Proximity transducer system type MDS30 / MDT30

Application

The non-contacting displacement probe-transducer systems are gap to voltage devices that measure static as well as dynamic distances between the probe tip and the observed target. The general application is any requirement for an accurate, non-contacting displacement measurement. The most common use of this type of transducer is shaft differential expansion (the thermal differential expansion between shaft expansion and casing expansion). This type of measurement is typical for steam turbines.

Description

One measuring system consists of the MDS30 probe and the MDT30 transducer. The transducer radio frequency oscillator generates a radio frequency signal, that is radiated through the probe into the observed surface.The transducer detects in the return signal the strength loss for the eddy-currents generated in observed surface and conditions the signal to linear voltage output.

The probe tip is constructed of polyphenylene sulfide, a high performance plastic, impervious to oil, water and many different chemical liquids. The probe housing is made of stainless steel. The probe cable is concentric with PTFE/FEP isolation and can be provided with stainless steel protective armour.

The transducer circuit is placed in aluminium alloy enclosure with gland seals for probe and supply/output cable. The electronics is silicon-resin encapsulated and electrically isolated from the enclosure.

The probe is connected with the transducer through cable of 5m or 9m total length. This total length is a length of probe integral cable or is a sum of probe integral cable length and extension cable length. In last case both cables are connected by threaded miniature coaxial connector.The possible length combinations of probe integral cable and extension cable are described below in ordering information.

The transducer is powered from -24V DC source (from monitor). The output voltage from the transducer is a negative DC voltage proportional to the distance between the target and the probe tip. The environmental protection rate for transducer is IP65.

A three - conductor, shielded cable of 0,5 to 1,5mm^2 cross section is recommended to connect transducer with monitor providing power supply and output signal interface. The transducer can be placed up to 300 m from monitor without degradation of performance.

The terminal block inside the transducer have five screw connections: probe cable central wire, probe cable screen, common 0V, output voltage and supply -24V. Output signal is of -4V to -20V standard. The probe-transducer system is factory calibrated for nominal range 12mm or 16mm with target material 4140 steel at +22 °C for linearity error adequately 1,0% and 1,5%. However probes, extension cables and transducers are mutually interchangeable within the same cable length. Without individual calibration the linearity error can grow to maximum ±4%FS.

Performances

METROLOGICAL

Nominal measuring range

Range 1: 12mm(gap 1-13mm)
Range 2: 16mm(gap 1-17mm)

Nominal output voltage range: -4V ÷ -20V

Sensitivity:

-1,33 V/mm for 12 mm range
-1,00 V/mm for 16mm range

Frequency response: 0 ÷ 1kHz

Max. linearity error of FS (full scale) at +22°C:

±1% for 12mm range
±1,5% for 16mm range

Max. linearity error of FS including additional error of interchangeability of probe, extension cable and transducer in temperature range 0°C to + 50 °C: ±5%

Maximum temperature error of FS:

Probe: ±3%
Transducer: ±1%

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Minimum target size in diameter: 65mm for 12mm range and 75mm for 16mm range

ELECTRICAL

Power supply: –24V ± 1,5V
Current consumption: < 15 mA
Output load, minimum: 10Kohm

ENVIRONMENTAL

Operating temperature:
Probe: -35 ÷ +150°C
Transducer: -35 ÷ +70°C
Relative humidity:
Probe: to 95%, without condensation
Transducer: 100%, not submerged

MECHANICAL

Mass(typical):
Probe with 1m cable, without armour : 210g
Cable: 32g/m
Armour: 50g/m
Transducer: 600g

The probe option with integral cable with miniature connector (described in ordering information below) is equipped with one part of rubber protection shield(Fig.1). Second part of rubber connector shield is standard element of extension cable. The connector protection shield is made of high quality rubber impervious to oil, high temerature and many different chemical liquids. The rubber shield is an element sealing and galvanic isolating the connector. As both parts of the shield are mutually connected in „flange-groove" way the shield is a kind of additional connector protection from disconnection.

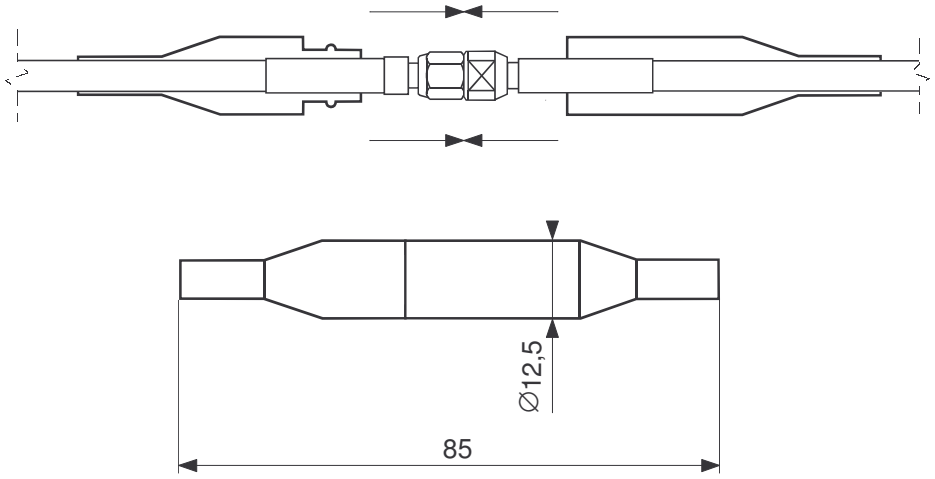

Fig.1 Connector rubber shield at probe cable

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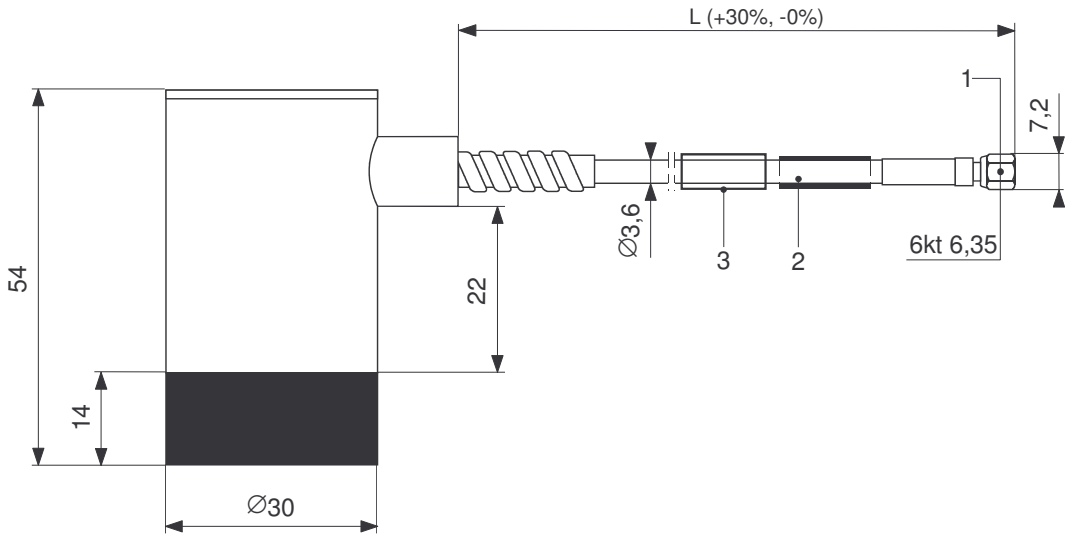

1 – Miniature female coaxial connector
2 – Part number and serial number
3 – Heat shrinkable jacket for user's designation

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

Figure 2. MDS30K probe – probe shape with side exit cable, smooth casing

Ordering information for MDS30K probe

A B C
MDS30K - ☐☐-☐☐-☐☐

Options description
A ☐☐ Total probe integral cable length L
- **0 5** cable length 0.5m
- **1 0** cable length 1.0m
- **2 0** cable length 2.0m
- **5 0** cable length 5.0m
- **9 0** cable length 9.0m

B ☐☐ Cable stainless steel armour protection
- **0 0** without armour
- **0 1** with armour
- **0 2** with armour having additional Kynar 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 (apply to probe with L=0.5m, 1.0m, 2.0m)

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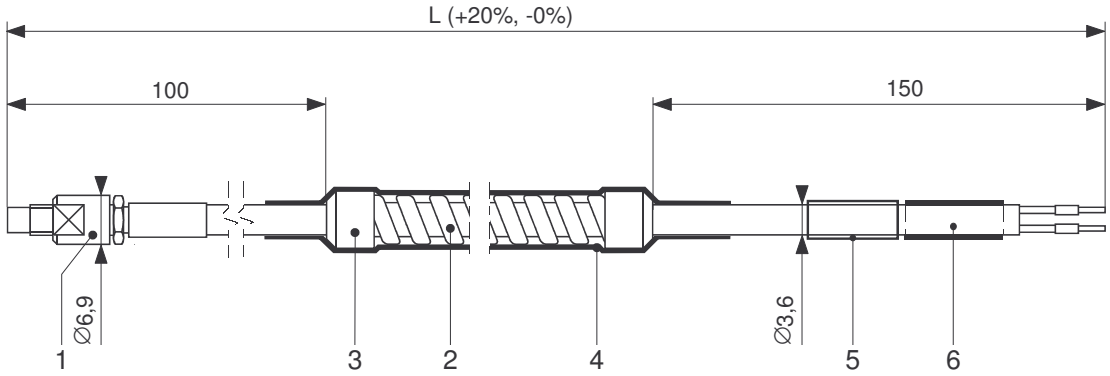

1 – Miniature male coaxial connector
2 – Stainless steel armor, outer diameter 7.0mm
3 – Stainless steel ferrules, 8.0mm diameter
4 – Kynar jacket, outer diameter 7.5mm
5 – Heat shrinkable jacket for user's designation
6 – Part number and serial number

- cable diameter 3,6mm , FEP isolation
- armor length is app.300mm shorter than true extension cable length

Fig.3 MDS30C – Extension cable for MDS30 probe

Ordering information for extension cable

MDS30C- **A** ☐☐-**B** ☐☐

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: 5m or 9m

Options description
A ☐☐ Cable length L
- **3 0** 3.0m
- **4 0** 4.0m
- **4 5** 4.5m
- **7 0** 7.0m
- **8 0** 8.0m
- **8 5** 8.5m

B ☐☐ Cable stainless steel armour protection
- **0 0** without armour
- **0 1** with armour
- **0 2** with armour having additional Kynar outer jacket

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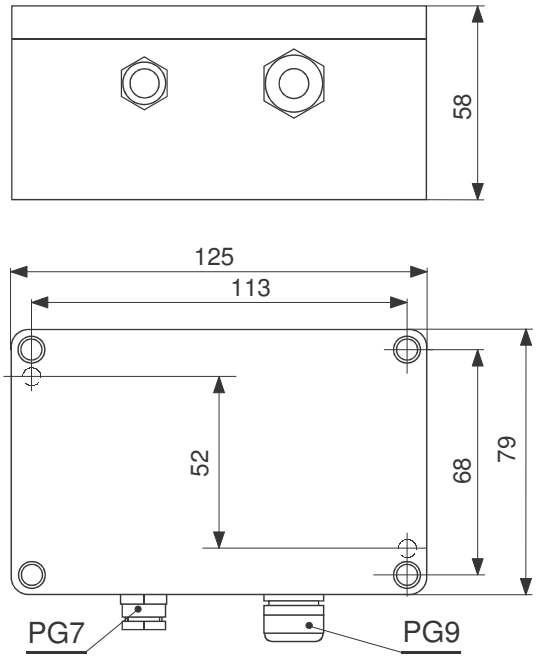

Fig.4 Transducer MDT30. Dimensions.

Ordering information for transducer cooperating with MDS30K probe

A B
MDT30 - ☐☐-☐☐

Options description
A ☐☐ Probe cable total length (a sum of probe integral cable length and extension cable length)
5 0 cable total length 5.0m
9 0 cable total length 9.0m
B ☐☐ Measuring range
1 2 measuring range 12mm
1 6 measuring range 16mm

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