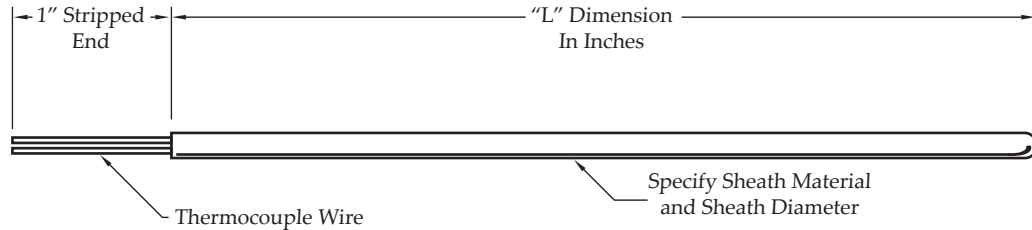


Industrial Process Thermocouples

SHEATHED MgO THERMOCOUPLE ASSEMBLY WITH STRIPPED END

The TDC2 Style Thermocouple features an MgO insulated element which is junctioned and terminated with a standard 1" long strip. This style is designed for field replacement or addition of other termination options.



STYLE TDC2 - Stripped End MgO Thermocouple

Table 1: Thermocouple Type

| Thermocouple Type Codes | | | | Limits of Error |
|-------------------------|---|---|---|-----------------|
| E | J | K | T | Standard Limits |
| 2 | 3 | 4 | 8 | Special Limits |

Table 2: Junction Type

| Code | Single Junction | Code | Dual Junction |
|------|-----------------|------|---------------------|
| G | Grounded | H | Grounded |
| U | Ungrounded | L | Ungrounded Isolated |
| C | Exposed | V | Ungrounded Common |
| | | W | Exposed |

Table 3: Sheath Material

| Code | Material Type |
|------|--------------------------|
| 1 | 310 Stainless Steel |
| 2 | 321 Stainless Steel |
| 3 | 330 Stainless Steel |
| 4 | 304 Stainless Steel |
| 5 | 446 Stainless Steel |
| 6 | 316 Stainless Steel |
| 7 | 347 Stainless Steel |
| 8 | Inconel® 600 (Alloy 600) |
| A | Alloy 601 |

Table 4: Sheath Diameter

| Code | O.D. Size |
|------|---------------------|
| T | .020" O.D. |
| Y | .032" or 1/32" O.D. |
| W | .040" O.D. |
| A | .062" or 1/16" O.D. |
| B | .125" or 1/8" O.D. |
| V | .156" or 5/32" O.D. |
| C | .188" or 3/16" O.D. |
| D | .250" or 1/4" O.D. |
| E | .313" or 5/16" O.D. |
| F | .375" or 3/8" O.D. |
| H | .500" or 1/2" O.D. |

Table 5: Dimension

Specify in inches. See table on page 27 for codes.

Part Number Sequence

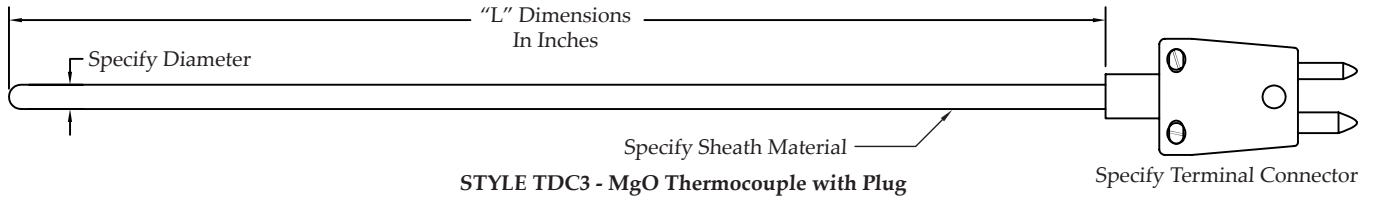
TDC2-JG-4F100

| | | | | | | | |
|-------------------------|---|-------------------|---------------|---|-----------------|-----------------|---------------|
| TDC2 | - | J | G | - | 4 | F | 100 |
| TDC2 | | Table 1 | Table 2 | | Table 3 | Table 4 | Table 5 |
| Sensor Type & Style No. | | Thermocouple Type | Junction Type | | Sheath Material | Sheath Diameter | "L" Dimension |

Industrial Process Thermocouples

SHEATHED MgO THERMOCOUPLE ASSEMBLY WITH PLUG

The TDC3 Style Thermocouple features an MgO insulated element with universal disconnect plug for reliable connections. Plugs are available in standard (400°F), high temperature (800°F), and ceramic (1200°F) materials.



STYLE TDC3 - MgO Thermocouple with Plug

Specify Terminal Connector

Table 1: Thermocouple Type

| Thermocouple Type Codes | | | | Limits of Error |
|-------------------------|---|---|---|-----------------|
| E | J | K | T | Standard Limits |
| 2 | 3 | 4 | 8 | Special Limits |

Table 2: Junction Type

| Code | Single Junction | Code | Dual Junction |
|------|-----------------|------|---------------------|
| G | Grounded | H | Grounded |
| U | Ungrounded | L | Ungrounded Isolated |
| C | Exposed | V | Ungrounded Common |
| | | W | Exposed |

Table 3: Sheath Material

| Code | Material type |
|------|--------------------------|
| 1 | 310 Stainless Steel |
| 2 | 321 Stainless Steel |
| 3 | 330 Stainless Steel |
| 5 | 446 Stainless Steel |
| 6 | 316 Stainless Steel |
| 7 | 347 Stainless Steel |
| 8 | Inconel® 600 (Alloy 600) |
| A | Alloy 601 |

Table 4: Sheath Diameter

| Code | O.D. Size |
|------|---------------------|
| T | .020" O.D. |
| Y | .032" or 1/32" O.D. |
| W | .040" O.D. |
| A | .062" or 1/16" O.D. |
| B | .125" or 1/8" O.D. |
| V | .156" or 5/32" O.D. |
| C | .188" or 3/16" O.D. |
| D | .250" or 1/4" O.D. |
| E | .313" or 5/16" O.D. |
| F | .375" or 3/8" O.D. |
| H | .500" or 1/2" O.D. |

Table 5: Dimension

Specify in inches. See table on page 27 for codes.

Table 6: Terminal Connector

| Code | Terminal Connector |
|------|--|
| 3 | Standard Molded Plug |
| 6 | Standard Plug with Brazing Adapter |
| 7 | Standard Plug with Tube Adapter |
| 8 | High Temperature Plug with Crimp Adapter |
| 9 | Ceramic Plug with Tube Adapter |
| F | Mini Molded Plug |
| M | Mini Plug with Crimp Adapter |
| X | Special, Specify |

Part Number Sequence

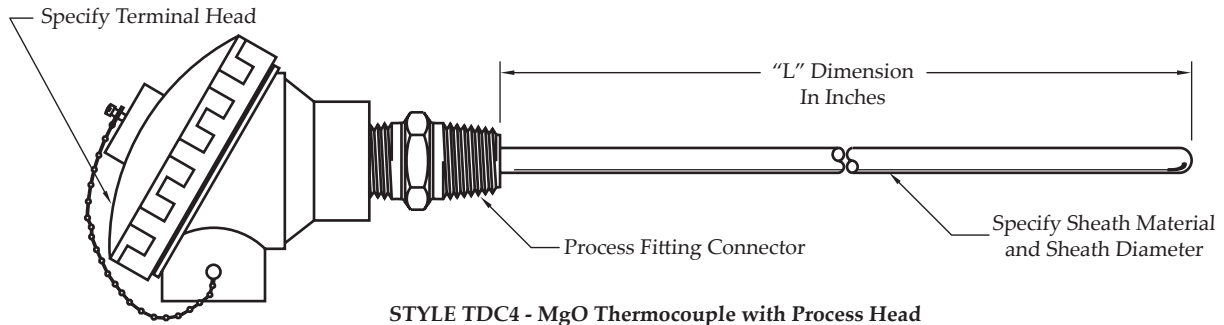
TDC3-JG-4F12F-3

| | | | | | | | | | |
|-------------------------|---|-------------------|---------------|---|-----------------|-----------------|---------------|---|--------------------|
| TDC3 | - | J | G | - | 4 | F | 12F | - | 3 |
| TDC3 | | Table 1 | Table 2 | | Table 3 | Table 4 | Table 5 | | Table 6 |
| Sensor Type & Style No. | | Thermocouple Type | Junction Type | | Sheath Material | Sheath Diameter | "L" Dimension | | Terminal Connector |

Industrial Process Thermocouples

SHEATHED MgO THERMOCOUPLE ASSEMBLY WITH PROCESS HEAD

The TDC4 Style Thermocouple features an MgO insulated element with a protective terminal housing and process connector. This style can be manufactured as spring loaded for direct field replacement into existing thermowells.



STYLE TDC4 - MgO Thermocouple with Process Head

Table 1: Thermocouple Type

| Thermocouple Type Codes | | | | Limits of Error |
|-------------------------|---|---|---|-----------------|
| E | J | K | T | Standard Limits |
| 2 | 3 | 4 | 8 | Special Limits |

Table 2: Junction Type

| Code | Single Junction | Code | Dual Junction |
|------|-----------------|------|---------------------|
| G | Grounded | H | Grounded |
| U | Ungrounded | L | Ungrounded Isolated |
| C | Exposed | V | Ungrounded Common |
| | | W | Exposed |

Table 3: Sheath Material

| Code | Material Type |
|------|--------------------------|
| 1 | 310 Stainless Steel |
| 2 | 321 Stainless Steel |
| 4 | 304 Stainless Steel |
| 5 | 446 Stainless Steel |
| 6 | 316 Stainless Steel |
| 7 | 347 Stainless Steel |
| 8 | Inconel® 600 (Alloy 600) |
| A | Alloy 601 |

Table 4: Sheath Diameter

| Code | O.D. Size |
|------|---------------------|
| T | .020" O.D. |
| Y | .032" or 1/32" O.D. |
| W | .040" O.D. |
| A | .062" or 1/16" O.D. |
| B | .125" or 1/8" O.D. |
| V | .156" or 5/32" O.D. |
| C | .188" or 3/16" O.D. |
| D | .250" or 1/4" O.D. |
| E | .313" or 5/16" O.D. |
| F | .375" or 3/8" O.D. |
| H | .500" or 1/2" O.D. |

Table 5: Dimension

Specify in inches. See table on page 27 for codes.

Table 7: Spring Loaded Option

| Code | Probe Style |
|------|---------------|
| 1 | Fixed |
| 2 | Spring Loaded |

Table 8: Screw Cover Terminal Heads

| Code | Screw Cover Head Materials |
|------|---|
| A | 1/2" NPT Conduit, Aluminum Head |
| B | 3/4" NPT Conduit, Aluminum Head |
| C | 1/2" NPT Conduit, Cast Iron Head |
| D | 3/4" NPT Conduit, Cast Iron Head |
| M | 1/4" NPT Conduit Connection, Miniature Plastic Head |
| P | 1/2" NPT Conduit, Grey Delrin Head |
| R | 3/4" NPT Conduit, Grey Delrin Head |
| W | 1/2" NPT Conduit, White Polypropylene Head |
| V | 3/4" NPT Conduit, White Polypropylene Head |
| Z | 1/2" NPT Conduit, Explosion Proof Aluminum Head |
| Y | 3/4" NPT Conduit, Explosion Proof Aluminum Head |

Table 6: Fitting Options

| Code | Process Size |
|------|--------------------------------------|
| 0 | No Process Connection |
| 6 | 1/2" NPT Stainless Steel Hex Nipple |
| 8 | 3/4" NPT Stainless Steel Hex Nipple |
| G | 1/2" NPT Brass Hex Bushing |
| H | 1/2" NPT Stainless Steel Hex Bushing |

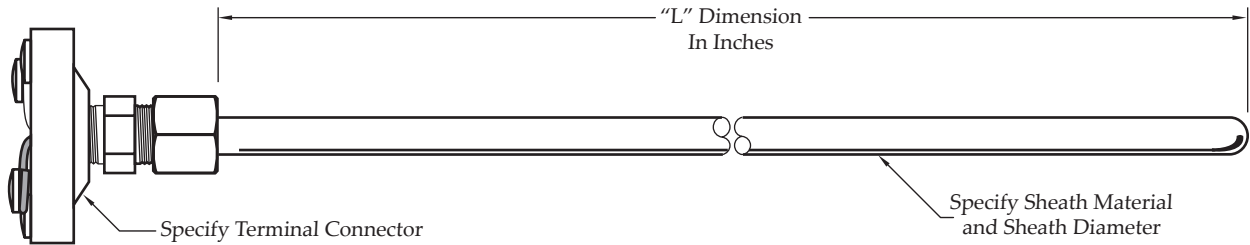
Part Number Sequence TDC4-JG-6C060-61A0

| | | | | | | | | | | | | |
|-------------------------|---|-------------------|---------------|-----------------|-----------------|---------------|---------------------------|----------------------|----------------|--------------------------|---|---|
| TDC4 | - | J | G | - | 6 | C | 060 | - | 6 | 1 | A | 0 |
| TDC4 | | Table 1 | Table 2 | Table 3 | Table 4 | Table 5 | Table 6 | Table 7 | Table 8 | Table 6 | | |
| Sensor Type & Style No. | | Thermocouple Type | Junction Type | Sheath Material | Sheath Diameter | "L" Dimension | Fitting Options Into Head | Spring Loaded Option | Terminal Heads | Fitting Options On Probe | | |

Industrial Process Thermocouples

SHEATHED MgO THERMOCOUPLE ASSEMBLY WITH OPEN TERMINAL DISC

The TDC5 Style Thermocouple features an MgO insulated element with an open terminal disc design. This design allows greater accessibility in wiring for space restricted areas.



STYLE TDC5 - MgO Thermocouple with Open Terminal Disc

Table 1: Thermocouple Type

| Thermocouple Type Codes | | | | Limits of Error |
|-------------------------|---|---|---|-----------------|
| E | J | K | T | Standard Limits |
| 2 | 3 | 4 | 8 | Special Limits |

Table 2: Junction Type

| Code | Single Junction | Code | Dual Junction |
|------|-----------------|------|---------------------|
| G | Grounded | H | Grounded |
| U | Ungrounded | L | Ungrounded Isolated |
| C | Exposed | V | Ungrounded Common |
| | | W | Exposed |

Table 3: Sheath Material

| Code | Material Type |
|------|--------------------------------------|
| 1 | 310 Stainless Steel |
| 2 | 321 Stainless Steel |
| 4 | 304 Stainless Steel |
| 5 | 446 Stainless Steel |
| 6 | 316 Stainless Steel |
| 7 | 347 Stainless Steel |
| 8 | Inconel [®] 600 (Alloy 600) |
| A | Alloy 601 |

Table 4: Sheath Diameter

| Code | O.D. Size |
|------|---------------------|
| T | .020" O.D. |
| Y | .032" or 1/32" O.D. |
| W | .040" O.D. |
| A | .062" or 1/16" O.D. |
| B | .125" or 1/8" O.D. |
| V | .156" or 5/32" O.D. |
| C | .188" or 3/16" O.D. |
| D | .250" or 1/4" O.D. |
| E | .313" or 5/16" O.D. |
| F | .375" or 3/8" O.D. |
| H | .500" or 1/2" O.D. |

Table 5: Dimension

Specify in inches. See table on page 27 for codes.

Table 6: Terminal Connector

| Code | Terminal Style |
|------|--------------------------------------|
| J | Circular Terminal Block, Ceramic |
| K | Circular Terminal Block, Glass Cloth |
| X | Special, Specify |

Part Number Sequence

TDC5-KG-4D09D-K

| | | | | | | | | | |
|-------------------------|---|-------------------|---------------|---|-----------------|-----------------|---------------|---|--------------------|
| TDC5 | - | K | G | - | 4 | D | 09D | - | K |
| TDC5 | | Table 1 | Table 2 | | Table 3 | Table 4 | Table 5 | | Table 6 |
| Sensor Type & Style No. | | Thermocouple Type | Junction Type | | Sheath Material | Sheath Diameter | "L" Dimension | | Terminal Connector |

Industrial Process Thermocouples

SHEATHED MgO THERMOCOUPLE ASSEMBLY WITH INSULATED LEADWIRE

The TDC6 Style Thermocouple features an MgO insulated element that is terminated to an insulated extension wire. An optional terminal connector can be added to the extension wire.

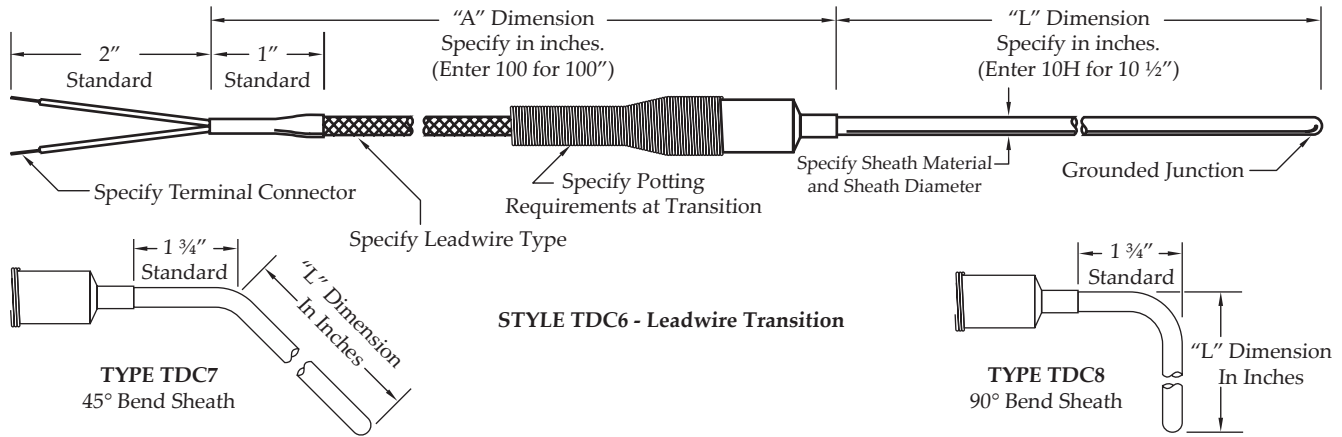


Table 1: Thermocouple Type

| Thermocouple Type Codes | | | | Limits of Error |
|-------------------------|---|---|---|-----------------|
| E | J | K | T | Standard Limits |
| 2 | 3 | 4 | 8 | Special Limits |

Table 2: Junction Type

| Code | Single Junction | Code | Dual Junction |
|------|-----------------|------|---------------------|
| G | Grounded | H | Grounded |
| U | Ungrounded | L | Ungrounded Isolated |
| C | Exposed | V | Ungrounded Common |
| | | W | Exposed |

Table 3: Sheath Material

| Code | Material Type |
|------|--------------------------|
| 1 | 310 Stainless Steel |
| 2 | 321 Stainless Steel |
| 4 | 304 Stainless Steel |
| 5 | 446 Stainless Steel |
| 6 | 316 Stainless Steel |
| 7 | 347 Stainless Steel |
| 8 | Inconel® 600 (Alloy 600) |
| A | Alloy 601 |

Table 4: Sheath Diameter

| Code | O.D. Size |
|------|---------------------|
| T | .020" O.D. |
| Y | .032" or 1/32" O.D. |
| W | .040" O.D. |
| A | .062" or 1/16" O.D. |
| B | .125" or 1/8" O.D. |
| V | .156" or 5/32" O.D. |
| C | .188" or 3/16" O.D. |
| D | .250" or 1/4" O.D. |
| E | .313" or 5/16" O.D. |
| F | .375" or 3/8" O.D. |
| H | .500" or 1/2" O.D. |

Table 5: D dimension

Specify in inches. See table on page 27 for codes.

Table 6: AD dimension

Specify in inches. See table on page 27 for codes.

Table 7: Leadwire Type & Construction

| Insulation Type | Conductor Type | Standard | Stainless Steel Overbraid | Stainless Steel Armor |
|-----------------|----------------|----------|---------------------------|-----------------------|
| Fiberglass | Solid | A | B | C |
| Teflon | Solid | D | E | F |
| Fiberglass | Stranded | G | H | J |
| Teflon | Stranded | K | L | M |
| Kapton | Solid | N | P | Q |
| PVC | Solid | R | S | T |
| PVC | Stranded | W | Y | Z |

Table 8: Terminal Connector

| Code | Terminal Style |
|------|---------------------------------|
| 0 | Split Leads, 2" Length Standard |
| 1 | 3/16" Spade Lugs |
| 3 | Standard Plug |
| 4 | Standard Jack |
| M | Mini Plug |
| N | Mini Jack |
| X | Special, Specify |

Table 9: Potting Requirements

| Code | Maximum Temperatures |
|------|----------------------|
| L | 500°F |
| M | 1000°F |

Part Number Sequence TDC6-TG-6D08M-024C0M

| | | | | | | | | | | | | |
|------|---|---------|---------|---------|---------|---------|---------|---------|---------|---------|---|---|
| TDC6 | - | T | G | - | 6 | D | 08M | - | 024 | C | 0 | M |
| TDC6 | | Table 1 | Table 2 | Table 3 | Table 4 | Table 5 | Table 6 | Table 7 | Table 8 | Table 9 | | |

Sensor Type Thermocouple Junction Sheath Sheath "L" "A" Leadwire Terminal Potting & Style No. Type Type Material Diameter Dimension Dimension Construction Connector Requirements

Industrial Process Thermocouples

SHEATHED MgO MINI THERMOCOUPLE ASSEMBLY WITH MOLDED TRANSITION

The TDC9 Style Thermocouple features an MgO insulated element that is terminated to an insulated extension wire and encapsulated in a plastic injection molded "mini" transition using insert mold technology and a Liquid Crystal Polymer. Transition can withstand continuous exposure to temperatures up to 562°F.

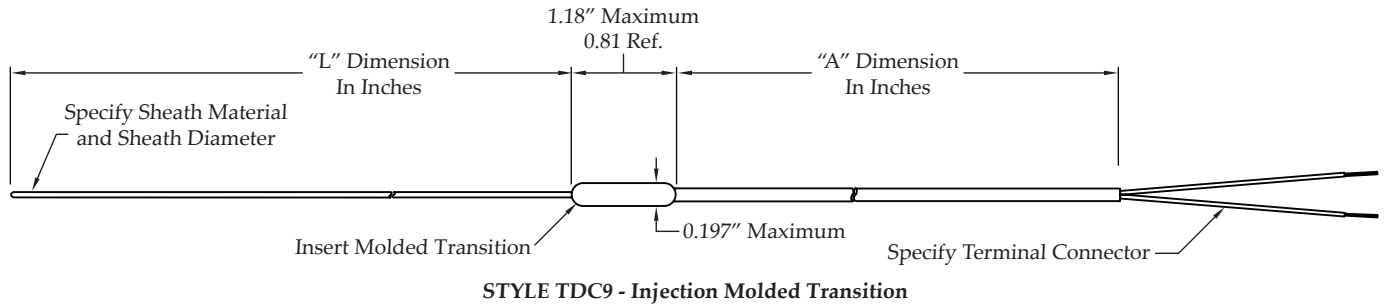


Table 1: Thermocouple Type

| Thermocouple Type Codes | | | | Limits of Error |
|-------------------------|---|---|---|-----------------|
| E | J | K | T | Standard Limits |
| 2 | 3 | 4 | 8 | Special Limits |

Table 2: Junction Type

| Code | Single Junction |
|------|-----------------|
| G | Grounded |
| U | Ungrounded |
| C | Exposed |

Table 3: Sheath Material

| Code | Material Type |
|------|--------------------------|
| 4 | 304 Stainless Steel |
| 6 | 316 Stainless Steel |
| 8 | Inconel® 600 (Alloy 600) |

Table 4: Sheath Diameter

| Code | O.D. Size |
|------|---------------------|
| T | .020" O.D. |
| Y | .032" or 1/32" O.D. |
| W | .040" O.D. |
| A | .062" or 1/16" O.D. |
| X | Special, Specify |

Table 5: Dimension

Specify in inches. See table on page 27 for codes.

Table 6: AD Dimension

Specify in inches. See table on page 27 for codes.

Table 7: Leadwire Type & Construction

| Insulation Type | Conductor Type | Standard |
|-----------------|----------------|----------|
| Fiberglass | Solid | A |
| Teflon | Solid | D |
| Fiberglass | Stranded | G |
| Teflon | Stranded | K |
| Kapton | Solid | N |

Table 8: Terminal Connector

| Code | Terminal Style |
|------|---------------------------------|
| 0 | Split Leads, 2" Length Standard |
| 1 | #6 Spade Lugs |
| 3 | Standard Plug |
| 4 | Standard Jack |
| X | Special, Specify |

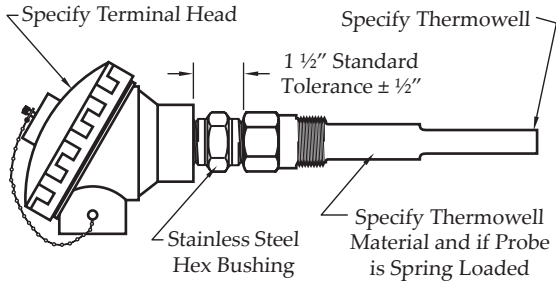
Part Number Sequence TDC9-TG-6T08M-024A0L

| | | | | | | | | | | | |
|-------------------------|---|-------------------|---------------|-----------------|-----------------|---------------|---------------|-----------------------|--------------------|---|---|
| TDC9 | - | T | G | - | 6 | T | 08M | - | 024 | A | 0 |
| TDC9 | | Table 1 | Table 2 | Table 3 | Table 4 | Table 5 | Table 6 | Table 7 | Table 8 | | |
| Sensor Type & Style No. | | Thermocouple Type | Junction Type | Sheath Material | Sheath Diameter | "L" Dimension | "A" Dimension | Leadwire Construction | Terminal Connector | | |

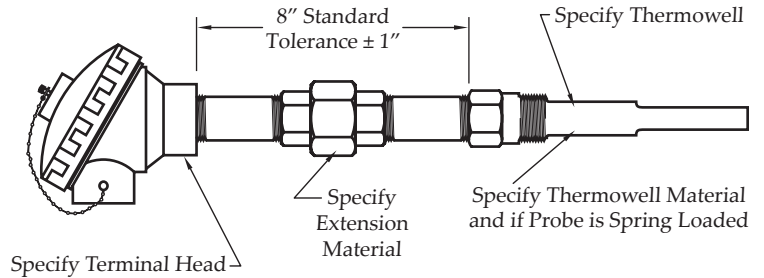
Industrial Process Thermocouples

THERMOCOUPLE WITH THREADED THERMOWELL

The TDW1 and TDW2 Style Thermocouple assemblies feature a thermocouple element protected by a drilled bar stock thermowell. Various well materials and terminal heads are available as options. See next page for well selections.



STYLE TDW1 - Nipple, Thermowell Assembly



STYLE TDW2 - Nipple, Union, Nipple, Thermowell Assembly

Table 1: Thermocouple Type

| Thermocouple Type Codes | | | | Limits of Error |
|-------------------------|---|---|---|-----------------|
| E | J | K | T | Standard Limits |
| 2 | 3 | 4 | 8 | Special Limits |

Table 2: Element Type

| Code | Material Type |
|------|--|
| O | MI Cable, 18 Gauge, Single, Specify Junction GND/UNG |
| P | MI Cable, 18 Gauge, Dual, Specify Junction GND/UNG |

Table 3: Well Material

| Code | Material Type |
|------|---------------------|
| 4 | 304 Stainless Steel |
| 6 | 316 Stainless Steel |
| B | Brass |
| R | Carbon Steel |

Table 4: Extension Material (TDW2 Only)

| Code | Nipple Material |
|------|-------------------------|
| K | Black Pipe, Schedule 40 |
| Y | Galvanized Steel |
| 4 | 304 Stainless Steel |
| 6 | 316 Stainless Steel |

Table 5: Spring Loaded Option

| Code | Probe Style |
|------|-----------------------|
| 1 | Fixed Fitting |
| 2 | Spring Loaded Fitting |

Table 6: Screw Cover Terminal Heads

| Code | Screw Cover Head Materials |
|------|---|
| A | 1/2" NPT Conduit, Aluminum Head |
| B | 3/4" NPT Conduit, Aluminum Head |
| C | 1/2" NPT Conduit, Cast Iron Head |
| D | 3/4" NPT Conduit, Cast Iron Head |
| M | 1/4" NPT Conduit Connection, Miniature Plastic Head |
| P | 1/2" NPT Conduit, Grey Delrin Head |
| W | 1/2" NPT Conduit, White Polypropylene Head |
| Z | 1/2" NPT Conduit, Explosion Proof Aluminum Head |
| Y | 3/4" NPT Conduit, Explosion Proof Aluminum Head |

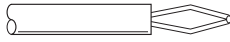
Part Number Sequence

TDW2-KP-1207H6-Y1A

| | | | | | | | | | | |
|-------------------------|---|-------------------|--------------|---|-------------------|---------------|---|--------------------|----------------------|----------------|
| TDW2 | - | K | P | - | 1207H | 6 | - | Y | 1 | A |
| TDW2 | | Table 1 | Table 2 | | See next page | Table 3 | | Table 4 | Table 5 | Table 6 |
| Sensor Type & Style No. | | Thermocouple Type | Element Type | | Thermowell Number | Well Material | | Extension Material | Spring Loaded Option | Terminal Heads |

Industrial Process Thermocouples

JUNCTION TYPES



EXPOSED (E)

Joined and welded wires.
Specified where fast response is required.



GROUNDING (G)

Junction is seal welded integrally to the sheath.
Protects wire from corrosive conditions.



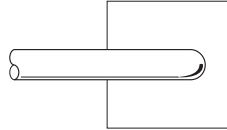
UNGROUNDING (U)

Junction is electrically insulated from seal welded sheath. Design helps prevent stray EMF's.



NECKDOWN (N)

Neckdown provides faster response.
Junction can be single or dual circuit and grounded or ungrounded.



PAD (P)

Pad is designed for welding directly to boiler or process tubes for sensing skin temperatures.

SHEATH DIAMETERS

| Sheath Code | T | Y | W | A | B | V | C | D | E | F | H |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Sheath Diameter | .020" | .032" | .040" | .062" | .125" | .156" | .188" | .250" | .313" | .375" | .500" |
| Wire Gauge | 38 | 34 | 33 | 30 | 24 | 22 | 20 | 18 | 16 | 15 | 11 |
| Min Length | 100' | 150' | 200' | 400' | 250' | 200' | 175' | 100' | 55' | 40' | 30' |

PART NUMBER CODE DEFINITIONS

| L Dimensions & U Dimensions | | | | "A" Dimensions | | Fractional Dimension Letter Code | | | |
|---|-----|---------|-----|--|-----|----------------------------------|---|----------|----|
| "L" and "U" dimensions are specified in whole inches and use a letter Code for the fraction. (Enter 0 when there is no fraction) Enter the three digit code per examples below: | | | | "A" dimensions are specified in whole inches only. Enter the three digit code as follows: | | 1/16" | A | 11/16" | L |
| | | | | | | 1/8" | B | 3/4" | M |
| | | | | | | 3/16" | C | 13/16" | N |
| | | | | | | 1/4" | D | 7/8" | P |
| | | | | | | 5/16" | E | 15/16" | R |
| | | | | | | 3/8" | F | 1" | S |
| 3" | 030 | 10 5/8" | 10K | 9" | 009 | 7/16" | G | 0 | No |
| 4 1/2" | 04H | 12" | 120 | 12" | 012 | 1/2" | H | Fraction | |
| 6 1/4" | 06D | 15 3/8" | 15F | 36" | 036 | 9/16" | J | | |
| 7 7/8" | 07P | 17 3/4" | 17M | 144" | 144 | 5/8" | K | | |
| 9 5/8" | 09K | 22 1/8" | 22B | | | | | | |