Rosemount Bearing Temperature Sensors (Type WEX 926)

- Non-intrusive measurement on bearing applications
- Oil sealing for increased process safety
- Thermal expansion compensation
- Flexible installation with adjustable process connections
Success with Bearing Temperature Measurement

The Rosemount WEX926 Bearing Temperature Sensor offers a reliable solution for your Bearing temperature measurement needs. This high quality product delivers superior performance and can be used in a variety of bearing temperature applications.

Overview
The Rosemount Bearing Thermocouple and RTD temperature sensor has been specifically designed for use in embedded bearings, critical to machine performance in industrial rotating equipment, for a reliable indication of bearing wear and oil film breakdown through continuous monitoring of temperature. The oil sealing feature allows for usage of this sensor in lubricated and harsh environments beneath the Babbitt layer of the bearing shoe. Rising temperatures indicate the breakdown of the lubricated oil film due to changes in the friction. A quick identification of early bearing failure warning is crucial for predicting machine shutdowns and maintenance to prevent serious damage to machinery.

Accurate and reliable measurement
The Rosemount Bearing Thermocouple and RTD temperature sensor ensures improved response time and constant contact of the sensing element with the bearing Babbitt layer by using a spring loaded design. The spring loaded design also compensates for thermal expansion of the bearing layer.

Process safety
To allow a secure and safe temperature measurement in the harsh and oily bearing environment, the Rosemount Bearing Thermocouple and RTD temperature sensor offers oil sealing features and safety approvals. The specific design prevents oil leakage through the sensor itself as well as through the holding tube.

Complete assemblies
Emerson makes it easy for you to order and install complete assemblies to accomplish your measurement needs. The Rosemount Bearing Temperature Assembly is available with an in-head HART® or FOUNDATION™ fieldbus transmitter (Rosemount 248 or Rosemount 644).

Temperature solutions
Rosemount 644 Temperature Transmitter
Head mount styles available with HART or FOUNDATION fieldbus protocol. Rail mount style available for HART protocol.

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.

Rosemount 248 Temperature Transmitter
Head mount (DIN B) and rail mount style with HART protocol and complete temperature assembly.

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 3144P Temperature Transmitter
Field mount style HART or FOUNDATION fieldbus protocol. Dual sensor input with advanced diagnostics.

Contents
Product Overview ........................................... 3
Specifications ............................................. 4
Dimensional Drawings ................................. 6
Product Certifications ................................. 7
Customer Data Sheet ................................. 9
Product Overview

Product introduction

The Rosemount WEX 926 Bearing Thermocouple and RTD sensor can be used in various different bearing applications. The oil sealing and spring loading makes this sensor a perfect solution for rough environments where the highest performance of the sensor is crucial.

Emerson uses highly linear RTD elements with a very stable resistance versus temperature relationship and are designed to meet the parameters of IEC 751 (DIN EN 60751), incorporating Amendments 1 and 2. Rosemount Bearing Thermocouples conform to IEC 584 (DIN EN 60584). Consult the factory and use the Customer Data Sheet (CDS) provided for Bearing Sensor models and Emerson will provide the sensor that will accommodate the process application.

Model code meaning

<table>
<thead>
<tr>
<th>Code</th>
<th>Type name</th>
<th>Process connection</th>
<th>Protection tube</th>
<th>Lead wire termination</th>
<th>Tube diameter</th>
<th>Detailed description</th>
<th>Additional options</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEX926</td>
<td>G Thread</td>
<td>Y Metal protection tube</td>
<td>I Enclosure</td>
<td>12 12 mm</td>
<td>RZ Cylindric tapered measuring tip</td>
<td>T Head mounted transmitter</td>
<td>VER Adjustable process connection</td>
</tr>
</tbody>
</table>

Additional options are defined by quoting. Consult factory and use the Customer Data Sheet (CDS).
**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 Process Management 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.

Table 2 provides a quick reference for the performance and physical aspects of the Rosemount Bearing Thermocouple and RTD temperature sensor assembly.

**Table 2. Performance Specifications**

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Limits of Error Interchangeability acc. IEC 584 (DIN EN 60584) for thermocouple</th>
<th>RTD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type E</td>
<td>±1.5 °C</td>
<td></td>
</tr>
<tr>
<td>Type J</td>
<td>±1.5 °C</td>
<td></td>
</tr>
<tr>
<td>Type K</td>
<td>±1.5 °C</td>
<td></td>
</tr>
<tr>
<td>Type N</td>
<td>±1.5 °C</td>
<td></td>
</tr>
<tr>
<td>Type T</td>
<td>±0.5 °C 0 to 125 °C</td>
<td>±0.004 x t °C 125 to 180 °C</td>
</tr>
<tr>
<td><strong>Class 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type E</td>
<td>±2.5 °C</td>
<td></td>
</tr>
<tr>
<td>Type J</td>
<td>±2.5 °C</td>
<td></td>
</tr>
<tr>
<td>Type K</td>
<td>±2.5 °C</td>
<td></td>
</tr>
<tr>
<td>Type N</td>
<td>±2.5 °C</td>
<td></td>
</tr>
<tr>
<td>Type T</td>
<td>±1.0 °C 0 to 133 °C</td>
<td>±0.0075 x t °C 133 to 180 °C</td>
</tr>
</tbody>
</table>

- **Ambient Temperature Limits**: -50 to 60 °C (-58 to 140 °F)
- **Temperature Measuring Range**: 0 to 180 °C (32 to 356 °F)
- **Ratings**: max. IP65
- **Insulation resistance**: 1000 MΩ at room temperature, test voltage is 500 Vac
- **Connection Cable**: PTFE, foil, wire mesh, PTFE insulated AWG24 stranded cable, Color coding. See Figure 1 on page 5 for wire configuration

*PTFE, foil, wire mesh, PTFE insulated AWG24 nickel plated copper wire. See Figure 1 on page 5 for wire configuration.*
Wiring diagrams

Figure 1. WEX926 Bearing Sensor RTD and Thermocouple Lead Wire Configuration

<table>
<thead>
<tr>
<th>Lead wire configuration RTD</th>
<th>Single element 3-wire</th>
<th>Single element 4-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Brown</td>
<td>4 Yellow</td>
<td></td>
</tr>
<tr>
<td>2 White</td>
<td>3 Yellow</td>
<td></td>
</tr>
<tr>
<td>4 Yellow</td>
<td>6 Blue</td>
<td></td>
</tr>
<tr>
<td>5 Black</td>
<td>1 Red</td>
<td></td>
</tr>
<tr>
<td>6 Red</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dual element 3-wire</th>
<th>Dual element 4-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Yellow</td>
<td>5 Grey</td>
</tr>
<tr>
<td>2 White</td>
<td>6 Rose</td>
</tr>
<tr>
<td>1 Brown</td>
<td>7 Blue</td>
</tr>
<tr>
<td>6 Blue</td>
<td>8 Red</td>
</tr>
<tr>
<td>5 Black</td>
<td>1 White</td>
</tr>
<tr>
<td>4 Red</td>
<td>2 Brown</td>
</tr>
<tr>
<td>3 Green</td>
<td>3 Green</td>
</tr>
<tr>
<td>4 Yellow</td>
<td>4 Yellow</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lead wire configuration thermocouple</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single element</td>
</tr>
<tr>
<td>3(-)</td>
</tr>
<tr>
<td>1(+)</td>
</tr>
</tbody>
</table>

Table 3. WEX926 Thermocouple Wire Colors

<table>
<thead>
<tr>
<th>Type</th>
<th>IEC wire color</th>
<th>ISA wire color</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive (+)</td>
<td>Negative (-)</td>
</tr>
<tr>
<td></td>
<td>Positive (+)</td>
<td>Negative (-)</td>
</tr>
<tr>
<td>E</td>
<td>Violet</td>
<td>White</td>
</tr>
<tr>
<td>J</td>
<td>Black</td>
<td>White</td>
</tr>
<tr>
<td>K</td>
<td>Green</td>
<td>White</td>
</tr>
<tr>
<td>N</td>
<td>Rose</td>
<td>White</td>
</tr>
<tr>
<td>T</td>
<td>Brown</td>
<td>White</td>
</tr>
</tbody>
</table>

www.rosemount.com
**Dimensional Drawings**

**Figure 2. Sensor Assembly Example**

**Figure 3. Connection head dimensional drawing**

<table>
<thead>
<tr>
<th></th>
<th>With LCD display cover</th>
<th>With standard cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Head Connection</td>
<td>104</td>
<td>104</td>
</tr>
<tr>
<td>B. LCD Display</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>128</td>
<td>100</td>
</tr>
</tbody>
</table>

A. Head Connection
B. LCD Display
Product Certifications

ATEX Flameproof
Certificate Number KEMA 99ATEX8715 X
ATEX Marking IIC II G Ex d IIC T6
Marking: Ex d IIC T6

Special Condition for Safe Use (X):
1. For information on the dimensions or the flameproof joints the manufacturer should be contacted.

Table 4. Entity parameters

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Transmitter</th>
</tr>
</thead>
<tbody>
<tr>
<td>U_{max} = 5 V</td>
<td>U_{max} = 55 Vdc</td>
</tr>
<tr>
<td>I_{max} = 2.0 mA</td>
<td>I_{max} = 40 mA</td>
</tr>
</tbody>
</table>

Temperature codes
T6 (-50 °C ≤ T_{amb} ≤ 65 °C)
The ATEX Flameproof approval is dependent on the Rosemount Integral Sensor Connection Head assembled with a RTD or thermocouple temperature sensor drawing, see Figure 3. The captive flame arrestor insert must be fully engaged into the connection head for compliance with this approval.

IECEx Intrinsically Safety
Certificate number IECEx IBE 09.0015X
Marking: Ex ia IIC T6

Special Conditions for Safe Use (X):
1. For the assembly and the operation of temperature sensor the requirements of the operating instruction have to be observed.
2. The application of the temperature sensor requires a protection tube.
3. The electrical connection has to be in an enclosure which is certified in a standardized type of protection.

Electrical and thermal data
Temperature measuring range 0 °C to +180 °C
Ambient temperature at the connection head -40 °C to +60 °C
Input voltage max. 30 V DC
Measuring current 1x respectively 2x ≤ 1 mA
Fault current max. 100 mA (limited by a fuse)
Power ≤ 10 mW
Measuring elements Resistance thermometer Pt100 acc. IEC 60751 class A or B in 3- respectively 4-conductor circuit or alternatively Thermo couples type K, J or T acc. to IEC 60584-1 class 1 or 2.

IECEx Flameproof
Certificate number IECEx KEM 09.0015X

Special Condition for Safe Use (X):
1. For information on the dimensions of the flameproof joints the manufacturer shall be contacted.
**Electrical and thermal data**

Electrical apparatus for potentially explosive gas atmospheres:
-40 to +65 °C

Electrical apparatus for use in the presence of combustible dust:
-40 to +85 °C

PRTE and TC sensor: Maximum input voltage: 5 V, Maximum input current: 2.0 mA

Temperature transmitter: Maximum input voltage: 55 Vdc, Maximum input current: 40 mA

**Material overview**

**Table 5. Component Material Overview**

<table>
<thead>
<tr>
<th>Part</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>ASTM301/1.4310</td>
</tr>
<tr>
<td>Mounting tube</td>
<td>ASTM316Ti/1.4571</td>
</tr>
<tr>
<td>Compression fitting</td>
<td>ASTM316Ti/1.4571</td>
</tr>
<tr>
<td>Screw bushing</td>
<td>ASTM303/1.4305</td>
</tr>
</tbody>
</table>

**Process and connection head connections**

**Figure 4. Compression Fitting G¹/₂**

**Figure 5. Compression Fitting ¹/₂ NPT**

**Figure 6. Screw Bushing**
Customer Data Sheet

BOLD = Required Value
* = Default

Select only one of the items provided
One or more of the listed items can be selected

Customer information

Customer: ________________________________________________________
Name: _________________________________________________________
Phone No:_______________________________________________________
Fax No./Email: ________________________________________________
P.O./Reference No.: _____________________________________________
P.O. Line Item: _________________________________________________
Quote No._______________________________________________________
Model No.:_____________________________________________________
Customer Signoff: ____________________________________________________________________________________________

Bearing sensor information

Device Tag Name: ________________________________________________

Process information

Temperature Range: _____________________________________________
Process Pressure: _____________________________________________
Process Medium: ______________________________________________
Application: _________________________________________________

Sensor base model WEX926-GY1 12

Hazardous Location Certifications:

☐ Ex d ATEX Flameproof Approval ☐ GOST (not yet available)
☐ KOSHA ☐ IECEx i
☐ IECEx e ☐ IECEx d
☐ NONE

Sensor Type: (select only one)

☐ Thermocouple Type J ☐ RTD, single element 4-wire
☐ Thermocouple Type K ☐ RTD, single element 3-wire
☐ Thermocouple Type T ☐ RTD, dual element 3-wire
☐ Thermocouple Type E ☐ RTD, dual element 4-wire
☐ Thermocouple Type N
☐ Other: __________________________

Thermocouple Wire Code (select only if sensor type thermocouple is required)

☐ Wire Color per IEC 60584-2
☐ Wire Color per ISA MC96.1
### Sensor base model WEX926-GYI 12

#### Sensor Class/Configuration: (select only one)
- [ ] Class 1 (TC only)
- [ ] Class B (RTD only)
- [ ] Class 2 (TC only)
- [ ] Class A (RTD only)

#### Connection head Material and Form (select only one)
- [ ] Rosemount aluminum
- [ ] Rosemount aluminum with LCD display cover
- [ ] Rosemount stainless steel
- [ ] Rosemount stainless steel with LCD display cover

#### Connection Head Conduit/Cable Entry (select only one)
- [ ] M20 x 1,5
- [ ] 1/2-in. NPT

### Sensor base model WEX926-GYI 12

#### Head Connection (select only one)
- [ ] M24x1,5
- [ ] G 1/2
- [ ] 1/2-in. NPT

#### Process Connection: (select only one)
- [ ] 1/2-in. NPT
- [ ] G 1/2

#### Nominal Length:
- [ ] NL: ___________ mm