Head Assembly Thermocouple Detector

Standard Type

HAWK®
Since 1971

P-4B

CE

SH Series

ISO 9000 Certified

- **Noble/Base Metal Sensing Elements**
- **316 Stainless Steel Head**
- **Wide Temperature Ranges from -200°C to 2300°C**
- **Various Sizes and Materials for your applications**
- **IP68 Weather Proof for better dust and moisture resistance**

A temperature sensor is a device to measure temperature by an electrical signal. The typical sensing element is RTD (Resistance Temperature Detector) or thermocouple (T/C).
The RTD is a variable resistor that will change its electrical resistance depending on temperature. The platinum is commonly used as an RTD sensing element due to its purity, linearity and stability over a wide range of temperatures. A thermocouple is made by two dissimilar metals that generate electrical voltage in direct proportion to changes in temperature. ***HAWK SH model*** is with a 316 stainless steel head assembly and a element installed in a metallic drawn and top-welded stem tube. The head assembly temperature sensor provides the better dust and moisture resistance. It is most widely used for general applications to offer the better environment resistance.

Specifications

Sensing Element:
K(Ni-Cr, Ni-Al)...0/+1200°C,
E(Ni-Cr, Ni-Cu)...-200/+900°C,
J(Fe, Ni-Cr)...-50/+750°C,
T(Cr, Ni-Cr)...-200/+350°C,
N(Ni-Cr-Si, Ni-Si)...0/+1200°C,
D(3%W.Re, 25%W.Re)...-200/+2300°C,
C(5%W.Re, 26%W.Re)...-200/+2300°C,
B(30%Pt.Ph, 6%Pt.Ph)...-200/+1700°C,
R(13%Pt.Ph, Pt)...0/+1600°C,
S(10%Pt.Ph, Pt)...0/+1550°C.

Stem Diameter:
1/4" diameter-standard, 3/8", 1/2", 6mm, 8mm, 10mm, 12mm, other diameters available.

Stem Material:
SS304, SS316, SS316L, SS310, Inconel.

Stem Length:
2 1/2", 4", 6", 9", 12", 15", 18", 24" standard lengths, available in other stem lengths.

Head&Conduit:
Casting 316 Stainless Steel,
1/2", 3/4"NPT, BSPT, PF or M20*1.5.

Thread Connection Style:
Fixed Rigid Male/Female,
Sliding Compression Male/Female,
Plain.
1/2", 3/8", 1/4" NPT standard, JIS, DIN, M14*1.0 and M20*1.5 available.

Flange Connection Style:
ANSI Flange 1/2".....2"
(150LB...2500LB rating),
JIS Flange 15A.....50A
(10K.....63K rating),
DIN Flange DN15.....DN50
(PN2.5.....PN400Bar rating).

Sanitary Connection Style:
1/2"(DN15).....5"(DN125)
Tri-Clamp, APC, IDF, SMS,
Cherr-Tank, Spud, DIN11851,
Cheer-Brrell I Line, RTJ(APV).

Terminal Block (Insulation):
Ceramic (Al_2O_3).

Weatherproof
IP68.

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Tolerance

	JIS C1605/DIN(IEC 584-2)			ASTM E230
Code	Class 1	Class 2	Class 3	STD / SP
B-TYPE	-	-	600°C~800°C ±4°C	STD...±0.5%
	-	600°C~1700°C ±0.0025 · t	600°C~1700°C ±0.005 · t	SP...±0.25%
R-TYPE	0°C~1100°C ±1°C	0°C~600°C ±1.5°C	-	STD...±0.25% or ±1.5°C(2.7°F)
	-	600°C~1600°C ±0.0025 · t	-	SP...±0.1% or ±0.6°C(1.1°F)
S-TYPE	0°C~1100°C ±1°C	0°C~600°C ±1.5°C	-	STD...±0.25% or ±1.5°C(2.7°F)
	-	600°C~1600°C ±0.0025 · t	-	SP...±0.1% or ±0.6°C(1.1°F)
K-TYPE	-40°C~375°C ±1.5°C	-40°C~333°C ±2.5°C	-167°C~40°C ±2.5°C	STD...±0.75% or ±2.2°C(4°F)
	375°C~1000°C ±0.004 · t	333°C~1200°C ±0.0075 · t	-200°C~-167°C ±0.0015 · t	SP...±0.4% or ±1.1°C(2°F)
N-TYPE	-40°C~375°C ±1.5°C	-40°C~333°C ±2.5°C	-167°C~40°C ±2.5°C	STD...±0.75% or ±2.2°C(4°F)
	375°C~1000°C ±0.004 · t	333°C~1200°C ±0.0075 · t	-200°C~-167°C ±0.0015 · t	SP...±0.4% or ±1.1°C(2°F)
E-TYPE	-40°C~375°C ±1.5°C	-40°C~333°C ±2.5°C	-167°C~40°C ±2.5°C	STD...±0.5% or ±1.7°C(3.1°F)
	375°C~800°C ±0.004 · t	333°C~900°C ±0.0075 · t	-200°C~-167°C ±0.0015 · t	SP...±0.4% or ±1°C(1.8°F)
J-TYPE	-40°C~375°C ±1.5°C	-40°C~333°C ±2.5°C	-	STD...±0.75% or ±2.2°C(4°F)
	375°C~750°C ±0.004 · t	333°C~750°C ±0.0075 · t	-	SP...±0.4% or ±1.1°C(2°F)
T-TYPE	-40°C~125°C ±0.5°C	-40°C~133°C ±1°C	-67°C~40°C ±1°C	STD...±0.75% or ±1°C(1.8°F)
	125°C~350°C ±0.004 · t	133°C~350°C ±0.0075 · t	-200°C~-67°C ±0.0015 · t	SP...±0.4% or ±0.5°C(0.9°F)

Measuring Junction Type

(A)

Grounded Type

Ungrounded Type

(B)

Ungrounded Separated Type

(C)

Exposed Type

(A) The thermocouple is grounded to the protective tube. It is with fair response than unground type. It is not suitable for the noisy an dangerous location such as electromagnetic induction interfered by radio frequency.

(B) The thermocouple is covered with insulator. It responses slower than grounded type. For most applications, it can ensure a long-life. It is available in two control loop separately.

(C) The thermocouple is exposed. It is with rapid response, but not good in airtightness, insulation and mechanical strenght.

Typical Applications

- Medical and Pharmaceutical industry
- Dairy processing
- Food and Beverage processing
- Power generating stations
- Offshore Oil platforms
- Pulp and Paper mills
- Waste water treatment
- Petrochemical, Oil and Gas processing

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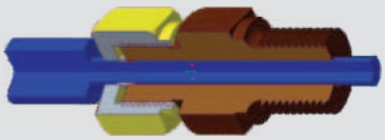
Process Connection

P-4B

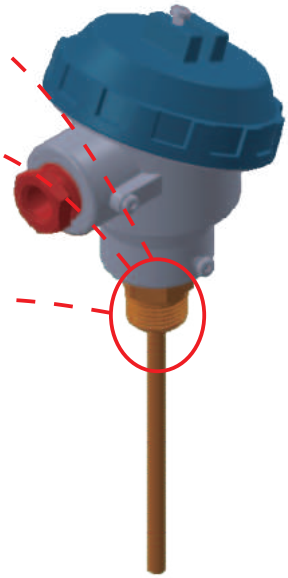
Fixed/Rigid Type:

The fixed/rigs type is the most common connection. This threaded type connection is directly attached to the process by means of a male or female NPT, BSP, BSPT or other threads.



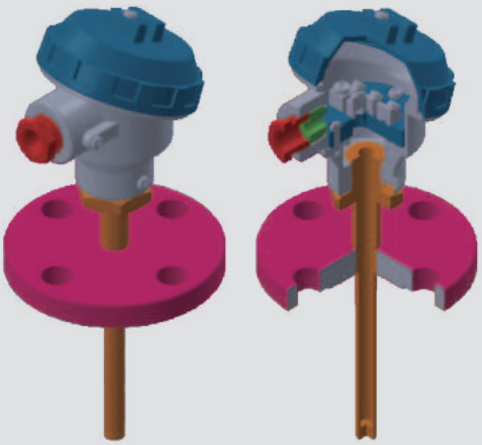
Sliding Type:

The sliding type allows to adjust the variable inserted length of bulb for best performance.



Plain Type:

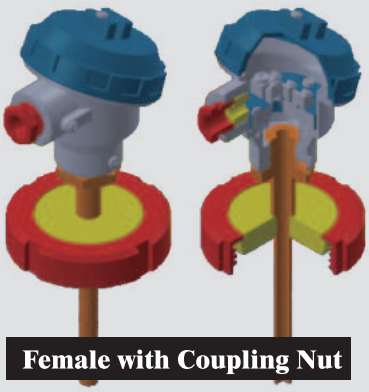
The plain bulbs are suitable for open tank applications without any pressure or combine with thermowell for the applications where fixed installation is not required.



Flange Type:

The flange connection is directly attached to the process by means of a ANSI, DIN or JIS flange. This connection is most popular for a piping system and have been designed to meet the needs of standard industrial applications and installations.

Sanitary Type: The sanitary probes are designed for the sanitary/aseptic applications. These quick process connections including clamp, female thread with coupling nut or male thread enable frequent removal from the process when Cleaned In Place (CIP) or Steamed In Place (SIP).


Female with Coupling Nut


Clamp


Male

Head Assembly Thermocouple Detector

Standard Type

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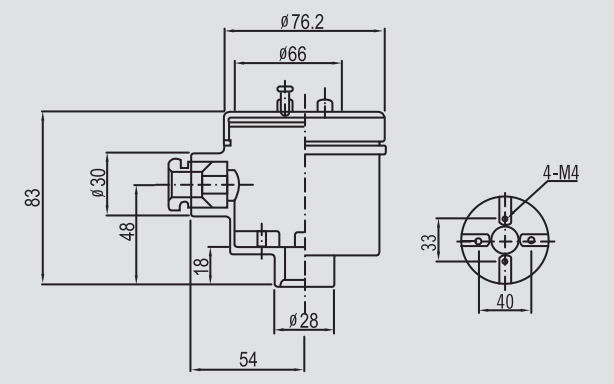
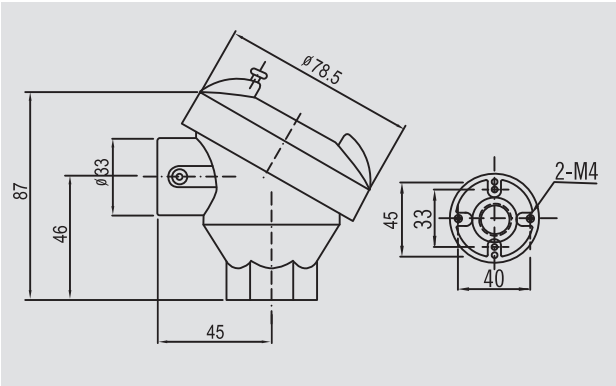
Head Style/Dimensions

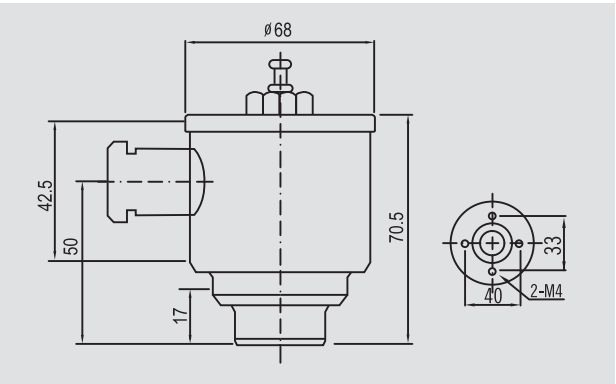
SH-R Series



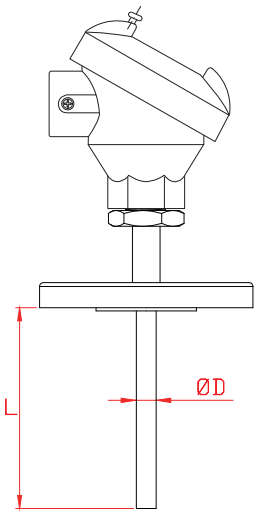
SH-S Series



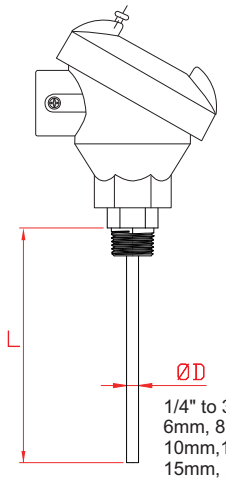
SH-T Series



Flange

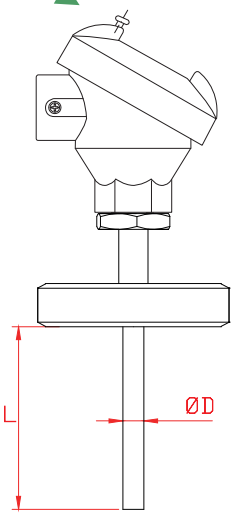


Thread

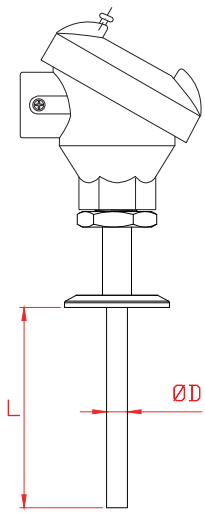


Sanitary Clamp

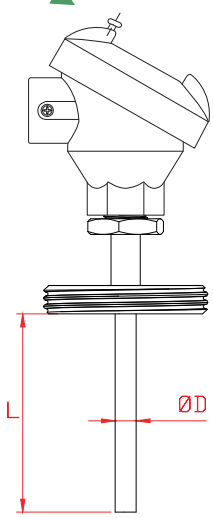
F Female with Coupling Nut



C Clamp



M Male



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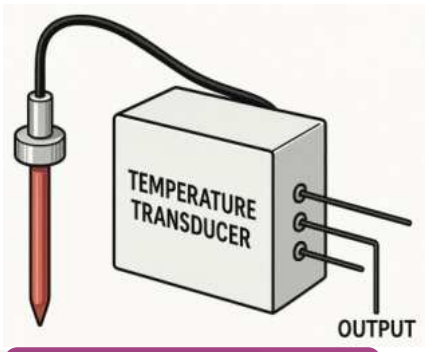
Accessories/Options

- ZC Certificate of Accuracy (Factory)
- ZE Certificate of Accuracy (TAF)
- ZI Certificate of Accuracy (NIST)
- ZN NACE-MR0175 Heat Treatment
- ZX Oxygen Cleaning
- KA SS Armor Cable

- KF PTFE Insulation Cable
- KC PVC Insulation Cable

- KC Fiberglass Insulation Cable



- VA 0...10V Transducer (Analog 3 Wires)
- VB 0...5V Transducer (Analog 3 Wires)
- VC 1...5V Transducer (Analog 3 Wires)
- VD 0.5...4.5V Transducer (Analog 3 Wires)
- VE 1...6V Transducer (Analog 3 Wires)
- VF 4...20mA Transducer (Analog 2 Wires)

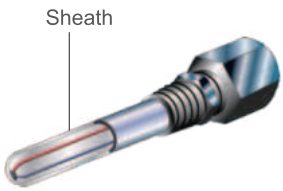
- TC PFA Lining Stem

- TD PTFE Coating Stem

- TE Titanium Coating Stem

- KN Pipe Nipple Extension

- KU Nipple Union Nipple Extension



- KH Sheath Type
- KS Load Spring

- ZY Stainless Steel Tag Plate

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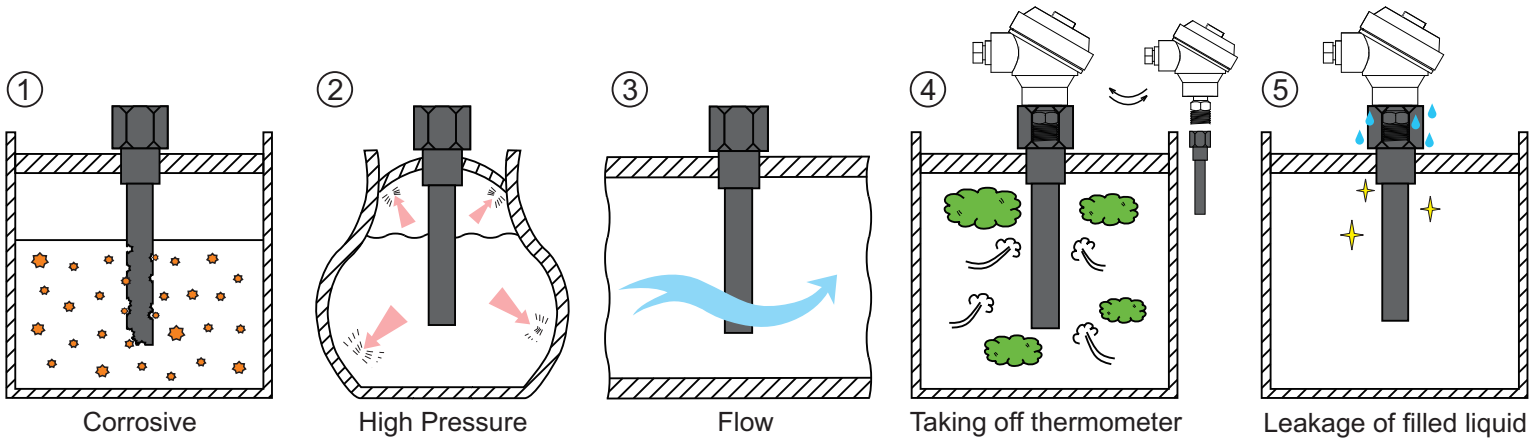
Thermowells

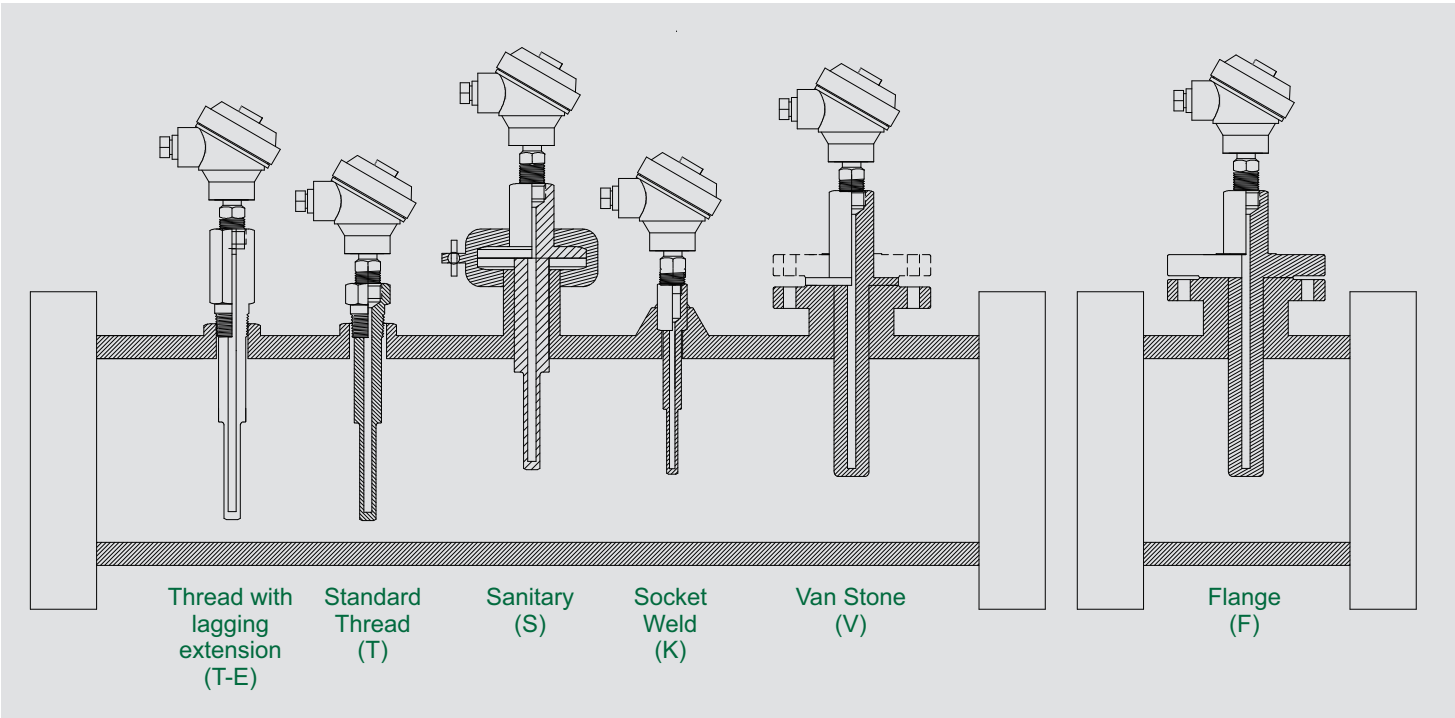
P-4B

In the case of following conditions, thermowell should be provide to protect bulb:

1) In case of corrosive fluid, thermowell with suitable material is necessary.
2) In case of high pressure, necessary to use thermowell suitable for operating pressure.
3) In case of fluid with flow, necessary to use thermowell suitable for flow and viscosity.
4) In case of fluid leaking out when taking off the thermometer, necessary to use thermowell.
5) In case of filled liquid in thermometer is leak out from bulb and it is harmful, necessary to use thermowell.



Please refer to HAWK thermowell data sheets for detailed information.



Head Assembly Thermocouple Detector

Standard Type

HAWK®
Since 1971

P-4B

Order Information

** For Thread&Plain Style*

Example:

P-4B-SH | **R** | **M2** | **K** | **J2** | **S** | **A** | **C38** | **2C5** | **R** | **000** | **N** | **S** | **3** | **H-** | **XX**

Option **XX**
- **ZC**-Certificate of Accuracy (Factory)
- **ZE**-Certificate of Accuracy (TAF)
- **ZI**-Certificate of Accuracy (NIST)
- **ZN**-NACE-MR0175-2002 Heat Treatment
- **ZX**-Oxygen Cleaning
- **ZY**-Stainless Steel Tag Plate
- **KA**-SS Armor Cable **KS**-Load Spring
- **TC**-PFA Lining Stem

Please refer to the options and write down the code which you need.

Wires **3**
2-2 wires **4**-4 wires **8**-8 wires
3-3 wires **6**-6 wires **9**-9 wires

Number of elements **S**
S-Single Element **T**-Triple Elements
D-Double Elements

Type of Junction **N**
G-Grounded **E**-Explosed **L**-Others
U-Ungrounded **N**-None

Cable Length **000**
000-No Wire **01M**-1m **10C**-10" **10F**-10Feet
050-50mm **10M**-10m **50C**-50" **50F**-50Feet
200-200mm and so on...

Electrical Connection **R**
Q-Head-1/2"NPT-F **U**-Head-1/2"BSPT-F **R**-Head-1/2"PF-F
X-Head-3/4"NPT-F **V**-Head-3/4"BSPT-F **Y**-Head-3/4"PF-F
S-Head-M20*1.5-F **L**-Others

Stem Length **2C5**
2C5-2 1/2" **06C**-6" **12C**-12" **075**-75mm **200**-200mm
04C-4" **09C**-9" **16C**-16" **100**-100mm **250**-250mm
24C-24" **150**-150mm and so on...

Stem Diameter **C38**
C25-1/4" **C38**-3/8" **C50**-1/2"
006-6mm **008**-8mm **010**-10mm **012**-12mm and so on...

Stem Material **A**
A-SS304 **S**-SS316 **W**-SS316L **K**-SS310 **O**-Inconel

Shank Design **S**
S-Straight **R**-Stepped **T**-Tapered

Class **J1**
J1-JIS/DIN Class 1 **J2**-JIS/DIN Class 2 **J3**-JIS/DIN Class 3 **AT**-ASTM Standard **AP**-ASTM Special

Sensor Type **K**
K-K-Type **E**-E-Type **J**-J-Type **T**-T-Type **N**-N-Type **C**-C-Type **D**-D-Type **B**-B-Type **R**-R-Type **S**-S-Type

Process Connection
Style **M**
M-Fixed Rigid Male **F**-Fixed Rigid Female **T**-Sliding Compression Male **Y**-Sliding Compression Female

Size **1**
1-1"NPT **3**-3/8"NPT **T**-3/4"PT(R) **B**-1/4"PT(R) **D**-1/2"PF(G) **J**-M20*1.5
5-3/4"NPT **4**-1/4"NPT **A**-1/2"PT(R) **I**-1"PF(G) **H**-3/8"PF(G) **K**-M14*1.0
2-1/2"NPT **U**-1"PT(R) **G**-3/8"PT(R) **Q**-3/4"PF(G) **E**-1/4"PF(G) and so on...
0P-Plain **0L**-Others

Head Style **R**
R-Casting 316 Stainless Steel, IP68, 704g **S**-Casting 316 Stainless Steel, 782g
T-Casting 316 Stainless Steel, 750g
Please refer to the Head style-page 4 and write down the code you need.

Head Assembly Thermocouple Detector

Standard Type

HAWK
Since 1971

P-4B

Order Information

**** For Flange Style***

Example:

Process Connection

P-4B-SH | **R** | **V** | **1** | **R** | **K** | **J2** | **S** | **A** | **C38** | **2C5** | **R** | **000** | **N** | **S** | **3** | **H-** | **XX**

Option — **ZC**-Certificate of Accuracy (Factory); **ZE**-Certificate of Accuracy (TAF); **ZI**-Certificate of Accuracy (NIST); **ZN**-NACE-MR0175-2002 Heat Treatment; **ZX**-Oxygen Cleaning; **ZY**-Stainless Steel Tag Plate; **KA**-SS Armor Cable; **KS**-Load Spring; **TC**-PFA Lining Stem. Please refer to the options and write down the code which you need.

Wires — **2**-2 wires; **3**-3 wires; **4**-4 wires; **6**-6 wires; **8**-8 wires; **9**-9 wires

Number of elements — **S**-Single Element; **D**-Double Elements; **T**-Triple Elements

Type of Junction — **G**-Grounded; **U**-Ungrounded; **E**-Explosed; **N**-None; **L**-Others

Cable Length — **000**-No Wire; **050**-50mm; **200**-200mm; **01M**-1m; **10M**-10m; **10C**-10"; **50C**-50"; **10F**-10Feet; **50F**-50Feet; and so on...

Electrical Connection — **Q**-Head-1/2"NPT-F; **X**-Head-3/4"NPT-F; **S**-Head-M20*1.5-F; **U**-Head-1/2"BSPT-F; **V**-Head-3/4"BSPT-F; **L**-Others; **R**-Head-1/2"PF-F; **Y**-Head-3/4"PF-F

Stem Length — **2C5**-2 1/2"; **04C**-4"; **06C**-6"; **09C**-9"; **12C**-12"; **16C**-16"; **24C**-24"; **075**-75mm; **100**-100mm; **150**-150mm; **200**-200mm; **250**-250mm; and so on...

Stem Diameter — **C25**-1/4"; **006**-6mm; **C38**-3/8"; **008**-8mm; **C50**-1/2"; **010**-10mm; **012**-12mm; and so on...

Stem Material — **A**-SS304; **S**-SS316; **W**-SS316L; **K**-SS310; **O**-Inconel

Shank Design — **S**-Straight; **R**-Stepped; **T**-Tapered

Class — **J1**-JIS/DIN Class 1; **J2**-JIS/DIN Class 2; **J3**-JIS/DIN Class 3; **AT**-ASTM Standard; **AP**-ASTM Special

Sensor Type — **K**-K-Type; **C**-C-Type; **E**-E-Type; **D**-D-Type; **J**-J-Type; **B**-B-Type; **T**-T-Type; **R**-R-Type; **N**-N-Type; **S**-S-Type

Face — **R**-RF(Raise Face); **P**-SFF(Small Female Face); **B**-SGF(Small Groove Face); **M**-LMF(Large Male Face); **L**-LTF(Large Tongue Face); **F**-FF(Flat Face); **N**-LFF(Large Female Face); **G**-LGF(Large Groove Face); **J**-RJ(Ring Joint Face); **O**-SMF(Small Male Face); **A**-STF(Small Tongue Face); **K**-RFSF(Raise/Smooth Face)

Size

ANSI, DIN, HG20615,JIS		**1**-1/2"(DN15); **2**-3/4"(DN20)	**3**-1"(DN25); **4**-1 1/4"(DN32)	**5**-1 1/2"(DN40); **6**-2"(DN50)	**7**-2 1/2"(DN65); **8**-3"(DN80)	**9**-4"(DN100); **A**-5"(DN125)
HG20592	PN0.25, 0.6, 1.0, 2.5, 6.3, 10, 16	**B**-DN20; **C**-DN25	**D**-DN32; **E**-DN40	**F**-DN50; **G**-DN65	**H**-DN80; **I**-DN100	**J**-DN125
	PN0.4, 1.6, 4.0	**L**-DN20; **M**-DN25	**N**-DN32; **O**-DN40	**P**-DN50; **Q**-DN65	**R**-DN80; **S**-DN100	**T**-DN125

Rating (Standard)

ANSI	**A**-150LB	**B**-300LB	**C**-400LB	**D**-600LB	**E**-900LB	**F**-1500LB	**G**-2500LB
DIN	**H**-PN2.5Bar; **I**-PN4.0Bar	**J**-PN6.0Bar; **K**-PN10Bar	**L**-PN16Bar; **M**-PN25Bar	**N**-PN40Bar; **O**-PN64Bar	**P**-PN100Bar; **Q**-PN160Bar	**R**-PN250Bar; **S**-PN320Bar	**T**-PN400Bar
JIS	**U**-PN 5K	**V**-PN 10K	**W**-PN 16K	**X**-PN 20K	**Y**-PN 30K	**Z**-PN 40K	**0**-PN 63K
HG20615 (MPA)	**1**-150LB(PN2.0)	**2**-300LB(PN5.0)	**3**-600LB(PN11)	**4**-900LB(PN15)	**5**-1500LB(PN26)	**6**-2500LB(PN42)	
HG20592 (MPA)	**1**-PN0.25,PN0.4	**2**-PN0.6	**3**-PN1.0, PN1.6	**4**-PN2.5, PN4.0	**5**-PN6.4	**6**-PN10	**7**-PN16

Head Style — **R**-Casting 316 Stainless Steel, IP68, 704g; **S**-Casting 316 Stainless Steel, 782g; **T**-Casting 316 Stainless Steel, 750g. Please refer to the Head style-page 4 and write down the code you need.

Head Assembly Thermocouple Detector

Standard Type

HAWK®
Since 1971

P-4B

Order Information

** For Sanitary Style*

Example:

Process Connection

P-4B-SH | **R** | **A** | **5** | **C** | **K** | **J2** | **S** | **A** | **C38** | **2C5** | **R** | **000** | **N** | **S** | **3** | **H-** | **XX**

Option **ZC**-Certificate of Accuracy (Factory) **ZE**-Certificate of Accuracy (TAF) **ZI**-Certificate of Accuracy (NIST) **ZN**-NACE-MR0175-2002 Heat Treatment **ZX**-Oxygen Cleaning **ZY**-Stainless Steel Tag Plate **KA**-SS Armor Cable **KS**-Load Spring **TC**-PFA Lining Stem
Please refer to the options and write down the code which you need.

Wires **2**-2 wires **3**-3 wires **4**-4 wires **6**-6 wires **8**-8 wires **9**-9 wires

Number of elements **S**-Single Element **D**-Double Elements **T**-Triple Elements

Type of Junction **G**-Grounded **U**-Ungrounded **E**-Explosed **N**-None **L**-Others

Cable Length **000**-No Wire **050**-50mm **200**-200mm **01M**-1m **10M**-10m **10C**-10" **50C**-50" **10F**-10Feet **50F**-50Feet and so on...

Electrical Connection **Q**-Head-1/2"NPT-F **X**-Head-3/4"NPT-F **S**-Head-M20*1.5-F **U**-Head-1/2"BSPT-F **V**-Head-3/4"BSPT-F **L**-Others **R**-Head-1/2"PF-F **Y**-Head-3/4"PF-F

Stem Length **2C5**-2 1/2" **04C**-4" **06C**-6" **09C**-9" **12C**-12" **16C**-16" **24C**-24" **075**-75mm **100**-100mm **150**-150mm **200**-200mm **250**-250mm and so on...

Stem Diameter **C25**-1/4" **006**-6mm **C38**-3/8" **008**-8mm **C50**-1/2" **010**-10mm **012**-12mm and so on...

Stem Material **A**-SS304 **S**-SS316 **W**-SS316L **K**-SS310 **O**-Inconel

Shank Design **S**-Straight **R**-Stepped **T**-Tapered

Class **J1**-JIS/DIN Class 1 **J2**-JIS/DIN Class 2 **J3**-JIS/DIN Class 3 **AT**-ASTM Standard **AP**-ASTM Special

Sensor Type **K**-K-Type **C**-C-Type **E**-E-Type **D**-D-Type **J**-J-Type **B**-B-Type **T**-T-Type **R**-R-Type **N**-N-Type **S**-S-Type

Face **F**-Female with Coupling Nut **C**-Clamp **M**-Male

Size **1**-1/2"(DN15) **2**-3/4"(DN20) **3**-1"(DN25) **4**-1 1/4"(DN32) **5**-1 1/2"(DN40) **6**-2"(DN50) **7**-2 1/2"(DN65) **8**-3"(DN80) **9**-4"(DN100) **A**-5"(DN125)

Design **A**-Tri-Clamp **B**-APC **C**-Cherry-Tank Spud **D**-IDF **E**-Cherry-Burrell Line **F**-SMS **G**-DIN11851 **H**-RJT (APV)

Head Style **R**-Casting 316 Stainless Steel, IP68, 704g **S**-Casting 316 Stainless Steel, 782g **T**-Casting 316 Stainless Steel, 750g
Please refer to the Head style-page 4 and write down the code you need.

Limited Warranty and Liability

HAWK GAUGE CO.,LTD warrants all its mechanical instruments to be free from defects in materials and workmanship.

HAWK agrees to repair or replace any thermometers if returned to our factory, transportation charges prepaid, and after which examination reveals is to be defective due to faculty workmanship or material.
This warrant should not apply to subject to the following terms and conditions:

A. The product has not been subjected to misuse, neglect, abuse , accident, incorrect mounting, improper use or misapplication such as negligence, accident, vandalism, shock or vibration.

B. The performance of any system of which HAWK's products are a component part.

C. The product has not been exposed to any other service, range or environment of greater severity than that for which the products were designed.

D. The product has not been altered or repaired by anyone except HAWK GAUGE or its authorized service

E. The serial number or date code has not been removed, defaced or changed.

F. The actual pressure&temperature occurring exceed the values specified for HAWK Thermometer.

Unless otherwise specified in a manual or warranty card, or agree to in a writing signed by HAWK GAUGE office, HAWK Process gauge products shall be warranted for one years from the date of sale.

This warranty is in lieu of all other warranties expressed or implied, and of all obligations or liabilities on its part for damages including but not limited to consequential damages, following the use of misuse of instruments sold by it. No agent is authorized to assume for it any liability except as set forth above.

Note

HAWK GAUGE CO.,LTD reserves the right to make product improvements and change its specifications at any time stated throughout this brochure without notification. Please contact the factory on all critical dimensions and specifications for verification.
HAWK GAUGE is not expert in the customer's technical field and therefore doesn't warrant suitability of it's product for the application selected by customer.

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