

TQ 423 / EA 403 / IQS 453

Proximity System : TQ 423 Pressure-Proof Proximity Transducer EA 403 Extension Cable IQS 453 Signal Conditioner

FEATURES

- Designed for high-pressure applications
- Certified for use in potentially explosive atmospheres
- Non-contacting measurement system based on eddy current principle
- 5 m and 10 m systems
- Temperature compensated system
- Voltage or current output with protection against short circuits

CHARACTERISTICS

- Measuring range:
12 mm
- Transducer temperature range:
-25°C to +140°C
- Sensitivity:
1.33 mV/μm or 0.417 μA/μm
- Frequency response:
DC to 20 kHz (-3 dB)

TQ 423 with BOA protection



TQ 423 without BOA protection



IQS 453



DESCRIPTION

This proximity system allows contactless measurement of the relative displacement of moving machine elements. The system is based around a TQ 423 non-contacting transducer and its matching IQS 453 signal conditioner. Together, these form a calibrated proximity system in which each component is interchangeable. The system outputs a voltage or current proportional to the distance between the transducer tip and the target (e.g. machine shaft).

The TQ 423 is specially designed for high-pressure applications, with the transducer tip withstanding pressures of up to 100 bar. This makes it particularly suitable for measuring relative displacement on submerged pumps and various types of hydraulic turbines (e.g. Kaplan and Francis).

The active part of the transducer is a coil of wire that is moulded inside the tip of the device, which is made of PEEK (polyetheretherketone). The transducer body is made of stainless steel. The target material must, in all cases, be metallic.

The transducer body is available only with metric thread. The TQ 423 has an integral coaxial cable, terminated with an AMP-type connector. Various cable lengths (integral and extension) may be ordered.

The IQS 453 signal conditioner contains an HF 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 423 transducer can be matched with the EA 403 extension cable. Optional junction boxes and housings offer mechanical protection of the integral and extension cable connectors.

The proximity system is powered by associated processor modules or a rack power supply.

SPECIFICATIONS

Overall Proximity System

OPERATION

Sensitivity	: 1.33 mV/ μ m (34 mV/mil) using IQS 453 Version 0XX 0.417 μ A/ μ m (10.6 μ A/mil) using IQS 453 Version 1XX
Linear measuring range (typical)	: 0.15 - 12.15 mm, corresponding to -1.6 V to -17.6 V output using IQS 453 Version 0XX 15.5 mA to 20.5 mA output using IQS 453 Version 1XX
Linearity	: See system performance curves
Frequency response	: DC to 20 kHz (-3 dB)
Interchangeability of elements	: All components in system are interchangeable

ENVIRONMENTAL

Use in explosive atmospheres

- *EC type examination certificate* : LCIE 02 ATEX 6086 X II 2 G (Zones 1, 2) EEx ib IIC T6 to T3



For specific parameters of the mode of protection concerned and special conditions for safe use, please refer to the "EC type examination certificate" that is available from Vibro-Meter SA on demand.

SPECIFICATIONS *(Continued)*

- *CSA standard* : Certificate 1514309 (LR 62075-5),
Class I, Divisions 1 and 2, Groups A, B, C and D Ex ia

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. Ø 60 mm / 1 cm thick)

TOTAL SYSTEM LENGTH (TSL)

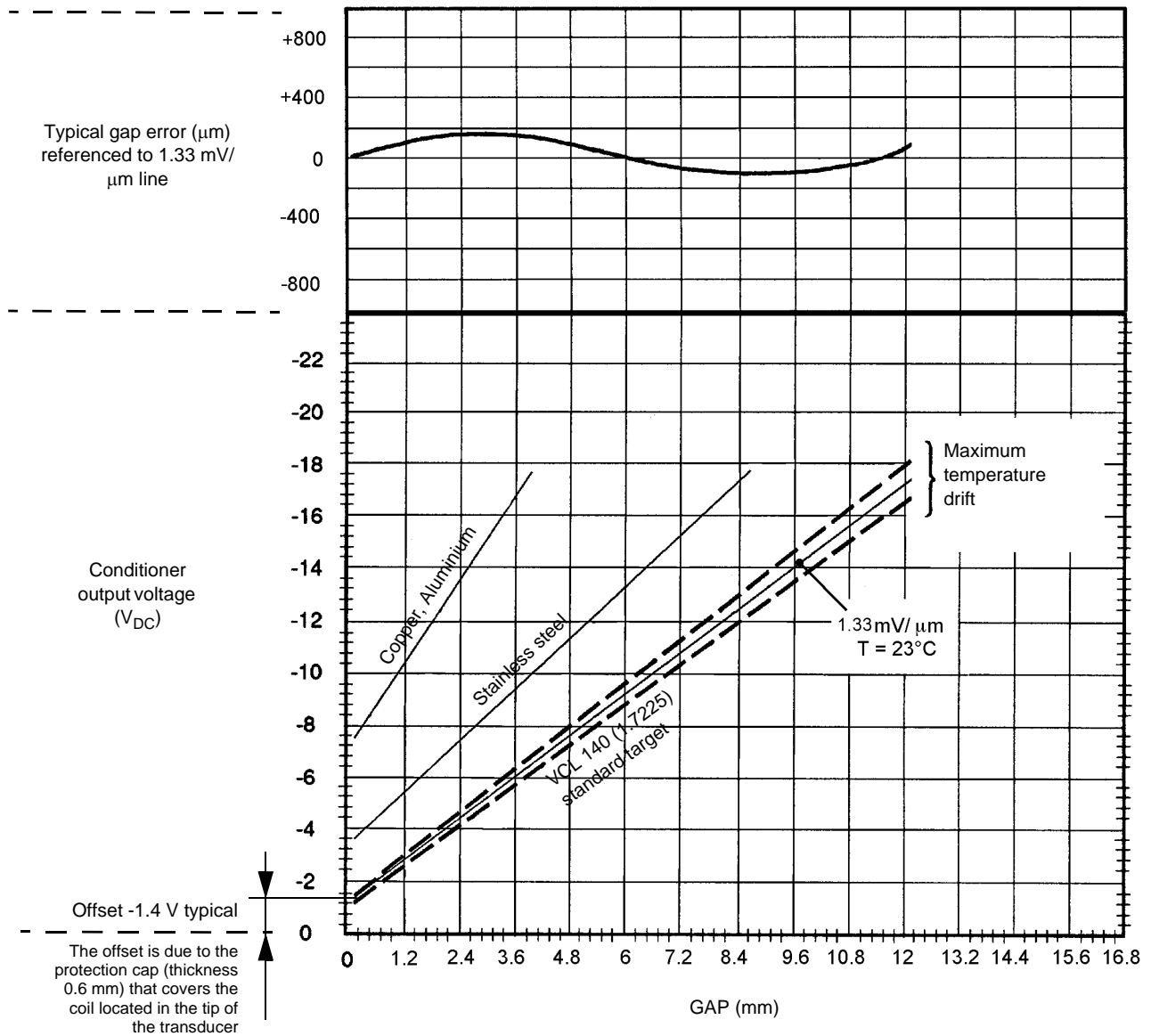
Due to the characteristics of the coaxial cable, an "electrical trimming" of the nominal length of the integral and extension cables is necessary to optimize the system performance and the transducer interchangeability.

TSL for a 5 m chain : 4.4 m minimum

TSL for a 10 m chain : 8.8 m minimum

SPECIFICATIONS (Continued)

Performance Curves for TQ 423 Transducer with IQS 453 Version 0XX or Version 1XX Conditioner



Proximity transducer: TQ 423
 Signal conditioner: IQS 453
 Standard target material: VCL 140 (1.7225)
 Equivalent materials: A 37.11 (1.0065), AFNOR 40 CD4, AISI 4137

SPECIFICATIONS (Continued)

TQ 423 Proximity Transducer

GENERAL

Transducer input requirements : High-frequency power source via matching conditioner type IQS 453

ENVIRONMENTAL

Temperature ranges

- *Transducer* : -25°C to +140°C with drift < 5%
- *Cable* : -100°C to +200°C
- *Connector* : -65°C to +85°C

Protection class : IP 68 according to IEC 529 and DIN 40050

Probe construction : Wire coil Ø 18 mm, PEEK (polyetheretherketone) tip, encapsulated in stainless steel body (1.4435) with high-temperature epoxy glue

Maximum pressure

- *Transducer tip* : 100 bar
- *Transducer/cable assembly* : 10 bar (with BOA option)
1 bar (without BOA option)

Integral cable : FEP covered 70 Ω coaxial cable, Ø 3.6 mm

- *Option* : BOA stainless steel armour sheathing

Connector : Miniature coaxial male connector type AMP 1-330 723-0
NB : This should be hand-tightened only when connecting

IQS 453 Signal Conditioner

OUTPUT CHARACTERISTICS

Voltage output, 3-wire configuration

- *Voltage at min. GAP* : -1.6 V
- *Voltage at max. GAP* : -17.6 V
- *Dynamic range* : 16 V
- *Output impedance* : 500 Ω
- *Short-circuit current* : 45 mA

Current output, 2-wire configuration

- *Current at min. GAP* : 15.5 mA
- *Current at max. GAP* : 20.5 mA
- *Dynamic range* : 5 mA

Output capacitance : 1 nF

Output inductance : 100 µH

SPECIFICATIONS (Continued)

SUPPLY

Voltage	: -20 V to -32 V
Current	: 13 ± 1 mA (25 mA max.)
Supply input capacitance	: 1 nF
Supply input inductance	: 100 μ H

ENVIRONMENTAL CHARACTERISTICS

(According to DIN 40040)

Temperature range

- *Operation* : -30°C to +70°C
- *Storage* : -40°C to +80°C

Humidity

- *Operation and storage* : Max. 95% non condensing

Vibration

- *Operation and storage* : 2 g peak between 10 Hz and 500 Hz

Protection class : IP 40

PHYSICAL CHARACTERISTICS

Construction material : Injection moulded aluminium

ELECTRICAL CONNECTIONS

Input : Stainless steel coaxial female socket

Output and power : Screw terminal strip

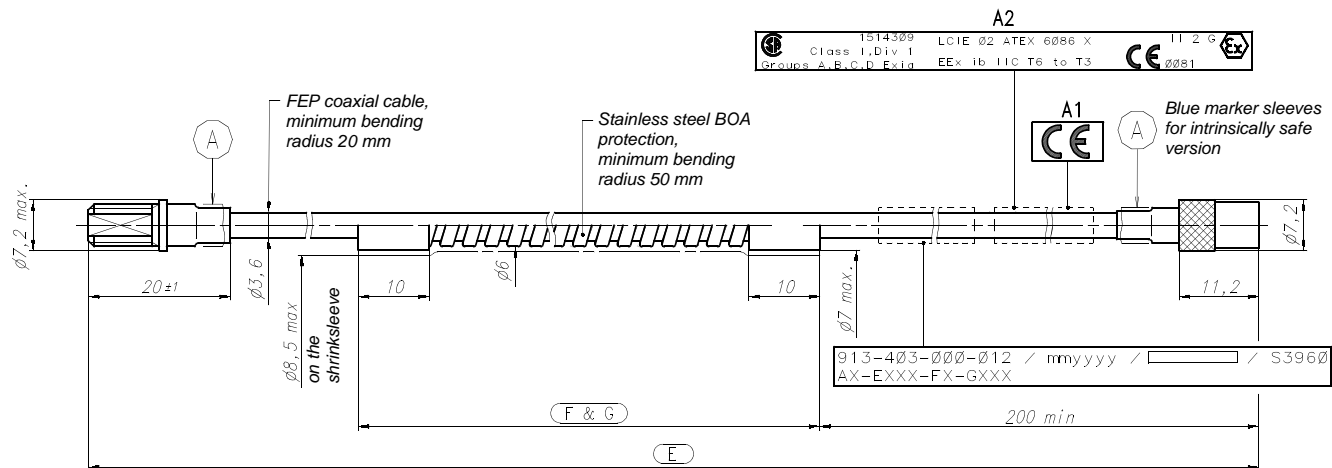
WEIGHT

Standard version : Approx. 140 g

Exi version : Approx. 220 g

DIMENSIONS AND ORDERING INFORMATION (Continued)

EA 403 Extension Cable



Ordering Number : 913 - 403 - 000 - 01 - **A** - **E** - **F** - **G**

Environment (A)	
Standard	1
Explosive	2

Cable Length (E)		
$\phi 3.6$	4.0 m	040
	9.0 m	090

Cable Protection (F)	
None	0
BOA	1
BOA + sleeve	2

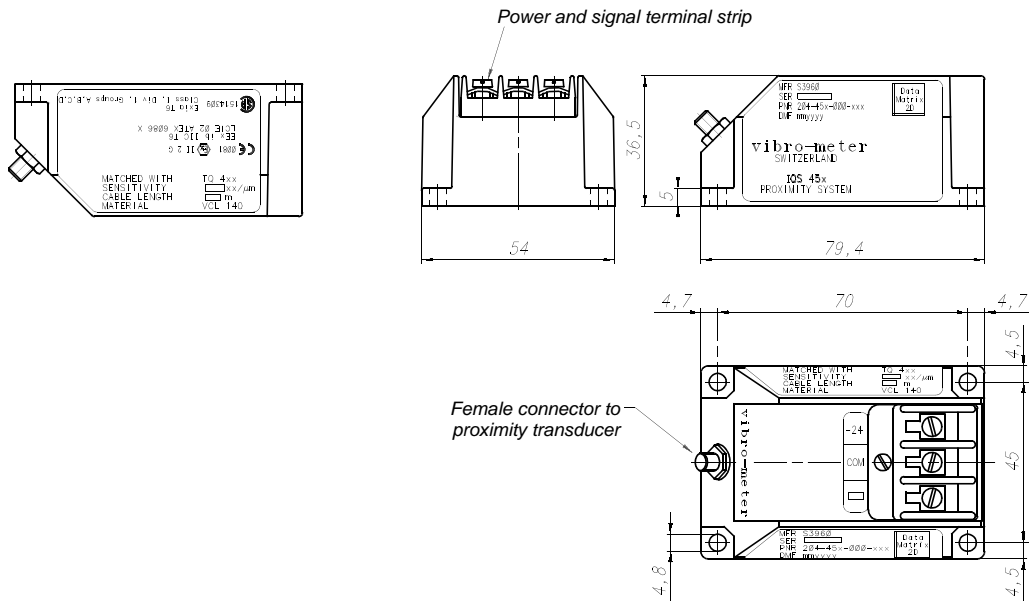
BOA Length (G)	
000	None
038	3.8 m
088	8.8 m

Note :

- (1) All dimensions are in mm unless otherwise stated.
- (2) For details on cable length tolerances, please refer to the section ["Total System Length \(TSL\)" on page 3.](#)

DIMENSIONS AND ORDERING INFORMATION (Continued)

IQS 453 Signal Conditioner



To order please specify :

IQS Type	Mode	Sensitivity	Total System Length	Version	Ordering Number
IQS 453	Voltage output, 3-wire config.	1.33 mV/ μ m	5 m	Standard	204-453-000-01
			10 m	Standard	204-453-000-02
			5 m	Exi	204-453-000-03
			10 m	Exi	204-453-000-04
	Current output, 2-wire config. 1)	0.417 μ A/ μ m	5 m	Standard	204-453-000-11
			10 m	Standard	204-453-000-12
			5 m	Exi	204-453-000-13
			10 m	Exi	204-453-000-14

1) Current output is used in conjunction with GSI 124 galvanic separation

ACCESSORIES

JB 118 Junction box
SG 102 Cable feedthrough



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Your local agent

Head office

Vibro-Meter SA
Rte de Moncor 4
P.O. Box
CH-1701 Fribourg
Switzerland

Tel: +41 26 407 11 11
Fax: +41 26 407 13 01

www.vibro-meter.com

