

Rosemount™ 248 Wireless Temperature Transmitter



- Standard temperature transmitter offers a wireless solution for process monitoring
- Optimize plant efficiency and increase measurement reliability with industry-proven capabilities and specifications
- Emerson Wireless delivers innovative wireless solutions for temperature measurement and overall transmitter performance
- Explore the benefits of Complete Point Solutions™ from Emerson

Features and benefits

Standard temperature transmitter offers a cost- effective solution for wireless process monitoring

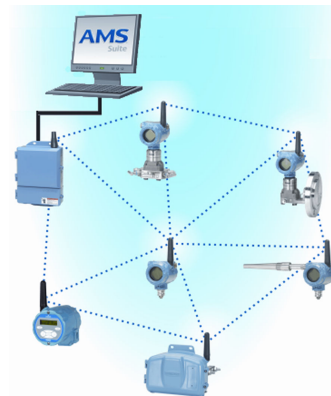
- Single sensor capability with universal sensor inputs (RTD, T/C, mV, and ohms)
- IEC-approved *WirelessHART*® protocol
- Large LCD display

Optimize plant efficiency and increase measurement reliability with industry-proven capabilities and specifications

- One-year stability rating reduces maintenance costs
- User-centric device dashboards communicate important diagnostics and ensure process health
- Open/short sensor diagnostics assist with detecting issues in the sensor loop
- Compensation for ambient temperatures enhances transmitter performance
- Four user-configurable alerts provide increased process information and measurement point insight

Wireless delivers innovative wireless solutions for temperature measurement and overall transmitter performance

- Self-organizing network delivers information rich data with >99 percent data reliability and establishes a highly stable network
- Smart Wireless capabilities extend the full benefits of Plantweb™ to previously inaccessible temperature measurement locations
- Emerson SmartPower™ solutions provide an intrinsically safe Power Module, allowing field replacements without removing the transmitter from the process, keeping personnel safe and reducing maintenance costs
- Emerson’s layered approach to wireless network security ensures that data transmissions are secure

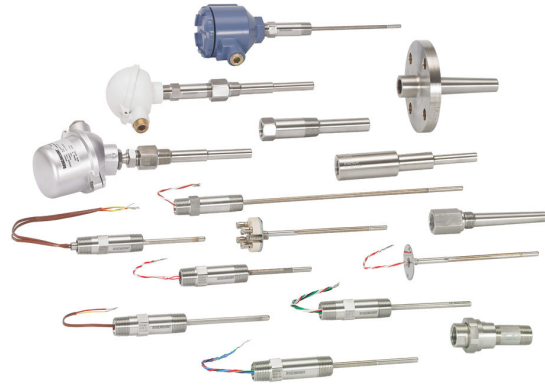


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Explore the benefits of a complete point solution from Rosemount Temperature Measurement

- Emerson offers a selection of RTDs, thermocouples, and thermowells that bring superior durability and Rosemount reliability to temperature sensing, complementing the Rosemount Transmitter portfolio.



Experience global consistency and local support from numerous worldwide Rosemount Temperature manufacturing sites



- Experienced Instrumentation Consultants help select the right product for any temperature application and advise on best installation practices
- An extensive global network of Emerson service and support personnel can be onsite when and where they are needed
- World-class manufacturing provides globally consistent product from every factory and the capacity to fulfill the needs of any project, large or small

Access information when you need it with asset tags

Newly shipped devices include a unique QR code asset tag that enables you to access serialized information directly from the device. With this capability, you can:

- Access device drawings, diagrams, technical documentation, and troubleshooting information in your MyEmerson account
- Improve mean time to repair and maintain efficiency
- Ensure confidence that you have located the correct device
- Eliminate the time-consuming process of locating and transcribing nameplates to view asset information

Ordering information



The Rosemount 248 Wireless Temperature Transmitter has a rugged design and industry-proven capabilities and specifications.

Transmitter features include:

- IEC-approved *WirelessHART*[®] protocol (option code WA3)
- Large LCD display (option code M5)
- Internal antenna (option code WP5)
- 3-point calibration certificate (option code Q4)
- Assemble to sensor options (option code XA)

CONFIGURE >

VIEW PRODUCT >

Online product configurator

Many products are configurable online using our Product Configurator. Select the **Configure** button or visit [Emerson.com](https://emerson.com) to start. With this tool's built-in logic and continuous validation, you can configure your products more quickly and accurately.

Model codes

Model codes contain the details related to each product. Exact model codes will vary. An example of a typical model code is shown in [Figure 1](#).

Figure 1: Model code example

3144P D1 A 1 NA	M5 DA1 Q4
1	2

1. Required model components (choices available on most)
2. Additional options (variety of features and functions that may be added to products)

Specifications and options

The purchaser of the equipment must specify and select the product materials, options, or components.

Optimizing lead time

The starred offerings (★) represent the most common options and should be selected for the fastest delivery times. The non-starred offerings are subject to additional delivery lead time.

Required model components

Model

Code	Description	
248	Temperature transmitter	★

Transmitter type

Code	Description	
D	Wireless field mount	★

Transmitter output

Code	Description	
X	Wireless	★

Product certifications

Code	Description	
NA	No Approval	★
I5	USA Intrinsically Safe and Non-incendive	★
I6	Canada Intrinsically Safe	★
I1	ATEX Intrinsic Safety	★
KQ	USA, Canada, ATEX Intrinsic Safety Combination	★
I7	IECEX Intrinsic Safety	★
I2	INMETRO Intrinsic Safety	★
I4	TIIS Intrinsic Safety	★
I3	NEPSI Intrinsic Safety	★
IM	Technical Regulation Customs Union (EAC), Intrinsic Safety	★
KL	USA, Canada, ATEX, IECEX Intrinsic Safety Combination	★

Enclosure

Code	Description	Material	IP rating	
P	Wireless engineered polymer housing	Engineered Polymer	IP66/67	★

Conduit entry size

Code	Description	
2	½-in. NPT	

Additional options

Assemble to options

Code	Description	
XA ⁽¹⁾	Sensor specified separately and assembled to transmitter	★
NS	No sensor	

(1) When ordering a Rosemount 248 Wireless with the XA option, a mounting bracket is not included. If a bracket is required, order option code B5.

Wireless update rate, operating frequency, and protocol

Code	Description	
WA3	User configurable update rate, 2.4 GHz, WirelessHART®	★

Omnidirectional wireless antenna and SmartPower™

Green power module must be shipped separately, order Model 701PGNKF.

Code	Description	
WP5	Internal Antenna, Compatible with Green Power Module (I.S. Power Module sold separately)	★

Mounting bracket

Code	Description	
B5	Universal "L" mounting bracket for 2-in. pipe mounting – SST bracket and bolts	★

Display

Code	Description	
M5	LCD display	★

5-point calibration

Code	Description	
C4	5-point calibration (requires Q4 option code to generate a calibration certificate)	★

Calibration certificate

Code	Description	
Q4	Calibration certificate (3-point calibration)	★

Line filter

Code	Description	
F5	50 Hz line voltage filter	★
F6	60 Hz line voltage filter	★

Software configuration

Code	Description	
C1	Custom configuration of date, descriptor, message, and wireless parameters (requires CDS with order)	★

Extended product warranty

Code	Description	
WR3	Three-year limited warranty	★
WR5	Five-year limited warranty	★

Specifications

Functional specifications

Input

Supports Thermocouple, RTD, millivolt, and ohm input types. See [Accuracy](#) for a full listing of sensor options.

Output

IEC 62591 (*WirelessHART*[®]) compliant, 2.4 GHz

Local display

The optional five-digit integral LCD display can display sensor temperature in engineering units (°F, °C, °R, K, Ω, and millivolts) and percent of range. The display updates based in the wireless update rate.

Humidity limits

0–99 percent non-condensing relative humidity

Update rate

WirelessHART[®], user-selectable one second to 60 minutes

Accuracy (Pt 100 at reference condition: 20 °C)

±0.45 °C (±0.81 °F)

Wireless radio

Frequency:	2,400–2,485 GHz
Channels:	15
Modulation:	IEEE 802.15.4 compliant

Physical specifications

Material selection

Emerson provides a variety of Rosemount product with various product options and configurations including materials of construction that can be expected to perform well in a wide range of applications. The Rosemount product information presented is intended as a guide for the purchaser to make an appropriate selection for the application. It is the purchaser's sole responsibility to make a careful analysis of all process parameters (such as all chemical components, temperature, pressure, flow rate, abrasives, contaminants, etc.), when specifying product, materials, options and components for the particular application. Emerson is not in a position to evaluate or guarantee the compatibility of the process fluid or other process parameters with the product, options, configuration or materials of construction selected.

Conformance to specifications ($\pm 3\sigma$ [Sigma])

Technology leadership, advanced manufacturing techniques, and statistical process control ensure specification conformance to at least $\pm 3\sigma$.

Electrical connections

Power module

The Emerson SmartPower™ power module is field replaceable, featuring keyed connections that eliminate the risk of incorrect installation.

The power module is an Intrinsically Safe solution, containing Lithium-thionyl chloride with a polybutadiene terephthalate (PBT) enclosure.

The device has a power module life time rating of 10 years with a one minute update rate at reference conditions. Reference conditions are 21 °C (70 °F), and routing data for three additional network devices.

Note

Continuous exposure to ambient temperature limits -40 °C or 85 °C (-40 °F or 185 °F) may reduce specified life by less than 20 percent.

Sensor terminals

Sensor terminals permanently fixed to terminal block

Field Communicator connections

Communication terminals

HART® interface connections fixed to the power module

Materials of construction

Enclosure

Housing:	PBT/PC with NEMA® 4X and IP66/67
Cover O-ring:	Silicone
Conduit entry:	316 SST

Mounting

Transmitters may be attached directly to the sensor. Mounting brackets also permit remote mounting. See [Dimensional drawings](#).

Weight

Engineered polymer

Rosemount 248 Wireless without LCD display: 0.99 lb (0.45 kg)

Rosemount 248 Wireless with LCD display: 1.11 lb (0.51 kg)

Enclosure ratings

Type 4X and IP66/67

Performance specifications

Electromagnetic Compatibility (EMC)

Meets all industrial environment requirements of EN61326 and NAMUR NE-21. Maximum deviation < 1 percent span during EMC disturbances.

Transmitter measurement stability

±0.15 percent of output reading or 0.15 °C (whichever is greater) for 12 months

Self calibration

The analog-to-digital measurement circuitry automatically self-calibrates for each temperature update by comparing the dynamic measurement to extremely stable and accurate internal reference elements.

Vibration effect

The Rosemount 248 Wireless in direct mount configuration is tested to the following specifications with no effect on performance per IEC 60770-1, 1999:

Frequency	Acceleration
10-60 Hz	0.21 mm peak displacement
60-2000 Hz	3 g

The Rosemount 248 Wireless in remote mount configuration is tested to the following specifications with no effect on performance per IEC 60770-1, 1999:

Frequency	Acceleration
10-60 Hz	0.15 mm peak displacement
60-500 Hz	2 g

Sensor connections

Figure 2: Sensor Terminal Block

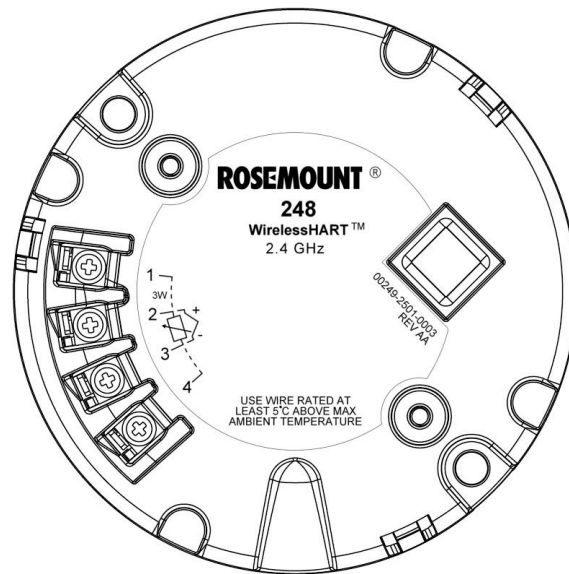
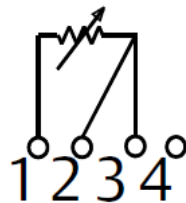


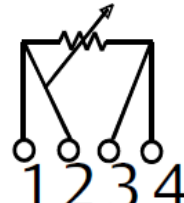
Figure 3: Sensor Connections



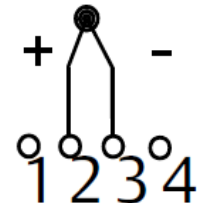
2-wire RTD and Ω



3-wire RTD and Ω



4-wire RTD and Ω



T/C and mV

Note

Emerson provides 4-wire sensors for all single element RTDs. Use these RTDs in 3- or 2-wire configurations by leaving the unneeded leads disconnected and insulated with electrical tape.

Temperature limits

Operating limit	Storage limit
-40 to 85 °C (-40 to 185 °F)	-40 to 85 °C (-40 to 185 °F)

Accuracy

Table 1: Input Options and Accuracy

Sensor options	Sensor reference	Input ranges		Digital accuracy ⁽¹⁾	
		°C	°F	°C	°F
2-, 3-, 4-wire RTDs					
Pt 100 ($\alpha = 0.00385$)	IEC 751	-200 to 850	-328 to 1562	± 0.45	± 0.81
Pt 200 ($\alpha = 0.00385$)	IEC 751	-200 to 850	-328 to 1562	± 0.45	± 0.81
Pt 500 ($\alpha = 0.00385$)	IEC 751	-200 to 850	-328 to 1562	± 0.57	± 1.026

Table 1: Input Options and Accuracy (continued)

Sensor options	Sensor reference	Input ranges		Digital accuracy ⁽¹⁾	
		°C	°F	°C	°F
2-, 3-, 4-wire RTDs					
Pt 1000 ($\alpha = 0.00385$)	IEC 751	-200 to 300	-328 to 572	±0.57	±1.026
Pt 100 ($\alpha = 0.003916$)	JIS 1604	-200 to 645	-328 to 1193	±0.45	±0.81
Pt 200 ($\alpha = 0.003916$)	JIS 1604	-200 to 645	-328 to 1193	±0.45	±0.81
Ni 120	Edison Curve No. 7	-70 to 300	-94 to 572	±0.45	±0.81
Cu 10	Edison Copper Winding No. 15	-50 to 250	-58 to 482	±4.16	±7.488
Pt 50 ($\alpha = 0.00391$)	GOST 6651-94	-200 to 550	-328 to 1022	±0.9	±1.62
Pt 100 ($\alpha = 0.00391$)	GOST 6651-94	-200 to 550	-328 to 1022	±0.45	±0.81
Cu 50 ($\alpha = 0.00426$)	GOST 6651-94	-50 to 200	-58 to 392	±1.44	±2.592
Cu 50 ($\alpha = 0.00428$)	GOST 6651-94	-185 to 200	-301 to 392	±1.44	±2.592
Cu 100 ($\alpha = 0.00426$)	GOST 6651-94	-50 to 200	-58 to 392	±0.72	±1.296
Cu 100 ($\alpha = 0.00428$)	GOST 6651-94	-185 to 200	-301 to 392	±0.72	±1.296
Thermocouples⁽²⁾					
Type B ⁽³⁾	NIST Monograph 175, IEC 584	100 to 1820	212 to 3308	±2.25	±4.05
Type E	NIST Monograph 175, IEC 584	-50 to 1000	-58 to 1832	±0.60	±1.08
Type J	NIST Monograph 175, IEC 584	-180 to 760	-292 to 1400	±1.05	±1.89
Type K ⁽⁴⁾	NIST Monograph 175, IEC 584	-180 to 1372	-292 to 2501	±1.46	±2.628
Type N	NIST Monograph 175, IEC 584	-200 to 1300	-328 to 2372	±1.46	±2.628
Type R	NIST Monograph 175, IEC 584	0 to 1768	32 to 3214	±2.25	±4.05
Type S	NIST Monograph 175, IEC 584	0 to 1768	32 to 3214	±2.1	±3.78
Type T	NIST Monograph 175, IEC 584	-200 to 400	-328 to 752	±1.05	±1.89
DIN Type L	DIN 43710	-200 to 900	-328 to 1652	±1.05	±1.89
DIN Type U	DIN 43710	-200 to 600	-328 to 1112	±1.05	±1.89
Type W5Re/W26Re	ASTM E 988-96	0 to 2000	32 to 3632	±2.1	±3.78
GOST Type L	GOST R 8.585-2001	-200 to 800	-328 to 1472	±1.80	±3.24
Other sensor types					
Millivolt input		-10 to 100 mV		±0.045 mV	
2-, 3-, 4-wire ohm input		0 to 2000 ohms		±1.35 ohm	

(1) The published digital accuracy applies over the entire sensor input range. Digital output can be accessed by HART® Communications or wireless protocol.

(2) Total digital accuracy for thermocouple measurement: sum of digital accuracy +0.8 °C (cold junction accuracy).

(3) Digital accuracy for NIST Type B T/C is ± 9.0 °C (± 16.2 °F) from 100 to 300 °C (212 to 572 °F).

(4) Digital accuracy for NIST Type K T/C is ± 2.1 °C (± 35.79 °F) from -180 to -90 °C (-292 to -130 °F).

Ambient temperature effect

Sensor options	Sensor reference	Input range (°C)	Temperature effects per 1.0 °C (1.8 °F) change in ambient temperature ^{(1) (2)}	Range
2-, 3-, 4-wire RTDs				
Pt 100 ($\alpha = 0.00385$)	IEC 751	-200 to 850	0.009 °C (0.0162 °F)	Entire sensor input range

Sensor options	Sensor reference	Input range (°C)	Temperature effects per 1.0 °C (1.8 °F) change in ambient temperature ^{(1) (2)}	Range
Pt 200 ($\alpha = 0.00385$)	IEC 751	-200 to 850	0.012 °C (0.0216 °F)	Entire sensor input range
Pt 500 ($\alpha = 0.00385$)	IEC 751	-200 to 850	0.009 °C (0.0162 °F)	Entire sensor input range
Pt 1000 ($\alpha = 0.00385$)	IEC 751	-200 to 300	0.009 °C (0.0162 °F)	Entire sensor input range
Pt 100 ($\alpha = 0.003916$)	JIS 1604	-200 to 645	0.009 °C (0.0162 °F)	Entire sensor input range
Pt 200 ($\alpha = 0.003916$)	JIS 1604	-200 to 645	0.012 °C (0.0216 °F)	Entire sensor input range
Ni 120	Edison Curve No. 7	-70 to 300	0.009 °C (0.0162 °F)	Entire sensor input range
Cu 10	Edison Copper Winding No. 15	-50 to 250	0.06 °C (0.162 °F)	Entire sensor input range
Pt 50 ($\alpha = 0.003910$)	GOST 6651-94	-200 to 550	0.018 °C (0.0324 °F)	Entire sensor input range
Pt 100 ($\alpha = 0.003910$)	GOST 6651-94	-200 to 550	0.009 °C (0.0162 °F)	Entire sensor input range
Cu 50 ($\alpha = 0.00426$)	GOST 6651-94	-50 to 200	0.012 °C (0.0216 °F)	Entire sensor input range
Cu 50 ($\alpha = 0.00428$)	GOST 6651-94	-185 to 200	0.012 °C (0.0216 °F)	Entire sensor input range
Cu 100 ($\alpha = 0.00426$)	GOST 6651-94	-50 to 200	0.009 °C (0.0162 °F)	Entire sensor input range
Cu 100 ($\alpha = 0.00428$)	GOST 6651-94	-185 to 200	0.009 °C (0.0162 °F)	Entire sensor input range
Thermocouples				
Type B	NIST Monograph 175, IEC 584	100 to 1820	0.0435 °C	$T \geq 1000$ °C
			0.096 °C - (0.0075% of [T - 300])	300 °C $\leq T < 1000$ °C
			0.162 °C - (0.033% of [T - 100])	100 °C $\leq T < 300$ °C
Type E	NIST Monograph 175, IEC 584	-50 to 1000	0.015 °C + (0.00129% of absolute value T)	All
Type J	NIST Monograph 175, IEC 584	-180 to 760	0.0162 °C + (0.00087% of T)	$T \geq 0$ °C
			0.0162 °C + (0.0075% of absolute value T)	$T < 0$ °C
Type K	NIST Monograph 175, IEC 584	-180 to 1372	0.0183 °C + (0.0027% of T)	$T \geq 0$ °C
			0.0183 °C + (0.0075% of absolute value T)	$T < 0$ °C
Type N	NIST Monograph 175, IEC 584	-200 to 1300	0.0204 °C + (0.00108% of absolute value T)	All
Type R	NIST Monograph 175, IEC 584	0 to 1768	0.048 °C	$T \geq 200$ °C
			0.069 °C - (0.0108% of T)	$T < 200$ °C
Type S	NIST Monograph 175, IEC 584	0 to 1768	0.048 °C	$T \geq 200$ °C
			0.069 °C - (0.0108% of T)	$T < 200$ °C

Sensor options	Sensor reference	Input range (°C)	Temperature effects per 1.0 °C (1.8 °F) change in ambient temperature ^{(1) (2)}	Range
Type T	NIST Monograph 175, IEC 584	-200 to 400	0.0192 °C	T ≥ 0 °C
			0.0192 °C + (0.0129% of absolute value T)	T < 0 °C
DIN Type L	DIN 43710	-200 to 900	0.0162 °C + (0.00087% of T)	T ≥ 0 °C
			0.0162 °C + (0.0075% of absolute value T)	T < 0 °C
DIN Type U	DIN 43710	-200 to 900	0.0192 °C	T ≥ 0 °C
			0.0192 °C + (0.0129% of absolute value T)	T < 0 °C
Type W5Re/W26Re	ASTM E 988-96	0 to 2000	0.048 °C	T ≥ 200 °C
			0.069 °C - (0.0108% of T)	T < 200 °C
GOST Type L	GOST R 8.585-2001	-200 to 800	0.021 °C	T ≥ 0 °C
			0.0105 °C + (0.0045% of absolute value T)	T < 0 °C
Other sensor types				
Millivolt input		-10 to 100 mV	0.0015 mV	Entire sensor input range
2-, 3-, 4-wire ohm		0 to 2000 W	0.0252 W	Entire sensor input range

(1) Change in ambient is with reference to the calibration temperature of the transmitter 20 °C (68 °F) from factory.

(2) Ambient temperature effect specification valid over minimum temperature span of 28 °C (50 °F).

Transmitters can be installed in locations where the ambient temperature is between -40 and 85 °C (-40 and 185 °F). In order to maintain excellent accuracy performance, each transmitter is individually characterized over this ambient temperature range at the factory.

Temperature effects example

When using a Pt 100 (α = 0.00385) sensor input at 30 °C ambient temperature:

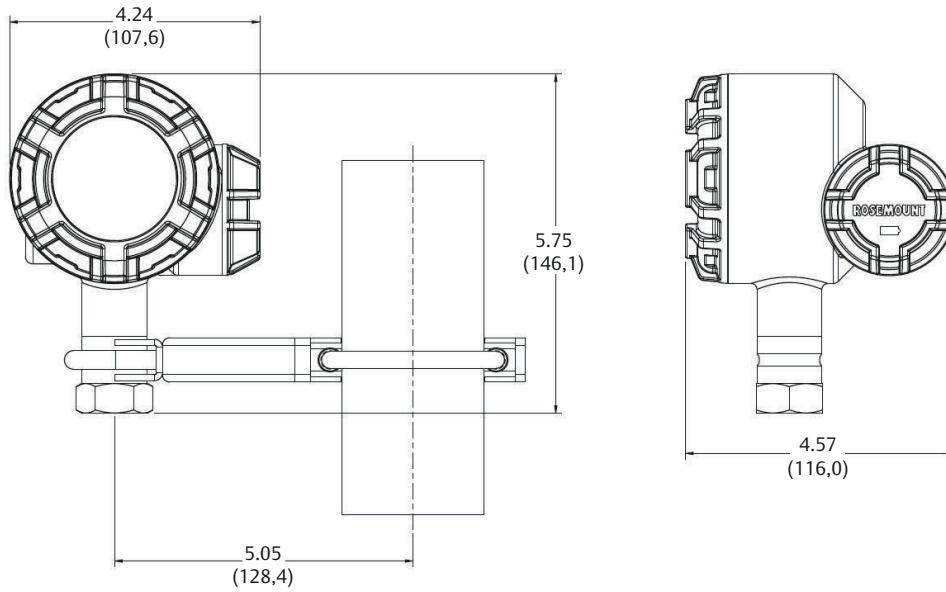
- Digital temperature effects: 0.009 °C × (30 - 20) = 0.09 °C
- Worst case error: Digital + Ambient temperature effects = 0.45 °C + 0.09 °C = 0.54 °C
- Total probable error: $\sqrt{0.45^2 + 0.09^2} = 0.459 \text{ °C}$

Product certifications

For Rosemount 248 Wireless product certifications, see the [Rosemount 248 Wireless Temperature Transmitter Quick Start Guide](#).

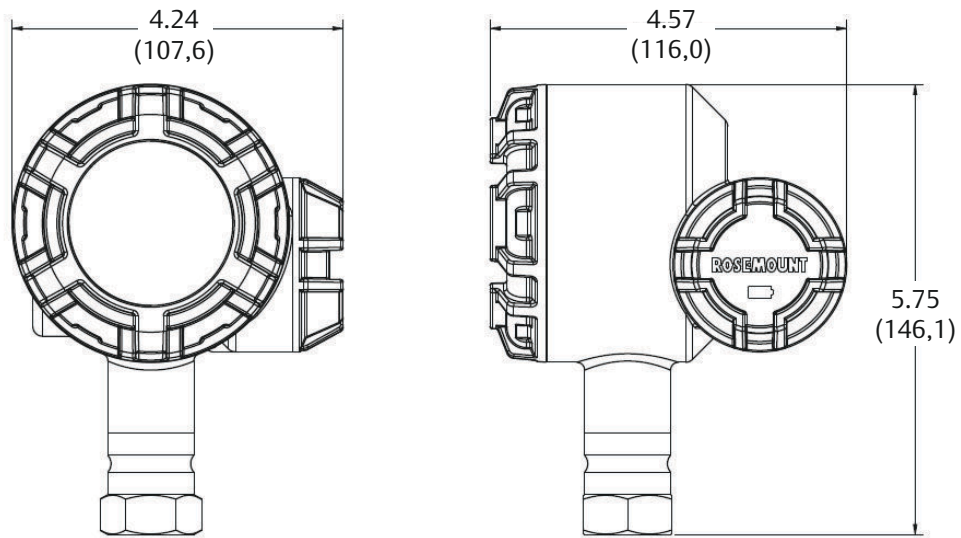
Dimensional drawings

Figure 4: Remote Mount



Dimensions are in inches (millimeters).

Figure 5: Direct Mount



Dimensions are in inches (millimeters).

For more information: [Emerson.com/global](https://emerson.com/global)

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