OPTIGAS 4010C

Technical Datasheet

Sensor for gas dispenser applications

- Compact design for easy istallation
- High accuracy with wide measuring range
- Designed to fit existing dispensers

The documentation is only complete when used in combination with the relevant documentation for the signal converter.

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1.1 Overview

The OPTIGAS 4010C has been developed to compliment the OPTIMASS family of mass flowmeters, as a specialised meter for Compressed Natural Gas (CNG) dispensers.

As part of the Coriolis family of meters, the OPTIGAS offers excellent long-term stability and reliability of mass flow, over long periods.

① Innovative twin V-tube design.
② ¾" NPT female connection, with adaptor options.
③ Welded outer casing.

Highlights

- Compact design
- Integrated electronics
- Excellent reliability and accuracy
- Excellent repeatability
- Stainless Steel 316L construction
- Welded outer casing, sealed to IP 67

Applications

- CNG dispensing

1.2 Features and options

Features

- Low pressure drop.
- Optimised signal to pressure drop ratio.
- Reliable and accurate.

Connection options

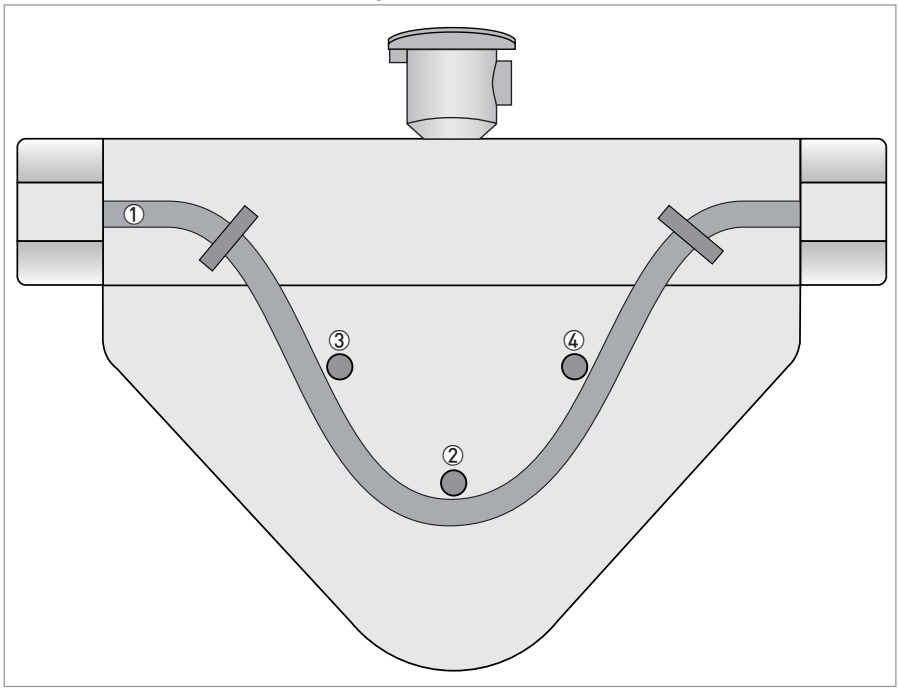
- ¾" NPT connections.
- Adaptor options available.

Integral electronics

- Integral electronics.
- Stand alone signal conversion.
- No requirement for a separate converter.

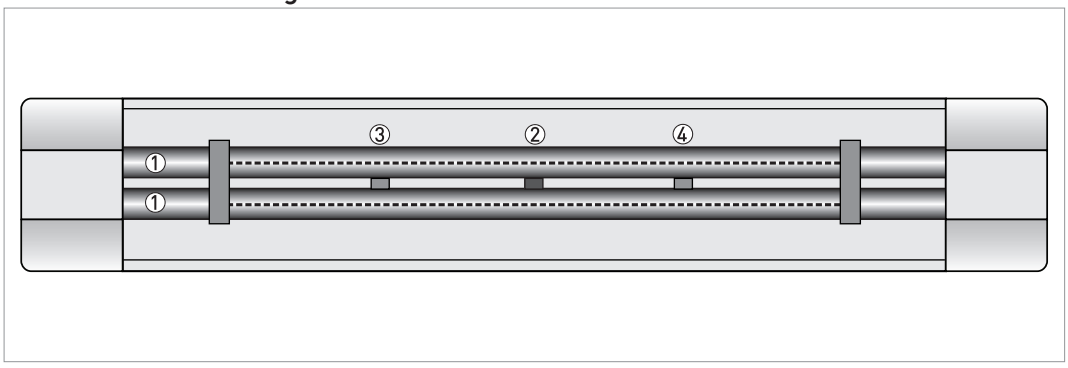
2.1 Measuring principle

Meter from the side, showing tube layout



① Measuring tubes
② Drive coil
③ Sensor 1
④ Sensor 2

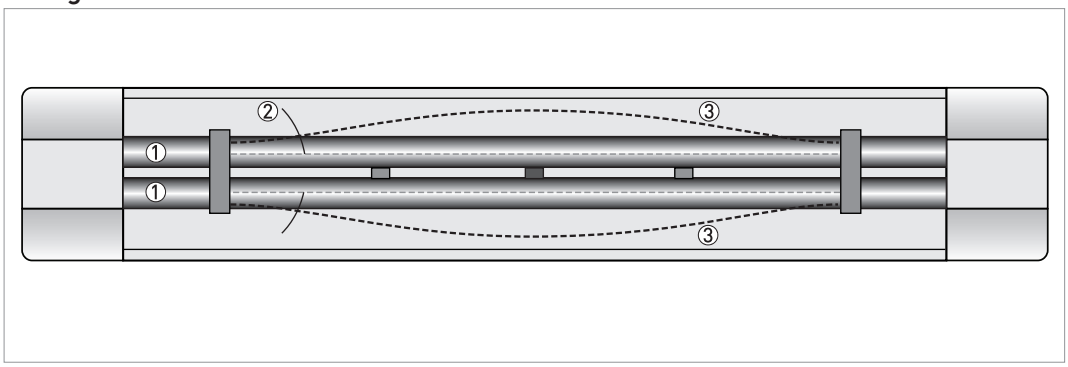
Static meter not energised and with no flow



① Measuring tubes
② Drive coil
③ Sensor 1
④ Sensor 2

A Coriolis twin-tube mass flowmeter consists of two measuring tubes (①) a drive coil (②) and two sensors (③ and ④) that are positioned either side of the drive coil.

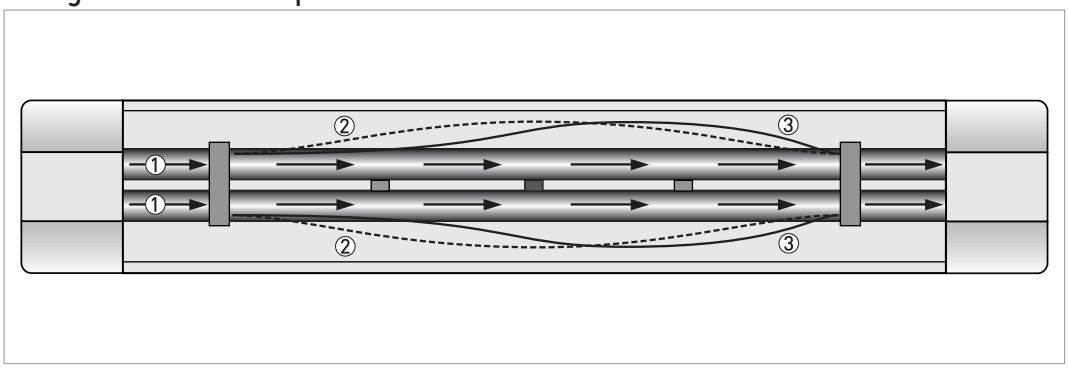
Energised meter



① Measuring tubes
② Direction of oscilation
③ Sine wave

When the meter is energised, the drive coil vibrates the measuring tubes causing them to oscillate and produce a sine wave (③). The sine wave is monitored by the two sensors.

Energised meter with process flow



① Process flow
② Sine wave
③ Phase shift

When a fluid or gas passes through the tubes, the Coriolis effect causes a phase shift in the sine wave that is detected by the two sensors. This phase shift is directly proportional to the mass flow.

Temperature measurement is made using a Pt500 sensor.

2.2 Technical data

- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Downloadcenter).*

Measuring system

Measuring principle	Coriolis mass flow
Application range	Measurement of Compressed Natural Gas (CNG)
Measured values	Mass, standard or normal volume, temperature (volume & density for liquids only)

Design

Basic	System consists of a measuring sensor with integral MFC010 converter to process the output signal.
Features	Fully welded maintenance- free sensor with twin U-shaped measuring tube

Application conditions

Fluid	Compressed Natural Gas (CNG) with operating pressure typically > 100 barg / 1450 psig
Flow range capacity	1...70 kg/min / 2.2...155 lbs/min
Accuracy	±0.5% of total batch (where minimum actual flow rate is 1 kg/min / 2.2 lbs/min)
Repeatability	±0.3% of actual flow rate + zero stability (for a batch size > 1 kg . 2.2lbs)
Zero stability	±0.015% of flow range capacity
Pressure rating	
Static	350 barg / 5076 psig
Cycling	300 barg / 4351 psig
Process fluid temperature	-40...+93°C / -40...+200°F
Ambient temperature	-40...+55°C / -40...+131°F

Mechanical

Process connections	¾" NPT female (adaptor options are available)
Materials	
Measuring tube	Stainless Steel 316L (1.4404)
Outer casing	
Sensor electronics housing	
Junction box	Die cast Aluminium (polyurethane coating)

Electrical

Power supply	12 VDC via Ex approved barrier (11.4...12.6 VDC)
Programming	Via Modbus. ①
Outputs	Modbus RTU over RS485
Diagnostics	
Interface cable	2 x screened twisted pairs with a minimum 20 AWG conductors. Total C ≤ 50nF, total L ≤ 200µH

Cable glands	M20 X 1.5 Stainless Steel suitable for cable diameter 6.5...9.5 mm

Approvals

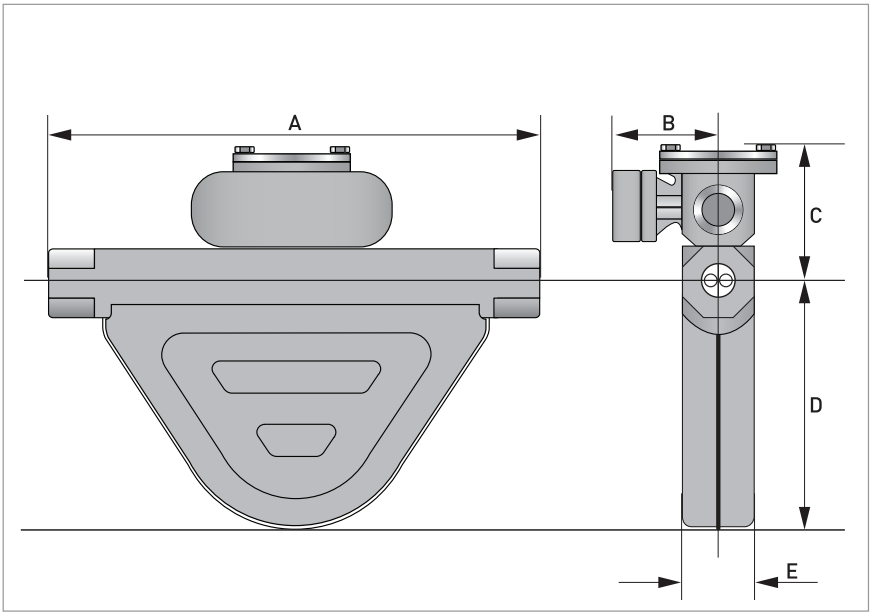
Custody transfer	PTB type approval 5.411 / 04.15
Vibration	IEC 60068-2-6
ATEX (acc. 94/9/EC)	
OPTIGAS 4010C without heating jacket / insulation	
II 1/2 G Ex ib IIC T4...T1 Ga/Gb	
II 2 D Ex ib IIIC T210°C Db	
Ex ib IIC T4...T1 Ga/Gb	
Ex ib IIIC T210°C Db	
IECEx	
Ex ib IIC T6...T1 Ga/Gb	
Ex ib IIIC T4*** °C Db	
NEPSI	
OPTIGAS 4010C	
Ex ib IIC T4...T1 Ga/Gb	

① Toolbox software is available from the manufacturer but it requires a compatible Modbus to PC adapter with approved barrier. Please call for more information.

ATEX (acc. 94/9/EC) temperature limits

	Ambient temp. Tamb °C	Max. medium temp. Tm °C	Temp. class	Max. surface temp. °C
OPTIGAS 4010C without heating jacket / insulation	-40...+65	60	T4	T130
		125	T3	T195
		140	T2 - T21	T210

2.3 Dimensions and weights



Meter dimensions

	[mm]	[inches]
A	359 ±2	14.1 ±0.08
B	97	3.8
C	97	3.8
D	194	7.6
E	50	1.97

Meter weights

	kg	lbs
All versions	9	19.8

3.1 Intended use

This flowmeter has been specifically designed for measuring Compressed Natural Gas (CNG) in retail dispensers.

Responsibility for the use of the measuring devices with regard to suitability, intended use and corrosion resistance of the used materials against the measured fluid lies solely with the operator.

This device is a Group 1, Class A device as specified within CISPR11:2009. It is intended for use in industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

The manufacturer is not liable for any damage resulting from improper use or use for other than the intended purpose.

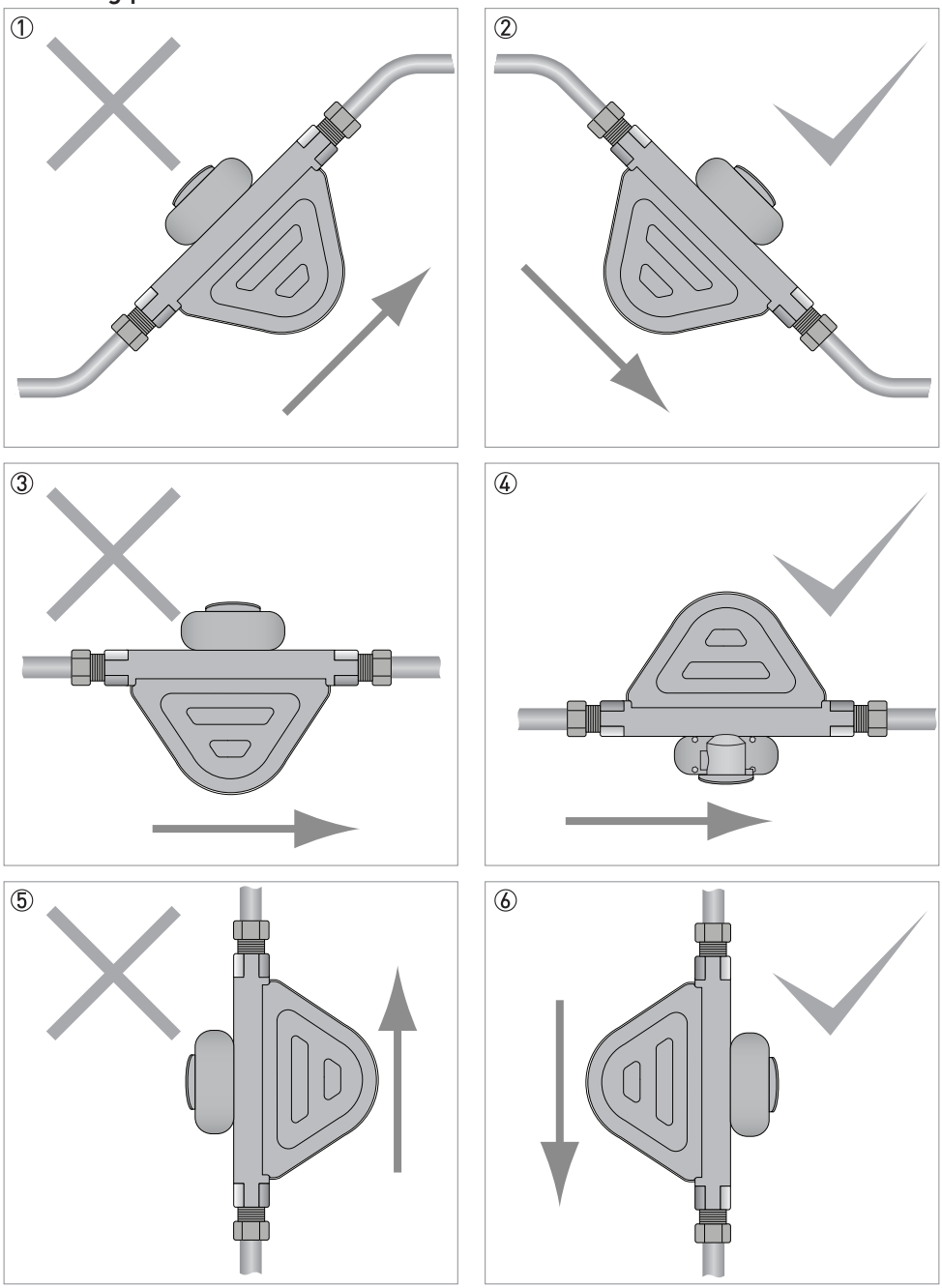
3.2 Mounting restrictions

3.2.1 General installation principles

There are no special installation requirements but you should note the following points:

- Support the weight of the meter as close to the meter body as possible.
- Mount the meter in such a way to avoid the build up of liquid in the measuring tube.
- Straight runs either side of the meter are not required.
- The use of reducers and other fittings at flanges, including flexible hoses, is allowed but you should take care to avoid cavitation.
- Avoid extreme pipe size reductions.
- Meters are not affected by crosstalk and can be mounted in series or in parallel.
- Avoid mounting the meter at the lowest point in the pipeline where liquid can collect.

Mounting positions



① Avoid mounting the meter with the flow running uphill because it can cause liquid to build up on the supply side of the meter.
② Mount the meter with the flow running downhill. This will allow any build up of liquid to drain from the meter.
③ Avoid mounting the meter with the connection box above the meter. This can cause liquid to collect in the measuring tubes at their lowest point in the meter.
④ Mount the meter with the junction box underneath the meter. This will prevent liquid from collecting in the measuring tubes.
⑤ The meter can be mounted vertically but DO NOT mount it so that the flow is uphill. This can cause fluid to build up on the supply side of the meter.
⑥ If you are mounting the meter vertically, mount it so that the flow is downhill. This will allow any build up of fluid to drain from the meter.

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- Flow
- Level
- Temperature
- Pressure
- Process Analysis
- Services

Head Office KROHNE Messtechnik GmbH
Ludwig-Krohne-Str. 5
47058 Duisburg (Germany)
Tel.: +49 203 301 0
Fax: +49 203 301 10389
info@krohne.com

The current list of all KROHNE contacts and addresses can be found at:
www.krohne.com

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