Product Data Sheet
July 2017
00813-0100-4952, Rev GC

Rosemount™ 0085 Pipe Clamp Sensor

CE

- Direct mount assembly with Rosemount 3144P Temperature transmitter or Rosemount 648 Wireless Temperature transmitter with Rosemount X-well™ Technology provides accurate process temperature without the requirement of a thermowell or process penetration
- Non-intrusive design for fast and easy temperature measurement in piping applications
- Platinum RTD temperature sensors with silver or nickel tip
- Integrated temperature assemblies provide time and cost savings

EMERSON

Rosemount 0085 Pipe Clamp Sensor

Rosemount X-well Technology provides a Complete Point Solutions™ for accurately measuring process temperature without the requirement of a thermowell or process penetration.

- Simplify temperature measurement point specification, installation and maintenance, and eliminate possible leak points
- Calculates a repeatable and accurate process temperature measurement via an in-transmitter thermal conductivity algorithm
- Measures pipe surface and ambient temperature, and utilizes the thermal conductivity properties of the installation and process piping in order to provide an accurate process measurement

Proven pipe clamp sensors deliver excellent performance and reliability

- Superior accuracy and stability
- Improved response time with silver and nickel tip

Easy implementation and installation in existing application

- Available in a wide variety of pipe sizes and material
- Installation with only two bolts – no welding needed
- Optimized surface contact by spring loaded sensor design

Minimized risk of sensor failure and unplanned shutdowns

- Avoids stresses related to flow, pressure, chemical contact, abrasion, vibration, and bending
- Maintenance of sensor without shutdown of process

Achieve optimal efficiency with Rosemount wireless transmitter offering

- Measure your temperature anywhere

Contents

Explore the benefits of Complete Point Solutions from Rosemount Temperature Measurement

- An “Assemble to Transmitter” option enables Emerson™ to provide a complete point temperature solution, delivering an installation-ready transmitter and sensor assembly
- Emerson has a complete portfolio of single point, high density and wireless temperature measurement solutions, allowing you to effectively measure and control your processes with the reliability you trust from Rosemount products

Experience global consistency and local support from numerous worldwide Rosemount Temperature 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 on-site when and where they are needed

Ordering information

The Rosemount 0085 Pipe Clamp Sensor is designed for fast and easy non-intrusive surface temperature measurements in piping applications.

Features include:

- Temperature range of -50 to 300 °C (-58 to 572 °F) for silver tip, -200 to 300 °C (-328 to 572 °F) for nickel tip
- Suitable for pipe sizes 1/2-in. to 48-in. (22 mm to 1219 mm)
- Single or Dual Element Class A Sensor
- Assemble to Transmitter Option

Specification and selection of product materials, options, or components must be made by the purchaser of the equipment.
See page 10 for more information on material selection.

Table 1. Rosemount Pipe Clamp Sensor Ordering Information
The starred offerings (★) represent the most common options and should be selected for best delivery. The non-starred offerings are subject to additional delivery lead time.

Model	Product description			
0085	Non Intrusive Pipe Clamp Sensor			
Code	**Connection head**	**IP rating**	**Conduit entry**	
C	Connection head Rosemount, aluminum	68	M20 x 1.5	★
D	Connection head Rosemount, aluminum	68	1/2-in. NPT	★
G	Connection head Rosemount, stainless steel	68	M20 x 1.5	★
H	Connection head Rosemount, stainless steel	68	1/2-in. NPT	★
N	No connection head	N/A	N/A	★
1	Connection head Rosemount, aluminum with LCD display cover	68	M20 x 1.5	★
2	Connection head Rosemount, aluminum with LCD display cover	68	1/2-in. NPT	★
3	Connection head Rosemount, stainless steel with LCD display cover	68	M20 x 1.5	★
4	Connection head Rosemount, stainless steel with LCD display cover	68	1/2-in.NPT	★
Sensor connection				
3	Spring loaded adapter			★
5	Spring loaded adapter with terminal block			★
Sensor type			**Temperature range**	
P1	RTD, single element, 4-wire, silver tip		-50 to 300 °C (-58 to 572 °F)	★
P2	RTD, dual element, 3-wire, silver tip		-50 to 300 °C (-58 to 572 °F)	★
P3	RTD, single element, 4-wire, nickel tip		-200 to 300 °C (-328 to 572 °F)	★
P4	RTD, dual element, 3-wire, nickel tip		-200 to 300 °C (-328 to 572 °F)	★

Extension type		Head connection	Instrument connection	Material	
J	Nipple -Union	None	1/2-in. NPT	Stainless steel	★
N	No extension (sensor only option)				★

Table 1. Rosemount Pipe Clamp Sensor Ordering Information

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

Extension length (N)							
0080	80 mm						★
0150	150 mm						★
XXXX	Non standard lengths 200–500 mm (available in 50 mm increments)						
Pipe clamp material							
N	No clamp (sensor only option)						★
P	ASTM 304 SST (1.4301)						★
B	Duplex F51 (1.4462)						
C	Carbon steel (1.0037)						
S	ASTM 316 SST (1.4401)						
Inner diameter (D)[(1)]		**Standard pipe sizes**		**Nonstandard pipe sizes**		**Clamp/bolt dimensions**	
		Inches	**DIN**	**Millimeters**			
				Min. OD	**Max. OD**		
0022	22 mm	1/2	DN15	19	24	30 x 5 mm, M10	★
0027	27 mm	3/4	DN20	24	27	30 x 5 mm, M10	★
0030	30 mm	N/A	DN25	27	31	30 x 5 mm, M10	
0034	34 mm	1	DN25	31	35	30 x 5 mm, M10	★
0043	43 mm	1 1/4	DN32	40	46	30 x 5 mm, M10	
0049	49 mm	1 1/2	DN40	46	50	30 x 5 mm, M10	★
0061	61 mm	2	DN50	58	68	40 x 6 mm, M12	★
0077	77 mm	2 1/2	DN65	74	86	40 x 6 mm, M12	
0089	89 mm	3	DN80	86	96	40 x 6 mm, M12	★
0115	115 mm	4	DN100	112	120	50 x 8 mm, M16	★
0140	140 mm	5	DN135	137	144	50 x 8 mm, M16	★
0159	159 mm	N/A	DN150	156	162	50 x 8 mm, M16	
0169	169 mm	6	DN150	166	172	50 x 8 mm, M16	★
0220	220 mm	8	DN200	217	223	50 x 8 mm, M16	★
0273	273 mm	10	DN250	269	278	60 x 8 mm, M20	
0306	306 mm	N/A	N/A	302	311	60 x 8 mm, M20	
0324	324 mm	12	DN300	320	329	60 x 8 mm, M20	
0356	356 mm	14	DN350	352	361	60 x 8 mm, M20	
0368	368 mm	N/A	DN350	364	373	60 x 8 mm, M20	
0407	407 mm	16	DN400	401	417	70 x 10 mm, M24	
0458	458 mm	18	DN450	452	468	70 x 10 mm, M24	
0508	508 mm	20	DN500	502	518	70 x 10 mm, M24	
0521	521 mm	N/A	DN500	515	531	70 x 10 mm, M24	

Table 1. Rosemount Pipe Clamp Sensor Ordering Information
The starred offerings (★) represent the most common options and should be selected for best delivery. The non-starred offerings are subject to additional delivery lead time.

0610	610 mm	24	DN600	604	620	70 x 10 mm, M24	
0660	660 mm	26	N/A	654	670	70 x 10 mm, M24	
0720	720 mm	N/A	N/A	714	730	70 x 10 mm, M24	
0762	762 mm	30	N/A	756	772	70 x 10 mm, M24	
0813	813 mm	32	DN790	807	823	70 x 10 mm, M24	
0915	915 mm	36	DN900	909	925	70 x 10 mm, M24	
1016	1016 mm	40	DN1000	1010	1026	70 x 10 mm, M24	
1070	1070 mm	42	N/A	1064	1064	70 x 10 mm, M24	
1219	1219 mm	48	N/A	1213	1229	70 x 10 mm, M24	
Corrosion protection inlay							
N	None						★
A	Material NBR						

Options (include with selected model number)

316SST material options		
M1	316SST Wire-on tag	★
M2	316SST Components	★
Sensor options		
A1	Single element Class A sensor from -50 to 300 °C (-58 to 572 °F)	★
A2[(2)]	Dual element Class A sensor from -50 to 300 °C (-58 to 572 °F)	★
Assemble to option		
XA	Assemble sensor to specific temperature transmitter	★
Cable gland options		
G2	Cable gland, Ex d, brass, 7.5–11.9 mm	★
G7	Cable gland, M20 x 1.5, Ex e, blue, Polyamide, diam 5–9 mm	★
Product certifications		
E1	ATEX Flameproof	★
I1	ATEX Intrinsic Safety	★
E7	IECEx Flameproof and Dust	★
E5	FM Explosion-Proof	★
E6	CSA Explosion-Proof	★
EM	Technical Regulations Customs Union (EAC) Flameproof	★
IM	Technical Regulations Customs Union (EAC) Intrinsic Safety	★
Cover chain option		
G3	Cover chain (only available with Rosemount connection head material codes C, D, G, and H)	★

Table 1. Rosemount Pipe Clamp Sensor Ordering Information

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

Product certifications		
LT	Special material to meet extended temperature range of -51 °C	★
Q8	Material Traceability Certification per EN 10204 3.1B	★
Typical pipe clamp model number:	**0085 C 3 P 1 J 0080 P 0061 N**	
Replacement sensor only model number:	**0085 N3 P 1 N 0080 N 0061 N**	

1. When selecting this option in regards to Rosemount X-well Technology, refer to "How to order Rosemount X-well Technology" on page 8.
2. The sensor option code A2 is not available with sensor type P4.

How to order Rosemount X-well Technology

Rosemount X-well Technology is for temperature monitoring applications and is not intended for control or safety applications. It is available in the Rosemount 3144P Transmitter and 648 Wireless Transmitter in a factory assembled direct mount configuration with a Rosemount 0085 Pipe Clamp Sensor. It cannot be used in a remote mount configuration. Rosemount X-well Technology will only work as specified with factory supplied and assembled Rosemount 0085 Sensor silver tipped single element sensor with an 80 mm extension length. It will not work as specified if used with other sensors.

Transmitter

The Rosemount 3144P option code requirements are:

Code	Description
D1-D4	Aluminum field mount housing
PT	Temperature measurement assembled with Rosemount X-well Technology
A	4-20 mA with digital signal based on HART protocol
XA	Sensor specified separately and assembled to transmitter
C1	Custom configuration of date, descriptor, message, and wireless parameters (requires CDS with order)
HR7	Configured for HART Revision 7

The Rosemount 648 Wireless option code requirements are:

Code	Description
PT	Temperature measurement assembled with Rosemount X-well Technology
XA	Sensor specified separately and assembled to transmitter
C1	Custom configuration of date, descriptor, message, and wireless parameters (requires CDS with order)

The Rosemount 0085 Pipe Clamp Sensor option code requirements are:

Code	Description
N	No connection head
3	Sensor connection
P1	Sensor type
J	Extension type
0080	Extension length
XA	Assemble sensor to specific temperature transmitter

Rosemount X-well assemblies are available in most Rosemount 0085 Pipe Clamp sensor diameter sizes.

Typical model number of the assembly:	**Rosemount 3144P and 0085** 3144P D 1A 1 NA M5 PT C1 HR7 XA 0085 N 3 P1 J 0080 C 0169 N XA
	Rosemount 648 Wireless and 0085 648 D X 1 D NA WA3 WK1 M5 PT C1 XA 0085 N 3 P1 J 0080 C 0169 N XA

Overview

Rosemount Pipe Clamp overview

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

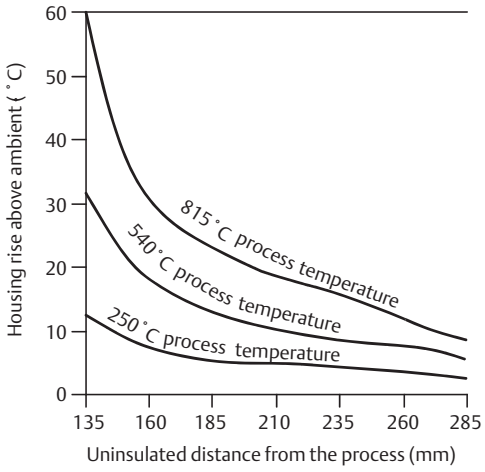
Rosemount Pipe Clamp Platinum RTD Sensors are highly linear and have a stable resistance versus temperature relationship. They are used primarily in industrial environments where high accuracy, durability, and long-term stability are required, and are designed to meet the most critical parameters of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

Rosemount Pipe Clamp Sensors are available in single and dual element types.

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 pipe 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.

Sensor tip material configuration

The pipe clamp sensor tip is constructed from silver or nickel for better thermal conductivity and to reduce the thermal response time. The silver tip has a slightly faster response time while the nickel tip has a larger temperature range, which allows for cryogenic applications. The silver tip temperature range is -50 to 300 °C (-58 to 572 °F), and the nickel tip temperature range is -200 to 300 °C (-328 to 572 °F).

1. *100 Ω at 0 °C, α = 0.00385 Ω x °C/Ω*

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.

Rosemount Pipe Clamp Platinum RTD

Nominal resistance

In accordance with DIN EN 60751/IEC 751 1983 incorporating Amendments 1 and 2, the nominal resistance is defined:

100 Ω RTD at 0 °C

α = 0.00385 Ω x °C/Ω., averaged between 0 and 100 °C

Limit deviations

Tolerance Class B, as standard t = ±(0.3 + 0.005 x [t]); temperature range -200 to 300 °C (-328 to 572 °F)

Tolerance Class A, as option t = ±(0.15 + 0.002 x [t]); temperature range -50 to 300 °C (-58 to 572 °F)

Process temperature range

-200 to 300 °C (-328 to 572 °F)

Ambient temperature range

-40 to 85 °C (-40 to 185 °F)

Self-heating

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

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 tip

Lead wires

PTFE insulated, silver-coated copper wire (Figure 2)

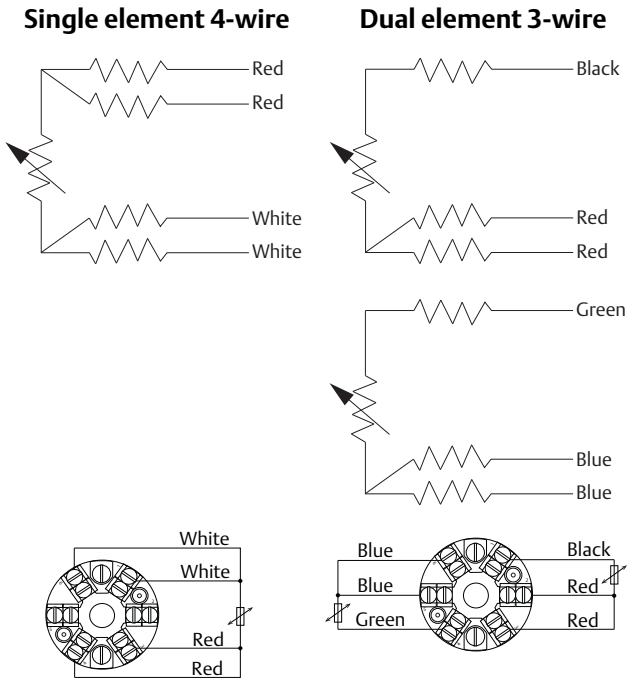
Identification data

The model and serial numbers are engraved directly on the spring loaded adapter.

Ingress Protection (IP) rating for connection head

IP68 and NEMA® 4X

Figure 2. Sensor Lead Wire Termination - Pipe Clamp RTD Spring Loaded



Dimensional Drawings

Figure 3. 1/2-in. ANPT Spring Loaded Adapter

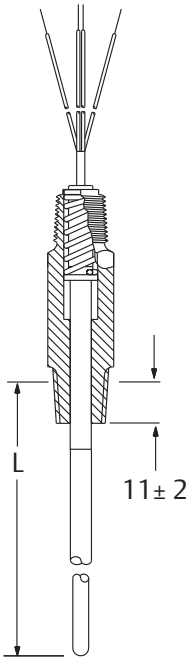
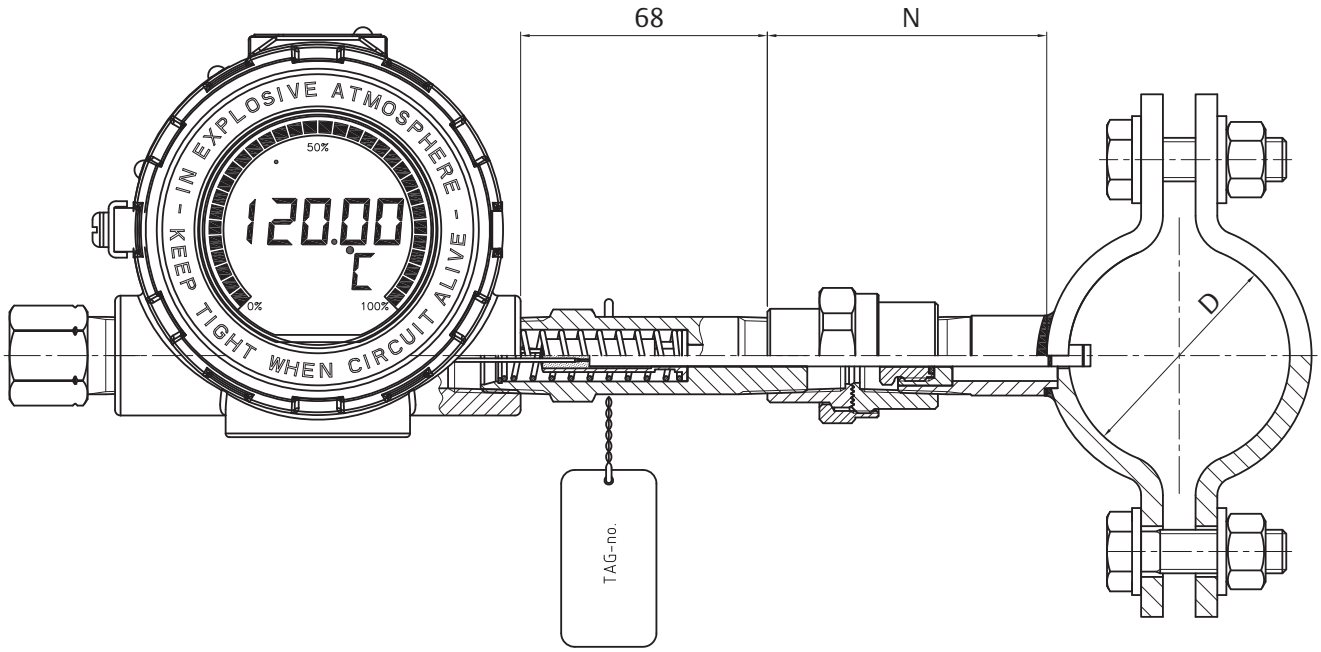


Figure 4. Pipe Clamp Sensor Assembly with Rosemount 3144P



Dimensions are in millimeters.

Figure 5. Pipe Clamp Sensor Assembly with Rosemount Connection Head

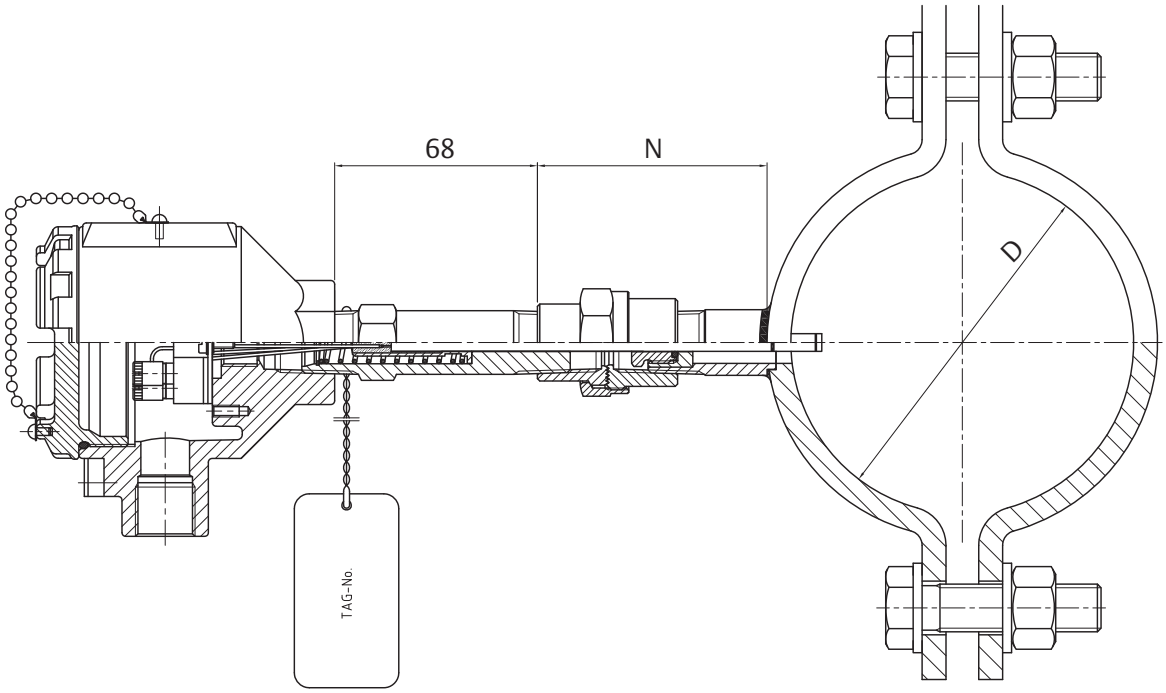
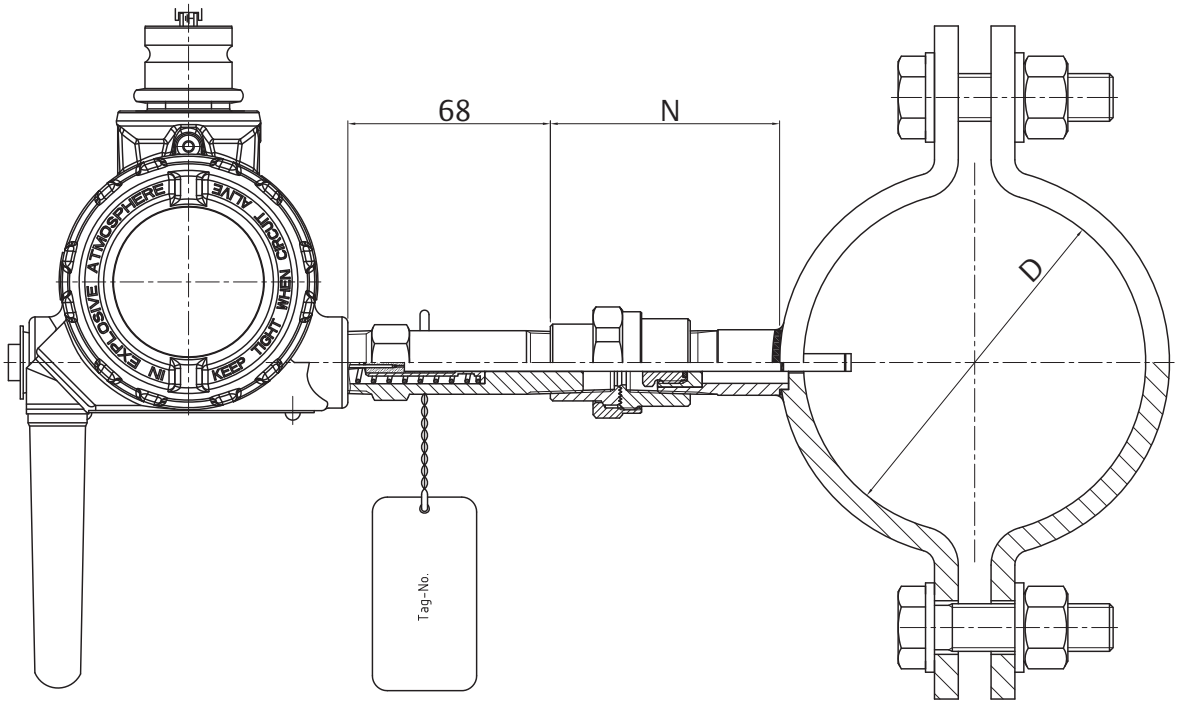


Figure 6. Pipe Clamp Sensor Assembly with Rosemount 648 Wireless Transmitter



Dimensions are in millimeters.

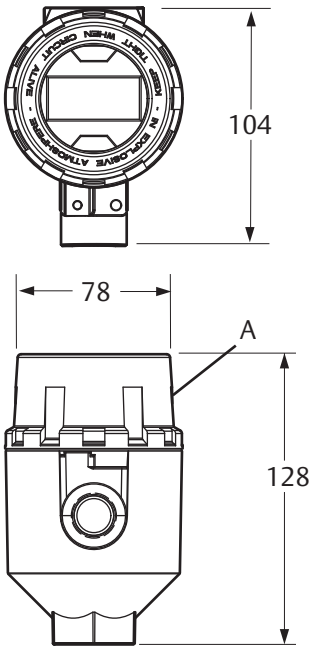
Accessories

Table 2. Connection Head

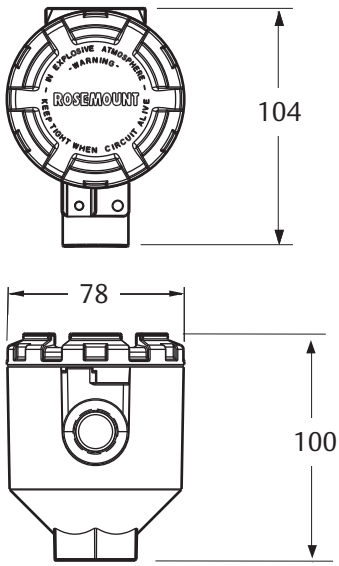
Part number	Model/material	IP rating	Conduit connection	Process connection
00644-4410-0011	Rosemount, aluminum	68	1/2-in. NPT	1/2-in. NPT
00644-4410-0021	Rosemount, aluminum	68	M20 x 1.5	1/2-in. NPT
00644-4410-0111	Rosemount, aluminum with LCD display cover	68	1/2-in. NPT	1/2-in. NPT
00644-4410-0121	Rosemount, aluminum with LCD display cover	68	M20 x 1.5	1/2-in. NPT
00644-4411-0011	Rosemount, stainless steel	68	1/2-in. NPT	1/2-in. NPT
00644-4411-0021	Rosemount, stainless steel	68	M20 x 1.5	1/2-in. NPT
00644-4411-0111	Rosemount, stainless steel with LCD display cover	68	1/2-in. NPT	1/2-in. NPT
00644-4411-0121	Rosemount, stainless steel with LCD display cover	68	M20 x 1.5	1/2-in. NPT

Figure 7. Connection Head

With LCD display cover



With standard cover



A. LCD display
Dimensions are in millimeters.

Product Certifications

Rev 1.8

European Directive Information

A copy of the EU Declaration of Conformity can be found at the end of the Quick Start Guide. The most recent revision of the EU Declaration of Conformity can be found at Emerson.com/Rosemount.

Ordinary Location Certification

As standard, the transmitter has been examined and tested to determine that the design meets the basic electrical, mechanical, and fire protection requirements by a nationally recognized test laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

North America

The US National Electrical Code® (NEC) and the Canadian Electrical Code (CEC) permit the use of Division marked equipment in Zones and Zone marked equipment in Divisions. The markings must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

North America

E5 FM Explosionproof and Dust-Ignitionproof

Certificate: 0R7A2.AE

Standards: FM Class 3600- 2011, FM Class 3615-2006, FM Class 3810-2005, ANSI/NEMA 250-1991

Markings: XP CL I, DIV 1, GP B, C, D, T6; DIP CL II/III, DIV 1, GP E, F, G, T6; Type 4X; Installed per 00068-0013;

E6 CSA Explosionproof, Dust-Ignitionproof

Certificate: 1063635

Standards: CAN/CSA C22.2 No. 0-M91, CSA Std. C22.2 No. 25-1966, CSA Std. C22.2 No. 30-M1986, CSA Std. C22.2 No.94-M91, CSA Std. C22.2 No. 142-M1987, CSA Std. C22.2 No. 213-M1987

Markings: XP Class I Groups B, C, and D; DIP Class II Groups E, F, G; Class III; Class I Div. 2 Groups A, B, C, D; Class I Zone 1 Group IIB+H2; Class I Zone 2 Group IIC; Installed per 00068-0033;

Europe

E1 ATEX Flameproof

Certificate: FM12ATEX0065X

Standards: EN60079-0:2012, EN60079-1:2007

Markings: Ⓔx II 2 G Ex d IIC T6...T1 Gb

Special Conditions for Safe Use (X):

1. See certificate for ambient temperature range
2. The non-metallic label may store an electrostatic charge and become a source of ignition in Group III environments
3. Guard the LCD cover against impact energies greater than 4 joules
4. Flameproof joints are not intended for repair
5. A suitable certified Ex d or Ex tb enclosure is required to be connected to temperature probes with Enclosure option "N".
6. Care shall be taken by the end user to ensure that the external surface temperature on the equipment and the neck of DIN Style Sensor probe does not exceed 130 °C.
7. Non-Standard Paint options may cause risk from electrostatic discharge. Avoid installations that cause electrostatic build-up on painted surfaces, and only clean the painted surfaces with a damp cloth. If paint is ordered through a special option code, contact the manufacturer for more information

I1 ATEX Intrinsic Safety

Certificate: Baseefa16ATEX0101X

Standards: EN 60079-0:2012+A11:2013, EN 60079-11:2012

Markings: Ⓔx II 1 G Ex ia IIC T5/T6 Ga SEE CERTIFICATE FOR SCHEDULE

Thermocouples; Pi = 500mW	T6 60 °C ≤ Ta ≤ +70 °C
RTDs; Pi = 192mW	T6 60 °C ≤ Ta ≤ +70 °C
RTDs; Pi = 290mW	T6 60 °C ≤ Ta ≤ +60 °C
	T5 60 °C ≤ Ta ≤ +70 °C

Special Conditions of Use (X):

1. The equipment must be installed in an enclosure which affords it a degree of ingress protection of at least IP20

International

E7 IECEx Flameproof

Certificate: IECEx FMG 12.0022X

Standards: IEC60079-0:2011, IEC60079-1:2007

Markings: Ex d IIC T6...T1 Gb

Special Conditions for Safe Use (X):

1. See certificate for ambient temperature range
2. The non-metallic label may store an electrostatic charge and become a source of ignition in Group III environments
3. Guard the LCD cover against impact energies greater than 4 joules
4. Flameproof joints are not intended for repair
5. A suitable certified Ex d or Ex tb enclosure is required to be connected to temperature probes with Enclosure option "N".
6. Care shall be taken by the end user to ensure that the external surface temperature on the equipment and the neck of DIN Style Sensor probe does not exceed 130 °C.
7. Non-Standard Paint options may cause risk from electrostatic discharge. Avoid installations that cause electrostatic build-up on painted surfaces, and only clean the painted surfaces with a damp cloth. If paint is ordered through a special option code, contact the manufacturer for more information

EAC

EM Explosionproof/ Flameproof

Markings: 1Ex db IIC T6..T1 Gb X; T6 (-50°C to 40°C); T5..T1 (-50°C to 60°C); IP66/IP167

Special Conditions for Safe Use (X):

1. See Certificate

IM Intrinsic Safety

Markings: 0Ex ia IIC T5/T6 Ga X; T5, Pi = 0.29W, (-60°C to +70°C); T6, Pi = 0.29W, (-60°C to +60°C); T6, Pi = 0.192W, (-60° to +70°C);

Special Conditions for Safe Use (X):

1. See Certificate

KM Combination of EM, IM, and Dust-Ignitionproof

Markings: Ex tb IIIC T130°C Db X (-60°C to +70°C); Markings for both EM and IM above are included with this option.

Special Conditions for Safe Use (X):

1. See Certificate

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