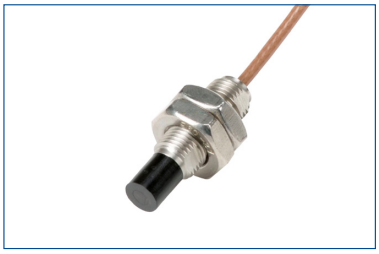
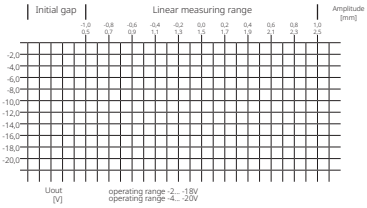
**PR6423**

**Specifications Sheet**
December 2024

# 8mm Eddy Current Sensor

Non-contact sensor designed for critical turbomachinery applications such as steam, gas and hydro turbines, compressors, gearboxes, pumps and fans to measure radial and axial shaft dynamic displacement; position, eccentricity and speed.






| Performance | |
|---|---|
| Linear Measurement Range | 2 mm (80 mils) |
| Initial Air Gap | 0.5 mm (20 mils) |
| Incremental Scale Factor (ISF) | ISO: 8 V/mm (203.2 mV/mil) ± 5% @ temperature range 0 to 45°C (+32 to +113°F) |
| Deviation from best fit straight line (DSL) | ± 0.025 mm (± 1 mil) @ temperature range 0 to 45°C (+32 to +113°F) |
| **Measuring Target** | |
| Minimum Shaft Diameter | 25 mm (0.79") |
| Target Material (Ferromagnetic Steel) | 42CrMo4 (AISI/SAE 4140) Standard<br>Other (On Request) |
| **Environmental, General** | |
| Protection Class | IP66, IEC 60529 |
| Operating Temperature Range | Sensor incl. 1m Cable:<br>-35 to +180°C (-31 to 356°F)<br>Cable & Connector:<br>-35 to +150°C (-31 to 302°F) |
| Material | Sensor Tip (PEEK Polyether Ether Ketone), Case (Stainless Steel)<br>Cable (PTFE Polytetrafluoroethylene),<br>Connector (Brass, nickel-plated) |
| Weight (Sensor with 1m Cable) | Approx. 100 grams (3.53 oz) |

AMS

EMERSON

| Compliance and Certifications | |
|---|---|
| CE | 2014/30/EU (EN 61326-1)<br>2014/34/EU<br>2011/65/EU |
| ATEX | EN 60079-0<br>EN 60079-11 |
| IEC-Ex | IEC 60079-0<br>IEC 60079-11<br>IEC 60079-26 |
| CSA | CAN/CSA-C22.2 NO. 0-M91<br>CAN/CSA-C22.2 NO. 157-92<br>CAN/CSA-C22.2 NO. 213-M1987<br>CAN/CSA-E60079-15-02 (R2006)<br>CAN/CSA-C22.2 NO. 25-1966<br>CAN/CSA-C22.2 NO. 61010-1-04<br>ANSI/UL Standard 913-2004<br>ANSI/UL Standard 1604-1995<br>UL 60079-15 2002<br>UL 61010-1 |

## Hazardous Area Approvals

| Intrinsic Safety (ia) | |
|---|---|
| ATEX / IEC-Ex / CSA | Area classification depends on converter, see converter documentation for details.<br>Sensor temperature classification:<br>T6: Ta ≤ 64°C<br>T4: Ta ≤ 114°C<br>T3: Ta ≤ 160°C |
| **Non-sparking (nA)** | |
| ATEX / IEC-Ex / CSA | Area classification depends on converter, see converter documentation for details.<br>Sensor temperature classification:<br>T6: Ta ≤ 64°C<br>T4: Ta ≤ 114°C<br>T3: Ta ≤ 160°C |



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## 8mm Eddy Current Sensor

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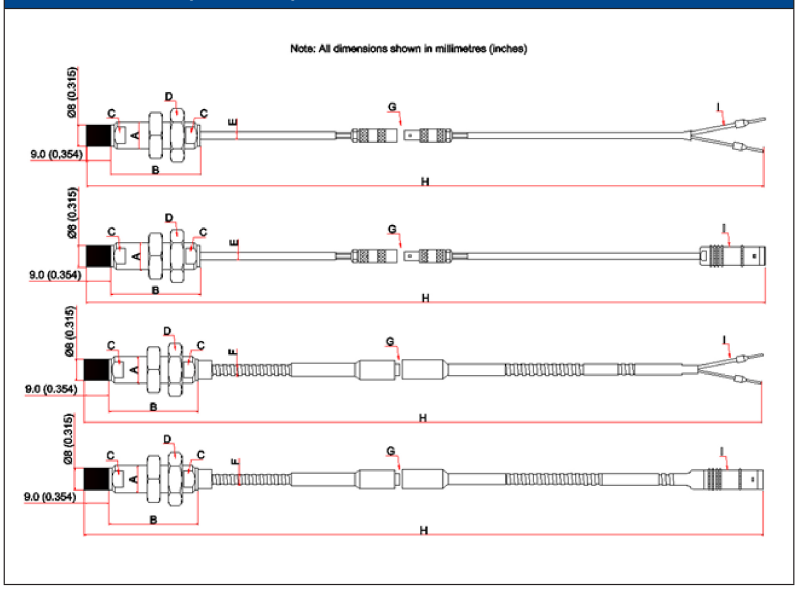
# Dimensions

**PR6423/xxx-xxx (Standard)**




A. Case thread, M10x1 or 3/8-24UNF
B. SW 11 mm for M10 threads, SW 7/9-16 in for 3/8-24UNF threads
C. Standard cable diameter 2.8 mm (0.110 in), minimum bending radius 25 mm (0.984 in)
D. Armored cable diameter 6 mm (0.236 in), minimum bending radius 35 mm (1.378 in)
E. Optional Adapter Plug after 1m cable from Sensor
F. Cable Length (Tolerances 0... +10%)
G. Lemo connector (male), 11.0 mm (0.433 in) diameter or open cable end

## Ordering Information

| Tip Diameter | Case Threads | Armored Cable | Model No. |
|---|---|---|---|
| 8mm | M10x1 | No | PR6423/00 |
| | | Yes | PR6423/01 |
| | | | PR6423/03* |
| | 3/8"-24 UNF | No | PR6423/10 |
| | | Yes | PR6423/11 |
| | | | PR6423/13* |

**Armored cable option for Reverse Mount, if Adapter Plug is chosen.*

| Model No. | Case Thread X | Adapter Plug X | Cable Length X | Cable End X |
|---|---|---|---|---|
| PR6423/00 | **0** 25mm | **0** With | **0** 4.0m | **0** Lemo* |
| PR6423/01 | **1** 35mm | **1** Without | **1** 5.0m | **1** Open |
| PR6423/10 | **2** 45mm | | **3** 8.0m | |
| PR6423/11 | **3** 55mm | | **F** 9.0m | |
| | **4** 65mm | | **4** 10.0m | |
| | **5** 75mm | | | |
| | **6** 85mm | | | |
| | **7** 95mm | | | |
| | **8** 105mm | | | |
| | **9** 115mm | | | |
| | **E** 155mm | | | |
| | **H** 195mm | | | |
| | **R** Reverse Mount | | | |

**Not available, if Reverse Mount without Adapter Plug is chosen.*

Example: PR6423/000-000
ECS 8mm, M10X1, NO ARMOR, 25MM SLEEVE, 1+3M CABLE, LEMO

# 3 Application and design

## 3.1 Application

The CON 041 Signal Converter in combination with sensors of type PR 6422 to PR 6426 form eddy current measuring chains to be used for static and dynamic distance measurements at all kinds of rotating machinery. This means that slow axial displacements as well as fast radial vibrations of rotating machines can be measured. By using pulse wheels or key marks stuck on the shaft, the speed of the machine can be measured and key pulses generated.

Sensors and signal converters are adjusted together and are delivered as complete measuring chains in order to achieve a maximum accuracy. For this reason it is important to always operate sensors and converters together. The type of the sensor and its serial number are marked on the type plate of the converter.

The characteristics of the measuring chain are adapted to the material mainly used for turbo machinery (reference material: 42 Cr Mo 4, according to SAE 4140). The standard adjustment of the measuring chains is generally related to this material – if necessary, other materials can be used for the adjustment (see installation guide PR 642x, Eddy Current Sensors). During installation at the machine only the distance between the head of the sensor and the measuring target are to be adjusted. Criterion for the adjustment of the sensor is the output signal of the converter.

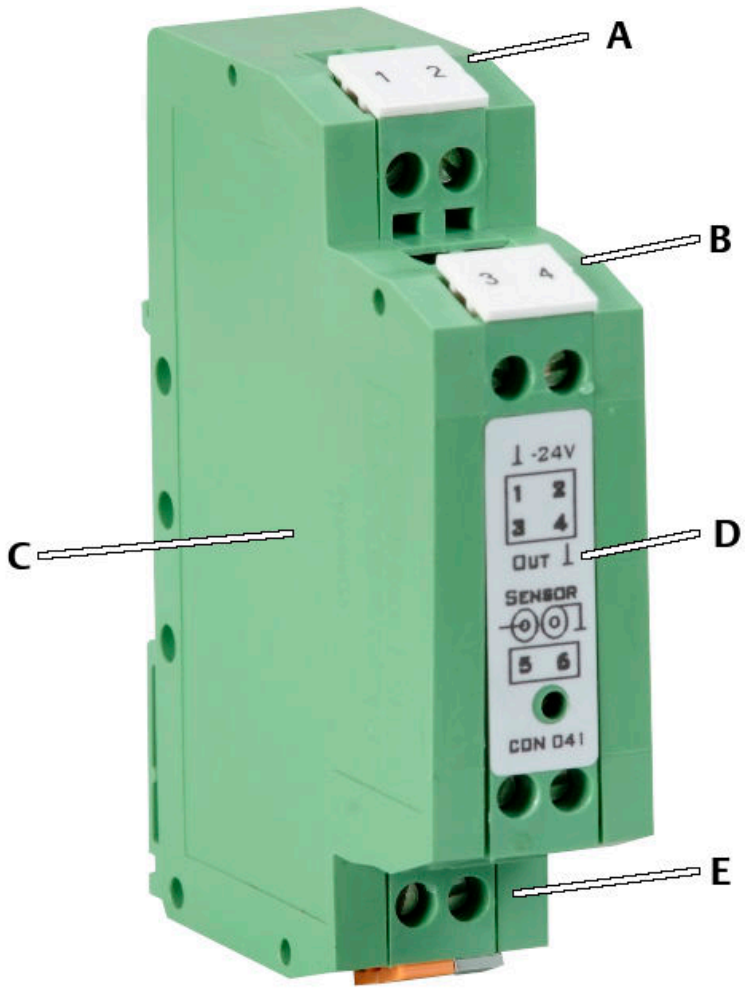
Supply circuits for the eddy current sensor and the measuring electronic are contained in the converter. The nominal supply voltage for the converter is -24 V DC, the nominal range of the output signal, proportional to the nominal measuring range of the sensor, may be set to either -4 to -20 V or -2 to -18 V. The output voltage of converters for special measuring ranges (CON 041 / 91x-xxx) have a firmly adjusted range of -4 to -20V.

Five eddy current probes are at disposal. The actual type to be used depends on the measuring range, on the available space for measuring and on the environmental temperature.

## 3.2 Design

The CON 041 Converter is accommodated in a housing for din rail mounting. Connection of the eddy current sensor, signal output, and converter supply is made by screw terminals. See Figure 3-1 and Figure 3-2 for details.

**Figure 3-1: CON 041 Converter**




*A. Screw terminals for voltage supply (-24 V DC)*
*B. Screw terminals for sensor signal*
*C. Place for label*
*D. Label with screw terminal description*

# 8 Technical data

Only specifications with indicated tolerances or limit values are required. Data without tolerances or without error limits are informative data and not guaranteed. Technology is under constant development, and specifications are subject to change without notice. If not stated otherwise, the specifications are valid for the nominal supply voltage of -24V.

## 8.1 Input

Connection for eddy current sensors. Screw terminals for connection of Emerson sensors PR 6422/xxx-xx0, PR 6423/xxx-xx0, PR 6424/xxx-xx0, PR6424/xxx-xx0, and PR 6426/xxx-xx0.

## 8.2 Supply

| | |
|---|---|
| Supply voltage range | -23 to -28 V for output voltage range -4 to -20 V |
| | -21 to -28 V for output voltage range -2 to -18 V |
| | -18 to -21 V with reduced output voltage range |
| Nominal supply current | <15 mA, with 10 kΩ load resistance |
| Reverse connect protection | Reverse connect protection of all 3 terminals (GND, Output, and -24 V) |
| Nominal operating frequency | approximately 1.25 MHz |
| De−adjustment of oscillator for adjacent arrangement of sensors | open Jumper D in Figure 3-2 (delivery state: closed) |

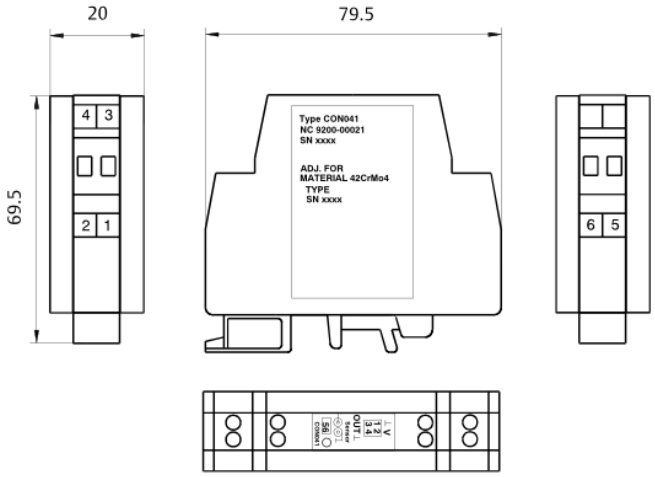
## 8.3 Output

DC voltage with superimposed AC signal corresponding to vibration or displacement of the shaft. Open-circuit and short-circuit proof.

| | |
|---|---|
| Output voltage range | Jumper B in Figure 3-2 closed: -2 to -18 V (factory setting) |
| | Jumper B in Figure 3-2 open: -4 to -20 V |
| | adjusted with 100kΩ load resistance |
| Limit range | -1 to -22 V (at -24 V supply voltage) |
| Nominal frequency range | 0 to 20 kHz (-3 dB) with C - load = 10 nF |
| | 0 to 15 kHz (-3 dB) with C - load = 20 nF |
| Rise time | <15 µs, with C - load = 1 nF |
| Output impedance | approximately 100 Ω |
| Load resistance | nominal value 100 kΩ (for R = 10 kΩ, error <1%) |

| | | |
|---|---|---|
| CE – compatibility | | Test according to: EN 55011(1998) & A1(1999) & A2(2001) (emitted interference) EN 61362(1997) & A1(1998) & A2(2001) & A3(2003) IEC 61326−1:2005 including EN 61000−4−5:2006 (interference resistance).<br>The converter CON041/... meets the specifications mentioned above. The test specifications as setup, test levels, pass criteria, and so on, are described in the document “CON0x1_EMV −Testspezifikationen”. For copies of this document contact Emerson. |
| Housing | Dimensions | see Figure 8-2 |
| | Material | Polyamide PA6.6 |
| Weight | | 60 g net weight |

**Figure 8-2: Dimensions**




All dimensions in mm.

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