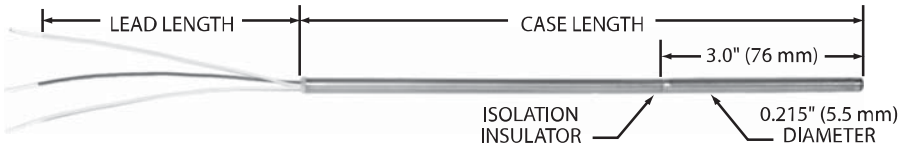
Electrically Isolated RTDs



RTD STAINLESS PROBE

Overview

- Electrically isolated sensing tip for "hot" bearings
- Accurate sensing to 260°C (500°F)
- Copper alloy tip for fast time response and increased tip sensitivity

Specifications

Dielectric strength of isolation insulator: 1000 volts RMS at 60 Hz for 30 seconds, between case sections, 1 mA max. leakage current.

Pressure rating: 30 psi (2.1 bar).

Vibration: Withstands 10 to 2000 Hz at 20 G's minimum per MIL-STD-202, Method 204, Test Condition D.

Shock: Withstands 100 G's minimum sine wave shock of 8 milliseconds duration.

Specification and order options

S52CA	Model number from isolated tip table
355	Case length: Specify in 0.1" increments (Ex: 355 = 35.5 inches)
Z	Number of leads: Y = 2 leads Z = 3 leads (required for copper elements) X = 4 leads (PD only)
36	Lead length in inches
S52CA355Z36 = Sample part number	

Isolated tip RTDs

RTD sensing element		Model
Platinum (0.00392 TCR)	100 Ω ±0.5% at 0°C	S52PA
Platinum (0.00385 TCR) (Meets EN60751, Class B)	100 Ω ±0.1% at 0°C	S852PD
Platinum (0.00385 TCR)	100 Ω ±0.5% at 0°C	S882PE
Copper (0.00427 TCR)	10 Ω ±0.2% at 25°C	S52CA
Nickel (0.00672 TCR)	120 Ω ±0.5% at 0°C	S52NA

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

Case: Stainless steel with copper alloy tip.
Minimum case length: 4.0" (101.6 mm).
Maximum case length: 48" (1220 mm), longer on special order.

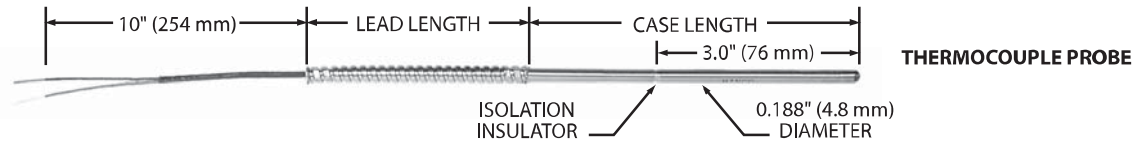
Leads: 2, 3, or 4 leadwires, AWG 22, stranded copper with PTFE insulation. For 2-lead RTDs add 0.03 Ω per foot of combined case and lead length to element tolerance.

Time constant: 2 seconds typical in moving water.

Insulation resistance: 1000 megohms min. at 500 VDC, leads to case.

Specifications subject to change

Electrically Isolated Thermocouples



Overview

- Electrically isolated sensing tip for "hot" bearings
- Accurate sensing to 260°C (500°F)
- Copper alloy tip for fast time response and increased tip sensitivity

Specifications

Dielectric strength of isolation insulator: 1000 volts RMS at 60 Hz for 30 seconds, between case sections, 1 mA max. leakage current.

Pressure rating: 30 psi (2.1 bar).

Vibration: Withstands 10 to 2000 Hz at 20 G's minimum per MIL-STD-202, Method 204, Test Condition D.

Shock: Withstands 100 G's minimum sine wave shock of 8 milliseconds duration.

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

Case: Stainless steel with copper alloy tip.
Minimum case length: 4.0" (101.6 mm).
Maximum case length: 48" (1220 mm), longer on special order.

Leads: Solid thermocouple wire, AWG 20 (AWG 24 for stainless steel braid option). Specify PTFE insulation or PTFE with stainless steel armor and shrink tubing over all.

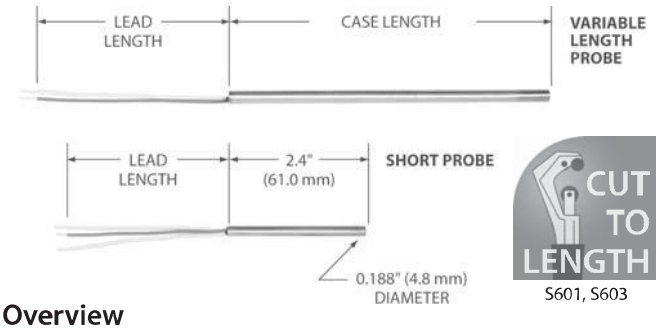
Time constant: Typical value in moving water:
Grounded junction: 1.5 seconds.
Ungrounded junction: 7 seconds.

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

Specification and order options

TC2198	Model number: TC2198
E	Junction type: E = Chromel-Constantan J = Iron-Constantan K = Chromel-Alumel T = Copper-Constantan
U	Junction grounding: G = Grounded U = Ungrounded
225	Case length: Specify in 0.1" increments (Ex: 225 = 22.5 inches)
T	Covering over leadwires: T = PTFE only A = Stainless steel armor plus shrink tubing S = SS braid over PTFE (5" min. case length)
48	Lead length in inches
TC2198EU225T48 = Sample part number	

Fast Response RTDs



S601, S603

Overview

These probes have rugged stainless steel cases for use in high pressures or corrosive fluids. Yet their time constants are comparable to copper-tipped probes at 2 to 4 seconds, compared to 8 to 10 seconds for other all-stainless probes.

- All-stainless steel probes for use to 260°C (500°F)
- Unique low-mass element reacts quickly to temperature changes
- Non-armor models can be user-shortened

Specifications

Temperature range: -269 to 260°C (-452 to 500°F).

Case material:
S601, S603, S604: 316 stainless steel.
S602, S614: 304/305 stainless steel.

Case length:
Minimum case length:
S602, S604: 2.0" (50.8 mm) with PTFE insulated leads;
3.0" (76.2 mm) with SS braid over leads.
S601, S603: 3.0" (76.2 mm).
Maximum case length:
48" (1220 mm), longer on special order.

Time constant: Typical in moving water:
S602, S604, S614: 2 seconds.
S601: 3 seconds.
S603: 4 seconds.

Pressure rating: 1500 psi (103 bar).

Leads: 2, 3, or 4 leadwires, AWG 22, stranded copper with PTFE insulation, stainless steel braid, or stainless steel armor. For 2-lead RTDs add 0.03 Ω per foot of combined case and lead length to element tolerance (model S602 has AWG 26; add 0.08 Ω per foot for 2-lead).

Insulation resistance: 1000 megohms minimum at 500 VDC, leads to case.

Vibration: Withstands 10 to 2000 Hz at 20 G's minimum per MIL-STD-202, Method 204, Test Condition D.

Shock: Withstands 100 G's minimum sine wave shock of 8 milliseconds duration.

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
Platinum (0.00385 TCR) (N/A for model S602)	1000 Ω ±0.1% at 0°C	PF
Copper (0.00427 TCR)	10 Ω ±0.2% at 25°C	CA
Nickel (0.00672 TCR)	120 Ω ±0.5% at 0°C	NA

Specification and order options:

Fast response probes

Specify 0.125" or 0.188" for fastest response, 0.250" or 0.215" for greater strength and cut-to-length capability (PTFE and SS braid models).

S604	Model number: S601: Ø 0.215" (5.5 mm) Cut-to-length probe S602: Ø 0.125" (3.2 mm) S603: Ø 0.250" (6.4 mm) Cut-to-length probe S604: Ø 0.188" (4.8 mm)
PD	Sensing element from table
140	Case length: Specify in 0.1" increments (Ex: 140 = 14.0 inches)
X	Number of leadwires: Y = 2 leads Z = 3 leads (required for copper elements) X = 4 leads (PD only)
36	Lead length in inches
T	Covering over leadwires: (S, A not available on S602) T = PTFE only S = Stainless steel braid A = Stainless steel armor
S604PD140X36T = Sample part number	

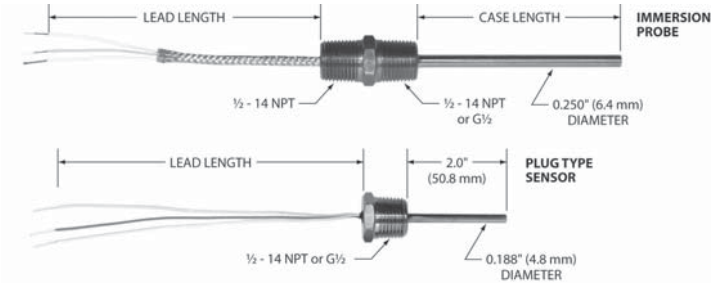
Short probes

S614	Model number (case with fixed length of 2.4" (61 mm))
PA	Sensing element from table
Z	Number of leadwires: Y = 2 leads Z = 3 leads (required for copper elements) X = 4 leads (PD only)
12	Lead length in inches
S	Covering over leadwires: T = PTFE only S = Stainless steel braid
S614PAZ12S = Sample part number	

STOCKED PARTS AVAILABLE

Specifications subject to change

Fast Response Immersion RTDs



Overview

You can mount these probes directly in fluid streams for accurate, reliable sensing. Time constant is just 2 seconds, compared to 10 seconds for an ordinary stainless probe or up to 50 seconds for a thermowell. The result is more accurate monitoring of dynamic processes.

- Stainless steel probes for use to 260°C (500°F)
- Pressure rating 1500 psi (103 bar)
- Quick reaction to changing fluid and gas temperatures
- NPT (U.S.) or metric threads

Specifications

Temperature range: -269 to 260°C (-452 to 500°F).

Case material:
S623, S628: 316 stainless steel.
S634, S639: 304/305 stainless steel.

Case length:
Minimum case length: 1.5" (38.1 mm).
Maximum case length: 48" (1220 mm), longer on special order.

Time constant: Typical value in moving water:
S623, S628: 4 seconds.
S634, S639: 2 seconds.

Pressure rating: 1500 psi (103 bar).

Leads: 2, 3, or 4 leadwires, AWG 22, stranded copper with PTFE insulation, stainless steel braid, or stainless steel armor.
For 2-lead RTDs add 0.03 Ω per foot of combined case and lead length to element tolerance.

Insulation resistance: 1000 megohms minimum at 500 VDC, leads to case.

Vibration: Withstands 10 to 2000 Hz at 20 G's minimum per MIL-STD-202, Method 204, Test Condition D.

Shock: Withstands 100 G's minimum sine wave shock of 8 milliseconds duration.

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
Platinum (0.00385 TCR) (N/A for model S602)	1000 Ω ±0.1% at 0°C	PF
Copper (0.00427 TCR)	10 Ω ±0.2% at 25°C	CA
Nickel (0.00672 TCR)	120 Ω ±0.5% at 0°C	NA

Specification and order options:

Immersion probes

These probes have welded fittings to mount directly into fluid vessels. Add a connection head for termination of extension leads.

S623	Model number: S623: ½ - 14 NPT thread [2] S628: ISO 228/1-G½ process thread (½ - 14 NPT on leads end)
PF	Sensing element from table
60	Case length: Specify in 0.1" increments (Ex: 60 = 6.0 inches)
Y	Number of leads: Y = 2 leads X = 4 leads (PD only) Z = 3 leads (required for copper elements)
72	Lead length in inches
A	Covering over leadwires: T = PTFE only A = Stainless steel armor S = Stainless steel braid
S623PF60Y72A = Sample part number	

Plug type sensors

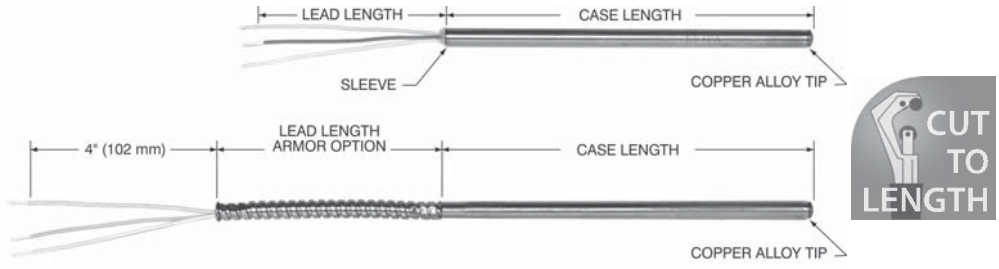
Save space and get accurate readings with this compact, easy-to-install probe.

S634	Model number: S634: ½ - 14 NPT thread S639: ISO 228/1-G½ thread
NA	Sensing element from table
Y	Number of leads: Y = 2 leads X = 4 leads (PD only) Z = 3 leads (required for copper elements)
24	Lead length in inches
T	Covering over leadwires: T = PTFE only S = Stainless steel braid
S634NAY24T = Sample part number	

STOCKED PARTS AVAILABLE

Specifications subject to change

Tip-sensitive RTDs & Thermocouples



Overview

The probe sensing tip is constructed of copper alloy which is twenty times more conductive than stainless steel. The sensors react more quickly to changes and indicate tip temperature instead of stem temperature. The result is better accuracy in thermowells, bearings, and other installations. Minco recommends 0.250" diameter probes for use in thermowells.

- Copper alloy tip for fast response
- Accurate sensing to 260°C (500°F)
- Non-armor models can be user-shortened

Specifications

Temperature range:
Thermocouple: -184 to 260°C (-300 to 500°F).
RTD: -50 to 260°C (-58 to 500°F).

Case:
Stainless steel with copper alloy tip.

Minimum case length:
Thermocouple: 2.5" (63.5 mm).
RTD: • Single element probes: 2.8" (71.1 mm).
• Dual element probes: 4.0" (101.6 mm).

Maximum case length:
48" (1220 mm), longer on special order.

Leads:
Thermocouple: Solid thermocouple wire, AWG 20 (except AWG 24 on model TC355). Specify PTFE insulation, stainless steel overbraid, or stainless steel armor.
RTD: 2, 3, or 4 leadwires, stranded copper with PTFE insulation. AWG 22, except 0.188" diameter dual probes AWG 24. For 2-lead RTDs add 0.03 Ω per foot (0.05 Ω per foot for 0.188" diameter dual probes) of combined case and lead length to element tolerance. Copper (CA, CC) models must have 3 leads.

Time constant:
Thermocouple: Typical value in moving water:
- Grounded junction: 1.5 seconds.
- Ungrounded junction: 7 seconds.

RTD:
- 2.0 seconds typical in moving water.
- 3.0 seconds for dual element models.

Pressure rating:
100 psi (6.9 bar).

Insulation resistance:
Thermocouple: 10 megohms minimum at 100 VDC, leads to case, ungrounded junctions only.
RTD:
- Single element probes: 1000 megohms min. at 500 VDC, leads to case.
- Dual element probes: 100 megohms min. at 100 VDC, between elements and leads to case.

Vibration:
Withstands 10 to 2000 Hz at 20 G's min. per MIL-STD-202, Method 204, Test Condition D.

Shock:
Withstands 100 G's min. sine wave shock of 8 milliseconds duration.

Model numbers: Thermocouples

	Model for probe diameter:		
	0.188" (4.8 mm)	0.215" (5.5 mm)	0.250" (6.4 mm)
Single junction	TC354	TC356	TC358
Dual junction	TC355	TC357	TC359

Specification and order options: Thermocouples

TC356	Model number from table
T	Junction type: E = Chromel-Constantan J = Iron-Constantan K = Chromel-Alumel T = Copper-Constantan
G	Junction grounding: G = Grounded U = Ungrounded
200	Case length: Specify in 0.1" increments: Ex: 200 = 20.0 inches
S	Covering over leadwires: T = PTFE only G = Glass braid only S = Stainless steel overbraid A = Stainless steel armor
24	Lead length in inches
TC356TG200S24 = Sample part number	

Specifications subject to change

Model numbers: RTD's

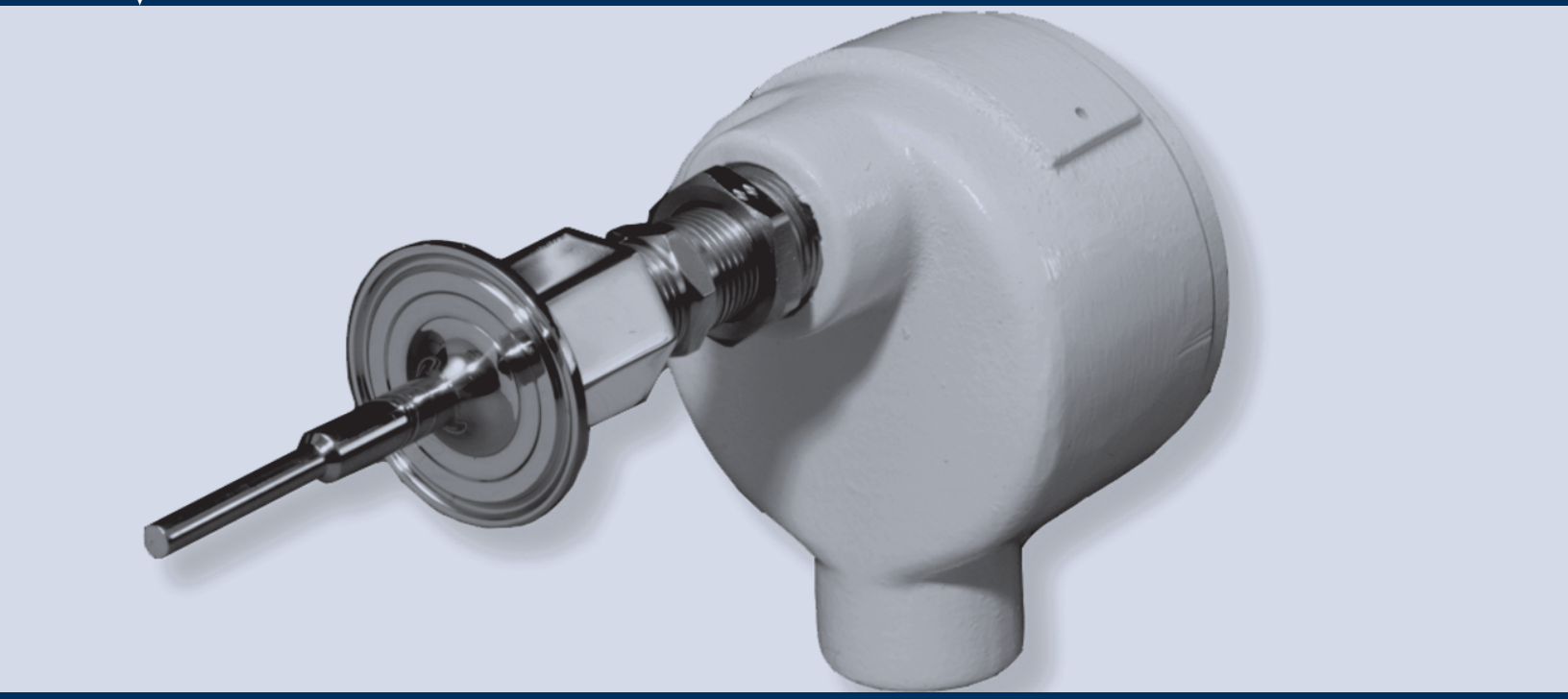
Element	Model for probe diameter:		
	0.188" (4.8 mm)	0.215" (5.5 mm)	0.250" (6.4 mm)
Single element RTDs: No armor over leads			
Platinum (0.00392 TCR) 100 Ω ±0.5% at 0°C	S54PA	S51PA	S53PA
Platinum (0.00385 TCR) 100 Ω ±0.06% at 0°C (Meets EN60751, Class A)	S554PM	S551PM	S553PM
Platinum (0.00385 TCR) 100 Ω ±0.1% at 0°C (Meets EN60751, Class B)	S854PD	S851PD	S853PD
Platinum (0.00385 TCR) 100 Ω ±0.5% at 0°C	S884PE	S881PE	S883PE
Copper (0.00427 TCR) 10 Ω ±0.2% at 25°C	S54CA	S51CA	S53CA
Nickel (0.00672) 120 Ω ±0.5% at 0°C	S54NA	S51NA	S53NA
Single element RTDs: With armor over leads			
Add element code (Ex: S154__ =S154NA)	S154__	S151__	S153__
Dual element RTDs: No armor over leads			
Platinum (0.00392 TCR) 100 Ω ±0.5% at 0°C	S59PA	S56PA	S57PA
Platinum (0.00385 TCR) 100 Ω ±0.06% at 0°C (Meets EN60751, Class A)	S559PM	S856PM	S557PM
Platinum (0.00385 TCR) 100 Ω ±0.1% at 0°C (Meets EN60751, Class B)	S859PD	S856PD	S857PD
Platinum (0.00385 TCR) 100 Ω ±0.5% at 0°C	S889PE	S886PE	S887PE
Copper (0.00427 TCR) 10 Ω ±0.5% at 25°C		S56CC	S57CC
Nickel (0.00672) 120 Ω ±0.5% at 0°C	S59NA	S56NA	S57NA
Dual element RTDs: With armor over leads			
Add element code (Ex: S159__ =S159NA)	S159__	S156__	S157__

STOCKED PARTS AVAILABLE

Specification and order options: RTD's

S56NA	Model number from table
125	Case length: Specify in 0.1" increments (Ex: 125 = 12.5 inches)
Y	# of leads per sensing element: Y = 2 leads Z = 3 leads (req'd for copper elements) X= 4 leads (PD only)
36	Lead length in inches
S56NA125Y36 = Sample part number	

Specifications subject to change



► SECTION 6: SANITARY SENSORS

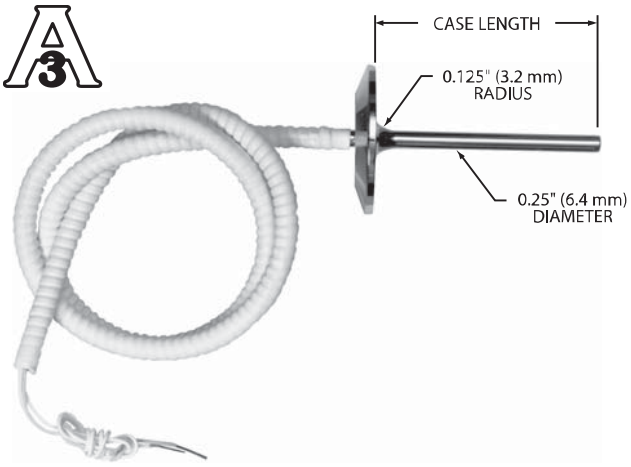
- Authorized to carry 3-A symbol for sanitary applications
- Fast response for food, beverage and pharmaceutical processing
- Accurate 100 ohm platinum elements, single or dual
- Three styles: probe, connection head assembly, thermowell assembly

Sanitary RTD Probes

Overview

Install directly into process lines for fast response. Cases, made of polished 316 stainless steel, are free of cracks and crevices that might shelter bacteria. External cables will withstand wash-down; optional stainless steel armor prevents abrasion wear.

Tri-clamp® caps are standard. Contact Minco for other styles. Note that clamp and gasket are not part of the assembly.
Get more information on page 6-4.



Specifications

Sensing element: Platinum RTD, 100 Ω ±0.1% at 0°C, TCR = 0.00385 Ω/Ω/°C (Meets EN60751, Class B).

Temperature range:
Probe: -100 to 200°C (-148 to 392°F).
External leadwires: -100 to 121°C (-148 to 250°F).

Material: 316 stainless steel.

Finish:
Standard: #4 finish per 3-A standard 74-02, 32 microinches max.
Pharmaceutical (optional): Polished to mirror finish and passivated. 10 microinches typical.

Pressure rating: 500 psi (34.5 bar).

Leadwires: AWG 22, polyimide insulation; optional stainless steel armor. Polyolefin shrink tubing wrap standard over either option.

Time constant: 2 seconds.

Self-heating: 50 mW/°C typical in moving water.

Insulation resistance:
Single element probes: 1000 megohms minimum at 500 VDC, leads to case.

Dual element probes: 100 megohms minimum at 100 VDC, between elements and leads to case.

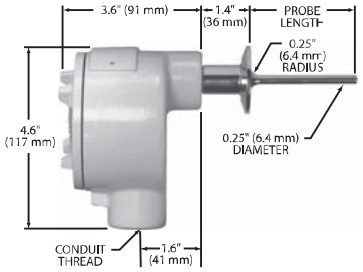
Specification and order options

S5020PD	Model number: S5020PD: Single element S5022PD: Dual element
Z	Number of leads per sensing element: Y = 2 leads Z = 3 leads
30	Case length in 0.1" increments: Standard lengths: 30 = 3.0" 40 = 4.0" 50 = 5.0"
A	Lead covering: T = Tubing A = Armor
60	Lead length in inches
TC	Sanitary cap style: TC = Tri-clamp®
20	Nominal diameter: 10 = 1.0" 15 = 1.5" 20 = 2.0"
P	Case finish: S = Standard finish P = Pharmaceutical finish
S5020PDZ30A60TC20P = Sample part number	

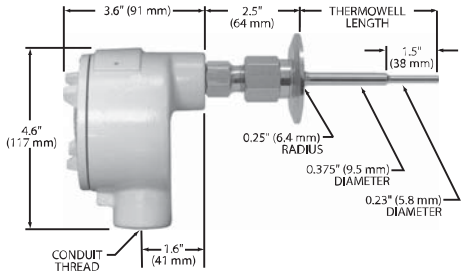
Specifications subject to change

Sanitary RTD Assemblies

CH328 EPOXY-COATED ALUMINUM HEAD SHOWN.
SEE PAGES 4-2 FOR OTHER MODELS.
· CAST IRON: MODEL CH103
· POLYPROPYLENE: MODEL CH366;
· STAINLESS STEEL: MODEL CH335, CH360



PROBE ASSEMBLY



THERMOWELL ASSEMBLY

Overview

These assemblies include a connection head for terminating RTD leads to external wiring. The fast-response thermowell assembly lets you remove the RTD probe without breaking into process lines. Cases and thermowells, made of polished 316 stainless steel, are free of cracks and crevices that might shelter bacteria.

Specifications

Sensing element: Platinum RTD, 100 Ω ±0.1% at 0°C, TCR = 0.00385 Ω/Ω/°C (Meets EN60751, Class B).

Temperature range: -100 to 200°C (-148 to 392°F).

Material:
Probe: 316 stainless steel.
Spring-loaded holder on thermowell version: 300 series stainless steel.

Finish:
Standard: #4 finish per 3-A standard 74-02, 32 microinches max.
Pharmaceutical (optional): Polished to mirror finish and passivated. 10 microinches typical.

Pressure rating: 500 psi (34.5 bar).

Leadwires: Polyimide insulated leads, 4" (102 mm) long.

Time constant:
Probe assembly: 2 seconds.
Thermowell assembly: 4 seconds.

Self-heating: Typical value in moving water.
Probe assembly: 50 mW/°C
Thermowell assembly: 25 mW/°C.

Insulation resistance:
Single element probes: 1000 megohms min. at 500 VDC, leads to case.

Dual element probes: 100 megohms min. at 100 VDC, between elements and leads to case.

Temperature Transmitters

Minco's Temptran™ transmitters provide a 4 to 20 mA signal or HART® Protocol that can be sent over long distances with a simple 2-wire system. See Section 5 for complete temperature transmitter specifications.

Contact Minco if transmitter is required.

Specification and order options

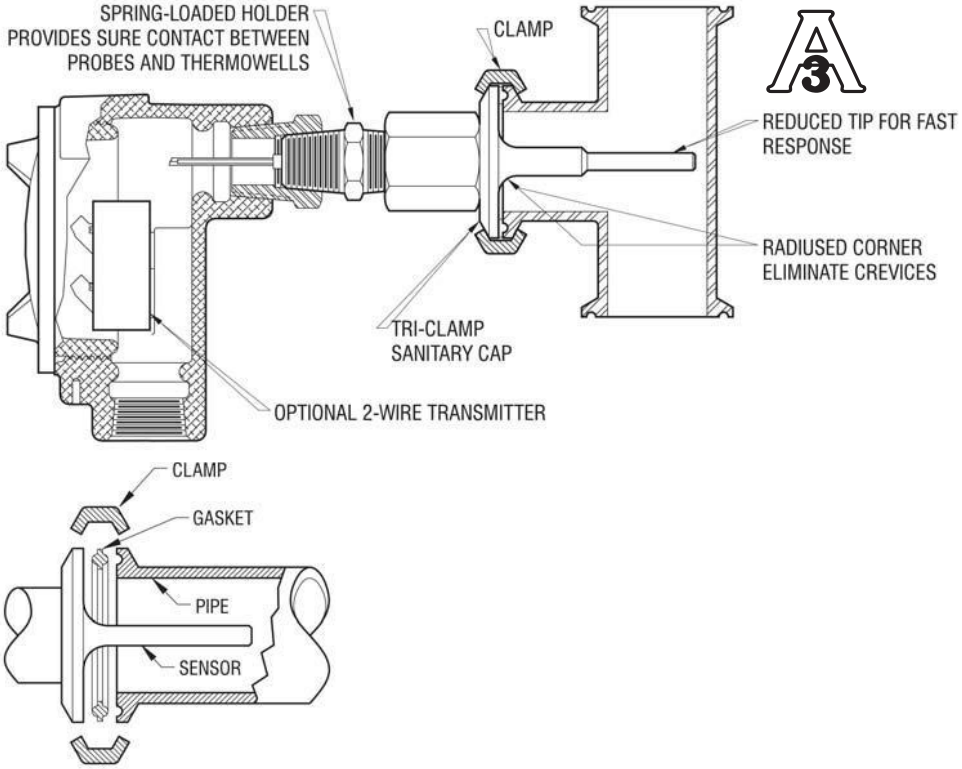
AS5000PD	Model number: Probe assembly: AS5010PD: Single element AS5012PD: Dual element Thermowell assembly: AS5000PD: Single element AS5002PD: Dual element
Z	Number of leads per element: Y = 2 leads Z = 3 leads
50	Probe or thermowell length in 0.1" increments: Standard lengths: 30 (3.0"), 40 (4.0"), 50 (5.0")
TC	Sanitary cap style: TC = Tri-Clamp®
15	Nominal diameter: 10 = 1.0" 15 = 1.5" 20 = 2.0"
E	Connection head: C = Cast iron E = Epoxy coated alum. N = White polypropylene S = Stainless steel (CH335) SS = Stainless steel (CH360)
3	Conduit thread: 3 = 1/2 - 14 NPT 4 = 3/4 - 14 NPT (N/A with N or S connection heads)
S	Case finish: S = Standard finish P = Pharmaceutical finish
AS5000PDZ50TC15E3S = Sample part number	

SANITARY SENSORS

Specifications subject to change

Installation and Accessories

Installation



Accessories

Tri-Clamp fittings, manufactured by Tri-Clover, consist of two identical pipe faces with a gasket between them. A hinged clamp holds the two flanges together.

Pipe diameter	Clamp part #
1.5"	AC101656
2.0"	AC101657

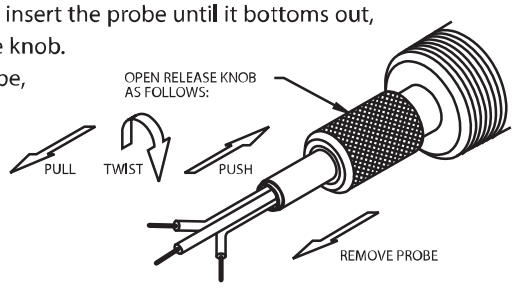
Clamp for sanitary fitting

Specifications subject to change

Spring-loaded Holders

Exclusive Minco user-friendly design!

Minco's spring-loaded holders provide a quick and simple installation and removal of probe sensors — pull out and twist the knob, insert the probe until it bottoms out, and release the knob.
To remove probe, pull out and twist the knob.



Spring pressure holds the probe tip in contact with the measuring surface for faster response and more reliable measurements. Many models feature a rubber O-ring that doesn't crimp the probe but prevents oil leakage to 50 psi (3.4 bar) at up to 260°C. High temperature models are usable to 450°C. Nylon versions provide electrical insulation.

ALL PARTS STOCKED

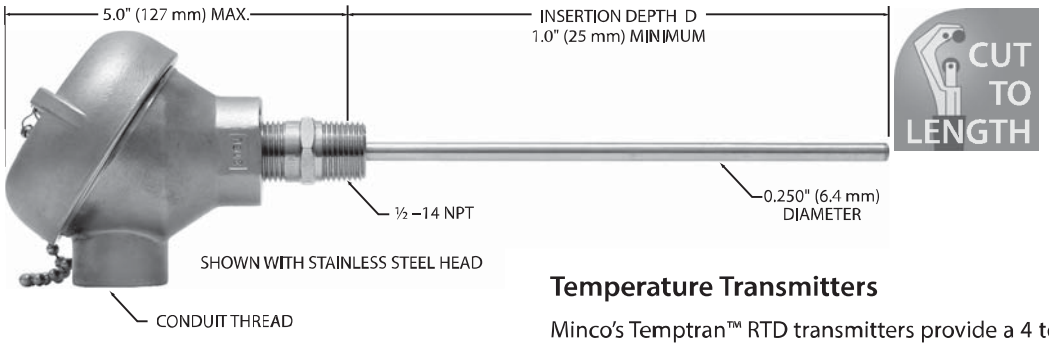
Note: Available up to 10 pieces or contact Minco Customer Service

Fluoroelastomer O-ring seal: 50 psi pressure rated fluid seal								
	Body material	Temperature range	Thread "CH"	Process thread	Hex size	Adder "A" (Total length)	Probe Ø inch (mm)	Model
	300 series stainless steel	-40 to 260°C (-40 to 500°F)	3/4 - 14 NPT	1/2 - 14 NPT	1 1/8" (29 mm)	3.6" (91 mm)	0.188 (4.8)	FG114-1
							0.215 (5.5)	FG110-1
							0.250 (6.4)	FG113-1
	316 stainless steel	-40 to 260°C (-40 to 500°F)	3/4 - 14 NPT	1/2 - 14 NPT	1 1/8" (29 mm)	3.6" (91 mm)	0.188 (4.8)	FG914
							0.215 (5.5)	FG912
							0.250 (6.4)	FG911
	Nylon	-40 to 120°C (-40 to 248°F)	3/4 - 14 NPT	1/2 - 14 NPT	1" (25 mm) wrench flats	3.6" (91 mm)	0.188 (4.8)	FG314
							0.215 (5.5)	FG310
							0.250 (6.4)	FG313
	300 series stainless steel	-40 to 260°C (-40 to 500°F)	1/2 - 14 NPT	1/2 - 14 NPT	7/8" (22 mm)	2.6" (66 mm)	0.125 (3.2)	FG216N
							0.188 (4.8)	FG214N
							0.215 (5.5)	FG210N
							0.250 (6.4)	FG213N
							0.236 (6.0)	FG215N
	300 series stainless steel	-40 to 260°C (-40 to 500°F)	None	1/8 - 27 NPT	5/8" (16 mm)	2.8" (71 mm)	0.125 (3.2)	FG116
						3.6" (91 mm)	0.188 (4.8)	FG112
							0.215 (5.5)	FG111
							0.250 (6.4)	FG117
	300 series stainless steel	-40 to 260°C (-40 to 500°F)	None	1/4 - 18 NPT	5/8" (16 mm)	1.9" (48 mm)	0.188 (4.8)	FG101072
							0.215 (5.5)	FG101078
							0.250 (6.4)	FG101080

High temperature: No pressure rating or fluid seal								
	Body material	Temperature range	Thread "CH"	Process thread	Hex size	Adder "A" (Total length)	Probe Ø inch (mm)	Model
 (Set screw installation)	300 series stainless steel	-40 to 450°C (-40 to 842°F)	1/2 - 14 NPT	1/2 - 14 NPT	7/8" (22 mm)	2.3" (58 mm)	0.188 (4.8)	FG801
							0.215 (5.5)	FG802
							0.250 (6.4)	FG810

Specifications subject to change

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 or HART® Protocol that can be sent over long distances with a simple 2-wire system. See Section 5 for complete temperature transmitter specifications.

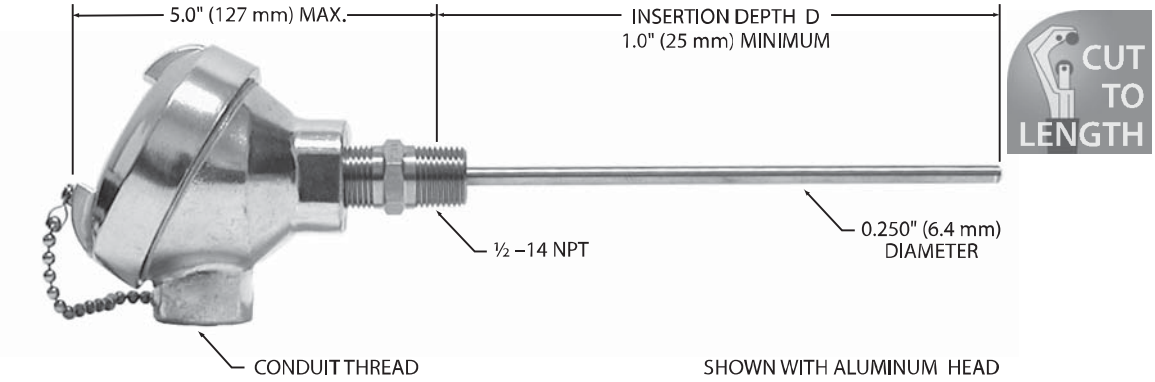
Special high-accuracy calibration: For high system accuracy, specify transmitters with matched calibration. Calibration data traceable to NIST will also be provided. Get more information on page 5-22.

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 = ½ - 14 NPT 2 = ¾ - 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) add:	
211	Temptran™ transmitter model: 211 = TT211: Fixed Range (2-lead RTDs) 520 = TT520: Programmable (2, 3, & 4-lead RTDs) 521 = TT521: HART® Programmable (2, 3, & 4-lead RTDs)
A	Temperature range codes starting on page 5-20 or at www.minco.com
1	Calibration: 1 = Nominal calibration 2 = Match calibrated, 0.75% total system accuracy. For other calibration options, contact Minco
AS5004PA67Y2C211A1 = Sample part number	

Specifications subject to change

Tip-sensitive Spring-loaded Thermocouples



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

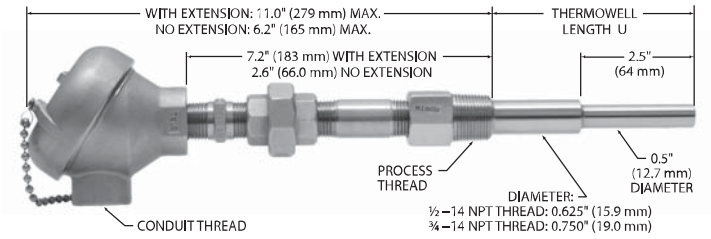
Minco's Temptran™ thermocouple transmitters provide a 4 to 20 mA signal or HART® Protocol that can be sent over long distances with a simple 2-wire system. See Section 5 for complete temperature transmitter specifications.

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 = ½ - 14 NPT 2 = ¾ - 14 NPT
C	Connection head: C = Cast iron A = Aluminum S = Stainless steel
To order sensor assembly, stop here. To order with transmitter, add:	
520	Temptran™ transmitter model: 205 = TT205: Fixed Range, Miniature 520 = TT520: Programmable, Hockey Puck 521 = TT521: HART® Programmable, Hockey Puck
A	Temperature range codes starting on page 5-20 or at www.minco.com
AS5192EU133P1C520A = Sample part number	

Specifications subject to change

Tip-sensitive RTDs with Thermowells



SHOWN WITH STAINLESS STEEL HEAD AND UNION/NIPPLE EXTENSION

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 or HART® Protocol that can be sent over long distances with a simple 2-wire system. See Section 5 for complete temperature transmitter specifications.

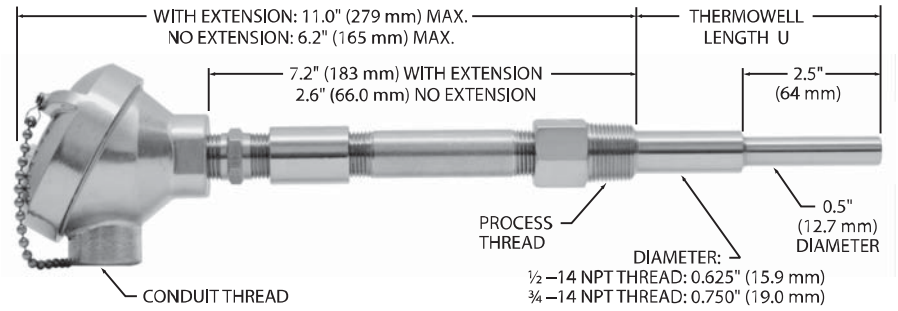
Special high-accuracy calibration: For high system accuracy, specify transmitters with matched calibration. Calibration data traceable to NIST will also be provided. Get more information on page 5-22.

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 = ½ - 14 NPT 2 = ¾ - 14 NPT
C	Connection head: C = Cast iron A = Aluminum S = Stainless steel
1	Thermowell process thread: 1 = ½ - 14 NPT 2 = ¾ - 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) add:	
520	Temptran™ transmitter model: 211 = TT211: Fixed Range (2-lead RTDs) 520 = TT520: Programmable (2, 3, & 4-lead RTDs) 521 = TT521: HART® Programmable (2, 3, & 4-lead RTDs)
A	Temperature range codes starting on page 5-20 or at www.minco.com
1	Calibration: 1 = Nominal calibration 2 = Match calibrated, 0.75% total system accuracy. For other calibration options, contact Minco
AS5140CA60Z2C1U520A1 = Sample part number	

Specifications subject to change

Tip-sensitive Thermocouples with Thermowells



SHOWN WITH ALUMINUM HEAD AND COUPLING/NIPPLE EXTENSION

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

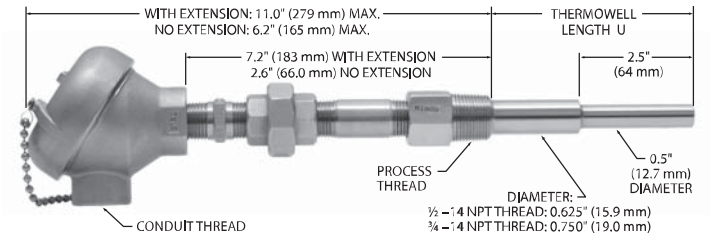
Minco's Temptran™ thermocouple transmitters provide a 4 to 20 mA signal or HART® Protocol that can be sent over long distances with a simple 2-wire system. See Section 5 for complete temperature transmitter specifications.

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 = ½ - 14 NPT 2 = ¾ - 14 NPT
C	Connection head: C = Cast iron A = Aluminum S = Stainless steel
1	Thermowell process thread: 1 = ½ - 14 NPT 2 = ¾ - 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:	
520	Temptran™ transmitter model: 205 = TT205: Fixed Range, Miniature 520 = TT520: Programmable, Hockey Puck 521 = TT521: HART® Programmable, Hockey Puck
A	Temperature range codes starting on page 5-20 or at www.minco.com
AS5145EU135P1C1U520A = Sample part number	

Specifications subject to change

550°C RTDs with Thermowells



SHOWN WITH STAINLESS STEEL HEAD AND UNION/NIPPLE EXTENSION

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 Temptran™ RTD transmitters provide a 4 to 20 mA signal or HART® Protocol that can be sent over long distances with a simple 2-wire system. See Section 5 for complete temperature transmitter specifications.

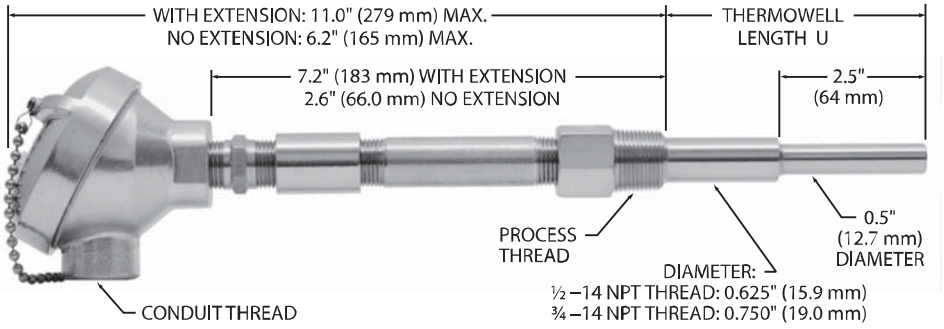
Special high-accuracy calibration: For high system accuracy, specify transmitters with matched calibration. Calibration data traceable to NIST will also be provided. Get more information on page 5-22.

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 = ½ - 14 NPT 2 = ¾ - 14 NPT
C	Connection head: C = Cast iron A = Aluminum S = Stainless steel
1	Thermowell process thread: 1 = ½ - 14 NPT 2 = ¾ - 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 add:	
520	Temptran™ transmitter model: 211 = TT211: Fixed Range (2-lead RTDs) 520 = TT520: Programmable (2, 3, & 4-lead RTDs) 521 = TT521: HART® Programmable (2, 3, & 4-lead RTDs)
A	Temperature range codes starting on page 5-20 or at www.minco.com
1	Calibration: 1 = Nominal calibration 2 = Match calibrated, 0.75% total system accuracy. For other calibration options, contact Minco
AS5160PB105Z2C1U520A1 = Sample part number	

Specifications subject to change

550°C Thermocouples with Thermowells



SHOWN WITH ALUMINUM HEAD AND COUPLING/NIPPLE EXTENSION

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.

Temperature Transmitters

Minco's Temptran™ thermocouple transmitters provide a 4 to 20 mA signal or HART® Protocol that can be sent over long distances with a simple 2-wire system. See Section 5 for complete temperature transmitter specifications.

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 = ½ - 14 NPT 2 = ¾ - 14 NPT
C	Connection head: C = Cast iron A = Aluminum S = Stainless steel
1	Thermowell process thread: 1 = ½ - 14 NPT 2 = ¾ - 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:	
520	Temptran™ transmitter model: 205 = TT205: Fixed Range, Miniature 520 = TT520: Programmable, Hockey Puck 521 = TT521: HART® Programmable, Hockey Puck
A	Temperature range codes starting on page 5-20 or at www.minco.com
AS5165KU135P1C1U520A = Sample part number	

Specifications subject to change

Explosionproof/Flameproof RTD Sensors

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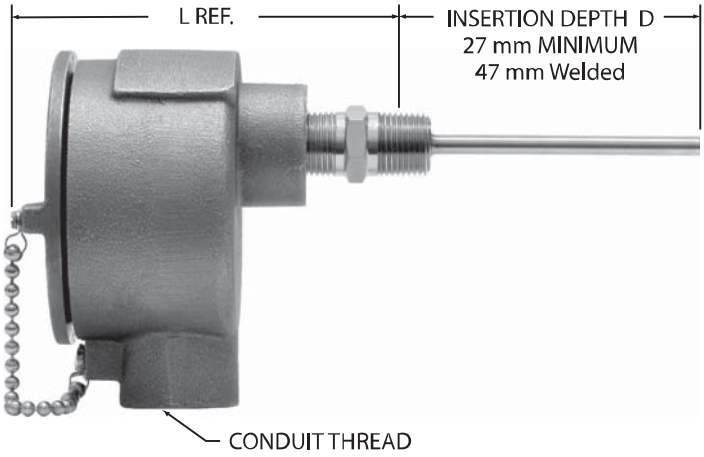

Overview

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
- High temp process temperature options (600°C) available. Contact Minco for more information.

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).

Special options: Higher temperature ranges.

Hazardous area requirements

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), visit www.minco.com.

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	Minimum Insertion Depth (mm)
Welded	1/2 - 14 NPT	200 psi (13.8 bar)	4.4" (112 mm)	CH104	0*	47
Welded	1/2 - 14 NPT	200 psi (13.8 bar)	4.2" (106 mm)	CH106	1*	47
Welded	G 1/2	200 psi (13.8 bar)	4.2" (107 mm)	CH104	2*	47
Welded	G 1/2	200 psi (13.8 bar)	4.0" (101 mm)	CH106	3*	47
Adjustable spring-loaded	1/2 - 14 NPT	50 psi (3.4 bar)	5.7" (144 mm)	CH104	4	27
Adjustable spring-loaded	1/2 - 14 NPT	50 psi (3.4 bar)	5.4" (138 mm)	CH106	5	27
Adjustable spring-loaded	G 1/2	50 psi (3.4 bar)	5.7" (144 mm)	CH104	6	27
Adjustable spring-loaded	G 1/2	50 psi (3.4 bar)	5.4" (138 mm)	CH106	7	27
Fixed spring-loaded	1/2 - 14 NPT	None	4.4" (112 mm)	CH104	8**	27
Fixed spring-loaded	1/2 - 14 NPT	None	4.2" (106 mm)	CH106	9**	27

** 0.250 diameter only for all stainless and MgO probes (not available in tip-sensitive, 0.215" diameter or 0.236" diameter 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	
		Single	Dual
Platinum (0.00392 TCR)	100 Ω ±0.5% at 0°C	PA	PAPA
Platinum (0.00385 TCR) (Meets EN60751, Class B)	100 Ω ±0.1% at 0°C	PD	PDPD
Platinum (0.00385 TCR) (Meets EN60751, Class A)	100 Ω ±0.06% at 0°C	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)	10 Ω ±0.2% at 25°C	CA	
(dual)	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 (mm): See table for minimums
X	Leads per sensing element: Y = 2 leads (n/a for copper) Z = 3 leads X = 4 leads
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

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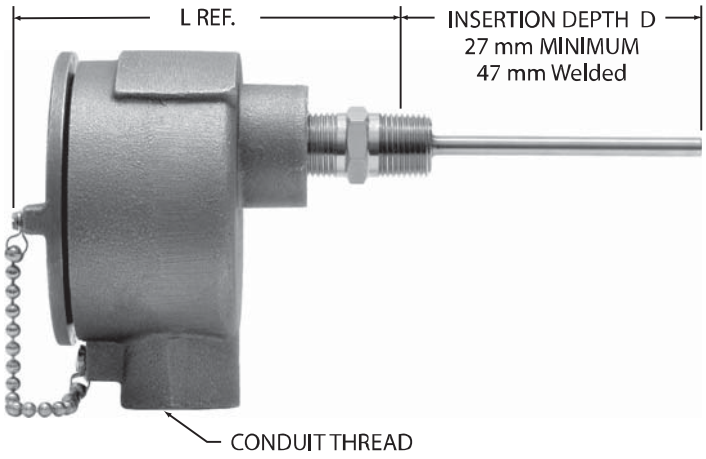


Overview

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

- Tip sensitive, 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).

Special options: Higher temperature ranges.

Temperature Transmitters

Minco's Temptran™ RTD transmitters provide a 4 to 20 mA signal or HART® Protocol that can be sent over long distances with a simple 2-wire system. See Section 5 for complete temperature transmitter specifications.

Contact Minco if transmitter is required

Hazardous area requirements

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), visit www.minco.com.

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	Minimum Insertion Depth (mm)
Welded	½ - 14 NPT	200 psi (13.8 bar)	4.4" (112 mm)	CH104	0*	47
Welded	½ - 14 NPT	200 psi (13.8 bar)	4.2" (106 mm)	CH106	1*	47
Welded	G ½	200 psi (13.8 bar)	4.2" (107 mm)	CH104	2*	47
Welded	G ½	200 psi (13.8 bar)	4.0" (101 mm)	CH106	3*	47
Adjustable spring-loaded	½ - 14 NPT	50 psi (3.4 bar)	5.7" (144 mm)	CH104	4	27
Adjustable spring-loaded	½ - 14 NPT	50 psi (3.4 bar)	5.4" (138 mm)	CH106	5	27
Adjustable spring-loaded	G ½	50 psi (3.4 bar)	5.7" (144 mm)	CH104	6	27
Adjustable spring-loaded	G ½	50 psi (3.4 bar)	5.4" (138 mm)	CH106	7	27
Fixed spring-loaded	½ - 14 NPT	None	4.4" (112 mm)	CH104	8**	27
Fixed spring-loaded	½ - 14 NPT	None	4.2" (106 mm)	CH106	9**	27

** Welded fitting only available with 0.250 Mg0 filled probes [minimum insertion (2.5" 63mm)]*
*** 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)	
Number of elements	Single	Dual	Single	Dual	Single	Dual
Tip-sensitive	AS766	AS767	AS706	AS707	AS726	AS727
MgO filled			AS708	AS709	AS728	AS729

Specification and order options

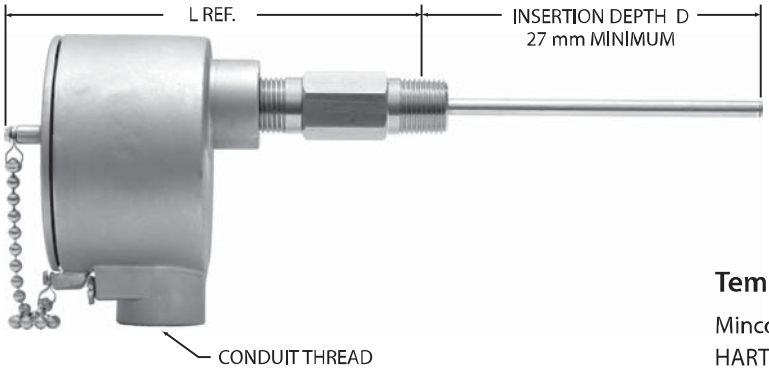
AS706	Assembly number from table
4	Connection head/fitting from table
E	Junction type from table
U	Junction Grounding: G = Grounded U = Ungrounded
100	Insertion depth D (mm): See table for minimums
P	
3	Conduit thread: 3 = ½ - 14 NPT 4 = ¾ - 14 NPT
AS7064EU100P3 = Sample part number	

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



FM APPROVED

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

Minco's Temptran™ RTD transmitters provide a 4 to 20 mA or HART® Protocol signal that can be sent over long distances with a simple 2-wire system.

Leadwires:
2-lead RTD: TT211, TT520, TT521
3-lead RTD: TT520, TT521
4-lead RTD: TT520, TT521

Physical: Epoxy potted for moisture resistance.

See Section 5 for complete temperature transmitter specifications.

Hazardous area requirements

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), visit www.minco.com.

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	Minimum Insertion Depth (mm)
Welded	½ - 14 NPT	200 psi (13.8 bar)	4.4" (112 mm)	CH104	0*	47
Welded	½ - 14 NPT	200 psi (13.8 bar)	4.2" (106 mm)	CH106	1*	47
Welded	G ½	200 psi (13.8 bar)	4.2" (107 mm)	CH104	2*	47
Welded	G ½	200 psi (13.8 bar)	4.0" (101 mm)	CH106	3*	47
Adjustable spring-loaded	½ - 14 NPT	50 psi (3.4 bar)	5.7" (144 mm)	CH104	4	27
Adjustable spring-loaded	½ - 14 NPT	50 psi (3.4 bar)	5.4" (138 mm)	CH106	5	27
Adjustable spring-loaded	G ½	50 psi (3.4 bar)	5.7" (144 mm)	CH104	6	27
Adjustable spring-loaded	G ½	50 psi (3.4 bar)	5.4" (138 mm)	CH106	7	27
Fixed spring-loaded	½ - 14 NPT	None	4.4" (112 mm)	CH104	8**	27
Fixed spring-loaded	½ - 14 NPT	None	4.2" (106 mm)	CH106	9**	27

** 0.250 diameter only for all stainless and MgO probes.*
(not available in tip-sensitive, 0.215" diameter or 0.236" diameter 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 starting on page 5-20 and at www.minco.com

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
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 ±0.06% at 0°C (Meets EN60751, Class A)	PM
Platinum (0.00385 TCR) 100 Ω ±0.5% at 0°C	PE
Platinum (0.00375 TCR) 1000 Ω ±0.12% at 0°C	PW
Copper (0.00427 TCR) 10 Ω ±0.2% at 25°C	CA
Nickel (0.00672 TCR) 120 Ω ±0.5% at 0°C	NA
Nickel (0.00618 TCR) 100 Ω ±0.22% at 0°C	NB

Specification and order options

AS720	Assembly number from table
4	Connection head/fitting from table
PD	Sensing element from table
100	Insertion depth D (mm): See table for minimums
Y	Leads per sensing element: Y = 2 leads (n/a for copper) Z = 3 leads X = 4 leads
3	Conduit thread: 3 = ½ - 14 NPT 4 = ¾ - 14 NPT
TT520	Temptran™ model number: TT211: Fixed Range (2-lead RTDs) TT520: Programmable (2, 3, & 4-lead RTDs) TT521: HART Programmable (2, 3, & 4-lead RTDs)
N	Temperature range code from table
1	Calibration: 1 = Nominal calibration 2 = Match calibrated, 0.75% total system accuracy. For other calibration options, contact Minco
AS7204PD100Y3TT520N1 = Sample part number	

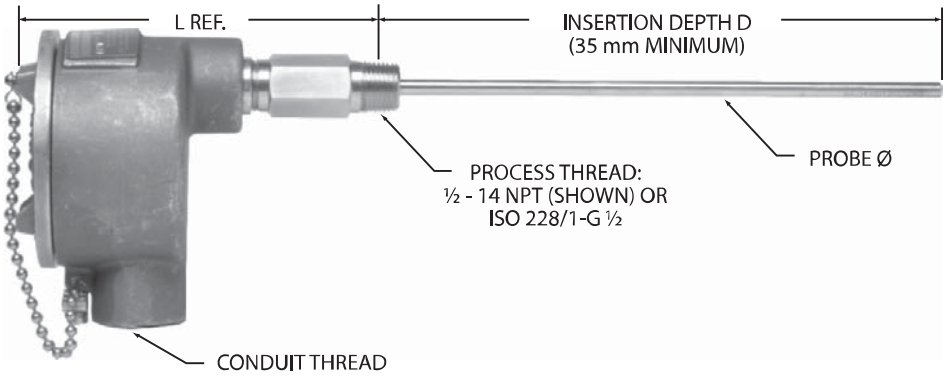
Specifications subject to change

Flameproof RTD Sensors – Metric Dimensioned

CE 0344

II 2 G Ex 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 X), and Ex II 2 G Ex 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: 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.

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.

Special options: Higher temperature ranges.

Hazardous area requirements

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), visit www.minco.com.

Specifications subject to change

Fitting options

Fitting	Process Thread	L REF.		Code	Pressure Rating
		CH356	CH357/CH358		
Fluid Seal	½ - 14 NPT		4.6" (116 mm)	0*	50psi (3.4 bar)
Fluid Seal	G ½		4.4" (111 mm)	1*	50psi (3.4 bar)
Set screw spring-loaded	½ - 14 NPT	5.3" (135 mm)	5.6" (143 mm)	2	50psi (3.4 bar)
Set screw spring-loaded	G ½	5.0" (128mm)	5.4" (136 mm)	3	50psi (3.4 bar)
Fixed spring-loaded	½ - 14 NPT	4.5" (115 mm)		4	None
Welded	½ - 14 NPT	4.2"(107 mm)	4.5" (115 mm)	6**	200psi (13.8 bar)
Welded	G ½	4.0" (101 mm)	4.3" (109 mm)	7**	200psi (13.8 bar)
Release knob spring-loaded	½ - 14 NPT	5.4" (137 mm)	5.7" (145 mm)	8	50psi (3.4 bar)
Release knob spring-loaded	G ½	5.2" (132 mm)	5.5" (140 mm)	9	50psi (3.4 bar)

** Not available with CH356 stainless steel connection head.*
*** 0.250" (6.4mm) for all stainless and MgO only (not available in tip-sensitive or 0.236" diameter models).*

RTD Assembly Numbers

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

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	
		Single	Dual
Platinum (0.00392 TCR)	100 Ω ±0.5% at 0°C	PA	PAPA
Platinum (0.00385 TCR) (Meets EN60751, Class B)	100 Ω ±0.1% at 0°C	PD	PDPD
Platinum (0.00385 TCR) (Meets EN60751, Class A)	100 Ω ±0.06% at C°C	PM	PMPM
Platinum (0.00385 TCR)	100 Ω ±0.5% at 0°C	PE	PEPE
Platinum (0.00375 TCR)	1000 Ω ±0.12% at C°C	PW	PWPW
Copper (0.00427 TCR)	10 Ω ±0.2% at 25°C	CA	
(dual)	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

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 = ½ - 14 NPT 4 = ¾ - 14 NPT 5 = M20 x 1.5
AS8004PD100X3 = Sample part number	

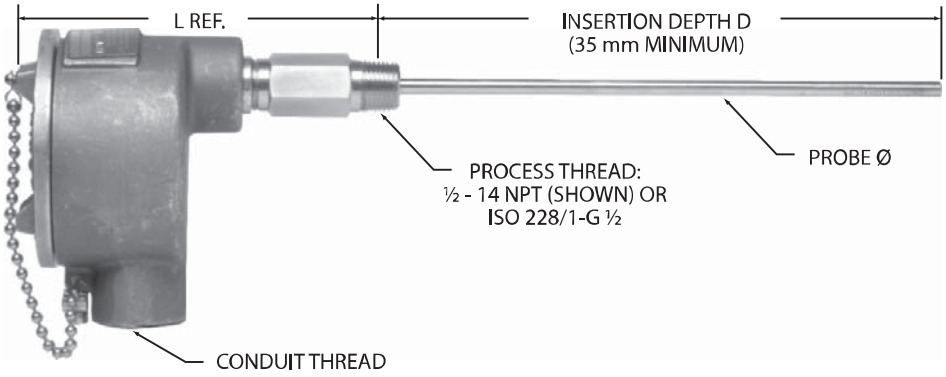
Specifications subject to change

Flameproof Thermocouple Sensors – Metric Dimensioned

CE 0344

II 2 G Ex 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 X), and Ex II 2 G Ex d IIC T6
- Features tip-sensitive or MgO filled thermocouple 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.
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.

Special options: Higher temperature ranges.

Temperature Transmitters

Minco's Temptran™ thermocouple transmitters provide a 4 to 20 mA signal or HART® Protocol that can be sent over long distances with a simple 2-wire system. See Section 5 for complete temperature transmitter specifications.

Contact Minco if transmitter is required.

Hazardous area requirements

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), visit www.minco.com.

Specifications subject to change

Fitting options

Fitting	Process Thread	L REF.		Code	Pressure Rating
		CH356	CH357/CH358		
Fluid Seal	1/2 - 14 NPT		4.6" (116 mm)	0*	50psi (3..4 bar)
Fluid Seal	G 1/2		4.4" (111 mm)	1*	50psi (3..4 bar)
Set screw spring-loaded	1/2 - 14 NPT	5.3" (135 mm)	5.6" (143 mm)	2	50psi (3..4 bar)
Set screw spring-loaded	G 1/2	5.0" (128mm)	5.4" (136 mm)	3	50psi (3..4 bar)
Fixed spring-loaded	1/2 - 14 NPT	4.5" (115 mm)		4	None
Welded	1/2 - 14 NPT	4.2"(107 mm)	4.5" (115 mm)	6**	200psi (13.8 bar)
Welded	G 1/2	4.0" (101 mm)	4.3" (109 mm)	7**	200psi (13.8 bar)
Release knob spring-loaded	1/2- 14 NPT	5.4" (137 mm)	5.7" (145 mm)	8	50psi (3..4 bar)
Release knob spring-loaded	G 1/2	5.2" (132 mm)	5.5" (140 mm)	9	50psi (3..4 bar)

** Not available with CH356 stainless steel connection head.*
*** 0.250" (6.4mm) for MgO only (not available in tip-sensitive or 0.236" diameter models).*

Thermocouple Assembly Numbers

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

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	

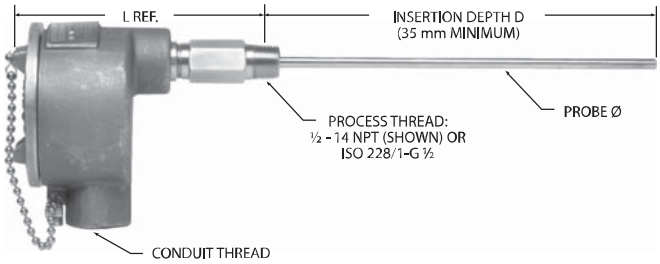
Specifications subject to change

Flameproof RTDs With Transmitters – Metric Dimensioned

CE 0344

II 2 G Ex 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 X), and Ex II 2 G Ex 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: 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.

Connection: Terminal block for wires to 14 AWG.

Time constant: Typical value in moving water.
Tip sensitive:
Single element 1.5 seconds.
All stainless and MgO filled: 10 seconds.

Temperature Transmitters

Minco's Temptran™ RTD transmitters provide a 4 to 20 mA or HART® Protocol signal that can be sent over long distances with a simple 2-wire system.

Leadwires:
2-lead RTD: TT211, TT520, TT521
3-lead RTD: TT520, TT521
4-lead RTD: TT520, TT521

Physical: Epoxy potted for moisture resistance.

See Section 5 for complete temperature transmitter specifications.

Hazardous area requirements

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), visit www.minco.com.

Specifications subject to change

Fitting options

Fitting	Process Thread	L REF.		Code	Pressure Rating
		CH356	CH357/CH358		
Fluid Seal	1/2 - 14 NPT		4.6" (116 mm)	0*	50psi (3.4 bar)
Fluid Seal	G 1/2		4.4" (111 mm)	1*	50psi (3.4 bar)
Set screw spring-loaded	1/2 - 14 NPT	5.3" (135 mm)	5.6" (143 mm)	2	50psi (3.4 bar)
Set screw spring-loaded	G 1/2	5.0" (128mm)	5.4" (136 mm)	3	50psi (3.4 bar)
Fixed spring-loaded	1/2 - 14 NPT	4.5" (115 mm)		4	None
Welded	1/2 - 14 NPT	4.2"(107 mm)	4.5" (115 mm)	6**	200psi (13.8 bar)
Welded	G 1/2	4.0" (101 mm)	4.3" (109 mm)	7**	200psi (13.8 bar)
Release knob spring-loaded	1/2 - 14 NPT	5.4" (137 mm)	5.7" (145 mm)	8	50psi (3.4 bar)
Release knob spring-loaded	G 1/2	5.2" (132 mm)	5.5" (140 mm)	9	50psi (3.4 bar)

** Not available with CH356 stainless steel connection head.*

*** 0.250" (6.4mm) for all stainless and MgO only (not available in tip-sensitive or 0.236" diameter models).*

RTD Assembly Numbers

Connection Head	CH356 Stainless		CH357 Aluminum		CH358 Epoxy Coated	
Probe Diameters	0.236" (6.0mm)	0.250" (6.4mm)	0.236" (6.0mm)	0.250" (6.4mm)	0.236" (6.0mm)	0.250" (6.4mm)
Number of elements	Single	Single	Single	Single	Single	Single
Tip Sensitive	AS800	AS810	AS830	AS840	AS860	AS870
All Stainless	AS802	AS812	AS832	AS842	AS862	AS872
MgO Platinum	AS804	AS814	AS834	AS844	AS864	AS874

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 5-20 and at www.minco.com

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

Sensing elements

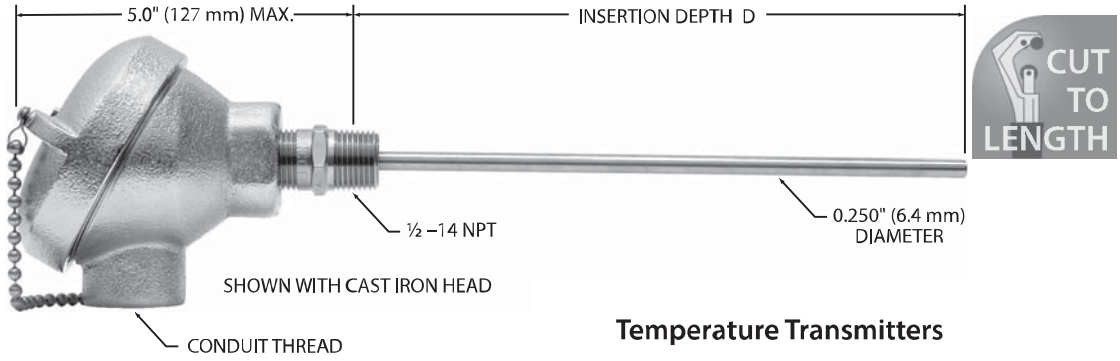
RTD sensing element		Code
Platinum (0.00392 TCR)	100 Ω ±0.5% at 0°C	PA
Platinum (0.00385 TCR) (Meets EN60751, Class B)	100 Ω ±0.1% at 0°C	PD
Platinum (0.00385 TCR)	100 Ω ±0.5% at 0°C	PE

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)
Y	Leads per sensing element: Y = 2 leads (n/a for copper) Z = 3 leads X = 4 leads
3	Conduit thread: 3 = 1/2 - 14 NPT 4 = 3/4 - 14 NPT 5 = M20 x 1.5
TT520	Temptran™ model number: TT211: Fixed Range (2-lead RTDs) TT520: Programmable (2, 3, & 4-lead RTDs) TT521: HART® Programmable (2, 3, & 4-lead RTDs)
N	Temperature range code from table
1	Calibration: 1 = Nominal calibration 2 = Match calibrated, 0.75% total system accuracy. For other calibration options, contact Minco
AS8004PD100Y3TT520N1 = 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 or HART® Protocol that can be sent over long distances with a simple 2-wire system. See Section 5 for complete temperature transmitter specifications.

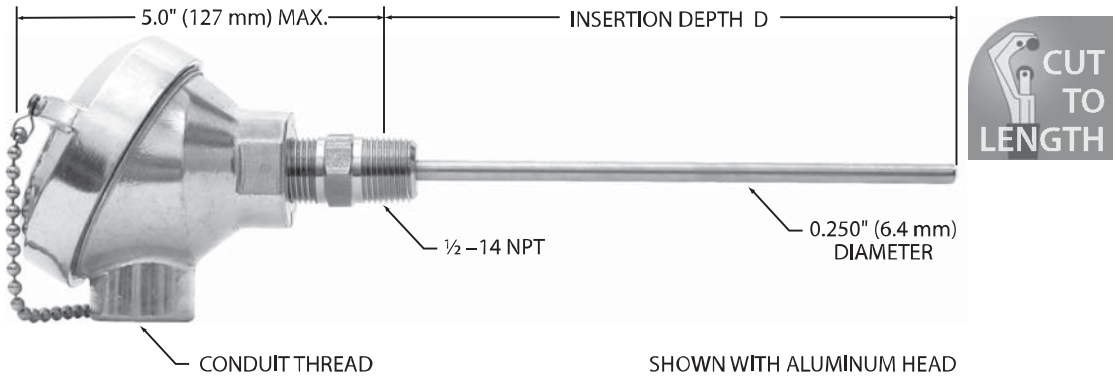
Special high-accuracy calibration: For high system accuracy, specify transmitters with matched calibration. Calibration data traceable to NIST will also be provided. Get more information on page 5-22.

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 = ½ - 14 NPT 2 = ¾ - 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) add:	
520	Temptran™ transmitter model: 211 = TT211: Fixed Range (2-lead RTDs) 520 = TT520: Programmable (2, 3, & 4-lead RTDs) 521 = TT521: HART® Programmable (2, 3, & 4-lead RTDs)
A	Temperature range codes starting on page 5-20 or at www.minco.com
1	Calibration: 1 = Nominal calibration 2 = Match calibrated, 0.75% total system accuracy. For other calibration options, contact Minco
AS5200PD100Z2C520A1 = Sample part number	

Specifications subject to change

Tip-sensitive Direct Immersion Thermocouples



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

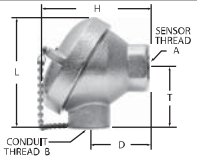
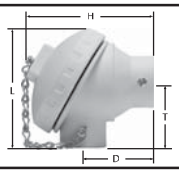
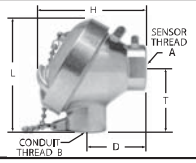
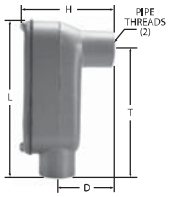
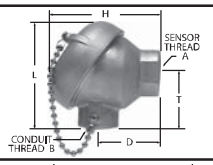
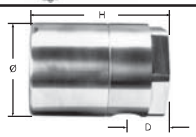
Minco's Temptran™ thermocouple transmitters provide a 4 to 20 mA signal or HART® Protocol that can be sent over long distances with a simple 2-wire system. See Section 5 for complete temperature transmitter specifications.

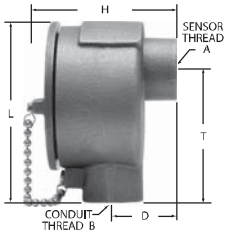
Specification and order options

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 = ½ - 14 NPT 2 = ¾ - 14 NPT
C	Connection head: C = Cast iron A = Aluminum S = Stainless steel
To order sensor assembly, stop here. To order with transmitter, add:	
520	Temptran™ transmitter model: 205 = TT205: Fixed Range, Miniature 520 = TT520: Programmable, Hockey Puck 521 = TT521: HART® Programmable, Hockey Puck
A	Temperature range codes starting on page 5-20 or at www.minco.com
AS5205EU215P1C520A = Sample part number	

Specifications subject to change

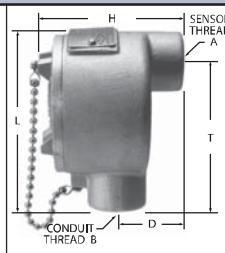
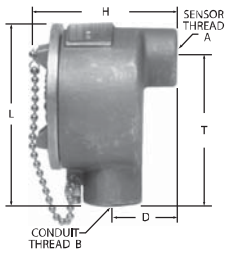
Connection Heads

Dimensions in inches (mm)	Body/gasket material	IP/NEMA Rating	Max Temp.	Pipe thread codes	Temptran™ models	Approx. weight	Model
CH103 3.5 (89) H 3.5 (89) L 1.9 (48) D 1.9 (48) T 	Nickel-plated cast iron with SS chain/ silicone gasket	IP55 Type 3 and 4	316°C (600°F)	P1, P2, P3, P4	All models except TT220 and TT221	2.0 lbs. (0.9 kg.)	CH103
CH366 3.0 (76) H 3.7 (94) L 1.37 (35) D 1.9 (48) T 	White polypropylene (FDA approved)/ neoprene gasket	IP55 Type 3 and 4	110°C (230°F)	P3 only	All models except TT220 and TT221	0.2 lbs. (0.1 kg.)	CH366
CH359 3.5 (89) H 3.5 (89) L 2.0 (51) D 1.75 (44) T 	Aluminum/ silicone gasket	IP55 Type 3 and 4	316°C (600°F)	P1, P2, P3, P4	All models except TT220 and TT221	0.8 lbs. (0.4 kg.)	CH359
CH301 2.33 (59.2) H 4.25 (108) L 1.25 (31.8) D 3.60 (91.4) T 	Aluminum/ neoprene gasket	IP55 Type 3 and 4	115°C (240°F)	CH301: P3 only	Miniature TT111 and TT211 models	0.5 lbs. (0.2 kg.)	CH301
CH302 2.60 (66.0) H 5.20 (132) L 1.50 (38.1) D 4.25 (108) T				CH302: P2 only			CH302
CH360 3.5 (89) H 3.5 (89) L 2.0 (51) D 1.75 (44) T 	316 SS with silicone gasket	IP56 Type 3, 4 and 4x	316°C (600°F)	P1, P2, P3, P4	All models except TT220 and TT221	1.8 lbs. (0.8 kg.)	CH360
CH335/CH339 2.5 (64) Ø 3.5 (89) H 0.95 (20) D 	300 series SS with Buna N O-ring	IP56 Type 3, 4 and 4x	121°C (250°F)	P3 only	All models except TT220 and TT221	2.6 lbs. (1.2 kg.)	CH335
	300 series SS with Buna N O-ring and chain	IP56 Type 3, 4 and 4x	121°C (250°F)	P3 only	All models except TT220 and TT221	2.6 lbs. (1.2 kg.)	CH339

Dimensions in inches (mm)	Body/gasket material	Hazardous location rating	IP/NEMA Rating	Max Temp.	Approx. weight	Model
Explosionproof/flameproof heads FM/CSA approved						
CH104: 4.60 (116.8) L 3.50 (88.9) H 1.63 (41.4) D 3.35 (85.1) T **CH106:** 4.20 (106.7) L 3.50 (88.9) H 1.35 (34.3) D 3.22 (81.8) T 	Copper-free aluminum/ Buna-N O-ring	Division 1; Division 2 Class I, Groups B, C, D; Class II, Groups E, F, G; Class I, Zone 1, AEx d IIC; Zone 1, EX d IIC; T6 (Ta = 40°C), T2 (Ta = 260°C)	IP65 Type 3 and 4	121°C* (250°F)	1.5 lbs. (0.7 kg.)	CH104
	Stainless steel/ Buna-N O-ring		IP66 Type 3, 4, and 4X	121°C* (250°F)	2.4 lbs. (1.1 kg.)	CH106

**Maximum temperature increases to 500°F (260°C) if O-ring is removed. Environmental rating drops to Type 3, IP54.*

Specifications subject to change

Dimensions in inches (mm)		Body/gasket material	Hazardous location rating	IP/NEMA Rating	Max Temp.	Approx. weight	Model
Explosionproof heads FM/CSA approved							
CH405/CH407/ CH342/CH343/ CH330/CH328: 4.60 (116.8) L 3.60 (91.4) H 1.63 (41.4) D 3.70 (96.0) T		Copper-free aluminum	Division 1; Class I, Groups A, B, C, D; Class II, Groups E, F, G; Class III (FM approved only)	IP54 Type 3	260°C (500°F)	1.4 lbs. (0.6 kg.)	CH405
		Copper-free aluminum/ Buna-N O-ring		IP65 Type 3 and 4	121°C (250°F)		CH407
		Copper-free aluminum, gray epoxy coat, no chain/ Buna-N O-ring	Division 1; Class I, Groups B, C, D; Class II, Groups E, F, G;	IP66 Type 3, 4 and 4X			CH342
		Copper-free aluminum, gray epoxy coat, with chain/ Buna-N O-ring					CH343
		Note: The following models have lower cost but no FM/CSA approval or label.					
		Aluminum/ Buna-N O-ring	Division 1; Class I, Groups B, C, D; Class II, Groups E, F, G; Class III	IP65 Type 3 and 4	121°C (250°F)	1.4 lbs. (0.6 kg.)	CH330
		Aluminum with FDA approved white epoxy coat, no chain/Buna-N O-ring		IP66 Type 3, 4 and 4X			CH328
Flameproof heads CENELEC/ATEX approved ⟨Ex⟩ II 2G Ex d IIC T6							
CH357/CH358: 4.49 (114) L 3.60 (91.4) H 1.63 (41.4) D 3.78 (96.0) T CH356: 4.20 (106.7) L 3.50 (88.9) H 1.35 (34.3) D 3.22 (81.8) T		Copper-free aluminum/ Buna-N O-ring	Zone 1, Group IIC	IP65 Type 3 and 4	55°C (104°F)	1.4 lbs. (0.6 kg.)	CH357
		Copper-free aluminum, epoxy coated/Buna-N O-ring	Zone 1, Group IIC	IP66 Type 3, 4 and 4X			CH358
		Stainless steel/Buna-N O-ring			121°C (250°F)	2.4 lbs. (1.1 kg.)	CH356

Replacement terminal boards

Model	6-position board	8-position board
CH103	AC103029	AC101926
CH104	AC1039	AC101122
CH106	AC1039	AC101122
CH301	AC101377T6	
CH302	AC101377T6	
CH328	AC1039	AC101122
CH330	AC1039	AC101122
CH331	AC100427	
CH335	AC100427	AC101926
CH339	AC100427	AC101926
CH342	AC1039	AC101122
CH343	AC1039	AC101122
CH356	AC1039	AC101122
CH357	AC1039	AC101122
CH358	AC1039	AC101122
CH359	AC100427	AC101926
CH360	AC100427	AC101926
CH405	AC1039	AC101122
CH407	AC1039	AC101122

Notes:

- *View photos of terminal boards under accessories at www.minco.com*
- *All Temptran™ transmitter models may be used with connection heads on these pages.*
  - *AC103133 dual miniature Temptran™ mounting kit fits CH104, CH106, and CH356. CH106 and CH356 also require AC103625 modification.*
  - *AC103528 dual miniature Temptran™ mounting kit fits CH342, CH343, CH405, CH407, CH328, CH330, CH357, and CH358.*
  - *See Section 5 for more information.*

Specification and order options

CH104	Model number from table		
P2	Pipe thread code:	Thread A	Thread B
	P1 =	3/4 - 14	1/2 - 14
	P2 =	3/4 - 14	3/4 - 14
	P3 =	1/2 - 14	1/2 - 14
	P4 =	1/2 - 14	3/4 - 14
	P5 (CH356 only) =	1/2 - 14	M20 x 1.5
	P6 (CH356 only) =	3/4 - 14	M20 x 1.5
T	Connection type: T = Terminal board for wires AWG 14 or smaller W = Wire nuts for wires AWG 14 to 22		
6	Number of terminal posts or wire nuts: 0, 6 or 8 (see terminal board table at right for model options) T0: transmitter mounting hardware W0: empty enclosure		
CH104P2T6 = Sample part number			

Specifications subject to change

ACCESSORIES

Minco CT425 Temperature Controller

Versatile, configurable controller

Minco's CT425 Temperature Controller provides simple, yet quick customization for most controller applications. The CT425 Temperature Controller features three user-configurable outputs, two programmable inputs, and communication via USB.

Overview

Minco's CT425 Temperature Controller is a PID temperature controller capable of reading two independent temperature sensors (RTDs). By utilizing an internal solid state relay, logic voltage output, and internal mechanical relay, the controller is fully configurable. Simply connect the CT425 to a laptop or PC to configure.

Features

Flexible configuration for:

- Inputs
  - Utilize one or two Platinum RTDs
  - Choose 100 or 1000 ohm RTDs (independently programmable)
- Outputs
  - Utilize up to three outputs
    - Solid state relay
    - Logic voltage
    - Mechanical relay
  - Choose control type
    - PID
    - On/Off (mechanical relay only)
    - Alarm
- USB and a user-friendly software package allow for easy setup and use
- 32-bit microprocessor executes both PID loops simultaneously at individually configurable rates up to 25 times/second
- High current capacity internal switching
- Electrically isolated switching outputs increase high voltage safety
- AC powered models perform zero-cross detection to reduce switching noise
- LED indicators provide a quick confirmation of correct sensors input operation

Applications

The CT425 is designed for a variety of applications that include heating and cooling of equipment or processes. The CT425's versatility makes it ideal to use as an off-the-shelf prototyping tool or as an economical controller for small to medium volume applications. Moreover, the CT425's modular design provides the platform for fast and cost-effective custom designs for medium to high volume applications.

Key Specifications

<table>
<tr><th colspan="2"></th><th>CT425 Temperature Controller</th></tr>
<tr><td rowspan="3">Performance</td><td>Measurement Range</td><td>-70°C to 650°C (-94°C to 1202°F), 0.25°C full-range accuracy at 25C</td></tr>
<tr><td>Input Power</td><td>Model CT425A: 120VAC, 50-60Hz
Model CT425B: 10.5-60VDC
Model CT425C: 240VAC, 50-60Hz</td></tr>
<tr><td>Sensor Inputs (RTD)</td><td>100Ω or 1000Ω Platinum, 0.00385Ω/Ω/°C TCR,
2-wire connection,
Open and shorted sensor detection</td></tr>
<tr><td rowspan="3">Environment</td><td>Connections</td><td>5mm spacing terminal block</td></tr>
<tr><td>Output Ratings</td><td>
<table>
<tr><th>Output</th><th>Max Voltage</th><th>Current (25C)</th><th>Current (55C)</th></tr>
<tr><td>120VAC Solid State (CT425A)</td><td>120VAC</td><td>6A</td><td>5A</td></tr>
<tr><td>DC Solid State (CT425B)</td><td>60VDC</td><td>15A</td><td>11A</td></tr>
<tr><td>240VAC Solid State (CT425C)</td><td>240VAC</td><td>3A</td><td>2.5A</td></tr>
<tr><td>Mechanical Relay</td><td>250VAC/30VDC</td><td colspan="2">10A resistive</td></tr>
<tr><td>Logic Voltage</td><td>4.4V, +/- 0.1V output</td><td colspan="2">26mA, +/- 3mA</td></tr>
</table>
</td></tr>
<tr><td>Temperature Range</td><td>-40°C to 70°C, 95% humidity, non-condensing</td></tr>
<tr><td rowspan="3">Mechanical</td><td>Dimensions</td><td>5.46” x 3.34” x 1.22”</td></tr>
<tr><td>Weight</td><td>350 grams (12.3 ounces)</td></tr>
<tr><td>Enclosure</td><td>UL 94V-0 ABS plastic with epoxy potting</td></tr>
</table>

Ordering Information

To configure your temperature controller, select from the options listed below to determine the complete part number.

	CT425 Power Supply
CT425A	120VAC power, 120 VAC solid state relay
CT425B	10.5–60VDC power, DC solid state relay
CT425C	240VAC power, 240 VAC solid state relay

Miniature Temptran™ RTD Transmitters

TT111 only

TT211 only

TT111, TT211

Overview

- Two models:
  TT111: UL-recognized component for Canada and United States.
  TT211: Wider ambient rating; Factory Mutual (FM) approved intrinsically safe and nonincendive.
- Optional high-accuracy calibration to Minco RTDs for improved accuracy; see next page and page 5-22 for more information.

Specifications

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

Calibration accuracy: ±0.1% of span.

Linearity: Referenced to actual sensor temperature.
Platinum RTD input: ±0.1% of span.
Nickel and nickel-iron RTD input:
±0.25% of span for spans less than 100°C.
±0.25% of span per 100°C of span for spans greater than 100°C.

Adjustments: Zero and span, ±5% of span. Factory set.

Ambient temperature:
TT111: 0 to 50°C (32 to 122°F).
TT211: -25 to 85°C (-13 to 185°F).
Storage: -55 to 100°C (-67 to 212°F).

Ambient temperature effects:
±0.013% of span per °C.
±0.025% of span per °C for spans less than 55°C.

Warmup drift: ±0.1% of span max., with V_{supply} = 24 VDC and R_{loop} = 250 Ω.
Stable within 30 minutes.

Supply voltage: 8.5 to 35 VDC. Voltage effect ±0.001% of span per volt. Reverse polarity protected.

Maximum load resistance: The maximum allowable resistance of the signal carrying loop is:

$$R_{loop\ max} = \frac{V_{supply} - 8.5}{0.020\ \text{amps}}$$

Example: With supply voltage 24 VDC, maximum loop resistance is 775 Ω.

Minimum span: 27.8°C (50°F).

Hazardous atmospheres: All models may be used with Minco flameproof/explosionproof connection heads. Models TT211 is Factory Mutual approved nonincendive for use in Class I, Division 2 areas and intrinsically safe for Class I, Division 1 areas (requires approved barrier). Transmitter entity parameters:

V_{max} = 35 volts; I_{max} = 150 mA; C_i = 0 μF and L_i = 0 mH.

Connections:
Terminal block for wires AWG 22 to AWG 14.

Physical: Polycarbonate case, epoxy potted for moisture resistance.

Weight: 1.1 oz. (30 g).

Hazardous area requirements

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), visit www.minco.com.

Specifications subject to change

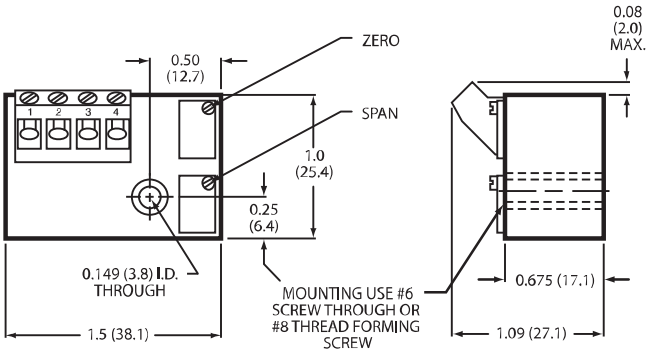
Miniature RTD Transmitters

RTD input types

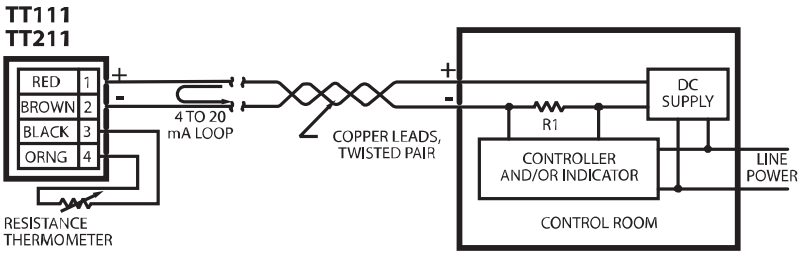
2-wire resistance thermometer:

Element		Code
Platinum (0.00392 TCR)	100 Ω at 0°C	PA
Platinum (0.00391 TCR)	100 Ω at 0°C	PB
Platinum (0.00385 TCR)	100 Ω at 0°C	PD, PE
Platinum (0.00385 TCR)	1000 Ω at 0°C	PF
Platinum (0.00375 TCR)	1000 Ω at 0°C	PW
Nickel-iron (0.00518 TCR)	604 Ω at 0°C	FA
Nickel-iron (0.00527 TCR)	1000 Ω at 70°F	FB
Nickel-iron (0.00527 TCR)	2000 Ω at 70°F	FC
Nickel (0.00672 TCR)	120 Ω at 0°C	NA

Dimensions in inches (mm)



Wiring Diagram



Special high-accuracy calibration

For high system accuracy, specify transmitters with matched calibration. Temptrans match calibrated to a sensor are always ordered as assemblies. Common examples are shown in Section 2.

Specification and order options:

TT111	Model number: TT111 or TT211
PD	RTD element code from table
1	Output: 4 to 20 mA DC
C	Temperature range code starting on page 5-20 [Ex: C = 0 to 100°C (32 to 212°F)]
TT111PD1C = Sample part number	

INSTRUMENTS

Specifications subject to change

TT246 RTD Transmitters

TT246 RTD Transmitter, voltage output

Overview

Specify this rugged, accurate transmitter for process control and other industrial applications.

Model TT246 outputs 1 to 5 VDC proportional to temperature. It draws only 3 mA of quiescent current, making it ideal for solar or battery powered systems.

- 2 or 3-wire RTD input
- Ambient rated to 85°C (185°F)
- Fits DIN "B" style connection heads
- Optional high-accuracy calibration to Minco RTDs for improved accuracy; see next page and page 5-22 for more information.

Specifications

Output: Linear with temperature over specified range.
TT246: 1 to 5 VDC

Calibration Accuracy: ±0.1% of span (0.2% of span for spans less than 10 Ω)

Linearity: 0.1% of span, referenced to actual sensor temperature

Adjustments Zero and span, ±5% of span, non-interacting. Factory set.

Ambient temperature:
Operating: -40 to 85°C (-40 to 185°F)
Storage: -55 to 100°C (-67 to 212°F)

Ambient temperature effects:
±0.009% of span per °C
±0.014% of span per °C for spans less than 10 Ω

Warmup drift:
±0.1% of span max., with V_{supply} = 24 VDC and R_{loop} = 250 Ω.
Stable within 15 minutes.

Supply voltage:
TT246: 7.5 to 35 VDC
Voltage effect ±0.001% of span per volt.
Reverse polarity protected.

Supply current: 3mA max. with no load.

Maximum load resistance: The maximum allowable resistance of the signal carrying loop is:

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

Example: With supply voltage 24 VDC, maximum loop resistance is 700 Ω.

Minimum span: 10°C (18°F).

Minimum output current: 2.2 mA.

Maximum output current: 28 mA.

Leadwire compensation: (3-wire RTD) ±0.05% of span per Ω up to 25 Ω in each leg.

Hazardous atmospheres: May be used with Minco explosion-proof connection heads.

Connections: Terminal block for wires AWG 22 to AWG 14.

Physical: Polycarbonate case, epoxy potted for moisture resistance.

Weight: 2.0 oz. (57 g).

Specifications subject to change

RTD input types

2 or 3-wire resistance thermometer:

Element		Code
Platinum (0.00392 TCR)	100 Ω at 0°C	PA
Platinum (0.00391 TCR)	100 Ω at 0°C	PB
Platinum (0.00385 TCR)	100 Ω at 0°C	PD, PE
Platinum (0.00385 TCR)	1000 Ω at 0°C	PF
Platinum (0.00375 TCR)	1000 Ω at 0°C	PW
Copper (0.00427 TCR)	10 Ω at 25°C	CA
Nickel-iron (0.00518 TCR)	604 Ω at 0°C	FA
Nickel-iron (0.00527 TCR)	1000 Ω at 70°F	FB
Nickel-iron (0.00527 TCR)	2000 Ω at 70°F	FC
Nickel (0.00672 TCR)	120 Ω at 0°C	NA

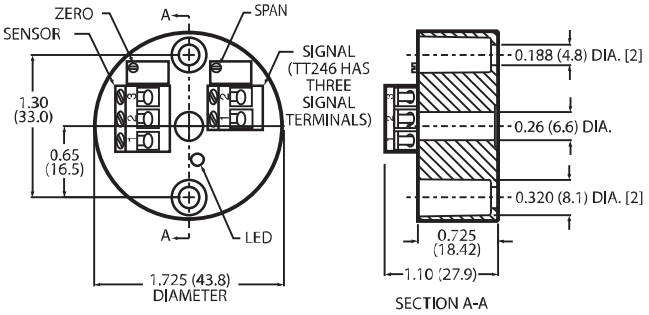
Special high-accuracy calibration

For high system accuracy, specify transmitters with matched calibration. Temptrans match calibrated to a sensor are always ordered as assemblies.

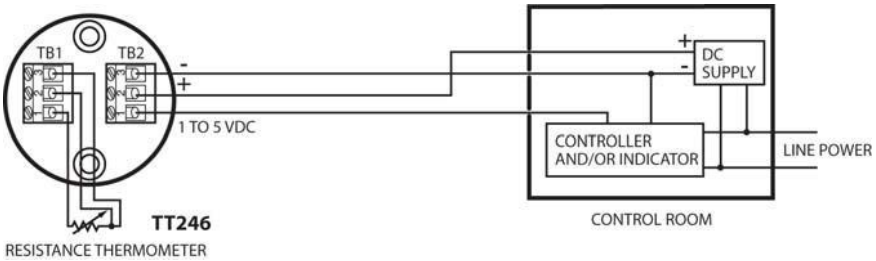
Specification and order options:

TT246	Model Number:
PB	RTD element code from table
1	
K	Temperature range code starting on page 5-20 [Ex: K = 0 to 200°C (32 to 392°F)]
TT246PB1K = Sample part number	

Dimensions in inches (mm)



Wiring Diagram



INSTRUMENTS

Specifications subject to change

TT205 Thermocouple Transmitters

TT205
Thermocouple Transmitter

Overview

Model TT205 interfaces with thermocouples for use in process control and other industrial applications.

Model TT205 offers superior performance in an economical and small package.

- Thermocouple input
- Fits DIN "B" style connection heads

Specifications

Output: 4 to 20 mA over specified range.

Accuracy: ±0.2% of span.

Linearity: Voltage linear.
The output signal is voltage linear (not temperature linear) and is intended for use with instruments which compensate for the nonlinear signal output of the thermocouples sensor.

Adjustments: Zero and span, ±5% of span, non-interacting. Factory set.

Warmup drift: ±0.2% of span max., with V_{supply} = 24 VDC and R_{loop} = 250 Ω.
Stable within 15 minutes.

Supply voltage: 8.5 to 35 VDC
Voltage effect ±0.001% of span per volt.
Reverse polarity protected.

Maximum load resistance: The maximum allowable resistance of the signal carrying loop is:

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

Example: With supply voltage 24 VDC, maximum loop resistance is 700 Ω.

Minimum output current: 1.5 mA.

Maximum output current: 28 mA.

Burnout: Downscale burnout standard; upscale optional.

Connections: Terminal block for wires AWG 22 to AWG 14.

Physical: Polycarbonate case, epoxy potted for moisture resistance.

Weight: 1.8 oz. (52 g).

Specifications subject to change

TT205

Ambient temperature:
Operating: -10 to 60°C (14 to 140°F).
Storage: -55 to 100°C (-67 to 212°F).

Ambient temperature effects: ±0.036% of span per °C.

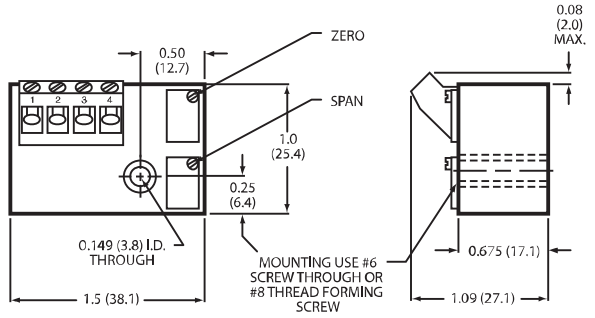
Cold junction compensation drift: ±0.05°C per °C.

Minimum span: 150°C (270°F).

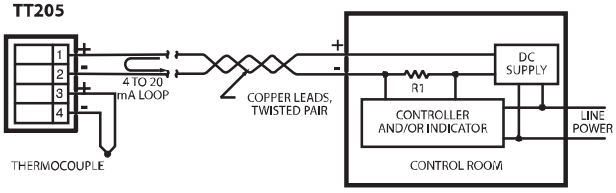
Specification and order options

TT205	Model Number: TT190: Round TT205: Rectangular
J	TC junction type: E = Chromel-Constantan J = Iron-Constantan K = Chromel-Alumel T = Copper-Constantan
U	U = Ungrounded junction (required)
1	Output: 4 to 20 mA DC
AN	Temperature range code starting on page 5-20 [Ex: AN = -17.8 to 148.9°C (0 to 300°F)]
TT205JU1AN = Sample part number	

TT205 Dimensions in inches (mm)



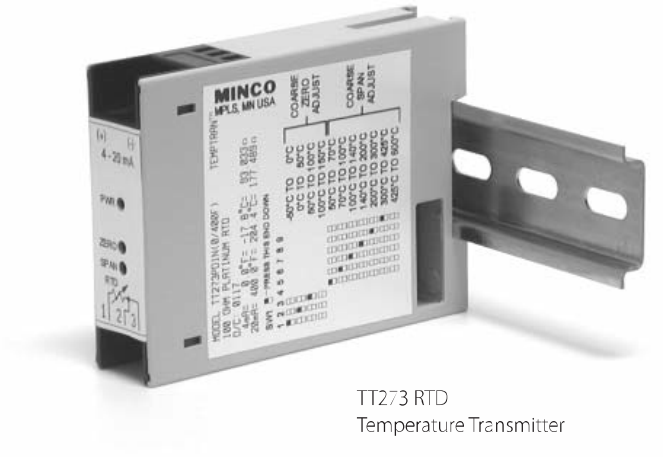
Wiring Diagram



INSTRUMENTS

Specifications subject to change

TT273 Field Rangeable RTD Temperature Transmitter



TT273 RTD
Temperature Transmitter

Overview

Model TT273 is a 2-wire temperature transmitter for 2 or 3-lead 100 Ω platinum RTDs. The transmitter converts the RTD temperature into a linearized 4 to 20 mA DC current signal. Because this current signal is immune to leadwire and electrical noise, the TT273 lets you obtain accurate temperature readings from RTDs thousands of feet away. An ordinary twisted pair of wires carries both the temperature signal and power for the transmitter's electronics.

An LED conveniently indicates the status of the control loop. The brightness is directly proportional to the loop current. A very bright LED indicates an open RTD; a dark LED signals a shorted RTD or loss of current loop power.

- 4 to 20 mA current signal
- Fits standard 35 mm DIN rail
- Field-calibrate to your temperature range
- Optional high-accuracy calibration to Minco RTDs for improved accuracy; see next page and page 5-22 for more information
- Optional Input/Output isolation to 600 VRMS

Specifications

Output: 4 to 20 mA DC over specified range.

Calibration accuracy: ±0.2% of span.

Linearity: ±0.2% of span, reference to actual sensor temperature.

Adjustments:
Zero: -50 to 150°C (-58 to 302°F).
Span: 50 to 600°C (90 to 1080°F).

Ambient temperature:
Operating: -40 to 85°C (-40 to 185°F).
Storage: -55 to 100°C (-67 to 212°F).

Ambient temperature effects:
±0.018% of span/°C (±0.01% of span/°F).

Warmup drift: ±0.1% of span max., assuming V_{supply} = 24 VDC and R_{loop} = 250 Ω.
Stable within 15 minutes.

Input/output isolation (optional): 600 VRMS, 1 minute.

Supply voltage:
Non-Isolated: 10 to 45 volts DC with no load.
Isolated: 13 to 45 volts DC with no load.
Reverse polarity protected.

Voltage effect: ±0.001% of span per volt.

Lead wire compensation: (3-wire RTD)
±0.05% of span per Ω, up to 25 Ω in each leg.

Maximum load resistance: The maximum allowable resistance of the signal-carrying loop is given by this formula:

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

Isolated: $$R_{loop\ max} = \frac{V_{supply} - 13}{0.020\ \text{amps}}$$

Maximum output current: 28 mA.

Connections: Terminal block accepts wires from AWG 22 to AWG 14.

Physical: Polycarbonate, DIN rail enclosure.

Weight: 4.2 oz. (119 g).

Specifications subject to change

RTD input types

2 or 3-wire 100 Ω platinum RTD.

Element		Code
Platinum (0.00392 TCR)	100Ω at 0°C	PA
Platinum (0.00391 TCR)	100Ω at 0°C	PB
Platinum (0.00385 TCR)	100Ω at 0°C	PD, PE

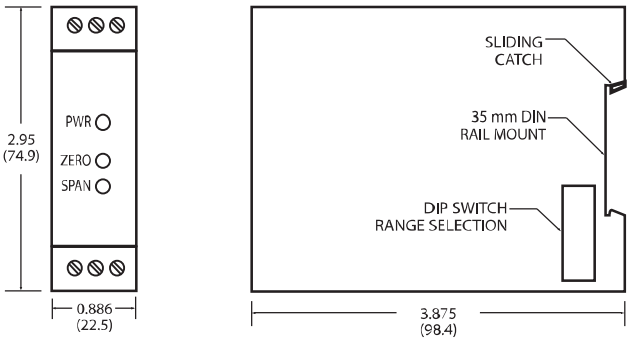
Special high-accuracy calibration

For high system accuracy, specify transmitters with matched calibration. Temptrans match calibrated to a sensor are always ordered as assemblies. Common examples are shown in Section 2.

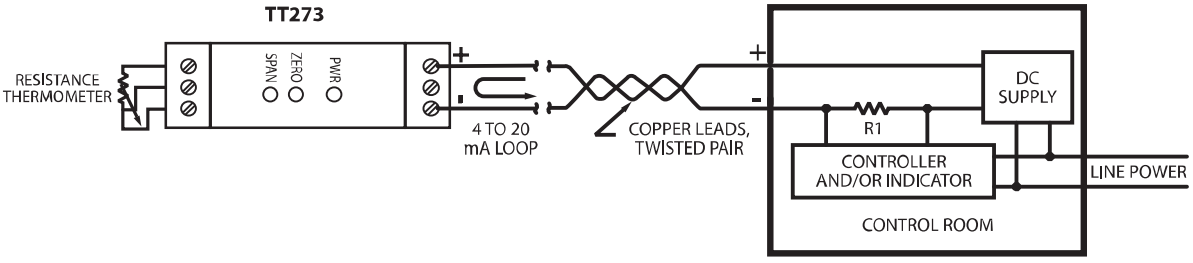
Specification and order options

TT273	Model number
PD	RTD element code from table
1	Output: 4 to 20 mA DC
N	Input/Output: N = Non-isolated I = Isolated
(-25/50)	Factory preset temp. range: (4 mA/20 mA temperature) Range is user adjustable. Refer to the Zero and Span specifications.
C	Temperature scale: F = Fahrenheit C = Celsius
TT273PD1N(-25/50)C = Sample part number	

Dimensions in inches (mm)



Wiring diagram



Specifications subject to change

TT274 Field Rangeable Thermocouple Temperature Transmitter

TT274 Thermocouple Temperature Transmitter

Overview

Model TT274 is a 2-wire temperature transmitter for types J and K thermocouples. The transmitter converts the thermocouple's millivolt signal to a 4 to 20 mA DC current signal. Because this current signal is immune to leadwire and electrical noise, the TT274 lets you obtain accurate temperature readings from thermocouples thousands of feet away. An ordinary twisted pair of wires carries both the temperature signal and power for the transmitter's electronics.

With the isolation option, the mV input signal from the thermocouple is electrically isolated from the 4 to 20 mA output, allowing use of grounded thermocouples with multiple TT274s operating from the same power supply.

An LED conveniently indicates the status of the control loop. The brightness is directly proportional to the loop current. A dark LED signals an open sensor or loss of current loop power.

- 4 to 20 mA current signal
- Fits standard 35 mm DIN rail
- Field-calibrate to your thermocouple type and temperature range
- Optional Input/Output isolation to 600 VRMS

Specifications

Input: Type J or K thermocouple (field selectable).

Output: 4 to 20 mA DC over specified range.

Accuracy: ±0.2% of span.

Linearity: Voltage linear.
The output signal of the TT274 is voltage linear (not temperature linear) and is intended for use with instruments which compensate for the nonlinear signal output of the thermocouple sensor.

Adjustments:
Zero: -50°C to 150°C (-58°F to 302°F).
Span: Type J: 125 to 850°C (225 to 1530°F).
Type K: 150 to 1200°C (270 to 2160°F).

Ambient temperature:
Operating: -40 to 85°C (-40 to 185°F).
Storage: -55 to 100°C (-67 to 212°F).

Ambient temperature effects: ±0.036% of span/°C (±0.02% of span/°F).

Cold junction compensation drift: ±0.03°C/°C for -25 to 70°C ambients. ±0.06°C/°C for -40 to -25°C and 70 to 85°C ambients.

Warmup drift: ±0.1% of span max., assuming V_{supply} = 24 VDC and R_{loop} = 250 Ω.
Stable within 15 minutes.

Input/output isolation (optional): 600 VRMS, 1 minute.

Supply voltage:
Non-Isolated: 10 to 45 volts DC with no load.
Isolated: 13 to 45 volts DC with no load.
Reverse polarity protected.

Voltage effect: ±0.001% of span per volt.

Maximum load resistance: The maximum allowable resistance of the signal-carrying loop is given by this formula:

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

Isolated: $$R_{loop\ max} = \frac{V_{supply} - 13}{0.020\ \text{amps}}$$

Maximum output current: 28 mA.

Connections: Terminal block accepts wires from AWG 22 to AWG 14.

Physical: Polycarbonate, DIN rail enclosure.

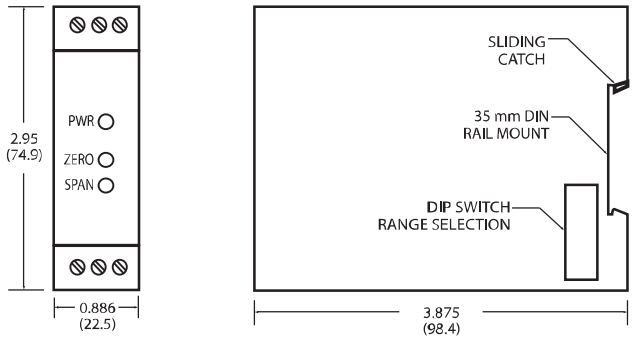
Weight: 4.2 oz. (119 g).

Specifications subject to change

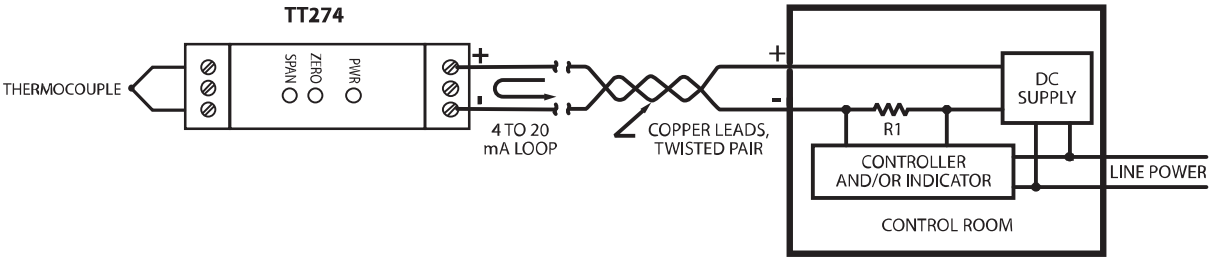
Specification and order options

TT274	Model number
K	T/C element code J = Type J thermocouple K = Type K thermocouple
1	Output: 4 to 20 mA DC
N	Input/Output: N = Non-isolated I = Isolated
(-25/200)	Factory preset temp. range: (4 mA/20 mA temperature) Range is user adjustable. Refer to the Zero and Span specifications.
C	Temperature scale: F = Fahrenheit C = Celsius
TT274K1N(-25/200)C = Sample part number	

Dimensions in inches (mm)



Wiring diagram



Specifications subject to change