



9/1/2024

Temperature Sensors

Q2024104

Welcome to AVA ESPIKOO SANAT

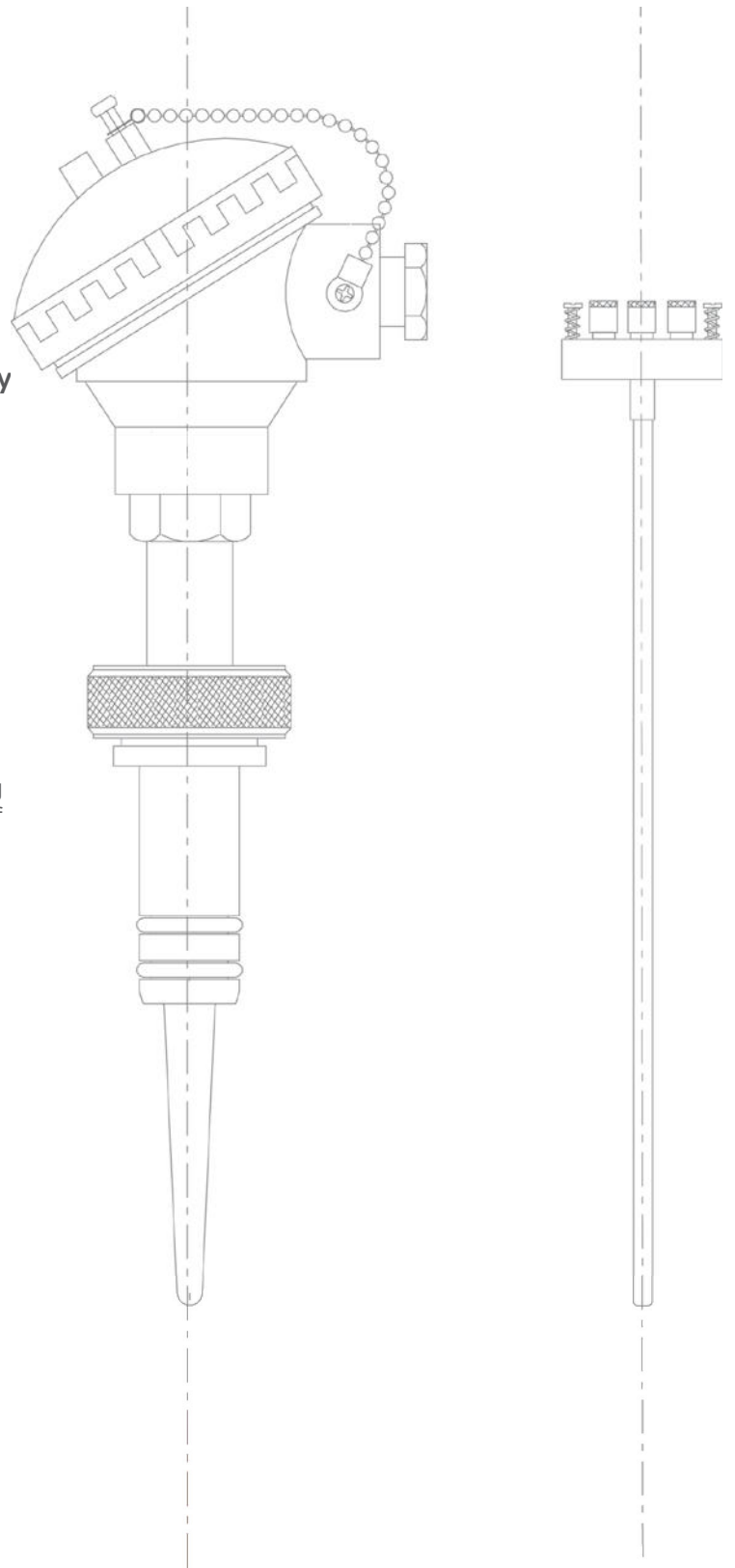
AVA ESPIKOO SANAT is an established leader in the design and manufacture of high quality industrial temperature sensors for the process and manufacturing industries locally, nationally and Internationally:

- Petrochemical
- Oil & Gas
- Marine
- Power Generation
- Food
- Pharmaceutical & Healthcare

We are driven by a strong commitment to quality, service and support and accredited to ISO 9001.

The Company is located in a modern manufacturing facility in the Iran where we have a good combination of technology and experienced engineering staff.

This brochure showcases our range of industrial products. For more detail on any of the products, or to discuss your specific requirements, we would love to hear from you.



Mineral Insulated Resistance Thermometer PT100

Product Code: MIR

MIR sensors are manufactured from ready made lengths of soft annealed stainless steel sheathed, mineral insulated (MI) 'flexible' copper signal cable.

Product Information

- Available in PT100 class B, class A and fractional DIN configurations
- Single, duplex or triplex sensors dependant on diameter
- 2, 3 or 4 wire connection
- The soft annealed stainless steel sheath allows bending/flexing to shape and fit for easier installation
- Sheath diameters from as small as 3mm to 8mm, Metric and Imperial. Length as required
- Sheath material in Grade 316L, Grade 304, Grade 310, Grade 321 stainless steel or Inconel
- Supplied as a plain stem with flying leads, or threaded connection, or with terminal head, or plug/connectors.



Mineral Insulated Thermocouple

Product Code: MIT

MIT sensors are manufactured from ready made lengths of soft annealed stainless steel sheathed, mineral insulated (MI) 'flexible' thermocouple cable.

Product Information

- Available in type K, J, T, N, E
- Single, duplex or triplex sensors dependent on diameter
- Insulated, grounded or exposed hot junctions
- The soft annealed stainless steel sheath allows bending/flexing to shape and fit for easier installation
- Sheath diameters from 0.5mm to 10.8mm, Metric and Imperial. 0.25mm is available on special applications. Length as required
- Sheath material in Grade 316L, Grade 304, Grade 310, Grade 321 stainless steel or Inconel & Microbel
- Can be supplied as a plain stem with flying leads, threaded connection, or with terminal head or plug/connectors.



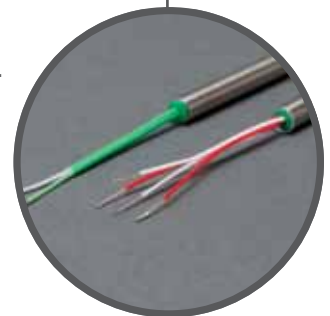
Basic Thermocouple and RTD Temperature Probes

Product Code: PT100 or TC

A simple general purpose temperature probe with a fabricated plain, rigid stainless steel stem.

Product Information

- Thermocouple types K, J, T, N, E
- PT100 class B, class A and fractional DIN configurations
- Single, duplex or triplex sensors dependant on diameter
- 2, 3 or 4 wire connection
- Sheath diameters from 3mm to 12.7mm. Metric and Imperial sizes. Length as required
- Sheath material in Grade 316L, 304 and 310 stainless steel or Inconel
- Supplied with flying leads, threaded connection or plug/connectors.



Light Duty Temperature Probe

Product Code: ALD, ALDS, ALDF, ALDH

General purpose temperature probe for light duty applications for areas where the environment is less demanding.

Product Information

- Thermocouple types K, J, T, N, E
- PT100 class B, class A and fractional DIN configurations
- Single, duplex or triplex sensors dependant on diameter
- 2, 3 or 4 wire connection
- Sheath diameters from 3mm to 15mm. Metric and Imperial sizes. Length as required
- Supplied with a plain stem [ALD] or fitted with screwed [ALDS] or flanged [ALDF] or hygienic/sanitary/dairy [ALDH] connection. Fitments can be welded or sliding
- Sheath material in Grade 316L, 304, 321, 310 stainless steel. Inconel and Microbel also available
- Connection head mounting plate can accept either a standard ceramic connection block (up to 8 pole) or a temperature transmitter providing a 4 to 20mA output signal.

Medium Duty Temperature Probe

Product Code: AMD, AMDS, AMDF, AMDH

General purpose temperature probe for medium duty applications. Consists of a fabricated thermowell with a spring loaded sensor insert, allowing the sensor be removed/replaced without interrupting the process.

Product Information

- Spring loaded insert housing thermocouple types K, J, T, N, E, R, S & B
- Spring loaded insert housing PT100 class B, class A and fractional DIN configurations
- Single, duplex or triplex sensors dependant on diameter.
- 2, 3 or 4 wire connection
- Sheath diameters from 3mm to ½" NB [21.7mm] and inserts to suit. Metric and Imperial sizes. Length as required
- Supplied with a plain stem [AMD] or fitted with screwed [AMDS] or flanged [AMDF] or hygienic/sanitary/dairy [AMDH] connection. Fitments can be welded or sliding
- Sheath material in Grade 316L, 304, 321 or 310 stainless steel. Inconel also available
- Connection head mounting plate can accept either a standard ceramic connection block (up to 8 pole) or a temperature transmitter providing a 4 to 20mA output signal.



Heavy Duty Temperature Probe

Product Code: AHD, AHDS & AHDF

The HD series is of rugged construction. Consists of a solid drilled thermowell, screwed or flanged process connection with extension lagging with a spring loaded sensor insert, allowing the sensor be removed/replaced without interrupting the process.

Product Information

- Spring loaded insert housing thermocouple types K, J, T, N, E, R, S & B
- Spring loaded insert housing PT100 class B, class A and fractional DIN configurations
- Single, duplex or triplex sensors dependant on diameter
- Solid drilled thermowell with either a screwed [AHDS] or flanged [AHDF] process connection
- Parallel or tapered stem. Length as required
- Pocket material in grade 316L, 304, 321, 310, Inconel, Hastelloy, Monel, Nickel 200 and Titanium and various other materials to suit the application
- Standard lagging extension or nipple/union/nipple extension with choice of connection head environmentally rated from IP54 to IP68
- Connection head can accept either a standard ceramic connection block (up to 8 poles) or a temperature transmitter providing a 4 to 20mA output signal.



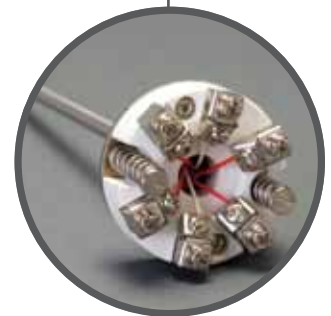
Spring-Loaded Insert

Product Code: ASLI

Designed to fit into new or existing thermowells, pockets and other protective sheaths.

Product Information

- Thermocouple types K, J, T, N, E, R, S & B
- PT100 class B, class A and fractional DIN configurations
- Single, duplex or triplex sensors dependant on diameter
- 2, 3 or 4 wire connection
- Available in sheath diameters from 1mm to 12.7mm. Metric and Imperial sizes. Length as required
- Rigid stem or MI flexible sheath
- Sheath material in Grade 316L, 304, 321, 310 stainless steel. Inconel and Nicrobel also available
- Insert mounting plate can accept either a standard ceramic connection block (up to 8 pole) or a temperature transmitter providing a 4 to 20mA output signal.



Fire Detection Duty Sensor

Product Code: AFDD

A sensor with multipoint thermocouples designed for fire detection duties, the thermocouples are connected in parallel to provide an average temperature across the measurement span.

Product Information

- MI thermocouple type K, all sensor tips are in direct contact with the thermowell inner wall
- From 2-8 integral sensors per thermowell
- Available in thermowell diameters from 25mm to 50mm. Metric and Imperial sizes. Length up to 2m
- Flanged or screwed connection
- Sheath material in Grades 316L, 304, 321 or 310 stainless steel
- Standard ceramic connection blocks or a temperature transmitters providing a 4 to 20mA output signal.



Furnace Temperature Probe



Product Code: AFSS, AFSF

The furnace sensor is for applications with a maximum operating temperature of 1250°C. The selection of the correct probe material ensures reliability and maximised life for the probe in this challenging environment.

Product Information

- Thermocouples type K or N in heavy duty wire gauge or in a mineral insulated (MI) thermocouple format. Type 'R' also available
- Single, duplex or triplex sensors dependant on diameter
- Process connections Screwed (AFSS) or flanged (AFSF) welded to sheath or sliding
- Parallel or tapered stem
- Thermocouple protection tubes in grade 310 stainless steel, Inconel, Hastelloy and various other materials to suit the application
- Standard lagging extension or nipple/union/nipple extension with choice of connection head environmentally rated from IP54 to IP68
- Connection head can accept either a standard ceramic connection block (up to 8 poles) or a temperature transmitter providing a 4 to 20mA output signal.

High Temperature Furnace Probe

Product Code: [AHTFS, AHTFF]

For continuously high temperatures in excess of 1250°C. Precious metal thermocouple types R, S & B are required and supplied with inner and outer protection tubes, complete with support.

Product Information

- Thermocouple protection tubes in aluminous porcelain, recrystallised alumina, silicone carbide and others. Length as required depending on mounting orientation
- Support tubes in Grade 310 stainless steel or Inconel
- Supplied as a plain stem with the option of either a screwed (AHTFS) or flanged (AHTFF) process connection
- Type R (Pt-13%Rh/Pt), type S (Pt-10%Rh/Pt) or type B (Pt-30%Rh/Pt-6%Rh) thermocouple wire 0.3mm to 0.5mm OD as standard. Other diameters available
- Single, duplex or triplex sensors dependant on diameter dependant on diameter
- Connection head can accept either a standard ceramic connection block or a temperature transmitter providing a 4 to 20mA output signal.



Fabricated Thermowells

Product Code: AMTWS, AMTWF, AMTWW, AMTWP

Medium duty fabricated thermowells can be supplied with various thread forms or flanges.

Product Information

- Screwed [AMTWS], flanged [AMTWF], weld-in [AMTWW] or plain [AMTWP]
- Fabricated where process pressures is up to 10 bar
- Threads supplied in taper or parallel format for both male or female versions and in various thread forms to meet most International standards
- Flanges to ANSI, DIN, BS and JIS. Hygienic and vacuum flanges also available
- Available in pocket diameters parallel from 6mm to ½" NB (21.7mm) in plain stem or stepped with a reduced tip
- Length as required and various bore sizes to suit temperature sensor
- Pocket material in grade 316L, 304, 310, Inconel, Hastelloy, and various other materials to suit the application. Teflon® coating also available
- Various instrument connections BSPT, BSP & NPT and lagging extensions
- Can be supplied on their own to suit the customer's existing temperature sensors or together with temperature sensors manufactured by Thermal Detection.



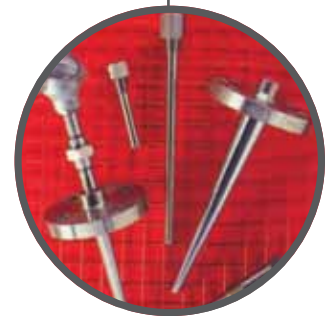
Solid Drilled Thermowell

Product Code: AHTWS, AHTWF, AHTWW, AHTWP

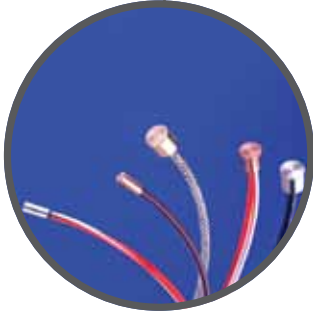
Heavy duty solid drilled thermowells can be supplied with various thread forms or flanges.

Product Information

- Screwed [AHTWS], flanged [AHTWF], Weld-in [AHTWW] or plain [AHTWP]
- Solid drilled where process pressures are above 10 bar
- Threads supplied in taper or parallel format for both male or female versions and in various thread forms to meet most International standards
- Flanges to ANSI, DIN, BS and JIS. Hygienic and sanitary flanges also available
- Available in pocket diameters from 6mm to 30mm in parallel and/or tapered stem, with plain or reduced tip
- Length as required and various bore sizes to suit temperature sensor
- Various instrument connections BSPT, BSP & NPT and lagging extensions
- Pocket material in grade 316L, 304, 310, Inconel, Hastelloy, Monel, Nickel 200 and Titanium and various other materials to suit the application. Teflon® coating also available.
- Can be supplied on their own to suit the customer's existing temperature sensors or together with temperature sensors manufactured by Thermal Detection.



Miniature Bearing Temperature Sensor



Product Code: AMBS

Miniature bearing sensors are designed to monitor the temperature of bearings on large rotating plant. The sensor provides critical indication of the status of the bearings allowing for preventative maintenance to take place.

Product Information

- Thermocouple types K, J, and T
- PT100 class B with 2 or 3 wire connection
- Single or duplex sensors
- Sensor caps in Grade 316L stainless steel, copper and brass also available
- Teflon® insulated conductors, with or without stainless steel braid. Length as required
- Small physical size allows the unit to be positioned close to the surface, sensing an early change in temperature
- Available with oil seal barriers or bearing sensor wire seals to prevent wicking.

Standard Bearing Temperature Sensor



Product Code: ASBS

Temperature is a critical indication of the status of bearings on all rotating plant. Early indication of a rise in temperature allows the plant engineer to instigate a planned maintenance schedule and so prevent production upset's and expensive replacements. The ASBS bearing sensor is designed to allow a quick and simple installation as close to the bearing surface as possible.

Product Information

- Thermocouple types K, J, and T
- PT100 class B with 2, 3 or 4 wire connection
- Single, duplex or triplex sensors
- Teflon® insulated conductors, with or without stainless steel flexible conduit. Length as required.

Calibration Service

Thermal Detection can arrange for calibration of any of our temperature probes.

- Certification is produced conforming to Iran Accreditation Service



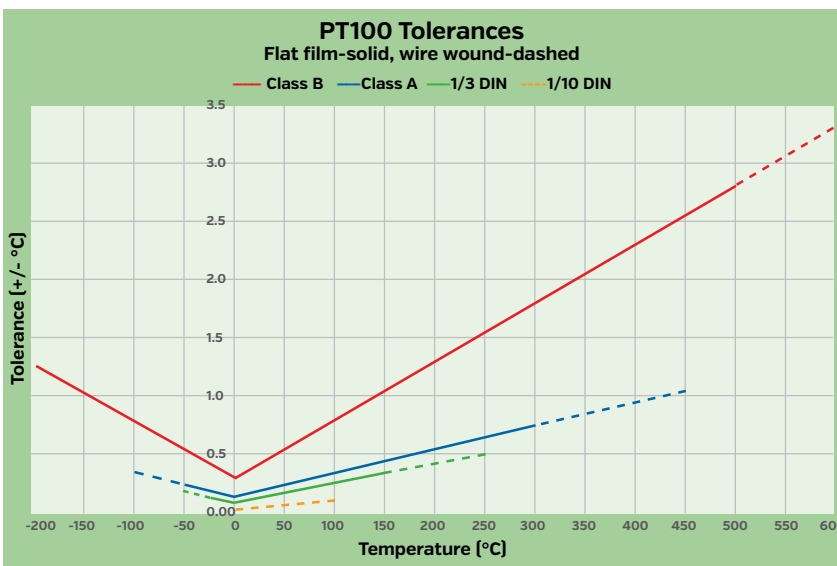
Thermocouple Information International Thermocouple Colour Codes

TYPE	Conductors Max. Continuous Working Temp.	IEC 584-1:1995 BS EN 60584-1:1996	BS 1843	ANSI MC96.1	DIN 43714	JIS C 1610-1981
J	Iron/Constantan +20 to 700°C					
K	Nickel Chromium/ Nickel Aluminium 0 to 1100°C					
T	Copper/Constantan -185 to +300°C					
E	Nickel Chromium/ Constantan 0 to +800°C					
N	Nicrosil/Nisil 0 to +1100°C					
R	Platinum / 13% Rhodium +Platinum 0 to 1600°C					
S	Platinum / 10% Rhodium +Platinum 0 to 1550°C					
B	30% Rhodium+ Platinum / 6% Rhodium +Platinum 0 to 1600°C					
KCA Compensating for type K	Copper/Constantan (Low Nickel) 0 to +80°C					
RCA/SCA Compensating for type R&S	Copper/ Copper Nickel 0 to +50°C					

Thermocouple Tolerances: IEC 60584-2:1993 / BS EN 60584-1:2013

TYPE	Thermocouple Material	Tolerance Class 1	Tolerance Class 2	Tolerance Class 3
Type T	Copper/Constantan (Cu/Con)	-40 to +350°C (+/-0.5°C) or +/-t x 0.004	-40 to +350°C (+/-0.5°C) or +/-t x 0.0075	-200 to +40°C (+/-1.0°C) or +/-t x 0.015
Type J	Iron/Constantan (Fe/Con)	-40 to +750°C (+/-1.5°C) or +/-t x 0.004	-40 to +750°C (+/-2.5°C) or +/-t x 0.0075	
Type E	Nickel Chrome/Constantan (NiCr/Con)	-40 to +800°C (+/-1.5°C) or +/-t x 0.004	-40 to +900°C (+/-2.5°C) or +/-t x 0.0075	-200 to +40°C (+/-2.5°C) or +/-t x 0.015
Type K	Nickel Chrome/Nickel Aluminium (NiCr/NiAl)	-40 to +1000°C (+/-1.5°C) or +/-t x 0.004	-40 to +1200°C (+/-2.5°C) or +/-t x 0.0075	-200 to +40°C (+/-2.5°C) or +/-t x 0.0075
Type N	Nicrosil/Nisil (NiCrNi/NiSi)	-40 to +1000°C (+/-1.5°C) or +/-t x 0.004	-40 to +1200°C (+/-2.5°C) or +/-t x 0.0075	-40 to +1000°C (+/-1.5°C) or +/-t x 0.004
Type R	Platinum-13% Rhodium/Platinum (Pt-13Rh/Pt)	0.0 to +1600°C (+/-1.5°C) or +/-[1+(-1000)/0.003]	-40 to +1600°C (+/-1.5°C) or +/-t x 0.0025	
Type S	Platinum-10% Rhodium/Platinum (Pt-10Rh/Pt)	0.0 to +1600°C (+/-1.5°C) or +/-[1+(-1000)/0.003]	-40 to +1600°C (+/-1.5°C) or +/-t x 0.0025	
Type B	Platinum-30% Rhodium/Platinum-6% Rhodium (Pt-30Rh/Pt-6Rh)		+600 to +1700°C (+/-1.5°C) or +/-t x 0.0025	+600 to +1700°C (+/-4.0°C) or +/-t x 0.005

PT100 Information



General Information Temperature Conversion Equations

From Unit	To Unit	Formula
Fahrenheit	Celsius	$T(^{\circ}\text{C}) = [T(^{\circ}\text{F}) - 32] \times 5/9$
Celsius	Fahrenheit	$T(^{\circ}\text{F}) = T(^{\circ}\text{C}) \times 9/5 + 32$
Fahrenheit	Kelvin	$T(\text{K}) = [T(^{\circ}\text{F}) + 459.67] \times 5/9$
Celsius	Kelvin	$T(\text{K}) = T(^{\circ}\text{C}) + 273.15$

Approximate Maximum Service Temperature of Common Sheath Materials

Maximum Intermittent Service
Temperature in Dry Air

Material	°C
304 Stainless Steel	870
316 Stainless Steel	870
310 Stainless Steel	1050
Inconel 600	1150
Hastelloy C276	900