TI00421F/97/EN/14.24-00
71654174
2024-05-15

Technical Information
Silopilot FMM20

Electromechanical level system



The simple and easy-to-understand level meter for light bulk solids

Application

- Measuring principle independent of physical properties like mass density
- Measuring of level in bunkers and silos with powdered or fine grain bulk solids and liquids
- Level measurements up to 42 m
- Process temperature of up to +150 °C (+302 °F)
- Can be used in aggressive atmospheres, for example acid or alkali vapors
- Separation layer detection in fluids possible with suitable sensing weights

Your benefits

- Suitable for process conditions in which classic ultrasonic or radar level gauges do not work reliably
- Precise detection of the level (accuracy of ±2.5 cm or ±1 pulse)
- Compact device with 0/4 - 20 mA current output as well as further free programmable signal outputs (for example counter pulse)
- Quick menu-guided local operation using a 4-line text display
- Fully electronic digital minimum fail-safe control, therefore no running down of the sensor weight into the silo outlet and no risk to the conveying systems

Endress+Hauser
People for Process Automation

Table of contents

About this document 3
Symbols 3

Function and system design 3
Measuring principle 3
Measuring system 4
Safety 5

Input 5
Measured variable 5
Measuring range 6
Block distance 6
Input signal 6
Operating frequency 6

Output 7
Output signal 7
Signal on alarm 8
Load (Current output) 8

Power supply 9
Supply voltage 10
Power consumption 10
Power supply failure 10
Potential equalization 10
Terminals 10
Cable entries 10
Cable specification 10

Performance characteristics 10
Measured value resolution 10
Maximum measured error 10
Influence ambient temperature 10

Mounting 11
Mounting location 11
Installation instructions 12
Selection sensing weights 12
Special installation 13

Environment 13
Ambient temperature 13
Storage temperature 13
Degree of protection 14
Electromagnetic compatibility 14

Process 14
Process temperature 14
Process pressure 14
Heating 14
Vibration 15

Mechanical construction 15
Dimensions 15
Weight 16
Materials 16
Process connection 17

Operability 17
Operation concept 17
On-site operation 17
Languages 18

Certificates and approvals 18
CE mark 18
Ex approval 18
RoHS 18

Ordering information 19
TAG 19
Scope of delivery 19
User-specific settings 19

Accessories 20
Device specific accessories 20

Supplementary documentation 26
Device-dependent supplementary documentation 26

About this document

Symbols

Safety symbols

DANGER
This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

WARNING
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

CAUTION
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE
This symbol contains information on procedures and other facts which do not result in personal injury.

Electrical symbols

⏚ Ground connection
Grounded clamp, which is grounded via a grounding system.

Symbols for certain types of information

✓ Permitted
Procedures, processes or actions that are permitted.

✗ Forbidden
Procedures, processes or actions that are forbidden.

ℹ Tip
Indicates additional information

Reference to documentation

Reference to another section

Reference to graphic

1., 2., 3. Series of steps

Symbols in graphics

A, B, C ... View

1, 2, 3 ... Item numbers

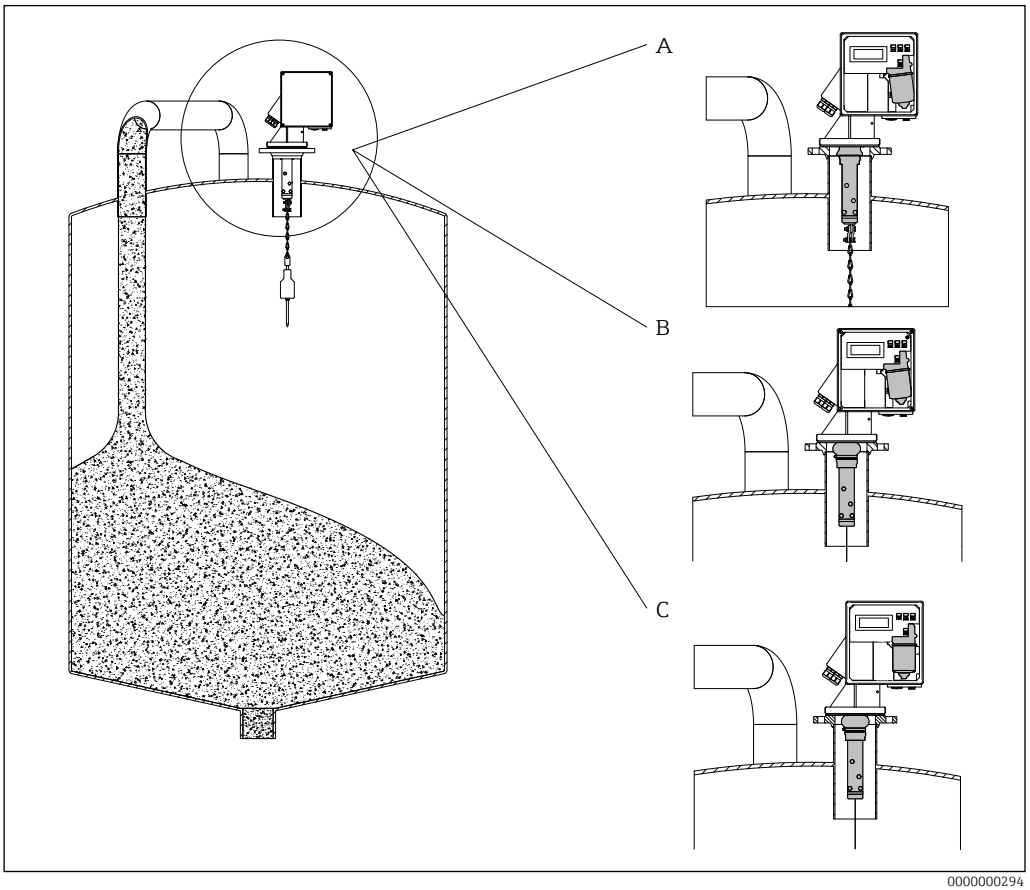
Function and system design

Measuring principle

The FMM works according to a simple measuring principle:

1. When a measurement starts (manually or automatically), a sensing weight is lowered by a motor and spring action causes the wiper to be moved slightly out of its end position. As the weight is lowered, the measuring tape passes over a counting wheel which sends a pulse to the electronics every 2.5 cm.
2. When it hits the medium, the freely oscillating motor tilts from its working position, in which it is held by the weight of the sensing weight, to its rest position. This is detected by the electronics and the motor is switched off.
3. The sensing weight is pulled up again and counter pulses are detected once more.
4. As soon as the sensing weight reaches the measuring device, it causes the wiper to move to its top position which is detected by the electronics.

5. The motor is switched off, the measuring cycle is ended and the measured value, which depends on the configuration, is put out:
   - Display value on the LC display
   - Current value at the 4-20 mA current output
   - Relay switching (e.g. for the "top position" or "measuring" function)



1 Measuring principle of the FMM20

A Sensing weight in the top position
B Sensing weight when lowered (run-down) or raised (run-up)
C Sensing weight on reaching the surface of the medium

During the entire measuring process (lowering and hoisting of the sensing weight) the device can also transmit pulses (relay output) corresponding to the length of the measuring tape, which can be recorded by a control unit or by an electromechanical counter.

Individual measurements or periodic measurement processes are possible. A measurement can be started via a parameterized input (e.g. switching contact of a connected system or PLC), manual operation (e.g. externally connected start button) or periodically (e.g. programmed function on the device).

The unit is delivered with default values for the maximum measuring range according to the unit configuration (see ordering information). The menu-guided programming using the 4-line text display assures easy and fast adjustment to the bunker or silo geometry.

Measuring system

The measuring device is a compact transmitter with integrated microprocessor-controlled electronics, various in- and outputs are provided. The device can be adapted to different applications by choosing one of the suitable sensing weights.

- Type of housing and materials:
  Compact, Aluminium, optional coated

- Sensing weights and materials:
  - Steel, optional with umbrella made of Polyester
  - Stainless steel 316TI, optional with umbrella made of Polyester
  - Plastic (PVC), optional with spike made of stainless steel 316Ti (1.4571)
  - Medium bag (Polyester)
  - Oval float made of stainless steel 316Ti (1.4571)
  - Variants for separation layer detection as accessories
- Configuration: Operation via 4-line local display with plain and help texts

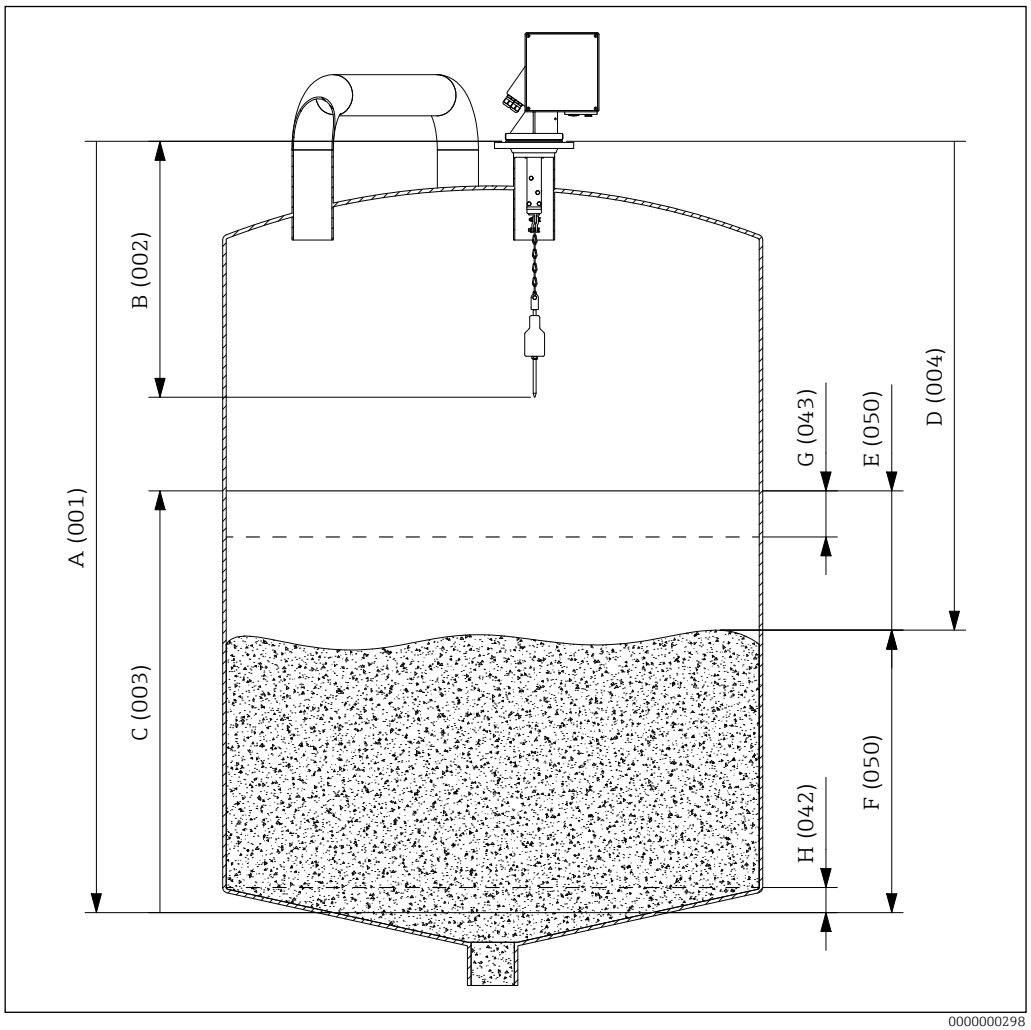
Safety

The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

Security measures in line with operators' security standards and designed to provide additional protection for the device and device data transfer must be implemented by the operators themselves.

Input

Measured variable



2 *Parameters of the basic setup*

A Empty calibration
B Block distance
C Full calibration
D Distance
E Ullage
F Level/volume
G Security distance
H Safety distance

Measured process value (D)

The measured value is the distance between the flange of the Silopilot minus a blocking distance (**B**) and the surface of the product.

Calculated process values

- The filling level (**F**) is computed taking into account the fixed given calibration values, for example the height of the silo (**A**).
- Furthermore, the residual volume (**E**) can be calculated as the difference between the level and the selected full calibration (**C**).
- The filling level can be converted to other values as desired, for example volume or mass, by the application of linearization.

Safety variables

The following calculated safety variables can be used as a warning if the measured value moves into these ranges.

- Security distance (**G**)
  Configurable range below the maximum measuring range (full calibration)
- Safety distance (**H**)
  Configurable range above the minimum measuring range (empty calibration)

Measuring range

Max. 42 m

The highest measurable point is given by the blocking distance plus a minimum descent length of 20 cm, this maximum length must be considered on input of the maximum measuring range (full calibration).

Block distance

The block distance (**B**) depends on the wiper length and the selected sensing weight.

Sensing weight	Wiper		
	230 mm	500 mm	1000 mm
B - E, N	0.72 m (28.35 in)	1.02 m (40.16 in)	1.52 m (59.84 in)
G	1.22 m (48.03 in)	1.52 m (59.84 in)	2.02 m (79.53 in)
P	0.82 m (32.28 in)	1.12 m (44.09 in)	1.62 m (63.78 in)
X	0.63 m (24.80 in)	0.93 m (36.61 in)	1.43 m (56.30 in)
71629601/ 71629605	0.77 m (30.31 in)	1.07 m (42.13 in)	1.57 m (61.81 in)

The individual value for the blocking distance is preset on delivery and only needs to be adjusted when changing the sensing weight for example, the relevant input option can be found in the menu.

Input signal

Remote operation possible via two inputs, each input can be assigned as either active or passive and is therfore usable.

The device is available with an optional external start button, which is connected to the passive signal input 1. → 17

Inputs, active

- Connection of an external voltage
- Input voltage range: 12 to 24 V DC
- Start pulse length: min. 200 ms

Inputs, passive

- Connection of an external command device, for example switch/button, relay contact
- Contact load: max. 0.3 W / 30 V DC
- Start pulse length: min. 200 ms

Operating frequency

Measurement cycle

→ 11

- When operating the measuring device, the minimum time for one measuring cycle depending on the measuring range must be observed, this time must be taken into account in all measuring modes. → 11
- Even with smaller measuring ranges, it is recommended not to go below a minimum time of 5 minutes for one measuring cycle.

Tape running speed

0.16 to 0.25 m/s

Output

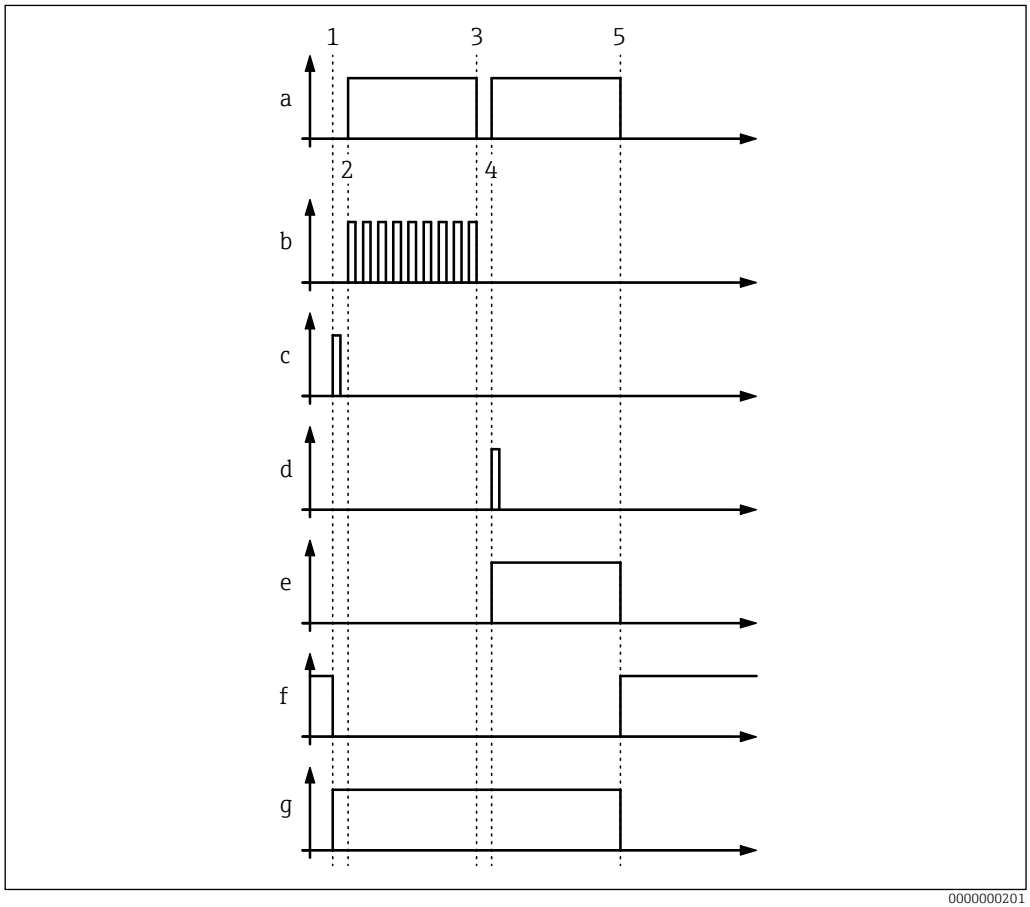
Output signal

Current output

- 0/4 to 20 mA (active, 0 to 20 mA / 4 to 20 mA programmable)
- Max. 22 mA

Relay outputs

- Quantity: 2 (optional 4)
- Contact load: max. 250 V AC / 6 A



3 *Programmable relay output functions*

Measurement cycle (a)

1. A measurement starts (time-controlled or event-controlled)
2. The sensing weight is lowered
3. The surface of the medium is detected (measured value generation)
4. The sensing weight is raised
5. The measurement ends

Programmable relay output functions

- Counter pulse (**b**)
  Output pulses that correspond to the length of unwound tape
- Reset pulse (**c**)
  Pulse before every new measurement
- Running up (**e**)
  Displayed when the tape runs back up
- Top position (**f**)
  Indicated when the upper end position is reached (end of measurement)
- Measuring (**g**)
  Indicates an active measuring cycle, for example to lock a filling system to protect the sensing weight from being buried
- Alarm
  Relay switches in a fault condition
- Service interval
  Relay switches when the set number of measuring cycles is reached

Optocoupler output

- Optional output on devices with 4 relays.
- When using the "counter pulse" output function, the counter pulses are output in parallel with relay 4.
- Contact load: max. 30 V DC / 10 mA

Signal on alarm

Malfunction signal can be called up via the following interfaces.

Local display

Error symbol, error code and description in plain text on the on-site display

Current output

- Minimum: minimum current value <= 3.6 mA (4-20 mA) or 0 mA (0-20 mA)
- Maximum: maximum current value + 10 % (22 mA)
- Programmable: current value 0 to 22 mA
- Hold: Last valid current value is held

Relay output

Alarm function

Load (Current output)

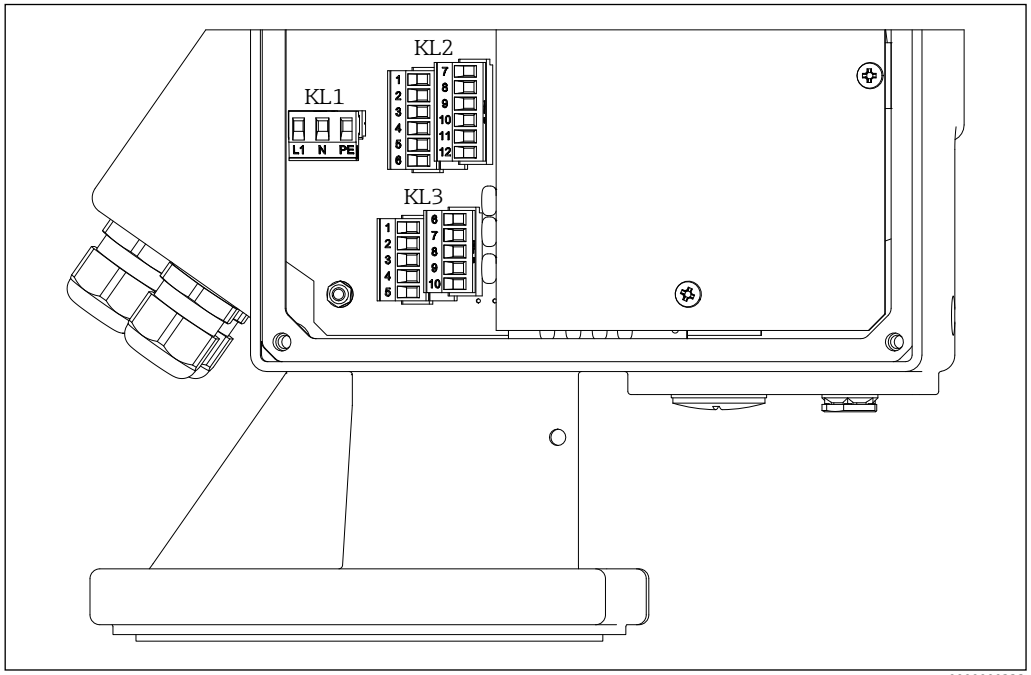
Max. 600 Ω

Linearization

The linearisation function of the device facilitates conversion of the measured value into engineering units such as cubic metres or hectolitres.

Power supply

Terminal assignment



4 *Terminal assignment*

Signal input

Order code	Terminal assignment		
Without	**Input 1 (active)**	**Input 2 (active)**	
	3.1	3.6	(+)
	3.3	3.8	(–)
	Input 1 (passive)	**Input 2 (passive)**	
	3.1	3.6	
	3.2	3.7	

Relay output

Order code	Terminal assignment		
Output option A	**Relay 1**	**Relay 2**	
	2.1	2.4	
	2.2	2.5	
	2.3	2.6	
Output option C	**Relay 3**	**Relay 4**	
	2.7	2.10	
	2.8	2.11	
	2.9	2.12	

The rest position matches with the position of the relays without power supply, this represents the alarm condition if the function "alarm" is selected.

Optocoupler output

Order code	Terminal assignment	
Output option C	3.4	
	3.5	

Supply voltage

- 90 to 253 V AC, 50/60 Hz (Ordering code "**power supply**", option **1**)
- 20 to 28 V DC (Ordering code "**power supply**", option **3**)
- Terminal assignment:
  - AC: 1.1 (L1) / 1.2 (N) / 1.3 (PE)
  - DC: 1.1 (L+) / 1.2 (L–)

- In accordance with IEC/EN61010 a suitable circuit breaker must be provided for the measuring device.
- Provide overcurrent protection device (max. 16 A) for the supply voltage.
- For the DC version of the FMM20 with optional heating, the maximum inrush current is 10 A (≤ 2 s).

Power consumption

- Max. 150 VA (Ordering code "**ambient temperature**", option **D** or **F**)
- Max. 170 VA (Ordering code "**ambient temperature**", option **E** or **G**)

Power supply failure

- Configuration remains in the device memory
- The current error is moved to the "previous error" function.

Potential equalization

Requirements:
- The potential equalization must be connected to the external ground terminal on the device.
- For optimum electromagnetic compatibility, keep the potential equalization line as short as possible.
- The recommended cable cross-section is 2.5 mm^2.
- The potential equalization of the FMM20 must be included in the local potential equalization.

For a device for the hazardous area:
Observe the instructions in the Ex documentation (XA).

Terminals

- Max. 2.5 mm^2 (Supply voltage)
- Max. 1.5 mm^2 (Signal inputs, relay outputs and current output)

Cable entries

- M20x1.5
- Clamping range: 7 to 12 mm (0.28 to 0.47 in)
- Material: Plastic
- Color:
  - grey (Ex-free area)
  - black (Ex approval)
- Quantity: 3

Cable specification

- Minimum requirement: cable temperature range ≥ ambient temperature
- Standard installation cable is sufficient for signal inputs, relay outputs and current output.

Performance characteristics

Measured value resolution

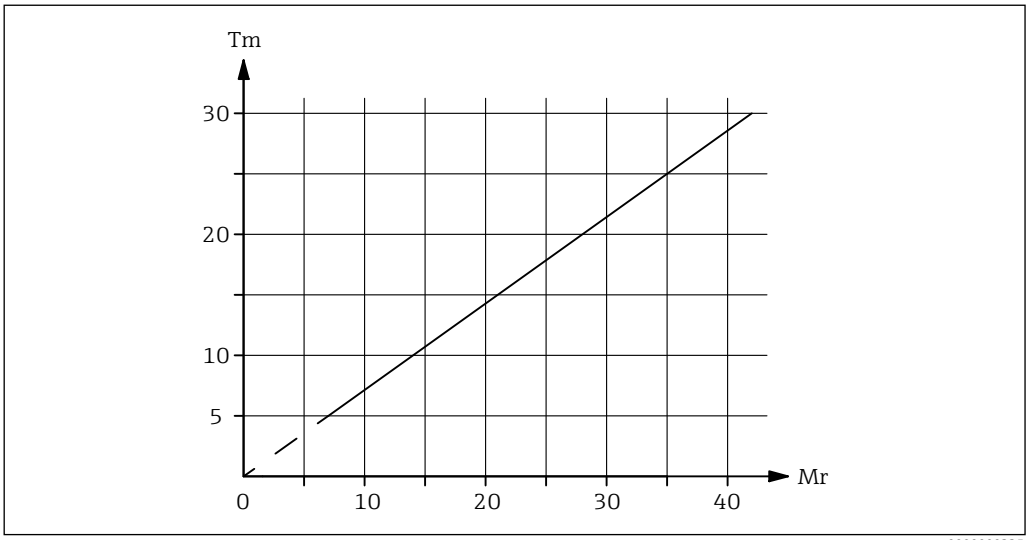
± 2.5 cm or ± 1 pulse (irrespective of the selected measuring range)

Maximum measured error

→ Measured value resolution

Influence ambient temperature

The minimum time for a measuring cycle depending on the measuring range must be observed.

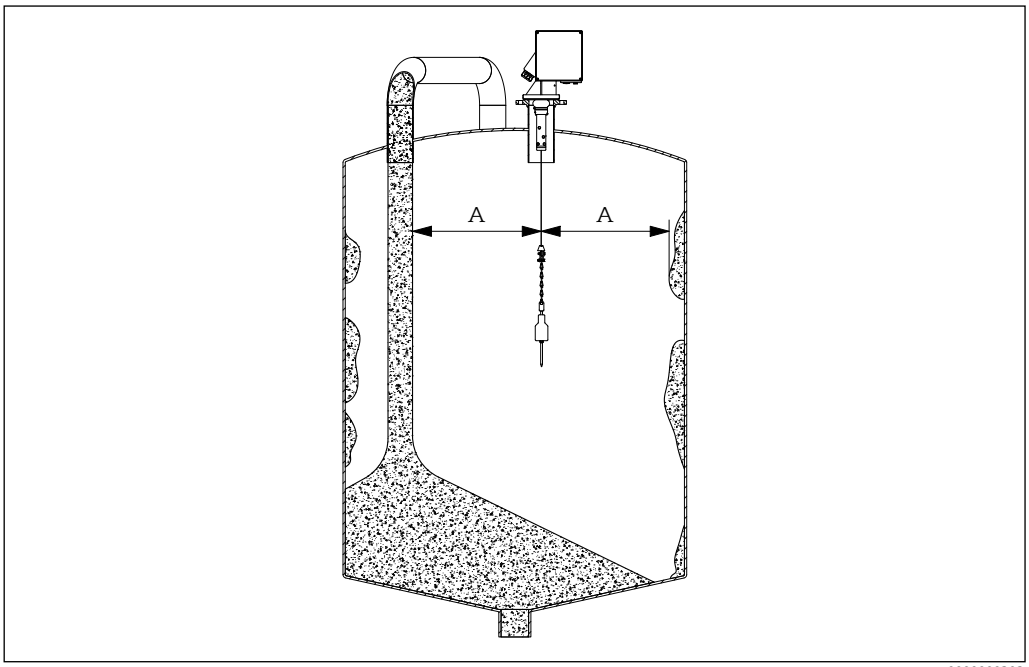


5 *Minimum time for one measurement cycle*

Mounting

Mounting location

- Select the installation location on the bunker or silo ceiling such that product falling inside during filling or cornices (product accumulating on container wall) collapsing inward are prevented from covering the sensing weight or damaging the measuring tape.
- Take due account of the shape and location of the product inflow cone and the outflow funnel within the container. Do not run the measuring path too close to fixtures and struts so that the measuring tape does not brush against them when the sensing weight swings around.
- Select the length of the wiper so that the sensing weight can move freely during downward or upward running and does not, for example, come into contact with the edges of a connection pipe. The sensing weight should be located in the middle between the container wall and filling curtain when it is run up and down.



6 *Installation position*

A Distance

Take due account of the shape and location of the product inflow cone and the outflow funnel within the vessel.

Mounting position

Normally, the measuring device is mounted on a counter flange DN100 PN16 (bore dimensions as per EN 1092-1) or a flange of the same connection dimensions.

The counter flange must be mounted in such a way that it is perfectly horizontal so that the device can also be mounted horizontally onto it (maximum angle of inclination 2°).

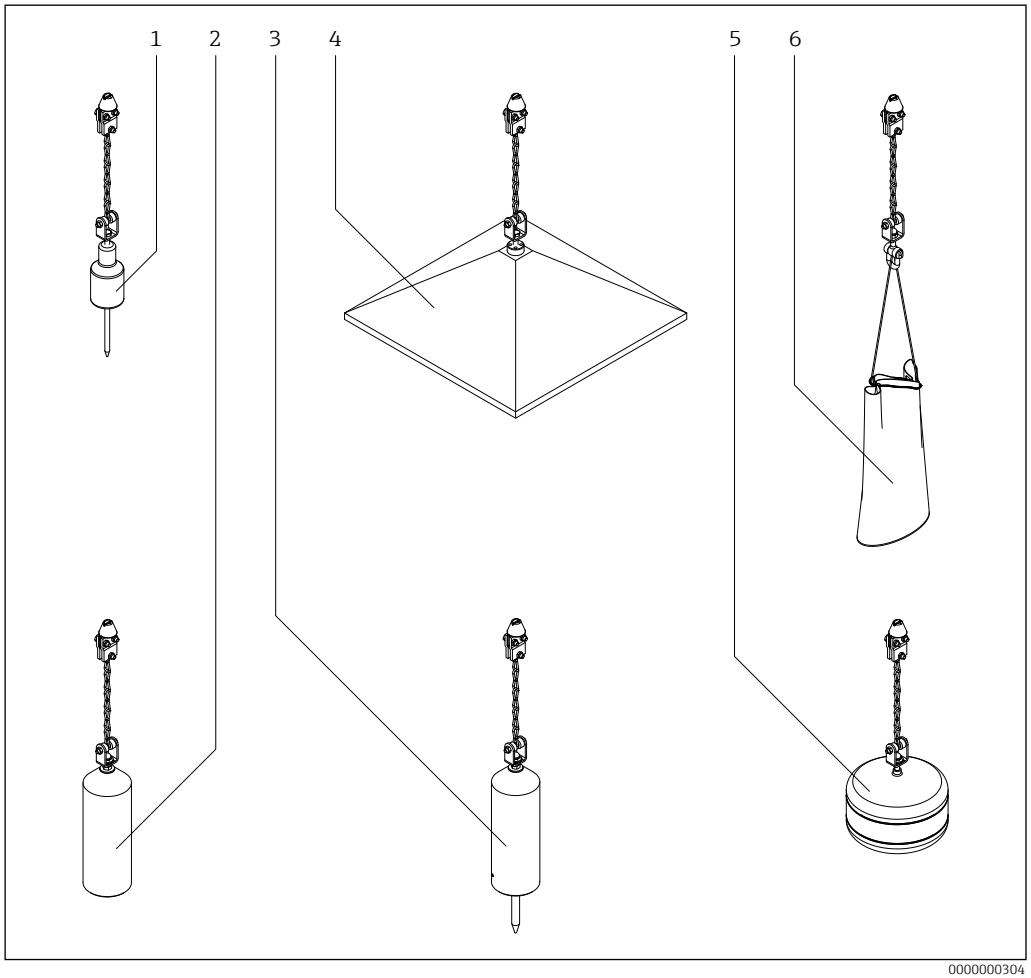
Installation instructions

- In case of higher process temperatures in the area of the installation site, create a suitable structural measure for compliance with this temperature condition.
- Use an extension of the process connection nozzle to keep the meter away from high process temperatures. The length of the connection nozzle is based on the specific process and ambient conditions.
- When mounting outdoors, use weather protection cover or attach weather protection roof.
- Normal weights, umbrella weights and bag weights can be passed through the DN100 mounting flange into the bunker/silo. When using larger sensing weights, such as floats and some bag-type weights, access provision must be present in the construction of the bunker/silo for installation of these weights.
- When installing in bunkers/silos with heavy dust loadings, a slight positive pressure can be generated at the device by connecting a compressed air line to its device flange (airflow quantity as required). There is a G1/4 female connection provided for this purpose.

Selection sensing weights

When selecting the sensing weight the following points should be considered:

- During the measuring process, the sensing weight must not sink into the product, nor must it be allowed to slide off the cone.
- The sensing weight must be suitable for the chemical properties of the filling material and the temperatures prevailing in the bunker or silo.
- Special types for your individual applications are available on request.



7 *Sensing weight*

Normal weight (1)

Ordering code "**sensing weight**", option **B** or **C**
- Used for granules and compressed bulk solids.
- Material: Steel or stainless steel 316TI (1.4571)
- Weight: 1.5 kg
- The spike can be taken off.

Plastic weight (2+3)

Ordering code "**sensing weight**", option **N** or **P**
- Used for granules and compressed bulk solids.
- Material: Plastic, optional spike made of stainless steel
- Weight: 1.5 kg (option N) / 1.8 kg (option P)
- Maximum permissible temperature: +70 °C (+158 °F)
- The spike can be taken off.

Umbrella weight (4)

Ordering code "**sensing weight**", option **D** or **E**
- Application for very light and loose bulk solids, for example flour or coal-dust.
- Material: Steel or stainless steel 316Ti (1.4571), Polyester
- Weight: 1.9 kg
- When folded closed, the weight can be passed through the DN100 mounting flange into the bunker.
- The umbrella weight has a large square surface area which prevents it from sinking deeply into the product.

Float (5)

Ordering code "**sensing weight**", option **X**
- Material: Stainless steel 316Ti (1.4571)
- Weight: 1.9 kg
- Application for liquids, for example fuel oil, also for granulates.

Medium bag (6)

Ordering code "**sensing weight**", option **G**
- Application in bunkers to which for example mills are connected down-stream. The bag contains whichever product is contained within the bunker.
- Material: Bag made of polyester, all metal parts made from stainless steel
- Weight: 0.25 kg (empty) / 1.5 kg (filled)
- Maximum permissible temperature: +150 °C (+302 °F)
- The bag shall be closed at the top to prevent the contents from falling out if the bag tips over when it hits the slope of a dump cone.

If the bunker/silo has a downstream crushing or milling system, we recommend using the electrical signal function "tape breakage" to avoid damaging the system in the event of the sensing weight breaking free.

Special installation

Weather protection cover

When using the protectin hood available as an accessory, a free height of at least 240 mm (9.45 in) is required above the measuring device for mounting.

Weather protection cover
→ 20

Environment

Ambient temperature
- -20 to +60 °C (-4 to +140 °F) (The readability of the display may be impaired at temperatures outside the temperature range.)
- -40 to +60 °C (-40 to +140 °F) using the self-regulating device heater

Storage temperature

-40 to +80 °C (-40 to +176 °F)

Degree of protection

- With closed enclosure: IP67
- With closed enclosure and with the use of the external start button: IP65
- With open housing: IP20

Electromagnetic compatibility

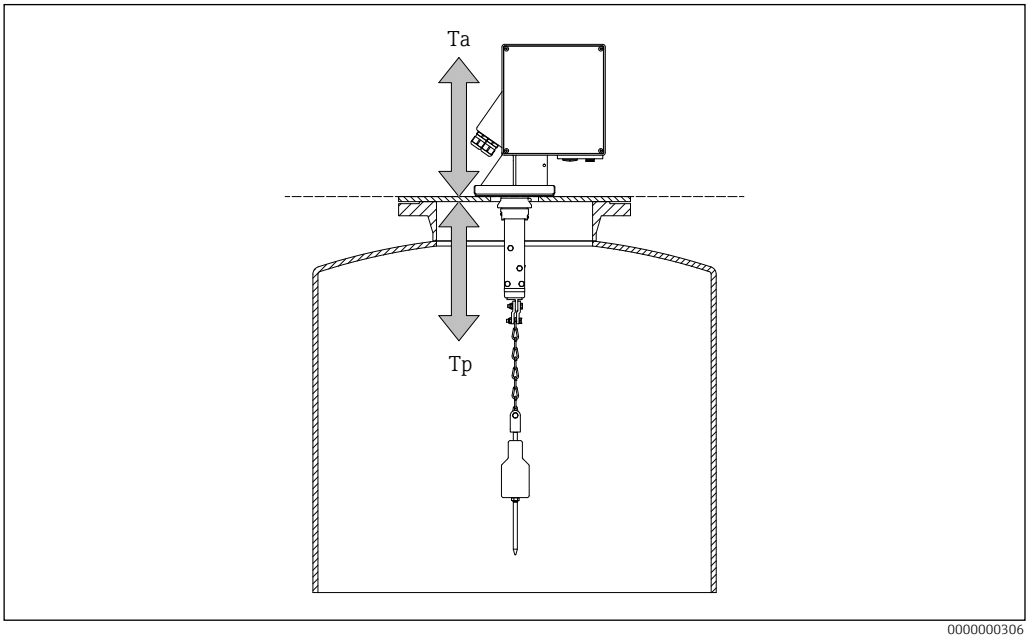
- Interference emission to EN 61326, Electrical Equipment Class B
- Interference immunity to EN 61326, Appendix A (Industrial)

Process

Process temperature

- -20 to +70 °C (-4 to +158 °F), Ordering code "**process temperature**", option **1**
- -20 to +150 °C (-4 to +302 °F), Ordering code "**process temperature**", option **2**
- Observe deviating temperature ranges for the accessories offered!

The maximum process temperature at the unit from the bottom of the adaptor flange upwards is +60 °C (+140 °F). In the presence of higher process temperatures in the vicinity of the mounting location, suitable installation provisions must be utilized to assure these temperature guidelines.



0000000306

8 Permissible ambient temperatures at the FMM20

Ta -20 to +60 °C (-4 to +140 °F)
-40 to +60 °C (-40 to +140 °F) using the self-regulating device heater
Tp -20 to +150 °C (-4 to +302 °F)

- An extension for the process connection can be used to separate the device from the higher process temperatures. The maximum allowed temperature of +70 °C (+158 °F) can be met through this. The required length of the connection nozzle is dependant on the actual process and ambient conditions.
- We recommend the use of an extended wiper (500/1000 mm) at a process temperature greater than +70 °C (+158 °F).
- When using process nozzles with longer lengths than 230 mm (length of the standard wiper), longer wipers can be ordered as a device option. Alternatively, the length of the chain between tape border and sensing weight can be increased, corresponding parts are available as an accessory.

Process pressure

0.8 to 1.1 bar (12 to 16 psi) absolute

Heating

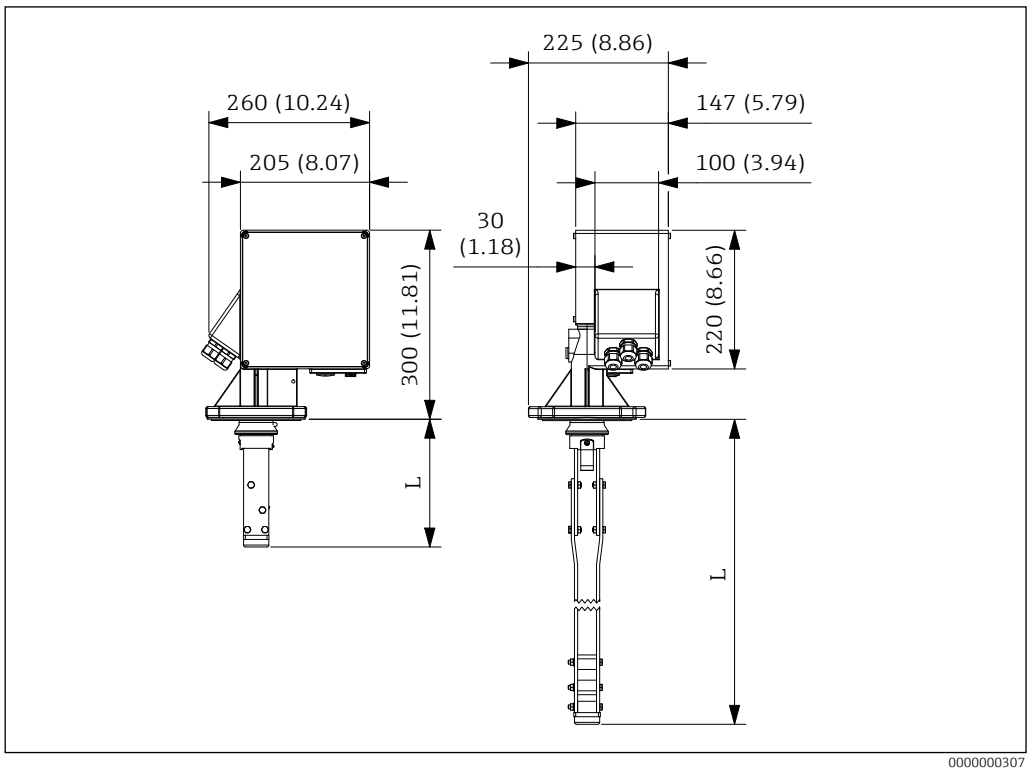
It is recommended that at ambient temperatures below 0 °C (+32 °F) a device with integrated heater is chosen (ordering code "**ambient temperature**", option **E** and **G**).

Vibration

Due to the layout, the device should not be exposed to vibration. The pendular motion of the motor combined with vibrations can lead to erratic triggering of the tape switch and therefore to faulty measurements.

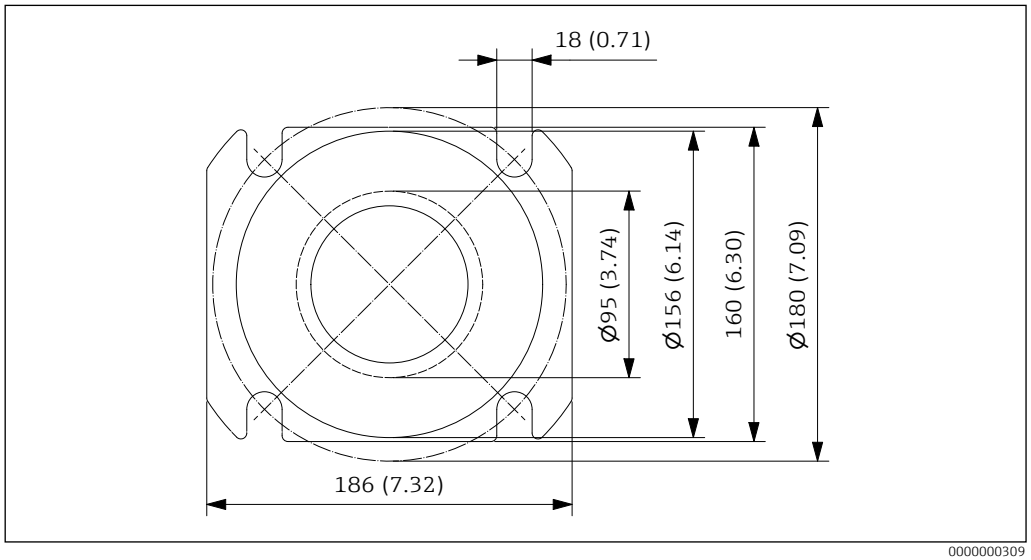
Mechanical construction

Dimensions



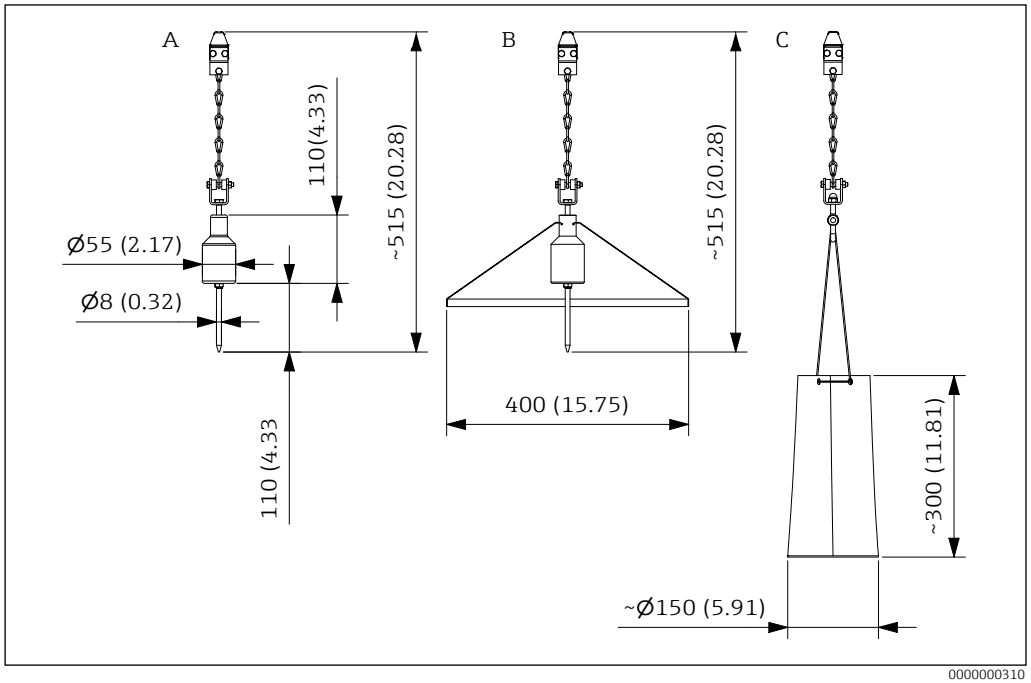
9 Housing dimensions. Unit of measurement mm (in)

The wiper length (**L**) depends on the selected maximum nozzle height:
- 225 mm (8.86 in), Ordering code "**maximum connection height; wiper**", option **A** or **B**
- 515 mm (20.28 in), Ordering code "**maximum connection height; wiper**", option **C** or **D**
- 1015 mm (39.96 in), Ordering code "**maximum connection height; wiper**", option **E** or **F**



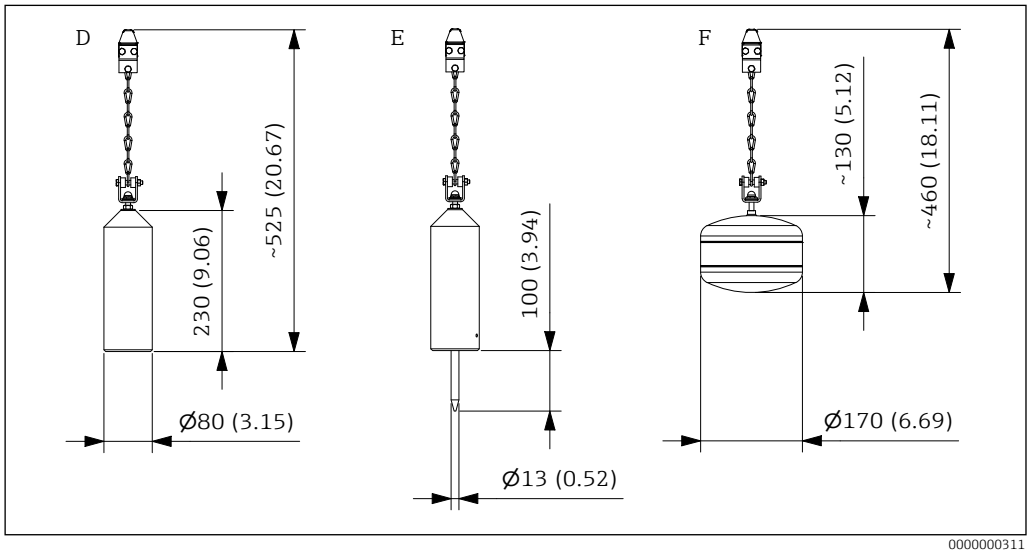
10 Dimensions of the process connection. Unit of measurement mm (in)

Minimum process connection diameter of 95 mm (3.74 in) for installation of wiper mechanism and sensing weights



11 *Dimensions of sensing weights - Standard (with umbrella) and medium bag. Unit of measurement mm (in)*

A Normal weight
B Umbrella weight
C Medium bag



12 *Dimensions of plastic sensing weight and float. Unit of measurement mm (in)*

D Plastic weight
E Plastic weight with spike
F Stainless steel float

Weight

- 11 to 17 kg (depends on the selected type of device, without sensing weight)
- Sensing weight → 12

Materials

- Housing: Aluminum (optional coated, RAL 5012 and RAL 7035)
- Wiper: Aluminum/steel or stainless steel
- Measuring tape: Stainless steel or plastic
- Sensing weight → 12

Process connection

- Flange
- Hole dimensions DN100 PN16 according to EN 1092-1

Operability

Operation concept

Operator-oriented menu structure for user-specific tasks

- Commissioning
- Operation
- Diagnostics
- Expert level

Quick and safe commissioning

Menu guidance with brief explanations of the individual parameter functions

Reliable operation

- Operation in the following languages: English, German, French, Japanese
- Other operating languages can be ordered optionally (product configurator)
- Help texts in the selected language

Efficient diagnostics increase measurement availability

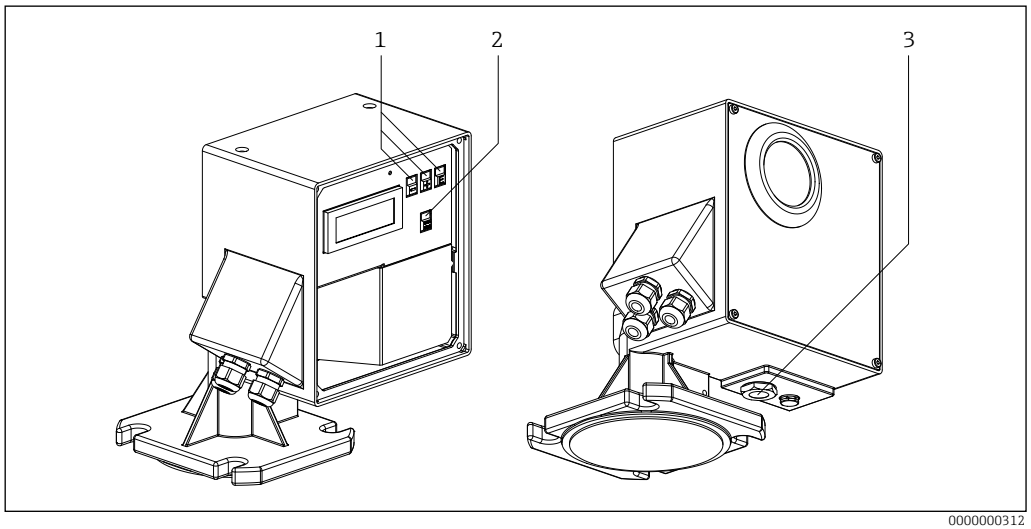
- Display of the current and the previous error
- Help texts for every occuring error
- Various simulation options

The parameterization is stored internally and is retained even after the supply voltage is removed. No operation is required while the device is working. Adaptation to the application must only be carried out during initial installation. However, subsequent changes can be made and saved at any time.

On-site operation

Operating elements

- Local operation (parameterization) with 3 push buttons (**1**): −, +, E
- Local operation (start measuring) with one push button (**2**), optional with external start button (**3**), ordering code "**additional equipment**", option **2**



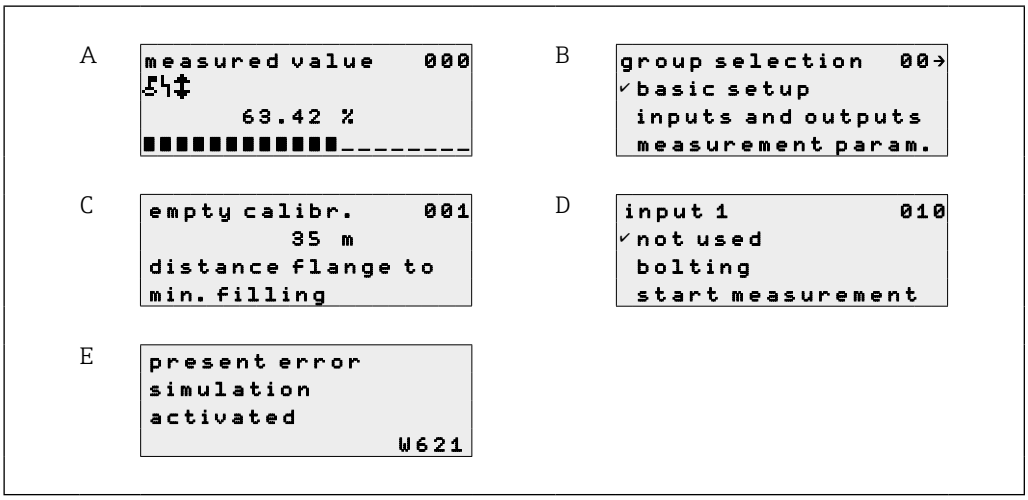
13 On-site operation

1 Operating keys for configuration
2 Operation key start measurement
3 Operation key start measurement, external

Display elements

- 4-line display
- 20 characters per line
- Display contrast adjustable by using a key combination
- Display of measurand numeric and graphic

Permitted ambient temperature for the display: -20 to +70 °C (-4 to +158 °F), the readability of the display may be impaired at temperatures outside the temperature range.



14 *Display options*

A Operational display (measured value display)
B Navigation view
C Entering a value
D Selecting a value
E Diagnostic messages

Languages

- Deutsch
- English
- Francais
- ニホンゴ (Katakana, Japanese)
- Other operating languages can be ordered optionally (product configurator)

Certificates and approvals

CE mark

The level meter Silopilot FMM20 is in conformity with the statutory requirements of the applicable EU Directives. These are listed in the corresponding EU Declaration of Conformity along with the standards applied.
By applying the CE mark, Endress+Hauser confirms that the device has passed the necessary tests.

Ex approval

All explosion protection data is listed in separate documentation which is available from the download area. The Ex documentation is supplied as standard with all Ex-systems.

RoHS

The level meter complies with the substance restrictions of the Restriction of Hazardous Substances Directive 2011/65/EU and the Delegated Directive 2015/863/EU.

Ordering information

Detailed ordering information is available from the following sources:
- In the Product Configurator on the Endress+Hauser website: www.endress.com → Click "Corporate" → Select your country → Click "Products" → Select the product using the filters and search field → Open product page → The "Configure" button to the right of the product image opens the Product Configurator.
- Endress+Hauser sales center: www.addresses.endress.com

Product Configurator – the tool for individual product configuration
- Up-to-the-minute configuration data
- Depending on the device: Direct input of measuring point-specific information such as measuring range or operating language
- Automatic verification of exclusion criteria
- Automatic creation of the order code and its breakdown in PDF or Excel output format

TAG

Measuring point (tag) (TAG)

The device can be ordered with a tag name.

Position of the tag name

In the additional specification, select:
- Tag plate, stainless steel
- Plastic film
- Supplied plate

Definition of the tag name

In the additional specification, specify:
3 lines, each containing up to maximum 18 characters
The specified tag name appears on the selected label.

Scope of delivery

The scope of delivery includes a minimum of the FMM20 in one cardboard box.
Depending on the ordering code the following additional parts are supplied:
- Wiper extension 500/1000 mm in one separate cardboard box
- Accessories (usually packed separately)

User-specific settings

As a service, the measuring device can be preset according to customer-specific requirements during production; a corresponding order can be placed using the extended order code.

Accessories

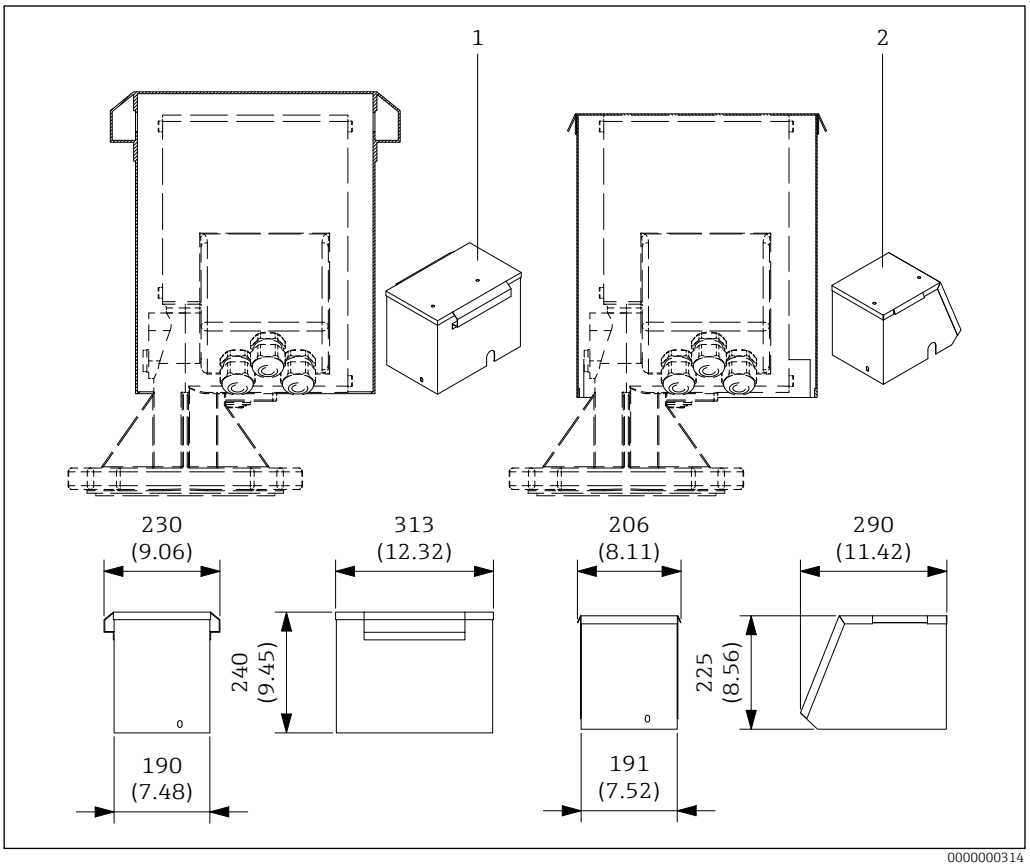
Various accessories are available for the device, and can be ordered with the device or at a later stage from Endress+Hauser. Detailed information on the order code in question is available from your local Endress+Hauser sales center or on the product page of the Endress+Hauser website: www.endress.com.

Device specific accessories

Weather protection cover

The weather protection cover is simply slipped over the FMM after installation and attached to the device with three screws. You will need a free height of at least 240 mm (9.45 in) above the measuring device for installing and/or dismantling.

- Order number: 71028956
  - Material: Stainless steel 304 (1.4301)
  - Weight: 4.3 kg (9.48 lb)
- Order number: 71075962
  - Material: Aluminum
  - Weight: 0.7 kg (1.54 lb)

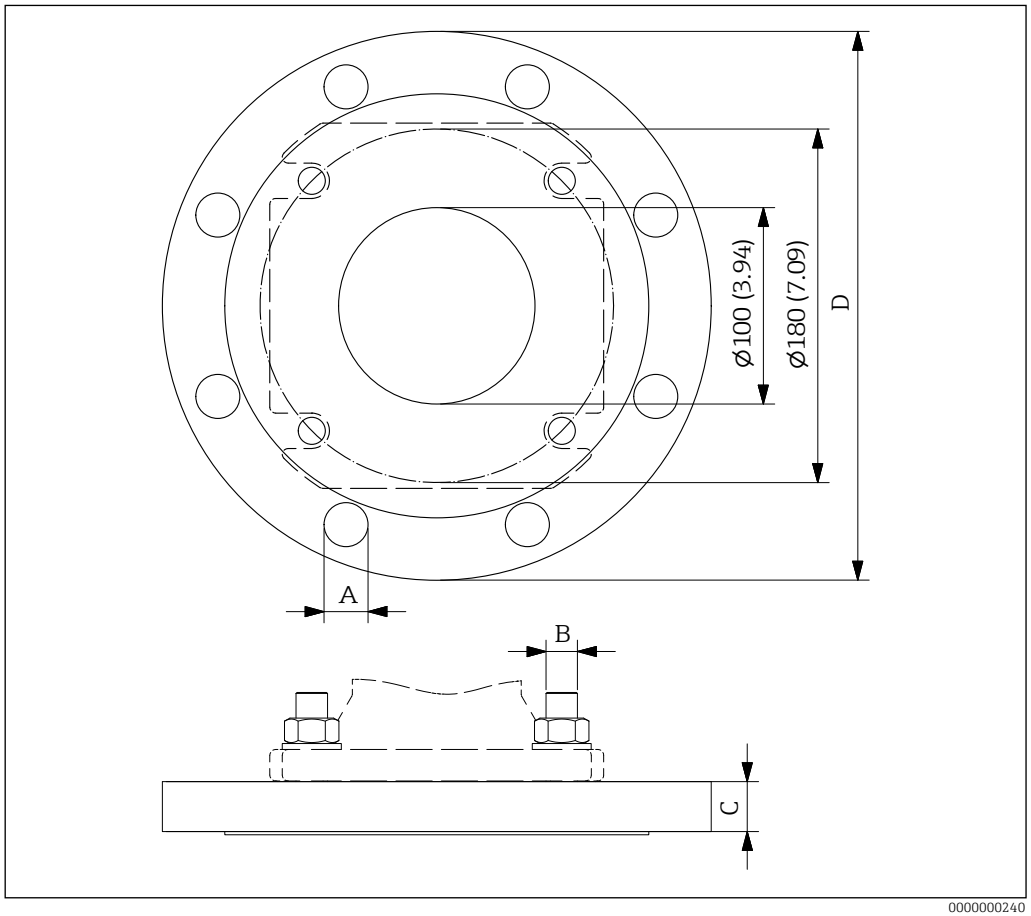


15 *Weather protection cover*

1 *Stainless steel*
2 *Aluminum*

Adapter flange for lower pressure ratings

The following adapter flanges can be used to adapt to existing process connections. The adapter flange is mounted between the process connection of the device and the application. As the flange is not very high, the clearance needed for the device is only marginally increased.



16 Adapter flange (example ASME B16.5 6" 150 lbs). Unit of measurement mm (in)

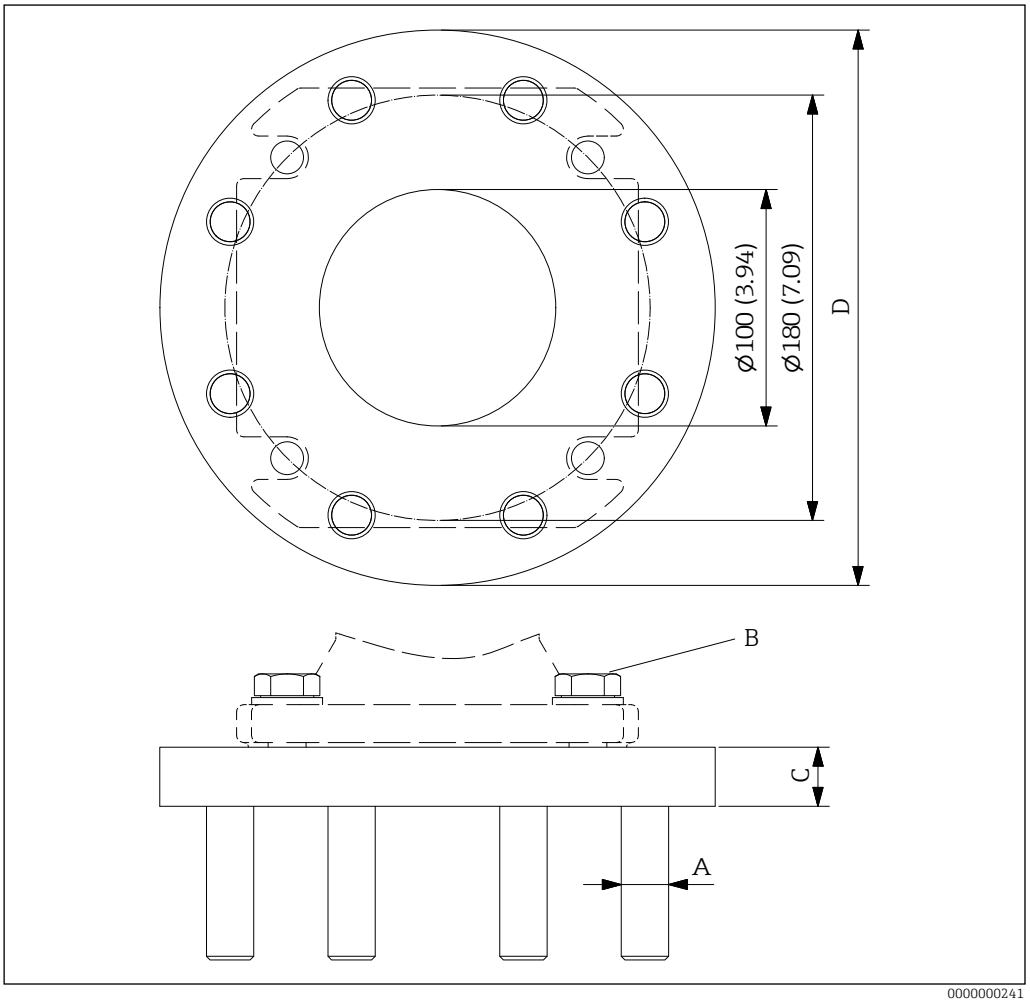
- Order number:
  71301820 (DN150, PN16, EN1092-1, stainless steel 316Ti, 9 kg (19.8 lb))
  71301821 (DN150, PN16, EN1092-1, steel, 9 kg (19.8 lb))
  71301822 (DN200, PN16, EN1092-1, stainless steel 316Ti, 15 kg (33.1 lb))
  71301824 (DN200, PN16, EN1092-1, steel, 15 kg (33.1 lb))
  71301811 (6", 150lbs, ASME B16.5, stainless steel 316Ti, 10 kg (22 lb))
  71301815 (6", 150lbs, ASME B16.5, steel, 10 kg (22 lb))
  71301816 (8", 150lbs, ASME B16.5, stainless steel 316Ti, 18 kg (39.7 lb))
  71301817 (8", 150lbs, ASME B16.5, steel, 18 kg (39.7 lb))
- Dimension (mm (in)):

Order number	Holes	A	B	C	D
71301820	8	22 (0.87)	M16	22 (0.87)	285 (11.22)
71301821					
71301822	12	22 (0.87)		24 (0.94)	340 (13.39)
71301824					
71301811	8	22.4 (0.88)	UNC 5/8"	25.4 (1)	279.4 (11)
71301815					
71301816				28.6 (1.13)	342.9 (13.5)
71301817					

- The delivery contains suitable nuts to secure the measuring device to the adapter flange.

Adapter flange with studs for higher pressure ratings

The following adapter flanges can be used to adapt to existing process connections.



17 Adapter flange (example DN100 PN25/40). Unit of measurement mm (in)

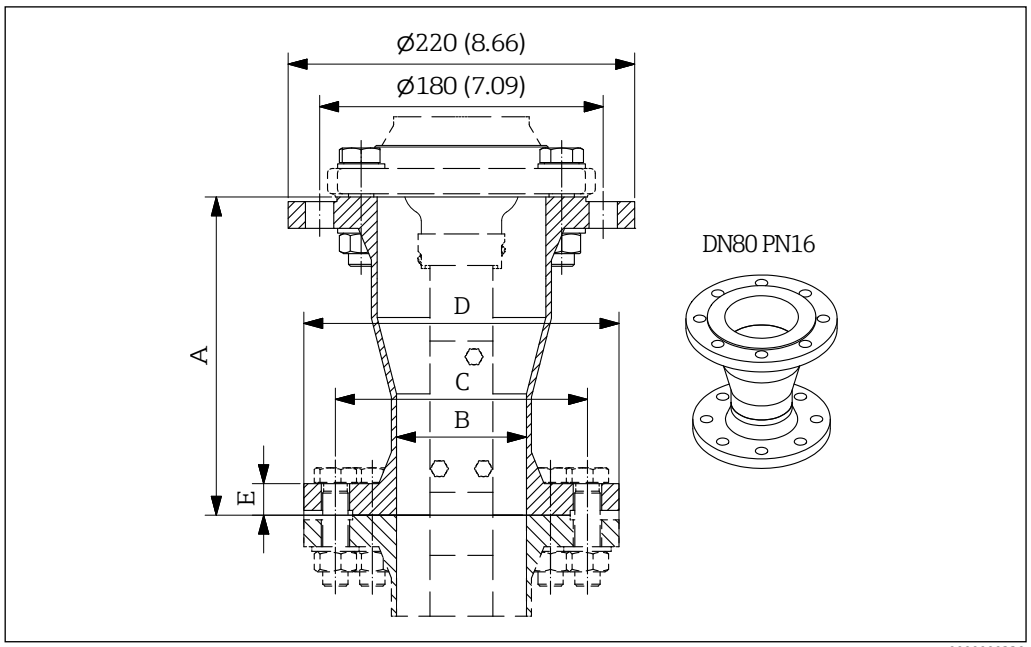
- Order number:
  71301826 (DN100, PN25/40, EN1092-1, stainless steel 316Ti, 7 kg (15.4 lb))
  71301829 (DN100, PN25/40, EN1092-1, steel, 7 kg (15.4 lb))
  71301831 (4", 300lbs, ASME B16.5, stainless steel 316Ti, 11 kg (24.3 lb))
  71301833 (4", 300lbs, ASME B16.5, steel, 11 kg (24.3 lb))
  71301834 (4", 600lbs, ASME B16.5, stainless steel 316Ti, 16 kg (35.3 lb))
  71301835 (4", 600lbs, ASME B16.5, steel, 16 kg (35.3 lb))
- Dimension (mm (in)):

Order number	Stud bolts	A	B	C	D
71301826	8	M22	M16	25 (0.98)	235 (9.25)
71301829					
71301831		UNC 3/4"	UNC 5/8"	31.8 (1.25)	254 (10)
71301833					
71301834				38.1 (1.5)	273.1 (10.75)
71301835					

- The delivery suitable screws to secure the measuring device to the adapter flange.

Process adapters for smaller nominal diameters

The following process adapters can be used to adapt to existing process connections with smaller nominal diameters (< DN100).



18 Process adapter (example DN80 PN16). Unit of measurement mm (in)

- Order number:
  71301837 (DN50, PN16, EN1092-1, stainless steel 316Ti, 10.5 kg (23.1 lb))
  71301839 (DN50, PN16, EN1092-1, steel, 10.5 kg (23.1 lb))
  71301841 (DN65, PN16, EN1092-1, stainless steel 316Ti, 11 kg (24.3 lb))
  71301843 (DN65, PN16, EN1092-1, steel, 11 kg (24.3 lb))
  71301844 (DN80, PN16, EN1092-1, stainless steel 316Ti, 10 kg (22 lb))
  71301857 (DN80, PN16, EN1092-1, steel, 10 kg (22 lb))
  71301858 (2", 150lbs, ASME B16.5, stainless steel 316Ti, 11 kg (24.3 lb))
  71301859 (2", 150lbs, ASME B16.5, steel, 11 kg (24.3 lb))
  71301861 (3", 150lbs, ASME B16.5, stainless steel 316Ti, 11.5 kg (25.3 lb))
  71301864 (3", 150lbs, ASME B16.5, steel, 11.5 kg (25.3 lb))
  71301867 (4", 150lbs, ASME B16.5, stainless steel 316Ti, 12.5 kg (27.6 lb))
  71301868 (4", 150lbs, ASME B16.5, steel, 12.5 kg (27.6 lb))
- Dimension (mm (in)):

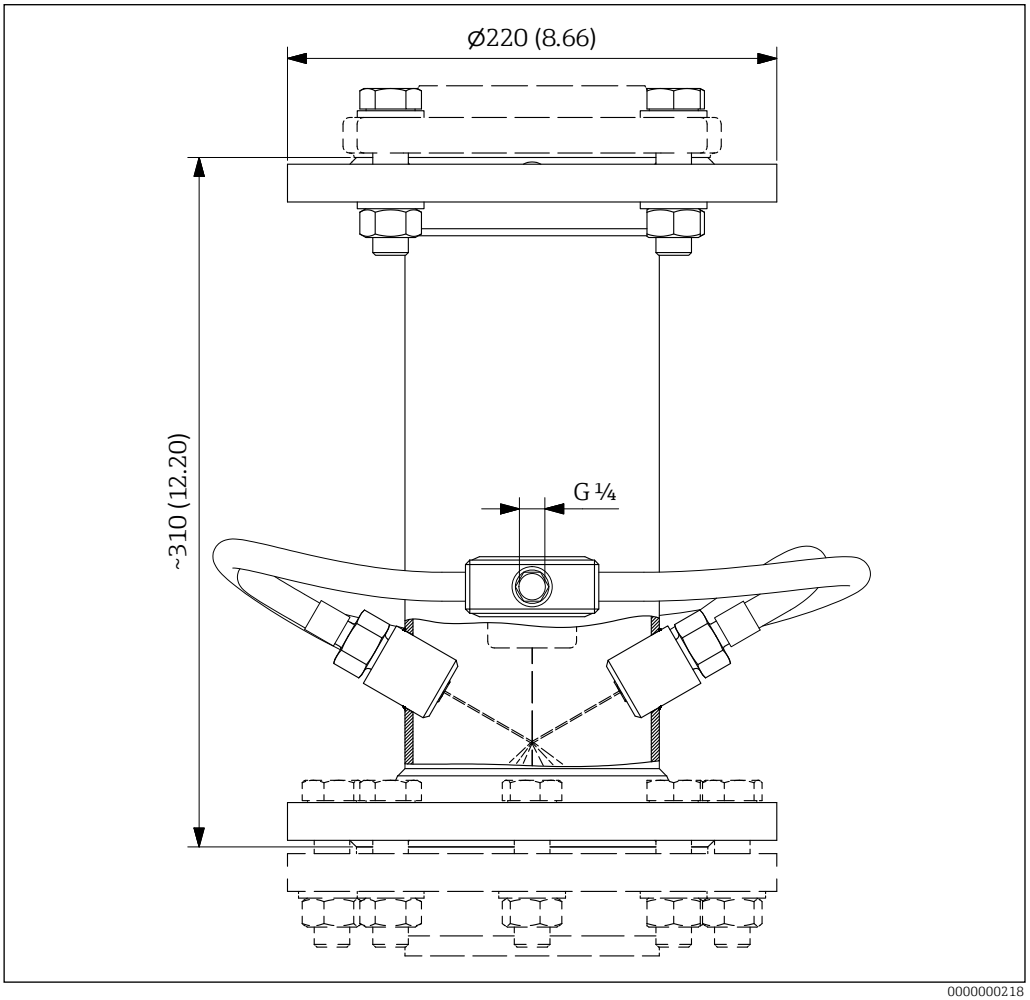
Order number	A	B	C	D	E
71301837	400 (15.75)	54.5 (2.15)	125 (4.92)	165 (6.50)	18 (0.71)
71301839					
71301841		70.3 (2.77)	145 (5.71)	185 (7.28)	
71301843					
71301844	200 (7.87)	82.5 (3.25)	160 (6.30)	200 (7.87)	200 (7.87)
71301857					
71301858	420 (16.54)	52.6 (2.07)	120.7 (4.75)	152.4 (6.00)	20 (0.79)
71301859					
71301861	220 (8.66)	78 (3.07)	152.4 (6.00)	190.5 (7.50)	23.9 (0.94)
71301864					
71301867	128 (5.04)	102.4 (4.03)	190.5 (7.50)	228.6 (9.00)	
71301868					

- The delivery contains suitable screws and nuts to secure the measuring device to the process adapter extension.

Process adapter with spray water cleaning

The following process adapter can be used with spray water cleaning to prevent any damage from chemical substances that can enter the measuring device via the measuring tape. The process adapter is mounted between the process connection of the measuring device and the application.

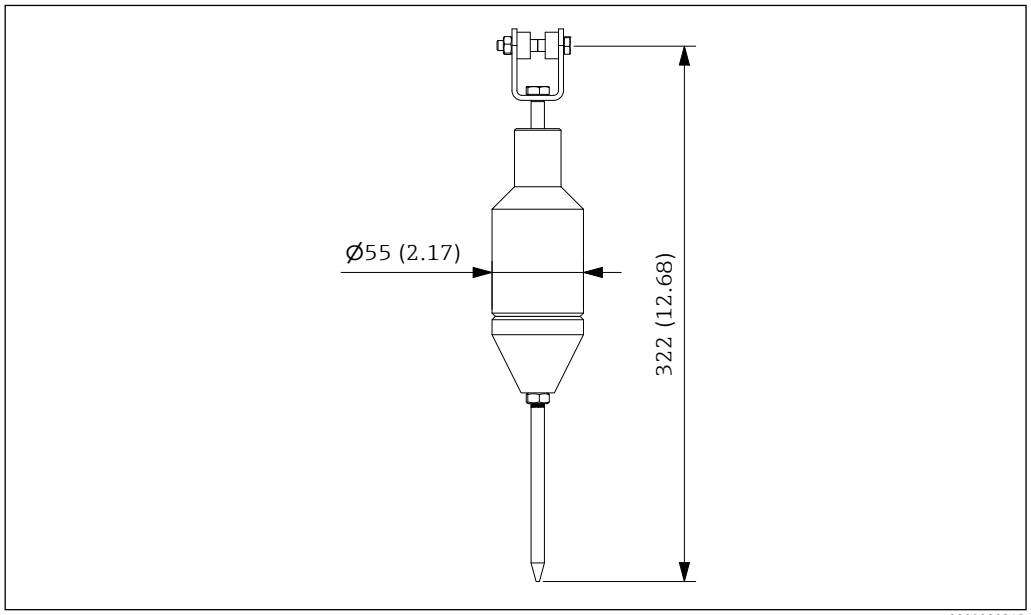
- Filtered water should only be used for spray water cleaning as otherwise the nozzles could clog.
- The amount of water needed is between 1 l/min (1 bar) and 3 l/min (6 bar).
- Use the adapter only for pressureless processes.



19 Process adapter with spray water cleaning. Unit of measurement mm (in)

- DN100 PN16 (Connection dimensions according to DIN EN 1092-1)
- Material: 316Ti (1.4571)
- Weight: 15 kg (33.1 lb)
- Order number: 71301886
- Mounting screws enclosed
- For pressureless processes only!

Sensing weight for interface measurement in liquids with a significant difference in density



20 *Sensing weight for interface measurement in liquids with a significant difference in density. Unit of measurement mm (in)*

- Order number:
  71629601 (316Ti (1.4571))
  71629605 (316Ti (1.4571), coated)
- Weight: 1.8 kg (4 lb)

Chain to increase the block distance

The following chain can increase the block distance by a maximum distance of 2 m in the event of longer connections which the sensing weight should not enter into.

If the sensing weights sway significantly, we recommend the use of the extended wiper.

- Order number: 71301880
- Material: Stainless steel 316
- Length: 2 m (78.74 in)
- Weight: 0.3 kg (0.66 lb)

Supplementary documentation

The certificates and approvals currently available can be accessed via the
- Product Configurator
- Endress+Hauser website: www.endress.com → Downloads.

Device-dependent supplementary documentation

Document type: Operating Instructions (BA)
Installation and initial commissioning – contains all functions in the operating menu that are required for a typical measuring task. Functions beyond this scope are not included.
BA00334F

Document type: Brief Operating Instructions (KA)
Quick guide to the first measured value – includes all essential information from the incoming acceptance to the electrical connection.
KA01692F

Document type: Safety Instructions, certificates
Depending on the approval, Safety Instructions are also supplied with the device, e. g. XA. This documentation is an integral part of the Operating Instructions.
The nameplate indicates the Safety Instructions (XA) that are relevant to the device.

www.addresses.endress.com

Endress+Hauser

People for Process Automation