



## TQ 422 & TQ 432 / EA 402 / IQS 452

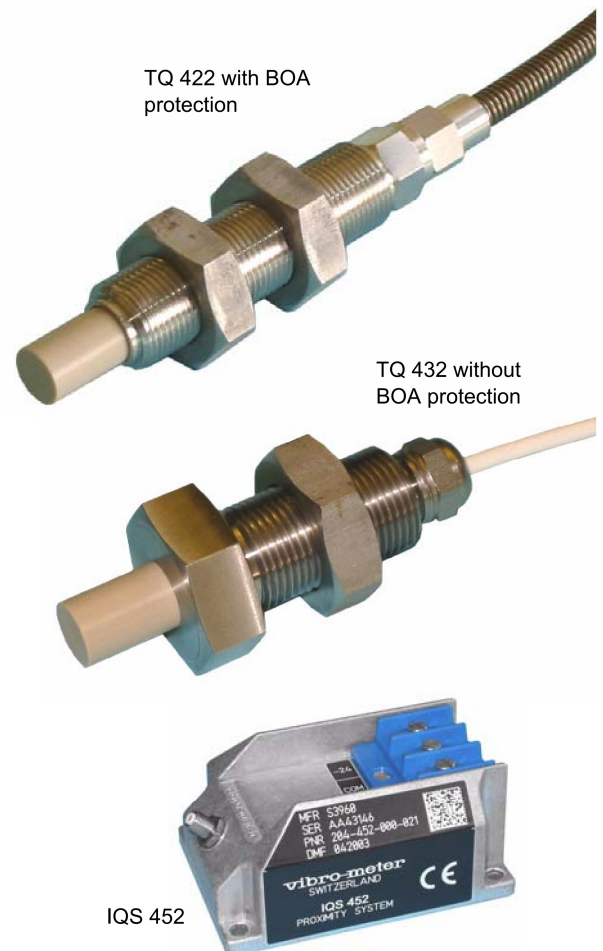
### Proximity System : TQ 422 & TQ 432 Pressure- Proof Proximity Transducers EA 402 Extension Cable IQS 452 Signal Conditioner

#### 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:  
4 mm
- Transducer temperature range:  
-25°C to +140°C
- Sensitivity:  
4 mV/μm or 1.25 μA/μm
- Frequency response:  
DC to 20 kHz (-3 dB)



## DESCRIPTION

This proximity system allows contactless measurement of the relative displacement of moving machine elements. The system is based around a TQ 422 or TQ 432 non-contacting transducer and its matching IQS 452 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).

Both the TQ 422 and the TQ 432 are specially designed for high-pressure applications, with the transducer tip withstanding pressures of up to 100 bar. This makes them particularly suitable for measuring relative displacement or vibration 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 432 version is intended for reverse-mount applications. The TQ 422/432 has an integral coaxial cable, terminated with an AMP-type connector. Various cable lengths (integral and extension) may be ordered.

The IQS 452 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 422/432 transducer can be matched with a single EA 402 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	: 4 mV/ $\mu$ m (100 mV/mil) using IQS 452 Version 0XX 1.25 $\mu$ A/ $\mu$ m (31.2 $\mu$ A/mil) using IQS 452 Version 1XX
Linear measuring range (typical)	: 0 - 4.0 mm, corresponding to -2.4 V to -18.4 V output using IQS 452 Version 0XX 15.75 mA to 20.75 mA output using IQS 452 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.

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

## SPECIFICATIONS *(Continued)*

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### SYSTEM CALIBRATION

Calibration temperature :  $+23^{\circ}\text{C} \pm 5^{\circ}\text{C}$

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.  $\varnothing$  50 mm / 1 cm thick)

### TOTAL SYSTEM LENGTH (TSL)

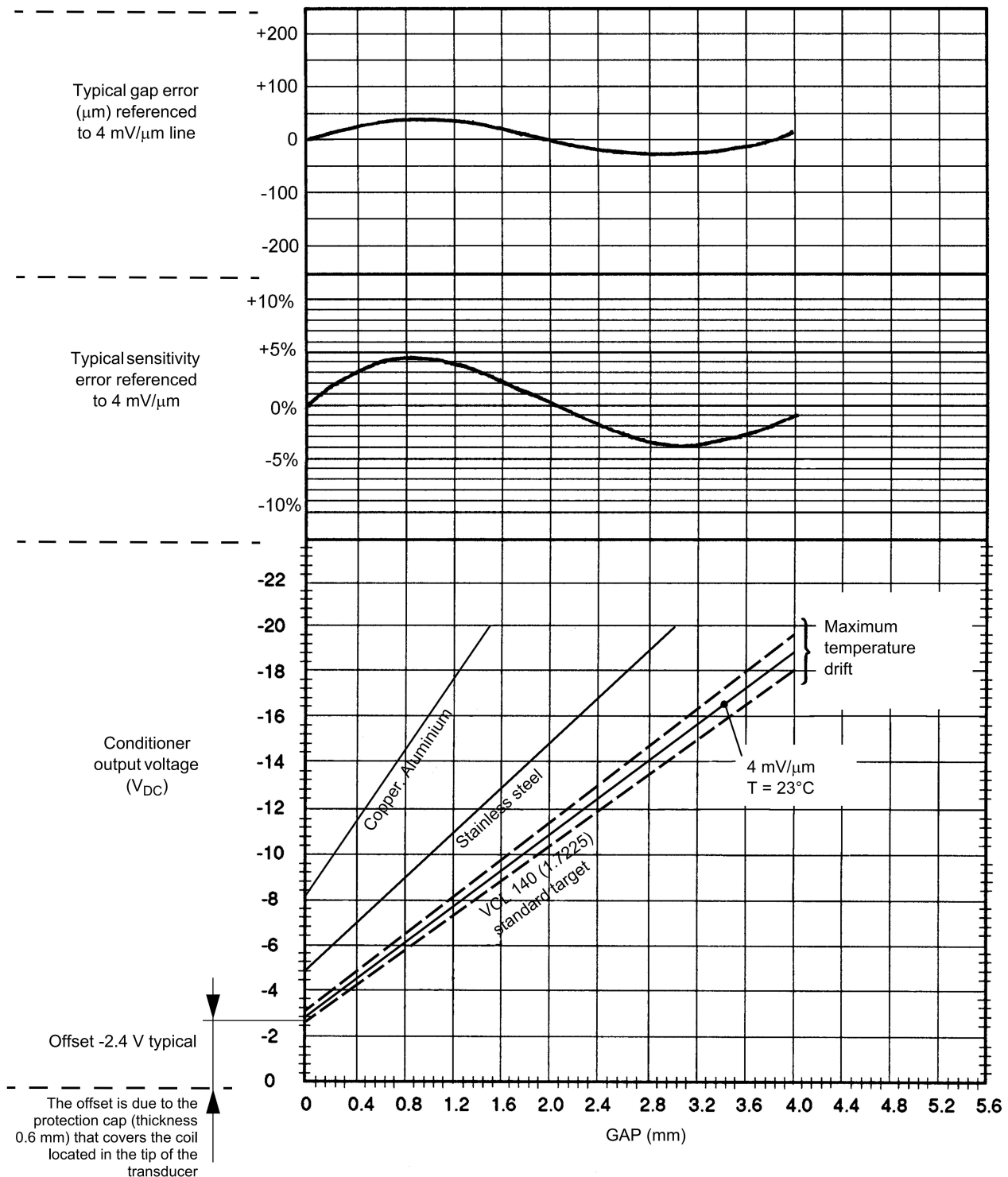
Due to the characteristics of the coaxial cable, an "electrical trimming" of the nominal length of the integral and extension cables is necessary to optimize the system performance and the transducer interchangeability.

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 422 / 432 Transducer with IQS 452 Version 0XX or Version 1XX Conditioner



Proximity transducer: TQ 422 / TQ 432  
Signal conditioner: IQS 452  
Standard target material: VCL 140 (1.7225)  
Equivalent materials : A 37.11 (1.0065), AFNOR 40 CD4, AISI 4137

## SPECIFICATIONS *(Continued)*

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### TQ 422 / TQ 432 Proximity Transducer

#### GENERAL

Transducer input requirements : High-frequency power source via matching conditioner type IQS 452

#### 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

Maximum pressure

- *Transducer tip* : 100 bar (TQ 422 and TQ 432)
- *Transducer/cable assembly* : 10 bar (with BOA option)  
1 bar (without BOA option)

Transducer construction

: Wire coil Ø 8 mm, PEEK (polyetheretherketone) tip, encapsulated in stainless steel body (1.4435) with high-temperature epoxy glue

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

**SPECIFICATIONS** (Continued)

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**IQS 452 Signal Conditioner**

**OUTPUT CHARACTERISTICS**

Voltage output, 3-wire configuration

- *Voltage at min. GAP* : -2.4 V
- *Voltage at max. GAP* : -18.4 V
- *Dynamic range* : 16 V
- *Output impedance* : 500  $\Omega$
- *Short-circuit current* : 45 mA

Current output, 2-wire configuration

- *Current at min. GAP* : 15.75 mA
- *Current at max. GAP* : 20.75 mA
- *Dynamic range* : 5 mA

Output capacitance : 1 nF

Output inductance : 100  $\mu$ H

**SUPPLY**

Voltage : -20 V to -32 V

Current : 13  $\pm$  1 mA (25 mA max.)

Supply input capacitance : 1 nF

Supply input inductance : 100  $\mu$ 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

## TQ 422 Proximity Transducer



111 - 422 - 000 - 01 - A B 1 C E F G H

	<b>Total System Length (H)</b>
05	5 m length
10	10 m length

(3) For details on cable length tolerances, please refer to the section **"Total System Length (TSL)"** on page 3.

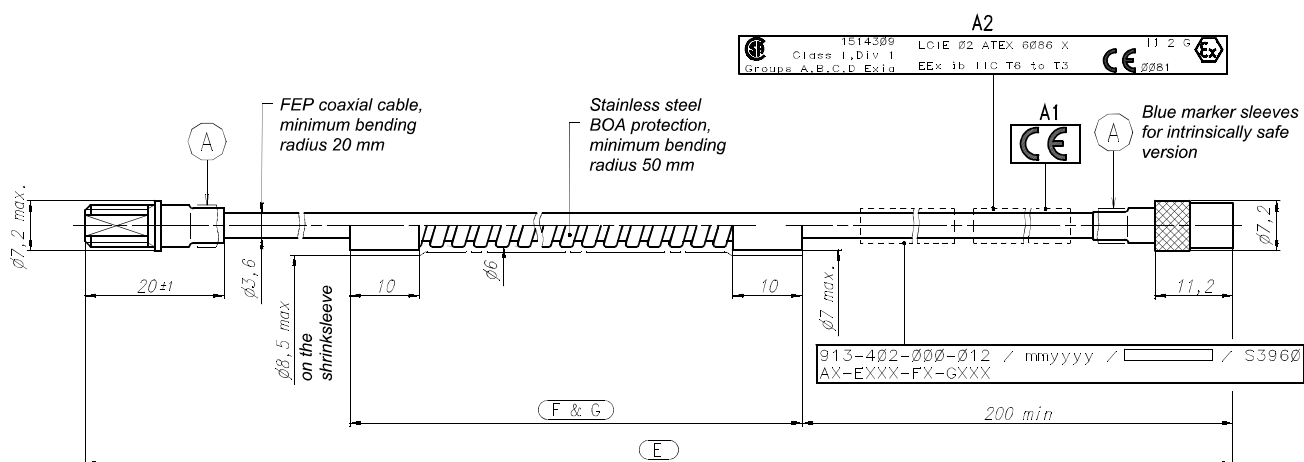
## TQ 432 Proximity Transducer



	BOA Length (G)
000	No BOA
010	For 1 m integral cable
050	For 5 m integral cable
100	For 10 m integral cable

(3) For details on cable length tolerances, please refer to the section "Total System Length (TSL)" on page 3.

## EA 402 Extension Cable



Ordering Number : 913 - 402 - 000 - 01 - A - E - F - G

<b>Environment (A)</b>	
Standard	1
Explosive	2

<b>Cable Length (E)</b>		
Ø 3.6	4.0 m	040
	5.0 m	050
	9.0 m	090

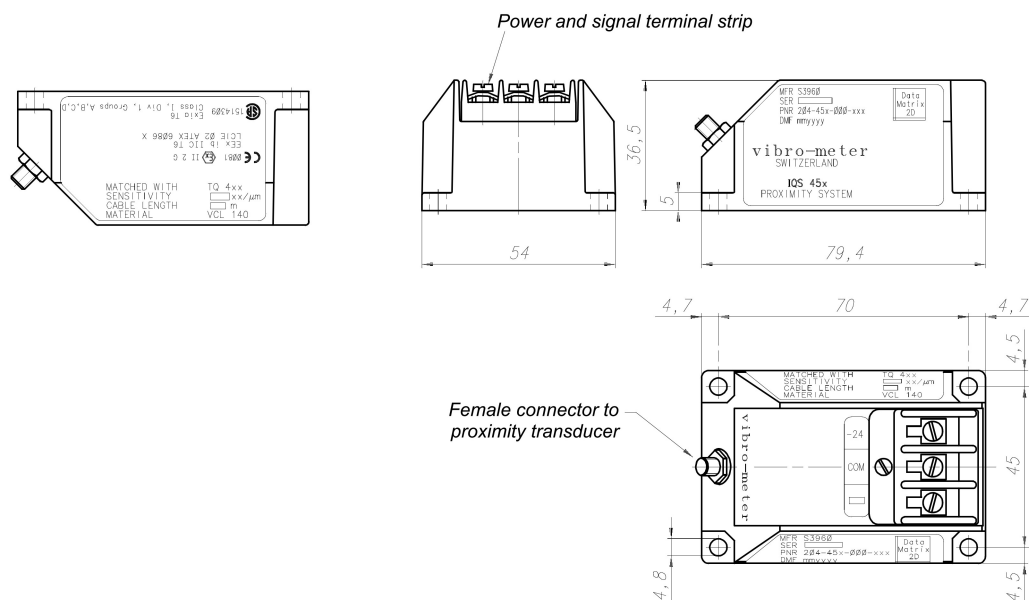
Cable Protection (F)	
None	0
BOA	1
BOA + sleeve	2

	BOA Length (G)
000	None
038	3.8 m
048	4.8 m
088	8.8 m

(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 452 Signal Conditioner



To order please specify :

IQS Type	Mode	Sensitivity	Total System Length	Version	Ordering Number
IQS 452	Voltage output, 3-wire configuration	4 mV/μm	5 m	Standard	204-452-000-01
			10 m	Standard	204-452-000-02
			5 m	Exi	204-452-000-03
			10 m	Exi	204-452-000-04
	Current output, 2-wire configuration <sup>1)</sup>	1.25 μA/μm	5 m	Standard	204-452-000-11
			10 m	Standard	204-452-000-12
			5 m	Exi	204-452-000-13
			10 m	Exi	204-452-000-14

<sup>1)</sup> Current output is used in conjunction with GSI 124 galvanic separation

## ACCESSORIES

JB 118	Junction box
SG 102	Cable feedthrough



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