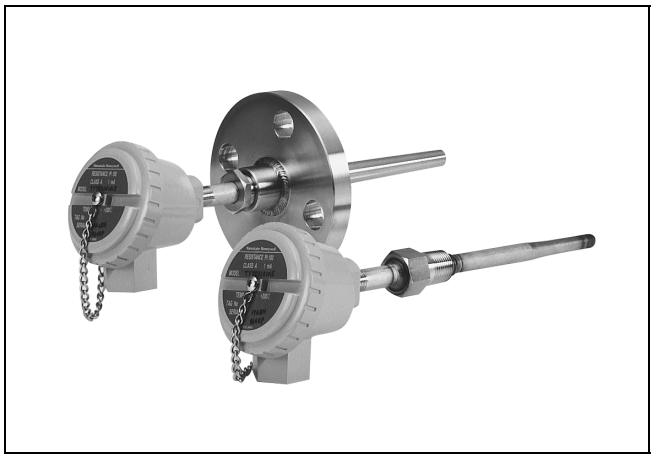
Pipe Insertion Sensor
TY783

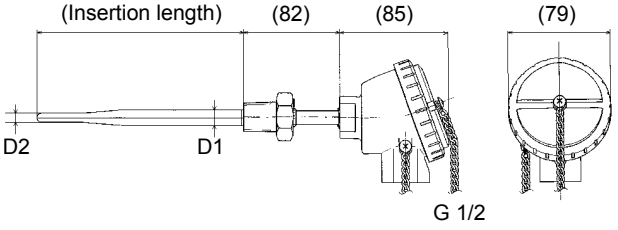
General

The pipe insertion temperature sensor (TY783) has the output characteristics of a Pt100 platinum resistance (JIS C1604A) and is used for temperature reading, control and recording of a variety of liquids inside pipes, tanks or heat exchangers. It can be used in combination with most electronic instruments with Pt100 input. It can also be used as a temperature sensor inside ducts or chambers.



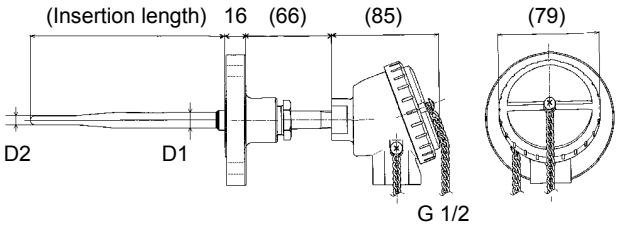
Specifications

Item	Specifications
Sensing range	–50 to 200 °C
Applicable liquid/gas	Depends on the material of the protective well. Refer to the Comparison of corrosiveness.
Sensing element accuracy	± (0.15 + 0.002 |t|) °C t: Sensing temperature
Time constant	TY7830A to F, J, K / TY7831 to F, J, K (Welded pipe): Approx. 50 sec (agitated water) TY7830G, H, M, N / TY7831G, H, M, N, TY7832G, H, M, N (cut off pipe): Approx. 20 sec (agitated water)
Recommended current	1 mA
Wiring	3 wires (single element)/ 6 wires (double element)
Pressure resistance	Screw connection: 1.47MPa Flange connection: JIS 20 k
Insulating resistance	500V DC 20 MΩ or more
Dielectric strength	Leakage of 1 mA or less in 1 min. 500V AC
Terminal box material	Aluminium
The applicable velocity of flowing fluid	Insertion length 150 to 300 mm: 4 m/s or less Insertion length 150 to 400 mm: 2.5 m/s or less Insertion length 150 to 2000 mm: 0.3 m/s or less (Location with least flow such as storage tanks) Note: The applicable velocity of flowing fluid depends on installation method and insertion length. Refer to the applicable velocity of flowing fluid and insertion length.



(mm)

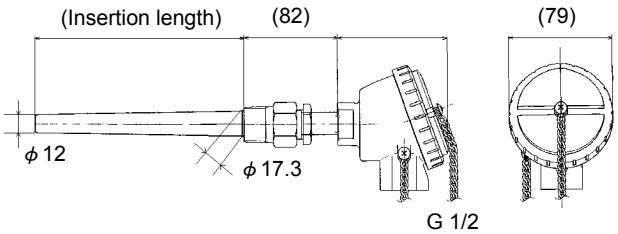
	Insertion length	D1	D2
TY7830A to F TY7831A to F	150	ϕ 12	ϕ 9.6
	160 to 400	ϕ 17.3	ϕ 12.5
	410 to 2000	ϕ 12	ϕ 9.6



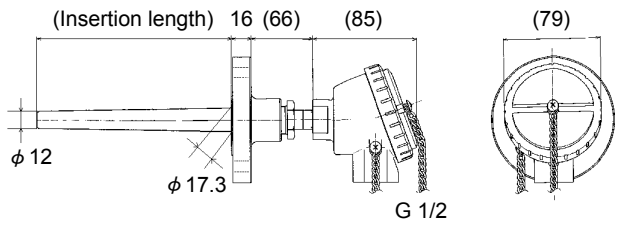
(mm)

Insertion length	D1	D2
150	ϕ 12	ϕ 9.6
160 to 400	ϕ 17.3	ϕ 12.5

TY7830J,K, TY7831J,K



TY7830G,H, TY7831G,H, TY7832G,H



TY7830M,N、TY7831M,N、TY7832M,N

Safety Instructions

Please read instructions carefully and use the product properly. Please keep this instruction on hand for reference at any time.

Usage Restrictions

This product is targeted for general air conditioning. Do not use this product in a situation where human life may be affected. If this product is used in clean rooms or places where reliability or control accuracy is particularly required, please contact Yamatake's sales representatives. Yamatake Building Systems Co., Ltd. bears no responsibility for any benefit, or lack of benefit, derived from the operation by the customer.

⚠ CAUTION

- Installer must be a trained, experienced technician.
- Check the ratings given in this instructions to prevent equipment damage.
- Check the environment given in this instructions to prevent equipment damage.
- All wiring must confirm to local codes and ordinances.
- Use insulated terminals.
- Disconnect the power supply before beginning wiring to prevent electrical shock or equipment damage.
- Do not remove or disassemble the cover except for wiring or part replacement. Equipment damage or electrical shock may result.
- This product includes a well in its insertion part. Do not remove the insertion part. This may cause water leakage.

Model number

Basic model number	Usage	Material of well	Connec-tion	Lock	Insertion length	Test report	Description
TY78							Pipe insertion sensor
	3						Piping connection
		0					SUS304
		1					SUS316L
		2					Titanium
			A				R1/2 welded pipe (Insertion length 150 mm) SUS304, 316L only
			B				R3/4 welded pipe (Insertion length 150 to 2000 mm) SUS304, 316L only
			C				R1 welded pipe (Insertion length 150 to 2000 mm) SUS304, 316L only
			D				G1/2 welded pipe (Insertion length 150 mm) SUS304, 316L only
			E				G3/4 welded pipe (Insertion length 150 to 2000 mm) SUS304, 316L only
			F				G1 welded pipe (Insertion length 150 to 2000 mm) SUS304, 316L only
			G				R1/2 bored taper pipe (Insertion length 150 to 400 mm)
			H				R3/4 bored taper pipe (Insertion length 150 to 400 mm)
			J				JIS20K 20A RF welded pipe (Insertion length 150 to 400 mm), SUS304, 316L only
			K				JIS20K 25A RF welded pipe (Insertion length 150 to 400 mm), SUS304, 316L only
			M				JIS20K 20A RF bored taper pipe (Insertion length 150 to 400 mm)
			N				JIS20K 25A RF bored taper pipe (Insertion length 150 to 400 mm)
			Y				Maintenance element (for TY7830C, D, E, F, TY7831C, D, E, F, TY7832C, D, E, F)
			Z				Maintenance element (for TY7830A to F, J, K) TY7831A to F, J, K)
				1			Single element
				2			Double element
					015		150 mm
					020		200 mm
					025		250 mm
					030		300 mm
					050		500 mm only TY7830B,C,E,F TY7831B,C,E,F
					xxx		Xxx cm(screw welded pipe max. 2000 mm, RF and bored taper pipe max. 400 mm)
						-A	With standard test report (0 °C,100 °C)
						-BX (X: points)	With test report specified from customer X: Specify more than 2 points

Notes: Titanium will all be bored taper pipe.

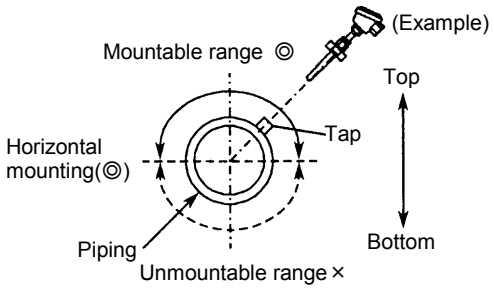
Order separately

83104098-003	Seal connector (sensing temperature:-30 °C to 60 °C, cable diameter: ϕ8.5 to ϕ12.5 Plastic)
83104098-004	Seal connector (sensing temperature:-30 °C to 60 °C, cable diameter: ϕ10.5 to ϕ14.5 Plastic)
PA1-A3PFH	Heat proof seal connector (sensing temperature: -40 °C to 120 °C, cable diameter: ϕ12 to ϕ16 Metal)

Installation

Mounting

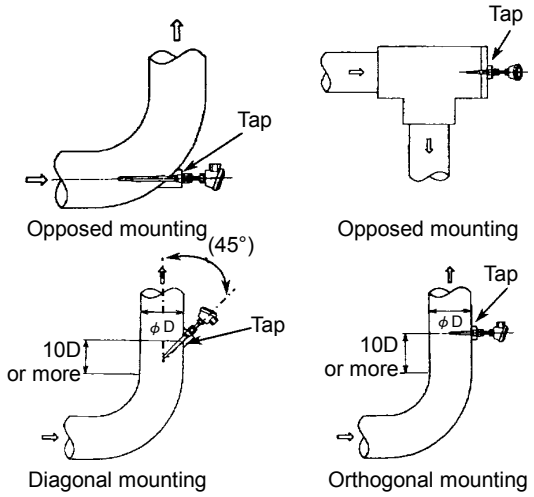
1. To prevent condensation, mount the pipe insertion sensor on pipes as follows.



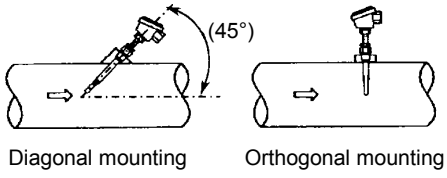
2. Select the position available for detecting the typical temperature of the measured fluid for mounting.
3. Mount the unit so that the whole temperature sensor has full contact with the measured fluid.
4. When used in liquid flow, if possible install the sensor so that it faces the flow. If impossible, install the sensor diagonal to the flow. If this is not feasible either, install the sensor orthogonally to the flow (refer to the following mounting conditions).

Mounting conditions

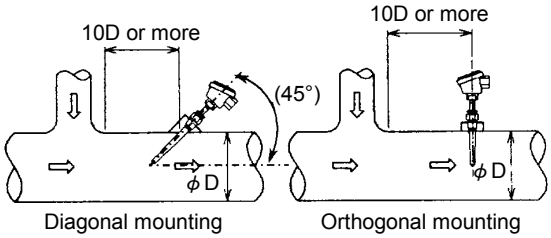
a) Mounting on elbow pipe (Top view)



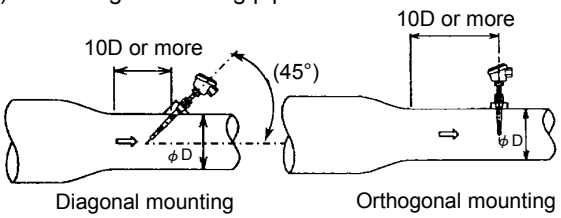
b) Mounting on straight pipe



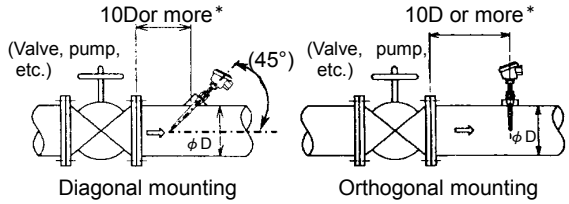
c) Mounting on T-joint + straight pipe



d) Mounting on choking pipe

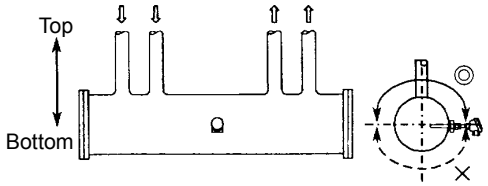


e) Mounting on pipe or joint with other equipment mounted



* For more than 10D, confirm that there is no interference with swirl or shock flow (pulsation) etc., for mounting.

f) Mounting on header



* Maximum insertion length shoud be 300mm.

Suitable flow speed by mounting conditions

Flow speed	Insertion length in orthogonal and diagonal mounting	Insertion length in opposed mounting
4 m/s or less	150 to 200 mm	150 to 300 mm
2.5 m/s or less	150 to 300 mm	150 to 400 mm
0.3 m/s or less	150 to 2,000 mm	

5. Do not mount in a location where a pipe vibrates.
6. To reduce the influence by natural vibration, use as short a socket as possible (approx. 50 to 60 mm.)
7. Use pipe seal for screw connection.

⚠ CAUTION
Do not step on the unit.

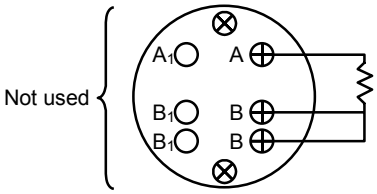
Wire connection

⚠ CAUTION
All wiring must conform to local codes and ordinances.

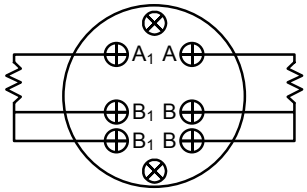
Be sure to turn off the power of the sensor to be connected in connection wiring.

In the case of measuring liquid temperature from –50 to 100 C, use IV or CVV wire of 1.25 mm² or more.

For 100 to 200 °C, use silicon or fluoroplastic cable of 1.25 mm² or more.



Wiring (single element)



Wiring (double element)

8. Order the seal connector separately. (see page 3)

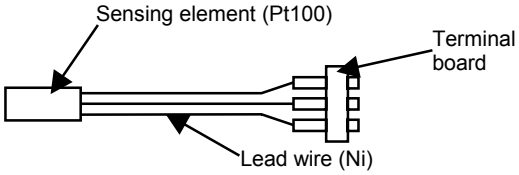
Maintenance

⚠ CAUTION
The insertion part of this product includes well. Do not remove the insertion part. Water leakage may occur.
Do not touch the unit carelessly. When used for vapor, touching the unit may cause burns as it gets very hot.

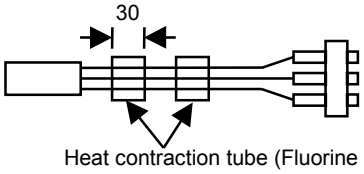
A well and a terminal box are included in a single unit other than bored taper pipe models.

To replace the sensing element...

1. Prepare the replacement element. The replacing element is composed of an element and a terminal strip.
2. Turn off the power of the connected sensor.
3. Remove the terminal cover of the temperature sensing resistor and remove the exterior wiring of the terminal.
4. Remove screws attaching the terminal strip and draw out the element with the terminal strip.
5. We recommend digital multi meter when checking resistance.
6. Insert the replacement element and restore the screws and covers in the reverse procedures.



(1) Element assembly TY783*A to F,J,K



The quantity and location of the heat contraction tube depend on the insertion length.

(2) Element assembly TY783*G,H,M,N

Comparison of corrosiveness

	Corrosive medium	Composition (%)	Temperature (°C)	SUS304	SUS316L	Titanium
Inorganic acid	Hydrochloric acid (HCl)	1	25	○	◎	◎
			Boiling	×	×	×
		10	25	×	×	○
			Boiling	×	×	×
	Nitric acid (H_2SO_4)	1	25	◎	◎	◎
			Boiling	×	△	×
		10	25	○	○	○
			Boiling	×	×	×
	Nitric acid (HNO_3)	10	25	◎	◎	◎
			Boiling	◎	◎	◎
		65	25	◎	◎	◎
			Boiling	○	○	◎
Organic acid	Acetic acid (CH_3COOH)	10	Boiling	◎	◎	◎
		60	Boiling	○	○	◎
	Formic acid (HCOOH)	10	25	△	○	◎
		30	Boiling	×	×	×
	Oxalic acid ($(COOH)_2$)	10	25	○	○	○
		25	60	△	○	×
	Lactic acid ($CH_3CH(OH)COOH$)	10	Boiling	○	○	◎
		85	Boiling	×	×	◎
Alkali	Caustic soda (NaOH)	10	100	◎	◎	◎
		40	Boiling	○	○	×
	Potassium carbonate (K_2CO_3)	5	Boiling	◎	◎	◎
		20	Boiling	◎	◎	◎
Inorganic chloride	Sodium chloride (NaCl)	25	25	○*	○*	◎
			Boiling	○*	○*	◎*
	Ammonium chloride (NH_4Cl)	40	25	○*	○*	◎
			Boiling	△*	○*	◎*
	Zinc chloride ($ZnCl_2$)	20	Boiling	×	×	◎
		50	Boiling	×	×	◎*
	Magnesia chloride ($MgCl_2$)	42	25	◎*	◎*	◎
			Boiling	◎*	◎*	◎*
	Ferric chloride ($FeCl_3$)	30	25	×	×	◎
			Boiling	×	×	◎*
Inorganic salt	Sodium nitrate(Na_2SO_4)	20	25	◎	◎	◎
			Boiling	◎	◎	◎
	Sodium sulfide (Na_2S)	10	25	◎	◎	◎
			Boiling	○	○	◎
	Sodium hypochlorite (NaOCl)	5	25	△	△	◎
		15	25	△	△	◎
	Sodium carbonate (Na_2CO_3)	30	25	◎	◎	◎
			Boiling	◎	◎	◎
Organic compound	Methyl alcohol (CH_3OH)	95	25	◎	◎	◎
	Carbon tetrachloride (CCl_4)	100	Boiling	○	○	◎
	Phenol (C_6H_5OH)	Saturated	25	◎	◎	◎
	Formaldehyde (HCHO)	37	Boiling	◎	◎	◎
Gas	Chloride(Cl_2)	Dry	25	◎	◎	×
		Wet	25	×	×	◎*
	Hydrogen chloride (H_2S)	Dry	25	△	○	◎
		Wet	25	○	◎	◎
	Ammonia (NH_3)	100	40	◎	◎	◎
			100	◎	◎	◎
Others	Sea water	-	25	◎*	◎*	◎
			100	○*	○*	◎*
	Naphtha	-	80	◎*	◎*	◎
			180	◎*	◎*	◎

◎: 0.125 mm/year or less, ○: 0.125 to 0.5 mm/year, △: 0.5 to 1.25 mm/year, ×: 1.25 mm/year or more,

* : Pitting or crevice corrosion may occur.

Specifications are subjects to change without notice.

YAMATAKE

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