

KF Series

Temperature Indicating Controller

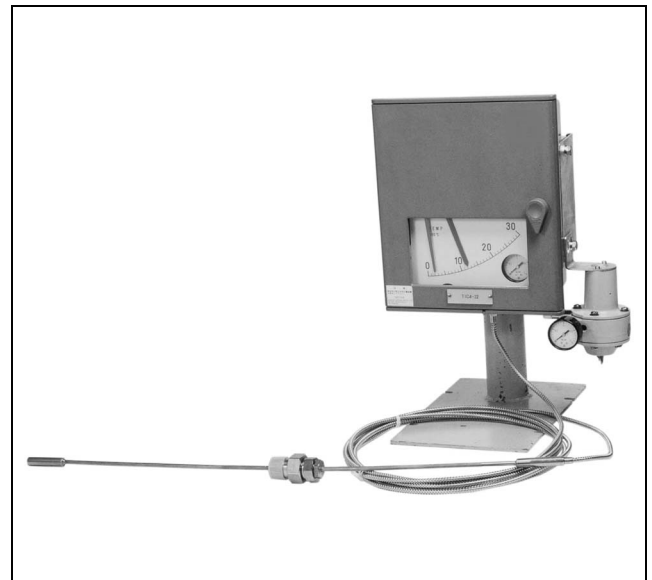
Model KFT

OVERVIEW

The KF Series instruments are field-installed type of pneumatic indicating controllers which are used to measure and control the various types of process variables such as temperatures, pressures, flows and liquid levels.

Model KFT 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 mechanism for ambient temperature change is incorporated.

SPECIFICATIONS**Standard Specifications**

Item	Specifications																																								
Detector Section																																									
Measuring range	<table border="1"> <thead> <tr> <th colspan="2">Special range : (°C)</th> <th colspan="2">Special range (see note) : (°C)</th> </tr> <tr> <th>Span</th> <th>Range</th> <th>Span</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>50</td> <td>0 to 50, 50 to 100</td> <td>50</td> <td>-20 to 30, 20 to 70</td> </tr> <tr> <td>100</td> <td>-50 to 50, 0 to 100, 100 to 200</td> <td>60</td> <td>-10 to 50</td> </tr> <tr> <td>150</td> <td>-50 to 100, 0 to 150</td> <td>80</td> <td>-15 to 65, 0 to 80</td> </tr> <tr> <td>200</td> <td>0 to 200, 100 to 300</td> <td>100</td> <td>50 to 150</td> </tr> <tr> <td>300</td> <td>0 to 300, 100 to 400 (*)</td> <td>120</td> <td>-20 to 100, 0 to 120</td> </tr> <tr> <td>400</td> <td>0 to 400 (*)</td> <td>150</td> <td>50 to 200</td> </tr> <tr> <td>500</td> <td>0 to 500 (*)</td> <td>200</td> <td>-50 to 150, 50 to 250</td> </tr> <tr> <td colspan="2">Note) *Gas-fill type (nitrogen) Others Liquid-fill type (kerosene)</td> <td colspan="2">Note) Indicating accuracy: ±1.5% FS Repeatability : 1% FS</td> </tr> </tbody> </table>	Special range : (°C)		Special range (see note) : (°C)		Span	Range	Span	Range	50	0 to 50, 50 to 100	50	-20 to 30, 20 to 70	100	-50 to 50, 0 to 100, 100 to 200	60	-10 to 50	150	-50 to 100, 0 to 150	80	-15 to 65, 0 to 80	200	0 to 200, 100 to 300	100	50 to 150	300	0 to 300, 100 to 400 (*)	120	-20 to 100, 0 to 120	400	0 to 400 (*)	150	50 to 200	500	0 to 500 (*)	200	-50 to 150, 50 to 250	Note) *Gas-fill type (nitrogen) Others Liquid-fill type (kerosene)		Note) Indicating accuracy: ±1.5% FS Repeatability : 1% FS	
	Special range : (°C)		Special range (see note) : (°C)																																						
Span	Range	Span	Range																																						
50	0 to 50, 50 to 100	50	-20 to 30, 20 to 70																																						
100	-50 to 50, 0 to 100, 100 to 200	60	-10 to 50																																						
150	-50 to 100, 0 to 150	80	-15 to 65, 0 to 80																																						
200	0 to 200, 100 to 300	100	50 to 150																																						
300	0 to 300, 100 to 400 (*)	120	-20 to 100, 0 to 120																																						
400	0 to 400 (*)	150	50 to 200																																						
500	0 to 500 (*)	200	-50 to 150, 50 to 250																																						
Note) *Gas-fill type (nitrogen) Others Liquid-fill type (kerosene)		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 (∅ 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.)																																								
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 [N]																																								
	Indicating controller (A1, A3) : 4 L/min [N]																																								
	Indicating transmitting controller (A2, A4) : 8 L/min [N]																																								
	Manual controller (M) : 3 L/min [N]																																								
Saturated air supply capacity	Transmitter output : 40 L/min [N]																																								
	Controller output : 40 L/min [N]																																								
	Manual control output : 30 L/min [N]																																								
Air connection	Rc¼ or ¼ 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, meets JIS F 8001 class 3 splash-proof, 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 : Dark beige (Munsell 10YR 4.7/0.5)																																								
Mounting	Panel, wall or 2 in. pipe mounting (mounting bolt, nut material; SUS304)																																								
Weight	Approx. 6.7 kg (For pipe mounting type, local mode PI controller using 0 to 100 °C element.)																																								

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 filter (not applicable to panel mounting type)	Pressure regulator with filter plus 40 mm pressure gauge. (supply pressure; 200 to 970 kPa {2 to 9.7 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)	<p><i>Corrosion-resistant finish with baked acryl (Y138A)</i> : Resistant against corrosive gases.</p> <p><i>Corrosion-proof finish with baked epoxy resin (Y138B)</i> ; Resistant against corrosive liquids.</p> <p><i>Regular silver finish with baked acryl (Y138C)</i> : To suppress temperature rise caused by direct or indirect sunlight and other cause.</p> <p><i>Corrosion-resistant silver finish with baked acryl (Y138D)</i> : To suppress temperature rise caused as above and to be resistance against corrosive gases.</p> <p>(note : silver finish is not resistant against alkaline gases.)</p>
(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.)	<ol style="list-style-type: none"> 1) Indication only 2) Door lock 3) Stainless steel tag plate 4) AUTO / MAN switch viewing window 5) Pressure gauge (40 mm) for transmitting signal

MODEL SELECTION

Temperature Indicating Controller

Ex.; KFTA 12-06100A1T-K, M, U, 7

Basic Model No.			Selections					Options	Description
Type	Function	Control action	Sensing element	Measuring range	Air connection	Output Pres- sure unit	Mounting method		
KFT									Temperature indicating controller
	A0								Indicating transmitter
	A1								Indicating controller (local type)
	A2								Indicating transmitting controller (local type)
	A3								Indicating controller (cascade type)
	A4								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 ¼ internal thread (When this option chosen, instruction plate becomes Japanese version.)
					B				¼ NPT internal thread (When this option chosen, instruction plate becomes Japanese version.)
						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
							-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.)
							-U*		With union (see Notes 2 and 3.)
							-7		With pressure regulator with filter

[Note]

1) When specifying semi-standard option (Y) , please write as :

KFTA12Y-06100A1T-K, M, U, 7 (Y 138)

2) When neither option – U (with well or -U (union) is specified, only nut is provided to ship. (nut: liquid-fill type: G¾, gas-fill type: G1)

3) Air connecting screw and union screw

Type of air connecting screw	Union screw (material: SUS 304)
Rc¼	Liquid-fill ; Rc ¾*
	Gas-fill ; Rc 1
¼ NPT	Liquid-fill ; ¾ NPT*
	Gas-fill ; 1 NPT

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

Well (Liquid-fill type)

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		"	¾ in.-ANSI 150	
			32		"	1 in.-ANSI 150	
			33		"	1½ in.-ANSI 150	
			34		"	2 in.-ANSI 150	
			41		"	¾ in.-ANSI 300	
			42		"	1 in.-ANSI 300	
			43		"	1½ in.-ANSI 300	
			44		"	2 in.-ANSI 300	
			71		"	¾ in.-JPI 150	
			72		"	1 in.-JPI 150	
			73		"	1½ in.-JPI 150	
			74		"	2 in.-JPI 150	
			81		"	¾ in.-JPI 300	
			82		"	1 in.-JPI 300	
			83		"	1½ in.-JPI 300	
			84		"	2 in.-JPI 300	
			91		"	¾ in.-ANSI 600	
			92		"	1 in.-ANSI 600	
			93		"	1½ in.-ANSI 600	
			94		"	2 in.-ANSI 600	
			01		"	¾ in.-JPI 600	
			02		"	1 in.-JPI 600	
			03		"	1½ in.-JPI 600	
			04		"	2 in.-JPI 600	
			51		Screw connection	R¾	
			52		"	R1	
			61		"	¾NPT	
			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	Available
			-30		300 mm	Available	Available
			-35		350 mm	Available	Available
			-40		400 mm	Available	Available
			-45		450 mm	Available	Available
			-50		500 mm	Available	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).

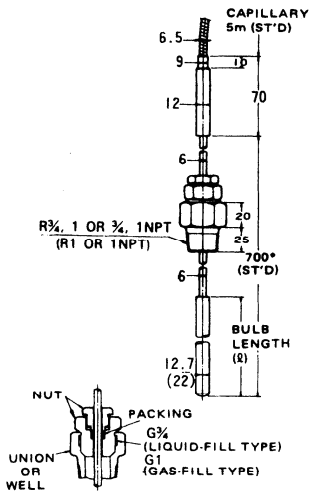
Well (Gas-fill type)

Basic model no.		Selections			Options	Description
		Type	Connection	Material		
KFZ	1					Well for temperature element
		-3				For gas-fill type (drilled)
		-4				" (welded)
			13			Flange connection 40 mm-JIS10K
			14			" 50 mm-JIS10K
			23			" 40 mm-JIS20K
			24			" 50 mm-JIS20K
			33			" 1½ in.-ANSI 150
			34			" 2 in.-ANSI 150
			43			" 1½ in.-ANSI 300
			44			" 2 in.-ANSI 300
			73			" 1½ in.-JPI 150
			74			" 2 in.-JPI 150
			83			" 1½ in.-JPI 300
			84			" 2 in.-JPI 300
			93			" 1½ in.-ANSI 600
			94			" 2 in.-ANSI 600
			03			" 1½ in.-JPI 600
			04			" 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
						Welded
			-30			300 mm Available Available
			-35			350 mm Available Available
			-40			400 mm Available Available
			-45			450 mm Available Available
			-50			500 mm Available Available
			-60			600 mm Available Available
			-70			700 mm Available * Available *
			-80			800 mm Available * Available *
			-90			900 mm Available * Available *
			-00			1000 mm Available * Available *

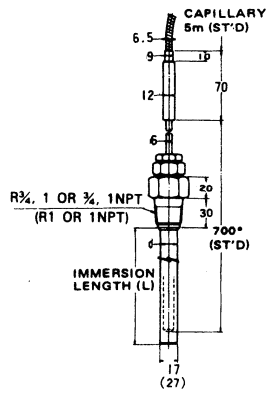
Note) *marked means Protecting tubes with insertion lengths (extension lengths) longer than 600mm are available as special order items (standard length 700 mm).

DIMENSIONS

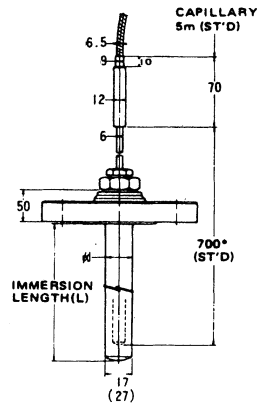
Union type (without well)



Screw type (with well)



Flange type (with well)



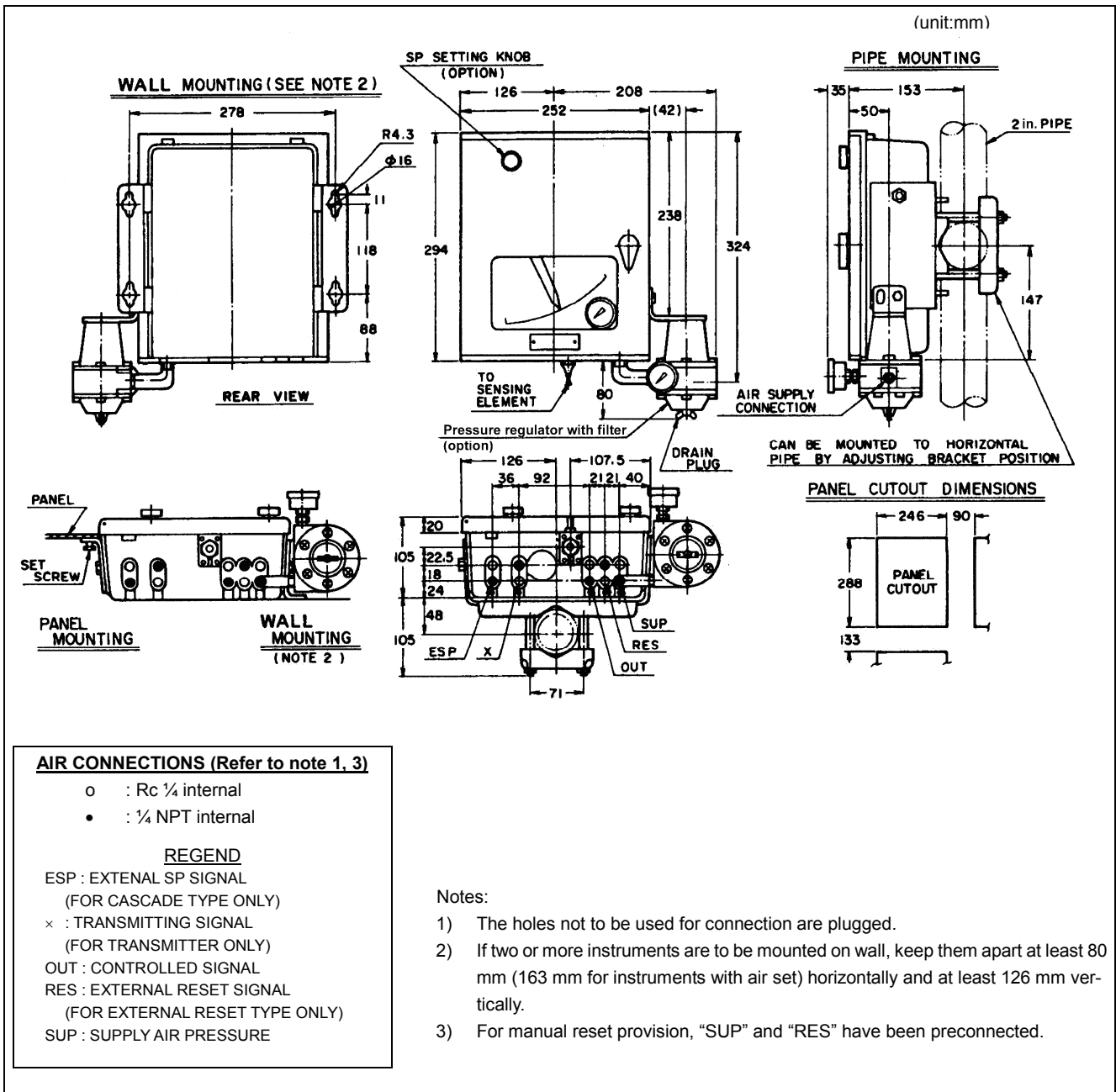
Bulb Dimensions

DIMENSION TEMP. SPAN	BULB LENGTH L (mm)	LENGTH OF UNDER SCREW OR FLANGE	
		MIN.	MAX.
LIQUID-FILL	50	267	300
	100	140	200
	150	100	150
	200	80	100
	300	60	100
GAS-FILL	300		
	400	250	300
	500		

Well Dimensions

DIMENSION TYPE	IMMERSION LENGTH L (mm)	d	
		WELDED	DRILLED
LIQUID-FILL	150	—	18
	200	—	19
	250	—	20
	300	17	21
	350		22
	400		22
	500		22
600-1000	—	—	
GAS-FILL	300	27	28
	350		SCREW TYPE 28 FLANGE TYPE 29
	400		SCREW TYPE 28 FLANGE TYPE 30
	500		SCREW TYPE 28 FLANGE TYPE 30
	600-1000		—

- Notes: 1) The dimensions enclosed in the parentheses in the above drawings are for gas-fill type of elements. Dimensions of those not enclosed in parentheses are identical with those of liquid seal type of elements.
 2) *Insertion lengths 800-1000mm are available in 100-mm increments and those 1200-2200mm in 200-mm increments.



Ordering Information

When ordering please specify;

- 1) Model no. 2) Temperature range 3) Type of detector 4) Options

Please read the "Terms and Conditions" from the following URL before ordering or use:

<http://www.azbil.com/products/bi/order.html>

Specifications are subject to change without notice.

azbil

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