



OPTIPROBE Technical Datasheet

The low-cost flow indicator

- Simple installation
- Accurate and stable measurements
- KROHNE quality

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1.1 The low cost 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 representative.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Download Center).*

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 GKI mode
Remote version	With IFC 100 or IFC 300 signal converter
	IFC 300 only in GKI 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	
Process temperature	0...100°C
Ambient temperature	-30...55°C
Pressure	
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

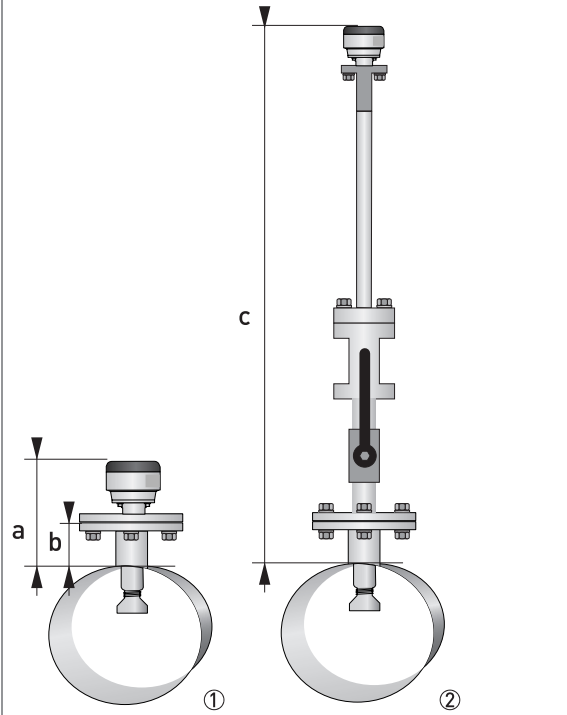
Materials

Measuring head	POM (Polyacetal)
Measuring head sleeve	CrNi steel 1.4301
Electrodes	Hastelloy C
Connecting flange	Steel RST 37
Counterflange	Steel RST 37
Pipe sleeve	Steel RST 37
Flange gasket	FKM, FPM
Junction box	Die cast aluminum, polyurethane 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

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 Notes on installation

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

Check the packing list to check if you received completely all that you ordered.

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 Installation conditions

3.2.1 Inlet and outlet

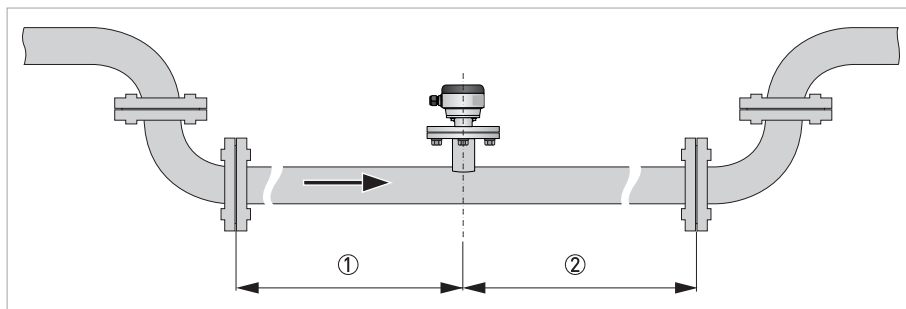


Figure 3-1: Recommended inlet and outlet sections

- ① ≥ 10 DN
- ② ≥ 5 DN

3.2.2 Mounting position

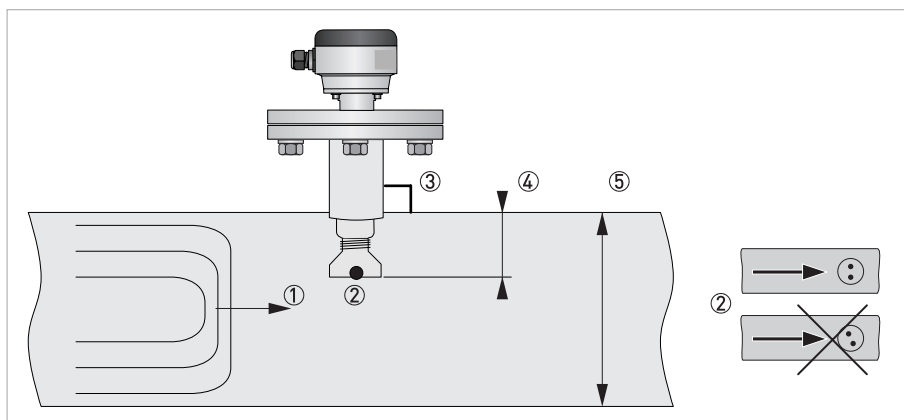


Figure 3-2: Mounting position

- 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 $\geq 25\text{mm}$.
- ⑤ $\text{DN} \geq 80\text{mm}$.

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:

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

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

3.2.3 T-section

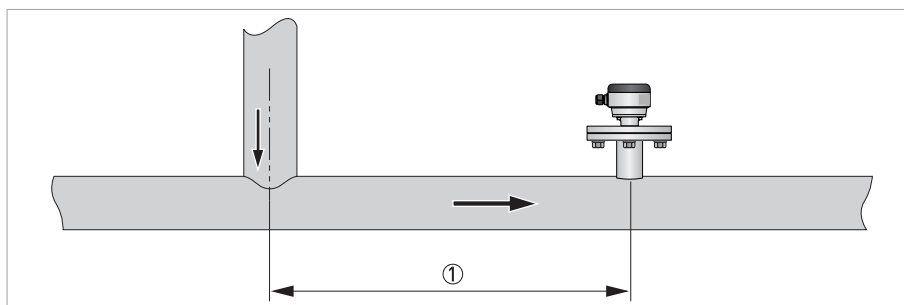


Figure 3-3: Distance after T-sections

- ① $\geq 30 \text{ DN}$

3.2.4 Vibration

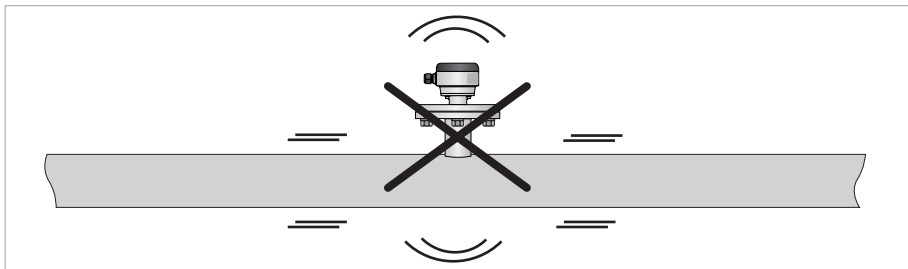


Figure 3-4: Avoid vibrations

3.2.5 Magnetic field

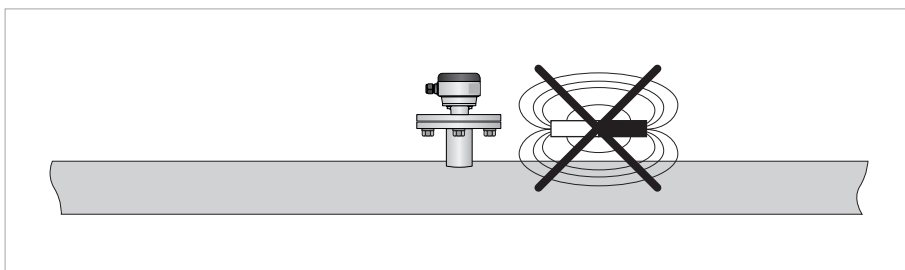


Figure 3-5: Avoid magnetic fields

3.2.6 Bends

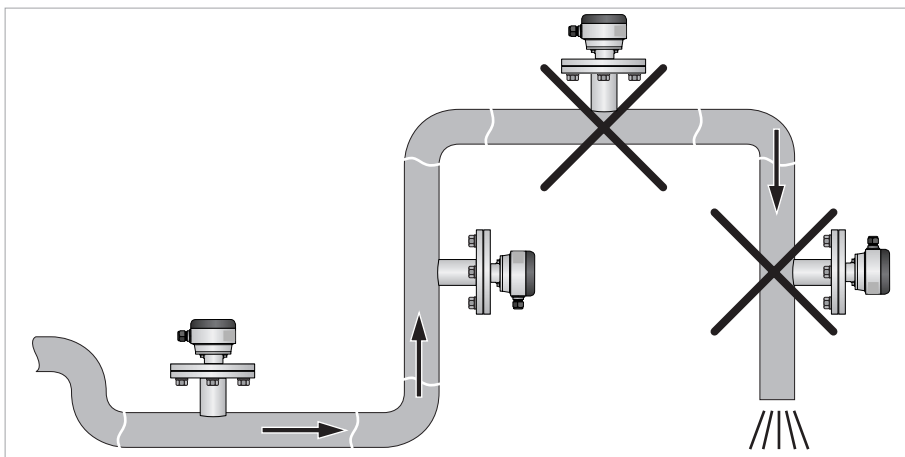


Figure 3-6: Installation in bending pipes

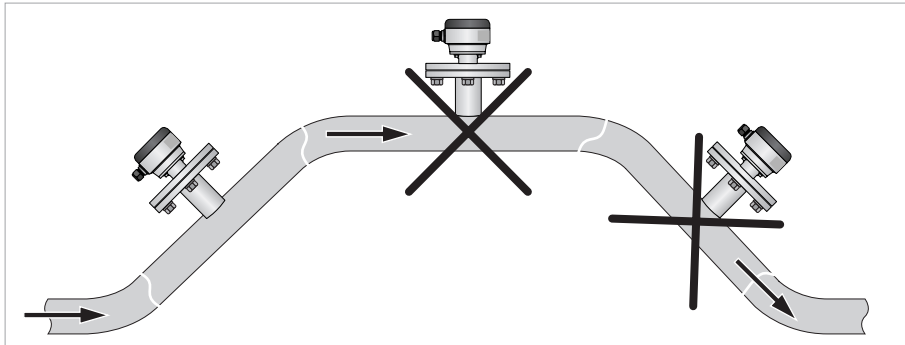


Figure 3-7: Installation in bending pipes

3.2.7 Open discharge

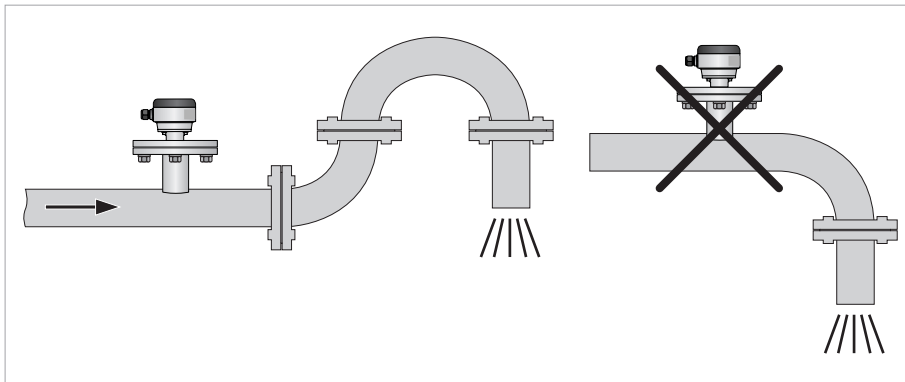


Figure 3-8: Installation before an open discharge

3.2.8 Control valve

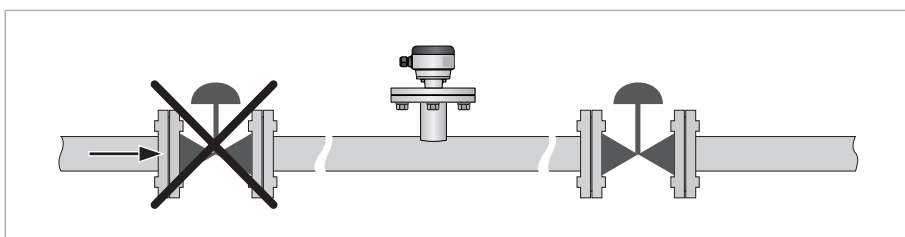


Figure 3-9: Installation before control valve

3.2.9 Pump

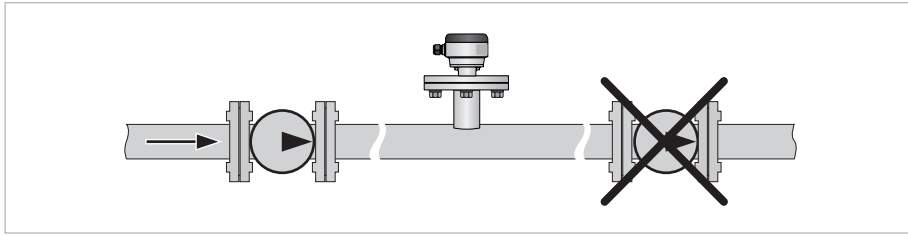
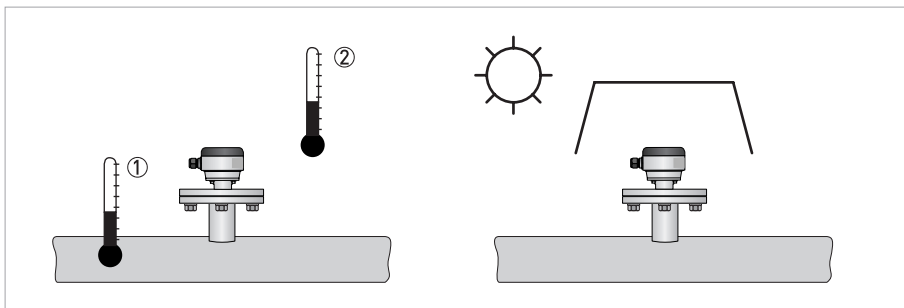


Figure 3-10: Installation after pump

3.2.10 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.
- Bending radius of 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.

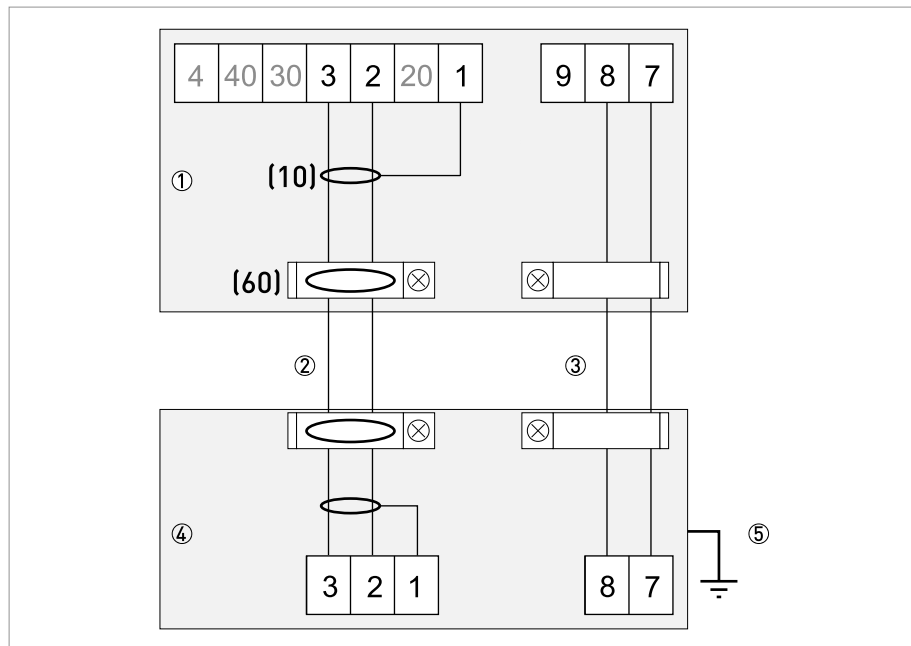
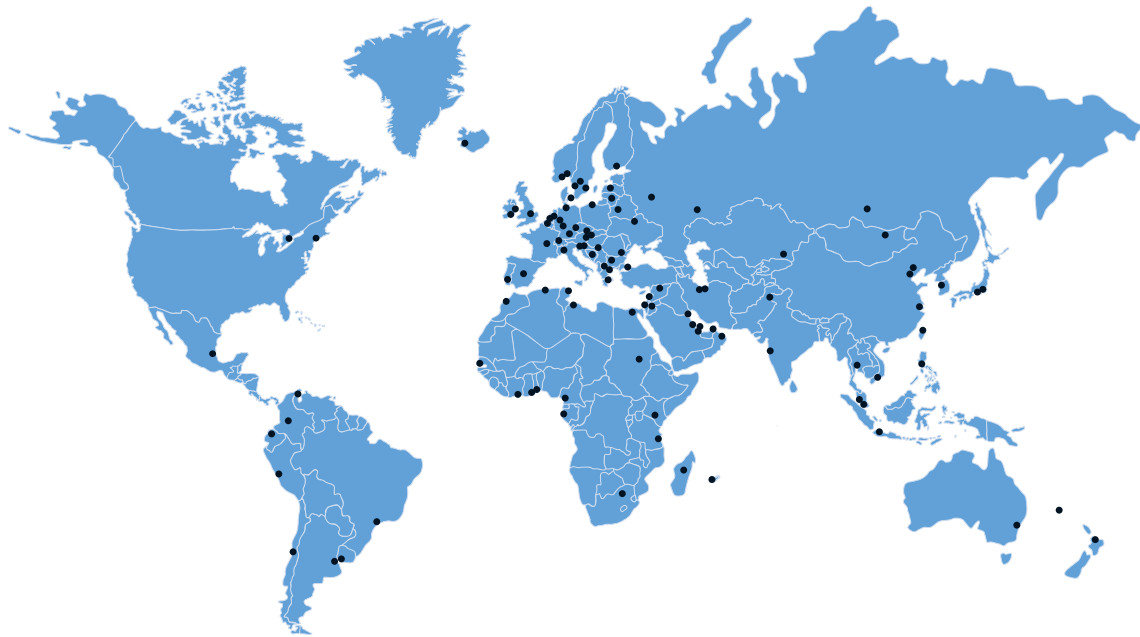


Figure 4-1: Connection diagram

- 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 product overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Ultrasonic flowmeters
- Mass flowmeters
- Vortex flowmeters
- Flow controllers
- Level meters
- Temperature meters
- Pressure meters
- Analysis products
- Measuring systems for the oil and gas industry
- Measuring systems for sea-going tankers

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