

# General Specifications

## Models RM and RH Resistance Temperature Sensor

GS 06B03B01-00E

### ■ GENERAL

Model RM and RH Resistance Temperature Sensors (RTSs) have a platinum resistance element (Pt 100 Ω or 50 Ω) in a metallic protection tube or thermowell which is joined to a terminal box.

The Model RM uses a drawn protection tube. Versions are available for pipe threads mounting or mounting by a fixed or movable flange. The Model RM is most widely used for general processes.

Model RH uses a thermowell - straight or tapered tubes are available - and fixed flange or pipe threads mounting. Since the Model RH RTS is much stronger than the Model RM, it is suitable for use in high-pressure processes.

The operating temperature range depends on the resistance element; -200 to +100 °C, 0 to +300 °C or 0 to +500 °C.

The Model RM-00 is the resistance element and lead-wires alone.

These RTSs conform to JIS standards. RTSs conforming to IEC or DIN standards are also available to order.

### ■ STANDARD SPECIFICATIONS

#### Construction:

- R.T.S. with drawn protection tube for model RM
- R.T.S with drilled thermowell for model RH

#### Mounting Style:

- RM-0. . . . Element only
- RM-1. . . . Plain insertion type
- RM-2. . . . Flange mount type
- RH-2. . . . Flange mount type
- RM-3. . . . Pipe threads mount type
- RH-3. . . . Pipe threads mount type

#### Terminal Box:

Refer to Figure 1.

#### Nominal Resistance:

IEC, JIS Pt 100 Ω (at 0 °C) or Pt 50 Ω (at 0 °C) (Options)

#### Rated Current:

1 mA, 2 mA or 5 mA. (options)

#### Class:

IEC, JIS Class A or Class B

#### Operating Temperature Range:

- JIS Low temperature. . . . . -200 to 100 °C
- JIS Medium temperature. . . . . 0 to 350 °C
- JIS High temperature. . . . . 0 to 650 °C

#### Ambient Temperature Range:

-10 to 60 °C

#### Tolerance on Temperature:

Refer to Table 1.

#### Number of Element:

Single or double.



#### Protection Tube Outside Dia.:

φ10, 12, 13, or 21.7 mm.

#### Thermowell Outside Dia.:

φ15, 22 or 26 mm

#### Material;

- Protection Tube: Stainless steel.
- Thermowell: Stainless steel (JIS SUS304 or SUS316)
- Flange and Pipe Threads: Same as that of the protection tube (or thermowell).

Note: ⚠ Users must consider the characteristics of selected wetted parts material and the influence of process fluids. The use of inappropriate materials can result in the leakage of corrosive process fluids and cause injury to personnel and/or damage to plant facilities. It is also possible that the instrument itself can be damaged and that fragments from the instrument can contaminate the user's process fluids. Be very careful with highly corrosive process fluids such as hydrochloric acid, sulfuric acid, hydrogen sulfide, sodium hypochlorite, and high-temperature steam (150 °C [302 °F] or above). Contact Yokogawa for detailed information of the wetted parts material.

#### Mounting Flange;

- Rating: JIS 5K, 10K or 20K  
ANSI Class 150 or Class 300.
- Facing: Raised face or Flat face.
- Nominal Size: 15 mm (1/2 in.), 20 mm (3/4 in.),  
25 mm (1 in.), 40 mm (1-1/2 in.) or  
50 mm (2 in.).

#### Mounting Pipe Threads;

- Style: JIS Straight or Tapered type.  
ANSI Tapered type.
- Nominal Size: 1/2 in., 3/4 in. or 1 in.

#### Protection Tube and Flange or Pipe Threads Combinations:

Refer to Table 5.

#### Thermowell and Flange or Pipe Threads Combinations:

Refer to Table 5.

**Table 1. Tolerance on Temperature**

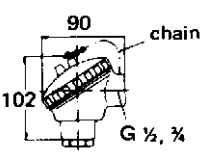
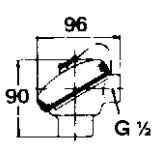
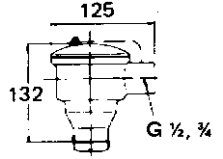
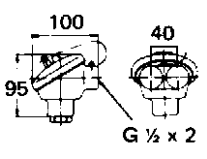
Operating temperature range	Measured temperature °C	Tolerance	
		Class index A	Class index B
		Temperature °C	Temperature °C
H { M { L {	-200	±0.55	±1.3
	-100	±0.35	±0.8
	0	±0.15	±0.3
	100	±0.35	±0.8
	200	±0.55	±1.3
	300	±0.75	±1.8
	350	±0.85	±2.05
	400	±0.95	±2.3
	500	±1.15	±2.8
	650	±1.45	±3.6

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**Table 2. Protection Tube or Thermocouple and Mounting Flange or Pipe Threads Combinations**

Protection tube/thermowell o.d.	Flange nominal size	Pipe threads nominal size
φ10, 12 mm	15 mm, 20 mm, 25 mm, 40 mm, 50 mm	1/2 in., 3/4 in., 1 in.
φ15 mm	15 mm, 20 mm, 25 mm, 40 mm, 50 mm	3/4 in., 1 in.
φ22, 26 mm	25 mm, 40 mm, 50 mm	1 in.

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Suffix code	1	3	4	5
Type	General type	Phenol resin type	Flameproof type (d2G4)	Double element type
Terminal box material	Cast aluminum alloy	Phenolic resin	Cast aluminum alloy	Cast aluminum alloy
Electrical connections	JIS G1/2 or G3/4 female	JIS G1/2 female	JIS G1/2 or G3/4 female	JIS G1/2 female
Number of terminals	3 or 6	3 or 6	3 or 6	6
Terminal material	Ceramic	Ceramic	Epoxy resin	Ceramic
Finished	Polyurethane paint	None	Polyurethane paint	Polyurethane paint
Color	Jade green	Black	Jade green	Jade green
External Dimension (unit: mm)				

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**Figure 1. List of Terminal Box**

**■ OPTIONS (Category I)**

● **With Movable Collar (Option code suffix: /MC)**

Applied only to model RM-1 for  $\phi$ 10, 12 and 15.  
Material: iron (FC20).

● **With Waterproof Cap**

Option code	Terminal box elec. connection	I. D. of packing	Applied to terminal box
/WP	-15A -15B -15C	JIS G1/2 Female	$\phi$ 9 mm $\phi$ 10 mm $\phi$ 10 mm
	-20A -20B -20C	JIS G3/4 Female	$\phi$ 12 mm $\phi$ 13 mm $\phi$ 15 mm

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● **With Flameproof Packing Adapter**

(Option code suffix: /PG)

Electrical connection:

JIS G1/2 Female. . . . . for single element

JIS G3/4 Female. . . . . for double element

Cable O.D.:

$\phi$ 8.8 to 9.5 mm. . . . . for JIS G1/2 female

$\phi$ 10 to 12 mm. . . . . for JIS G3/4 female

● **With Allen Wrench (Option code suffix: /AW)**

For flameproof type terminal box.

● **Special Color Finish**

Option code	Color	Finished
/CFP	-G1	Black
	-G7	Metallic silver
/CFE	-G1	Black
	-G2	Jade green
	-G7	Metallic silver

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● **Tetrafluoroethylene-hexafluoropropylene copolymer cover (code: FE□□□□)**

This cover - used to protect the metallic protection tube or thermowell from corrosion - can be used with the fixed flange mounting type of insertion length 100 to 1000 mm and flange nominal size 15 to 40 A. Thickness of the cover is approximately 1.25 to 1.5 mm. This tetrafluoroethylene-hexafluoropropylene copolymer can withstand almost all corrosive conditions and can be used in the temperature range -200 to +150 °C. (Specify insertion length (mm) as four characters in □□□□ of the option code suffix.)

● **Rated current 5 mA (code: /5 MA)**

Standard rated current is 2 mA. However, the 5 mA version has only class 0.5 (0.5 %) accuracy.

● **With Movable Flange**

Applied only to model RM-1.

Option code	Flange rating, nominal size	Material	
/MF	-J05 -15A	JIS 5K, 15 mm	
	-J10	-15A	JIS 10K, 15 mm
		-20A	JIS 10K, 20 mm
		-25A	JIS 10K, 25 mm

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< NOTE >

● **Revision of JIS RTS Symbols**

The JIS C1604 (resistance thermometer sensors) have been changed, effective March. 20, 1997, in order to conform to IEC standard. According to these JIS revisions, some products and documents of Instruments Div. have also been revised as follows:

Note) JIS: Japanese Industrial Standard

IEC: International Electrotechnical Commission

**■ 1. Outline of JIS RTD revision**

**1.1 R<sub>100</sub>/R<sub>0</sub> (resistance relationship for resistance elements) has been adopted by JIS, and the symbols have been changed:**

R <sub>100</sub> /R <sub>0</sub>	JIS RTD Symbols	
	Old	New
1.3850	Not available	Pt100 ..... New adopted (conforming to DIN & IEC Pt100)
1.3916	Pt100	JPt100 ..... Shall be obsoleted in the future

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**1.2 Newly-adopted JIS Pt100 has the same characteristics as those of DIN IEC751 and IEC751**

**1.3 Pt50  $\Omega$  has been deleted from the revised JIS**

Note) DIN: Deutsche Industries Norm

**MODEL AND SUFFIX CODES**

Model	Suffix Code	Description
<b>RM</b> <b>RH</b>	..... .....	Resistance Temperature Sencor (with Drawn Protection Tube) Resistance Temperature Sencor (with Drilled Thermowell and Nipple)
(1) Construction	<b>-0</b> ..... <b>-1</b> ..... <b>-2</b> ..... <b>-3</b> .....	Element only (Applied to Model RM-00) Plain Insertion Type (Applied to Model RM) Flange-mount Type (Flange Facing: Raised Face) Pipe threads-mount Type
(2) Terminal Box	<b>0</b> ..... <b>1</b> ..... <b>3</b> ..... <b>4</b> ..... <b>5</b> .....	None (Element only) General Type Phenol Resin Type Flameproof Type *1 Double Element Type
(3) Protection Tube Outside Diameter (Applied to Model RM)	<b>-1</b> ..... <b>-2</b> ..... <b>-3</b> ..... <b>-4</b> .....	φ10 } φ12 } Drawn Protection Tube (Applied to Model RM) φ15 } φ21.7 }
(3) Thermowell Outside Diameter (Applied to Model RH)	<b>-A</b> ..... <b>-B</b> ..... <b>-C</b> ..... <b>-D</b> ..... <b>-E</b> ..... <b>-F</b> .....	φ15 (Straight Tube) φ22 (Straight Tube) φ26 (Straight Tube) φ22×φ15 (Tapered Tube) φ22×φ18 (Tapered Tube) φ26×φ22 (Tapered Tube) } Drilled Thermowell (Applied to Model RH)
(4) Protection Tube or Thermowell Material	<b>N</b> ..... <b>1</b> ..... <b>3</b> .....	None (Applied to Model RM-00) Stainless Steel (JIS SUS 304) Stainless Steel (JIS SUS 316)
(5) Mounting (Rating)	<b>NN</b> ..... <b>JH</b> ..... <b>J1</b> ..... <b>J2</b> ..... <b>A1</b> ..... <b>A3</b> ..... <b>JT</b> ..... <b>JF</b> ..... <b>AT</b> .....	Without Mounting (Applied to Model RM-0 and RM-1) JIS 5K Flange JIS 10K Flange JIS 20K Flange ANSI Class 150 Flange ANSI Class 300 Flange JIS Taper Pipe Threads JIS Straight Pipe Threads ANSI Taper Pipe Threads
(6) Mounting (Nominal Size)	<b>N</b> ..... <b>1</b> ..... <b>2</b> ..... <b>3</b> ..... <b>4</b> ..... <b>5</b> ..... <b>C</b> ..... <b>D</b> ..... <b>E</b> .....	Without Mounting (Applied to Model RM-0 and RM-1) 15 mm (1/2 in.) Flange (Applied to φ10, 12 and 15) 20 mm (3/4 in.) Flange (Applied to φ10, 12 and 15) 25 mm (1 in.) Flange 40 mm (1-1/2 in.) Flange 50 mm (2 in.) Flange (Applied to JIS 10K Flange) 1/2 in. Pipe Threads (Applied to φ10 and 12, Model RM-3) 3/4 in. Pipe Threads (Applied to φ10, 12 and 15) 1 in. Pipe Threads
(7) Classification of Element	<b>-L</b> ..... <b>-M</b> ..... <b>-H</b> ..... <b>-S</b> ..... <b>-T</b> ..... <b>-U</b> .....	JIS JPt100 for Low Temperature (-200 to 100 °C) JIS JPt100 for Medium Temperature (0 to 350 °C) JIS JPt100 for High Temperature (0 to 500 °C) JIS, IEC Pt100 for Low Temperature (-200 to 100 °C) JIS, IEC Pt100 for Medium Temperature (0 to 350 °C) JIS, IEC Pt100 for High Temperature (0 to 650 °C)
(8) Class	<b>A</b> ..... <b>B</b> ..... <b>D</b> ..... <b>E</b> .....	Single Element, JIS Class B Single Element, JIS Class A Double Element, JIS Class B Double Element, JIS Class A
(9) Sheath Length (L)	<b>-■□□□</b> . . . .	Expressed in 4-Digit Numbers (in mm) <b>-■</b> : A (Element only, Single Element), B (Element only, Double Element), D (Double Element) or L (Single Element)

\*1: Maximum length of protection tube for flameproof type: 2000 mm

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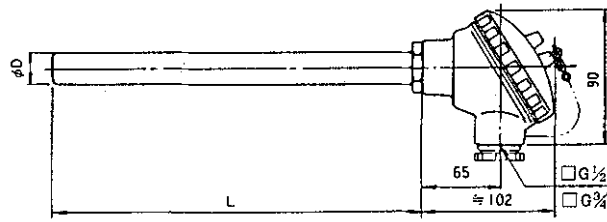
## ■ OPTION CODES

Option code		Description
/FF (Non-Standard)		Flat Face (Standard Flange Facing: Raised Face)
/MC		Movable Collar Material: FC20
/WP	-15A	Waterproof Cap (G1/2 φ9)
	-15B	Waterproof Cap (G1/2 φ10)
	-15C	Waterproof Cap (G1/2 φ10)
	-20A	Waterproof Cap (G3/4 φ12)
	-20B	Waterproof Cap (G3/4 φ13)
	-20C	Waterproof Cap (G3/4 φ15)
/PG		Flameproof Packing Adaptor G1/2 φ8.8 to φ9.5 or G3/4 φ10 to φ12
/AW		Allen Wrench for Flameproof Type Terminal Box
/CFP	-G1	Special Color Finish for Terminal Box Baked Polyurethane Resin Finish Color: Black
	-G7	Special Color Finish for Terminal Box Baked Polyurethane Resin Finish Color: Metallic Silver
/CFE	-G1	Special Color Finish for Terminal Box Baked Epoxy Resin Finish Color: Black
	-G2	Special Color Finish for Terminal Box Baked Epoxy Resin Finish Color: Jade Green
	-G7	Special Color Finish for Terminal Box Baked Epoxy Resin Finish Color: Metallic Silver
/CFU		Special Color Finish for Terminal Box Customer Specification with Color Sample
/FE□□□□ (□□□□: Insertion Length in mm)		FEP Cover for φ10, φ12 or φ15
/MF	-J05-15A	Movable Flange (Raised Face; FC20; JIS 5K 15A)
	-J10-15A	Movable Flange (Raised Face; SUS304; JIS 10K 15A)
	-J10-20A	Movable Flange (Raised Face; SUS304; JIS 10K 20A)
	-J10-25A	Movable Flange (Raised Face; SUS304; JIS 10K 25A)
	-J10-40A	Movable Flange (Raised Face; SUS304; JIS 10K 40A)
	-J10-50A	Movable Flange (Raised Face; SUS304; JIS 10K 50A)

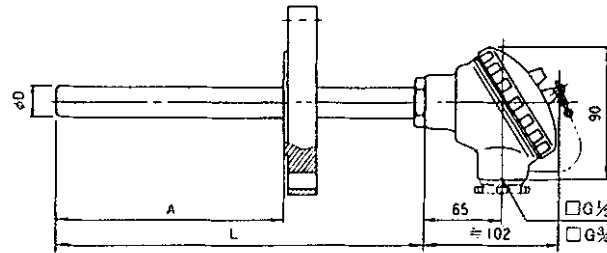
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## DIMENSIONS

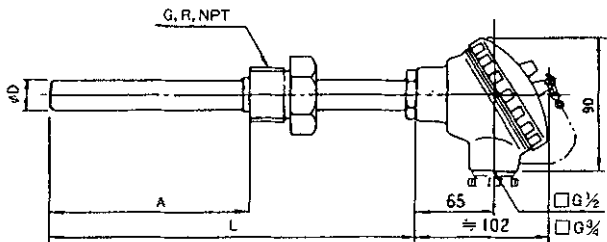
RM-11



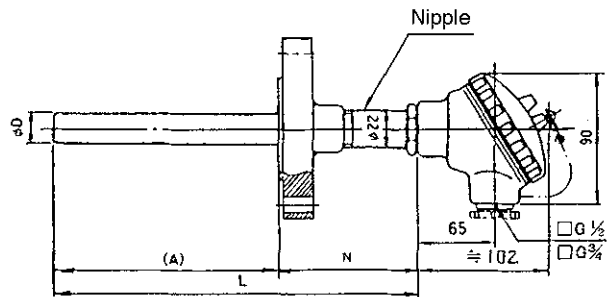
RM-21



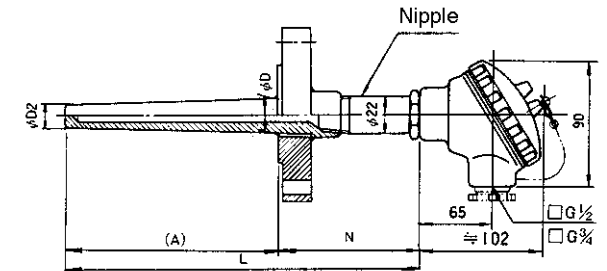
RM-31



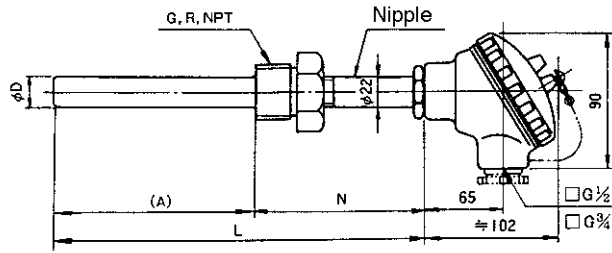
RH-21 (Straight tube)



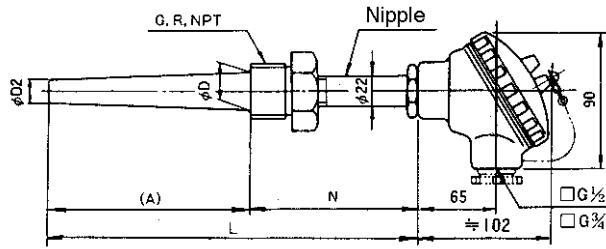
RH-21 (Tapered tube)



RH-31 (Straight tube)



RH-31 (Tapered tube)



\*: Model RM-2 with the length of L-A < 50 mm is not available.  
Model RM-3 with the length of L-A < 60 mm is not available.

< ORDERING INFORMATIONS >

1. Model and Suffix Codes
2. Insertion Length (Applied to model RM-2 and RM-3)
3. Option Desired