



OPTIPROBE Technical Datasheet

The cost efficient flow indicator

- Simple installation
- Accurate and stable measurements
- KROHNE quality

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1.1 The cost efficient flow indicator

The OPTIPROBE is a magnetic inductive flow indicator for use in conjunction with clean, electrically conductive fluids in pipes with nominal diameters of 80 mm and above.



- ① Connection box
- ② Process connection flange
- ③ Head with integrated coils and electrodes

Highlights

- All wetted parts of non-corrosive materials
- Easy to install
- Pulsed DC field excitation
- Wide (bidirectional) measuring range
- Installation possible in pipelines under pressure

Industries

- Water
- Wastewater

Applications

- For clean liquids with a minimum conductivity of 20 $\mu\text{S}/\text{cm}$

1.2 Measuring principle

The OPTIPROBE is inserted through a hole drilled in the pipe. A magnetic coil located in the probe's measuring head generates a pulsed DC field perpendicular to the measuring head. This together with the movement of the fluid induces a voltage proportional to the mean flow velocity. The voltage is picked up by two electrodes fitted to the front of the probe and forwarded to a signal converter, where it is converted into a measured flow speed.

2.1 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	Faraday's law
Application range	Electrically conductive fluids
Measured value	Flow velocity

Design

Features	Wide range of measuring range
	Bidirectional measuring
	Non-corrosive materials
	Two models available
Models	Model A: insertion length 25 mm
	Model B: insertion length 25...400 mm (variable; replaceable under operating pressure)
Compact version	With IFC 100 or IFC 300 signal converter
	IFC 300 only in GKL mode
Remote version	With IFC 100 or IFC 300 signal converter
	IFC 300 only in GKL mode
Nominal diameters	≥ DN80
Measurement range	-12...12 m/s

Measuring accuracy

Reference conditions	Medium: water
	Electrical conductivity: ≥ 300 μS/cm
	Temperature: 10...30°C
Accuracy	Full scale range > 3 m/s: 3% of measured value
	Full scale range ≤ 3 m/s: 2% of measured value + 2 cm/s
Repeatability	2% of measured value

Operating conditions

Temperature	
For Ex versions different temperatures are valid. Please refer to the relevant Ex documentation for details.	
Process temperature	0...100°C
Ambient temperature	-30...55°C
Pressure	
EN 1092-1	PN16 (model A)
	Option: G 1½" (model B only)
ASME B16.5	150 lb (model B)
Connecting flange	DN40; PN 16
Chemical properties	
Physical condition	Electrically conductive liquids
Electrical conductivity	≥ 20 μS/cm

Installation conditions

Installation	Pipe must be fully filled for model A
	Electrodes must be perpendicular to the flow direction
	Weld the socket with connecting flange square to the longitudinal axis of the pipeline
	Probe insertion length minimum 25 mm
Flow direction	Forward and reverse
	Arrow on connection box indicates the positive flow direction
Inlet run	≥ 10 DN
Outlet run	≥ 5 DN

Materials

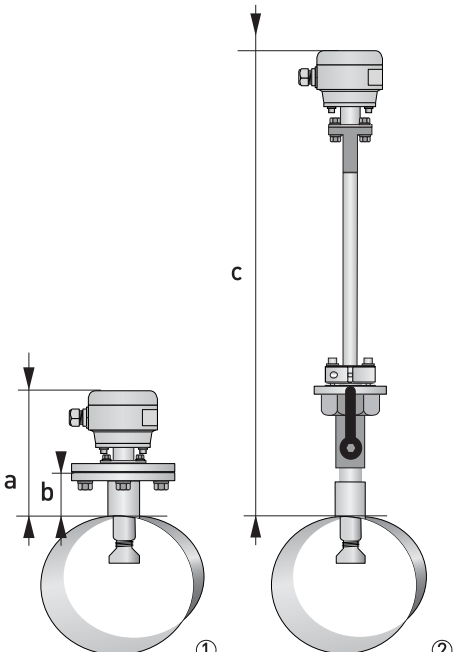
Measuring head	POM (Polyacetal)
Measuring head sleeve	CrNi steel 1.4301
Electrodes	Hastelloy C
Connecting flange	Carbon steel/stainless steel
Counter flange	Carbon steel/stainless steel
Pipe sleeve	Stainless steel 1.4404
Flange gasket	FKM/FPM
Connection box	Die cast aluminium; standard coated

Electrical connections

Signal cable; type A (DS)	Standard cable, double shielded
	Maximum length: 300 m
Field current cable	Minimum cross section of 2x 1.5 mm ²
	Maximum length: 300 m
	No part of delivery

CE	
This device fulfils the statutory requirements of the EU directives. The manufacturer certifies successful testing of the product by applying the CE mark.	
	For full information of the EU directive & standards and the approved certifications; please refer to the EU declaration of conformity or the website of the manufacturer.
Hazardous area	
ATEX	Please check the relevant Ex documentation for details
	Compact version with signal converter IFC 100 / IFC 300
	II 3G; IIC T3
NEPSI	GYJ16.1332X
	Ex ic nA II B T3 Ge
Other approvals and standards	
Protection category acc. to IEC/EN 60529	Standard:
	IP66 / 67 (NEMA 4/4X/6)
	IP68 (NEMA 6P) is only available for separate design and with a stainless steel connection box
Shock test	IEC 68-2-27
	30 g for 18 ms
Vibration test	IEC 6800-2-64
	f = 20...2000 Hz; rms = 4.5 g; t = 30 min

2.2 Dimensions

Model	Approximate dimensions
	<p>①: Model A a = 215 mm / 8.5" b = 78 mm / 3.1"</p> <p>②: Model B c = 877 mm / 34.5"</p>

3.1 Intended use

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.

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

The OPTIPROBE/OPTIBAR electromagnetic flow indicator is designed exclusively to measure the flow of electrically conductive, liquid media.

3.2 General notes on installation

Inspect the packaging carefully for damages or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.

Do a check of the packing list to make sure that you have all the elements given in the order.

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

3.2.1 Vibration

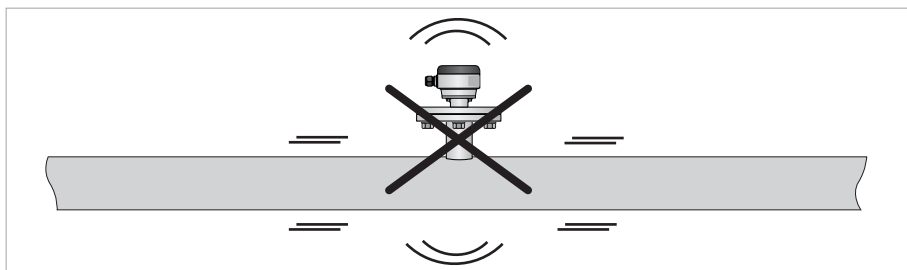


Figure 3-1: Avoid vibrations

3.2.2 Magnetic field

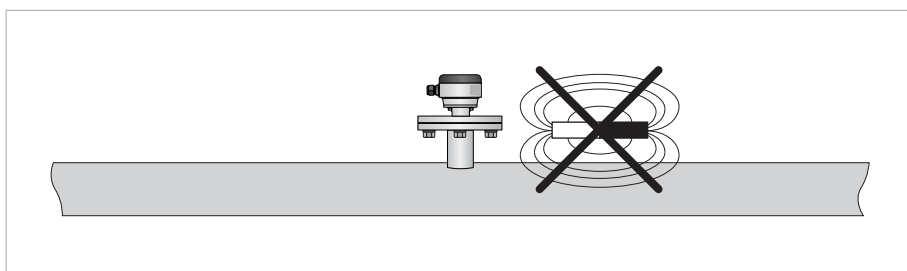


Figure 3-2: Avoid magnetic fields

3.3 Installation conditions

3.3.1 Inlet and outlet

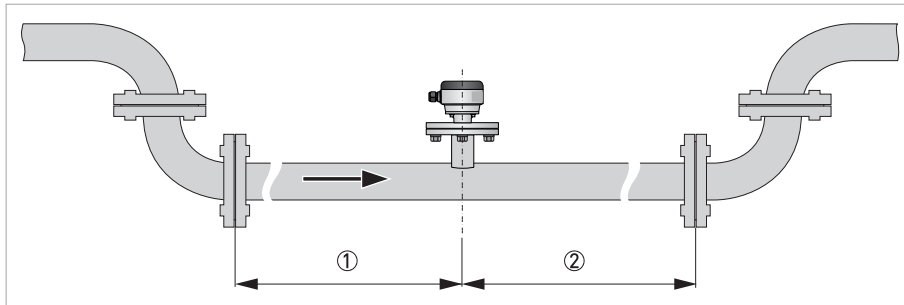


Figure 3-3: Recommended inlet and outlet sections

- ① ≥ 10 DN
- ② ≥ 5 DN

3.3.2 Bends in 2 or 3 dimensions

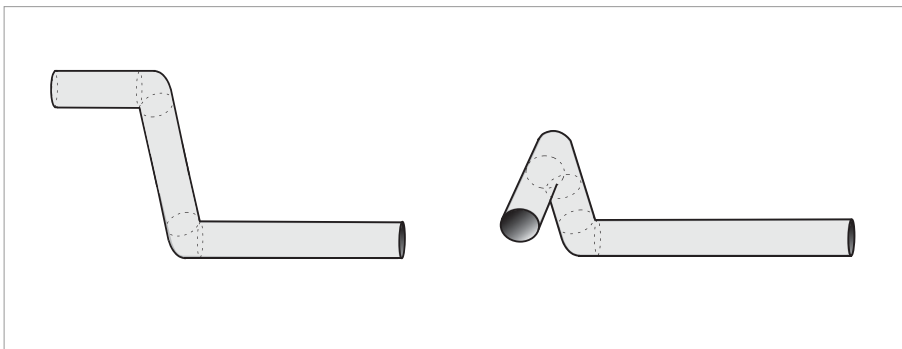


Figure 3-4: Inlet when using 2 and/or 3 dimensional bends upstream of the flowmeter
for bends in 2 dimensions: ≥ 20 DN; when having bends in 3 dimensions: ≥ 30 DN

*2 Dimensional bends occur in a vertical **or** horizontal plane only, while 3 Dimensional bends occur in both vertical **and** horizontal plane.*

3.3.3 T-section

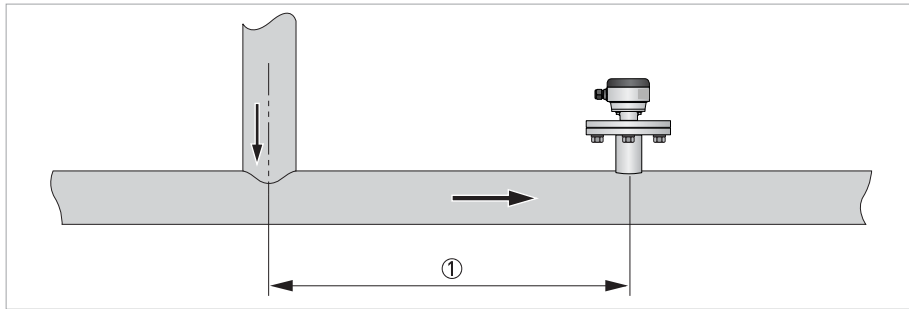


Figure 3-5: Distance behind T-sections

① ≥ 30 DN

3.3.4 Bends

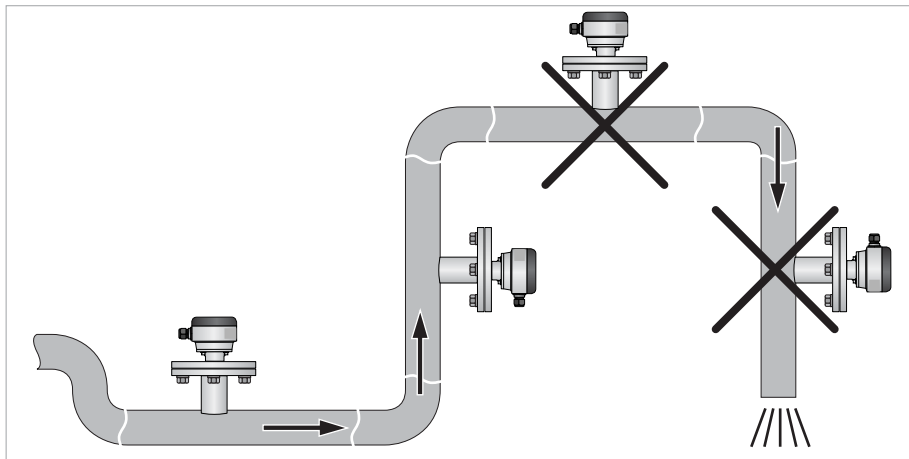


Figure 3-6: Installation in bending pipes

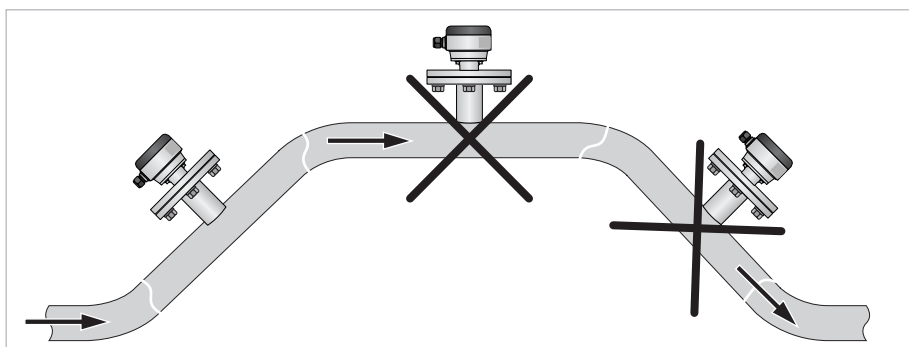


Figure 3-7: Installation in bending pipes

3.3.5 Open discharge

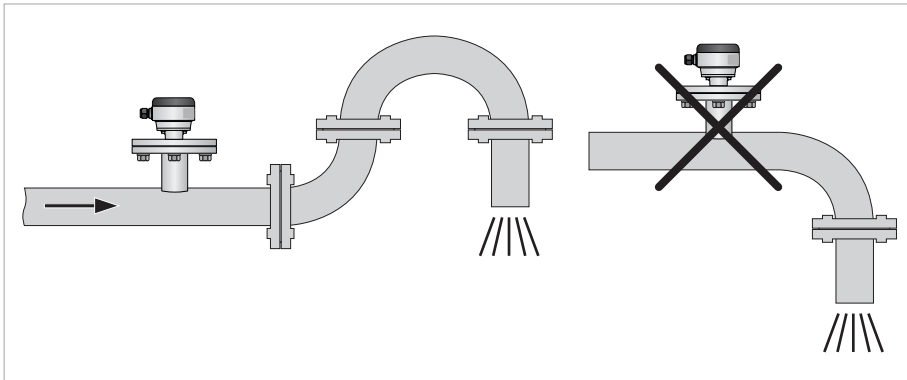


Figure 3-8: Installation in front of an open discharge

3.3.6 Control valve

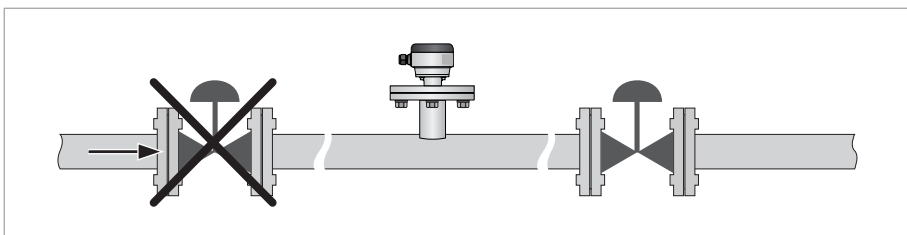


Figure 3-9: Installation in front of a control valve

3.3.7 Pump

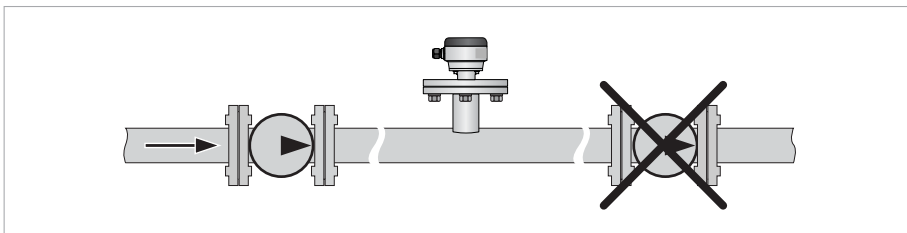


Figure 3-10: Installation behind a pump

3.3.8 Mounting position

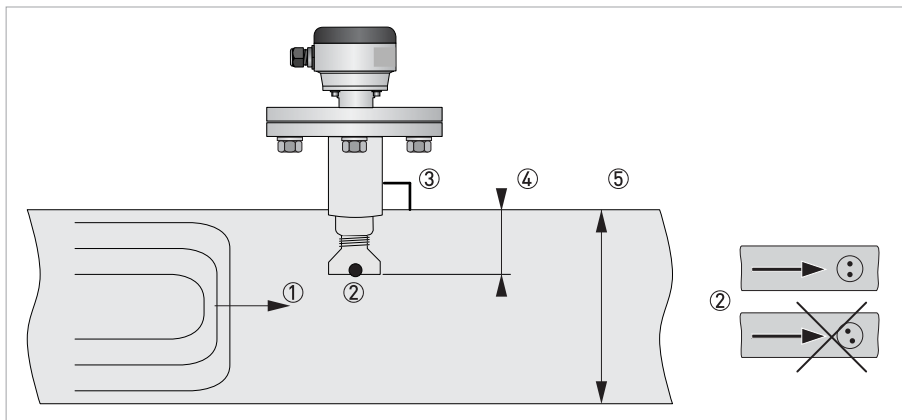


Figure 3-11: Mounting position

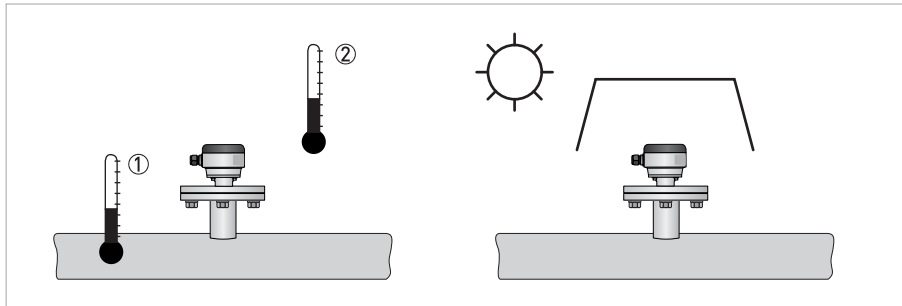
- ① Flow profile must be fully developed
- ② Welding instructions: the electrodes must point to the side of the pipeline
- ③ Insert the OPTIPROBE perpendicular
- ④ Insertion length ≥ 25 mm
- ⑤ DN ≥ 80 mm

The OPTIPROBE is a sensor which measures flow speed at one point in the pipe. In case the flow speed has to be converted into a volume, please note that the measured value depends on the used diameter and the insertion length, because the OPTIPROBE decreases the inner surface of the pipe at the measuring section. The corrected GKI value for any other installation condition can be calculated as:

$$GKI = GKI_{cal} * \left(1 - \frac{30 * L_{insertion}}{0.79 * DN^2} \right)$$

*All measures in mm
 GKI_{cal} is GKI on nameplate*

3.3.9 Temperatures



- ① Process temperature
- ② Ambient temperature

Protect the device from direct sunlight.

Temperature range	[°C]		[°F]	
	min.	max.	min.	max.
Process temperature	0	100	32	212
Ambient temperature	-30	55	-22	131

4.1 Safety instructions

*All work on the electrical connections may only be carried out with the power disconnected.
Take note of the voltage data on the nameplate!*

Observe the national regulations for electrical installations!

For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.

Observe without fail the local occupational health and safety regulations.

Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.

*Look at the device nameplate to ensure that the device is delivered according to your order.
Check for the correct supply voltage printed on the nameplate.*

4.2 Connection diagram

- The outer shield of the signal cable in the signal converter housing is connected via the strain relief terminal.
- The bending radius of the signal and field current cable: $\geq 50 \text{ mm}/2''$.
- The following illustration is schematic. The positions of the electrical connection terminals may vary depending on the type of converter.

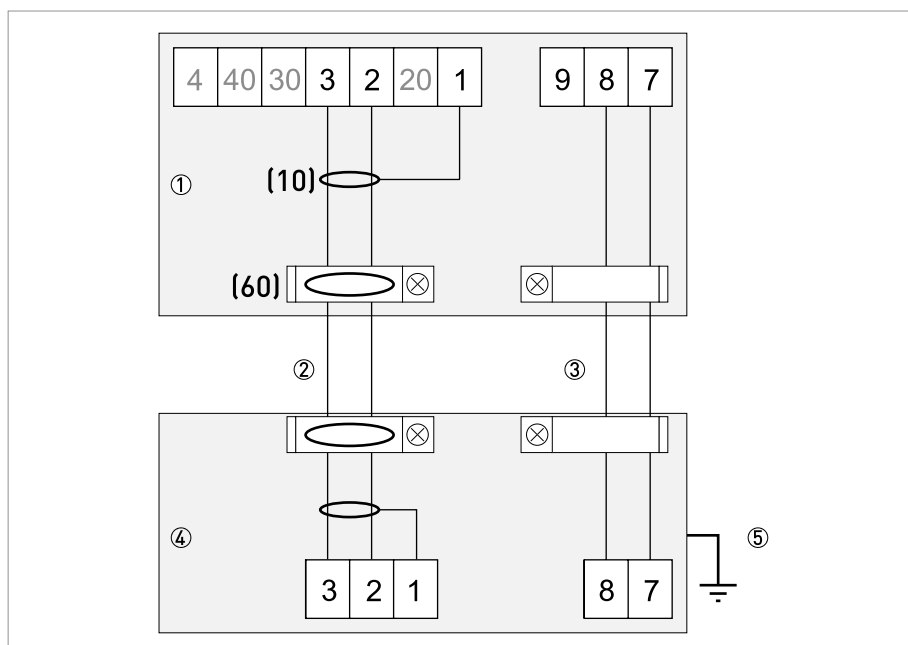
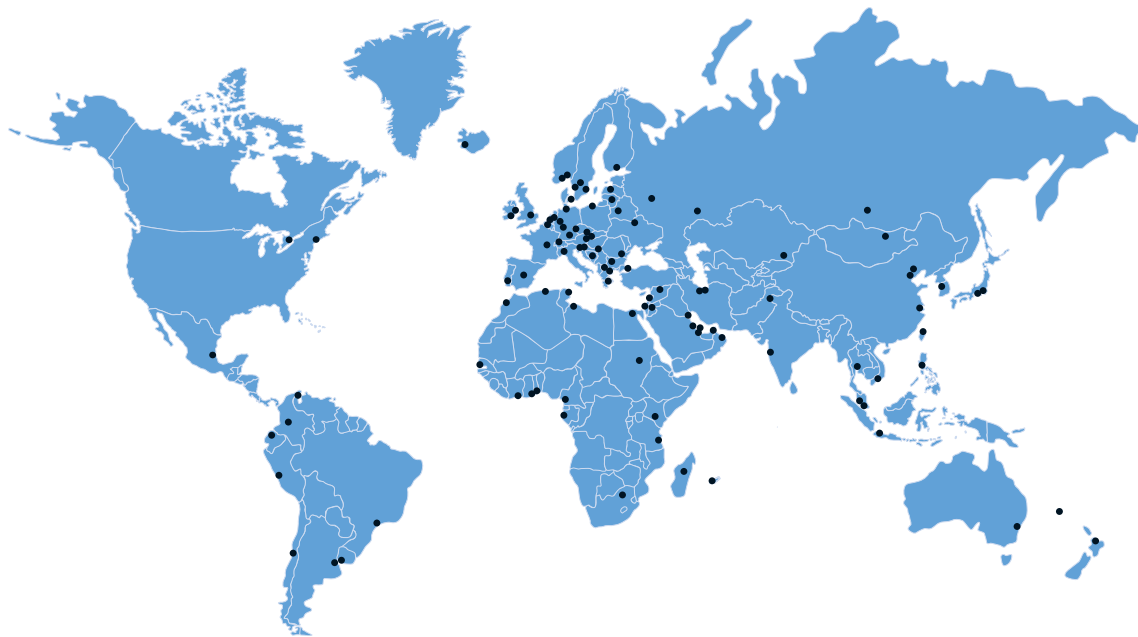


Figure 4-1: Connection diagram

- ① Electrical terminal compartment in housing of the signal converter for signal and field current cable
- ② Signal cable
- ③ Field current cable C
- ④ Connection box for measuring sensor
- ⑤ Functional ground FE





KROHNE – Process instrumentation and measurement solutions

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