

Temperature Measurement Solutions



Dial Indicating
Electronic
Industrial RTDs
Thermowells
Accessories



At NOSHOK, we pride ourselves on being innovators in the industry by continually offering the latest technology and measurement solutions, and providing the best customer support in the marketplace.

Established in 1967, NOSHOK was one of the first companies to offer liquid filled pressure gauges. We also took a bold step by backing our quality gauges with an extended 3-year warranty. That unwavering standard of quality has endured for over 50 years, and as we have expanded our product offering we continue to provide industry-leading warranties. NOSHOK also leads the industry as one of the first companies to offer corrosion-resistant zinc nickel plating standard on our carbon steel valves.

We have the capacity to put together special requirements which are so often hard to find. If you do not find what you need in this catalog, chances are we can still put a solution together.

NOSHOK is committed to providing excellence on every level. Thank you for choosing NOSHOK products.



Jeff N. Scott
President



NOSHOK Corporate Headquarters
Your Single Source Instrumentation Company

NOSHOK is a member and actively supports:



NOSHOK is an ISO 9001:2015 registered company.

www.mfcp.com

WARRANTY INFORMATION

NOSHOK's **Eight Year Warranty** applies to our 3" and 5" 300 Series Bimetal Thermometers. Our **Three Year Warranty** applies to our 800 Series Platinum Resistance Temperature Transmitters, 810 Series Compact OEM Temperature Transmitters, 820/821 and 822/823 Series Digital Temperature Indicators, 850 Series Electronic Indicating Temperature Switch/Transmitters, 900/915 Series Probe-Type Industrial RTDs, 910 Series Probe-Type Industrial RTDs with Process Connection and 920 Series RTD Transmitter. Our **One Year Warranty** applies to our 100, 150, 300 (2") and 350 Series Bimetal Thermometers, Vapor Actuated Remote Thermometers and Thermowells.

NOSHOK guarantees all products to be free from defects in material and workmanship, to remain within catalogued accuracy specifications, and to operate within the catalogued performance specifications. These products must be operated within the catalogued environmental and application parameters. Determination of failure will be made by NOSHOK, Inc.'s equipment and personnel or a certified test facility specializing in this type of evaluation.

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In keeping with and for purpose of product and/or manufacturing process improvements, NOSHOK, Inc. reserves the right to make design changes without prior notice.

Bimetal, Industrial Type



100 SERIES

- Heavy-duty, industrial thermometer featuring a weather-resistant, tamper-proof case
- Single °F, single °C, and dual scale options available
- Accuracy: ±1% full scale, Grade A, ASME B40.3
- 1-3/4", 2", 3" and 5" sizes - center back connection only
- 304 Stainless Steel case and bezel
- Standard stem lengths 2-1/2" through 42"
- Highly sensitive bimetallic helix coil is heat-treated for stress relief, and silicone-coated to minimize pointer vibration and maximize heat transfer and response time
- 360° groove around stem is a visual reference to show minimum immersion point
- Made in the U.S.A.

APPLICATIONS

Used in almost every area of manufacturing, especially suited for applications in the following areas:

- Industrial process
- Petrochemical
- Food & beverage processing
- Commercial
- Wastewater

| | SERIES | SPECIFICATIONS |
|--------------------------------|------------------------------------|---|
| Case & bezel | All 100 Series | 304 Stainless Steel; 316 Stainless Steel optional |
| Lens | All 100 Series | Instrument glass |
| Pointer | All 100 Series | Aluminum, black finish |
| Stem diameter | 18-110 20-110, 30-110, 50-110 | .150" (3.81 mm) .250" (6.35 mm) |
| Accuracy | All 100 Series | ±1% full scale, Grade A, ASME B40.3 |
| Dial | All 100 Series | Anodized Aluminum with large black numbers and graduations |
| Process connection | 18-110 20-110 30-110, 50-110 | 1/4" NPT, 1/8" and 3/8" NPT optional 1/4" NPT 1/2" NPT |
| Wetted parts | All 100 Series | 304 Stainless Steel; 316 Stainless Steel optional |
| Hermetic seal | All 100 Series | Per ASME B40.3 dustproof and leakproof |
| Bimetal coil | All 100 Series | Silicone coated helix coil on ranges below 500 °F for vibration dampening, maximum heat transfer and response time |
| Over temperature limits | All 100 Series | Up to 250 °F 100%; 250 °F to 550 °F 50%; 550 °F to 1,000 °F continuous use up to 800 °F; intermittent use over 800 °F |



WARNING: This product can expose you to chemicals including Chromium (VI) and Nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

Thermowells are recommended for pressure, corrosive fluids and high velocity applications, see pages 48-50.

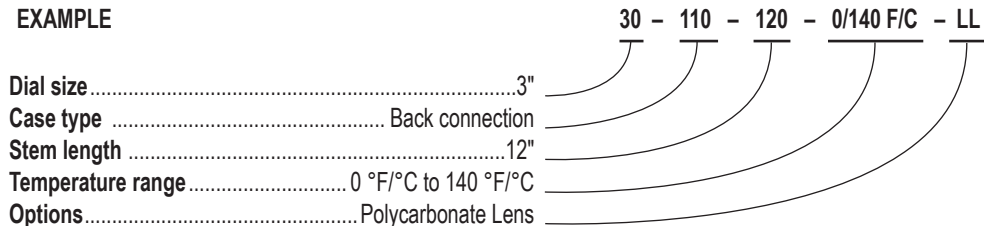
| ORDERING INFORMATION | | | | | |
|--|---|-------------------------|------------|----------------------------------|--|
| DIAL SIZES | 18 | 1-3/4" †† | 30 | 3" | |
| | 20 | 2" | 50 | 5" | |
| CASE TYPES | 110 | Back connection | | | |
| STEM LENGTHS Available up to 120" | 025 | 2-1/2" | 090 | 9" | 240 24" |
| | 040 | 4" | 120 | 12" | 300 30" |
| | 060 | 6" | 150 | 15" | 360 36" |
| | 080 | 8" † | 180 | 18" | 420 42" |
| TEMPERATURE RANGES <i>Dual Scale °F/°C</i> | -100/100 F/C | -100 °F/°C to 100 °F/°C | 0/250 F/C | 0 °F/°C to 250 °F/°C | 50/500 F/C 50 °F/°C to 500 °F/°C |
| | -40/160 F/C | -40 °F/°C to 160 °F/°C | 20/240 F/C | 20 °F/°C to 240 °F/°C | 150/750 F/C 150 °F/°C to 750 °F/°C |
| | 0/140 F/C | 0 °F/°C to 140 °F/°C | 25/125 F/C | 25 °F/°C to 125 °F/°C | 200/1000 F/C 200 °F/°C to 1,000 °F/°C* |
| | 0/180 F/C | 0 °F/°C to 180 °F/°C | 50/300 F/C | 50 °F/°C to 300 °F/°C | |
| | 0/220 F/C | 0 °F/°C to 220 °F/°C | 50/400 F/C | 50 °F/°C to 400 °F/°C | |
| <i>Single Scale °F</i> | -100/100 F | -100 °F to 100 °F | 0/300 F | 0 °F to 300 °F** | 50/550 F 50 °F to 550 °F |
| | -50/120 F | -50 °F to 120 °F | 0/500 F | 0 °F to 500 °F** | 100/800 F 100 °F to 800 °F** |
| | -40/160 F | -40 °F to 160 °F | 20/240 F | 20 °F to 240 °F | 150/750 F 150 °F to 750 °F |
| | 0/140 F | 0 °F to 140 °F | 25/125 F | 25 °F to 125 °F | 200/1000 F 200 °F to 1,000 °F* |
| | 0/180 F | 0 °F to 180 °F | 50/250 F | 50 °F to 250 °F | |
| | 0/200 F | 0 °F to 200 °F | 50/300 F | 50 °F to 300 °F | |
| | 0/220 F | 0 °F to 220 °F | 50/400 F | 50 °F to 400 °F | |
| | 0/250 F | 0 °F to 250 °F | 50/500 F | 50 °F to 500 °F | |
| <i>Single Scale °C</i> | -75/175 C | -75 °C to 175 °C | 0/50 C | 0 °C to 50 °C | 0/300 C 0 °C to 300 °C |
| | -70/70 C | -70 °C to 70 °C** | 0/60 C | 0 °C to 60 °C** | 0/400 C 0 °C to 400 °C |
| | -50/100 C | -50 °C to 100 °C** | 0/80 C | 0 °C to 80 °C** | 0/450 C 0 °C to 450 °C |
| | -50/50 C | -50 °C to 50 °C | 0/100 C | 0 °C to 100 °C | 100/400 C 100 °C to 400 °C |
| | -40/70 C | -40 °C to 70 °C | 0/150 C | 0 °C to 150 °C | 100/550 C 100 °C to 550 °C* |
| | -20/120 C | -20 °C to 120 °C** | 0/200 C | 0 °C to 200 °C | |
| | -10/110 C | -10 °C to 110 °C** | 0/250 C | 0 °C to 250 °C | |
| | Consult factory for additional temperature ranges | | | | |
| OPTIONS | 1/8 | 1/8" NPT † | AU | 1/2" NPT Adjustable Union ** | SL Silicone Filled *** |
| | 3/8 | 3/8" NPT † | HD | Heavy-Duty Stem (0.375" Dia.) ** | ST Stainless Steel Tagging |
| | 6 | 6 mm stem diameter ** | LL | Polycarbonate Lens | TG Tempered Glass Lens ††† |
| | 8 | 8 mm stem diameter ** | PL | Acrylic Lens | |
| | 316 | 316 SS Wetted Parts ** | SG | Safety Glass Lens ** | |

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

Note: All 316 Stainless Steel construction (case, bezel, wetted parts) is available. Please consult factory.

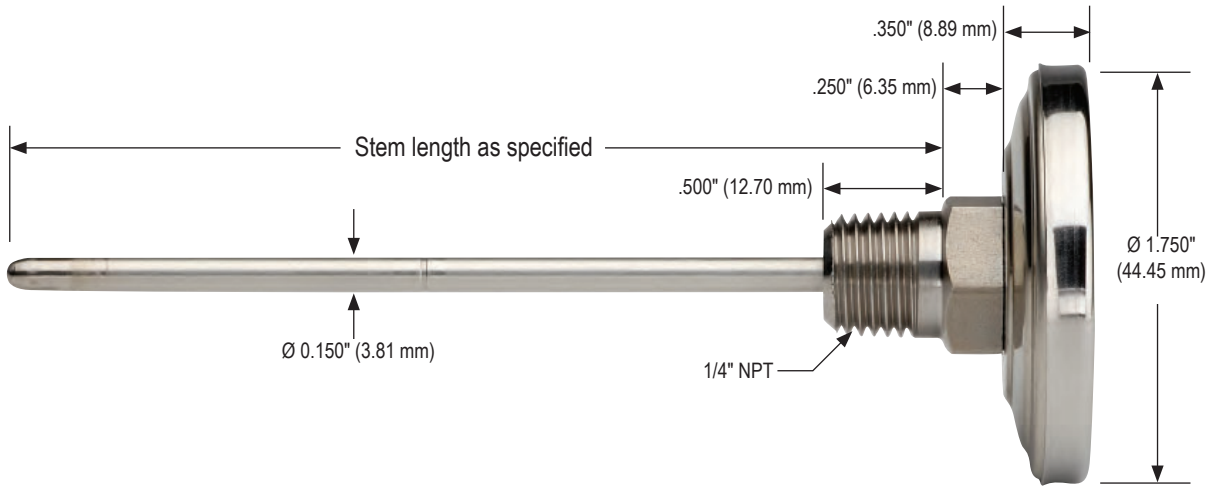
- * Thermometers with temperature ranges 200/1,000 °F and 100/500 °C are not recommended for continuous use above 800 °F/425 °C. For intermittent use only.
- ** Available for 30-110 and 50-110 models only.
- *** Available for 20-110, 30-110 and 50-110 models only. Available only for ranges from -50 °F (-45 °C) to 500 °F (260 °C). Polycarbonate lens is standard with Silicone Fill.
- † Available for 18-110 model only.
- †† 18-110 model is only available in 2-1/2", 4", 6", 8", 12", 15" and 18" stem lengths.
- ††† Not available with Silicone Filled (SL) option.

EXAMPLE

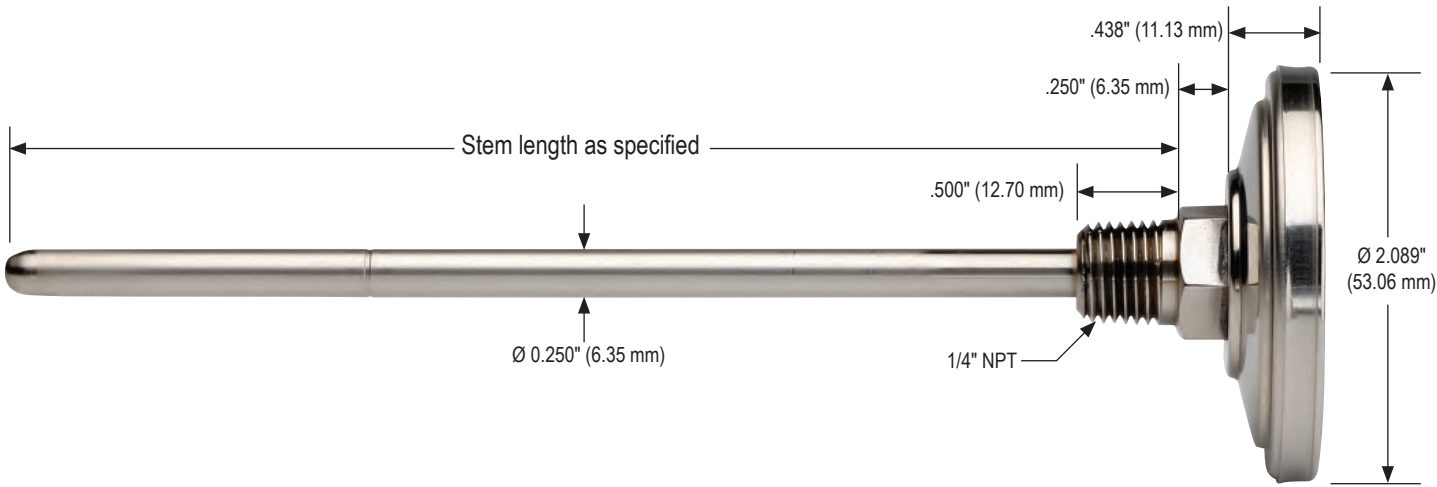


Dimensions

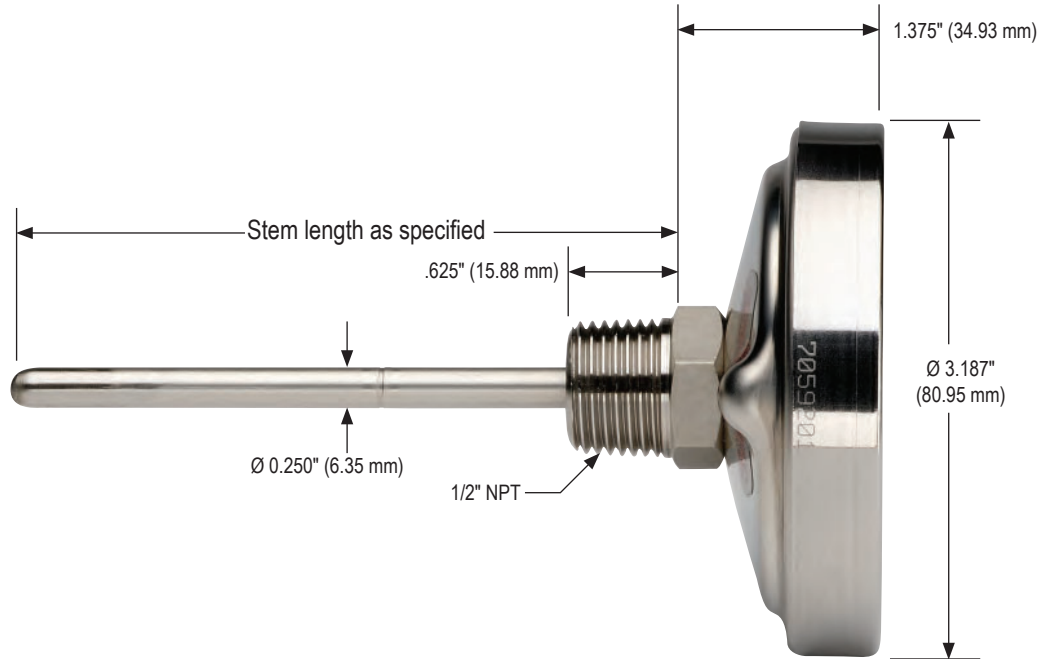
18-110



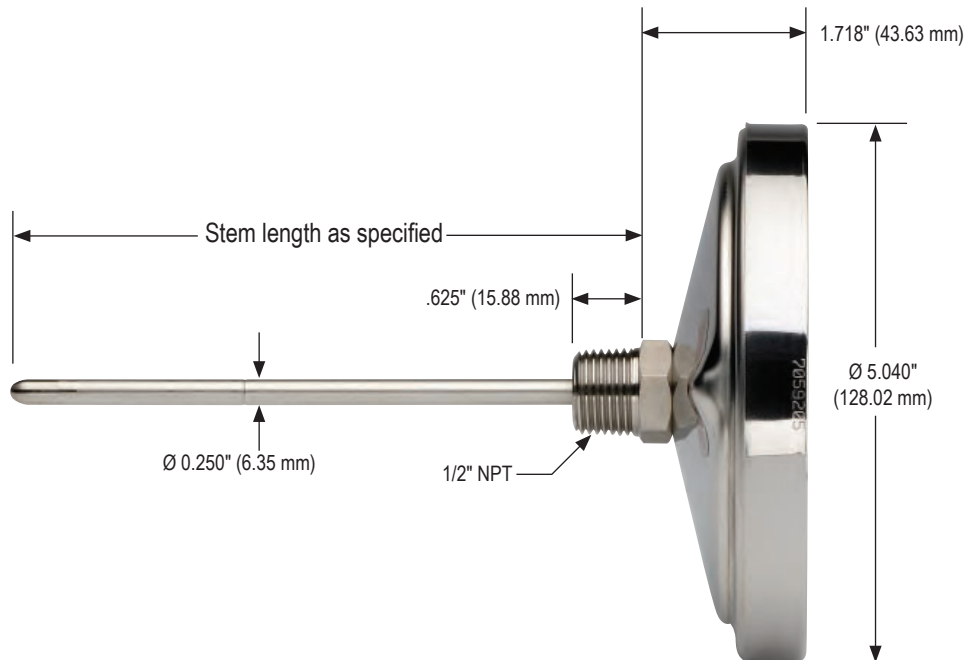
20-110



30-110



50-110



Bimetal, Testing and General Purpose

150 SERIES



- Designed for general purpose testing applications, featuring a weather-resistant, tamper-proof case
- Pocket sized model is used by inspectors, service and maintenance personnel for spot checking
- Single °F, single °C, and dual scale options (1-3/4" and 2" models only) available
- Accuracy: ±1% full scale, Grade A, ASME B40.3
- 1", 1-3/4" and 2" sizes - center back connection only
- 304 Stainless Steel case and bezel
- Highly sensitive bimetallic helix coil is heat-treated for stress relief, and silicone-coated to minimize pointer vibration and maximize heat transfer and response time
- 360° groove around stem is a visual reference to show minimum immersion point
- Made in the U.S.A.

APPLICATIONS

Used in almost every area of manufacturing, especially suited for laboratory testing and general purpose applications in the following areas:

- Laboratory
- Food & beverage processing
- Concrete
- Asphalt
- OEM equipment

| | SERIES | SPECIFICATIONS |
|--------------------------------|----------------|---|
| Case & bezel | All 150 Series | 304 Stainless Steel |
| Lens | All 150 Series | Instrument glass |
| Pointer | All 150 Series | Aluminum, black finish |
| Stem diameter | All 150 Series | .150" (3.81 mm) |
| Accuracy | All 150 Series | ±1% full scale, Grade A, ASME B40.3 |
| Dial | All 150 Series | Anodized Aluminum with large black numbers and graduations |
| Wetted parts | All 150 Series | 304 Stainless Steel |
| Hermetic seal | All 150 Series | Per ASME B40.3 dustproof and leakproof |
| Bimetal coil | All 150 Series | Silicone coated helix coil on ranges below 500 °F for vibration dampening, maximum heat transfer and response time |
| Over temperature limits | All 150 Series | Up to 250 °F 100%; 250 °F to 550 °F 50%; 550 °F to 1,000 °F continuous use up to 800 °F; intermittent use over 800 °F |



WARNING: This product can expose you to chemicals including Chromium (VI) and Nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

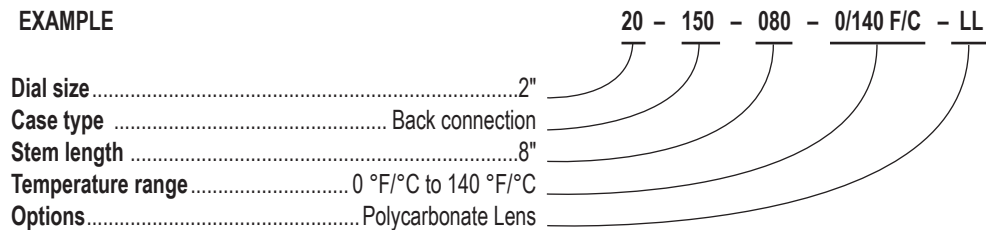
Thermowells are recommended for pressure, corrosive fluids and high velocity applications, see pages 48-50.

| ORDERING INFORMATION | | | | | |
|------------------------------------|---|-------------------------|-------------------|-----------------------|--|
| DIAL SIZES | 10 | 1" ** | 18 | 1-3/4" | 20 2" |
| CASE TYPES | 150 | Back connection | | | |
| STEM LENGTHS | 050 | 5" | 120 | 12" † | |
| | 080 | 8" | 180 | 18" † | |
| TEMPERATURE RANGES | -100/100 F/C | -100 °F/°C to 100 °F/°C | 0/250 F/C | 0 °F/°C to 250 °F/°C | 50/550 F/C 50 °F/°C to 550 °F/°C |
| | -40/160 F/C | -40 °F/°C to 160 °F/°C | 20/240 F/C | 20 °F/°C to 240 °F/°C | 150/750 F/C 150 °F/°C to 750 °F/°C |
| <i>Dual Scale °F/°C</i> | 0/140 F/C | 0 °F/°C to 140 °F/°C | 25/125 F/C | 25 °F/°C to 125 °F/°C | 200/1000 F/C 200 °F/°C to 1,000 °F/°C * |
| <i>(Not available on 1" model)</i> | 0/180 F/C | 0 °F/°C to 180 °F/°C | 50/300 F/C | 50 °F/°C to 300 °F/°C | |
| | 0/220 F/C | 0 °F/°C to 220 °F/°C | 50/400 F/C | 50 °F/°C to 400 °F/°C | |
| <i>Single Scale °F</i> | -100/100 F | -100 °F to 100 °F | 0/220 F | 0 °F to 220 °F ** | 50/400 F 50 °F to 400 °F |
| | -50/120 F | -50 °F to 120 °F | 0/250 F | 0 °F to 250 °F | 50/500 F 50 °F to 500 °F ** |
| | -40/160 F | -40 °F to 160 °F ** | 20/240 F | 20 °F to 240 °F | 50/550 F 50 °F to 550 °F |
| | 0/140 F | 0 °F to 140 °F | 25/125 F | 25 °F to 125 °F ** | 150/750 F 150 °F to 750 °F ** |
| | 0/180 F | 0 °F to 180 °F | 50/250 F | 50 °F to 250 °F | 200/1000 F 200 °F to 1,000 °F * |
| | 0/200 F | 0 °F to 200 °F | 50/300 F | 50 °F to 300 °F | |
| <i>Single Scale °C</i> | -75/175 C | -75 °C to 175 °C | -10/110 C | -10 °C to 110 °C ** | 0/300 C 0 °C to 300 °C |
| | -50/100 C | -50 °C to 100 °C | 0/50 C | 0 °C to 50 °C ** | 0/400 C 0 °C to 400 °C |
| | -50/25 C | -50 °C to 25 °C | 0/100 C | 0 °C to 100 °C | 100/400 C 100 °C to 400 °C |
| | -50/50 C | -50 °C to 50 °C | 0/150 C | 0 °C to 150 °C | 100/550 C 100 °C to 550 °C * |
| | -40/70 C | -40 °C to 70 °C ** | 0/200 C | 0 °C to 200 °C | |
| | -20/120 C | -20 °C to 120 °C | 0/250 C | 0 °C to 250 °C ** | |
| | Consult factory for additional temperature ranges | | | | |
| OPTIONS | LL | Polycarbonate Lens | PS | Pocket Sheath *** | ST Stainless Steel Tagging |
| | PL | Acrylic Lens † | SL | Silicone Filled † | TG Tempered Glass Lens †† |

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

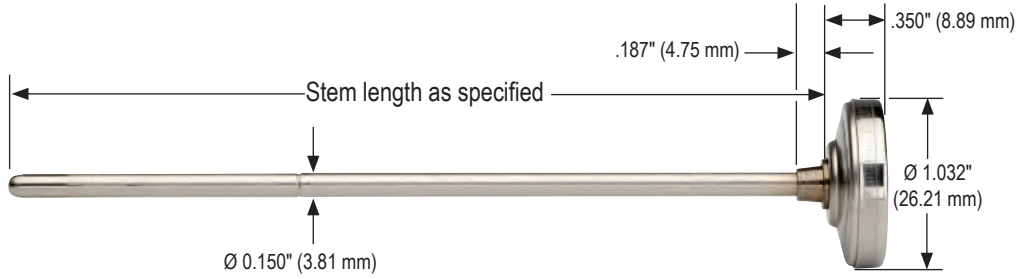
- * Thermometers with temperature ranges 200/1000 °F and 100/500 °C are not recommended for continuous use above 800 °F/425 °C. **For intermittent use only.**
- ** 1" model available **only** in these ranges.
- *** Available for 10-150 and 18-150 models only, with stem lengths of 5" or 8".
- † Available for 20-150 models only. Available only for ranges from -50 °F (-45 °C) to 500 °F (260 °C). Polycarbonate lens is standard with Silicone Fill.
- †† Not available on 10-150 model. Also not available with Silicone Filled (SL) option.

EXAMPLE

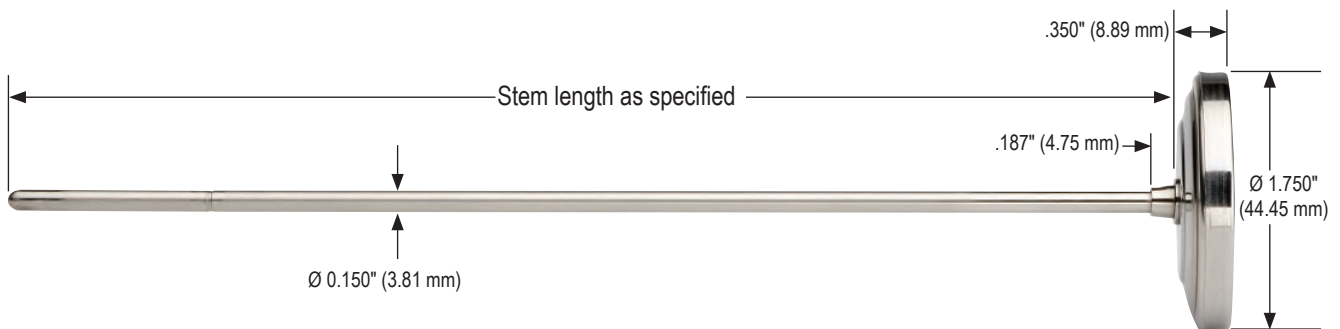


Dimensions

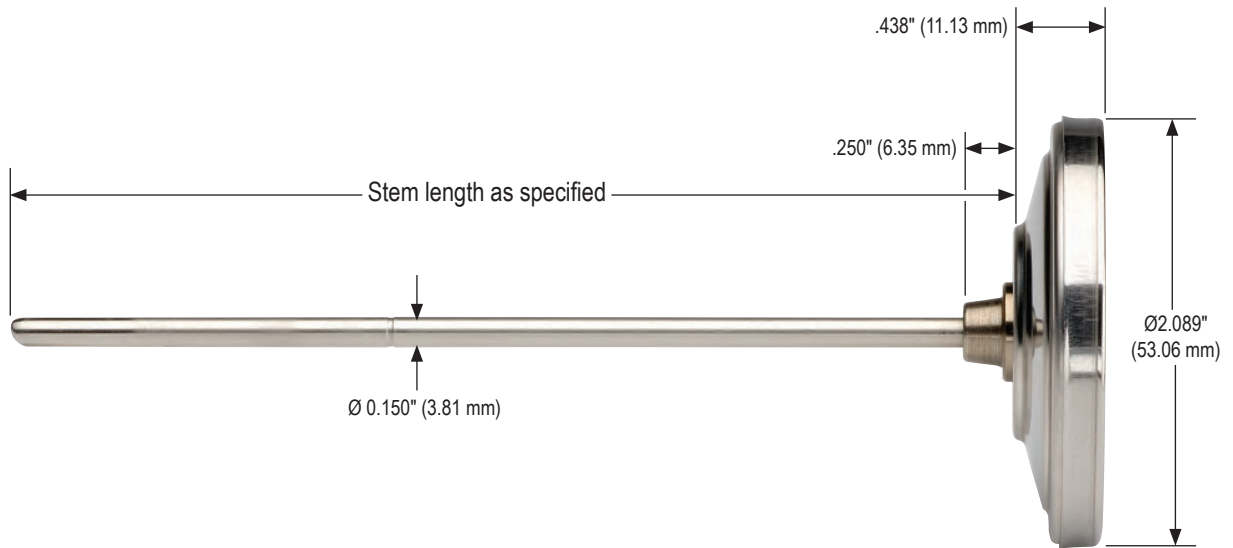
10-150



18-150



20-150



Bimetal, Industrial Type with External Reset, Sanitary Options



300 SERIES



- Highest quality thermometers available on the market
- Easy to calibrate with 1/16" Allen key
- Corrosion-resistant 304 Stainless Steel case and bezel provide a hermetic seal to prevent lens fogging and moisture damage
- Sanitary Tri-Clamp® options available
- Single °F, single °C, and dual scale options available
- Accuracy: ±1% full scale, Grade A, ASME B40.3
- 2", 3" and 5" sizes - center back and bottom connections
- 2" Dial Size - 1/4" NPT; 3" & 5" Dial Sizes - 1/2" NPT
- Standard stem lengths 2-1/2" through 42"
- Minimum or maximum indicating pointers are available in 3" and 5" sizes
- Highly sensitive bimetallic helix coil is heat-treated for stress relief, and silicone-coated to minimize pointer vibration and maximize heat transfer and response time
- 360° groove around stem is a visual reference to show minimum immersion point
- Made in the U.S.A.

APPLICATIONS

- Industrial process
- Petrochemical
- Food & beverage processing
- Commercial
- Wastewater



Sanitary options available

| | SERIES | SPECIFICATIONS |
|-------------------------|---|--|
| Case & bezel | All 300 Series | 304 Stainless Steel |
| Lens | All 300 Series | Instrument glass |
| Pointer | All 300 Series | Aluminum, black finish |
| Stem diameter | 300 Series, Standard & 06SAN 300 Series, All Other Sanitary models | .250" (6.35 mm) .375" (9.53 mm) |
| Accuracy | All 300 Series | ±1% full scale, Grade A, ASME B40.3 |
| Dial | All 300 Series | Anodized Aluminum with large black numbers and graduations |
| Process connection | 300 Series, 2" Dial Size, Standard 300 Series, 3" & 5" Dial Size, Standard 300 Series, Sanitary | 1/4" NPT 1/2" NPT 3/4" Tri-Clamp through 4" Tri-Clamp |
| Wetted parts | 300 Series, Standard 300 Series, Sanitary | 304 Stainless Steel; 316 Stainless Steel optional 316 Stainless Steel |
| Hermetic seal | All 300 Series | Per ASME B40.3 dustproof and leakproof |
| Bimetal coil | All 300 Series | Silicone coated helix coil on ranges below 500 °F for vibration dampening, maximum heat transfer and response time |
| Over temperature limits | All 300 Series | Up to 250 °F 100%; 250 °F to 550 °F 50%; 550 °F to 1,000 °F continuous use up to 800 °F; intermittent use over 800 °F |
| Recalibrator | All 300 Series | External reset |
| Adjustable angle form | 320 Series | All Stainless Steel brackets with screws that loosen to allow 360° rotation of head and 180° adjustment of stem position |



WARNING: This product can expose you to chemicals including Chromium (VI) and Nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

Thermowells are recommended for pressure, corrosive fluids and high velocity applications, see pages 48-50.

| ORDERING INFORMATION | | | | | | |
|---------------------------|--------------------------------------|--|---|--|---|--|
| DIAL SIZES | 20 2" (Back connected only) | | 30 3" | | 50 5" | |
| CASE TYPES | 300 Bottom connection | | 310 Back connection | | 320 Adjustable angle connection ** | |
| STEM LENGTHS | 025 2-1/2" | | 120 12" | | 300 30" | |
| | 040 4" | | 150 15" | | 360 36" | |
| | 060 6" | | 180 18" | | 420 42" | |
| | 090 9" | | 240 24" | | Available up to 120" | |
| TEMPERATURE RANGES | -100/100 F/C -100 °F/°C to 100 °F/°C | | 0/250 F/C 0 °F/°C to 250 °F/°C | | 50/500 F/C 50 °F/°C to 500 °F/°C | |
| <i>Dual Scale °F/°C</i> | -40/160 F/C -40 °F/°C to 160 °F/°C | | 20/240 F/C 20 °F/°C to 240 °F/°C | | 150/750 F/C 150 °F/°C to 750 °F/°C | |
| | 0/140 F/C 0 °F/°C to 140 °F/°C | | 25/125 F/C 25 °F/°C to 125 °F/°C † | | 200/1000 F/C 200 °F/°C to 1,000 °F/°C * | |
| | 0/180 F/C 0 °F/°C to 180 °F/°C | | 50/300 F/C 50 °F/°C to 300 °F/°C | | | |
| | 0/220 F/C 0 °F/°C to 220 °F/°C | | 50/400 F/C 50 °F/°C to 400 °F/°C | | | |
| <i>Single Scale °F</i> | -100/100 F -100 °F to 100 °F | | 0/250 F 0 °F to 250 °F | | 50/400 F 50 °F to 400 °F | |
| | -50/120 F -50 °F to 120 °F | | 0/300 F 0 °F to 300 °F** | | 50/500 F 50 °F to 500 °F | |
| | -40/160 F -40 °F to 160 °F | | 0/500 F 0 °F to 500 °F** | | 50/550 F 50 °F to 550 °F | |
| | 0/140 F 0 °F to 140 °F | | 20/240 F 20 °F to 240 °F | | 100/800 F 100 °F to 800 °F** | |
| | 0/180 F 0 °F to 180 °F | | 25/125 F 25 °F to 125 °F | | 150/750 F 150 °F to 750 °F | |
| | 0/200 F 0 °F to 200 °F | | 50/250 F 50 °F to 250 °F | | 200/1000 F 200 °F to 1,000 °F* | |
| | 0/220 F 0 °F to 220 °F | | 50/300 F 50 °F to 300 °F | | | |
| <i>Single Scale °C</i> | -75/175 C -75 °C to 175 °C | | 0/50 C 0 °C to 50 °C | | 0/300 C 0 °C to 300 °C | |
| | -70/70 C -70 °C to 70 °C ** | | 0/60 C 0 °C to 60 °C ** | | 0/400 C 0 °C to 400 °C | |
| | -50/100 C -50 °C to 100 °C ** | | 0/80 C 0 °C to 80 °C ** | | 0/450 C 0 °C to 450 °C | |
| | -50/50 C -50 °C to 50 °C | | 0/100 C 0 °C to 100 °C | | 100/400 C 100 °C to 400 °C | |
| | -40/70 C -40 °C to 70 °C | | 0/150 C 0 °C to 150 °C | | 100/550 C 100 °C to 550 °C * | |
| | -20/120 C -20 °C to 120 °C ** | | 0/200 C 0 °C to 200 °C | | (Consult factory for additional temperature ranges) | |
| | -10/110 C -10 °C to 110 °C ** | | 0/250 C 0 °C to 250 °C | | | |
| OPTIONS | 6 6 mm stem diameter ** | | HD Heavy-Duty Stem (0.375" Dia.) ** | | SG Safety Glass Lens ** | |
| | 8 8 mm stem diameter ** | | LL Polycarbonate Lens | | SL Silicone Filled ††† | |
| | 316 316 SS Connection & Stem ** | | MIP Min or Max Indicating Pointer*** | | ST Stainless Steel Tagging | |
| | AU 1/2" NPT Adjustable Union** | | MIP2 Min and Max Indicating Pointers*** | | TG Tempered Glass Lens †† | |
| | GD Glow Dial † | | PL Acrylic Lens | | | |

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

Note: All 316 Stainless Steel construction (case, bezel, wetted parts) is available. Please consult factory.

* Thermometers with temperature ranges 200/1000 °F and 100/500 °C are not recommended for continuous use above 800 °F/425 °C.

For intermittent use only.

** Available for 3" and 5" dial sizes only.

*** Available only on 30-310 and 50-310 models.

† Available only on 50-310 and 50-320 model. Includes reflective pointer and two reflective clips.

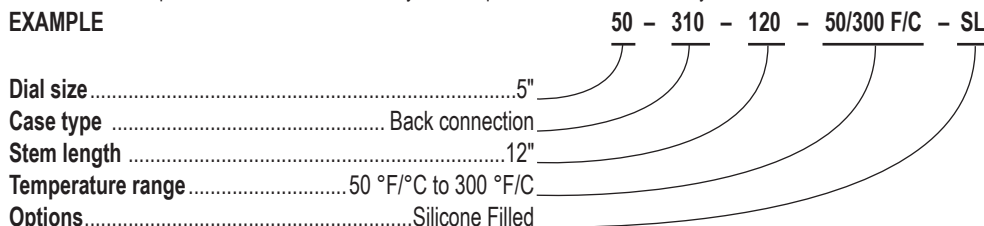
†† Not available with Silicone Filled (SL) option.

††† Available only for ranges from -50 °F (-45 °C) to 500 °F (260 °C). Polycarbonate lens is standard with Silicone Fill.

| ORDERING INFORMATION - SANITARY TRI-CLAMP | | | | | |
|---|----------------------------------|--|----------------------------------|--|---------------------------------|
| DIAL SIZES | 30 3" | | 50 5" | | |
| CASE TYPES | 300 Bottom connection | | 310 Back connection | | 320 Adjustable angle connection |
| STEM LENGTHS | 01625 1.625" | | 045 4.5" | | 135 13.5" |
| | 025 2.5" | | 075 7.5" | | 165 16.5" |
| | 0275 2.75" | | 105 10.5" | | 225 22.5" |
| TEMPERATURE RANGES | 0/220 F/C 0 °F/°C to 220 °F/°C | | 20/240 F/C 20 °F/°C to 240 °F/°C | | |
| <i>Dual Scale °F/°C</i> | 0/250 F/C 0 °F/°C to 250 °F/°C | | 50/300 F/C 50 °F/°C to 300 °F/°C | | |
| <i>Single Scale °F</i> | -40/160 F -40 °F to 160 °F | | 0/250 F 0 °F to 250 °F | | 50/300 F 50 °F to 300 °F |
| | 0/140 F 0 °F to 140 °F | | 0/300 F 0 °F to 300 °F | | |
| | 0/220 F 0 °F to 220 °F | | 20/240 F 20 °F to 240 °F | | |
| <i>Single Scale °C</i> | -20/120 C -20 °C to 120 °C | | 0/100 C 0 °C to 100 °C | | |
| | -10/110 C -10 °C to 110 °C | | 0/150 C 0 °C to 150 °C | | |
| PROCESS CONNECTIONS | 06SAN 3/4" Sanitary Tri-Clamp® | | 16SAN 2" Sanitary Tri-Clamp® | | 24SAN 3" Sanitary Tri-Clamp® |
| | 12SAN 1-1/2" Sanitary Tri-Clamp® | | 20SAN 2-1/2" Sanitary Tri-Clamp® | | 32SAN 4" Sanitary Tri-Clamp® |

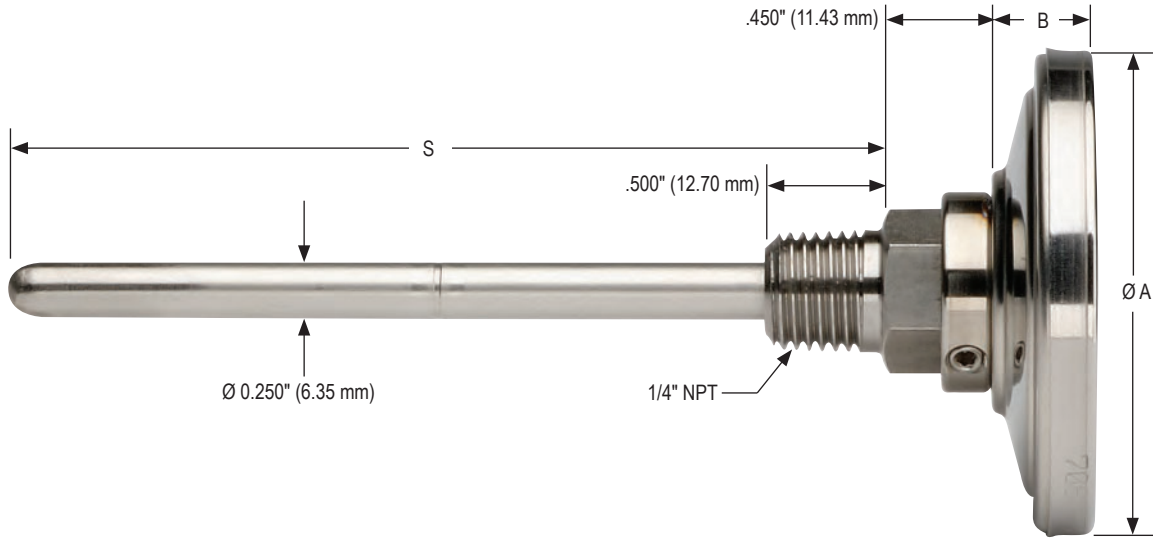
Note: Most standard bimetal thermometer options are available with Sanitary Tri-Clamp connection, consult factory.

EXAMPLE



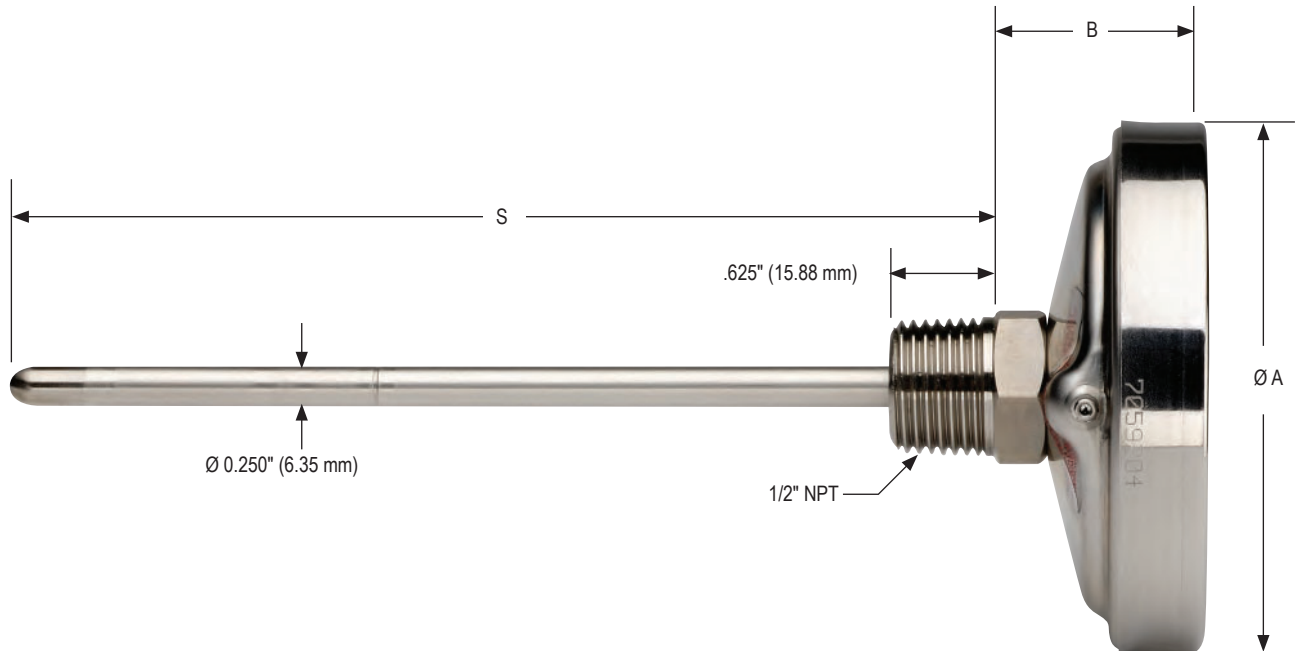
Dimensions

20-310



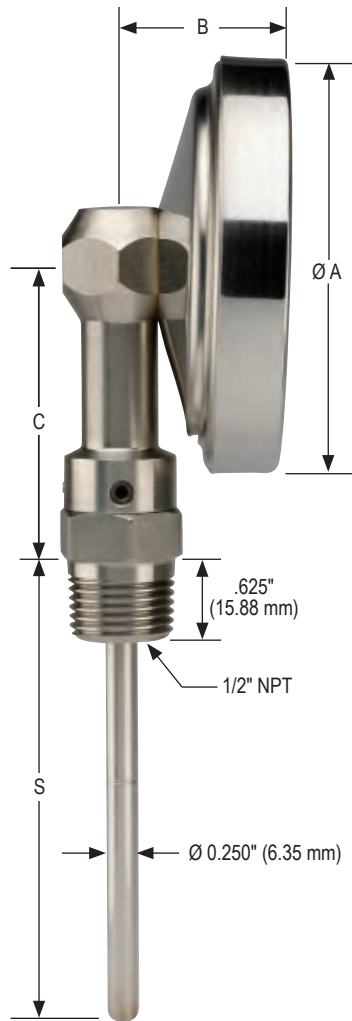
See page 15 for dimension chart.

30-310/50-310

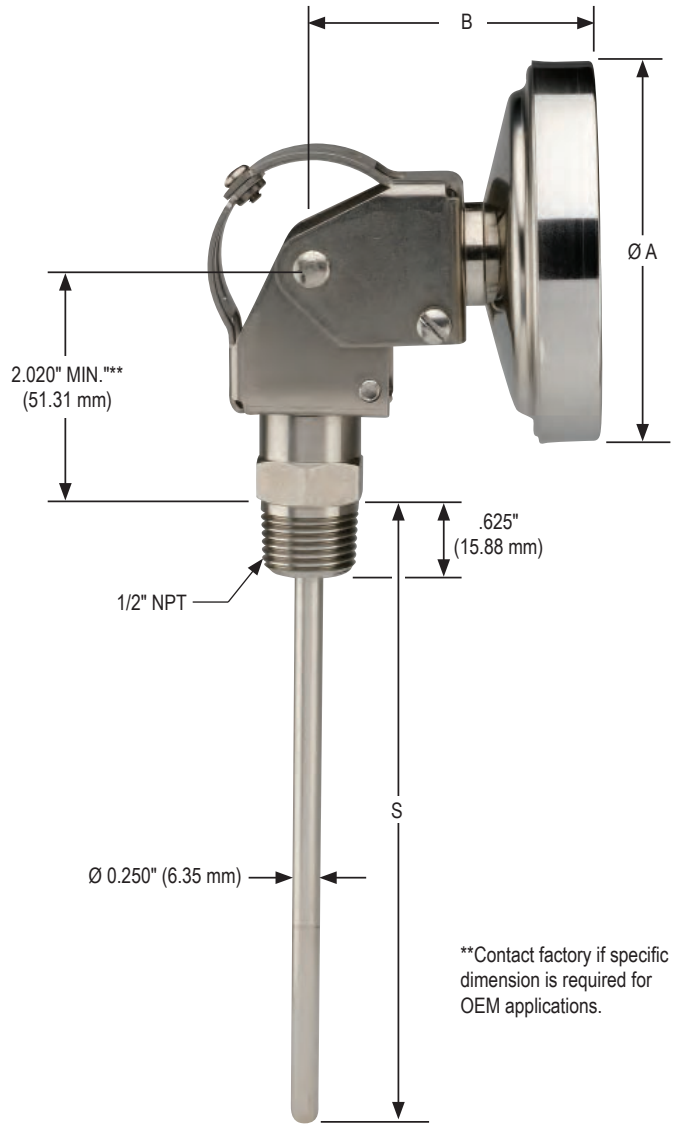


See page 15 for dimension chart.

30-300/50-300



30-320/50-320

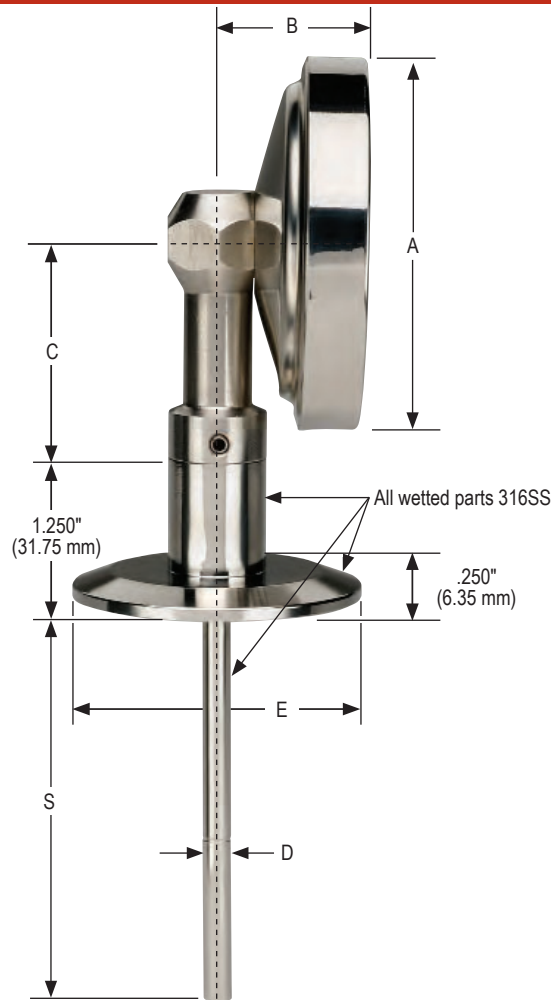


**Contact factory if specific dimension is required for OEM applications.

| Series | Ø A | B | C | S (Stem Length) |
|--------|---------------------|--------------------|----------------------|-----------------|
| 20-310 | 2.089" 53.06 mm | .438" 11.13 mm | — | As specified |
| 30-310 | 3.187" 80.95 mm | 1.375" 34.93 mm | — | As specified |
| 50-310 | 5.040" 128.02 mm | 1.718" 43.63 mm | — | As specified |
| 30-300 | 3.187" 80.95 mm | 1.187" 30.15 mm | 2.300" (58.42 mm) | As specified |
| 50-300 | 5.040" 128.02 mm | 1.625" 41.28 mm | 3.000" (76.20 mm) | As specified |
| 30-320 | 3.187" 80.95 mm | 2.430" 61.72 mm | — | As specified |
| 50-320 | 5.040" 128.02 mm | 2.660" 67.56 mm | — | As specified |

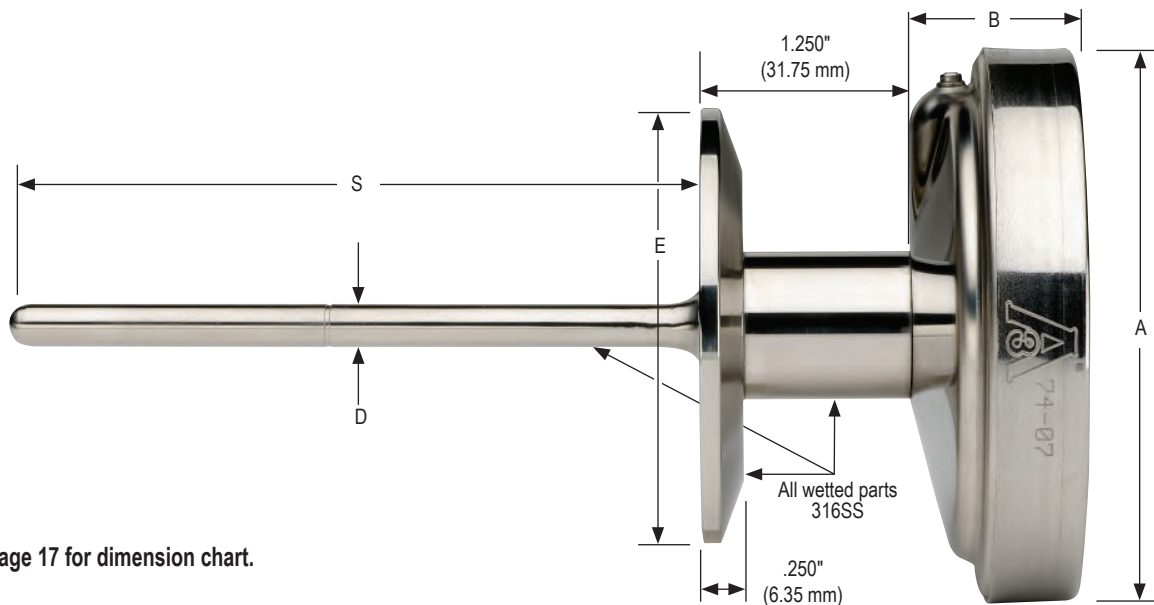


300 Series Sanitary Bimetal Thermometer



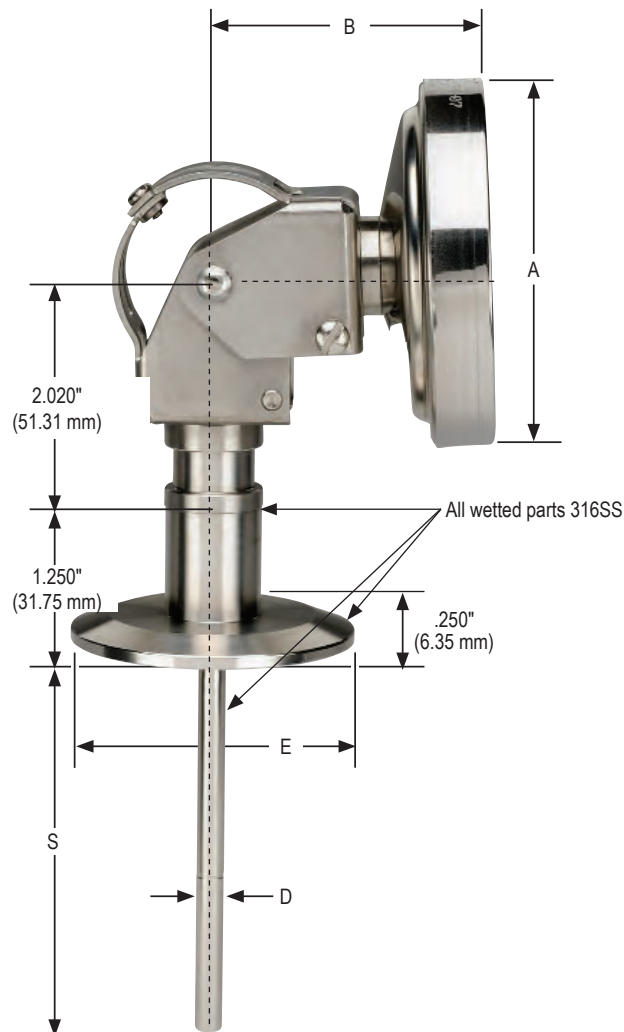
See page 17 for dimension chart.

310 Series Sanitary Bimetal Thermometer



See page 17 for dimension chart.

320 Series Sanitary Bimetal Thermometer



300 SERIES BIMETAL THERMOMETERS - SANITARY TRI-CLAMP® MODELS

| Series | A | B | C | D | S (Stem Length) |
|--------|---------------------|--------------------|----------------------|------------------|-----------------|
| 30-300 | 3.187" 80.95 mm | 1.187" 30.15 mm | 1.875" 47.63 mm | .375" 9.53 mm | As specified |
| 30-310 | 3.187" 80.95 mm | .890" 22.61 mm | — | .375" 9.53 mm | As specified |
| 30-320 | 3.187" 80.95 mm | 2.430" 61.72 mm | — | .375" 9.53 mm | As specified |
| 50-300 | 5.040" 128.02 mm | 1.625" 41.28 mm | 2.625" (66.68 mm) | .375" 9.53 mm | As specified |
| 50-310 | 5.040" 128.02 mm | 1.328" 33.73 mm | — | .375" 9.53 mm | As specified |
| 50-320 | 5.040" 128.02 mm | 2.660" 67.56 mm | — | .375" 9.53 mm | As specified |

TRI-CLAMP® FITTING

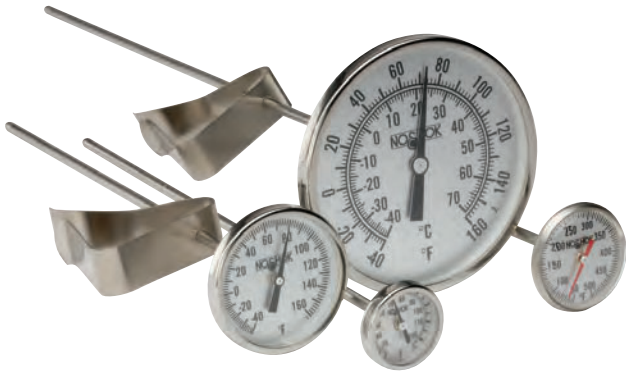
| Part Number Designation | Tri-Clamp Connection Size | E |
|-------------------------|---------------------------|---------------------|
| 06SAN * | 3/4" | .984" 25.00 mm |
| 12SAN ** | 1-1/2" | 1.984" 50.40 mm |
| 16SAN | 2" | 2.516" 63.90 mm |
| 20SAN | 2-1/2" | 3.047" 77.40 mm |
| 24SAN | 3" | 3.579" 90.90 mm |
| 32SAN | 4" | 4.682" 118.90 mm |

* Used on both 1/2" and 3/4" lines

** Used on both 1" and 1-1/2" lines

Bimetal, Testing and General Purpose with External Reset

350 SERIES



- Designed for general purpose testing applications, featuring a weather-resistant, tamper-proof case
- Pocket sized model is used by inspectors, service and maintenance personnel for spot checking
- A friction adjustment nut design provides easy calibration and maximum accuracy at a selected range
- Single °F, single °C, and dual scale (1-3/4" and 2" models only) options available
- Accuracy: ±1% full scale, Grade A, ASME B40.3
- 1", 1-3/8", 1-3/4", 2" and 3" sizes - center back connection only
- 304 Stainless Steel case and bezel
- Standard stem lengths 5 through 18"
- Highly sensitive bimetallic helix coil is heat-treated for stress relief, and silicone-coated to minimize pointer vibration and maximize heat transfer and response time
- 360° groove around stem is a visual reference to show minimum immersion point
- Adjustable pan clips are standard on 18-350, 20-350 and 30-350 models with 5" and 8" stem lengths
- Made in the U.S.A.

APPLICATIONS

Used in almost every area of manufacturing, especially suited for laboratory testing and general purpose applications in the following areas:

- Laboratory
- Food & beverage processing
- Concrete
- Asphalt
- OEM equipment
- HVAC

| | SERIES | SPECIFICATIONS |
|--------------------------------|---------------------------------------|---|
| Case & bezel | All 350 Series | 304 Stainless Steel; 316 Stainless Steel optional |
| Lens | 14-350 All other 350 Series models | Convex Polycarbonate Instrument Glass |
| Pointer | All 350 Series | Aluminum, black finish |
| Stem diameter | All 350 Series | .150" (3.81 mm) |
| Accuracy | All 350 Series | ±1% full scale, Grade A, ASME B40.3 |
| Dial | All 350 Series | Anodized Aluminum with large black numbers and graduations |
| Wetted parts | All 350 Series | 304 Stainless Steel; 316 Stainless Steel optional |
| Hermetic seal | All 350 Series | Per ASME B40.3 dustproof and leakproof |
| Bimetal coil | All 350 Series | Silicone coated helix coil on ranges below 500 °F for vibration dampening, maximum heat transfer and response time |
| Over temperature limits | All 350 Series | Up to 250 °F 100%; 250 °F to 550 °F 50%; 550 °F to 1,000 °F continuous use up to 800 °F; intermittent use over 800 °F |
| Recalibrator | All 350 Series | External reset |



WARNING: This product can expose you to chemicals including Chromium (VI) and Nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

Thermowells are recommended for pressure, corrosive fluids and high velocity applications, see pages 48-50.

| ORDERING INFORMATION | | | | | |
|------------------------------------|---|-------------------------|------------|-------------------------|---|
| DIAL SIZES | 10 | 1" ** | 18 | 1-3/4" | 30 3" |
| | 14 | 1-3/8" ** | 20 | 2" | |
| CASE TYPES | 350 | Back connection | | | |
| STEM LENGTHS | 050 | 5" ** | 120 | 12" | |
| | 080 | 8" ** | 180 | 18" | |
| TEMPERATURE RANGES | -100/100 F/C | -100 °F/°C to 100 °F/°C | 0/250 F/C | 0 °F/°C to 250 °F/°C | 50/550 F/C 50 °F/°C to 550 °F/°C |
| | -40/160 F/C | -40 °F/°C to 160 °F/°C | 20/240 F/C | 20 °F/°C to 240 °F/°C | 150/750 F/C 150 °F/°C to 750 °F/°C |
| <i>Dual Scale °F/°C</i> | 0/140 F/C | 0 °F/°C to 140 °F/°C | 25/125 F/C | 25 °F/°C to 125 °F/°C | 200/1000 F/C 200 °F/°C to 1,000 °F/°C * |
| <i>(Not available on 1" model)</i> | 0/180 F/C | 0 °F/°C to 180 °F/°C | 50/300 F/C | 50 °F/°C to 300 °F/°C | |
| | 0/220 F/C | 0 °F/°C to 220 °F/°C | 50/400 F/C | 50 °F/°C to 400 °F/°C | |
| <i>Single Scale °F</i> | -100/100 F | -100 °F to 100 °F | 0/220 F | 0 °F to 220 °F ** | 50/400 F 50 °F to 400 °F |
| | -50/120 F | -50 °F to 120 °F | 0/250 F | 0 °F to 250 °F | 50/500 F 50 °F to 500 °F ** |
| | -40/160 F | -40 °F to 160 °F ** | 20/240 F | 20 °F to 240 °F | 50/550 F 50 °F to 550 °F |
| | 0/140 F | 0 °F to 140 °F | 25/125 F | 25 °F to 125 °F ** | 150/750 F 150 °F to 750 °F ** |
| | 0/180 F | 0 °F to 180 °F | 50/250 F | 50 °F to 250 °F | 200/1000 F 200 °F to 1,000 °F * |
| | 0/200 F | 0 °F to 200 °F | 50/300 F | 50 °F to 300 °F | |
| <i>Single Scale °C</i> | -75/175 C | -75 °C to 175 °C | -10/110 C | -10 °C to 110 °C ** | 0/300 C 0 °C to 300 °C |
| | -50/100 C | -50 °C to 100 °C | 0/50 C | 0 °C to 50 °C** | 0/400 C 0 °C to 400 °C |
| | -50/25 C | -50 °C to 25 °C | 0/100 C | 0 °C to 100 °C | 100/400 C 100 °C to 400 °C |
| | -50/50 C | -50 °C to 50 °C | 0/150 C | 0 °C to 150 °C | 100/550 C 100 °C to 550 °C * |
| | -40/70 C | -40 °C to 70 °C ** | 0/200 C | 0 °C to 200 °C | |
| | -20/120 C | -20 °C to 120 °C | 0/250 C | 0 °C to 250 °C ** | |
| | Consult factory for additional temperature ranges | | | | |
| OPTIONS | LL | Polycarbonate Lens | PS | Pocket Sheath*** | TG Tempered Glass Lens † |
| | PL | Acrylic Lens | ST | Stainless Steel Tagging | |

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

Note: All 316 Stainless Steel construction (case, bezel, wetted parts) is available. Please consult factory.

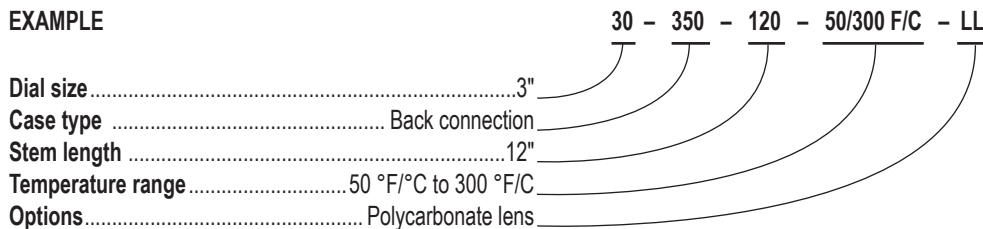
* Thermometers with temperature ranges 200/1000 °F and 100/500 °C are not recommended for continuous use above 800 °F/425 °C. **For intermittent use only.**

** 10-350 and 14-350 models are only available in these stem lengths and ranges.

*** Available for 5" or 8" stem lengths only.

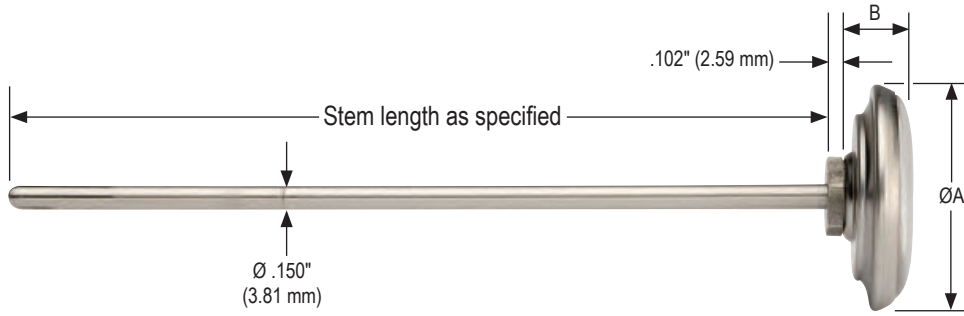
† Not available on 10-350 model. Also not available with Silicone Filled (SL) option.

EXAMPLE



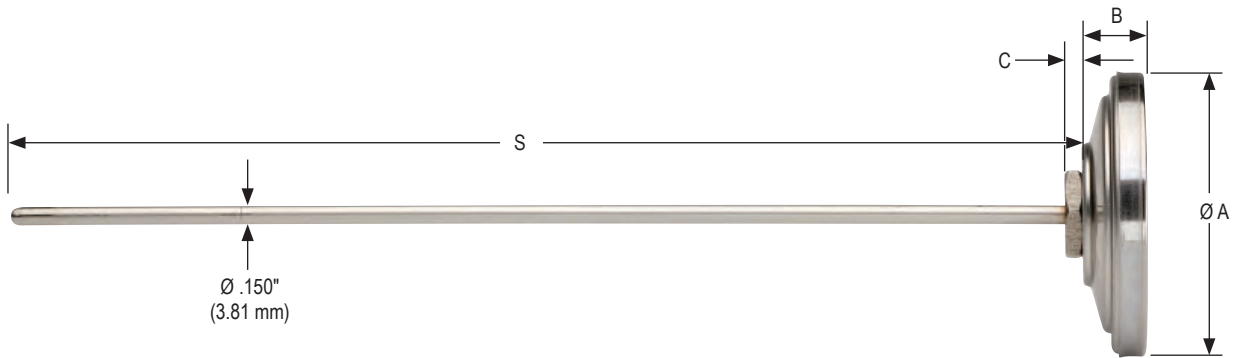
Dimensions

14-350



See page 19 for dimension chart.

10-350/18-350/20-350/30-350



See page 19 for dimension chart.

| Series | Ø A | B | C | S (Stem Length) |
|--------|--------------------|-------------------|------------------|-----------------|
| 10-350 | 1.032" 26.21 mm | .350" 8.89 mm | — | As specified |
| 14-350 | 1.358" 34.50 mm | .456" 11.58 mm | — | As specified |
| 18-350 | 1.750" 44.45 mm | .412" 10.47 mm | .102" 2.59 mm | As specified |
| 20-350 | 2.089" 53.06 mm | .438" 11.13 mm | .120" 3.05 mm | As specified |
| 30-350 | 3.200" 81.28 mm | .465" 11.81 mm | .120" 3.05 mm | As specified |



Pocket Sheath is available on 14-350 (shown left) and 10-350 (shown right) models, with 5" or 8" stem.

Vapor Actuated Remote

300/400/ 600/700 SERIES



- Indicates media temperature using a temperature-actuated liquid in the sensing element and a highly accurate, high quality pressure gauge
- As the media temperature increases, the capillary fill fluid vaporizes, increasing pressure in the Bourdon tube to activate the movement and pointer for proper indication
- Ranges available from -40 °F/C to 60 °F/C through 100 °F/C to 350 °F/C
- 2-1/2", 4", 4-1/2" and 6" sizes
- Brass, Stainless Steel, or Phenolic case
- Dry or liquid filled
- Bottom, back or lower back connected
- Mounting options: front or rear flange, bezel, and u-clamp
- Capillary material: Copper or Stainless Steel
- Bulb material & dimensions: Copper or Stainless Steel, 2-5/8" x 3/8" through 7-5/8" x 3/8"
- The dial scale graduations are non-linear, therefore the highest degree of accuracy and readability is found in the upper half of the scale

APPLICATIONS

- Power transformers
- Paper mills
- Refineries
- Petrochemical
- Oil and gas
- Chemical
- HVAC/R
- Food processing
- Pharmaceutical

| | SERIES | SPECIFICATIONS |
|-----------------|------------------------------------|--|
| Lens | 300, 600, 700 Series 400 Series | Acrylic Instrument glass |
| Pointer | All | Aluminum, black finish |
| Accuracy | All | ±2.0% full scale, Grade B, ASME B40.4 |
| Dial | All | Aluminum, white background, dual scale, black Celsius scale and black Fahrenheit scale |

For NOSHOK Vapor Remote Thermometers using 300, 600 & 900 Series Gauges:



WARNING: This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

For NOSHOK Vapor Remote Thermometers using 400 & 700 Series Gauges:



WARNING: This product can expose you to chemicals including Chromium (VI) and Nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

Thermowells are recommended for pressure, corrosive fluids and high velocity applications, see pages 48-50.

| ORDERING INFORMATION | | | |
|----------------------------------|---------------|---|---|
| 300 SERIES | 25-300 | 2-1/2", Brass case, bottom connection | 25-310 2-1/2", Brass case, back connection |
| 400 SERIES | 40-400 | 4", all Stainless, bottom connection | 40-410 4", all Stainless, back connection |
| | 60-400 | 6", all Stainless, bottom connection | 60-410 6", all Stainless, back connection |
| 600 SERIES | 45-640 | 4-1/2", Phenolic case/Brass bottom connection | |
| 700 SERIES | 45-740 | 4-1/2", Phenolic case/Stainless bottom connection | |
| GAUGE FILL FLUIDS | 0 | Dry gauge | 2 -40° service |
| | 1 | Glycerin | 3 Silicone |
| MOUNTING OPTIONS | 0 | None | 3 Rear flange ² |
| | 1 | Chrome front flange ¹ | 4 Bezel & u-clamp ³ |
| | 2 | Brass front flange ¹ | 5 Stainless Steel front flange ⁴ |
| TEMPERATURE RANGES | 1 | -40 °F/°C to 60 °F/°C | 6 30 °F/°C to 180 °F/°C |
| | 2 | -20 °F/°C to 120 °F/°C | 7 30 °F/°C to 240 °F/°C |
| | 3 | 0 °F/°C to 250 °F/°C | 8 30 °F/°C to 300 °F/°C |
| | 4 | 0 °F/°C to 300 °F/°C | 9 50 °F/°C to 350 °F/°C |
| | 5 | 20 °F/°C to 220 °F/°C | 10 100 °F/°C to 350 °F/°C |
| CAPILLARY TYPES/MATERIALS | 1 | Plain Copper | 3 Plain Stainless Steel |
| | 2 | Armored Copper | 4 Armored Stainless Steel |
| CAPILLARY LENGTH | ## | Specify in feet | |
| BULB STYLES/MATERIALS | 1 | Plain Copper | 3 1/2" NPT union Copper |
| | 2 | Plain Stainless Steel | 4 1/2" NPT union Stainless Steel |
| BULB DIMENSIONS | 1 | 2-5/8" x 3/8" | 6 4" x 3/8" |
| | 2 | 4-1/2" x 3/8" | 7 9" x 3/8" |
| | 3 | 8" x 3/8" | 8 7-5/8" x 3/8" |
| | 4 | 3-1/2" x 3/8" | 15 6" x 1/2" ⁵ |
| | 5 | 6" x 3/8" | |
| OPTIONS | CC | Certified Calibration | |

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

* Not available for gauge sizes ≥4" or ≥16' capillary

¹ Only available on 300 Series

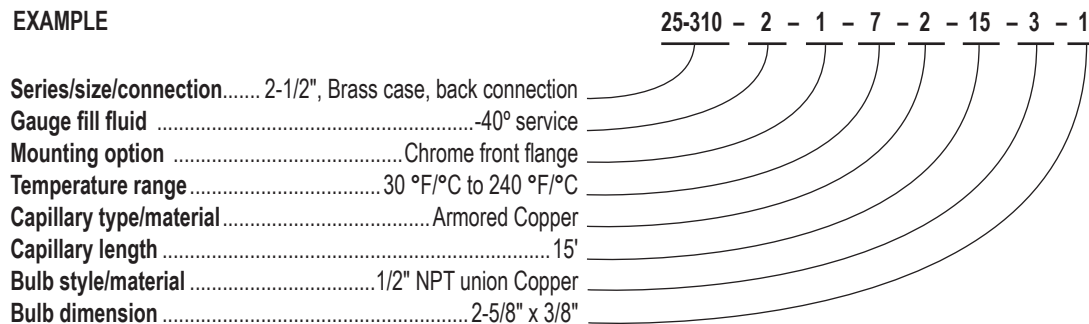
² Not available on 600/700 Series

³ Only available on back connection case types

⁴ Only available on 400 Series

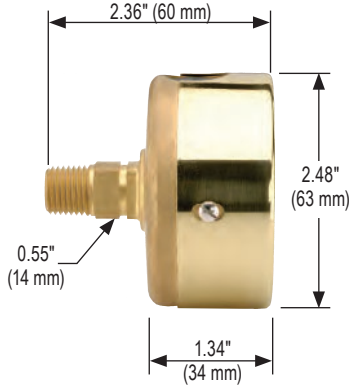
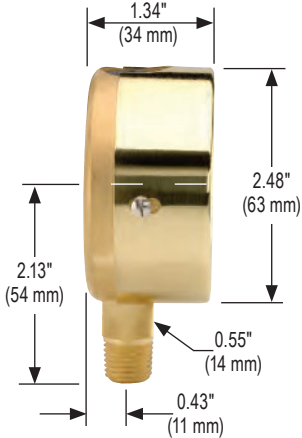
⁵ 4" gauge or larger requires 6" bulb

EXAMPLE

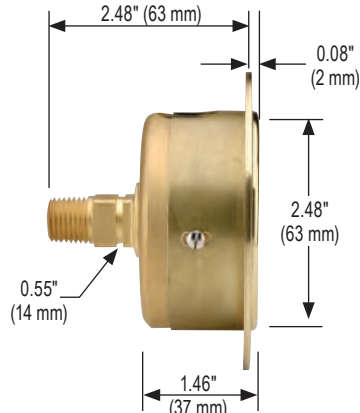
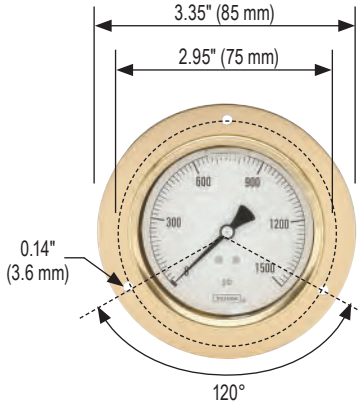
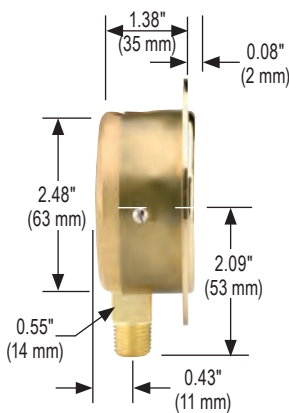
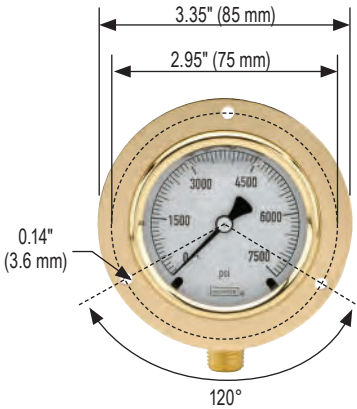


Dimensions

25-300 **25-310**

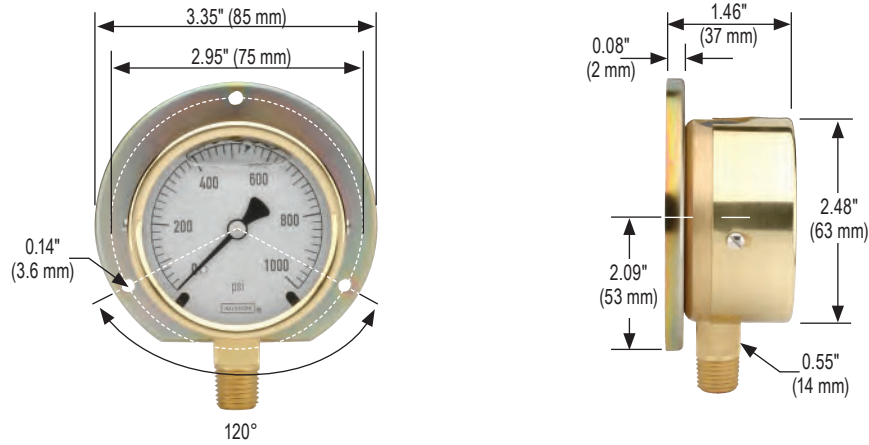


25-300 Front Flange **25-310 Front Flange**



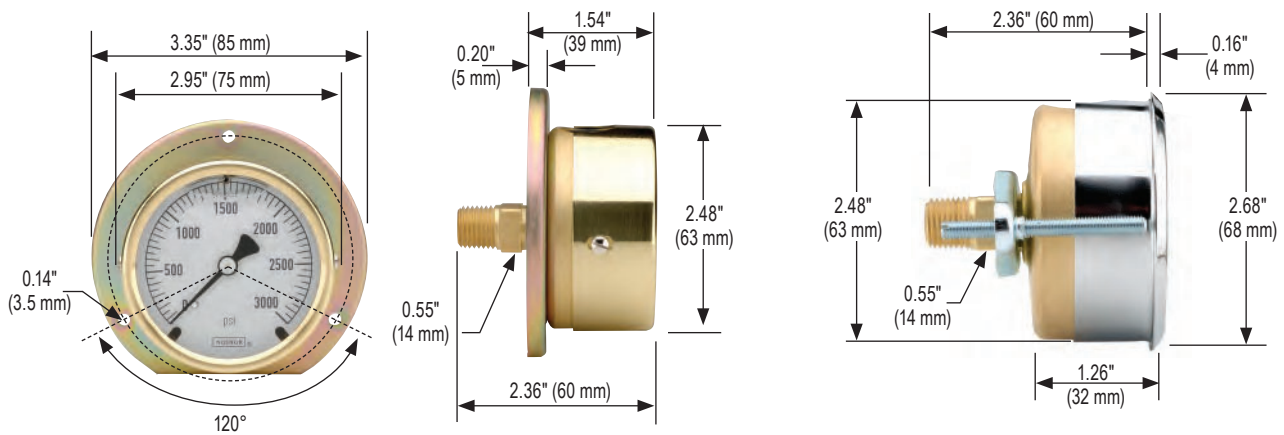
300/400/600/700 SERIES DIMENSIONS

25-300 Rear Flange



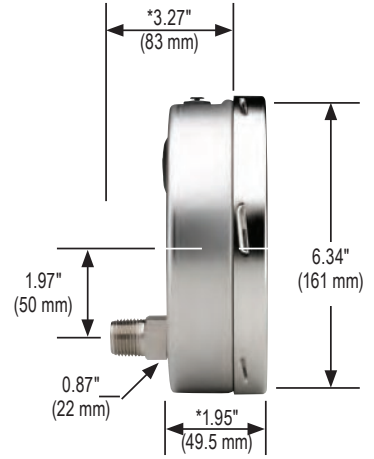
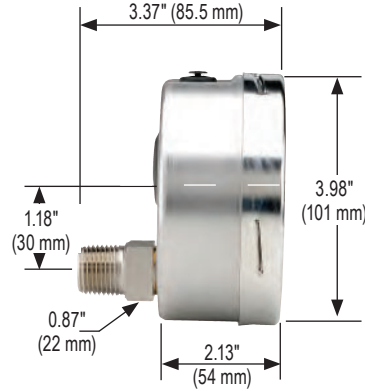
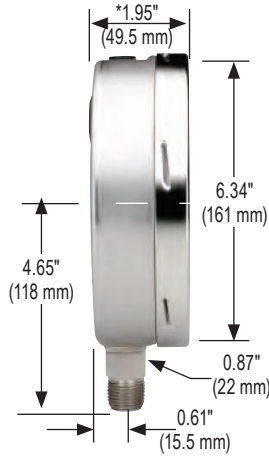
25-310 Rear Flange

25-310 Chrome Bezel with U-Clamp



Dimensions

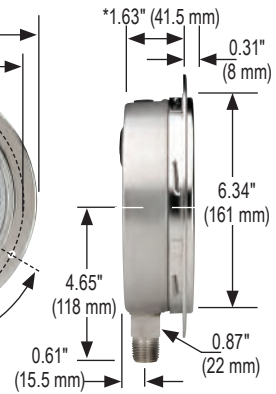
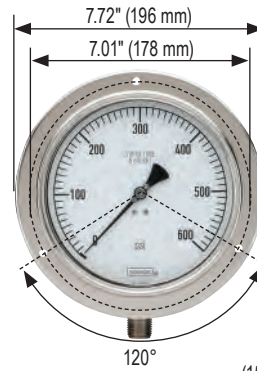
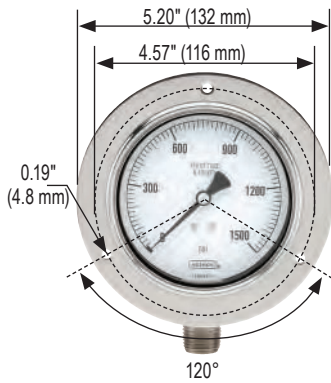
| 40-400 | 60-400 | 40-410 | 60-410 |
|--------|--------|--------|--------|
|--------|--------|--------|--------|



* ≥ 1,500 psi increase by 0.67\" (17 mm)

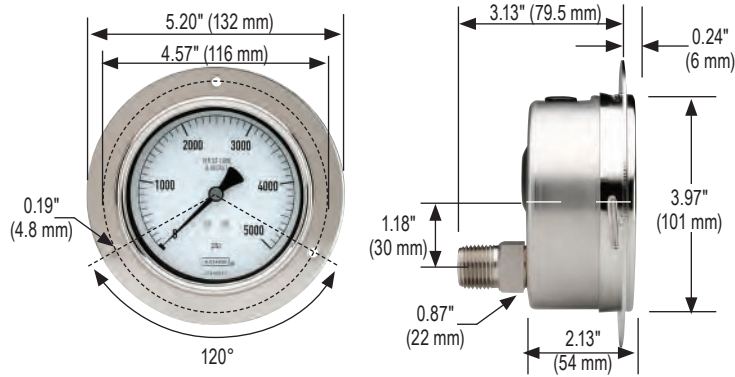
* ≥ 1,500 psi increase by 0.67\" (17 mm)

| 40-400 Front Flange | 60-400 Front Flange |
|---------------------|---------------------|
|---------------------|---------------------|

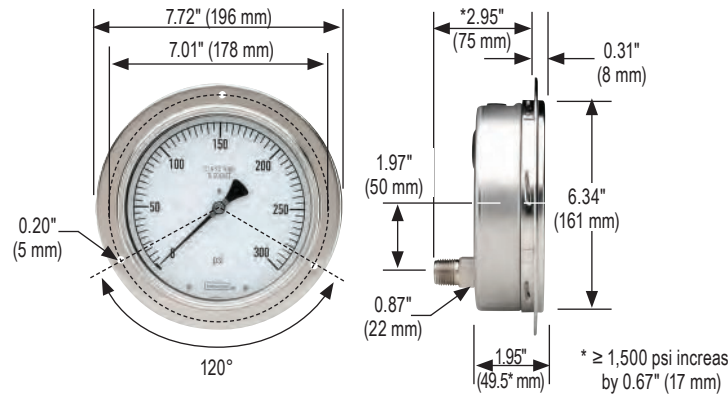


300/400/600/700 SERIES DIMENSIONS

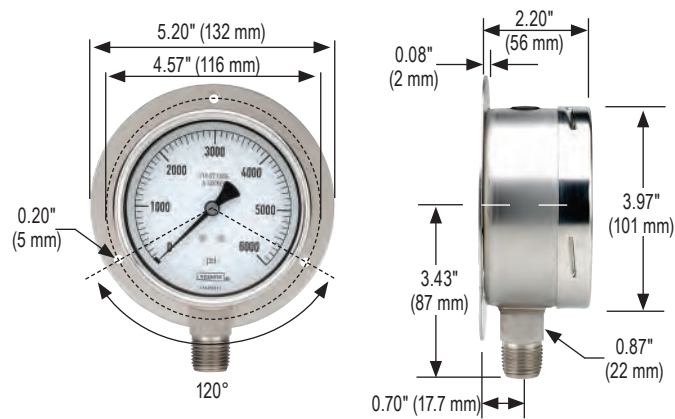
40-410 Front Flange



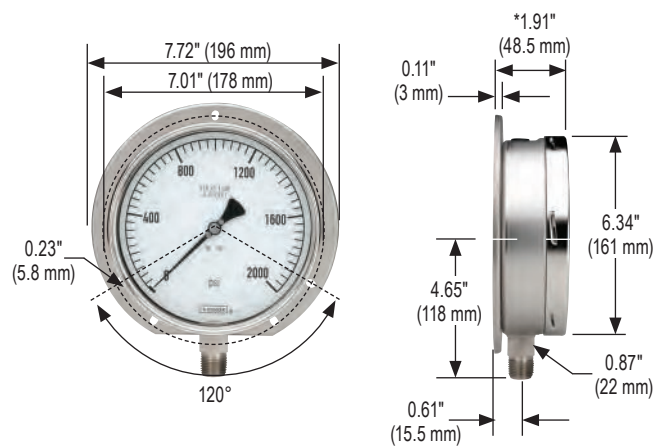
60-410 Front Flange



40-400 Rear Flange



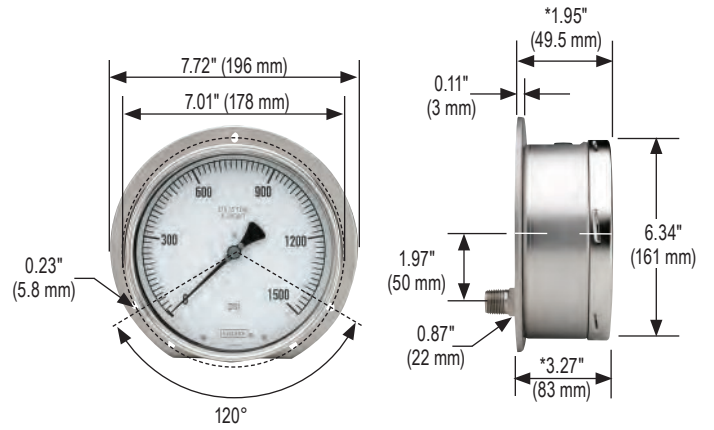
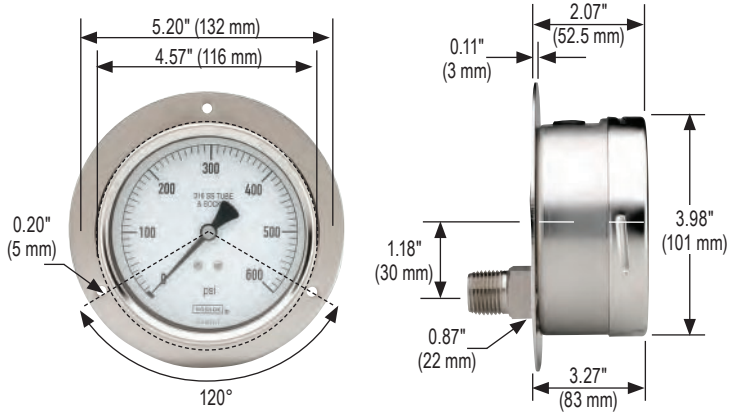
60-400 Rear Flange



Dimensions

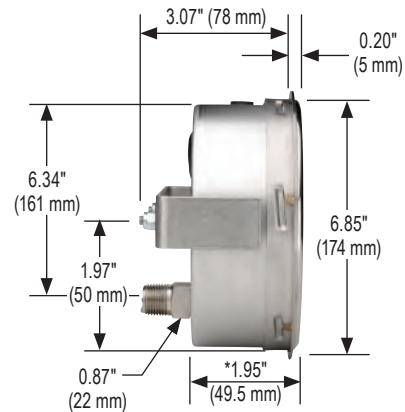
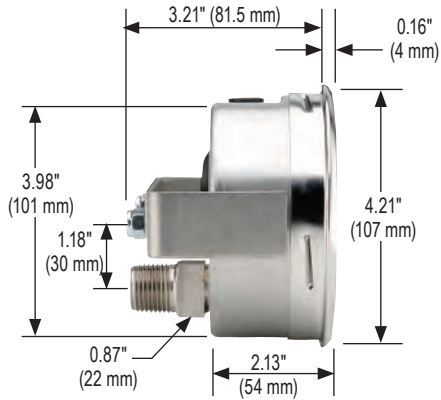
40-410 Rear Flange

60-410 Rear Flange



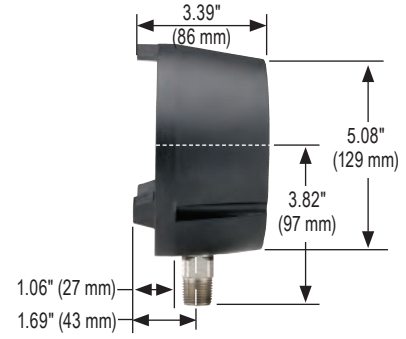
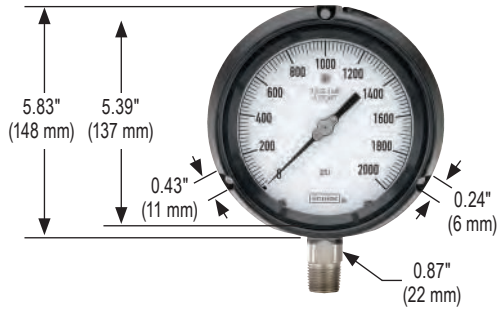
40-410/510 SS Bezel w/U-Clamp

60-410 SS Bezel w/U-Clamp



300/400/600/700 SERIES DIMENSIONS

45-640 & 45-740



Dial Indicating Thermometer Options

ADJUSTABLE UNION CONNECTION

- Can be used to reposition the dial face for better viewing
- Also helpful when installing a thermometer where space is limited

CERTIFIED CALIBRATION

- Available on all NOSHOK thermometers
- Certified calibration provides the user with a serial numbered thermometer along with a calibration sheet against a primary temperature standard
- Traceable to the National Institute of Standards and Technology

CONNECTIONS

- In addition to our standard 1/2" NPT connection, 1/4" , 3/8" NPT and metric connections are also available
- If a special connection is required, please consult the factory
- Other options include a plain stem with an adjustable compression fitting, or left, right or top connections

GLOW DIAL (GD)

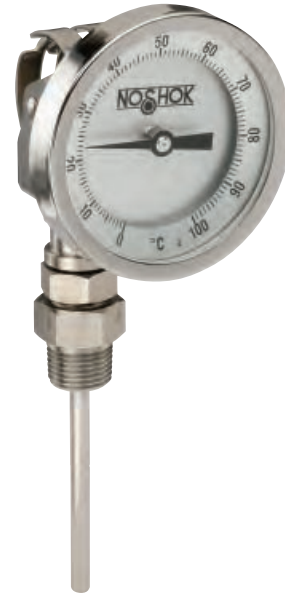
- Allows up close daylight and/or distant night time viewing
- 5" Adjustable angle or back connect
- Reflective Pointer
- Two reflective clips included to indicate custom minimum and maximum limits

LENSES

- Laminated safety glass lenses are available on all 3" and 5" NOSHOK bimetal thermometers
- Acrylic and polycarbonate lenses are available on all NOSHOK bimetal thermometers also, however they should not be used where case temperature exceeds 300 °F/150 °C

MINIMUM OR MAXIMUM INDICATING POINTER (MIP)

- The MIP allows you to view your minimum **or** maximum temperatures for visual clarification of safe operation
- Available only on 30-310 and 50-310 models



MINIMUM AND MAXIMUM INDICATING POINTER (MIP2)

- The MIP2 allows you to view your minimum **and** maximum temperatures for visual clarification of safe operation
- Available only on 30-310 and 50-310 models

MOUNTING FLANGES

- Various sizes and types of mounting flanges are available

SILICONE FILLED

- All 2", 3" and 5" NOSHOK Industrial bimetal thermometers are offered in a filled version
- For applications where severe vibration may be a factor
- Silicone dampens and lubricates the internal mechanism thus reducing pointer oscillation and premature wear
- A polycarbonate lens is standard with a silicone filled thermometer
- Maximum case temperature not to exceed 300 °F (150 °C)

SPECIAL DIALS

- Special ranges and dials with company names, company logos, part numbers, telephone numbers, or almost any custom layout is available

STEM TYPES

- The 304 Series Stainless Steel stem is welded at the tip and case for hermetic seal
- 1/4" (6.35 mm) diameter is standard for lengths up to 24" (609 mm)
- 3/8" diameter, sharp tip options and optional 316SS wetted parts are also available



Platinum Resistance Temperature Transmitter



800 SERIES



- Proven 100 Ω platinum resistance sensor provides reliability, stability and unbeatable performance
- Economical price
- Standard temperature ranges from -40 °F to 120 °F through 50 °F to 400 °F
- Wide variety of temperature ranges and connections
- Quick response time
- 316 Stainless Steel housing
- Burnout protection from 3.3 mA to 23 mA
- Also available with our 1800 Series attachable loop indicator
- CE compliant to suppress RFI, EMI, and ESD

APPLICATIONS

- Water systems
- Storage tanks
- Industrial machinery and machine tools
- HVAC systems
- Refrigeration systems



Also available with our 1800 Series attachable loop indicator. See www.noshok.com for details.

SPECIFICATIONS

| | |
|---------------------------------|--|
| Output signals | 4 mA to 20 mA 2-wire, 0 Vdc to 5 Vdc 3-wire 0 Vdc to 10 Vdc 3-wire, 1 Vdc to 5 Vdc 3-wire |
| Temperature ranges | Standard ranges from -40 °F to 400 °F |
| Accuracy | |
| Measuring element | Class B per EN 60751 (IEC 751) |
| Output | ±[0.30 +0.005* t] °C ±0.5% full scale |
| Sensor protection | Burnout protected from 3.3 mA to 23 mA |
| Power requirement* | 10 Vdc to 30 Vdc (4 mA to 20 mA, 2-wire) 10 Vdc to 30 Vdc (0 Vdc to 5 Vdc, 3-wire) 10 Vdc to 30 Vdc (1 Vdc to 5 Vdc, 3-wire) 14 Vdc to 30 Vdc (0 Vdc to 10 Vdc, 3-wire) |
| Load limitations | ≤ (VPower -10)/0.020 Amp for 4 mA to 20 mA output ≤ 5,000 Ω for 1 Vdc to 5 Vdc output ≤ 10,000 Ω for 0 Vdc to 10 Vdc output ≤ 4,500 Ω for 0.5 Vdc to 4.5 Vdc output |
| Wetted materials | 316 Stainless Steel |
| Housing material | 316 Stainless Steel |
| Max. operating pressure | 6 mm: 725 psi 8 mm: 1,500 psi |
| Ambient temperature | -40 °F to 185 °F (-40 °C to 85 °C) |
| Storage temperature | -40 °F to 185 °F (-40 °C to 85 °C) |
| Environmental protection | IP65 according to EN 60529/IEC 529 |
| Electromagnetic rating | CE compliant to EMC norm EN 61326:1997/A1:1998 RFI, EMI and ESD protection |
| Electrical protection | Reverse polarity, over-voltage and short circuit protection |
| Weight | Approximately 4 oz. |

* Unregulated



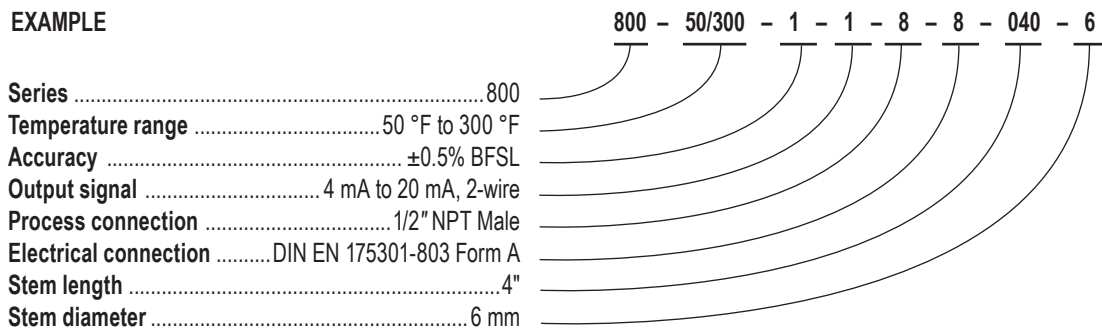
WARNING: This product can expose you to chemicals including Chromium (VI) and Nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

Thermowells are recommended for pressure, corrosive fluids and high velocity applications, see pages 48-50.

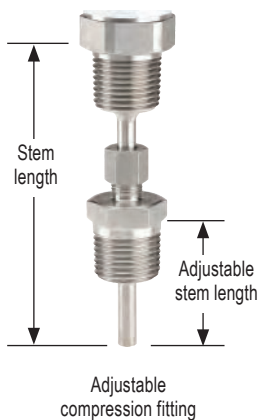
| ORDERING INFORMATION | | | | |
|-------------------------------|--------------------------|---|---------------|--|
| SERIES | 800 | | | |
| TEMPERATURE RANGES | -40/120 | -40 °F to 120 °F | 0/200 | 0 °F to 200 °F |
| | 0/100 | 0 °F to 100 °F | 0/250 | 0 °F to 250 °F |
| | 0/140 | 0 °F to 140 °F | 20/240 | 20 °F to 240 °F |
| ACCURACY | 1 Class B + (±0.5% BFSL) | | | |
| OUTPUT SIGNALS | 1 | 4 mA to 20 mA, 2-wire | 3 | 1 Vdc to 5 Vdc, 3-wire |
| | 2 | 0 Vdc to 5 Vdc, 3-wire | 5 | 0 Vdc to 10 Vdc, 3-wire |
| PROCESS CONNECTIONS | 2 | 1/4" NPT Male | 48 | 1/2" NPT Male w/adjustable compression fitting |
| | 8 | 1/2" NPT Male | | |
| ELECTRICAL CONNECTIONS | 1 | DIN EN 175301-803 Form A with 36" cable | 14 | DIN EN 175301-803 Form A with ISO 4400 1/2" NPT female conduit |
| | 8 | DIN EN 175301-803 Form A | 25 | M12 x 1 (4-pin) |
| STEM LENGTHS | 025 | 2.5" | 060 | 6" |
| | 040 | 4" | 090 | 9" |
| STEM DIAMETERS | 6 | 6 mm | 8 | 8 mm |

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

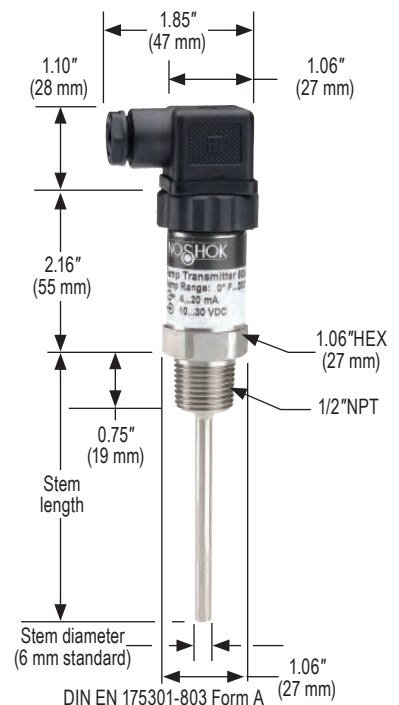
EXAMPLE



800 Series Platinum Resistance Temperature Transmitter



| Load Limitations 4 mA to 20 mA output | |
|--|---------------------------------------|
| Vmin | = 10V + (.020 x RL) |
| RL | = Loop resistance (Ω) RL = RS + RW |
| RS | = Sensor resistance (Ω) |
| RW | = Wire resistance (Ω) |



| 800 Series | 4 mA to 20 mA | |
|---------------------------------------|---------------|-------|
| CONNECTION TYPE (CODE) | V+ | V- |
| DIN EN 175301-803 Form A (8 or 14) | 1 | 2 |
| DIN EN 175301-803 Form A w/ Cable (1) | Red | Black |
| M12 x 1, 4-Pin (25) | 1 | 3 |

| 800 Series | 0-10 Vdc | | |
|---------------------------------------|----------|--------|--------|
| CONNECTION TYPE (CODE) | V+ | COMMON | OUTPUT |
| DIN EN 175301-803 Form A (8 or 14) | 1 | 2 | 3 |
| DIN EN 175301-803 Form A w/ Cable (1) | Red | Black | White |
| M12 x 1, 4-Pin (25) | 1 | 3 | 4 |



810 SERIES

- Proven PT1000 platinum resistance sensor provides reliability, stability and unbeatable performance
- Standard temperature ranges from -22 °F to 302 °F (-30 °C to 150 °C)
- 4 mA to 20 mA transmitter included
- 316 Stainless Steel housing
- CE compliant to suppress RFI, EMI, and ESD
- RoHS compliant

APPLICATIONS

- Mobile hydraulics
- Automotive
- Heat exchangers
- HVAC
- Transportation
- Refrigeration controls

SPECIFICATIONS

| | |
|---|--|
| Output signal | 4 mA to 20 mA, 2-wire |
| Temperature ranges | Standard ranges from -22 °F to 302 °F (-30 °C to 150 °C) |
| Accuracy | Measuring element PT1000 Class A |
| | Temperature sensor For °F: $\pm[1.8*(0.15 + 0.002(t - 32) / 1.8)]$ For °C: $\pm(0.15 K + 0.002 t)$ per EN 60751 |
| | Accuracy ^{1,2} ± 0.80 °F (+- 0.45 °C) |
| Failure signal | Sensor burnout ≥ 21.0 mA |
| | Sensor short circuit ≤ 3.6 mA |
| Power requirement* | 10 Vdc to 30 Vdc |
| Environmental temperature affect | 0.1% of span / 18 °F (10 °C) |
| Load limitations | $\leq (\text{Supply Voltage} - 10 \text{ Volts}) / 0.023 \text{ A}$ |
| Wetted materials | 316 Stainless Steel |
| Housing material | 316 Stainless Steel |
| Ambient temperature | -40°F to 185 °F (-40°C to 85 °C) |
| Storage temperature | -40°F to 185 °F (-40°C to 85 °C) |
| Electromagnetic rating | CE compliant to EMC norm EN 61326 RFI, EMI and ESD protection |
| Electrical protection | Reverse polarity, over-voltage and short circuit protection |
| Max. operating pressure | 3,915 psi (270 bar) ³ |
| Environmental protection | IP67 |

* Unregulated

¹ Maximum uncertainty calculated @ maximum span, maximum measurement temperature, and ambient temperature

² Maximum uncertainty includes Usensing element, Usensor measurement, Uoutput linearization

³ Pressure rating may vary based on the process medium, temperature and flow rate



WARNING: This product can expose you to chemicals including Chromium (VI) and Nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

Thermowells are recommended for pressure, corrosive fluids and high velocity applications, see pages 46-48.

| ORDERING INFORMATION | | | |
|------------------------------|--|---------------------------------|-----------------------------|
| SERIES | 810 | | |
| TEMPERATURE RANGES | -22/125 -22 °F to 125 °F | -22/302 -22 °F to 302 °F | 0/200 0 °F to 200 °F |
| | -22/250 -22 °F to 250 °F | 0/100 0 °F to 100 °F | 0/300 0 °F to 300 °F |
| | (L/H) Custom ranges available on request, specify low and high ranges (70 °F minimum span) | | |
| ACCURACY | 1 PT1000 Class A ±0.8 °F (±0.45 °C) | | |
| OUTPUT SIGNAL | 1 4 mA to 20 mA, 2-wire | | |
| PROCESS CONNECTIONS | 2 1/4" NPT Male | 8 1/2" NPT Male | |
| ELECTRICAL CONNECTION | 25 M12 x 1 (4-pin) | | |
| STEM LENGTHS | 010 1" | 030 3" | 080 8" |
| | 020 2" | 040 4" | 120 12" |
| | 025 2.5" | 060 6" | 140 14" |
| STEM DIAMETER | 6 6 mm | | |

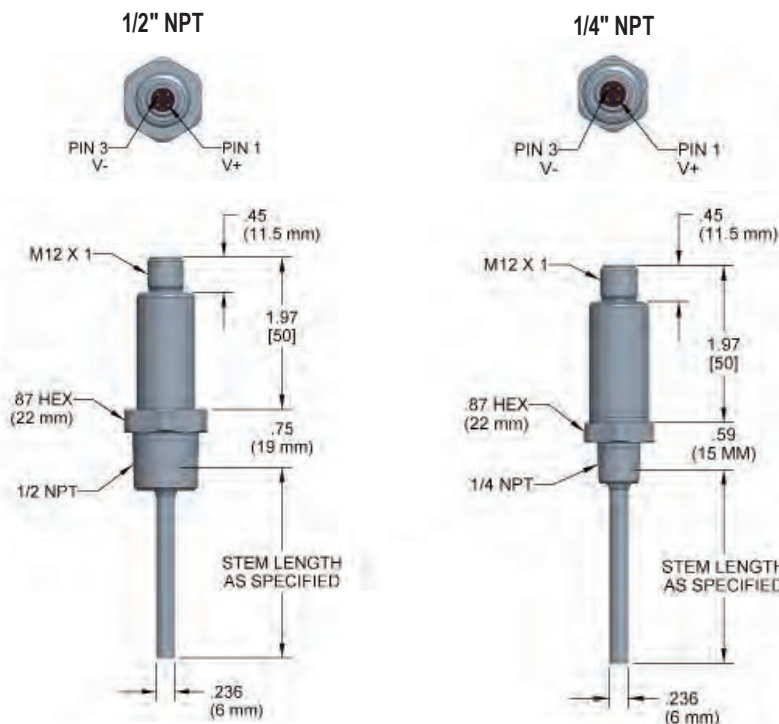
Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

EXAMPLE

810 - 22/125 - 1 - 1 - 2 - 25 - 020 - 6

| | |
|-----------------------------|-----------------------------------|
| Series | 810 |
| Temperature range | -22 °F to 125 °F |
| Accuracy | PT1000 Class A ±0.8 °F (±0.45 °C) |
| Output signal | 4 mA to 20 mA, 2-wire |
| Process connection | 1/4" NPT Male |
| Electrical connection | M12 x 1 (4-pin) |
| Stem length | 2" |
| Stem diameter | 6 mm |

810 Series Compact Temperature Transmitter



| 810 Series | 4 mA to 20 mA | |
|------------------------|---------------|----|
| CONNECTION TYPE (CODE) | V+ | V- |
| M12 x 1, 4-Pin (25) | 1 | 3 |

| Load Limitations 4 mA to 20 mA output |
|--|
| Vmin = 10V + (.020 x RL) |
| RL = Loop resistance (Ω) RL = RS + RW |
| RS = Sensor resistance (Ω) |
| RW = Wire resistance (Ω) |

Digital Temperature Indicators



APPLICATIONS

- Replacement for bimetal, liquid bulb and glass thermometers
- Pharmaceutical
- Food preparation
- Utilities and municipal refineries
- Chemical and petrochemical plants
- Paper mills
- Hydraulics

820/821 SERIES

- Large 4-digit LED display
- Field re-programmable with optional PC interface module and software
- Software includes a security feature to prevent accidental re-programming
- 4 mA to 20 mA programmable linearized output signal
- Utilizes a self-calibration feature for accurate and stable performance
- Optional fully programmable switch output; relay or transistor
- Utilizes a PT100 Ω RTD Class A element for temperature sensing
- M12 x 1 (5-pin) plug or 36" integral cable electrical connection
- IP 65 / NEMA 4 rated environmental protection
- All 316 Stainless Steel construction
- Easy installation with various mounting configurations

SPECIFICATIONS

| | |
|----------------------------|--|
| Temperature ranges | Standard ranges from -325 °F to 1,100 °F (-200 °C to 600 °C) Customer rescalable with optional PC interface and software |
| Temperature sensor | RTD (PT100 DIN EN 60751, Class A) |
| Housing material | 316 Stainless Steel |
| Probe material | 316 Stainless Steel standard |
| Maximum pressure | 500 psig (on probe) |
| Power requirement | 9-36 Vdc, polarity protected |
| Supply effect | 0.005%/V |
| Power consumption | 15 mA @ 24 Vdc + output current – 950 mW max. 20 mA @ 24 Vdc for PNP output – 500 mW max. 20 mA @ 24 Vdc + sourcing current for NPN output 50 mA @ 24 Vdc for relay output – 1200 mW max. |
| Current output | 4 mA to 20 mA (3-wire configuration) linear to temperature |
| Max load on current output | (Vsupply-9V) / 20 mA, Ω |
| Optional switching output | Relay SPDT 0.5A @ 240 Vac or Transistor NPN (max 100 mA source) or Transistor PNP (max 100 mA sink) |
| Optional switching logic | N.C. or N.O. software selectable |
| Optional switching ranges | Customer programmable between -325 °F to 1,100 °F (-200 °C to 600 °C) |
| Isolation | 500 Vdc input/output (between probe and output signal) |
| Electrical connection | M12 x 1 (5-pin) or integral cable |
| Hysteresis | 1% of range standard; customer programmable optional |
| Accuracy | $\leq 0.22\%$ full scale; $\leq 0.1\%$ full scale optional |
| Open circuit detection | Upscale (22 mA) or downscale (2.5 mA) current output. Error message on LED display |
| Warm-up | 30 seconds |
| Response time | 0.5 sec to 30 sec (software selectable) |
| Display | 4-digit LED, decimal point selectable by software |
| Display resolution | $\pm 0.02\%$ F.S. ± 1 digit |
| RFI effect | 1% or less typical |
| Temperature ranges | Ambient -40 °F to 176 °F (-40 °C to 80 °C) Effect <0.01% FS/°C Storage -58 °F to 185 °F (-50 °C to 85 °C) |
| Environmental protection | NEMA 4/ IP 65 |

Thermowells are recommended for pressure, corrosive fluids and high velocity applications, see pages 48-50.



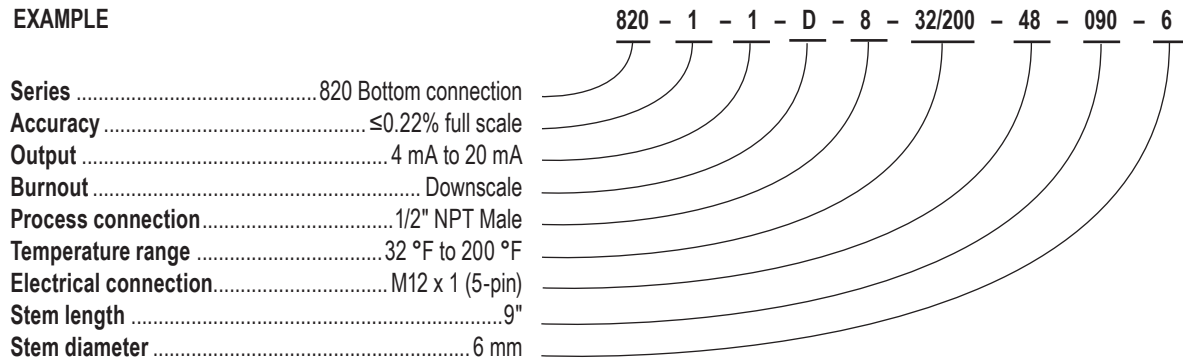
WARNING: This product can expose you to chemicals including Chromium (VI) and Nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

| ORDERING INFORMATION | | | | | |
|-------------------------------|---------------------------------|--|-------------------------------|-------------------------------|--|
| SERIES | 820 Bottom connection | 821 Back connection | | | |
| ACCURACY | 1 ≤0.22% full scale | 2 ≤0.1% full scale | | | |
| OUTPUT | 1 4 mA to 20 mA | | | | |
| BURNOUT | U Upscale | D Downscale | | | |
| PROCESS CONNECTIONS | 0 None | 8 1/2" NPT Male | | | |
| | 2 1/4" NPT Male | 48 1/2" NPT Male w/sliding compression fitting* | | | |
| TEMPERATURE RANGES | -50/120 -50 °F to 120 °F | -50/400 -50 °F to 400 °F | 32/200 32 °F to 200 °F | 32/400 32 °F to 400 °F | |
| | -50/300 -50 °F to 300 °F | 32/120 32 °F to 120 °F | 32/300 32 °F to 300 °F | | |
| ELECTRICAL CONNECTIONS | 36 Integral cable 36" | 48 M12 x 1 (5-pin) | | | |
| STEM LENGTHS | 025 2.5" | 060 6" | 120 12" | 180 18" | |
| | 040 4" | 090 9" | 150 15" | 240 24" | |
| STEM DIAMETERS | 2 1/4" | 3 3/8" | 4 1/2" | 6 6 mm | |

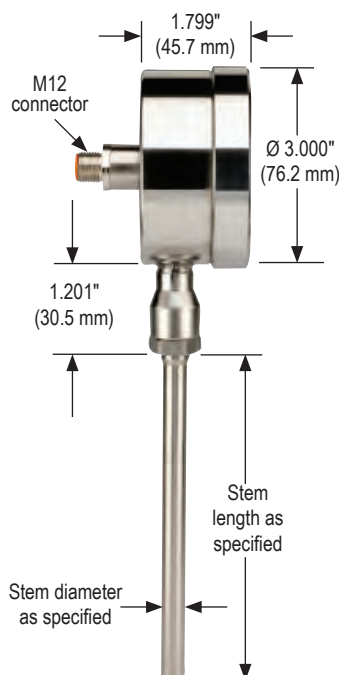
Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

* Add 2" to stem length for this option.

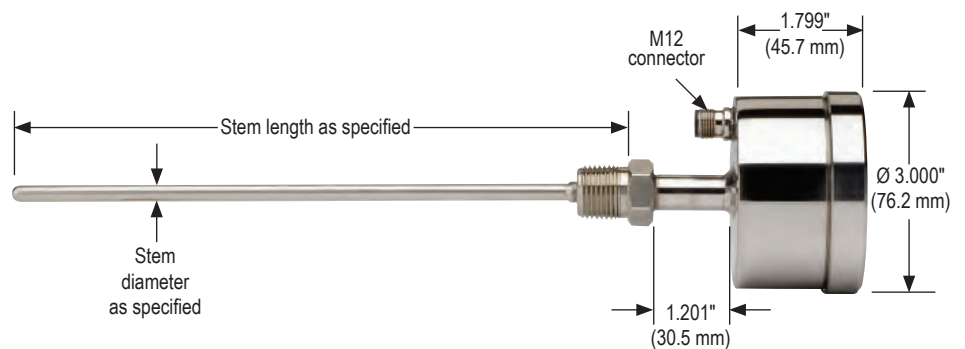
EXAMPLE



820 Series



821 Series



Digital Temperature Indicators, Battery Powered



822/823 SERIES

- 5 year minimum battery life
- Large 4-digit LCD display
- Utilizes a PT100 Ω RTD Class A element for temperature sensing
- IP 65 / NEMA 4 rated environmental protection
- All 316 Stainless Steel construction
- Easy installation with various mounting configurations

APPLICATIONS

- Replacement for bimetal, liquid bulb and glass thermometers
- Pharmaceutical
- Food preparation
- Utilities and municipal refineries
- Chemical and petrochemical plants
- Paper mills
- Hydraulics

SPECIFICATIONS

| | |
|---------------------------------|---|
| Temperature ranges | Standard ranges from -58 °F to 392 °F (-50 °C to 200 °C) |
| Temperature sensor | RTD (PT100 DIN EN 60751, Class A) |
| Housing material | 316 Stainless Steel |
| Probe material | 316 Stainless Steel standard |
| Maximum pressure | 500 psig (on probe) |
| Power requirement | Lithium battery (3.6 V) |
| Supply effect | 0.005%/V |
| Accuracy | $\leq 0.22\%$ full scale; $\leq 0.1\%$ full scale optional |
| Display | 4-digit LCD |
| Display resolution | $\pm 0.02\%$ F.S. ± 1 digit |
| RFI effect | 1% or less typical |
| Temperature ranges | Ambient -40 °F to 176 °F (-40 °C to 80 °C) Effect <0.01% FS/°C Storage -58 °F to 185 °F (-50 °C to 85 °C) |
| Environmental protection | NEMA 4/ IP 65 |

Thermowells are recommended for pressure, corrosive fluids and high velocity applications, see pages 48-50.



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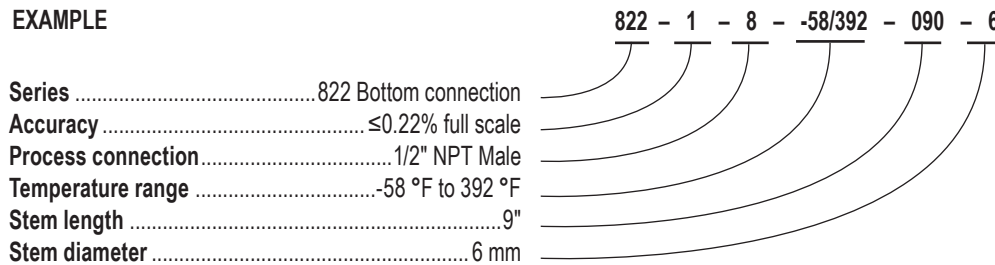
| ORDERING INFORMATION | | | | |
|----------------------------|---------------------------------|--|----------------|----------------|
| SERIES | 822 Bottom connection | 823 Back connection | | |
| ACCURACY | 1 ≤0.22% full scale | 2 ≤0.1% full scale | | |
| PROCESS CONNECTIONS | 0 None | 8 1/2" NPT Male | | |
| | 2 1/4" NPT Male | 48 1/2" NPT Male w/sliding compression fitting* | | |
| TEMPERATURE RANGE | -58/392 -58 °F to 392 °F | -50/200C -50 °C to 200 °C | | |
| STEM LENGTHS ** | 025 2.5" | 060 6" | 120 12" | 180 18" |
| | 040 4" | 090 9" | 150 15" | 240 24" |
| STEM DIAMETERS | 2 1/4" | 4 1/2" | 8 8 mm | |
| | 3 3/8" | 6 6 mm | | |

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

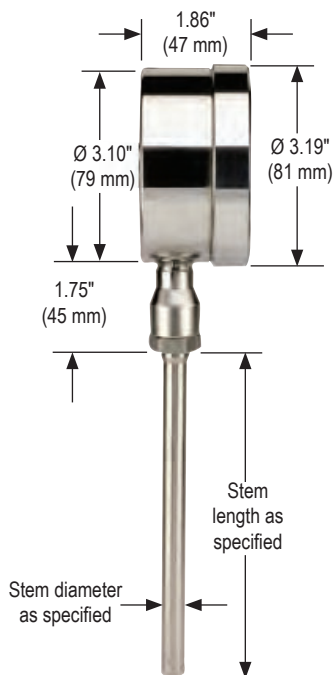
* Add 2" to stem length for this option.

** Consult factory for additional stem length options.

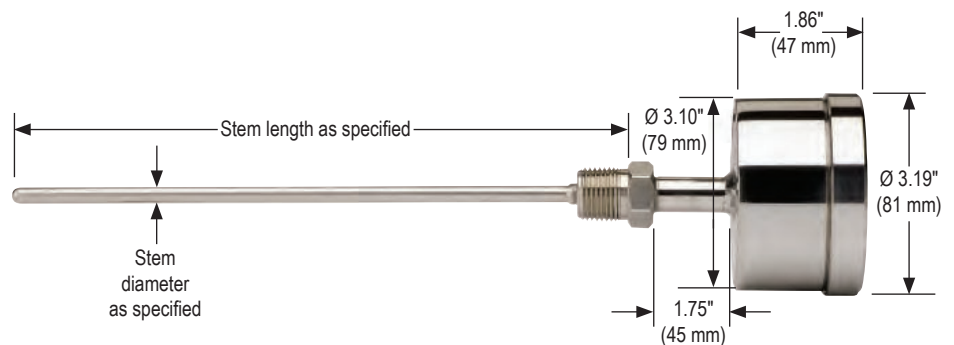
EXAMPLE



822 Series



823 Series





850 SERIES

- Utilizes PT1000 technology for continuous temperature monitoring, electronic temperature switching, and transmission of analog output while providing local digital indication
- Allows for one or two switching outputs as well as optional current and voltage outputs
- Three buttons on top allow simple adjustment of the temperature set points, reset points, switching functions and the measuring range of the optional analog output
- 1/2" NPT Male standard connection
- A variety of stem lengths are available for maximum versatility; also available with adjustable insertion lengths via the sliding compression fitting
- Durable stainless steel housing and wetted parts
- Display and electrical connection can be rotated independently
- RoHS compliant

APPLICATIONS

- Mechanical engineering
- Heating and cooling circuits
- Air conditioning technology
- Plant construction
- Environmental technology

SPECIFICATIONS

| | |
|---------------------------------|---|
| Temperature ranges | Standard -4 °F to 176 °F (-20 °C to 80 °C) Optional -4 °F to 248 °F (-20 °C to 120 °C) Selectable display for °F or °C |
| Temperature sensor | Platinum resistor (PT1000 2-wire, DIN EN 60751 Class A) |
| Wetted materials | 316Ti stainless steel |
| Housing material | 304 Stainless steel |
| Max. operating pressure | 2,000 psi (1/2" NPT Male fixed process connection); 725 psi (1/2" NPT Male sliding compression fitting process connection) |
| Power requirement* | 15 Vdc to 35 Vdc |
| Signal output adjustment | Zero point: 0-25% of span Full scale: 75-100% of span |
| Switch points | Individually adjustable via external control keys |
| Number | 1 or 2 (PNP) |
| Function | N.O. / N.C.; windows-and hysteresis function freely adjustable |
| Adjustment accuracy | ≤ 0.5% of span |
| Switch rating | Max. 250 mA |
| Electrical connection | M12 x 1 (4-pin), M12 x 1 (5-pin) |
| Accuracy | |
| Analog signal | ≤ ±0.5% of span + temperature sensor error |
| Switching output | ≤ ±0.8% of span + temperature sensor error |
| Display | ≤ ±(0.8% of span + temperature sensor error) ±1 digit |
| Temperature sensor | For °F: ±[1.8*(0.15 + 0.002 (t - 32) / 1.8)] For °C: ±(0.15 K + 0.002 t) per EN 60751 |
| Display | 14 segment-LED, red 4-digit, height 0.35" |
| Environmental protection | IP65 and IP67 (IEC 60529) |

* Unregulated

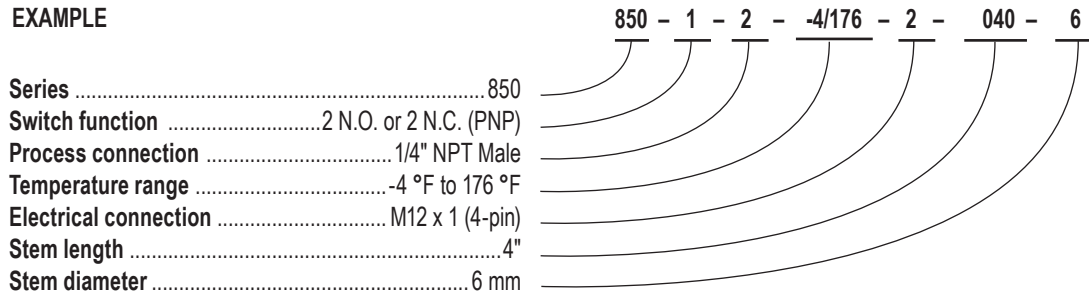
Thermowells are recommended for pressure, corrosive fluids and high velocity applications, see pages 48-50.

| ORDERING INFORMATION | | | |
|------------------------------|--|---|--------------------|
| SERIES | 850 | | |
| SWITCH FUNCTIONS | 1 2 N.O. or 2 N.C. switch (PNP *) 2 1 N.O. or 1 N.C. switch (PNP *) with 4 mA to 20 mA 3-wire analog output 3 1 N.O. or 1 N.C. switch (PNP *) with 0 Vdc to 10 Vdc 3-wire output | 4 2 N.O. or 2 N.C. switch (PNP*) with 4 mA to 20 mA 3-wire analog output ** 5 2 N.O. or 2 N.C. switch (PNP*) with 0 Vdc to 10 Vdc 3-wire output ** | |
| PROCESS CONNECTIONS | 2 1/4" NPT Male 8 1/2" NPT Male | 47 1/4" NPT Male sliding compression fitting 48 1/2" NPT Male sliding compression fitting | |
| TEMPERATURE RANGES | -4/176 -4 °F to 176 °F (-20 °C to 80 °C) | -4/248 -4 °F to 248 °F (-20 °C to 120 °C) † This range is available with sliding compression fitting ONLY | |
| ELECTRICAL CONNECTION | 2 M12 x 1 (4-pin) | 3 M12 x 1 (5-pin) †† | |
| STEM LENGTHS | 010 1" *** 020 2" *** 025 2.5" *** | 040 4" 060 6" 090 9" | 120 12" 140 14" |
| STEM DIAMETERS | 6 6 mm | | |

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

- * NPN available, consult factory
- ** Available only with M12 x 1 (5-pin) connector
- *** Not available with sliding compression fitting
- † Available only with sliding compression fitting process connection and stem lengths ≥4"
- †† Switch function 4 and 5 only

EXAMPLE



850 Series

Tapered Thread

| F | | | | | | | |
|----|---|---|-----|---|---|---|----|
| in | 1 | 2 | 2.5 | 4 | 6 | 9 | 14 |

1 switching output (M12 x 1) with 4 mA to 20 mA signal ††

p-switching

2 switching output (M12x1) with 4 mA to 20 mA signal ††

p-switching

Sliding Compression Fitting with Tapered Thread

| F | | | | |
|----|---|---|---|----|
| in | 4 | 6 | 9 | 14 |

2 switching output (M12 x 1) p-switching

†† Also applies to 0 Vdc to 10 Vdc output

Dimensions inches (mm) with circular connector M12 x 1 (4-pin and 5-pin)

Ø1.50" (38 mm)

1.42" (36 mm)

3.23" (82 mm)

1.38" (35 m)

M12 x 1

1.06" (27 mm) HEX

1/2" NPT

Ø.1.38" (35 mm)

Ø.24" (6 mm)

1.16" (29.5 mm)

Display rotates >300°

Electrical Connection rotates >300°

Industrial RTD, Probe Type

900 SERIES



- General purpose RTD probe with PVC or PTFE lead wires
- Adjustable and welded fittings available
- Ideal for OEM applications
- PVC or PTFE jacketed lead wires are available
- A variety of fitting sizes and probe diameters are available
- RTD PT100 Ω standard, others available
- 2, 3 or 4-wire circuit types
- Isolation to 500 Vdc
- Custom designs available

APPLICATIONS

- Chemical processing
- Textile production
- Automotive
- Plastics processing
- HVAC

SPECIFICATIONS

| | |
|------------------------------|--|
| Temperature ranges | -50 °F to 400 °F (-50 °C to 200 °C) -50 °F to 750 °F (-50 °C to 400 °C) -330 °F to 1,100 °F (-200 °C to 600 °C) |
| Sheath material | 316 Stainless Steel |
| Finish (standard) | 32 micro-inches maximum |
| Pressure rating | 500 psi (34.5 bar), tube only |
| RTD element | PT100 Ω @ 32 °F (0 °C), $\alpha=0.00385$ IEC 751 |
| Lead wires | Stranded 22 AWG standard, PVC or PTFE insulation |
| Self-heating | 50 mW / °C typical in moving water |
| Insulation resistance | Single element probes: 100 mega Ω /min. at 500 Vdc, leads to case Dual element probes: 100 mega Ω /min. at 100 Vdc, between element and leads to case |
| Transition | Sheath to wire transition max. temperature 266 °F (130 °C) |



WARNING: This product can expose you to chemicals including Chromium (VI) and Nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

Thermowells are recommended for pressure, corrosive fluids and high velocity applications, see pages 48-50.

| ORDERING INFORMATION | | | |
|-------------------------------|---|--|-----------------------|
| SERIES | 900 | | |
| TEMPERATURE RANGES | -50/400 -50 °F to 400 °F | -330/1100 -330 °F to 1,100 °F | |
| | -50/750 -50 °F to 750 °F | | |
| ACCURACIES | 1 ±0.12% (±0.3 °C) at 0 °C, Class B | 3 ±0.04% (±0.1 °C) at 0 °C, Class AA | |
| | 2 ±0.06% (±0.15 °C) at 0 °C, Class A | | |
| ELEMENT TYPES | C PT100 Ω at 0 °C | M PT1000 Ω at 0 °C | |
| CIRCUIT TYPES | 1 Single, 2-wire | 3 Single, 4-wire | 5 Dual, 3-wire |
| | 2 Single, 3-wire | 4 Dual, 2-wire | 6 Dual, 4-wire |
| PROCESS CONNECTIONS | 0 None | 8 1/2" NPT Male | |
| | 1 1/8" NPT Male | 48 1/2" NPT Male w/sliding compression fitting ** | |
| | 2 1/4" NPT Male | 61 Spring loaded 1/2" NPT **,*** | |
| ELECTRICAL CONNECTIONS | 6 1/2" NPT conduit with 36" cable | 48 M12 x 1 (5-pin) * | |
| | 36 Integral cable 36" | 49 3-pin RTD plug | |
| | 37 1/2" NPT conduit with 6" flying leads | 50 M12 x 1 (8-pin) | |
| STEM LENGTHS | 025 2.5" | 090 9" | 180 18" |
| | 040 4" | 120 12" | 240 24" |
| | 060 6" | 150 15" | |
| STEM DIAMETERS | 1 1/8" | 3 3/8" | 6 6 mm |
| | 2 1/4" | 4 1/2" | |

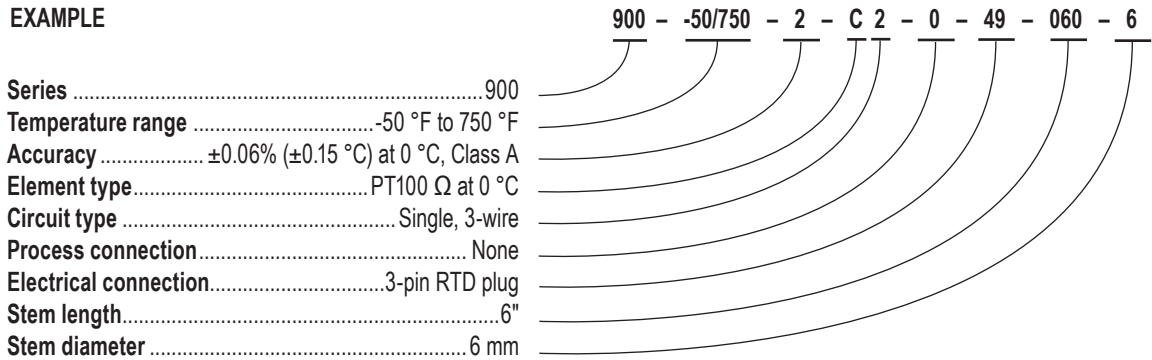
Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

* Single circuit types only

** Add 2" to stem length for this option. If installing with thermowells, Process Connection option 48 or 61 must be selected.

*** Only available with Electrical Connection options 6 & 37

EXAMPLE



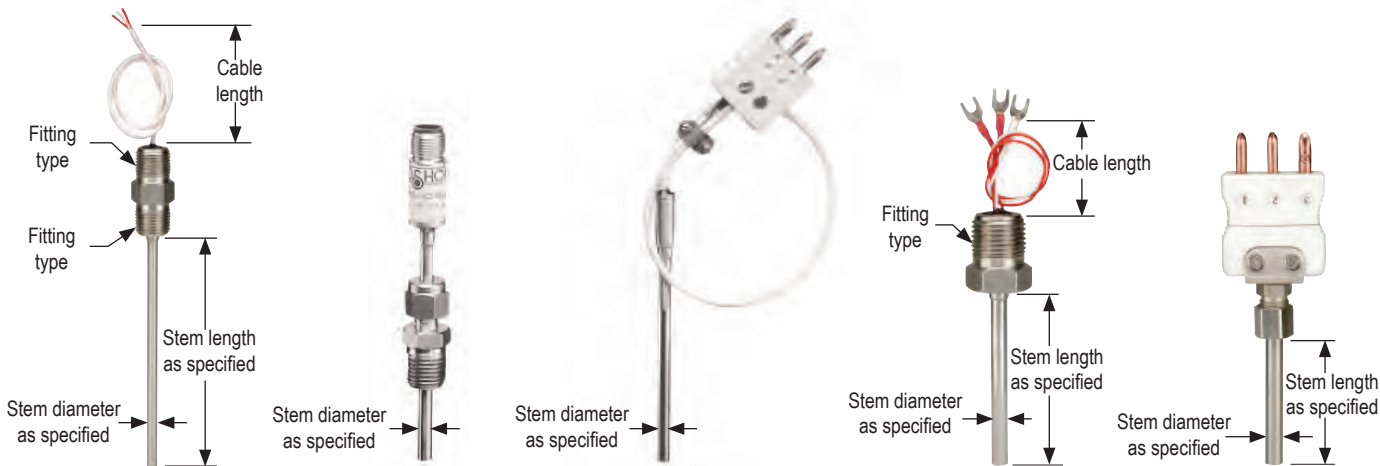
1/2" Conduit With Cable

M12 x 1 (5-pin)

Integral Cable 36"

1/2" NPT w/Flying Leads

RTD Plug





910/915 SERIES

- Standard head-type RTD assembly
- A variety of head types are available
- Factory Mutual and Canadian Standards approved explosion proof models available
- Transmitter available, fits standard heads
- Probe welded to fitting or spring loaded
- If used in conjunction with a thermowell, probe can be replaced in some models without possibility for leakage
- Process fitting 1/2" NPT standard, others available
- RTD PT100 Ω standard, others available
- 2, 3 or 4-wire circuit types
- Isolation to 500 Vdc

APPLICATIONS

- Industrial boilers
- Petrochemical
- Exhaust gas monitoring
- Food processing

SPECIFICATIONS

| | |
|---------------------------------|--|
| Temperature ranges | -50 °F to 400 °F (-50 °C to 200 °C) -50 °F to 750 °F (-50 °C to 400 °C) -330 °F to 1,100 °F (-200 °C to 600 °C) |
| Sheath material | 316 Stainless Steel |
| Finish (standard) | 32 micro-inches maximum |
| Pressure rating | 500 psi (34.5 bar), tube only |
| RTD element | PT100 Ω @ 32 °F (0 °C), $\alpha=0.00385$ IEC 751 |
| Lead wires | Stranded 22 AWG standard, PVC or PTFE insulation |
| Self-heating | 50 mW / °C typical in moving water |
| Insulation resistance | Single element probes: 100 mega Ω /min. at 500 Vdc, leads to case Dual element probes: 100 mega Ω /min. at 100 Vdc, between element and leads to case |
| Environmental protection | A1/A2: NEMA 4 P1 & S1/S2: NEMA 4X |
| Transition | Sheath to wire transition max. temperature 266 °F (130 °C) |



WARNING: This product can expose you to chemicals including Chromium (VI) and Nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

Thermowells are recommended for pressure, corrosive fluids and high velocity applications, see pages 48-50.

| ORDERING INFORMATION | | | |
|---|---|--|--|
| SERIES | 910 Fixed RTD | 915 Spring-loaded RTD | |
| TEMPERATURE RANGES | -50/400 -50 °F to 400 °F -50/750 -50 °F to 750 °F | -330/1100 -330 °F to 1,100 °F | |
| ACCURACIES | 1 ±0.12% (±0.3 °C) at 0 °C, Class B 2 ±0.06% (±0.15 °C) at 0 °C, Class A | 3 ±0.04% (±0.1 °C) at 0 °C, Class AA | |
| ELEMENT TYPES | C PT100 Ω at 0 °C | M PT1000 Ω at 0 °C | |
| CIRCUIT TYPES | 1 Single, 2-wire 2 Single, 3-wire | 3 Single, 4-wire 4 Dual, 2-wire | 5 Dual, 3-wire 6 Dual, 4-wire |
| OPTIONAL TRANSMITTER/ OUTPUT | 1U 4 mA to 20 mA, 2-wire, upscale burnout 1D 4 mA to 20 mA, 2-wire, downscale burnout 2 0 Vdc to 5 Vdc, 3-wire | 3 1 Vdc to 5 Vdc, 3-wire 5 0 Vdc to 10 Vdc, 3-wire | |
| PROCESS CONNECTIONS | 0 None 1 1/8" NPT Male 2 1/4" NPT Male | 8 1/2" NPT Male 48 1/2" NPT Male w/sliding compression fitting ** | |
| ELECTRICAL CONNECTIONS | 23 Connection head w/ 1/2" NPT conduit | 45 Connection head with 3/4" NPT conduit | |
| ELECTRICAL CONNECTION MATERIALS | A1 Aluminum cast A2 Aluminum cast, explosion proof* | P1 PP, white S1 Stainless Steel cast | S2 Stainless Steel cast, explosion proof* |
| STEM LENGTHS | 025 2.5" 040 4" 060 6" | 090 9" 120 12" 150 15" | 180 18" 240 24" |
| STEM DIAMETERS | 1 1/8" 2 1/4" | 3 3/8" 4 1/2" | 6 6 mm |

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

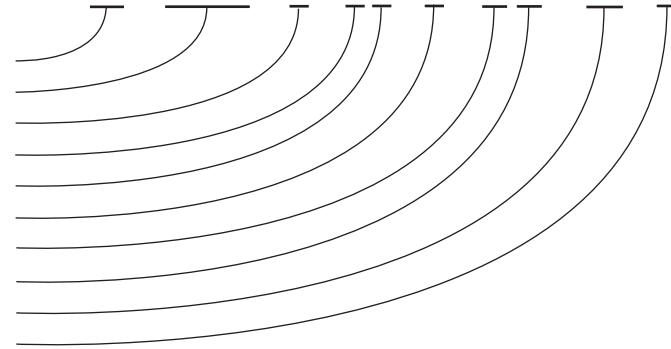
* Factory Mutual and Canadian Standards approved explosion proof Class I, Division I, Groups B, C and D; Class II, Division I, Groups E, F and G

** Add 2" to stem length for this option. If installing with thermowells, Process Connection option 48 must be selected.

EXAMPLE

Series 910
 Temperature range -330 °F to 1,100 °F
 Accuracy ±0.12% (±0.3 °C) at 0 °C, Class B
 Element type PT1000 Ω at 0 °C
 Circuit type Dual, 2-wire
 Process connection 1/2" NPT Male
 Electrical connection Connection head w/1/2" NPT conduit
 Electrical connection material Stainless Steel cast
 Stem length 12"
 Stem diameter 3/8"

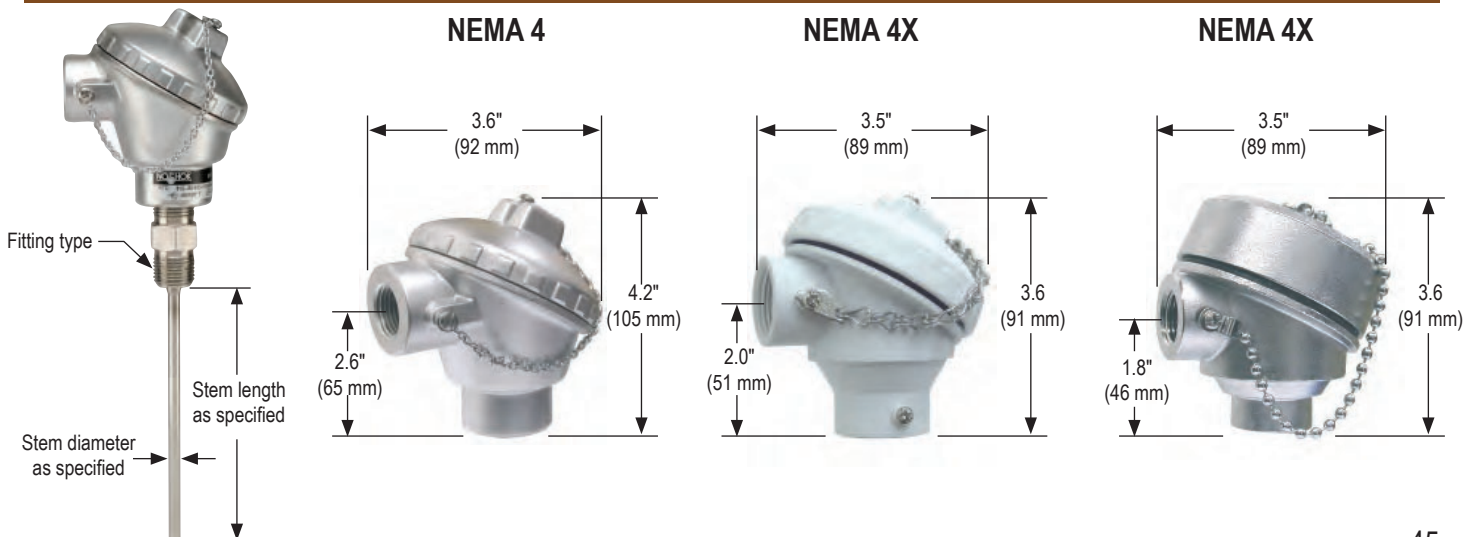
910 - -330/1100 - 1 - M 4 - 8 - 23 S1 - 120 - 3



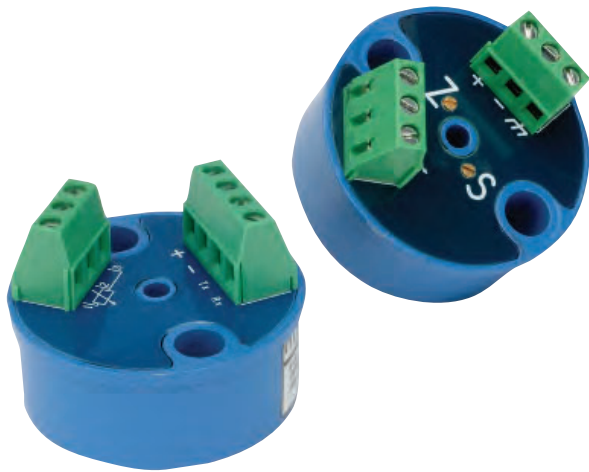
Aluminum Cast (A1/A2)

Polypropylene (P1)

Stainless Steel Cast (S1/S2)



RTD Transmitter



920 SERIES

RTD TRANSMITTERS

- High accuracy ($\pm 0.1\%$)
- 2-wire loop-powered 4 mA to 20 mA output
- Linearized output to temperature
- Input RTD PT100 with 3-wire compensation
- Analog design, potentiometer adjustable
- Factory calibrated for fixed range
- Metal housing
- Fits standard heads
- Optional model is fully field re-programmable with module and PC-based software

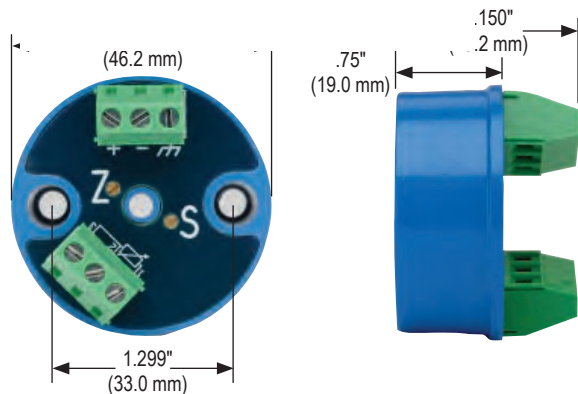
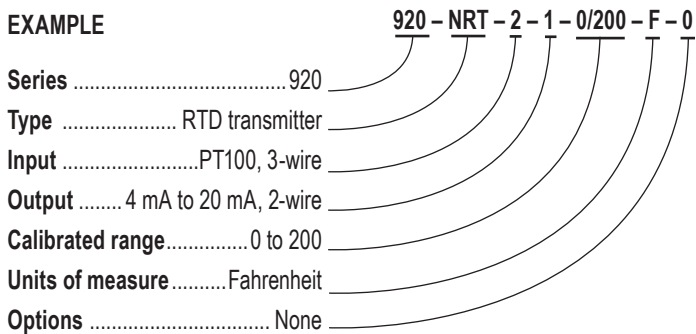
| ORDERING INFORMATION | |
|-------------------------------------|---|
| SERIES | 920 |
| TYPE | NRT Head-mounted |
| INPUT | 2 PT-100, 3-wire |
| OUTPUTS | 1 4 mA to 20 mA, 2-wire 2 0 Vdc to 5 Vdc, 3-wire 5 0 Vdc to 10 Vdc, 3-wire |
| CALIBRATED TEMPERATURE RANGE | Please specify low/high |
| UNITS OF MEASURE | C Celsius F Fahrenheit |
| OPTIONS | 0 None PC* Computer Programmable |

Special configurations available on request, please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

*Requires program module and software, 4 mA to 20 mA only

@Vnom = 24 Vdc, T.ambient = 25 °C, Span nom. = 100 °C

EXAMPLE



SPECIFICATIONS

| | |
|-----------------------------------|--|
| Housing material | Die-cast zinc, enamel painted |
| Housing dimensions | 1.82" dia. x 1.15" H |
| Input | PT100, 3-wire, $\alpha=0.00385$, DIN EN 60751 |
| Output | 4 mA to 20 mA loop powered or voltage, linear to temperature |
| Power requirement | 12-32 Vdc, polarity protected |
| Supply effect | 0.02%/V, 0.001%/V with computer programmable version |
| Zero drift | $\pm 0.01\%$ FS/ °C |
| Span drift | $\pm 0.01\%$ FS/ °C |
| Long term drift | $\leq 0.5\%$ FS/year |
| Excitation current RTD | 0.8 mA |
| Sensor lead resistance RTD | 500 Ω max. |
| Accuracy¹ | 0.1% FS (includes effects of linearity, hysteresis and repeatability) |
| Span/zero adjustment | 20 turn potentiometer, $\pm 10\%$ for zero and span |
| Maximum loop resistance | $R_{max} = [(V_{supply} - 9 Vdc) / 20 mA]$ |
| Open circuit detection | Overscale limit (27.0 mA) or underscale limit (2.2 mA) |
| Warm up | 30 seconds |
| Temperature ranges | Ambient -40 °F to 176 °F (-40 °C to 80 °C) Storage -40 °F to 176 °F (-40 °C to 80 °C) |

¹ Max. error on complete span. Error at calibration point ≤ 0.1 °C.

RTD Accessories

RTD CONNECTION HEADS

- Screw cover
- Meet NEMA requirements for indoor or outdoor use providing protection against dust, rain, splashing and hose-directed water
- Easy access, one-turn caps
- Accept standard and DIN terminal blocks and transmitters
- Provide greater volume for ease of field wiring

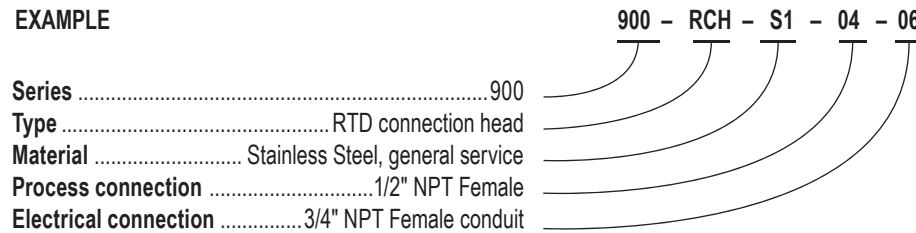


| ORDERING INFORMATION | | | |
|-------------------------------|--------------------------------------|--|--|
| SERIES | 900 | | |
| TYPE | RCH RTD connection head | | |
| MATERIALS | A1 Aluminum, general service | P1 PP (white), general service | S2 Stainless Steel, explosion proof * |
| | A2 Aluminum, explosion proof* | S1 Stainless Steel, general service | |
| INSTRUMENT CONNECTION | 04 1/2" NPT Female | | |
| ELECTRICAL CONNECTIONS | 04 1/2" NPT Female conduit | 06 3/4" NPT Female conduit | |

Special configurations available on request, please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

* Explosion proof Class I, Division I, Groups B, C and D; Class II, Division I, Groups E, F and H

EXAMPLE



WARNING: This product can expose you to chemicals including Chromium (VI) and Nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

RTD TERMINAL BLOCKS

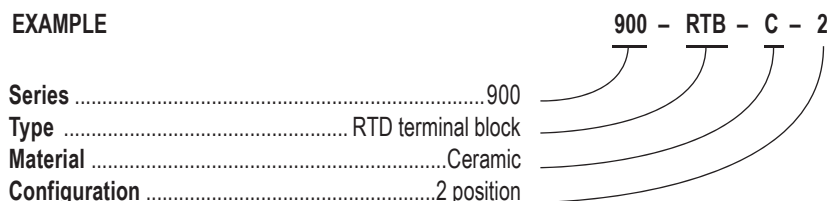
- Provided with a steatite ceramic base, Brass terminal pieces, and Stainless Steel screws
- Not rated for high voltage use
- Can be used in temperature sensor or low voltage Class 2 circuits



| ORDERING INFORMATION | | | |
|-----------------------|------------------------|---------------------|---------------------|
| SERIES | 900 | | |
| TYPE | RTB RTD terminal block | | |
| MATERIALS | B Bakelite | C Ceramic | |
| | 2 2 position | 4 4 position | 6 6 position |
| CONFIGURATIONS | 3 3 position | | |

Special configurations available on request, please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

EXAMPLE



WARNING: This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov



WARNING: This product can expose you to chemicals including Chromium (VI) and Nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

50/75/100 SERIES



- Allows a temperature instrument to be removed and replaced without shutting down and draining the process
- Reduces the possibility of damage to the temperature instrument
- Provides protection to the operator
- 1/2" NPSM instrument connection, 3/4" NPT process connection standard - 1/2" NPT, 1" NPT, flanged and sanitary options available
- 150 Class and 300 Class raised face flanged thermowells available
- The Female thread will accept the 1/2" NPT Male thread without galling or seizing
- Brass, 304 Stainless Steel, or 316 Stainless Steel standard material options - other options available
- Standard style is stepped; available in straight and tapered
- Different lagging lengths are available

APPLICATIONS

- Recommended wherever the process being measured is under pressure, corrosive, abrasive, or moving at a high velocity
- HVAC
- Petrochemical
- Oil and gas
- Process (flanged thermowells)

SPECIFICATIONS

| | |
|-------------------------------|--|
| Bore size | 0.260" (6.35 mm) |
| Process connection | 1/2" NPT, 3/4" NPT, 1" NPT |
| Instrument connection | 1/2" NPSM |
| Materials | 316 Stainless Steel, 304 Stainless Steel, Brass |
| Pressure rating | 316 and 316 Stainless Steel: 7,000 psi @ 70 °F Brass: 5,000 psi @ 70 °F |
| Style | ≤4": Straight shank >4": Stepped shank |
| Maximum shank diameter | 0.750" (19.05 mm) |



WARNING: This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov



WARNING: This product can expose you to chemicals including Chromium (VI) and Nickel, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

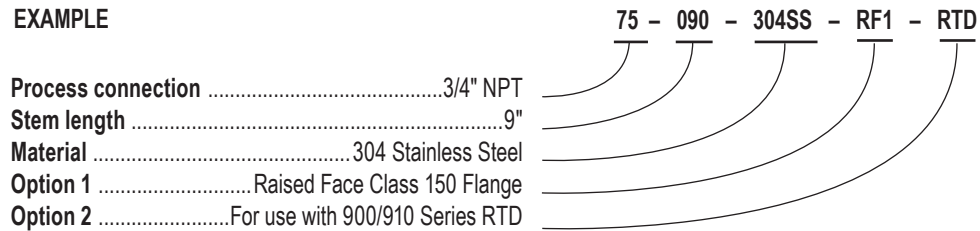
| ORDERING INFORMATION | | | | | | |
|----------------------------|--------------------------------------|-----------------------------------|--------------------------------------|--------------|--|--|
| PROCESS CONNECTIONS | 50 1/2" NPT only | 100 1" NPT or Flange Connection * | 200 2" Flange Connection * | | | |
| | 75 3/4" NPT only | 150 1-1/2" Flange Connection * | | | | |
| STEM LENGTHS | 025 2-1/2" ** | 120 12" | 25mm 25 mm | 250mm 250 mm | | |
| | 040 4" ** | 150 15" | 50mm 50 mm | 350mm 350 mm | | |
| | 060 6" | 180 18" | 100mm 100 mm | | | |
| | 090 9" | 240 24" | 150mm 150 mm | | | |
| MATERIALS | Brass Brass | 304SS 304 Stainless Steel | 316SS 316 Stainless Steel | | | |
| | Other materials available on request | | | | | |
| OPTIONS | 1/4 1/4" NPT Instrument Connection | PC Plug and Chain | RF2 Raised Face 300 Class Flange | | | |
| | 3/8B 3/8" Diameter Bore | RF1 Raised Face 150 Class Flange | RTD For use with 900/910 Series RTDs | | | |

Please consult your local NOSHOK Distributor or NOSHOK, Inc. for availability and delivery information.

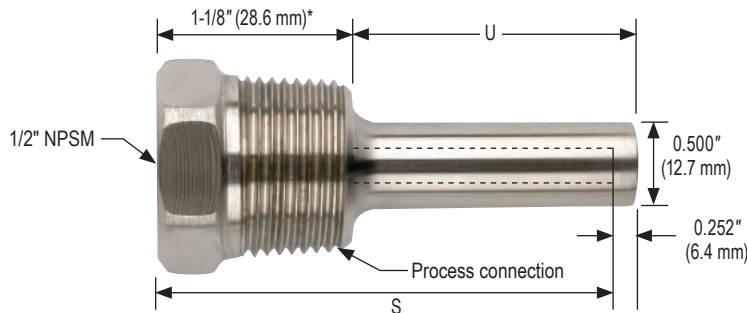
* To order a Flange Connection, you must specify Option RF1 or RF2. Flange Connections available only in Stainless Steel.

** Flange Connection not available.

EXAMPLE

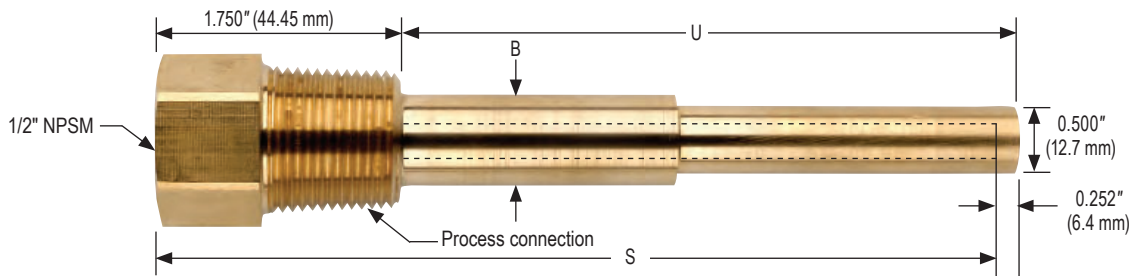


Straight Shank



*1-3/4" (44.5 mm) for 040 Ordering Code

Stepped Shank

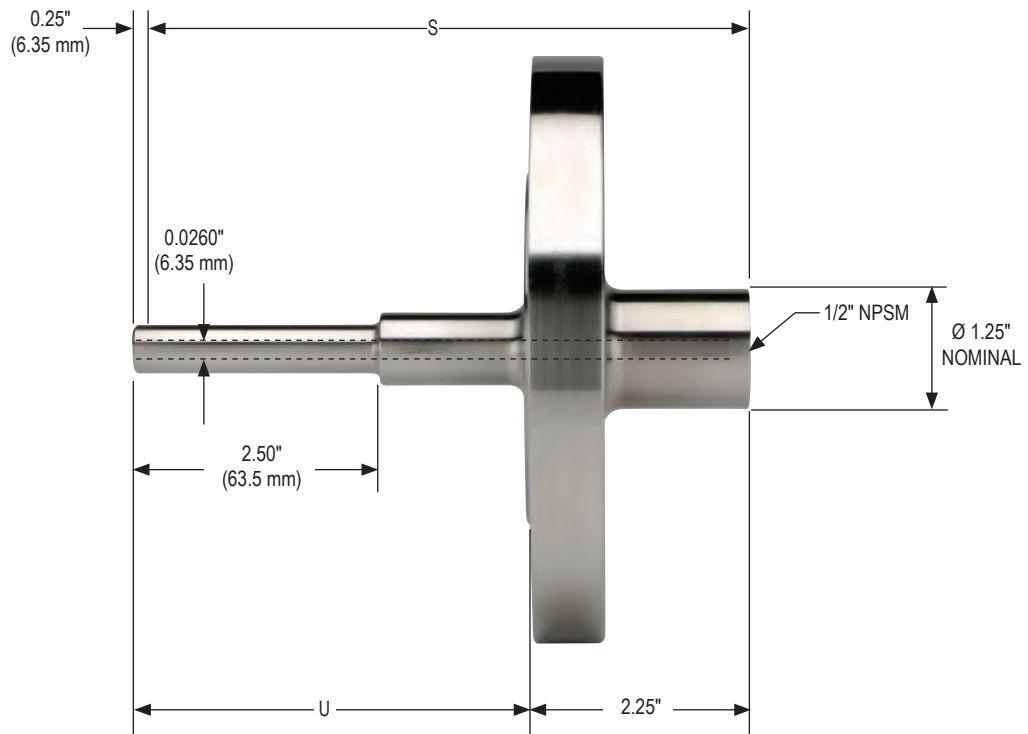


| Bore Size | "B" Maximum Insertion Diameter |
|------------------|--------------------------------|
| 0.260" (6.35 mm) | 3/4" (19.05 mm) |

| | | Straight | | | | Stepped | | | | |
|----------------|------|----------|-------|-------|-------|---------|--------|--------|--------|--|
| Insertion "U" | mm | 41.3 | 63.5 | 114.3 | 190.5 | 266.7 | 342.9 | 419.1 | 571.5 | |
| | inch | 1-5/8 | 2-1/2 | 4-1/2 | 7-1/2 | 10-1/2 | 13-1/2 | 16-1/2 | 22-1/2 | |
| Bore Depth "S" | mm | 63.5 | 101.6 | 152.4 | 228.6 | 304.8 | 381.0 | 457.2 | 609.6 | |
| | inch | 2-1/2 | 4 | 6 | 9 | 12 | 15 | 18 | 24 | |
| Ordering Code | | 025 | 040 | 060 | 090 | 120 | 150 | 180 | 240 | |

Flange Connection Thermowell dimensions on next page.

RF1 150 Class & RF2 300 Class Raised Face Flanges



| RF1 Class 150 Flange / RF2 Class 300 Flange | | | | | | | |
|---|------|-------|-------|-------|-------|-------|-------|
| Insertion "U" | mm | 101.6 | 177.8 | 254.0 | 330.2 | 406.4 | 558.8 |
| | inch | 4 | 7 | 10 | 13 | 16 | 22 |
| Bore Depth "S" | mm | 152.4 | 228.6 | 304.8 | 381.0 | 457.2 | 609.6 |
| | inch | 6 | 9 | 12 | 15 | 18 | 24 |
| Ordering Code | | 060 | 090 | 120 | 150 | 180 | 240 |

Note: NOSHOK Thermowells are provided with NPSM internal thread connections. This female connection may be used with NPT or NPSM mating threads. The NPSM thread provides a better mechanical connection without seizing or galling.

Standard Temperature Ranges / Figure Intervals

| °F Ranges | Figure Interval | Div. | °C Ranges | Figure Interval | Div. |
|------------------|-----------------|------|----------------|-----------------|------|
| -100° to 150 °F | 20° | 2° | -70° to 70 °C | 10° | 1° |
| -80° to 120 °F | 20° | 2° | -60° to 50 °C | 10° | 1° |
| -40° to 120 °F | 20° | 2° | -40° to 50 °C | 10° | 1° |
| -20° to 120 °F | 20° | 2° | -30° to 50 °C | 10° | 1° |
| -40° to 160 °F | 20° | 2° | -40° to 70 °C | 10° | 1° |
| 0° to 100 °F | 10° | 1° | -20° to 40 °C | 5° | 1/2° |
| 25° to 125 °F | 10° | 1° | -5° to 50 °C | 5° | 1/2° |
| 30° to 130 °F | 10° | 1° | 0° to 55 °C | 5° | 1/2° |
| 0° to 140 °F | 10° | 1° | -20° to 60 °C | 5° | 1/2° |
| 0° to 200 °F | 20° | 2° | -15° to 90 °C | 10° | 1° |
| 0° to 250 °F | 20° | 2° | -20° to 120 °C | 10° | 1° |
| 20° to 240 °F | 20° | 2° | -5° to 115 °C | 10° | 1° |
| 50° to 300 °F | 20° | 2° | 10° to 150 °C | 10° | 1° |
| 50° to 400 °F | 50° | 5° | 10° to 200 °C | 20° | 2° |
| 50° to 500 °F | 50° | 5° | 10° to 260 °C | 20° | 2° |
| 50° to 550 °F | 50° | 5° | 10° to 290 °C | 20° | 2° |
| 0° to 600 °F | 100° | 10° | -20° to 315 °C | 50° | 5° |
| 150° to 750 °F | 100° | 10° | 65° to 400 °C | 50° | 5° |
| 100° to 800 °F | 100° | 10° | 40° to 425 °C | 50° | 5° |
| 200° to 1,000 °F | 100° | 10° | 100° to 540 °C | 50° | 5° |

Thermowells: Pressure Rating vs. Temperature

| Thermowell Material | Temperature in Degrees Fahrenheit | | | | | | |
|--|-----------------------------------|--------|--------|--------|--------|----------|----------|
| | 70 °F | 200 °F | 400 °F | 600 °F | 800 °F | 1,000 °F | 1,200 °F |
| Pressure Rating (Pounds Per Square Inch) | | | | | | | |
| Brass | 5,000 | 4,200 | 1,000 | - | - | - | - |
| Welded Stainless Steel | 982 | 820 | 675 | 604 | 550 | 510 | 299 |
| 304 Stainless Steel | 7,000 | 6,200 | 5,600 | 5,400 | 5,200 | 4,500 | 1,650 |
| 316 Stainless Steel | 7,000 | 7,000 | 6,400 | 6,200 | 6,100 | 5,100 | 2,500 |

Thermowells: Maximum Fluid Velocity vs. Insertion Length

| Thermowell Material | Fluid Type | Insertion Length (Inches) | | |
|--|------------|---------------------------|------|------|
| | | 2" | 4" | 8" |
| Maximum Fluid Velocity (Feet per Second) | | | | |
| Brass | Air/Steam | 207 | 75.5 | 27.3 |
| | Water | 59.3 | 32.2 | 19.7 |
| Welded Stainless Steel | Air/Steam | 169 | 61 | 20 |
| | Water | 88 | 20 | 10 |
| 304 Stainless Steel | Air/Steam | 300 | 109 | 39.5 |
| 316 Stainless Steel | Water | 148 | 82.2 | - |

Note: The values shown in this table are based on operating temperatures of 350 °F for Brass and 1,000 °F for Stainless Steel. Slightly higher velocities are possible at lower temperatures.

RTD Temperature vs. Resistance Table (Alpha +0.00385)

| °C | °F | Ohms | °C | °F | Ohms | °C | °F | Ohms | °C | °F | Ohms | °C | °F | Ohms |
|-----|--------|--------|-----|-------|--------|----|-------|--------|-----|-------|--------|-----|-------|--------|
| -75 | -103 | 101.95 | -27 | -16.6 | 89.4 | 21 | 69.8 | 108.18 | 69 | 156.2 | 126.7 | 117 | 242.6 | 144.94 |
| -74 | -101.2 | 70.73 | -26 | -14.8 | 89.8 | 22 | 71.6 | 108.57 | 70 | 158 | 127.08 | 118 | 244.4 | 145.32 |
| -73 | -99.4 | 71.13 | -25 | -13 | 90.19 | 23 | 73.4 | 108.96 | 71 | 159.8 | 127.46 | 119 | 246.2 | 145.69 |
| -72 | -97.6 | 71.53 | -24 | -11.2 | 90.59 | 24 | 75.2 | 109.35 | 72 | 161.6 | 127.85 | 120 | 248 | 146.07 |
| -71 | -95.8 | 71.93 | -23 | -9.4 | 90.98 | 25 | 77 | 109.73 | 73 | 163.4 | 128.23 | 121 | 249.8 | 146.45 |
| -70 | -94 | 72.33 | -22 | -7.6 | 91.37 | 26 | 78.8 | 110.12 | 74 | 165.2 | 128.61 | 122 | 251.6 | 146.82 |
| -69 | -92.2 | 72.73 | -21 | -5.8 | 91.77 | 27 | 80.6 | 110.51 | 75 | 167 | 128.99 | 123 | 253.4 | 147.2 |
| -68 | -90.4 | 73.13 | -20 | -4 | 92.16 | 28 | 82.4 | 110.9 | 76 | 168.8 | 129.38 | 124 | 255.2 | 147.58 |
| -67 | -88.6 | 73.53 | -19 | -2.2 | 92.55 | 29 | 84.2 | 111.28 | 77 | 170.6 | 129.76 | 125 | 257 | 147.95 |
| -66 | -86.8 | 73.93 | -18 | -0.4 | 92.95 | 30 | 86 | 111.67 | 78 | 172.4 | 130.14 | 126 | 258.8 | 148.33 |
| -65 | -85 | 74.33 | -17 | 1.4 | 93.34 | 31 | 87.8 | 112.06 | 79 | 174.2 | 130.52 | 127 | 260.6 | 148.71 |
| -64 | -83.2 | 74.73 | -16 | 3.2 | 93.73 | 32 | 89.6 | 112.45 | 80 | 176 | 130.9 | 128 | 262.4 | 149.08 |
| -63 | -81.4 | 75.13 | -15 | 5 | 94.12 | 33 | 91.4 | 112.83 | 81 | 177.8 | 131.28 | 129 | 264.2 | 149.46 |
| -62 | -79.6 | 75.53 | -14 | 6.8 | 94.52 | 34 | 93.2 | 113.22 | 82 | 179.6 | 131.67 | 130 | 266 | 149.83 |
| -61 | -77.8 | 75.93 | -13 | 8.6 | 94.91 | 35 | 95 | 113.61 | 83 | 181.4 | 132.05 | 131 | 267.8 | 150.21 |
| -60 | -76 | 76.33 | -12 | 10.4 | 95.3 | 36 | 96.8 | 113.99 | 84 | 183.2 | 132.43 | 132 | 269.6 | 150.58 |
| -59 | -74.2 | 76.73 | -11 | 12.2 | 95.69 | 37 | 98.6 | 114.38 | 85 | 185 | 132.81 | 133 | 271.4 | 150.96 |
| -58 | -72.4 | 77.13 | -10 | 14 | 96.09 | 38 | 100.4 | 114.77 | 86 | 186.8 | 133.19 | 134 | 273.2 | 151.34 |
| -57 | -70.6 | 77.52 | -9 | 15.8 | 96.48 | 39 | 102.2 | 115.15 | 87 | 188.6 | 133.57 | 135 | 275 | 151.71 |
| -56 | -68.8 | 77.92 | -8 | 17.6 | 96.87 | 40 | 104 | 115.54 | 88 | 190.4 | 133.95 | 136 | 276.8 | 152.09 |
| -55 | -67 | 78.32 | -7 | 19.4 | 97.26 | 41 | 105.8 | 115.93 | 89 | 192.2 | 134.33 | 137 | 278.6 | 152.46 |
| -54 | -65.2 | 78.72 | -6 | 21.2 | 97.65 | 42 | 107.6 | 116.31 | 90 | 194 | 134.71 | 138 | 280.4 | 152.84 |
| -53 | -63.4 | 79.11 | -5 | 23 | 98.04 | 43 | 109.4 | 116.7 | 91 | 195.8 | 135.09 | 139 | 282.2 | 153.21 |
| -52 | -61.6 | 79.51 | -4 | 24.8 | 98.44 | 44 | 111.2 | 117.08 | 92 | 197.6 | 135.47 | 140 | 284 | 153.58 |
| -51 | -59.8 | 79.91 | -3 | 26.6 | 98.83 | 45 | 113 | 117.47 | 93 | 199.4 | 135.85 | 141 | 285.8 | 153.95 |
| -50 | -58 | 80.31 | -2 | 28.4 | 99.22 | 46 | 114.8 | 117.85 | 94 | 201.2 | 136.23 | 142 | 287.6 | 154.32 |
| -49 | -56.2 | 80.7 | -1 | 30.2 | 99.61 | 47 | 116.6 | 118.24 | 95 | 203 | 136.61 | 143 | 289.4 | 154.71 |
| -48 | -54.4 | 81.1 | 0 | 32 | 100 | 48 | 118.4 | 118.62 | 96 | 204.8 | 136.99 | 144 | 291.2 | 155.08 |
| -47 | -52.6 | 81.5 | 1 | 33.8 | 100.39 | 49 | 120.2 | 119.01 | 97 | 206.6 | 137.37 | 145 | 293 | 155.46 |
| -46 | -50.8 | 81.89 | 2 | 35.6 | 100.78 | 50 | 122 | 119.4 | 98 | 208.4 | 137.75 | 146 | 294.8 | 155.83 |
| -45 | -49 | 82.29 | 3 | 37.4 | 101.17 | 51 | 123.8 | 119.78 | 99 | 210.2 | 138.13 | 147 | 296.6 | 156.21 |
| -44 | -47.2 | 82.69 | 4 | 39.2 | 101.56 | 52 | 125.6 | 120.16 | 100 | 212 | 138.51 | 148 | 298.4 | 156.58 |
| -43 | -45.4 | 83.08 | 5 | 41 | 101.95 | 53 | 127.4 | 120.55 | 101 | 213.8 | 138.89 | 149 | 300.2 | 156.96 |
| -42 | -43.6 | 83.48 | 6 | 42.8 | 102.34 | 54 | 129.2 | 120.93 | 102 | 215.6 | 139.27 | 150 | 302 | 157.33 |
| -41 | -41.8 | 83.88 | 7 | 44.6 | 102.73 | 55 | 131 | 121.32 | 103 | 217.4 | 139.65 | 151 | 303.8 | 157.71 |
| -40 | -40 | 84.27 | 8 | 46.4 | 103.12 | 56 | 132.8 | 121.7 | 104 | 219.2 | 140.03 | 152 | 305.6 | 158.08 |
| -39 | -38.2 | 84.67 | 9 | 48.2 | 103.51 | 57 | 134.6 | 122.09 | 105 | 221 | 140.39 | 153 | 307.4 | 158.45 |
| -38 | -36.4 | 85.06 | 10 | 50 | 103.9 | 58 | 136.4 | 122.47 | 106 | 222.8 | 140.77 | 154 | 309.2 | 158.83 |
| -37 | -34.6 | 85.46 | 11 | 51.8 | 104.29 | 59 | 138.2 | 122.86 | 107 | 224.6 | 141.15 | 155 | 311 | 159.2 |
| -36 | -32.8 | 85.85 | 12 | 53.6 | 104.68 | 60 | 140 | 123.24 | 108 | 226.4 | 141.53 | 156 | 312.8 | 159.56 |
| -35 | -31 | 86.25 | 13 | 55.4 | 105.07 | 61 | 141.8 | 123.62 | 109 | 228.2 | 141.91 | 157 | 314.6 | 159.94 |
| -34 | -29.2 | 86.64 | 14 | 57.2 | 105.46 | 62 | 143.6 | 124.01 | 110 | 230 | 142.29 | 158 | 316.4 | 160.31 |
| -33 | -27.4 | 87.04 | 15 | 59 | 105.85 | 63 | 145.4 | 124.39 | 111 | 231.8 | 142.66 | 159 | 318.2 | 160.68 |
| -32 | -25.6 | 87.43 | 16 | 60.8 | 106.24 | 64 | 147.2 | 124.77 | 112 | 233.6 | 143.04 | 160 | 320 | 161.05 |
| -31 | -23.8 | 87.83 | 17 | 62.6 | 106.63 | 65 | 149 | 125.17 | 113 | 235.4 | 143.42 | 161 | 321.8 | 161.43 |
| -30 | -22 | 88.22 | 18 | 64.4 | 107.02 | 66 | 150.8 | 125.55 | 114 | 237.2 | 143.8 | 162 | 323.6 | 161.8 |
| -29 | -20.2 | 88.62 | 19 | 66.2 | 107.4 | 67 | 152.6 | 125.93 | 115 | 239 | 144.18 | 163 | 325.4 | 162.17 |
| -28 | -18.4 | 89.01 | 20 | 68 | 107.79 | 68 | 154.4 | 126.32 | 116 | 240.8 | 144.56 | 164 | 327.2 | 162.54 |

RTD Temperature vs. Resistance Table (Alpha +0.00385)

| °C | °F | Ohms | °C | °F | Ohms | °C | °F | Ohms | °C | °F | Ohms | °C | °F | Ohms |
|-----|-------|--------|-----|-------|--------|-----|-------|--------|-----|-------|--------|-----|-------|--------|
| 165 | 329 | 162.91 | 213 | 415.4 | 180.63 | 261 | 501.8 | 198.07 | 309 | 588.2 | 215.26 | 357 | 674.6 | 232.16 |
| 166 | 330.8 | 163.28 | 214 | 417.2 | 180.99 | 262 | 503.6 | 198.43 | 310 | 590 | 215.61 | 358 | 676.4 | 232.51 |
| 167 | 332.6 | 163.66 | 215 | 419 | 181.36 | 263 | 505.4 | 198.79 | 311 | 591.8 | 215.97 | 359 | 678.2 | 232.86 |
| 168 | 334.4 | 164.03 | 216 | 420.8 | 181.73 | 264 | 507.2 | 199.15 | 312 | 593.6 | 216.32 | 360 | 680 | 233.21 |
| 169 | 336.2 | 164.4 | 217 | 422.6 | 182.09 | 265 | 509 | 199.51 | 313 | 595.4 | 216.68 | 361 | 681.8 | 233.56 |
| 170 | 338 | 164.77 | 218 | 424.4 | 182.46 | 266 | 510.8 | 199.87 | 314 | 597.2 | 217.03 | 362 | 683.6 | 233.91 |
| 171 | 339.8 | 165.14 | 219 | 426.2 | 182.82 | 267 | 512.6 | 200.23 | 315 | 599 | 217.39 | 363 | 685.4 | 234.26 |
| 172 | 341.6 | 165.51 | 220 | 428 | 183.19 | 268 | 514.4 | 200.59 | 316 | 600.8 | 217.73 | 364 | 687.2 | 234.6 |
| 173 | 343.4 | 165.88 | 221 | 429.8 | 183.55 | 269 | 516.2 | 200.95 | 317 | 602.6 | 218.08 | 365 | 689 | 234.95 |
| 174 | 345.2 | 166.25 | 222 | 431.6 | 183.92 | 270 | 518 | 201.31 | 318 | 604.4 | 218.44 | 366 | 690.8 | 235.3 |
| 175 | 347 | 166.62 | 223 | 433.4 | 184.28 | 271 | 519.8 | 201.67 | 319 | 606.2 | 218.79 | 367 | 692.6 | 235.65 |
| 176 | 348.8 | 167 | 224 | 435.2 | 184.65 | 272 | 521.6 | 202.03 | 320 | 608 | 219.15 | 368 | 694.4 | 236 |
| 177 | 350.6 | 167.37 | 225 | 437 | 185.01 | 273 | 523.4 | 202.38 | 321 | 609.8 | 219.5 | 369 | 696.2 | 236.35 |
| 178 | 352.4 | 167.74 | 226 | 438.8 | 185.38 | 274 | 525.2 | 202.74 | 322 | 611.6 | 219.85 | 370 | 698 | 236.7 |
| 179 | 354.2 | 168.11 | 227 | 440.6 | 185.74 | 275 | 527 | 203.1 | 323 | 613.4 | 220.21 | 371 | 699.8 | 237.05 |
| 180 | 356 | 168.48 | 228 | 442.4 | 186.11 | 276 | 528.8 | 203.46 | 324 | 615.2 | 220.56 | 372 | 701.6 | 237.4 |
| 181 | 357.8 | 168.85 | 229 | 444.2 | 186.47 | 277 | 530.6 | 203.82 | 325 | 617 | 220.91 | 373 | 703.4 | 237.75 |
| 182 | 359.6 | 169.22 | 230 | 446 | 186.84 | 278 | 532.4 | 204.18 | 326 | 618.8 | 221.27 | 374 | 705.2 | 238.09 |
| 183 | 361.4 | 169.59 | 231 | 447.8 | 187.2 | 279 | 534.2 | 204.54 | 327 | 620.6 | 221.62 | 375 | 707 | 238.44 |
| 184 | 363.2 | 169.96 | 232 | 449.6 | 187.56 | 280 | 536 | 204.9 | 328 | 622.4 | 221.97 | 376 | 708.8 | 238.79 |
| 185 | 365 | 170.33 | 233 | 451.4 | 187.93 | 281 | 537.8 | 205.25 | 329 | 624.2 | 222.32 | 377 | 710.6 | 239.14 |
| 186 | 366.8 | 170.69 | 234 | 453.2 | 188.29 | 282 | 539.6 | 205.61 | 330 | 626 | 222.68 | 378 | 712.4 | 239.48 |
| 187 | 368.6 | 171.06 | 235 | 455 | 188.65 | 283 | 541.4 | 205.97 | 331 | 627.8 | 223.03 | 379 | 714.2 | 239.83 |
| 188 | 370.4 | 171.43 | 236 | 456.8 | 189.02 | 284 | 543.2 | 206.33 | 332 | 629.6 | 223.38 | 380 | 716 | 240.18 |
| 189 | 372.2 | 171.8 | 237 | 458.6 | 189.38 | 285 | 545 | 206.7 | 333 | 631.4 | 223.73 | 381 | 717.8 | 240.52 |
| 190 | 374 | 172.17 | 238 | 460.4 | 189.74 | 286 | 546.8 | 207.05 | 334 | 633.2 | 224.09 | 382 | 719.6 | 240.87 |
| 191 | 375.8 | 172.54 | 239 | 462.2 | 190.11 | 287 | 548.6 | 207.41 | 335 | 635 | 224.45 | 383 | 721.4 | 241.22 |
| 192 | 377.6 | 172.91 | 240 | 464 | 190.47 | 288 | 550.4 | 207.77 | 336 | 636.8 | 224.8 | 384 | 723.2 | 241.56 |
| 193 | 379.4 | 173.27 | 241 | 465.8 | 190.83 | 289 | 552.2 | 208.13 | 337 | 638.6 | 225.15 | 385 | 725 | 241.91 |
| 194 | 381.2 | 173.64 | 242 | 467.6 | 191.2 | 290 | 554 | 208.48 | 338 | 640.4 | 225.5 | 386 | 726.8 | 242.25 |
| 195 | 383 | 174.01 | 243 | 469.4 | 191.56 | 291 | 555.8 | 208.84 | 339 | 642.2 | 225.85 | 387 | 728.6 | 242.6 |
| 196 | 384.8 | 174.39 | 244 | 471.2 | 191.92 | 292 | 557.6 | 209.2 | 340 | 644 | 226.21 | 388 | 730.4 | 242.95 |
| 197 | 386.6 | 174.75 | 245 | 473 | 192.28 | 293 | 559.4 | 209.55 | 341 | 645.8 | 226.56 | 389 | 732.2 | 243.29 |
| 198 | 388.4 | 175.12 | 246 | 474.8 | 192.66 | 294 | 561.2 | 209.91 | 342 | 647.6 | 226.91 | 390 | 734 | 243.64 |
| 199 | 390.2 | 175.49 | 247 | 476.6 | 193.02 | 295 | 563 | 210.27 | 343 | 649.4 | 227.26 | 391 | 735.8 | 243.98 |
| 200 | 392 | 175.86 | 248 | 478.4 | 193.38 | 296 | 564.8 | 210.62 | 344 | 651.2 | 227.61 | 392 | 737.6 | 244.33 |
| 201 | 393.8 | 176.23 | 249 | 480.2 | 193.74 | 297 | 566.6 | 210.98 | 345 | 653 | 227.96 | 393 | 739.4 | 244.67 |
| 202 | 395.6 | 176.59 | 250 | 482 | 194.1 | 298 | 568.4 | 211.34 | 346 | 654.8 | 228.31 | 394 | 741.2 | 245.02 |
| 203 | 397.4 | 176.96 | 251 | 483.8 | 194.47 | 299 | 570.2 | 211.69 | 347 | 656.6 | 228.66 | 395 | 743 | 245.36 |
| 204 | 399.2 | 177.33 | 252 | 485.6 | 194.83 | 300 | 572 | 212.05 | 348 | 658.4 | 229.01 | 396 | 744.8 | 245.71 |
| 205 | 401 | 177.7 | 253 | 487.4 | 195.19 | 301 | 573.8 | 212.4 | 349 | 660.2 | 229.36 | 397 | 746.6 | 246.05 |
| 206 | 402.8 | 178.06 | 254 | 489.2 | 195.55 | 302 | 575.6 | 212.76 | 350 | 662 | 229.72 | 398 | 748.4 | 246.4 |
| 207 | 404.6 | 178.43 | 255 | 491 | 195.9 | 303 | 577.4 | 213.12 | 351 | 663.8 | 230.07 | 399 | 750.2 | 246.74 |
| 208 | 406.4 | 178.8 | 256 | 492.8 | 196.26 | 304 | 579.2 | 213.47 | 352 | 665.6 | 230.42 | 400 | 752 | 247.09 |
| 209 | 408.2 | 179.16 | 257 | 494.6 | 196.62 | 305 | 581 | 213.83 | 353 | 667.4 | 230.77 | | | |
| 210 | 410 | 179.53 | 258 | 496.4 | 196.98 | 306 | 582.8 | 214.19 | 354 | 669.2 | 231.12 | | | |
| 211 | 411.8 | 179.9 | 259 | 498.2 | 197.35 | 307 | 584.6 | 214.55 | 355 | 671 | 231.47 | | | |
| 212 | 413.6 | 180.26 | 260 | 500 | 197.71 | 308 | 586.4 | 214.9 | 356 | 672.8 | 231.81 | | | |

Temperature Conversions

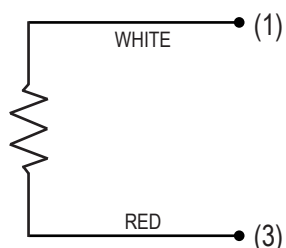
| | From Fahrenheit | To Fahrenheit |
|----------------|---|---|
| Celsius | $[^{\circ}\text{C}] = ([^{\circ}\text{F}] - 32) \times 5/9$ | $[^{\circ}\text{F}] = [^{\circ}\text{C}] \times 9/5 + 32$ |
| Kelvin | $[\text{K}] = ([^{\circ}\text{F}] + 459.67) \times 5/9$ | $[^{\circ}\text{F}] = [\text{K}] \times 9/5 - 459.67$ |
| Rankine | $[^{\circ}\text{R}] = [^{\circ}\text{F}] + 459.67$ | $[^{\circ}\text{F}] = [^{\circ}\text{R}] - 459.67$ |
| Delisle | $[^{\circ}\text{De}] = (212 - [^{\circ}\text{F}]) \times 5/6$ | $[^{\circ}\text{F}] = 212 - [^{\circ}\text{De}] \times 6/5$ |
| Newton | $[^{\circ}\text{N}] = ([^{\circ}\text{F}] - 32) \times 11/60$ | $[^{\circ}\text{F}] = [^{\circ}\text{N}] \times 60/11 + 32$ |
| Réaumur | $[^{\circ}\text{Ré}] = ([^{\circ}\text{F}] - 32) \times 4/9$ | $[^{\circ}\text{F}] = [^{\circ}\text{Ré}] \times 9/4 + 32$ |
| Rømer | $[^{\circ}\text{Rø}] = ([^{\circ}\text{F}] - 32) \times 7/24 + 7.5$ | $[^{\circ}\text{F}] = ([^{\circ}\text{Rø}] - 7.5) \times 24/7 + 32$ |

| | From Celsius (Centigrade) | To Celsius (Centigrade) |
|-------------------|---|---|
| Fahrenheit | $[^{\circ}\text{F}] = [^{\circ}\text{C}] \times 9/5 + 32$ | $[^{\circ}\text{C}] = ([^{\circ}\text{F}] - 32) \times 5/9$ |
| Kelvin | $[\text{K}] = [^{\circ}\text{C}] + 273.15$ | $[^{\circ}\text{C}] = [\text{K}] - 273.15$ |
| Rankine | $[^{\circ}\text{R}] = ([^{\circ}\text{C}] + 273.15) \times 9/5$ | $[^{\circ}\text{C}] = ([^{\circ}\text{R}] - 491.67) \times 5/9$ |
| Delisle | $[^{\circ}\text{De}] = (100 - [^{\circ}\text{C}]) \times 3/2$ | $[^{\circ}\text{C}] = 100 - [^{\circ}\text{De}] \times 2/3$ |
| Newton | $[^{\circ}\text{N}] = [^{\circ}\text{C}] \times 33/100$ | $[^{\circ}\text{C}] = [^{\circ}\text{N}] \times 100/33$ |
| Réaumur | $[^{\circ}\text{Ré}] = [^{\circ}\text{C}] \times 4/5$ | $[^{\circ}\text{C}] = [^{\circ}\text{Ré}] \times 5/4$ |
| Rømer | $[^{\circ}\text{Rø}] = [^{\circ}\text{C}] \times 21/40 + 7.5$ | $[^{\circ}\text{C}] = ([^{\circ}\text{Rø}] - 7.5) \times 40/21$ |

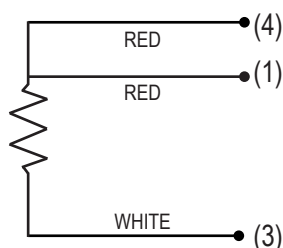
| | From Kelvin | To Kelvin |
|-------------------|--|--|
| Celsius | $[^{\circ}\text{C}] = [\text{K}] - 273.15$ | $[\text{K}] = [^{\circ}\text{C}] + 273.15$ |
| Fahrenheit | $[^{\circ}\text{F}] = [\text{K}] \times 9/5 - 459.67$ | $[\text{K}] = ([^{\circ}\text{F}] + 459.67) \times 5/9$ |
| Rankine | $[^{\circ}\text{R}] = [\text{K}] \times 9/5$ | $[\text{K}] = [^{\circ}\text{R}] \times 5/9$ |
| Delisle | $[^{\circ}\text{De}] = (373.15 - [\text{K}]) \times 3/2$ | $[\text{K}] = 373.15 - [^{\circ}\text{De}] \times 2/3$ |
| Newton | $[^{\circ}\text{N}] = ([\text{K}] - 273.15) \times 33/100$ | $[\text{K}] = [^{\circ}\text{N}] \times 100/33 + 273.15$ |
| Réaumur | $[^{\circ}\text{Ré}] = ([\text{K}] - 273.15) \times 4/5$ | $[\text{K}] = [^{\circ}\text{Ré}] \times 5/4 + 273.15$ |
| Rømer | $[^{\circ}\text{Rø}] = ([\text{K}] - 273.15) \times 21/40 + 7.5$ | $[\text{K}] = ([^{\circ}\text{Rø}] - 7.5) \times 40/21 + 273.15$ |

Wiring Diagrams

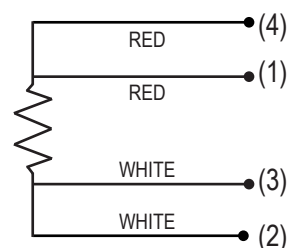
2-Wire



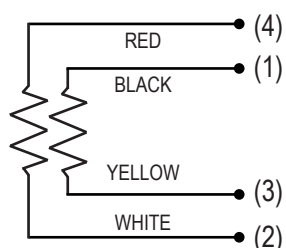
3-Wire



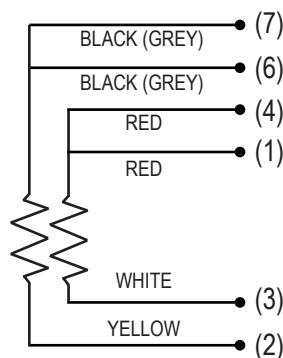
4-Wire



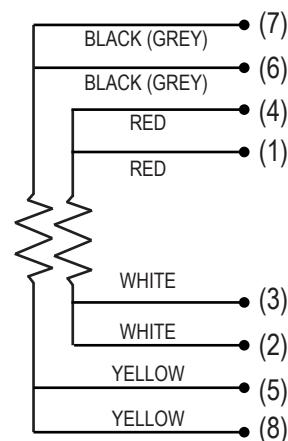
Dual 2-Wire



Dual 3-Wire



Dual 4-Wire



Thermometer Tolerance Classes per EN 60751

| Tolerance Classes | Resistance Tolerance at 0 °C | Tolerance as a Function of Absolute Value of Temperature in °C |
|-------------------|-------------------------------|--|
| Class AA | $\pm 0.04\%$ (± 0.1 °C) | $\pm[0.1 + (0.0017 * t)]$ |
| Class A | $\pm 0.06\%$ (± 0.15 °C) | $\pm[0.15 + (0.002 * t)]$ |
| Class B | $\pm 0.12\%$ (± 0.3 °C) | $\pm[0.3 + (0.005 * t)]$ |
| Class C | $\pm 0.23\%$ (± 0.6 °C) | $\pm[0.6 + (0.01 * t)]$ |

RTD Standards

| Organization | Standard | ALPHA: Average Temperature Coefficient of Resistance (0 °C) ⁻¹ | Nominal Resistance at 0 °C |
|---|---------------------------|---|----------------------------|
| British Standard | BS 1904 : 1984 | 0.003850 | 100 |
| Deutsch Industrial Norm | DIN 43760 :1980 | 0.003850 | 100 |
| International Electrotechnical Commission | IEC 751 : 1995 (Amend. 2) | 0.003850 | 100 |
| Scientific Apparatus Manufacturers of America | SAMA RC-4-1966 | 0.003923 | 98.129 |
| Japanese Standard | JIS C1604-1981 | 0.003916 | 100 |
| American Society for Testing & Materials | ASTM E1137 | 0.003850 | 100 |

NOTES

NOTES

A series of horizontal lines for writing notes, overlaid with a large, faint watermark of the letters 'MFC'.

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