

Environment responsive type

TL • RL • RV

Filled system Thermometers

Outline

Indicating thermometers can be classified into liquid filled type, which use the expansion and contraction of the liquid sealed in the thermometer caused by temperature changes, and gas filled type, which uses changes in the pressure of the insert gas sealed in the thermometer caused by temperature changes. These thermometers are perfect for local indication of temperature because a power source is unnecessary and they are easy to see.

Features

- Since the sealed-in medium is a non-polluting organic liquid or an inert gas, the thermometer is environmentally friendly.
- A large variety of types matched to a wide range of environments and applications is available.

* When selecting the temperature range of a thermometer, select one which is normally used within a temperature range of 75% or less. Check to confirm that the material of the wetted parts is appropriate for the gas or liquid to be measured.



Specifications

Manufacturing temperature range:
-200°C~600°C

Size:
φ 75, φ 100, φ 150

Mounting:

Direct type



Remote surface mounting



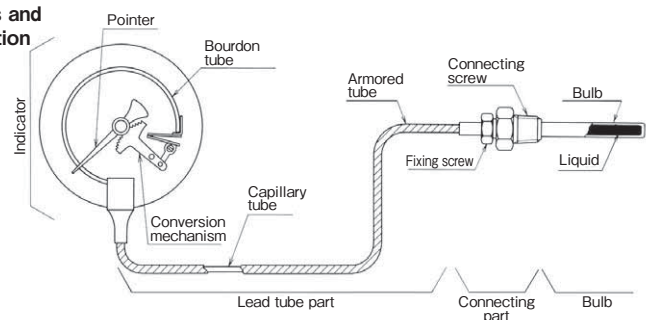
Remote panel mounting



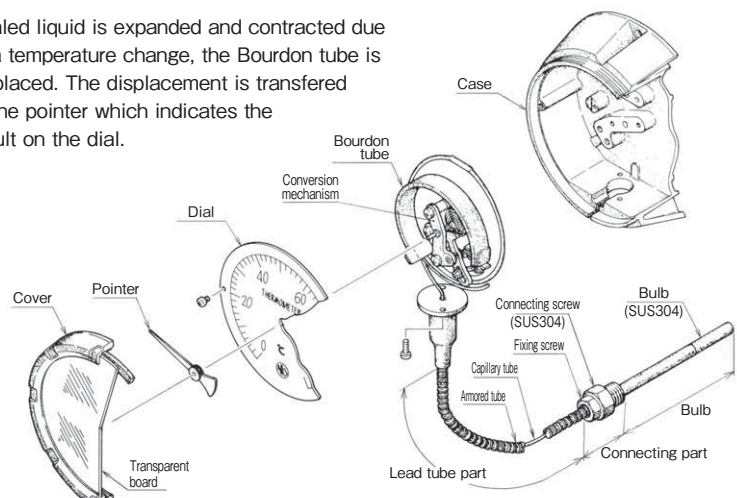
Bulb / Connection mounting:
SUS304

Lead parts material:
Capillary: SUS304 or SUS316
Armored tube: SUS430

Principles and Construction

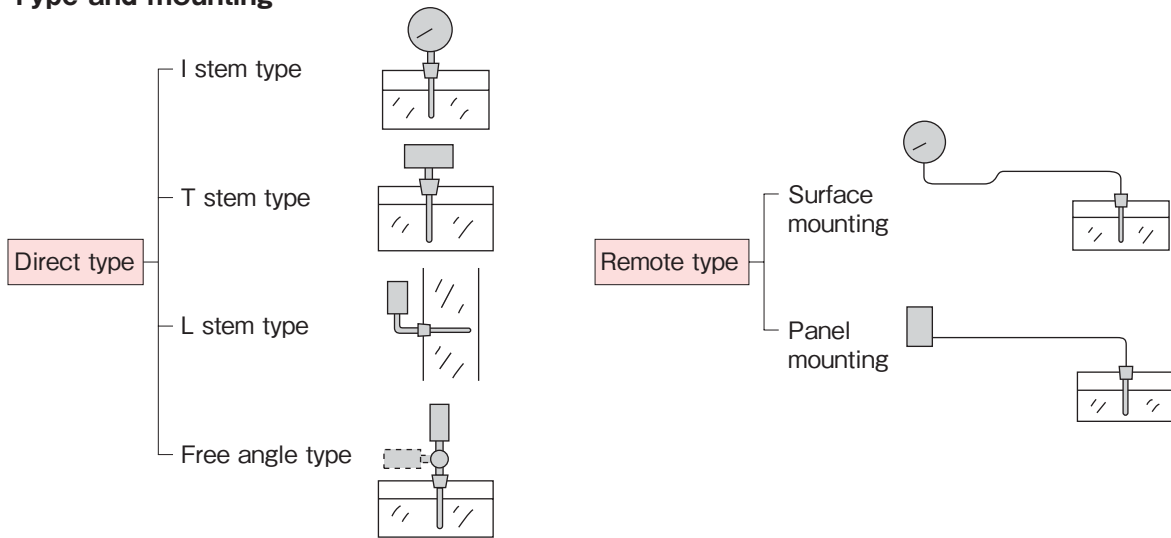


Sealed liquid is expanded and contracted due to a temperature change, the Bourdon tube is displaced. The displacement is transferred to the pointer which indicates the result on the dial.



Selection of the specifications of thermometers

1. Type and mounting

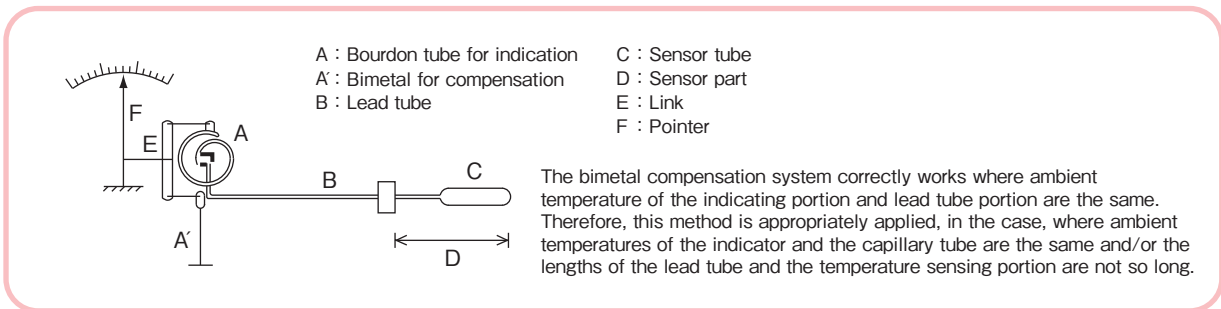


2. Compensation system by installation site

When the ambient temperature of a temperature gauge changes, the liquid sealed in the indicator and capillary tube of filled system thermometer expands or contracts and causes an indication error. To compensate for this error, the following compensation two systems are available.

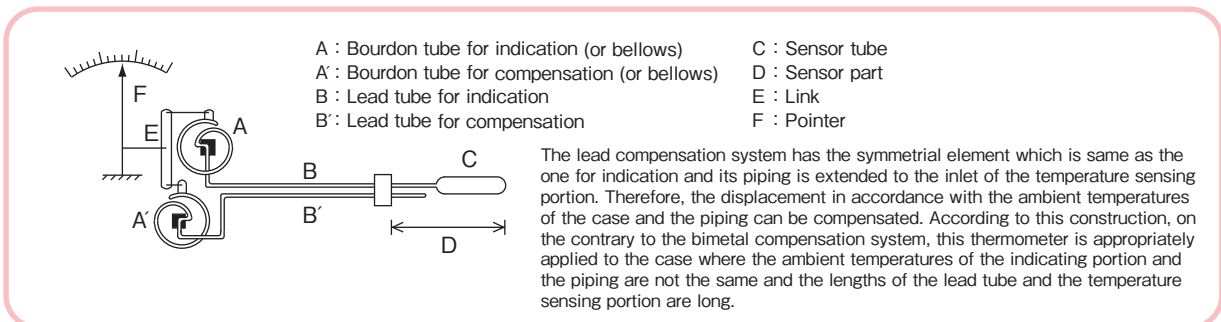
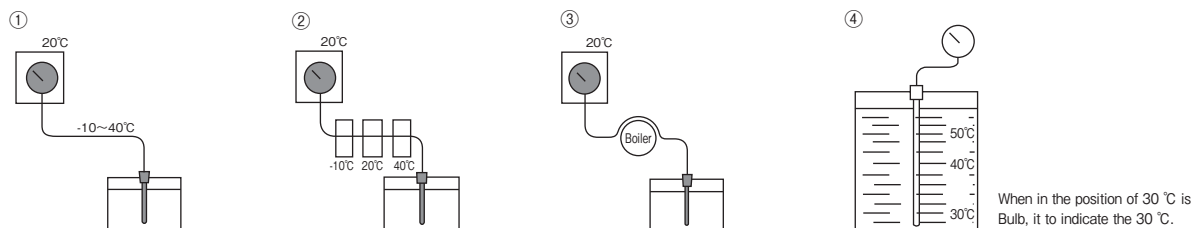
(1) Bimetal compensation

- When the temperature is changed in the same at the indicator and capillary tubes.



(2) Lead compensation

- When the temperature change around the indicator is very few and the temperature change around the capillary tubes is large and vice versa.
- When the capillary tubes are used under various ambient temperatures.
- When a part of the capillary tubes is heated.
- When measuring the liquid temperature in the tank with different temperature distribution. Or when the height of the liquid level changes.



Selection of the specifications of thermometers

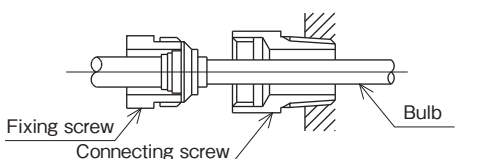
3. Temperature range (Scale range)

- The upper limit of the normal temperature should be selected temperature range to be 75% or less of the temperature span.
- The thermometers start measurement from the time of manufacture and are active even though the thermometer is not used.
- When the temperature exceeds the temperature range, it may cause the temperature gauge to break.
If the gauges will cross the equator or pass through cold regions during shipment, or will be stored in a cold region, careful attention is required.

4. Mounting type of bulb

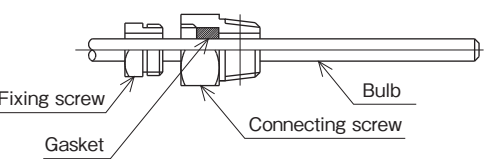
Union type

- Standard spec.

	<p>By tightening the fixing screw, the bulb is fixed to the connecting screws so that its position does not change.</p>	<p>Maximum allowable working pressure of union type is Less than 200°C → 2MPa Over 200°C → 1MPa (If the pressure is higher than the above, a thermowell should be provided.)</p>
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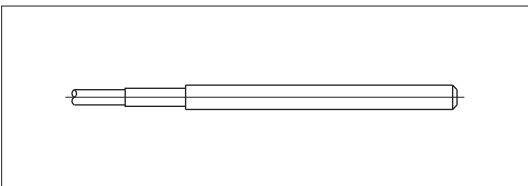
Slide type

- When the bulb position must be adjusted due to changing of the position of the fluid to be measured in a tank or other vessel.
- When thermowell is provided or the bulb must be inserted all the way to the bottom.

	<p>By tightening the gasket with fixing screw, bulb can be fixed at any position.</p>	<p>Maximum allowable working pressure of slide type is 0.3MPa (If the pressure is higher than the above, a thermowell should be provided.)</p>
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Plain type

- When a long bulb is inserted into the thermowell, it does not have to be fixed.
- Only remote type is manufactured.

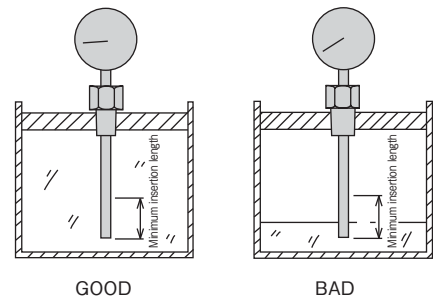


5. Bulb minimum insertion length

- The minimum bulb insertion length is decided according to the type, temperature range and bulb diameter. Decide the bulb length within the range between the minimum insertion length and the maximum insertion length. Make sure that the bulb is inserted into the liquid under measurement up to the screws, flange, or other connecting parts.

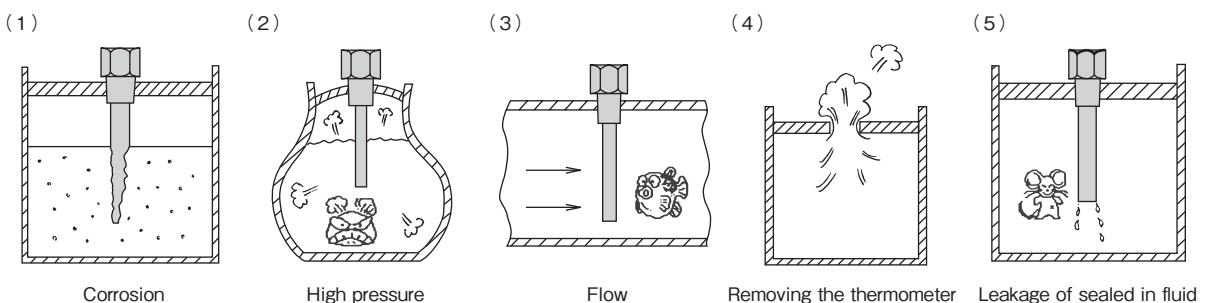
[Note]

If the bulb is not inserted into the liquid under measurement up to the screws or flange, an indication error may occur.



6. Thermowell necessary conditions

- (1) For corrosive fluids, a thermowell made of a suitable material is necessary.
- (2) For high pressure, a thermowell suited to the operating pressure must be used.
- (3) When the fluid flows, a thermowell suitable for the flow speed must be used.
- (4) When the fluid leaks when the thermometer is removed, a thermowell is convenient for maintenance.
- (5) When the liquid in the thermometer leaks from the bulb and is harmful, a thermowell must be used.



Liquid / Gas filled type indicating thermometers

1. Drip-proof thermometers

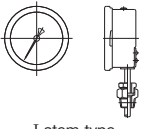
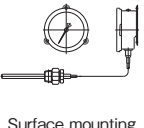
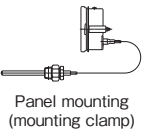
Mounting	Sensing method	Manufacturing range	Max. lead length		Dial size (mm)	Model	Page				
			Bimetal compensation	Lead compensation							
Direct type	Liquid filled type Gas filled type	-70°C~150°C 0~400°C→600°C	—	—	75	TL13	8				
		-70°C~600°C			100	TL14					
		-70°C~600°C			150	TL16					
		L. stem type			-70°C~150°C 0~400°C→600°C	75	TL23	9			
					-70°C~600°C	100	TL24				
		Free angle type			Liquid filled type	-70°C~150°C	75	TL33	10		
	-70°C~200°C					100	TL34				
	T stem type	-70°C~150°C				75	TL43	11			
		-70°C~150°C				100	TL44				
	Remote type	Liquid filled type Gas filled type				-70°C~600°C	* 5m	—	75	TL53	13
						-200°C~600°C			20m	100	
					-200°C~600°C	150				TL56	
Panel mounting (mounting hole)			-70°C~600°C	75	TL63	14					
			-200°C~600°C	20m	100				TL64		
-200°C~600°C			150		TL66						
Panel mounting (mounting clamp)		-70°C~600°C	75	TL73	15						
		-200°C~600°C	20m	100		TL74					
-200°C~600°C		150		TL76							
Surface mounting		-200°C~600°C	20m	150	TL86	16					

* For the -200 to 50°C and -100 to 100°C ranges, the maximum lead length can be increased up to 30m, depending on the size of the bulb. (φ 75 not available)

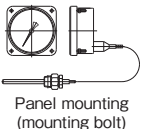
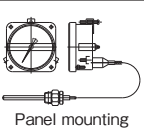
For 0 to 400°C and wider ranges, it can be increased up to 10m.

Liquid / Gas filled type indicating thermometers

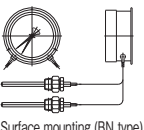
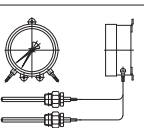
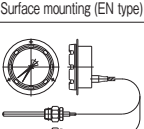
2. Stainless steel thermometers and glycerin bath type thermometers

Mounting	Sensing method	Manufacturing range	Dial size (mm)	Model		Page
				Stainless steel case	Glycerin bath type	
Direct type  I stem type	Liquid filled type	-70°C~150°C	100	RL14	RV14	18·22
			150	RL16	—	18
Remote type  Surface mounting  Panel mounting (mounting clamp)	Liquid filled type Gas filled type	-200°C~600°C	100	RL54	RV54	20·24
			150	RL56	—	20
			100	RL74	RV74	20·24
			150	RL76	—	20

3. Square type thermometer

Mounting	Sensing method	Manufacturing range	Dial size (mm)	Model	Page
Remote type  Panel mounting (mounting bolt)  Panel mounting (mounting clamp)	Liquid filled type Gas filled type	-200°C~600°C	□110	TL90	26
			□168	TL92	
			□110	TL91	
			□168	TL93	

4. Duplex dial thermometer

Mounting	Sensing method	Manufacturing range	Dial size (mm)	Model	Page
Remote type  Surface mounting (BN type)  Surface mounting (EN type)  Panel mounting (D1N type)	Liquid filled type	-70°C~300°C	φ 150	TL80	28
				TL81	
				TL83	

Connection / Bulb specifications

1. Without thermowell

	Connection		Bulb outer dia.	Note
	Screw type	Flange type		
Union type	<p>Max. operating pressure: 2MPa for less than 200°C, 1MPa for 200°C or over</p>		8	Direct type and slide type not available.
			10	_____
			12	_____
Slide type	<p>Max. operating pressure 0.3MPa</p>		13	_____
			16	T = 1/2 not available. Slide type not available.
Plain type	<p>Remote type only. Direct type not available.</p>			

2. With thermowell

	Connection		Thermowell outer dia.	Bulb outer dia.	Note	
	Screw type	Flange type				
Standard type			12	8	_____	
			15	10	_____	
Double socket type			19	13	T = 1/2 not available.	
			23	16	T = 1/2 not available. Welding type well not available	
	Slide type			19/23	13	T = 1/2 not available. Welding type well not available

Connection / Bulb specifications

3. Connection standard

	Screw type	Flange type
Standard connection	R $\frac{1}{2}$, R $\frac{3}{4}$, $\frac{1}{2}$ NPT, G $\frac{1}{2}$ B, G $\frac{3}{4}$ B (Fixing screw only = W22 thread 14)	JIS 10K 20ARF JIS 10K 25ARF ANSI 1B 150RF ANSI 1B 300RF

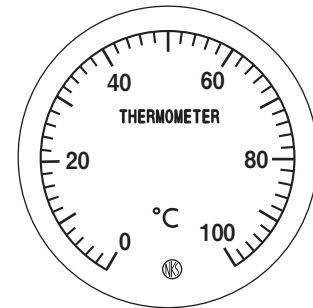
Other screws and flanges in addition to those shown at above are available.
Contact NKS for details.

Scale shape

Refer to the manufacturing specifications of the respective models for the graduations of the respective models.

Range °C	Scale division and number entry position	Size (○ mark adapt)		
		75	100	150
0~ 50		○	○	○
0~100		○	○	○
0~500		○	○	○
0~ 60		○	—	—
		—	○	○
0~120		○	○	○
0~ 80		○	○	○
0~400		○	○	○
0~150		○	—	—
		—	○	○
0~200		○	○	○
0~250		○	○	○
0~300		○	—	—
		—	○	○
0~600		○	—	—
		—	○	○
-10~ 50		○	○	○
-20~100		○	○	○
-30~ 50		○	○	○
-50~ 50		○	○	○
-70~ 50		○	○	○
-70~100		○	○	○
-100~100		—	○	○
-200~ 50		—	○	○

[Example : 0~100°C]



Ground: White
Entry: Black
Red for minus graduation lines and figures.

•Scale angle is 270° to 300°.

Indicating Thermometers

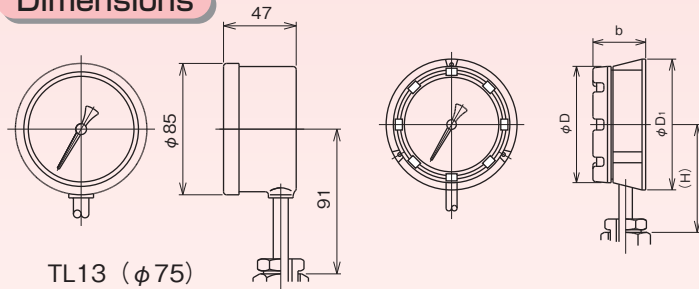
<Direct I type>

TL13·14·16

Liquid / Gas filled dial thermometer



Dimensions



TL13 (φ75)

Model	Dial size	Dimensions			
		D	D ₁	b	H
TL14	100	112	128	51	97
TL16	150	165	178	59	125

Specifications

Item		Description
Manufacturing range		TL14 · 16 : -70~600°C TL13 : -70~150°C, 0~400→600°C
Case		TL14 · 16 Construction: Drip-proof / equivalent to IP33, Material: ADC12, Finish: Black TL13 Construction: Drip-proof / equivalent to IP43, Material: AC7A, Finish: Black
Wetted parts material		Bulb: SUS304, Connection / Flange: SUS304
Accuracy	Indication error	Within ±2% F.S. at room temperature (20°C)
	Ambient temperature	Within ±2% F.S./15°C
Compensation		Bimetal compensation, lead compensation (However, applicable to TL14 and TL16 300°C or less. 0~200°C, 0~250°C, and 0~300°C: Lead compensation only.)
Connection		R ¹ / ₂ , R ³ / ₄ , ¹ / ₂ NPT, G ³ / ₄ B, G ³ / ₄ B ¹ / ₂ is not available with φ16 bulb and φ19, φ23 thermowell.
Flange		JIS10K20ARF, JIS10K25ARF, ANSI1B150RF, ANSI1B300RF
Connection	Without thermowell	Union type, Slide type
	With thermowell	Double socket union type: R ¹ / ₂ , ¹ / ₂ NPT (Connection) Double socket slide type: R ¹ / ₂ , ¹ / ₂ NPT (Connection)

Slide type is not available with φ8, φ16 bulb.
When the maximum temperature of temperature range exceeds 400°C, slide type is not available.

Range / Bulb DIA. / Bulb length

Range °C	Minimum graduation °C	Bulb minimum insertion length mm										Bulb maximum length mm
		Bimetal compensation					Lead compensation (Not available for TL13)					
		d=φ8	d=φ10	d=φ12	d=φ13	d=φ16	d=φ8	d=φ10	d=φ12	d=φ13	d=φ16	
-70~ 50	2	50	45	40	40	50	160	110	90	75	65	500
-70~100	5	40	40	40	40	40	125	90	75	65	60	
-50~ 50	2	55	45	40	40	55	180	120	95	85	70	
-30~ 50	2	65	55	45	40	40	215	140	110	95	80	
-20~100	2	50	45	40	40	50	160	110	90	75	65	
-10~ 50	1	70	60	50	45	40	265	170	130	110	90	
0~ 50	1	70	60	50	45	40	305	190	145	125	100	
~ 60	1 (2) *	65	55	45	40	40	265	170	130	110	90	
~ 80	2	65	55	45	40	40	245	155	120	105	85	
~100	2	55	45	40	40	55	205	135	105	90	75	
~120	2	50	45	40	40	50	180	120	95	85	70	
~150	2 (5) *	40	40	40	40	40	155	105	85	75	65	
~200	5	—	—	—	—	—	110	80	70	60	55	
~250	5	—	—	—	—	—	100	75	65	60	55	
~300	5 (10) *	—	—	—	—	—	90	70	60	55	50	
~400	10	230	170	120	100	80	—	—	—	—	—	
~500	10	230	170	120	100	80	—	—	—	—	—	
~600	10	230	170	120	100	80	—	—	—	—	—	

- The above lengths are the minimum necessary of the bulb to be inserted into the fluid to be measured.
- Bulb length should be over the above length and specified in 5mm steps.

* The number () in the minimum scale is for TL13.

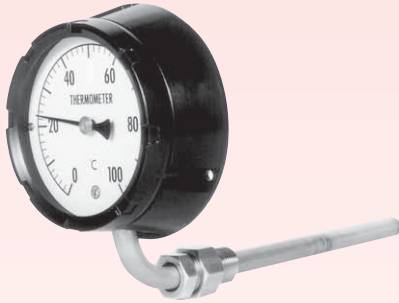
The above minimum insertion length is the length without thermowell.
With thermowell, 25mm is added to the above length.

Indicating Thermometers

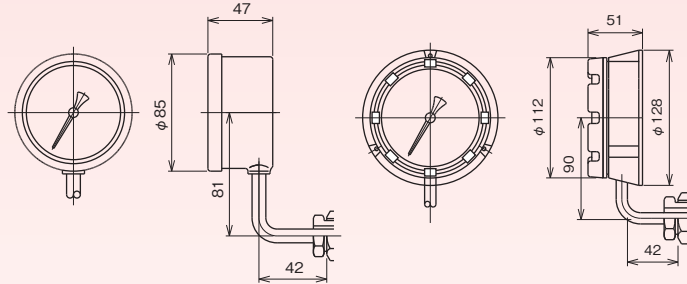
<Direct L type>

TL23·24

Liquid / Gas filled dial thermometer



Dimensions



TL23 (φ75)

TL24 (φ100)

Specifications

Item		Description
Manufacturing range		TL24 : -70~600°C TL23 : -70~150°C, 0~400→600°C
Case		TL24 Construction: Drip-proof / equivalent to IP33, Material: ADC12, Finish: Black TL23 Construction: Drip-proof / equivalent to IP43, Material: AC7A, Finish: Black
Wetted parts material		Bulb: SUS304, Connection / Flange: SUS304
Accuracy	Indication error	Within ±2% F.S. at room temperature (20°C)
	Ambient temperature	Within ±2% F.S./15°C
Compensation		Bimetal compensation, lead compensation (However, applicable to TL24 300°C or less. 0~200°C, 0~250°C, and 0~300°C: Lead compensation only.)
Connection		R $\frac{1}{2}$, R $\frac{3}{4}$, $\frac{1}{2}$ NPT, G $\frac{1}{2}$ B, G $\frac{3}{4}$ B $\frac{1}{2}$ is not available with φ16 bulb and φ19, φ23 thermowell.
Flange		JIS10K20ARF, JIS10K25ARF, ANSI1B150RF, ANSI1B300RF
Connection	Without thermowell	Union type
	With thermowell	Double socket union type: R $\frac{1}{2}$, $\frac{1}{2}$ NPT
		Slide type is not available.

Range / Bulb DIA. / Bulb length

Range °C	Minimum graduation °C	Bulb minimum insertion length mm										Bulb maximum length mm
		Bimetal compensation					Lead compensation (Not available for TL23)					
		d=φ8	d=φ10	d=φ12	d=φ13	d=φ16	d=φ8	d=φ10	d=φ12	d=φ13	d=φ16	
-70~ 50	2	50	45	40	40	50	160	110	90	75	65	500
-70~100	5	40	40	40	40	40	125	90	75	65	60	
-50~ 50	2	55	45	40	40	55	180	120	95	85	70	
-30~ 50	2	65	55	45	40	40	215	140	110	95	80	
-20~100	2	50	45	40	40	50	160	110	90	75	65	
-10~ 50	1	70	60	50	45	40	265	170	130	110	90	
0~ 50	1	70	60	50	45	40	305	190	145	125	100	
~ 60	1 (2) *	65	55	45	40	40	265	170	130	110	90	
~ 80	2	65	55	45	40	40	245	155	120	105	85	
~100	2	55	45	40	40	55	205	135	105	90	75	
~120	2	50	45	40	40	50	180	120	95	85	70	
~150	2 (5) *	40	40	40	40	40	155	105	85	75	65	
~200	5	—	—	—	—	—	110	80	70	60	55	
~250	5	—	—	—	—	—	100	75	65	60	55	
~300	5 (10) *	—	—	—	—	—	90	70	60	55	50	
~400	10	230	170	120	100	80	—	—	—	—	—	
~500	10	230	170	120	100	80	—	—	—	—	—	
~600	10	230	170	120	100	80	—	—	—	—	—	

- The above lengths are the minimum necessary of the bulb to be inserted into the fluid to be measured.
- Bulb length should be over the above length and specified in 5mm steps.

* The number () in the minimum scale is for TL23.

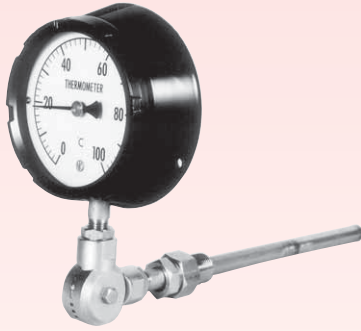
The above minimum insertion length is the length without thermowell.
With thermowell, 25mm is added to the above length.

Indicating Thermometers

〈Direct free angle type〉

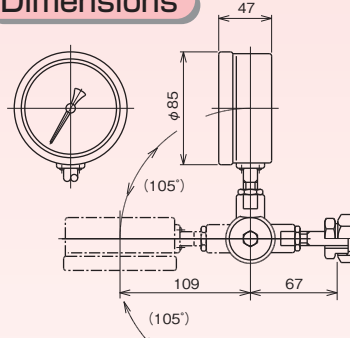
TL33·34

Liquid filled dial thermometer

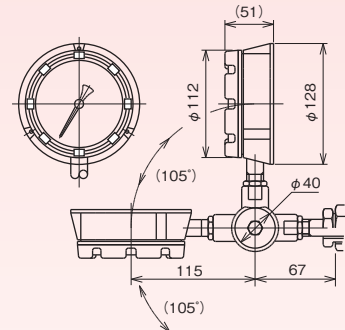


It is a handy thermometer directed freely in the direction which it is easy to look at the instructing section after installation.

Dimensions



TL33 (φ 75)



TL34 (φ 100)

Specifications

Item		Description
Manufacturing range		TL33 : -70~150°C TL34 : -70~200°C
Case		TL33 Construction: Drip-proof / equivalent to IP33, Material: AC7A, Finish: Black TL34 Construction: Drip-proof / equivalent to IP43, Material: ADC12, Finish: Black
Wetted parts material		Bulb: SUS304, Connection / Flange: SUS304
Accuracy	Indication error	Within ±2% F.S. at room temperature (20°C)
	Ambient temperature	Within ± 2 %F.S./15°C
Compensation		Bimetal compensation, lead compensation (However, applicable to TL34 0~200°C)
Connection		R1/2, R3/4, 1/2NPT, G1/2B, G3/4B 1/2 is not available with φ 16 bulb and φ 19, φ 23 thermowell.
Flange		JIS10K20ARF, JIS10K25ARF, ANSI1B150RF, ANSI1B300RF
Connection	Without thermowell	Union type
	With thermowell	Double socket union type: R1/2, 1/2NPT

Slide type is not available.

Range / Bulb DIA. / Bulb length

Range °C	Minimum graduation °C	Bulb minimum insertion length mm										Bulb maximum length mm
		Bimetal compensation					Lead compensation (Not available for TL33)					
		d=φ8	d=φ10	d=φ12	d=φ13	d=φ16	d=φ8	d=φ10	d=φ12	d=φ13	d=φ16	
-70~ 50	2	50	45	40	40	50	160	110	90	75	65	500
-70~100	5	40	40	40	40	40	125	90	75	65	60	
-50~ 50	2	55	45	40	40	55	180	120	95	85	70	
-30~ 50	2	65	55	45	40	40	215	140	110	95	80	
-20~100	2	50	45	40	40	50	160	110	90	75	65	
-10~ 50	1	70	60	50	45	40	265	170	130	110	90	
0~ 50	1	70	60	50	45	40	305	190	145	125	100	
~ 60	1 (2) *	65	55	45	40	40	265	170	130	110	90	
~ 80	2	65	55	45	40	40	245	155	120	105	85	
~100	2	55	45	40	40	55	205	135	105	90	75	
~120	2	50	45	40	40	50	180	120	95	85	70	
~150	2 (5) *	40	40	40	40	40	155	105	85	75	65	
~200	5	—	—	—	—	—	110	80	70	60	55	

- The above lengths are the minimum necessary of the bulb to be inserted into the fluid to be measured.
- Bulb length should be over the above length and specified in 5mm steps.

* The number () in the minimum scale is for TL33.

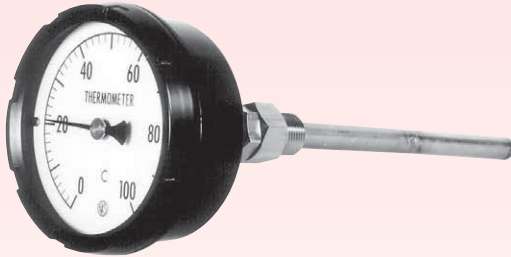
The above minimum insertion length is the length without thermowell. With thermowell, 25mm is added to the above length.

Indicating Thermometers

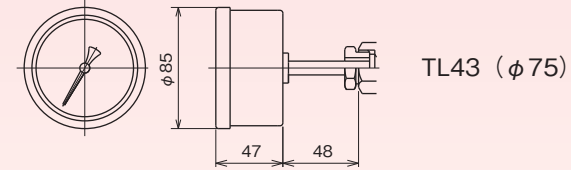
<Direct T stem type>

TL43·44

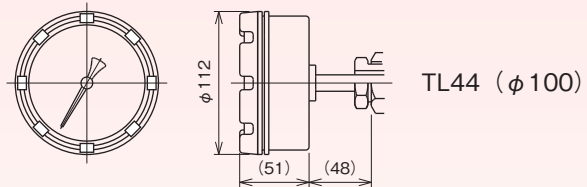
Liquid filled dial thermometer



Dimensions



TL43 (φ75)



TL44 (φ100)

Specifications

Item		Description
Manufacturing range		TL44 : -70~150°C TL43 : -70~150°C
Case		TL44 Construction: Drip-proof / equivalent to IP43, Material: ADC12, Finish: Black TL43 Construction: Drip-proof / equivalent to IP43, Material: AC7A, Finish: Black
Wetted parts material		Bulb: SUS304, Connection / Flange: SUS304
Accuracy	Indication error	Within ±2% F.S. at room temperature (20°C)
	Ambient temperature	Within ±2% F.S./15°C
Compensation		Bimetal compensation
Connection		R1½, R¾, ½NPT, G½B, G¾B ½ is not available with φ16 bulb and φ19, φ23 thermowell.
Flange		JIS10K20ARF, JIS10K25ARF, ANSI1B150RF, ANSI1B300RF
Connection	Without thermowell	Union type, Slide type
	With thermowell	Double socket union type: R1½, ½NPT (Connection) Double socket slide type: R1½, ½NPT (Connection)

Slide type is not available with φ8, φ16 bulb.
When the maximum temperature of temperature range exceeds 400°C, slide type is not available.

Range / Bulb DIA. / Bulb length

Range °C	Minimum graduation °C	Bulb minimum insertion length mm					Bulb maximum length mm
		Bimetal compensation					
		d=φ8	d=φ10	d=φ12	d=φ13	d=φ16	
-70~ 50	2	50	45	40	40	50	500
-70~100	5	40	40	40	40	40	
-50~ 50	2	55	45	40	40	55	
-30~ 50	2	65	55	45	40	40	
-20~100	2	50	45	40	40	50	
-10~ 50	1	70	60	50	45	40	
0~ 50	1	70	60	50	45	40	
~ 60	1 (2) *	65	55	45	40	40	
~ 80	2	65	55	45	40	40	
~100	2	55	45	40	40	55	
~120	2	50	45	40	40	50	
~150	2 (5) *	40	40	40	40	40	

- The above lengths are the minimum necessary of the bulb to be inserted into the fluid to be measured.
- Bulb length should be over the above length and specified in 5mm steps.

* The number () in the minimum scale is for TL43.

The above minimum insertion length is the length without thermowell.
With thermowell, 25mm is added to the above length.

Indicating Thermometers

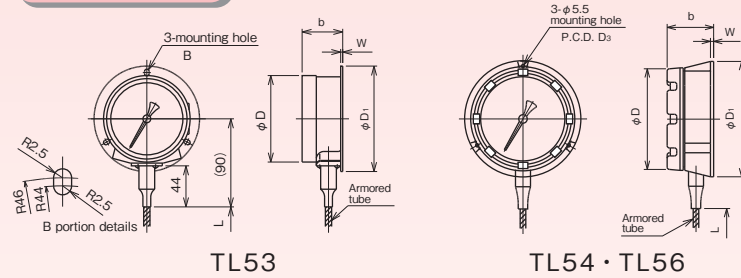
<Surface mounting type>

TL53·54·56

Liquid / Gas filled dial thermometer



Dimensions



TL53

TL54 · TL56

Model	Dial size	Dimensions				
		D	D ₁	D ₃	b	W
TL53	75	85	102	—	47	3.5
TL54	100	112	128	115	51	3
TL56	150	165	178	165	59	4

Specifications

Item		Description
Manufacturing range		TL54 · 56 : -200~600°C TL53 : -70~600°C
Case		TL54 Construction: Drip-proof / IP33, Material: ADC12, Finish: Black TL53 · 56 Construction: Drip-proof / equivalent to IP43, Material: ADC12, Finish: Black
Wetted parts material		Bulb: SUS304, Connection / Flange: SUS304
Accuracy	Indication error	Within ±2% F.S. at room temperature (20°C) Within ±1%F.S. is available in the range of 0 to 50°C → 0 to 150°C and φ 100 lead compensation. (TL54)
	Ambient temperature	Within ± 2 %F.S./15°C
Compensation		Bimetal compensation, lead compensation (φ 75 is not available. Available in the -70 to 300°C range.)
Connection		R ¹ / ₂ , R ³ / ₄ , 1/2NPT, G ¹ / ₂ B, G ³ / ₄ B 1/2 is not available with φ 16 bulb and φ 19, φ 23 thermowell.
Flange		JIS10K20ARF, JIS10K25ARF, ANSI1B150RF, ANSI1B300RF
Connection	Without thermowell	Union type, Slide type
	With thermowell	Double socket union type: R ¹ / ₂ , 1/2NPT (Connection) Double socket slide type: R ¹ / ₂ , 1/2NPT (Connection)

Slide type is not available with φ 16 bulb.
When the maximum temperature of temperature range exceeds 400°C, slide type is not available.

Range / Bulb DIA. / Bulb length / Lead length

Range °C	Minimum graduation °C	Bulb minimum insertion length mm															Bulb maximum length mm				
		Bimetal compensation						φ 100 lead compensation					φ 150 lead compensation								
		Bulb outer diameter					Lead length	Bulb outer diameter					Lead length	Bulb outer diameter				Lead length			
		φ 8	φ 10	φ 12	φ 13	φ 16			φ 8	φ 10	φ 12	φ 13		φ 16		φ 8	φ 10		φ 12	φ 13	φ 16
-200~ 50	5	—	—	—	225	170	2~ 5m	—	—	—	—	—	—	—	—	—	—	—	—	—	500
		—	—	—	300	220	6~15m	—	—	—	—	—	—	—	—	—	—	—	—	—	
		—	—	—	370	270	16~25m	—	—	—	—	—	—	—	—	—	—	—	—	—	
		—	—	—	—	300	26~30m	—	—	—	—	—	—	—	—	—	—	—	—	—	
		—	—	—	225	170	2~ 5m	—	—	—	—	—	—	—	—	—	—	—	—	—	
-100~100	5	—	—	—	300	220	6~15m	—	—	—	—	—	—	—	—	—	—	—	—	—	
		—	—	—	370	270	16~25m	—	—	—	—	—	—	—	—	—	—	—	—	—	
		—	—	—	—	300	26~30m	—	—	—	—	—	—	—	—	—	—	—	—	—	
-70 ~ 50	2	50	45	40	40	50	~ 5m	160	110	90	75	65	~20m	50	45	40	40	50	~20m	500	
-70 ~100	5	40	40	40	40	40	~ 5m	125	90	75	65	60	~20m	40	40	40	40	40	~20m		
-50 ~ 50	2	55	45	40	40	55	~ 5m	180	120	95	85	70	~20m	55	45	40	40	55	~20m		
-30 ~ 50	2	65	55	45	40	40	~ 5m	215	140	110	95	80	~20m	65	55	45	40	40	~20m		
-20 ~100	2	50	45	40	40	50	~ 5m	160	110	90	75	65	~20m	50	45	40	40	50	~20m		
-10 ~ 50	1	70	60	50	45	40	~ 5m	265	170	130	110	90	~20m	70	60	50	45	40	~20m		
0 ~ 50	1	70	60	50	45	40	~ 5m	305	190	145	125	100	~20m	70	60	50	45	40	~20m		
~ 60	1(2)*	65	55	45	40	40	~ 5m	265	170	130	110	90	~20m	65	55	45	40	40	~20m		
~ 80	2	65	55	45	40	40	~ 5m	245	155	120	105	85	~20m	65	55	45	40	40	~20m		
~100	2	55	45	40	40	55	~ 5m	205	135	105	90	75	~20m	55	45	40	40	55	~20m		
~120	2	50	45	40	40	50	~ 5m	180	120	95	85	70	~20m	50	45	40	40	50	~20m		
~150	2(5)*	40	40	40	40	40	~ 5m	155	105	85	75	65	~20m	40	40	40	40	40	~20m		
~200	5	40	40	40	40	40	~ 5m	110	80	70	60	55	~20m	40	40	40	40	40	~20m		
~250	5	40	40	40	40	40	~ 5m	100	75	65	60	55	~20m	40	40	40	40	40	~20m		
~300	5(10)*	40	40	40	40	40	~ 5m	90	70	60	55	50	~20m	40	40	40	40	40	~20m		
~400	10	230	170	120	100	80	~10m	—	—	—	—	—	—	—	—	—	—	—	—		1000 *1 or 3000
~500	10	230	170	120	100	80	~10m	—	—	—	—	—	—	—	—	—	—	—	—		
~600	10	230	170	120	100	80	~10m	—	—	—	—	—	—	—	—	—	—	—	—		

● The above lengths are the minimum necessary of the bulb to be inserted into the fluid to be measured.
● Bulb length should be over the above length and specified in 5mm steps.

● φ 75 are not available in the □ portion.

* 1 Bulb maximum dimension: Available up to 3000mm when φ 10, 12, and 13, up to 1000mm when φ 8, 16.

* The number () in the minimum scale is for TL53.

The above minimum insertion length is the length without thermowell.

With thermowell, 25mm is added to the above length.

The minimum length of the plain type bulb is the minimum length of the above table plus 40mm.

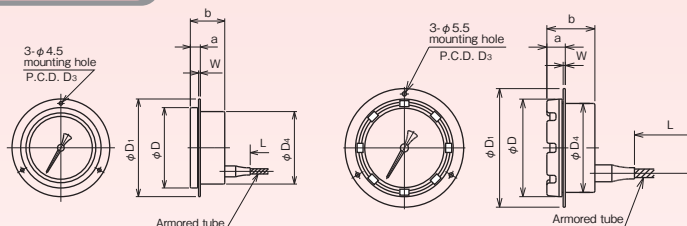
Indicating Thermometers TL63·64·66

〈Panel mounting type / Mounting hole〉

Liquid / Gas filled dial thermometer



Dimensions



TL63

TL64 · TL66

Model	Dial size	Dimensions							Panel cut dimension
		D	D ₁	D ₃	D ₄	a	b	W	
TL63	75	85	105	95	78	16	47	2.5	φ80±1
TL64	100	112	136	122	102	19	51	2.5	φ104±1
TL66	150	165	192	178	158	22	59	4	φ160±1

Specifications

Item		Description
Manufacturing range		TL64 · 66 : -200~600°C TL63 : -70~600°C
Case		TL64 · 66 Construction: Drip-proof / equivalent to IP43, Material: ADC12, Finish: Black TL63 Construction: Drip-proof / equivalent to IP43, Material: AC7A, Finish: Black
Wetted parts material		Bulb: SUS304, Connection / Flange: SUS304
Accuracy	Indication error	Within ±2% F.S. at room temperature (20°C) Within ±1%F.S. is available in the range of 0 to 50°C → 0 to 150°C and φ 100 lead compensation. (TL64)
	Ambient temperature	Within ± 2 %F.S./15°C
Compensation		Bimetal compensation, lead compensation (φ 75 is not available. Available in the -70 to 300°C range.)
Connection		R ¹ / ₂ , R ³ / ₄ , 1/2NPT, G ¹ / ₂ B, G ³ / ₄ B 1/2 is not available with φ 16 bulb and φ 19, φ 23 thermowell.
Flange		JIS10K20ARF, JIS10K25ARF, ANSI1B150RF, ANSI1B300RF
Connection	Without thermowell	Union type, Slide type
	With thermowell	Double socket union type: R ¹ / ₂ , 1/2NPT (Connection) Double socket slide type: R ¹ / ₂ , 1/2NPT (Connection)

Slide type is not available with φ 16 bulb.
When the maximum temperature of temperature range exceeds 400°C, slide type is not available.

Range / Bulb DIA. / Bulb length / Lead length

Range °C	Minimum graduation °C	Bulb minimum insertion length mm															Bulb maximum length mm			
		Bimetal compensation					φ 100 lead compensation					φ 150 lead compensation								
		Bulb outer diameter		Lead length	Bulb outer diameter		Lead length	Bulb outer diameter		Lead length	Bulb outer diameter		Lead length							
		φ8	φ10		φ12	φ13		φ16	φ8		φ10	φ12		φ13	φ16	φ8	φ10	φ12	φ13	φ16
-200~ 50	5	—	—	—	225	170	—	—	—	—	—	—	—	—	—	—	—	500		
		—	—	—	300	220	—	—	—	—	—	—	—	—	—	—	—			
		—	—	—	370	270	—	—	—	—	—	—	—	—	—	—	—			
		—	—	—	—	300	—	—	—	—	—	—	—	—	—	—	—			
		—	—	—	225	170	—	—	—	—	—	—	—	—	—	—	—			
		—	—	—	300	220	—	—	—	—	—	—	—	—	—	—	—			
		—	—	—	370	270	—	—	—	—	—	—	—	—	—	—	—			
		—	—	—	—	300	—	—	—	—	—	—	—	—	—	—	—			
-70 ~ 50	2	50	45	40	40	50	~ 5m	160	110	90	75	65	~20m	50	45	40	40		50	~20m
-70 ~100	5	40	40	40	40	40	~ 5m	125	90	75	65	60	~20m	40	40	40	40		40	~20m
-50 ~ 50	2	55	45	40	40	55	~ 5m	180	120	95	85	70	~20m	55	45	40	40		55	~20m
-30 ~ 50	2	65	55	45	40	40	~ 5m	215	140	110	95	80	~20m	65	55	45	40		40	~20m
-20 ~100	2	50	45	40	40	50	~ 5m	160	110	90	75	65	~20m	50	45	40	40		50	~20m
-10 ~ 50	1	70	60	50	45	40	~ 5m	265	170	130	110	90	~20m	70	60	50	45		40	~20m
0 ~ 50	1	70	60	50	45	40	~ 5m	305	190	145	125	100	~20m	70	60	50	45		40	~20m
~ 60	1(2)*	65	55	45	40	40	~ 5m	265	170	130	110	90	~20m	65	55	45	40		40	~20m
~ 80	2	65	55	45	40	40	~ 5m	245	155	120	105	85	~20m	65	55	45	40		40	~20m
~100	2	55	45	40	40	55	~ 5m	205	135	105	90	75	~20m	55	45	40	40		55	~20m
~120	2	50	45	40	40	50	~ 5m	180	120	95	85	70	~20m	50	45	40	40		50	~20m
~150	2(5)*	40	40	40	40	40	~ 5m	155	105	85	75	65	~20m	40	40	40	40		40	~20m
~200	5	40	40	40	40	40	~ 5m	110	80	70	60	55	~20m	40	40	40	40	40	~20m	
~250	5	40	40	40	40	40	~ 5m	100	75	65	60	55	~20m	40	40	40	40	40	~20m	
~300	5(10)*	40	40	40	40	40	~ 5m	90	70	60	55	50	~20m	40	40	40	40	40	~20m	
~400	10	230	170	120	100	80	~10m	—	—	—	—	—	—	—	—	—	—	—	1000 *1 or 3000	
~500	10	230	170	120	100	80	~10m	—	—	—	—	—	—	—	—	—	—	—		
~600	10	230	170	120	100	80	~10m	—	—	—	—	—	—	—	—	—	—	—		

● The above lengths are the minimum necessary of the bulb to be inserted into the fluid to be measured.
● Bulb length should be over the above length and specified in 5mm steps.
● φ 75 are not available in the portion.
* 1 Bulb maximum dimension: Available up to 3000mm when φ 10, 12, and 13, up to 1000mm when φ 8, 16.

* The number () in the minimum scale is for TL63.

The above minimum insertion length is the length without thermowell.
With thermowell, 25mm is added to the above length.
The minimum length of the plain type bulb is the minimum length of the above table plus 40mm.

Indicating Thermometers

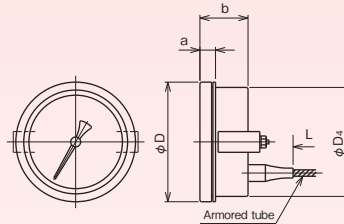
TL73·74·76

Liquid / Gas filled dial thermometer

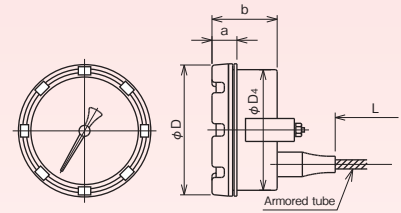
〈Panel mounting type / Mounting clamp〉



Dimensions



TL73



TL74 · TL76

Model	Dial size	Dimensions				Panel cut dimension
		D	D ₁	a	b	
TL73	75	85	78	16	47	φ80±1
TL74	100	112	102	19	51	φ104±1
TL76	150	165	158	22	59	φ160±1

Specifications

Item		Description
Manufacturing range		TL74 · 76 : -200~600°C TL73 : -70~600°C
Case		TL74 · 76 Construction: Drip-proof / equivalent to IP43, Material: ADC12, Finish: Black TL73 Construction: Drip-proof / equivalent to IP43, Material: AC7A, Finish: Black
Wetted parts material		Bulb: SUS304, Connection / Flange: SUS304
Accuracy	Indication error	Within ±2% F.S. at room temperature (20°C) Within ±1%F.S. is available in the range of 0 to 50°C → 0 to 150°C and φ 100 lead compensation. (TL74)
	Ambient temperature	Within ± 2%F.S./15°C
Compensation		Bimetal compensation, lead compensation (φ 75 is not available. Available in the -70 to 300°C range.)
Connection		R ¹ / ₂ , R ³ / ₄ , 1/2NPT, G ¹ / ₂ B, G ³ / ₄ B 1/2 is not available with φ 16 bulb and φ 19, φ 23 thermowell.
Flange		JIS10K20ARF, JIS10K25ARF, ANSI1B150RF, ANSI1B300RF
Connection	Without thermowell	Union type, Slide type
	With thermowell	Double socket union type: R ¹ / ₂ , 1/2NPT (Connection) Double socket slide type: R ¹ / ₂ , 1/2NPT (Connection)

Slide type is not available with φ 16 bulb.
When the maximum temperature of temperature range exceeds 400°C, slide type is not available.

Range / Bulb DIA. / Bulb length / Lead length

Range °C	Minimum graduation °C	Bulb minimum insertion length mm														Bulb maximum length mm						
		Bimetal compensation						φ 100 lead compensation				φ 150 lead compensation										
		Bulb outer diameter		Lead length		Bulb outer diameter		Lead length		Bulb outer diameter		Lead length										
φ8	φ10	φ12	φ13	φ16	φ8	φ10	φ12	φ13	φ16	φ8	φ10	φ12	φ13	φ16	φ8	φ10	φ12	φ13	φ16			
-200~ 50	5	—	—	—	225	170	2~ 5m	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		—	—	—	300	220	6~15m	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		—	—	—	370	270	16~25m	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		—	—	—	—	300	26~30m	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
-100~100	5	—	—	—	225	170	2~ 5m	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		—	—	—	300	220	6~15m	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		—	—	—	370	270	16~25m	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		—	—	—	—	300	26~30m	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
-70 ~ 50	2	50	45	40	40	50	~ 5m	160	110	90	75	65	~20m	50	45	40	40	40	50	~20m	500	
-70 ~100	5	40	40	40	40	40	~ 5m	125	90	75	65	60	~20m	40	40	40	40	40	40	~20m		
-50 ~ 50	2	55	45	40	40	55	~ 5m	180	120	95	85	70	~20m	55	45	40	40	40	55	~20m		
-30 ~ 50	2	65	55	45	40	40	~ 5m	215	140	110	95	80	~20m	65	55	45	40	40	40	~20m		
-20 ~100	2	50	45	40	40	50	~ 5m	160	110	90	75	65	~20m	50	45	40	40	40	50	~20m		
-10 ~ 50	1	70	60	50	45	40	~ 5m	265	170	130	110	90	~20m	70	60	50	45	40	50	~20m		
0 ~ 50	1	70	60	50	45	40	~ 5m	305	190	145	125	100	~20m	70	60	50	45	40	50	~20m		
~ 60	1(2)*	65	55	45	40	40	~ 5m	265	170	130	110	90	~20m	65	55	45	40	40	40	~20m		
~ 80	2	65	55	45	40	40	~ 5m	245	155	120	105	85	~20m	65	55	45	40	40	40	~20m		
~100	2	55	45	40	40	55	~ 5m	205	135	105	90	75	~20m	55	45	40	40	55	~20m			
~120	2	50	45	40	40	50	~ 5m	180	120	95	85	70	~20m	50	45	40	40	50	~20m			
~150	2(5)*	40	40	40	40	40	~ 5m	155	105	85	75	65	~20m	40	40	40	40	40	~20m			
~200	5	40	40	40	40	40	~ 5m	110	80	70	60	55	~20m	40	40	40	40	40	~20m			
~250	5	40	40	40	40	40	~ 5m	100	75	65	60	55	~20m	40	40	40	40	40	~20m			
~300	5(10)*	40	40	40	40	40	~ 5m	90	70	60	55	50	~20m	40	40	40	40	40	~20m			
~400	10	230	170	120	100	80	~10m	—	—	—	—	—	—	—	—	—	—	—	—	—		1000 *1 or 3000
~500	10	230	170	120	100	80	~10m	—	—	—	—	—	—	—	—	—	—	—	—	—		
~600	10	230	170	120	100	80	~10m	—	—	—	—	—	—	—	—	—	—	—	—	—		
~600	10	230	170	120	100	80	~10m	—	—	—	—	—	—	—	—	—	—	—	—	—		

● The above lengths are the minimum necessary of the bulb to be inserted into the fluid to be measured.
● Bulb length should be over the above length and specified in 5mm steps.

● φ 75 are not available in the □ portion.

* 1 Bulb maximum dimension: Available up to 3000mm when φ 10, 12, and 13, up to 1000mm when φ 8, 16.

* The number () in the minimum scale is for TL73.

The above minimum insertion length is the length without thermowell.

With thermowell, 25mm is added to the above length.

The minimum length of the plain type bulb is the minimum length of the above table plus 40mm.

Indicating Thermometers

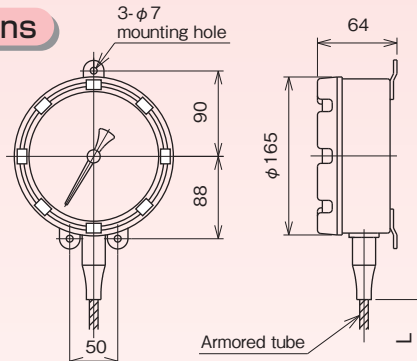
〈Surface mounting type〉

TL86

Liquid / Gas filled dial thermometer



Dimensions



Model	Dial size	Dimensions
TL86	150	Surface mounting type

Specifications

Item		Description
Manufacturing range		-200~600°C
Case		Construction: Drip-proof / equivalent to IP43, Material: ADC12, Finish: Black
Wetted parts material		Bulb: SUS304, Connection / Flange: SUS304
Accuracy	Indication error	Within ±2% F.S. at room temperature (20°C)
	Ambient temperature	Within ±2% F.S./15°C
Compensation		Bimetal compensation, lead compensation (Available in the -70 to 300°C range.)
Connection		R $\frac{1}{2}$, R $\frac{3}{4}$, $\frac{1}{2}$ NPT, G $\frac{1}{2}$ B, G $\frac{3}{4}$ B $\frac{1}{2}$ is not available with φ16 bulb and φ19, φ23 thermowell.
Flange		JIS10K20ARF, JIS10K25ARF, ANSI1B150RF, ANSI1B300RF
Connection	Without thermowell	Union type, Slide type
	With thermowell	Double socket union type: R $\frac{1}{2}$, $\frac{1}{2}$ NPT (Connection) Double socket slide type: R $\frac{1}{2}$, $\frac{1}{2}$ NPT (Connection)

Slide type is not available with φ16 bulb.
When the maximum temperature of temperature range exceeds 400°C, slide type is not available.

Range / Bulb DIA. / Bulb length / Lead length

Range °C	Minimum graduation °C	Bulb minimum insertion length mm										Bulb maximum length mm		
		Bimetal compensation					φ150 lead compensation							
		Bulb outer diameter					Lead length	Bulb outer diameter					Lead length	
φ8	φ10	φ12	φ13	φ16	φ8	φ10		φ12	φ13	φ16				
-200~ 50	5	—	—	—	225	170	2~ 5m	—	—	—	—	—	—	500
		—	—	—	300	220	6~15m	—	—	—	—	—	—	
		—	—	—	370	270	16~25m	—	—	—	—	—	—	
		—	—	—	—	300	26~30m	—	—	—	—	—	—	
-100~100	5	—	—	—	225	170	2~ 5m	—	—	—	—	—		
		—	—	—	300	220	6~15m	—	—	—	—	—		
		—	—	—	370	270	16~25m	—	—	—	—	—		
		—	—	—	—	300	26~30m	—	—	—	—	—		
-70 ~ 50	2	50	45	40	40	50	~ 5m	50	45	40	40	50	~20m	
-70 ~100	5	40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
-50 ~ 50	2	55	45	40	40	55	~ 5m	55	45	40	40	55	~20m	
-30 ~ 50	2	65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
-20 ~100	2	50	45	40	40	50	~ 5m	50	45	40	40	50	~20m	
-10 ~ 50	1	70	60	50	45	40	~ 5m	70	60	50	45	40	~20m	
0 ~ 50	1	70	60	50	45	40	~ 5m	70	60	50	45	40	~20m	
~ 60	1	65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
~ 80	2	65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
~100	2	55	45	40	40	55	~ 5m	55	45	40	40	55	~20m	
~120	2	50	45	40	40	50	~ 5m	50	45	40	40	50	~20m	
~150	2	40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
~200	5	40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
~250	5	40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
~300	5	40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
~400	10	230	170	120	100	80	~10m	—	—	—	—	—	—	
~500	10	230	170	120	100	80	~10m	—	—	—	—	—	—	
~600	10	230	170	120	100	80	~10m	—	—	—	—	—	—	

- The above lengths are the minimum necessary of the bulb to be inserted into the fluid to be measured.
- Bulb length should be over the above length and specified in 5mm steps.
- φ75 are not available in the portion.
- *1 Bulb maximum dimension: Available up to 3000mm when φ10, 12, and 13, up to 1000mm when φ8, 16.

The above minimum insertion length is the length without thermowell.
With thermowell, 25mm is added to the above length.
The minimum length of the plain type bulb is the minimum length of the above table plus 40mm.

TL5·6·7·8

Indicating Thermometers

Model number configuration

Please specify the model number, each specs and the range for ordering.

Model

Remote type Thermometer

Model number

Selective spec.

Additional spec. (Option)

Type	Available or not, depending on size.	φ 75	φ 100	φ 150
5	Remote type / Surface mounting type	○	○	○
6	Remote type / Panel mounting type (Hole mounting)	○	○	○
7	Remote type / Panel mounting type (Clamp mounting)	○	○	○
8	Remote type / Surface mounting type (EN type) φ 150 only available	×	×	○
Size				
3	φ 75 (TL8□ not available) Lead compensation not available.			
4	φ 100 (TL8□ not available)			
6	φ 150			

① Thermowell inside screws

0	Without thermowell	Welded type	Drilled type	Welded type
	With thermowell		Straight	Taper
1	Inside screws: Standard (W22 thread 14)	SW11 (SW10)	SW41 (SW40)	SW71 (SW70)
2	Inside screws: Rc1/2 double socket	SW12	SW42	SW72
3	Inside screws: 1/2NPT double socket	SW13	SW43	SW73
4	Inside screws: G1/2 double socket	SW14	SW44	SW74
5	Inside screws: Rc3/4 double socket	SW15	SW45	SW75

② Connecting part

0	Union type
1	Slide type (Not available for φ 16 bulb, and when the maximum temperature of temperature range exceeds 400°C.)
4	Plain type (Remote type)

③ Connecting screws

0	R1/2	H	JIS10K50ARF
1	R3/4	J	JIS20K20ARF
2	1/2NPT	K	JIS20K25ARF
3	G1/2B	L	JIS10K15AFF
4	G3/4B	M	JIS10K20AFF
5	JIS10K20ARF	N	JIS10K25AFF
6	JIS10K25ARF	P	ANSI3/4B150RF
7	ANSI1B150RF	Q	ANSI3/4B300RF
8	ANSI1B300RF	R	ANSI1B600RF
A	Fixing screws (W22 thread 14)	S	ANSI 1 1/2B150RF
B	R3/8	T	ANSI 1 1/2B300RF
C	R1	U	ANSI 1 1/2B600RF
D	3/4NPT	W	JPI 1B150RF
E	1NPT	X	JPI 1B300RF
F	JIS10K15ARF	Y	JPI 1B600RF
G	JIS10K40ARF	Z	Plain type

④ Range °C

1	0~50, 60, 80, 100, 120, 150	Accuracy ±1%F.S. not available
2	0~200, 250, 300	
3	0~400, 500 (Gas filled)	
4	0~600 (Gas filled)	
5	-10~50, -30~50, -50~50	
6	-70~50, -70~100, -20~100	
8	-100~100 (Gas filled)	
9	-200~50 (Gas filled)	

⑤ Bulb material

1	SUS304
2	SUS316
X	With thermowell

⑥ Bulb DIA.

1	d=φ 8
2	d=φ 10
3	d=φ 12
4	d=φ 13
5	d=φ 16 Slide type not available
X	With thermowell

⑦ Bulb length

A	Minimum dimension ~ 500mm
	Other specified (/100mm)
X	With thermowell

⑧ Compensation

1	Bimetal compensation
2	Lead compensation φ100
	Lead compensation φ150

⑨ Lead type

2	Armored tube B (SUS430) (Standard)
B	Armored tube B (SUS304)
E	Armored tube B (SUS316)

⑩ Lead length

	Bimetal	Lead
0	0	Direct type
A	ア	Up to 3m
B	イ	Up to 4m
C	ウ	Up to 5m
D	エ	Up to 6m
E	オ	Up to 7m
F	カ	Up to 8m
G	キ	Up to 9m
H	ク	Up to 10m
9		Other specified (/m)

⑪ Accuracy

0	±2%F.S. (Standard)
3	±1%F.S. (Selectable only TL54, 64, 74)

⑫ Glass

0	Standard (Inorganic glass)
2	Tempered glass

⑬ Kind of thermowell

1	Welded type
4	Drilled type straight
7	Drilled type taper
8	Welded flange

⑭ Thermowell inside screws

0	For slide type General products: Not available
1	W22 thread 14
2	Rc1/2
3	1/2NPT
4	G1/2
5	Rc3/4
6	3/4NPT
7	G3/4

⑮ Documents

0	Nil
1	Required (Please specify the desired documents separately.) Submission drawings, instruction manual, inspection procedure, mill sheet, test report (1 pc 1 copy), traceability / inspection certificate, strength calculation, attended inspection

Please specify the temperature range and units separately besides selection of range code.

* When ordering, please specify the bulb length and lead length.
* The thermowell model composition is SW ⑬ ⑭.
* For with thermowell, please refer to P 16 ~ thermowell manufacturing specifications and specify the SW model also.

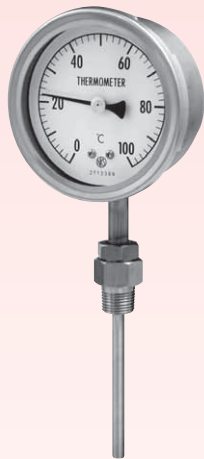
*Specify "X" if there is no specification item.

Stainless Steel Case Thermometers

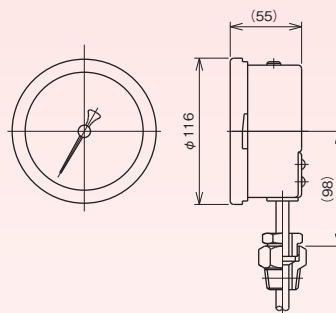
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RL14·16

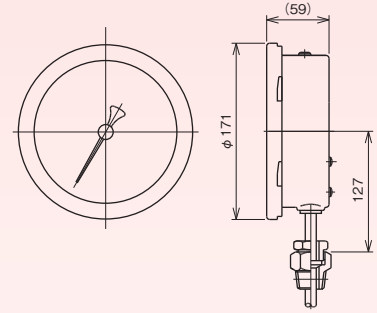
Liquid filled dial thermometer



Dimensions



RL14 (φ100)



RL16 (φ150)

Specifications

Item		Description
Manufacturing range		-70~150°C
Case		Construction: Spray-proof / equivalent to IP65, Material: SUS304, Finish: Plain
Wetted parts material		Bulb: SUS304, Connection / Flange: SUS304
Accuracy	Indication error	Within ±2% F.S. at room temperature (20°C)
	Ambient temperature	Within ±2% F.S./15°C
Compensation		Bimetal compensation
Connection		R $\frac{1}{2}$, R $\frac{3}{4}$, $\frac{1}{2}$ NPT, G $\frac{1}{2}$ B, G $\frac{3}{4}$ B $\frac{1}{2}$ is not available with φ16 bulb and φ19, φ23 thermowell.
Flange		JIS10K20ARF, JIS10K25ARF, ANSI1B150RF, ANSI1B300RF
Connection	Without thermowell	Union type, Slide type
	With thermowell	Double socket union type: R $\frac{1}{2}$, $\frac{1}{2}$ NPT (Connection) Double socket slide type: R $\frac{1}{2}$, $\frac{1}{2}$ NPT (Connection)

Slide type is not available with φ8, φ16 bulb.
When the maximum temperature of temperature range exceeds 400°C, slide type is not available.

Range / Bulb DIA. / Bulb length

Range °C	Minimum graduation °C	Bulb minimum insertion length mm					Bulb maximum length mm
		Bimetal compensation					
		d=φ8	d=φ10	d=φ12	d=φ13	d=φ16	
-70~ 50	2	50	45	40	40	50	500
-70~100	5	40	40	40	40	40	
-50~ 50	2	55	45	40	40	55	
-30~ 50	2	65	55	45	40	40	
-20~100	2	50	45	40	40	50	
-10~ 50	1	70	60	50	45	40	
0~ 50	1	70	60	50	45	40	
~ 60	1	65	55	45	40	40	
~ 80	2	65	55	45	40	40	
~100	2	55	45	40	40	55	
~120	2	50	45	40	40	50	
~150	2	40	40	40	40	40	

- The above lengths are the minimum necessary of the bulb to be inserted into the fluid to be measured.
- Bulb length should be over the above length and specified in 5mm steps.

The above minimum insertion length is the length without thermowell.
With thermowell, 25mm is added to the above length.

RL14·16

Indicating Thermometers

Model number configuration

Please specify the model number, each specs and the range for ordering.

Model

Stainless steel case thermometer/Direct type

Model number: **RL1** — **1000** — **1000**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮

Model number			Selective spec.							Additional spec. (Option)				
Type	1	4	φ 100	Spray-proof stem type										
Type	1	6	φ 150	Spray-proof stem type										
① Thermowell inside screws For with thermowell, please specify the thermowell type on a separate page	0	Without thermowell												
		With thermowell							Welded type	Drilled type		Welded type		
										Straight	Taper	Flange		
	1	Inside screws: Standard (W22 thread 14)							SW11 (SW10)	SW41 (SW40)	SW71 (SW70)	SW81		
	2	Inside screws: Rc1/2 double socket							SW12	SW42	SW72	SW82		
	3	Inside screws: 1/2NPT double socket							SW13	SW43	SW73	—		
4	Inside screws: G1/2 double socket							SW14	SW44	SW74	—			
5	Inside screws: Rc3/4 double socket							SW15	SW45	SW75	—			
② Connecting part	0	Union type												
	1	Slide type (Not available for φ8, φ16 bulb, and when the maximum temperature of temperature range exceeds 400°C.)												
③ Connecting screws	0	R1/2	H	JIS10K50ARF										
	1	R3/4	J	JIS20K20ARF										
	2	1/2NPT	K	JIS20K25ARF										
	3	G1/2B	L	JIS10K15AFF										
	4	G3/4B	M	JIS10K20AFF										
	5	JIS10K20ARF	N	JIS10K25AFF										
	6	JIS10K25ARF	P	ANSI3/4B150RF										
	7	ANSI1B150RF	Q	ANSI3/4B300RF										
	8	ANSI1B300RF	R	ANSI1B600RF										
	A	Fixing screws (W22 thread 14)	S	ANSI 1 1/2B150RF										
	B	R3/8	T	ANSI 1 1/2B300RF										
	C	R1	U	ANSI 1 1/2B600RF										
	D	3/4NPT	W	JPI 1B150RF										
	E	1NPT	X	JPI 1B300RF										
F	JIS10K15ARF	Y	JPI 1B600RF											
G	JIS10K40ARF	Z	Plain type											
④ Range °C	1	0~50, 60, 80, 100, 120, 150												
	5	-10~50, -30~50, -50~50												
	6	-70~50, -70~100, -20~100												
⑤ Bulb material	1	SUS304												
	2	SUS316												
	X	With thermowell												
⑥ Bulb DIA.	1	d=φ8	Slide type not available											
	2	d=φ10												
	3	d=φ12												
	4	d=φ13												
	5	d=φ16	Slide type not available											
	X	With thermowell												
⑦ Bulb length	A	Minimum dimension ~ 500mm												
		Other specified (/100mm)												
	X	With thermowell												
⑧ Compensation	1	Bimetal compensation												
⑨ Lead type	0	Direct type												
⑩ Lead length	Lead length	Bimetal	Lead											
		0	0	Direct type										
⑪ Accuracy	0	±2%F.S. (Standard)												
⑫ Glass	0	Standard (Inorganic glass)												
	2	Tempered glass												
⑬ Kind of thermowell	1	Welded type												
	4	Drilled type straight												
	7	Drilled type taper												
	8	Welded flange												
⑭ Thermowell inside screws	0	For slide type General products: Not available												
	1	W22 thread 14												
	2	Rc1/2												
	3	1/2NPT												
	4	G1/2												
	5	Rc3/4												
	6	3/4NPT												
7	G3/4													
⑮ Documents	0	Nil												
	1	Required (Please specify the desired documents separately.) Submission drawings, instruction manual, inspection procedure, mill sheet, test report (1 pc 1 copy), traceability / inspection certificate, strength calculation, attended inspection												

Please specify the temperature range and units separately besides selection of range code.

*Specify "X" if there is no specification item.

【Manufacturing range】

- Slide type is not available when the following conditions are true.
 - ① Bulb: φ8, φ16
 - ② When the maximum temperature of temperature range exceeds 400°C.

- * When ordering, please specify the bulb length and lead length.
- * The thermowell model composition is SW ⑬ ⑭.
- * For with thermowell, please refer to P ⑩ ~ thermowell manufacturing specifications and specify the SW model also.

*Specify "X" if there is no specification item.

Stainless Steel Case Thermometers

<Surface / Panel mounting type>

RL54·56·74·76

Liquid / Gas filled dial thermometer

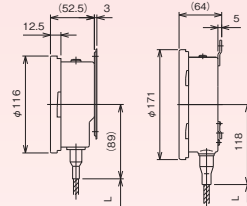


RL5

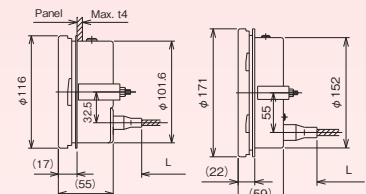
Dimensions

Surface mounting

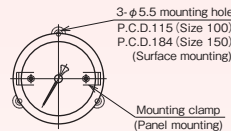
Panel mounting



RL54 (φ100) RL56 (φ150)



RL74 (φ100) RL76 (φ150)



Model	Panel cut dimensions
RL74	φ 103.6±1
RL76	φ 154±1

Specifications

Item		Description
Manufacturing range		-200~600°C
Case		Construction: Spray-proof / equivalent to IP65, Material: SUS304, Finish: Plain
Wetted parts material		Bulb: SUS304, Connection / Flange: SUS304
Accuracy	Indication error	Within ±2% F.S. at room temperature (20°C) Within ±1%F.S. is available in the range of 0 to 50°C → 0 to 150°C and φ 100 lead compensation. (RL54 · 74)
	Ambient temperature	Within ± 2 %F.S./15°C
Compensation		Bimetal compensation
Connection		R1/2, R3/4, 1/2NPT, G1/2B, G3/4B 1/2 is not available with φ 16 bulb and φ 19, φ 23 thermowell.
Flange		JIS10K20ARF, JIS10K25ARF, ANSI1B150RF, ANSI1B300RF
Connection	Without thermowell	Union type, Slide type
	With thermowell	Double socket union type: R1/2, 1/2NPT (Connection) Double socket slide type: R1/2, 1/2NPT (Connection)

Slide type is not available with φ 16 bulb.
When the maximum temperature of temperature range exceeds 400°C, slide type is not available.

Range / Bulb DIA. / Bulb length / Lead length

Range °C	Minimum graduation °C	Bulb minimum insertion length mm														Bulb maximum length mm			
		Bimetal compensation					φ 100 lead compensation					φ 150 lead compensation							
		Bulb outer diameter					Lead length					Bulb outer diameter					Lead length		
φ8	φ10	φ12	φ13	φ16	Lead length	φ8	φ10	φ12	φ13	φ16	Lead length	φ8	φ10	φ12	φ13	φ16	Lead length		
-200~ 50	5	—	—	—	225	170	2~ 5m	—	—	—	—	—	—	—	—	—	—	—	—
		—	—	—	300	220	6~15m	—	—	—	—	—	—	—	—	—	—	—	—
		—	—	—	370	270	16~25m	—	—	—	—	—	—	—	—	—	—	—	—
		—	—	—	—	300	26~30m	—	—	—	—	—	—	—	—	—	—	—	—
-100~100	5	—	—	—	225	170	2~ 5m	—	—	—	—	—	—	—	—	—	—	—	—
		—	—	—	300	220	6~15m	—	—	—	—	—	—	—	—	—	—	—	—
		—	—	—	370	270	16~25m	—	—	—	—	—	—	—	—	—	—	—	—
		—	—	—	—	300	26~30m	—	—	—	—	—	—	—	—	—	—	—	—
-70 ~ 50	2	50	45	40	40	50	~ 5m	160	110	90	75	65	~20m	50	45	40	40	50	~20m
-70 ~100	5	40	40	40	40	40	~ 5m	125	90	75	65	60	~20m	40	40	40	40	40	~20m
-50 ~ 50	2	55	45	40	40	55	~ 5m	180	120	95	85	70	~20m	55	45	40	40	55	~20m
-30 ~ 50	2	65	55	45	40	40	~ 5m	215	140	110	95	80	~20m	65	55	45	40	40	~20m
-20 ~100	2	50	45	40	40	50	~ 5m	160	110	90	75	65	~20m	50	45	40	40	50	~20m
-10 ~ 50	1	70	60	50	45	40	~ 5m	265	170	130	110	90	~20m	70	60	50	45	40	~20m
0 ~ 50	1	70	60	50	45	40	~ 5m	305	190	145	125	100	~20m	70	60	50	45	40	~20m
~ 60	1	65	55	45	40	40	~ 5m	265	170	130	110	90	~20m	65	55	45	40	40	~20m
~ 80	2	65	55	45	40	40	~ 5m	245	155	120	105	85	~20m	65	55	45	40	40	~20m
~100	2	55	45	40	40	55	~ 5m	205	135	105	90	75	~20m	55	45	40	40	55	~20m
~120	2	50	45	40	40	50	~ 5m	180	120	95	85	70	~20m	50	45	40	40	50	~20m
~150	2	40	40	40	40	40	~ 5m	155	105	85	75	65	~20m	40	40	40	40	40	~20m
~200	5	40	40	40	40	40	~ 5m	110	80	70	60	55	~20m	40	40	40	40	40	~20m
~250	5	40	40	40	40	40	~ 5m	100	75	65	60	55	~20m	40	40	40	40	40	~20m
~300	5	40	40	40	40	40	~ 5m	90	70	60	55	50	~20m	40	40	40	40	40	~20m
~400	10	230	170	120	100	80	~10m	—	—	—	—	—	—	—	—	—	—	—	—
~500	10	230	170	120	100	80	~10m	—	—	—	—	—	—	—	—	—	—	—	—
~600	10	230	170	120	100	80	~10m	—	—	—	—	—	—	—	—	—	—	—	—

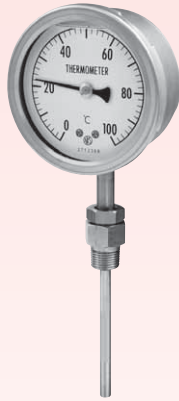
- The above lengths are the minimum necessary of the bulb to be inserted into the fluid to be measured.
- Bulb length should be over the above length and specified in 5mm steps.
- φ 75 are not available in the [] portion.
- *1 Bulb maximum dimension: Available up to 3000mm when φ 10, 12, and 13, up to 1000mm when φ 8, 16.

The above minimum insertion length is the length without thermowell.
With thermowell, 25mm is added to the above length.
The minimum length of the plain type bulb is the minimum length of the above table plus 40mm.

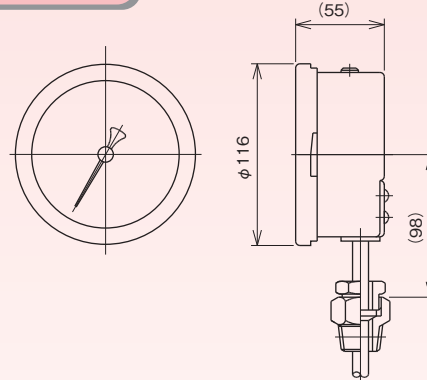
Stainless Steel Case Ultra Vibration-proof Glycerin Bath Type Thermometers <Direct I type>

RV14

Liquid filled dial thermometer



Dimensions



Model	Dial size
RV14	100

This product has improved the durability by reducing the wear, suppression of amplitude and violent vibration by back pressure which is immersed in a glycerin bath completely the case internal mechanism, caused by the viscous drag of glycerin. Resistance of atmosphere is good in made "SUS304" case, the filling liquid is using glycerin aqueous solution.

Specifications

Item		Description
Manufacturing range		-70~150°C
Case		Construction: Spray-proof / equivalent to IP65, Material: SUS304, Finish: Plain
Wetted parts material		Bulb: SUS304, Connection / Flange: SUS304
Accuracy	Indication error	Within ±2% F.S. at room temperature (20°C)
	Ambient temperature	Within ± 2 %F.S./15°C
Compensation		Bimetal compensation
Connection		R1½, R¾, ½NPT, G1½B, G¾B ½ is not available with φ 16 bulb and φ 19, φ 23 thermowell.
Flange		JIS10K20ARF, JIS10K25ARF, ANSI1B150RF, ANSI1B300RF
Connection	Without thermowell	Union type
	With thermowell	Double socket union type: R1½, ½NPT (Connection)

Slide type is not available.

Range / Bulb DIA. / Bulb length

Range °C	Minimum graduation °C	Bulb minimum insertion length mm					Bulb maximum length mm
		Bimetal compensation					
		d=φ8	d=φ10	d=φ12	d=φ13	d=φ16	
-70~ 50	2	50	45	40	40	50	500
-70~100	5	40	40	40	40	40	
-50~ 50	2	55	45	40	40	55	
-30~ 50	2	65	55	45	40	40	
-20~100	2	50	45	40	40	50	
-10~ 50	1	70	60	50	45	40	
0~ 50	1	70	60	50	45	40	
~ 60	1	65	55	45	40	40	
~ 80	2	65	55	45	40	40	
~100	2	55	45	40	40	55	
~120	2	50	45	40	40	50	
~150	2	40	40	40	40	40	

- The above lengths are the minimum necessary of the bulb to be inserted into the fluid to be measured.
- Bulb length should be over the above length and specified in 5mm steps.

The above minimum insertion length is the length without thermowell. With thermowell, 25mm is added to the above length.

RV14

Indicating Thermometers

Model number configuration

Please specify the model number, each specs and the range for ordering.

Model

Ultra Vibration-proof Glycerin Bath Type Thermometer

Model number: **RV14** — **0** — **100** ×

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮

Model number		Selective spec.				Additional spec. (Option)					
Type	1	4	φ 100 Spray-proof stem type								
① Thermowell inside screws For with thermowell, please specify the thermowell type on a separate page	0	Without thermowell					Welded type		Drilled type		Welded type
		With thermowell						Straight		Taper	Flange
	1	Inside screws: Standard (W22 thread 14)				SW11 (SW10)	SW41 (SW40)	SW71 (SW70)		SW81	
	2	Inside screws: Rc1/2 double socket				SW12	SW42	SW72		SW82	
	3	Inside screws: 1/2NPT double socket				SW13	SW43	SW73		—	
	4	Inside screws: G1/2 double socket				SW14	SW44	SW74		—	
	5	Inside screws: Rc3/4 double socket				SW15	SW45	SW75		—	
② Connecting part	0	Union type									
③ Connecting screws	0	R1/2	H	JIS10K50ARF							
	1	R3/4	J	JIS20K20ARF							
	2	1/2NPT	K	JIS20K25ARF							
	3	G1/2B	L	JIS10K15AFF							
	4	G3/4B	M	JIS10K20AFF							
	5	JIS10K20ARF	N	JIS10K25AFF							
	6	JIS10K25ARF	P	ANSI3/4B150RF							
	7	ANSI1B150RF	Q	ANSI3/4B300RF							
	8	ANSI1B300RF	R	ANSI1B600RF							
	A	Fixing screws (W22 thread 14)	S	ANSI 1 1/2B150RF							
	B	R3/8	T	ANSI 1 1/2B300RF							
	C	R1	U	ANSI 1 1/2B600RF							
	D	3/4NPT	W	JPI 1B150RF							
	E	1NPT	X	JPI 1B300RF							
F	JIS10K15ARF	Y	JPI 1B600RF								
G	JIS10K40ARF	Z	Plain type								
④ Range °C	1	0~50, 60, 80, 100, 120, 150									
	5	-10~50, -30~50, -50~50									
	6	-70~50, -70~100, -20~100									
⑤ Bulb material	1	SUS304									
	2	SUS316									
	X	With thermowell									
⑥ Bulb DIA.	1	d=φ 8		Slide type not available							
	2	d=φ 10									
	3	d=φ 12									
	4	d=φ 13									
	5	d=φ 16									
	X	With thermowell									
⑦ Bulb length	A	Minimum dimension ~ 500mm									
		Other specified									
	X	With thermowell									
⑧ Compensation	1	Bimetal compensation									
⑨ Lead type	0	Direct type									
⑩ Lead length	0	Direct type									
⑫ Glass	0	Standard (Inorganic glass)									
	2	Tempered glass									
⑬ Kind of thermowell	1	Welded type									
	4	Drilled type straight									
	7	Drilled type taper									
	8	Welded flange									
⑭ Thermowell inside screws	0	For slide type General products: Not available									
	1	W22 thread 14									
	2	Rc1/2									
	3	1/2NPT									
	4	G1/2									
	5	Rc3/4									
	6	3/4NPT									
7	G3/4										
⑮ Documents	0	Nil									
	1	Required (Please specify the desired documents separately.) Submission drawings, instruction manual, inspection procedure, mill sheet, test report (1 pc 1 copy), traceability / inspection certificate, strength calculation, attended inspection									

Please specify the temperature range and units separately besides selection of range code.

* When ordering, please specify the bulb length and lead length.
 * The thermowell model composition is SW ⑬ ⑭.
 * For with thermowell, please refer to P 16 ~ thermowell manufacturing specifications and specify the SW model also.

*Specify "X" if there is no specification item.

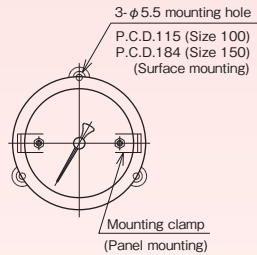
Stainless Steel Case Ultra Vibration-proof **RV54·74** Glycerin Bath Type Thermometers (Surface / Panel mounting type)

Liquid / Gas filled dial thermometer

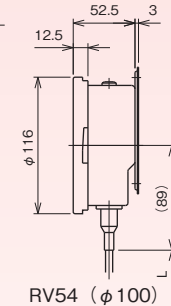
Dimensions



RV7

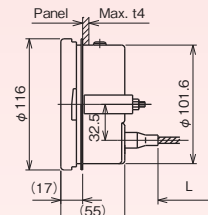


Surface mounting



RV54 (φ100)

Panel mounting



RV74 (φ100)

Model	Panel cut dimensions
RV74	φ103.6±1

This product has improved the durability by reducing the wear, suppression of amplitude and violent vibration by back pressure which is immersed in a glycerin bath completely the case internal mechanism, caused by the viscous drag of glycerin. Resistance of atmosphere is good in made "SUS304" case, the filling liquid is using glycerin aqueous solution.

Specifications

Item		Description
Manufacturing range		-200~600°C
Case		Construction: Spray-proof / equivalent to IP65, Material: SUS304, Finish: Plain
Wetted parts material		Bulb: SUS304, Connection / Flange: SUS304
Accuracy	Indication error	Within ±2% F.S. at room temperature (20°C)
	Ambient temperature	Within ±2% F.S./15°C
Compensation		Bimetal compensation *Please contact us for lead correction.
Connection		R $\frac{1}{2}$, R $\frac{3}{4}$, $\frac{1}{2}$ NPT, G $\frac{1}{2}$ B, G $\frac{3}{4}$ B $\frac{1}{2}$ is not available with φ16 bulb and φ19, φ23 thermowell.
Flange		JIS10K20ARF, JIS10K25ARF, ANSI1B150RF, ANSI1B300RF
Connection	Without thermowell	Union type, Slide type
	With thermowell	Double socket union type: R $\frac{1}{2}$, $\frac{1}{2}$ NPT (Connection) Double socket slide type: R $\frac{1}{2}$, $\frac{1}{2}$ NPT (Connection)
		Slide type is not available with φ16 bulb. When the maximum temperature of temperature range exceeds 400°C, slide type is not available.

Range / Bulb DIA. / Bulb length / Lead length

Range °C	Minimum graduation °C	Bulb minimum insertion length mm					Bulb maximum length mm
		Bimetal compensation					
		Bulb outer diameter				Lead length	
φ8	φ10	φ12	φ13	φ16			
-200~ 50	5	—	—	—	225	170	2~ 5m
		—	—	—	300	220	6~15m
		—	—	—	370	270	16~25m
		—	—	—	—	300	26~30m
-100~100	5	—	—	—	225	170	2~ 5m
		—	—	—	300	220	6~15m
		—	—	—	370	270	16~25m
		—	—	—	—	300	26~30m
-70 ~ 50	2	50	45	40	40	50	~ 5m
-70 ~100	5	40	40	40	40	40	~ 5m
-50 ~ 50	2	55	45	40	40	55	~ 5m
-30 ~ 50	2	65	55	45	40	40	~ 5m
-20 ~100	2	50	45	40	40	50	~ 5m
-10 ~ 50	1	70	60	50	45	40	~ 5m
0 ~ 50	1	70	60	50	45	40	~ 5m
~ 60	1	65	55	45	40	40	~ 5m
~ 80	2	65	55	45	40	40	~ 5m
~100	2	55	45	40	40	55	~ 5m
~120	2	50	45	40	40	50	~ 5m
~150	2	40	40	40	40	40	~ 5m
~200	5	40	40	40	40	40	~ 5m
~250	5	40	40	40	40	40	~ 5m
~300	5	40	40	40	40	40	~ 5m
~400	10	230	170	120	100	80	~10m
~500	10	230	170	120	100	80	~10m
~600	10	230	170	120	100	80	~10m

- The above lengths are the minimum necessary of the bulb to be inserted into the fluid to be measured.
- Bulb length should be over the above length and specified in 5mm steps.
- Please contact us for lead length of more than 5m for the portion.

The above minimum insertion length is the length without thermowell.
With thermowell, 25mm is added to the above length.
The minimum length of the plain type bulb is the minimum length of the above table plus 40mm.

RV54·74

Indicating Thermometers

Model number configuration

Please specify the model number, each specs and the range for ordering.

Model

Ultra Vibration-proof Glycerin Bath Type Thermometer

Model number: **RV** **4** — **1** **X**

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮

Model number		Selective spec.								Additional spec. (Option)						
Type	5	4	φ 100	Spray-proof surface mounting type												
	7	4	φ 100	Spray-proof panel mounting type												
① Thermowell inside screws For with thermowell, please specify the thermowell type on a separate page	0	Without thermowell								Welded type		Drilled type		Welded type		
		With thermowell										Straight	Taper	Flange		
	1	Inside screws: Standard (W22 thread 14)								SW11 (SW10)		SW41 (SW40)	SW71 (SW70)	SW81		
	2	Inside screws: Rc1/2 double socket								SW12		SW42	SW72	SW82		
	3	Inside screws: 1/2NPT double socket								SW13		SW43	SW73	—		
	4	Inside screws: G1/2 double socket								SW14		SW44	SW74	—		
	5	Inside screws: Rc3/4 double socket								SW15		SW45	SW75	—		
② Connecting part	0	Union type														
	1	Slide type (Not available for φ 16 bulb, and when the maximum temperature of temperature range exceeds 400°C.)														
	4	Plain type														
③ Connecting screws	0	R1/2	H	JIS10K50ARF												
	1	R3/4	J	JIS20K20ARF												
	2	1/2NPT	K	JIS20K25ARF												
	3	G1/2B	L	JIS10K15AFF												
	4	G3/4B	M	JIS10K20AFF												
	5	JIS10K20ARF	N	JIS10K25AFF												
	6	JIS10K25ARF	P	ANSI3/4B150RF												
	7	ANSI1B150RF	Q	ANSI3/4B300RF												
	8	ANSI1B300RF	R	ANSI1B600RF												
	A	Fixing screws (W22 thread 14)	S	ANSI 1 1/2B150RF												
	B	R3/8	T	ANSI 1 1/2B300RF												
	C	R1	U	ANSI 1 1/2B600RF												
	D	3/4NPT	W	JPI 1B150RF												
	E	1NPT	X	JPI 1B300RF												
	F	JIS10K15ARF	Y	JPI 1B600RF												
G	JIS10K40ARF	Z	Plain type													
④ Range °C *1	1	0~50, 60, 80, 100, 120, 150														
	2	0~200, 250, 300														
	3	0~400, 500 (Gas filled)								lead compensation not available						
	4	0~600 (Gas filled)														
	5	-10~50, -30~50, -50~50														
	6	-70~50, -70~100, -20~100														
	8	-100~100 (Gas filled)								lead compensation not available						
	9	-200~50 (Gas filled)														
	⑤ Bulb material	1	SUS304													
2		SUS316														
X		With thermowell														
⑥ Bulb DIA.	1	d=φ 8														
	2	d=φ 10														
	3	d=φ 12														
	4	d=φ 13														
	5	d=φ 16 Slide type not available														
	X	With thermowell														
⑦ Bulb length	A	Minimum dimension ~ 500mm														
		Other specified (Gas filled available)														
	X	With thermowell														
⑧ Compensation *1	1	Bimetal compensation														
⑨ Lead type	2	Armored tube B (SUS430) <Standard>														
	B	Armored tube B (SUS304)														
	E	Armored tube B (SUS316)														
⑩ Lead length	0	Direct type														
	A	Up to 3m														
	B	Up to 4m														
	C	Up to 5m														
	D	Up to 6m														
	E	Up to 7m														
	F	Up to 8m														
	G	Up to 9m														
	H	Up to 10m														
9	Other specified (/m)															
⑫ Glass	0	Standard (Inorganic glass)														
	2	Tempered glass														
⑬ Kind of thermowell	1	Welded type														
	4	Drilled type straight														
	7	Drilled type taper														
	8	Welded flange														
⑭ Thermowell inside screws	0	For slide type General products: Not available														
	1	W22 thread 14														
	2	Rc1/2														
	3	1/2NPT														
	4	G1/2														
	5	Rc3/4														
	6	3/4NPT														
7	G3/4															
⑮ Documents	0	Nil														
	1	Required (Please specify the desired documents separately.) Submission drawings, instruction manual, inspection procedure, mill sheet, test report (1 pc 1 copy), traceability / inspection certificate, strength calculation, attended inspection														

Please specify the temperature range and units separately besides selection of range code.

* 1 Please contact us for lead correction.

【Manufacturing range】
 - Slide type is not available when the following conditions are true.
 ① Bulb: φ 16
 ② When the maximum temperature of temperature range exceeds 400°C.

* When ordering, please specify the bulb length and lead length.
 * The thermowell model composition is SW ⑬ ⑭.
 * For with thermowell, please refer to P ⑩ ~ thermowell manufacturing specifications and specify the SW model also.

* Specify "X" if there is no specification item.

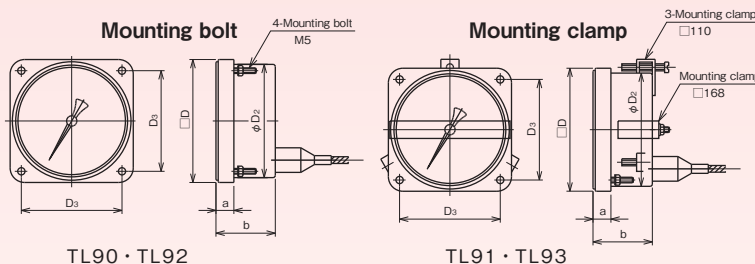
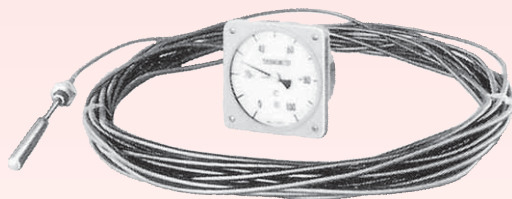
Square Thermometers

〈Remote type〉

TL90·91·92·93

Liquid / Gas filled dial thermometer

Dimensions



TL90 · TL92

TL91 · TL93

Model	Dial size	Dimensions					Panel cut dimension	Mounting
		D	D ₂	D ₃	a	b		
TL90	□110	110	102	90	16	53	φ104±1	Mounting bolt
TL91	□110	110	102	90	16	53	φ104±1	Mounting clamp
TL92	□168	168	152	145	17	60	φ154±1	Mounting bolt
TL93	□168	168	152	145	17	60	φ154±1	Mounting clamp

Specifications

Item	Description	
Manufacturing range	-200~600°C	
Case	TL90 · 91 Construction: Drip-proof / equivalent to IP33, Material: ADC12, Finish: Black TL92 · 93 Construction: Drip-proof / equivalent to IP33, Material: AC7A, Finish: Black	
Wetted parts material	Bulb: SUS304, Connection / Flange: SUS304	
Accuracy	Indication error	Within ±2% F.S. at room temperature (20°C)
	Ambient temperature	Within ±2 %F.S./15°C
Compensation	Bimetal compensation, lead compensation (□ 168 only)	
Max. lead length	TL: 5m (Bimetal compensation), 20m (lead compensation)	
Connection	R ¹ / ₂ , R ³ / ₄ , ¹ / ₂ NPT, G ¹ / ₂ B, G ³ / ₄ B ¹ / ₂ is not available with φ16 bulb and φ19, φ23 thermowell.	
Flange	JIS10K20ARF, JIS10K25ARF, ANSI1B150RF, ANSI1B300RF	
Connection	Without thermowell	Union type, Slide type
	With thermowell	Double socket union type: R ¹ / ₂ , ¹ / ₂ NPT (Connection) Double socket slide type: R ¹ / ₂ , ¹ / ₂ NPT (Connection)

Slide type is not available with φ16 bulb.
When the maximum temperature of temperature range exceeds 400°C, slide type is not available.

Range / Bulb DIA. / Bulb length / Lead length

Range °C	Minimum graduation °C	Bulb minimum insertion length mm											Bulb maximum length mm	
		Bimetal compensation					Lead length	□168 Lead compensation						
		Bulb outer diameter						Bulb outer diameter						
		φ8	φ10	φ12	φ13	φ16		φ8	φ10	φ12	φ13	φ16		
-200~ 50	5	—	—	—	225	170	2~ 5m	—	—	—	—	—	—	—
		—	—	—	300	220	6~15m	—	—	—	—	—	—	
		—	—	—	370	270	16~25m	—	—	—	—	—	—	
-100~100	5	—	—	—	—	300	26~30m	—	—	—	—	—	—	—
		—	—	—	225	170	2~ 5m	—	—	—	—	—	—	
		—	—	—	300	220	6~15m	—	—	—	—	—	—	
-70 ~ 50	2	50	45	40	40	50	~ 5m	50	45	40	40	50	~20m	
		40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
		55	45	40	40	55	~ 5m	55	45	40	40	55	~20m	
-30 ~ 50	2	65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
		50	45	40	40	50	~ 5m	50	45	40	40	50	~20m	
		70	60	50	45	40	~ 5m	70	60	50	45	40	~20m	
-20 ~100	2	65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
		65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
		65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
-10 ~ 50	1	70	60	50	45	40	~ 5m	70	60	50	45	40	~20m	
		70	60	50	45	40	~ 5m	70	60	50	45	40	~20m	
		70	60	50	45	40	~ 5m	70	60	50	45	40	~20m	
0 ~ 50	1	65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
		65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
		65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
~ 60	1	65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
		65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
		65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
~ 80	2	65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
		65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
		65	55	45	40	40	~ 5m	65	55	45	40	40	~20m	
~100	2	55	45	40	40	55	~ 5m	55	45	40	40	55	~20m	
		55	45	40	40	55	~ 5m	55	45	40	40	55	~20m	
		55	45	40	40	55	~ 5m	55	45	40	40	55	~20m	
~120	2	50	45	40	40	50	~ 5m	50	45	40	40	50	~20m	
		50	45	40	40	50	~ 5m	50	45	40	40	50	~20m	
		50	45	40	40	50	~ 5m	50	45	40	40	50	~20m	
~150	2	40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
		40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
		40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
~200	5	40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
		40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
		40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
~250	5	40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
		40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
		40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
~300	5	40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
		40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
		40	40	40	40	40	~ 5m	40	40	40	40	40	~20m	
~400	10	230	170	120	100	80	~10m	—	—	—	—	—	—	
		230	170	120	100	80	~10m	—	—	—	—	—	—	
		230	170	120	100	80	~10m	—	—	—	—	—	—	
~500	10	230	170	120	100	80	~10m	—	—	—	—	—	—	
		230	170	120	100	80	~10m	—	—	—	—	—	—	
		230	170	120	100	80	~10m	—	—	—	—	—	—	
~600	10	230	170	120	100	80	~10m	—	—	—	—	—	—	
		230	170	120	100	80	~10m	—	—	—	—	—	—	
		230	170	120	100	80	~10m	—	—	—	—	—	—	

● The above lengths are the minimum necessary of the bulb to be inserted into the fluid to be measured.
● Bulb length should be over the above length and specified in 5mm steps.

The above minimum insertion length is the length without thermowell.
With thermowell, 25mm is added to the above length.
The minimum length of the plain type bulb is the minimum length of the above table plus 40mm.

TL90·91·92·93

Indicating Thermometers

Model number configuration

Please specify the model number, each specs and the range for ordering.

Model

TL9 — ① ② ③ — ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ X ⑫ ⑬ ⑭ ⑮

Square thermometer

Model number

Type

Size

Selective spec.

Additional spec. (Option)

0	<input type="checkbox"/> 110 · Mounting bolt
1	<input type="checkbox"/> 110 · Mounting clamp
2	<input type="checkbox"/> 168 · Mounting bolt
3	<input type="checkbox"/> 168 · Mounting clamp

① Thermowell inside screws

For with thermowell, please specify the thermowell type on a separate page

0	Without thermowell	Welded type	Drilled type		Welded type
	With thermowell		Straight	Taper	Flange
1	Inside screws: Standard (W22 thread 14)	SW11 (SW10)	SW41 (SW40)	SW71 (SW70)	SW81
2	Inside screws: Rc1/2 double socket	SW12	SW42	SW72	SW82
3	Inside screws: 1/2NPT double socket	SW13	SW43	SW73	—
4	Inside screws: G1/2 double socket	SW14	SW44	SW74	—
5	Inside screws: Rc3/4 double socket	SW15	SW45	SW75	—

② Connecting part

0	Union type
1	Slide type (Not available for ϕ 16 bulb, and when the maximum temperature of temperature range exceeds 400°C.)
4	Plain type (Remote type only)

③ Connecting screws

0	R1/2	H	JIS10K50ARF
1	R3/4	J	JIS20K20ARF
2	1/2NPT	K	JIS20K25ARF
3	G1/2B	L	JIS10K15AFF
4	G3/4B	M	JIS10K20AFF
5	JIS10K20ARF	N	JIS10K25AFF
6	JIS10K25ARF	P	ANSI3/4B150RF
7	ANSI1B150RF	Q	ANSI3/4B300RF
8	ANSI1B300RF	R	ANSI1B600RF
A	Fixing screws (W22 thread 14)	S	ANSI 1 1/2B150RF
B	R3/8	T	ANSI 1 1/2B300RF
C	R1	U	ANSI 1 1/2B600RF
D	3/4NPT	W	JPI 1B150RF
E	1NPT	X	JPI 1B300RF
F	JIS10K15ARF	Y	JPI 1B600RF
G	JIS10K40ARF	Z	Plain type

④ Range °C

1	0~50, 60, 80, 100, 120, 150
2	0~200, 250, 300
3	0~400, 500 (Gas filled)
4	0~600 (Gas filled)
5	-10~50, -30~50, -50~50
6	-70~50, -70~100, -20~100
8	-100~100 (Remote type only) (Gas filled)
9	-200~50 (Remote type only) (Gas filled)

Please specify the temperature range and units separately besides selection of range code.

⑤ Bulb material

1	SUS304
2	SUS316
X	With thermowell

⑥ Bulb DIA.

1	d=φ 8
2	d=φ 10
3	d=φ 12
4	d=φ 13
5	d=φ 16 Slide type not available
X	With thermowell

⑦ Bulb length

A	Minimum dimension ~ 500mm
	Other specified (/100mm)
X	With thermowell

⑧ Compensation

1	Bimetal compensation
2	Lead compensation (<input type="checkbox"/> 168 only)

⑨ Lead type

2	Armored tube B (SUS430) <Standard>
B	Armored tube B (SUS304)
E	Armored tube B (SUS316)

⑩ Lead length

	Bimetal	Lead
A	ア	Up to 3m
B	イ	Up to 4m
C	ウ	Up to 5m
D	エ	Up to 6m
E	オ	Up to 7m
F	カ	Up to 8m
G	キ	Up to 9m
H	ク	Up to 10m
9	9	Other specified (/m)

⑫ Glass

0	Standard (Inorganic glass)
2	Tempered glass *1

⑬ Kind of thermowell

0	Nil
1	Welded type
4	Drilled type straight
7	Drilled type taper
8	Welded flange

⑭ Thermowell inside screws

0	For slide type General products: Not available
1	W22 thread 14
2	Rc1/2
3	1/2NPT
4	G1/2
5	Rc3/4
6	3/4NPT
7	G3/4

General products: Not available

⑮ Documents

0	Nil
1	Required (Please specify the desired documents separately.) Submission drawings, instruction manual, inspection procedure, mill sheet, test report (1 pc 1 copy), traceability / inspection certificate, strength calculation, attended inspection

* 1 TL92, TL93 (168) is not available.

【Manufacturing range】

- Slide type is not available when the following conditions are true.
- ① Bulb: ϕ 16
- ② When the maximum temperature of temperature range exceeds 400°C.

* When ordering, please specify the bulb length and lead length.

* The thermowell model composition is SW ⑬ ⑭.

* For with thermowell, please refer to P 16 ~ thermowell manufacturing specifications and specify the SW model also.

* Specify "X" if there is no specification item.

Duplex Thermometers

〈Remote type〉

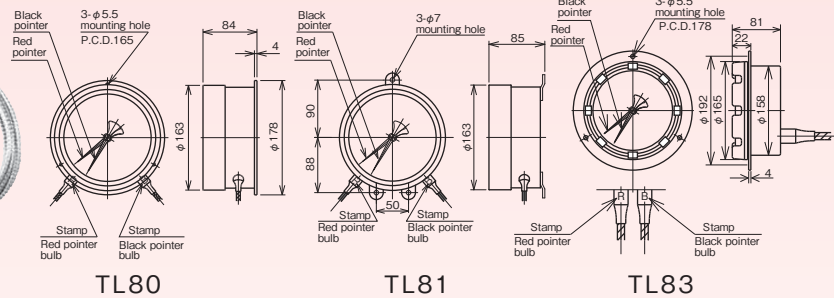
TL80·81·83

Liquid filled dial thermometer



TL80

Dimensions



TL80

TL81

TL83

Model	Panel cut dimension
TL83	φ160±1

Model	Dial size	Mounting
TL80	150	Surface mounting (BN type)
TL81		Surface mounting (EN type)
TL83		Panel mounting type (D1N type)

Duplex thermometers are thermometers which indicate the temperature of two points on the same scale. This is effective when you want to compare the temperature of two points and when there is not enough space to mount two thermometers.

Specifications

Item		Description
Manufacturing range		-70~300°C
Case		TL80·81 Construction: Spray-proof / equivalent to IP33, Material: ADC12, Finish: Black TL83 Construction: Spray-proof / equivalent to IP33, Material: AC7A, Finish: Black
Wetted parts material		Bulb: SUS304, Connection / Flange: SUS304
Accuracy	Indication error	Within ±2% F.S. at room temperature (20°C)
	Ambient temperature	Within ±2 %F.S./15°C
Compensation		Bimetal compensation
Max. lead length		TL80·81·83 : 5m
Connection		R $\frac{1}{2}$, R $\frac{3}{4}$, $\frac{1}{2}$ NPT, G $\frac{1}{2}$ B, G $\frac{3}{4}$ B $\frac{1}{2}$ is not available with φ16 bulb and φ19, φ23 thermowell.
Flange		JIS10K20ARF, JIS10K25ARF, ANSI1B150RF, ANSI1B300RF
Connection	Without thermowell	Union type, Slide type
	With thermowell	Double socket union type: R $\frac{1}{2}$, $\frac{1}{2}$ NPT (Connection) Double socket slide type: R $\frac{1}{2}$, $\frac{1}{2}$ NPT (Connection)

Slide type is not available with φ16 bulb.
When the maximum temperature of temperature range exceeds 400°C, slide type is not available.

Range / Bulb DIA. / Bulb length / Lead length

Range °C	Minimum graduation °C	Bulb minimum insertion length mm						Bulb maximum length mm
		Bimetal compensation						
		Bulb outer diameter					Lead length	
φ8	φ10	φ12	φ13	φ16	500			
-70 ~ 50	2	50	45	40		40	50	~ 5m
-70 ~ 100	5	40	40	40		40	40	~ 5m
-50 ~ 50	2	55	45	40		40	55	~ 5m
-30 ~ 50	2	65	55	45		40	40	~ 5m
-20 ~ 100	2	50	45	40		40	50	~ 5m
-10 ~ 50	1	70	60	50		45	40	~ 5m
0 ~ 50	1	70	60	50		45	40	~ 5m
~ 60	1	65	55	45		40	40	~ 5m
~ 80	2	65	55	45		40	40	~ 5m
~ 100	2	55	45	40		40	55	~ 5m
~ 120	2	50	45	40		40	50	~ 5m
~ 150	2	40	40	40	40	40	~ 5m	
~ 200	5	40	40	40	40	40	~ 5m	
~ 250	5	40	40	40	40	40	~ 5m	
~ 300	5	40	40	40	40	40	~ 5m	

- The above lengths are the minimum necessary of the bulb to be inserted into the fluid to be measured.
- Bulb length should be over the above length and specified in 5mm steps.

The above minimum insertion length is the length without thermowell.
With thermowell, 25mm is added to the above length.
The minimum length of the plain type bulb is the minimum length of the above table plus 40mm.

TL80·81·83

Indicating Thermometers

Model number configuration

Please specify the model number, each specs and the range for ordering.

Model

TL8 — **1** ×

Duplex thermometer

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮

Model number		Selective spec.									Additional spec. (Option)					
Type Size	0	Surface mounting (BN type), φ 150														
	1	Surface mounting (EN type), φ 150														
	3	Panel mounting, φ 150														

① Thermowell inside screws For with thermowell, please specify the thermowell type on a separate page	0	Without thermowell																
	1	With thermowell									Welded type		Drilled type		Welded type			
													Straight		Taper		Flange	
		Inside screws: Standard (W22 thread 14)									SW11 (SW10)		SW41 (SW40)		SW71 (SW70)		SW81	
		Inside screws: Rc1/2 double socket									SW12		SW42		SW72		SW82	
		Inside screws: 1/2NPT double socket									SW13		SW43		SW73		—	
Inside screws: G1/2 double socket									SW14		SW44		SW74		—			
Inside screws: Rc3/4 double socket									SW15		SW45		SW75		—			

② Connecting part	0	Union type												
	1	Slide type (Not available for φ 16 bulb, and when the maximum temperature of temperature range exceeds 400°C.)												
	4	Plain type (Remote type only)												

③ Connecting screws	0	R1/2	H	JIS10K50ARF
	1	R3/4	J	JIS20K20ARF
	2	1/2NPT	K	JIS20K25ARF
	3	G1/2B	L	JIS10K15AFF
	4	G3/4B	M	JIS10K20AFF
	5	JIS10K20ARF	N	JIS10K25AFF
	6	JIS10K25ARF	P	ANSI3/4B150RF
	7	ANSI1B150RF	Q	ANSI3/4B300RF
	8	ANSI1B300RF	R	ANSI1B600RF
	A	Fixing screws (W22 thread 14)	S	ANSI 1 1/2B150RF
	B	R3/8	T	ANSI 1 1/2B300RF
	C	R1	U	ANSI 1 1/2B600RF
	D	3/4NPT	W	JPI 1B150RF
	E	1NPT	X	JPI 1B300RF
	F	JIS10K15ARF	Y	JPI 1B600RF
G	JIS10K40ARF	Z	Plain type	

④ Range °C	1	0~50, 60, 80, 100, 120, 150		
	2	0~200, 250, 300		
	5	-10~50, -30~50, -50~50		
	6	-70~50, -70~100, -20~100		

Please specify the temperature range and units separately besides selection of range code.

⑤ Bulb material	1	SUS304		
	2	SUS316		
	X	With thermowell		

⑥ Bulb DIA.	1	d=φ 8		
	2	d=φ 10		
	3	d=φ 12		
	4	d=φ 13		
	5	d=φ 16 Slide type not available		
	X	With thermowell		

⑦ Bulb length	A	Minimum dimension ~ 500mm		
	X	Other specified (/100mm)		
	X	With thermowell		

⑧ Compensation	1	Bimetal compensation		
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⑨ Lead type	2	Armored tube B (SUS430) 〈Standard〉		
	B	Armored tube B (SUS304)		
	E	Armored tube B (SUS316)		

⑩ Lead length	A	Up to 3m		
	B	Up to 4m		
	C	Up to 5m		

⑫ Glass	0	Standard (Inorganic glass)		
	2	Tempered glass		

⑬ Kind of thermowell	1	Welded type		
	4	Drilled type straight		
	7	Drilled type taper		
	8	Welded flange		

⑭ Thermowell inside screws	0	For slide type General products: Not available		
	1	W22 thread 14		
	2	Rc1/2		
	3	1/2NPT		
	4	G1/2		
	5	Rc3/4		
	6	3/4NPT		
7	G3/4			

General products: Not available

⑮ Documents	0	Nil		
	1	Required (Please specify the desired documents separately.) Submission drawings, instruction manual, inspection procedure, mill sheet, test report (1 pc 1 copy), traceability / inspection certificate, strength calculation, attended inspection		

* When ordering, please specify the bulb length and lead length.
 * The thermowell model composition is SW ⑬ ⑭.
 * For with thermowell, please refer to P 16 ~ thermowell manufacturing specifications and specify the SW model also.

* Specify "X" if there is no specification item.

For Temperature Gauges

SW Thermo-well

When measuring temperature object flows, and the speed is fast, and the pressure is high, the same as general temperature indication indicator, thermo-well (well) is necessary to temperature sensor department of temperature gauge. And, in general application, it uses protecting tube to be easy maintenance.

As a condition of protecting tube

- 1) Standing temperature, the pressure that is going to be measured (it contains a flow) fully.
- 2) Not raising corrosion, other chemical reaction by measuring temperature object.
- 3) With Leakage.
- 4) It isn't damaged even if receives sudden temperature change.
- 5) It stands meachanical power such as vibration, a shock enough.
- 6) Thermo-well oneseft doesn't occur gas harmful to temperature sensor.
- 7) It informs measuring temperature department of temperature change quickly.

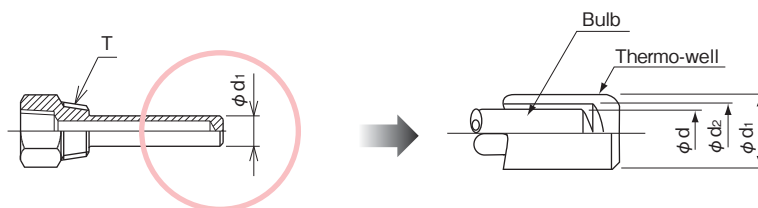
Thermo-well has digging type and welding type, and welding type is standard. And thermo-well a screw type and flange type by installation system.

Specifications

■Relation of thermo-well DIA. and bulb DIA., and manufacturing range of screws and flange

Outer DIA. (d_1)	Type	Inner DIA. (d_2)	Bulb outer DIA. (d)	Screw (T)			Flange
				$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	JIS, ANSI, JPI
$\phi 12$	Drilled type	$\phi 8.5$	$\phi 8$	○	○	○	○
	Welded type			—	○	○	○
$\phi 15$	Drilled type	$\phi 10.5$	$\phi 10$	—	○	○	○
	Welded type	$\phi 11$		—	○	○	○
$\phi 19$	Drilled type	$\phi 13.5$	$\phi 13$	—	—	○	○
	Welded type			—	—	○	○
$\phi 23$	Drilled type	$\phi 16.5$	$\phi 16$	—	—	○	○
$\phi 19/\phi 23$ (Taper)	Drilled type	$\phi 13.5$	$\phi 13$	—	—	○	○

Inside screws (Connecting screws with thermometer): W22 thread 14 or Rc $\frac{1}{2}$



■Thermo-well material

SUS304, SUS316, SUS316L, Titanium, Hastelloy-B[®], and Monel-metal[®] are available.

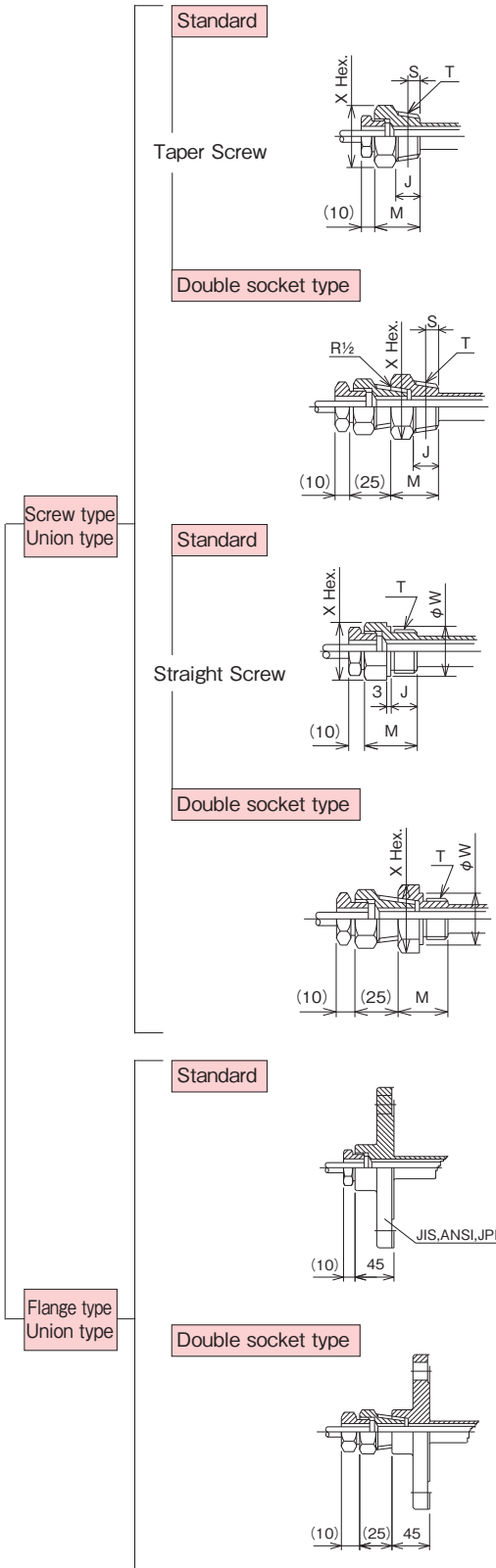
Teflon[®] or Glass etc. coating is available.

Coated thermo-well is available with flange type only.

Specifications

■ Connection parts and dimensions

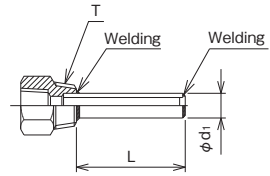
■ Thermo-well type and size



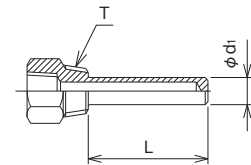
(mm)

T	J	S	W	X	M
R $\frac{1}{2}$	18	8	—	27×31.2	43
R $\frac{3}{4}$	20	9.5	—	30×34.6	45
G $\frac{1}{2}$ B	18	—	32	32×37	43
G $\frac{3}{4}$ B	20	—	36	36×41.6	45

Welding type Weld the pipe as shown below.

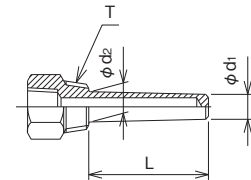


Drilled type (Straight)

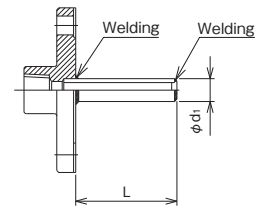


Screw type

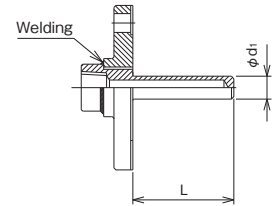
Drilled type (Taper)



Welding type Weld the pipe as shown below.

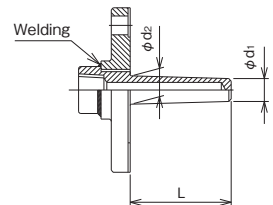


Drilled type (Straight)



Flange type

Drilled type (Taper)



Welded type

Model number configuration

Please specify the model number and each specs for ordering.

Model

S W 1 — [] [] [] — [] [] [X] [X] [X] [X] [X] [X] [X] [X] [X] [X]

Welded type thermo-well ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮

Model number		Selective spec.		Additional spec. (Option)		
Model	0	Welding type straight	For slide type W16 thread 18 (Bulb: φ8), W20 thread 16 (Bulb: φ10), W22 thread 14 (Bulb: φ13)			
	1	Welding type straight	Inside screws W22 thread 14			
	2	Welding type straight	Inside screws Rc1/2			
	3	Welding type straight	Inside screws 1/2NPT			
	4	Welding type straight	Inside screws G1/2			
	5	Welding type straight	Inside screws Rc3/4			
	6	Welding type straight	Inside screws 3/4NPT			
	7	Welding type straight	Inside screws G3/4			
①② Connection	00	R1/2	06	JIS10K25ARF	0M	JIS10K20AFF
	01	R3/4	07	ANSI 1B150RF	0N	JIS10K25AFF
	02	1/2NPT	08	ANSI 1B300RF	0P	ANSI 3/4 150RF
	03	G1/2B	0F	JIS10K15ARF	0Q	ANSI 3/4 300RF
	04	G3/4B	0G	JIS10K40ARF	0S	ANSI 1 1/2 150RF
	0C	R1	0H	JIS10K50ARF	0T	ANSI 1 1/2 300RF
	0D	3/4NPT	0J	JIS20K20ARF	0W	JPI 1 150RF
	0E	1NPT	0K	JIS20K25ARF	0X	JPI 1 300RF
	05	JIS10K20ARF	0L	JIS10K15AFF		
	③ Material	1	SUS304			
2		SUS316				
④ Outer DIA.	1	Outer DIA. φ12 (Bulb inner DIA. for φ8)				
	2	Outer DIA. φ15 (Bulb inner DIA. for φ10)				
	3	Outer DIA. φ19 (Bulb inner DIA. for φ13)				
⑤ L length (mm)	SUS304		SUS316			
	0	A	~ 100			
	1	B	101~ 200			
	2	C	201~ 300			
	3	D	301~ 400			
	4	E	401~ 500			
	5	F	501~ 600			
	6	G	601~ 700			
	7	H	701~ 800			
	8	J	801~ 900			
9	K	901~1000				
		1001~ (/100mm)				
⑮ Documents	0	Nil				
	1	Required (Please specify the desired documents separately.) Submission drawings, mill sheet				

Please specify thermo-well length. →

• No oil & no water treatment are available.

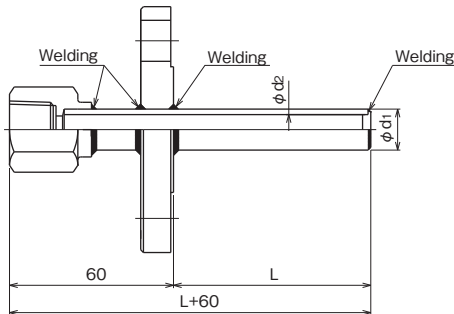
*Specify "X" if there is no specification item.

Welded type, flange general-purpose type

Flange general-purpose type specifications

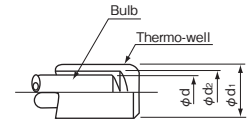
Types and dimensions

Please weld the pipe and flange the following figure.



Relation of thermo-well DIA. and bulb DIA., manufacturing range flange

Outer DIA. (d ₁)	Type	Inner DIA. (d ₂)	Bulb outer DIA. (d)	Flange
				JIS, ANSI, JPI
φ12	Welded type	φ8.5	φ8	○
φ15		φ11	φ10	○
φ19		φ13.5	φ13	○



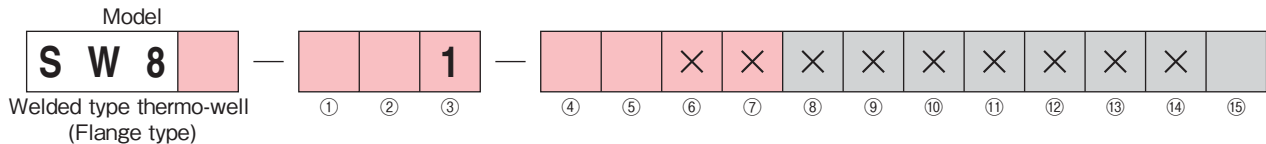
Inside screws (Connecting screws with thermometer): W22 thread 14 or Rc½

Thermo-well material

SUS304

Model number configuration

Please specify the model number and each specs for ordering.



Model number		Selective spec.		Additional spec. (Option)	
Model	1	Welding type straight	Inside screws	W22 thread 14	
	2	Welding type straight	Inside screws	Rc1/2	
①② Connection	05	JIS10K20ARF		OL	JIS10K15AFF
	06	JIS10K25ARF		OM	JIS10K20AFF
	07	ANSI 1B150RF		ON	JIS10K25AFF
	08	ANSI 1B300RF		OP	ANSI 3/4 150RF
	0F	JIS10K15ARF		OQ	ANSI 3/4 300RF
	0G	JIS10K40ARF		OS	ANSI 1 1/2 150RF
	0H	JIS10K50ARF		OT	ANSI 1 1/2 300RF
	0J	JIS20K20ARF		OW	JPI 1 150RF
	0K	JIS20K25ARF		OX	JPI 1 300RF
	③ Material	1	SUS304		
④ Outer DIA.	1	Outer DIA. φ12 (Bulb inner DIA. for φ8)			
	2	Outer DIA. φ15 (Bulb inner DIA. for φ10)			
	3	Outer DIA. φ19 (Bulb inner DIA. for φ13)			
⑤ L length (mm)	0	~ 100			
	1	101~ 200			
	2	201~ 300			
	3	301~ 400			
	4	401~ 500			
	5	501~ 600			
	6	601~ 700			
	7	701~ 800			
	8	801~ 900			
	9	901~1000			
		1001~ (/100mm)			
⑮ Documents	0	Nil			
	1	Required (Please specify the desired documents separately.) Submission drawings, mill sheet			

Please specify thermo-well length. →

• No oil & no water treatment are available.

*Specify "X" if there is no specification item.