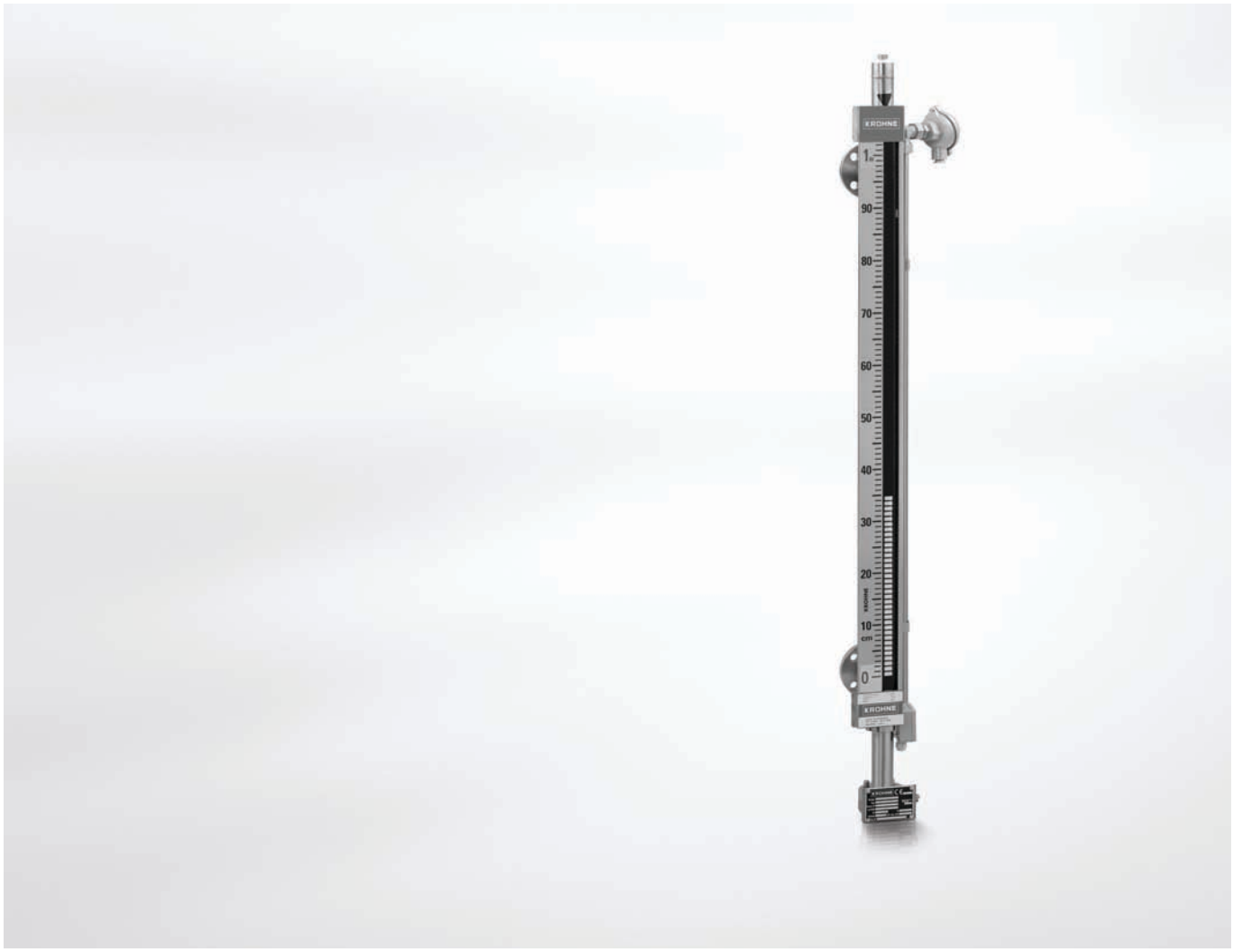

BM 26 BASIC/ADVANCED Quick Start

Stainless Steel Bypass Level Indicators for applications up to 40 bar / 580 psi

KROHNE

Warnings and symbols used

DANGER!
This information refers to the immediate danger when working with electricity.

DANGER!
These warnings must be observed without fail. Even partial disregard of this warning can lead to serious health problems and even death. There is also the risk of seriously damaging the device or parts of the operator's plant.

WARNING!
Disregarding this safety warning, even if only in part, poses the risk of serious health problems. There is also the risk of damaging the device or parts of the operator's plant.

CAUTION!
Disregarding these instructions can result in damage to the device or to parts of the operator's plant.

INFORMATION!
These instructions contain important information for the handling of the device.

HANDLING

- This symbol designates all instructions for actions to be carried out by the operator in the specified sequence.

➲ RESULT
This symbol refers to all important consequences of the previous actions.

Safety instructions for the operator

CAUTION!
Installation, assembly, start-up and maintenance may only be performed by appropriately trained personnel. The regional occupational health and safety directives must always be observed.

LEGAL NOTICE!
The responsibility as to the suitability and intended use of this device rests solely with the user. The supplier assumes no responsibility in the event of improper use by the customer. Improper installation and operation may lead to loss of warranty. In addition, the "Terms and Conditions of Sale" apply which form the basis of the purchase contract.

INFORMATION!

- *Further information can be found on the supplied CD-ROM in the manual, on the data sheet, in special manuals, certificates and on the manufacturer's website.*
- *If you need to return the device to the manufacturer or supplier, please fill out the form contained on the CD-ROM and send it with the device. Unfortunately, the manufacturer cannot repair or inspect the device without the completed form.*

2.1 Scope of delivery

INFORMATION!
Check the packing list to see if you have received all that you require.
The device will be delivered in one box.

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

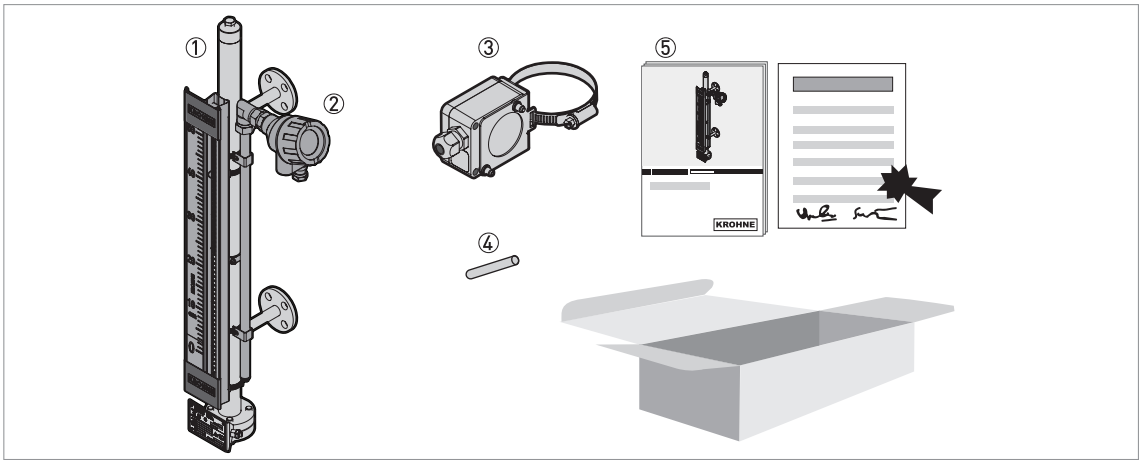

Figure 2-1: Scope of delivery

① Measuring chamber with the indicator column and optional indicator scale
② Optional analog transmitter
③ Optional limit switches (not attached to the device)
④ Magnet (to set the indicator column to zero after installation)
⑤ Quick Start and Handbook

INFORMATION!
No special tools, no training required!

2.2 Transportation

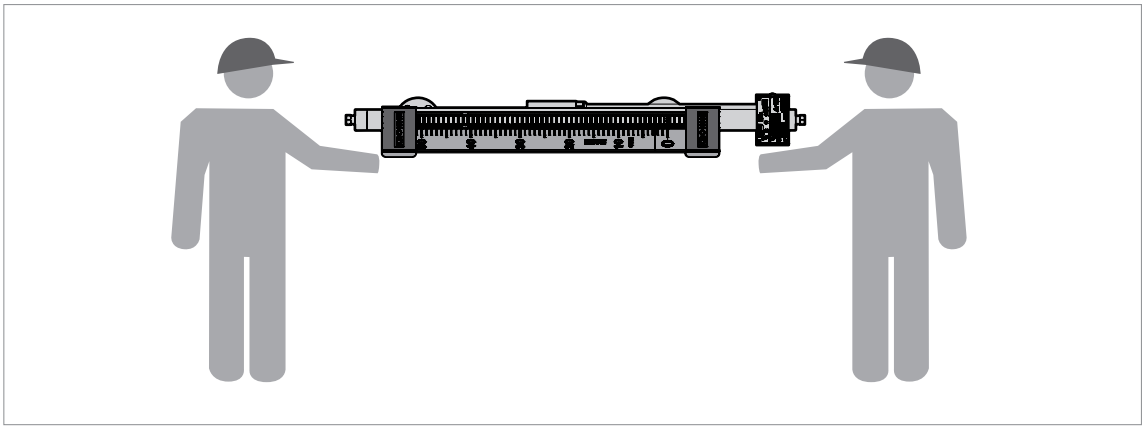

Figure 2-2: Transportation

WARNING!
The indicator column is made of Pyrex® glass.
If you do not lift the device carefully, you can cause damage to the device.

2.3 Remove all packing before installation

CAUTION!
Make sure that the measuring chamber does not contain unwanted objects (dirt etc.)

How to remove the float lock pin (devices with side process connections)

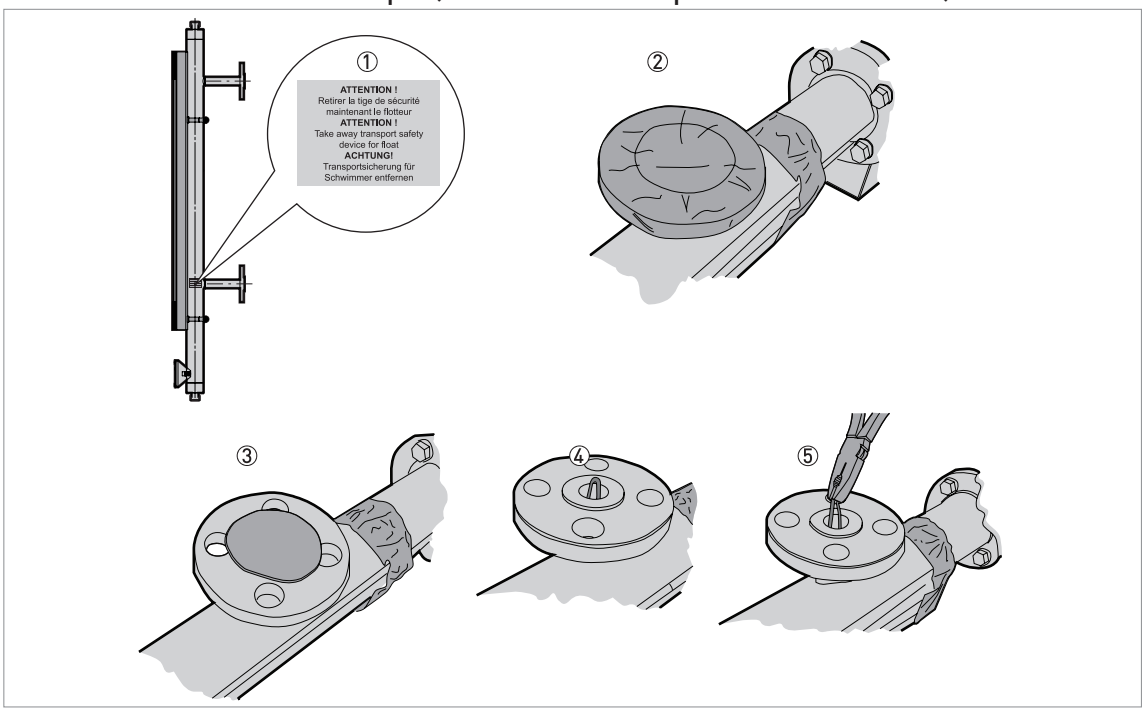

Figure 2-3: How to remove the float lock pin (devices with side process connections)

How to remove the float lock pin (devices with side process connections)

① Check the measuring chamber for a red sticker next to the bottom side process connection.
➲ Sticker text: ATTENTION! Take away transport safety device for float.
② Remove the adhesive tape around the top and bottom process connections.
③ Remove the plastic protection from the top and bottom process connections.
④ Find the lock pin.
⑤ Remove the lock pin with a pair of pliers.

How to put the float in the measuring chamber

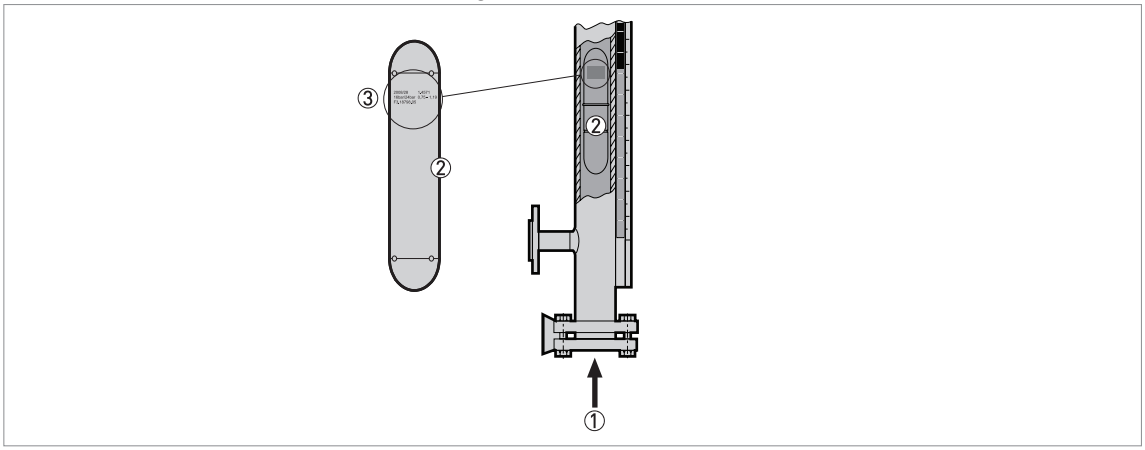

Figure 2-4: How to put the float in the measuring chamber (if it is delivered separately)

① Put the float in here
② Float
③ The float data (date of manufacture, P_s/P_t, float material etc.) must be at the top of the float when you put the float in the measuring chamber

How to put the float in the measuring chamber (if it is delivered separately)

- Remove the bottom blind flange or plug (if the basic version has the 1¼¨ drain option).
- Put the top of the float (the float data is on the top part of the float) in the measuring chamber first.
- Align the gaskets.
- Tighten the nuts on the blind flange to the correct torque (11 Nm in operating conditions, 23.5 Nm in test conditions). The 1¼¨ plug must be tightened in agreement with good engineering practice.

2.4 General requirements

2.4.1 How to attach the bypass level indicator to the tank

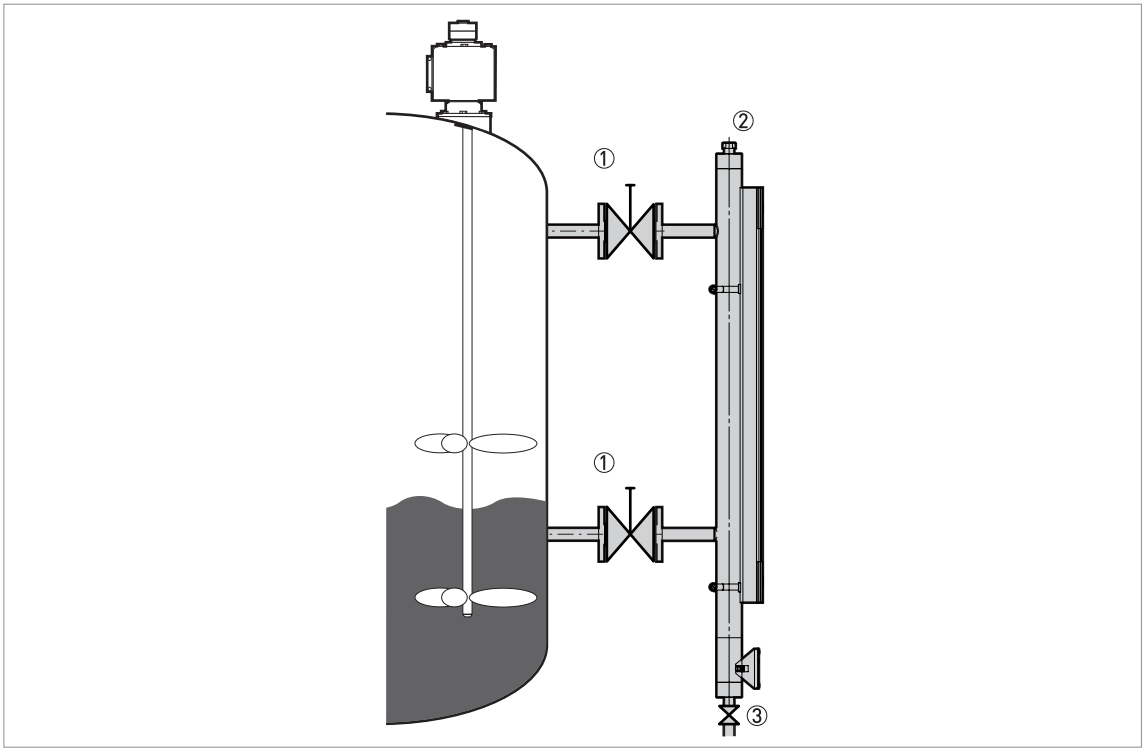

Figure 2-5: How to attach the bypass level indicator to the tank

① Optional isolation valve
② Optional vent
③ Optional drain with isolation valve

Obey the instructions that follow:

- Select bolts and gaskets (not supplied) that agree with the pressure rating of the process connection and the operating pressure.
- Install the bypass level indicator vertically on the tank.
- Make sure that there is no contamination (dirt etc.) or unwanted objects in the measuring chamber.
- Make sure that mechanical loadings do not cause damage to the process connections. If necessary, put supports on the device.
- Install shut-off valves so that the device can be cleaned separately from the tank. Drain the device only when it is isolated from the tank.

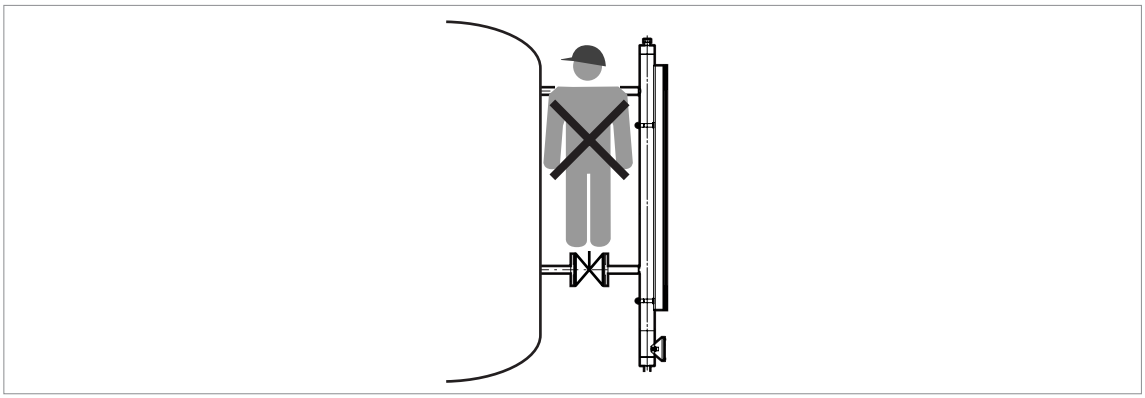

Figure 2-6: Stay away from the process connections

WARNING!
Stay away from the process connections. If you stand on the process connections, you can cause damage to the device and the installation.

DANGER!
Make sure that the outer surface temperature of the device is not more than 60° C / 140° F. If the surface temperature is more than 60° C / 140° F, use the device with precautions that agree with Health and Safety rules and regulations.

WARNING!
Pressure Equipment Directive 97/23/EC data

- *The process connections must be attached correctly to prevent mechanical stress. The axis of the process connection must be parallel to and centred with the axis of the tank's process connections. Tighten the process connections in agreement with the design code.*
- *The user must take necessary steps to protect the installed device from shock waves (water hammer). A pressure limiting valve must protect the installation.*
- *The effective pressure of the installation (the maximum permitted by the pressure limiting valve) must never be greater than the maximum permitted pressure, P_s, marked on the device nameplate.*
- *Make sure that the parts in contact with the fluid are compatible with the fluid and conform to the ageing characteristics of the measurement environment and the fluid used. These have either been recommended in the instructions or form the subject of a particular specification in the contract.*
- *The external pressure, P_{ext}, must be equal to atmospheric pressure, P_{atmos} ($P_{ext} = P_{atmos}$).*
- *If stainless steel devices are more than 6 m / 20 ft high, we recommend more anchoring points.*

CAUTION!
Before you fill the tank, make sure that the column of rotating flaps is set to zero (the flaps are all black). If not, the device may incorrectly indicate the level.

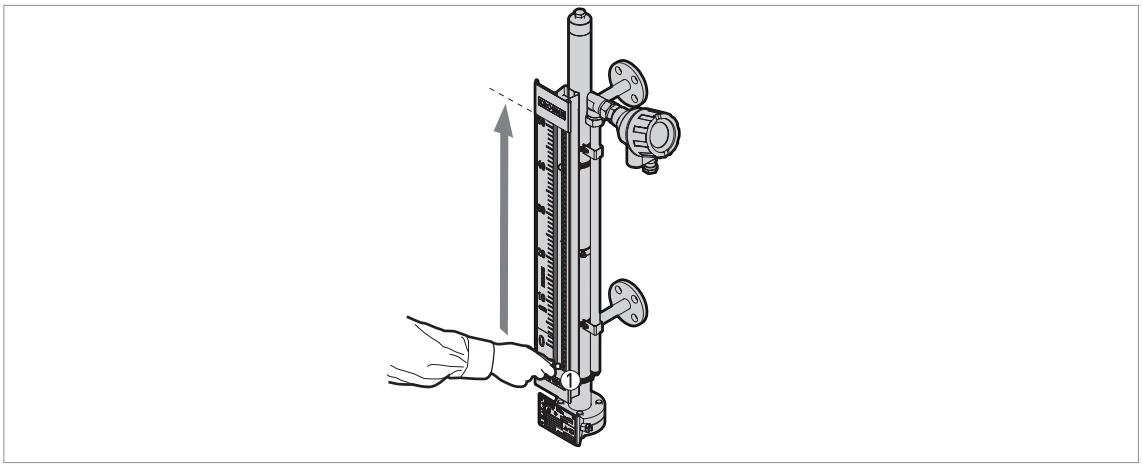

Figure 2-7: Set the indicator column to zero

① Magnet - point the red end of the magnet at the glass tube

Equipment needed:

- Magnet (supplied with the device)

How to make sure the column of rotating flaps is set to zero

- Hold the magnet in front of the glass tube at the bottom of the indicator column.

➲ Make sure the red end of the magnet points at the glass tube.

- Move the magnet slowly up to the top the glass tube.

➲ The flaps all turn to black. The indicator column is set to zero. You can now fill the tank.

2.5 Level indicator column

The level indicator column is attached to the measuring chamber before delivery. Customer order data is used to calibrate its position. No other adjustment is necessary.

CAUTION!
Customer order data is used to calibrate the device. If liquid density changes, the device will not measure correctly. Please contact our nearest sales office for advice.

2.6 Optional analog transmitter

The analog transmitter is attached to the measuring chamber before delivery. Customer order data is used to calibrate its position. No other adjustment is necessary.

WARNING!
Too much heat can cause damage to the analog transmitter. If the process temperature is more than 120° C / 250° F, put insulation between the bypass chamber and the analog transmitter. If the process temperature is more than 150° C / 300° F, do not cover any part of the analog transmitter.

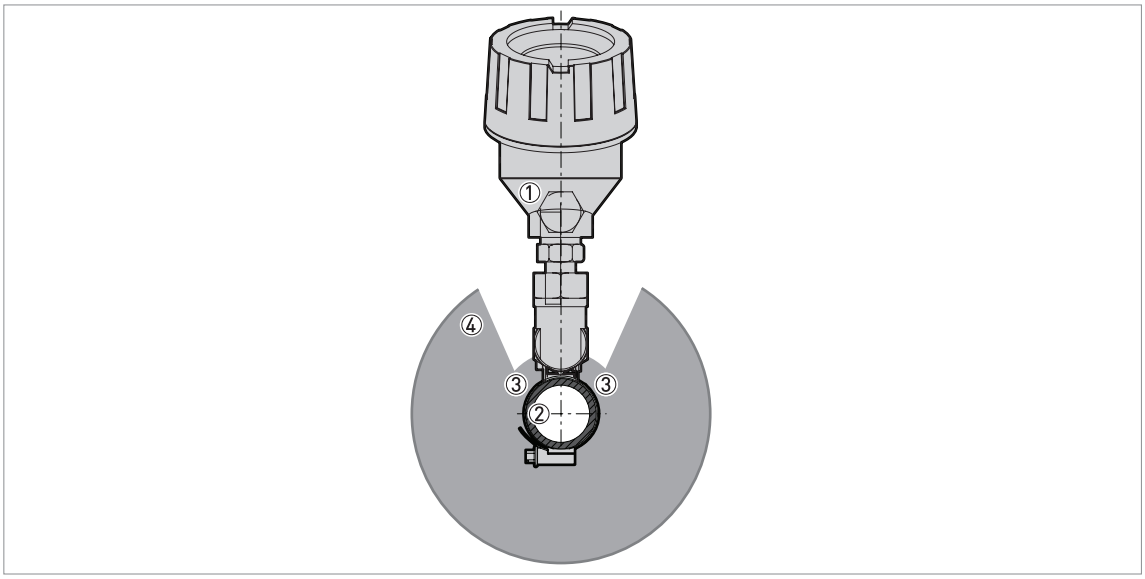

Figure 2-8: Analog transmitter and insulation for the bypass chamber

① Analog transmitter
② Bypass chamber (cross-section)
③ If temperature is more 120°C / 250°F, put insulation between the bypass chamber and the analog transmitter
④ Insulation (cross-section). If temperature is more 150°C / 300°F, do not cover any part of the analog transmitter with insulation.

CAUTION!
Do not move the analog transmitter. If you adjust the position of this device, the current output will be incorrect.

CAUTION!
Customer order data is used to calibrate the device. If liquid density changes, the device will not measure correctly. Please contact our nearest sales office for advice.

2.7 Optional limit switch

INFORMATION!
The level switches are not attached to the device before delivery. Remove the switches from the packing and obey the instructions that follow. For more data, refer to the handbook.

WARNING!
Too much heat can cause damage to the limit switch. If you put insulation around the bypass level indicator, do not cover the limit switch housing. Make sure that there is approximately 15 mm / 0.6" of empty space between the limit switch and the insulation.

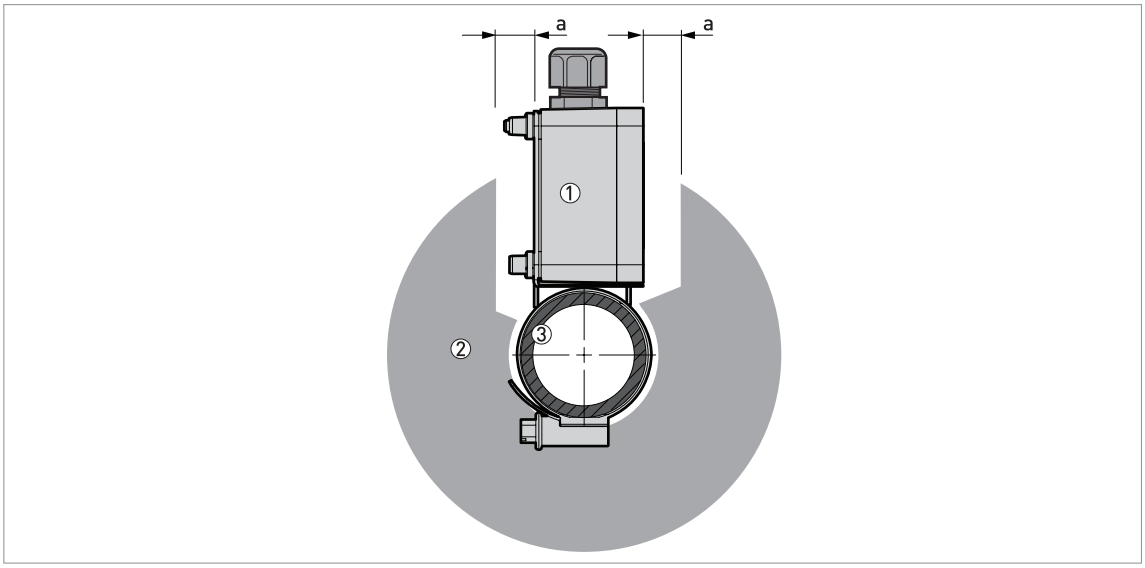

Figure 2-9: Limit switches and insulation for the measuring chamber

① Limit switch housing
② Insulation around the measuring chamber (cross-section)
③ Measuring chamber (cross-section)
Empty space between the limit switch and the insulation for the measuring chamber, a ≥15 mm / 0.6".

CAUTION!
If liquid density changes, the switch will not detect level correctly. Recalculate the position of the switch according to the true liquid density and repeat the installation procedure that follows.

CAUTION!
The switching point of the switch when the level increases is not in the same as the switching point of the switch when the level decreases. Does the limit switch have to be open when the float is above (for HIGH limit switches) or below (for LOW limit switches) the switching point? For more data, refer to ***Definition of switching point offset****.*

WARNING!
If you put insulation around the bypass level indicator, do not cover the limit switch housing. Too much heat can cause damage to the limit switch.

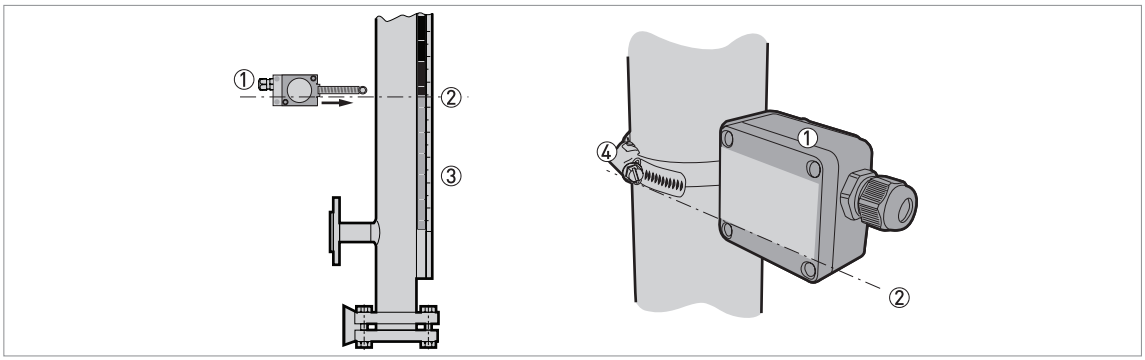

Figure 2-10: How to attach a limit switch

① Limit switch
② Switching point centreline
③ Level indicator and optional measuring scale
④ Limit switch clamp

Equipment needed:

- Large slotted tip screwdriver (not supplied)

Installation procedure

- Use the clamp to attach the limit switch to the measuring chamber. Do not tighten the clamp.

➲ The cable gland must be at the bottom of the housing.

- Move the limit switch until the switching point centreline is at the level required. Refer to the level indicator scale to help you position the limit switch.

➲ If the indicator column does not have the scale option, it will be necessary to calculate the vertical offset of the float magnet in relation to the level of the liquid (depends on the liquid density). Adjust the switch position for the float magnet offset. For the vertical offset tables, refer to the appendix in the Handbook.

- Adjust the switch position for the switching point offset.

➲ If the limit switch is set to **LOW limit** (the switch is **open** when the float is below the switching point), move the switch up a small distance to adjust for the offset. If the limit switch is set to **HIGH limit** (the switch is **open** when the float is above the switching point), move the switch down a small distance to adjust for the offset. For more data, refer to **Definition of switching point offset** and **Switching point offset values**.

- Tighten the limit switch clamp.

WARNING!
Make sure the cable gland is on the bottom the housing and is tight to stop liquid entering the housing.

Definition of switching point offset

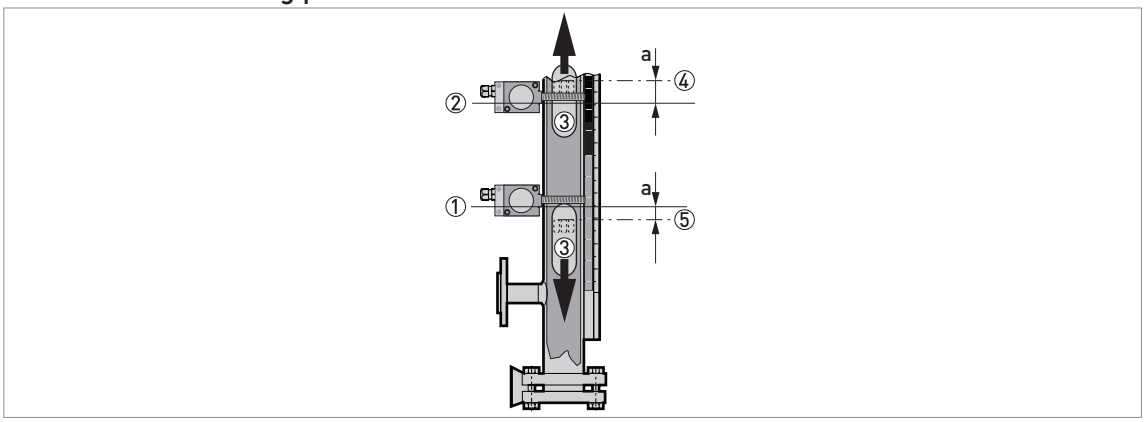

Figure 2-11: Switching point offset

① Zero point of the limit switch
② Zero point of the limit switch
③ Float and float magnet (switching point is in relation to the top of the magnet)
④ True switching point above a limit switch (the switch is open when the liquid level goes above this point - a **HIGH limit** switch)
⑤ True switching point below the limit switch (the switch is open when the liquid level goes below this point - a **LOW limit** switch)

Switching point offset values

Conditions	Switching point offset, a	
	mm	inches
When the switch must be open above the switching point (a **HIGH limit** switch), move the switch below the switching point:	15	0.6
When the switch must be open below the switching point (a **LOW limit** switch), move the switch above the switching point:	0	0

Installation of a limit switch for float failure detection

- Make sure the measuring chamber is empty and the float is in the chamber.
- Attach a limit switch to the bottom of the measuring chamber. Do not tighten the clamp.
- Connect the limit switch to the electrical circuit. Make sure that it is set to **LOW limit**. For more data, refer to *Optional limit switches* on page 16.
- Energize the electrical circuit.
- Lift the limit switch up the measuring chamber until the limit switch status changes to **open**.
- Hold the limit switch tightly in this position and tighten the clamp.

➲ The limit switch is in the correct position.

3.1 Optional analog transmitter

- Remove the terminal compartment cover.
- Connect the device to the electrical circuit. Obey the national electrical codes.

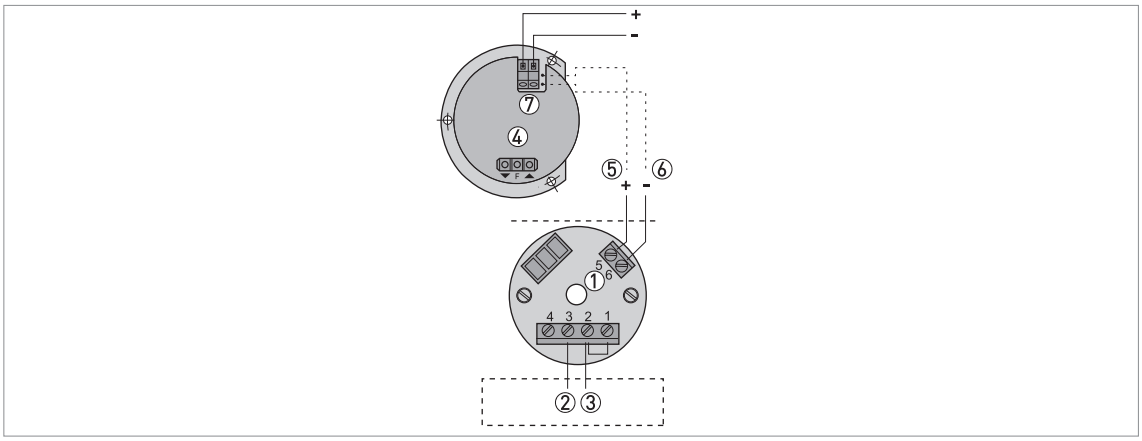

Figure 3-1: Electrical schematic for the 4...20 mA output module

① Power supply terminals
② Internal wiring - brown wire
③ Internal wiring - red wire
④ Optional LCD indicator
⑤ Power supply (+) - if optional LCD connected - red wire
⑥ Power supply (-) - if optional LCD connected - black wire
⑦ LCD power supply terminal (10...35 VDC)

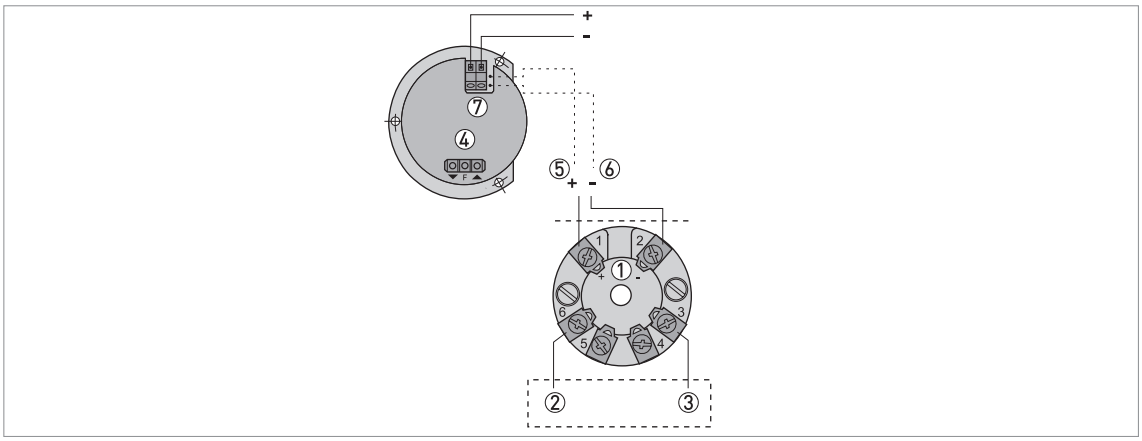

Figure 3-2: Electrical schematic for the 4...20 mA + HART output module

① Power supply terminals
② Internal wiring - brown wire
③ Internal wiring - red wire
④ Optional LCD indicator
⑤ Power supply (+) - if optional LCD connected - red wire
⑥ Power supply (-) - if optional LCD connected - black wire
⑦ LCD power supply terminal (10...35 VDC)

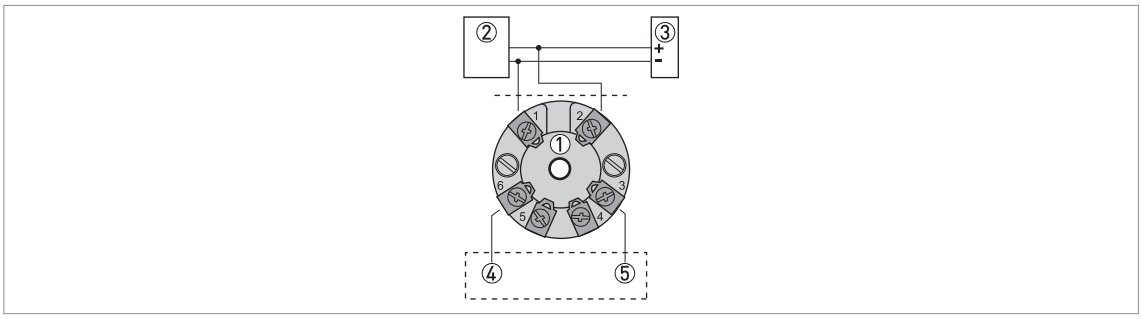

Figure 3-3: Electrical schematic for the FOUNDATION™ Fieldbus / PROFIBUS PA module

① Bus connection terminals
② Segment coupler
③ Bus termination
④ Internal wiring - orange wire
⑤ Internal wiring - brown wire

For more electrical data, refer to *Technical data: optional analog transmitter* on page 22.

3.2 Optional limit switches

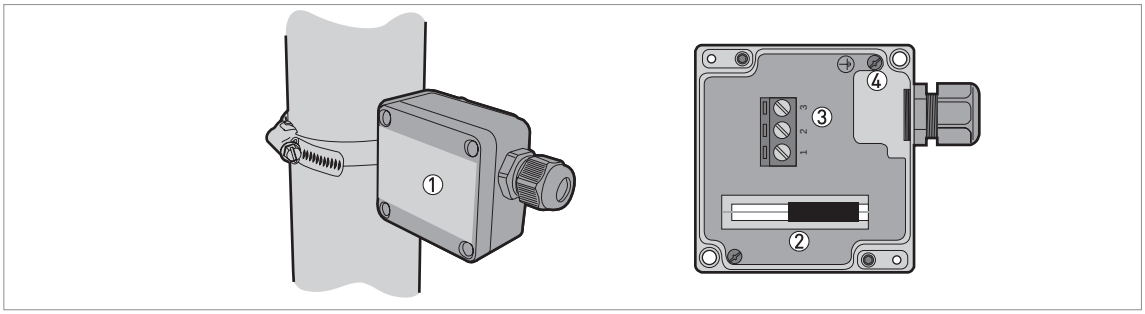

Figure 3-4: Terminal compartment

① Terminal compartment cover
② Bistable reed switch
③ Output terminal

- Remove the terminal compartment cover.
- Connect the device to the electrical circuit. Obey the national electrical codes.

WARNING!
*If the switch is set to **LOW limit**, make sure that switch is **open** when the float is below the switch position.*
*If the switch is set to **HIGH limit**, make sure that switch is **open** when the float is above the switch position.*

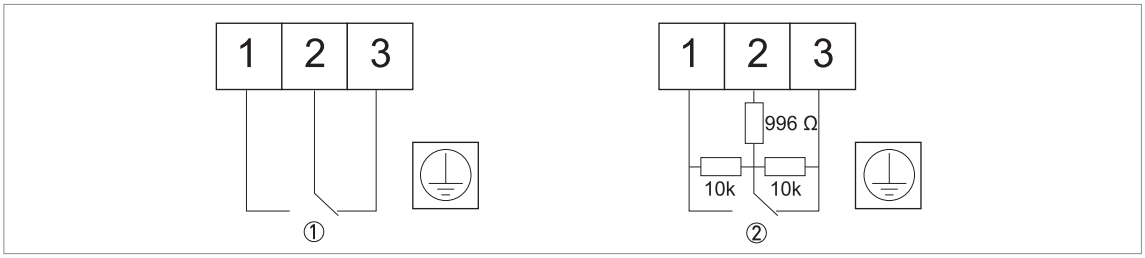

Figure 3-5: Electrical schema

① Non-NAMUR version
② NAMUR version

For more electrical data, refer to *Technical data: optional limit switches* on page 27.

3.3 Protection category

For the IP categories of the accessories for the device, refer to the table that follows:

Protection categories according to EN 60529

Equipment housing	IP category

Analog transmitter

Non-Ex / Ex i (without indicator)	54
Non-Ex / Ex i (with indicator)	66

Limit switches

Non-Ex / Ex i	66

DANGER!
Make sure the cable gland is watertight.

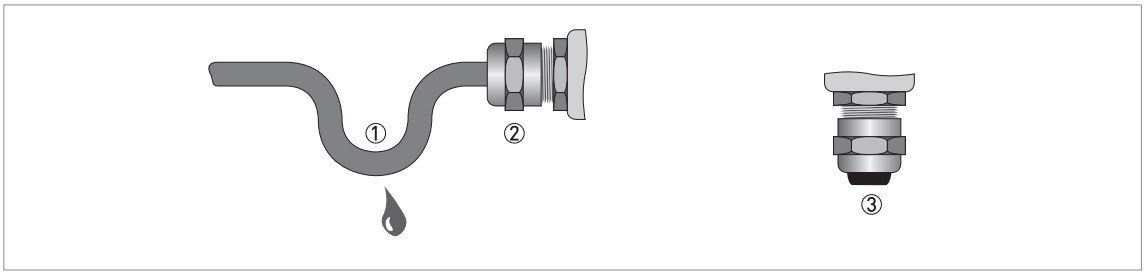

Figure 3-6: Protection category

How to make sure that the electrical installation agrees with the protection category

- Make sure that the gaskets are not damaged.
- Make sure that the electrical cables are not damaged.
- Make sure that the electrical cables agree with the national electrical code.
- The cables are in a loop in front of the device ① so water cannot enter the housing.
- Tighten the cable glands ②.
- Close unused cable glands with dummy plugs ③.

4.1 Technical data: general information

INFORMATION!

- *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 (Download Center).*

	Basic	Advanced

Measuring system

Measuring principle	Bypass level indicator (principle of communicating tubes). A float in the measuring chamber (Ø42 mm / 1.7") is magnetically-coupled to a mechanical level indicator.	
Application range	Level indication of liquids for low-pressure applications and in storage tanks	Level indication of liquids in applications up to 40 barg / 580 psig
Measured value		
Primary measured value	Level of the float magnets in the measuring chamber	
Secondary measured value	Level and volume of the liquid in the measuring chamber	

Design

Options and variants		
Variants	Lateral / lateral process connections	
	Axial / axial process connections	
	Top lateral / bottom axial process connections	
	Top axial / bottom lateral process connections	
Options	Support bracket (a wall support for long bypass level indicators)	
	Analog transmitter without display (converter with 4...20 mA, 4...20 mA + HART®, PROFIBUS PA or FF output module mounted at the top or bottom of the reed chain) ①	
	Analog transmitter with display (4...20 mA or 4...20 mA + HART® converter mounted at the top or bottom of the reed chain)	
	1¼" threaded cover (for installation/ removal of the float)	-
	Anti-freeze cover for glass indicator tube (when the ambient temperature is -40...-20°C / -40...-4°F)	
	-	OPTIFLEX 1300 C with Ø2 mm single cable probe (if ½ BSPP top axial connection is selected)
	-	OPTIFLEX 1300 C (if DN40 PN40 top axial connection is selected)
	-	OPTIWAVE 7300 C (if welded antenna or DN40 PN40 top axial connection is selected)
Accessories	Bistable limit switches (NAMUR or non-NAMUR)	
Measuring range (ML)	0.3...5.3 m / 1...17.4 ft	0.3...5.3 m / 1...17.4 ft (longer on request)

	Basic	Advanced
Display and user interface		
Display	Indicator column with magnetically-coupled yellow/black rotating flaps; no indicator column	
Float failure indication	Red/black rotating flaps at the bottom of the indicator column	
Scale marking options	No scale; m + cm; ft + inches; %	

Measuring accuracy

Accuracy	±10 mm / 0.4¨
Repeatability	±10 mm / 0.4¨ (when density is constant)
Maximum rate of change	2 m/minute / 6.5 ft/minute

Operating conditions

Temperature		
Process	-40…+150°C / -40…+300°F (Ex: see supplementary instructions or approval certificates)	-40...+300°C / -40…+570°F (Ex: see supplementary instructions or approval certificates)
Ambient temperature	-40…+80°C / -40…+176°F (Ex: see supplementary instructions or approval certificates)	
Storage temperature	-50…+80°C / -58…+176°F	
Pressure		
Max. allowable operating pressure	16 barg / 232 psig (according to the length of the measuring chamber. Also refer to "Guidelines for maximum operating pressure" in the handbook.)	40 barg / 580 psig (according to the flange pressure rating. Alsorefer to "Guidelines for maximum operating pressure" in the handbook.)
Chemical properties		
Density	0.8…1.19 kg/l / 49.9...68.7 lb/ft³	0.58…2 kg/l / 36.2...124.8 lb/ft³
Viscosity	≤ 5000 mPas / ≤ 3.360 lb/ft³	
Other conditions		
Ingress protection	IP 68	

Installation conditions

Recommendations	Mount vertically on the side of tanks	
	Fit isolation valves on process connections to permit maintenance of the bypass chamber (optional)	
Dimensions and weights	Refer to "Technical data: Dimensions and weights" in the Handbook	

Materials

Chamber	Standard: Stainless steel (1.4404 / 316L)	
	-	Option: Hastelloy® C-276 ②
Float	Standard: Stainless steel (1.4404 / 316L)	Stainless steel (1.4404 / 316L); Titanium (for data on material selection,refer to "Floats" in the Handbook)
	-	Option: Hastelloy®
Indicator rail	Stainless steel	
Indicator tube	Pyrex® glass (glass tube with a true hermetic seal) ③	

	Basic	Advanced
Scale (option)	Stainless steel	
Process fitting	Standard: Stainless steel (1.4404 / 316L)	
	-	Option: Hastelloy® C-276 (for the wetted parts of EN loose flanges only)
Gaskets	Teflon® tape ④	Standard: Aramid; Teflon® tape
	-	Options: Graphite; PTFE
Braid insulation	-	Ceramic fibre (insulation between the indicator column and the measuring chamber when the process temperature is +100...+300°C / +210...+570°F)
Anti-freeze cover for glass indicator tube (option)	Plexiglas®	

Process connections

Threaded pipes	½...¾ NPT; G ½...¾	
Smooth pipes, 10S	½"; ¾" in 10S	
Flange version		
EN	DN15...40 (Form B1) in PN16 / 40	DN15...50 (Form B1, C or E) in PN16 / 40; DN15...50 (Form B1, C or E) in PN63 / 100; others are available on request Note: Hastelloy® C-276 flange connections are only available as loose flanges with form B1
ASME	½...1½" (RF) in 150 lb / 300 lb	½...1½" (RF) in 150 lb / 300 lb; others are available on request

Drain and vent connections

Drain options		
Thread	Standard: cover with 3/8 NPT plug	Standard: flange with ½ NPT plug
	Option: cover with 1¼ NPT plug	Options: flange with 3/8 NPT plug; flange with G ½ plug; flange with G 3/8 plug
Flange	-	Options: all process connection options
Vent options		
Thread	Standard: without (convex cap)	Standard: 3/8 NPT plug
	Option: cover with 3/8 NPT plug	Options: flange with ½ NPT plug; flange with G ½ plug; DN40 top flange (for radar or TDR level transmitter) with ½ NPT lateral vent plug; welded antenna with ½ NPT lateral vent plug; ½ BSPP screw connection for OPTIFLEX 1300 C and Ø2 mm single cable probe, with ½ NPT lateral vent plug; all process connection options
Flange	-	Options: all process connection options

	Basic	Advanced

Power supply

Limit switches	Refer to "Technical data: optional level switches" in the Handbook
Analog transmitter	Refer to "Technical data: optional analog transmitter" in the Handbook

Input and output

Parameter	Level detection or indication
Output signal	Refer to "Technical data: optional level switches" and "Technical data: optional analog transmitter"

Approvals and certification

CE	CE marking not applicable (not subject to PED test requirements)	This device fulfils the statutory requirements of the EC directives. The manufacturer certifies successful testing of the product by applying the CE mark.
Explosion protection		
ATEX	II 1 G or II 1/2 G (measuring chamber) Refer also to approvals in "Technical data: optional level switches" and "Technical data: optional analog transmitter"	
Other standards and approvals		
PED	Not subject to PED test requirements	Pressure Equipment Directive 97/23/EC in conjunction with CODAP® 2010
Vibration resistance	Vibration class 4M4 according to EN 60721-3-4	
Construction code	Standard: "CODAP® 2010"	
	Option: NACE MR0175 / ISO 15156	
	On request: EN 13445	

① HART® is a registered trademark of the HART Communication Foundation
② Hastelloy® is a registered trademark of Haynes International, Inc.
③ Pyrex® is a registered trademark of Corning, Inc.
④ Teflon® is a registered trademark of E.I. du Pont de Nemours and Company

4.2 Technical data: optional analog transmitter

Analog output or HART® communication modules

Module output	4...20 mA	4...20 mA / HART®
Order code	xF45xBxxxxx (without LCD indicator) xF45xExxxxx (with LCD indicator)	xF45xWxxxxx (without LCD indicator) xF45xGxxxxx (with LCD indicator)

Measuring system

Measuring principle	A reed resistor chain that is magnetically actuated by a magnetic float in the BM 26 measuring chamber
Primary measured value	Resistance
Secondary measured value	Level and volume of the liquid in the measuring chamber

Design

Description of device	Resistance reed chain with 2-wire loop-powered transmitter module attached adjacent to the measuring chamber of the bypass level indicator. Changes in resistance are converted to an output signal via a transmitter module.	
Description of transmitter module	Changes in resistance are converted to analog current signals.	Changes in resistance are converted to analog or digital current signals. Up to 15 transmitters can be connected to a network that agrees with the HART® communication protocol.
Options	Converter position - The customer must specify the position of the converter at the top or the bottom of the analog transmitter	
	LCD indicator	
Accessories	SU 600 power supply unit 24 V	
	SU 600 power supply unit 24 V with integrated Ex ia barrier	
	PROF SI 24075 intrinsically-safe power supply unit (with galvanic separation)	
	C 95 Basic universal power supply (Panel mount, 2 relays, 4-digit local indicator and non-Ex)	
	C 95 Basic universal power supply (Panel mount, 2 relays, 4...20 mA output, 4-digit local indicator and non-Ex)	
Display and user interface		
Display	Standard: none	
	Option: 2-wire loop-powered LCD indicator	Option: 2-wire loop-powered LCD indicator
Functions	Display of level in mm; inches; % (stickers for optional units of measure are supplied with the device). 4-digit LCD with minus sign, 3-button keypad.	Display of level in mm; inches; % (stickers for optional units of measure are supplied with the device). 4-digit LCD with minus sign, 3-button keypad.
Display	2-wire loop-powered indicator 4-digit LCD with minus sign, 3-button keypad	2-wire loop-powered indicator 4-digit LCD with minus sign, 3-button keypad
Operation	Selectable number of decimals, 0 to 3. Open the housing to configure the device.	Selectable number of decimals, 0 to 3. Open the housing to configure the device.

Module output	4...20 mA	4...20 mA / HART®
Order code	xF45xBxxxxx (without LCD indicator) xF45xExxxxx (with LCD indicator)	xF45xWxxxxx (without LCD indicator) xF45xGxxxxx (with LCD indicator)

Measuring accuracy

Accuracy	±10 mm / 0.4¨ (when density is constant) ≤ ±0.1% of span	±10 mm / 0.4¨ (when density is constant) ≤ ±0.05% of span
Temperature coefficient	≤ ±0.01% of span/°C	≤ ±0.005% of span/°C
EMC immunity influence	< ±0.1% of span	< ±0.1% of span

Operating conditions

Temperature		
Operating temperature, transmitter module	-40...+85°C / -40...+185°F, if there is insulation around the measuring chamber, specify the temperature in the order. Do not put insulation around the transmitter housing.	
Operating temperature, LCD indicator	-20...+70°C / -4...+158°F ①	
Pressure		
Operating pressure	Atmospheric pressure	
Other conditions		
Warm-up time	5...10 minutes	30 s
Response time	1.5 s	1....60 s ②
Protection category	Transmitter housing without LCD indicator: IP 54 Transmitter housing with LCD indicator: IP 66	

Installation conditions

Notes	The analog transmitter is calibrated at the factory and attached to the measuring chamber before delivery
Dimensions and weight	Refer to the "Technical data: Dimensions and weights" section in the Handbook

Materials

Housing	Polyester-coated aluminium
Reed-chain tube	Stainless steel
Clamp	Stainless steel

Electrical connections

Power supply		
Voltage	**Non-Ex:**	
	12...35 VDC	8...30 VDC
	Ex ia, without LCD indicator:	
	Refer to supplementary instructions or approval certificates	
	Ex ia, with LCD indicator:	
	Refer to supplementary instructions or approval certificates	-

Module output	4...20 mA	4...20 mA / HART®
Order code	xF45xBxxxxx (without LCD indicator) xF45xExxxxx (with LCD indicator)	xF45xWxxxxx (without LCD indicator) xF45xGxxxxx (with LCD indicator)
LCD indicator; voltage drop	2.5 V	2.5 V
Cable entry	M20 × 1.5	
Intrinsically-safe circuit data for Ex ia-approved devices	Refer to supplementary instructions or approval certificates	

Input and output

Current output		
Output range	4...20 mA	
Error signal	Upper value, selectable	
	21.6 mA	23 mA
	Lower value, selectable	
	3.5 mA	
HART®		
Description	-	HART® protocol via passive current output
Multidrop operation	-	Yes, current output = 4 mA Multidrop address (1...15) adjustable

Approvals and certifications

CE	This device fulfils the statutory requirements of the EC directives. The manufacturer certifies successful testing of the product by applying the CE mark.	
Explosion protection		
ATEX - without LCD indicator	II 1 G Ex ia IIC T4...T6	II 1 G Ex ia IIC T4 or T6
ATEX - with LCD indicator	II 1 G Ex ia IIC T5	-
Other standards and approvals		
EMC	Electromagnetic Compatibility Directive 2004/108/EC in conjunction with EN 61326-1 (2006)	Electromagnetic Compatibility Directive 2004/108/EC in conjunction with EN 61326-1 (2006) NAMUR NE 21 ③
Vibration resistance	Vibration class 4M4 according to EN 60721-3-4	
NAMUR	NAMUR NE 43 ④	

① If the operating temperature is not in these limits, the display switches off. The transmitter module continues to operate above and below this temperature range.

② This value is programmable

③ Electromagnetic Compatibility of Industrial and Laboratory Control Equipment

④ Standardization of the Signal Level for the Failure Information of Digital Transmitters

Fieldbus modules

Module output	FOUNDATION™ Fieldbus	PROFIBUS PA
Order code	xF45xDxxxxx (PR)	xF45xXxxxxx (PR)

Measuring system

Measuring principle	A reed resistor chain that is magnetically actuated by a magnetic float in the BM 26 measuring chamber
Primary measured value	Resistance
Secondary measured value	Level and volume of the liquid in the measuring chamber

Design

Description of device	Resistance reed chain with 2-wire loop-powered transmitter module attached adjacent to the measuring chamber of the bypass level indicator. Changes in resistance are converted to an output signal via a transmitter module.	
Description of transmitter module	Changes in resistance are converted to signals that agree with the FF communication protocol.	Changes in resistance are converted to signals that agree with the PROFIBUS PA communication protocol.
Options	Converter position ①	
Accessories	SU 600 power supply unit 24 V	
Display and user interface		
Display	None	

Measuring accuracy

Accuracy	±10 mm / 0.4¨ (when density is constant)

Operating conditions

Temperature	
Operating temperature, transmitter module	-40…+85°C / -40…+185°F, if there is insulation around the measuring chamber, specify the temperature in the order. Do not put insulation around the transmitter housing.
Pressure	
Operating pressure	Atmospheric pressure
Other conditions	
Protection category	Transmitter housing without LCD indicator: IP 54 Transmitter housing with LCD indicator: IP 66

Installation conditions

Notes	The analog transmitter is calibrated at the factory and attached to the measuring chamber before delivery
Dimensions and weight	Refer to the "Technical data: Dimensions and weights" section in the Handbook

Materials

Housing	Polyester-coated aluminium
Reed-chain tube	Stainless steel
Clamp	Stainless steel

Module output	FOUNDATION™ Fieldbus	PROFIBUS PA
Order code	xF45xDxxxxx (PR)	xF45xXxxxxx (PR)

Electrical connections

Power supply		
Voltage	**Non-Ex:**	
	9...32 VDC	
	Ex ia:	
	Refer to supplementary instructions or approval certificates	
Cable entry	M20 × 1.5	
Intrinsically-safe circuit data for Ex ia-approved devices	Refer to supplementary instructions or approval certificates	
PROFIBUS PA		
Description	-	PROFIBUS PA protocol Profile A&B, ver.3.0 (EN 50170 vol.2)
FOUNDATION Fieldbus		
Description	FOUNDATION Fieldbus protocol	-

Approvals and certification

CE	This device fufills the statutory requirements of the EC directives. The manufacturer certifies successful testing of the product by applying the CE mark.	
Explosion protection		
ATEX	II 1 G Ex ia IIC T4...T6 ②	II 1 G Ex ia IIC T4...T6 ②
	II 2 G Ex ib IIC T4...T6 ③	II 2 G Ex ib IIC T4...T6 ③
Other standards and approvals		
EMC	Electromagnetic Compatibility Directive 2004/108/EC in conjunction with EN 61326-1 (2006)	
Vibration resistance	Vibration class 4M4 according to EN 60721-3-4	

① The customer must specify the position of the converter at the top or the bottom of the analog transmitter
② Conventional or FISCO systems intrinsically-safe systems
③ FISCO systems intrinsically-safe systems

4.3 Technical data: optional limit switches

Version	Non-NAMUR	NAMUR

Measuring system

Measuring principle	A bistable reed switch that is magnetically actuated by the float in the measuring chamber of the bypass level indicator.
Application range	Level detection

Design

Description of device	Limit switch attached adjacent to the measuring chamber of the bypass level indicator.

Measuring accuracy

Hysteresis	28 mm / 1.1¨. For more data, refer to the "Optional limit switch" section.

Operating conditions

Temperature	
Operating temperature	-40...+120°C / -40...+250°F, if there is insulation around the measuring chamber, specify the temperature in the order. Do not put insulation around the switch housing.
Storage	-40...+120°C / -40...+250°F
Pressure	
Operating pressure	Atmospheric pressure
Other conditions	
Protection category	IP 66

Installation conditions

Notes	The switch is not attached to the measuring chamber before delivery
	Adjust the switch position for hysteresis and liquid density
Dimensions and weights	Refer to "Technical data: Dimensions and weights" in the Handbook

Materials

Switch housing	Aluminium with epoxy powder paint
Bracket	Stainless steel
Clamp	Stainless steel

Electrical connections

Cable entry	M16 × 1.5	
Control input		
Switching capacity	60 VA/W; 1 A; 250 VAC/VDC	According to NAMUR 19234
Intrinsically-safe circuit data	Refer to supplementary instructions or approval certificates.	

Version	Non-NAMUR	NAMUR

Approvals and certifications

CE	This device fulfils the statutory requirements of the EC directives. The manufacturer certifies successful testing of the product by applying the CE mark.	
Explosion protection		
ATEX	II 1 G Ex ia IIC T6...T4	
Other standards and approvals		
LVD	Low-Voltage Directive 2006/95/EC in conjunction with EN 61010-1 (2001)	-
Vibration resistance	Vibration class 4M5 according to EN 60721-3-4	

4.4 Guidelines for maximum operating pressure

Make sure that the devices are used within their operating limits. For more data, refer to the handbook.

4.5 Floats

Make sure that the devices are used within the operating limits of the floats. For more data, refer to the handbook.

KROHNE product overview

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

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

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

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