OPTIBATCH 4011 C Tec nical Datas eet

Mass flowmeter for process batching

- Reliable batching repeatability
- cellent low flow stability
- Hygienic design for food be erage and pharmaceutical applications

KROHNE

1 Product features 3

1.1 O er iew ... 3
1.2 Features and options ... 5
1.3 Measuring principle ... 6

2 Technical data 8

2.1 Technical data ... 8
2.2 Measuring accuracy ... 11
2.3 Pressure drop ... 12
2.4 Dimensions and weights ... 14
2.4.1 Dimensions ... 14
2.4.2 Weights ... 15

3 Installation 16

3.1 Intended use ... 16
3.2 Mounting restrictions ... 16
3.2.1 eneral installation principles ... 16
3.2.2 Carousel installation ... 17

4 lectrical connections 18

4.1 umberg connections ... 18
4.2 Power supply ... 1
4.3 Schematic layout pulse output ... 1

5 otes 22

1.1 O er ie

The OPTIBATCH has been de eloped to compliment the OPTIMASS family of mass flowmeters as a specialised meter for batching and filling machines.

As part of the Coriolis family of meters the OPTIBATCH offers e cellent long-term stability and reliability of mass flow o er long periods.

① Micro M12 male connector pro iding all electrical connections.
② Hygienic flange and clamp connections as standard.
③ Welded outer casing.

Hig lig ts

- Compact design
- Integrated electronics
- cellent reliability and accuracy
- Hygienic design of process connections
- cellent repeatability
- Stainless Steel 316 construction
- CIP / SIP to ma imum 120°C / 248°F
- Welded outer casing sealed to IP 67

Industries

- Food Be erage
- Chemical
- Pharmaceutical industry
- Cosmetic
- Health care

Applications

- Filling machines
- Fast batching
- ltra-pure water

1.2 eatures and options

eatures

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

Connection options

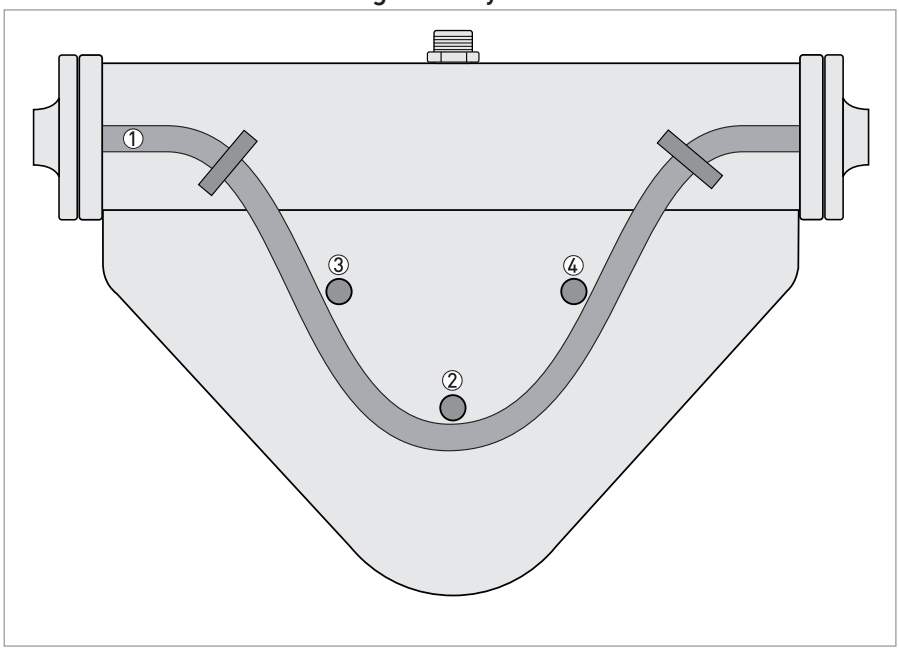
- DI 11864-2 hygienic flange connections or a range of hygienic clamp connections.
- Bespoke fittings to the customer s specification.

Integral electronics

- Integral electronics.
- Stand alone signal con ersion.
- o re uirement for a separate con erter.

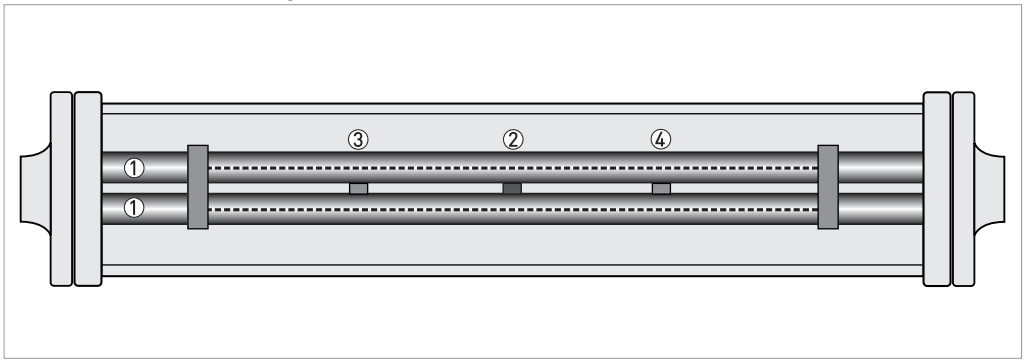
1.3 Measuring principle

Meter from t e side s o ing tu e layout



① Measuring tubes
② Dri e coil
③ Sensor 1
④ Sensor 2

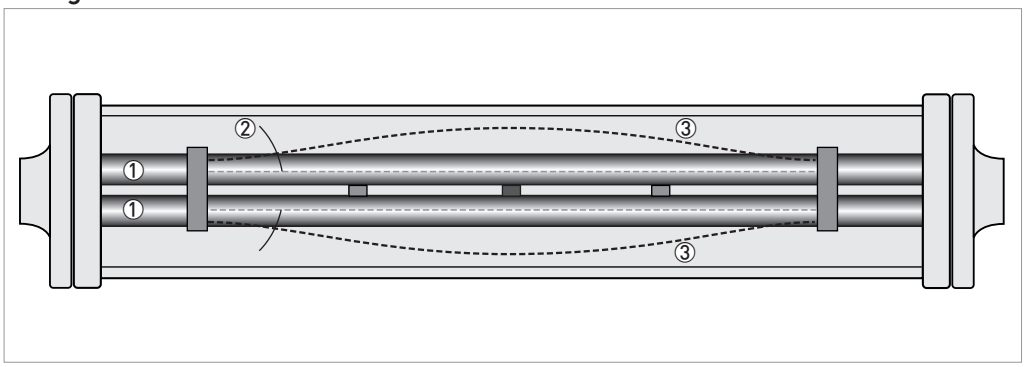
tatic meter not energised and it no flo



① Measuring tubes
② Dri e coil
③ Sensor 1
④ Sensor 2

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

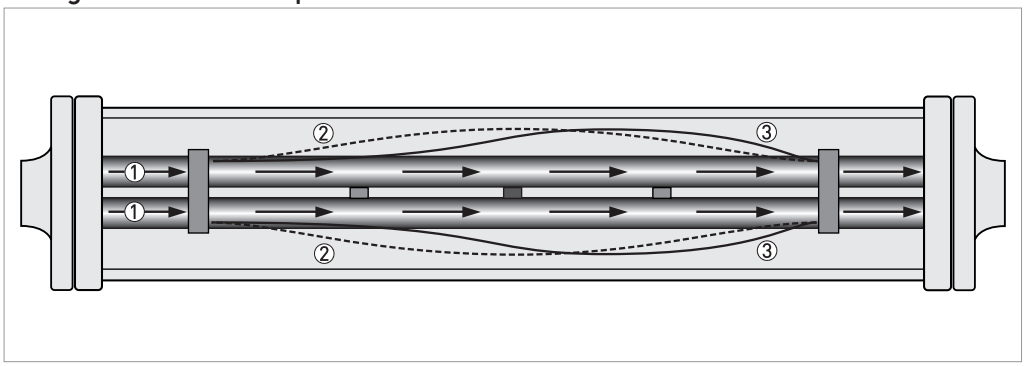
Energised meter



① Measuring tubes
② Direction of oscilation
③ Sine wa e

When the meter is energised the dri e coil ibrates the measuring tubes causing them to oscillate and produce a sine wa e ③. The sine wa e is monitored by the two sensors.

Energised meter it process flo



① Process flow
② Sine wa e
③ Phase shift

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

Density measurement is made by e aluation of the fre uency of ibration and temperature measurement is made using a Pt500 sensor.

2.1 Tec nical data

- *The following data is pro ided for general applications. If you re uire data that is more rele ant 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 li uids in batching and filling machines
Measured alues	Mass
Calculated alues	olume

Design

Basic	System consists of a measuring sensor with integral con erter to process the output signal
Features	Fully welded maintenance- free sensor with twin -shaped measuring tube
ariants	
Compact ersion	Integral con erter

Measuring accuracy

Mass	
nom 0.1 ≤	±0.15% of actual measured flow rate
nom 0.1	±0.1% of actual measured flow rate + zero stability
olume	
nom 0.1 ≤	±0.2% of actual measured flow rate
nom 0.1	±0.15% of actual measured flow rate + zero stability
ero stability	
Stainless Steel	0.005% of nominal flow
Repeatability at reference condtions	
Filling time	Standard de iation
1.5 s Filling time ≤ 3 s	0.13%
3 s Filling time ≤ 5 s	0.07%
5 s Filling time	0.04%
Reference conditions	
Warm-up time	15 min
Product	Water
Temperature	+20°C / +68°F
Operating pressure	1 barg / 14.5 psig
Accreditation	AS to 17025

Operating conditions

ominal flow rates	
S08	10 kg/min / 22 lb/min
S10	22 kg/min / 48.4 lb/min
S15	72 kg/min / 158.4 lb/min
Ambient temperature	
Compact ersion	-40...+55°C / -40...+131°F
Process temperature	
Operating temperature	0...+100°C / 32...+212°F
SIP/CIP	Ma imum +120°C / +248°F
	Ma imum 1h duration
ominal pressure at 20°C / 68°F	
Measuring tube	
Stainless Steel	-1...40 barg / -14.5...580 psig
Fluid properties	
Permissible physical condition	i uids
Permissible gas content olume	Contact manufacturer for information.
Permissible solid content olume	Contact manufacturer for information.
Protection category acc. to 6052	IP 67 MA 6

Installation conditions

Inlet runs	one re uired
Outlet runs	one re uired

Materials

Stainless Steel meter	
Measuring tube	Stainless Steel 316 1.4404
Surface finish wetted parts	Standard
	Optional Ra 0.8 µm with electro polishing
Process connections	Stainless Steel 316 1.4404
Outer casing	Stainless Steel 316 1.4401 hermetically sealed as standard
	Optional polishing of all e ternals

Process connections

Hygienic	
Tri-clo er	½...1¨
Tri-clamp DI 32676	D 10...25
Tri-clamp ISO 2852	1¨
Clamp IDF	10...15A
DI 11864-2 Form A	D 20
Male thread DI 11851	D 10...25
Male thread SMS	1¨
Male thread R T	1¨

Electrical Connection

Connection	
lectrical connections	Micro M12 male 8 pole umberg PRSFM 8/0.5M
Power Supply	
oltage	24 DC ±20%
Power consumption	3 W
Power supply type	Protected e tra-low oltage P
Pulse/Fre uency Output	
Pulse rate for 100%	Ma imum 10 kHz
	Factory set according to customer re uirements
Pulse width	Selectable 1 kHz or 10 kHz symmetrical pulse
	Factory set according to customer re uirements
Connection	ternal oltage $_{e\ t} \leq 30$ DC / ≤ 24 AC
	oad rating I_{ma} 20 mA

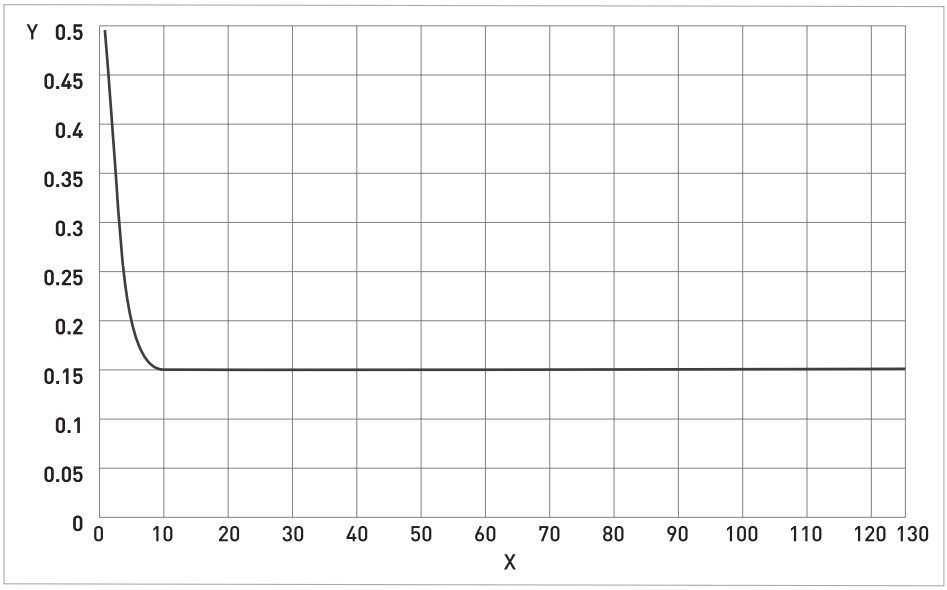
Configuration

Function	MODB S connection for programming and configuration of full process parameters using software supplied
	ote MODB S and pulse / fre uency output can not be used simutaneously
Type	RS485 Modbus RT

Appro als

C	The de ice fulfils the statutory re uirements of the C directi e. The manufacturer certifies that these re uires ha e been met by applying the C mark.
lectromagnetic compatibility	amur 21 most recent and up to date ersion
	MC directi e most recent and up to date ersion
	ow oltage Directi e most recent and up to date ersion
Hygienic	3A 28-03
	ASM BP 2005
	Conforms with FDA guidelines
	H D
ibration	I C 60068-2-6

2.2 Measuring accuracy



X Flow rate [%]
Y Measuring error [%]

Measuring error

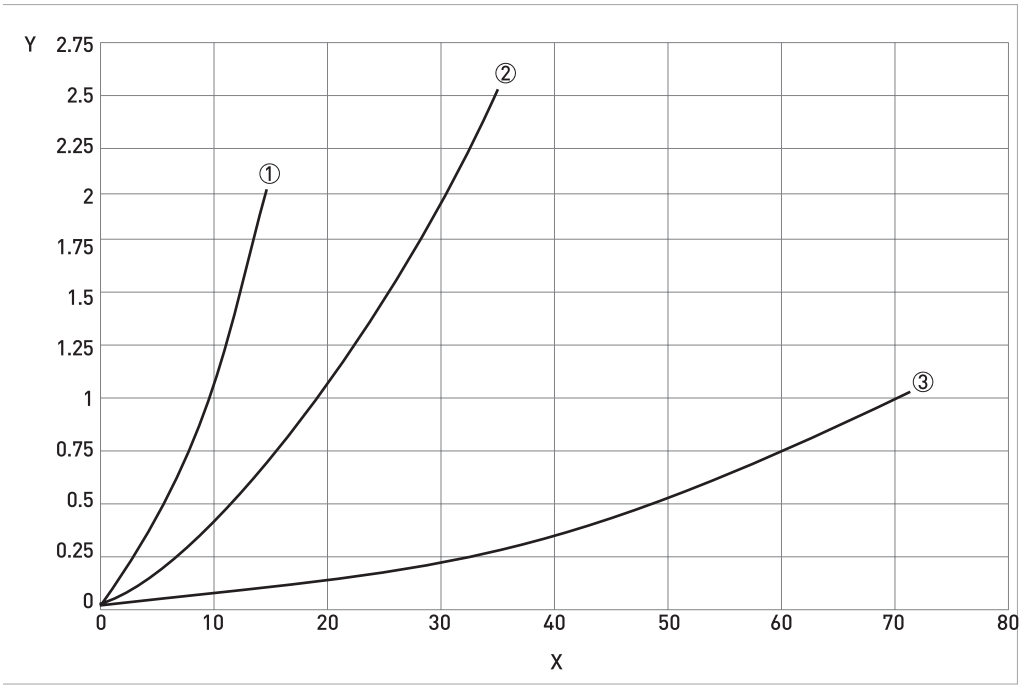
The measuring error is obtained from the combined effects of accuracy and zero stability.

Reference conditions

Product	Water
Temperature	+20°C / +68°F
Operating pressure	1 barg / 14.5 psig

2.3 Pressure drop

Metric

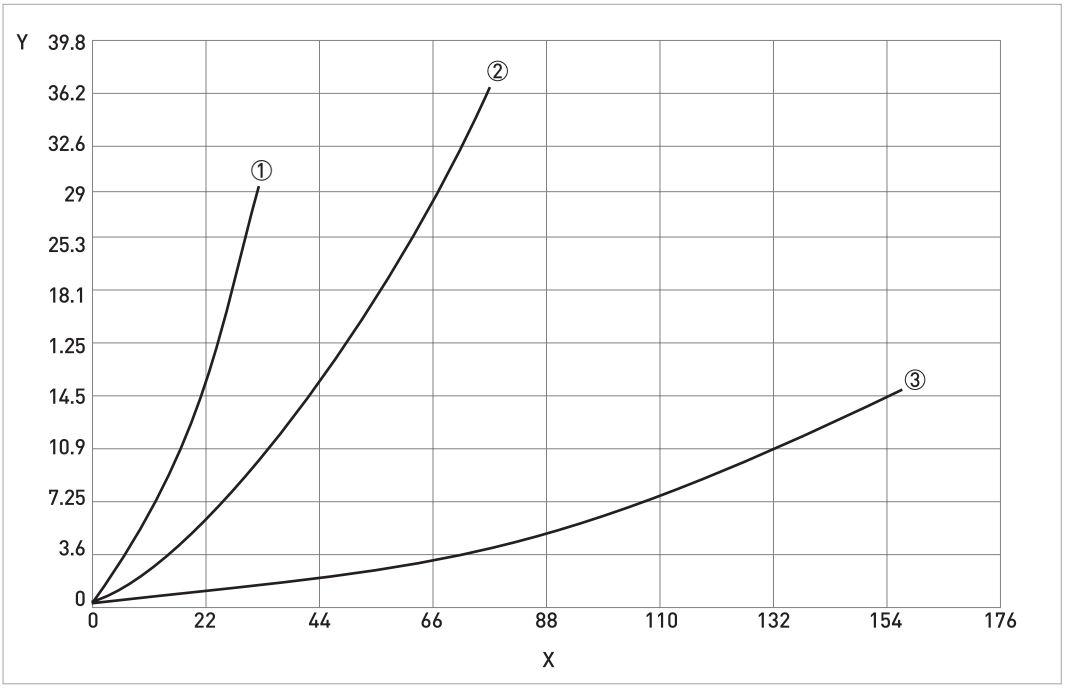


X Mass flow [kg / min]
Y Pressure [barg]
① S08
② S10
③ S15

Reference conditions

Meter	Product	Temperature
OPTIBATCH S08	Water	20°C
OPTIBATCH S10		
OPTIBATCH S15		

Imperial



X Mass flow [lb / min]
Y Pressure [psig]
① S08
② S10
③ S15

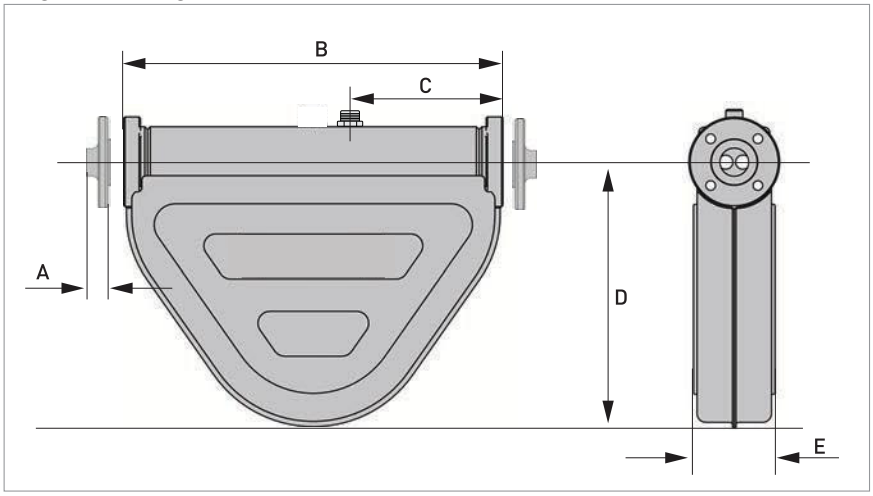
Reference conditions

Meter	Product	Temperature
OPTIBATCH S08	Water	68°F
OPTIBATCH S10		
OPTIBATCH S15		

2.4 Dimensions and eig ts

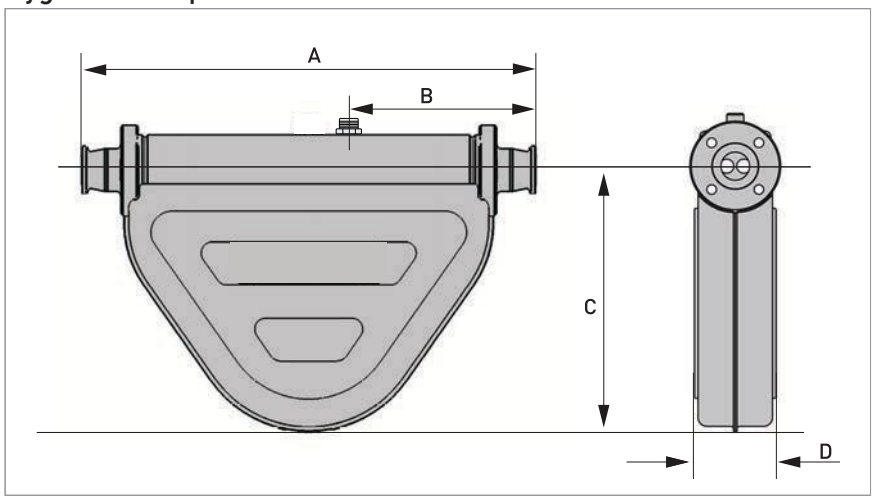
2.4.1 Dimensions

Hygienic flange



Meter	0		10		1	
Connection	DN20 DIN11 4 2		DN20 DIN11 4 2		DN20 DIN11 4 2	
	mm	inc es	mm	inc es	mm	inc es
A	15	0.5	15	0.5	15	0.5
B	270	10.6	270	10.6	270	10.6
C	112	4.4	112	4.4	112	4.4
D	18	7.44	18	7.44	18	7.44
	5 .5	2.34	5 .5	2.34	5 .5	2.34

Hygienic clamp



Meter	0 10				1								
Connection	DN10 Clamp DIN32	DN1 Clamp DIN32	DN10 ID Clamp A type	DN1 Tri Clo er	DN1 Clamp DIN32	DN20 Clamp DIN32	DN2 Clamp DIN32	DN1 ID Clamp A type	DN20 Tri Clo er	DN2 Tri Clo er	DN2 Clamp I O2 2	DN2 R T	DN2 M
mm													
A	333				333								
B	144				144								
C	18				18								
D	5 .5				5 .5								
inc es													
A	13.1				13.1								
B	5.7				5.7								
C	7.44				7.44								
D	2.34				2.34								

2.4.2 eig ts

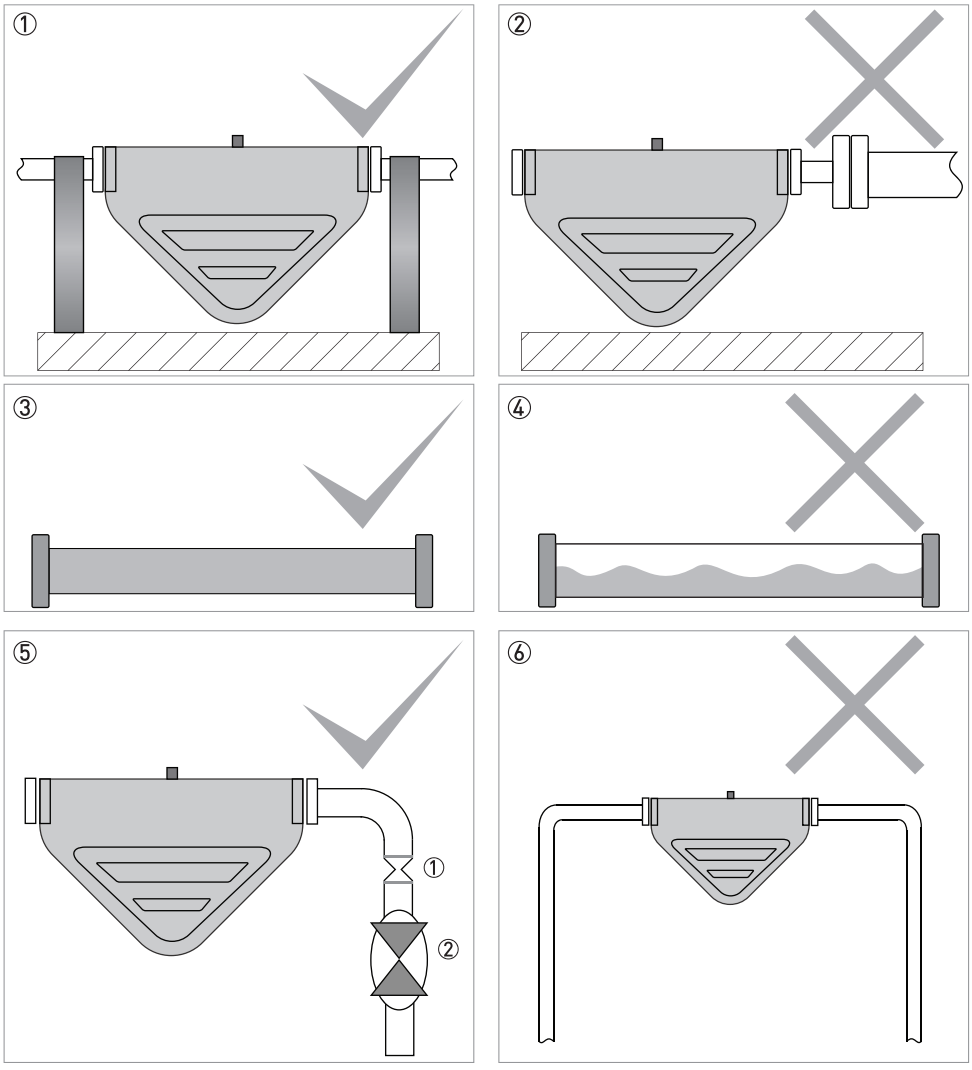
Meter	0		10		1	
	g	l	g	l	g	l
	2.	6.38	2.	6.38	2.	6.38

3.1 Intended use

This flowmeter has been specifically designed for the fast batching measurement of mass or olume and is intended for use in filling machines or bespoke applications.

3.2 Mounting restrictions

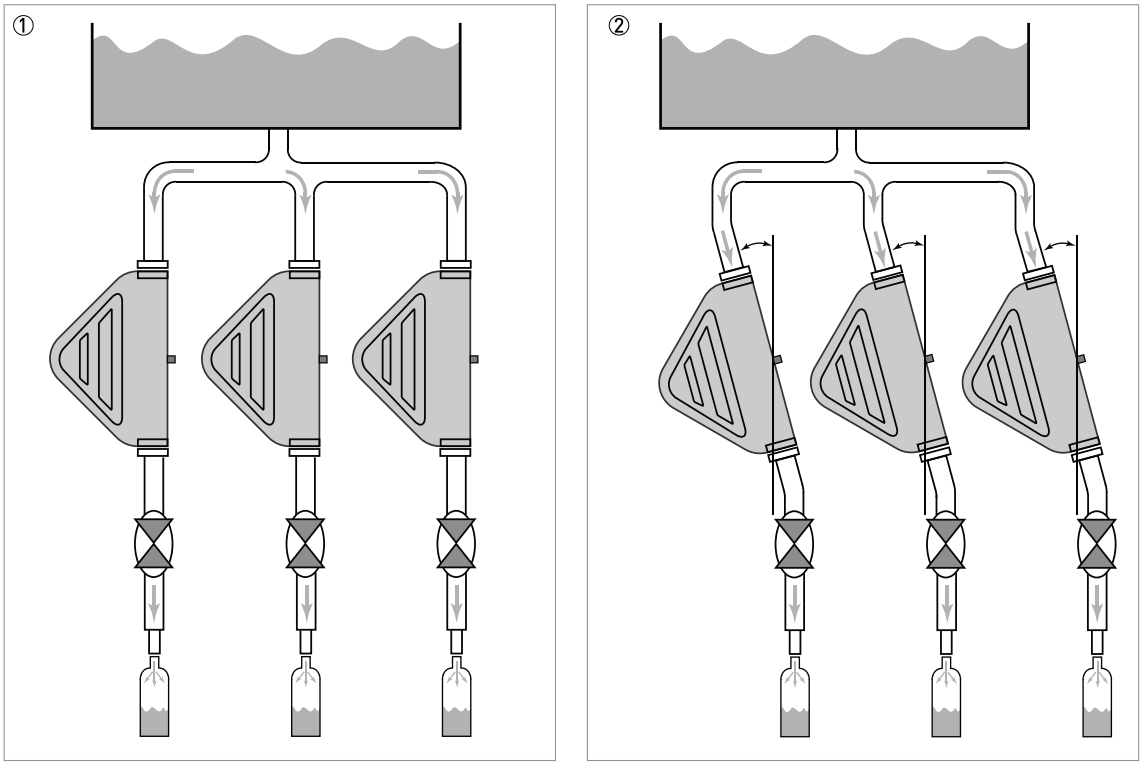
3.2.1 eneral installation principles



igure 3 1 eneral mounting restictions

① Fully support the weight of the meter. The meter can be supported with clamps close to the connecting flanges.
② Do not use e treme reductions in process pipework size.
③ Make sure that the process pipework is full at all times.
④ Do not let the flow fall in the process pipework. ow process flow will cause a measuring error.
⑤ If the meter has been installed with an open-ended down-pipe Install an orifice plate or restrictor ① to make sure that the pipework remains full during measurement. A fast-acting batch or shut-off al e ② should also be installed downstream of the meter.
⑥ It is recommended that you DO OT mount the meter at the highest point in the pipework because it can cause air / gas to collect in the meter.

3.2.2 Carousel installation



igure 3 2 Carousel installation

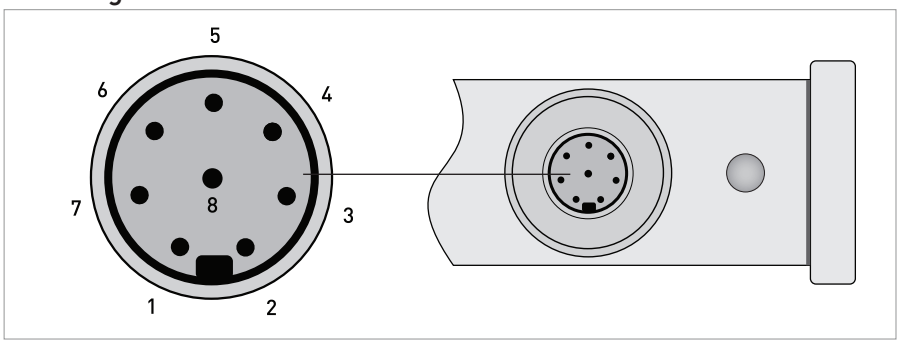
① Typical installation
② Installation showing the ma imum offset angle which is 12º from the ertical

- Where the meter has to be installed at an angle DO OT e ceed the ma imum offset angle.
- If the ma imum angle is e ceeded the meter will not self drain.

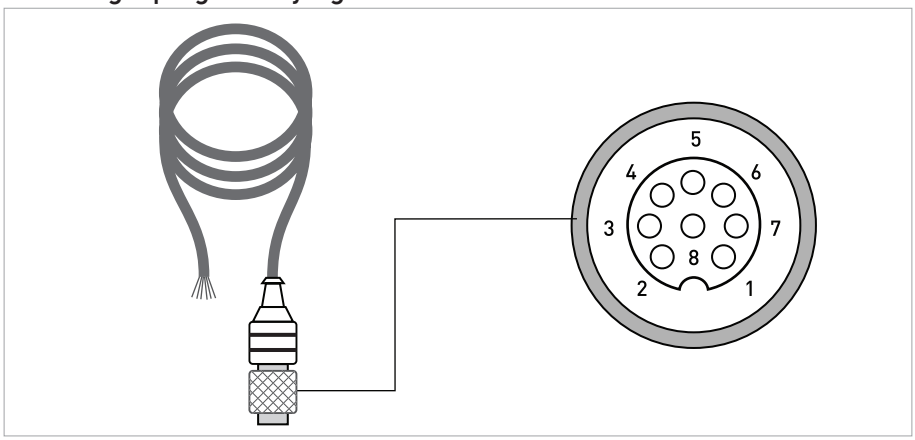
4.1 Lum erg connections

lectrical and signal connections to the flowmeter are through an 8 pin umberg® connector. To connect to the flowmeter use a umberg® R T 8-282/2 M straight or R WT 8-282/2 M 0° elbow plug and flying lead. An alternati e plug connector with the same pin / keyway configuration can also be used.

Lum erg® connector



Lum erg® plug and flying lead

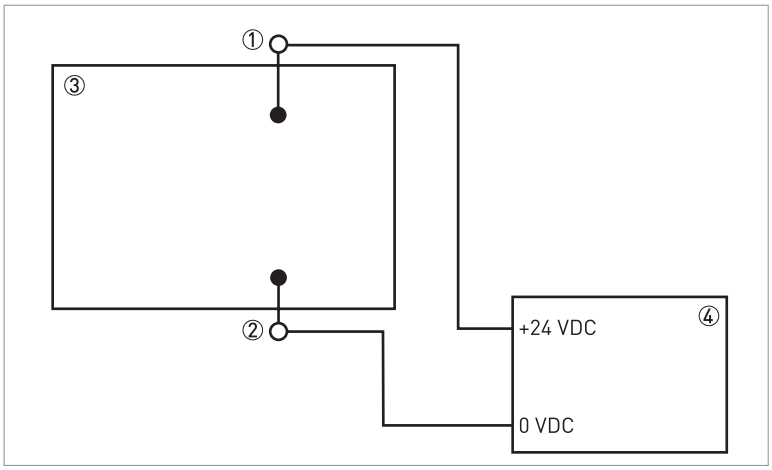


Plug pin connections

Pin	unction	Colour
1	PS + 24	White
2	RS485 A	Brown
3	RS485 B	reen
4	PS + 0	Yellow
5	Pulse +	rey
6	Pulse -	Pink
7	/ C	Blue
8	/ C	Screen

The pin / colour configurations shown in the table are for the umberg® flying lead. Other manufacturers might use a different pin / colour configuration. If you are not using the umburg® flying lead use the first two columns in the table to assign the correct function to each pin.

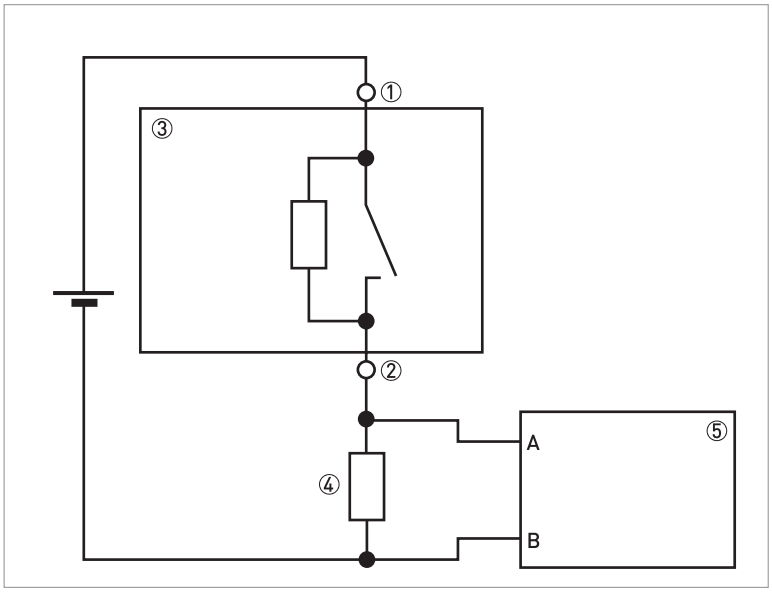
4.2 Po er supply



① Connection plug pin 1
② Connection plug pin 4
③ Meter
④ Protected e tra-low oltage P power supply

4.3 c ematic layout pulse output

in input



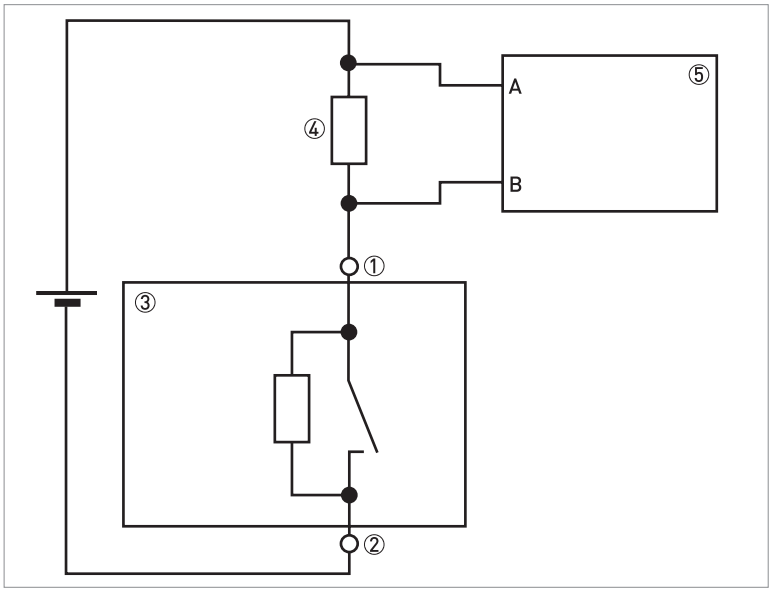
A Input
B round

① Connection plug pin 5
② Connection plug pin 6
③ al anically isolated pulse output of the meter
④ oad resistor. See table for typical alues
⑤ Batch processor or P C sink input with an impedance greater than 10 kΩ

Typical load resistor alues

Input	Load resistor
5 TT input	330 Ω
10...24 input	1 kΩ

ource input 10...24



A +
B Input

① Connection plug pin 5
② Connection plug pin 6
③ al anically isolated passi e pulse output of the meter
④ oad resistor. Typical alue is 1 kΩ
⑤ P C source input with an impedance greater than 10 kΩ

ROHNE – Process instrumentation and measurement solutions

- Flow
- e el
- Temperature
- Pressure
- Process Analysis
- Ser ices

Head Office ROH Messtechnik mbH
udwig- rohne-Str. 5
47058 Duisburg ermany
Tel. +4 203 301 0
Fa +4 203 301 1038
info krohne.com

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

KROHNE

ROH 07/2020 - 4000601804 - TD OPTIBATCH 4011 C R04 en - Sub ect to change without notice.