Product Data Sheet
00813-0100-4697, Rev SD
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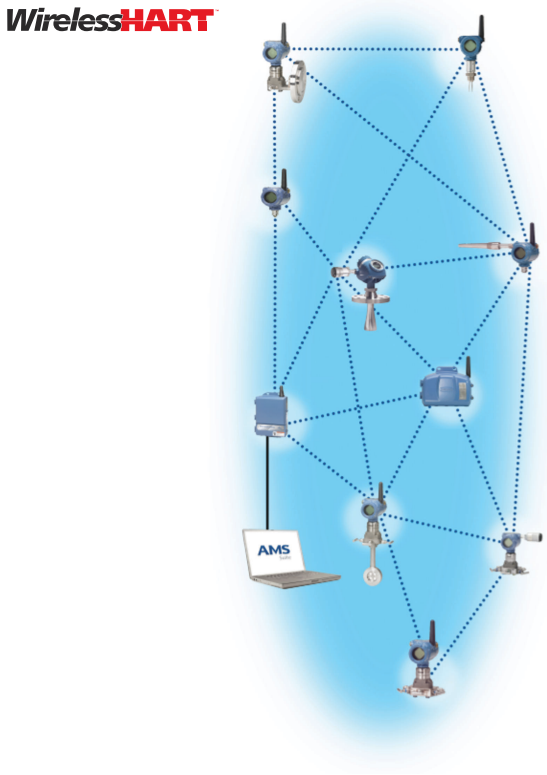
Rosemount™ 848T High Density Temperature Measurement Family

- Innovative temperature measurement for high density applications that provide installation and operational savings.
- Independently configurable inputs that support RTD, thermocouple, ohm, mV, and 4–20 mA signals.
- Enclosure options and intrinsically safe design allows for installation close to any process, including hazardous areas.
- *Wireless*HART® capabilities extends the full benefits of Plantweb™ to previously inaccessible locations.
- Industry first measurement validation diagnostic can identify a variety of process concerns including sensor degradation, sensor wiring connectivity, high vibration (affecting the measurement), and abnormal process variations.

High density temperature measurement

Wireless delivers innovative wireless solutions for temperature

- Self-organizing network delivers information rich data with greater than 99 percent data reliability and establishes a highly stable network.
- IEC-approved *Wireless*HART® protocol.
- 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 data transmissions are secure.



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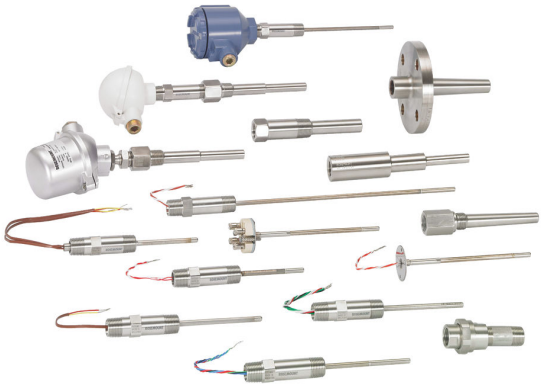
FOUNDATION™ Fieldbus provides effective measurements with reduced wiring costs

- Internationally recognized digital network (IEC 61158) supports the connection of up to 16 devices on a single twisted wire pair.
- Allows advanced computations through use of function blocks.
- Provides continuous measurement status for each measurement point.
- Lower costs by reducing wiring, terminations, and required number of I.S. Barriers.

Explore the benefits of a fully assembled solution from Rosemount Temperature Measurement

- Emerson offers a selection of RTDs and thermocouples that bring superior durability and Rosemount reliability to temperature sensing.
- A broad thermowell offering meets the demanding requirements of a variety of process applications.



Experience global consistency and local support from worldwide Rosemount Temperature manufacturing site

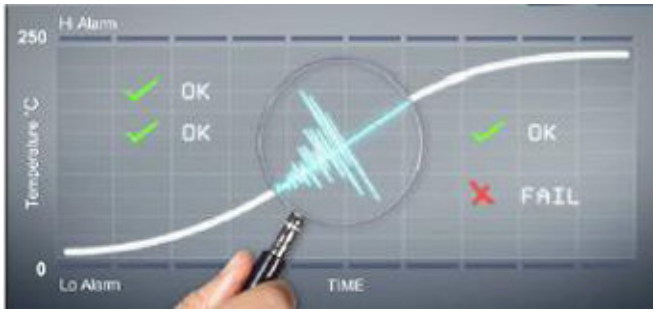
- World-class manufacturing provides globally consistent product from every factory and the capacity to fulfill the needs of any project.
- Experienced instrumentation consultants help select the right products for each temperature application.
- An extensive global network of Emerson service and support personnel can be onsite when and where they are needed.

Increase performance with High Density transmitters

- Transmit multiple measurements with one set of electronics.
- Mount close to process to reduce sensor wire length and increase measurement reliability.
- Enhance accuracy with EMI correction, cold junction compensation, and device diagnostics.
- Reduce installation costs by as much as 70 percent.

Avoid unnecessary process shutdowns, on-scale failure related issues, and unsafe process conditions with measurement validation diagnostic

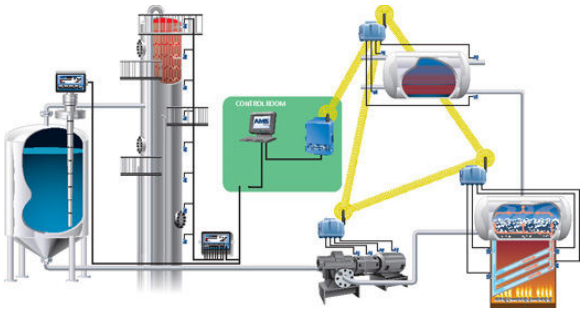
- Detect measurement abnormalities and take preventive action before shutdown is necessary.
- Determine validity of data points that are outside of alarm limits.
- Identify on-scale failures and take action before process efficiency and safety is compromised.
- Detect abnormally fast process rates of change before alarm state is reached.



High density temperature measurement

Ideal solution for taking multiple measurements in close proximity to each other such as:

- Bearing temperature on pumps and motors
- Distillation columns
- Furnaces and boilers
- Reactors, storage tanks, and many more

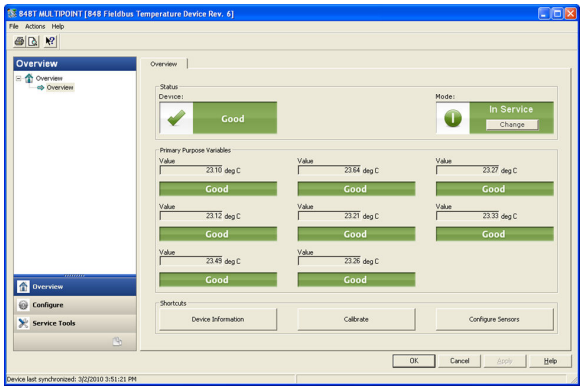


Simplify installation and reduce wiring costs

- Eliminate marshalling
- Less wire routing and fewer terminations
- Faster startups with fewer devices

Access powerful information with new device dashboards

- Leverage Human Centered Design practices to create an intuitive user interface
- Instantly see status and output of each sensor
- Direct links to graphical diagnostics and troubleshooting help
- Drastically lower configuration time



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

Rosemount 848T FOUNDATION™ Fieldbus Temperature Transmitter

The Rosemount 848T offers a low-cost solution for high density measurements. The transmitter accepts eight independently configurable sensor inputs, and can be mounted close to the process to improve data quality. FOUNDATION Fieldbus architecture allows up to 128 temperature measurements to be transmitted on a single H1 Fieldbus line.

Additionally, the transmitter is bus-powered, further reducing the amount of required wiring to install the device. The robust design has proven itself in thousands of successful installations. Capabilities include:

- Eight independently configurable inputs, including 2- and 3-wire RTDs, thermocouples, mV, 2- and 3-wire ohms, and 4–20 mA signals
- Industry-first measurement validation diagnostic
- Fieldbus functionality with eight AI blocks, two MAI blocks, four ISEL Blocks, and backup LAS capabilities
- 600 Vdc isolation and integral transient protection

CONFIGURE > VIEW PRODUCT >

Online product configurator

Many products are configurable online using our product configurator. Select the **Configure** button or visit Emerson.com/MeasurementInstrumentation 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 (1) M5 DA1 Q4 (2)

1. Required model components (1)
2. Additional options (2)

(1) Choices available on most.
(2) Variety of features and functions that may be added to products.

Specifications and options

Specification and selection of product materials, options, and/or components must be made by the purchaser of the equipment.

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	
848T	High Density Temperature Measurement Family	★

Transmitter output

Code	Description	
F	FOUNDATION™ Fieldbus digital signal (includes AI, MAI, and ISEL function blocks, and Backup Link Active Scheduler)	★

Product certification

Consult factory for availability.

Code	Description	Rosemount junction box required?	
I1	ATEX Intrinsic Safety	No	★
I2	Brazil Intrinsic Safety	No	★
I3	China Intrinsic Safety	No	★
I4	Japan Intrinsic Safety (FISCO) Type 'ia' and 'ib'	No	
I5[(1)]	USA Intrinsically Safe	No	★
I6[(1)]	Canada Intrinsically Safe	No	★
I7	IECEx Intrinsic Safety	No	★
IA	ATEX FISCO Intrinsic Safety	No	★
IB	Brazil FISCO Intrinsic Safety	No	★
IE	USA FISCO Intrinsically Safe	No	★
IF[(1)]	Canada FISCO Intrinsically Safe, Division 2	No	★
IG	IECEx FISCO (Intrinsic Safety)	No	★
IM	Technical Regulations Customs Union (EAC) Intrinsic Safety	No	★
KG	USA, Canada, ATEX, and IECEx Intrinsic Safety	No	★
N1	ATEX Type n (enclosure required)	Yes	★
N3	China Type n (enclosure required)	Yes	★

Code	Description	Rosemount junction box required?	
N5	USA Class I, Division 2, and Dust Ignition proof (enclosure required)	Yes	★
N6	Canada Class I, Division 2	No	★
N7	IECEx Type n (enclosure required)	Yes	★
NC	ATEX Type n Component (Ex nA nL)	No(2)	★
ND	ATEX Dust (enclosure required)	Yes	★
NJ	IECEx Type n Component (Ex nA nL)	No(2)	★
NK	USA Class I, Division 2	Yes	★
IP	Korea Intrinsic Safety	No	★
NA	No approval	No	★

(1) *Available only with S001 option.*
(2) *The Rosemount 848T ordered with component approval is not approved as a stand-alone unit. Additional system certification is required.*

Input types

Code	Description	
S001	RTD, thermocouple, mV, Ohm inputs	★
S002(1)	RTDs, thermocouple, mV, Ohm and 4–20 mA inputs	★

(1) *S002 is only available with Product Certification N5, N6, N1, NC, NK, and NA.*

Additional options

Plantweb™ advanced diagnostics

Code	Description	
D04	Measurement validation diagnostic	★

Transient protection

Code	Description	
T1	Integral transient protector	★

Mounting bracket

Code	Description	
B6	Mounting bracket for 2-in. (51 mm) pipe mounting – SST bracket and bolts	★

Enclosure options

Code	Description	
JA4	Aluminum with cable glands (9 x ½-in. NPT for 0.30-in. (7.5 mm) – 0.47-in. (11.9 mm))	★
JA5	Aluminum with conduit entries (nine plugged holes, suitable for installing ½-in. NPT fittings)	★
JS1	Stainless steel junction box; no entries	★
JS2	Stainless steel box, cable glands (9 × M20 nickel-plated brass glands for 0.30-in. (7.5 mm) – 0.47-in. (11.9 mm) unarmored cable)	★
JS3	Stainless steel box, conduit entries (five plugged holes, suitable for installing ½-in. NPT fittings)	★

Software configuration

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

Line filter

Code	Description	
F5	50 Hz line voltage filter	★

Calibration certificate

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

Special temperature test

Code	Description	
LT	Test to –60 °F (–51 °C)	★

Conduit electrical connector

Code	Description	
GE	M12, 4-pin, male connector (Eurofast®)	★
GM	A size mini, 4-pin, male connector (Minifast®)	★

Extended product warranty

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

Wiring

Figure 2: Rosemount 848T Sensor Wiring Diagram

2-wire RTD and ohms

3-wire RTD and ohms(1)

Thermocouples/ohms and millivolts

2-wire RTD with compensation loop(2)

(1) *Emerson provides 4-wire sensors for all single-element RTDs. Use these RTDs in 3-wire configurations by clipping the fourth lead or leaving it disconnected and insulated with electrical tape.*

(2) *The transmitter must be configured for a 3-wire RTD in order to recognize an RTD with a compensation loop.*

Standard configuration

Unless otherwise specified, the transmitter will be shipped as follows for all eight sensors:

Standard configuration settings	
Sensor type(1)	Thermocouple Type J
Damping(1)	Five seconds
Measurement units(1)	°C
Output(1)	Linear with temperature
Line voltage filter(1)	60 Hz
Temperature specific blocks	Sensor transducer block (1)
FOUNDATION™ Fieldbus function blocks	Analog input (8) Multiple analog input (2) Input selector (4)
Input transient filter	Enabled

(1) *For all eight sensors.*

Specifications for Rosemount 848T FOUNDATION™ Fieldbus

Functional specifications

Inputs

- Eight independently configurable channels including combinations of 2- and 3-wire RTDs, thermocouples, mV, 2- and 3-wire and ohm inputs
- 4–20 mA inputs using optional connector(s)

Outputs

Outputs consist of Manchester-encoded digital signal that conforms to IEC 61158 and ISA 50.02.

Status

- 600 Vdc channel to channel isolation(3)
- 10 Vdc channel to channel isolation for all operating conditions with maximum 500 ft. (152 m) of sensor lead length 18 AWG (0.823 mm^2).

Ambient temperature limits

–40 °F (–40 °C) to 185 °F (85 °C)

Accuracy

(Pt 100 at reference condition: 20 °C) ±0.30 °C (±0.54 °F)

Related information

Accuracy — Input options

Isolation

- 600 Vdc channel to channel isolation.(3)
- 10 Vdc channel to channel isolation for all operating conditions with maximum 500 ft. (152 m) of sensor lead length 18 AWG (0.823 mm^2).

Power supply

Powered over FOUNDATION Fieldbus with standard fieldbus power supplies. The transmitter operates between 9.0 and 32.0 Vdc, 22 mA maximum (transmitter power terminals are rated to 42.4 Vdc).

Transient protection

The transient protector (option code T1) helps to prevent damage to the transmitter from transients induced on the loop wiring by lightning, welding, heavy electrical equipment, or switch gears. This option is installed at the factory for the Rosemount 848T and is not intended for field installation.

(3) Reference conditions are -40 °F (-40 °C) to 140 °F (60 °C) with 100 ft. (30 m) of sensor lead length 18 AWG (0.823 mm^2) wire.

Update time

Approximately 1.5 seconds to read all eight inputs

Humidity limits

0–99 percent non-condensing relative humidity

Turn-on time

Performance within specifications is achieved in less than 30 seconds after power is applied to the transmitter.

Alarms

The AI and ISEL function blocks allow the user to configure the alarms to HI-HI, HI, LO, or LO-LO with a variety of priority levels and hysteresis settings.

Electromagnetic compatibility (EMC)

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

Stability

- ±0.1 percent of reading or 0.18 °F (0.1 °C), whichever is greater, for two years for RTDs.
- ±0.1 percent of reading or 0.18 °F (0.1 °C), whichever is greater, for one year for thermocouples.

Self calibration

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

Vibration effect

Tested to the following 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

Backup Link Active Scheduler (LAS)

The transmitter is classified as a device link master, which means it can function as a LAS if the current link master device fails or is removed from the segment.

The host or other configuration tool is used to download the schedule for the application to the link master device. In the absence of a primary link master, the transmitter will claim the LAS and provide permanent control for the H1 segment.

Software upgrade in the field

Software for the Rosemount 848T with FOUNDATION Fieldbus is easy to upgrade in the field using the FOUNDATION Fieldbus Common Device Software Download procedure.

FOUNDATION Fieldbus parameters

Schedule Entries	20
Links	30
Virtual Communications Relationships (VCR)	20

Physical specifications

Conformance to specifications (±3σ [Sigma])

Technology leadership, advanced manufacturing techniques, and statistical process control ensure specification conformance to at least ±3σ.

Mounting

The transmitter can be mounted directly onto a DIN rail or it can be ordered with an optional junction box. When using the optional junction box, the transmitter can be mounted onto a panel or a 2-in. (51 mm) pipe stand (with option code B6).

Entries for optional junction box

No entry	Used for custom fittings.
Cable gland for aluminum junction box (JA4)	9 x ½-in. NPT nickel-plated brass glands for 0.30-in. (7.5 mm) – 0.47-in. (11.9 mm) unarmored cable
Cable gland for stainless steel junction box (JS2)	9 x M20 nickel-plated brass glands for 0.30-in. (7.5 mm) – 0.47-in. (11.9 mm) unarmored cable
Conduit	Five plugged 0.86-in. (21.8 mm) diameter holes suitable for installing ½-in. NPT fittings.

Materials of construction for optional junction box

Junction box type	Paint
Aluminum	Epoxy resin
Stainless steel	N/A

Weight

Assembly	Weight		
	oz	lb	kg
Rosemount 848T only	7.5	.47	.208
Rosemount 848T aluminum(1)	76	4.75	2.2
Stainless steel(1)	77.0	4.81	2.18

(1) *Add 35.2 oz (2.2 lb, 0.998 kg) for nickel-plated brass glands.*

Environmental ratings

Type 4X and IP66 with optional junction box.

Function blocks

Analog Input (AI)

- Processes the measurement and makes it available on the fieldbus segment.
- Allows filtering, alarming, and engineering unit changes.

Input Selector (ISEL)

- Used to select between inputs and generate an output using specific selection strategies such as minimum, maximum, midpoint, or average temperature.
- Since the temperature value always contains the measurement status, this block allows the selection to be restricted to the first “good” measurement.

Multiple Analog Input (MAI) Block

- The MAI block allows the eight AI blocks to be multiplexed together so they serve as one function block on the H1 segment, resulting in greater network efficiency.

Accuracy — Input options

Table 1: 2- and 3-wire RTDs

Sensor option	Sensor reference	Input ranges		Accuracy over range(s)	
		°C	°F	°C	°F
Pt 50 (α = 0.00391)	GOST 6651-94	–200 to 550	–328 to 1022	± 0.57	± 1.03
Pt 100 (α = 0.00391)	GOST 6651-94	–200 to 550	–328 to 1022	± 0.28	± 0.50
Pt 100 (α = 0.00385)	IEC 751; α = 0.00385, 1995	–200 to 850	–328 to 1562	± 0.30	± 0.54
Pt 100 (α = 0.003916)	JIS 1604, 1981	–200 to 645	–328 to 1193	± 0.30	± 0.54
Pt 200 (α = 0.00385)	IEC 751; α = 0.00385, 1995	–200 to 850	–328 to 1562	± 0.54	± 0.98
Pt 200 (α = 0.003916)	JIS 1604; α = 0.003916, 1981	–200 to 645	–328 to 1193	± 0.54	± 0.98
Pt 500	IEC 751; α = 0.00385, 1995	–200 to 850	–328 to 1562	± 0.38	± 0.68
Pt 1000	IEC 751; = 0.00385, 1995	–200 to 300	–328 to 572	± 0.40	± 0.72
Ni 120	Edison curve no. 7	–70 to 300	–94 to 572	± 0.30	± 0.54
Cu 10	Edison curve no. 7	–50 to 250	–58 to 482	± 3.20	± 5.76
Cu 100 (a=428)	GOST 6651-94	–185 to 200	–301 to 392	± 0.48	±0.86
Cu 50 (a=428)	GOST 6651-94	–185 to 200	–301 to 392	± 0.96	±1.73
Cu 100 (a=426)	GOST 6651-94	–50 to 200	–58 to 392	± 0.48	±0.86
Cu 50 (a=426)	GOST 6651-94	–50 to 200	–58 to 392	± 0.96	±1.73

Table 2: Thermocouples—cold junction adds + 0.5 °C to listed accuracy

Sensor option	Sensor reference	Input ranges		Accuracy over range(s)	
		°C	°F	°C	°F
NIST Type B (Accuracy varies according to input range)	NIST Monograph 175	100 to 300 301 to 1820	212 to 572 573 to 3308	± 6.00 ± 1.54	± 10.80 ± 2.78
NIST Type E	NIST Monograph 175	–200 to 1000	–328 to 1832	± 0.40	± 0.72
NIST Type J	NIST Monograph 175	–180 to 760	–292 to 1400	± 0.70	± 1.26
NIST Type K	NIST Monograph 175	–180 to 1372	–292 to 2501	± 1.00	± 1.80
NIST Type N	NIST Monograph 175	–200 to 1300	–328 to 2372	± 1.00	± 1.80
NIST Type R	NIST Monograph 175	0 to 1768	32 to 3214	± 1.50	± 2.70
NIST Type S	NIST Monograph 175	0 to 1768	32 to 3214	± 1.40	± 2.52
NIST Type T	NIST Monograph 175	–200 to 400	–328 to 752	± 0.70	± 1.26
DIN L	DIN 43710	–200 to 900	–328 to 1652	± 0.70	± 1.26
DIN U	DIN 43710	–200 to 600	–328 to 1112	± 0.70	± 1.26
w5Re26/W26Re	ASTME 988-96	0 to 2000	32 to 3632	± 1.60	± 2.88
Type L	GOST R 8.585-2001	–200 to 800	–328 to 1472	± 0.71	±1.28
Terminal temperature		–50 to 85	–58 to 185	±0.50	±0.90
Millivolt input—Not approved for use with CSA Option Code I6		–10 to 100 mV		± 0.05 mV	
2- and 3-wire Ohm input		0 to 2000 ohms		± 0.90 ohm	
4–20 mA (Rosemount)(1)		4–20 mA		± 0.01 mA	
4–20 mA (NAMUR)(1)		4–20 mA		± 0.01 mA	

(1) *Requires the S002 option code.*

Related information

Accuracy

Differential configuration notes

Differential capability exists between any two sensor types.

For all differential configurations, the input range is X to Y where:

X = Sensor A minimum - Sensor B max.

Y = Sensor A maximum - Sensor B min.

Accuracy for differential configurations

If sensor types are similar (for example, both RTDs or both thermocouples), the accuracy = 1.5 times worst case accuracy of either sensor type. If sensor types are dissimilar (for example, one RTD and one thermocouple), the accuracy = Sensor 1 Accuracy + Sensor 2 Accuracy.

Analog sensors 4-20 mA

Two types of alarm levels are available with 4–20 mA sensors on the Rosemount 848T. These types must be ordered with the S002 option code complete with an analog connector kit. The alarm levels, accuracy for each type are listed in the following table.

Table 3: Analog sensors

Sensor option	Alarm levels	Accuracy
4–20 mA (Rosemount standard)	3.9 to 20.8 mA	± 0.01 mA
4–20 mA (NAMUR)	3.8 to 20.5 mA	± 0.01 mA

Ambient temperature effect

Transmitters may be installed in locations where the ambient temperature is between –40 °F (–40 °C) and 185 °F (85 °C).

Table 4: RTD

NIST type	Accuracy per 1.0 °C (1.8 °F) change in ambient temperature[1][2]	Temperature range (°C)
Pt 50 (α = 0.00391)	0.004 °C (0.0072 °F)	N/A
Pt 100 (α = 0.00391)	0.002 °C (0.0036 °F)	N/A
Pt 100 (α = 0.00385)	0.003 °C (0.0054 °F)	N/A
Pt 100 (α = 0.003916)	0.003 °C (0.0054 °F)	N/A
Pt 200 (α = 0.003916)	0.004 °C (0.0072 °F)	N/A
Pt 200 (α = 0.00385)	0.004 °C (0.0072 °F)	N/A
Pt 500	0.003 °C (0.0054 °F)	N/A
Pt 1000	0.003 °C (0.0054 °F)	N/A
Cu 10	0.03 °C (0.054 °F)	N/A
Cu 100 (a = 428)	0.002 °C (0.0036 °F)	N/A
Cu 50 (a = 428)	0.004 °C (0.0072 °F)	N/A
Cu 100 (a = 426)	0.002 °C (0.0036 °F)	N/A
Cu 50 (a = 426)	0.004 °C (0.0072 °F)	N/A
Ni 120	0.003 °C (0.0054 °F)	N/A

(1) *Change in ambient is in reference to the calibration temperature of the transmitter 68 °F (20 °C) typical from the factory.*
(2) *Ambient temperature effect specification valid over minimum temperature span of 28 °C (50 °F).*

Table 5: Thermocouple (R = the value of the reading)

NIST type	Accuracy per 1.0 °C (1.8 °F) change in ambient temperature[1][2]	Temperature range (°C)
Type B	0.014 °C 0.032 °C - (0.0025% of [R - 300]) 0.054 °C - (0.011% of [R - 100])	R ≥ 1000 300 ≤ R < 1000 100 ≤ R < 300
Type E	0.005 °C + (0.00043% of R)	All
Type J, DIN Type L	0.0054 °C + (0.00029% of R) 0.0054 °C + (0.0025% of |R|)	R ≥ 0 R < 0

Table 5: Thermocouple (R = the value of the reading) *(continued)*

NIST type	Accuracy per 1.0 °C (1.8 °F) change in ambient temperature[1][2]	Temperature range (°C)
Type K	0.0061 °C + (0.00054% of R) 0.0061 °C + (0.0025% of |R|)	R ≥ 0 R < 0
Type N	0.0068 °C + (0.00036% of R)	All
Type R, Type S	0.016 °C 0.023 °C - (0.0036% of R)	R ≥ 200 R < 200
Type T, DIN Type U	0.0064 °C 0.0064 °C - (0.0043% of |R|)	R ≥ 0 R < 0
GOST Type L	0.007 °C 0.007 °C + (0.003% of IRI)	R ≥ 0 R < 0
Type w5Re26	0.016 °C 0.023 °C - (0.0036% of R)	R > (less than or equal to) 200 R < 200
Millivolt	0.0005 mV	N/A
2- and 3-wire Ohm	0.0084 ohms	N/A
4–20 mA (Rosemount)	0.0001 mA	N/A
4-20 mA (NAMUR)	0.0001 mA	N/A

(1) *Change in ambient is in reference to the calibration temperature of the transmitter 68 °F (20 °C) typical from the factory.*
(2) *Ambient temperature effect specification valid over minimum temperature span of 28 °C (50 °F).*

Ambient temperature notes

Examples

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

- Ambient temperature effects: 0.003 °C x (30 – 20) = 0.03 °C
- Worst case error: Sensor accuracy + Ambient temperature effects = 0.30 °C + 0.03 °C = 0.33 °C
- Total probable error:

$$\sqrt{0.30^2 + 0.03^2} = 0.30\ °C$$

Product certifications

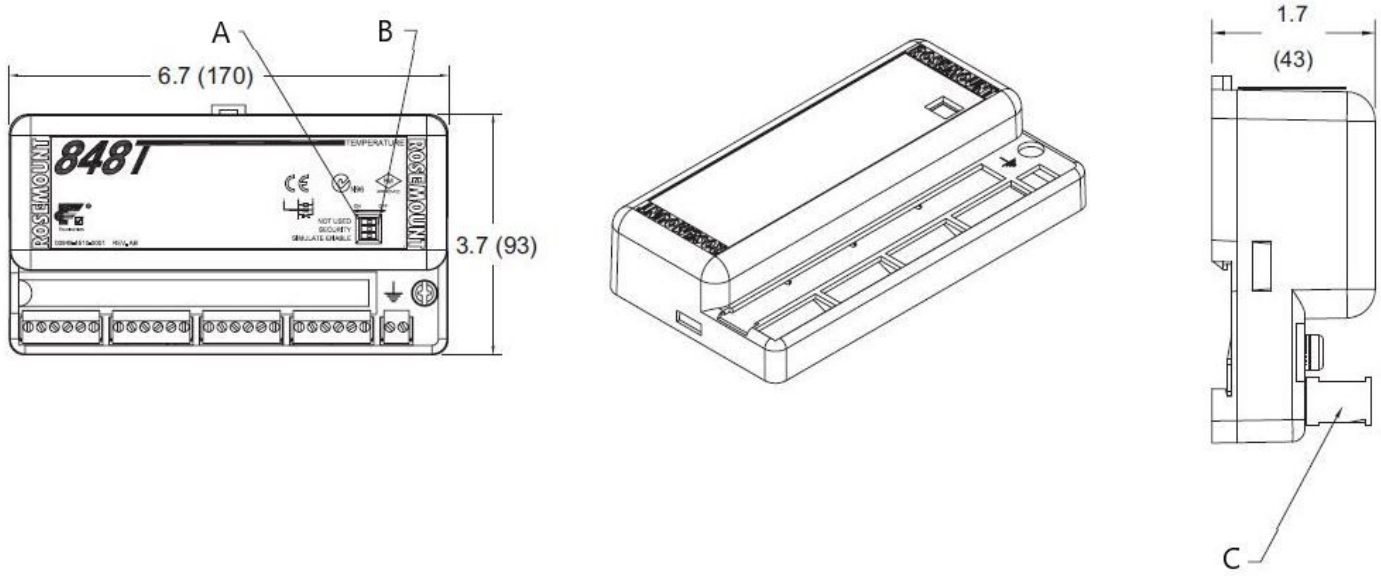
For Rosemount 848T FOUNDATION™ Fieldbus product certifications, see the Rosemount 848T FOUNDATION Fieldbus High Density Temperature Transmitter Quick Start Guide.

Dimensional drawings for Rosemount 848T FOUNDATION Fieldbus

Junction boxes

External dimensions for junction boxes with no entries are the same as those outlined for the other junction box materials in this section.

Figure 3: Rosemount 848T

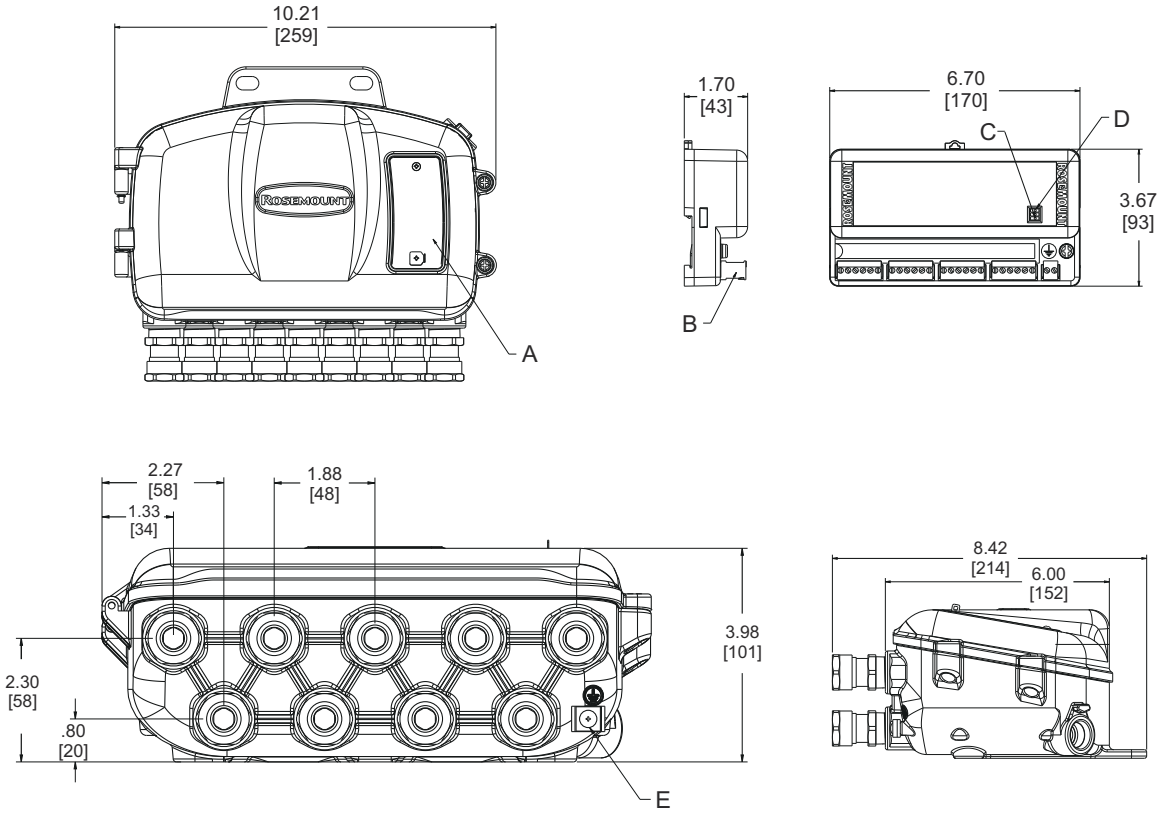


A. Security switch
B. Simulation switch
C. Removable wiring connection

Note
Dimensions are in inches (millimeters).

Aluminum junction box

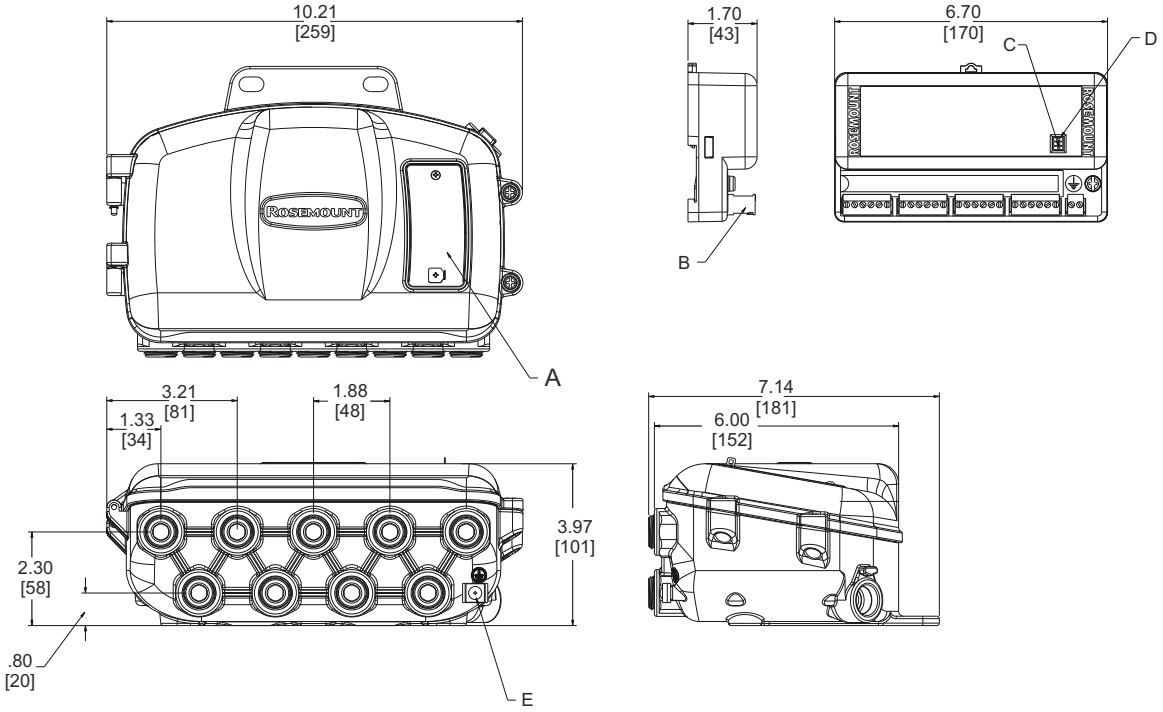
Figure 4: Aluminum junction box with cable glands (option code JA4)



A. Nameplate
B. Removable wiring connector
C. Security switch
D. Simulation switch
E. External ground screw (optional)

Note
Dimensions are in inches (millimeters).

Figure 5: Aluminum junction box with plugged holes (option code JA5)

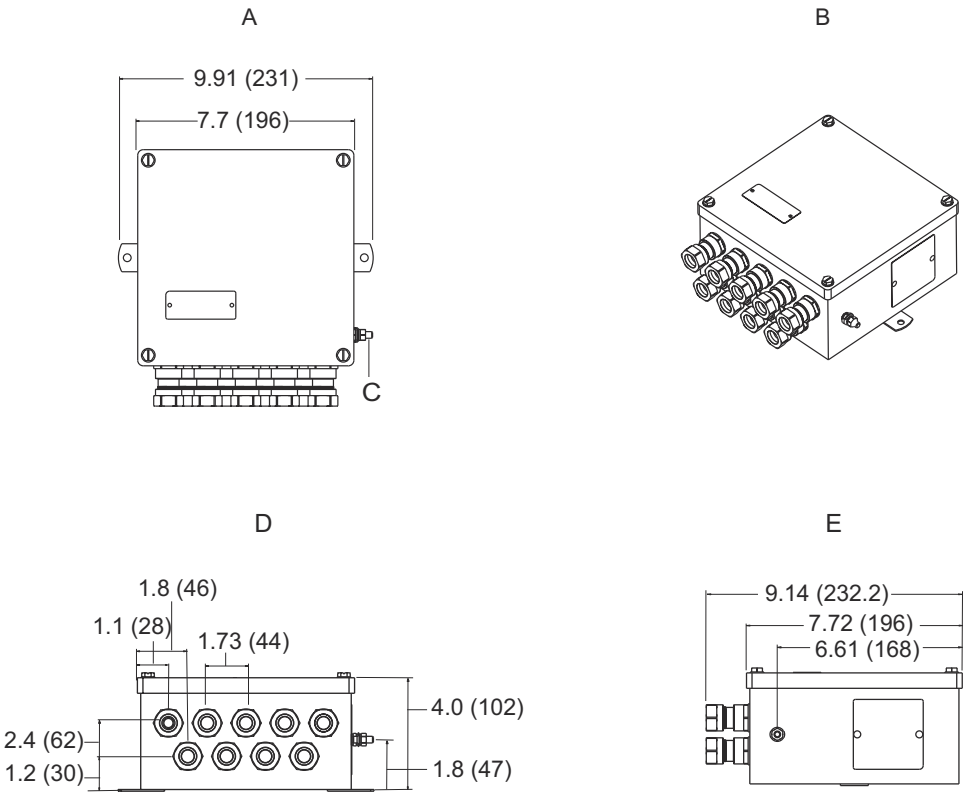


A. Nameplate
B. Removable wiring connection
C. Security switch
D. Simulation switch
E. External ground screw (optional)

Note
Dimensions are in inches (millimeters).

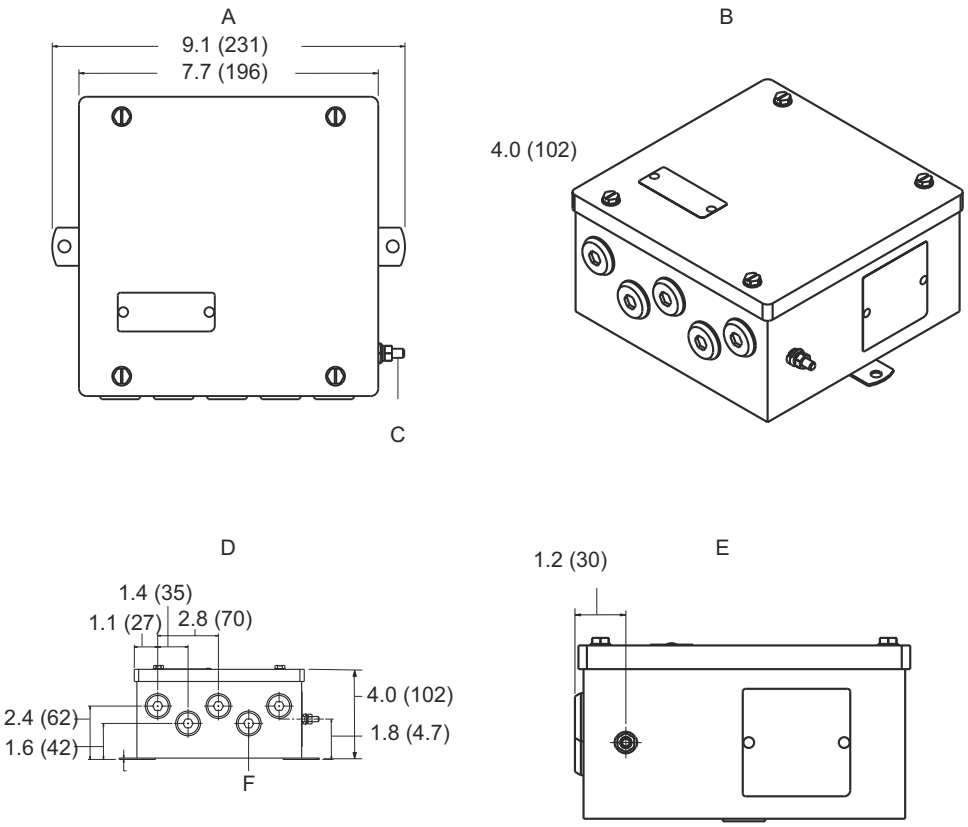
Stainless steel junction box

Figure 6: Stainless steel junction box with cable glands (option code JS2)



A. Top view
B. 3-D view
C. Ground screw
D. Front view
E. Side view

Figure 7: Stainless steel junction box with a conduit entry (option code JS3)



A. Top view
B. 3-D view
C. Ground screw
D. Front view
E. Side view
F. Five plugged 0.86-in (21.8 mm) diameter holes suitable for installing ½-in. NPT fittings

Note
Dimensions are in inches (millimeters).

Mounting options

Figure 8: Mount an aluminum junction box

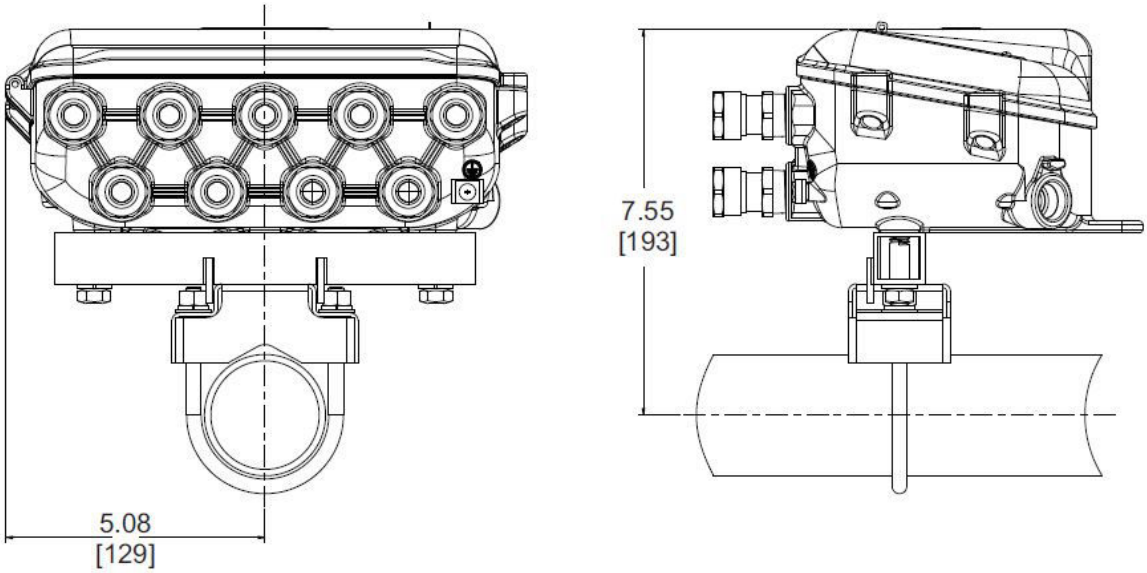


Figure 9: Mount a stainless steel junction box

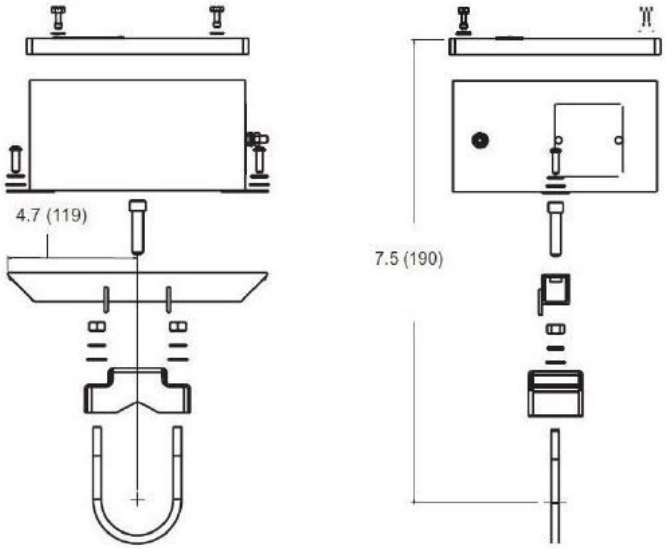


Figure 10: Mount aluminum on a vertical pipe

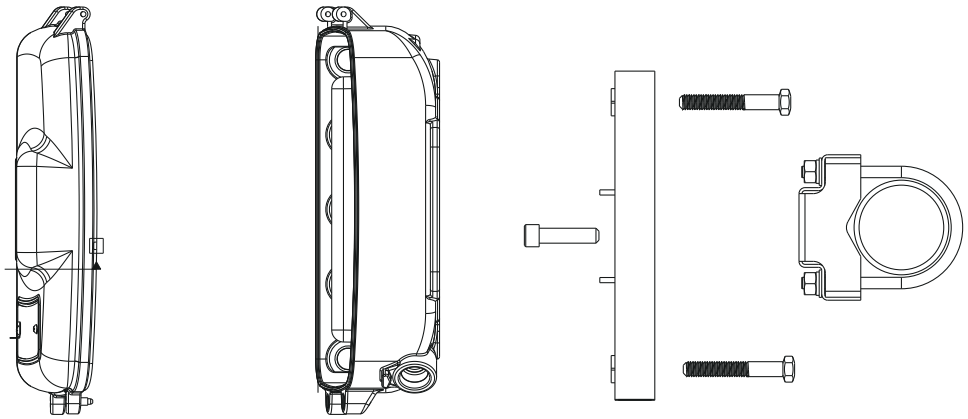
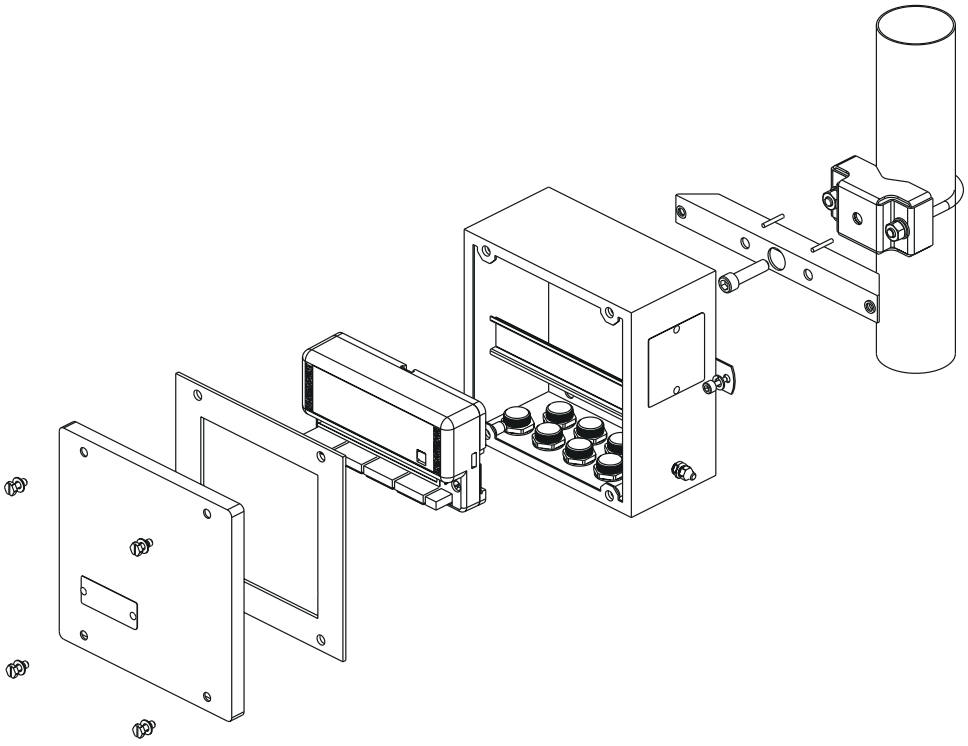


Figure 11: Mount stainless steel on vertical pipe



Note
Dimensions are in inches (millimeters).

Rosemount 848T Wireless Temperature Transmitter

The Rosemount 848T is the premier choice for Wireless High Density measurements. Four independently configurable inputs are transmitted through *Wireless*HART®. Costs per point are dramatically reduced through the use of smart wireless networks, with the same reliability and security of wired solutions.

Additionally, the field hardened enclosure is suitable for installation in IS areas. Capabilities include:

Four independently configurable inputs, including 2-, 3- and 4-wire RTDs, thermocouples, 0-1000 mV, 2-, 3- and 4-wire ohms, and 4-20 mA signals.

CONFIGURE > VIEW PRODUCT >

Online product configurator

Many products are configurable online using our product configurator. Select the **Configure** button or visit Emerson.com/MeasurementInstrumentation 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 12.

Figure 12: Model code example

3144P D1 A 1 NA (1) M5 DA1 Q4 (2)

1. Required model components [4]
2. Additional options [5]

(4) Choices available on most.
(5) Variety of features and functions that may be added to products.

Specifications and options

Specification and selection of product materials, options, and/or components must be made by the purchaser of the equipment.

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	
848T	High Density Temperature Measurement Family	★

Transmitter output

Code	Description	
X	Wireless	★

Product certification

Code	Description	
I1	ATEX Intrinsic Safety	★
I2	Brazil Intrinsic Safety	★
I3	China Intrinsic Safety	★
I4	Japan Intrinsic Safety	★
I5	USA Intrinsically Safe	★
I6	Canada Intrinsically Safe	★
I7	IECEx Intrinsic Safety	★
N5	USA Class I, Division 2, and Dust Ignition-proof (enclosure required)	★
N6	Canada Class I, Division 2	★
IM	Technical Regulations Customs Union (EAC) Intrinsic Safety	★
NA	No Approval	★
IP	Korea Intrinsic Safety	★

Input type

Code	Description	
S001	RTD, thermocouple, mV, ohm inputs	★

Code	Description	
S002[1]	RTD, thermocouple, mV, ohm and 4–20 mA inputs	★

(1) *Only available with product certifications NA and N5. Stable resistors included.*

Additional options

Wireless update rate, operating frequency, and protocol

Code	Description	
WA3	User configurable update rate, 2.4 GHz, *Wireless*HART®	★

Omnidirectional wireless antenna and SmartPower™

Black power module must be shipped separately, order Model 701PBKKF.

Code	Description	
WK1	Long Range, Integral Antenna, Power Module Adapter, Intrinsically Safe (Power Module separate)	★
WM1	Extended Range, External Antenna, Adapter for Black Power Module (I.S. Power Module Sold Separately)	★

Mounting bracket

Code	Description	
B6	Mounting bracket for 2-in. (51 mm) pipe mounting – SST bracket and bolts	★

Enclosure options

Option HA1 or HA2 required for wireless.

Code	Description	
HA1	Aluminum with cable glands (5 × ½-in. NPT for 0.30-in. (7.5 mm) - 0.47-in. (11.9 mm))	★
HA2	Aluminum with conduit entries (5 plugged holes, suitable for installing ½-in. NPT fittings)	★

Software configuration

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

Line filter

Code	Description	
F5	50 Hz line voltage filter	★

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)	★

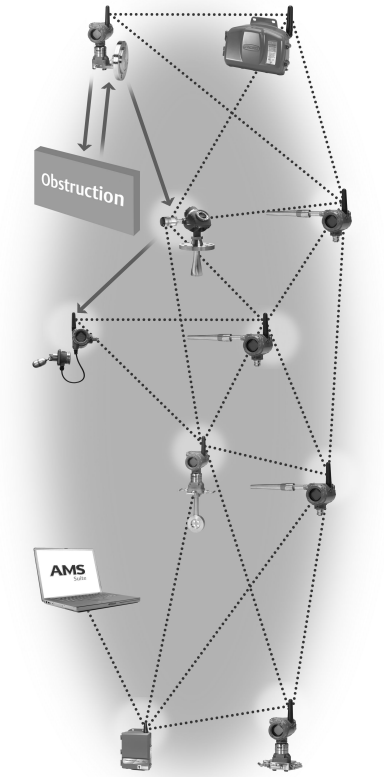
Extended product warranty

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

*Wireless*HART®...industry standard

Self-organizing adaptive mesh routing

- No wireless expertise required—devices automatically find the best communication paths
- Network continuously monitors paths for degradation and repairs itself
- Adaptive behavior provides reliable, hands-off operation and simplifies network deployments, expansion, and reconfiguration
- Supports both star and mesh topologies



Industry standard radio with channel hopping

- Standard IEEE 802.15.4 radios
- 2.4 GHz ISM band sliced into 16 radio-channels
- Continually “hop” across channels to avoid interference and increase reliability

- Frequency Hopping Spread Spectrum (FHSS) technology delivers high reliability in challenging radio environment

Self-healing network

- If an obstruction is introduced into the mesh network, devices will automatically find the best alternate communication path.
- This allows the network to instantly change to the new path without any loss in data.

Seamless integration to existing hosts

- Transparent and seamless integration
- Same control system applications
- Gateways connect using industry protocols

Specifications for Rosemount 848T Wireless

Functional specifications

Input

Four independently configurable input channels that supports Thermocouple, RTD, mV, ohm, and 4–20 mA, input types. See Accuracy for sensor options.

Output

IEC 62591 (*Wireless*HART®), 2.4 GHz DSSS

Ambient temperature limits

-40 °F (-40 °C) to 185 °F (85 °C)

Humidity limits

0–99 percent non-condensing relative humidity

Update rate

User selectable, 4 seconds to 60 minutes

Accuracy

(Pt 100 at reference condition: 20 °C)

±0.30 °C (±0.54 °F)

For the complete list, see Accuracy.

Isolation

Isolation between all sensor channels is rated to 10 Vdc over all operating conditions. No damage will occur to the device with up to 250 Vdc between any sensor channels.

Alerts

Message sent when open or short sensor is detected

Electromagnetic Compatibility (EMC)

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

Transmitter stability

- ±0.15 percent of reading or 0.27 °F (0.15 °C), whichever is greater, for two years for RTDs
- ±0.15 percent of reading or 0.27 °F (0.15 °C), whichever is greater, for one year for thermocouples

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

Tested to the following 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

Physical specifications

Material selection

Emerson provides a variety of Rosemount products with various 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 (±3σ [Sigma])

Technology leadership, advanced manufacturing techniques, and statistical process control ensure specification conformance to at least ±3σ.

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 the Lithium-thionyl chloride with a polybutadine terephthalate (PBT) enclosure. The 848T Wireless has a power module life time rating of six years with a one-minute update rate, at reference conditions.(6)

Sensor terminals

Sensor terminals permanently fixed to terminal block.

Field Communicator connections

Communication terminals

Clips permanently fixed to terminal block.

(6) Reference conditions are 68 °F (20 °C), and routing data for three additional network devices. Continuous exposure to ambient temperature limits -40 °F (-40 °C) or 185 °F (85 °C) may reduce specified life to less than 20 percent.

Materials of construction

Enclosure

Component	Material
Housing	Low-copper aluminum
Paint	Polyurethane
Cover O-ring	Silicone

Terminal block and power module

PBT

Antenna

PBT/Polycarbonate (PC) integrated omni-directional antenna

Mounting

Transmitter can be panel mounted, or be mounted onto a 2-in. (51 mm) pipe stand (with option code B6). Sensors must be remotely mounted, as transmitter conduit entries are not designed for direct sensor mounting.

Weight

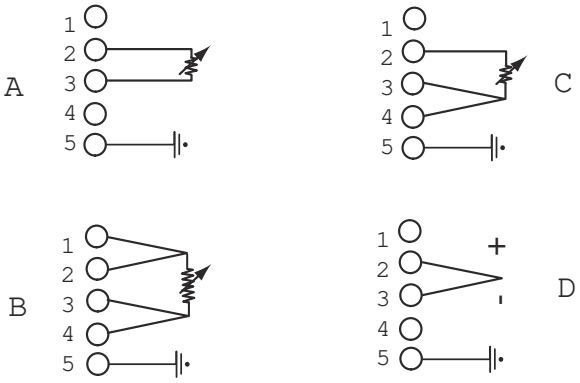
Rosemount 848T Wireless - 4.75 lb. (2.2 kg)

Enclosure ratings (Rosemount 848T Wireless)

Housing option codes HA1 or HA2 are Type 4x and IP66.

Sensor connections

Figure 13: Rosemount 848T Wireless Sensor Connections Diagram



A. 2-wire RTD and Ω
B. 4-wire RTD and Ω
C. 3-wire RTD and Ω
D. Thermocouple and mV

Accuracy

Table 6: 2-, 3-, and 4-wire RTDs

Sensor option	Sensor reference	Input ranges		Accuracy over range(s)	
		°C	°F	°C	°F
Pt 50 (α = 0.00391)	GOST 6651-94	–200 to 550	–328 to 1022	± 0.57	± 1.03
Pt 100 (α = 0.00391)	GOST 6651-94	–200 to 550	–328 to 1022	± 0.28	± 0.50
Pt 100 (α = 0.00385)	IEC 751; α = 0.00385, 1995	–200 to 850	–328 to 1562	± 0.30	± 0.54
Pt 100 (α = 0.003916)	JIS 1604, 1981	–200 to 645	–328 to 1193	± 0.30	± 0.54
Pt 200 (α = 0.00385)	IEC 751; = 0.00385, 1995	–200 to 850	–328 to 1562	± 0.54	± 0.98
PT 200 (α = 0.003916)	JIS 1604, 1981 (= 0.003916)	–200 to 645	–328 to 1193	± 0.54	± 0.98
Pt 500 (α = 0.00385)	IEC 751; = 0.00385, 1995	–200 to 850	–328 to 1562	± 0.38	± 0.68
Pt 1000 (α = 0.00385)	IEC 751; = 0.00385, 1995	–200 to 300	–328 to 572	± 0.40	± 0.72
Ni 120	Edison Curve No. 7	–70 to 300	–94 to 572	± 0.30	± 0.54
Cu 10	Edison Copper Winding No. 15	–50 to 250	–58 to 482	± 3.20	± 5.76
Cu 100 (a=428)	GOST 6651-94	–185 to 200	–301 to 392	± 0.48	±0.86
Cu 50 (a=428)	GOST 6651-94	–185 to 200	–301 to 392	± 0.96	±1.73
Cu 100 (a=426)	GOST 6651-94	–50 to 200	–58 to 392	± 0.48	±0.86
Cu 50 (a=426)	GOST 6651-94	–50 to 200	–58 to 392	± 0.96	±1.73

Table 7: Thermocouples — cold junction adds + 0.5 °C to listed accuracy

Sensor option	Sensor reference	Input ranges		Accuracy over range(s)	
		°C	°F	°C	°F
NIST Type B (Accuracy varies according to input range)	NIST Monograph 175	100 to 300 301 to 1820	212 to 572 573 to 3308	± 6.00 ± 1.54	10.80 ± 2.78
NIST Type E	NIST Monograph 175	–200 to 1000	–328 to 1832	± 0.40	± 0.72
NIST Type J	NIST Monograph 175	–180 to 760	–292 to 1400	± 0.70	± 1.26
NIST Type K	NIST Monograph 175	–180 to 1372	–292 to 2502	± 1.00	± 1.80
NIST Type N	NIST Monograph 175	–200 to 1300	–328 to 2372	± 1.00	± 1.80
NIST Type R	NIST Monograph 175	0 to 1768	32 to 3214	± 1.50	± 2.70
NIST Type S	NIST Monograph 175	0 to 1768	32 to 3214	± 1.40	± 2.52
NIST Type T	NIST Monograph 175	–200 to 400	–328 to 752	± 0.70	± 1.26

Table 7: Thermocouples — cold junction adds + 0.5 °C to listed accuracy *(continued)*

Sensor option	Sensor reference	Input ranges		Accuracy over range(s)	
		°C	°F	°C	°F
DIN L	DIN 43710	–200 to 900	–328 to 1652	± 0.70	± 1.26
DIN U	DIN 43710	–200 to 600	–328 to 1112	± 0.70	± 1.26
w5Re/W26Re	ASTME 988-96	0 to 2000	32 to 3632	± 1.60	± 2.88
Type L	GOST R.8.585-2001	–200 to 800	–328 to 1472	±0.71	±1.28
Terminal Temperature		–50 to 85	–58 to 185	±3.50	±6.30
Input units					
Ohm input		0 to 2000 ohms		±0.90 ohms	
Millivolt input		–10 to 100 mV		±0.05 mV	
1000 mV input		–10 to 1000 mV		±1.0 mV	
4–20 mA (Rosemount)(1)		4–20 mA ±0.01		±0.01 mA	
4–20 mA (NAMUR)(1)		4–20 mA ±0.01		±0.01 mA	

(1) *Requires the S002 option code.*

Analog sensors 4–20 mA

Two types of alarm levels are available with 4–20 mA sensors on the Rosemount 848T. These types must be ordered with the S002 option code complete with an analog connector kit. The alarm levels, accuracy for each type are listed in the table below:

Table 8: Analog sensors

Sensor option	Alarm levels	Accuracy
4–20 mA (Rosemount Standard)	3.9 to 20.8 mA	± 0.01 mA
4–20 mA (NAMUR)	3.8 to 20.5 mA	± 0.01 mA

Ambient temperature effect

Transmitters may be installed in locations where the ambient temperature is between –40 °F (–40 °C) and 185 °F (85 °C).

Table 9: RTD

NIST type	Accuracy per 1.0 °C (1.8 °F) change in ambient temperature (1)(2)	Temperature range (°C)
Pt 50 (α = 0.003910)	0.004 °C (0.0072 °F)	N/A
Pt 100 (α = 0.00391)	0.002 °C (0.0036 °F)	N/A
Pt 100 (α = 0.00385)	0.003 °C (0.0054 °F)	N/A
Pt 100 (α = 0.003916)	0.003 °C (0.0054 °F)	N/A
Pt 200 (α = 0.00385)	0.004 °C (0.0072 °F)	N/A
PT 200 (α = 0.003916)	0.004 °C (0.0072 °F)	N/A
Cu 10	0.03 °C (0.054 °F)	N/A
Pt 500	0.003 °C (0.0054 °F)	N/A
Pt 1000	0.003 °C (0.0054 °F)	N/A
Cu 100 (a=428)	0.002 °C (0.0036 °F)	N/A

Table 9: RTD *(continued)*

NIST type	Accuracy per 1.0 °C (1.8 °F) change in ambient temperature [1][2]	Temperature range (°C)
Cu 50 (a=428)	0.004 °C (0.0072 °F)	N/A
Cu 100 (a=426)	0.002 °C (0.0036 °F)	N/A
Cu 50 (a=426)	0.004 °C (0.0072 °F)	N/A
Ni 120	0.003 °C (0.0054 °F)	N/A

(1) *Change in ambient is in reference to the calibration temperature of the transmitter 68 °F (20 °C) typical from the factory).*
(2) *Ambient temperature affects valid specifications over a minimum temperature span of 50 °F (28 °C).*

Table 10: Thermocouple (R = the value of the reading)

NIST type	Accuracy per 1.0 °C (1.8 °F) change in ambient temperature [1][2]	Temperature range (°C)
Type B	0.014 °C 0.032 °C - (0.0025% of [R - 300]) 0.054 °C - (0.011% of [R - 100])	R ≥ 1000 300 ≤ R < 1000 100 ≤ R < 300
Type E	0.005 °C + (0.00043% of R)	All
Type J, Din Type L	0.0054 °C + (0.00029% of R) 0.0054 °C + (0.0025% of |R|)	R ≥ 0 R < 0
Type K	0.0061 °C + (0.00054% of R) 0.0061 °C + (0.0025% of |R|)	R ≥ 0 R < 0
Type N	0.0068 °C + (0.00036% of R)	All
Type R, Type S	0.016 °C 0.023 °C - (0.0036% of R)	R ≥ 200 R < 200
Type T, DIN Type U	0.0064 °C 0.0064 °C - (0.0043% of |R|)	R ≥ 0 R < 0
GOST Type L	0.007 °C 0.007 °C + (0.003% of IRI)	R ≥ 0 R < 0
Input units		
Ohm input	0.0084 ohms	N/A
100 mV input	0.0005 mV	N/A
1000 mV input	0.005 mV	N/A
4–20 mA (Rosemount)	0.0001 mA	N/A
4–20 mA (NAMUR)	0.0001 mA	N/A

(1) *Change in ambient is in reference to the calibration temperature of the transmitter 68 °F (20 °C) typical from the factory.*
(2) *Ambient temperature affects valid specifications over a minimum temperature span of 50 °F (28 °C).*

Ambient temperature notes

Examples

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

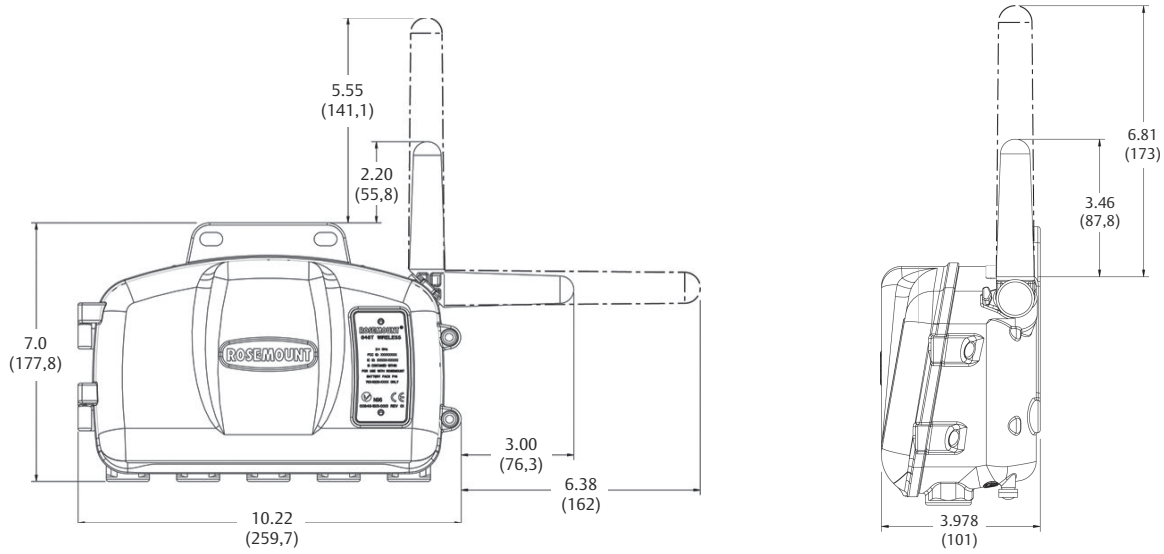
- Ambient temperature effects: 0.003 °C x (30 – 20) = 0.03 °C
- Worst case error: Sensor accuracy + Ambient temperature effects = 0.30 °C + 0.03 °C = 0.33 °C
- Total probable error:

$$\sqrt{0.30^2 + 0.03^2} = 0.30\ °C$$

Product certifications

For Rosemount 848T Wireless product certifications, see the Rosemount 848T Wireless Temperature Transmitter Quick Start Guide.

Dimensional drawings for Rosemount 848T Wireless



Note
Dimensions are in inches (millimeters).

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For more information: **Emerson.com/global**

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