

Rotational speed and phase marker measuring system RT04R / MDS10

- Input for MDS10 proximity probe
- 1 isolated output 4-20mA or 0-10V or 0-5V
- buffered TTL pulse output
- isolated RS-485 Modbus RTU
- 2 relay outputs
- possibility of programming a number of measurement parameters

Application

Non-contact measuring system MDS10 probe - RT04R monitor is a device for measuring the rotational speed of rotating elements. It is designed to work in on-line speed and/or phase marker measuring systems.

Description

The system processes a step change in the size of the gap in front of the probe 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. The probe, 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 12mm in diameter, and the probe observes the disc perpendicular to its plane being mounted in the axis of the hole.

The value of the measured rotational speed is provided in digital form (Modbus RTU protocol) and in the form of standard 4-20 mA or 0-10(5) V analog outputs. When a single pulse source is used on the shaft (one groove or, for example, a screw head), the sequency of voltage pulses then represents the phase marker signal (1 pulse / revolution). Buffered pulse train in TTL format is available at the device terminals.

The advantage of the RT04R monitor is the galvanic isolation of the module power supply circuit from the probe input circuit and from each of the output interfaces, as well as mutual galvanic isolation between the analog output and the digital output. The isolation enables the monitor to be used in a disturbed industrial environment or in distributed systems, where the distance between the system components is considerable.

The monitor has two relays at the output, the activation of which takes place after exceeding the set speed thresholds. The RT04R monitor is made in a narrow housing for mounting on the TS35 rail.



Through the MCX miniature connector of the RS485 port located on the front side of the monitor (PROG), the device can be programmed on the basis of the configuration program delivered with the device. On the front side there is one three-colour LED to signal the operation of the monitor.

In the rear part of the housing, within the TS35 bus, the module has an edge connector to which the TBUS bus can optionally be connected. The TBUS bus carries the 24VDC power supply and the RS485 signal, which can be used in case of mounting several measuring modules next to each other on the TS35 rail using the TBUS bus and analogous arrangement of contacts.

Performances

METROLOGICAL

Input:

- MDS10 probe (alternating voltage on the sensor coil depends on the goodness of the coil)
- pulse frequency: max. 3kHz
- probe working gap: 0,5 to 4 mm
- total length of the probe cable from 2m to 18m

Outputs:

- isolated 4...20mA, $R_{load} < 500\Omega$ or 0-10(5)V, $R_{load} > 10k\Omega$ proportional to the set measuring range
- TTL pulse train (rectangular pulses with amplitude 0 \pm 5V), $R_{load} > 10k\Omega$
- 2 relays from exceeding the set rotating speed threshold values, voltage free contacts with the ability to connect 2A / 250V AC, 2A / 24V DC,
- 2 isolated RS-485 ports with Modbus RTU protocol (PROG socket on the front side and housing screw terminals)

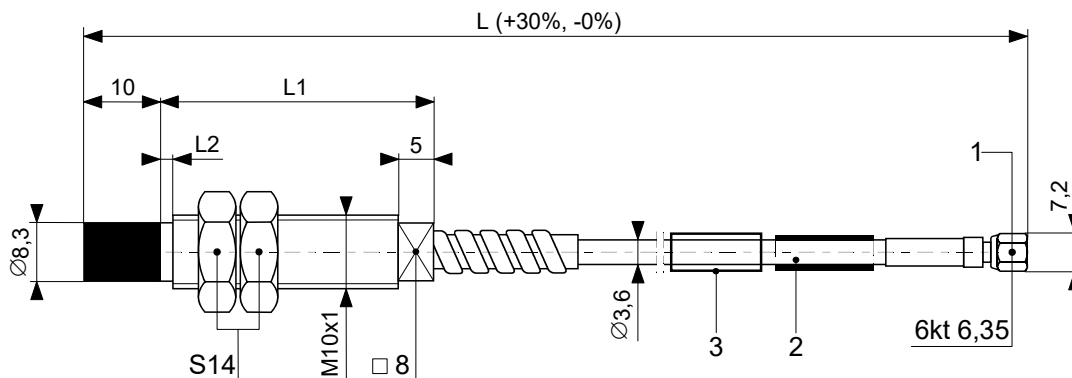
Measuring range: 0 do 65000 rpm

Accuracy:

- RS485: ± 1 rpm
- Analog output: 0,015% of the measuring range

The MDS10 proximity probe cooperating with the RT04R monitor may have several different versions, as shown below. The coding method is shown for each version when ordering. The individual versions of the probe differ basically in the shape of the housing and its length. In addition, the probe cable may have a length from 2m to 18m, the cable may be in one section or divided into two (integral cable and extension cable) using a micro-connector with a rubber cover.

All sensor versions are presented below, then the data of the extension cable and the data of the rubber cover (silicone rubber), which can be ordered separately. When purchasing a sensor with 2-piece cable (integral cable plus extension cable), the rubber cover protection for the micro-connector is provided with the sensor. If the sensor with an integral cable of the required length is selected without an extension cable, the rubber cover is not needed.



- 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 armour diameter with additional PVDF outer jacket: 7.5mm

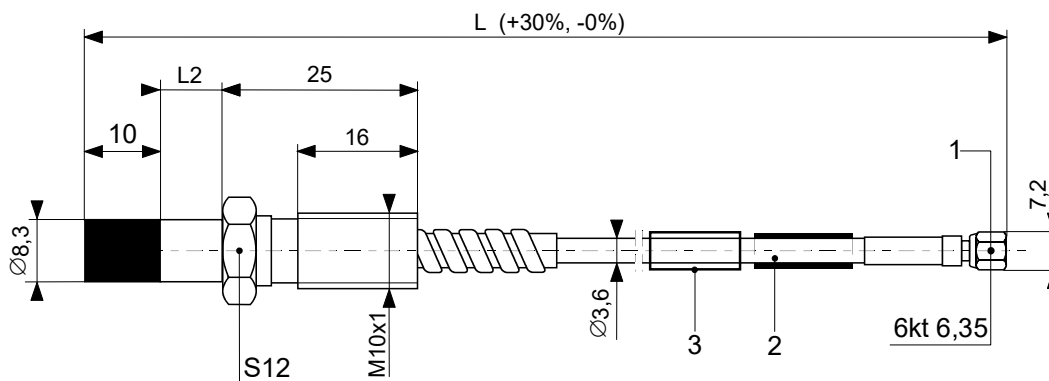
Fig.2 MDS10P - probe in basic shape

Ordering information of the probe in the basic version

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 0 5** cable length 0.5m (requires the application of extension cable with a minimum length of 1.5m)
 - 0 1 0** cable length 1.0m (requires the application of extension cable with a minimum length of 1.0m)
 - 0 2 0** cable length 2.0m
 - 0 3 0** cable length 3.0m
 - and further to 18.0m with 1m step
 - 1 8 0** cable length 18.0m
- D** □□ Equipping the integral sensor cable with a protective stainless steel armour protection
 - 0 0** without armour
 - 0 1** with armour
 - 0 2** with armour having additional PVDF outer jacket
- E** □□ Equipping the integral sensor cable with a miniature connector to connect with an 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 armour, outer diameter 7.0mm
- Stainless steel armour diameter with additional PVDF outer jacket: 7.5mm

Fig.3 MDS10PO – probe shape for reverse mount.

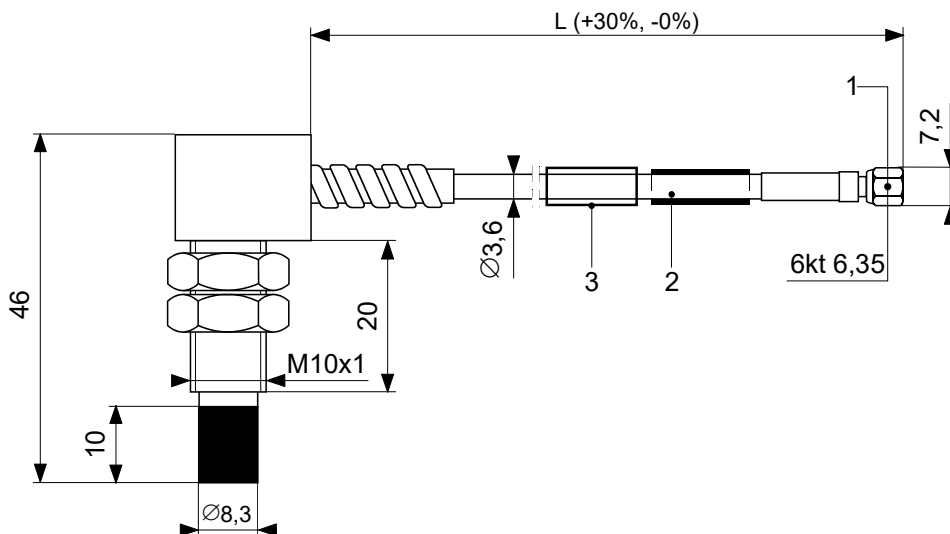
Ordering information for probe of reverse mount shape

A B C D

MDS10PO - □□-□□□-□□-□□

Options description

- A □□ Unthreaded length L2 in mm, selected from among the values: 05, 10, 15 or 20mm
- B □□□ Probe integral cable length L
 - 0 0 5 cable length 0.5m (requires the application of extension cable with a minimum length of 1.5m)
 - 0 1 0 cable length 1.0m (requires the application of extension cable with a minimum length of 1.0m)
 - 0 2 0 cable length 2.0m
 - 0 3 0 cable length 3.0m
and further to 18.0m with 1m step
 - 1 8 0 cable length 18.0m
- C □□ Equipping the integral sensor cable with a protective stainless steel armour protection
 - 0 0 without armour
 - 0 1 with armour
 - 0 2 with armour having additional PVDF outer jacket
- D □□ Equipping the integral sensor cable with a miniature connector to connect with an 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 armour, outer diameter 7.0mm
- Stainless steel armour diameter with additional PVDF outer jacket: 7.5mm

Fig.4 MDS10K – probe shape with side exit cable

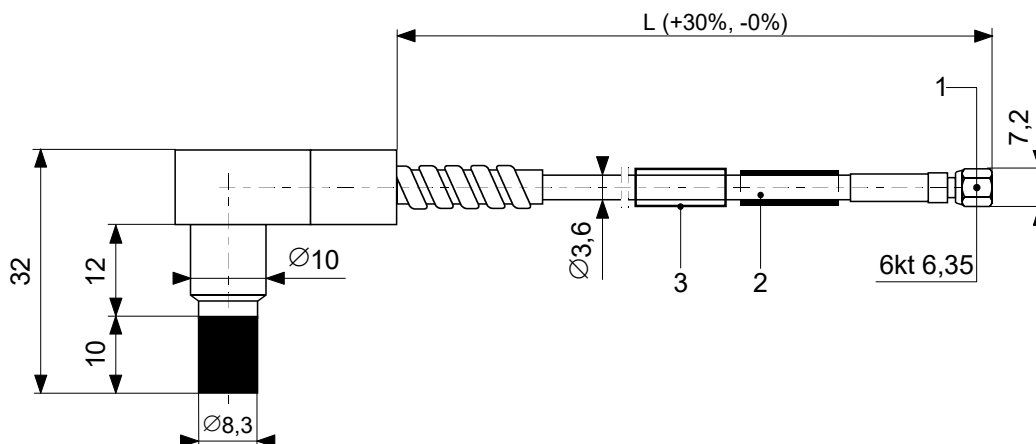
Ordering information for probe with side exit cable, threaded housing

A B C

MDS10K - □□□-□□-□□

Options description

- A** □□□ Probe integral cable length L
 - 0 0 5** cable length 0.5m (requires the application of extension cable with a minimum length of 1.5m)
 - 0 1 0** cable length 1.0m (requires the application of extension cable with a minimum length of 1.0m)
 - 0 2 0** cable length 2.0m
 - 0 3 0** cable length 3.0m
 - and further to 18.0m with 1m step
 - 1 8 0** cable length 18.0m
- B** □□ Equipping the integral sensor cable with a protective stainless steel armour protection
 - 0 0** without armour
 - 0 1** with armour
 - 0 2** with armour having additional PVDF outer jacket
- C** □□ Equipping the integral sensor cable with a miniature connector to connect with an 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 armour, outer diameter 7.0mm
- Stainless steel armour diameter with additional PVDF outer jacket: 7.5mm

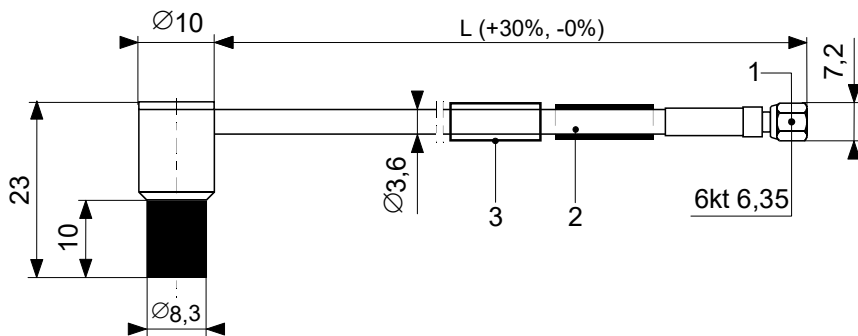
Fig.5 MDS10KG – probe shape with side exit cable and smooth casing.

Ordering information for probe with side exit cable, smooth casing

A B C
MDS10KG - □□□-□□-□□

Options description

- A** □□□ Probe integral cable length L
 - 0 0 5** cable length 0.5m (requires the application of extension cable with a minimum length of 1.5m)
 - 0 1 0** cable length 1.0m (requires the application of extension cable with a minimum length of 1.0m)
 - 0 2 0** cable length 2.0m
 - 0 3 0** cable length 3.0m
and further to 18.0m with 1m step
 - 1 8 0** cable length 18.0m
- B** □□ Equipping the integral sensor cable with a protective stainless steel armour protection
 - 0 0** without armor
 - 0 1** with armour
 - 0 2** with armour having additional PVDF outer jacket
- C** □□ Equipping the integral sensor cable with a miniature connector to connect with an extension cable
 - 0 0** without connector (cable wire and screen ended with kneced 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
- MDS10M probe is not offered with stainless steel armour

Fig.6 MDS10M – probe shape with miniature size

Ordering information for probe with miniature size

A B
MDS10M - □□□-□□

Options description

A □□□ Probe integral cable length L

0 0 5 cable length 0.5m (requires the application of extension cable with a minimum length of 1.5 m)

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

0 2 0 cable length 2.0m

0 3 0 cable length 3.0m

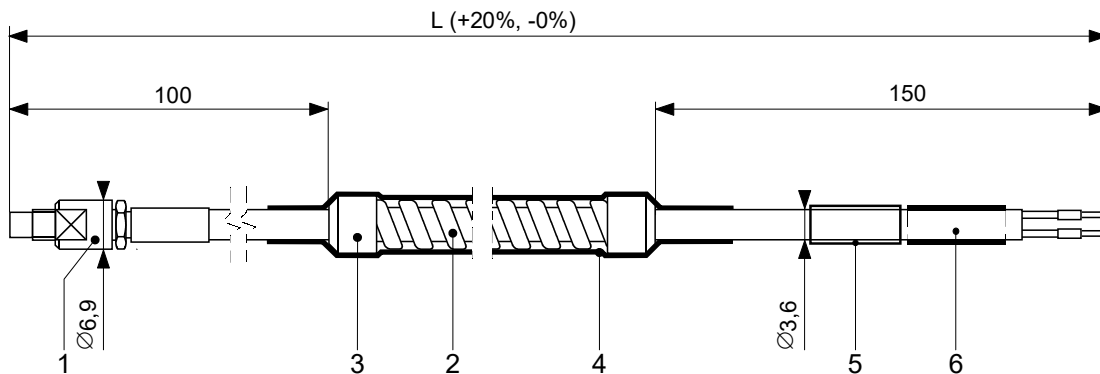
and further to 18.0m with 1m step

1 8 0 cable length 18.0m

B □□ Equipping the integral sensor cable with a miniature connector to connect with an 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 armour, outer diameter 7.0mm
 - 3 – Stainless steel ferrules, 8.0mm diameter
 - 4 – PVDF jacket, outer diameter 7.5mm and 8.5mm on the sleeves
 - 5 – Heat shrinkable jacket for user's designation
 - 6 – Part number and serial number
- armour length is app. 300mm shorter than true extension cable length

Fig.7 MDS10C – Extension cable for MDS10... probes

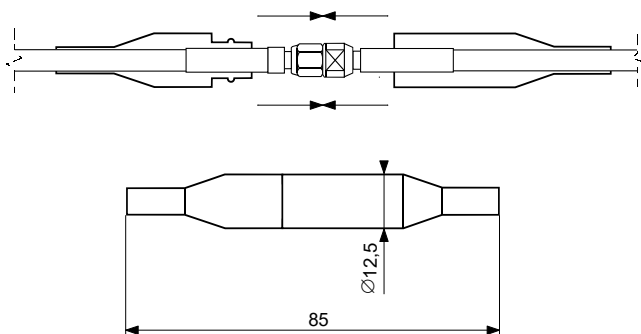
Ordering information for extension cable

A B
MDS10C- □□□-□□

Note: Please note that the total length of the integral sensor cable and extension cable must not be less than 2m and greater than 18m.

Options description

- A □□□** Extension cable length L
 - 0 1 0** cable length 1.0m
 - 0 1 5** cable length 1.5m
and further to 17.5m with 0,5m step
 - 1 7 5** cable length 17.5m
- B □□** Extension Cable stainless steel armor protection
 - 0 0** without armour
 - 0 1** with armour
 - 0 2** with armour having additional PVDF outer jacket



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