

Bristol® 2808-41A

RTD Temperature Transmitter

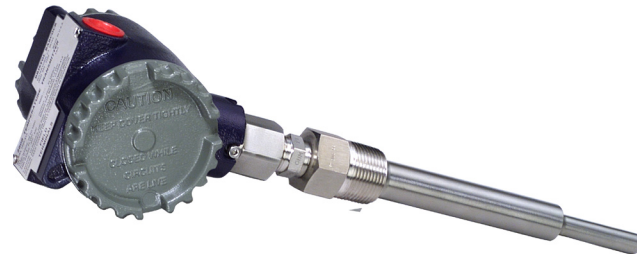
Featuring Very Low Power Consumption

The Bristol® 2808-41A, from Emerson Process Management is a high performance temperature transmitter featuring very low power consumption using a 1 –5 V signal. The user can also select standard, 4 – 20 mA operation.

Use of both coarse and fine adjustments allows this transmitter to accurately operate over any span within the –58 to +662 degree F range.

When combined with the 2808-15A pressure temperature, 2808-16 pressure temperature with flush diaphragm and 2808-35A differential pressure transmitter, the 2808-41A is ideal for remote measurement and control installations, which use solar panels or other, alternative energy sources.

The 2808 series is excellent for remote sites such as oil & gas production wells and natural gas metering stations. These transmitters are all ideal for use with Emerson's Bristol TeleFlow flow computers, *TeleRTU* and *ControlWave LP* products, all of which feature low power consumption and are available with standard, battery and solar power packages.



Functional Specifications

Sensor Type:

Resistance Temperature Detector, 100-ohm platinum bulb ($\alpha = 0.00385S/S/^{\circ}C$)

Per IEC 751 Class B

Range Limits:

-50°C to +350°C (-58°F to +662°F)

Span Adjustment:

-50°C to +300°C (-58°F to +572°F) or 0°C to +350°C (+32°F to +662°F)

Also 6:1 Turndown, e.g., 0°C to 58°C

Zero Adjustments:

-50°C to +300°C (-58°F to +572° F)

Output Signal

Range:

1-5Vdc (Load Resistance 5K-ohm to Open Circuit)

4-20 mA nominal; 2.8 mA Min. and (23mA Max. limited)

Power Source:

6 Vdc Min. at transmitter

42 Vdc Max. at transmitter

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Voltage Effect:

±0.001% of Span/Volt from 10 to 35 Vdc

Loop Resistance (4-20mA RTD):

R_L (K ohm) = $(V_s - 6) / .02$ Amps

Performance

Model Accuracy:

±0.15% of span (when factory calibrated 1:1)

±0.3% of span (when factory calibrated 6:1)

Linearity:

±0.05% of span (Referenced to actual sensor temperature)

Max. Output Current (4-20mA RTD):

23mA

Max. Supply Current (1-5 Vdc RTD):

2.0mA (with no load)

Temperature Limits:

-40 to +85 °C (-40 to +185 °F), operating.

-55 to +100 °C (-67 to +212 °F), storage.

RTD Input Lead Wire Effect:

0.005°C/ohm

Warm-up Drift:

±0.005% of span Max. (For $V_s = 24$ Vdc and $R_L = 250S$; stable within 15 Seconds)

Ambient Temperature Effect:

±0.025°C/°C

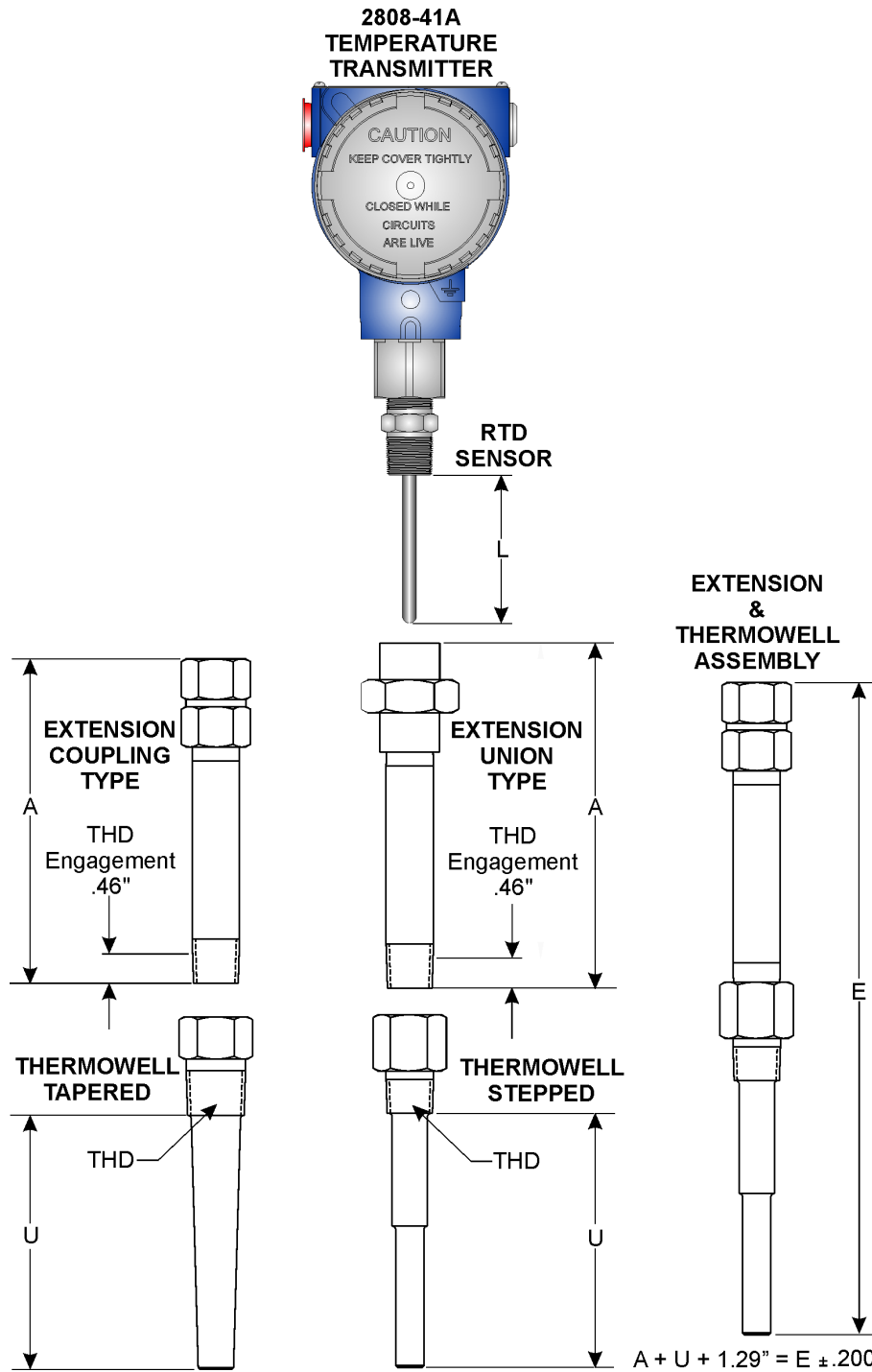
Humidity:

95% RH non-condensing @ +70°C (+158°F).

RFI Immunity:

Meets SAMA PMC 33.1-1978 over 20-500 MHz range.

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Model Number: 2808-41 A - A B C - D E F

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| SELECT | DESCRIPTION | | CODE |
|---------------|--|--|-------------|
| A | RTD MODULE XRTDMODULE | | A |
| 10 | 100 OHM PT (PER IEC 751 Class B) | | 1 |
| B | INDICATION XINDICAT | | B |
| 20 | None | NOTE: The Indicator works only with 4 - 20 mA current mode, not voltage. | 0 |
| | Local Digital Indicator | | 1 |
| C | CERTIFICATION | | C |
| 30 | None | An RTD must be included. See Item "E." | 0 |
| | UL / CUL (Exp Proof, NI) | | 1 |
| D | WARNING PLATE | | D |
| 40 | None | | 0 |
| | Russian (Without Indication) | | 1 |
| | Russian (With Indication) | | 2 |
| E | RTD OPTION | | E |
| | No RTD | | 0 |
| 50 | General Purpose | Specify RTD length in Attachment 2808-R. Spring-loaded RTD requires a thermowell. | 1 |
| | Spring Loaded | | 2 |
| F | EXTENSION/ THERMOWELL | | F |
| | None | | 0 |
| 60 | With Extension / Thermowell | Specify in Attachment 2808-W. These options require an RTD. | 1 |

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| Attachment 2808-R - A - B | | | |
|--|----------------------------|-------------------|------------|
| SELECT | DESCRIPTION | | CODE |
| A B | GENERAL PURPOSE RTD | XRTDGENP | A B |
| 140 | 2.5" lgth | | 02 |
| | 3.5" lgth | | 03 |
| | 4.5" lgth | | 04 |
| | 5.5" lgth | | 05 |
| | 6.5" lgth | | 06 |
| | 8.5" lgth | | 08 |
| | 9.5" lgth | | 09 |
| | 11.5" lgth | | 11 |
| | 14.5" lgth | | 14 |
| | 17.5" lgth | | 17 |
| | 20.5" lgth | | 20 |
| | 23.5" lgth | | 23 |
| A B | SPRING LOADED RTD | XRTDSPRING | A B |
| | 2.5" lgth | | 02 |
| | 3.5" lgth | | 03 |
| | 4.5" lgth | | 04 |
| | 5.5" lgth | | 05 |
| | 6.5" lgth | | 06 |
| | 8.5" lgth | | 08 |
| | 9.5" lgth | | 09 |
| | 11.5" lgth | | 11 |
| | 14.5" lgth | | 14 |
| | 17.5" lgth | | 17 |
| | 20.5" lgth | | 20 |
| | 23.5" lgth | | 23 |
| <p>An RTD ordered, here, will be assembled into the transmitter at the factory. Select sensor by length, "L". NOTE: For a spring-loaded RTD, "L" is the length when compressed 0.5".</p> | | | |

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| Attachment 2808-W - A - B C - D - E - F G | | | |
|---|-------------------------|--|------------|
| SELECT | DESCRIPTION | | CODE |
| A | EXTENSION TYPE | | A |
| 150 | NONE | | 0 |
| | UNION | Not Avail for UL/CUL Certification XEXUNION | 1 |
| | COUPLING | Not Avail for UL/CUL Certification XCOUPLING | 2 |
| B C | Extension Length | Extension Type | B C |
| 160 | NONE | None Option A = 0 | 0 0 |
| | 3" Length | Union | 25 |
| | | Coupling | |
| | 3 1/2" Length | Union | 30 |
| | | Coupling | |
| | 4" Length | Union | 35 |
| | | Coupling | |
| | 4 1/2" Length | Union | 40 |
| | | Coupling | |
| | 5" Length | Union | 45 |
| | | Coupling | |
| | 5 1/2" Length | Union | 50 |
| | | Coupling | |
| | 6" Length | Union | 55 |
| | | Coupling | |
| | 7" Length | Union | 70 |
| | | Coupling | |
| | 8" Length | Union | 80 |
| | | Coupling | |
| | 9" Length | Union | 90 |
| | | Coupling | |

An extension ordered, here, will be assembled to the transmitter, RTD and thermowell at the factory.

Specify the extension by end-to-end length, "A." Please refer to the diagram on page 3.

To select an extension-thermowell-spring-loaded RTD combination, use the equation on the next page.

To select an extension-thermowell-spring-loaded RTD combination, use the following equation:

$$L = A + U + 0.5" \quad \text{or,} \quad U = L - A - 0.5"$$

For example, a 6.5" RTD used with a 2.5" thermowell will require a 3.5" extension.

The end-to-end length, "E," of an extension-thermowell combination is the combined length of the two less the thread engagement (0.46" is typically allowed as shown on page 3) and can be determined using the following equation:

$$E = A + U + 1.75" - 0.46" \quad \text{or,} \quad E = A + U + 1.29"$$

For example, the end-to-end length of a 3.5" extension coupled to a thermowell with a 2.5" insertion length is 7.29".

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| Attachment 2808-W - A - B C - D - E - F G | | | |
|---|-----------------------------------|---|---|
| SELECT | DESCRIPTION | CODE | |
| D | THERMOWELL TYPE | D | |
| 170 | No Thermowell | 0 | |
| | Stepped | 1 | |
| | Tapered | 2 | |
| E | THERMOWELL EXTERNAL THREAD | E | |
| 180 | None | 0 | |
| | 1/2" - 14 N.P.T. | <div style="border: 1px solid black; padding: 5px; text-align: center;"> Not available for a tapered thermowell. </div> | 1 |
| | 3/4" - 14 N.P.T. | | 2 |
| | 1" - 11 1/2 N.P.T. | | 3 |

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| Attachment 2808-W - A - B C - D - E - F G | | | | |
|---|---|-----------------------------------|--------------|---------------------|
| SELECT | DESCRIPTION | | CODE | |
| F G | THERMOWELL INSERTION LENGTH, "U" - see diagram on pg 3 | | X THERMO F G | |
| 190 | None | | 0 0 | |
| | 2 1/2" Length, "U" for 3 1/2" RTD Length, "L" (without an extension) | | 04 | |
| | Thermowell Type | Thermowell External Thread | | |
| | Stepped | 1/2" - 14 NPT | | Option D = 1, E = 1 |
| | Stepped | 3/4" - 14 NPT | | Option D = 1, E = 2 |
| | Stepped | 1" - 11.5 NPT | | Option D = 1, E = 3 |
| | Tapered | 3/4" - 14 NPT | | Option D = 2, E = 2 |
| | Tapered | 1" - 11.5 NPT | | Option D = 2, E = 3 |
| | 3 1/2" Length, "U" for 4 1/2" RTD Length, "L" (without an extension) | | 05 | |
| | Thermowell Type | Thermowell External Thread | | |
| | Stepped | 1/2" - 14 NPT | | Option D = 1, E = 1 |
| | Stepped | 3/4" - 14 NPT | | Option D = 1, E = 2 |
| | Stepped | 1" - 11.5 NPT | | Option D = 1, E = 3 |
| | Tapered | 3/4" - 14 NPT | | Option D = 2, E = 2 |
| | Tapered | 1" - 11.5 NPT | | Option D = 2, E = 3 |
| | 4 1/2" Length "U" for 5 1/2" RTD Length, "L" (without an extension) | | 06 | |
| | Thermowell Type | Thermowell External Thread | | |
| | Stepped | 1/2" - 14 NPT | | Option D = 1, E = 1 |
| | Stepped | 3/4" - 14 NPT | | Option D = 1, E = 2 |
| | Stepped | 1" - 11.5 NPT | | Option D = 1, E = 3 |
| | Tapered | 3/4" - 14 NPT | | Option D = 2, E = 2 |
| | Tapered | 1" - 11.5 NPT | | Option D = 2, E = 3 |

Select the thermowell based on the insertion length, "U." $U = L - 1"$.

The total length of the thermowell, end-to-end (sometimes called the "stem length") and which is not shown in the diagram on page 3, is always $U + 1.75"$. For example, a thermowell with a 2.5" insertion length, "U," will measure 4.25" end-to-end.

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| Attachment 2808-W - A - B C - D - E - F G | | | |
|--|--|--|-------------|
| SELECT | DESCRIPTION | | CODE |
| F G | THERMOWELL INSERTION LENGTH, "U" - see diagram on pg 3 | | XTHERMO F G |
| 190 | 5 1/2" Length, "U" for 6 1/2" RTD Length, "L" (without an extension) | | 07 |
| | Thermowell Type Thermowell External Thread | | |
| | Stepped | 1/2" - 14 NPT Option D = 1, E = 1 | |
| | Stepped | 3/4" - 14 NPT Option D = 1, E = 2 | |
| | Stepped | 1" - 11.5 NPT Option D = 1, E = 3 | |
| | Tapered | 3/4" - 14 NPT Option D = 2, E = 2 | |
| | Tapered | 1" - 11.5 NPT Option D = 2, E = 3 | |
| | 7 1/2" Length, "U" for 8 1/2" RTD Length, "L" (without an extension) | | 09 |
| | Thermowell Type Thermowell External Thread | | |
| | Stepped | 1/2" - 14 NPT Option D = 1, E = 1 | |
| | Stepped | 3/4" - 14 NPT Option D = 1, E = 2 | |
| | Stepped | 1" - 11.5 NPT Option D = 1, E = 3 | |
| | Tapered | 3/4" - 14 NPT Option D = 2, E = 2 | |
| | Tapered | 1" - 11.5 NPT Option D = 2, E = 3 | |
| <p>Select the thermowell based on the insertion length, "U." $U = L - 1"$.</p> <p>The total length of the thermowell, end-to-end (sometimes called the "stem length") and which is not shown in the diagram on page 3, is always $U + 1.75"$. For example, a thermowell with a 2.5" insertion length, "U," will measure 4.25" end-to-end.</p> | | | |

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| Attachment 2808-W - A - B C - D - E - F G | | | |
|---|---|---------------------------------------|------|
| | DESCRIPTION | | CODE |
| F G | THERMOWELL INSERTION LENGTH, "U" - see diagram on pg 3 XTHERMO | | F G |
| 190 | 8 1/2" Length, "U" for 9 1/2" RTD Length, "L" (without an extension) | | 10 |
| | Thermowell Type | Thermowell External Thread | |
| | Stepped | 1/2 " - 14 NPT Option D = 1, E = 1 | |
| | Stepped | 3/4" - 14 NPT Option D = 1, E = 2 | |
| | Stepped | 1" - 11.5 NPT Option D = 1, E = 3 | |
| | Tapered | 3/4" - 14 NPT Option D = 2, E = 2 | |
| | Tapered | 1" - 11.5 NPT Option D = 2, E = 3 | |
| | 10 1/2" Length, "U" for 11 1/2" RTD Length, "L" (without an extension) | | 12 |
| | Thermowell Type | Thermowell External Thread | |
| | Stepped | 1/2 " - 14 NPT Option D = 1, E = 1 | |
| | Stepped | 3/4" - 14 NPT Option D = 1, E = 2 | |
| | Stepped | 1" - 11.5 NPT Option D = 1, E = 3 | |
| | Tapered | 3/4" - 14 NPT Option D = 2, E = 2 | |
| | Tapered | 1" - 11.5 NPT Option D = 2, E = 3 | |
| | 13 1/2" Length, "U" for 14 1/2" RTD Length, "L" (without an extension) | | 15 |
| | Thermowell Type | Thermowell External Thread | |
| | Stepped | 1/2 " - 14 NPT Option D = 1, E = 1 | |
| | Stepped | 3/4" - 14 NPT Option D = 1, E = 2 | |
| | Stepped | 1" - 11.5 NPT Option D = 1, E = 3 | |
| | Tapered | 3/4" - 14 NPT Option D = 2, E = 2 | |
| | Tapered | 1" - 11.5 NPT Option D = 2, E = 3 | |
| | 16 1/2" Length, "U" for 17 1/2" RTD Length, "L" (without an extension) | | 18 |
| | Thermowell Type | Thermowell External Thread | |
| | Stepped | 1/2 " - 14 NPT Option D = 1, E = 1 | |
| | Stepped | 3/4" - 14 NPT Option D = 1, E = 2 | |
| | Stepped | 1" - 11.5 NPT Option D = 1, E = 3 | |
| | Tapered | 3/4" - 14 NPT Option D = 2, E = 2 | |
| | Tapered | 1" - 11.5 NPT Option D = 2, E = 3 | |

Select the thermowell based on the insertion length, "U." $U = L - 1"$.

The total length of the thermowell, end-to-end (sometimes called the "stem length") and which is not shown in the diagram on page 3, is always $U + 1.75"$. For example, a thermowell with a 2.5" insertion length, "U," will measure 4.25" end-to-end.

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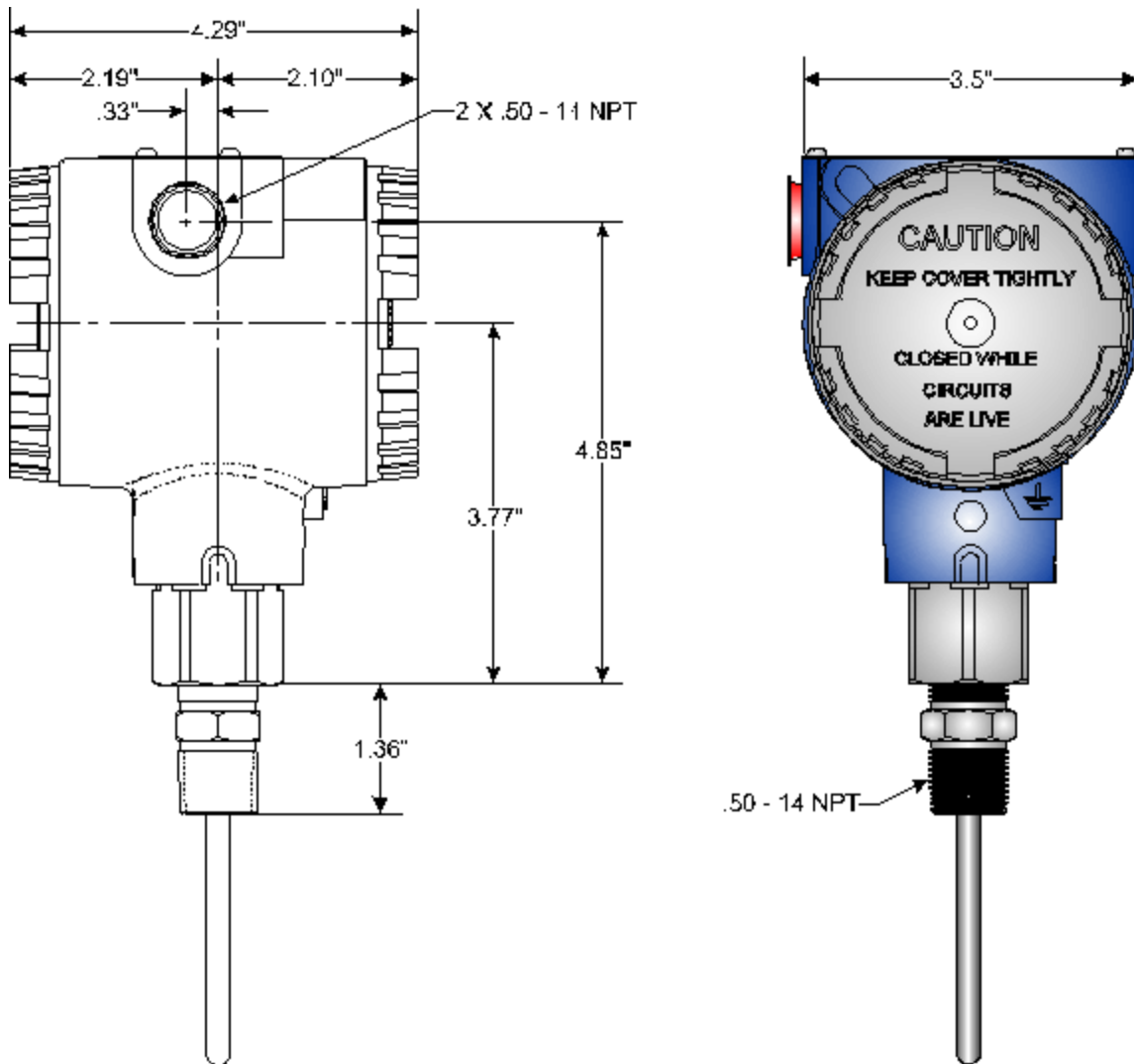
| Attachment 2808-W - A - B C - D - E - F G | | | | |
|---|--|----------------------------|---------------------|---------------------|
| | DESCRIPTION | | CODE | |
| F G | THERMOWELL INSERTION LENGTH, "U" - see diagram on pg 3 | | XTHERMO F G | |
| 190 | 19 1/2" Length, "U" for 20 1/2" RTD Length, "L" (without an extension) | | 21 | |
| | Thermowell Type | Thermowell External Thread | | |
| | Stepped | 1/2" - 14 NPT | | Option D = 1, E = 1 |
| | Stepped | 3/4" - 14 NPT | | Option D = 1, E = 2 |
| | Stepped | 1" - 11.5 NPT | | Option D = 1, E = 3 |
| | Tapered | 3/4" - 14 NPT | | Option D = 2, E = 2 |
| | Tapered | 1" - 11.5 NPT | Option D = 2, E = 3 | |
| | 22 1/2" Length, "U" for 23 1/2" RTD Length, "L" (without an extension) | | 24 | |
| | Thermowell Type | Thermowell External Thread | | |
| | Stepped | 1/2" - 14 NPT | | Option D = 1, E = 1 |
| | Stepped | 3/4" - 14 NPT | | Option D = 1, E = 2 |
| | Stepped | 1" - 11.5 NPT | | Option D = 1, E = 3 |
| Tapered | 3/4" - 14 NPT | Option D = 2, E = 2 | | |
| Tapered | 1" - 11.5 NPT | Option D = 2, E = 3 | | |

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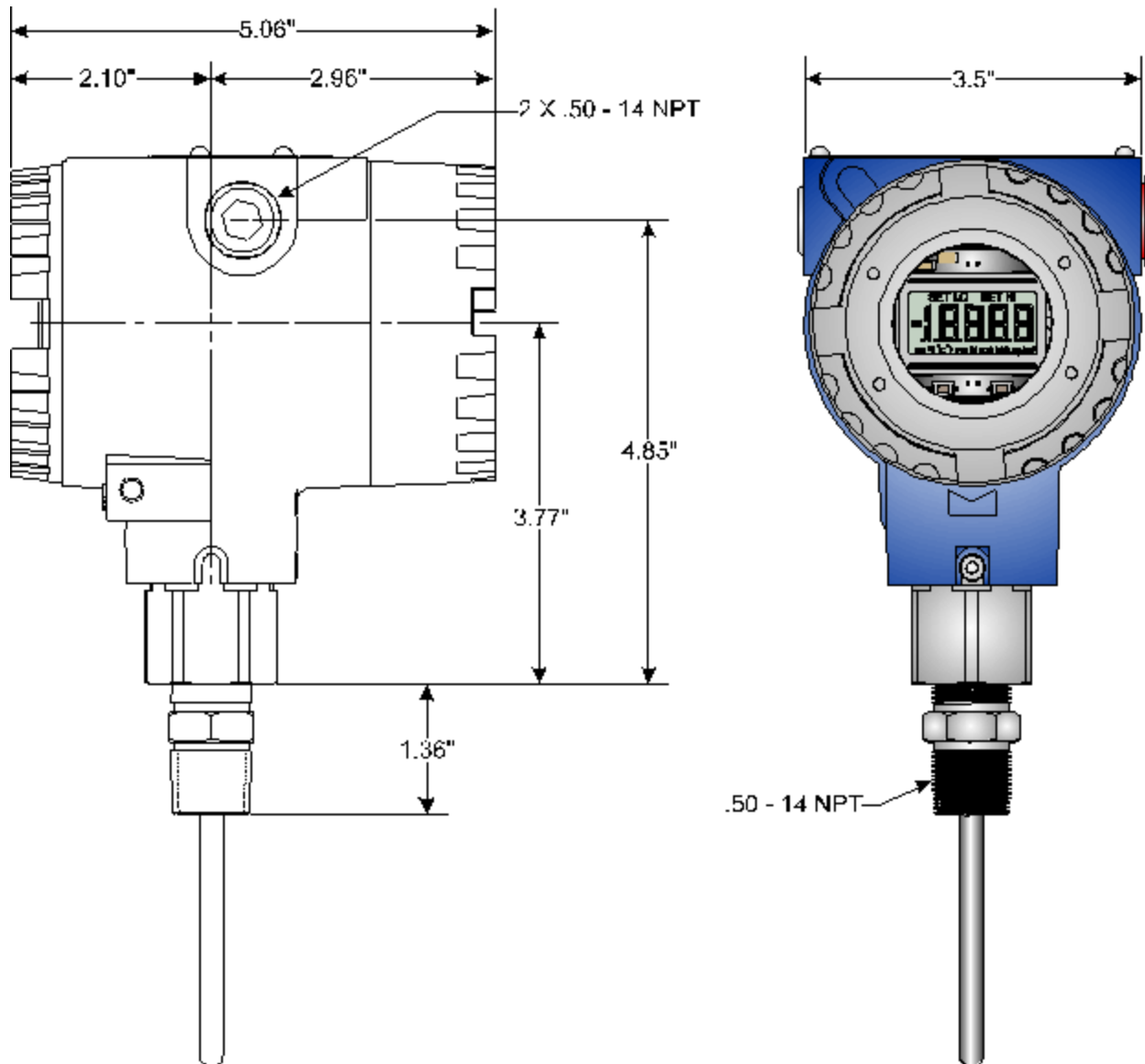
Model 2808-41A Dimensions (without Loop Indicator Option)

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Model 2808-41A Dimensions (with Loop Indicator Option)

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