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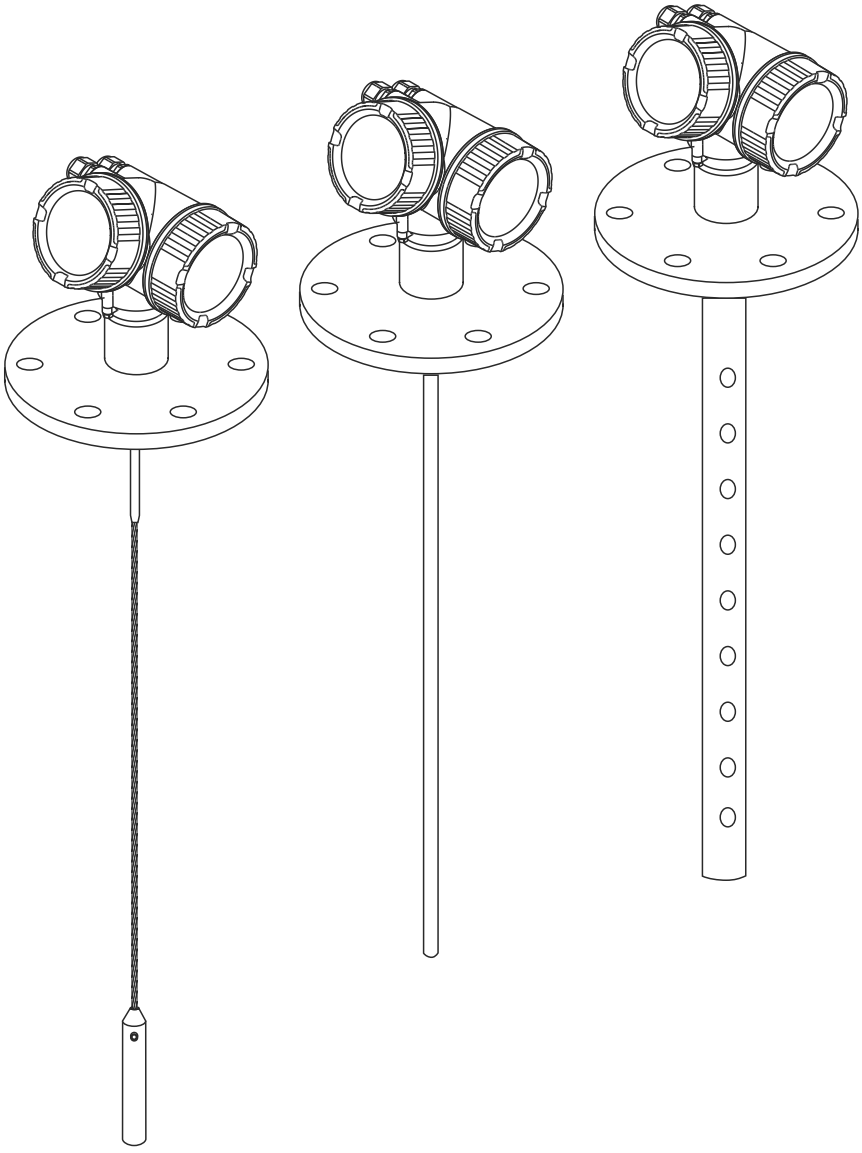
Special Documentation
Levelflex FMP51, FMP52, FMP54, FMP55, FMP57

Guided Level Radar
Installation and operating instructions for marine approval



Endress+Hauser
People for Process Automation

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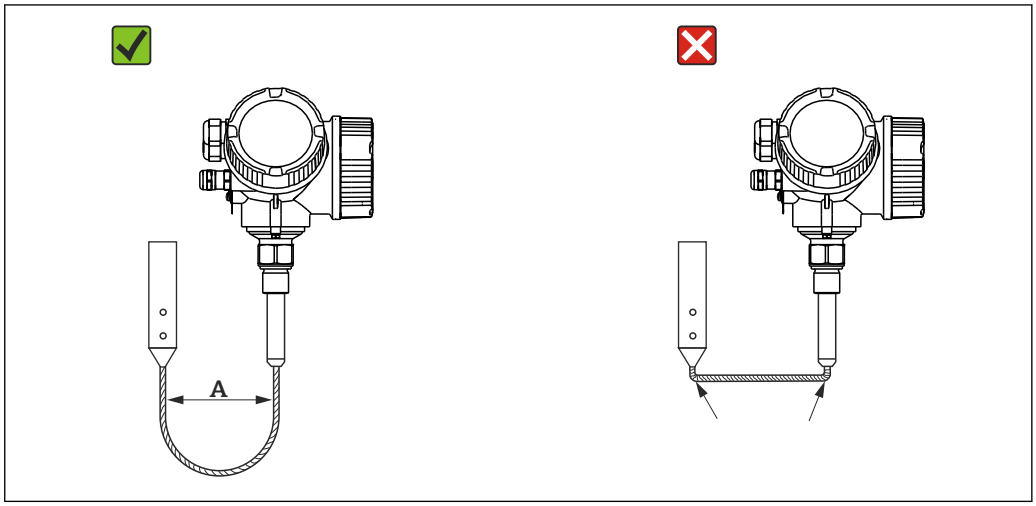
1 General information

1.1 Supplementary documentation

Document	Purpose and content of the document
Technical Information ▪ TI01001F/00/EN ▪ TI01003F/00/EN ▪ TI01004F/00/EN	**Planning aid for your device** The document contains all the technical data on the device and providesan overview of the accessories and other products that can be ordered forthe device.
Marine approvals ▪ DNVGL TAA00001DB ▪ ABS 19-HG1827536-1-PDA ▪ LR 14/20009 ▪ BV 33597/A0 ▪ RM RS 19.40028.250 ▪ KR HMB18553-AE006	The document contains all specifications concerning the scope of the certificate and details on the approved product versions.

2 Installation hints

2.1 General hints



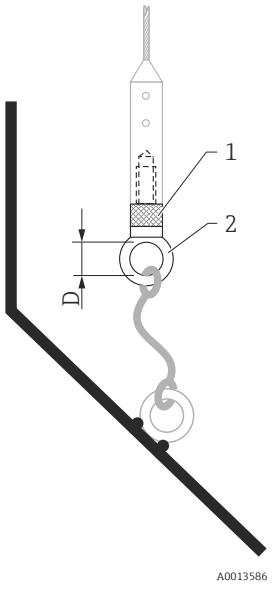
A ø >400 mm (15.7 in)

2.1.1 Design and usage

The end of rope probes needs to be secured under the following conditions:

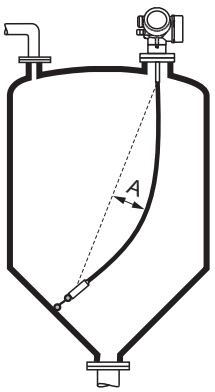
- if otherwise the probe sporadically comes into contact with the wall of the vessel, the outlet cone, internal fittings or other parts of the installation.
- if otherwise the probe sporadically gets close to a concrete wall (minimum distance 0.5 m / 20 inch).

The fixing must either be reliably groundend or reliably insulated. The "Isolation tie down for rope probes" can be used for a reliable insulation. The insulation is achieved by PEEK sleeve (1). The accompanying DIN 580 eye-bolt screw (2) is made of stainless steel. The "Isolation tie down" is suited for process temperatures up to 150 °C (300 °F).



When fixing a rope probe preferably use FMP57 with one of the following probes (due to the higher tensile strength):
- LC: Rope 6 mm
- LD: Rope 1/4"
- NC: Rope 8 mm PA>Steel
- NF: Rope 1/3" PA>Steel

In order to prevent an extremely high tensile strength (e.g. due to thermal expansion) and the risk of the rope breaking, the rope has to be slack.
Minimum sag (A):
≥ 10 mm/(1 m rope length) [0,12 in/(1 ft rope length)].



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⚠ WARNING

Explosion hazard due to electrostatic charging.

▶ Do not apply the insulating sleeve in hazardous areas.

2.1.2 Certificate-specific hints

BV - Bureau Veritas / DNVGL - Det Norske Veritas-Germanischer Lloyd / LR - Lloyds Register / ABS - American Bureau of Shipping / RM RS - Russian Maritime Register of Shipping / KR - Korean Register of Shipping

Probe:

- Rod:
  maximum length 4 m (13 ft) (Approval only for bypass and stilling well applications). The rod probe must be supported/fixed at the end and every 500 mm (19.7 in) using Endress+Hauser centering stars. The installation hints for centering stars must be observed. Centering stars must not be installed at the height of inlets or outlets.
- Coax:
  maximum length 6 m (20 ft). The coax probe must be supported/fixed at the end and every 1 500 mm (59.1 in).
- Rope
  maximum length 45 m (148 ft). The rope probe must be supported/fixed at the end.

2.2 Ambient conditions

Detailed specifications on the ambient conditions can be extracted from the respective Technical Information → 4.

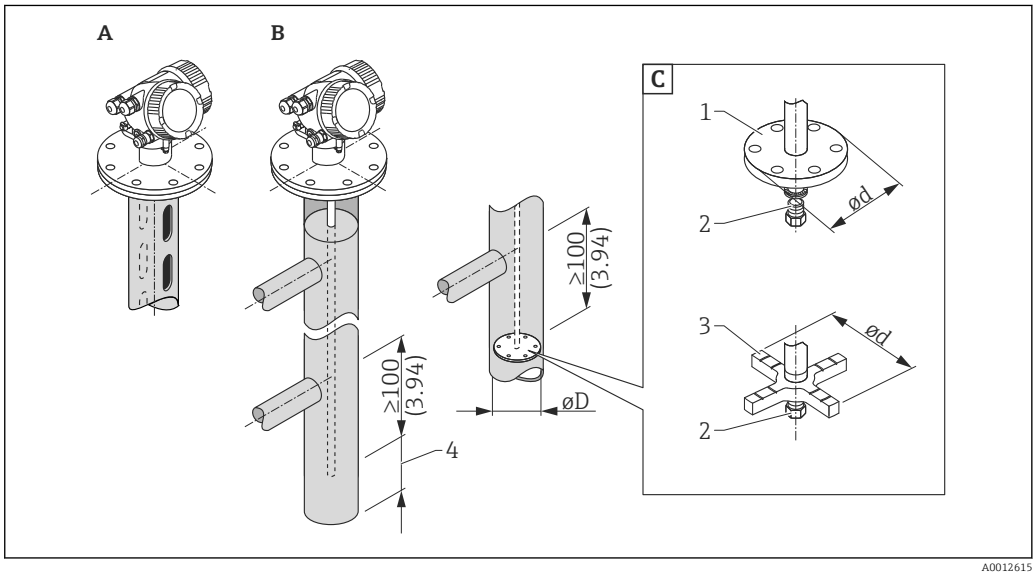
Special conditions concerning the environment of the installation (e.g. on deck, below deck, temperature, environmental conditions, vibration) are summarized in the respective certificate. Conditions stated in the certificate override any specifications in the Endress+Hauser standard documentation and thus are mandatory.

2.3 Process conditions

For additional information refer to chapter "Supplementary documentation" → 4 .

2.4 Bypasses and stilling wells

In bypass and stilling well applications it is mandatory to use a centering disks or stars.



1 *Dimensions: mm (in)*

A Mounting in a stilling well
B Mounting in a bypass
C Center washer or centering star
1 Metallic center washer (316L) for level measurement
2 Fixing screw; torque: 25 Nm ± 5 Nm
3 Non-metallic centering star (PEEK, PFA) for interface measurement
4 Minimum distance between end of probe and lower edge of the bypass; see table below

Allocation of probe type and center washer or centering star to pipe diameter

Feature 610 - Accessory mounted					
Application	**Option**	**Type of probe**	**Center washer Centering star**		**Pipe**
			ϕ d [mm (in)]	**Material**	**ϕ D [mm (in)]**
Level measurement	OA	Rod probe	75 (2,95)	316L	DN80/3" to DN100/4"
	OB	Rod probe	45 (1,77)	316L	DN50/2" to DN65/2½"
	OC	Rope probe	75 (2,95)	316L	DN80/3" to DN100/4"
Interface measurement	OD	Rod probe	48...95 (1,89...3,74)	PEEK	≥ 50 mm (2")
	OE	Rod probe	37 (1,46)	PFA	≥ 40 mm (1.57")

Minimum distance between end of probe and lower edge of the bypass

Type of probe	Minimum distance
Rope	10 mm (0.4 in)
Rod	10 mm (0.4 in)
Coax	10 mm (0.4 in)

- Pipe diameter: > 40 mm (1.6") for rod probes
- Rod probe installation can take place up to a diameter size of 150 mm (6 in). In the event of larger diameters, a coax probe is recommended.
- Side disposals, holes or slits and welded joints that protrude up to approx. 5 mm (0.2") inwards do not influence the measurement.
- The pipe may not exhibit any steps in diameter.
- The probe must be 100 mm longer than the lower disposal.
- Within the measuring range, the probe must not get into contact with the pipe wall. If necessary, secure the probe by retaining or tensioning. All rope probes are prepared for tensioning in containers (tensioning weight with anchor hole).
- If a metallic center washer is mounted at the end of the probe, it enables a reliable recognition of the end-of-probe signal (see feature 610 of the product structure).
  Note: For interface measurements only use the nonmetallic centering star made of PEEK or PFA (feature 610, options OD or OE).
- Within the measuring range, the probe must not get into contact with the pipe wall. If necessary, use a PFA centering star (see feature 610 of the product structure).
- Coax probes can always be applied if there is enough mounting space.

For bypasses with condensate formation (water) and a medium with low dielectric constant (e.g. hydrocarbons):

In the course of time the bypass is filled with condensate up to the lower disposal and for low levels the the level echo is superimposed by the condensate echo. Thus in this range the condensate level is measured instead of the correct level. Only higher levels are measured correctly. To prevent this, position the lower disposal 100 mm (4 in) below the lowest level to be measured and apply a metallic centering disk at the height of the lower edge of the lower disposal.

With heat insulated tanks the bypass should also be insulated in order to prevent condensate formation.

For information on bypass solutions from Endress+Hauser please contact your Endress+Hauser sales representative.

2.5 Restrictions and limitations

- For Levelflex FMP5x, using or mounting the weather protection cover is not allowed by the marine classification societies.
- Using FMP5x with rod probes is only approved by the marine classification societies when they are installed in bypasses or stilling wells. When doing so it is strictly mandatory to observe the installation hints concerning the application of centering aids as stated in the documents supplied by Endress+Hauser. Other ways of using rod probes are not allowed.

3 Certificates

In order to find the current certificates:

1. Open **www.endress.com** in the browser.
2. Enter the product root (FMP51, FMP52, FMP54, FMP55 or FMP57) in the search field.
3. On the resulting product page open the **Documents/Manuals/Certificates** category.
4. Select **Certificates** and scroll down to the **Marine** category.

www.addresses.endress.com

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