



Level



Pressure



Flow



Temperature



Liquid  
Analysis



Registration



Systems  
Components



Services



Solutions

## Technical Information

# Prosonic T FMU30

## Ultrasonic Level Measurement

Compact transmitters for non-contact level measurement of fluids, pastes and coarse bulk materials



### Application

- Continuous, non-contact level measurement in fluids, pastes, sullages and coarse bulk materials
- System integration via 4 to 20mA
- Maximum measuring range:
  - 1½" sensor: 5 m (16 ft) in fluids  
2 m (6 ft) in bulk materials
  - 2" sensor: 8 m (26 ft) in fluids  
3.5 m (11 ft) in bulk materials

### Features and benefits

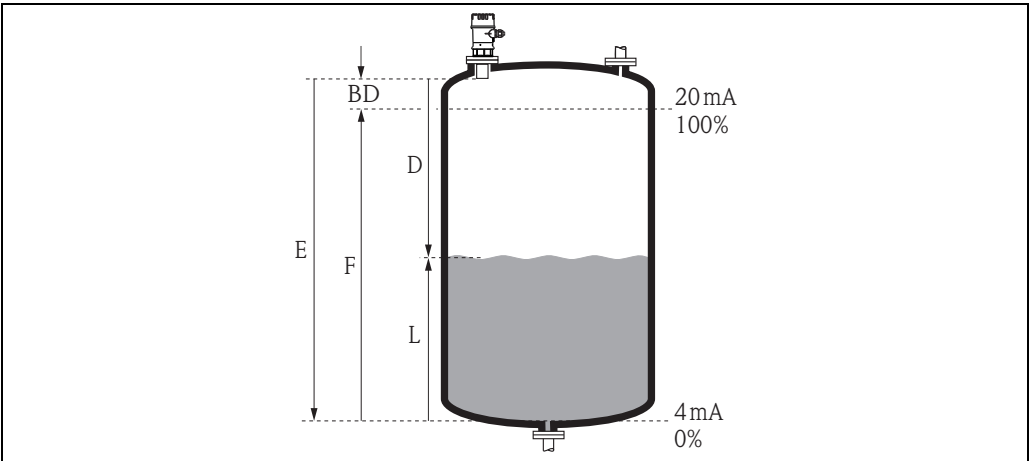
- Quick and simple commissioning via menu-guided on-site operation with four-line plain text display; 7 languages selectable
- Envelope curves on the on-site display for simple diagnosis
- Linearization function (up to 32 points) for conversion of the measured value into any unit of length, volume or flow rate
- Non-contact measurement method minimizes service requirements
- Installation possible from thread G 1½" or NPT 1½" upwards
- Integrated temperature sensor for automatic correction of the temperature dependent sound velocity

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## Function and system design

### Measuring principle



- BD*

*Blocking distance*
- E*

*Empty distance*
- L*

*Level*
- D*

*Distance from sensor membrane - product surface*
- F*

*Span (full distance)*

| Sensor | BD              | Max. range fluids | Max. range bulk materials |
|--------|-----------------|-------------------|---------------------------|
| 1 ½"   | 0.25 m (0.8 ft) | 5 m (16 ft)       | 2 m (6.6 ft)              |
| 2"     | 0.35 m (1.1 ft) | 8 m (26 ft)       | 3.5 m (11 ft)             |

### Time-of-flight method

The sensor of the instrument transmits ultrasonic pulses in the direction of the product surface. There, they are reflected back and received by the sensor. The instrument measures the time *t* between pulse transmission and reception. The instrument uses the time *t* (and the velocity of sound *c*) to calculate the distance *D* between the sensor membrane and the product surface:

$$D = c \cdot t / 2$$

As the device knows the empty distance *E* from a user entry, it can calculate the level as follows:

$$L = E - D$$

An integrated temperature sensor (NTC) compensates for changes in the velocity of sound caused by temperature changes.

### Interference echo suppression

The interference echo suppression feature on the instrument ensures that interference echos (e.g. from edges, welded joints and installations) are not interpreted as a level echo.

### Calibration

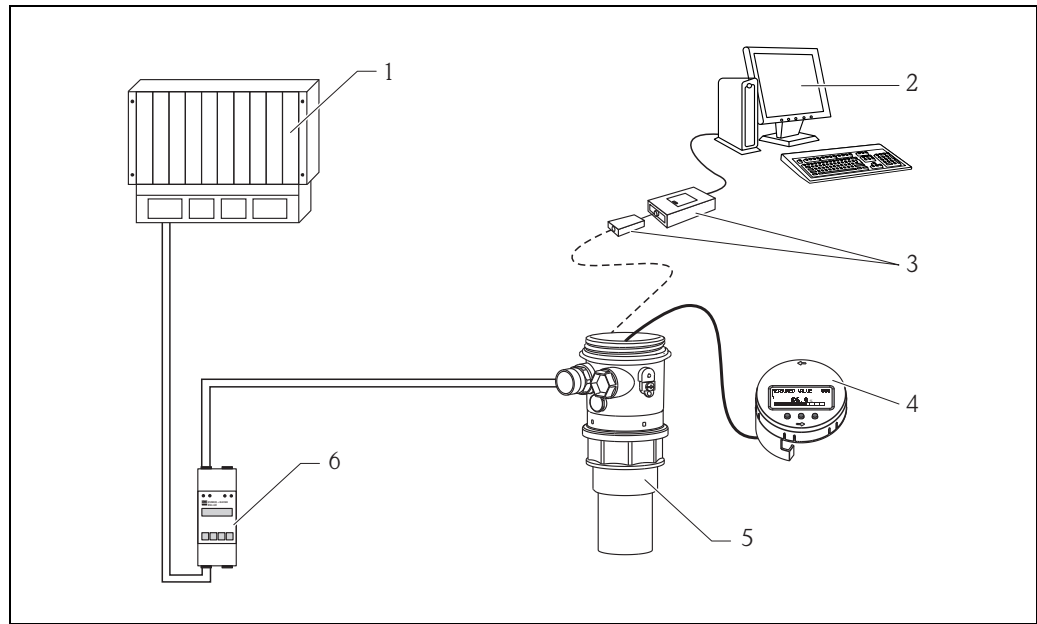
Enter the empty distance *E* and the span *F* to calibrate the device.

### Blocking distance

Span *F* may not extend into the blocking distance *BD*. Level echos within the blocking distance cannot be evaluated due to the transient characteristics of the sensor.

**Equipment architecture**

The complete measuring system consists of:



L00-FMU30xxx-14-00-06-xx-008

- 1 PLC (programmable logic controller)
- 2 Computer with operating tool (e.g. FieldCare)
- 3 Commubox FXA291 and ToF Adapter FXA291
- 4 Operating and display module
- 5 Prosonic FMU30
- 6 Transmitter power supply unit RMA42 or RN221N

**On-site operation**

- With display and operating module
- With a PC, Commubox FXA291 + ToF Adapter FXA291 and the operating software FieldCare

## Input

### Measured variable

The distance D between the sensor membrane and the product surface is measured, see also figure →  3.

Using the linearization function, the device uses D to calculate:

- Level L in any units
- Volume V in any units
- Flow Q across measuring weirs or open channels in any units

### Measuring range

The measuring range is limited by the range of a sensor. The sensor range is, in turn, dependent on the operating conditions. To estimate the actual range, proceed as follows (see also the calculation example in the diagram):

1. Determine which of the influences shown in the following table are appropriate for your process.
2. Add the corresponding attenuation values.
3. From the total attenuation, use the diagram to calculate the range.

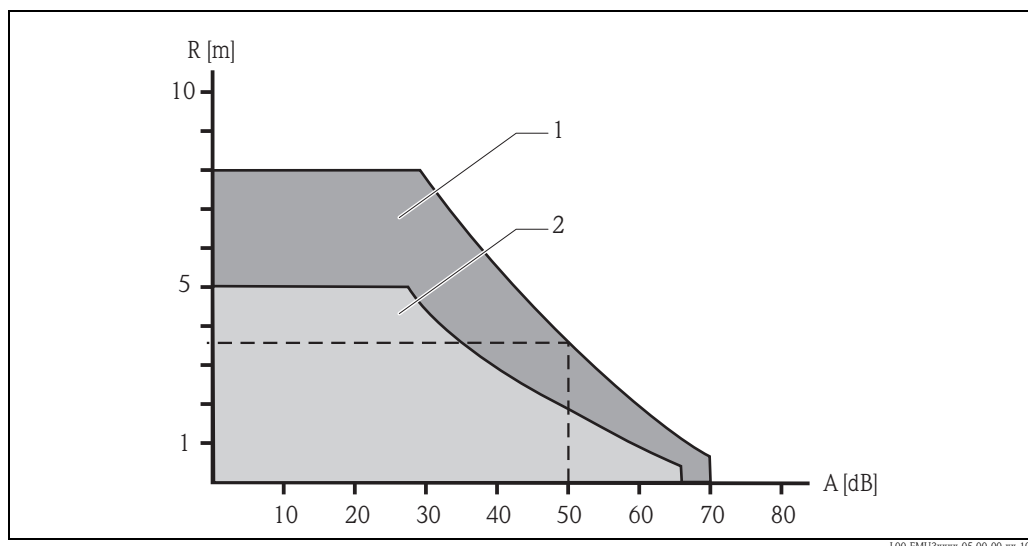
| Fluid surface                     | Attenuation                                              |
|-----------------------------------|----------------------------------------------------------|
| Calm                              | 0 dB                                                     |
| Waves                             | 5 to 10 dB                                               |
| Strong turbulence (e.g. stirrers) | 10 to 20 dB                                              |
| Foaming                           | Please contact your Endress+Hauser sales representative. |

| Bulk material surface                  | Attenuation |
|----------------------------------------|-------------|
| Hard, rough (e.g. rubble)              | 40 dB       |
| Soft (e.g. peat, dust-covered clinker) | 40 to 60 dB |

| Dust                  | Attenuation |
|-----------------------|-------------|
| No dust formation     | 0 dB        |
| Little dust formation | 5 dB        |
| Heavy dust formation  | 5 to 20 dB  |

| Filling curtain in detection range | Attenuation |
|------------------------------------|-------------|
| None                               | 0 dB        |
| Small quantities                   | 5 to 10 dB  |
| Large quantities                   | 10 to 40 dB |

| Temperature difference between sensor and product surface | Attenuation |
|-----------------------------------------------------------|-------------|
| to 20 °C (68 °F)                                          | 0 dB        |
| to 40 °C (104 °F)                                         | 5 to 10 dB  |
| to 60 °C (140 °F)                                         | 10 to 15 dB |



- 1     Sensor 2"  
 2     Sensor 1 1/2"  
 A     Attenuation (dB)  
 R     Range (m)

### Example

|                                      |               |                                                   |
|--------------------------------------|---------------|---------------------------------------------------|
| ■ Strong turbulence surface          | approx. 50 dB |                                                   |
| ■ No dust formation                  | 0 dB          |                                                   |
| ■ Filling curtain in detection range | 10 dB         |                                                   |
| ■ Temperature diff. < 20 °C (68 °F)  | 0 dB          |                                                   |
|                                      | approx. 50 dB | ⇒ range approx. 3.5 m (11 ft) for FMU30 2" sensor |

These measuring conditions have been taken into account during the calculation of the maximum measuring range in solid applications.

### Operating frequency

| 1 1/2" sensor  | 2" sensor      |
|----------------|----------------|
| approx. 70 kHz | approx. 50 kHz |

## Output

### Output signal

4 to 20 mA

### Signal on alarm

Error information can be accessed via the following interfaces:

- On-site display (error symbol, error code and plain text description)
- Current output, signal on error can be selected (e.g. according to NAMUR recommendation NE43)

### Output damping

Freely selectable, 0 to 255 s

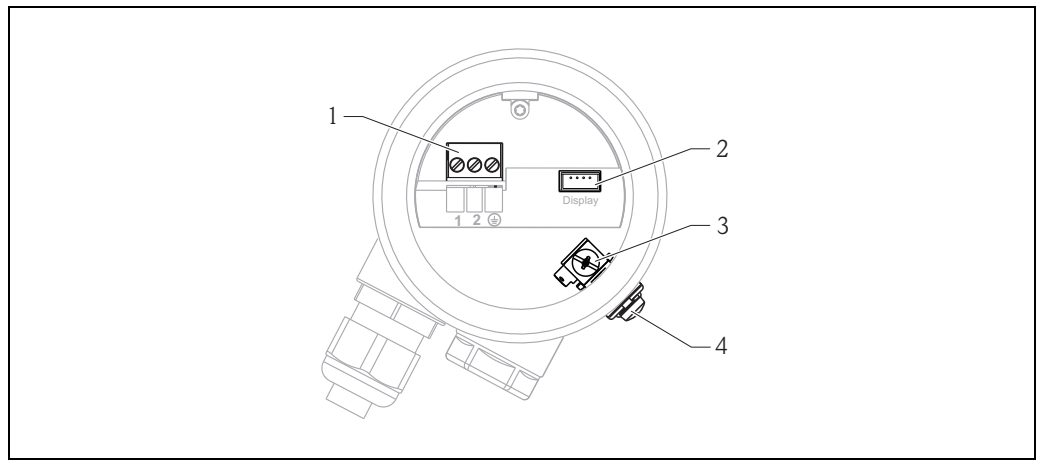
### Linearization

The linearization function of the instrument allows conversion of the measured value into any unit of length or volume. In open channels or measuring weirs, also a flow linearization is possible (calculation of the flow from the measured level).  
 The linearization table for calculating the volume in an horizontal cylindrical tank is preprogrammed. You can also enter any number of other tables containing up to 32 value pairs either manually or semi-automatically (by filling the vessel under controlled conditions).

## Power supply

### Terminal compartment

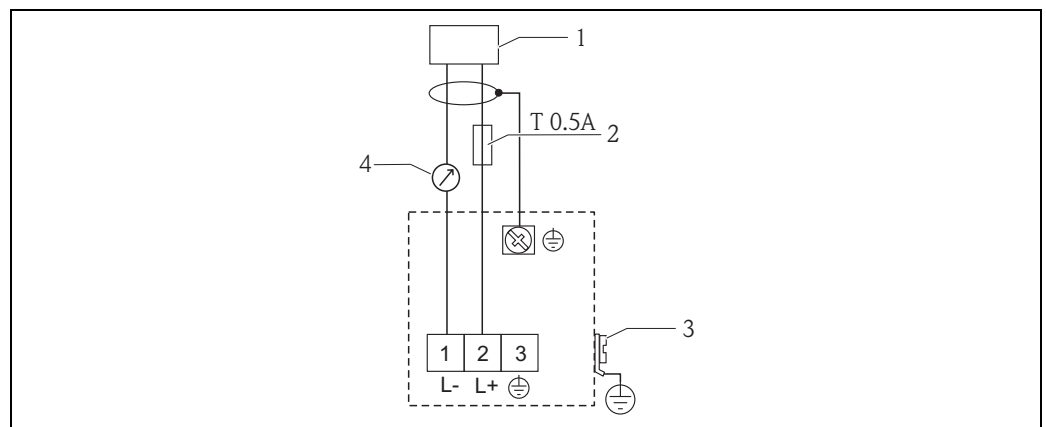
The terminals are located underneath the housing cover.



L00-FMU30xxx-04-00-00-xx-001

- 1 Terminals
- 2 Optional: display
- 3 Internal earth terminal
- 4 External earth terminal

### Terminal assignment



L00-FMU30xxx-04-00-00-de-015

- 1 Power
- 2 Fuse as per IEC 60127, T 0.5 A
- 3 Plant ground
- 3 4...20 mA

- Connect the connecting line to the screw terminals (line cross-sections of 0.25 to 2.5mm<sup>2</sup> (24...14 AWG)) in the terminal compartment.
- A standard installation cable is sufficient for the connection.
- Protective circuitry against reverse polarity, RFI and over-voltage peaks is built into the device (see also Technical Information TI00241F/00/EN "EMC Test Procedures")

|                            |                                                                   |
|----------------------------|-------------------------------------------------------------------|
| <b>Supply voltage</b>      | 14-35 V                                                           |
| <b>Terminals</b>           | Cable cross-section: 0.25 to 2.5 mm <sup>2</sup> (24 to 14 AWG)   |
| <b>Cable entry</b>         | G ½" or ½" NPT                                                    |
| <b>Cable gland</b>         | M20x1.5 (recommended cable diameter 6 to 10 mm (0.24 to 0.39 in)) |
| <b>Power consumption</b>   | 51 mW to 800 mW                                                   |
| <b>Current consumption</b> | 3.6 to 22 mA                                                      |

## Performance characteristics

|                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Reaction time</b>                           | The reaction time depends on the parameter settings. The minimum value is: min. 2 s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Reference operating conditions</b>          | <ul style="list-style-type: none"> <li>■ Temperature = +20 °C (+68 °F)</li> <li>■ Pressure = 1013 mbar abs. (15 psi abs.)</li> <li>■ Humidity = 50 %</li> <li>■ Ideal reflective surface (e.g. calm, smooth fluid surface)</li> <li>■ No interference reflections within signal beam</li> <li>■ Set application parameters: <ul style="list-style-type: none"> <li>– Tank shape = dome ceiling</li> <li>– Medium property = liquid</li> <li>– process conditions = standard liquid</li> </ul> </li> </ul>                                                                                                                                                     |
| <b>Measured value resolution</b>               | 1 mm (0.04 in)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Pulse frequency</b>                         | max. 0.5Hz<br>The exact values are dependent on the type of device and the parameter settings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Maximum measuring error<sup>1) 2)</sup></b> | ±0.2 % of the maximum span of the sensor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Typical measuring error<sup>2)</sup></b>    | Include linearity, repeatability, and hysteresis<br>Better than: ±3 mm (±0.12 in) or 0.2 % of measuring distance*<br><br>* whichever is greater                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Influence of the vapor pressure</b>         | <p>The vapor pressure at 20 °C (68 °F) gives a hint on the accuracy of the ultrasonic level measurement. If the vapor pressure at 20 °C (68 °F) is below 50 mbar (1 psi), ultrasonic level measurement is possible with a very high accuracy. This is valid for water, aqueous solutions, water-solid-solutions, dilute acids (hydrochloric acid, sulfuric acid, ...), dilute bases (caustic soda, ...), oils, greases, slurries, pastes, ...</p> <p>High vapor pressures or outgassing media (ethanol, acetone, ammonia, ...) can influence the accuracy. If conditions like these are present, please contact your Endress+Hauser sales representative.</p> |

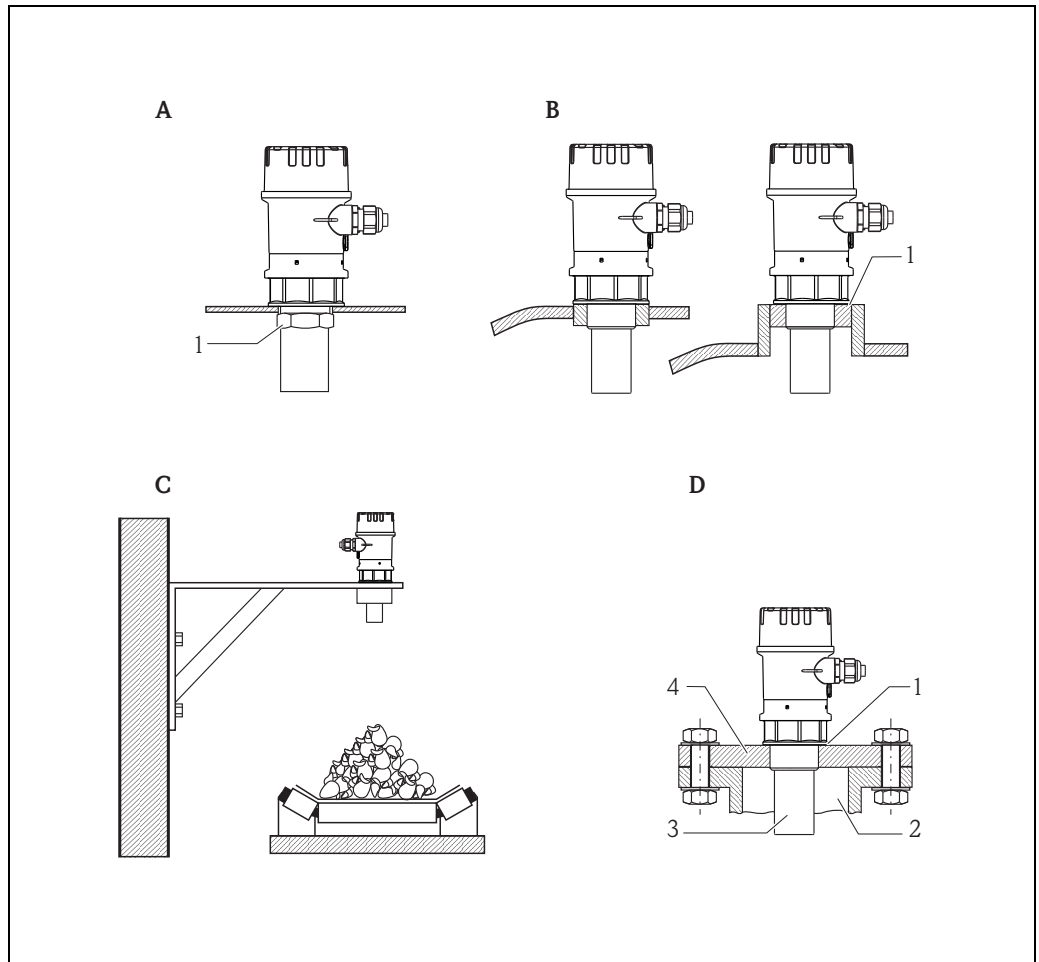
1) according to EN 61298-2

2) with reference operating conditions



## Installation

### Installation variants

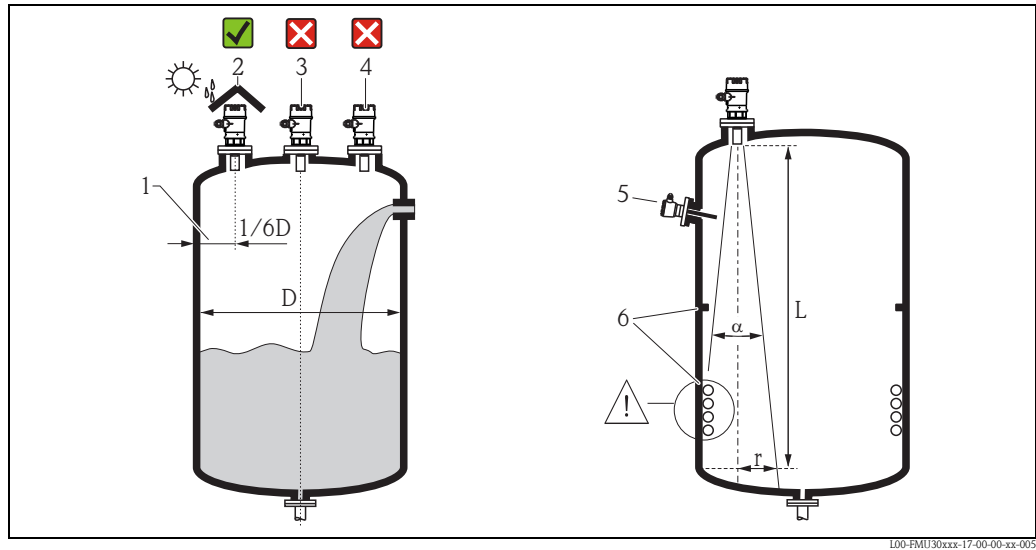


L00-FMU30xxx-17-00-00-xx-002

- A** Installation with counter nut  
 1 counter nut (PC) supplied for G1½ and G2 instruments
- B** Installation with sleeve  
 1 sealing (EPDM) supplied
- C** Installation with installation bracket
- D** Installation with screw in flange  
 1 sealing (EPDM) supplied  
 2 nozzle  
 3 sensor  
 4 screw in flange

For installation bracket or screw in flange → 22, "Accessories".

### Installation conditions for level measurements



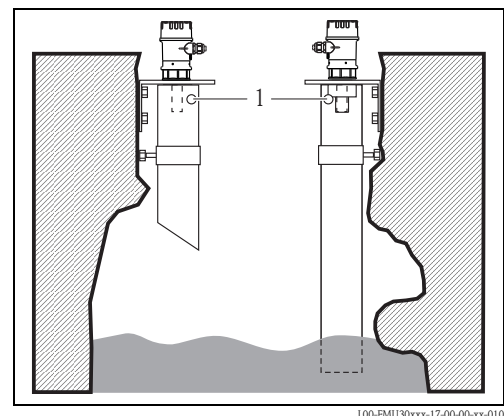
- Do not install the sensor in the middle of the tank (3). We recommend leaving a distance between the sensor and the tank wall (1) measuring  $1/6$  of the tank diameter.
- Protect the device against direct sun or rain (2) → 26 "Weather protection cover".
- Avoid measurements through the filling curtain (4).
- For solid application where bulk solid cones appear, align the sensor membrane perpendicular to the surface.
- Make sure that equipment (5) such as limit switches, temperature sensors, etc. are not located within the emitting angle  $\alpha$ . In particular, symmetrical equipment (6) such as heating coils, baffles etc. can influence measurement.
- Never install two ultrasonic measuring devices in a tank, as the two signals may affect each other.
- To estimate the detection range, use the 3 dB emitting angle  $\alpha$ .

| Sensor | $\alpha$ | $L_{\max}$  | $r_{\max}$      |
|--------|----------|-------------|-----------------|
| 1½"    | 11°      | 5 m (16 ft) | 0.48 m (1.6 ft) |
| 2"     | 11°      | 8 m (26 ft) | 0.77 m (2.5 ft) |

### Installation in narrow shafts

In narrow shafts with strong interference echoes, we recommend using an ultrasound guide pipe (e.g. PE or PVC wastewater pipe) with a minimum diameter of 100 mm (3.94 in).

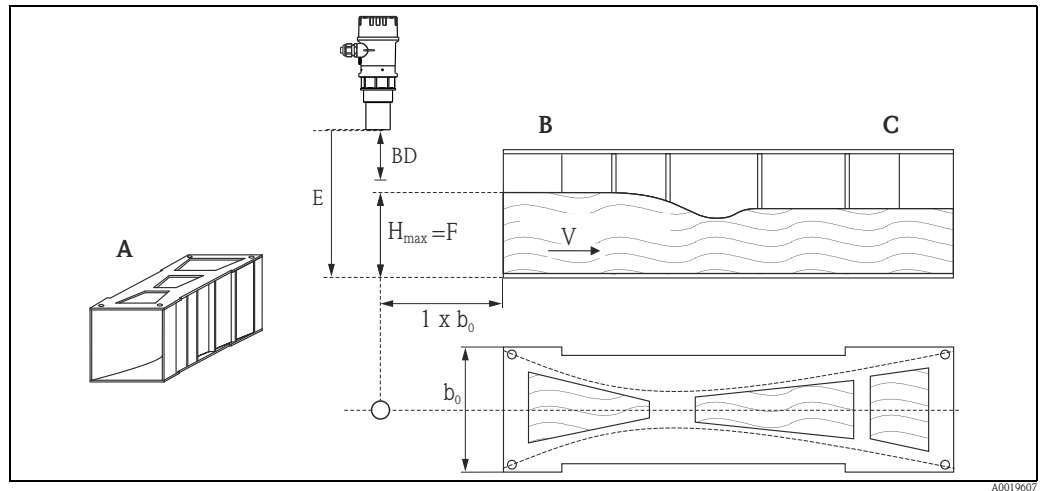
Make sure that the pipe is not soiled by accumulated dirt. If necessary, clean the pipe at regular intervals.



1 Venting hole

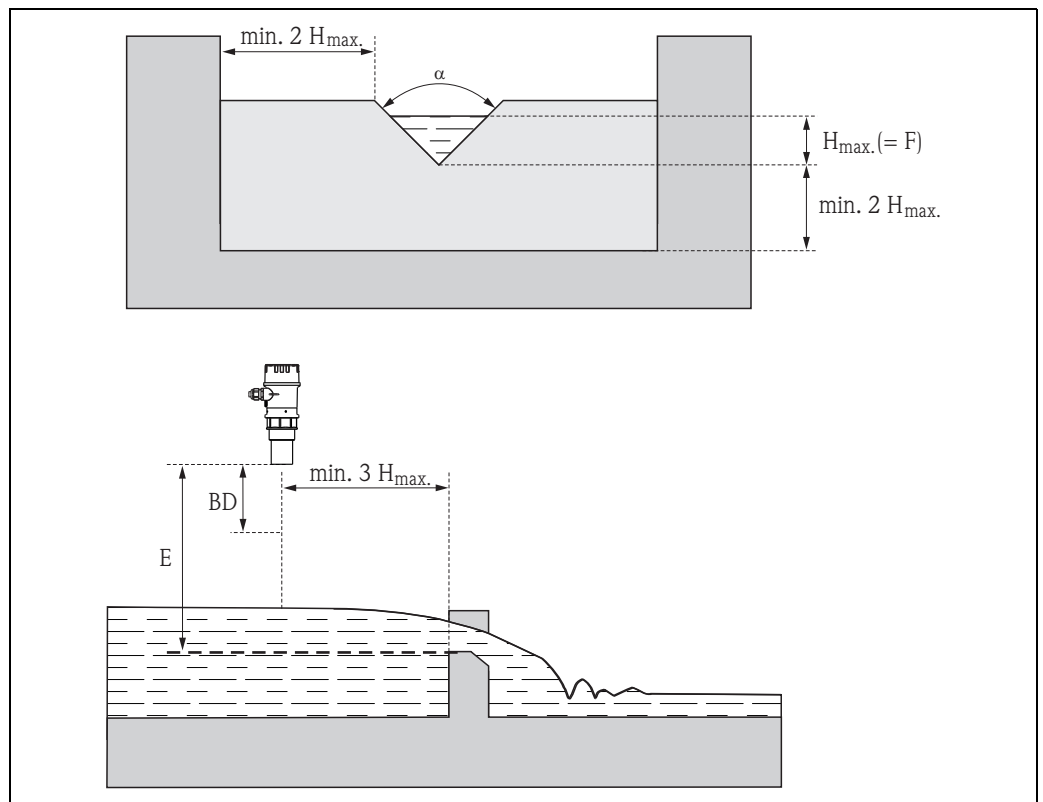
**Installation conditions for flow measurements**

- Install the instrument at the inflow side (B), as close above the maximum water level  $H_{\max}$  as possible (take into account the blocking distance BD).
- Position the instrument in the middle of the channel or weir.
- Align the sensor membrane parallel to the water surface.
- Keep to the installation distance of the channel or weir.

**Example: Khafagi-Venturi flume**

A Khafagi-Venturi flume  
 B Inflow  
 C Outflow

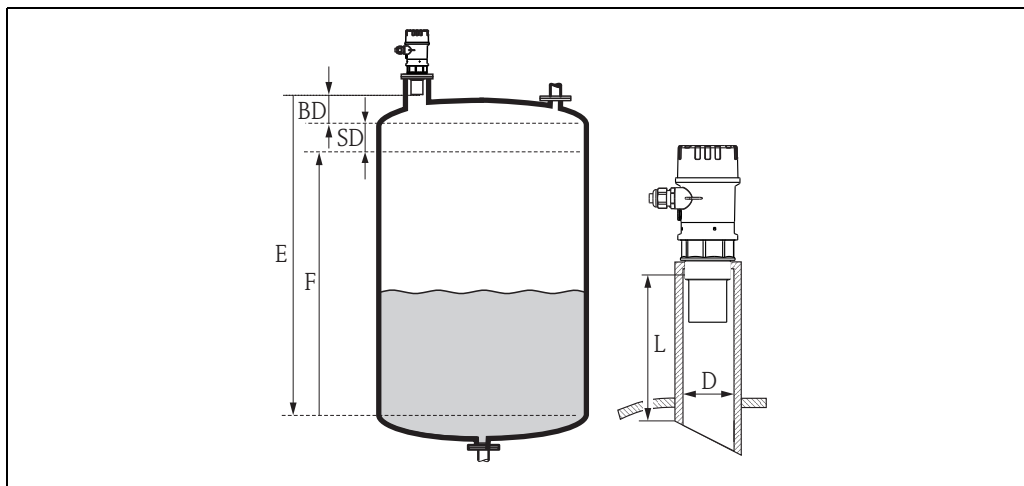
BD Blocking distance  
 E Empty calibration  
 F Full calibration  
 V Direction of flow

**Example: Triangular weir**

BD Blocking distance  
 E Empty calibration  
 F Full calibration

### Blocking distance, nozzle installation

Install the instrument at a height so that the blocking distance BD is not undershot, even at maximum fill level. Use a pipe nozzle if you cannot maintain the blocking distance in any other way. The interior of the nozzle must be smooth and may not contain any edges or welded joints. In particular, there should be no burr on the inside of the tank side nozzle end. Note the specified limits for nozzle diameter and length. To minimise disturbing factors, we recommend an angled socket edge (ideally 45°).



L00-FMU30xxx-17-00-00-xx-004

*BD* Blocking distance  
*SD* Safety distance  
*E* Empty calibration

*F* Full calibration (span)  
*D* Nozzle diameter  
*L* Nozzle length

| Nozzle diameter                | Maximum nozzle length mm (in) |            |
|--------------------------------|-------------------------------|------------|
|                                | 1½" sensor                    | 2" sensor  |
| DN50/2"                        | 80 (3.15)                     | —          |
| DN80/3"                        | 240 (9.45)                    | 240 (9.45) |
| DN100/4"                       | 300 (11.8)                    | 300 (11.8) |
| DN150/6"                       | 400 (15.7)                    | 400 (15.7) |
| DN200/8"                       | 400 (15.7)                    | 400 (15.7) |
| DN250/10"                      | 400 (15.7)                    | 400 (15.7) |
| DN300/12"                      | 400 (15.7)                    | 400 (15.7) |
| <b>Sensor characteristics</b>  |                               |            |
| Emitting angle $\alpha$        | 11°                           | 11°        |
| Blocking distance (m [ft])     | 0.25 (0.8)                    | 0.35 (1.1) |
| Max. range (m [ft]) in liquids | 5 (16)                        | 8 (26)     |
| Max. range (m [ft]) in solids  | 2 (6.6)                       | 3.5 (11)   |

#### Caution!

If the blocking distance is undershot, it may cause device malfunction.

#### Note!

In order to notice if the level approaches the blocking distance, you can specify a safety distance (SD). If the level is within this safety distance, the instrument outputs a warning or alarm message.

## Environment

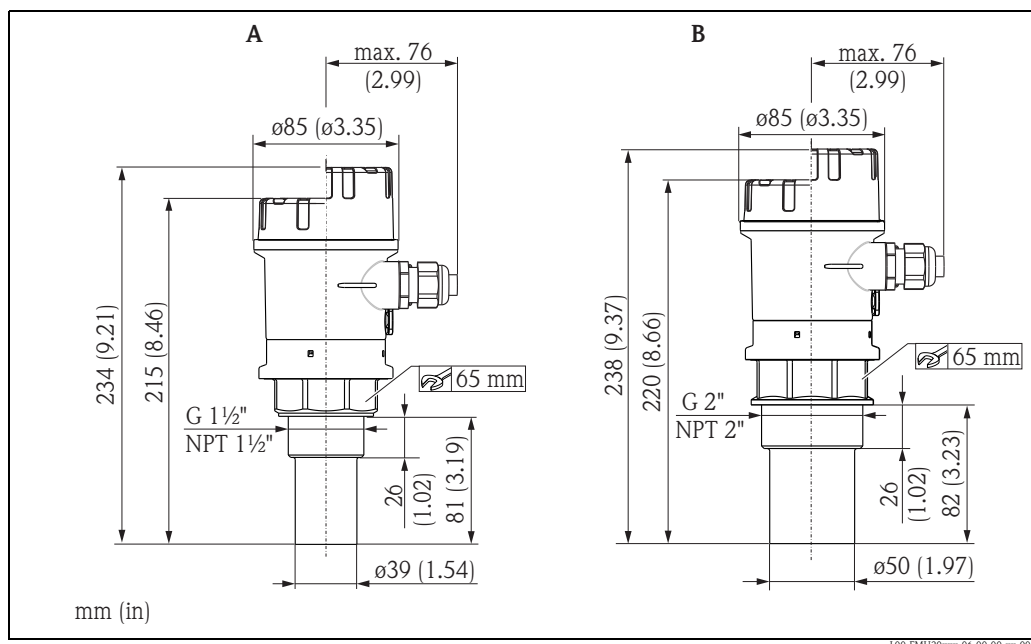
|                                                     |                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ambient temperature range</b>                    | –20 °C to +60 °C (–4 °F to +140 °F)<br>Use a protective cover, in order to protect the sensor from direct sun or rain →  26, "Weather protection cover".                                                   |
| <b>Storage temperature</b>                          | –40 °C to +80 °C (–40 °F to +176 °F)                                                                                                                                                                                                                                                          |
| <b>Resistance to alternating temperature cycles</b> | To DIN EN 60068-2-14; Nb test : +60°C/–20°C (+140 °F/–4 °F), 0.5K/min, 100cycles                                                                                                                                                                                                              |
| <b>Climate class</b>                                | DIN EN 60068-2-38 (Test Z/AD) DIN/IEC 68 T2-30Db                                                                                                                                                                                                                                              |
| <b>Ingress protection</b>                           | <ul style="list-style-type: none"><li>■ With closed housing, tested according to<ul style="list-style-type: none"><li>– IP68, 24h at 1.83 m (6.0 ft) under water surface</li><li>– IP66</li></ul></li><li>■ With open housing: IP20 (also ingress protection of the display)</li></ul>        |
| <b>Vibration resistance</b>                         | DIN EN 60068-2-64 / IEC 68-2-64: 20 to 2000 Hz, 1 (m/s <sup>2</sup> )/Hz; 3 x 100 min                                                                                                                                                                                                         |
| <b>Electromagnetic compatibility (EMC)</b>          | <ul style="list-style-type: none"><li>■ Electromagnetic compatibility to EN 61326. For details refer to the declaration of conformity.</li><li>■ With regard to interference immunity the requirements for "industrial environment" are met.</li><li>■ Influence of EMC &lt; 1 % FS</li></ul> |

## Process

|                                  |                                                                                                                                                   |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Process temperature range</b> | –20°C to +60°C (–4 °F to +140 °F)<br>A temperature sensor is integrated in the sensor for correction of the temperature-dependent time-of-flight. |
| <b>Process pressure range</b>    | 0.7 bar to 3 bar abs. (10.15 psi to 43.5 psi)                                                                                                     |

## Mechanical construction

### Design; dimensions



A Sensor 1 1/2"  
B Sensor 2"

### Weight

| Sensor | Weight                     |
|--------|----------------------------|
| 1 1/2" | approx. 0.75 kg (1.65 lbs) |
| 2"     | approx. 0.8 kg (1.76 lbs)  |

### Housing design

#### Type of housing

F16 plastic housing

#### Cover

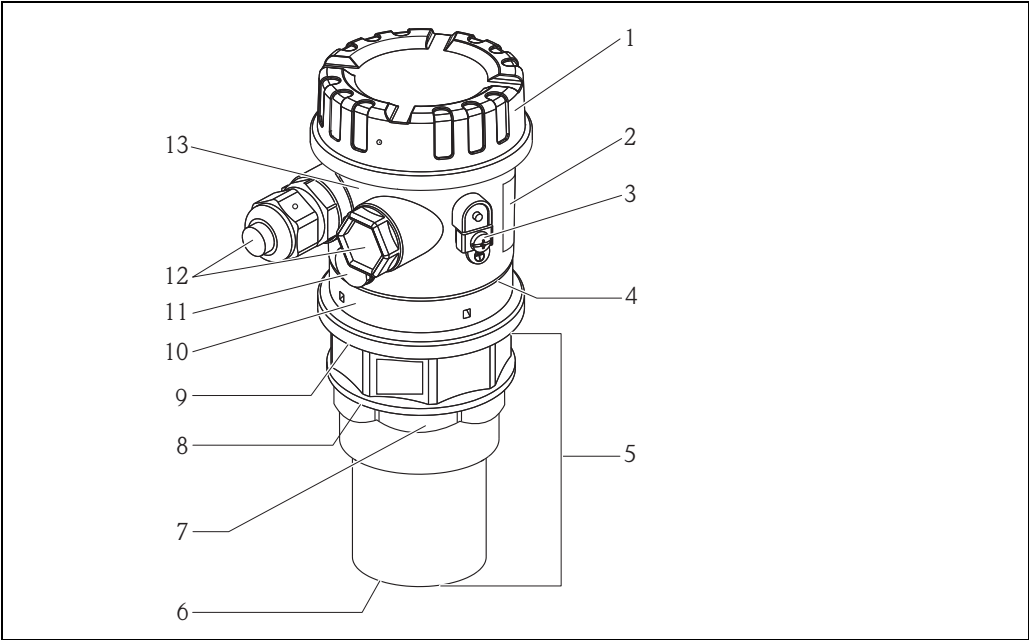
Plastic cover

- For version without on-site display (low, grey)
- For version with on-site display (high, transparent)

### Process connection

| Sensor | Process connection                                                                                           |
|--------|--------------------------------------------------------------------------------------------------------------|
| 1 1/2" | <ul style="list-style-type: none"> <li>■ Thread G 1 1/2", PP</li> <li>■ Thread MNPT 1 1/2" - 11.5</li> </ul> |
| 2"     | <ul style="list-style-type: none"> <li>■ Thread 2", PP</li> <li>■ Thread MNPT 2" - 11.5</li> </ul>           |

Materials



L00-FMU3xxxx-16-00-00-xx-001

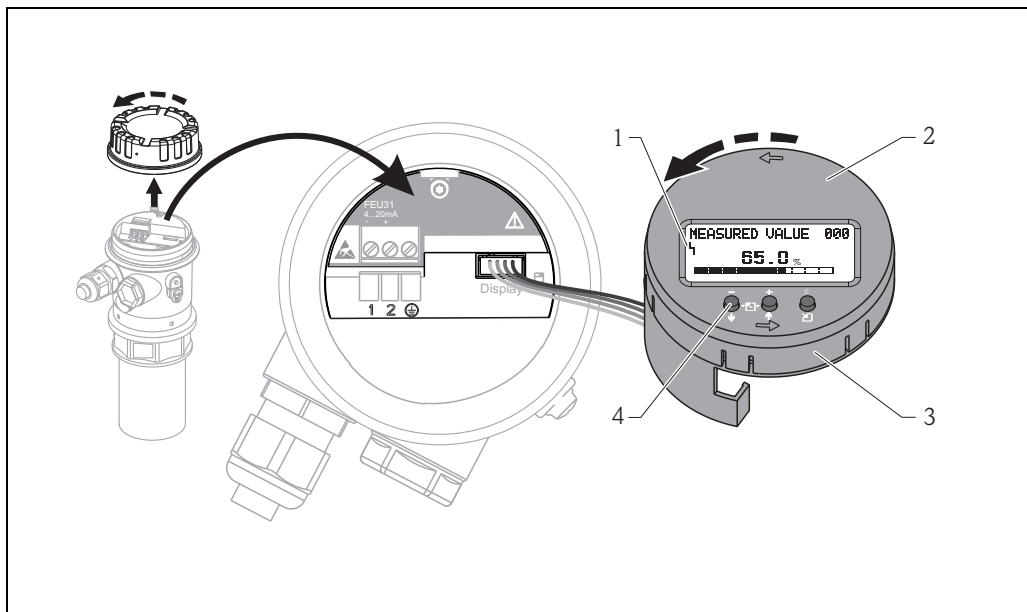
| Pos. | Part                                                           | Material                                 |
|------|----------------------------------------------------------------|------------------------------------------|
| 1    | Cover (grey)                                                   | PBT                                      |
|      | Cover (transparent)                                            | PA                                       |
|      | O-ring                                                         | EPDM                                     |
| 2    | Ground terminal:<br>Screws<br>Spring washer<br>Clamp<br>Holder | A2<br>A4<br>304 (1.4301)<br>301 (1.4310) |
| 3    | Nameplate                                                      | Polyester                                |
| 4    | O-ring                                                         | EPDM                                     |
| 5    | Sensor (in contact with process)                               | PP                                       |
| 6    | Matching Layer (in contact with process)                       | EPDM                                     |
| 7    | Counter nut (in contact with process)                          | PC                                       |
| 8    | Sealing (in contact with process)                              | EPDM                                     |
| 9    | Sealing                                                        | EPDM                                     |
| 10   | Adapter of housing                                             | PBT GF 30-FR                             |
| 11   | Goretex filter                                                 | PBT-20GF / grey RAL7035                  |
| 12   | Cable gland                                                    | Polyamid (PA)                            |
|      | Plug                                                           | PBT-GF30                                 |
| 13   | Housing                                                        | PBT-FR                                   |

Note!  
The chemical compatibility of the sensors must be checked before installation with compatibility charts.

## Operability

### Display and operating elements

The LCD module for display and operation is located beneath the housing cover. Open the cover to operate the device.



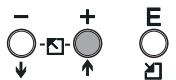
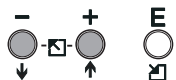
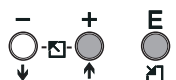
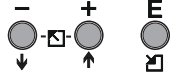
L00-FMU30xxx-07-05-xx-xx-000

- 1 Display symbol
- 2 Display (rotatable)
- 3 Plug-in module
- 4 Function keys

| Symbol in display |            |          |                  |
|-------------------|------------|----------|------------------|
|                   | continuous | flashing |                  |
| Meaning           | Alarm      | Warning  | Security Locking |



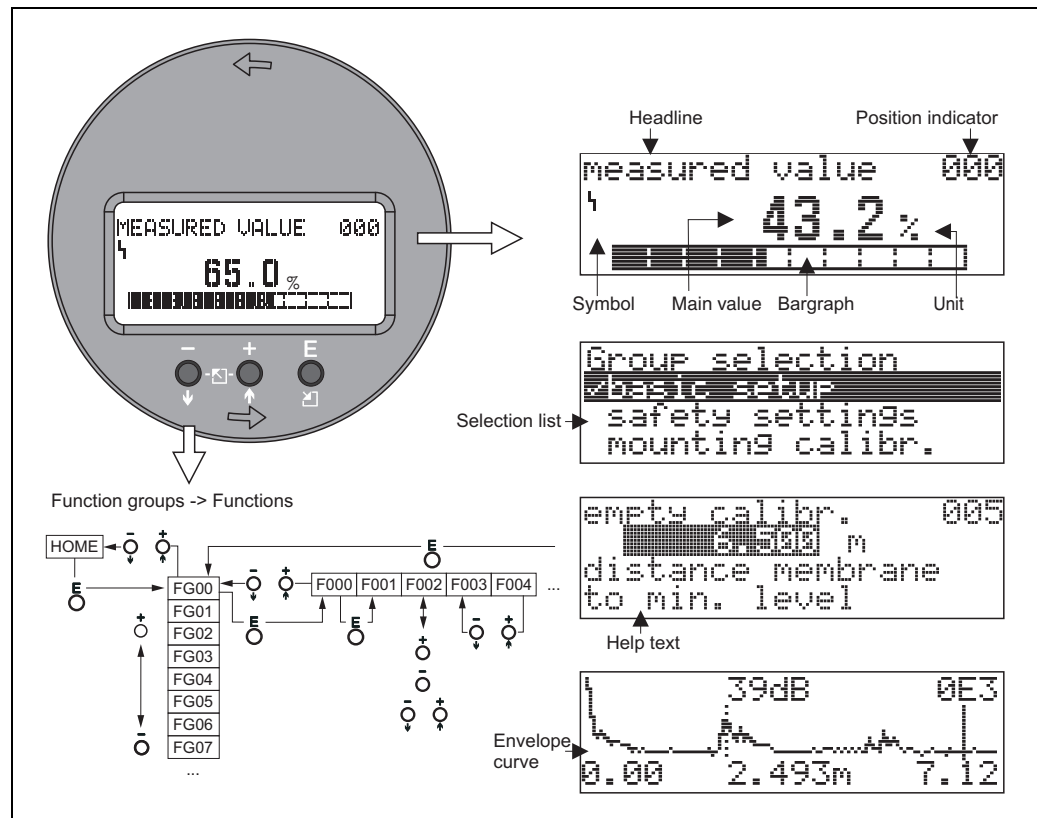
## Function of the keys

| Key(s)<br>(The keys to press are displayed in grey.)                                                                                                                            | Meaning                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                | Navigate upwards in the selection list<br>Edit numeric value within a function                                                                                                                                                                            |
|                                                                                                | Navigate downwards in the selection list<br>Edit numeric value within a function                                                                                                                                                                          |
|                                                                                                | Navigate to the left within a function group                                                                                                                                                                                                              |
|                                                                                                | Navigate to the right within a function group, confirmation.                                                                                                                                                                                              |
| <br>or<br> | Contrast settings of the LCD                                                                                                                                                                                                                              |
|                                                                                              | Hardware lock / unlock<br>After a hardware lock, an operation of the instrument via display or communication is not possible!<br>The hardware can only be unlocked via the display. An unlock parameter must be entered to do so (unlock parameter: 100). |

## On-site operation

## Operation

The LC-Display allows configuration via 3 keys directly at the instrument. All device functions can be set through a menu system. The menu consists of function groups and functions. Within a function, application parameters can be read or adjusted. The user is guided through a complete configuration procedure. For ease of operation can choose between 7 language: (de: german; en: english; es: spanish; fr: french; it: italian; ja: japanese; nl: dutch).



100-FMU30xxx-07-00-00-en-004

## Remote operation

## Operation with FieldCare

FieldCare is Endress+Hauser's FDT based Plant Asset Management Tool. It can configure all intelligent field devices in your plant and supports you in managing them. By using status information, it also provides a simple but effective means of checking their health.

- Supports Ethernet, HART, PROFIBUS PA, FOUNDATION Fieldbus etc.
- Operates all Endress+Hauser devices
- Operates all third-party actuators, I/O systems and sensors supporting the FDT standard
- Ensures full functionality for all devices with DTMs
- Offers generic profile operation for any third-party fieldbus device that does not have a vendor DTM

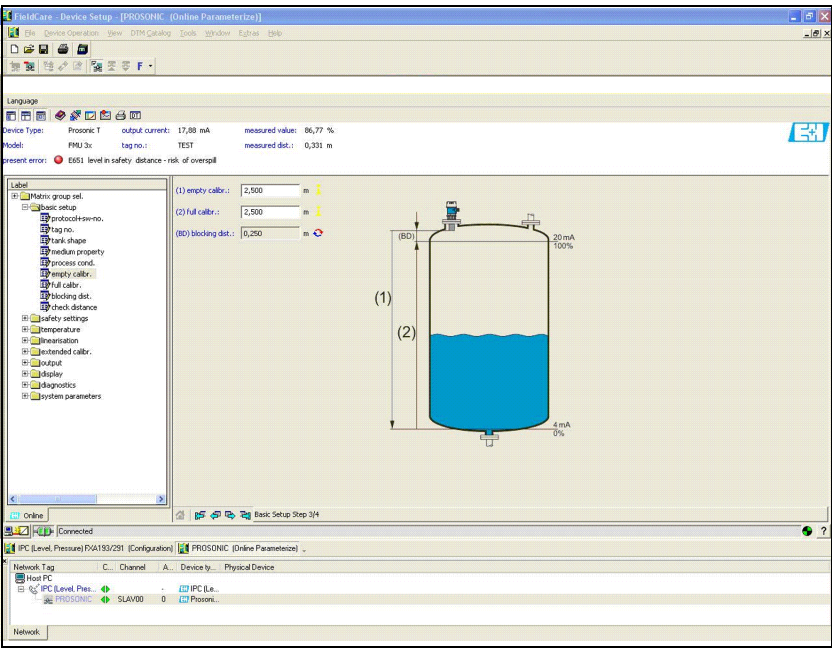
Connection for FMU30:

- Commubox FXA291 and ToF adapter FXA291 (available as accessory)

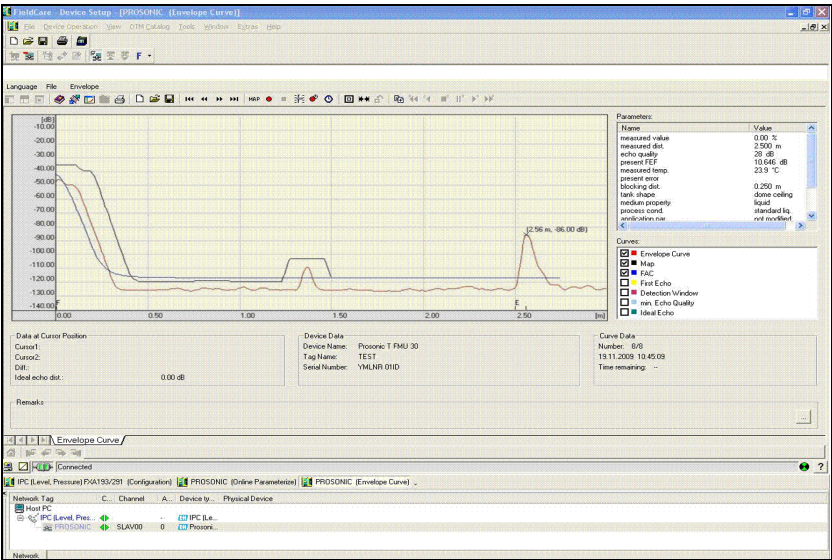
Using the following functions:

- Signal analysis via envelope curve
- Linearization table (graphically supported creation, editing, importing and exporting)
- Loading and saving of instrument data (Upload/Download)
- Documentation of measuring point

Menu-guided commissioning:



Signal analysis via envelope curve:



## Certificates and Approvals

|                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CE mark</b>                           | The measuring system meets the legal requirements of the EC-guidelines. Endress+Hauser confirms the instrument passing the required tests by attaching the CE-mark.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Ex approvals</b>                      | <ul style="list-style-type: none"> <li>■ ATEX</li> <li>■ IECEx</li> <li>■ CSA C/US</li> <li>■ NEPSI</li> </ul> <p>Additional safety instructions must be observed for applications in hazardous areas. They are contained in the separate "Safety Instructions" (XA) document, which is included in the scope of delivery. Reference is made to the XA on the nameplate of the device.</p> <p>Note!<br/>Details on the available certificates as well as the associated XAs can be found in the Associated documentation chapter documentation →  27.</p> |
| <b>Ex approval</b>                       | The available certificates are listed in the ordering information. Note the associated safety instructions (XA) and control or installation drawings (ZD).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>External standards and guidelines</b> | <p><b>EN 60529</b><br/>Protection class of housing (IP-code)</p> <p><b>EN 61326 series</b><br/>EMC product family standard for electrical equipment for measurement, control and laboratory use</p> <p><b>NAMUR</b><br/>User association for automation technology in process industries</p>                                                                                                                                                                                                                                                                                                                                               |

## Ordering information

### FMU30

Versions that mutually exclude one another are not marked.

|            |                                              |                                                                                              |
|------------|----------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>010</b> | <b>Approval:</b>                             |                                                                                              |
|            | AA                                           | Non-hazardous area                                                                           |
|            | BB                                           | ATEX II 1/2G Ex ia IIC T5                                                                    |
|            | CA                                           | CSA C/US General Purpose                                                                     |
|            | CB                                           | CSA C/US IS C.I Div.1 Gr.A-D                                                                 |
|            | IB                                           | IEC Ex zone 0/1, Ex ia IIC T5 Ga/Gb                                                          |
|            | NB                                           | NEPSI zone 0/1, Ex ia IIC T5 Ga/Gb                                                           |
|            | 99                                           | Special version                                                                              |
| <b>020</b> | <b>Display; Operating:</b>                   |                                                                                              |
|            | G                                            | W/o; via spare part display FMU30                                                            |
|            | H                                            | Envelope curve display on site; push button                                                  |
|            | Y                                            | Special version                                                                              |
| <b>030</b> | <b>Electrical Connection:</b>                |                                                                                              |
|            | E                                            | Gland M20, IP68                                                                              |
|            | F                                            | Thread G1/2, IP68                                                                            |
|            | G                                            | Thread NPT1/2, IP68                                                                          |
|            | Y                                            | Special version                                                                              |
| <b>040</b> | <b>Sensor; Max Range; Blocking Distance:</b> |                                                                                              |
|            | AA                                           | 1-1/2"; 5m liquid/2m solid; 0.25m                                                            |
|            | AB                                           | 2"; 8m liquid/3.5m solid; 0.35m                                                              |
|            | YY                                           | Special version                                                                              |
| <b>050</b> | <b>Process Connection:</b>                   |                                                                                              |
|            | GGF                                          | Thread ISO228 G1-1/2, PP                                                                     |
|            | GHF                                          | Thread ISO228 G2, PP                                                                         |
|            | RGF                                          | Thread ANSI MNPT1-1/2, PP                                                                    |
|            | RHF                                          | Thread ANSI MNPT2, PP                                                                        |
|            | YYY                                          | Special version                                                                              |
| <b>620</b> | <b>Accessory Enclosed:</b>                   |                                                                                              |
|            | RA                                           | UNI flange 2"/DN50/50, PP max 4bar abs/58psia, suitable for 2" 150lbs/DN50 PN16/10K 50       |
|            | RB                                           | UNI flange 2"/DN50/50, PVDF max 4bar abs/58psia, suitable for 2" 150lbs/DN50 PN16/10K 50     |
|            | RC                                           | UNI flange 2"/DN50/50, 316L max 4bar abs/58psia, suitable for 2" 150lbs/DN50 PN16/10K 50     |
|            | RD                                           | UNI flange 3"/DN80/80, PP max 4bar abs/58psia, suitable for 3" 150lbs/DN80 PN16/10K 80       |
|            | RE                                           | UNI flange 3"/DN80/80, PVDF max 4bar abs/58psia, suitable for 3" 150lbs/DN80 PN16/10K 80     |
|            | RF                                           | UNI flange 3"/DN80/80, 316L max 4bar abs/58psia, suitable for 3" 150lbs/DN80 PN16/10K 80     |
|            | RG                                           | UNI flange 4"/DN100/100, PP max 4bar abs/58psia, suitable for 4" 150lbs/DN100 PN16/10K 100   |
|            | RH                                           | UNI flange 4"/DN100/100, PVDF max 4bar abs/58psia, suitable for 4" 150lbs/DN100 PN16/10K 100 |
|            | RI                                           | UNI flange 4"/DN100/100, 316L max 4bar abs/58psia, suitable for 4" 150lbs/DN100 PN16/10K 100 |
|            | R9                                           | Special version                                                                              |
| <b>895</b> | <b>Marking:</b>                              |                                                                                              |
|            | Z1                                           | Tagging (TAG), see additional spec.                                                          |

You can enter the versions for the specific feature in the following table. The versions entered make up the complete order code. Options which are mutually exclusive are not marked.

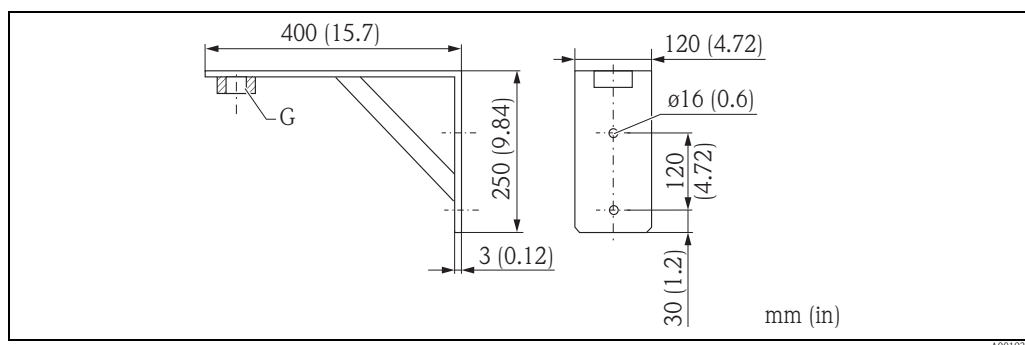
|         | <b>010</b> | <b>020</b> | <b>030</b> | <b>040</b> | <b>050</b> | <b>620</b> | <b>895</b> |
|---------|------------|------------|------------|------------|------------|------------|------------|
| FMU30 - |            |            |            |            |            |            |            |

Endress+Hauser supplies DIN/EN flanges made of stainless steel AISI 316L with the material number 1.4404 or 1.4435. With regard to their temperature stability properties, the materials 1.4404 and 1.4435 are grouped under 13E0 in EN 1092-1 Tab. 18. The chemical composition of the two materials can be identical.

**Scope of delivery**

- Instrument according to the version ordered
- Short instructions KA01054F; additional documentations on the supplied CD-ROM
- For certified instrument versions: Safety Instructions, Control- or Installation drawings
- Counter nut (PC): option 50, versions GGF/GHF, → 21 "Ordering information"
- Sealing ring (EPDM): option 50, versions GGF/GHF → 21 "Ordering information"
- For gland M20x1.5: 1 cable gland for 2-wire instruments  
The cable gland is mounted on delivery.

## Accessories

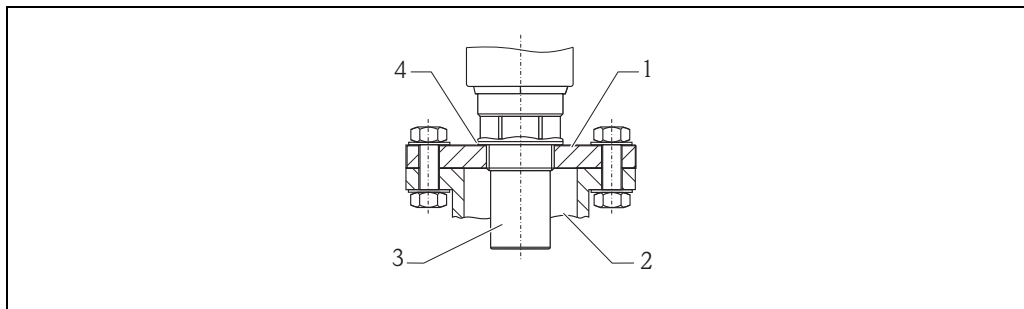
**Installation bracket**

A0019346

| Process connection | Order No.   | Material        | Weight           |
|--------------------|-------------|-----------------|------------------|
| G 1½"              | 942669-0000 | 316 Ti (1.4571) | 3.4 kg (7.5 lbs) |
| G 2"               | 942669-0001 |                 |                  |

suited for NPT 1½" and 2" as well

## Screw in flange



- 1 Screw in flange  
 2 Nozzle  
 3 Sensor  
 4 Sealing ring EPDM (supplied)

## Screw in flange FAX50

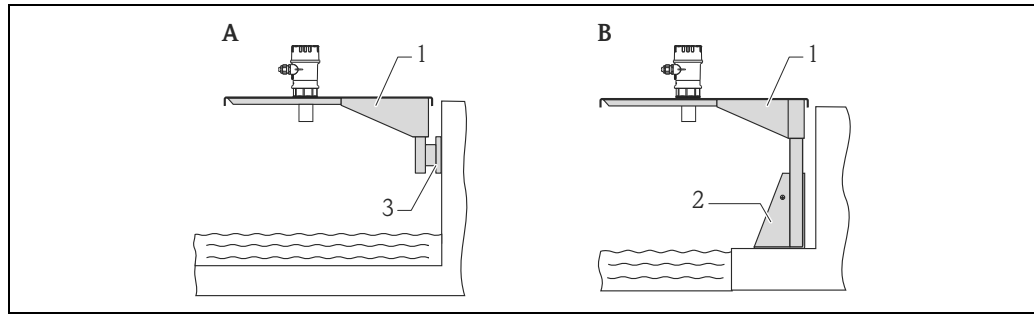
| 015 | Material:                                                                                    |
|-----|----------------------------------------------------------------------------------------------|
| BR1 | DN50 PN10/16 A, steel flange EN1092-1                                                        |
| BS1 | DN80 PN10/16 A, steel flange EN1092-1                                                        |
| BT1 | DN100 PN10/16 A, steel flange EN1092-1                                                       |
| JF1 | 2" 150lbs FF, steel flange ANSI B16.5                                                        |
| JG1 | 3" 150lbs FF, steel flange ANSI B16.5                                                        |
| JH1 | 4" 150lbs FF, steel flange ANSI B16.5                                                        |
| JK2 | 8" 150lbs FF, PP max 3bar abs/44psia flange ANSI B16.5                                       |
| XIF | UNI flange 2"/DN50/50, PVDF max 4bar abs/58psia, suitable for 2" 150lbs/DN50 PN16/10K 50     |
| XIG | UNI flange 2"/DN50/50, PP max 4bar abs/58psia, suitable for 2" 150lbs/DN50 PN16/10K 50       |
| XIJ | UNI flange 2"/DN50/50, 316L max 4bar abs/58psia, suitable for 2" 150lbs/DN50 PN16/10K 50     |
| XJF | UNI flange 3"/DN80/80, PVDF max 4bar abs/58psia, suitable for 3" 150lbs/DN80 PN16/10K 80     |
| XJG | UNI flange 3"/DN80/80, PP max 4bar abs/58psia, suitable for 3" 150lbs/DN80 PN16/10K 80       |
| XJJ | UNI flange 3"/DN80/80, 316L max 4bar abs/58psia, suitable for 3" 150lbs/DN80 PN16/10K 80     |
| XKF | UNI flange 4"/DN100/100, PVDF max 4bar abs/58psia, suitable for 4" 150lbs/DN100 PN16/10K 100 |
| XKG | UNI flange 4"/DN100/100, PP max 4bar abs/58psia, suitable for 4" 150lbs/DN100 PN16/10K 100   |
| XKJ | UNI flange 4"/DN100/100, 316L max 4bar abs/58psia, suitable for 4" 150lbs/DN100 PN16/10K 100 |
| XLF | UNI flange 6"/DN150/150, PVDF max 4bar abs/58psia, suitable for 6" 150lbs/DN150 PN16/10K 150 |
| XLG | UNI flange 6"/DN150/150, PP max 4bar abs/58psia, suitable for 6" 150lbs/DN150 PN16/10K 150   |
| XLJ | UNI flange 6"/DN150/150, 316L max 4bar abs/58psia, suitable for 6" 150lbs/DN150 PN16/10K 150 |
| XMG | UNI flange DN200/200, PP max 4bar abs/58psia, suitable for DN200 PN16/10K 200                |
| XNG | UNI flange DN250/250, PP max 4bar abs/58psia, suitable for DN250 PN16/10K 250                |
| YYY | Special version                                                                              |
| 020 | Sensor Connection:                                                                           |
| A   | Thread ISO228 G3/4                                                                           |
| B   | Thread ISO228 G1                                                                             |
| C   | Thread ISO228 G1-1/2                                                                         |
| D   | Thread ISO228 G2                                                                             |
| E   | Thread ANSI NPT3/4                                                                           |
| F   | Thread ANSI NPT1                                                                             |
| G   | Thread ANSI NPT1-1/2                                                                         |
| H   | Thread ANSI NPT2                                                                             |
| Y   | Special version                                                                              |

The filled in options result in the complete order code.

|         | 015 | 020 |
|---------|-----|-----|
| FAX50 - |     |     |

For more information, see the documentation TI00426F/00/EN.

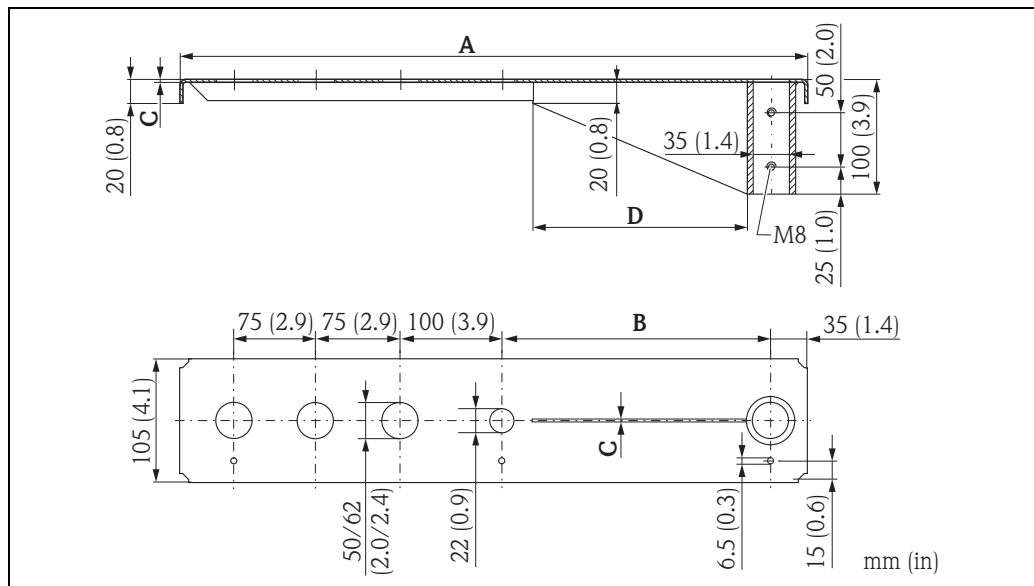
### Cantilever with mounting frame or wall bracket



A0019506

- A** Installation with cantilever and wall bracket  
**B** Installation with cantilever and mounting frame  
 1 Cantilever  
 2 Mounting frame  
 3 Wall bracket

### Cantilever



A0019349

| A           | B          | C        | D          | Weight               | Sensor | Material       | Order Code |
|-------------|------------|----------|------------|----------------------|--------|----------------|------------|
| 585 (23)    | 250 (9.84) | 2 (0.08) | 200 (7.87) | 1.9 kg<br>(4.19 lbs) | 1½"    | 316Ti (1.4571) | 52014132   |
|             |            |          |            |                      |        | galv. steel    | 52014131   |
|             |            |          |            |                      | 2"     | 316Ti (1.4571) | 52014136   |
|             |            |          |            |                      |        | galv. steel    | 52014135   |
| 1085 (42.7) | 750 (29.5) | 3 (0.12) | 300 (11.8) | 4.4 kg<br>(9.7 lbs)  | 1½"    | 316Ti (1.4571) | 52014134   |
|             |            |          |            |                      |        | galv. steel    | 52014133   |
|             |            |          |            |                      | 2"     | 316Ti (1.4571) | 52014138   |
|             |            |          |            |                      |        | galv. steel    | 52014137   |

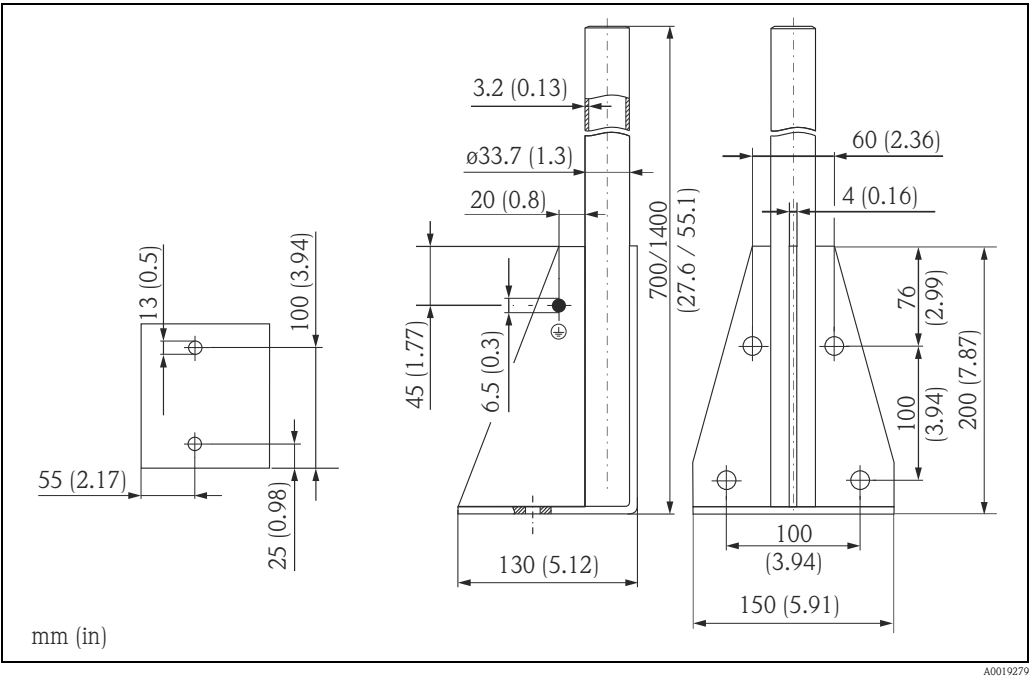
mm (in)

- The 50 mm (2.17 in) or 62 mm (2.44 in) orifices serve for the mounting of the 1½" or 2" sensor, respectively.
- The 22 mm (0.87 in) orifice may be used for an additional sensor.

Fixing screws are supplied.



Mounting Frame

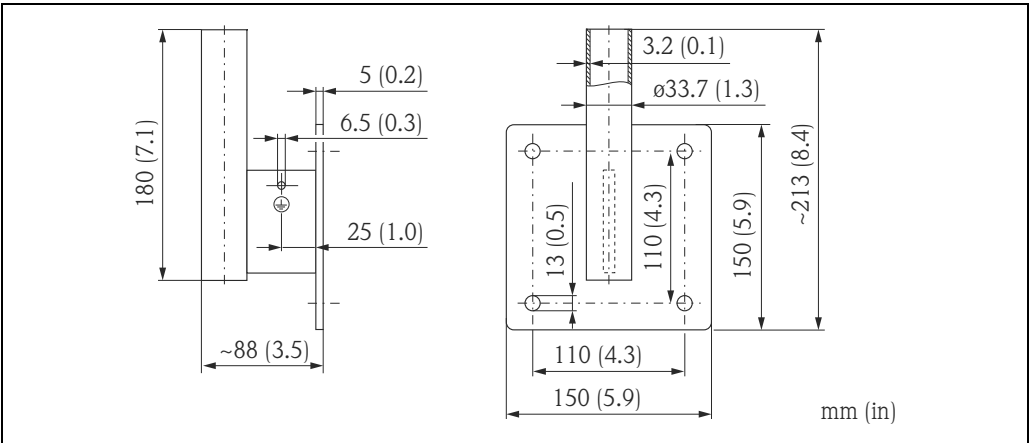


A0019279

| Height      | Material       | Weight             | Order Code  |
|-------------|----------------|--------------------|-------------|
| 700 (27.6)  | galv. steel    | 3.2 kg (7.06 lbs)  | 919791-0000 |
| 700 (27.6)  | 316Ti (1.4571) |                    | 919791-0001 |
| 1400 (55.1) | galv. steel    | 4.9 kg (10.08 lbs) | 919791-0002 |
| 1400 (55.1) | 316Ti (1.4571) |                    | 919791-0003 |

mm (in)

Wall Bracket

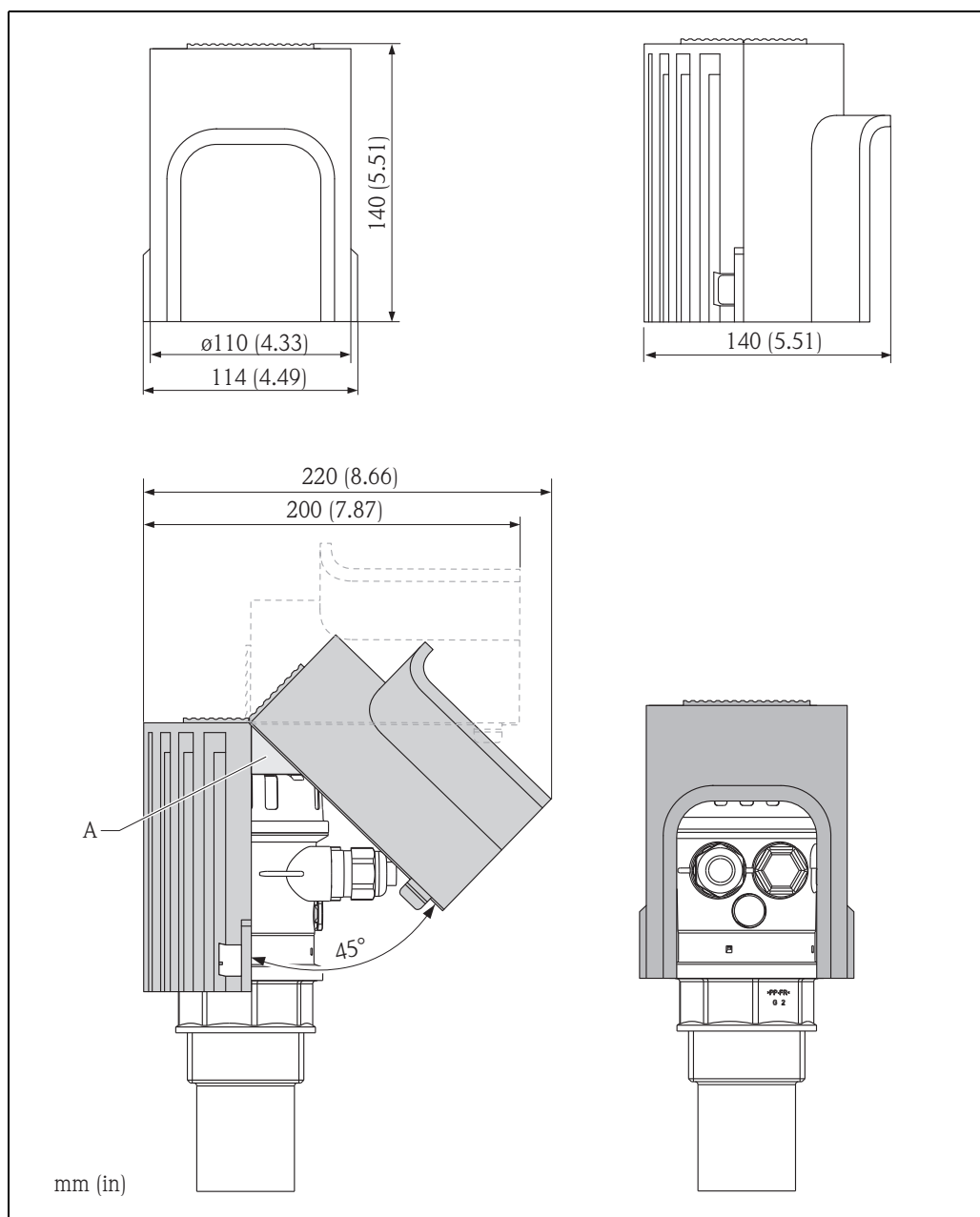


A0019350

| Material       | Weight            | Order Code  |
|----------------|-------------------|-------------|
| galv. steel    | 1.4 kg (3.09 lbs) | 919792-0000 |
| 316Ti (1.4571) |                   | 919792-0001 |

**Weather protection cover**

A Weather protection cover is recommended for outdoor mounting.



100-FMU30-00-00-00-xx-000

A Foam pad

| Material  | Order No. | Weight          | Operating conditions                  |
|-----------|-----------|-----------------|---------------------------------------|
| PBT, grey | 71127762  | 240 g (8.46 oz) | -50 °C to +150 °C (-58 °F to +302 °F) |

**Commubox FXA291**

The Commubox FXA291 connects Endress+Hauser field instruments via the service interface to the USB interface of a personal computer or a notebook. For details refer to TI00405C/07/EN.

Note!

For the FMU30 you need the "ToF Adapter FXA291" as an additional accessory.

**ToF Adapter FXA291**

The ToF Adapter FXA291 connects the Commubox FXA291 via the USB interface of a personal computer or a notebook to the FMU30.

For details refer to KA00271F/00/A2.

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## Documentation

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**Operating manual****BA00387F**

This instruction describe the installation and first commissioning of the instrument. From the operating menu, all functions are included, which are required for standard measurement tasks. Additional functions are not contained in the manual.

The documentation can be found on the supplied documentation CD. The documentation is also available via the Internet → siehe: [www.endress.com](http://www.endress.com) → Download.

**Description of device functions****BA00388F**

This contains a detailed description of all the functions of the instrument and is valid for all communication variants.

The documentation can be found on the supplied documentation CD. The documentation is also available via the Internet → [www.endress.com](http://www.endress.com) → Download.

**Short instructions****KA01054F**

is for rapid commissioning of the device. The instructions are attached to the device. The documentation can be found on the supplied documentation CD.

The documentation is also available via the Internet → [www.endress.com](http://www.endress.com) → Download.

**KA00290F**

can be found under the device housing cover.

The most important menu functions are summarised on this sheet. It is intended primarily as a memory jogger for users who are familiar with the operating concept of Endress+Hauser time-of-flight instruments.

**Safety Instructions**

Depending on the approval, the following Safety Instructions (XA) are supplied with the device. They are an integral part of the Operating Instructions.

| Certificate/type of protection                                                   | Documentation | Order code |         |
|----------------------------------------------------------------------------------|---------------|------------|---------|
|                                                                                  |               | Feature    | Version |
| ATEX II 1/2 G Ex ia IIC T5 Ga/Gb                                                 | XA01054F      | 10         | BB      |
| IECEx, Ex ia IIC T5 Ga/Gb                                                        |               |            | CB      |
| Ex ia Class I, Division 1, Group A-D, T5<br>Class I, Zone 0, AEx/Ex ia IIC T5 Ga | XA01080F      |            | IB      |
| NEPSI Zone 0/1, Ex ia IIC T5 Ga/Gb                                               | XA01264F      |            | NB      |



For certified devices the relevant Safety Instructions (XA) are indicated on the nameplate.

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## Instruments International

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Switzerland

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**Endress+Hauser**   
People for Process Automation

