

Rosemount Pipe Clamp RTD Sensor

- *Platinum RTD Temperature Sensors with silver or nickel tip*
- *Non intrusive design for measurement on pipe applications*
- *Temperature-sensor matching provides increased measurement accuracy*
- *Wide range of calibration options provide maximum measurement reliability*
- *Integrated temperature assemblies provide time and cost savings*



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Rosemount Pipe Clamp RTD Sensor

Success with Surface Temperature Measurement

Overview

The Rosemount Pipe Clamp RTD Sensor is non-intrusive and can be used in rough, corrosive, and high-vibration applications, including the oil, gas and chemical industries. The design of the sensor allows for installation to take place without any welding to ensure high measurement accuracy.

The non-intrusive nature of the sensor does not interfere with internal cleaning of the pipes, saving installation time and costs.

Ease-of-Use

The Rosemount Pipe Clamp RTD Sensor has a spring loaded sensor design that ensures constant contact with the pipe surface without welding or penetrating the pipe while allowing for pipe expansion. The tip materials available, silver and nickel, minimize the thermal resistance between the pipe and the sensor to improve response time.

Complete Assemblies

Emerson makes it easy for you to order and install complete assemblies to accomplish your measurement needs. The Rosemount Pipe Clamp RTD Assembly is available with an in-head HART® or FOUNDATION™ fieldbus transmitter (Rosemount 248 or Rosemount 644). Additionally the Rosemount Pipe Clamp RTD Assembly is available with a direct mount HART or FOUNDATION™ fieldbus transmitter (Rosemount 3144P or Rosemount 648), if an ANPT spring loaded adapter (1/2-in.) is used.

Wireless Measurement

The non-intrusive Pipe Clamp Sensor when partnered with a Rosemount 648 Wireless Temperature Transmitter, provides a quick wireless installation for surface measurements. The simple clamp-on design lets the entire measurement point to easily be moved giving you maximum flexibility for installation.

TEMPERATURE SOLUTIONS

Rosemount 248 Temperature Transmitter

Head mount (DIN B) and rail mount style with HART protocol and complete temperature assembly.

Rosemount 644 Temperature Transmitter

Head mount styles available with HART® or FOUNDATION™ fieldbus protocol. Rail mount style available for HART protocol.

Rosemount 3144P Temperature Transmitter

Field mount style HART® or FOUNDATION fieldbus protocol. Dual sensor input with advanced diagnostics.

Rosemount 648 Wireless Temperature Transmitter

The Rosemount 648 integrates temperature measurement into a self-organizing wireless network, providing best in class security, reliability, SmartPower™ capabilities, and network scalability, optimizing plant performance while minimizing maintenance.

Rosemount 848T Temperature Transmitter

Eight input transmitter available with FOUNDATION fieldbus protocol.

Rosemount 848T Wireless Temperature Transmitter

The 848T Wireless temperature transmitter integrates four temperature measurements into a self-organizing network. It provides a reliable and cost effective solution for high density applications.

Product Data Sheet

00813-0100-4952, Rev AA

April 2009

Rosemount Pipe Clamp RTD Sensor

Overview

Rosemount Pipe Clamp Overview

Emerson offers a wide range of RTDs and thermocouples alone, or as integrated temperature assemblies including Rosemount Temperature Transmitters and connection heads.

Rosemount Pipe Clamp Platinum RTD Sensors are highly linear and have a stable resistance versus temperature relationship. They are used primarily in industrial environments where high accuracy, durability, and long-term stability are required, and are designed to meet the most critical parameters of international standards: IEC 751 1983/DIN EN 60751 incorporating Amendments 1 and 2.⁽¹⁾

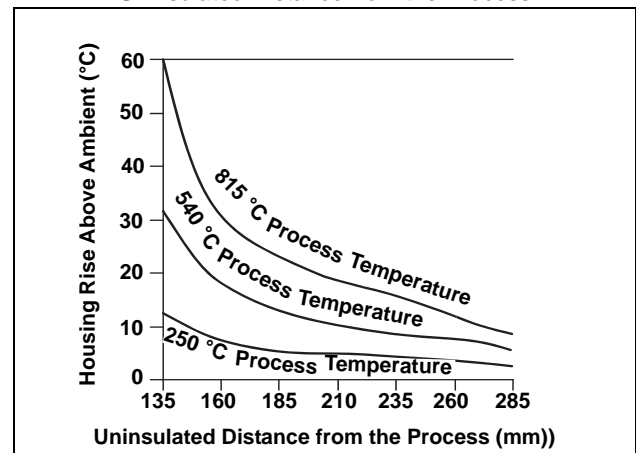
RTD sensors offer enhanced performance and optimal pipe clamp temperature measurement accuracy when coupled with temperature transmitters using Callendar-van Dusen constants. Emerson offers two designs of the Pipe Clamp RTD Sensor. The grated head design is suitable for all above ground applications such as refineries, chemical plants, oil and gas fields, etc. The Pipe Clamp RTD Design with Cable meets the requirements for underground installation and allows for long wiring distances and for pipe movement in extreme environments.

Rosemount Pipe Clamp Sensors are available with flying lead or terminal block lead wire terminations in a variety of lengths and ranges and are available in single and dual element types. Additionally, spring loaded pipe clamps are offered for most industrial application in a wide range of materials, styles, and lengths. Standard materials include SST 304, Duplex and Super Duplex, while other materials for corrosive environments are also available. Emerson also offers Pipe Clamp Sensors as cable assemblies. Consult with your Emerson representative for more information.

Selecting the Extension Length for a Pipe Clamp Sensor

A direct mounting configuration allows heat from the process, aside from ambient temperature variations, to transfer from the pipe clamp to the transmitter housing. If the expected process surface temperature is near or above the transmitter specification limits, consider using additional extension length or a remote mounting configuration to isolate the transmitter. Figure 1 provides an example of the relationship between transmitter housing temperature rise and distance from the process.

FIGURE 1. Transmitter Housing Temperature Rise vs. Uninsulated Distance from the Process



Example

The rated ambient temperature specification for the transmitter is 85 °C. If the maximum ambient temperature is 40 °C and the temperature to be measured is 540 °C, the maximum allowable housing temperature rise is the rated temperature specification limit minus the existing ambient temperature (85 – 40), or 45 °C.

As shown in Figure 1, an uninsulated distance from the process of 90 mm will result in a housing temperature rise of 22 °C. Therefore, 100 mm would be the minimum recommended distance from the process providing a safety factor of about 25 °C. A longer length, such as 150 mm, is desired to reduce errors caused by transmitter temperature effect, although in that case the transmitter may require extra support.

(1) 100Ω at $0 \text{ }^\circ\text{C}$, $\alpha = 0.00385 \Omega \times \text{ }^\circ\text{C}/\Omega$

Rosemount Pipe Clamp RTD Sensor

TRANSMITTER-SENSOR MATCHING

By using a temperature sensor matched to a temperature transmitter, significant measurement accuracy improvement can be attained. This involves identifying the relationship between resistance and temperature for a specific RTD sensor. This relationship is approximated by the Callendar-van Dusen equation:

$$R_t = R_o + R_o\alpha[t - \delta(0.01t - 1)(0.01t) - \beta(0.01t - 1)(0.01t)^3],$$

where:

- R_t = Resistance (ohms) at Temperature t (°C)
- R_o = Sensor-Specific Constant (Resistance at $t = 0$ °C)
- α = Sensor-Specific Constant
- δ = Sensor-Specific Constant
- β = Sensor-Specific Constant (0 at $t > 0$ °C)

The exact values for the Callendar-van Dusen constants (R_o , α , δ , β) are specific to each RTD sensor and are established by testing each individual sensor at various temperatures. Rosemount Pipe Clamp RTD Sensors can be ordered Sensor Calibrated to a Fixed Temperature Range, as shown in Table 2 on page 5, where the values of all four sensor specific constants are supplied for each sensor. To utilize the unique, built-in sensor-matching capability of the Rosemount 644 and 3144P transmitters, the Callendar-van Dusen constants can be programmed into the transmitter at the factory, or in the field using a HART Communicator.

The transmitter uses the Callendar-van Dusen constants to generate a sensor curve describing the relationship between resistance and temperature for this particular sensor and transmitter assembly. There is a 3- or 4-fold improvement in temperature measurement accuracy for the total system by using the sensor's actual resistance vs. temperature curve.

The sensor calibrated specific to a particular temperature range and, as with calibration schedules, the accuracies associated with this option represent worst case conditions when the sensor is used over the entire temperature range.

IEC 751 Interpretation

The Callendar-van Dusen equation is one method used to describe the resistance versus temperature (R vs.T) relationship for platinum RTDs. International Standard IEC 751 interprets the R vs. T relationship using an approach similar to the Callendar-van Dusen methodology. The IEC 751 R vs.T relationship standard uses the following equation:

$$R_t = R_o[1 + At + Bt^2 + C(t-100)t^3]$$

As in the Callendar-van Dusen method, R_o , A, B, C are specific for each RTD and are established by testing each sensor at various temperatures. The actual values for A, B, and C differ in magnitude from the Callendar-van Dusen constants (R_o , α , β , δ), while R_o is the same for both equations. Either methodology produces the same result in any Transmitter-Sensor Matching scenario, since one equation is a simple mathematical interpretation of the other.

TABLE 1. Pipe Clamp Interchangeability

Pipe Clamp RTD IEC-751 Class B	Temperature
±0.80 °C (±1.44 °F)	-100 °C (-148 °F)
±0.30 °C (±0.54 °F)	0 °C (32 °F)
±0.80 °C (±1.44 °F)	100 °C (212 °F)
±1.80 °C (±3.24 °F)	300 °C (572 °F)
±2.30 °C (±4.14 °F)	400 °C (752 °F)
Pipe Clamp RTD with IEC-751 Class A Option	Temperature
±0.35 °C (±0.63 °F)	-100 °C (-148 °F)
±0.15 °C (±0.27 °F)	-0 °C (32 °F)
±0.35 °C (±0.63 °F)	100 °C (212 °F)
±0.75 °C (±1.35 °F)	300 °C (572 °F)
±0.95 °C (±1.71 °F)	400 °C (752 °F)

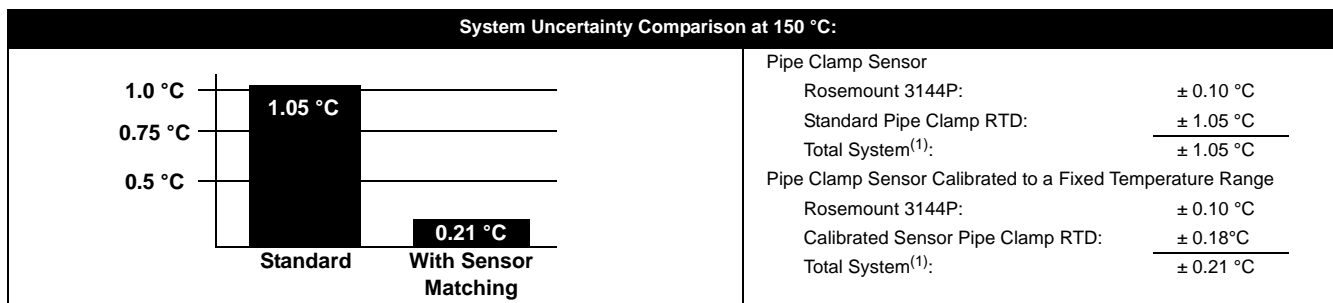
Typical Transmitter-Sensor Matching Accuracy Improvements

Transmitter: Rosemount 3144P (built-in sensor matching capabilities), span of 0 to 200 °C, accuracy = 0.1 °C)

Sensor: Pipe Clamp RTD

Callendar-van Dusen Option: -50 to 150 °C

Process Temperature: 150 °C



(1) Calculated using RSS statistical method:

$$\text{System accuracy} = \sqrt{(\text{Transmitter accuracy})^2 + (\text{Sensor accuracy})^2}$$

CALIBRATION

Sensor calibration may be needed for input to quality systems, or for control system enhancement. It is used mainly to improve the overall temperature measurement performance by matching the sensor to a temperature transmitter.

Calibration Options

Sensor Calibrated to a Customer-Specified Temperature Range option calibrates the sensor to a customer-specified temperature range. The Callendar-van Dusen, and A, B, and C-constants are supplied with a calibration certificate.

NOTE

When ordering an RTD with this option, the temperature range for the sensor calibration needs to be specified.

Sensor Calibrated to a Customer-Specified Single Measurement Point option refers to the above option when calibrated on a single temperature point.

Sensor Calibrated to a Fixed Temperature Range option is where the RTD sensor is calibrated within standard temperature ranges (Table 2 on page 5). To achieve optimum performance, select the option that corresponds to the operating temperature range for your application.

TABLE 2. Temperature Range Options

Temperature Range	Calibration Points (°C)
0 to 100 °C (32 to 212 °F)	0, 50, 100
-50 to 100 °C (-58 to 212 °F)	-50, 0, 50, 100
-50 to 150 °C (-58 to 302 °F)	-50, 0, 100, 150

SENSOR TIP MATERIAL CONFIGURATION

The mount Pipe Clamp Sensor sensor plate tip is constructed of silver or nickel for better thermal conductivity and to reduce the thermal response time of stainless steel designs. Silver tip plate temperature range is -50 to 350 °C (-58 to 662 °F), and the nickel tip plate temperature range is -110 to 450 °C (-166 to 842 °F).

Rosemount Pipe Clamp RTD Sensor

Product Certifications

HAZARDOUS LOCATIONS CERTIFICATION

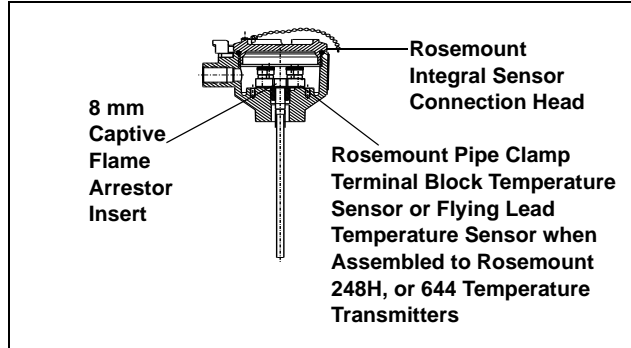
- E1** ATEX/CENELEC Flameproof Approval
ATEX Marking II 2 G
Certification Number. KEMA99ATEX8715
EEx d IIC T6 ($T_{\text{amb}} = -40$ to 70 °C).

The ATEX/CENELEC Flameproof approval is dependent on the Rosemount Connection Head assembled with a Rosemount RTD or thermocouple temperature sensor (see Figure 2). The captive flame arrestor insert must be fully engaged into the connection head for compliance with this approval.

- ATEX Flameproof Approval
ATEX Marking II 2 G
Certification Number. KEMA01ATEX2181.
EEx d IIC T5 ($-40 \leq T_{\text{amb}} \leq 80$ °C)
EEx d IIC T6 ($-40 \leq T_{\text{amb}} \leq 70$ °C)

The Rosemount Pipe Clamp RTD Temperature Sensor with 1/2-in. ANPT Spring Loaded Adapters are approved for direct mount to the Rosemount 3144P Temperature Transmitter (Reference Manual 00809-0100-4021) or the Rosemount 648 Wireless Temperature Transmitter (Reference Manual 00809-0100-4648). For installation information, see the Reference Manuals cited above.

FIGURE 2. ATEX/CENELEC Flameproof Configuration.



- ATEX/IBExU Intrinsic Safety Approval
ATEX Marking II 2 G
EEx ia IIC T6 (-51 to 60 °C)
The Intrinsic Safety Approval is valid for Rosemount Pipe Clamp RTD Sensors, and can only be applied in Zone 1. The marking of intrinsically safe circuits is by color codes, or print. A mounted on connection head is provided with a grounding screw and a blue cable gland.

Pipe Clamp Assembly with Integrated Connection Head or Transmitter Specifications

Rosemount Pipe Clamp Platinum RTD

Nominal Resistance

In accordance with DIN EN 60751, the nominal resistance is defined:

100 Ω RTD at 0 °C

$\alpha = 0.00385 \text{ } \Omega \times \text{ } ^\circ\text{C}/\Omega$, averaged between 0 and 100 °C

Limit Deviations

Tolerance Class B, as standard $t = \pm(0.3 + 0.005 \times [t])$; temperature range 110 to 450 °C

Tolerance Class A, as option $t = (0.15 + 0.002 \times [t])$; temperature range 0 to 250 °C

Process Temperature Range:

-110 to 450 °C (-166 to 842 °C)

Ambient Temperature Range

-51 to 85 °C (-60 to 185 °F)

Self-Heating

0.15 K/mW when measured as defined in DIN EN 60751; 1996.

Thermal Response Time

Sensor response time floating in water according to DIN EN 60751.

Silver tip:

$t_{0.5} = 1.8 \text{ sec } \pm 1 \text{ sec}$

$t_{0.63} = 2.4 \text{ sec } \pm 1 \text{ sec}$

$t_{0.9} = 4.7 \text{ sec } \pm 1 \text{ sec}$

Nickel tip:

$t_{0.5} = 2.1 \text{ sec } \pm 1 \text{ sec}$

$t_{0.63} = 2.7 \text{ sec } \pm 1 \text{ sec}$

$t_{0.9} = 5.5 \text{ sec } \pm 1 \text{ sec}$

Insulation Resistance (RTD)

1,000 MΩ minimum insulation resistance when measured at 500 V dc at room temperature

Sheath Material

321 SST with mineral insulated cable construction and silver or nickel plate tip

Lead Wires

PTFE insulated, silver-coated copper wire (Figure 3)

Identification Data

The model and serial numbers are marked on the bottom of the sensor DIN mounting plate or engraved directly on the spring loaded adapter

Ingress Protection (IP) Rating

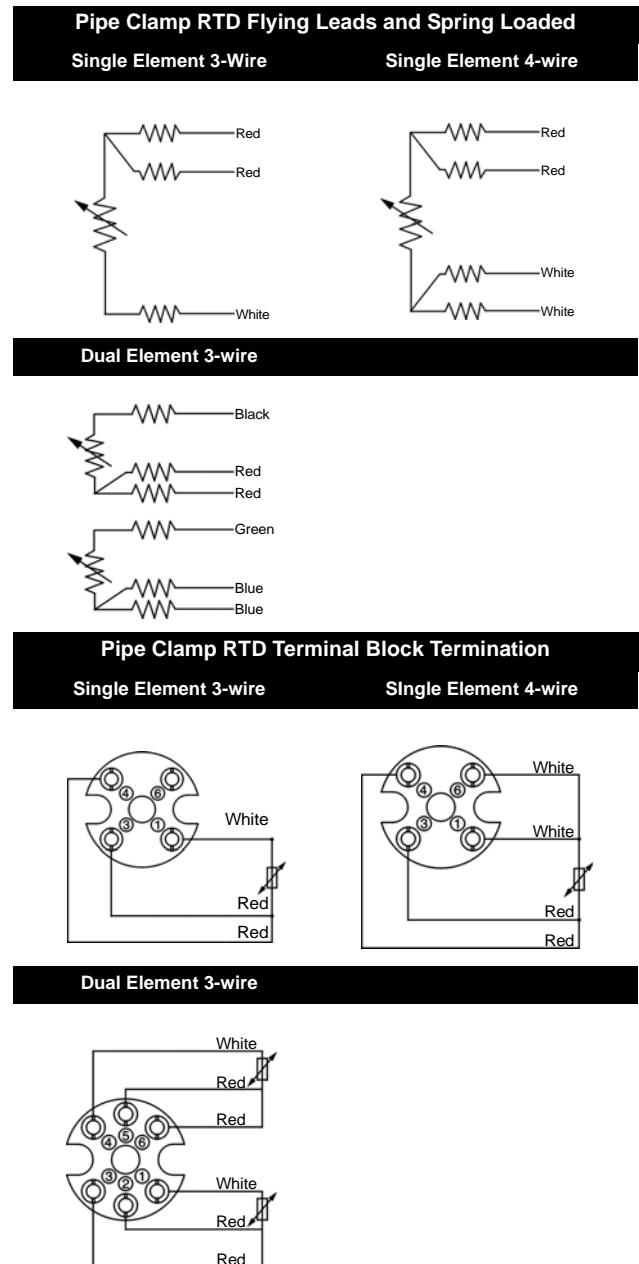
IP68 and NEMA 4X.

Hazardous Locations Certifications

ATEX IBEXU, according to EEx ia

ATEX EEx d

FIGURE 3. Sensor Lead Wire Termination



Rosemount Pipe Clamp RTD Sensor

FIGURE 4. RTD Sensor Dimensional Drawings

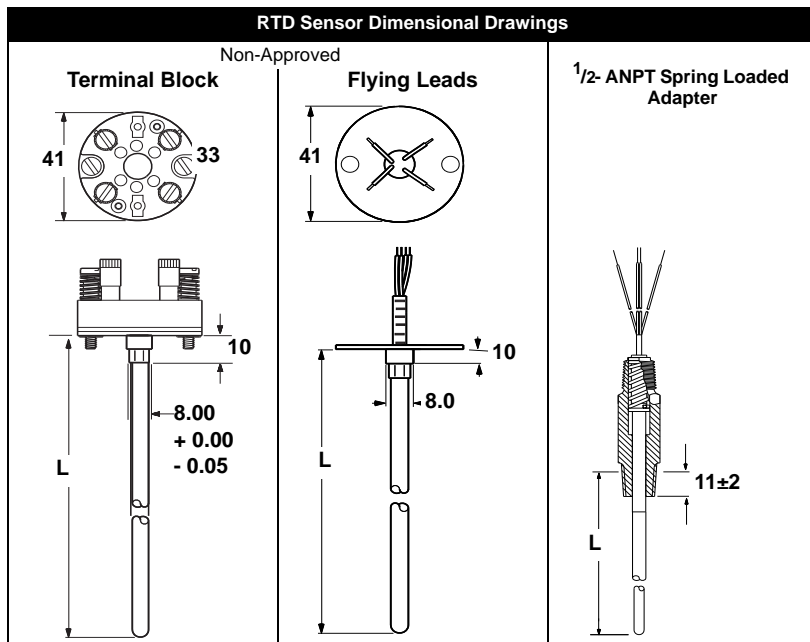


FIGURE 5. Sensor Assembly with DIN Style Measuring Insert Suitable for Use with Terminal Block or Head Mount Transmitter

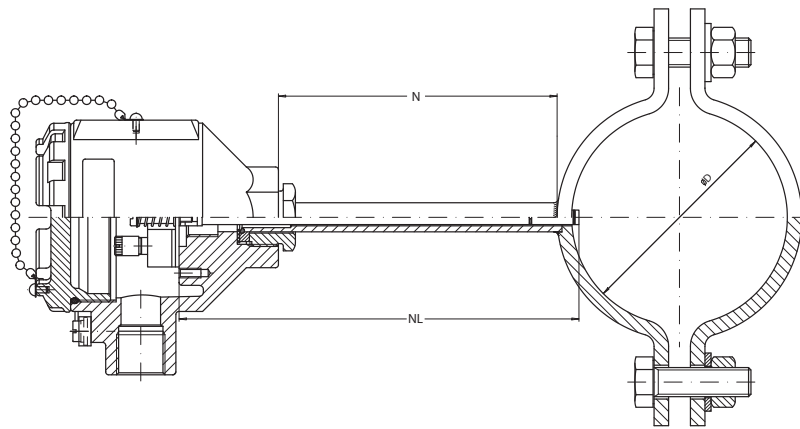
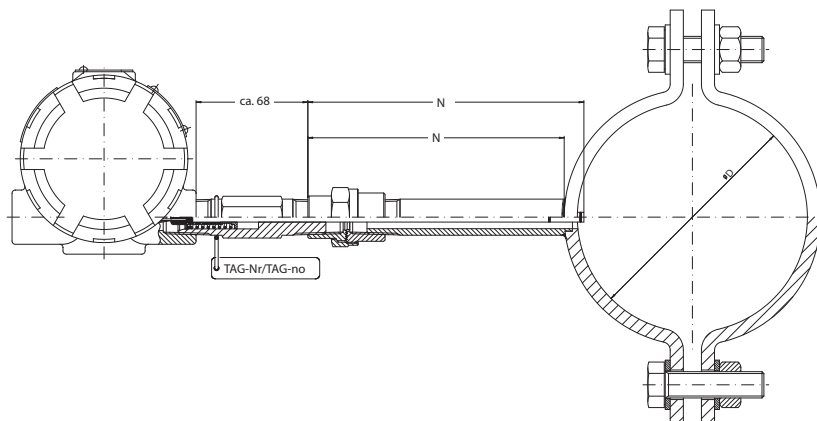


FIGURE 6. Spring Loaded Adapter Sensor Assembly Suitable for Use with Rosemount Transmitter Model 3144P or 648



Customer Data Sheet

Rosemount Pipe Clamp Temperature Sensor

Rosemount Pipe Clamp Assembly with Integrated Connection Head or Transmitter Customer Data Sheet

Customer Information

Customer: _____ Phone: _____ Fax: _____
Contact Name _____ Quote No: _____
P.O./Reference No.: _____ P.O. Line Item: _____
Customer Sign Off: _____

Pipe Clamp Information

Device Tag Name: _____

Hazardous Location Certifications: (Select only one)

- EEx ia - ATEX/IBExU Intrinsic Safety Approval No Approval
 EEx d - ATES/CELENEC Flameproof Approval

Connection Head: (Select only one)

- RMT, Aluminum RMT, SST
 RMT, Aluminum with LCD Cover RMT, SST with LCD Cover
 TZ-A/BL GR-A/BL
 No Connection Head

Conduit/Cable Entry: (Select only one)

- M20 x 1.5
 M20 x 1.5 with cable gland
 1/2-in. NPT
 No Cable Entry

Sensor Lead Wire Termination: (Select only one)

- Flying Leads
 Spring Loaded
 Terminal Block

Sensor Type: (Select only one)

- RTD, Single Element 4-Wire (-50 to 350 °C) RTD, Dual Element 3-Wire (-50 to 350 °C)
 RTD, Single Element 4-Wire (-110 to 450 °C) RTD, Dual Element 3-Wire (-110 to 450 °C)
 RTD, Single Element 3-Wire (-50 to 350 °C)

Extension Type: (Select only one)

- DIN-Standard 12 x 2.5 M24 x 1.5 Nipple-Union 1/2-in. NPT
 Nipple-Union 1/2-in. NPT (for TRX and Spring Loaded) None (for replacement only)

Extension Length:

- N _____(mm)

Clamp Material: (Select only one)

- 1.4301 (SS304) 1.4571 (SS316Ti) Other _____
 Duplex Super Duplex

Clamp Size:

- D _____(mm) (20 mm to 1219 mm)

Options: (May select more than one)

- RTD Class A Cover Chain
 Assemble to Transmitter External Grounding Screw
 Extension Ring NBR Coated Clamp

Sensor Calibrations: (May select more than one)

- Sensor Calibrated to a Fixed Temperature Range (-0 to 100 °C) Sensor Calibrated to a Fixed Temperature Range (-50 to 150 °C)
 Sensor Calibrated to Customer Specified Temperature Range Sensor Calibrated to Customer Specified Single Measurement Point
 Sensor Calibrated to a Fixed Temperature Range (-50 to 100 °C)

Rosemount Pipe Clamp RTD Sensor

Pipe Clamp Sensor Assembly with Cable Specifications

Rosemount Pipe Clamp Platinum RTD

Nominal Resistance

In accordance with DIN EN 60751, the nominal resistance is defined:

100 Ω RTD at 0 °C

$\alpha = 0.00385 \text{ } \Omega \times \text{ } ^\circ\text{C}/\Omega$, averaged between 0 and 100 °C

Limit Deviations

Tolerance Class B, as standard $t = \pm(0.3 + 0.005 \times [t])$; temperature range 110 to 450 °C

Tolerance Class A, as option $t = (0.15 + 0.002 \times [t])$; temperature range 0 to 250 °C

Process Temperature Range:

-110 to 450 °C (-166 to 842 °C)

Ambient Temperature Range

-51 to 85 °C (-60 to 185 °F)

Self-Heating

0.15 K/mW when measured as defined in DIN EN 60751; 1996.

Thermal Response Time

Sensor response time floating in water according to DIN EN 60751

Insulation Resistance (RTD)

1,000 MΩ minimum insulation resistance when measured at 500 V dc at room temperature

Silver tip:

$t_{0.5} = 1.8 \text{ sec } \pm 1 \text{ sec}$

$t_{0.63} = 2.4 \text{ sec } \pm 1 \text{ sec}$

$t_{0.9} = 4.7 \text{ sec } \pm 1 \text{ sec}$

Nickel tip:

$t_{0.5} = 2.1 \text{ sec } \pm 1 \text{ sec}$

$t_{0.63} = 2.7 \text{ sec } \pm 1 \text{ sec}$

$t_{0.9} = 5.5 \text{ sec } \pm 1 \text{ sec}$

Sheath Material

316 SST with mineral insulated cable construction and silver or nickel plate tip

Cable

PVC/PVC insulated, armored, 0.75 sq mm type, cable gland for armored cable is available upon request.

Identification Data

The model and serial numbers are marked on the cable

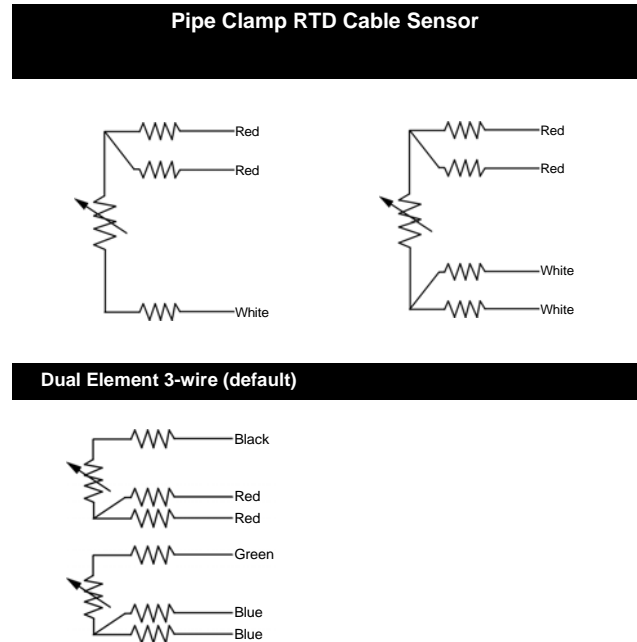
Ingress Protection (IP) Rating

IP68 and NEMA 4X.

Hazardous Locations Certifications

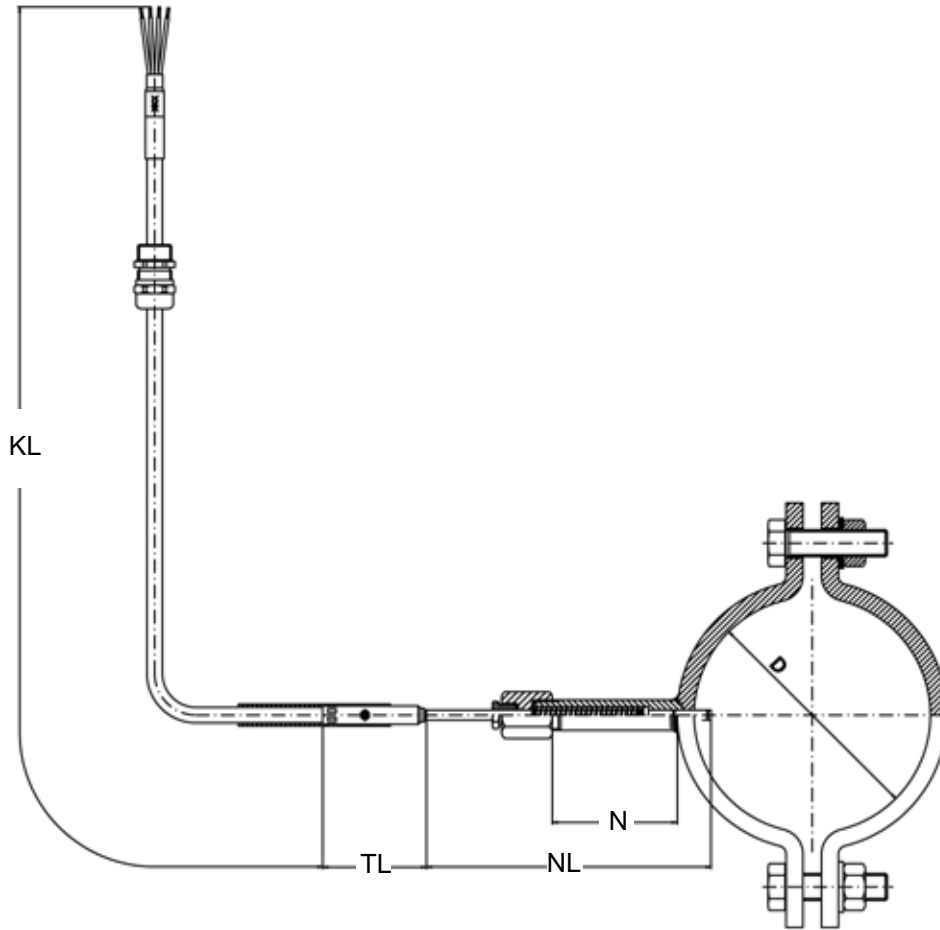
ATEX IBEXU, according to EEx ia (Approval Pending)

FIGURE 7. Sensor Lead Wire Termination



Design Example Drawings

FIGURE 8. RTD Sensor Dimensional Drawings



Rosemount Pipe Clamp RTD Sensor

Customer Data Sheet

Rosemount Pipe Clamp Temperature Sensor
Rosemount Pipe Clamp Assembly with Cable Customer Data Sheet

Customer Information

Customer: _____ Phone: _____ Fax: _____
Contact Name: _____ Quote No.: _____
P.O./Reference No.: _____ P.O. Line Item: _____
Customer Sign Off: _____

Pipe Clamp Information

Device Tag Name: _____

Hazardous Location Certifications: (Select only one)

- EEx ia - ATEX/IBExU Intrinsic Safety Approval
 No Approval

Sensor Type: (Select only one)

- RTD, Single Element 4-Wire (-50 to 350 °C) RTD, Dual Element 3-Wire (-50 to 350 °C)
 RTD, Single Element 4-Wire (-110 to 450 °C) RTD, Dual Element 3-Wire (-110 to 450 °C)
 RTD, Single Element 3-Wire (-50 to 350 °C)

Nominal Length:

- NL _____(mm)

Transition Sleeve Length:

- TL _____(mm)

Extension Type: (Select only one)

- DIN-Standard 12 x 2.5 M24 x 1.5
 Nipple-Union 1/2-in. NPT (for TRX and Spring Loaded)
 Nipple-Union 1/2-in. NPT
 None (for replacement only)

Extension Length:

- N _____(mm)

Cable Type:

- _____

Cable Length:

- KL _____(mm)

Cable Gland Thread:

- M20 x 1.5 M24 x 1.5
 Other _____

Clamp Material: (Select only one)

- 1.4301 (SS304) 1.4571 (SS316Ti)
 Duplex Super Duplex
 Other _____

Clamp Size:

- D _____(mm) (20 mm to 1219 mm)

Options: (May select more than one)

- RTD Class A NBR Coated Clamp

Sensor Calibrations: (May select more than one)

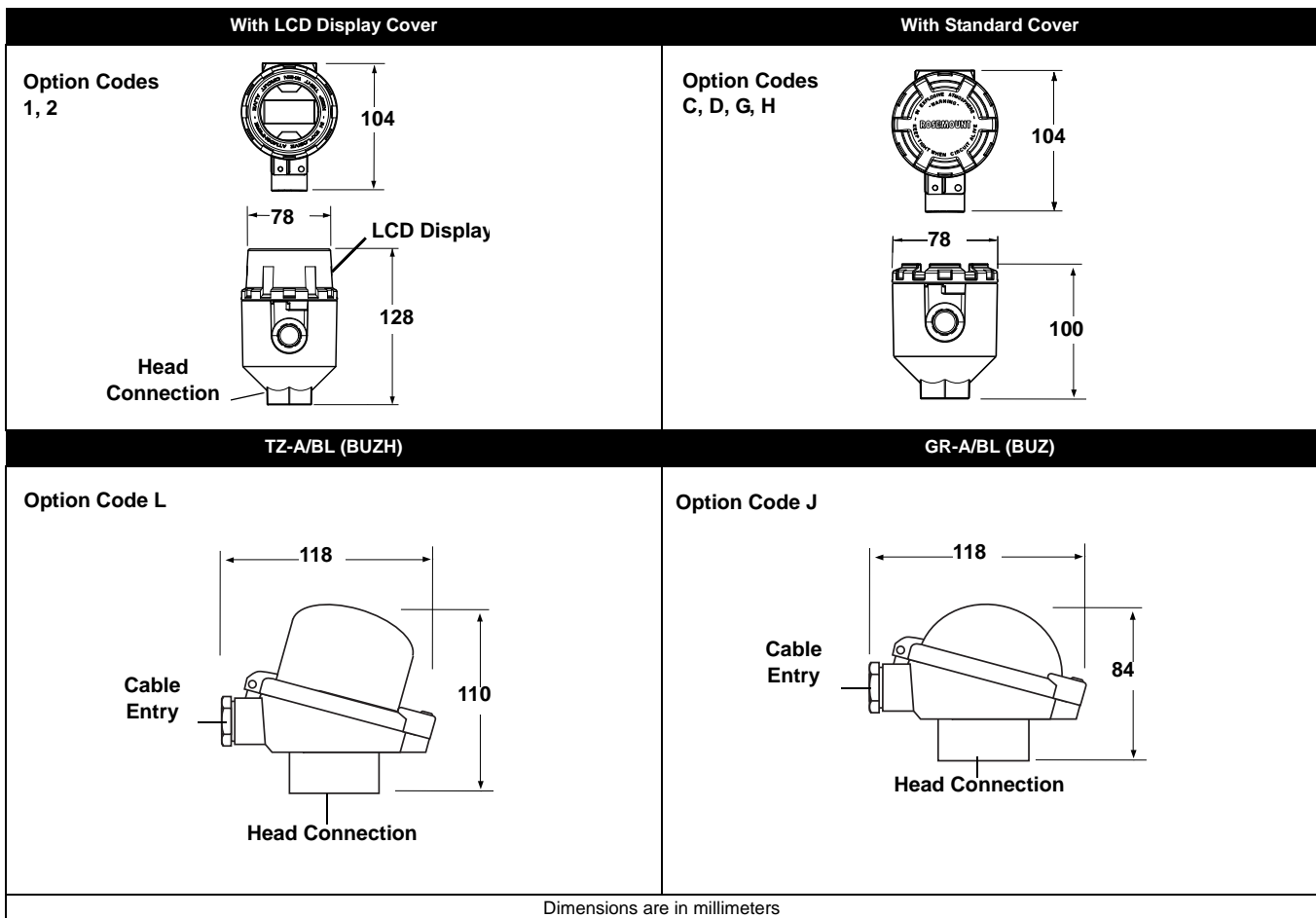
- Sensor Calibrated to a Fixed Temperature Range (0 to 100 °C) Sensor Calibrated to a Fixed Temperature Range (-50 to 150 °C)
 Sensor Calibrated to a Fixed Temperature Range (-50 to 100 °C) Sensor Calibrated to a Customer Specified Temperature Range
 Sensor Calibrated to a Customer Specified Single Measurement Point

Accessories

TABLE 3. Connection Head

Part Number	Model/Material	IP Rating	Conduit Connection	Process Connection
00644-4410-0011	Rosemount, Aluminium	68	1/2-inch NPT	1/2-inch NPT
00644-4410-0013	Rosemount, Aluminium	68	1/2-inch NPT	M24 x 1.5
00644-4410-0021	Rosemount, Aluminium	68	M20 x 1.5	1/2-inch NPT
00644-4410-0023	Rosemount, Aluminium	68	M20 x 1.5	M24 x 1.5
00644-4410-0111	Rosemount, Aluminium with LCD Display Cover	68	1/2-inch NPT	1/2-inch NPT
00644-4410-0113	Rosemount, Aluminium with LCD Display Cover	68	1/2-inch NPT	M24 x 1.5
00644-4410-0121	Rosemount, Aluminium with LCD Display Cover	68	M20 x 1.5	1/2-inch NPT
00644-4410-0123	Rosemount, Aluminium with LCD Display Cover	68	M20 x 1.5	M24 x 1.5
00644-4411-0011	Rosemount, Stainless Steel	68	1/2-inch NPT	1/2-inch NPT
00644-4411-0013	Rosemount, Stainless Steel	68	1/2-inch NPT	M24 x 1.5
00644-4411-0021	Rosemount, Stainless Steel	68	M20 x 1.5	1/2-inch NPT
00644-4411-0023	Rosemount, Stainless Steel	68	M20 x 1.5	M24 x 1.5
00644-4411-0111	Rosemount, Stainless Steel with LCD Display Cover	68	1/2-inch NPT	1/2-inch NPT
00644-4411-0113	Rosemount, Stainless Steel with LCD Display Cover	68	1/2-inch NPT	M24 x 1.5
00644-4411-0121	Rosemount, Stainless Steel with LCD Display Cover	68	M24 x 1.5	1/2-inch NPT
00644-4411-0123	Rosemount, Stainless Steel with LCD Display Cover	68	M24 x 1.5	M24 x 1.5
00644-4196-0023	GR-A/BL (BUZ), Aluminium	65	M20 x 1.5	M24 x 1.5
00644-4197-0023	TZ-A/BL (BUZH), Aluminium	65	M20 x 1.5	M24 x 1.5

FIGURE 9. Connection Head Dimensional Drawing



Rosemount Pipe Clamp RTD Sensor

Rosemount Pipe Clamp RTD Sensor

Product Data Sheet
00813-0100-4952, Rev AA
April 2009

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