

Rotational speed measuring system

MDS10 / RT03

Outputs: voltage pulses, 4-20mA

Application

Non-contact measuring system
MDS10P sensor - RT03 transmitter is a device for rotating machinery shaft speed measurements.

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.

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 disc, 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 sensors ordering information. 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 IP65. The transmitter is powered by 24VDC.

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 have 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 pulse train (rectangular pulses with amplitude 0-10V)

- 4...20 mA proportional to the rpm measuring range

Measuring range: in rpm according to the order

Frequency band: 0 ÷ 5kHz

Sensor working gap: 0,5 to 4 mm

ELECTRICAL

Power supply: 24 V DC ± 10%

Power consumption: < 100 mA

Output load:

Voltage(pulses) output >10 kΩ

Current 4-20mA output <500 Ω

ENVIRONMENTAL

Ambient temperature range:

Sensor: -35 to +180°C

Transmitter: -35 to +70°C

Relative humidity:

Sensor: up to 95% no condensation

Transmitter: up to 100% not submerged

MECHANICAL

Weight: (typical):

Sensor with 1m cable, without armour : 100g

Cable: 32g/m

Armour: 50g/m

Transmitter: 600g

Casing material:
Sensor: stainless steel AISI 304

Transmitter: aluminum alloy

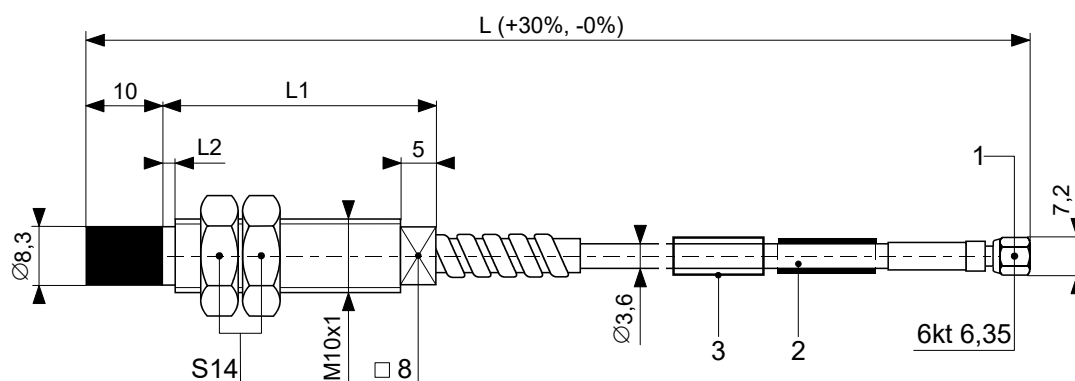
Protection:
Sensor: IP65

Transmitter: IP65

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

The terminal block is located inside the transmitter housing and has seven screw terminals for connecting the wires: two for sensor cable, three 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 probe of basic shape

A B C D E
MDS10P -□□□-□□□-□□-□□-□□

Options description

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

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

C □□ Probe integral cable length L

0 5 cable length 0.5m (requires the application of extension cable)

1 0 cable length 1.0m (requires the application of extension cable)

2 0 cable length 2.0m

3 0 cable length 3.0m

5 0 cable length 5.0m

7 0 cable length 7.0m

9 0 cable length 9.0m

1 2 cable length 12.0m

D □□ Cable stainless steel armor protection

0 0 without armor

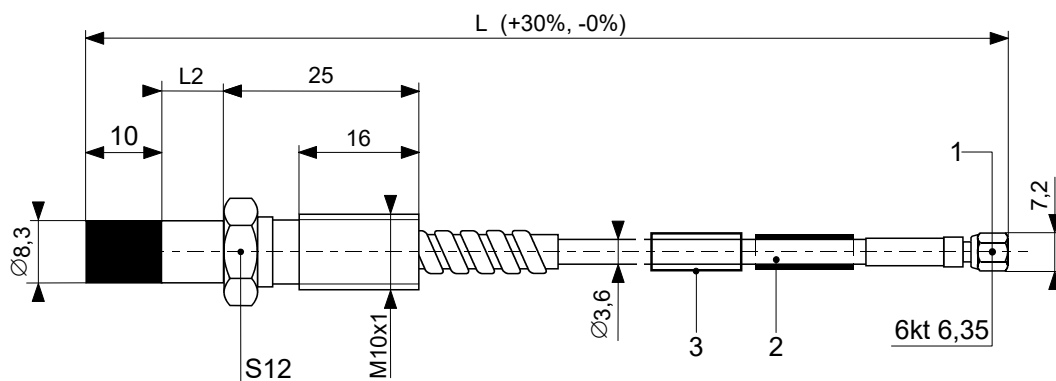
0 1 with armor

0 2 with armor having additional PVDF outer jacket

E □□ Probe cable with miniature connector to connect with extension cable

0 0 without connector (cable wire and screen ended with kneaded sleeves)

0 1 with connector (applies when using an extension cable)



- 1 – Miniature female coaxial connector
- 2 – Part number and serial number
- 3 – Heat shrinkable jacket for user's design

- Cable diameter 3,6mm , FEP isolation
- Stainless steel armor, outer diameter 7.0mm
- Stainless steel armor diameter with additional PVDF outer jacket: 7.5mm

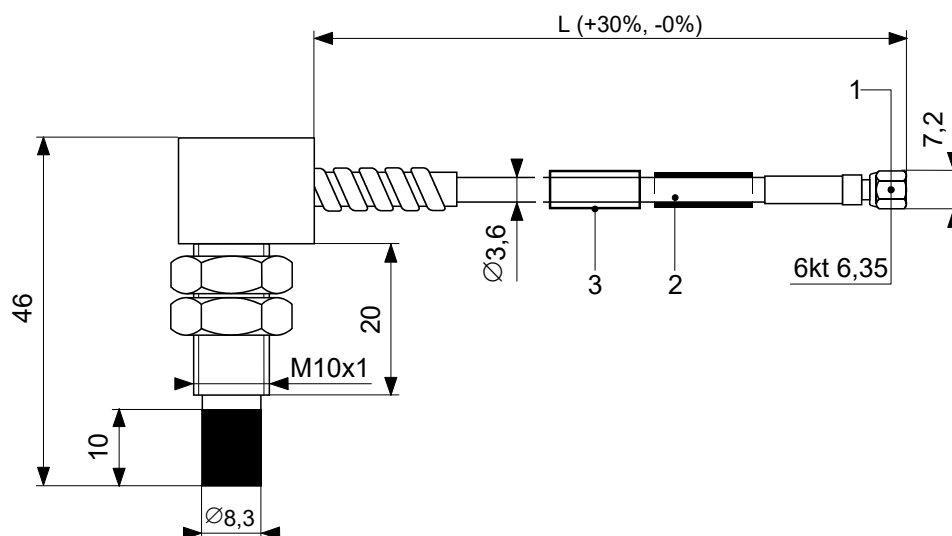
Fig.2 MDS10PO – sensor shape for reverse mount.

Ordering information for probe of reverse mount shape

A B C
MDS10PO - □□-□□-□□

Options description

- A** □□ Total probe integral cable length L
 - 0 5** cable length 0.5m (requires the application of extension cable)
 - 1 0** cable length 1.0m (requires the application of extension cable)
 - 2 0** cable length 2.0m
 - 3 0** cable length 3.0m
 - 5 0** cable length 5.0m
 - 7 0** cable length 7.0m
 - 9 0** cable length 9.0m
 - 1 2** cable length 12.0m
- B** □□ Cable stainless steel armor protection
 - 0 0** without armor
 - 0 1** with armor
 - 0 2** with armor having additional PVDF outer jacket
- C** □□ Probe cable with miniature connector to connect with extension cable
 - 0 0** without connector (cable wire and screen ended with kneaded sleeves)
 - 0 1** with connector (applies when using an extension cable)



- 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

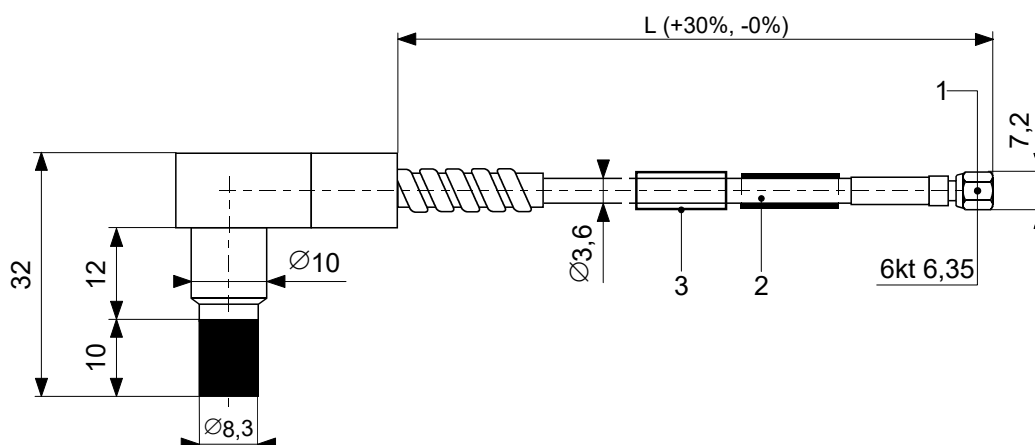
Fig.3 MDS10K – probe shape with side exit cable

Ordering information for probe with side exit cable

A B C
MDS10K - □□-□□-□□

Options description

- A** □□ Total probe integral cable length L
- 0 5** cable length 0.5m (requires the application of extension cable)
 - 1 0** cable length 1.0m (requires the application of extension cable)
 - 2 0** cable length 2.0m
 - 3 0** cable length 3.0m
 - 5 0** cable length 5.0m
 - 7 0** cable length 7.0m
 - 9 0** cable length 9.0m
 - 1 2** cable length 12.0m
- B** □□ Cable stainless steel armor protection
- 0 0** without armor
 - 0 1** with armor
 - 0 2** with armor having additional PVDF outer jacket
- C** □□ Probe cable with miniature connector to connect with extension cable
- 0 0** without connector (cable wire and screen ended with kneaded sleeves)
 - 0 1** with connector (applies when using an extension cable)



- 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 – probe shape with side exit cable and smooth casing

Ordering information for probe with side exit cable, smooth casing

A B C
MDS10KG - □□-□□-□□

Options description

A □□ Total probe integral cable length L

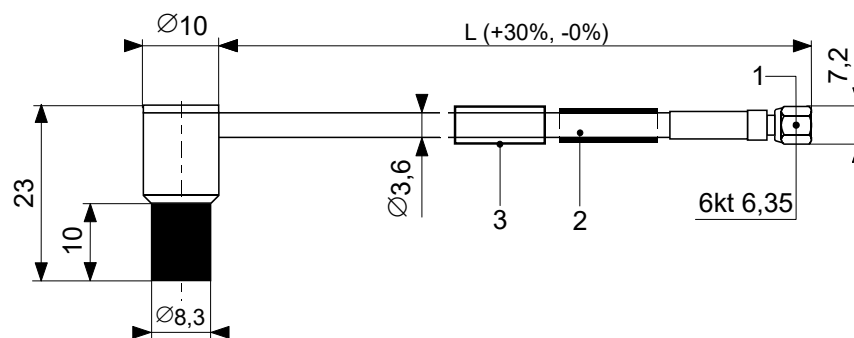
- 0 5** cable length 0.5m (requires the application of extension cable)
- 1 0** cable length 1.0m (requires the application of extension cable)
- 2 0** cable length 2.0m
- 3 0** cable length 3.0m
- 5 0** cable length 5.0m
- 7 0** cable length 7.0m
- 9 0** cable length 9.0m
- 1 2** cable length 12.0m

B □□ Cable stainless steel armor protection

- 0 0** without armor
- 0 1** with armor
- 0 2** with armor having additional PVDF outer jacket

C □□ Probe cable with miniature connector to connect with extension cable

- 0 0** without connector (cable wire and screen ended with kneaded sleeves)
- 0 1** with connector (applies when using an extension cable)



- 1 – Miniature female coaxial connector
- 2 – Part number and serial number
- 3 – Heat shrinkable jacket for user's design

- cable diameter 3,6mm , FEP isolation
- MDS10M probe is not offered with stainless steel armor

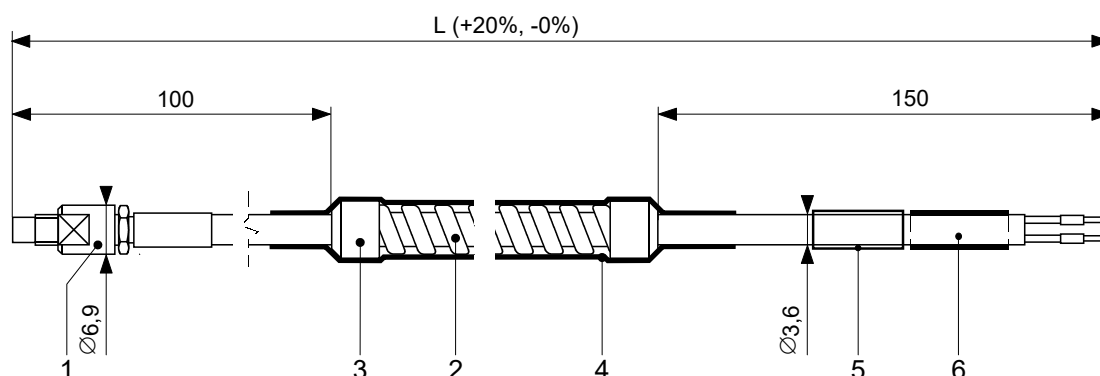
Fig.5 MDS10M – probe shape with miniature size

Ordering information for probe with miniature size

A B
MDS10M - □□-□□

Options description

- A** □□ Total probe integral cable length L
- 0 5** cable length 0.5m (requires the application of extension cable)
 - 1 0** cable length 1.0m (requires the application of extension cable)
 - 2 0** cable length 2.0m
 - 3 0** cable length 3.0m
 - 5 0** cable length 5.0m
 - 7 0** cable length 7.0m
 - 9 0** cable length 9.0m
 - 1 2** cable length 12.0m
- B** □□ Probe cable with miniature connector to connect with extension cable
- 0 0** without connector (cable wire and screen ended with kneaded sleeves)
 - 0 1** with connector (applies when using an extension cable)



- 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... probes

Ordering information for extension cable

A B

MDS10C- □-□

Note: the probe cable total length (a sum of probe 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

B □□ Cable stainless steel armor protection

- 0 0** without armor
- 0 1** with armor
- 0 2** with armor having additional PVDF outer jacket

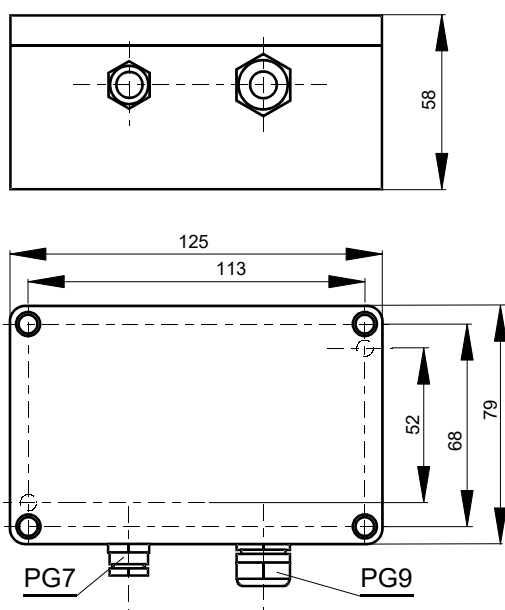


Fig 7. RT03 – rotational speed transmitter - dimensions

Ordering information for rotational speed transmitter

A **B** **C** **D** **E**
RT03-□□-□□□□□□-□□□□- □□ - □□

Options specification:

A □□ The number of pulses per one shaft revolution

e.g. 01 for 1 pulse per one shaft revolution

B □□□□□ Rotational speed measuring range in rpm

e.g. 03000 for range 0-3000rpm

C □□□ Probe total cable length (integral cable length plus-if applicable- extension cable length)

2 0 cable length 2.0m

3 0 cable length 3.0m

5 0 cable length 5.0m

7 0 cable length 7.0m

9 0 cable length 9.0m

1 2 cable length 12.0m

D □□ Pulse source on the shaft

0 1 groove

0 2 tenon

E □□ Output voltage pulses

0 1 0-5V (TTL)

0 2 0-10V (CMOS)

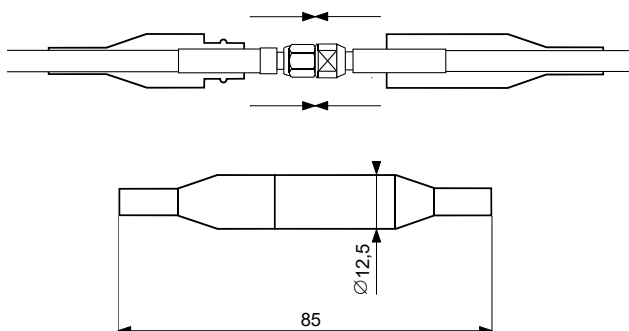


Fig.8 Connector rubber cover on the sensor cable

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