Frode Pedersen temperature sensors

Thermocouple assembly UST 1

for exhaust gasses

Data sheet 1801

Application

- Measurement of exhaust temperature in ships- and stationary diesel engines
- The operating range is up to 800°C in gaseous media
- Fields of application
  - Diesel engines
  - Generators
  - Marine sector

Technical features

- Thermocouple type K acc. to IEC 584-1 (EN60584-1)
- Solid construction with high resistance against vibration acc. to IEC 68-2-6
- The thermocouple is electrical insulated from the protective tube
- Supplied with robust compensation cable resistance against moisture and heat
- Connected to the process by adjustable compression fittings

Ordering

Please select the requested sensor from the table below
The colour code means:

Standard: Built of standard modules (short delivery time)

Variant: Modified standard modules

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do our utmost to solve your specific measuring tasks

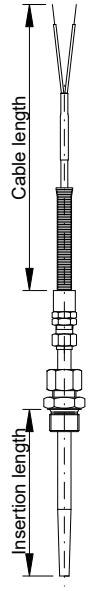


Fig. 1

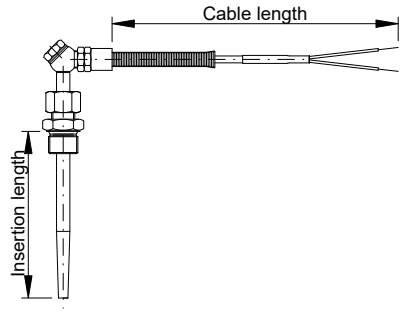


Fig. 2

Ordering information

Sensor

Specifications number 1801- | | | | | | | | | | |

Type

Straight Fig. 1 0
90°Angle Fig. 2 1

Protective tube

SS, acidproof steel, W.no. 1.4571 (AISI 316Ti)
Max. 800°C
Conus 12.5→ 8.5mm OD 0

Insertion length (mm)

100-150 adjustable 0

Process connection (see page 2)

None 0
1/2" BSP compression fittings 1
3/4" BSP compression fittings 2

Thermocouple

Model	Type
NiCr-Ni	K

Max. temperature

Continuously
800°C 0

Number of thermocouples

0 1

Tolerance acc. to IEC 584-1 (EN60584-1)

0 ..... Class 2, for J, K and N, i.e. ±2.5°C or 0.0075 x t_{actual} (°C) 1)

Note 1: The highest value applies

Cable type

0 ..... XSGLO 2x0.75mm^2 with silicone and steel braid insulation, 200°C

Cable length (meter)

0	2	2
0	4	4
x	6	6
x	x.x	Special (Min. 0.1m)

Accessories

Compensation cable: See datasheet 9150

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TECHNICAL DATA

All dimensions in mm

Dimensions

Fig. 1

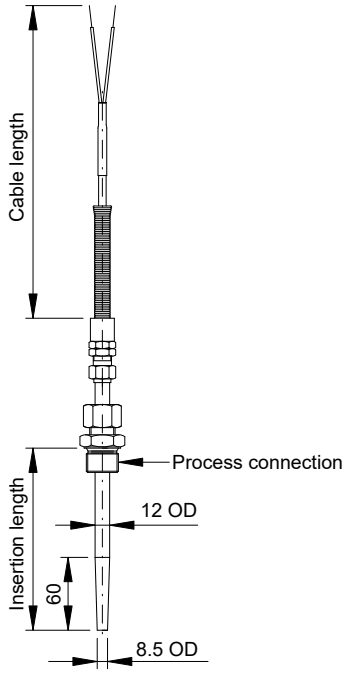
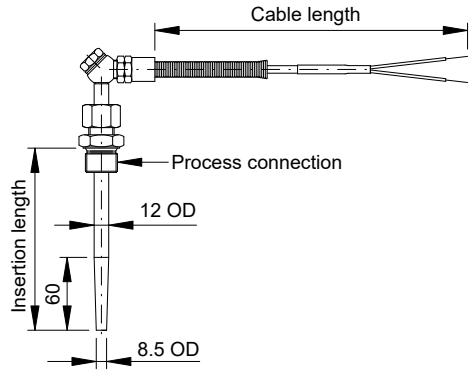


Fig. 2

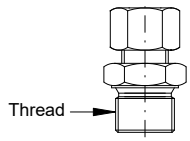


Compensating cable

XSGLO 2x0.75 mm^2 , insulated with silicone, glass fiber and outer steel braid

Process connection

Fig. 3



Compression fitting in SS steel with steel fixing ferrule	
Protective tube	Thread
12 OD	1/2" BSP
12 OD	3/4" BSP

Response time

Protective tube	Response time acc. to representative measurement	
	Temp. changed from 800°C to 20°C (immersed in water)	
	$t_{0.5}$	$t_{0.9}$
12 OD	15	45

Note:
The 0.5/0.9 time is the time that it takes the sensor to reach 50%/90% of the final value of a temperature change of a medium.
If media and velocity are different from the ones stated, the time can change significantly.

Connection diagram

XSGLO
1xK
Green + − White



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SS-FP-UST1 1801-UK. Version 202401

Frode Pedersen temperature sensors

Thermocouple assembly UST 2

for exhaust gasses, with interchangeable insert

Data sheet 1802

Application

- Measurement of exhaust temperature in ships- and stationary diesel engines
- The operating range is up to 800°C in gaseous media with high flow velocity
- Fields of application
  - Big ship engines
  - Generators

Technical features

- Thermocouple type K acc. to IEC 584-1 (EN60584-1)
- Solid construction with high resistance against vibration acc. to IEC 68-2-6
- Measuring insert is a mineral insulated type, and can be changed during operation
- Thermowell drilled from bar stock for optimum strength
- Supplied with robust compensation cable resistance against moisture and heat
- Connected to the process with a screwed attachment on the thermowell

Ordering

Please select the requested sensor from the table below
The colour code means:

Standard: Built of standard modules (short delivery time)

Variant: Modified standard modules

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Assembly UST 2

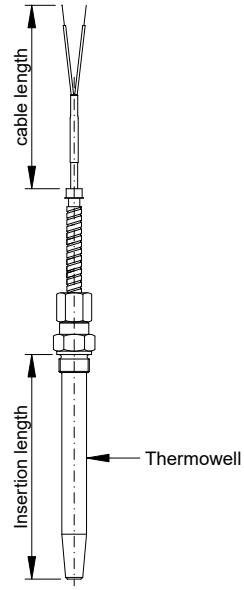


Fig. 1

Measuring insert

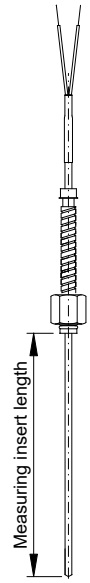


Fig. 2

Ordering information

Sensor

Specification number 1802- | | | | | | | | | | | | | |

Thermowell (drilled, bar stock)

Stainless, acidproof steel, 800°C
W.no. 1.4404 (AiSi 316L)

Fig. 1	Complete assembly	0
Fig. 2	Measuring insert	1

Insertion length (mm)

Thermowell

200	2 0 0

Measuring insert length (mm)

Insert length 1)

140	1 4 0
215	2 1 5
265	2 6 5
315	3 1 5

Note 1: Measuring insert length=insertion length for thermowell + 15mm
Used when fig. 2 is selected

Process connection (see page 2)

None (when fig. 2 is selected)	0
3/4" BSP	1

Cable length (meter)

0 2	2
0 4	4
0 6	6
x x.x	Special (Min. 0.1m)

Cable type

0	XSGLO 2x0.75mm^2 with silicone and steel braid insulation, 200°C

Tolerance acc to IEC 584-1 (EN60584-1)

0	Class 2, for type K, i.e. ±2.5°C or 0.0075 x t_{actual} (°C) 3)

Note 3: The highest value applies

Number of thermocouples

0	1

Measuring insert

Thermocouple	Type	Diam./type		
0 NiCr-Ni	K	6	MI	2)

Max. temperature

Continuously
800°C

Note 2: MI= Mineral insulated cable.

Accesseories

Compensation cable: See data sheet 9150

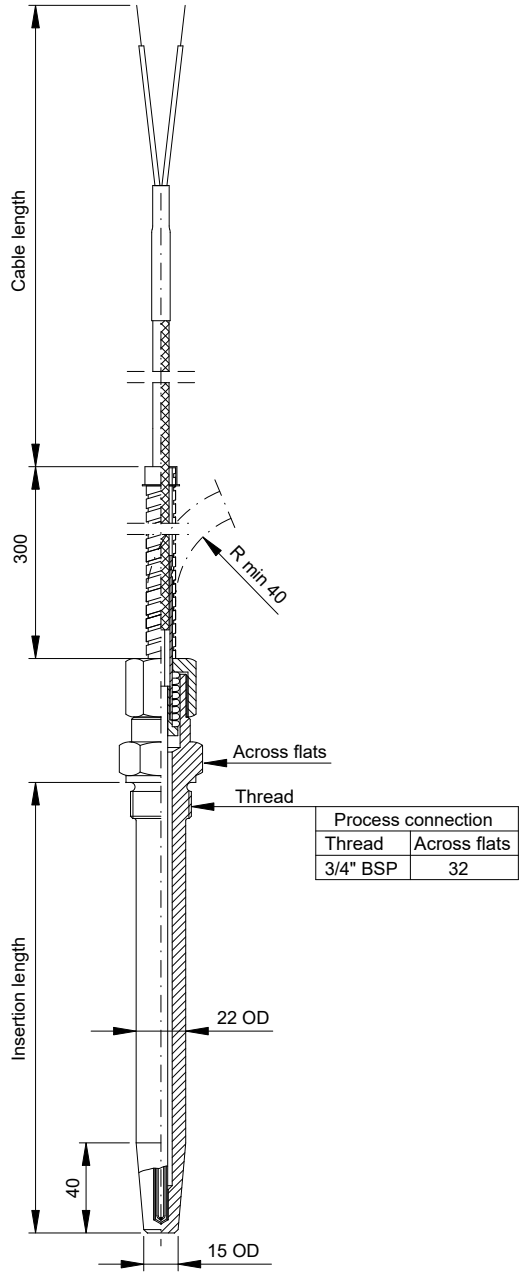
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TECHNICAL DATA

All dimensions in mm

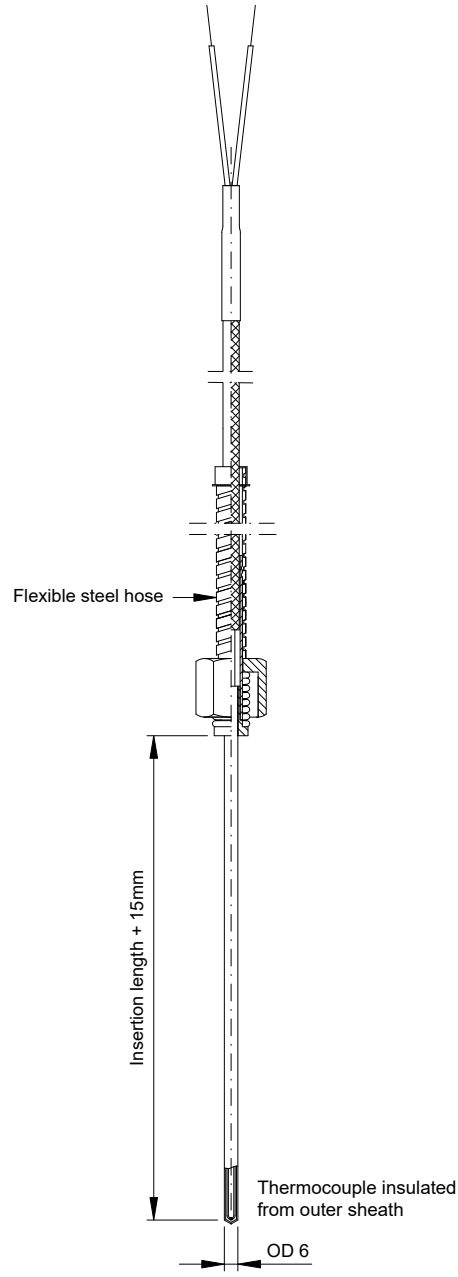
Dimensions

Complete UST 2 assembly



Process connection	
Thread	Across flats
3/4" BSP	32

Measuring insert



Compensating cable

XSGLO 2x0.75mm^2 with silicone and steel braid insulation, 200°C

Insulation resistance

Versus temperature

Test temperature °C	U Volt	Rmin M ohm
20±15	500	1000
500±15	500	5

Response time

Thermowell Diameter	Response time acc. to representative measurement	
	Temp. changed from 800°C to 20°C (immersed in water)	
	$t_{0.5}$	$t_{0.9}$
22 → 15	40	120

Note:
The 0.5/0.9 time is the time that it takes the sensor to reach 50%/90% of the final value of a temperature change of a medium.
If media and velocity are different from the ones stated, the time can change significantly.

Connection diagram

XSGLO
1xK
Green + | - White

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Frode Pedersen temperature sensors

Thermocouple assembly UST 3

for exhaust gasses, with interchangeable insert

Data sheet 1803

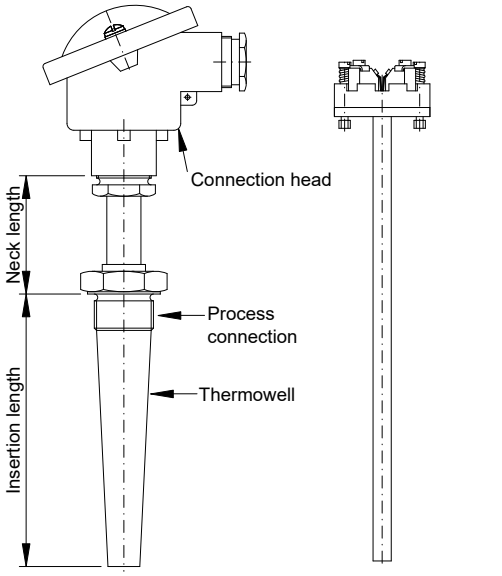
Application

- Measurement of exhaust temperature in ships- and stationary diesel engines
- The operating range is up to 800°C in gaseous media with high flow velocity
- Fields of application
  - Ship engines
  - Generators

Technical features

- Thermocouple type K acc. to IEC 584-1 (EN60584-1)
- Solid construction with high resistance against vibration acc. to IEC 68-2-6
- The measuring insert can be exchanged or calibrated without closing down the process
- Thermowell drilled from bar stock for optimum strength
- Connected to the process with a screwed attachment on the thermowell
- Can be supplied with head mounted transmitter as an option

Assembly **Measuring insert**



Ordering

Please select the requested sensor from the table below
The colour code means:

Standard: Built of standard modules (short delivery time)

Variant: Modified standard modules

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Ordering information **Sensor** **Transmitter**

Specifications number 1803- | | | | | | | | | | | | | | | | | **4mA: °C 20mA: °C** 3

Thermowell (drilled, bar stock)

Material: Stainless, acidproof steel
AiSi 316 L max. 800°C

Conus 24→ 14 mm OD 0
Conus 20→ 12.5 mm OD 1) 1

Note 1: Allways, when insertion lgth=350mm

Neck length (mm)

52 ..... 0 5 2
102 ..... 1 0 2

Insertion length (mm)

100 ..... 1 0 0
200 ..... 2 0 0
350 ..... 3 5 0

Process connection

3/4" BSP 0

Connection head

B: Degree of protection IP 54 0

Electrical connection

0 Terminalblock with screws
1 FPTU galvanic isolated. As terminal block
2 FPTU galvanic isolated. In high cap (B-head)
a FPTT galvanic isolated. As terminal block
b FPTT galvanic isolated. In high cap (B-head)

Note 3: Please specify measuring range

Tolerance acc to IEC 584-1 (EN60584-1)

0 .... Class 2 for K, i.e. ±2.5°C or 0.0075 x t_{actual} (°C) 2)
1 .... Class 1 for K, i.e. ±1.5°C or 0.0040 x t_{actual} (°C) 2)

Note 2: The highest value apply

Number of thermocouples

0 1

Measuring insert

Model	Thermocouple	Type
0 ..... TS85	NiCr-Ni	K

Max. temperature

Continuosly 800°C

Accesseories

Measuring insert: See data sheet 9108-01
Transmitter: See data sheet 9168

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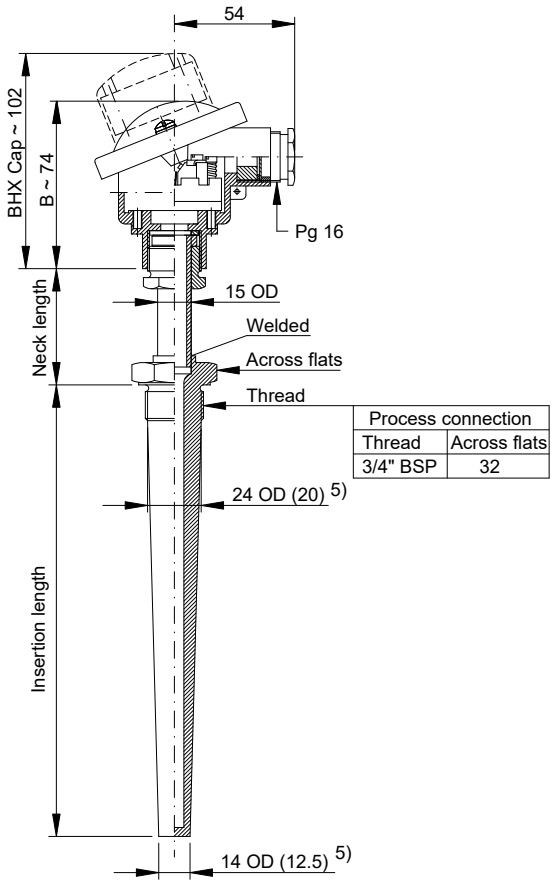
TECHNICAL DATA

All dimensions in mm

Dimensions

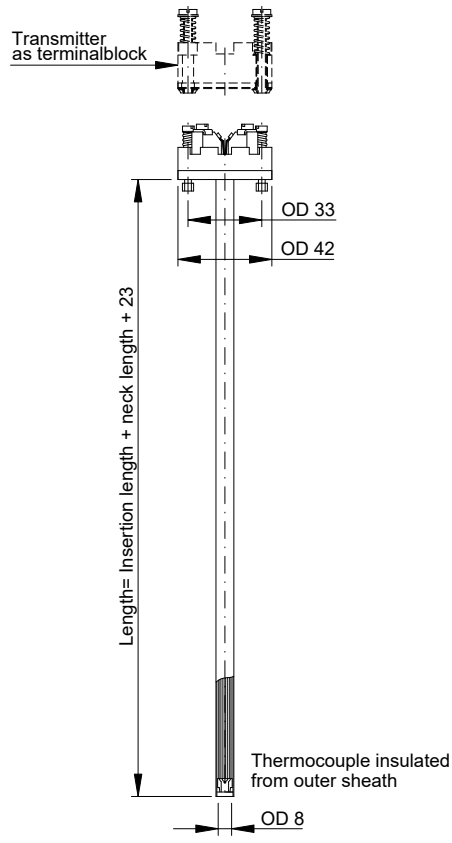
Assembly UST 3

Connection head
Type B / B+BHX Cap (for transmitter)



Process connection	
Thread	Across flats
3/4" BSP	32

Measuring insert



Note 5: Value in () apply when insertion lgth = 350mm

Insulation resistance

Versus temperature

Test temperature °C	U Volts	Rmin M ohm
20±15	500	1000
500±15	500	5

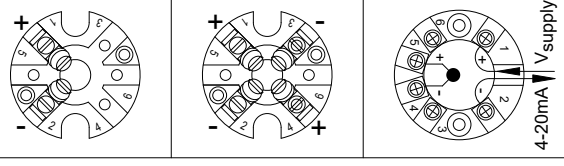
Response time

Thermowell	Response time acc. to representative measurement	
	Temp. changed from 800°C to 20°C (immersed in water)	
	$t_{0.5}$	$t_{0.9}$
Conus 24 OD → 14 OD	40	120
Conus 20 OD → 12.5 OD	36	108

Note:
The 0.5/0.9 time is the time that it takes the sensor to reach 50%/90% of the final value of a temperature change of a medium.
If media and velocity are different from the ones stated, the time can change significantly.

Connection diagram

Thermocouple		Transmitter FPTU/FPTT
Single thermocouple	Duplex thermocouple	



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SS-FP-UST3 1803-UK-202401

Frode Pedersen temperature sensors

Thermocouple assembly ST

stern tube

Data sheet
1807

Application

- For measurement and surveillance of bearing temperature in stern tubes on ships in order to avoid damages and break down of costly equipment.
- The operating range is up to 800°C
- Fields of application
  - Marine industry

Technical features

- Thermocouple type K and J according to IEC 584-1 (EN60584-1)
- ST is a mineral insulated thermocouple protected with a thin-walled flexible metal tube. Inside are the TC wires firmly embedded in ceramic powder (MgO - purity >96%)
- Solid construction with high resistance against vibration acc. to IEC 68-2-6.
- Connected to the process by one or two adjustable compression fittings
- Electrical wiring in a junction box or with cable
-

Ordering

The requested sensor is selected from the table below
The colour code means:

Standard: Built of standard modules (short delivery time)

Variant: Modified standard modules

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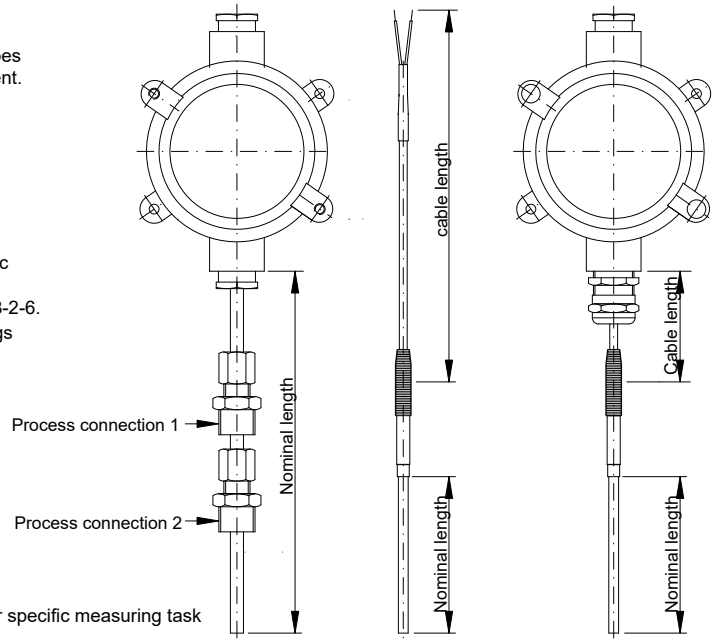


Fig. 1 Fig. 2 Fig. 3

Ordering information

Specification number 1807- **Sensor**

Type

Fig. 1 With junction box 0
Fig. 2 With cable and flying leads 1
Fig. 3 With cable and junction box 2

Cable length (meter)

0 0 None (for fig. 1)
0 1 1 meter
x x Special (Min. 1m)

Sheath diameter and material

3mm OD. Material: W.no. 1.4571. 0
4.5mm OD. Material: W.no. 1.4571. 1
6mm OD. Material: W.no. 1.4571 2

Cable type

0 . . . . . None (for fig. 1)
1 . . . . . XPP 2x0.22mm^2. PVC insulated, 105°C
2 . . . . . XPFP 2x0,22mm^{2}Inner screen + PVC insulated,105°C

Process connection 1 (see page 2)

Material: Stainless steel AiSi 316
None 0
½" BSP compression fittings with teflon olive (ferrule) 2

Tolerance acc. to. IEC 584-1 (EN50584-1)

0 . . . . . Class 2, for K and J, i.e. ± 2.5°C or 0.0075 x t $_{actual}$ (°C) 1)
1 . . . . . Class 1, for K and N, i.e. ±1.5°C or 0.0040 x t $_{actual}$ (°C) 1)

Note 1: The highest value apply

Process connection 2 (see page 2)

Material: Stainless steel AiSi 316
None 0
½" BSP compression fittings with teflon olive (ferrule) 2

Hot Junction

0 . . . . . Insulated from outer sheath
1 . . . . . Grounded (thermocouple bonded to outer sheath)

Number of thermocouples

0 1

Nominal length (mm)

2000	0	2	0	0	0	
3000	0	3	0	0	0	
5000	0	5	0	0	0	0
10000	1	0	0	0	0	1
Interim lengths (Min.100, max. 30.000)	x	x	x	x	x	

Thermocouple and measuring range

NiCr-Ni type K Max. 800°C
Fe-CuNi type J Max. 700°C

Accesesories

Process connection: See data sheet 9113
Compensation cable: See data sheet 9150

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TECHNICAL DATA

All dimensions in mm

Dimensions

Fig. 1

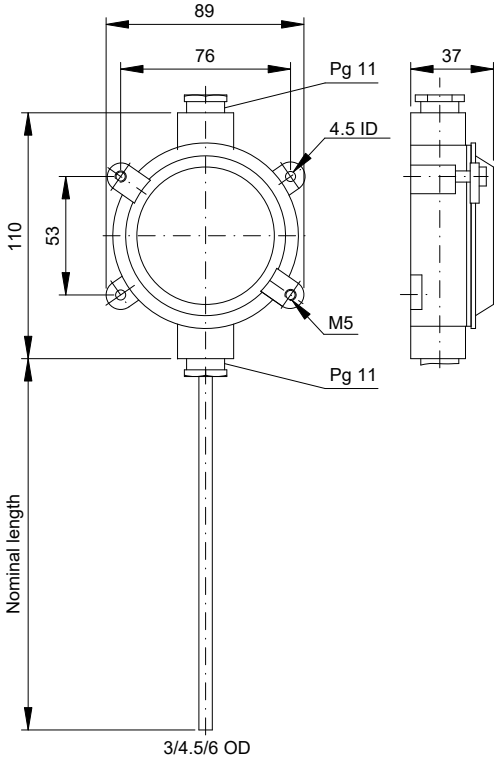


Fig. 2

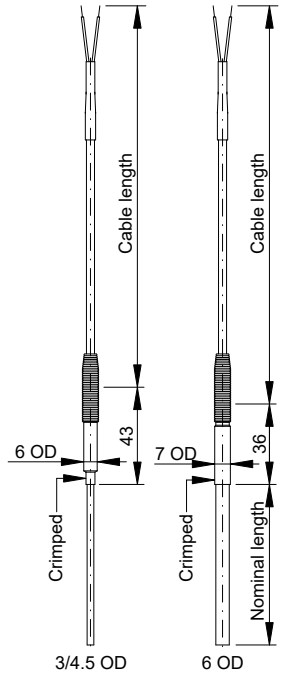
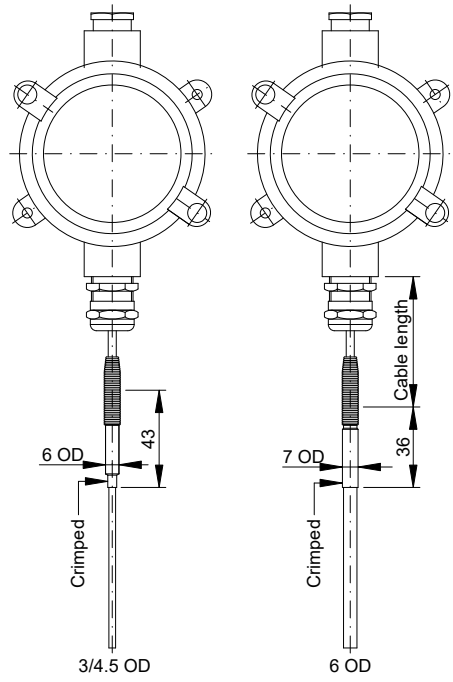


Fig. 3



Insulation resistance and test voltage @ 20°C

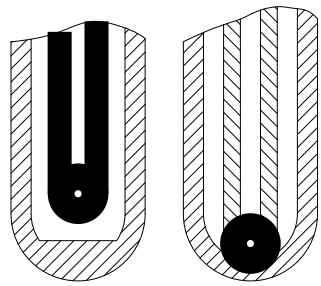
Depending of temperature and length acc. to IEC 1515 (EN61515)

Diameter	Number of thermocouples			
	1		2	
	U	**Rmin**	**U**	**Rmin**
mm	Volt	M ohm x m	Volt	M ohm x m
3 - 6	500 ±50	1000	250 ±50	1000

Bending radius
Min. bending radius is
5 x D @ repeatable bendings
2 x D @ stationary bending

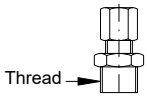
Hot junction

Insulated Grounded



Process connection

Fig. 4



Compression fitting with teflon ferrule		
Sheath dia.	Thread	Material
3	1/2" BSP	SS steel AISI 316
4.5	1/2" BSP	SS steel AISI 316
6	1/2" BSP	SS steel AISI 316

Response time

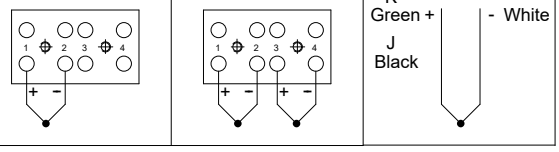
Sheath diameter	Hot junction insulated: Response time in seconds (guidelines)				Hot junction grounded: Response time in seconds (guidelines)			
	In water @ 0.2m/sec.		In air @ 2m/sec.		In water @ 0.2m/sec.		In air @ 2m/sec.	
	$t_{0.5}$	$t_{0.9}$	$t_{0.5}$	$t_{0.9}$	$t_{0.5}$	$t_{0.9}$	$t_{0.5}$	$t_{0.9}$
3	1,2	2,9	23	80	0,22	0,75	23	80
4.5	2,5	7,5	42	130	0,4	1,2	45	135
6	4	9,6	60	200	0,55	2,6	55	185

Note:

The 0.5/0.9 time is the time that it takes the sensor to reach 50%/90% of the final value of a temperature change of a medium.
If media and velocity are different from the ones stated, the time can change significantly.

Connection diagram

With junction box		Cable w/ flying leads
Single TC	Duplex TC	



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SS-FP-ST1807-UK. Version 202401

Frode Pedersen temperature sensors

Resistance Thermometer SM

Stern tube

Data sheet
1808

Application

- For measurement and surveillance of bearing temperature in stern tubes on ships in order to avoid damages and break down of costly equipment.
- The operating range is up to 400°C
- Fields of application
  - Marine industry

Technical features

- Pt100 resistance thermometer acc. to IEC 751 (EN60751)
- 3-wire connection is standard
- SM is a mineral insulated resistance thermomater protected with a thin-walled flexible metal tube. The resistance element is welded to the inner wires which are firmly embedded in ceramic powder (MgO - purity >96%)
- Solid construction with high resistance against vibration acc. to IEC 68-2-6.
- Connected to the process by one or two adjustable compression fittings
- Electrical wiring in a junction box or with cable

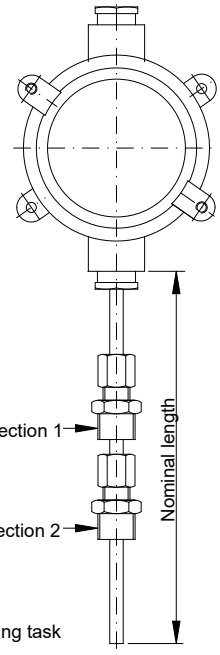


Fig. 1

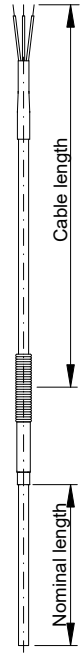


Fig. 2

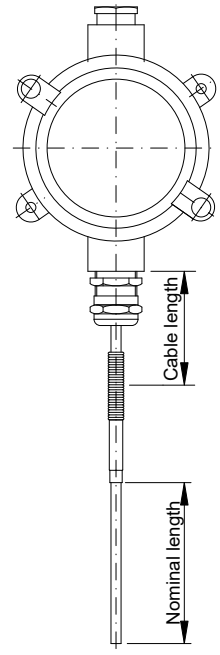


Fig. 3

Ordering

The requested sensor is selected from the table below
The colour code means:

Standard: Built of standard modules (short delivery time)

Variant: Modified standard modules

We are specialist in temperature measurement.
Please contact us and we will do our best to solve your specific measuring task

Ordering information

Sensor

Specification number 1808-

Type

Fig. 1	With junction box	0
Fig. 2	With cable and flying leads	1
Fig. 3	With cable and junction box	2

Cable length (meter)

0 0	None (for fig. 1)
0 1	1 meter
x x	Special (Min. 1m)

Sheath diameter and material

3mm OD. Material: W.no. 1.4571	0
4.5mm OD. Material: W.no. 1.4571	1
6mm OD. Material: W.no. 1.4571 [1)]	2

Note 1: For 2xPt100, 3-wire W.no. 1.4541

Cable type

0	None (for fig. 1)
1	0.382mm . Teflon (FEP) insulated, inner braided screen

Process connection 1 (see page 2)

Material: Stainless steel AiSi 316

None	0
1/2" BSP compression fittings with teflon olive (ferrule)	2

Connection. Wiring configuration

0	3-wire
1	4-wire
2	2-wire

Tolerance acc. to IEC 751 (EN60751)

0	Class B, i.e. ± (0.3°C + 0.005 x t_{actual})°C
1	Class A, i.e. ± (0.15°C + 0.002 x t_{actual})°C

Process connection 2 (see page 2)

Material: Stainless steel AiSi 316

None	0
1/2" BSP compression fittings with teflon olive (ferrule)	2

Resistance value (Ω) IEC 751 (EN60751)

0	1xPt100
1	2xPt100 (only as 2-wire for sheath diam.3 and 4.5mm)

Measuring range

0	-50 +400°C

Nominal length (mm)

2000	0 2 0 0 0
3000	0 3 0 0 0
5000	0 5 0 0 0
10000	1 0 0 0 0
Interim lengths (Min.100, max. 30.000)	x x x x x

Accesesories

Process connection: See data sheet 9113

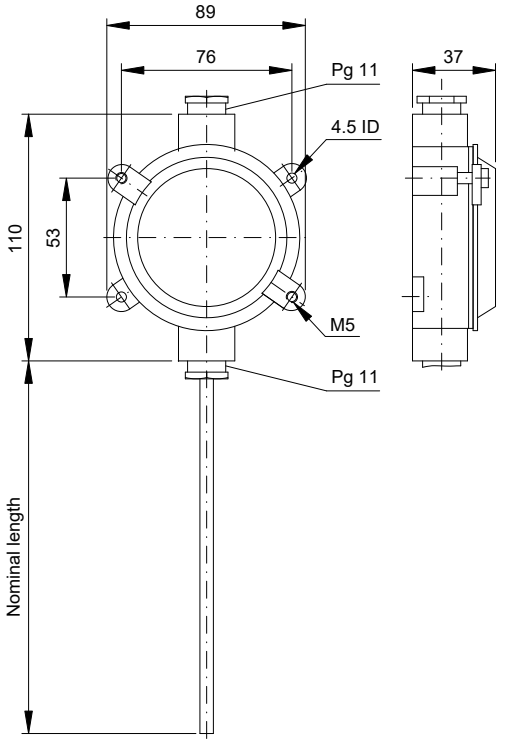
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TECHNICAL DATA

All dimensions in mm

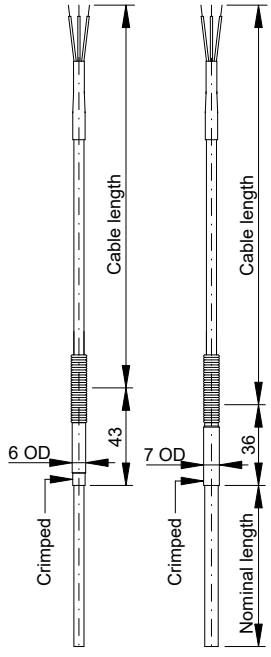
Dimensions

Fig. 1



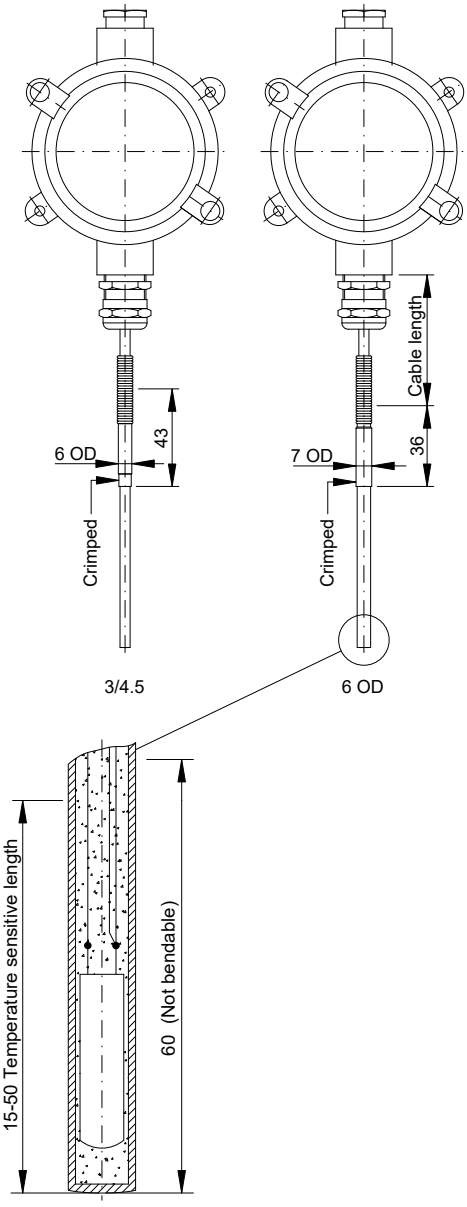
3/4.5/6 OD

Fig. 2



3/4.5 OD 6 OD

Fig. 3



3/4.5 6 OD

Insulation resistance

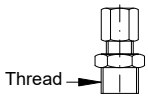
Depending of temperature, length and diameter

Diameter mm	U Volt	Rmin M ohm x m
3 - 6	100	1000

Bending radius
Min. bending is
5 x D @ repeatable bendings
2 x D @ stationary bending

Process connection

Fig. 4



Compression fitting with teflon ferrule		
Sheath dia.	Thread	Materiale
3	1/2" BSP	SS steel AISI 316
4.5	1/2" BSP	SS steel AISI 316
6	1/2" BSP	SS steel AISI 316

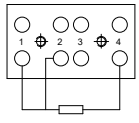
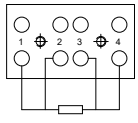
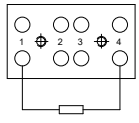
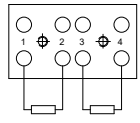
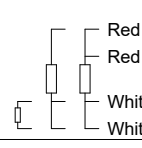
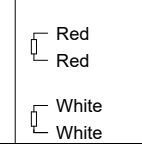
Response time

Sheath diameter	Response time in seconds (guidelines)			
	In water @ 0.4m/sec.		In air @ 2m/sec.	
	$t_{0.5}$	$t_{0.9}$	$t_{0.5}$	$t_{0.9}$
3	2	7	36	94
4.5	4	12	42	126
6	7	20	48	151

Note:

The 0.5/0.9 time is the time that it takes the sensor to reach 50%/90% of the final value of a temperature change of a medium.
If media and velocity are different from the ones stated, the time can change significantly.

Connection diagram

With junction box				Teflon w/screen Screen connected to outer sheath	
1xPt100	1xPt100	1xPt100	2xPt100	1xPt100	2xPt100
3-wire	4-wire	2-wire	2-wire	2- 3- 4-wire	2-wire
				 Red Red White White	 Red Red White White

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SS-FP-SM1808-UK. Version 202401

Frode Pedersen temperature sensors

Resistance Thermometer BFM

Screw - in type with fixed insert. Classified

Data Sheet 1809

Application

- Measurement of temperature in gasses, vapours and fluids in pipes and cooling systems. Threaded connection to the process directly or with separate screw - in pocket.
- The operating range is up to 250°C, max. 50 bar and flow velocity up to 25m/sec (air)
- Fields of application
  - Marine sector
  - Diesel engines for generators

Technical features

- Pt100 resistance thermometer acc. to IEC 751 (EN60751)
- 3-wire configuration is standard
- Easy connection and removal with special screw-in thermowell with female swivel for the sensor, allowing to rotate the cable entry of the sensor in the desired direction
- Solid construction with high resistance against vibration acc. to IEC 68-2-6
- Standard modules and lengths means that few spare parts need to be kept in stock
- Can be supplied with head mounted transmitter as an option

Ordering

The requested sensor is selected from the table below
The colour code means:

Standard: Built of standard modules (short delivery time)

Variant: Modified standard modules

Special versions and materials. We are specialist in temperature measurement. Please contact us and we will do our utmost to solve your specific measuring task

Sensor

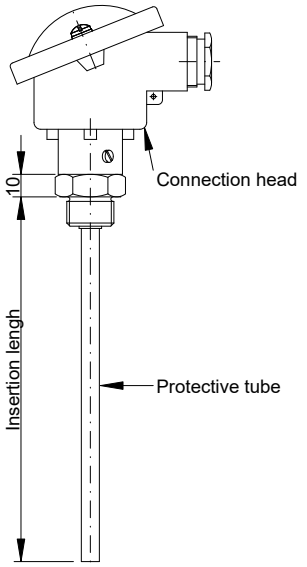


Fig.1

Pocket

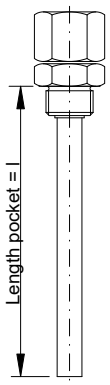


Fig.2

Ordering information

Sensor | **Transmitter**

Specification number 1809- [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ] **4mA: °C 20mA: °C** 2)

Protective tube

Stainless, acidproof steel, W.no. 1.4571 (AISI 316Ti)

8mm OD. 1mm wall 0

Insertion length (mm) (fig.1 sensor)

100	1 0 0
125	1 2 5
150	1 5 0
200	2 0 0
Special (min. 50, max. 400) 1)	x x x

Note 1: Insertion length > 200mm is not type approved

Screw - in pocket (fig. 2)

Stainless, acidproof steel, W.no. 1.4571 (AISI 316Ti) 11mm OD

None	0
For 100mm sensor l = 67mm	1
For 125mm sensor l = 92mm	2
For 150mm sensor l = 117mm	3
For 200mm sensor l = 167mm	4
Special (l = Insertion length for sensor - 33mm)	9

Process connection - screw-in pocket (see page 2)

1/2" BSP	0
3/4" BSP	1
None: (Without pocket)	2

Connection head

B: Degree of protection IP 54	0 0

Electrical connection

0	Terminalblock with screws
1	FPTM as terminal block (Sensor only 3-wire)
2	FPTM in high cap, B-head. (Sensor only 3-wire)
5	FPTU galvanic isolated. As terminal block
6	FPTU galvanic isolated. In high cap, B-head
7	FPTU galvanic isolated. EEXiaIICT4/6. As terminal block
8	FPTU galvanic isolated. EEXiaIICT4/6. In high cap, B-head
9	None. Without terminal block, flying ends for transmitter

Note 2: Please specify measuring range in °C

Connection. Wiring configuration

0	3-wire
1	4-wire
2	Special

Tolerance acc. to IEC 751 (EN60751)

0	Class B, i.e. ± (0.3°C + 0.005 x t_{actual})°C
1	Class A, i.e. ± (0.15°C + 0.002 x t_{actual})°C

Resistance value (Ω) acc. to IEC 751 (EN60751)

0	1xPt100
1	2xPt100

Measuring insert: Type and measuring range

-50 +250°C. Fixed insert

Accessesories

Transmitter: Ses data sheet 9168

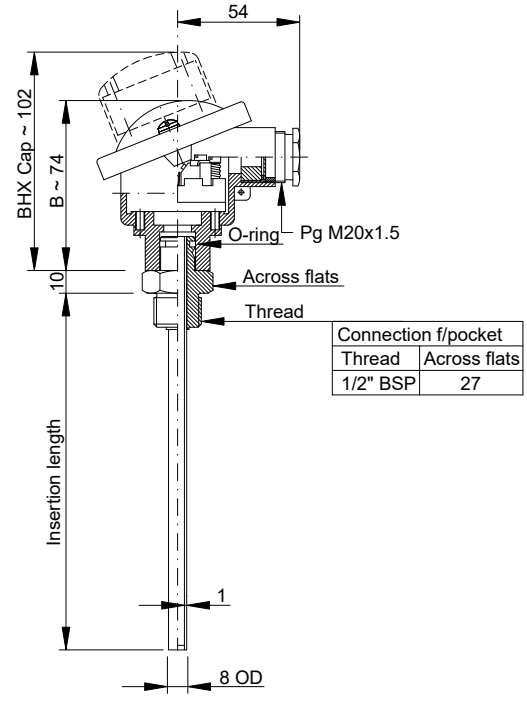
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TECHNICAL DATA

All dimensions in mm

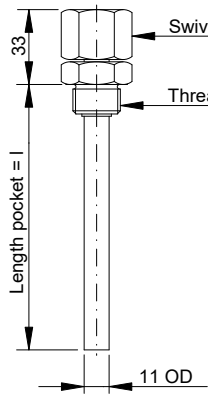
Dimensions

Resistance thermometer BFM
Connection head
Type B / B+BHX Cap (for transmitter)



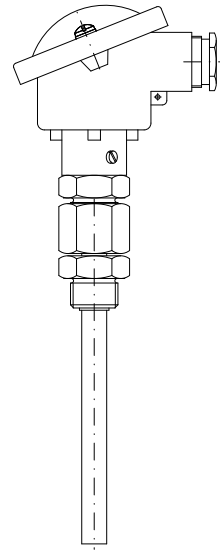
Connection f/pocket	
Thread	Across flats
1/2" BSP	27

Pocket



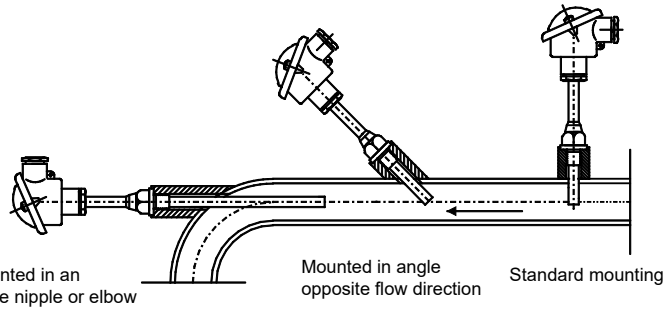
Process connection	
Thread	Across flats
1/2" BSP	27
3/4" BSP	32

BFM with pocket



Length pocket l = Insertion length sensor minus 33mm

Installation of screw- in sensor



Mounted in an angle nipple or elbow

Mounted in angle opposite flow direction

Standard mounting

Insertion length

In order to minimize heat dissipation/conduction from sensor tip to the surroundings it is recommended to select the sensor length acc. to guidelines in below table.
The length of the sensor also has to concidered with regards to vibrations, shocks and resonance frequency. Here it is important to ensure that the sensor does not get too long if mounted in a very turbulent liquid medium.
The insertion depth should further be added to the physical length of the sensing element (TSL), which typical is 15-50 mm for RTD.

Medium	Dynamic	Static
Liquid	5 - 10 x dia.	10 - 20 x dia.
Air	10 - 20 x dia.	20 - 40 x dia.

Load for protective tube acc. to DIN 43772, material W.no. 1.4571

Partly as form 2/2G+8/9 acc. DIN 43772 *) note		BFM	Wih pocket	
Protective tube		OD 8x1	OD 11x1	
Process connection		1/2" BSP	1/2" or 3/4" BSP	
Torque on installation (max.)		50Nm	50Nm	50Nm
Maximum flow velocity (m/sec)	Air	25	25	25
	Superheated steam	25	25	25
	Water	3	3	3

*) note
Dynamic load in relation to pressure, media velocity, length and material see DIN 43772

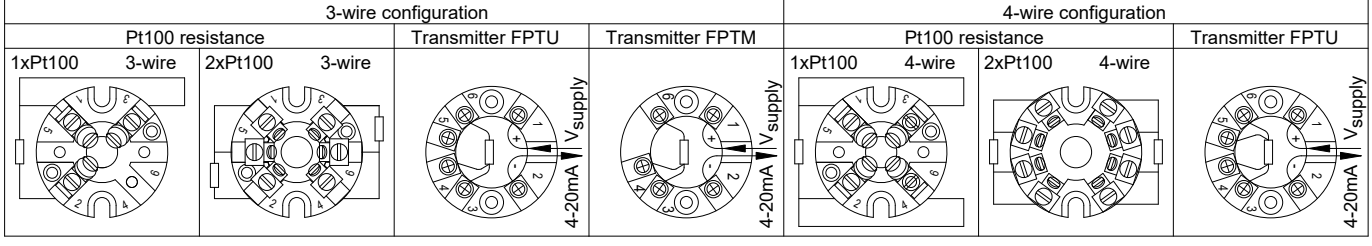
Response time

Protective tube	Response time in seconds (guidelines)			
	In water @ med 0.4m/sec.		In air @ 3m/sec.	
	$t_{0,5}$	$t_{0,9}$	$t_{0,5}$	$t_{0,9}$
8 OD	9	27	50	150
With 11 OD pocket	25	75	140	430

Note:

The 0.5/0.9 time is the time that it takes the sensor to reach 50%/90% of the final value of a temperature change of a medium.
If media and velocity are different from the ones stated, the time can change significantly.

Connection diagram



AMETEK DENMARK A/S Gydevang 32-34, 3450 Allerød, DK, Tlf: 48168000, E-mail: jofra@ametek.com,
Web: www.jofra.com

Frode Pedersen temperature sensors

Resistance Thermometer BM

Screw-in type with interchangeable insert

Data Sheet 1810

Application

- Measurement of temperature in pipes and containers with gaseous and liquids media, such as air, vapour, gasses, water and oil
- The operating range is up to 600°C, max. 50 bar and flow velocity up to 25m/sec (air)
- Fields of application
  - Marine industry
  - Diesel engines for generators

Technical features

- Pt100 resistance thermometer acc. to IEC 751 (EN60751)
- Permissible mechanical and thermal stress acc. to DIN 43772
- 3-wire connection is standard
- Connected to the process with a screwed attachment on the protective tube
- The measuring insert can be exchanged or calibrated without closing down the process
- Solid construction with high resistance against vibration acc. to IEC 68-2-6
- Can be supplied with head mounted transmitter as an option

Ordering

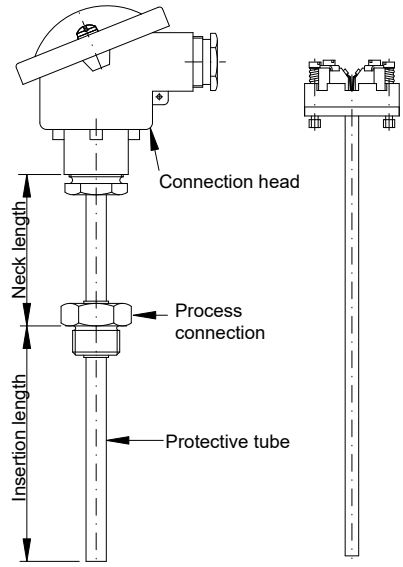
The requested sensor is selected from the table below
The colour code means:

Standard: Built of standard modules (short delivery time)

Variant: Modified standard modules

We are specialist in temperature measurement.
Please contact us and we shall do our utmost to solve your specific measuring task

Assembly **Measuring insert**



Ordering information

Specifications number 1810- | Sensor | Transmitter **4mA: °C 20mA: °C** 3)

Protective tube

SS, acidproof steel, W.no. 1.4571 (AISI 316Ti)
Max. 800°C

11mm OD. 2mm wall	0
15mm OD. 1,5mm wall (3/4" BSP recommended)	1

Neck length (mm)

25 (min.)	0
50	1
100	2
Special:	9

Insertion length (mm)

100	0 1 0 0
150	0 1 5 0
200 max. for 11mm OD	0 2 0 0
250 Only for 15mm OD	0 2 5 0
Special (Min 50, max. 3000) 1)	x x x x

Note 1: Insertion length > 250 not type approved

Process connection (see page 2)

1/2" BSP	0
3/4" BSP	1

Connection head

B: Degree of protection IP 54 — 0

Measuring insert: Type and measuring range 2)

0	M40: -50 +400°C	Standard version, tube w/ceramic powder.
1	MK60: -196+600°C	Mineral insulated. Vibration proof

Note 2:
Total permissible range.
Actual working range: Value listed in section tolerance class

Resistance value (Ω) acc. to IEC 751 (EN60751)

0	1xPt100
1	2xPt100 (max 2x3- wire)

Tolerance acc to IEC 751 (EN60751)

	Class	Value	Apply in the range for MK60	Apply in the range for M40
0	B	± (0.3°C + 0.005 x t_{actual})°C	-196+600°C	-50+400°C
1	A	± (0.15°C + 0.002 x t_{actual})°C	-100+450°C	-50+400°C

Connection. Wiring configuration

0	3-wire
1	4-wire
2	2-wire

Electrical connection

0	Terminalblock with screws
1	FPTM as terminal block (Sensor only 3-wire)
2	FPTM in high cap, B-head. (Sensor only 3-wire)
5	FPTU galvanic isolated. As terminal block
6	FPTU galvanic isolated. In high cap, B-head
7	FPTU galvanic isolated. EEXiallCT4/6. As terminal block
8	FPTU galvanic isolated. EEXiallCT4/6. In high cap, B-head
9	None. Without terminal block, flying ends for transmitter

Note 3: Please specify measuring range in °C

Accessesories

Measuring insert:	See data sheet 9108-02
Transmitter:	See data sheet 9168

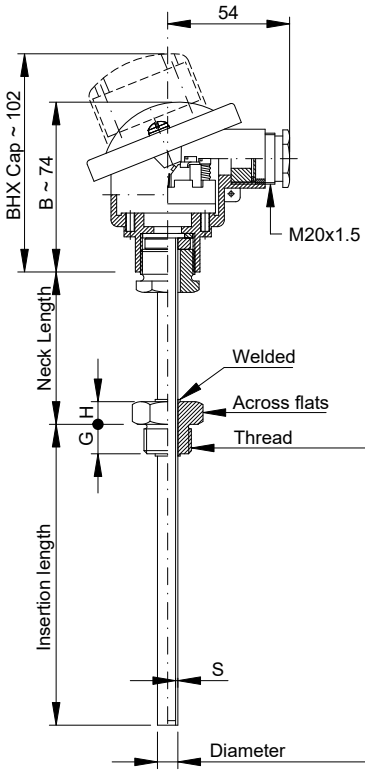
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TECHNICAL DATA

All dimensions in mm

Dimensions

Assembly
Connection head
Type B / B+BHX Cap (for transmitter)

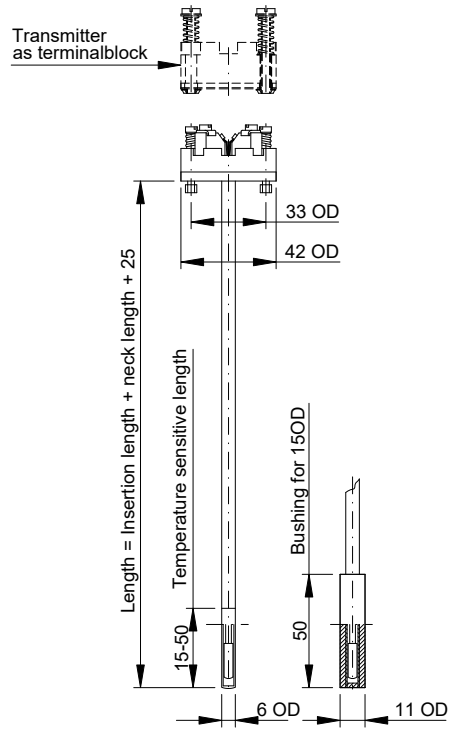


Process connection			
Thread	Across flats	G	H
1/2" BSP	27	13	10
3/4" BSP	32	14.5	12

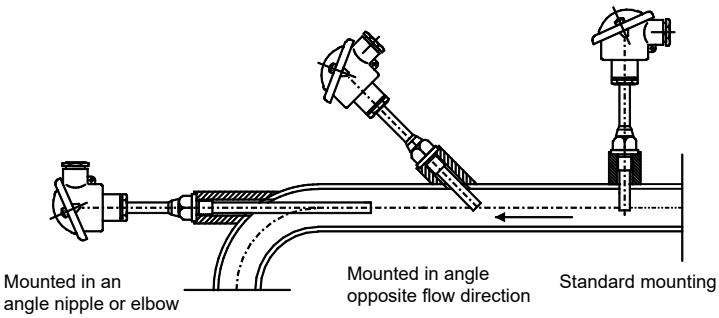
Protective tube W.no. 1.4571 (AiSi 316 Ti)	
Diameter	Wall thickness S
11	2
15	1.5

Measuring insert

Type M40 / MK60



Installation of screw- in sensor



Mounted in an angle nipple or elbow

Mounted in angle opposite flow direction

Standard mounting

Insertion length

In order to minimize heat dissipation/conduction from sensor tip to the surroundings it is recommended to select the sensor length acc. to guidelines in below table.
The length of the sensor also has to concidered with regards to vibrations, shocks and resonance frequency. Here it is important to ensure that the sensor does not get too long if mounted in a very turbulent liquid medium.
The insertion depth should further be added to the physical length of the sensing element (TSL), which typical is 15-50 mm for RTD.

Medium	Dynamic	Static
Liquid	5 - 10 x dia.	10 - 20 x dia.
Air	10 - 20 x dia.	20 - 40 x dia.

Load for protective tube acc. to DIN 43772, material W.no. 1.4571

Partly as form 2/2G+8/9 acc. DIN 43772 *) note				
Protective tube - OD/ID		9/7	9/7	15/11
Process connection		1/2" BSP	3/4" BSP	
Torque on installation (max.)		50Nm	50Nm	50Nm
Maximum flow velocity (m/sec)	Air	25	25	25
	Superheated steam	25	25	25
	Water	3	3	3

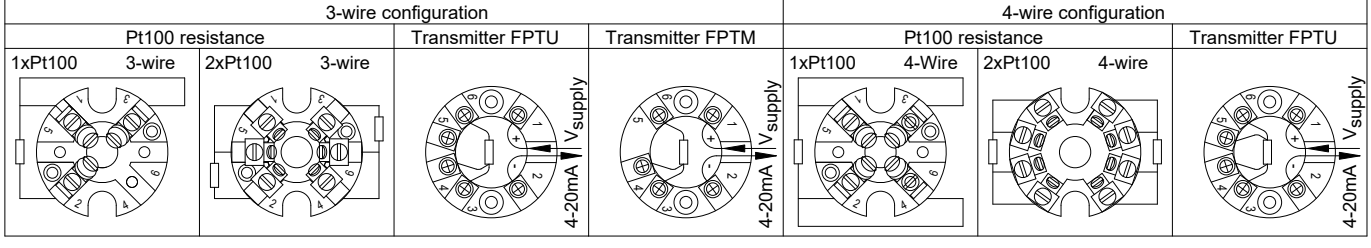
*) note
Dynamic load in relation to pressure, media velocity, length and material see DIN 43772

Response time

Protective tube Diameter	Response time in seconds (guidelines)			
	In water @ 0.4m/sec.		In air @ 3m/sec.	
	$t_{0.5}$	$t_{0.9}$	$t_{0.5}$	$t_{0.9}$
11	25	80	120	360
15	30	90	140	410

Note:
The 0.5/0.9 time is the time that it takes the sensor to reach 50%/90% of the final value of a temperature change of a medium.
If media and velocity are different from the ones stated, the time can change significantly.

Connection diagram



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SS-FP-BM1810-UK- Version 202401

Frode Pedersen temperature sensors

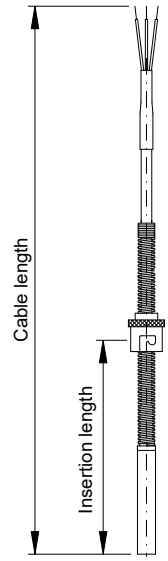
Resistance Thermometer HLM

for bearing and surface temperature measurement

Data sheet
1812

Application

- For measurement and surveillance of bearing temperature on ship engines and machine constructions, in order to avoid damages and breaks down of costly equipment.
- Can be used on surfaces up to 150°C.
- Fields of application
  - Marine industry
  - Machinery



Technical features

- Pt100 resistance thermometer (RTD) acc to IEC 751 (EN60751).
- 3 - wire connection is standard.
- Very fast response time. Achieved by using a silver buttom and special selected resistance element (RTD).
- Solid construction with high resistance against vibration acc. to IEC 68-2-6.
- Quick mounting and adjustment of insertion length by means of a bayonet socket on a spring.

Ordering

The required sensor is selected from the table below.

Standard: Standard modules (Short delivery time).

Variant: Modified standard modules.

We are specialist in temperature measurement.
Please contact us and we will do our best to solve your specific measuring task

Ordering information

Specification number **1812-** [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

Protective tube

Acid proof and stainless steel, W.no. 1.4571 (AISI 316Ti)
with silver buttom
8mm OD. 0.4mm wall. L = 46mm 0

Cable length (meter)

0 2	2 meter
0 4	4 meter
x x	Special (in meters: Min. 1m)

Cable type

0	0.382mm^2 Teflon insulated with inner screen, max 200°C
s	Special:

Process connection (see page 2)

None:	0
1/4" BSP Bayonet nipple:	1

Connection. Wiring configuration

0	3-wire (only 1xPt100)
1	4-wire (only 1xPt100)
2	2-wire (always with 2xPt100)

Measuring range

-40 +150°C 0

Tolerance acc. to IEC 751 (EN60751)

0 ..... Class B, i.e. ± (0.3°C + 0.005 x t_{actual})°C

Resistance value (Ω) acc. IEC 751 (EN60751)

1xPt100	0
2xPt100	1

Accessories

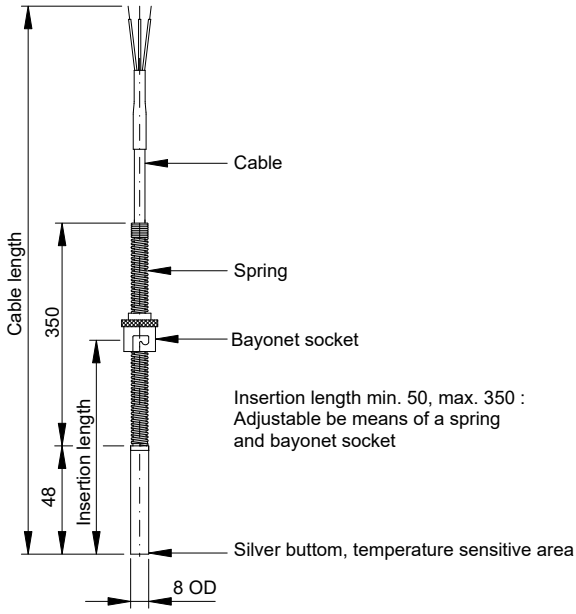
AMETEK®
SENSORS, TEST & CALIBRATION

TECHNICAL DATA

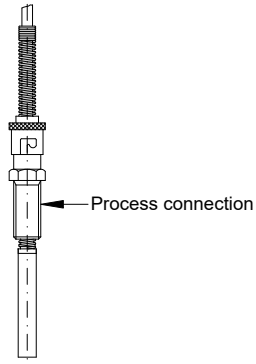
All dimensions in mm

Dimensions

Type HLM



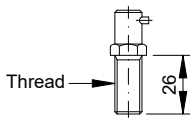
Mounting



Features for cable

Insulation	Temperature range	Application
Teflon FEP	-50 +200°C	Corrosive and heat resistance

Process connection



Bayonet nipple Nickel plated brass
Thread
1/4" BSP

Response time

Protective tube	Response time acc. to representative measurement	
	Temp. changed from 150°C to 20°C (immersed in water)	
	$t_{0.5}$	$t_{0.9}$
8 OD	0.5 sec	1.5 sec

Cable connection

Teflon w/screen Screen connected to protective tube	
1xPt100 2- 3- 4-wire	2xPt100 2-wire
Red Red White White	Red Red White White

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