

▶ SECTION 2: ASSEMBLIES

- Easy-to-order temperature sensor assemblies to fit a variety of applications
- RTDs, thermocouples, and transmitters
- Fittings, connection heads, and thermowells included
- Tip-sensitive, high temperature, explosionproof, and flameproof options

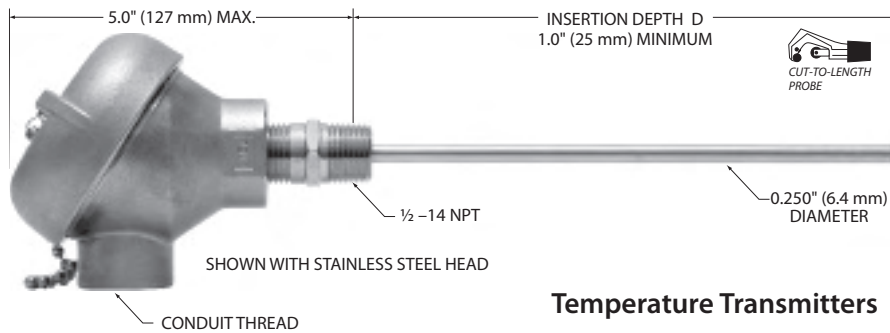
To specify custom assemblies see:

Probes	Section 3
Accessories	Section 4
Transmitters	Section 5

To specify humidity assemblies see Section 9

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Tip-sensitive Spring-loaded RTDs



Overview

Fast and accurate readings from bearings, blocks, and other solids. Minco's spring-loaded holder ensures solid contact in drilled holes and has a built-in oil seal. The sensing probe features a copper alloy tip for quick response to temperature changes.

- Tip-sensitive RTD probe for use to 260°C (500°F)
- Spring-loaded holder with fluid seal
- Cast iron, stainless steel, or aluminum connection head

Specifications

Temperature range: -50 to 260°C (-58 to 500°F).

Material:

Probe: Stainless steel with copper alloy tip.

Holder: Stainless steel with Viton O-ring.

Connection head: Cast iron, aluminum, or stainless steel.

Pressure rating: 50 psi (3.4 bar).

Insulation resistance: 100 megohms minimum at 100 VDC, leads to case.

Connection: Terminal block for wires to AWG 14.

Time constant: Typical value in moving water:

Single element: 1.5 seconds.

Dual element: 3.0 seconds.

Sensing Elements

Element		Code
Platinum (0.00392 TCR)	100 Ω ±0.5% at 0°C	PA
Platinum (0.00385 TCR) (Meets EN60751, Class B)	100 Ω ±0.1% at 0°C	PD
Platinum (0.00385 TCR)	100 Ω ±0.5% at 0°C	PE
Copper (0.00427 TCR)	10 Ω ±0.2% at 25°C	CA
(dual)	10 Ω ±0.5% at 25°C	CC
Nickel (0.00672 TCR)	120 Ω ±0.5% at 0°C	NA

Temperature Transmitters

Minco's Temptran™ RTD transmitters provide a 4 to 20 mA signal that can be sent over long distances with a simple 2-wire system. Add any Minco model transmitter (except electrically isolated models). See Section 5 for complete details and ordering information.

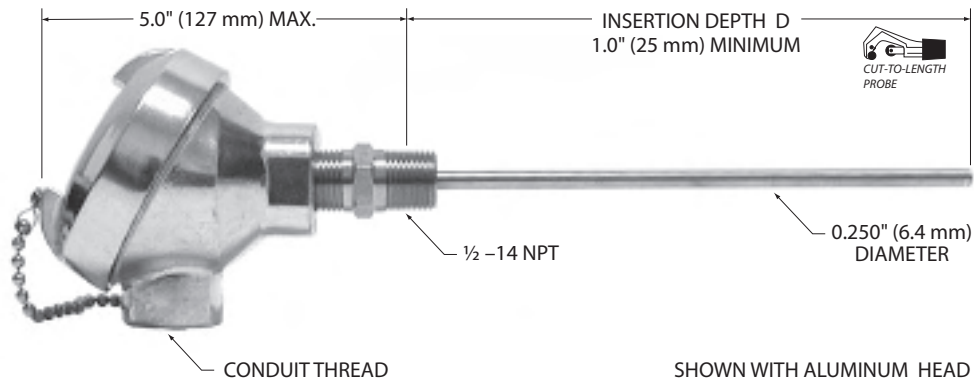
Special high-accuracy calibration: For guaranteed system accuracy of ± 0.75% of temperature span, specify transmitters with high accuracy calibration. Calibration data traceable to NIST will also be provided. Get more information on page 5-18.

Specification and order options

AS5004	Assembly number AS5004: Single element RTD AS5005: Dual element RTD
PA	Sensing element from table
67	Insertion depth D: Specify in 0.1" increments (Ex: 67 = 6.7 inches)
Y	Leads per sensing element: Y = 2 leads Z = 3 leads (required for CA and CC elements) X = 4 leads (PD elements only)
2	Conduit thread: 1 = 1/2 - 14 NPT 2 = 3/4 - 14 NPT
C	Connection head: C = Cast iron A = Aluminum S = Stainless steel
To order sensor assembly, stop here. To order with transmitters (single platinum element only, 2 or 3 leads) add:	
211	Temptran™ transmitter model: 211 = TT211: 2-lead RTDs 176 = TT176: 3-lead RTDs 711 = TT711: 2-lead RTDs, match calibrated 676 = TT676: 3-lead RTDs, match calibrated
A	Temperature range codes on page 5-16 or at www.minco.com/rangecode/
AS5004PA67Y2C211A = Sample part number	

Specifications subject to change

Tip-sensitive Spring-loaded Thermocouples



ASSEMBLIES

Overview

Fast and accurate readings from bearings, blocks, and other solids. Minco's spring-loaded holder ensures solid contact in drilled holes and has a built-in oil seal. The sensing probe features a copper alloy tip for quick response to temperature changes.

- Tip-sensitive Thermocouple for use to 260°C (500°F)
- Spring-loaded holder with fluid seal
- Cast iron, stainless steel, or aluminum connection head

Specifications

Temperature range: -50 to 260°C (-58 to 500°F).

Material:

Probe: Stainless steel with copper alloy tip.
 Holder: Stainless steel with Viton O-ring.
 Connection head: Cast iron, aluminum, or stainless steel.

Pressure rating: 50 psi (3.4 bar).

Insulation resistance: 10 megohms minimum at 100 VDC, leads to case. Ungrounded junctions only.

Connection: Terminal block for wires to AWG 14.

Time constant: Typical value in moving water:

Grounded junction: 1.5 seconds.

Ungrounded junction: 7 seconds

Temperature Transmitters

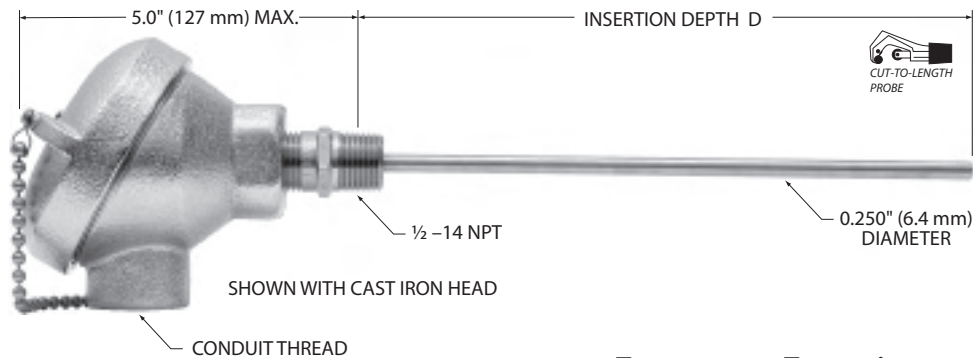
Minco's Tempran™ thermocouple transmitters provide a 4 to 20 mA signal that can be sent over long distances with a simple 2-wire system. See Section 5 for complete details and ordering information.

Specification and order options

AS5192	Assembly number AS5191: Single junction AS5192: Dual junction
E	Junction type: E = Chromel-Constantan J = Iron-Constantan K = Chromel-Alumel T = Copper-Constantan
U	Junction grounding: G = Grounded U = Ungrounded
133	Insertion depth D: Specify in 0.1" increments (Ex: 133 = 13.3 inches)
P	
1	Conduit thread: 1 = 1/2 - 14 NPT 2 = 3/4 - 14 NPT
C	Connection head: C = Cast iron A = Aluminum S = Stainless steel
To order sensor assembly, stop here. To order with transmitter, add:	
190	Tempran™ transmitter model: 190 = TT190, standard 205 = TT205, miniature
A	Temperature range codes on page 5-16 or at www.minco.com/rangecode/
AS5192EU133P1C190A = Sample part number	

Specifications subject to change

Tip-sensitive Direct Immersion RTDs



Overview

Mount sensors directly in fluid flow for fast response. Probes are rated to 100 psi (6.9 bar). For use in non-corrosive fluids only.

- RTD probe for use to 260°C (500°F)
- Adjustable fluid seal fitting
- Cast iron, stainless steel, or aluminum connection head

Specifications

Temperature range: -50 to 260°C (-58 to 500°F).

Material:

Probe: Stainless steel with copper alloy tip.
 Fitting: Stainless steel, silicone rubber O-ring.
 Connection head: Cast iron, aluminum, or stainless steel.

Pressure rating: 100 psi (6.9 bar).

Insulation resistance: 100 megohms minimum at 100 VDC, leads to case.

Connection: Terminal block for wires to AWG 14.

Time constant: Typical value in moving water:
 Single element: 2.0 seconds.
 Dual element: 5.0 seconds.

Sensing elements

Element		Code
Platinum (0.00392 TCR)	100 Ω ±0.5% at 0°C	PA
Platinum (0.00385 TCR) (Meets EN60751, Class B)	100 Ω ±0.1% at 0°C	PD
Platinum (0.00385 TCR)	100 Ω ±0.5% at 0°C	PE
Copper (0.00427 TCR)	10 Ω ±0.2% at 25°C	CA
(dual)	10 Ω ±0.5% at 25°C	CC
Nickel (0.00672 TCR)	120 Ω ±0.5% at 0°C	NA

Temperature Transmitters

Minco's Temptran™ RTD transmitters provide a 4 to 20 mA signal that can be sent over long distances with a simple 2-wire system. Add any Minco model transmitter (except electrically isolated models). See Section 5 for complete details and ordering information.

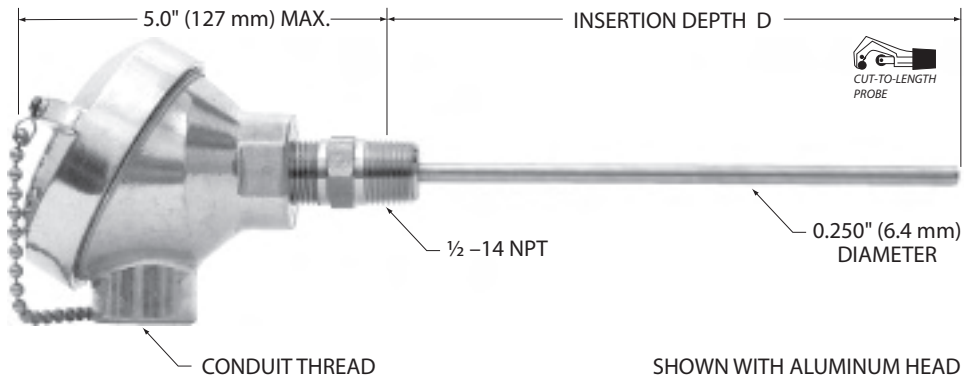
Special high-accuracy calibration: For guaranteed system accuracy of ± 0.75% of temperature span, specify transmitters with high accuracy calibration. Calibration data traceable to NIST will also be provided. Get more information on page 5-18.

Specification and order options

AS5200	Assembly number AS5200: Single element AS5201: Dual element
PD	Sensing element from table
100	Insertion depth D: Specify in 0.1" increments (Ex: 100 = 10.0 inches)
Z	Leads per sensing element: Y = 2 leads Z = 3 leads (required for CA and CC elements) X = 4 leads (PD elements only)
2	Conduit thread: 1 = 1/2 - 14 NPT 2 = 3/4 - 14 NPT
C	Connection head: C = Cast iron A = Aluminum S = Stainless steel
To order sensor assembly, stop here. To order with transmitters (single platinum element only, 2 or 3 leads) add:	
211	Temptran™ transmitter model: 211 = TT211: 2-lead RTDs 176 = TT176: 3-lead RTDs 711 = TT711: 2-lead RTDs, match calibrated 676 = TT676: 3-lead RTDs, match calibrated
A	Temperature range codes on page 5-16 or at www.minco.com/rangecode/
AS5200PD100Z2C211A = Sample part number	

Specifications subject to change

Tip-sensitive Direct Immersion Thermocouples



ASSEMBLIES

Overview

Mount sensors directly in fluid flow for fast response. Probes are rated to 100 psi (6.9 bar). For use in non-corrosive fluids only.

- Thermocouple for use to 260°C (500°F)
- Adjustable fluid seal fitting
- Cast iron, stainless steel, or aluminum connection head

Specifications

Temperature range: -50 to 260°C (-58 to 500°F).

Material:

Probe: Stainless steel with copper alloy tip.
 Fitting: Stainless steel, silicone rubber O-ring.
 Connection head: Cast iron, aluminum, or stainless steel.

Pressure rating: 100 psi (6.9 bar).

Insulation resistance: 10 megohms minimum at 100 VDC, leads to case. Ungrounded junctions only.

Connection: Terminal block for wires to AWG 14.

Time constant: Typical value in moving water:

Grounded junction: 1.5 seconds.

Ungrounded junction: 7 seconds.

Temperature Transmitters

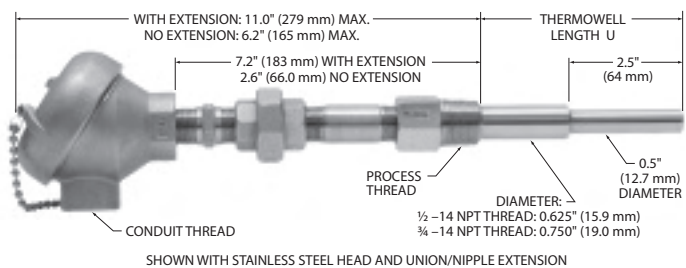
Minco's Temptran™ thermocouple transmitters provide a 4 to 20 mA signal that can be sent over long distances with a simple 2-wire system. See Section 5 for complete details and ordering information.

Specification and order options

AS5205	Assembly number AS5205: Single junction AS5206: Dual junction
E	Junction type: E = Chromel-Constantan J = Iron-Constantan K = Chromel-Alumel T = Copper-Constantan
U	Junction grounding: G = Grounded U = Ungrounded
215	Insertion depth D: Specify in 0.1" increments (Ex: 215 = 21.5 inches)
P	
1	Conduit thread: 1 = 1/2 - 14 NPT 2 = 3/4 - 14 NPT
C	Connection head: C = Cast iron A = Aluminum S = Stainless steel
To order sensor assembly, stop here. To order with transmitter, add:	
190	Temptran™ transmitter model: 190 = TT190, standard 205 = TT205, miniature
A	Temperature range codes on page 5-16 or at www.minco.com/rangecode/
AS5205EU215P1C190A = Sample part number	

Specifications subject to change

Tip-sensitive RTDs with Thermowells



Overview

Thermowells protect sensors from the effects of fluid flow and pressure. These assemblies are spring-loaded for positive probe contact against the bottom of the thermowell. The probe's copper alloy tip provides superior time response and reduces error from stem conduction.

- 316 stainless steel thermowell
- Tip-sensitive RTD probe for use to 260°C (500°F)
- Spring-loaded probe
- Cast iron, stainless steel, or aluminum connection head

Specifications

Temperature range: -50 to 260°C (-58 to 500°F).

Material:

Probe: Stainless steel with copper alloy tip.
 Connection head: Cast iron, aluminum, or stainless steel.
 Thermowell: 316 stainless steel.
 Extension: Stainless steel.

Pressure rating: 7000 psi (483 bar) at 21°C, reducing to 6300 psi (433 bar) at 260°C.

Standard U dimensions: 2.5, 4.5, 6.0, 7.5, 8.0, 10.5, 13.5, 16.5, and 22.5".

Insulation resistance: 100 megohms minimum at 100 VDC, leads to case.

Connection: Terminal block for wires to AWG 14.

Time constant: 17 seconds typical in moving water.

Sensing elements

Element		Code
Platinum (0.00392 TCR)	100 Ω ±0.5% at 0°C	PA
Platinum (0.00385 TCR) (Meets EN60751, Class B)	100 Ω ±0.1% at 0°C	PD
Platinum (0.00385 TCR)	100 Ω ±0.5% at 0°C	PE
Copper (0.00427 TCR)	10 Ω ±0.2% at 25°C	CA
(dual)	10 Ω ±0.5% at 25°C	CC
Nickel (0.00672 TCR)	120 Ω ±0.5% at 0°C	NA

Temperature Transmitters

Minco's Temptran™ RTD transmitters provide a 4 to 20 mA signal that can be sent over long distances with a simple 2-wire system. Add any Minco model transmitter (except electrically isolated models). See Section 5 for complete details and ordering information.

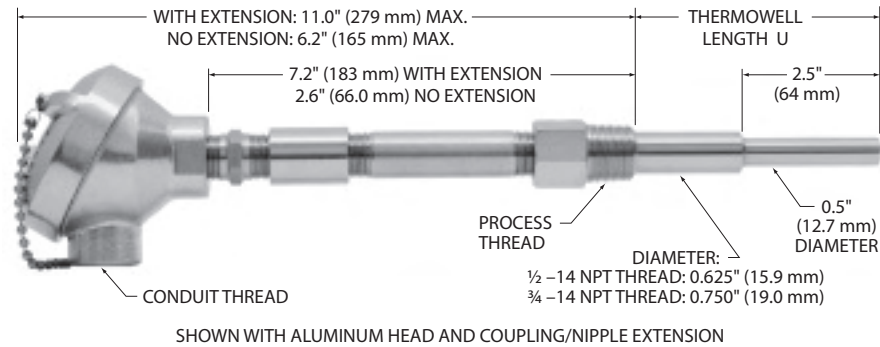
Special high-accuracy calibration: For guaranteed system accuracy of ± 0.75% of temperature span, specify transmitters with high accuracy calibration. Calibration data traceable to NIST will also be provided. Get more information on page 5-18.

Specification and order options

AS5140	Assembly number AS5140: Single element RTD AS5141: Dual element RTD
CA	Sensing element from table
60	Thermowell length U: Specify in 0.1" increments (Ex: 60 = 6.0 inches)
Z	Leads per sensing element: Y = 2 leads Z = 3 leads (required for CA and CC elements) X = 4 leads (PD elements only)
2	Conduit thread: 1 = 1/2 - 14 NPT 2 = 3/4 - 14 NPT
C	Connection head: C = Cast iron A = Aluminum S = Stainless steel
1	Thermowell process thread: 1 = 1/2 - 14 NPT 2 = 3/4 - 14 NPT
U	Extension option: P = Coupling/nipple extension N = No extension U = Union/Nipple extension
To order sensor assembly, stop here. To order with transmitters (single platinum element only, 2 or 3 leads) add:	
211	Temptran™ transmitter model: 211 = TT211: 2-lead RTDs 176 = TT176: 3-lead RTDs 711 = TT711: 2-lead RTDs, match calibrated 676 = TT676: 3-lead RTDs, match calibrated
A	Temperature range codes on page 5-16 or at www.minco.com/rangecode
AS5140CA60Z2C1U211A = Sample part number	

Specifications subject to change

Tip-sensitive Thermocouples with Thermowells



Overview

Thermowells protect sensors from the effects of fluid flow and pressure. These assemblies are spring-loaded for positive probe contact against the bottom of the thermowell. The probe's copper alloy tip provides superior time response and reduces error from stem conduction.

- 316 stainless steel thermowell
- Tip-sensitive thermocouple for use to 260°C (500°F)
- Spring-loaded probe
- Cast iron, stainless steel, or aluminum connection head

Specifications

Temperature range: -50 to 260°C (-58 to 500°F).

Material:

Probe: Stainless steel with copper alloy tip.
 Connection head: Cast iron, aluminum, or stainless steel.
 Thermowell: 316 stainless steel.
 Extension: Stainless steel.

Pressure rating: 7000 psi (483 bar) at 21°C, reducing to 6300 psi (433 bar) at 260°C.

Standard U dimensions: 2.5, 4.5, 6.0, 7.5, 8.0, 10.5, 13.5, 16.5, and 22.5".

Insulation resistance: 10 megohms min. at 100 VDC, leads to case. Ungrounded junctions only.

Connection: Terminal block for wires to AWG 14.

Time constant: Typical value in moving water.

Grounded junction: 17 seconds.

Ungrounded junction: 22 seconds.

Temperature Transmitters

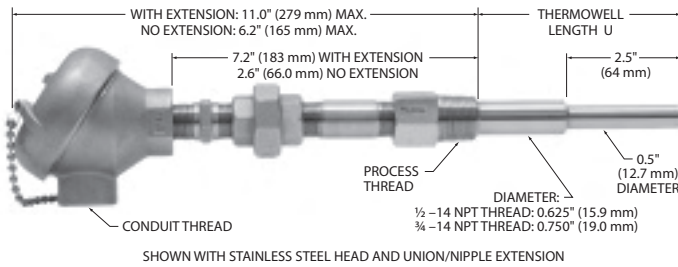
Minco's Temptran™ thermocouple transmitters provide a 4 to 20 mA signal that can be sent over long distances with a simple 2-wire system. See Section 5 for complete details and ordering information.

Specification and order options

AS5145	Assembly number AS5145: Single junction TC AS5146: Dual junction TC
E	Junction type: E = Chromel-Constantan J = Iron-Constantan K = Chromel-Alumel T = Copper-Constantan
U	Junction Grounding: G = Grounded U = Ungrounded
135	Thermowell length U: Specify in 0.1" increments (Ex: 135 = 13.5 inches)
P	
1	Conduit thread: 1 = 1/2 - 14 NPT 2 = 3/4 - 14 NPT
C	Connection head: C = Cast iron A = Aluminum S = Stainless steel
1	Thermowell process thread: 1 = 1/2 - 14 NPT 2 = 3/4 - 14 NPT
U	Extension option: P = Coupling/nipple extension N = No extension U = Union/Nipple extension
To order sensor assembly, stop here.	
To order with transmitter, add:	
190	Temptran™ transmitter model: 190 = TT190, standard 205 = TT205, miniature
A	Temperature range codes on page 5-16 or at www.minco.com/rangecode/
AS5145EU135P1C1U190A = Sample part number	

Specifications subject to change

550°C RTDs with Thermowells



Overview

Sense temperature in high-pressure fluids and gases. These assemblies are spring-loaded for positive probe contact against the bottom of the thermowell.

- 316 stainless steel thermowell
- RTD probe for use to 550°C (1022°F)
- Spring-loaded probe
- Cast iron, stainless steel, or aluminum connection head

Note: For temperatures less than 260°C (500°F), assemblies using tip-sensitive sensors are recommended.

Specifications

Temperature range:

Thermowell and sensor: -100 to 550°C (-148 to 1022°F).

Connection head:

- Cast iron: 260°C (500°F) max.
- Aluminum: 316°C (600°F) max.
- Stainless steel: 121°C (250°F) max.

Material:

- Probe: 316 stainless steel.
- Connection head: Cast iron, aluminum, or stainless steel.
- Thermowell: 316 stainless steel.
- Extension: Stainless steel.

Pressure rating: 7000 psi (483 bar) at 21°C, reducing to 2500 psi (172 bar) at 550°C.

Standard U dimensions: 2.5, 4.5, 6.0, 7.5, 8.0, 10.5, 13.5, 16.5, and 22.5".

Insulation resistance: 10 megohms min. at 100 VDC, leads to case.

Connection: Terminal block for wires to 14 AWG.

Time constant: 23 seconds typical in moving water.

Sensing elements

Element		Code
Platinum (0.00391 TCR)	100 Ω ±0.1% at 0°C	PB
Platinum (0.00385 TCR) (Meets EN60751, Class B)	100 Ω ±0.1% at 0°C	PD

Temperature Transmitters

Minco's Tempran™ RTD transmitters provide a 4 to 20 mA signal that can be sent over long distances with a simple 2-wire system. Add any Minco model transmitter (except electrically isolated models). See Section 5 for complete details and ordering information.

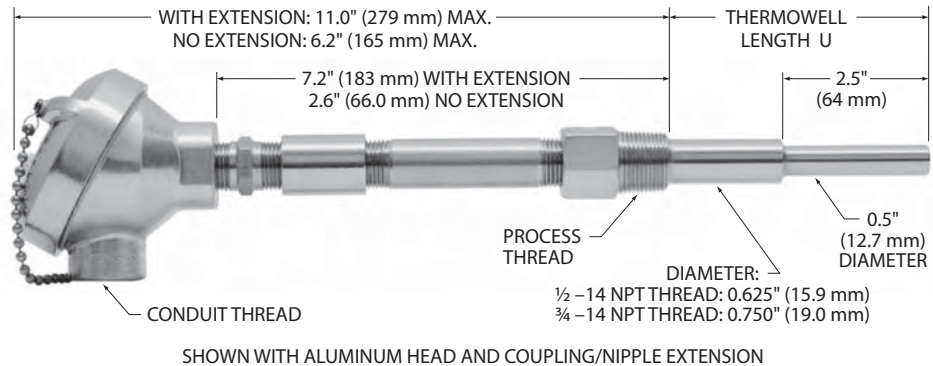
Special high-accuracy calibration: For guaranteed system accuracy of ± 0.75% of temperature span, specify transmitters with high accuracy calibration. Calibration data traceable to NIST will also be provided. Get more information on page 5-18.

Specification and order options

AS5160	Assembly number AS5160
PB	Sensing element from table
105	Thermowell length U: Specify in 0.1" increments (Ex: 105 = 10.5 inches)
Z	Leads per sensing element: Y = 2 leads Z = 3 leads X = 4 leads (PD elements only)
2	Conduit thread: 1 = 1/2 - 14 NPT 2 = 3/4 - 14 NPT
C	Connection head: C = Cast iron A = Aluminum S = Stainless steel
1	Thermowell process thread: 1 = 1/2 - 14 NPT 2 = 3/4 - 14 NPT
U	Extension option: P = Coupling/nipple extension N = No extension U = Union/Nipple extension
To order sensor assembly, stop here. To order with transmitters (2 or 3 leads), add:	
211	Tempran™ transmitter model: 211 = TT211: 2-lead RTDs 176 = TT176: 3-lead RTDs 711 = TT711: 2-lead RTDs, match calibrated 676 = TT676: 3-lead RTDs, match calibrated
A	Temperature range codes on page 5-16 or at www.minco.com/rangecode/
AS5160PB105Z2C1U211A = Sample part number	

Specifications subject to change

550°C Thermocouples with Thermowells



Overview

Sense temperature in high-pressure fluids and gases. These assemblies are spring-loaded for positive probe contact against the bottom of the thermowell.

Note: For temperatures less than 260°C (500°F), assemblies using tip-sensitive sensors are recommended.

- 316 stainless steel thermowell
- Thermocouple probe for use to 550°C (1022°F)
- Spring-loaded probe
- Cast iron, aluminum or stainless steel connection head

Specifications

Temperature range:

Thermowell and sensor: -100 to 550°C (-148 to 1022°F).

Connection head:

- Cast iron: 260°C (500°F) max.
- Aluminum: 316°C (600°F) max.
- Stainless steel: 121°C (250°F) max.

Material:

Probe: 316 stainless steel.
 Connection head: Cast iron, aluminum, or stainless steel.
 Thermowell: 316 stainless steel.
 Extension: Stainless steel.

Pressure rating: 7000 psi (483 bar) at 21°C, reducing to 2500 psi (172 bar) at 550°C.

Standard U dimensions:

2.5, 4.5, 6.0, 7.5, 8.0, 10.5, 13.5, 16.5, and 22.5".

Insulation resistance: 10 megohms min. at 100 VDC, leads to case. Ungrounded junctions only.

Connection: Terminal block for wires to 14 AWG.

Time constant: 60 seconds typical in moving water.

Specify and order products at:
www.minco.com/sensors_config

Temperature Transmitters

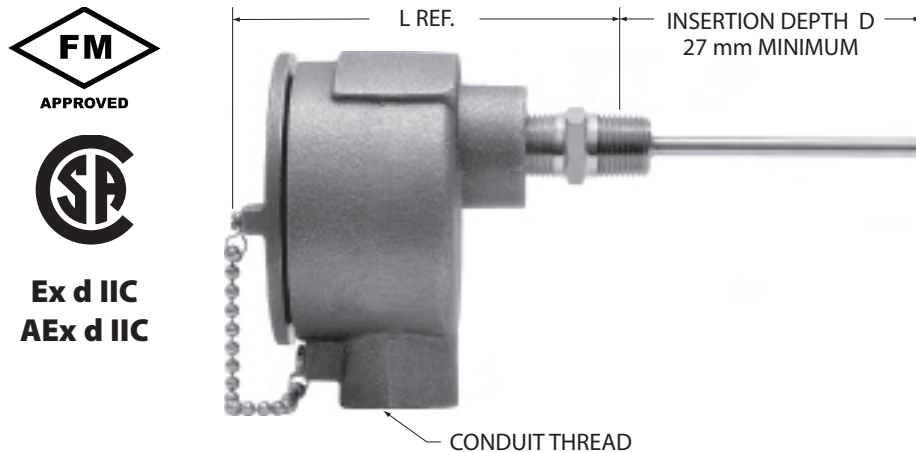
Minco's Temptran™ thermocouple transmitters provide a 4 to 20 mA signal that can be sent over long distances with a simple 2-wire system. See Section 5 for complete details and ordering information.

Specification and order options

AS5165	Assembly number: AS5165
K	Junction type: E = Chromel-Constantan J = Iron-Constantan K = Chromel-Alumel
U	Junction Grounding: G = Grounded U = Ungrounded
135	Thermowell length U: Specify in 0.1" increments (Ex: 135 = 13.5 inches)
P	
1	Conduit thread: 1 = 1/42 - 14 NPT 2 = 3/44 - 14 NPT
C	Connection head: C = Cast iron A = Aluminum S = Stainless steel
1	Thermowell process thread: 1 = 1/42 - 14 NPT 2 = 3/44 - 14 NPT
U	Extension option: P = Coupling/nipple extension N = No extension U = Union/Nipple extension
To order sensor assembly, stop here. To order with transmitter, add:	
190	Temptran™ transmitter model: 190 = TT190, standard 205 = TT205, miniature
A	Temperature range codes on page 5-16 or at www.minco.com/rangecode/
AS5165KU135P1C1U190A = Sample part number	

Specifications subject to change

Explosionproof/Flameproof RTD Sensors



Overview

Explosionproof and flameproof rating for hazardous areas where accurate temperature sensing is critical.

- Tip sensitive, all stainless or MgO filled probes available
- Hazardous area rated

Specifications

Temperature range: -50 to 260°C (-58 to 500°F).

Material:

Probe: Stainless steel (tip sensitive models have copper alloy tip).

Holder: Stainless steel.

Connection head:

Copper free aluminum alloy (CH104)

316L stainless steel (CH106).

Pressure rating: See table on next page.

Insulation resistance: 10 megohms min. at 100 VDC, leads to case.

Connection: Terminal block for wires to 14 AWG.

Time constant: Typical value in moving water.

Tip sensitive:

Single element 1.5 seconds.

Dual element 5 seconds.

All stainless and MgO filled: 10 seconds.

Explosionproof and flameproof ratings:

National and Canadian Electrical Code:

Class I, Divisions 1 and 2, Groups B, C, and D,
Class II, Groups E, F, and G,

T6 (Ta = 40°C),

T2 (Ta = 260°C). Ta limited to 160°C for CSA Class II locations.

National Electrical Code (Article 505):

Class I, Zones 1 and 2, AEx d IIC,

T6 (Ta = 40°C), T2 (Ta = 260°C).

Canadian Electrical Code (IEC 60079):

Zones 1 and 2, Ex d IIC,

T6 (Ta = 40°C), T2 (Ta = 260°C).

Hazardous area requirements

Refer to Minco's Application Aid #19 entitled "Specifying Temperature Sensors for Hazardous Areas" for more information on how to classify a hazardous area, methods of protection, and the various standards and agencies (including FM, CSA, CENELEC and ATEX). Application Aid #19 is available at www.minco.com/sensoraid/.

Specifications subject to change

Assembly numbers

Probe diameters	0.215" (5.5 mm)		0.236" (6.0 mm)		0.250" (6.4 mm)	
Number of elements	Single	Dual	Single	Dual	Single	Dual
Tip-sensitive	AS760	AS761	AS700	AS701	AS720	AS721
All stainless	AS762	AS763	AS702	AS703	AS722	AS723
MgO filled (platinum only)			AS704		AS724	AS725

Connection head and fitting options

CH104: Aluminum IP65, Type 3 and 4.

CH106: 316L stainless steel IP66, Type 3, 4, and 4X.

Fitting	Process thread	Pressure Rating	L REF.	Head	Code
Welded	1/2 - 14 NPT	200 psi (13.8 bar)	4.4" (112 mm)	CH104	0*
Welded	1/2 - 14 NPT	200 psi (13.8 bar)	4.2" (106 mm)	CH106	1*
Welded	G 1/2	200 psi (13.8 bar)	4.2" (107 mm)	CH104	2*
Welded	G 1/2	200 psi (13.8 bar)	4.0" (101 mm)	CH106	3*
Adjustable spring-loaded	1/2 - 14 NPT	50 psi (3.4 bar)	5.7" (144 mm)	CH104	4
Adjustable spring-loaded	1/2 - 14 NPT	50 psi (3.4 bar)	5.4" (138 mm)	CH106	5
Adjustable spring-loaded	G 1/2	50 psi (3.4 bar)	5.7" (144 mm)	CH104	6
Adjustable spring-loaded	G 1/2	50 psi (3.4 bar)	5.4" (138 mm)	CH106	7
Fixed spring-loaded	1/2 - 14 NPT	None	4.4" (112 mm)	CH104	8**
Fixed spring-loaded	1/2 - 14 NPT	None	4.2" (106 mm)	CH106	9**

* 0.250 diameter only for all stainless and MgO probes.

** 0.236 and 0.250 diameters only for fixed spring-loaded fittings.

Note: Connection head dimensions are found on pages 4-2 to 4-3.

Sensing elements

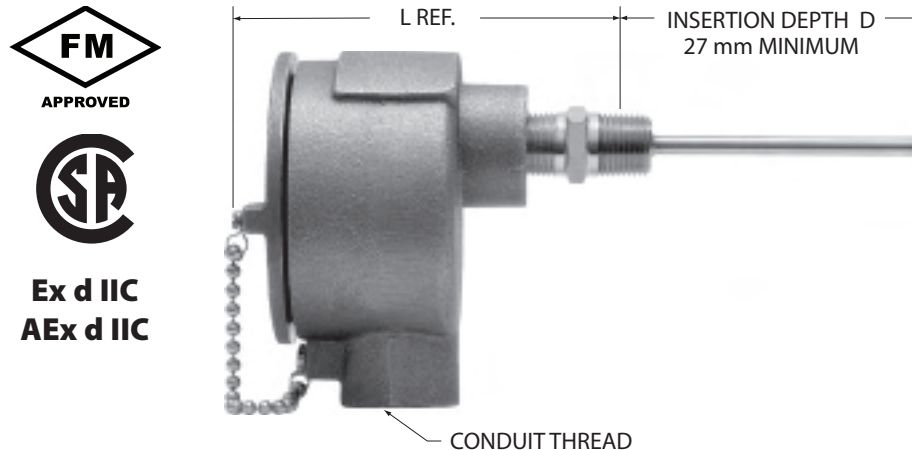
Element	Code	Code	
		Single	Dual
Platinum (0.00392 TCR) 100 Ω \pm 0.5% at 0°C	PA	PAPA	
Platinum (0.00385 TCR) 100 Ω \pm 0.1% at 0°C (Meets EN60751, Class B)	PD	PDPD	
Platinum (0.00385 TCR) 100 Ω \pm 0.06% at 0°C (Meets EN60751, Class A)	PM	PMPM	
Platinum (0.00385 TCR) 100 Ω \pm 0.5% at 0°C	PE	PEPE	
Platinum (0.00375 TCR) 1000 Ω \pm 0.12% at 0°C	PW	PWPW	
Copper (0.00427 TCR) 10 Ω \pm 0.2% at 25°C	CA		
(dual) 10 Ω \pm 0.5% at 25°C		CCCC	
Nickel (0.00672 TCR) 120 Ω \pm 0.5% at 0°C	NA	NANA	
Nickel (0.00618 TCR) 100 Ω \pm 0.22% at 0°C	NB	NBNB	

Specification and order options

AS720	Assembly number from table
4	Connection head/fitting from table
PD	Sensing element from table
100	Insertion depth D (in mm): (43–1219 mm)
X	Leads per sensing element: Y = 2 leads (n/a for copper) Z = 3 leads X = 4 leads (n/a for dual models)
3	Conduit thread: 3 = 1/2 - 14 NPT 4 = 3/4 - 14 NPT
AS7204PD100X3 = Sample part number	

Specifications subject to change

Explosionproof/Flameproof Thermocouple Sensors



Overview

Explosionproof and flameproof rating for hazardous areas where accurate temperature sensing is critical.

- Tip sensitive, all stainless or MgO filled probes available
- Hazardous area rated

Specifications

Temperature range: -50 to 260°C (-58 to 500°F).

Material:

Probe: Stainless steel (tip sensitive models have copper alloy tip).

Holder: Stainless steel.

Connection head:

- Copper free aluminum alloy (CH104)
- 316L stainless steel (CH106).

Pressure rating: See table on next page.

Insulation resistance: 10 megohms min. at 100 VDC, leads to case. Ungrounded junctions only.

Connection: Terminal block for wires to 14 AWG.

Time constant: Typical value in moving water.

Tip sensitive:

- Grounded 1.5 seconds.
- Ungrounded 7 seconds.

MgO filled:

- Grounded: 1.5 seconds.
- Ungrounded: 5.0 seconds.

Explosionproof and flameproof ratings:

National and Canadian Electrical Code:

Class I, Divisions 1 and 2, Groups B, C, and D,
Class II, Groups E, F, and G,

T6 (Ta = 40°C),

T2 (Ta = 260°C). Ta limited to 160°C for CSA Class II locations.

National Electrical Code (Article 505):

Class I, Zones 1 and 2, AEx d IIC,

T6 (Ta = 40°C), T2 (Ta = 260°C).

Canadian Electrical Code (IEC 60079):

Zones 1 and 2, Ex d IIC,

T6 (Ta = 40°C), T2 (Ta = 260°C).

Temperature Transmitters

Minco's Temptran™ RTD transmitters provide a 4 to 20 mA signal that can be sent over long distances with a simple 2-wire system. Add any Minco model transmitter (except electrically isolated models). See Section 5 for complete details and ordering information.

Note: Order thermocouple Temptran™ transmitters separately

Hazardous area requirements

Refer to Minco's Application Aid #19 entitled "Specifying Temperature Sensors for Hazardous Areas" for more information on how to classify a hazardous area, methods of protection, and the various standards and agencies (including FM, CSA, CENELEC and ATEX). Application Aid #19 is available at www.minco.com/sensoraid/.

Specifications subject to change

Connection head and fitting options

CH104: Aluminum IP65, Type 3 and 4.

CH106: 316L stainless steel IP66, Type 3, 4, and 4X.

Fitting	Process thread	Pressure Rating	L REF.	Head	Code
Welded	1/2 - 14 NPT	200 psi (13.8 bar)	4.4" (112 mm)	CH104	0*
Welded	1/2 - 14 NPT	200 psi (13.8 bar)	4.2" (106 mm)	CH106	1*
Welded	G 1/2	200 psi (13.8 bar)	4.2" (107 mm)	CH104	2*
Welded	G 1/2	200 psi (13.8 bar)	4.0" (101 mm)	CH106	3*
Adjustable spring-loaded	1/2 - 14 NPT	50 psi (3.4 bar)	5.7" (144 mm)	CH104	4
Adjustable spring-loaded	1/2 - 14 NPT	50 psi (3.4 bar)	5.4" (138 mm)	CH106	5
Adjustable spring-loaded	G 1/2	50 psi (3.4 bar)	5.7" (144 mm)	CH104	6
Adjustable spring-loaded	G 1/2	50 psi (3.4 bar)	5.4" (138 mm)	CH106	7
Fixed spring-loaded	1/2 - 14 NPT	None	4.4" (112 mm)	CH104	8**
Fixed spring-loaded	1/2 - 14 NPT	None	4.2" (106 mm)	CH106	9**

* 0.250 diameter only for all stainless and MgO probes.

** 0.236 and 0.250 diameters only for fixed spring-loaded fittings.

Note: Connection head dimensions are found on pages 4-2 to 4-3.

Assembly numbers

Probe diameters	0.215" (5.5 mm)		0.236" (6.0 mm)		0.250" (6.4 mm)	
	Single	Dual	Single	Dual	Single	Dual
Tip-sensitive	AS766	AS767	AS706	AS707	AS726	AS727
MgO filled			AS708	AS709	AS728	AS729

Specification and order options

AS706	Assembly number from table
4	Connection head/fitting from table
E	Junction type from table
U	Junction Grounding: G = Grounded U = Ungrounded
100	Insertion depth D (in mm): (37–3000 mm)
P	
3	Conduit thread: 3 = 1/2 - 14 NPT 4 = 3/4 - 14 NPT
AS7064EU100P3 = Sample part number	

Order thermocouple transmitters separately.

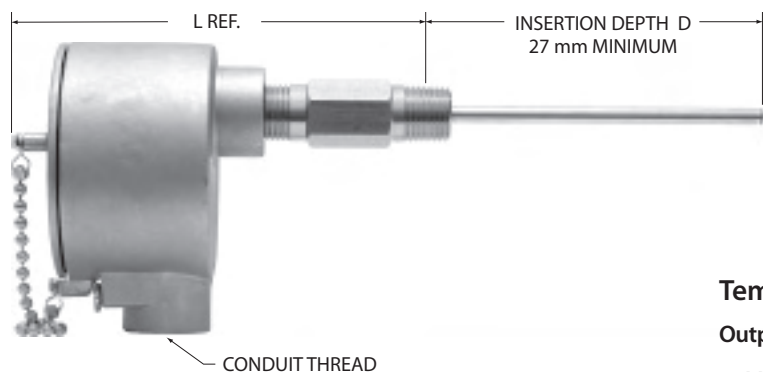
See section 5 for details.

Junction types

Thermocouple Junction	Code	
	Single	Dual
Chromel-Constantan	E	EE
Iron-Constantan	J	JJ
Chromel-Alumel	K	KK
Copper-Constantan	T	TT

Specifications subject to change

Explosionproof/Flameproof RTDs with Transmitters



Ex d IIC
AEx d IIC

Overview

- Tip sensitive, all stainless or MgO filled RTD probe
- Temptran™ transmitter for long signal path

Specifications

Temperature range: -50 to 260°C (-58 to 500°F).

Material:

Probe: Stainless steel (tip sensitive models have copper alloy tip).

Holder: Stainless steel.

Connection head:

Copper free aluminum alloy (CH104)

316L stainless steel (CH106).

Pressure rating: See table on next page.

Insulation resistance: 10 megohms min. at 100 VDC, leads to case.

Connection: Terminal block for wires to 14 AWG.

Time constant: Typical value in moving water.

Tip sensitive:

Single element 1.5 seconds.

Dual element 5 seconds.

All stainless and MgO filled: 10 seconds.

Explosionproof and flameproof ratings:

National and Canadian Electrical Code:

Class I, Divisions 1 and 2, Groups B, C, and D,

Class II, Groups E, F, and G,

T6 (Ta = 40°C),

T2 (Ta = 260°C). Ta limited to 160°C for CSA Class II locations.

National Electrical Code (Article 505):

Class I, Zones 1 and 2, AEx d IIC,

T6 (Ta = 40°C), T2 (Ta = 260°C).

Canadian Electrical Code (IEC 60079):

Zones 1 and 2, Ex d IIC,

T6 (Ta = 40°C), T2 (Ta = 260°C).

Temperature Transmitters

Output: 4 to 20 mA over specified range, linear with temperature.

Calibration accuracy: ±0.1% of span. For guaranteed system accuracy of ± 0.75% of span, specify a match calibrated transmitter. Get more information on page 5-18.

Linearity: 0.1% of span.

Adjustments: Zero and span, ±5% of span. Factory calibrated to nominal R/T curve.

Ambient operating temperature:

TT211, TT711: -25 to 85°C (-13 to 185°F).

TT176, TT676: -40 to 85°C (-40 to 185°F).

Supply voltage: 10 to 35 VDC.

Maximum load resistance:

$$R_{loop\ max} = \frac{V_{supply} - 10}{0.020\ \text{amps}}$$

Leadwires:

TT211, TT711: 2-lead RTD.

TT176, TT676: 3-lead RTD for resistance compensation.

Physical: Epoxy potted for moisture resistance.

Mounting: Transmitter mounts in connection head.

Hazardous area requirements

Refer to Minco's Application Aid #19 entitled "Specifying Temperature Sensors for Hazardous Areas" for more information on how to classify a hazardous area, methods of protection, and the various standards and agencies (including FM, CSA, CENELEC and ATEX). Application Aid #19 is available at www.minco.com/sensoraid/.

Specifications subject to change

Connection head and fitting options

CH104: Aluminum IP65, Type 3 and 4.

CH106: 316L stainless steel IP66, Type 3, 4, and 4X.

Fitting	Process thread	Pressure Rating	L REF.	Head	Code
Welded	1/2 - 14 NPT	200 psi (13.8 bar)	4.4" (112 mm)	CH104	0*
Welded	1/2 - 14 NPT	200 psi (13.8 bar)	4.2" (106 mm)	CH106	1*
Welded	G 1/2	200 psi (13.8 bar)	4.2" (107 mm)	CH104	2*
Welded	G 1/2	200 psi (13.8 bar)	4.0" (101 mm)	CH106	3*
Adjustable spring-loaded	1/2 - 14 NPT	50 psi (3.4 bar)	5.7" (144 mm)	CH104	4
Adjustable spring-loaded	1/2 - 14 NPT	50 psi (3.4 bar)	5.4" (138 mm)	CH106	5
Adjustable spring-loaded	G 1/2	50 psi (3.4 bar)	5.7" (144 mm)	CH104	6
Adjustable spring-loaded	G 1/2	50 psi (3.4 bar)	5.4" (138 mm)	CH106	7
Fixed spring-loaded	1/2 - 14 NPT	None	4.4" (112 mm)	CH104	8**
Fixed spring-loaded	1/2 - 14 NPT	None	4.2" (106 mm)	CH106	9**

* 0.250 diameter only for all stainless and MgO probes.

** 0.236 and 0.250 diameters only for fixed spring-loaded fittings.

Note: Connection head dimensions are found on page 4-2.

Temperature transmitter range codes

Popular ranges below.

More range codes on page 5-16 and at www.minco.com/rangecode/

Code	Range	
EO	-50 to 100°C	-58 to 212°F
BC	-30 to 30°C	-22 to 86°F
S	-17.8 to 37.8°C	0 to 100°F
AC	-17.8 to 93.3°C	0 to 200°F
AN	-17.8 to 148.9°C	0 to 300°F
AG	-17.8 to 260°C	0 to 500°F
AP	-6.7 to 21.1°C	20 to 70°F
A	-6.7 to 48.9°C	20 to 120°F
N	0 to 50°C	32 to 122°F
C	0 to 100°C	32 to 212°F
J	0 to 150°C	32 to 302°F
K	0 to 200°C	32 to 392°F
V	10 to 65.6°C	50 to 150°F
P	37.8 to 179.4°C	100 to 355°F
BH	50 to 150°C	122 to 302°F

Assembly numbers

Probe diameters	0.215" (5.5 mm)	0.236" (6.0 mm)	0.250" (6.4 mm)
Tip-sensitive	AS760	AS700	AS720
All stainless	AS762	AS702	AS722
MgO filled		AS704	AS724

Sensing elements

Element		Code	
		Single	Dual
Platinum (0.00392 TCR)	100 Ω ±0.5% at 0°C	PA	PAPA
Platinum (0.00385 TCR)	100 Ω ±0.1% at 0°C (Meets EN60751, Class B)	PD	PDPD
Platinum (0.00385 TCR)	100 Ω ±0.06% at 0°C (Meets EN60751, Class A)	PM	PMPM
Platinum (0.00385 TCR)	100 Ω ±0.5% at 0°C	PE	PEPE
Platinum (0.00375 TCR)	1000 Ω ±0.12% at 0°C	PW	PWPW
Copper (0.00427 TCR) (dual)	10 Ω ±0.2% at 25°C	CA	
	10 Ω ±0.5% at 25°C		CCCC
Nickel (0.00672 TCR)	120 Ω ±0.5% at 0°C	NA	NANA
Nickel (0.00618 TCR)	100 Ω ±0.22% at 0°C	NB	NBNB

Specification and order options

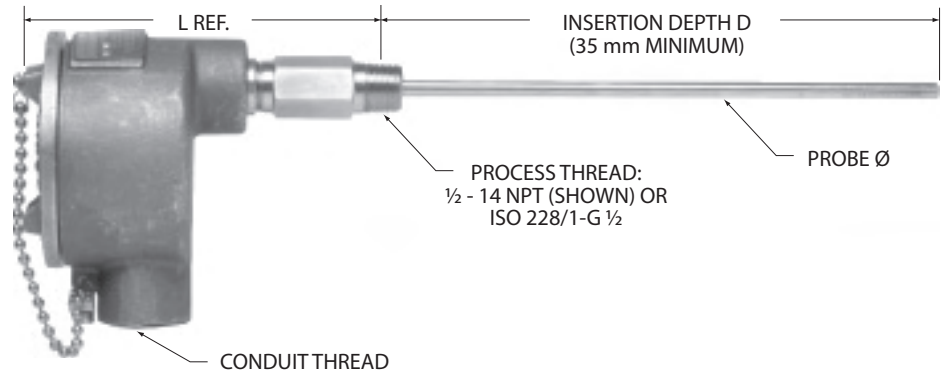
AS720	Assembly number from table
4	Connection head/fitting from table
PD	Sensing element from table
100	Insertion depth D (in mm): (43-1219 mm)
X	Leads per sensing element: Y = 2 leads (n/a for copper) Z = 3 leads X = 4 leads (n/a for dual models)
3	Conduit thread: 3 = 1/2 - 14 NPT 4 = 3/4 - 14 NPT
TT176	Temptran™ model number: TT211: 2-lead RTDs TT176: 3-lead RTDs TT711: 2-lead RTDs, match calibrated TT676: 3-lead RTDs, match calibrated
N	Temperature range code from table
AS7204PD100X3TT176N = Sample part number	

Specifications subject to change

Flameproof RTD Sensors – Metric Dimensioned



ATEX



Overview

Flameproof sensors are designed to contain an explosion as well as prevent the transmission of an explosion to the surrounding atmosphere. These sensors are suitable for use in Zone 1 or Zone 2.

- Approved for use in hazardous locations defined by IEC/EN 60079-0 and IEC/EN 60079-1, ATEX directive 94/9/EC (KEMA 03 ATEX 2389), and II 2 G EEx d IIC T6
- Features tip-sensitive, all stainless or MgO filled RTD probe for fast response
- Spring-loaded holder ensures good probe contact
- U.S. or metric threads

Specifications

Tip-sensitive probe: Stainless steel with copper alloy tip.

All stainless RTD: Stainless steel.

MgO filled RTD: Inconel.

Fittings: Stainless steel.

Connection head:

CH356: 316L stainless steel IP66, Type 3, 4, and 4X.

CH357: Aluminum alloy IP65, Type 3 and 4.

CH358: Epoxy coated aluminum alloy IP66, Type 3, 4, and 4X.

Pressure rating:

Spring-loaded holder: 50 psi (3.4 bar).

Fluid seal fitting: 100 psi (6.9 bar).

Insulation resistance: 100 megohms min. at 100 VDC, leads to probe case.

Connection: Terminal block for wires up to AWG 14.

Time constant: Typical value in moving water.

Tip sensitive:

Single element 1.5 seconds.

Dual element 7 seconds.

All stainless and MgO filled: 10 seconds.

Hazardous area requirements

Refer to Minco's Application Aid #19 entitled "Specifying Temperature Sensors for Hazardous Areas" for more information on how to classify a hazardous area, methods of protection, and the various standards and agencies (including FM, CSA, CENELEC and ATEX). Application Aid #19 is available at www.minco.com/sensoraid/.

Specifications subject to change

Fitting options

Fitting	Process Thread	L REF.		Code
		CH356	CH357/CH358	
Fluid Seal	1/2 - 14 NPT	4.3" (108mm)	4.6" (116 mm)	0*
Fluid Seal	G 1/2	4.1" (103 mm)	4.4" (111 mm)	1*
Set screw spring-loaded	1/2 - 14 NPT	5.3" (135 mm)	5.6" (143 mm)	2
Set screw spring-loaded	G 1/2	5.0" (128mm)	5.4" (136 mm)	3
Fixed spring-loaded	1/2 - 14 NPT	4.5" (115 mm)	4.9" (123 mm)	4
Welded	1/2 - 14 NPT	4.2"(107 mm)	4.5" (115 mm)	6**
Welded	G 1/2	4.0" (101 mm)	4.3" (109 mm)	7**
Release knob spring-loaded	1/2 - 14 NPT	5.4" (137 mm)	5.7" (145 mm)	8
Release knob spring-loaded	G 1/2	5.2" (132 mm)	5.5" (140 mm)	9

* Not available with CH356 stainless steel connection head.

** 0.250" (6.4mm) for all stainless and MgO only.

RTD Assembly Numbers

Connection Head	CH356 Stainless				CH357 Aluminum				CH358 Epoxy Coated			
	0.236" (6.0mm)		0.250" (6.4mm)		0.236" (6.0mm)		0.250" (6.4mm)		0.236" (6.0mm)		0.250" (6.4mm)	
Probe Diameters	Single	Dual	Single	Dual	Single	Dual	Single	Dual	Single	Dual	Single	Dual
Number of elements	AS800	AS801	AS810	AS811	AS830	AS831	AS840	AS841	AS860	AS861	AS870	AS871
Tip Sensitive	AS802	AS803	AS812	AS813	AS832	AS833	AS842	AS843	AS862	AS863	AS872	AS873
All Stainless	AS804	AS805	AS814	AS815	AS834	AS835	AS844	AS845	AS864	AS865	AS874	AS875
MgO Platinum												

Notes:

CH356: 316L stainless steel IP66, Type 3, 4, and 4X.

CH357: Aluminum alloy IP65, Type 3 and 4.

CH358: Epoxy coated aluminum alloy IP66, Type 3, 4, and 4X.

Get more information on connection heads on pages 4-2 to 4-3.

Sensing elements

Element	Code	Code	
		Single	Dual
Platinum (0.00392 TCR) 100 Ω \pm 0.5% at 0°C	PA	PAPA	
Platinum (0.00385 TCR) 100 Ω \pm 0.1% at 0°C (Meets EN60751, Class B)	PD	PDPD	
Platinum (0.00385 TCR) 100 Ω \pm 0.06% at 0°C (Meets EN60751, Class A)	PM	PMPM	
Platinum (0.00385 TCR) 100 Ω \pm 0.5% at 0°C	PE	PEPE	
Platinum (0.00375 TCR) 1000 Ω \pm 0.12% at 0°C	PW	PWPW	
Copper (0.00427 TCR) 10 Ω \pm 0.2% at 25°C	CA		
(dual) (0.00427 TCR) 10 Ω \pm 0.5% at 25°C		CCCC	
Nickel (0.00672 TCR) 120 Ω \pm 0.5% at 0°C	NA	NANA	
Nickel (0.00618 TCR) 100 Ω \pm 0.22% at 0°C	NB	NBNB	

Specification and order options

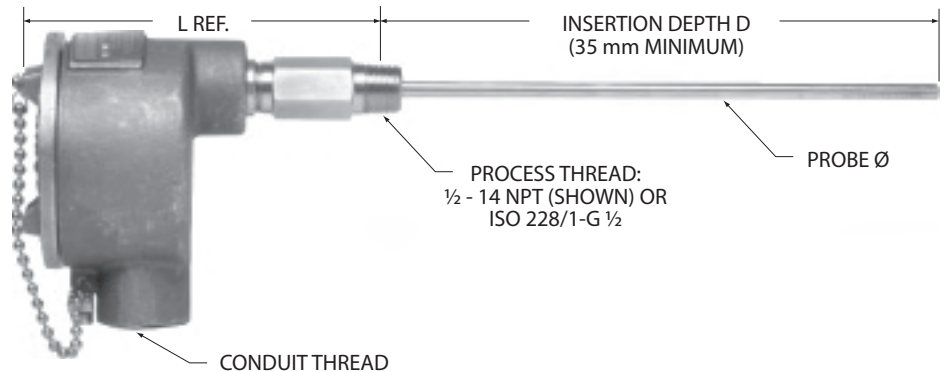
AS800	Assembly number from table
4	Fitting from table
PD	Sensing element from table
100	Insertion depth D (in mm): (35-3000 mm)
X	Leads per sensing element: Y = 2 leads (n/a for copper) Z = 3 leads X = 4 leads (n/a for dual models)
3	Conduit thread: 3 = 1/2 - 14 NPT 4 = 3/4 - 14 NPT 5 = M20 x 1.5
AS8004PD100X3 = Sample part number	

Specifications subject to change

Flameproof Thermocouple Sensors – Metric Dimensioned



ATEX



Overview

Flameproof sensors are designed to contain an explosion as well as prevent the transmission of an explosion to the surrounding atmosphere. These sensors are suitable for use in Zone 1 or Zone 2.

- Approved for use in hazardous locations defined by IEC/EN 60079-0 and IEC/EN 60079-1, ATEX directive 94/9/EC (KEMA 03 ATEX 2389), and II 2 G EEx d IIC T6
- Features tip-sensitive, all stainless or MgO filled thermocouple probe for fast response
- Spring-loaded holder ensures good probe contact
- U.S. or metric threads

Specifications

Tip-sensitive probe: Stainless steel with copper alloy tip.

MgO filled thermocouple: Stainless steel.

Fittings: Stainless steel.

Connection head:

CH356: 316L stainless steel IP66, Type 3, 4, and 4X.

CH357: Aluminum alloy IP65, Type 3 and 4.

CH358: Epoxy coated aluminum alloy IP66, Type 3, 4, and 4X.

Pressure rating:

Spring-loaded holder: 50 psi (3.4 bar).

Fluid seal fitting: 100 psi (6.9 bar).

Insulation resistance: 100 megohms min. at 100 VDC, leads to probe case. Ungrounded junction models only on thermocouples.

Connection: Terminal block for wires up to AWG 14.

Time constant: Typical value in moving water.

Tip sensitive:

Single element 1.5 seconds.

Dual element 7 seconds.

All stainless and MgO filled: 10 seconds.

Temperature Transmitters

Minco's Temptran™ thermocouple transmitters provide a 4 to 20 mA signal that can be sent over long distances with a simple 2-wire system. See Section 5 for complete details and ordering information.

Note: Order thermocouple TempTran™ transmitters separately

Hazardous area requirements

Refer to Minco's Application Aid #19 entitled "Specifying Temperature Sensors for Hazardous Areas" for more information on how to classify a hazardous area, methods of protection, and the various standards and agencies (including FM, CSA, CENELEC and ATEX). Application Aid #19 is available at www.minco.com/sensoraid/.

Specifications subject to change

Fitting options

Fitting	Process Thread	L REF.		Code
		CH356	CH357/CH358	
Fluid Seal	1/2 - 14 NPT	4.3" (108mm)	4.6" (116 mm)	0*
Fluid Seal	G 1/2	4.1" (103 mm)	4.4" (111 mm)	1*
Set screw spring-loaded	1/2 - 14 NPT	5.3" (135 mm)	5.6" (143 mm)	2
Set screw spring-loaded	G 1/2	5.0" (128mm)	5.4" (136 mm)	3
Fixed spring-loaded	1/2 - 14 NPT	4.5" (115 mm)	4.9" (123 mm)	4
Welded	1/2 - 14 NPT	4.2"(107 mm)	4.5" (115 mm)	6**
Welded	G 1/2	4.0" (101 mm)	4.3" (109 mm)	7**
Release knob spring-loaded	1/2- 14 NPT	5.4" (137 mm)	5.7" (145 mm)	8
Release knob spring-loaded	G 1/2	5.2" (132 mm)	5.5" (140 mm)	9

* Not available with CH356 stainless steel connection head.

** 0.250" (6.4mm) for all stainless and MgO only.

Thermocouple Assembly Numbers

Connection Head	CH356 Stainless				CH357 Aluminum				CH358 Epoxy Coated			
	0.236" (6.0mm)		0.250" (6.4mm)		0.236" (6.0mm)		0.250" (6.4mm)		0.236" (6.0mm)		0.250" (6.4mm)	
Probe Diameters	Single	Dual	Single	Dual	Single	Dual	Single	Dual	Single	Dual	Single	Dual
Number of elements	AS806	AS807	AS816	AS817	AS836	AS837	AS846	AS847	AS866	AS867	AS876	AS877
Tip Sensitive	AS808	AS809	AS818	AS819	AS838	AS839	AS848	AS849	AS868	AS869	AS878	AS879
MgO												

Notes:

CH356: 316L stainless steel IP66, Type 3, 4, and 4X.

CH357: Aluminum alloy IP65, Type 3 and 4.

CH358: Epoxy coated aluminum alloy IP66, Type 3, 4, and 4X.

Get more information on connection heads on pages 4-2 to 4-3.

Junction types

Thermocouple Junction	Code	
	Single	Dual
Chromel-Constantan	E	EE
Iron-Constantan	J	JJ
Chromel-Alumel	K	KK
Copper-Constantan	T	TT

Specification and order options

AS806	Assembly number from table
4	Fitting from table
EE	Junction type from table
U	Junction Grounding: G = Grounded U = Ungrounded
450	Insertion depth D (in mm): (35-3000 mm)
P	
3	Conduit thread: 3 = 1/2 - 14 NPT 4 = 3/4 - 14 NPT 5 = M20 x 1.5
AS8064EEU450P3 = Sample part number	

Order thermocouple transmitters separately.

See section 5 for details.

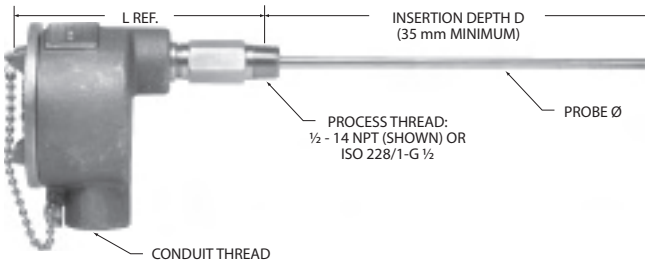
Specifications subject to change

Flameproof RTDs With Transmitters – Metric Dimensioned



II 2 G EEx d IIC T6

ATEX



Overview

Flameproof sensors are designed to contain an explosion as well as prevent the transmission of an explosion to the surrounding atmosphere. These sensors are suitable for use in Zone 1 or Zone 2.

- Approved for use in hazardous locations defined by IEC/EN 60079-0 and IEC/EN 60079-1, ATEX directive 94/9/EC (KEMA 03 ATEX 2389), and II 2 G EEx d IIC T6
- Features tip-sensitive, all stainless or MgO filled RTD probe for fast response
- Spring-loaded holder ensures good probe contact
- U.S. or metric threads

Specifications

Temperature range: -50 to 260°C (-58 to 500°F).

Material:

Tip-sensitive probe: Stainless steel with copper alloy tip.

All stainless RTD: Stainless steel.

MgO filled RTD: Inconel.

Fittings: Stainless steel.

Connection head:

CH356: 316L stainless steel IP66, Type 3, 4, and 4X.

CH357: Aluminum alloy IP65, Type 3 and 4.

CH358: Epoxy coated aluminum alloy IP66, Type 3, 4, and 4X.

Pressure rating:

Spring-loaded holder: 50 psi (3.4 bar).

Fluid seal fitting: 100 psi (6.9 bar).

Insulation resistance: 100 megohms min. at 100 VDC, leads to probe case.

Connection: Terminal block for wires to 14 AWG.

Time constant: Typical value in moving water.

Tip sensitive:

Single element 1.5 seconds.

Dual element 5 seconds.

All stainless and MgO filled: 10 seconds.

Temperature Transmitters

Output: 4 to 20 mA over specified range, linear with temperature.

Calibration accuracy: ±0.1% of span. For guaranteed system accuracy of ± 0.75% of span, specify a match calibrated transmitter. Get more information on page 5-18.

Linearity: 0.1% of span.

Adjustments: Zero and span, ±5% of span. Factory calibrated to nominal R/T curve.

Ambient operating temperature:

TT211, TT711: -25 to 85°C (-13 to 185°F).

TT176, TT676: -40 to 85°C (-40 to 185°F).

Supply voltage: 10 to 35 VDC.

Maximum load resistance:

$$R_{loop\ max} = \frac{V_{supply} - 10}{0.020\ \text{amps}}$$

Leadwires:

TT211, TT711: 2-lead RTD.

TT176, TT676: 3-lead RTD for resistance compensation.

Physical: Epoxy potted for moisture resistance.

Mounting: Transmitter mounts in connection head.

Hazardous area requirements

Refer to Minco's Application Aid #19 entitled "Specifying Temperature Sensors for Hazardous Areas" for more information on how to classify a hazardous area, methods of protection, and the various standards and agencies (including FM, CSA, CENELEC and ATEX). Application Aid #19 is available at www.minco.com/sensoraid/.

Specifications subject to change

Fitting options

Fitting	Process Thread	L REF.		Code
		CH356	CH357/CH358	
Fluid Seal	1/2 - 14 NPT	4.3" (108mm)	4.6" (116 mm)	0*
Fluid Seal	G 1/2	4.1" (103 mm)	4.4" (111 mm)	1*
Set screw spring-loaded	1/2 - 14 NPT	5.3" (135 mm)	5.6" (143 mm)	2
Set screw spring-loaded	G 1/2	5.0" (128mm)	5.4" (136 mm)	3
Fixed spring-loaded	1/2 - 14 NPT	4.5" (115 mm)	4.9" (123 mm)	4
Welded	1/2 - 14 NPT	4.2"(107 mm)	4.5" (115 mm)	6**
Welded	G 1/2	4.0" (101 mm)	4.3" (109 mm)	7**
Release knob spring-loaded	1/2 - 14 NPT	5.4" (137 mm)	5.7" (145 mm)	8
Release knob spring-loaded	G 1/2	5.2" (132 mm)	5.5" (140 mm)	9

* Not available with CH356 stainless steel connection head.

** 0.250" (6.4mm) for all stainless and MgO only.

RTD Assembly Numbers

Connection Head	CH356 Stainless				CH357 Aluminum				CH358 Epoxy Coated			
	0.236" (6.0mm)		0.250" (6.4mm)		0.236" (6.0mm)		0.250" (6.4mm)		0.236" (6.0mm)		0.250" (6.4mm)	
Probe Diameters	Single	Dual	Single	Dual	Single	Dual	Single	Dual	Single	Dual	Single	Dual
Number of elements	AS800	AS801	AS810	AS811	AS830	AS831	AS840	AS841	AS860	AS861	AS870	AS871
Tip Sensitive	AS802	AS803	AS812	AS813	AS832	AS833	AS842	AS843	AS862	AS863	AS872	AS873
All Stainless	AS804	AS805	AS814	AS815	AS834	AS835	AS844	AS845	AS864	AS865	AS874	AS875
MgO Platinum												

Notes:

CH356: 316L stainless steel IP66, Type 3, 4, and 4X.

CH357: Aluminum alloy IP65, Type 3 and 4.

CH358: Epoxy coated aluminum alloy IP66, Type 3, 4, and 4X.

Get more information on connection heads on pages 4-2 to 4-3.

Temperature transmitter range codes

Popular ranges below. More range codes on pages 5-16 and at www.minco.com/rangecode/

Code	Range	
EO	-50 to 100°C	-58 to 212°F
BC	-30 to 30°C	-22 to 86°F
S	-17.8 to 37.8°C	0 to 100°F
AC	-17.8 to 93.3°C	0 to 200°F
AN	-17.8 to 148.9°C	0 to 300°F
AG	-17.8 to 260°C	0 to 500°F
AP	-6.7 to 21.1°C	20 to 70°F
A	-6.7 to 48.9°C	20 to 120°F
N	0 to 50°C	32 to 122°F
C	0 to 100°C	32 to 212°F
J	0 to 150°C	32 to 302°F
K	0 to 200°C	32 to 392°F
V	10 to 65.6°C	50 to 150°F
P	37.8 to 179.4°C	100 to 355°F
BH	50 to 150°C	122 to 302°F

Specifications subject to change

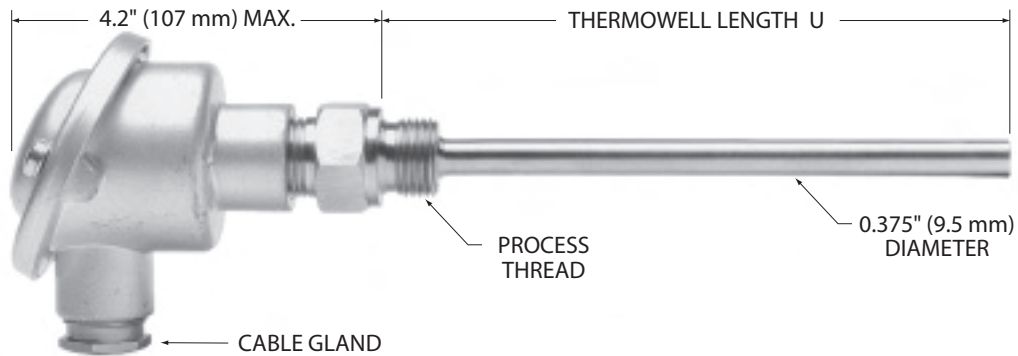
Sensing elements

RTD sensing element	Code
Platinum (0.00392 TCR) 100 Ω ±0.5% at 0°C	PA
Platinum (0.00385 TCR) 100 Ω ±0.1% at 0°C (Meets EN60751, Class B)	PD
Platinum (0.00385 TCR) 100 Ω ±0.5% at 0°C	PE

Specification and order options

AS800	Assembly number from table
4	Fitting from table
PD	Sensing element from table
100	Insertion depth D (in mm): (35-3000 mm)
X	Leads per sensing element: Y = 2 leads (n/a for copper) Z = 3 leads X = 4 leads (n/a for dual models)
3	Conduit thread: 3 = 1/2 - 14 NPT 4 = 3/4 - 14 NPT 5 = M20 x 1.5
TT676	Tempran™ model number: TT211: 2-lead RTDs TT176: 3-lead RTDs TT711: 2-lead RTDs, match calibrated TT676: 3-lead RTDs, match calibrated
N	Temperature range code from table
AS8004PD100X3TT176N = Sample part number	

Eurostyle Sensors



Overview

These low priced assemblies come complete with thermowells, spring-loaded probes, and connection heads. They provide accurate sensing and quick response in liquid or air streams. Specify U.S. or metric thread for global compatibility.

- Compact, economical RTD or thermocouple assembly
- Metric straight thread or U.S. tapered thread
- Tip-sensitive probe for use to 260°C (500°F)
- Optional European Form B connection head to DIN 43729
- Stainless steel thermowell

Temperature Transmitters

Minco's Temptran™ RTD transmitters provide a 4 to 20 mA signal that can be sent over long distances with a simple 2-wire system. Add any Minco model transmitter (except electrically isolated models). See Section 5 for complete details and ordering information.

Special high-accuracy calibration: For guaranteed system accuracy of $\pm 0.75\%$ of temperature span, specify transmitters with high accuracy calibration. Calibration data traceable to NIST will also be provided. Get more information on page 5-18.

Specifications

Temperature range: -50 to 260°C (-58 to 500°F).

Material:

Probe: Stainless steel with copper alloy tip.
Connection head: Cast aluminum.
Thermowell: 300 series stainless steel.

Pressure rating: 2755 psi (190 bar) at 25°C, reducing to 493 psi (34 bar) at 600°C.

Insulation resistance: 10 megohms min. at 100 VDC, leads to case. Ungrounded junctions only on thermocouples.

Connection: Terminal block for wires to 14 AWG.

Time constant: Typical in moving water:

RTD: 35 seconds.

Thermocouple: 27 seconds.

Specifications subject to change

Sensing elements

RTD sensing element		Code
Platinum (0.00392 TCR)	100 Ω ±0.5% at 0°C	PA
Platinum (0.00385 TCR) (Meets EN60751, Class B)	100 Ω ±0.1% at 0°C	PD
Platinum (0.00385 TCR)	100 Ω ±0.5% at 0°C	PE
Copper (dual) (0.00427 TCR)	10 Ω ±0.2% at 25°C 10 Ω ±0.5% at 25°C	CA CC
Nickel (0.00672 TCR)	120 Ω ±0.5% at 0°C	NA

RTD specification and order options

AS5240	Assembly number: AS5240: Single element RTD AS5241: Dual element RTD
PD	Sensing element from table
40	TW length U in 0.1" increments [Ex: 40 = 4.0 inches (102 mm)]
Z	Leads per sensing element: Y = 2 leads Z = 3 leads (required for CA/CC) X = 4 leads (single element only)
2	Conduit thread: 1 = 1/2 - 14 NPT 2 = 3/4 - 14 NPT 3 = PG cable gland (Eurostyle only)
A	Connection head: A = Standard aluminum head E = Eurostyle aluminum head
1	TW process thread: 1 = 1/2 - 14 NPT 2 = 3/4 - 14 NPT 3 = ISO 228/1 - G 1/2
To order sensor assembly, stop here. To order with transmitters, add:	
TT176	Temptran™ model: TT176: 3-lead RTDs TT676: 3-lead RTDs, match calibrated
A	Temperature range codes on page 5-16 or at www.minco.com/rangecode/
AS5240PD40Z2A1TT176A = Sample part number	

Thermocouple specification and order options

AS5245	Assembly number: AS5245: Single junction TC AS5246: Dual junction TC
E	Junction type: E = Chromel-Constantan J = Iron-Constantan K = Chromel-Alumel T = Copper-Constantan
G	Junction grounding: G = Grounded U = Ungrounded
135	TW length U in 0.1" increments Specify in 0.1" increments [Ex: 135 = 13.5 inches (343 mm)]
P	
3	Conduit thread: 1 = 1/2 - 14 NPT 2 = 3/4 - 14 NPT 3 = PG cable gland (Eurostyle only)
E	Connection head: A = Standard aluminum head E = Eurostyle aluminum head
3	TW process thread: 1 = 1/2 - 14 NPT 2 = 3/8 - 14 NPT 3 = ISO 228/1 - G 1/2
To order sensor assembly, stop here. To order with transmitters, add:	
TT190	Temptran™ model: 190 = TT190, standard 230 = TT230, rangeable
A	Temperature range codes on page 5-16 or at www.minco.com/rangecode/
AS5245EG135P3E3190A = Sample part number	

Specifications subject to change

Specifying Custom Assemblies

The standard assemblies in this section will fit a wide variety of installations. However, for more versatility you can create new assemblies from the probes, accessories, and transmitters in the pages listed.

Follow these steps:

1. Choose a probe

Select an RTD or thermocouple from Section 3. The section includes tip-sensitive, high temperature, and fast response models. Some have integral fittings or bayonet lockcaps.

Factors to consider are:

- Temperature rating
- Compatibility with receiving instruments
- Probe style and diameter
- Accuracy vs. cost

2. Add a fitting

See Section 4 for probe mounting fittings. Adjustable fittings, combined with cut-to-length probes, allow instant fabrication of assemblies to any length required. Included are spring-loaded holders, pressure fittings, and bayonet-style fittings.

Factors to consider are:

- Temperature rating
- Probe diameter
- Correct NPT threads
- Pressure ratings
- Compatibility with environment

3. Select a thermowell

Thermowells protect sensors from the effects of fluid flow and pressure. See Section 4 for a variety of well styles and materials.

Factors to consider are:

- Pressure rating
- Compatibility with fluid media
- Insertion depth
- Correct NPT thread

4. Attach a connection head

Finish off your assembly with a connection head for termination to remote extension wires. See page 4-2 for specifications.

Factors to consider are:

- Connection head size
- Temperature rating
- Correct pipe threads for fitting and conduit
- Number of terminals or wire nuts
- Hazardous area requirements

5. Install a transmitter

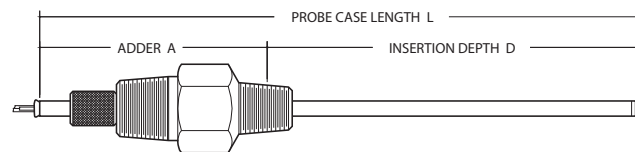
Transmitters convert sensor output to a 4 to 20 mA current signal, immune to leadwire resistance. See Section 5 for RTD and thermocouple transmitters.

Factors to consider are:

- Transmitter accepts sensor input
- Transmitter fits connection head
- Ambient temperature range acceptable

6. How to calculate probe length

All Minco fittings have probe length adders to help you determine total probe length. Total length L is the insertion depth D plus the adder A .



Thermowell drawings show an adder to convert thermowell length U to insertion depth D . Then use D plus the fitting adder A to find total probe length L .

