Vibro Meter EA402 913-402-000-013 A2-E040-F1-G030

Proximity Probe Extension Cable

Vibro Meter EA402 913-402-000-013 A2-E040-F1-G030 is the matched extension cable used between a TQ402 or TQ412 proximity transducer and an IQS450 signal conditioner. It forms part of the calibrated eddy-current measurement chain used for non-contact shaft vibration and position measurements. The visible E040 code identifies a nominal 4 m cable, while F1-G030 specifies flexible stainless-steel protection over 3 m. Its coaxial construction and keyed self-locking connectors carry the probe signal without converting it into a standalone process output.



Technical Specifications

Product Identity	
Product type	Matched proximity probe extension cable
Cable construction	FEP-covered 70 Ω coaxial cable, 3.6 mm nominal diameter
Functional Configuration	
Complete cable code	EA402 913-402-000-013 A2-E040-F1-G030
Measurement chain	TQ402/TQ412 with IQS450
Nominal extension length	E040: 4.0 m ±400 mm
Protection option	F1: flexible stainless-steel hose, no connector protector
Hose length	G030: 3.0 m
Connectors	Self-locking miniature coaxial female and male
Performance & Power	
Minimum bend radii	FEP cable: 20 mm; stainless-steel hose: 50 mm
Environment	
Environment option	A2; assess complete Ex i chain
Cable temperature	A2 Ex-zone transducer and cable: –40 to +195 °C; general cable/connector rating: –40 to +200 °C

Selected original manufacturer material follows on pages 3–6.

Compatibility & Selection Guide

System compatibility. Select the EA402 together with the probe integral cable and the IQS450 total-system-length option. Cable electrical trimming is part of the calibrated system, so nominal physical length alone does not establish interchangeability. The A2 option belongs to the intrinsically safe configuration and must be checked against the complete chain and applicable certificate.

Wiring & Installation Reference

Cable routing

1. Match total system length Check the probe integral cable, EA402 extension and IQS450 length option as a single measuring chain.

2. Maintain bend radii Allow at least 20 mm for bare FEP cable and 50 mm for the stainless-steel hose.

3. Protect the connections F1 hose is mechanical protection and is not leak-tight; apply the specified connector protection where required.

Installation precautions

Do not shorten or splice a calibrated extension cable as though it were generic wiring.

For the A2 intrinsically safe transducer-and-cable configuration, respect the –40 to +195 °C Ex-zone range and all conditions of the complete certified chain.

View cable assembly (PDF) — page 6 · View mounting diagram — page 6

DESCRIPTION *(continued)*

The active part of the transducer is a coil of wire that is moulded inside the tip of the device, made of Torlon® (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 TQ 412 version is intended for reverse-mount applications. The TQ 402/412 has an integral coaxial cable, terminated with a self-locking miniature coaxial connector. Various cable lengths (integral and extension) can be ordered.

The IQS 450 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 an aluminium extrusion.

The TQ 402 and TQ 412 transducers can be matched with a single EA 402 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.

The proximity system can be powered by associated signal processing modules (for example, VM600 cards) or a rack power supply.

SPECIFICATIONS

Overall proximity 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 measuring 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 pages 4 and 5

Frequency response : DC to 20 kHz (−3 dB)

Interchangeability of elements : All components in system are interchangeable

Environmental – explosive atmospheres

Available in Ex approved versions for use in hazardous locations

Type of protection Ex i: intrinsic safety (**ordering option A2**)		
Europe	EC type examination certificate	LCIE 11 ATEX 3091 X II 1G (Zones 0, 1, 2) Ex ia IIC T6 … T3 Ga
International	IECEx certificate of conformity	IECEx LCI 11.0061X Ex ia IIC T6 … T3 Ga
North America	cCSAus certificate of compliance	1514309 Class I, Divisions 1 and 2, Groups A, B, C and D Ex ia

⚠ **For specific parameters of the mode of protection concerned and special conditions for safe use, please refer to the Ex certificates that are available from Meggitt SA on demand.**

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SPECIFICATIONS *(continued)*

Type of protection Ex nA: non-sparking (**ordering option A3**)		
Europe	Voluntary type examination certificate	LCIE 11 ATEX 1010 X II 3G (Zone 2) Ex nA II T6 … T3 Gc
International	IECEx certificate of conformity	IECEx LCI 11.0063X Ex nA II T6 … T3 Gc
North America	cCSAus certificate of compliance	1514309 Class I, Division 2, Groups A, B, C, D

⚠ **When using protection mode 'nA' (non-sparking), the user shall ensure that the signal conditioner is installed in an enclosure that ensures a protection rating of at least IP54 (or equivalent).**

⚠ **For specific parameters of the mode of protection concerned and special conditions for safe use, please refer to the Ex certificates that are available from Meggitt SA on demand.**

System calibration

Calibration temperature : +23°C ±5°C

Target material : VCL 140 steel (1.7225)

Note: If special calibration is required, please define the alloy precisely or supply a sample of alloy (min. Ø50 mm / 1 cm thick) according to Meggitt Sensing Systems' drawing number PZ 7009/1.

Total system length

The total system length (TSL) is the sum of the length of the TQ 4xx transducer's integral cable and the length of the EA 40x extension cable. The supported TSLs can be obtained from different combinations of cables.

Total system lengths

- 1 m : 1.0 m integral cable with no extension cable
- 5 m : 0.5 m integral cable + 4.5 m extension cable
  1.0 m integral cable + 4.0 m extension cable
  1.5 m integral cable + 3.5 m extension cable
  2.0 m integral cable + 3.0 m extension cable
  5.0 m integral cable with no extension cable
- 10 m : 0.5 m integral cable + 9.5 m extension cable
  1.0 m integral cable + 9.0 m extension cable
  1.5 m integral cable + 8.5 m extension cable
  2.0 m integral cable + 8.0 m extension cable
  5.0 m integral cable + 5.0 m extension cable
  10.0 m integral cable with no extension cable

The combination of cables selected for a particular total system length depends on the application. For example, to obtain the optimum location for the separation between the integral and extension cables or to eliminate the requirement for an extension cable.

Total system length trimming

Due to the characteristics of the coaxial cable, an "electrical trimming" of the nominal length of extension cables is necessary to optimize the system performance and the transducer interchangeability.

TSL for a 1 m measuring chain : 0.9 m minimum

TSL for a 5 m measuring chain : 4.4 m minimum

TSL for a 10 m measuring chain : 8.8 m minimum

SPECIFICATIONS *(continued)*

TQ 402 and TQ 412 proximity transducers and EA 402 extension cable

General

Transducer input requirements	:	High-frequency power source from an IQS 450 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)

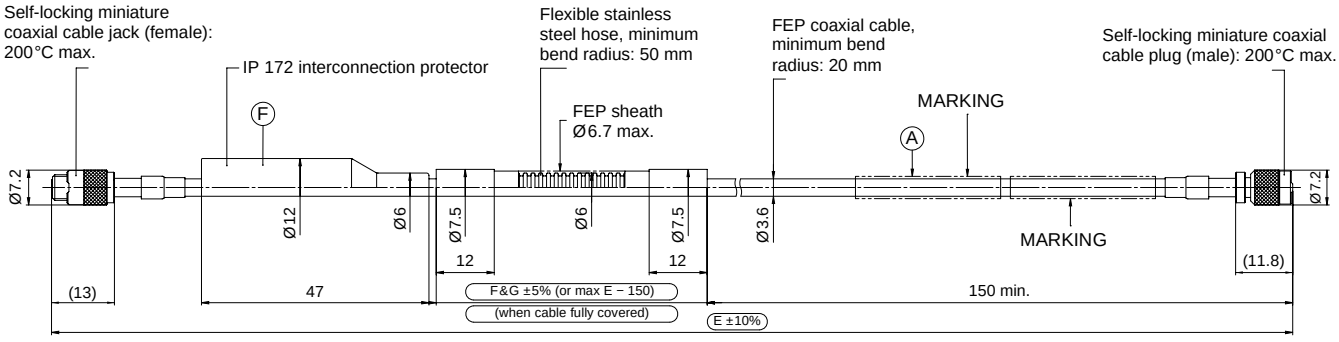
Physical characteristics

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.

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MECHANICAL DRAWINGS AND ORDERING INFORMATION *(continued)*

EA 402 extension cable



Ordering number: 913 - 402 - 000 - 013 **A** **E** **F** **G**

Environment (A)	
Standard	1
Explosive Ex i	2
Explosive Ex nA	3

Extension cable length (E) See note 1	
3.0 m ±300 mm	030
3.5 m ±350 mm	035
4.0 m ±400 mm	040
4.5 m ±450 mm	045
5.0 m ±500 mm	050
8.0 m ±800 mm	080
8.5 m ±850 mm	085
9.0 m ±900 mm	090
9.5 m ±950 mm	095

Optional protection (F) See note 2		
Cable	**Connector**	
None	None	0
Flexible hose	None	1
Flexible hose with FEP sheath	None	2
None	IP 172	5
Flexible hose	IP 172	6
Flexible hose with FEP sheath	IP 172	7

Flexible hose length (G) Each 0.1 m, from 0 to 9.3 m	
000	None
001	0.1 m min.
093	9.3 m max.

Notes
All dimensions are in mm unless otherwise stated.
1. The total system length = TQ 402/412 integral cable length + Extension cable length (E).
   For information on combining integral and extension cables to obtain a particular total system length, see Total system length on page 3.
   For information on cable length tolerances, see Total system length trimming on page 3.
2. When optional protection such as a flexible stainless steel hose with or without an FEP sheath is ordered:
   Flexible hose length (G) max. = Extension cable length (E) − 150 mm, for an extension cable that is protected to the maximum extent possible (“cable fully covered”).