

Bimetal Thermometer for Heavy Industry TBHI

- Fully made of stainless steel**
- Completely welded construction**
- Robust against vibrations**
- Case with bayonet ring**
- IP68 (according to EN 60529)**
- Every angle \varnothing 100 (4") and \varnothing 130 (5")**
- Adjustable directly from the front side**
- Temperature ranges from -70°C up to $+600^{\circ}\text{C}$
(-100°F up to $+1100^{\circ}\text{F}$)**
- Accuracy classes 1 and 2 (according to EN 13190)**
- Conform to EN 13190 Standard**
- Wide range of connections (fix and sliding)**
- Oil filling available as option**



Description

The TBHI is a robust stainless steel bimetal thermometer specially designed to be used in severe conditions, such as in heavy industry: chemical and petrochemical industries, marine and offshore applications, power generation. The TBHI is universally suitable in plant, machinery and tank construction but also in the general industry and process industries such as food processing.

The completely welded construction, the strong reinforced case with a sealed bayonet ring and the reinforced harness construction of the every angle version make the TBHI thermometer

suitable for the heavy industry and particularly robust against vibrations. The TBHI is conform to the international standards IEC 60068-2-6 and MIL STD 810E, Meth. 514.4.

The bayonet ring is sealed with a silicone dustproof and leak proof gasket (EPDM with oil filling option) making the TBHI conform to the IP68 protection class as defined by the EN 60529 Standard. At the same time the bayonet ring makes possible to open the case in order to adjust the pointer if necessary.

Selection chart TBHI

Ordering code digit: Positions	1	2	3	4	5	6	7	8	9	10	11	12
Nominal size												
NS 100	1	0	0									
NS 130	1	3	0									
Case and ring												
Stainless steel 1.4301 (AISI 304)				2								
Connection												
Without connection (direct mounting)					1							
With sliding connection:												
Sliding screw connection M20x1.5, male					2							
Sliding screw connection M24x1.5, male					3							
Sliding screw connection G1/2", male					5							
Sliding screw connection 1/2"-14 NPT, male					6							
Sliding screw connection G3/4", male					7							
Sliding screw connection G1", male					8							
Sliding screw connection G1/2" female					9							
Sliding screw connection G3/4" female					A							
Sliding screw connection G1" female					B							
With fix connection:												
Fix screw connection G1/2", male					C							
Fix screw connection G3/4", male					D							
Fix screw connection G1", male					E							
Fix screw connection M20x1.5, male					S							
Fix screw connection M24x1.5, male					T							
Fix screw connection 1/2"-14 NPT, male					Q							
Specific connection (additional code needed, see below)					0							
Immersion tube outlet												
Center back, every angle						4						
Indicator												
Standard							1					
Immersion tube / diameter / material												
Ø 6 mm, stainless steel 1.4571 (AISI 316Ti)								4				
Ø 8 mm, stainless steel 1.4571 (AISI 316Ti)								6				
Immersion tube / installed length l1												
60 mm ¹⁾									1			
100 mm									2			
160 mm									4			
250 mm									6			
400 mm									7			
600 mm									8			
1000 mm (max. available length)									9			
Customer specific length (see option /9003/) ¹⁾									0			
Temperature range												
From -70°C up to +600°C (-100°F up to +1100°F)												See table Temperature range

1) Tube < 100 mm: only for immersion tube Ø 8 mm and only for temperature 250°C (480°F) and below. The case must not be heated over 110°C (230°F).

Additional ordering codes

The following ordering codes have to be completed with an additional code to be precisely defined:

Connection Code 0 (Ordering code position 5) – Specific connection

The following additional codes are available. Others on request:

Connections	Sliding	Fix
G1/4" male	/ 9550	/ 9551
1/4"-18 NPT male	/ 9560	/ 9561
3/4"-14 NPT male	/ 9562	/ 9563
1"-11.5 NPT male	/ 9564	/ 9565
M18x1.5 male	/ 9574	/ 9575
M27x2.0 male	/ 9576	/ 9577
M20x1.5 female	/ 9584	/ -
M24x1.5 female	/ 9586	/ -

Example: TBHI 130 204.166.23T /9562

Options

Case, ring and brackets in 1.4571 (AISI 316Ti)	/ 0105
Safety glass	/ 0751
Window made of macrolon® (polycarbonate)	/ 0753
Customer specific length	/ 9003 / nnnn; nnnn = length in mm
Oil filling (silicon oil) ¹⁰⁾	/ 9610
Red mark	/ 9700
Specific temperature range	/ 9704
Customer logo on dial	/ 9710
Specific technical data on dial	/ 9711

10) Only available with fluid temperature ranges between -30°C (-20°F) and +250°C (480°F).

Temperature ranges

Order No.	Range °C	Order No.	Range ¹¹⁾ °C	°F	Order No.	Range °F
52 T	-20 ... 40	51V	-30 ... 70	- 40 ... 160	68U ¹²⁾	-100 ... 120
54 T	-20 ... 60	68V ¹²⁾	-70 ... 50	-100 ... 100	09U ¹²⁾	- 50 ... 120
84 T	-20 ... 100	55V	-30 ... 170	0 ... 350	08U ¹²⁾	- 40 ... 160
55 T	-30 ... 170	11V	0 ... 60	30 ... 140	54U	0 ... 140
51 T	-30 ... 70	20V	0 ... 120	30 ... 250	02U	0 ... 200
68 T ¹²⁾	-70 ... 50	13V	0 ... 160	30 ... 320	03U	0 ... 250
11 T	0 ... 60	14V	0 ... 250	30 ... 500	04U	0 ... 300
27 T	0 ... 80	15V ¹²⁾	0 ... 400	30 ... 750	05U	0 ... 400
12 T	0 ... 100	16V ¹²⁾	0 ... 600	100 ... 1100	06U	0 ... 500
20 T	0 ... 120				11U	30 ... 140
13 T	0 ... 160				20U	30 ... 250
22 T	0 ... 200				13U	30 ... 320
14 T	0 ... 250				22U	30 ... 400
23 T ¹²⁾	0 ... 300				23U ¹²⁾	30 ... 580
15 T ¹²⁾	0 ... 400				15U ¹²⁾	30 ... 750
25 T ¹²⁾	0 ... 500				28U ¹²⁾	100 ... 800
16 T ¹²⁾	0 ... 600				29U ¹²⁾	200 ... 1000
30 T ¹²⁾	100 ... 500					

11) °C range outside / °F range inside
12) Oil filling option (/9610) not available

Technical data

Temperature ranges	-70°C...600°C / -100°F..1100°F Over temperature limit: up to 400°C (750°F): 35% above 400°C (750°F): max. instantaneous temperature 600°C (1100°F)
Accuracy	Accuracy class 1 up to 250°C (480°F) Accuracy class 2 above 250°C (480 °F) According to EN 13190
Case and ring	Standard: stainless steel 1.4301 (AISI 304). With option /0105: stainless steel 1.4571 (AISI 316 Ti), A4 according to ISO 3506. Gasket sealing of the bayonet ring with VMQ silicone. TBHI with oil filling are sealed with EPDM (see below under Oil filling).
Window	Standard glass. With option /0751: Safety glass (laminated glass). With option /0753: Macrolon® (polycarbonate)
Dial	White dial with black graduations, according to EN 13190
Pointer	Conform to EN 13190. Non reflective black, anodized aluminium. Adjustable directly from the front side by opening the case (bayonet ring) The pointer is stabilized with dampening grease
Harness assembly	Brackets: Standard: stainless steel 1.4301 (AISI 304). With option /0105: stainless steel 1.4571 (AISI 316 Ti) , A4 according to ISO 3506. Bellow: stainless steel 1.4404 (AISI 316L), A4 according to ISO 3506. Bolts and washers: stainless steel 1.4401 (AISI 316), A4 according to ISO 3506.
Connections	The fix and sliding connections are made of stainless steel 1.4435 (AISI 316L)
Immersion tube	Stainless steel 1.4571 (316 Ti). Available with diameter Ø 6 mm and Ø 8 mm Standard lengths from 60 mm up to max. 1000 mm. Customer specific length with the option /9003
Protection class	IP68 according to EN 60529
Vibrations	According to IEC 60068-2-6: 10–58 Hz: 0.15 mm amplitude 58–150 Hz: 2g According to MIL STD 810E, Meth. 514.4 10 Hz: 0.015 g2/Hz 40 Hz: 0.015 g2/Hz 500 Hz: 0.00015 g2/Hz
Oil filling (optional)	Silicon oil. Gasket sealing of the bayonet ring is made of EPDM. Only available with fluid temperature ranges between -30°C (-20°F) and +250°C (480°F)
Disposal of product and packing	According to national laws or by returning to the manufacturer

Application notes

Specified accuracy

The instruments operate within the specified accuracy only if the minimum immersion length l_2 is respected (see Drawing section). l_2 is depending on the immersion tube diameter and has to be adapted if the thermometer is mounted into a thermowell:

- Immersion tube diameter $\varnothing 6$ mm: l_2 has to be at least 65 mm (70 mm when mounted into a thermowell).
- Immersion tube diameter $\varnothing 8$ mm: l_2 has to be at least 50 mm (55 mm when mounted into a thermowell).

Thermowell

The use of a thermowell is recommended for static pressure above 10 bar, for high velocity applications, and for corrosive fluids.

The thermowell makes it possible to remove the thermometer without affecting the tightness of the system and without stopping the process (e.g. calibration check or change of the thermometer).

Case temperature

The case must not be heated above 110°C (230°F) by the heat given off. It would result in degraded measurement accuracy and could severely damage the thermometer. In order to avoid a too high case temperature, the position of the thermometer, the distance between the case and the assembly point (i.e. screw connection) should be considered before mounting a thermo-

meter on an equipment. If necessary an insulation between the case and the assembly point must be inserted.

Fluid temperature

TBHI bimetal thermometers should not be continuously exposed to fluid temperatures of more than 400°C (750°F). It could damage the bimetal sensing element.

When the TBHI is filled with silicon oil (option /9610) the max. allowed fluid temperature is 250°C (480°F) and the min. allowed fluid temperature is -30°C (-20°F).

Over temperature limit

- For temperature ranges up to 400°C (750°F): 35%
- Above, only intermittent uses are recommended.

Bayonet ring

Please refer to the instruction manual of the TBHI to properly mount the bayonet ring on the case. An incorrect mounted bayonet ring can deteriorate the TBHI.

Adjustment of the pointer

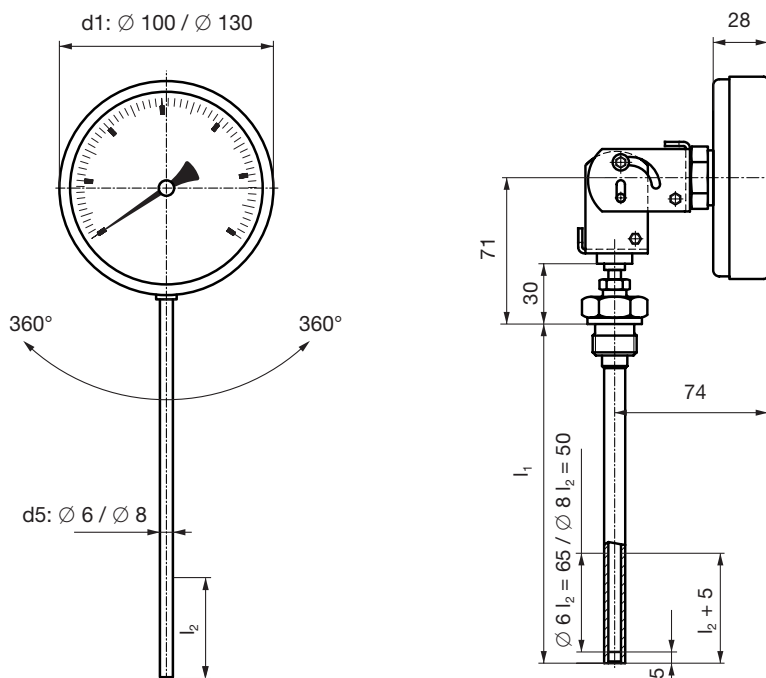
Please refer to the instruction manual of the TBHI to properly adjust the pointer. An incorrect adjustment can deteriorate the TBHI.

Every angle TBHI

Please refer to the instruction manual of the TBHI to properly mount the thermometer and to properly orient and tilt the thermometer case. An incorrect mounting, orienting and tilting of the TBHI can deteriorate the TBHI.

Drawings TBHI (dimensions in mm)

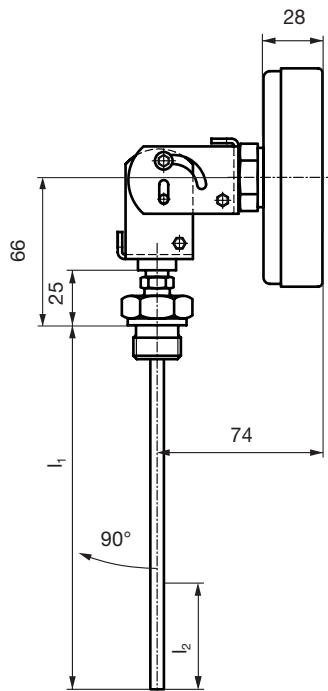
TBHI, center back – every angle, without connection



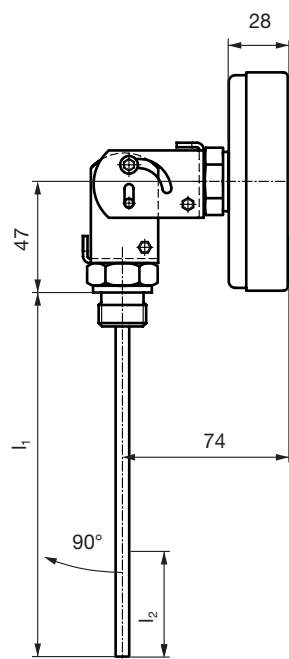
Mounted in a thermowell

Drawings TBHI (dimensions in mm)

TBHI, center back – every angle, with connection

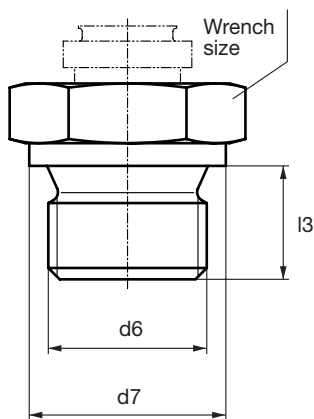


With sliding connection

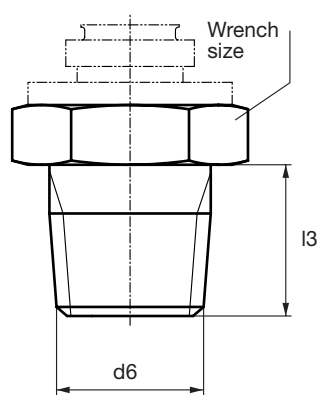


With fix connection

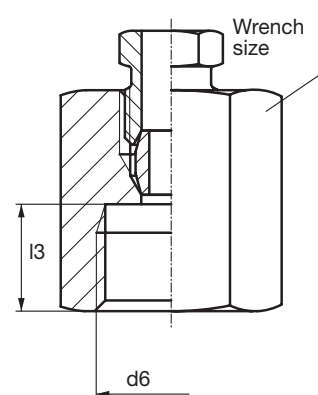
Drawings connections



Form 2 and Form 6 according to EN13190



Form 3 and Form 7 according to EN13190



Sliding screw connection female

Dimensions (in mm)

d6	d7	l3	Wrench size
G 1/2", male	26	15	27
G 3/4", male	32	16	32
G 1", male	39	19	41
M 20x1.5, male	27	14	27
1/2" - 14 NPT", male	-	20	27
G 1/2", female	-	15	27
G 3/4", female	-	16	32
G 1", female	-	19	41

Weight Chart

TBHI NS	Without immersion tube, without connection	Immersion tube. Weight in kg per 100 mm	
	Weight in kg	Ø 6 mm	Ø 8 mm
100	0,45	0,007	0,017
130	0,58	0,007	0,017

Connection	Sliding connection	Fix connection
	Weight in kg	Weight in kg
M20x1.5, male		0.09
M24x1.5, male		
1/2"-14 NPT, male	0.095	0.10
G1/2", male	0.095	0.09
G3/4", male	0.15	0.14
G1", male	0.21	0.24
G1/2", female	0.13	-
G3/4", female	0.165	-
G1", female	0.33	-

Accessories

Screw connections

See datasheets B51 T6.110 for immersion tubes Ø 6 mm and B51 T6.115 for immersion tubes Ø 8 mm.

Thermowells

See datasheets B51 T6.210 for immersion tubes Ø 6 mm and B51 T6.215 for immersion tubes Ø 8 mm.