

DATA SHEET

vibro-meter®

TQ402/TQ412, EA402 and IQS900 proximity measurement system

TQ402
(standard mount)



TQ412 (reverse mount)



IQS900



KEY FEATURES AND BENEFITS

- From the vibro-meter® product line
- Non-contact measurement system based on eddy-current principle
- Ex certified versions for use in hazardous areas (potentially explosive atmospheres)
- Conforms to API 670 recommendations
- 1, 5 and 10 m systems
- Temperature-compensated design
- Voltage or current output with protection against short circuits
- Frequency response:
DC to 20 kHz (-3 dB)
- Measurement range:
2 or 4 mm
- Temperature range:
-40 to +180 °C

APPLICATIONS

- Shaft relative vibration and gap/position measurement chains for machinery protection and/or condition monitoring
- Ideal for use with VM600^{Mk2}/VM600 and VibroSmart® machinery monitoring systems
- API 670 applications

DESCRIPTION

The TQ402/TQ412, EA402 and IQS900 form a proximity measurement system, from Meggitt's vibro-meter® product line. This proximity measurement system allows contactless measurement of the relative displacement of moving machine elements.

TQ4xx-based proximity measurement systems are particularly suitable for measuring the relative vibration and axial position of rotating machine shafts, such as those found in steam, gas and hydraulic turbines, as well as in alternators, turbo-compressors and pumps.



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DESCRIPTION (continued)

The system is based around a TQ402 or TQ412 non-contact sensor and an IQS900 signal conditioner. Together, these form a calibrated proximity measurement system in which each component is interchangeable. The system outputs a voltage or a current proportional to the distance between the transducer tip and the target, such as a machine shaft.

The active part of the transducer is a coil of wire that is moulded inside the tip of the device, made of Torton[®] (polyamide-imide). The transducer body is made of stainless steel. The target material must, in all cases, be metallic.

The transducer body is available with metric or imperial thread. The TQ412 version is intended for reverse-mount applications. Both the TQ402 and TQ412 have an integral coaxial cable, terminated with a self-locking miniature coaxial connector. Various cable lengths (integral and extension) can be ordered.

The IQS900 signal conditioner contains a high-frequency modulator/demodulator that supplies a driving signal to the transducer. This generates the necessary electromagnetic field used to measure the gap. The conditioner circuitry is made of high-quality components and is mounted in a painted aluminium housing.

Note: The IQS900 signal conditioner matches or better the outstanding measurement performance and specifications of the IQS450 signal conditioner, which it replaces. Accordingly, the IQS900 is compatible with all TQ9xx and TQ4xx proximity sensors / measurement chains.

In addition, the IQS900 signal conditioner includes improvements such as: SIL 2 “by design”, improved frame-voltage immunity, improved electromagnetic immunity and emissions, smaller output impedance (voltage output), optional diagnostic circuitry (that is, built-in self-test (BIST)), raw output pin, test input pin, new DIN-rail mounting adaptor and removable screw-terminal connectors for easier installation.

The TQ402 and TQ412 transducers can be matched with a single EA402 extension cable to effectively lengthen the front-end. Optional housings, junction boxes and interconnection protectors are available for the mechanical and environmental protection of the connection between the integral and extension cables.

TQ4xx-based proximity measurement systems can be powered by associated machinery monitoring systems such as VM600^{Mk2}/VM600 modules (cards) or VibroSmart[®] modules, or by another power supply.

For specific applications, contact your local Meggitt representative.

SPECIFICATIONS

Overall proximity measurement system

Operation

Sensitivity

- Ordering option B21 : 8 mV/μm (200 mV/mil)
- Ordering option B22 : 2.5 μA/μm (62.5 μA/mil)
- Ordering option B23 : 4 mV/μm (100 mV/mil)
- Ordering option B24 : 1.25 μA/μm (31.2 μA/mil)

Linear measurement range (typical)

- Ordering option B21 : 0.15 to 2.15 mm, corresponding to a -1.6 to -17.6 V output
- Ordering option B22 : 0.15 to 2.15 mm, corresponding to a -15.5 to -20.5 mA output
- Ordering option B23 : 0.3 to 4.3 mm, corresponding to a -1.6 to -17.6 V output
- Ordering option B24 : 0.3 to 4.3 mm, corresponding to a -15.5 to -20.5 mA output

Linearity

: See **Performance curves on page 8 and on page 9**

Frequency response

: DC to 20 kHz (-3 dB)

Interchangeability of elements

: All components in system are interchangeable

SPECIFICATIONS *(continued)*

TQ402 and TQ412 proximity transducers and EA402 extension cable

General

Transducer input requirements : High-frequency power source from an IQS900 signal conditioner

Environmental

Temperature ranges

- Transducer : -40 to +180°C with drift <5% (operating).
+180 to +220°C with drift >5% (short-term survival).
 - Transducer and cable : **-40 to +195°C if used in an Ex Zone**
 - Cable, connector and optional protection : -40 to +200°C
- Protection rating (according to IEC 60529) : The head of the proximity transducer (transducer tip and integral cable) is rated IP68
- Vibration (according to IEC 60068-2-26) : 5 g peak between 10 and 500 Hz
- Shock acceleration (according to IEC 60068-2-27) : 15 g peak (half sine-wave, 11 ms duration)

Physical characteristics

- Transducer construction : Wire coil Ø8 mm, Torlon (polyamide-imide) tip, encapsulated in stainless steel body (AISI 316L) with high-temperature epoxy glue
- Integral and extension cables : FEP covered 70 Ω coaxial cable, Ø3.6 mm
- Connectors : Self-locking miniature coaxial connectors.
Note: When connecting, these should be hand-tightened until locked.
- Optional protection
- *Flexible stainless steel hose (protection tube)* : The stainless steel hose provides additional mechanical protection but is not leak-tight
 - *FEP sheath (extruded fluorinated ethylene propylene)* : The FEP sheath provides resistance to almost all chemicals and low permeability to liquids, gases and moisture. It is also flexible, low friction and mechanically tough.