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# J5S

## Universal Type Bimetal Thermometer

### Working principle

Bimetal thermometers are based on the principle of solid thermal expansion, usually the two metal sheets with relatively large difference in expansion coefficient are welded together to form a bimetal temperature sensing element.

When the temperature changes, due to the relatively large difference in the linear expansion coefficient of the two different materials of the bimetal sheet, different expansion and contraction occur, resulting in bending deformation of the bimetal sheet.

According to the different amount of deformation and produce different momentum, the amount of rotation drives the connected shaft, the shaft drives the other end of the indicator needle, so that the indicator pointer can be pointed to the correct reading, indicating the temperature.

### Product description

The J5S bimetallic thermometer is the entry-level product for process thermometers. Its target market is the air conditioning and machinery manufacturing industries.

Type J5S bimetallic thermometers are manufactured in accordance with EN 13190 in stainless steel housing, accuracy class 1 and nominal size greater than 60mm.

The J5S bimetal thermometer probe and its variety of nominal sizes make it widely used in different fields.

### Product application

Universal temperature measuring instrument for gases, liquids and high viscosity process media in harsh operating environments

Refrigeration industry  
Machine building

### Functional characteristics

Application range: -70... +600°C  
extreme ambient temperature

Bayonet case for easy maintenance

All stainless steel construction

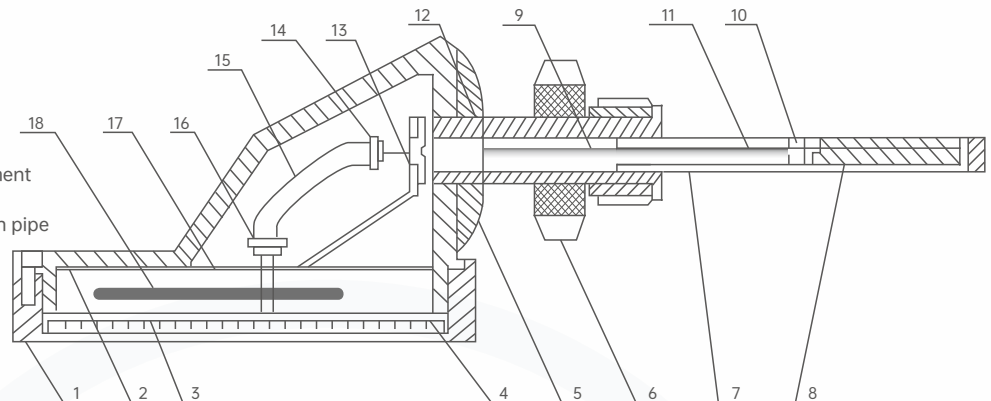
Length of single probe rod: 63... 1,000mm

Dial diameter: 100mm, 160mm



## Bimetallic thermometer Structure chart

1. Watch cover
2. shell
3. glass
4. Sealing ring
5. nut
6. Male joint
7. Outer protective tube
8. Bimetallic temperature sensing element
9. Driving shaft
10. Lower connection of inner protection pipe
11. Inner protective tube
12. External protection pipe fitting
13. support
14. Angle spring lower fastener
15. Angle spring
16. Angle spring upper fastener
17. Panel
18. pointer



## Technical parameter

Measuring element	bimetal
Nominal size (mm)	100 and 160
Joint design	5 standard (External thread connection)
	1 Smooth rod (without thread)
	2 External thread nuts
	3 Coupling nut
	4 Movable sleeve (can slide on the probe)
	5 Attach the nut and loosen the threaded joint
Accuracy class	Level 1, in accordance with EN13190
Shell, bayonet ring	1.4301 (304) stainless steel
Scope of work	Standard value (1 year): Measuring range (EN 13190 standard)
	Short time (up to 24 hours): scale range (EN 13190 standard)
Dial plate	Aluminum, white, black print
Watch window	Meter glass: polycarbonate window
Pointer	Aluminum, black, adjustable needle
Zero adjustment	On the back of the housing, external zeroing device, adjustable probe and dial type only (optional)
Probe rod, process connection	1.4571 (316Ti) stainless steel
Insert length L1	63... 1000 mm
	The minimum/maximum length depends on the measuring range and diameter
Storage and transport temperature limits	- Fifty... +70 °C
Allowable ambient temperature	- Fifty... +70 °C (with/without filling solution)
Allowable working pressure of the probe rod	Max. 2.5 MPa (static pressure)
Class of protection	IP65, according to IEC/EN 60529 standard

## Options

Scale unit	° F and ° C / ° F (dual scale)
Damping liquid temperature	Max. 250 ° C (on the sensor)
Watch window material	Laminated safety glass, transparent anti-cracking plastic
Rod diameter	6, 10 and 12mm
Allowable ambient temperature	- Fifty... + 70 °C
	- Seventy... + 60 °C
Case protection class	IP66
	IP67
Other options	Thermometer with switch contact
	Special measuring ranges or dial contents are available according to customer specifications (on request)
	Models that comply with ATEX standards

Scale range, measuring range <sup>1)</sup>, Error limit (EN 13190)

1) The limit value of the measuring range is indicated by two triangular marks on the dial.  
Only within this range can the error limits specified in EN 13190 be guaranteed.

## Scale according to LUDWIG's standard

Scale range °C	range <sup>1)</sup> °C	Scale spacing °C
-70 ... +70	-50 ... +50	2
-70 ... +30	-60 ... +20	1
-50 ... +50	-40 ... +40	1
-50 ... +100	-30 ... +80	2
-50 ... +300	0 ... 250	5
-50 ... +500	0 ... 450	5
-40 ... +60	-30 ... +50	1
-40 ... +80	-20 ... +60	2
-40 ... +160	-20 ... +140	2
-30 ... +50	-20 ... +40	1
-30 ... +70	-20 ... +60	1
-20 ... +60	-10 ... +50	1
-20 ... +80	-10 ... +70	1
-20 ... +100	0 ... 80	2
-20 ... +120	0 ... 100	2
-20 ... +140	0 ... 120	2
-10 ... +50	0 ... 40	1
0 ... 60	10 ... 50	1
0 ... 80	10 ... 70	1
0 ... 100	10 ... 90	1
0 ... 120	10 ... 110	2
0 ... 150	20 ... 130	2
0 ... 160	20 ... 140	2
0 ... 200	20 ... 180	2



**Scale range, measuring range 1), Error limit (EN 13190)**

1) The limit value of the measuring range is indicated by two triangular marks on the dial. Only within this range can the error limits specified in EN 13190 be guaranteed.

**Scale according to LUDWIG's standard**

Scale range °C	Range <sup>1)</sup> °C	Scale spacing °C
0 ... 250	30 ... 220	2
0 ... 300	30 ... 270	5
0 ... 400	50 ... 350	5
0 ... 500	50 ... 450	5
0 ... 600	100 ... 500	5

Scale range °F	Range <sup>1)</sup> °F	Scale range °F
-80 ... +120	-40 ... +100	2
-80 ... +240	-50 ... +210	2
-20 ... +120	0 ... 100	2
0 ... 200	20 ... 180	2
0 ... 250	30 ... 220	2
30 ... 300	60 ... 270	5
30 ... 400	80 ... 350	5
50 ... 300	80 ... 270	5
50 ... 400	100 ... 350	5
100 ... 800	200 ... 700	5
200 ... 700	250 ... 650	5
200 ... 1.000	300 ... 900	5

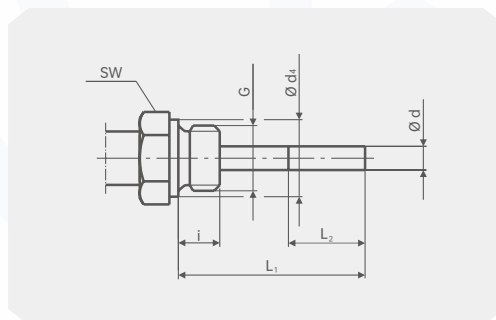
**Joint design**

**Standard design (external thread connection)**

Standard insertion length L1= 63, 100, 160, 200 and 250 mm

**Icon symbol:**

- G Male thread
- l Thread length
- Ø d4 Seal ring diameter
- SW Wrench width
- Ø d Rod diameter
- L2 Effective length



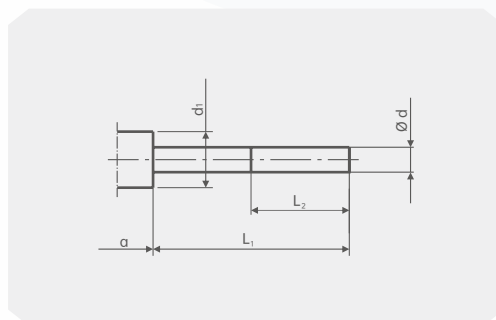
Nominal size	Process connection		Size (mm)		
	G	i	SW	Ø d <sub>4</sub>	Ø d
NS 100,160	G1/2B	14	27	26	8
	G3/4B	16	32	32	8
	1/2NPT	19	22	-	8
	3/4NPT	20	30	-	8

**Design 1, smooth rod (no thread)**

Standard insertion length L1=140, 200, 240 and 290 mm

**Icon symbol:**

- a Distance between housing and live joint
- Ø d1 aperture
- Ø d Rod diameter
- L2 Effective length



Nominal size	Size (mm)			
	d <sub>1</sub>	Ø d <sub>1</sub>	Axial mounting type	Adjustable probe and dial type
NS 100,160	18	8	15	25

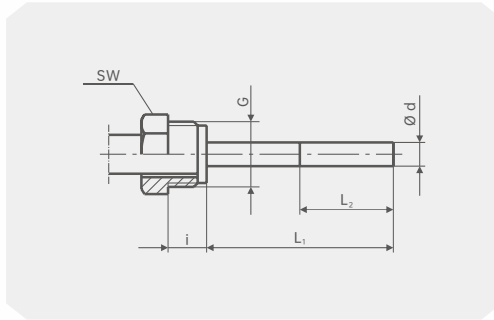


### Joint design

#### Design 2, nuts with external threads

Standard insertion lengths  $L_1=80, 140, 180$  and  $230\text{mm}$

Icon symbol:  
 G Male thread  
 I Thread length  
 SW Wrench width  
 $\varnothing d$  Rod diameter  
 $L_2$  Effective length

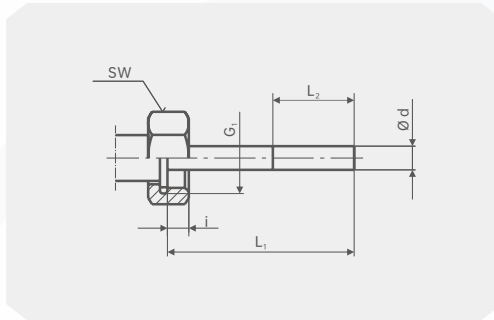


Nominal size	Process connection		Size (mm)	
	G	i	SW	$\varnothing d$
100,160	G1/2B	20	27	8

#### Design 3, coupling nut

Standard insertion length  $L_1=89, 126, 186, 226$  and  $276\text{mm}$

Icon symbol:  
 G Male thread  
 I Thread length  
 SW Wrench width  
 $\varnothing d$  Rod diameter  
 $L_2$  Effective length

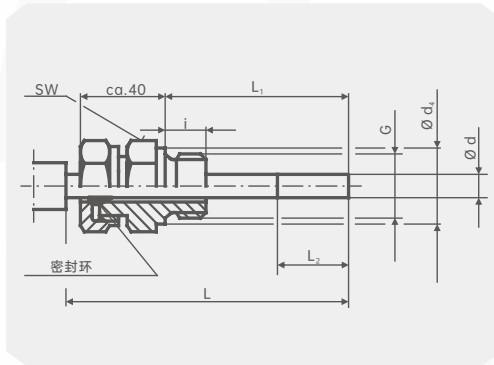


Nominal size	Process connection		Size (mm)	
	G	i	SW	$\varnothing d$
100,160	G1/2	8.5	27	8
	G3/4	10.5	32	8
	M24*1.5	13.5	32	8

#### Design 4, active card sleeve (Slide on the probe)

Standard insertion length  $L_1=89, 126, 186, 226$  and  $276\text{mm}$   
 Length  $L=L_1+40\text{mm}$

Icon symbol:  
 G Male thread  
 I Thread length  
 $\varnothing d_4$  Seal ring diameter  
 SW Wrench width  
 $\varnothing d$  Rod diameter  
 $L_2$  Effective length

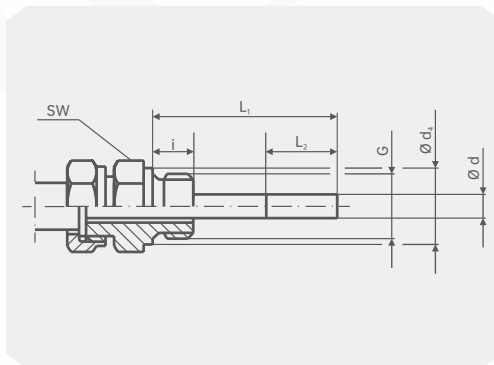


Nominal size	Process connection		Size (mm)		
	G	i	SW	$\varnothing d_4$	$\varnothing d$
100,160	G1/2B	14	27	26	8
	G3/4B	16	32	32	8
	M18x1.5	12	24	23	8
	1/2NPT	19	22	-	8
	3/4NPT	20	30	-	8

#### Design 5, loose nut and loosen threaded joint

The minimum insertion length ( $L_{\min}$ ) is  $60\text{mm}$   
 Insert length  $L_1 =$  adjustable  
 Length  $L=L_1 + 40\text{mm}$

Icon symbol:  
 G Male thread  
 I Thread length  
 $\varnothing d_4$  Seal ring diameter  
 SW Wrench width  
 $\varnothing d$  Rod diameter  
 $L_2$  Effective length



Nominal size	Process connection		Size (mm)		
	G	i	SW	$\varnothing d_4$	$\varnothing d$
100,160	G1/2B	14	27	26	8
	G3/4B	16	32	32	8
	M18x1.5	12	24	23	8
	1/2NPT	19	22	-	8
	3/4NPT	20	30	-	8

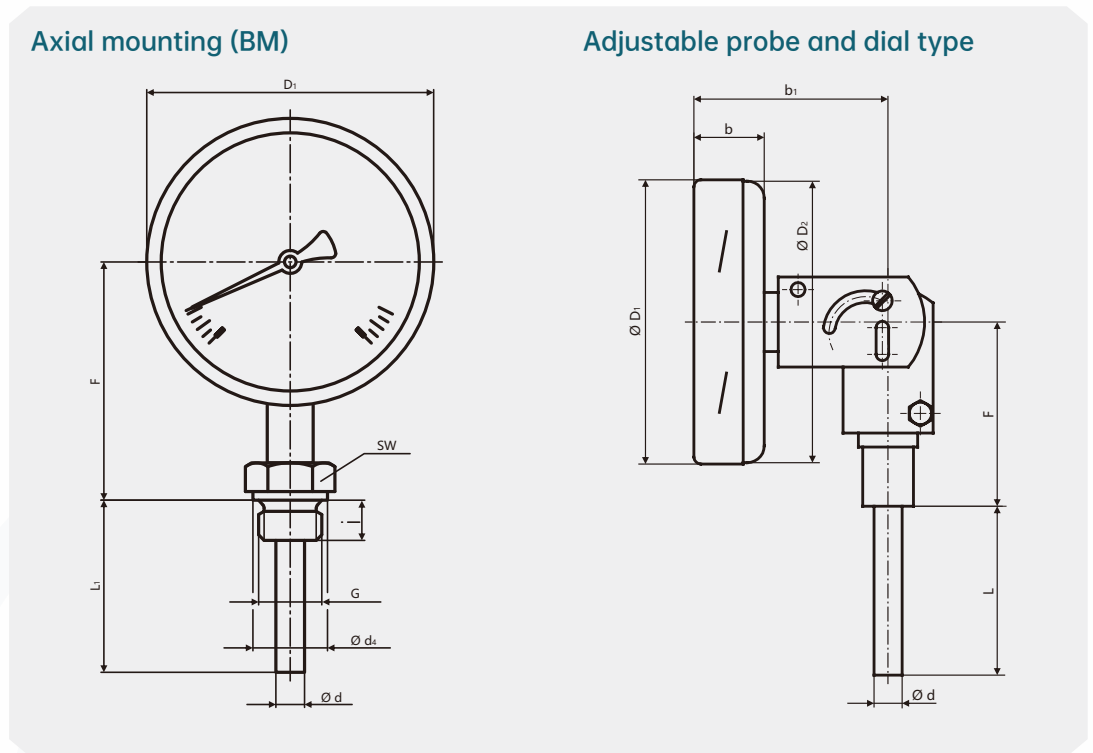
**Size (mm)**

**Axial mounting (BM)**

The dimensions are shown in Table 1

**Adjustable probe rod and variable disk type**

The dimensions are shown in Table 2



**Table 1**

NS	Size (mm)									weight kg
	b	b1	d <sup>2)</sup>	d4	ØD <sub>1</sub>	ØD <sub>2</sub>	F <sup>1)</sup>	G	SW	
100	50	83	8	26	101	99	83	G1/2B	27	0.8
160	50	83	8	26	161	159	113	G1/2B	27	1.1

**Table 2**

NS	Size (mm)						weight kg
	b	b1	d <sup>2)</sup>	ØD <sub>1</sub>	ØD <sub>2</sub>	F	
100	25	68	8	101	101	68	0.5
160	25	68	8	161	161	68	0.7

J5S-Selection composition

Selection example **J5S**



1.Installation form	<b>A</b>	Cardan type
	<b>B</b>	Radial type
	<b>T( )</b>	Other installation forms
2.Material	<b>S</b>	304SS
	<b>L</b>	316L
	<b>T( )</b>	Other materials
3.Dial diameter	<b>G</b>	100mm
	<b>H</b>	160mm
4.Precision	<b>J</b>	1.5%
	<b>K</b>	1.0%
5.Process connection	<b>N</b>	Fixed thread
	<b>O</b>	Sliding thread
6.Specification of threaded connection (Flange connection not optional)	<b>U</b>	G1/2 Male thread
	<b>V</b>	G1/4 Male thread
	<b>W</b>	1/2NPT Male thread
	<b>X</b>	1/4NPT Male thread
	<b>Y</b>	M14*1.5 Male thread
	<b>Z</b>	M20*1.5 Male thread
	<b>Q</b>	M27*1.5 Male thread
	<b>T( )</b>	Other thread specifications
6.1.Flange connection specification (Threaded connection not optional)	<b>A</b>	DN15
	<b>B</b>	DN20
	<b>C</b>	DN25
	<b>D</b>	DN32
	<b>E</b>	DN40
	<b>F</b>	DN50
	<b>T( )</b>	Other flange specifications
7.Rod diameter(mm)	<b>G</b>	6
	<b>H</b>	8
	<b>I</b>	10
	<b>J</b>	12
	<b>T( )</b>	Other probe diameters
8.Rod length (mm)	<b>N</b>	100
	<b>O</b>	150
	<b>P</b>	200
	<b>Q</b>	250
	<b>R</b>	300
	<b>S</b>	350
	<b>W</b>	400
	<b>U</b>	450
	<b>V</b>	500
	<b>T( )</b>	Other

**J5S-Selection composition**

Selection example **J5S**



9.Measuring range(°C)	<b>A</b>	-50~50
	<b>B</b>	-30~50
	<b>C</b>	-20~60
	<b>D</b>	0~50
	<b>E</b>	0~80
	<b>F</b>	0~100
	<b>G</b>	0~150
	<b>H</b>	0~200
	<b>I</b>	0~250
	<b>J</b>	0~300
	<b>K</b>	0~350
	<b>L</b>	0~400
	<b>M</b>	0~450
	<b>N</b>	0~500
<b>T( )</b>	Other temperature ranges	
10.Special requirements	<b>T( )</b>	Other

**Instructions:**

It means that J5S bimetal thermometer installation mode is radial, material 304 stainless steel, dial diameter 100mm, accuracy 1.5%, fixed thread connection, thread specification is G1/2 external thread, probe rod diameter 6mm, probe rod length 200mm, measuring range 0~400°C, the 10th item gray part is not required.

**Product certification**

Compliance and approval; Rodwig thermometers meet key standards and certifications for process measurement technology; Thus guaranteeing the highest reliability in such Settings;