

Temperature Indicating Controller

Model KFTA

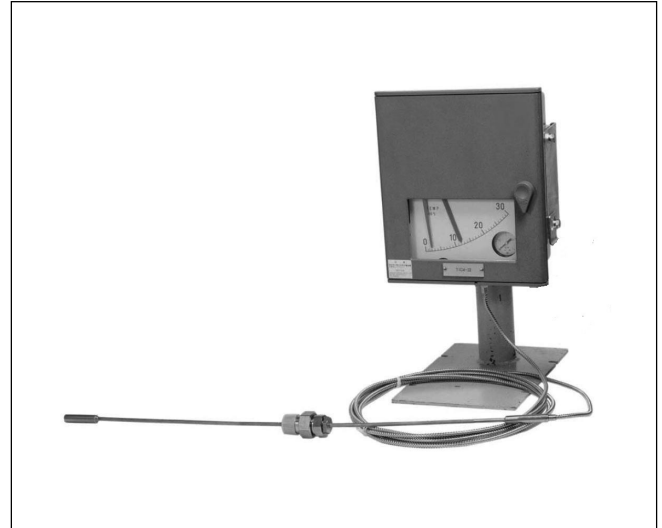
Overview

Model KFTA Temperature Indication Controllers indicate and control a process variable by converting its temperature change into mechanical displacement of a bellows through change in expansion of liquid-fill by temperature or change in gas-fill pressure by temperature.

Indicating transmitters and indicating transmitting controllers also are available as well as indicating controllers. The controllers are available either in the local type to set the set-point value with the knob on the instrument or in the cascade type (remote type) to set the set-point value with a pneumatic set-point signal.

Features

- A wide variety of measuring elements and control mechanisms are available to meet various applications.
- A pneumatic circuit board and a heat-resistant weatherproof sturdy case are used, thereby greatly improving durability and reliability.
- The pneumatic circuit board system allows to readily add or eliminate control mechanisms and units, thereby enhancing the system modification and expansion flexibility.
- Interchangeable parts are used to the maximum practicable extent, thereby reducing the number of parts to be kept in stock.
- A bellows type pressure receiving element, which provides a larger torque and a higher resistance against vibration, is employed.
- A compensation mechanisms for ambient temperature change is incorporated.



Specifications

■ Standard Specifications

Item	Specifications	
Detector Section		
Measuring range	Standard range:	
	MEASURING RANGE (°C)	LIQUID OF SENSOR
	0 to 50	KEROSENE
	0 to 100	KEROSENE
	0 to 150	KEROSENE
	0 to 200	SILICONE
	0 to 300	SILICONE
	0 to 400	NITROGEN *GAS
	0 to 500	NITROGEN *GAS
	50 to 100	KEROSENE
	100 to 200	SILICONE
	100 to 300	SILICONE
	100 to 400	NITROGEN *GAS
	-50 to +50	ETHYL ALCOHOL
-50 to +100	SILICONE	
	Special range (see note) : (°C)	
	Span	Range
	50	-20 to +30, 20 to 70
	60	-10 to +50
	80	-15 to +65, 0 to 80
	100	50 to 150
	120	-20 to +100, 0 to 120
	150	50 to 200
	200	-50 to +150, 50 to 250
	250	-50 to +200, 0 to 250
	300	-50 to +250
	Note) Indicating accuracy: ±1.5% FS Repeatability : 1% FS	
Allowable over-range	Maximum temperature plus 20% of span.	
Material	Bulb : SUS304 Armored tube; SUS304 Capillary tube : SUS304 Pressure element : Phosphor bronze bellows	
Capillary tube length	5 m standard (6-9 m available in 1 m increments and 12 to 30 m in 2 m increments.)	
Function		
Indicating capacity	±1% FS	
Repeatability	Within 0.3% FS	
Dead band	Within 0.2% FS	
Indication		
Angle	44 degrees	
Scale length	150 mm	
Pointer	Process variable ; Red, Set-point value ; Green	
Output indicator (φ 40 mm)	Scale range; 0 to 200 kPa {0 to 2 kgf/cm ² }, Indicator accuracy; ±3% FS	
Set-point Section		
Local setting	Internal or external setting by setting knob.	
Remote setting	Pneumatic pressure setting of 20 to 100 kPa {0.2 to 1.0 kgf/cm ² }	
Setting range	0 to 100% FS	
Controller		
Control action	P + Manual reset, PI, PID, PD + Manual reset, PI + Batch, On-Off, Differential gap, P + External reset, PD + External reset	
Proportional band (P)	5-500% (direct or reverse action)	
Integral (I)	0.05 to 30 min.	
Derivative (D)	0.05 to 30 min.	
Differential gap	1 to 100% FS, adjustable	
Batch setting pressure	60 to 110 kPa {0.6 to 1.1 kgf/cm ² }, adjustable	
External reset pressure	20 to 100 kPa {0.2 to 1.0 kgf/cm ² }	
Manual reset	0 to 100% FS, adjustable (by pneumatic pressure setting.)	

Item	Specifications
General Specifications	
Output	20 to 100 kPa {0.2 to 1.0 kgf/cm ² }, 0 or Corresponding to supply air pressure (on-off, differential gap)
Minimum load	I.D. 4 mm x 3 m + 20 cm ³
Supply air pressure	140 ± 14 kPa {1.4 ± 0.14 kgf/cm ² }
Air consumption (50% output balanced)	Indicating transmitter (A0) ; 4 L/min (normal) Indicating controller (A1, A3) ; 4 L/min (normal) Indicating transmitting controller (A2, A4) ; 8 L/min (normal) Manual controller (M) ; +3 L/min (normal)
Maximum air deliver flowrate	Transmitter output ; 40 L/min (normal) Controller output ; 40 L/min (normal) Manual control output ; 30 L/min (normal)
Air connection	Rc1/4 or 1/4 NPT internal thread
Ambient temperature	-30 to +80 °C (-30 to +60 °C for 0 to 50 °C range)
Relative humidity	10 to 90% RH
Case, Door	Enclosure; Rain-tight and dust-tight, NEMA 3, IEC IP54 Vibration resistant Lloyd regulation or equivalent Materials ; Case Aluminum die-cast Door Polyester with fiberglass Door-glass Reinforced glass (3 mm thick) Case finish ; Acryl baking finish (for corrosion-resistant and silver finish, refer to the optional specification.) Color of finish ; Case Light beige (munsell 4Y7.2/1.3) Door Light gray (munsell N8)
Mounting	Panel, wall or 2 in. pipe mounting (mounting bolt, nut material; SUS304)
Weight	Approx. 9.2kg (with options)

■ Optional Specifications

Item	Specifications
(1) External SP setting knob (for local setting)	A setting knob is mounted on the door. SP can be adjusted from outside.
(2) Built-in manual controller (with auto/manual transfer switch)	Consists of a manual control regulator, two position transfer switch and balance check button.
(3) With union	Threaded union nut provided for connection with thermal well provided.
(4) Pressure Regulator with air filter (RA1B) (not applicable to panel mounting type)	Pressure regulator with filter plus 40 mm pressure gauge. (supply pressure; 200 to 1035 kPa {2 to 10.55 kgf/cm ² } output; 140 kPa {1.4 kgf/cm ² }, pressure gauge; 0 to 200 kPa {0-2 kgf/cm ² })

■ Optional Semi-standard and Special Specifications

Item	Specifications	
(1) Corrosion-resistant and silver finish (Y 138)	<i>Corrosion-resistant finish with baked acryl (Y138A)</i> : Resistant against corrosive gases. <i>Corrosion-proof finish with baked epoxy resin (Y138B)</i> : Resistant against corrosive liquids. <i>Regular silver finish with baked acryl (Y138C)</i> : To suppress temperature rise caused by direct or indirect sunlight and other cause. <i>Corrosion-resistant silver finish with baked acryl (Y138D)</i> : To suppress temperature rise caused as above and to be resistance against corrosive gases. (note : silver finish is not resistant against alkaline gases.)	
(2) Long type capillary tube (Y 160)	10 m	
(3) Special order items (The items mentioned in the right are available as special order items.)	SP0039	Topicalization (Field and pneumatic instruments)
	SP0047	Stainless TAG No.plate
	SP0084	KF with door lock
	SP0085	KF with AUTO/MANUAL indicator
	SP0086	KF (transmitting type only) with output gauge
	SP0100-ITEM	Submittal of mil sheet for wetted parts.
	SP0106	5-point check
SP0153-ITEM	Φ40 pressure gauge made with special scale.	

Model Selection

■ Temperature Indicating Controller

Ex.; KFTA 12-06100A1T-K, M, U, R

Basic Model No.			Selections					Options	Description	
Type	Function	Control action	Sensing element	Measuring range	Air connection	Output Pressure unit	Mounting method			
KFTA									Temperature indicating controller	
	0								Indicating transmitter	
	1								Indicating controller (local type)	
	2								Indicating transmitting controller (local type)	
	3								Indicating controller (cascade type)	
	4								Indicating transmitting controller (cascade type)	
		0							No selection	
		1							P + Manual reset	
		2							PI	
		3							PID	
		4							PD + Manual reset	
		5							PI + Batch	
		6							On-Off	
		7							Differential gap	
		8							P + External reset	
		9							PD + External reset	
			-06							Liquid-fill type
			-07							Gas-fill type
					105					Liquid-fill type -50 to +50 °C
					155					" -50 to +100 °C
					050					" 0 to 50 °C
					100					" 0 to 100 °C
					150					" 0 to 150 °C
					200					" 0 to 200 °C
					300					" 0 to 300 °C
					400					Gas-fill type 0 to 400 °C
					500					" 0 to 500 °C
					055					Liquid-fill type 50 to 100 °C
					101					" 100 to 200 °C
					201					" 100 to 300 °C
				301					Gas-fill type 100 to 400 °C	
					A				Rc 1/4 internal thread	
					B				1/4 NPT internal thread	
						1			0.2 to 1.0 kgf/cm ²	
						2			3 to 15 PSI	
						3			0.2 to 1.0 bar	
						4			20 to 100 kPa	
						8			19.6 to 98.1 kPa (equality to 0.2 to 1.0 kgf/cm ²)	
							P		Panel mounting	
							S		Wall mounting	
							T		2 in. pipe mounting	
								-X	No selection (without union)	
								-U*	With union (see Notes 2 and 3.)	
								-K	With external SP setting knob (applicable to type A1 or A2 controller.)	
								-M	Built-in manual controller (with auto /manual switch) (applicable to type A1, A2, A3 or A4 controller.)	
								R	Pressure Regulator with air filter (RA1B)	

Note)

- When specifying semi-standard option (Y □), please write as : KFTA12Y-06100A1T-K, M, U, R (Y 138)
- When neither option – U (with well or -U (union) is specified, only nut is provided to ship. (nut: liquid-fill type: G3/4, gas-fill type: G1)
- Air connecting screw and union screw

Type of air connecting screw	Union screw (material: SUS 304)
Rc1/4	Liquid-fill ; Rc 3/4*
	Gas-fill ; Rc 1
1/4 NPT	Liquid-fill ; 3/4 NPT*
	Gas-fill ; 1 NPT

* For liquid-fill type, either Rc 1 or 1 NPT is available, please specify it.

■ Well (Liquid-fill type)

Ex.: KFZ1-1112-15

Basic model no.		Selections			Options	Description		
		Type	Connection	Material				
KFZ	1					Well for temperature element		
		-1				For liquid-fill type (drilled)		
		-2				" (welded)		
			11			Flange connection	20 mm-JIS10K	
			12			"	25 mm-JIS10K	
			13			"	40 mm-JIS10K	
			14			"	50 mm-JIS10K	
			21			"	20 mm-JIS20K	
			22			"	25 mm-JIS20K	
			23			"	40 mm-JIS20K	
			24			"	50 mm-JIS20K	
			31			"	3/4 in.-ANSI 150	
			32			"	1 in.-ANSI 150	
			33			"	1-1/2 in.-ANSI 150	
			34			"	2 in.-ANSI 150	
			41			"	3/4 in.-ANSI 300	
			42			"	1 in.-ANSI 300	
			43			"	1-1/2 in.-ANSI 300	
			44			"	2 in.-ANSI 300	
			71			"	3/4 in.-JPI 150	
			72			"	1 in.-JPI 150	
			73			"	1-1/2 in.-JPI 150	
			74			"	2 in.-JPI 150	
			81			"	3/4 in.-JPI 300	
			82			"	1 in.-JPI 300	
			83			"	1-1/2 in.-JPI 300	
			84			"	2 in.-JPI 300	
			91			"	3/4 in.-ANSI 600	
			92			"	1 in.-ANSI 600	
			93			"	1-1/2 in.-ANSI 600	
			94			"	2 in.-ANSI 600	
			01			"	3/4 in.-JPI 600	
			02			"	1 in.-JPI 600	
			03			"	1-1/2 in.-JPI 600	
			04			"	2 in.-JPI 600	
			51			Screw connection	R 3/4	
			52			"	R1	
			61			"	3/4 NPT	
			62			"	1 NPT	
			2				SUS316	
			7				SUS304	
			8				SUS316L	
							Insertion length	Drilled
								Welded
			-15				150 mm	Available
			-20				200 mm	Available
			-25				250 mm	Available
			-30				300 mm	Available
			-35				350 mm	Available
			-40				400 mm	Available
			-45				450 mm	Available
			-50				500 mm	Available
			-60				600 mm	Available
			-70				700 mm	Available *
			-80				800 mm	Available *
			-90				900 mm	Available *
			-00				1000 mm	Available *

Note) *marked means Protecting tubes with insertion lengths (extension lengths) longer than 600 mm are available as special order items (standard length 700 mm).

■ Well (Gas-fill type)

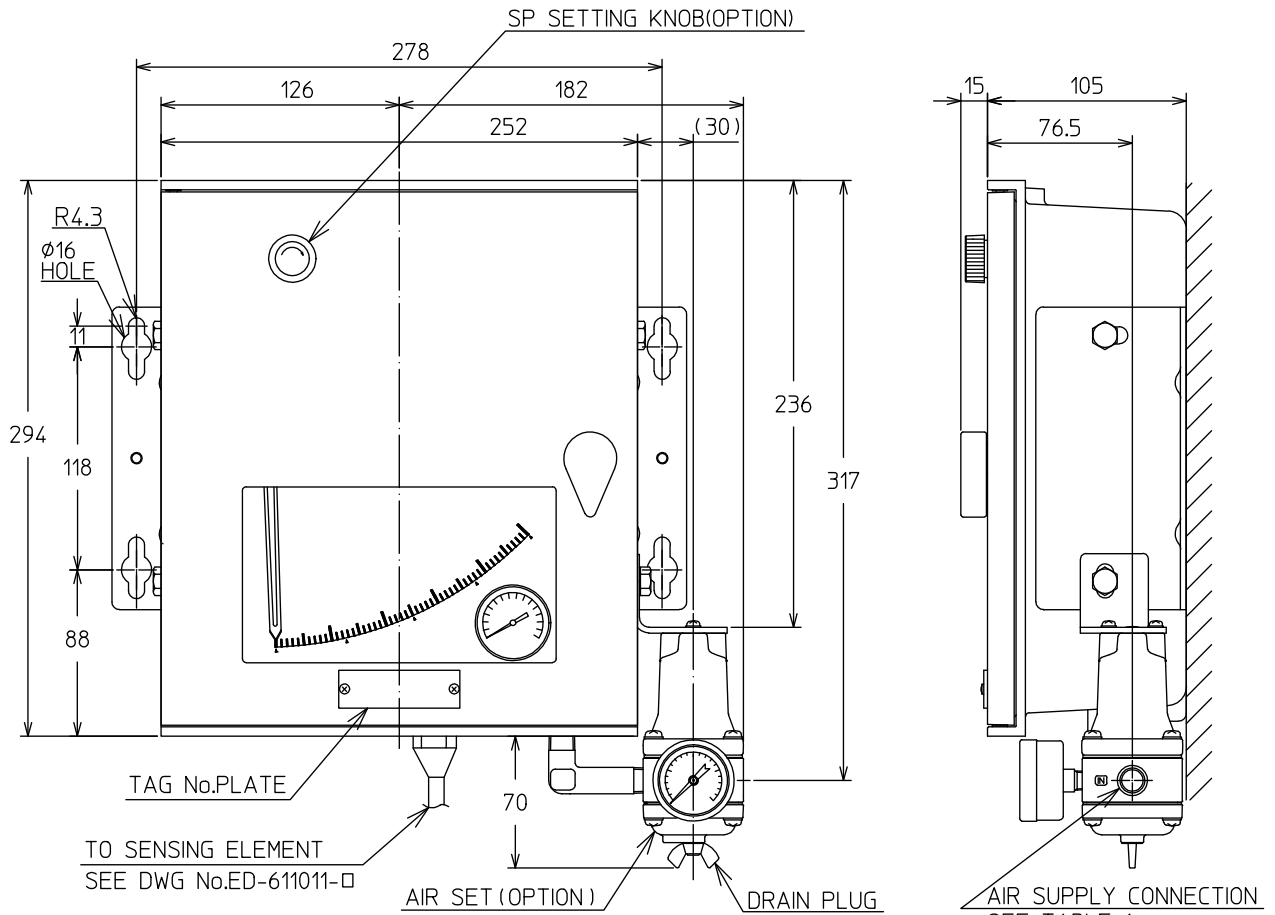
Ex.; KFZ1-3132-30

Basic model no.		Selections			Options	Description	
		Type	Connection	Material			
KFZ	1					Well for temperature element	
		-3				For gas-fill type (drilled)	
			13			Flange connection	40 mm-JIS10K
			23			"	40 mm-JIS20K
			33			"	1-1/2 in.-ANSI 150
			43			"	1-1/2 in.-ANSI 300
			73			"	1-1/2 in.-JPI 150
			83			"	1-1/2 in.-JPI 300
			93			"	1-1/2 in.-ANSI 600
			03			"	1-1/2 in.-JPI 600
			52			Screw connection	R1 (not applicable to welded type)
			62			"	1 NPT (")
				2		SUS316	
				7		SUS304	
				8		SUS316L	
						Insertion length	Drilled
					-30	300 mm	Available
					-35	350 mm	Available
					-40	400 mm	Available
					-45	450 mm	Available
					-50	500 mm	Available

Dimensions

■ Wall Mounting

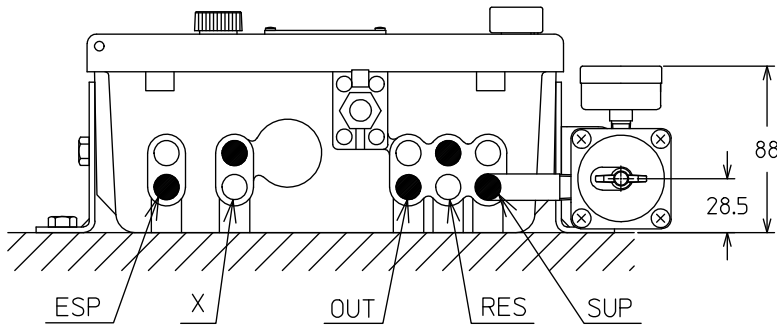
(unit:mm)



TO SENSING ELEMENT
SEE DWG No.ED-611011-□

AIR SET (OPTION) DRAIN PLUG

AIR SUPPLY CONNECTION
SEE TABLE 1



Air Connection (See note 1,2)
 ○ Rc1/4
 ● 1/4NPT (Internal thread)

Legend
 ESP : External set-point Signal
 X : Pneumatic Pressure Receiving or Transmitting Signal
 OUT : Controlled output Signal
 RES : External Reset Signal
 SUP : Supply Air Pressure

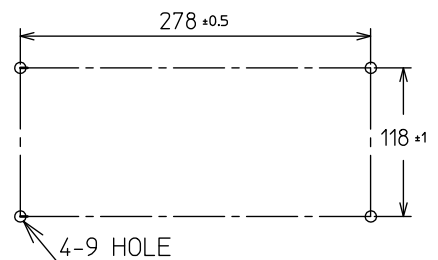
Table 1

Model	Air piping Connection
A	Rc1/4
B	R1/4NPT Internal thread

Note

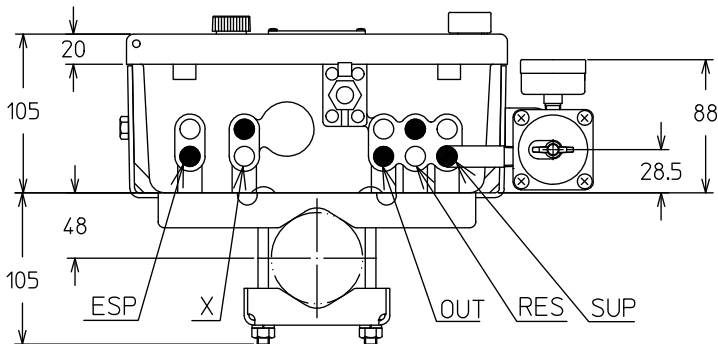
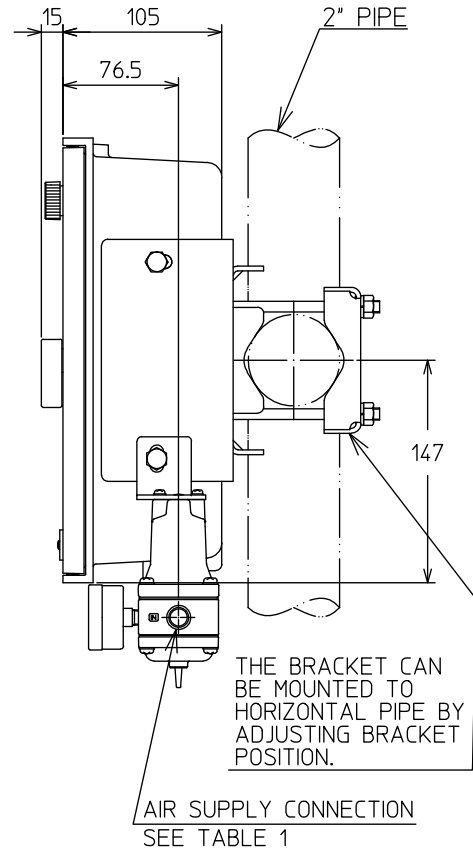
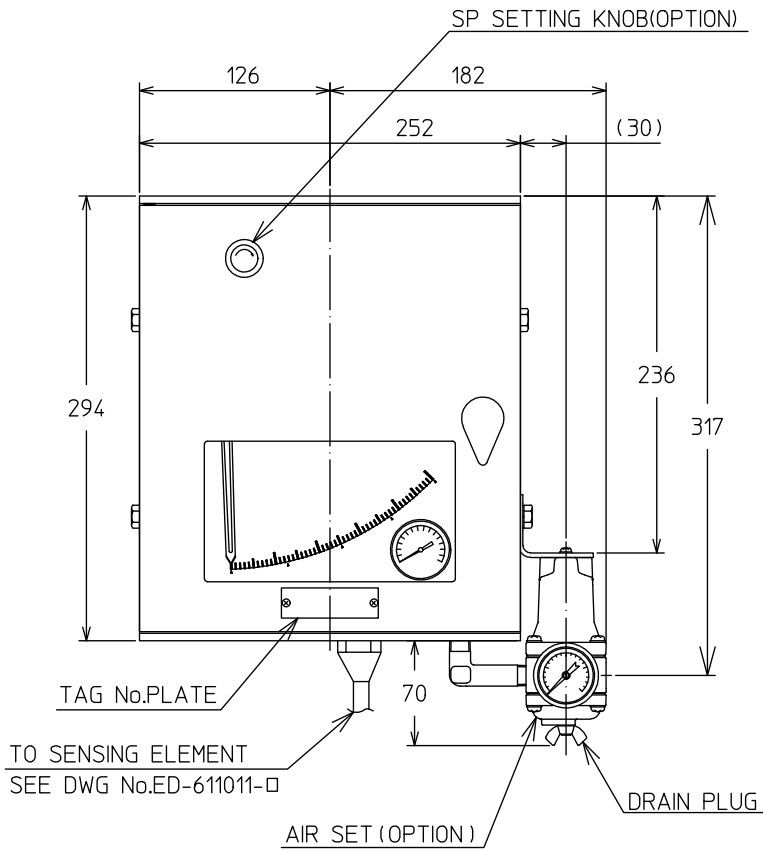
1. The Holes not to be used for Air Connection are plugged.
2. For Manual Reset Provision SUP and RES have been Preconnected.
3. If Two Or More Instruments Are To Be Mounted On A Surface. Keep Them Apart At Least 80mm (137mm For Instruments With Air Set) Horizontally And At Least 126mm Vertically.

SURFACE MOUNTING DIMENSIONS



■ Pipe Mounting

(unit:mm)



Air Connection (See note 1,2)	
○	Rc1/4
●	1/4NPT (Internal thread)
Legend	
ESP	: External set-point Signal
X	: Pneumatic Pressure Receiving or Transmitting Signal
OUT	: Controlled output Signal
RES	: External Reset Signal
SUP	: Supply Air Pressure

Table 1

Model	Air piping Connection
A	Rc1/4
B	R1/4NPT Internal thread

Note

1. The Holes not to be used for Air Connection are plugged.
2. For Manual Reset Provision SUP and RES have been Preconnected.

■ Panel Mounting

(unit:mm)

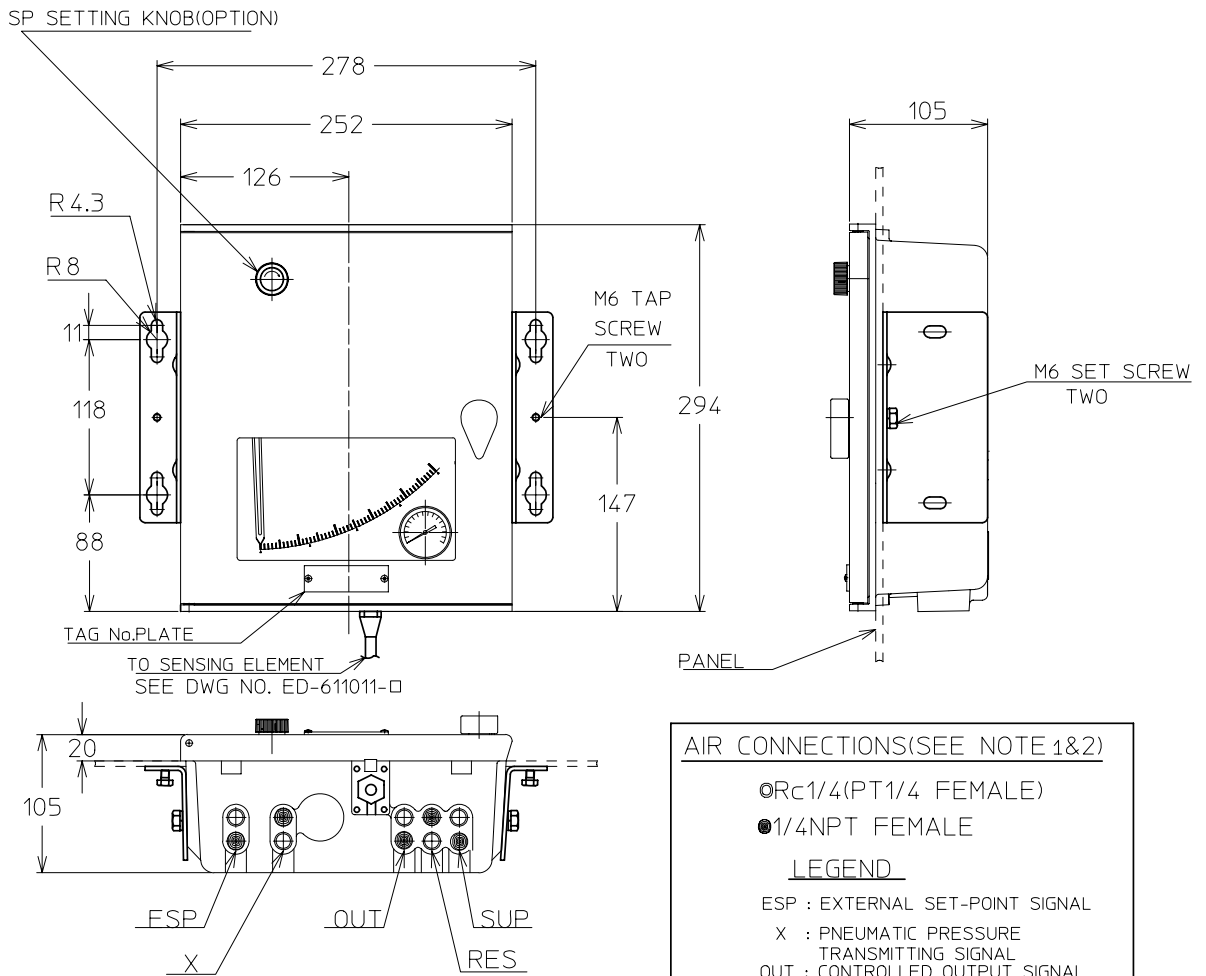


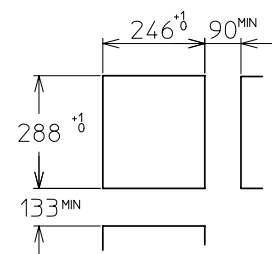
TABLE1

MODEL	AIR PIPING CONNECTION
A	Rc1/4(PT1/4 FEMALE)
B	1/4NPT FEMALE

NOTE 1. THE HOLE NOT TO BE USED FOR CONNECTION ARE PLUGGED

2. FOR MANUAL RESET PROVISION,SUP AND RES HAVE BEEN PRECONNECTED.

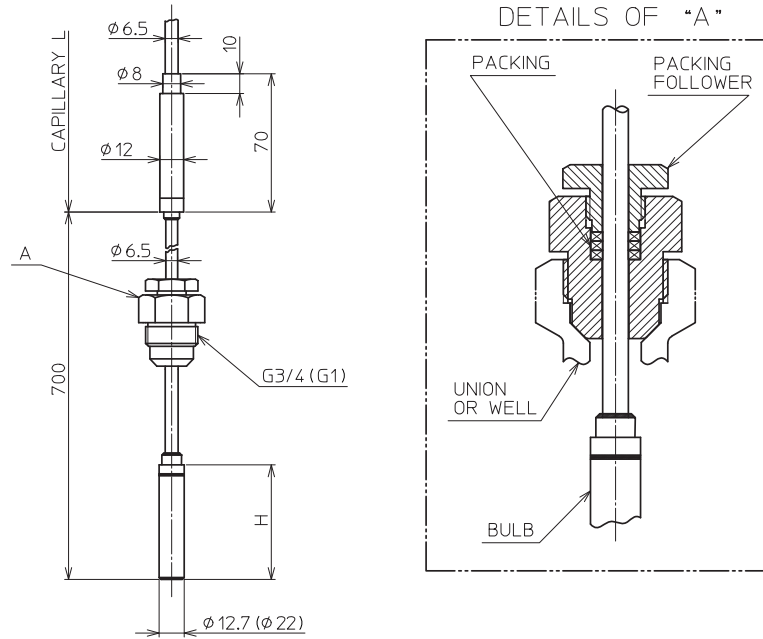
PANEL CUTOUT DIMENSIONS



Dimensions of elements

■ Option-X Without union

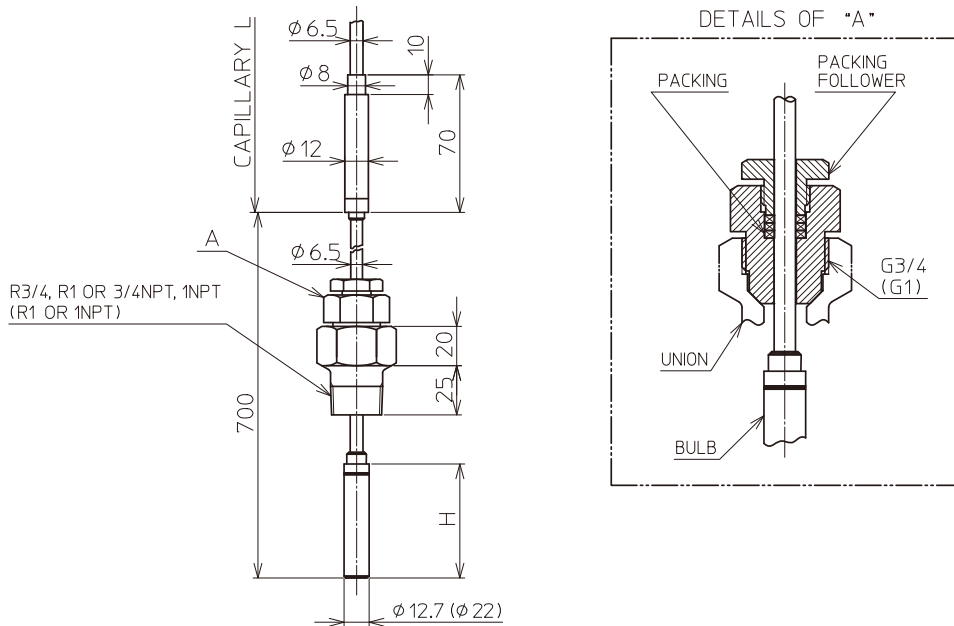
(unit:mm)



The dimensions enclosed in parentheses in the above drawings are for gas-fill type of elements. Dimensions of those not enclosed in parentheses are identical with those liquid seal type of elements.

■ Option-U With union

(unit:mm)

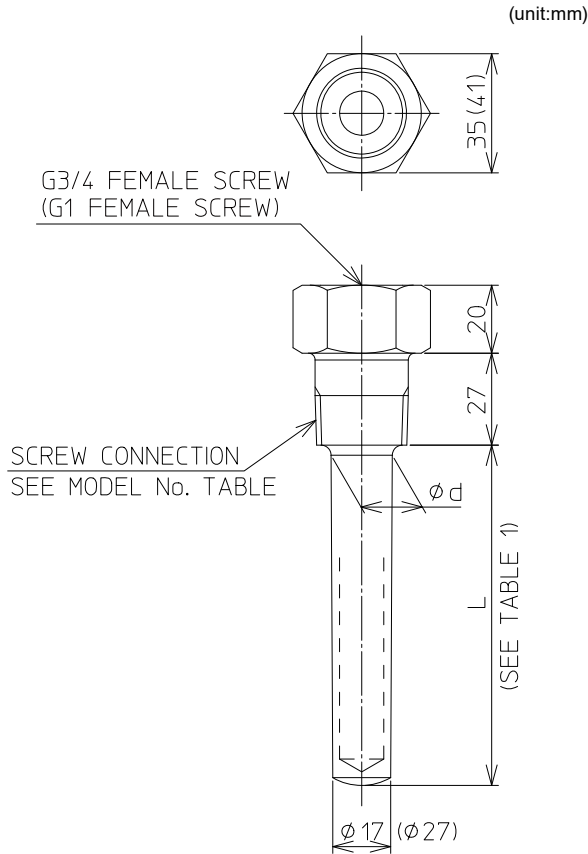


Bulb Dimensions

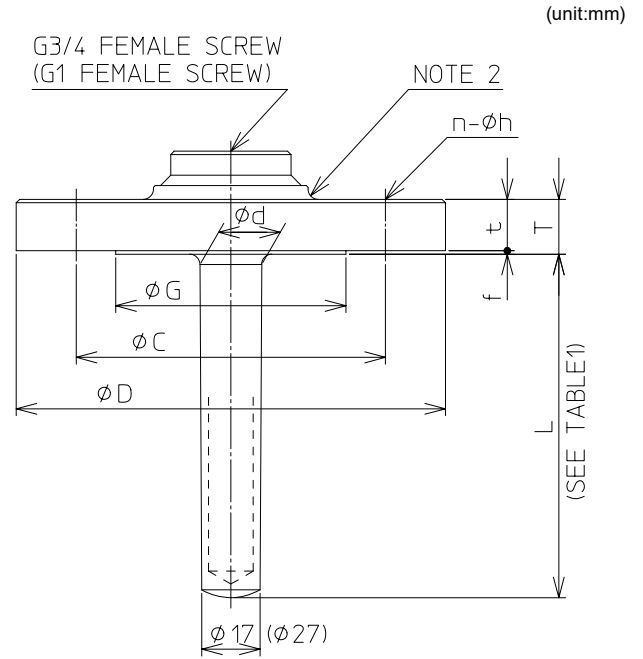
TEMP. SPAN	DIMENSION	BULB LENGTH l (mm)	LENGTH OF UNDER SCREW OR FLANGE
			MIN. (mm)
LIQUID-FILL	50	145	200
	100	83	100
	150	66	100
	200	45	100
	300	35	
GAS-FILL	300	260	300
	400		
	500		

Well Dimensions

■ Screw type



■ Flange type



Liquid-Fill type Well Dimensions

DIMENSION TYPE	IMMERSION LENGTH L (mm)	ϕ_d							
		DRILLED					WELDED		
		20 mm, 3/4 inch	25 mm, 1 inch	40 mm, 1 1/2 inch	50 mm, 2 inch	DRILLED	FLANGED	DRILLED	
LIQUID-FILL	150	18	18	18	18	18	23*2	22	
	200	19	19	19	19	19			
	250	20	20	20	20	19			
	300	20	21	21	21	20			
	350	20	22	22	22	21			
	400	20	22	22	22	22			
	450	20	22	23	23	22			
	500	20	23*1	23	23	22			
	600	—							
	700	—							
	800	—							
900	—								
1000	—								

*1 For 25mm JIS 10K RF, it is $\phi 22$.

*2 For 20mm 3/4 inch, it is $\phi 17$.

Gas-Fill type Well Dimensions

DIMENSION TYPE	IMMERSION LENGTH L (mm)	ϕ_d	
		DRILLED	
		FLANGED	DRILLED
GAS-FILL	300	28	28
	350	29	
	400	30	
	450	30	
	500	30	

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