

ROSEMOUNT 0085 Pipe Clamp Sensor User Guide

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ROSEMOUNT 0085 Pipe Clamp Sensor



Product Information

Rosemount 0085 Pipe Clamp Sensor Assembly

The Rosemount 0085 Pipe Clamp Sensor Assembly is a device used to measure temperature in pipes. It can be mounted on any orientation of the pipe and is designed for full or partial pipe flow applications. The assembly consists of a transmitter, a sensor with spring loaded adapter, nipple union of the extension, nut, O-ring, mounting hardware, corrosion protection inlay (optional), and a pipe clamp. The transmitter can be ordered assembled with the sensor, or separately.

Safety Messages

The document provides safety messages to ensure the protection of the end user's assets. Unauthorized personnel must not have physical access to the equipment.

Product Certification

Refer to the Product Certification section of the Quick Start Guide documentation for certification information.

Product Usage Instructions

Location and Orientation

The Rosemount 0085 Pipe Clamp Sensor can be mounted in any orientation for full pipe flow applications. For best practice, mount the pipe clamp sensor on the upper half of the pipe. It can be installed in any position around the circumference of the pipe for partial pipe flow applications.

Horizontal Orientation

For full pipe flow applications, mount the pipe clamp sensor on the upper half of the pipe. Refer to Figure 3-1 in the Quick Start Guide for the recommended zone.

Vertical Orientation

The pipe clamp sensor can be installed in any position around the circumference of the pipe. Refer to Figure 3-2 in the Quick Start Guide for more information.

Special Considerations

- If the expected process temperature is near or beyond specification limits, consider using a remote mount configuration to isolate the transmitter from the process. Refer to the appropriate transmitter reference manual for temperature effects. Refer to Figure 3-3 in the Quick Start Guide for more information.
- Wireless transmitters with external antennas allow for multiple antenna configurations. All wireless transmitters should be appropriately 3 ft. (1 m) from any large structure or building to allow clear communication to other devices. Wireless transmitters with external antennas should be positioned vertically, either straight up or straight down.

About this guide

- This guide provides basic guidelines for Rosemount 0085 Pipe Clamp Sensor. It does not provide instructions for configuration, diagnostics, maintenance, service, troubleshooting, explosion-proof, flameproof, or intrinsically safe (I.S.) installations. Refer to the Emerson.com/Rosemount.
- If the Rosemount 0085 Sensor was ordered assembled to a temperature transmitter, see the appropriate Quick Start Guide for information on configuration and hazardous locations certifications.

Safety messages

WARNING

Physical access

- Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and needs to be protected against.
- Physical security is an important part of any security program and fundamental to protecting your system.

Restrict physical access by unauthorized personnel to protect end users' assets. This is true for all systems used within the facility.

CAUTION

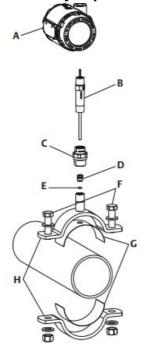
Conduit/cable entries

- Unless otherwise marked, the conduit/cable entries in the housing enclosure use a ½- NPT form. Only use plugs, adapters, glands, or conduit with a compatible thread form when closing these entries.
- Entries marked M20 are M20 x 1.5 thread form. On devices with multiple conduit entries, all entries will have the same thread form.
- When installing in a hazardous location, use only appropriately listed or Ex certified plugs, glands, or adapters in cable/conduit entries.

CAUTION

• Refer to Product Certification section of this Quick Start Guide documentation.

Rosemount 0085 Pipe Clamp Sensor Assembly exploded view



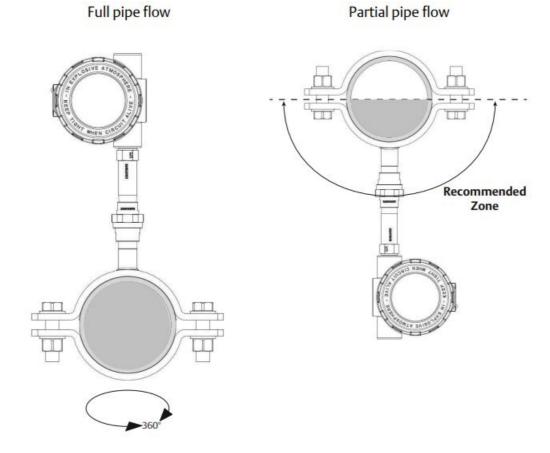
- A. Transmitter
- B. Sensor with spring loaded adapter
- C. Nipple union of the extension
- **D**. Nut
- E. O-ring
- F. Mounting hardware
- **G**. Corrosion protection inlay (optional)
- H. Pipe clamp

Location and orientation

- The pipe clamp sensor should be mounted on the outside section of the pipe where the process medium is in contact of the inside of the pipe wall.
- Ensure that the pipe surface is clean of debris.
- The pipe clamp sensor should be mounted in a secure position to ensure there is no rotational movement after installation.
- To ensure ingress protection, the nut of the Rosemount 0085 Pipe Clamp sensor can be tightened to a torque of 2 lbf · in to compress the O- ring to form a seal. The nut can be accessed and tightened by removing the sensor and the nipple union of the extension. Refer to the Rosemount 0085 Pipe Clamp Sensor Assembly exploded view for the location of each part.

Horizontal orientation

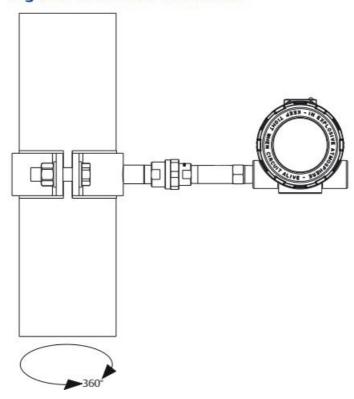
• Though the Rosemount 0085 Pipe Clamp Sensor can be mounted in any orientation for full pipe flow applications, the best practice is to mount the pipe clamp sensor on the upper half of the pipe.



Vertical orientation

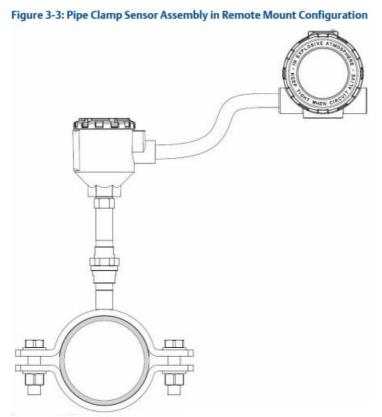
• The pipe clamp sensor can be installed in any position around the circumference of the pipe.

Figure 3-2: Vertical Orientation



Special considerations

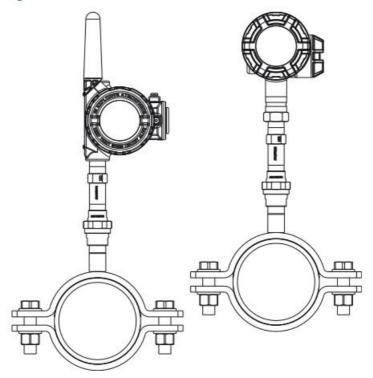
Under most circumstances, the Rosemount 0085 Pipe Clamp Sensor can be mounted in a direct mount
configuration. Since heat from the process is transferred from the pipe clamp sensor to the transmitter housing,
if the expected process temperature is near or beyond specification limits, consider using a remote mount
configuration to isolate the transmitter from the process. Refer to the appropriate transmitter reference manual
for temperature effects.



• Wireless transmitters with external antennas allow for multiple antenna configurations. All wireless transmitters

should be appropriately 3 ft. (1 m) from any large structure or building to allow clear communication to other devices. Wireless transmitters with external antennas should be positioned vertically, either straight up or straight down.

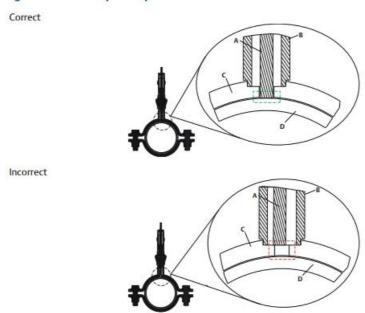
Figure 3-4: Wireless Transmitter Orientation



Install pipe clamp sensor

Select the area for pipe clamp sensor installation with the recommendations outlined in Horizontal orientation.
 Mount the pipe clamp sensor on the pipe and tighten the bolts. Ensure the sensor passes through the hole of the pipe clamp and has direct contact between the sensor tip and pipe. Refer to Figure 3-3 for more information. Tighten the bolts to secure the pipe clamp sensor to the pipe.

Figure 4-1: Sensor Tip and Pipe Contact

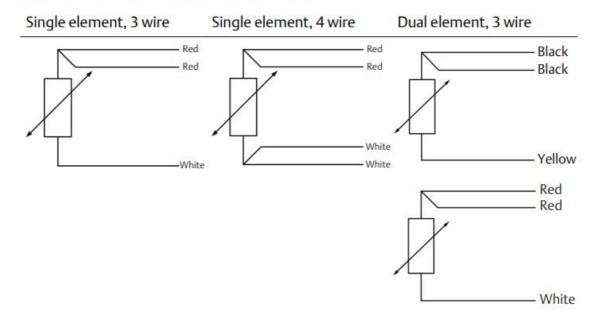


- A. Sensor
- B. Extension of pipe clamp
- C. Pipe clamp
- D. Pipe

Install transmitter

• See the appropriate transmitter reference manual for sensor-transmitter installation.

Figure 4-2: Sensor Lead Wire Termination



Commission transmitter

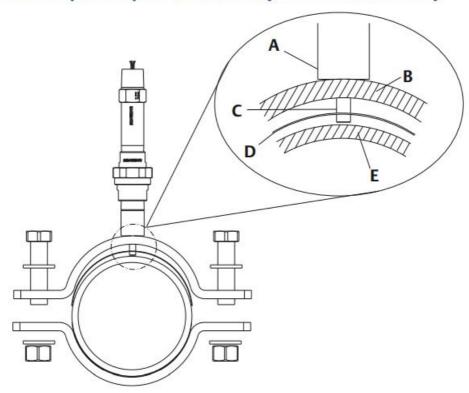
• See the appropriate transmitter reference manual for transmitter commissioning instructions.

Installing optional accessories

Corrosion protection inlay

• The corrosion protection inlay provides a layer of protection to help minimize the possibility of dissimilar metal corrosion between the pipe clamp and pipe. The inlay is installed in between the pipe clamp and the pipe. Ensure the sensor is clearing the hole in the protection inlay after installation.

Figure 5-1: Pipe Clamp Sensor Assembly with Protection Inlay



- A. Extension of pipe clamp
- B. Pipe clamp
- C. Sensor
- D. Corrosion protection inlay
- E. Pipe

Replacement sensor

- Procedure for replacing the spring-loaded sensor in the pipe clamp sensor.
- The spring-loaded sensor can be ordered for replacement using the Rosemount 0085 Pipe Clamp Sensor Product Data Sheet.

Procedure

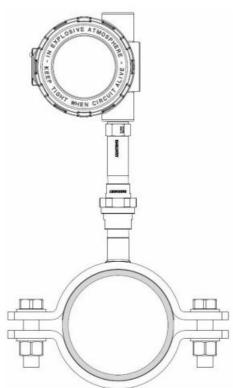
- 1. Loosen and remove the original sensor from the extension of the pipe clamp.
- 2. Add pipe compound or PTFE tape (where local piping codes allow) to the threads of the new sensor.
- 3. Insert the new sensor into the extension of the pipe clamp sensor and ensure the sensor tip passes through the hole of the pipe clamp. Refer to the Replacement sensor for more information.
- 4. Screw in the sensor and tighten to 24 ft-lbs of torque.

Rosemount X-well™ Technology considerations

 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 Temperature Transmitter and 648 Wireless Temperature 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 Pipe Clamp silver tipped single element sensor with an 80 mm extension length. It will not work as specified if used with other sensors.
- Installation and use of an incorrect sensor will result in inaccurate process temperature calculations. It is extremely important the above requirements and installation steps are followed to ensure Rosemount X-well Technology works as specified.
- In general, pipe clamp sensor installation best practices shall be followed
- (see Location and orientation) as well as the specific Rosemount X-well Technology requirements noted below:
- Direct mounting of the transmitter on a pipe clamp sensor is required for Rosemount X-well Technology to properly function. Figure 6-1 displays a transmitter/pipe clamp assembly that is in a direct mount configuration.

Figure 6-1: Pipe Clamp Sensor Assembly in Direct Mount Configuration



- Assembly shall be installed away from dynamic external temperature sources such as a boiler or heat tracing.
- The pipe clamp sensor makes direct contact with the pipe surface. Moisture buildup between the sensor and
 the pipe surface or the sensor hangup in the assembly can cause inaccurate process temperature calculations.
 Refer to Install pipe clamp sensor for more information on proper sensor to pipe surface contact.
- Insulation at least ½-in. thick (with R-value of > 0.42 m2 × K/W) is required over the sensor clamp assembly and the sensor extension up to the transmitter head to prevent heat loss. Apply a minimum of six inches of insulation on each side of the pipe clamp sensor. Care should be taken to minimize air gaps between insulation and pipe. See Figure 6-2 for more information.

Figure 6-2: Pipe Clamp Insulation



Note

- DO NOT apply insulation over the transmitter head.
- Although it will come from the factory configured as such, ensure that the pipe clamp RTD sensor is assembled
 in the correct wire configuration. Refer to the appropriate transmitter reference manual for correct wire
 configurations.

Product certifications

Rev 1.26

European Directive information

 A copy of the EU Declaration of Conformity can be found at the end of this guide. The most recent revision of the EU Declaration of Conformity can be found at <u>Emerson.com/Rosemount</u>.

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.

E5 USA Explosionproof

• Certificate: FM17US0170X

• Standards: FM Class 3600:2011, FM Class 3611:2004, FM Class 3615:2006, FM Class 3810:2005,

ANSI/NEMA 250:1991

• Markings: XP CL I, DIV 1, GP B, C, D; T5 (-50 °C ≤ Ta ≤ 85 °C); Type 4X; Installed per 00068-0013

E6 Canada Explosionproof

• Certificate: 70044744

• Standards: CAN/CSA C22.2 No. 0:2010, CAN/CSA C22.2 No. 30-M1986

(R2012), CAN/CSA C22.2 No. 94-M1991 (R2011), CAN/CSA C22.2 No. 61010-1:2012

• Markings: XP CL I, DIV 1, GP B, C, D; T6 (-50 °C ≤ Ta ≤ +80 °C), T5 (-50 °C ≤ Ta ≤ +95 °C); Seal not required; installed per Rosemount drawing 00068-0033; Type 4X and IP 66/67; Vmax 35 VDC, 750 mW max

Europe

E1 ATEX Flameproof

• Certificate: DEKRA 19ATEX0076X

• Standards: EN IEC 60079-0:2018, EN 60079-1:2014

• Markings: II 2 G Ex db IIC T6...T1 Gb, (-60 °C ≤ Ta ≤ +80 °C)

Special Conditions for Safe Use (X):

1. Flameproof joints are not intended for repair.

- 2. 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.
- 3. When provided on their own, the adapter style sensors must be assembled to a suitable Ex db enclosure with a free internal volume no greater than 550 cm3.

Process temperature range (°C)1	Ambient temperature range (°C)1	Temperature class
-60 °C to +80 °C	-60 °C to +80 °C	Т6
-60 °C to +95 °C	-60 °C to +80 °C	T5
-60 °C to +130 °C	-60 °C to +80 °C	T4
-60 °C to +195 °C	-60 °C to +80 °C	Т3
-60 °C to +290 °C	-60 °C to +80 °C	T2
-60 °C to +440 °C	-60 °C to +80 °C	T1

I1 ATEX Intrinsic Safety

• Certificate: Baseefa16ATEX0101X

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

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

Thermocouples; P _i = 500 mW	T6 -60 °C \leq T _a \leq +70 °C
RTDs; P _i = 192 mW	T6 -60 °C ≤ T _a ≤ +70 °C
	T6 -60 °C \leq T _a \leq +60 °C
RTDs; $P_i = 290 \text{ mW}$	T5 -60 °C ≤ T _a ≤ +70 °C

Special Condition for Safe Use (X):

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

International

E7 IECEx Flameproof

• Certificate: IECEx DEK 19.0041X

• Standards: IEC 60079-0:2017, IEC 60079-1:2014

• Markings: Ex db IIC T6...T1 Gb, (-60 °C \leq Ta \leq 80 °C)

Special Conditions for Safe Use (X):

1. Flameproof joints are not intended for repair.

- 2. 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.
- 3. When provided on their own, the adapter-style sensors must be assembled to a suitable Ex db enclosure with a free internal volume no greater than 550 cm3.

Process temperature range (°C)1	Ambient temperature range (°C)1	Temperature class
-60 °C to +80 °C	-60 °C to +80 °C	Т6
-60 °C to +95 °C	-60 °C to +80 °C	T5
-60 °C to +130 °C	-60 °C to +80 °C	Т4
-60 °C to +195 °C	-60 °C to +80 °C	Т3
-60 °C to +290 °C	-60 °C to +80 °C	T2
-60 °C to +440 °C	-60 °C to +80 °C	T1

EACH

EM Explosionproof/Flameproof

- Markings: 1Ex db IIC T6...T1 Gb X; T6 (-55 °C to 40 °C), T5...T1 (-55 °C to 60 °C) IP66, IP68
- Special Condition for Safe Use (X): See certificate.
- IM Intrinsic Safety
- Markings: 0Ex ia IIC T5/T6 Ga X; T5, Pi = 0.29 W, (-60 °C to +70 °C); T6, Pi = 0.29 W, (-60 °C to +60 °C); T6, Pi = 0.192 W, (-60 °C to +70 °C)
- Special Condition for Safe Use (X):
- · See certificate.

Korea

• EP Explosionproof/Flameproof

• Certificate: 13-KB4BO-0560X

• Markings: Ex d IIC T6...T1; T6(-50 °C ≤ Tamb ≤ +40 °C), T5...T1(-50 °C ≤

• Tamb ≤ +60 °C)

• Special Condition for Safe Use (X): See certificate.

Process temperature limits

Table 7-1: Sensor Only (No Transmitter Installed

	Process temperature (°C)						
Extension len	Gas						Dust
gth	Т6	T5	T4	Т3	T2	T1	T130 °C
Any extension length	85	100	135	200	300	450	130

Table 7-2: Transmitter

	Process tem	perature (°C)					
Extension len	Gas						Dust
gth	Т6	T5	T4	Т3	T2	T1	T130 °C
No extension	55	70	100	170	280	440	100
3-in. extensio n	55	70	110	190	300	450	110
6-in. extensio n	60	70	120	200	300	450	110
9-in extension	65	75	130	200	300	450	120

Adhering to the process temperature limitations of Table 7-3 will ensure that the service temperature limitations of the LCD cover are not exceeded. Process temperatures may exceed the limits defined in Table 7-3 if the temperature of the LCD cover is verified to not exceed the service temperatures in Table 7-4 and the process temperatures do not exceed the values specified in Table 7-2.

Table 7-3: Transmitter with LCD Cover – Process Temperature (°C)

	Gas			Dust
Extension length	Т6	T5	T4T1	T130 °C
No extension	55	70	95	95
3-in. extension	55	70	100	100
6-in. extension	60	70	100	100
9-in. extension	65	75	110	110

Table 7-4: Transmitter with LCD Cover – Service Temperature (°C)

	Gas			Dust
Extension length	Т6	T5	T4T1	T130 °C
No extension	65	75	95	95

Declaration of Conformity

Figure 8-1: Rosemount 0085 Pipe Clamp Sensor Declaration of Conformity



EU Declaration of Conformity No: RMD 1109 Rev. G



We.

Rosemount, Inc. 6021 Innovation Boulevard Shakopee, MN 55379-4676

declare under our sole responsibility that the product,

Rosemount™ 65, 85, 185, and 214C Temperature Sensors

manufactured by,

Rosemount, Inc. 6021 Innovation Boulevard Shakopee, MN 55379-4676

to which this declaration relates, is in conformity with the provisions of the European Union Directives, including the latest amendments, as shown in the attached schedule

Assumption of conformity is based on the application of the harmonized standards and, when applicable or required, a European Union notified body certification, as shown in the attached schedule.

Vice President of Global Quality

Mark Lee

October 22, 2021



EU Declaration of Conformity No: RMD 1109 Rev. G



ATEX Directive (2014/34/EU)

DEKRA 19ATEX0076 X - Flameproof Certificate

Equipment Group II Category 2 G (Ex db IIC T6...T1 Gb) Harmonized Standards;

EN IEC 60079-0:2018, EN 60079-1:2014

DEKRA 19ATEX0076 X - Dust Certificate

Equipment Group II Category 2 D (Ex th IIIC T130°C Db)
Harmonized Standards:

EN IEC 60079-0:2018, EN 60079-31:2014

BAS00ATEX3145 - Type n Certificate

Equipment Group II Category 3 G (Ex nA IIC T5 Gc) Harmonized Standards:

EN 60079-0:2012+A11:2013 (a review against EN IEC 60079-0:2018, which is harmonized, shows no significant changes relevant to this equipment so EN 60079-0:2012+A11:2013 continues to represent "State of the Art"), EN 60079-15:2010

Baseefa16ATEX0101X - Intrinsic Safety Certificate

Equipment Group II Category 1 G (Ex ia IIC T5/T6 Ga) Harmonized Standards:

EN IEC 60079-0:2018, EN 60079-11:2012

RoHS Directive (2011/65/EU)

Harmonized Standard: EN 50581:2012

ATEX Notified Bodies for EC Type Examination Certificate

Dekra Certification B.V. [Notified Body Number: 0344]

Utrechtseweg 310 Postbus 5185

6802 ED Arnhem

Netherlands

SGS FIMKO OY [Notified Body Number: 0598]

Takomotie 8 00380 HELSINKI

ATEX Notified Body for Quality Assurance

SGS FIMKO OY [Notified Body Number: 0598]

00380 HELSINKI

Finland

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:
- \circ 100 Ω RTD at 0 $^{\circ}$ C
- $\alpha = 0.00385 \Omega \times {^{\circ}C/\Omega}$, averaged between 0 and 100 ${^{\circ}C}$

· Limit deviations

- Tolerance Class B, as standard $t = \pm (0.3 + 0.005 \times [t])$; temperature range
- -328 to 572 °F (-200 to 300 °C)
- Tolerance Class A, as option $t = \pm (0.15 + 0.002 \times [t])$; temperature range -58 to 572 °F (-50 to 300 °C)

· Process temperature range

-328 to 572 °F (-200 to 300 °C)

· Ambient temperature range

-40 to 185 °F (-40 to 85 °C)

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 Vdc 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 10-1)

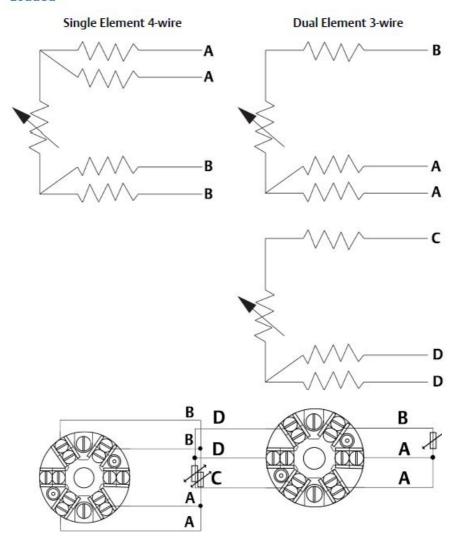
Identification data

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 10-1: Sensor Lead Wire Termination - Pipe Clamp RTD Spring Loaded



- A. Red
- B. White
- C. Yellow
- D. Black
- E. Blue
- F. Green
- Vibration effect
- The Rosemount 0085 Pipe Clamp Sensor is tested to the following
- specifications with no effect on performance per IEC 60770-1, 2010:

Frequency	Vibration
10 to 60 Hz	0.075 mm displacement
60 to1000 Hz	1 g (10 m/s2) peak acceleration

Functional specifications

- Power Overvoltage Category I
- Environmental Pollution Degree 4
- For more information: **Emerson.com**

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- The Emerson logo is a trademark and service mark of Emerson Electric Co.
- Rosemount is a mark of one of the Emerson family of companies.
- All other marks are the property of their respective owners

Documents / Resources



ROSEMOUNT 0085 Pipe Clamp Sensor [pdf] User Guide 0085, 0085 Pipe Clamp Sensor, Pipe Clamp Sensor, Clamp Sensor

References

- <u>Fmerson Global | Emerson</u>
- ♠ Rosemount | Emerson US
- Rosemount | Emerson US

Manuals+,