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Rotational speed sensor system **MDS10P / RT02**

Application

Non-contacting rotational speed measuring system MDS10P sensor - RT02 transmitter is used for rotating machinery shaft speed measurements. The voltage pulse train from the transmitter output can be used to measure the rotational speed in rpm by means of RDM digital meter or other rotation measuring device.

Description

The system processes a step change in the size of the gap in front of the sensor face to a series of voltage pulses. The element that produces a step change of the gap in front of the sensor's face can be a groove on the shaft (shaft flange), a disc with holes or a gear. To complete the measurement, one pulse per revolution is enough, and generally the number of pulses per revolution (the number of grooves on the shaft, holes in a disk or teeth on a gear wheel) can range from 1 to 60.

A sensor, installed radially relative to machinery shaft "observes" groove made axially on the shaft surface (recommended minimal groove dimensions: axial direction length 16mm, shaft perimeter direction width 12mm, depth 2 mm). For disk, holes shall be at least 15mm in diameter, and the sensor observes the disc perpendicular to its plane being mounted in the axis of the hole Sensor head is made of high quality plastic resistant to oil, water and many chemicals. Sensor casing is made of AISI 304 stainless steel and is made in several different versions as in the pictures below. The coaxial sensor cable has a PTFE insulation and is equipped with an elastic protective stainless steel armor. The sensor with the transmitter is connected by cable with a nominal length of 2m, 3m, 5m, 7m, 9m or 12m. This length corresponds to the length of the integral sensor cable or is made up of an integral sensor cable and an extension cable. Possible combinations of both cable sections are described further in the ordering of sensors. The transmitter's electronic system is housed in an aluminum alloy housing in gray RAL 7032 and sealed with a silicone resin filling. The transmitter is attached to the ground with two M4x16 screws. The degree of protection for electronic components is IP66. The transmitter is supplied with 24V DC.

For the cable route between the transmitter and the power supply/signal receiver, three wires with a



cross-section of 0.5 to 1.5 mm2 are needed. It is recommended that the cable has a screen.

Performances

METROLOGICAL

Input signal: alternating voltage on the sensor coil depends on the goodness of the coil Output signal: TTL pulse train (rectangular pulses with amplitude 0 ÷ 5V) or CMOS (0-10V) Frequency band: 0 ÷ 5kHz Sensor working gap: 0,5 to 4 mm

ELECTRICAL

Power supply: 24 V DC \pm 10% Power consumption: < 30mA Output load: >10kΩ

ENVIRONMENTAL

Ambient temperature range: Sensor: -35 to+180°C Transducer: -35 to +70°C **Relative humidity:** Sensor: up to 95% no condensation Transducer: up to 100% not submerged

MECHANICAL

Weight: (typical): Sensor with 1m cable, without armour : 100g Cable: 32g/m Armour: 50g/m Transducer: 600g Casing material: Sensor: stainless steel AISI 304 Transmitter: aluminum alloy Protection:

Sensor: IP66 Transmitter: IP66

Sensor cable length (total): 2m, 3m, 5m, 7m, 9m or 12m

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^{₼₩——} Przedsiębiorstwo Wdrażania Diagnostyki Technicznej TECHNICAD Spółka z o.o. 44 -100 Gliwice, ul Kozielska 18, Poland tel./fax:+48-32 279 07 56, 279 07 57, e-mail: info@technicad..pl; www.technicad..pl

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The terminal block is located inside the transmitter housing and has six screw terminals: two for sensor cable, two for output signal and two for power supply.

The sensor - transmitter system does not require any mutual calibration.



1 – Miniature female coaxial connector

2 - Part number and serial number

3 - Heat shrinkable jacket for user's designation

- Cable diameter 3,6mm, FEP isolation

- Stainless steel armor, outer diameter 7.0mm

- Stainless steel armor diameter with additional PVDF outer jacket: 7.5mm

Fig.1 MDS10P - sensor in basic shape

Ordering information for sensor of basic shape

A B C D E MDS10P - 000-000-000-000-000

Options description

A DDD Overall case length L1 in mm, range from 030 to 200 with 10mm step

B III Unthreaded length L2 in mm, range from 000, 010 and further to 160 with 10mm step

- **C** \Box Sensor integral cable length L
 - **05** cable length 0.5m (requires the application of extension cable)
 - **10** cable length 1.0m (requires the application of extension cable)
 - **20** cable length 2.0m
 - **30** cable length 3.0m
 - **50** cable length 5.0m
 - 70 cable length 7.0m
 - **90** cable length 9.0m
 - **12** cable length 12.0m

D Cable stainless steel armour protection

- 00 without armour
- 01 with armour
- 02 with armour having additional PVDF outer jacket
- **E** \Box Sensor cable with miniature connector to connect with extension cable
 - **00** without connector (cable wire and screen ended with kneaded sleeves)
 - **01** with connector (applies when using an extension cable)

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- 1 Miniature female coaxial connector
- 2 Part number and serial number
- 3 Heat shrinkable jacket for user's designation
- Cable diameter 3,6mm , FEP isolation
- Stainless steel armor, outer diameter 7.0mm
- Stainless steel armor diameter with additional PVDF outer jacket: 7.5mm

Fig.2 MDS10PO – sensor shape for reverse mount.

Ordering information for sensor of reverse mount shape

A B C MDS10PO - 00-00-00

Options description

- A
 Total sensor integral cable length L
 - **05** cable length 0.5m (requires the application of extension cable)
 - **10** cable length 1.0m (requires the application of extension cable)
 - 20 cable length 2.0m
 - **30** cable length 3.0m
 - **50** cable length 5.0m
 - **70** cable length 7.0m
 - **90** cable length 9.0m
 - **12** cable length 12.0m
- B Cable stainless steel armor protection
 - **00** without armor
 - 01 with armor
 - 02 with armor having additional PVDF outer jacket
- C DD Sensor cable with miniature connector to connect with extension cable
 - 00 without connector (cable wire and screen ended with kneaded sleeves)
 - **01** with connector (applies when using an extension cable)

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1 - Miniature female coaxial connector

- 2 Part number and serial number
- 3 Heat shrinkable jacket for user's designation
- Cable diameter 3,6mm, FEP isolation
- Stainless steel armor, outer diameter 7.0mm
- Stainless steel armor diameter with additional PVDF outer jacket: 7.5mm

Fig.3 MDS10K – sensor shape with side exit cable

Ordering information for sensor with side exit cable

В С Α MDS10K - 00-00-00

Options description

- A DD Total sensor integral cable length L
 - 05 cable length 0.5m (requires the application of extension cable)
 - 10 cable length 1.0m (requires the application of extension cable)
 - cable length 2.0m 20
 - 30 cable length 3.0m
 - 50 cable length 5.0m
 - cable length 7.0m 70
 - 90 cable length 9.0m
 - 12 cable length 12.0m
- B
 Cable stainless steel armor protection
 - **00** without armor
 - 01 with armor
 - 02 with armor having additional PVDF outer jacket
- C D Sensor cable with miniature connector to connect with extension cable
- 00 without connector (cable wire and screen ended with kneaded sleeves)
 - **01** with connector (applies when using an extension cable)

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- 1 Miniature female coaxial connector
- 2 Part number and serial number
- 3 Heat shrinkable jacket for user's designation
- Cable diameter 3,6mm, FEP isolation
- Stainless steel armor, outer diameter 7.0mm
- Stainless steel armor diameter with additional PVDF outer jacket: 7.5mm

Fig.4 MDS10KG – sensor shape with side exit cable and smooth casing

Ordering information for sensor with side exit cable, smooth casing

A B C MDS10KG - 00-00-00

Options description

- A D Total sensor integral cable length L
 - **05** cable length 0.5m (requires the application of extension cable)
 - **10** cable length 1.0m (requires the application of extension cable)
 - **20** cable length 2.0m
 - 30 cable length 3.0m
 - **50** cable length 5.0m
 - **70** cable length 7.0m
 - **90** cable length 9.0m
 - **12** cable length 12.0m
- **B** \Box Cable stainless steel armor protection
- **00** without armor
 - **01** with armor
- 02 with armor having additional PVDF outer jacket
- **C** \Box Sensor cable with miniature connector to connect with extension cable
 - **00** without connector (cable wire and screen ended with kneaded sleeves)
 - **01** with connector (applies when using an extension cable)

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- 1 Miniature female coaxial connector
- 2 Part number and serial number
- 3 Heat shrinkable jacket for user's designation
- cable diameter 3,6mm, FEP isolation
- MDS10M sensor is not offered with stainless steel armor

Fig.5 MDS10M – sensor shape with miniature size

Ordering information for sensor with miniature size

A B MDS10M - □□-□□

Options description

A DD Total sensor integral cable length L

- **05** cable length 0.5m (requires the application of extension cable)
- 10 cable length 1.0m (requires the application of extension cable)
- **20** cable length 2.0m
- 30 cable length 3.0m
- **50** cable length 5.0m
- **70** cable length 7.0m
- **90** cable length 9.0m
- **12** cable length 12.0m
- **B** \Box Sensor cable with miniature connector to connect with extension cable
 - **00** without connector (cable wire and screen ended with kneaded sleeves)
 - **01** with connector (applies when using an extension cable)

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- 1 Miniature male coaxial connector
- 2 Stainless steel armor, outer diameter 7.0mm
- 3 Stainless steel ferrules, 8.0mm diameter
- 4 PVDF jacket, outer diameter 7.5mm
- 5 Heat shrinkable jacket for user's designation
- 6 Part number and serial number
- cable diameter 3,6mm, FEP isolation

- armor length is app.300mm shorter than true extension cable length

Fig.6 MDS10C – Extension cable for MDS10... sensors

Ordering information for extension cable



Note: the sensor cable total length (a sum of sensor integral cable length and extension cable length) must equal one of two nominal total lengths: 2m, 3m, 5m, 7m, 9m or 12m

Options description:

A

Extension cable length L

- **10** 1.0m
- **15** 1.5m
- **20** 2.0m
- **25** 2.5m
- **30** 3.0m
- **40** 4.0m
- **45** 4.5m
- 50 5.0m
- **60** 6.0m
- **65** 6.5m
- **70** 7.0m
- **80** 8.0m
- **85** 8.5m
- **90** 9.0m
- **100** 10.0m
- **110** 11.0m
- **115** 11.5m
- $\textbf{B} \square \text{ Cable stainless steel armor protection}$
 - **00** without armor
 - **01** with armor
 - **02** with armor having additional PVDF outer jacket

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Fig 7. RT02 – Rotational Speed Transmitter - dimensions



Ordering information for Connector rubber cover

CP - connector rubber cover

Note: The sensor and extension cable are supplied with a rubber cover on the purchase

Fig.8 Connector rubber cover on the sensor cable

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