mSec.
Adjustment range : Free

Performance specification
Accuracy : ±0.2 % FSO
Non - linearity : Better than 0.10 % FSO
Repeatability : Better than 0.05 % FSO
Long term stability : Better than 0.05% FSO per month
Cutoff frequency : ±1 kHz
Ambient temperature limits : -10 ~ 70 ℃
Ambient humidity limits : 10 to 90 % R.H

Input
Temperature sensor type : See table "Sensor type, range and accuracy"
Signal source : See table "Sensor type, range and accuracy"

Output
Current output : 4 ~ 20 mA loop powered
Electrical connection type : 2-wire technique
Full scale output signal : 20 mA ±0.2 %
Zero measured output : 4 mA ±0.03 %
Sensor burnout : High (20.5 mA DC) or Low (3.9 mA)

Certificates
KCS Ex d IIC T6

Main order — Ordering information

1. Base model

R911	Temperature transmitter

2. Head and tip shape type

F	Explosion proof and ungrounded
G	Explosion proof and spring - loaded
H	Explosion proof and grounded
K	Explosion proof and exposed
P	Explosion proof (Double conduit) and ungrounded
Q	Explosion proof (Double conduit) and grounded
R	Explosion proof (Double conduit) and exposed
S	Explosion proof (Double conduit) and spring - loaded

3. Element

K	K (0.75)	**3**	T (0.4)
J	J (0.75)	**4**	E (0.4)
T	T (0.75)	**Q**	Pt 100 Ω (B)
N	N (0.75)	**9**	Pt 100 Ω (A)
E	E (0.5)	**Z**	Other
1	K (0.4)		
2	J (0.4)		

4. Sheath or tube material

0	304SS
1	316SS
2	Inconel 600
3	310SS
4	446SS
5	347SS
6	321SS
7	316L SS
9	Other

5. Sheath or tube/element outer diameter (mm)

Sheath type		Tube type	
D9	3.2	**F0**	6.4 and 0.65
E9	4.8	**G0**	8.0 and 0.65
F9	6.4	**G1**	8.0 and 1.0
G9	8.0	**J1**	10.0 and 1.0
		J2	10.0 and 1.6
		K1	12.0 and 1.0
		K2	12.0 and 1.6
		M1	15.0 and 1.0
		M2	15.0 and 1.6
		M3	15.0 and 2.3
		P2	17.3 and 1.6
		P3	17.3 and 2.3
		P4	17.3 and 3.2
		Q3	21.7 and 2.3
		Q4	21.7 and 3.2
		F8	6.4 for RTD
		G8	8.0 for RTD
		J0	10 for RTD

6. Conduit connection

3	½" NPT
6	¾" NPT
7	None
8	M20 x 1.5P
9	Other

7. Mounting type

X	Refer to mounting table (11th character)

8. Connection type

XX	Refer to Connection table (12th and 13th character)

9. Insert length

X	Refer to insert length table (14th character)

10. Option

0	None
1	Accessories
4	Epoxy coated ALDC head
6	Head material : 316SS
7	Accessories and epoxy coated ALDC head
9	Accessories and head material : 316SS

1	2	3	4	5	6	7	8	9	10	
R911	**F**	**K**	**0**	**D9**	**3**	**X**	**XX**	**X**	**4**	**Sample ordering code**

1. Base model

T900	Head mounting type multi input 2-wire transmitter

2. Input

N	Normal input (Standard)
O	Order input

3. Input signal

PT	Pt 100 Ω (RTD)
JP	JPt 100 Ω (RTD)
TR	R type (Thermo couple)
TK	K type (Thermo couple)
TE	E type (Thermo couple)
TJ	J type (Thermo couple)
TT	T type (Thermo couple)
TB	B type (Thermo couple)
TS	S type (Thermo couple)
TN	N type (Thermo couple)
mV	mV Input (Signals)
mA	mA Input (Signals)
DV	Voltage Input (Signals)

4. Measuring range (℃)

01	-50 ~ 0
02	-50 ~ 50
03	-20 ~ 80
04	-50 ~ 150
05	0 ~ 100
06	0 ~ 200
07	0 ~ 300
08	0 ~ 400
09	0 ~ 500
10	0 ~ 600
11	0 ~ 700
12	0 ~ 800
13	0 ~ 900
14	0 ~ 1000
XX	Other calibration ranges available on request

5. Calibration

C	Celsius scale ºC
F	Celsius scale ºF

6. Output singal

C	DC 4 ~ 20 mA current
V	DC 1 ~ 5 V Voltage
N	Non-output
X	Other signal available on request

7. Transmitter option

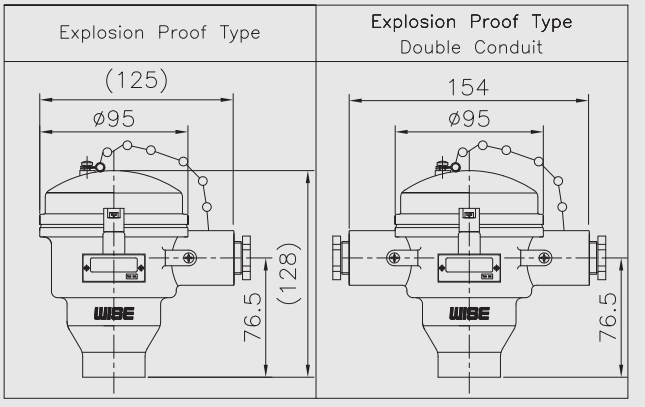
A	Hart temperature transmitter (ABB, TTH300)
B	Hart temperature transmitter (SIMENS, TH300)
C	Hart temperature transmitter (YOKOGAWA, YTA70)
D	Hart temperature transmitter (ROSEMOUNT, 644H)
E	Other
N	None

8. Accessories

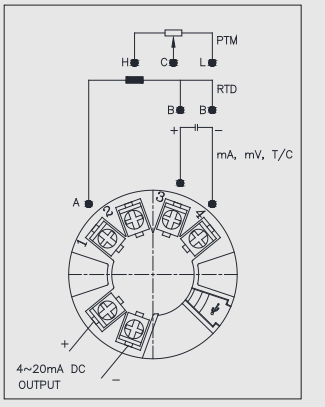
N	None
L	Hand held program loader
U	USB type program loader

1	2	3	4	5	6	7	8	
T900	**N**	**PT**	**01**	**C**	**C**	**N**	**N**	**Sample ordering code**

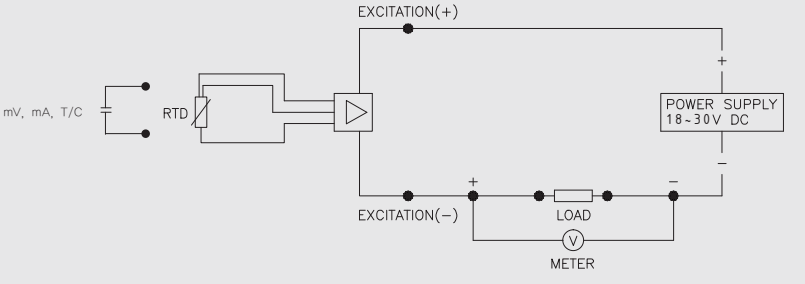
R911 : Type of mounting



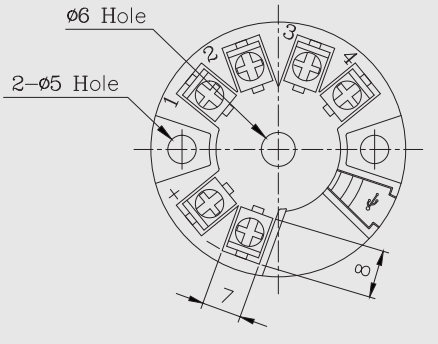
Head

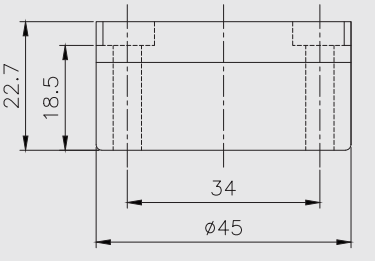


Electrical connection



System connection for 2 - wire transmitter





Sensor type, range, accuracy

Resistance temperature detector (RTD)				
Input	Measuring range (℃)	Min.measured span (℃)	Calibration range (℃)	Analog output (mA)Error
Pt100	-200 ~ 850	10	-200 ~ 850	0.2 % of span
JPt100	-200 ~ 650	10	-200 ~ 650	

Thermocouple elements (T/C)				
Input	Measuring range (℃)	Min.measured span (℃)	Calibration range (℃)	Analog output (mA)Error
Type B	100 ~ 1820	300	100 ~ 400	0.2 % of span
		100	400 ~ 1820	
Type E	-200 ~ 1000	50	-200 ~ 1000	
Type J	-200 ~ 1200	50	-200 ~ 1200	
Type K	-200 ~ 1370	50	-200 ~ 1370	
Type N	-200 ~ 1300	50	-200 ~ 1300	
Type R	0 ~ 1760	100	0 ~ 1760	
Type S	0 ~ 1760	100	0 ~ 1760	
Type T	-200 ~ 400	40	-200 ~ 400	

mV, V, mA sensor				
Input	Measuring range	Min.measured span	Calibration range	Analog output (mA)Error
mV	0 ~ 999 mV	2 mV	0 ~ 999 mV	0.2 % of span
V	0 ~ 10 V	1 V	0 ~ 10 V	
mA	0 ~ 30 mA	4 mA	0 ~ 30 mA	
	Input resistor : 250 Ω (External)			

Mounting, connection type and insert length table - 11th thru 14th characters

11th character		12th character		13th character		14th character	
Code	Mounting	Code	Connection size and connector material	Code	Connection type	Code	Insert length (mm)
A	None	A	None	A	None	A	100
	Fixed thread lag length	B	⅛" and 304SS	B	PT	B	200
B	80 mm	C	¼" and 304SS	C	NPT	C	300
C	100 mm	D	⅜" and 304SS	D	PF	D	400
D	150 mm	E	½" and 304SS	E	NPS	E	500
E	200 mm	F	¾" and 304SS	F	UNF	F	600
F	Other	G	1" and 304SS	G	BSPT	G	700
	Fixed flange lag length	H	1¼" and 304SS	H	BSPF	H	800
G	80 mm	J	1½" and 304SS	J	MM	J	900
H	100 mm	K	2" and 304SS	K	B16.5 Class 150 RF	K	1,000
J	150 mm	L	3" and 304SS	L	B16.5 Class 150 FF	L	1,500
K	200 mm	M	7/16" and 304SS	M	B16.5 Class 300 RF	M	2,000
L	Other	N	⅛" and 316SS	N	B16.5 Class 300 FF	N	2,500
M	Movable thread	P	¼" and 316SS	O	Sanitary	P	3,000
N	Movable flange	Q	⅜" and 316SS	P	B16.5 Class 600 RF	Q	3,500
P	Compression fitting	R	½" and 316SS	Q	B16.5 Class 600 FF	R	4,000
	Union and nipple length	S	¾" and 316SS	R	JIS 5K RF	S	4,500
Q	100 mm length	T	1" and 316SS	S	JIS 5K FF	T	5,000
R	150 mm length	U	1¼" and 316SS	T	JIS 10K RF	U	6,000
S	Other	V	1½" and 316SS	U	JIS 10K FF	V	7,000
	Nipple length	W	2" and 316SS	V	JIS 20K RF	W	8,000
T	50 mm	X	3" and 316SS	W	JIS 20K FF	X	9,000
U	100 mm	Y	7/16" and 316SS	X	B16.5 Class 1,500 RTJ	Y	10,000
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 14th character, please choose a code of next higher length if applicable length is not. Actual length shall be specified.
- Note for *Y code (Oil sealing type), only available with spring-loaded head type.

Head mounting type temperature transmitter (RTD only)
Model : R912 (with T990)

Spec. sheet no. RD09-02

Service intended
These transmitters are recommended be used in the situation where the application of RTD signals to carry to a long distance or to guard against the heavy electrical field noise. The transmitters convert RTD inputs to an analog signal for a direct interface with indicators, recorders, controllers, PLC, DCS systems, and these can be used for a wide range of applications in process control, automatic machinery and hydraulic or pneumatic system design.

Advantages
- Two wire 4 - 20 mA current output signal
- RTD input
- Measuring range from -50 ~ 400 ℃
- Fixed range
- Excellent accuracy and long term stability
- Low - cost
- Miniature design

Model : T990

Specification

Electrical specification
Excitation voltage : 18 ~ 30 V
Load resistance : Max. 500 Ω at 24 V
Influence of excitation : 0.01 % FSO/V
Burnout : Upscale (Approx. 23 mA DC) or
Down scale (Approx. 4 mA DC)
Reverse polarity : Protected
Shock resistance : No change in performance after
10Gs for 11ms
Vibration : 5g (10 ~ 2,000 Hz)
Response time (10 ~ 90 %) : ±0.5 seconds
Adjustment range : ±15 % of full scale / Zero and span

Performance specification
Accuracy : ±0.2 % of full scale
Non - linearity : Better than 0.10 % of full scale
Repeatability : Better than 0.05 % of full scale
Long term stability : Better than 0.05 % of full scale per month
Ambient temperature limits : -20 ~ 70 ℃
Ambient humidity limits : 5 ~ 95 % R.H

Input
Measuring element : Pt 100 Ω at 0 ℃

Output
Current output
Electrical connection type : 2-wire technique
Full scale output signal : 20 mA ±0.2 %
Zero measured output : 4 mA ±0.03 %
Other output signals available on request

Certificates
KCS Ex d IIC T6

Main order — Ordering information

1. Base model

R912 Temperature transmitter (RTD only)

2. Head and tip shape type

F Explosion proof and ungrounded
G Explosion proof and spring - loaded
P Explosion proof (Double conduit) and ungrounded
S Explosion proof (Double conduit) and spring - loaded

3. Element

Q Pt 100 Ω(B)
9 Pt 100 Ω(A)

4. Sheath or tube material

0 304SS
1 316SS
7 316L SS
9 Other

5. Sheath or tube outer diameter (mm)

Sheath type		Tube type	
D9	3.2	**E8**	4.8
E9	4.8	**F8**	6.4
F9	6.4	**G8**	8.0
G9	8.0	**J0**	10.0

6. Conduit connection

3 ½" NPT
6 ¾" NPT
7 None
8 M20 x 1.5P
9 Other

7. Mounting type

X Refer to mounting table (11th character)

8. Connection type

XX Refer to Connection table (12th and 13th character)

9. Insert length

X Refer to insert length table (14th character)

10. Option

0 None
1 Accessories
4 Epoxy coated ALDC head
6 Head material : 316SS
7 Accessories and epoxy coated ALDC head
9 Accessories and head material : 316SS

1	2	3	4	5	6	7	8	9	10	
R912	**F**	**Q**	**7**	**F9**	**3**	**X**	**XX**	**X**	**4**	**Sample ordering code**

1. Base model

T990	Temperature transmitter

2. Input type

RJ	Pt 100 Ω

3. Measuring range (℃)

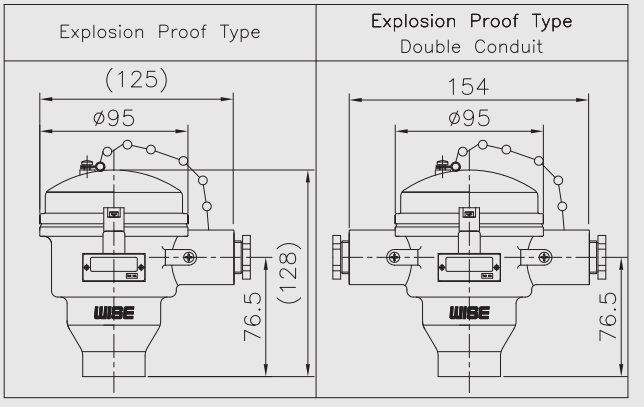
05	0 ~ 50
10	0 ~ 100
15	0 ~ 150
20	0 ~ 200
25	0 ~ 250
30	0 ~ 300
40	0 ~ 400
50	0 ~ 500
51	50 ~ 150
55	50 ~ 150
12	100 ~ 200
13	100 ~ 300
N0	-50 ~ 50
N1	-50 ~ 100
N5	-50 ~ 150
N2	-50 ~ 200
ZZ	Special

4. Burn-out

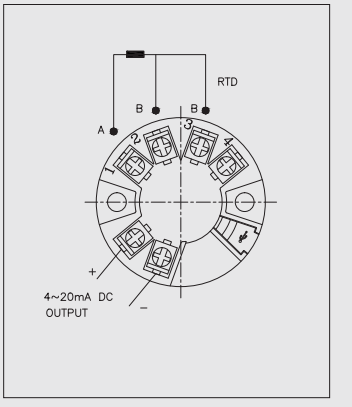
U	Up scale
D	Down scale

1	2	3	4	
T990	**RJ**	**05**	**U**	**Sample ordering code**

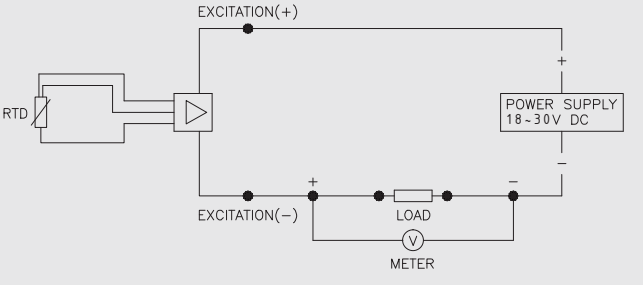
R912 : Type of mounting



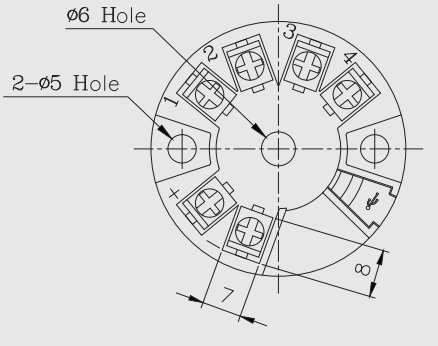
Head

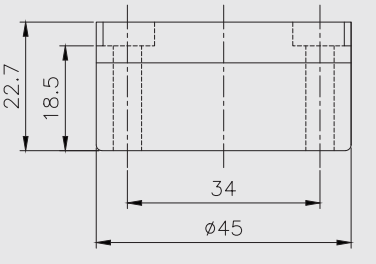


Electrical connection



System connection for 2 - wire transmitter





Mounting, connection type and insert length table - 11th thru 14th characters

11th character		12th character		13th character		14th character	
Code	Mounting	Code	Connection size and connector material	Code	Connection type	Code	Insert length (mm)
A	None	A	None	A	None	A	100
	Fixed thread lag length	B	⅛" and 304SS	B	PT	B	200
B	80 mm	C	¼" and 304SS	C	NPT	C	300
C	100 mm	D	⅜" and 304SS	D	PF	D	400
D	150 mm	E	½" and 304SS	E	NPS	E	500
E	200 mm	F	¾" and 304SS	F	UNF	F	600
F	Other	G	1" and 304SS	G	BSPT	G	700
	Fixed flange lag length	H	1¼" and 304SS	H	BSPF	H	800
G	80 mm	J	1½" and 304SS	J	MM	J	900
H	100 mm	K	2" and 304SS	K	B16.5 Class 150 RF	K	1,000
J	150 mm	L	3" and 304SS	L	B16.5 Class 150 FF	L	1,500
K	200 mm	M	7/16" and 304SS	M	B16.5 Class 300 RF	M	2,000
L	Other	N	⅛" and 316SS	N	B16.5 Class 300 FF	N	2,500
M	Movable thread	P	¼" and 316SS	O	Sanitary	P	3,000
N	Movable flange	Q	⅜" and 316SS	P	B16.5 Class 600 RF	Q	3,500
P	Compression fitting	R	½" and 316SS	Q	B16.5 Class 600 FF	R	4,000
	Union and nipple length	S	¾" and 316SS	R	JIS 5K RF	S	4,500
Q	100 mm length	T	1" and 316SS	S	JIS 5K FF	T	5,000
R	150 mm length	U	1¼" and 316SS	T	JIS 10K RF	U	6,000
S	Other	V	1½" and 316SS	U	JIS 10K FF	V	7,000
	Nipple length	W	2" and 316SS	V	JIS 20K RF	W	8,000
T	50 mm	X	3" and 316SS	W	JIS 20K FF	X	9,000
U	100 mm	Y	7/16" and 316SS	X	B16.5 Class 1,500 RTJ	Y	10,000
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 14th character, please choose a code of next higher length if applicable length is not. Actual length shall be specified.
- Note for *Y code (Oil sealing type), only available with spring-loaded head type.

Memo

Explosion proof type
Sheathed thermocouple and resistance temperature detector with spring load
Model : R921, R922 (RS series)

Spec. sheet no. RD09-03

Service intended

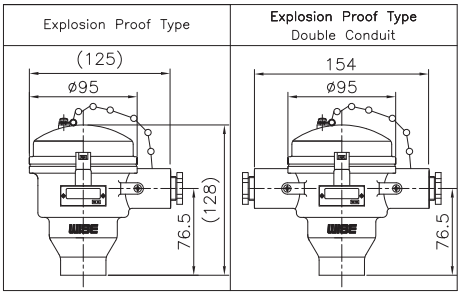
Generally, sheathed type temperature sensors are used with thermowell. To maximize the heat-transfer between sheath junction and thermowell, the sheath must be inserted as close as possible to the bottom of the well. However, it is not always possible to determine the actual distance between the end tip of the sheath and the bottom of the thermowell. Furthemore, heat expansion can damage the sheath which is located inside the thermowell. To prevent this uncertainty and the damage to the sheath, RS series employ the spring load type sheath. This spring load absorbs the impact to the sheath, and protects the sheath from the vibration.
Moreover, it is designed to be used in an explosive area.

Standard features

Element

Thermocouple : K, E, J, T, N
R.T.D. : Pt 100 Ω at 0 ℃
TCR : 3,850 ppm/k

Head type



Tolerances on temperature reading

■ Thermocouple
Class 1, Class 2 (DIN/IEC584-2, BS/EN60584-2, JIS C1602)
Special, Standard (ASTM E230 E988 ISA-MC96.1)

■ R.T.D.
Class A : ± (0.15 + 0.002 l t l)
Class B : ± (0.3 + 0.005 l t l)

Head material

ALDC (Standard)
316SS

Sheath outer diameters

■ Thermocouple
1.0, 1.6, 2.3, 3.2, 4.8, 6.4, 8.0, 9.5 and 12.7 mm
* Double elements is not available for 1.0 and 1.6 mm sheath outer diameters

■ R.T.D.
3.2, 4.8, 6.4 and 8.0 mm

Certificates

KCS Ex d IIC T6 IP65

1. Base model

R921	Single element
R922	Double (Duplex) element

2. Head and tip shape type

A	ALDC head and ungrounded
B	ALDC head and grounded
C	ALDC head(Double conduit) and ungrounded
D	ALDC head(Double conduit) and grounded
E	316SS head and ungrounded
F	316SS head and grounded
G	316SS head(Double conduit) and ungrounded
H	316SS head(Double conduit) and grounded

3. Element

K	K (0.75)	**1**	K (0.4)
J	J (0.75)	**2**	J (0.4)
T	T (0.75)	**3**	T (0.4)
E	E (0.5)	**4**	E (0.4)
N	N (0.75)	**5**	N (0.4)
Q	Pt 100 Ω (B), 3 wire	**9**	Pt 100 Ω (A), 3 wire
U	JPt 100 Ω (B), 3 wire	**0**	JPt 100 Ω (A), 3 wire
A	Pt 100 Ω (B), 4 wire	**C**	Pt 100 Ω (A), 4 wire
B	JPt 100 Ω (B), 4 wire	**D**	JPt 100 Ω (A), 4 wire
Z	Other		

4. Sheath material (RTD. is only 316SS and 316L SS)

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

5. Sheath outer diameter (mm)

A9	1.0 (Thermocouple only)
B9	1.6 (Thermocouple only)
C9	2.3 (Thermocouple only)
D9	3.2
E9	4.8
F9	6.4
G9	8.0
H9	9.5 (Thermocouple only)
L9	12.7 (Thermocouple only)

6. Conduit connection

1	½" PF
2	½" PT
3	½" NPT
4	¾" PF
5	¾" PT
6	¾" NPT
7	None
8	M20 x 1.5P
9	Other

7. Mounting type

X	Refer to mounting table (11th character)

8. Connection type

XX	Refer to connection type table (12th and 13th character)

9. Insert length

X	Refer to insert length table (14th character)

10. Option

0	None
1	Accessories

1	2	3	4	5	6	7	8	9	10	
R921	**A**	**K**	**1**	**B9**	**1**	**X**	**XX**	**X**	**1**	**Sample ordering code**

Mounting, connection type and insert length table - 11th thru 14th characters

11th character		12th character		13th character		14th character	
Code	Mounting	Code	Connection size and connector material	Code	Connection type	Code	Insert length (mm)
A	None	A	None	A	None	A	100
	Fixed thread lag length	B	⅛" and 304SS	B	PT	B	200
B	80 mm	C	¼" and 304SS	C	NPT	C	300
C	100 mm	D	⅜" and 304SS	D	PF	D	400
D	150 mm	E	½" and 304SS	E	NPS	E	500
E	200 mm	F	¾" and 304SS	F	UNF	F	600
F	Other	G	1" and 304SS	G	BSPT	G	700
	Fixed flange lag length	H	1¼" and 304SS	H	BSPF	H	800
G	80 mm	J	1½" and 304SS	J	MM	J	900
H	100 mm	K	2" and 304SS	K	B16.5 Class 150 RF	K	1,000
J	150 mm	L	3" and 304SS	L	B16.5 Class 150 FF	L	1,500
K	200 mm	M	7/16" and 304SS	M	B16.5 Class 300 RF	M	2,000
L	Other	N	⅛" and 316SS	N	B16.5 Class 300 FF	N	2,500
M	Movable thread	P	¼" and 316SS	O	Sanitary	P	3,000
N	Movable flange	Q	⅜" and 316SS	P	B16.5 Class 600 RF	Q	3,500
P	Compression fitting	R	½" and 316SS	Q	B16.5 Class 600 FF	R	4,000
	Union and nipple length	S	¾" and 316SS	R	JIS 5K RF	S	4,500
Q	100 mm length	T	1" and 316SS	S	JIS 5K FF	T	5,000
R	150 mm length	U	1¼" and 316SS	T	JIS 10K RF	U	6,000
S	Other	V	1½" and 316SS	U	JIS 10K FF	V	7,000
	Nipple length	W	2" and 316SS	V	JIS 20K RF	W	8,000
T	50 mm	X	3" and 316SS	W	JIS 20K FF	X	9,000
U	100 mm	Y	7/16" and 316SS	X	B16.5 Class 1,500 RTJ	Y	10,000
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 14th character, please choose a code of next higher length if applicable length is not. Actual length shall be specified.
- Note for *Y code (Oil sealing type), only available with spring-loaded head type.

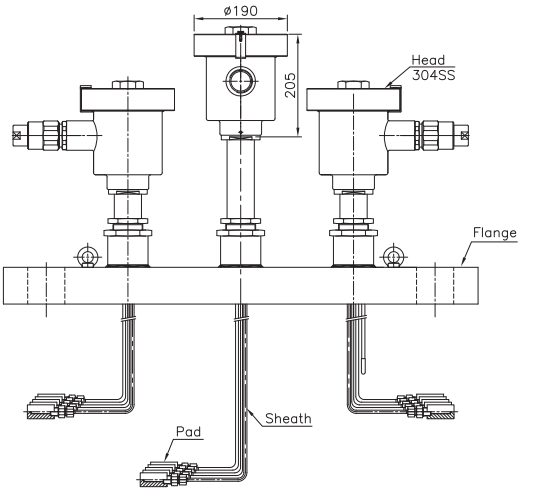
Memo

Explosion proof
Multi point thermocouple and resistance temperature detector
Model : R930 series (RC series)

Spec. sheet no. RD09-04

Service intended

This type of detector is designed to be used in a situation where the user wants to measure the distributed temperature of a reactor or a container. It can measure horizontally distributed temperature and also can measure the temperature in each depth of the container or the reactor. It is also designed to consider the size of nozzle, installation space and requirement, and convenience of repairing and replacing. Wise Control Inc. can manufacture any types of multi point temperature sensors, and upon request of the customer, we can employ the requested material of protection tube, the material of sheath, size, measuring points, and the method of attaching the senor. Espscially, we can provide the temperature sensors without protection tube in a high pressure line by employing our own safety measures. The temperature sensors for junction box to connect the terminal can be manufactured in explosion proof type.



Standard features

Element
Thermocouple : K, E, J, T, N
R.T.D. : Pt 100 Ω at 0 ℃

Head material
Stainless steel
Aluminium

Number of measuring temperature point
Possible to manufacture according to customer's require number of point within the allowed range of nozzle bore.
One thermocouple head could contain up to 5 points element.

Tolerances on temperature reading
■ Thermocouple
Class 1, Class 2 (DIN/IEC584-2, BS/EN60584-2, JIS C1602)
Special, Standard (ASTM E230 E988 ISA-MC96.1)

■ R.T.D.
Class A : ±(0.15 + 0.002 l t l)
Class B : ±(0.3 + 0.005 l t l)

Sheath outer diameter
■ Thermocouple
3.2, 4.8, 6.4 and 8.0 mm
■ R.T.D.
3.2, 4.8, 6.4 and 8.0 mm

Certificates
KCS Ex d IIC T6 IP67

1. Base model

R931	Thermocouple single element
R932	Thermocouple double element
R933	RTD single element
R934	RTD double element

2. Head material and tip shape type

A	Stainless steel and ungrounged
B	Stainless steel and grounged
C	Aluminium and ungrounged
D	Aluminium and grounged

3. Head extension type and sealing location

0	Nipple and head
1	Nipple and flange
9	Other

4. Element (Tolerance)

K	K (0.75)
J	J (0.75)
T	T (0.75)
E	E (0.5)
Q	Pt 100 Ω

5. Number of measuring temperature point

A	2
B	3
C	4
D	5
E	6
F	7
G	8
H	9
J	10
K	11
L	12
M	13
N	14
P	15
Z	Other

6. Sheath outer diameter (mm)

1	3.2
2	4.8
3	6.4
4	8.0

7. Sheath material

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

8. Protecting tube material

0	None

9. Connection type

XX	Refer to insert length table (12th and 13th character)

10. Insert length

X	Refer to insert length table (14th character)

11. Option

0	None
1	Accessories

1	2	3	4	5	6	7	8	9	10	11	
R933	**A**	**1**	**Q**	**J**	**3**	**1**	**0**	**XX**	**X**	**1**	**Sample ordering code**

Mounting, connection type and insert length table - 12th thru 14th characters

12th character		13th character		14th character	
Code	Connection size	Code	Connection type	Code	Insert length (m)
0	1"	A	NPT	A	2
1	1¼"	B	PT	B	3
2	1½"	C	B16.5 Class 150 RF	C	4
3	2"	D	B16.5 Class 150 FF	D	5
4	2½"	E	B16.5 Class 300 RF	E	6
5	3"	F	B16.5 Class 300 FF	F	7
6	4"	G	B16.5 Class 600 RF	G	8
7	6"	H	B16.5 Class 600 FF	H	9
9	8"	J	B16.5 Class 900 RF	J	10
A	12"	K	B16.5 Class 900 FF	K	15
B	24"	L	B16.5 Class 1,500 RF	L	20
Z	Other	M	B16.5 Class 1,500 FF	M	25
		N	B16.5 Class 1,500 RTJ	N	30
		P	B16.5 Class 2,500 RF	P	35
		Q	B16.5 Class 2,500 FF	Q	40
		R	B16.5 Class 2,500 RTJ	R	45
		S	JIS 10K RF	S	50
		T	JIS 10K FF	Z	60
		U	JIS 20K RF	1	70
		V	JIS 20K FF	2	80
		Z	Other	3	90
				4	100
				5	110
				6	120
				Z	Other

14th characters note : Please choose the longest among measuring points.

Memo

Explosion proof
Thermocouple and resistance temperature detector
Model : R940 series (ETR series)

Spec. sheet no. RS09-05

Service intended

Measuring the temperature in the area where combustible gas, particles and flammable liquid exist can be a very dangerous task. The electrical energy of measuring instrument is lower than electric motor, however, the malfunction of the instrument or the accident can cause to start the explosion. Therefore, ETR series is explosion proof type product which is designed to be used in a critical danger Zone 1 by acquiring IECEx and ATEX certification.

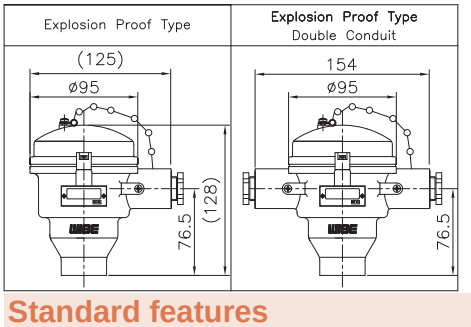
Certificates

ATEX II 2G Ex d IIC T6 Gb
IECEx Ex d IIC T6 Gb

Ambient temperature

-40 ~ +65 ºC

Head type



Sheath type

Non-metallic protection tube type

Standard features

Element

■ **Sheath type**
Thermocouple : K, E, J, T, N
RTD : Pt 100 Ω at 0 ℃

■ **Non-metallic protection tube type**
Type R (87 % Pt, 13 % Rh/Pt)
Type S (90 % Pt, 10 % Rh/Pt)
Type B (70 % Pt, 30 % Rh / 94 % Pt, 6 % Rh)
Type K

Head material

ALDC (Standard)
316SS

Tolerances on temperature reading

■ **Sheath type**
- Thermocouple
Class 1, Class 2 (DIN/IEC584-2, BS/EN60584-2, JIS C1602)
Special, Standard (ASTM E230, E988, ISA-MC96.1)

- R.T.D.
Class A : ± (0.15 + 0.002 l t l)
Class B : ± (0.3 + 0.005 l t l)

■ **Non-metallic protection tube type**
"K" type : Class 2 (0.75 %)
Standard (0.75 %)
"R", "S" type : Class 2 (0.25 %)
Standard (0.5 %)
"B" type : Class 3 (0.5 %)
Standard (0.5 %)

1. Base model

R941	Single element
R942	Double (Duplex) element
R943	Single element with spring load type
R944	Double (Duplex) element with spring load type

2. Head and tip shape type

A	ALDC head and ungrounded
B	ALDC head and grounded
C	ALDC head(Double conduit) and ungrounded
D	ALDC head(Double conduit) and grounded
E	316SS head and ungrounded
F	316SS head and grounded
G	316SS head(Double conduit) and ungrounded
H	316SS head(Double conduit) and grounded

3. Element

K	K (0.75)	**1**	K (0.4)
J	J (0.75)	**2**	J (0.4)
T	T (0.75)	**3**	T (0.4)
E	E (0.5)	**4**	E (0.4)
N	N (0.75)	**5**	N (0.4)
Q	Pt 100 Ω (B), 3 wire	**9**	Pt 100 Ω (A), 3 wire
U	JPt 100 Ω (B), 3 wire	**0**	JPt 100 Ω (A), 3 wire
A	Pt 100 Ω (B), 4 wire	**C**	Pt 100 Ω (A), 4 wire
B	JPt 100 Ω (B), 4 wire	**D**	JPt 100 Ω (A), 4 wire
Z	Other		

4. Sheath material (RTD. is only 316SS and 316L SS)

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

5. Sheath outer diameter (mm)

A9	1.0 (Thermocouple only)
B9	1.6 (Thermocouple only)
C9	2.3 (Thermocouple only)
D9	3.2
E9	4.8
F9	6.4
G9	8.0
H9	9.5 (Thermocouple only)
J9	10
L9	12.7 (Thermocouple only)

6. Conduit connection

3	½" NPT
6	¾" NPT
7	None
8	M20 x 1.5P
9	Other

7. Mounting type

X	Refer to mounting table (11th character)

8. Connection type

XX	Refer to mounting table (12th and 13th character)

9. Insert length

X	Refer to insert length table (14th character)

10. Integral transmitter (See note 1.)

0	None
1	T900
2	T990 (RTD only)
3	TH300 (SIEMENS)
4	TTH300 (ABB)
5	YTA70 (YOKOGAWA)
6	644H (ROSEMOUNT)
7	Other

11. Option

0	None
1	Accessories
3	IECEx certificate
4	Accessories and ATEX certificate
5	Accessories and IECEx certificate

** Note 1. Although temperature element is selected double(Duplex) type, output of integral transmitter is single.

1	2	3	4	5	6	7	8	9	10	11	
R941	**A**	**K**	**1**	**F9**	**3**	**X**	**XX**	**X**	**0**	**0**	**Sample ordering code**

1. Base model

R947	Single element
R948	Double (Duplex) element

2. Head and tip shape type

A	ALDC head and ungrounded
C	ALDC head(Double conduit) and ungrounded
E	316SS head and ungrounded
G	316SS head(Double conduit) and ungrounded

3. Element

K	K (0.75)
B	B (0.5)
1	K (0.4)
R	R (0.25)
S	S (0.25)

4. Mounting type and extension length (mm)

A	None	**K**	Fixed flange (300)
B	Support tube (100)	**L**	Movable thread (100)
C	Support tube (150)	**M**	Movable thread (150)
D	Support tube (300)	**N**	Movable thread (300)
E	Fixed thread (100)	**P**	Movable flange (100)
F	Fixed thread (150)	**Q**	Movable flange (150)
G	Fixed thread (300)	**R**	Movable flange (300)
H	Fixed flange (100)	**Z**	Other
J	Fixed flange (150)		

5. Outer protection tube diameter (mm)

00	8	**40**	21
10	10	**50**	25
20	13	**60**	30
25	15	**70**	40
30	17		

6. Outer protection tube material

0	316SS	**5**	Inconel
1	SSA-S (8~25 mm)	**6**	446SS
3	HB (8~21 mm)	**7**	Other
4	GK-SiC (25~40 mm)	**8**	310SS

7. Inner tube material

0	None
1	SSA-S
3	HB
5	Inconel
9	Other

8. Connection type

XX	Refer to connection type table (12th and 13th character)

9. Insert length

X	Refer to insert length table (14th character)

10. Integral transmitter (See note 1.)

0	None
1	T900
2	T990 (RTD only)
3	TH300 (SIEMENS)
4	TTH300 (ABB)
5	YTA70 (YOKOGAWA)
6	644H (ROSEMOUNT)
7	Other

11. Option

0	None
1	Accessories
3	IECEx certificate
4	Accessories and ATEX certificate
5	Accessories and IECEx certificate

** Note 1. Although temperature element is selected double(Duplex) type, output of integral transmitter is single.

1	2	3	4	5	6	7	8	9	10	11	
R947	**A**	**K**	**A**	**00**	**0**	**0**	**XX**	**X**	**0**	**0**	**Sample ordering code**

Sheath type

Mounting, connection type and insert length table - 11th thru 14th characters

11th character		12th character		13th character		14th character	
Code	Mounting	Code	Connection size and connector material	Code	Connection type	Code	Insert length (mm)
A	None	A	None	A	None	A	100
	Fixed thread lag length	B	⅛" and 304SS	B	PT	B	200
B	80 mm	C	¼" and 304SS	C	NPT	C	300
C	100 mm	D	⅜" and 304SS	D	PF	D	400
D	150 mm	E	½" and 304SS	E	NPS	E	500
E	200 mm	F	¾" and 304SS	F	UNF	F	600
F	Other	G	1" and 304SS	G	BSPT	G	700
	Fixed flange lag length	H	1¼" and 304SS	H	BSPF	H	800
G	80 mm	J	1½" and 304SS	J	MM	J	900
H	100 mm	K	2" and 304SS	K	B16.5 Class 150 RF	K	1,000
J	150 mm	L	3" and 304SS	L	B16.5 Class 150 FF	L	1,500
K	200 mm	M	7/16" and 304SS	M	B16.5 Class 300 RF	M	2,000
L	Other	N	⅛" and 316SS	N	B16.5 Class 300 FF	N	2,500
M	Movable thread	P	¼" and 316SS	O	Sanitary	P	3,000
N	Movable flange	Q	⅜" and 316SS	P	B16.5 Class 600 RF	Q	3,500
P	Compression fitting	R	½" and 316SS	Q	B16.5 Class 600 FF	R	4,000
	Union and nipple length	S	¾" and 316SS	R	JIS 5K RF	S	4,500
Q	100 mm length	T	1" and 316SS	S	JIS 5K FF	T	5,000
R	150 mm length	U	1¼" and 316SS	T	JIS 10K RF	U	6,000
S	Other	V	1½" and 316SS	U	JIS 10K FF	V	7,000
	Nipple length	W	2" and 316SS	V	JIS 20K RF	W	8,000
T	50 mm	X	3" and 316SS	W	JIS 20K FF	X	9,000
U	100 mm	Y	7/16" and 316SS	X	B16.5 Class 1,500 RTJ	Y	10,000
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 14th character, please choose a code of next higher length if applicable length is not. Actual length shall be specified.

Non-metallic protection tube type

Mounting, connection type and insert length table - 12th thru 14th characters

12th character		13th character		14th character	
Code	Connection size	Code	Connection type	Code	Insertion length (mm)
A	None	A	None	A	100
E	½" (15A)	B	PT	B	200
F	¾" (20A)	C	NPT	C	300
G	1" (25A)	D	PF	D	400
H	1¼" (32A)	K	B16.5 Class 150 RF	E	500
J	1½" (40A)	L	B16.5 Class 150 FF	F	600
K	2" (50A)	M	B16.5 Class 300 RF	G	700
L	2½" (65A)	N	B16.5 Class 300 FF	H	800
M	3" (80A)	P	B16.5 Class 600 RF	J	900
Z	Other	Q	B16.5 Class 600 FF	K	1,000
		R	JIS 5K RF	L	1,500
		S	JIS 5K FF	M	2,000
		T	JIS 10K RF	Z	Other
		U	JIS 10K FF		
		V	JIS 20K RF		
		W	JIS 20K FF		
		Z	Other		

Note : Please choose a code of next higher length if applicable length is not. Actual length shall be specified.

Memo

Intrinsic safety and increased safety type thermocouple and resistance temperature detector

Model : R950 (ETR10 series)

Spec. sheet no. RD09-06

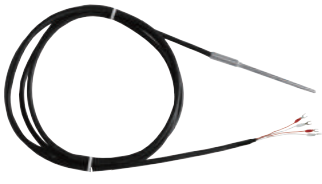
Service intended

Measuring the temperature in the area where combustible gas, particles and flammable liquid exist can be a very dangerous task. The electrical energy of measuring instrument is lower than electric motor, however, the malfunction of the instrument or the accident can cause to start the explosion. Therefore, ETR10 series is explosion proof type product which is designed to be used in a critical danger zone (Ex e=Zone 1, Ex ia=Zone 0) by acquiring IECEx and ATEX certification.

Certificates

KCS Ex e IIC T6...T1
ATEX II 2G Ex e IIC T6...T1
IECEx Ex e IIC T6...T1 Gb
KCS Ex ia IIC T6
ATEX II 1/2G Ex ia IIC T6...T1 Ga/Gb
IECEx Ex ia IIC T6...T1 Ga/Gb

Remote type



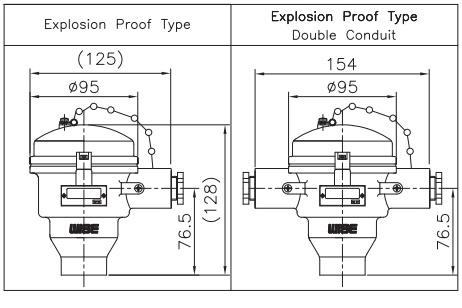
Lead wire type

Standard features

Element

Thermocouple : K, E
RTD : Pt 100 Ω at 0 ℃

Head type



Standard nipple material

304SS (Head type only)

Standard nipple length

100 or 150 mm (Head type only)

Enclosure material

Die cast aluminium (ALDC) or 316SS (Head type only)

Standard measuring material

316SS

Electrical rating

10 mA 4 VDC resistance load

Standard process connection

½" NPT

Ambient temperature

-40 ~ +65 ℃ (Ex ia)
-40 ~ +65 ℃ (Ex e)

1. Base model

R951	ETR10 series single element (ATEX II 1/2G Ex ia IIC T6...T1 Ga/Gb)
R952	ETR10 series double element (ATEX II 1/2G Ex ia IIC T6...T1 Ga/Gb)
R953	ETR10 series single element (IECEx Ex ia IIC T6...T1 Ga/Gb)
R954	ETR10 series double element (IECEx Ex ia IIC T6...T1 Ga/Gb)
R955	ETR10 series single element (ATEX II 2G Ex e IIC T6...T1 Gb)
R956	ETR10 series double element (ATEX II 2G Ex e IIC T6...T1 Gb)
R957	ETR10 series single element (IECEx Ex e IIC T6...T1 Gb)
R958	ETR10 series double element (IECEx Ex e IIC T6...T1 Gb)
R95A	ETR10 series single element (KCS Ex ia IIC T6)
R95B	ETR10 series double element (KCS Ex ia IIC T6)
R95C	ETR10 series single element (KCS Ex e IIC T6...T1)
R95D	ETR10 series double element (KCS Ex e IIC T6...T1)

2. Head type

A	Single entry head type (With ungrounded)
B	Dual entry head type (With ungrounded)
C	Single entry head type and spring load type (With ungrounded)
D	Dual entry head type and spring load type (With ungrounded)
E	Single entry head type and remote mounting with terminal head type (With ungrounded)
F	Dual entry head type and remote mounting with terminal head type (With ungrounded)
G	Extended lead wire type (With ungrounded)
H	Extended lead wire with steel armored tube type (With ungrounded)
J	Single entry head type (With grounded)
K	Dual entry head type (With grounded)
L	Single entry head type and spring load type (With grounded)
M	Dual entry head type and spring load type (With grounded)
N	Single entry head type and remote mounting with terminal head type (With grounded)
P	Dual entry head type and remote mounting with terminal head type (With grounded)
Q	Extended lead wire type (With grounded)
R	Extended lead wire with steel armored tube type (With grounded)

3. Element

K	K (0.75)	**1**	K (0.4)
J	J (0.75)	**2**	J (0.4)
T	T (0.75)	**3**	T (0.4)
E	E (0.5)	**4**	E (0.4)
N	N (0.75)	**5**	N (0.4)
Q	Pt 100 Ω (B), 3 wire	**9**	Pt 100 Ω (A), 3 wire
U	JPt 100 Ω (B), 3 wire	**0**	JPt 100 Ω (A), 3 wire
A	Pt 100 Ω (B), 4 wire	**C**	Pt 100 Ω (A), 4 wire
B	JPt 100 Ω (B), 4 wire	**D**	JPt 100 Ω (A), 4 wire
Z	Other	**6**	B (0.5)
7	R (0.25)	**8**	S (0.25)

4. Sheath material

1	316SS
2	Inconel 600 (Thermocouple only)
3	310SS (Thermocouple only)
6	321SS (Thermocouple only)
7	316L SS

5. Sheath outer diameter (mm)

D9	3.2	**F9**	6.4
E9	4.8	**G9**	8.0

6. Conduit connection

3	½" NPT	**7**	None
6	¾" NPT	**8**	M20 * 1.5

7. Extension length and type

A	None - Remote mounting with terminal head type and extended lead wire type only * Minimum lead wire length = 100 mm (Actual length will be specified on remark column)
P	Com. fitting type - Remote mounting with terminal head and extended lead wire type only * Minimum lead wire length = 100 mm (Actual length will be specified on remark column)
Q	100 mm (Nipple union nipple) - Extended direct mounting with terminal head type
R	150 mm (Nipple union nipple) - Extended direct mounting with terminal head type
U	100 mm (Nipple) - Extended direct mounting with terminal head type
V	150 mm (Nipple) - Extended direct mounting with terminal head type
Z	Other

8. Connection type

A	None
E	½" NPT and 304SS
F	¾" NPT and 304SS
R	½" NPT and 316SS
S	¾" NPT and 316SS
Z	Other

9. Insert length (mm)

A	100	**G**	700
B	200	**H**	800
C	300	**J**	900
D	400	**K**	1,000
E	500	**Z**	Other
F	600		

10. Outer material of lead wire

A	PVC	**C**	Non-asbestos
B	Teflon	**X**	None

11. Option

0	None
1	Accessories
C	Ceramic terminal

1	2	3	4	5	6	7	8	9	10	11	
R951	**A**	**K**	**1**	**D9**	**3**	**U**	**E**	**A**	**X**	**0**	**Sample ordering code**

Tolerance classes

Thermocouple

Standard	Type	Class	Temperature range (℃)	Maximum deviation
EN 60584 IEC 584	K	1	-40 ~ 375	±1.5 ℃
			375 ~ 1,000	±0.0040 X I t I
		2	-40 ~ 333	±2.5 ℃
			333 ~ 1,200	±0.0075 X I t I
	E	1	-40 ~ 375	±1.5 ℃
			375 ~ 800	±0.0040 X I t I
		2	-40 ~ 333	±2.5 ℃
			333 ~ 900	±0.0075 X I t I

Thermocouple

Standard	Type	Class	Temperature range (℃)	Maximum deviation
ASME/ANSI MC96.1	K	Special	0 ~ 275	±1.1 ℃
			275 ~ 1,250	±0.0040 X I t I
		Standard	0 ~ 293	±2.2 ℃
			293 ~ 1,250	±0.0075 X I t I
	E	Special	0 ~ 293	±1.0 ℃
			293 ~ 870	±0.0040 X I t I
		Standard	0 ~ 293	±1.7 ℃
			293 ~ 870	±0.0050 X I t I

Resistance thermometer

Type	Nominal resistance (Ω at 0 ℃)	Class	Temperature range (℃)	Maximum deviation
Pt100	100	A	-30 ~ 350	±(0.15 + 0.0020 I t I)
			-50 ~ -30 / 350 ~ 400	±(0.30 + 0.0050 I t I)
		B	-50 ~ 400	±(0.30 + 0.0050 I t I)

Memo

Explosion proof
Metallic protection tube thermocouple and RTD
Model : R960 series

Spec. sheet no. RD09-07

Service intended

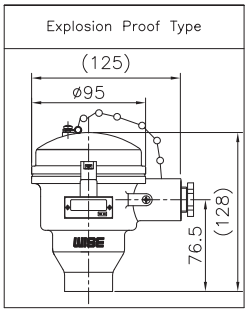
Protection tube type is constructed with the insulator which insulates the element wire, and with the protection tube which protects the insulator.
To install this model on the process pipe or on the container, it normally attaches to a connector,a flange, or a compression fitting on the protection tube.
It can be manufactured as it is required for its use.
As its special features, it does not have any resistance issues with a lead wire, and its immediate response to a temperature change leads to a less error rate of temperature change in a broade range.

Standard features

Element
Thermocouple : K, E, J, T, N
RTD : Pt 100 Ω at 0 ℃

Head material
ALDC (Standard)
316SS

Head type



Certificates
KCS Ex d e IIC T6 IP67

Tolerance on temperature reading
■ Thermocouple
Class 1, Class 2 (DIN/IEC584-2, BS/EN60584-2, JIS C1602)
Special, Standard (ASTM E230, E988, ISA-MC96.1)

■ RTD
Class A : ±(0.15 + 0.002 l t l)
Class B : ±(0.3 + 0.005 l t l)

Tube and element wire size (Thermocouple only)

Outer diameter (mm)	
Tube	Element wire
6.4	0.65
8.0	0.65 (1.0)
10.0	1.0 (1.6)
12.0	1.0 (1.6)
15.0	1.0, 1.6 (2.3)
17.3	1.6 (2.3) (3.2)
21.7	2.3 (3.2)

* ( ) Standard

Protecting tube outer diameter (RTD only)
6.4, 8.0 and 10 mm

1. Base model

R961	Thermocouple single element
R962	Thermocouple double (Duplex) element
R963	RTD single element
R964	RTD double element

2. Head and tip shape type

A	ALDC head and ungrounded
C	316SS head and ungrounded

3. Element

K	K (0.75)	**A**	Pt 100 Ω (B), 4 wire
J	J (0.75)	**B**	JPt 100 Ω (B), 4 wire
T	T (0.75)	**9**	Pt 100 Ω (A), 3 wire
E	E (0.5)	**0**	JPt 100 Ω (A), 3 wire
N	N (0.75)	**C**	Pt 100 Ω (A), 4 wire
Q	Pt 100 Ω (B), 3 wire	**D**	JPt 100 Ω (A), 4 wire
U	JPt 100 Ω (B), 3 wire	**Z**	Other

4. Tube material

0	304SS
1	316SS
2	Inconel 600
3	310SS
4	446SS
5	347SS
6	321SS
7	316L SS
9	Other

5. Tube and element outer diameter (mm)

F0	6.4 and 0.65	**M1**	15.0 and 1.0
F9	6.4 for RTD	**M2**	15.0 and 1.6
G0	8.0 and 0.65	**M3**	15.0 and 2.3
G1	8.0 and 1.0	**P2**	17.3 and 1.6
G9	8.0 for RTD	**P3**	17.3 and 2.3
J1	10.0 and 1.0	**P4**	17.3 and 3.2
J2	10.0 and 1.6	**Q3**	21.7 and 2.3
J9	10 for RTD	**Q4**	21.7 and 3.2
K1	12.0 and 1.0		
K2	12.0 and 1.6		

6. Conduit connection

1	½" PF
2	½" PT
3	½" NPT
4	¾" PF
5	¾" PT
6	¾" NPT
7	None
8	M20 x 1.5P
9	Other

7. Mounting type

X	Refer to mounting table (11th character)

8. Connection type

XX	Refer to connection type table (12th and 13th character)

9. Insert length

X	Refer to insert length table (14th character)

10. Option

0	None
1	Accessories
4	Epoxy coated ALDC head
7	Accessories and epoxy coated ALDC head

1	2	3	4	5	6	7	8	9	10	
R961	**A**	**K**	**1**	**F1**	**2**	**X**	**XX**	**X**	**1**	**Sample ordering code**

Mounting, connection type and insert length table - 11th thru 14th characters

11th character		12th character		13th character		14th character	
Code	Mounting	Code	Connection size and connector material	Code	Connection type	Code	Insert length (mm)
A	None	A	None	A	None	A	100
	Fixed thread lag length	B	⅛" and 304SS	B	PT	B	200
B	80 mm	C	¼" and 304SS	C	NPT	C	300
C	100 mm	D	⅜" and 304SS	D	PF	D	400
D	150 mm	E	½" and 304SS	E	NPS	E	500
E	200 mm	F	¾" and 304SS	F	UNF	F	600
F	Other	G	1" and 304SS	G	BSPT	G	700
	Fixed flange lag length	H	1¼" and 304SS	H	BSPF	H	800
G	80 mm	J	1½" and 304SS	J	MM	J	900
H	100 mm	K	2" and 304SS	K	B16.5 Class 150 RF	K	1,000
J	150 mm	L	3" and 304SS	L	B16.5 Class 150 FF	L	1,500
K	200 mm	M	7/16" and 304SS	M	B16.5 Class 300 RF	M	2,000
L	Other	N	⅛" and 316SS	N	B16.5 Class 300 FF	N	2,500
M	Movable thread	P	¼" and 316SS	O	Sanitary	P	3,000
N	Movable flange	Q	⅜" and 316SS	P	B16.5 Class 600 RF	Q	3,500
P	Compression fitting	R	½" and 316SS	Q	B16.5 Class 600 FF	R	4,000
	Union and nipple length	S	¾" and 316SS	R	JIS 5K RF	S	4,500
Q	100 mm length	T	1" and 316SS	S	JIS 5K FF	T	5,000
R	150 mm length	U	1¼" and 316SS	T	JIS 10K RF	U	6,000
S	Other	V	1½" and 316SS	U	JIS 10K FF	V	7,000
	Nipple length	W	2" and 316SS	V	JIS 20K RF	W	8,000
T	50 mm	X	3" and 316SS	W	JIS 20K FF	X	9,000
U	100 mm	Y	7/16" and 316SS	X	B16.5 Class 1,500 RTJ	Y	10,000
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 14th character, please choose a code of next higher length if applicable length is not. Actual length shall be specified.

Memo

Explosion proof
Non-metallic protection tube thermocouple
Model : R970 series

Spec. sheet no. RD09-08

Service intended

This thermocouple is the combination of a precious metal such as platinum and rhodium alloy with non-metallic materials such as alumina and ceramic which can withstand a high temperature.
It is mainly used in a furnace, kilns, and a production line of glass and ceramic.

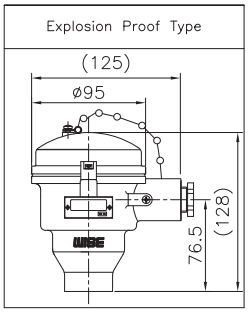
- Furnaces, kilns and ovens
- Furnaces with oxidizing and neutral atmosphere
- Glass, fiber and ceramic industries

Standard features

Element

- Type R (87 % Pt, 13 % Rh/Pt)
- Type S (90 % Pt, 10 % Rh/Pt)
- Type B (70 % Pt, 30 % Rh / 94 % Pt, 6 % Rh)
- Type K

Head type



Tolerance on temperature reading

"K" type : Class 2 (0.75 %)
Standard (0.75 %)
"R", "S" type : Class 2 (0.25 %)
Standard (0.5 %)
"B" type : Class 3 (0.5 %)
Standard (0.5 %)

Head material

ALDC (Standard)
316SS

Element outer diameter

"K" type : 3.2 mm
"R", "S" and "B" type : 0.5 mm

Protecting tube material and outer diameter

Material	Outer diameter (mm)
SSA-S (99.5 % Alumina)	8, 10, 13, 15, 17, 21, 25
HB (60 % Alumina,40 % Silica)	8, 10, 13, 15, 17, 21, 25
GK-SiC (90 % SiC)	25, 30, 40

Certificates

KCS Ex d IIC T6 IP65

1. Base model

R971	Single element
R972	Double(Duplex) element

2. Head and tip shape type

A	ALDC head and ungrounded
B	316SS head and ungrounded

3. Element

K	K (0.75)
B	B (0.5)
1	K (0.4)
R	R (0.25)
S	S (0.25)

4. Mounting type and extension length (mm)

A	None	**K**	Fixed flange (300)
B	Support tube (100)	**L**	Movable thread (100)
C	Support tube (150)	**M**	Movable thread (150)
D	Support tube (300)	**N**	Movable thread (300)
E	Fixed thread (100)	**P**	Movable flange (100)
F	Fixed thread (150)	**Q**	Movable flange (150)
G	Fixed thread (300)	**R**	Movable flange (300)
H	Fixed flange (100)	**Z**	Other
J	Fixed flange (150)		

5. Outer protection tube diameter (mm)

00	8	**40**	21
10	10	**50**	25
20	13	**60**	30
25	15	**70**	40
30	17		

6. Outer protection tube material

0	316SS	**5**	Inconel 600
1	SSA-S (8~25 mm)	**6**	446SS
3	HB (8~21 mm)	**7**	Other
4	GK-SiC (25~40 mm)	**8**	310SS

7. Inner tube material

0	None
1	SSA-S
3	HB
5	Inconel
9	Other

8. Connection type

XX	Refer to connection type table (12th and 13th character)

9. Insert length

X	Refer to insert length table (14th character)

10. Option

0	None
1	Accessories
4	Epoxy coated ALDC head
6	Accessories and epoxy coated ALDC head

1	2	3	4	5	6	7	8	9	10	
R971	**A**	**K**	**A**	**00**	**0**	**0**	**XX**	**X**	**1**	**Sample ordering code**

Mounting, connection type and insert length table - 12th thru 14th characters

12th character		13th character		14th character	
Code	Connection size	Code	Connection type	Code	Insertion length (mm)
A	None	A	None	A	100
E	½" (15A)	B	PT	B	200
F	¾" (20A)	C	NPT	C	300
G	1" (25A)	D	PF	D	400
H	1¼" (32A)	K	B16.5 Class 150 RF	E	500
J	1½" (40A)	L	B16.5 Class 150 FF	F	600
K	2" (50A)	M	B16.5 Class 300 RF	G	700
L	2½" (65A)	N	B16.5 Class 300 FF	H	800
M	3" (80A)	P	B16.5 Class 600 RF	J	900
Z	Other	Q	B16.5 Class 600 FF	K	1,000
		R	JIS 5K RF	L	1,500
		S	JIS 5K FF	M	2,000
		T	JIS 10K RF		
		U	JIS 10K FF		
		V	JIS 20K RF		
		W	JIS 20K FF		
		Z	Other		

Note : Please choose a code of next higher length if applicable length is not. Actual length shall be specified.

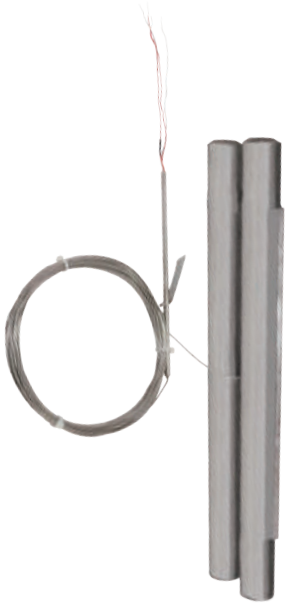
Memo

Chordal type thermocouple
Model : R980 series

Spec. sheet no. RD09-09

Service intended

Normally, Chordal type thermocouple is installed on the outer wall of the tube to measure the temperature, however, to measure the temperature more precisely and quickly, it is directly inserted into the boiler tube after generating a hole on the tube. Generally, the tube will be manufactured by the boiler maker, and the thermocouple will be inserted and calibrated by the manufacturer.



Application

- Boiler tube skin temperature
- Other various tube wall temperature measurement

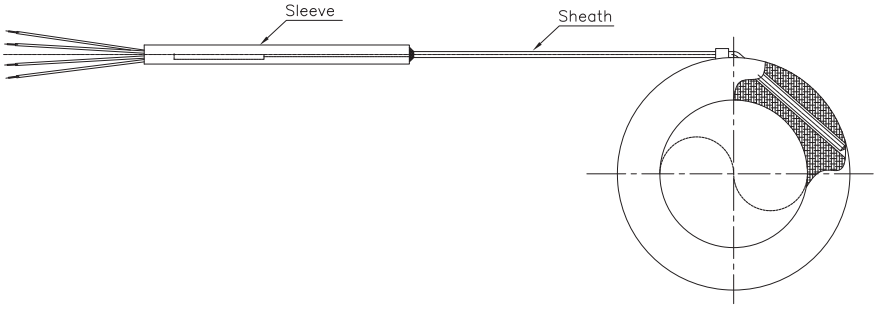
Standard feature

Element
K, E, J, T

Accuracy
Standard : 0.75 % (For reading temp.)
Special : 0.4 % (For reading temp.)

Sheath outer diameter (mm)
1.6, 2.3 and 3.2

Standard product drawing



1. Base model

R981	Chordal type thermocouple (Single element)
R982	Chordal 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)
1	K (0.4)
2	J (0.4)
3	T (0.4)
4	E (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	1.6
B	2.3
C	3.2
Z	Other

6. Conduit connection

1	½" PF
2	½" PT
3	½" NPT
4	¾" PF
5	¾" PT
6	¾" NPT
7	None
8	M20 x 1.5P
9	Other

7. Mounting type

X	Refer to connection type (11th character)

8. Connection type

XX	Refer to insert length table (12th and 13th character)

9. Insert length

X	Refer to insert length table (14th character)

10. Option

0	None
2	Epoxy coated ALDC head
3	Head material : 304SS
4	Head material : 316SS

1	2	3	4	5	6	7	8	9	10	
R981	**A**	**K**	**1**	**A**	**1**	**X**	**XX**	**X**	**0**	**Sample ordering code**

Mounting, connection type and insert length table - 11th thru 14th characters

11th character		12th character		13th character		14th character	
Code	Mounting	Code	Connection size and connector material	Code	Connection type	Code	Insert length (mm)
A	None	A	None	A	None	A	100
	Fixed thread lag length	B	⅛" and 304SS	B	PT	B	200
B	80 mm	C	¼" and 304SS	C	NPT	C	300
C	100 mm	D	⅜" and 304SS	D	PF	D	400
D	150 mm	E	½" and 304SS	E	NPS	E	500
E	200 mm	F	¾" and 304SS	F	UNF	F	600
F	Other	G	1" and 304SS	G	BSPT	G	700
	Fixed flange lag length	H	1¼" and 304SS	H	BSPF	H	800
G	80 mm	J	1½" and 304SS	J	MM	J	900
H	100 mm	K	2" and 304SS	K	B16.5 Class 150 RF	K	1,000
J	150 mm	L	3" and 304SS	L	B16.5 Class 150 FF	L	1,500
K	200 mm	M	7/16" and 304SS	M	B16.5 Class 300 RF	M	2,000
L	Other	N	⅛" and 316SS	N	B16.5 Class 300 FF	N	2,500
M	Movable thread	P	¼" and 316SS	O	Sanitary	P	3,000
N	Movable flange	Q	⅜" and 316SS	P	B16.5 Class 600 RF	Q	3,500
P	Compression fitting	R	½" and 316SS	Q	B16.5 Class 600 FF	R	4,000
	Union and nipple length	S	¾" and 316SS	R	JIS 5K RF	S	4,500
Q	100 mm length	T	1" and 316SS	S	JIS 5K FF	T	5,000
R	150 mm length	U	1¼" and 316SS	T	JIS 10K RF	U	6,000
S	Other	V	1½" and 316SS	U	JIS 10K FF	V	7,000
	Nipple length	W	2" and 316SS	V	JIS 20K RF	W	8,000
T	50 mm	X	3" and 316SS	W	JIS 20K FF	X	9,000
U	100 mm	Y	7/16" and 316SS	X	B16.5 Class 1,500 RTJ	Y	10,000
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 14th character, please choose a code of next higher length if applicable length is not. Actual length shall be specified.

Memo

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 kinfe-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 precess 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

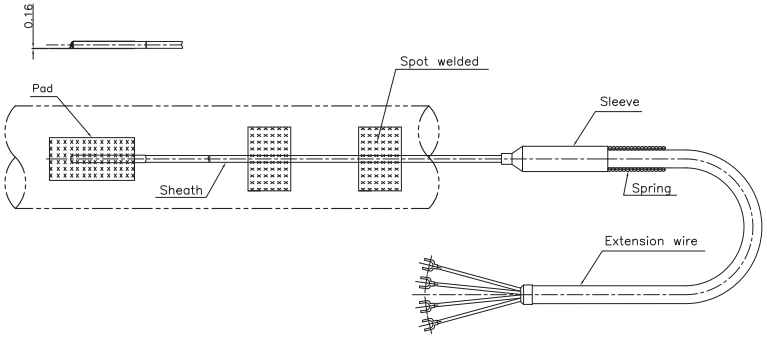
Element type
K, E, J, T, N

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



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
2	½" PT
3	½" NPT
4	¾" PF
5	¾" PT
6	¾" NPT
7	None
8	M20 x 1.5P
9	Other

8. Mounting type

X	Refer to connection type (11th character)

9. Connection type

XX	Refer to insert length table (12th and 13th character)

10. Insert length

X	Refer to insert length table (14th 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**

Mounting, connection type and insert length table - 11th thru 14th characters

11th character		12th character		13th character		14th 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	⅛" and 304SS	B	PT	B	3
B	80 mm	C	¼" and 304SS	C	NPT	C	4
C	100 mm	D	⅜" and 304SS	D	PF	D	5
D	150 mm	E	½" and 304SS	E	NPS	E	6
E	200 mm	F	¾" and 304SS	F	UNF	F	7
F	Other	G	1" and 304SS	G	BSPT	G	8
	Fixed flange lag length	H	1¼" and 304SS	H	BSPF	H	9
G	80 mm	J	1½" 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	⅛" and 316SS	N	B16.5 Class 300 FF	N	30
M	Movable thread	P	¼" and 316SS	O	Sanitary	P	35
N	Movable flange	Q	⅜" and 316SS	P	B16.5 Class 600 RF	Q	40
P	Compression fitting	R	½" and 316SS	Q	B16.5 Class 600 FF	R	45
	Union and nipple length	S	¾" 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	1¼" and 316SS	T	JIS 10K RF	2	80
S	Other	V	1½" 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 14th 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