

RTD and Thermocouple Temperature Probes

Custom Made to Your Specifications

Welcome to Ashcroft

Your trusted source for temperature measurement solutions.

Selecting the right temperature sensor isn't simple. Demanding process conditions, hazardous environments, and strict compliance requirements all must factor into your decision.

You need a partner with the experience and expertise deliver the right solution how and when you need it.

Ashcroft's RTD and thermocouple solutions are custom built to your specifications, with thermowells, terminal heads, and hazardous-area approvals (FM, ATEX, IECEx) to match. And, when you need guidance, our team is here to help.

Contact us:

 +1 800-328-8258

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S01 RTD & Thermocouple DIN Inserts	S10 RTD & Thermocouple Probes with Metric Connections	S50 RTD & Thermocouple Probes with NPT Connections	S70 Probes with Tube Skin Connections
			
Thermocouple Types: J, K, T, E, N	Thermocouple Types: J, K, T, E, N	Thermocouple Types: J, K, T, E, N	Thermocouple Types: J, K, N
RTDs: 100 or 1000 Ohm, 2, 3, or 4 wire	RTDs: 100 or 1000 Ohm, 2, 3, or 4 wire	RTDs: 100 or 1000 Ohm, 2, 3, or 4 wire	RTDs: Available on request
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S80 & S81 Probes with Extension Cable	S40 & S41 Thermocouple Probes for High Temperature Applications	S96 Multipoint Temperature Assemblies	Thermowells
			
S80 Thermocouple Probe Thermocouple Types: J, K, T, E, N:	S40 Common Metal Sensor up to 1200 °C	Straight or Flexible Assemblies	Flanged, Threaded, Weld-in or Van Stone Thermowells
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S01 Industrial Temperature Sensor Insert

Sensor inserts for RTDs and thermocouples (types J, K, T, E, and N) feature mineral insulation and a DIN mounting plate with ceramic terminal block. They are available with or without a transmitter and typically used for probe replacements.

Applications

- Mounting in thermowells for protected, replaceable installation
- Direct contact mounting with the medium, provided the electrical terminal block is shielded from the environment
- Intrinsically safe and non-incendive applications with FM, ATEX, and IECEx approvals

Design

Each insert houses an RTD or thermocouple sensor in a protective metal sheath that supplies an electrical signal corresponding to the process temperature.

The connection head carries a ceramic terminal block for connecting the wires, attached by two screws with springs. The travel of this spring mounting assures best thermal conductivity, compensation of length tolerances in thermowells, and protection against vibration.

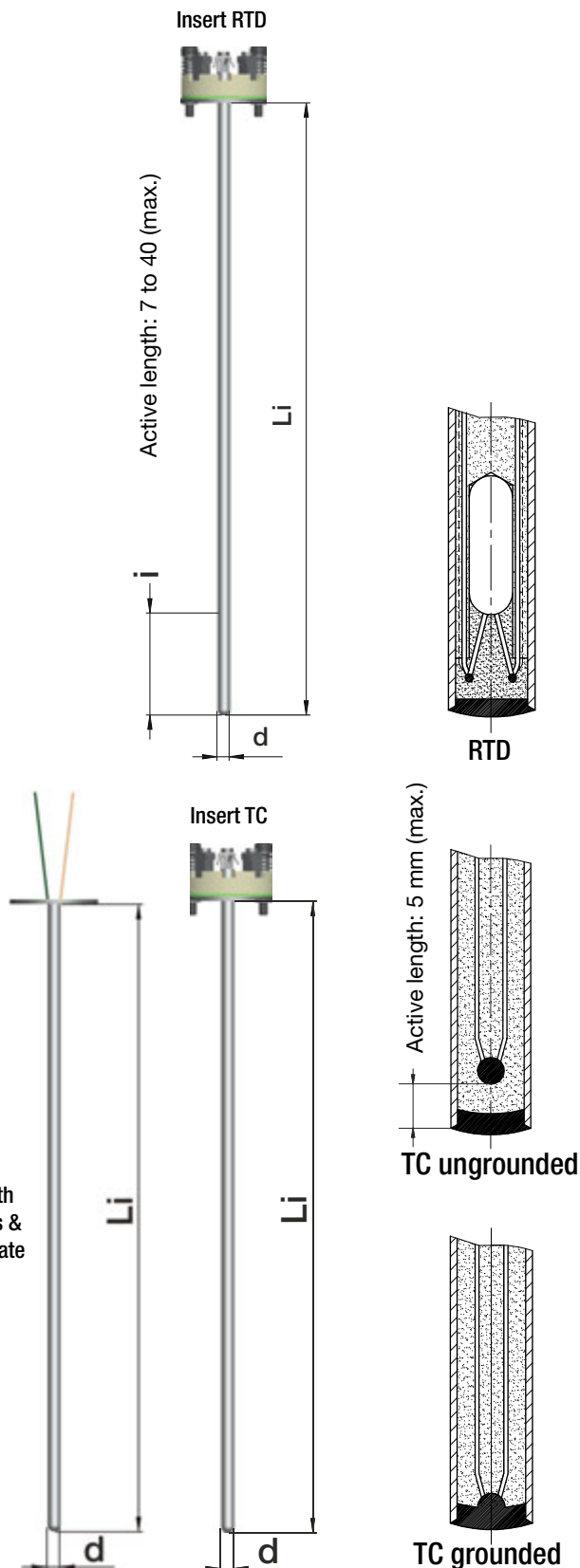


Ceramic terminal block or transmitter :

Size DIN B
Diam. 42 mm
Screw spring : 33 mm
Screw thread : M4 x 1.5
Spring travel : 8 to 10 mm

Insert RTD or TC
with transmitter

Insert TC with
Flying Leads &
Mounting Plate



S10 Industrial RTD & Thermocouples with Metric Connections

RTD and thermocouple probes (types J, K, T, E, and N) with mineral insulation and a DIN mounting plate are available with or without lag extension per DIN 43772.

Applications

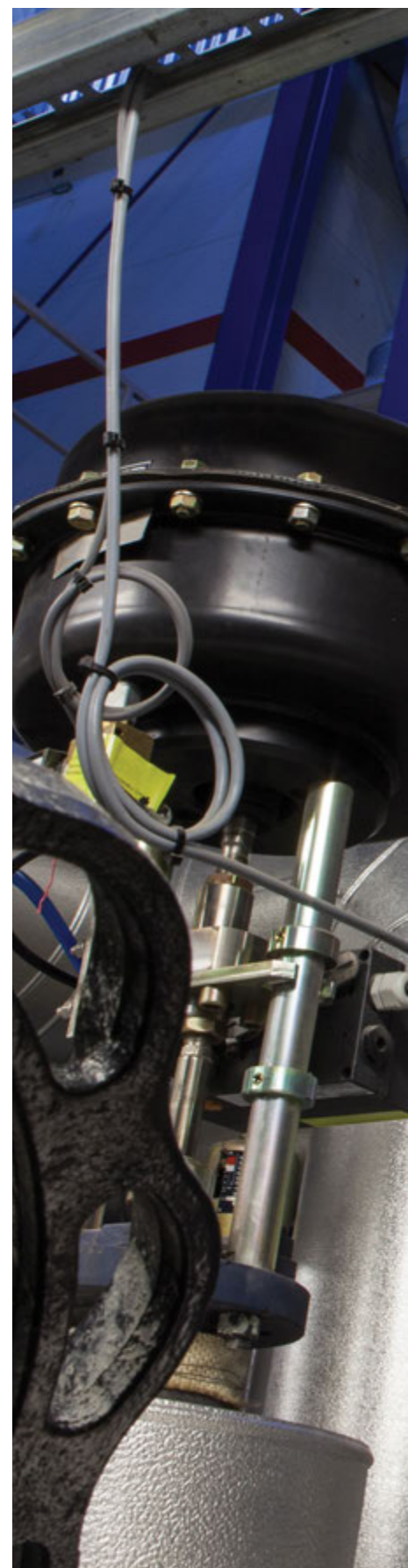
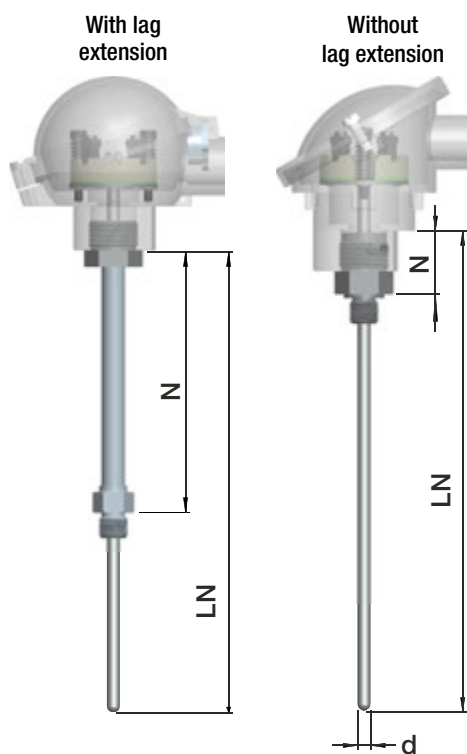
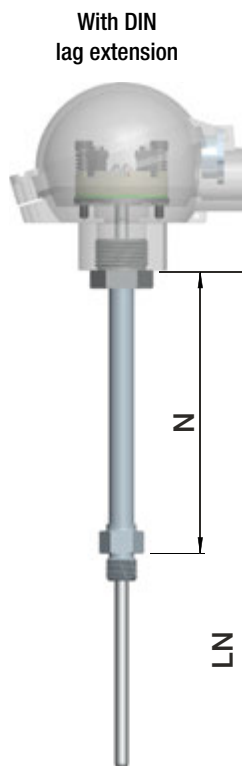
- Mounting on pipes, vessels, and equipment fitted with thermowells
- Intrinsically safe and non-incendive applications with FM, ATEX, and IECEx approvals

User Industries

- Oil & Gas
- Chemical, petrochemical
- Power generation

Design

These probes may be fitted with one or two RTDs or thermocouples. Each probe consists of a temperature sensor (insert), a connection head, and a lag extension, with standardized process connection, with or without compression fitting.



S50 Industrial RTD & Thermocouples with NPT Connections

RTD and thermocouple probes (types J, K, T, E, and N) with mineral insulation, are available with or without a lag extension. They are designed for mounting on pipes and vessels with process thermowells using standard NPT connections. These probes are available with a DIN mounting plate or a spring-loaded fitting design.

Applications

- Mounting on pipes and vessels with process thermowells
- Intrinsically safe, non-incendive, and explosion-proof applications with FM, ATEX, and IECEx approvals

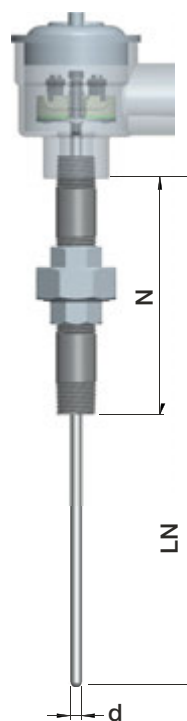
User Industries

- Oil & Gas
- Chemical, petrochemical
- Power generation
- Water, wastewater

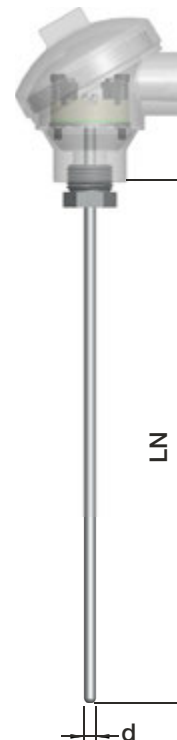
Design

These probes may be fitted with one or two RTDs or thermocouples. Each probe consists of a temperature sensor (insert), a connection head, a lag extension, and a standardized process connection with or without compression fitting.

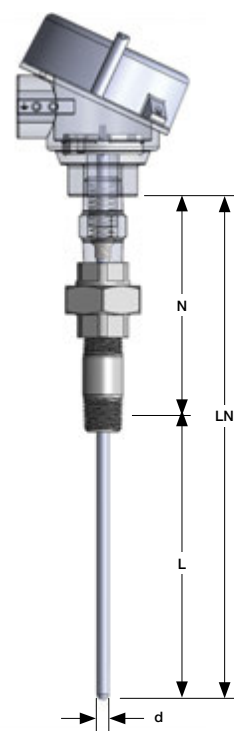
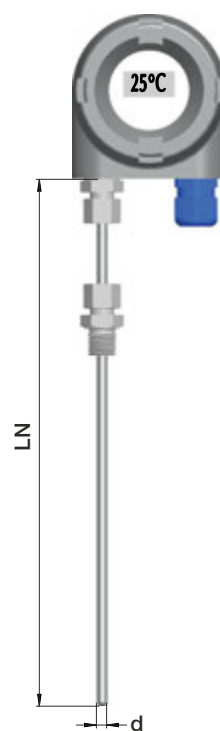
Nipple-Union
Nipple-extension



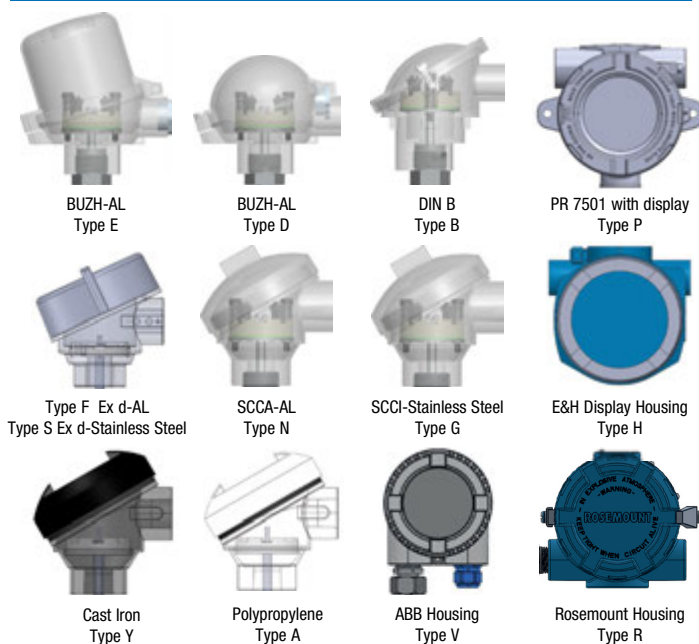
Without lag
extension



With
transmitter
and display



S50 HEADS





SPECIFICATIONS FOR S01, S10, S50

Sheath Diameter:

1/8", 3/16", 1/4", 3/8", 1/2", 3 mm, 4.5 mm, 6 mm, 8 mm, 10 mm

Sheath Length:

Minimum: 50 mm (2 in.)

Maximum: 3000 mm (120 in.)

Sensor Type & Measuring Range:

RTDs

Pt 100 -196 to 600 °C

Pt 1000 -40 to 600 °C

Thermocouples

Type J -40 to 750 °C

Type E -200 to 800 °C

Type K -200 to 1200 °C

Type N 0 to 1200 °C

Type T -200 to 350 °C

Wiring Configuration

RTDs Platinum 385

2 wire

3 wire

4 wire

Thermocouple

Single or Dual

Accuracy Class:

RTDs (IEC 60751)

Class A: $\pm(0.15 + 0.0020 \text{ Itl})$

Class B: $\pm(0.30 + 0.0050 \text{ Itl})$

Class AA: $\pm(0.10 + 0.0017 \text{ Itl})$

Thermocouples (ASTM E230)

	Type J	Type K	Type E	Type N	Type T
Standard	$\pm 2.2 \text{ °C or } \pm 0.0075 \text{ °Itl}^{(1)}$	$\pm 2.2 \text{ °C or } \pm 0.0075 \text{ °Itl}^{(1)}$	$\pm 1.7 \text{ °C or } \pm 0.0050 \text{ °Itl}^{(1)}$	$\pm 2.2 \text{ °C or } \pm 0.0040 \text{ °Itl}^{(1)}$	$\pm 1.0 \text{ °C or } \pm 0.0075 \text{ °Itl}^{(1)}$
Special	$\pm 1.1 \text{ °C or } \pm 0.0040 \text{ °Itl}^{(1)}$	$\pm 1.1 \text{ °C or } \pm 0.0040 \text{ °Itl}^{(1)}$	$\pm 1.0 \text{ °C or } \pm 0.0075 \text{ °Itl}^{(1)}$	$\pm 1.1 \text{ °C or } \pm 0.0040 \text{ °Itl}^{(1)}$	$\pm 0.5 \text{ °C or } \pm 0.0040 \text{ °Itl}^{(1)}$

(1) Absolute temperature in °C

Thermocouples (IEC 60584-2)

	Type J	Type K	Type E	Type N	Type T
Class 1	$\pm 1.5 \text{ °C or } \pm 0.0040 \text{ °Itl}^{(1)}$	$\pm 1.5 \text{ °C or } \pm 0.0040 \text{ °Itl}^{(1)}$	$\pm 1.5 \text{ °C or } \pm 0.0040 \text{ °Itl}^{(1)}$	$\pm 1.5 \text{ °C or } \pm 0.0040 \text{ °Itl}^{(1)}$	$\pm 0.5 \text{ °C or } \pm 0.0040 \text{ °Itl}^{(1)}$
Class 2	$\pm 2.5 \text{ °C or } \pm 0.0075 \text{ °Itl}^{(1)}$	$\pm 2.5 \text{ °C or } \pm 0.0075 \text{ °Itl}^{(1)}$	$\pm 2.5 \text{ °C or } \pm 0.0075 \text{ °Itl}^{(1)}$	$\pm 2.5 \text{ °C or } \pm 0.0040 \text{ °Itl}^{(1)}$	$\pm 1.0 \text{ °C or } \pm 0.0075 \text{ °Itl}^{(1)}$
Class 3	N/A	$\pm 2.5 \text{ °C or } \pm 0.0040 \text{ °Itl}^{(1)}$	$\pm 2.5 \text{ °C or } \pm 0.0150 \text{ °Itl}^{(1)}$	$\pm 2.5 \text{ °C or } \pm 0.0150 \text{ °Itl}^{(1)}$	$\pm 1.0 \text{ °C or } \pm 0.0150 \text{ °Itl}^{(1)}$

(1) Absolute temperature in °C

S70 Tube Skin Thermocouples

Thermocouple types J, K, and N for monitoring process temperature without the use of a thermowell. Skin type sensors accurately and reliably measure the temperature of a surface that the process media is in contact with without ever coming into contact with the media.

Applications

- Surface temperature measurement on steam pipes, inside or outside vessels and reactors
- Temperature measurement on walls or flat surfaces
- Intrinsically safe, non-incendive, and explosion-proof applications with FM, ATEX, and IECEx approvals

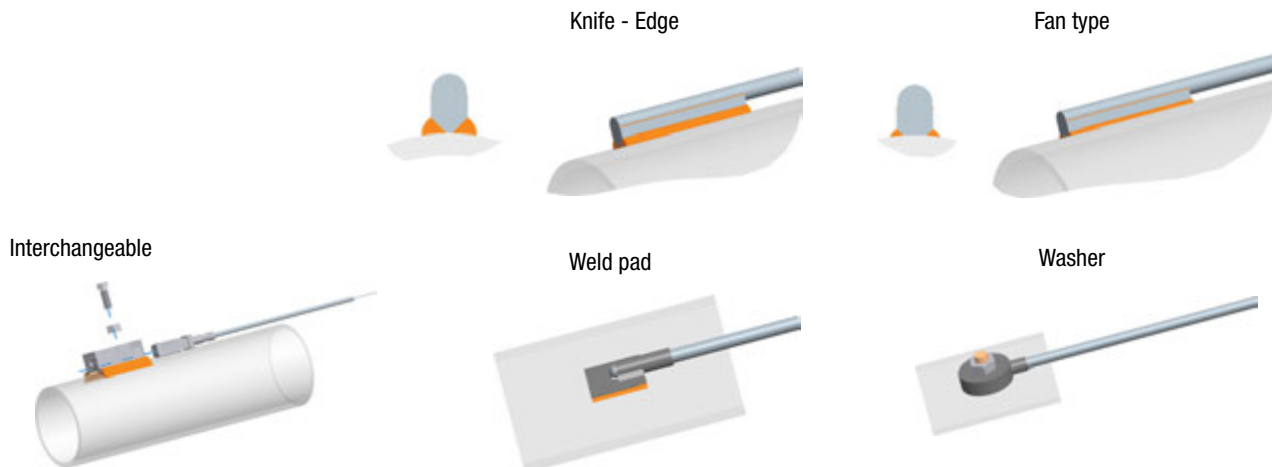
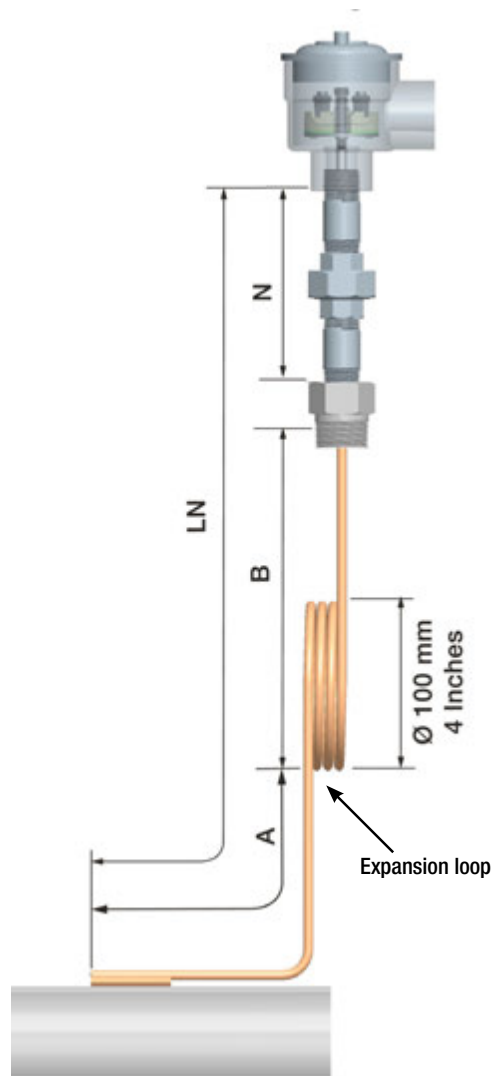
User Industries

- Oil & Gas
- Chemical, petrochemical
- Power generation
- Fired heaters, boilers, reactor vessel wall

Design

Each probe contains a single or dual thermocouple sensor inside a flexible metal sheath, with an optional connection head, lag extension, and compression fitting seal.

Expansion loops in the sheathed cable accommodate thermal expansion between the measurement point and process connection, while protecting against vibration-related cable failure. Washer thermocouples capture hot spots where needed.





SPECIFICATIONS FOR S70

Insert Stem Diameter:

¼", ⅜", ½", 6 mm, 8 mm, 10 mm

Stem Length:

Maximum: 100 m (328 ft.)

Sensor Type & Measuring Range:

Type J -40 to 750 °C

Type K -200 to 1200 °C

Type N 0 to 1200 °C

Wiring Configuration:

2 wire

Accuracy Class:

(ASTM E230)

Standard limits of error

Special limits of error

(IEC 60584-2)

Class 1

Class 2

Class 3

Mounting:

Knife-edge

Fan type

Washer

Interchangeable

Weld pad

Interchangeable with heat shield

Thermocouples (ASTM E230)

	Type J	Type K	Type N
Standard	±2.2 °C or ±0.0075* t ⁽¹⁾	±2.2 °C or ±0.0075* t ⁽¹⁾	±2.2 °C or ±0.0040* t ⁽¹⁾
Special	±1.1 °C or ±0.0040* t ⁽¹⁾	±1.1 °C or ±0.0040* t ⁽¹⁾	±1.1 °C or ±0.0040* t ⁽¹⁾

(1) Absolute temperature in °C

Thermocouples (IEC 60584-2)

	Type J	Type K	Type N
Class 1	±1.5 °C or ±0.0040* t ⁽¹⁾	±1.5 °C or ±0.0040* t ⁽¹⁾	±1.5 °C or ±0.0040* t ⁽¹⁾
Class 2	±2.5 °C or ±0.0075* t ⁽¹⁾	±2.5 °C or ±0.0075* t ⁽¹⁾	±2.5 °C or ±0.0075* t ⁽¹⁾
Class 3	N/A	±1.5 °C or ±0.0040* t ⁽¹⁾	±1.5 °C or ±0.0150* t ⁽¹⁾

(1) Absolute temperature in °C

S80 Thermocouple

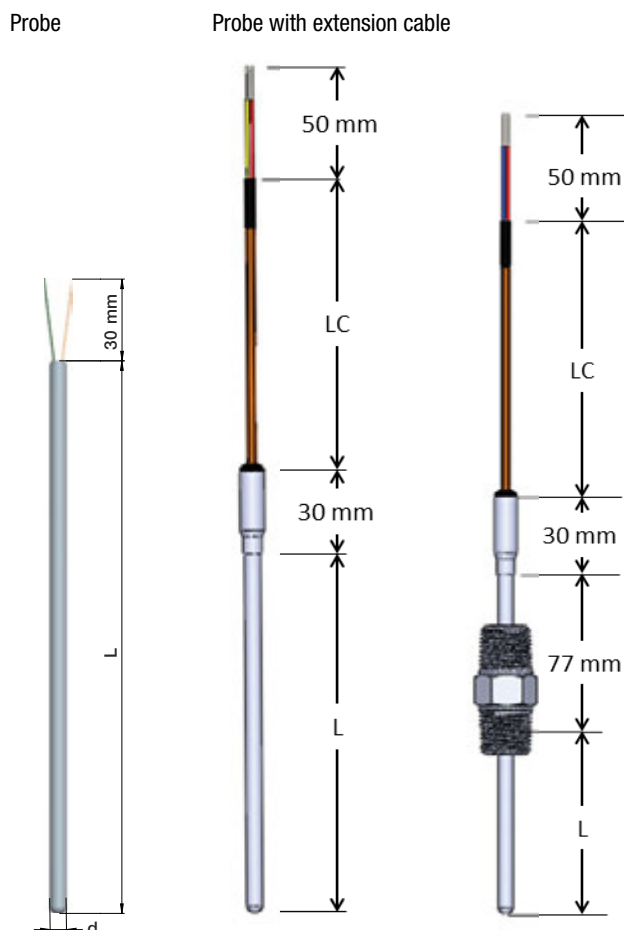
Thermocouple probes (types J, K, T, E, and N) with mineral insulation, are available with or without extension cables and with wire terminations or connectors.

Applications

- Flexible, small-size installations in machines and chemical plants
- Low-pressure, low-speed fluid applications requiring short response time
- Vapors, gases, liquids, and non-abrasive media compatible with the sheath material
- Installation on solid surfaces or in cavities
- Intrinsically safe and non-incendive applications with FM, ATEX, and IECEx approvals
- Remote head and flex armor configurations

Design

These probes may be supplied with one or two sensors placed inside a flexible metal sheath. An optional cable and process connection is available (with or without extension cable and process connection) on request. If fitted, the extension cable can be provided with PVC, silicone, PTFE or fiberglass insulation. The soldering between the extension cable and the sheathed cable is enclosed in a sleeve.



Round pin



Connector



Protection spring



Compression fitting



S81 RTD Probes

RTD probes (types Pt100 and Pt1000) available with or without extension cables and with wire terminations or connectors.

Applications

- Flexible, small-size installations in machines and chemical plants
- Low-pressure, low-speed fluid applications requiring short response time
- Vapors, gases, liquids, and non-abrasive media compatible with the sheath material
- Installation on solid surfaces or in cavities
- Intrinsically safe and non-incendive applications with FM, ATEX, and IECEx approvals
- Remote head and flex armor configurations

Design

These probes may be supplied with one or two sensors placed inside a flexible metal sheath. An optional cable and process connection is available (with or without extension cable and process connection) on request. If fitted, the extension cable can be provided with PVC, silicone, PTFE or fiberglass insulation. The soldering between the extension cable and the sheathed cable is enclosed in a sleeve.

Inset



Probe with extension lead wire



Round pin



Connector



Protection spring



Compression fitting



S40 Common Metal Sensors

Thermocouple probe types J, K or N, for temperatures up to 1200 °C, with common metal sensors in ceramic inserts, and with protection tubes in metal (AMK, AM) or in ceramic (AK) according to DIN EN 50446.

Applications

- Industrial ovens, including heat treatment and incineration
- Power engineering and reactors
- Chimney and combustion gas measurement (combustion gases)
- Annealing and heat treatment process
- Fusion baths for metal and glass
- Intrinsically safe and non-incendive applications with FM, ATEX, and IECEx approvals

Design

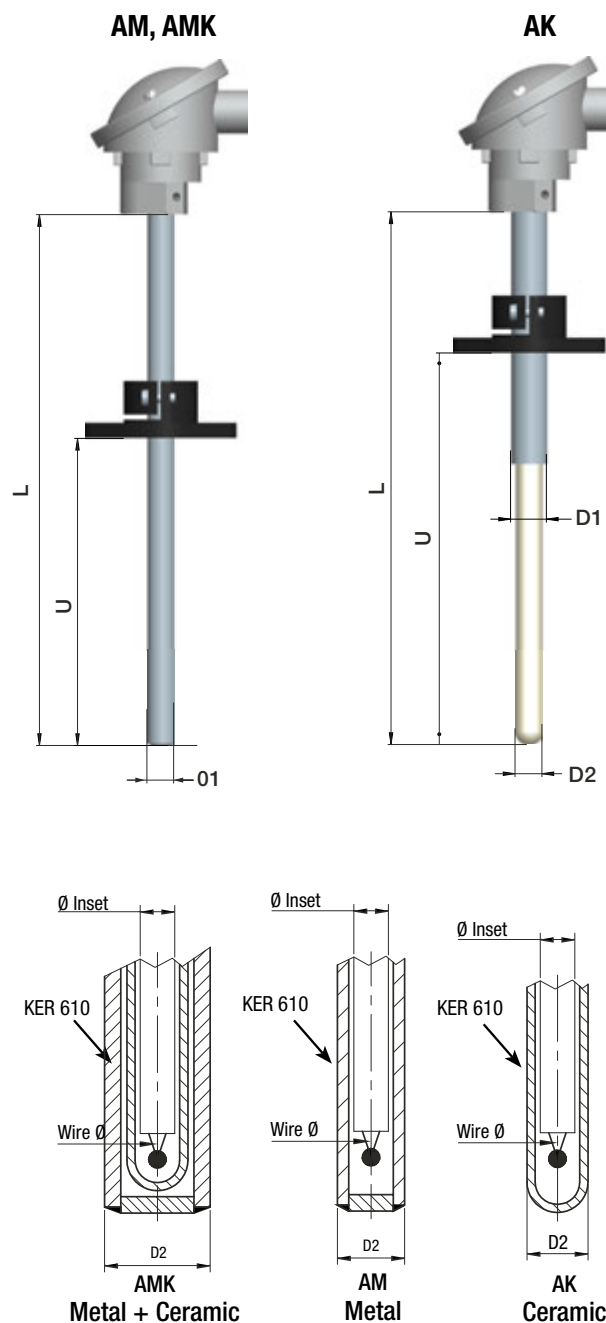
These probes are designed especially for measurement of temperatures up to 1200 °C, but under low pressures only (high pressure available on request). They have a ceramic or metal thermowell (in contact with the medium), which houses a ceramic insert containing either one or two thermocouple sensors in common metal. Each probe also has a process connection (adjustable flange or welded flange) and a connection head. The inserts can be replaced without removing the thermowell (provided this is undamaged) and without any process interruption.

Three types of protection tubes are available:

AM = Metal protection tubes

AMK = Protection tubes consisting of a metal outer tube and ceramic inner tube

AK = Protection tubes consisting of one ceramic tube and a metal process connection tube



S41 Precious Metal Sensor

Thermocouple probe types R, S or B for temperatures up to 1800 °C, with precious metal sensors in ceramic inserts, and with ceramic protection tubes (AKK, AK) according to DIN EN 50446.

Applications

- Industrial ovens, including heat treatment and incineration
- Power engineering and reactors
- Combustion gases
- Annealing and heat treatment process
- Fusion baths for metal and glass
- Special designs for intrinsically safe and non-incendive applications with FM, ATEX, and IECEx approvals

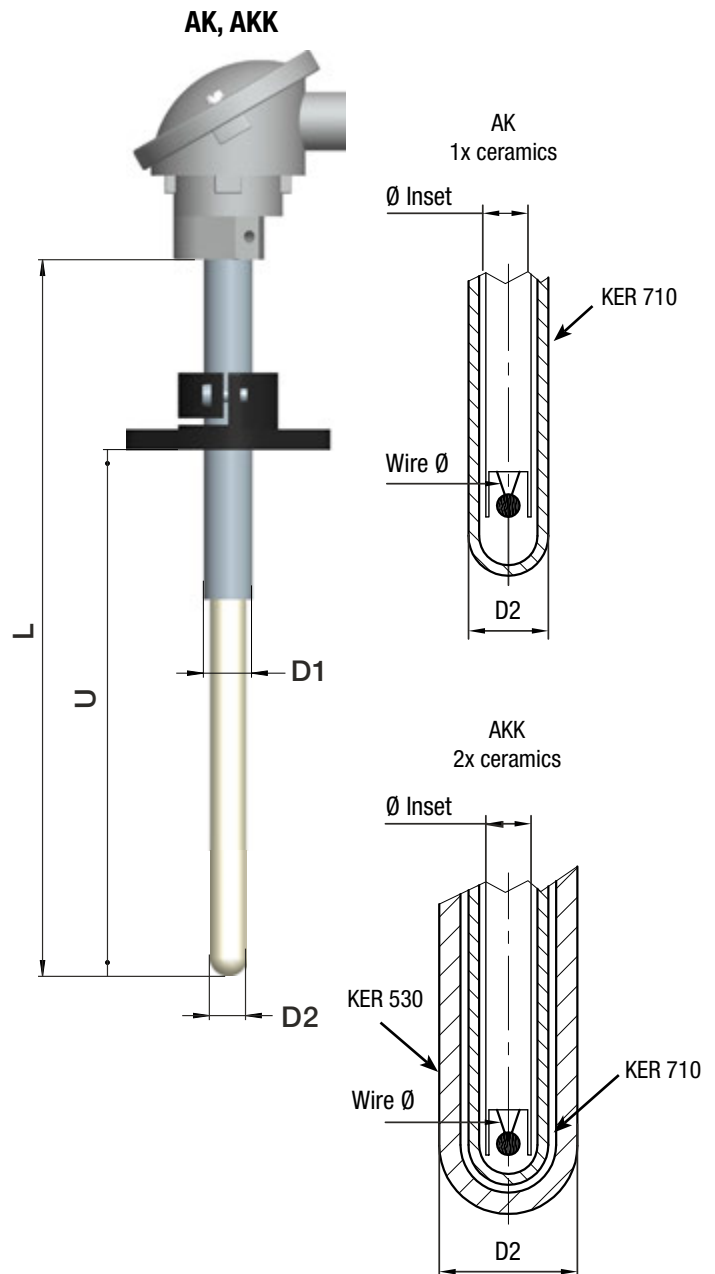
Design

These probes are designed especially for measurement of temperatures up to 1800 °C, but under low pressures only (high pressure available on request). They include a ceramic thermowell (in contact with the medium), which houses a ceramic insert containing either one or two thermocouple sensor(s) in precious metal. Each probe also has a process connection (adjustable flange or welded flange) and a connection head. The inserts can be replaced without removing the protection tubes (provided this is undamaged) and without any process interruption.

Two types of protection tubes are available:

AK = Protection tubes consisting of one single ceramic tube and a metal process connection tube

AKK = Protection tubes consisting of two ceramic tubes and a metal process connection tube



S96 Straight or Flexible Multipoint Assemblies

Applications

- Mounting in chemical, petrochemical, and pharmaceutical reactors and vessels
- Accommodation of a wide range of insert diameters and lengths up to 1,000 ft (300 m)

User Industries

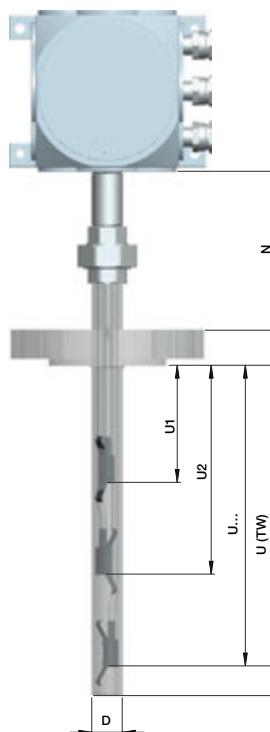
- Oil & Gas
- Chemical
- Power generation
- Hydrocracker
- Hydrotreating

Design

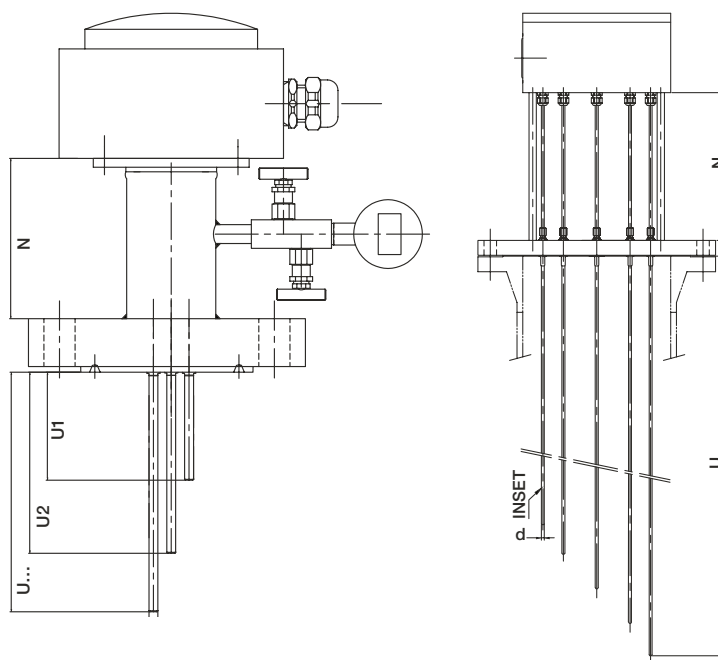
These probes incorporate multiple RTD and thermocouple sensors for:

- Precise process temperature measurement for optimal conversion
- Catalyst bed inlet differential temperature measurement to ensure proper distribution
- Temperature excursion indication in high-temperature/high-pressure reactors
- Reliable operation in hydrocracking and severe hydrotreating units

**S96-SX
Straight Multipoint**



**S96-FX
Flexible Multipoint**



Thermowells

Thermowells isolate and protect temperature sensing instruments from pressurized, high-velocity, and corrosive process media while allowing sensor removal without shutting down the process. Available in a variety of materials, sizes, and configurations, thermowells help extend instrument and process service life.

Flanged

Flanged thermowells are used in high-pressure and high-velocity applications where robust mechanical protection and process isolation are required.

Key Features

- One piece bar stock
- Wide selection of materials
- Selection of shank styles
- Stamped with date code, material, and heat numbers
- Wake frequency calculation available

Specifications

- Raised face, flat face, and ring joint versions (ASME B16.5)
- Process connection: 1, 1½ and 2 NPT
- Bore size: 0.260", 0.385"
- Flange ratings: 150, 300, 600, 900, 1,500 and 2,500 class



Threaded

Threaded thermowells are a versatile solution for general industrial applications requiring simple installation and easy sensor replacement. Commonly used in utility, OEM, and process systems.

Key Features

- Straight, stepped or tapered designs
- One piece bar stock construction
- Wide selection of sizes, material and dimensions
- Stamped with date code, material, and heat numbers
- Wake frequency calculation available

Specifications

- Process connection: ½, ¾ and 1 NPT
- Bore size: 0.260", 0.385"



Weld-in

The weld-in design of these thermowells are used for sanitary and contamination-sensitive applications where a smooth, crevice-free connection helps minimize product buildup and supports easier cleaning.

Key Features

- Wide selection of materials
- Stamped with date code, material, and heat numbers
- Wake frequency calculation available

Specifications

- Process connection: 1½
- Bore size: 0.260", 0.385"



Van Stone

Van Stone thermowells are designed for installation between existing flanges in process piping systems, such as chemical and petrochemical plants, where alignment flexibility and simplified installation are required.

Key Features

- Wide selection of materials
- Stamped with date code, material, and heat numbers
- Wake frequency calculation available

Specifications

- Fits: 1" and 1½" lap joint flanges
- Bore size: 0.260", 0.385"



Visit our website to learn more about Ashcroft's instruments for measuring temperature



Watch video to learn about RTDs and thermocouples.



Visit our Resource Center for blog articles, videos and solution guides.

Related blog articles:

- [When to Use an RTD vs. a Thermocouple Temperature Sensor](#)
- [What are Important Features of Temperature Sensors?](#)
- [How Much Does a Temperature Sensor Cost?](#)
- [How to Select the Right RTD Sensing Element for Your Application](#)
- [Why Fully Certified Thermocouples and RTDs are Critical for Hazardous Locations](#)

Contact us:

 + 1 800-328-8258

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