Level meter FMM20

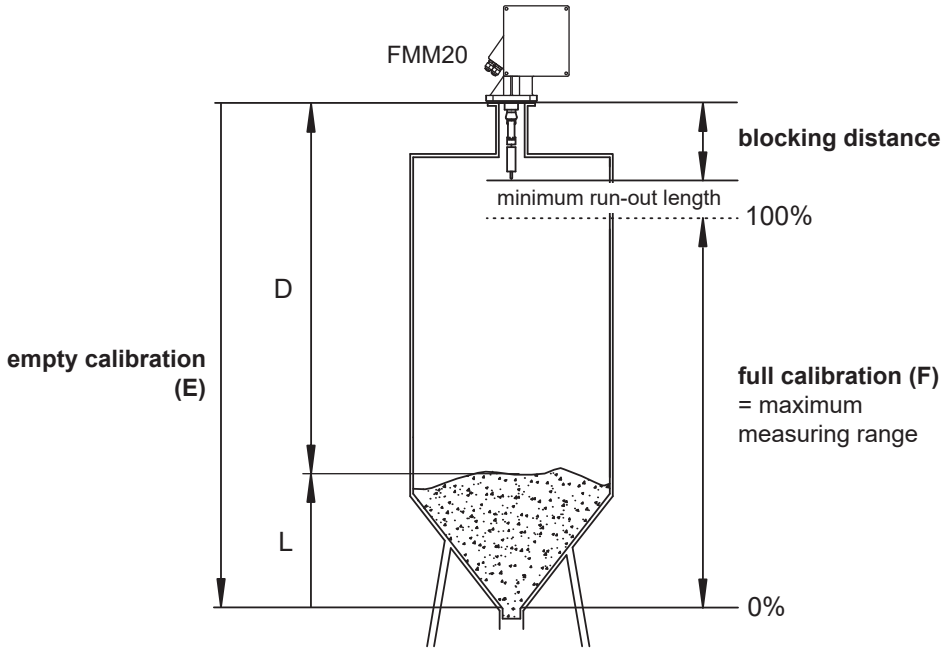
- Electromechanical level measurement system
- Depending on the sensing weight, the level in bunkers or silos can be measured with dusty, fine-grain or coarse-grain bulk solids.
- Measurement of levels up to 42 m irrespective of the product characteristics.
- Accuracy of ± 2.5 cm or ± 1 pulse, therefore precise detection of the level
- Process temperatures up to +150°C possible
- Compact unit with 0/4 - 20 mA current output as well as further free programmable signal outputs, e.g. counter pulses
- 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
- Supply voltage 90 – 253 VAC (wide-range voltage power unit) as well as 24 VDC, depending on version selected
- Optional version with certification for application in areas subject to dust explosion hazard zones 20, 21 and 22 (measuring zone) or zones 21 and 22 (device zone), category 1/2D

Table of contents

Function and system design

Measuring principle

A measuring tape, from which a sensing element is suspended, is lowered into the bunker or silo. When the weight meets the surface of the product, the tensile force on the measuring tape decreases and this is detected by the electronics of the FMM20.



level (**L**) = empty calibration (**E**) – distance determined to surface of product (**D**)

The measured value is output at the 0/4 - 20 mA current output. The sensing weight then returns to the end position whereby the measured value determined is retained until the next measurement.

The 0/4 - 20 mA current output signal corresponds to the level (L). When the device is delivered, the basic settings are preset to the maximum possible measuring range in accordance with the device version (see Ordering Information). Menu-guided operation via the four-line plain text display guarantees unproblematic and rapid adjustment to the container geometry in question.

Note:
This adjustment must be made before the first time the instrument is started to avoid damage to the conveyor elements.

During the entire measurement procedure (moving the sensing weight up and down), the FMM20 can additionally emit pulses (relay output or optionally optocoupler output) in accordance with the length of the rolled out measuring tape. These pulses can be recorded by a process control system or an electromechanical counter.

Single measurements or periodic measurement procedures are possible. The measurement can thus be started manually (e.g. start button connected externally) or periodically (e.g. programmed function at the FMM20).

Measuring system

The FMM20 is a compact device. It makes extensive inputs and outputs available. Please refer to the ordering information for details.

Device versions

“Dust ignition-proof” version:

For use in areas which are hazardous due to combustible dusts of Zones 20, 21 and 22 (measuring environment) or Zones 21 and 22 (instrument environment), Category 1/2D.

Mechanical and electrical versions

- Ambient temperature:
  -20°C to +60°C or
  -40°C to +60°C when using the self-regulating device heater
  The optional device heater is also recommended in the event of moisture in the container and ambient temperatures below 0°C.
- Process temperature:
  -20°C to +70°C or
  -20°C to +150°C
- With two supply voltage ranges as standard:
  90 - 253 VAC, 50/60 Hz or
  20 - 28 VDC
- Wiper:
  Material: aluminum/steel or stainless steel (304)
- Optional:
  - Two additional relay outputs (standard: 2 relay outputs)
  - External start button on housing and sight-glass in housing cover
  - Extended climate class (with ambient temperature range from -20°C to +60°C)
  - Powder-coated housing (RAL 5012, cover RAL 7035)
  - Wiper extension aluminum/steel or stainless steel, 500 mm or 1000 mm
- Sensing weights:
  A wide range of sensing weights are available depending on the application. For details, please see the section in question.

Alternative level measuring device FMM50

Extended features of FMM50:

- Higher motor traction power:
  Max. 500 N, for heavy bulk solids such as cement, lime, gypsum, sand
- Large measuring range:
  Max. 90 m
- Higher max. process temperature:
  Up to 230°C
- Higher max. process pressure:
  Up to 3 bar absolute
- Optionally 4 instead of 2 additional relay outputs
- Extended functionality such as
  - Limit value formation
  - Linearization or
  - Current magnifier
- Larger selection of standard sensing weights such as
  - Cage weight,
  - Bell weight or
  - Oval float

Please refer to catalogue extract ka042000en for details on the FMM50 level measuring device!

Input

Measured variable

The measured variable is the distance between the lower flange edge of the FMM20 minus a block distance (see figure “Measuring principle” in chapter “Function and system design”) and the product surface. The level is then calculated taking into account the calibration values entered, e.g. silo height. Alternatively, the distance to the surface of the product can also be put out.

Block distance

The block distance depends on the wiper used and the sensing weight:

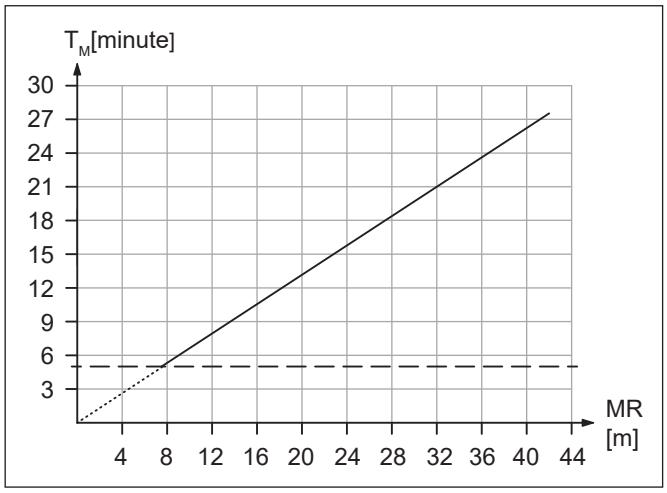
Sensing weight	Wiper 230 mm	Wiper 500 mm	Wiper 1000 mm
B, C, D, E	0.72 m	1.02 m	1.52 m
G	1.22 m	1.52 m	2.02 m
N	0.72 m	1.02 m	1.52 m

Measuring range

Max. 42 m

Measuring cycle

Please observe the minimum time (T_M) for one measuring cycle with the FMM20 according to the measuring range (MR). This minimum time must be taken into account in all types of measuring.



Note:
Disregarding this can lead to undue warming and result in failures. We recommend not to go below a time of 5 minutes for one measuring cycle, even with measuring ranges below 8 m.

Measuring uncertainty

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

Inputs

Two inputs (active/passive) are available to operate the FMM20 externally:

- Active input:
  - NO contact
  - Connection of a control voltage from an external system
  - Input voltage range: 12 to 24 VDC
- Passive input:
  - NO contact
  - Connection of an external command unit, e.g. switch, key, relay contact
  - Contact load: max. 30 VDC / 0.3 W
- Start pulse length: min. 200 ms
- Optional:
  Start button on device, can be operated externally
- Selectable functions of inputs: Start measurement or lock measurement

Outputs

Output signal

- 0/4 - 20 mA current output, active
- 2 relay outputs (optional 4 relay outputs)
  - Contact load: 250 VAC, 6 A
  - Contact material: silver-cadmium-oxide, gold flashing
- Selectable relay functions:
  - Counting pulse: output pulses in accordance with tape length rolled out, e.g. for down-stream control units
  - Reset pulse: pulse before every new measurement, e.g. to reset an external counter
  - Running up the sensing weight: display when running up tape, e.g. to hide counting pulses when running up tape
  - Upper end position of sensing weight: display when upper end position is reached (end of measurement)
  - Measurement active: displays an active measuring cycle, e.g. to lock a filling device to protect the FMM20 from being covered by medium
  - Alarm: fault states output
  - Service interval: information on FMM20 maintenance
- Optocoupler output for counting pulse (optional when 4 relays are selected)

Signal on alarm

Breakdown information can be called up via the following interfaces:

- Local display:
  - Error symbol
  - Error code with plain text display
- Current output, state can be programmed:
  - Minimum: current value <= 3.6 mA (4 - 20 mA) or current value 0 mA (0 - 20 mA)
  - Maximum: maximum current value + 10% (≈22 mA)
- Relay outputs (alarm function)

Highest measurable point

The highest measurable point is calculated from the block distance plus a minimum run-out length of 20 cm. This overall length must be taken into account when entering the maximum measuring range „**full calibration (003)**“.

Note:
The individual value of the block distance is preset when delivered and only has to be adjusted when the sensing weight is replaced, for example. The operating matrix provides a way of entering this information.

Auxiliary energy

Power supply

- 90 - 253 VAC, 50/60 Hz or
  20 - 28 VDC
- Power consumption:
  - Without heater: approx. 150 VA
  - With heater (optional): approx. 170 VA

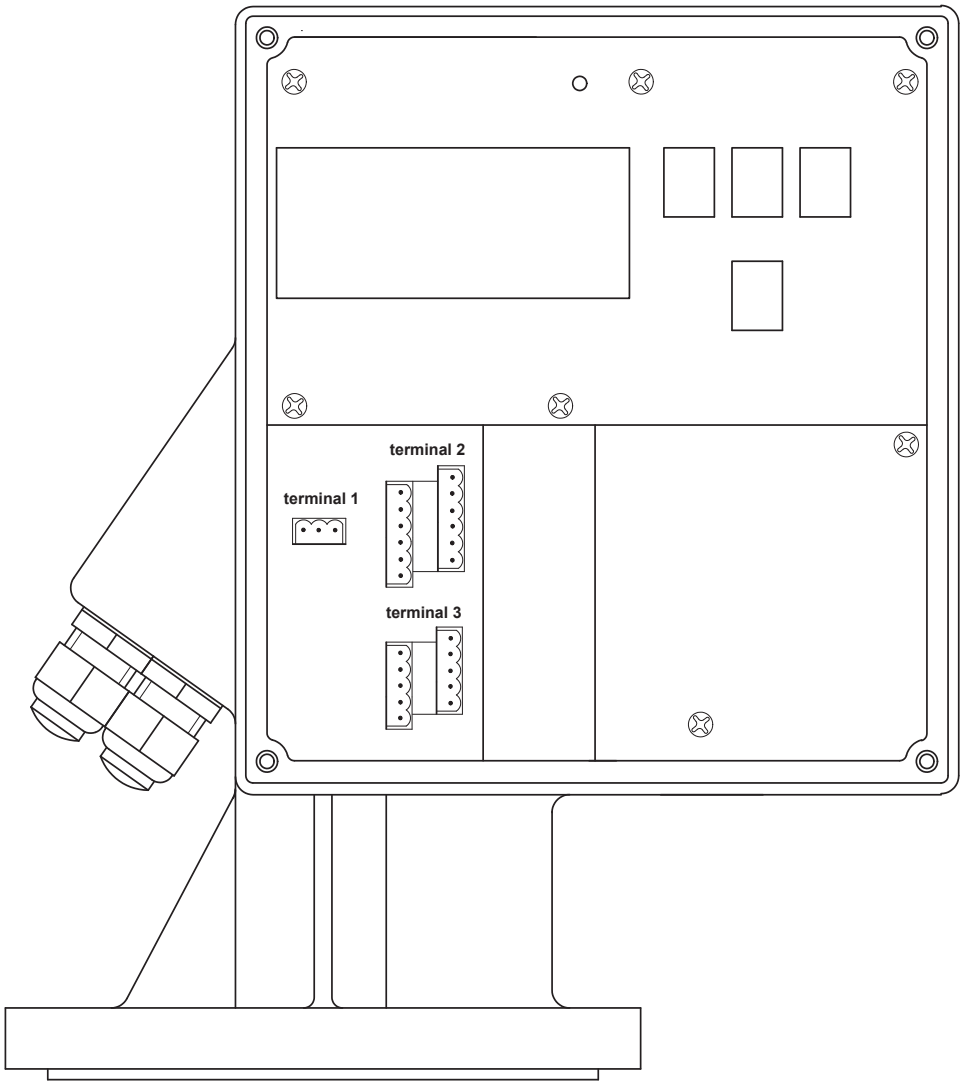
Cable entry

- M20x1,5
- Number: 3
- Material: Plastic
- Cable gland FMM20-A* (Non-hazardous area):
  - Clamping range 6.0 - 12.0 mm
  - Color: grey
- Cable gland FMM20-B* (ATEX):
  - Clamping range 6.0 - 13.0 mm
  - Tightening torque 1.5 Nm
  - Color: black

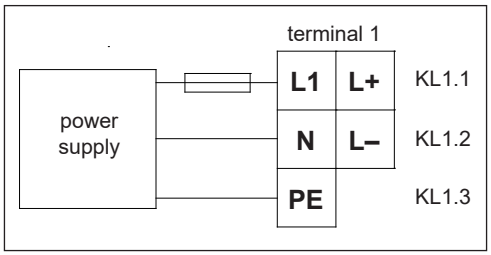
Note:
- The cable gland is only suitable for “fixed” installation because no tensile load may be applied to the screw joint.
- Seal unused entry glands with approved sealing plugs that correspond to the type of protection. The plastic transport sealing plug does not meet this requirement and must therefore be replaced during installation.

Electrical connection

Terminal assignment



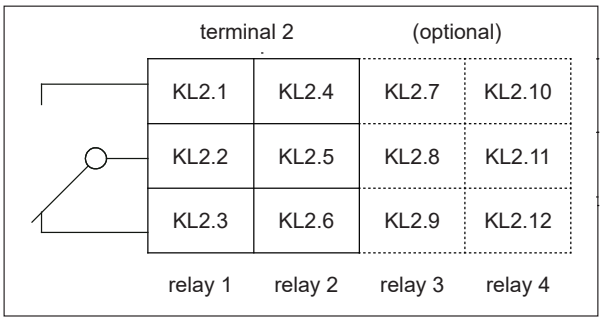
Power supply (terminal 1)



- The power supply is connected to the plug-in terminals of terminal 1.
- The maximum conductor cross-section is 2.5 mm².
- A fuse should be fitted to protect the power supply against short circuits.

Note:
When using the public powers supply, install an easy accessible power switch in the proximity of the device. Mark the power switch as a disconnector for the device according to EN 61010.

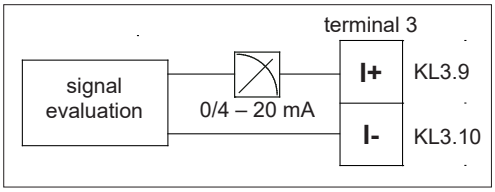
Relays (terminal 2)



- The connection cables are connected to the plug-in terminals of terminal 2, relay 1 to relay 2 and optionally to relay 4.
- The maximum conductor cross-section is 2.5 mm².
- Normal installation cables are suffi-cient for making the connections.
- The individual circuits must have a maximum of 6 A fuse protection (see technical data of relay outputs).

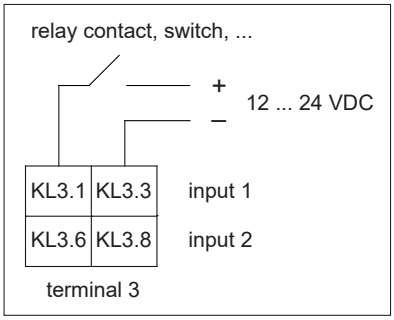
Note:
The rest position matches with the position of the relays without power supply, this represents the alarm condition if the function „**alarm**“ is selected.

0/4 - 20 mA current output (terminal 3)



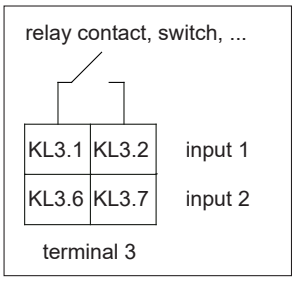
- The active 0/4 – 20 mA current output is connected to the plug-in terminals of terminal 3.
- The maximum conductor cross-section is 2.5 mm².
- Normal installation cables are sufficient for making the connections.

Signal inputs, active (terminal 3)



- The active input signal is connected to the plug-in terminals on terminal block 3.
- The maximum cable cross-section is 2.5 mm².
- Normal installation cables are sufficient for making the connections.
- Input voltage range: 12 ... 24 VDC

Signal inputs, passive (terminal 3)



- The passive input signal is connected to the plug-in terminals on terminal block 3.
- The maximum cable cross-section is 2.5 mm².
- Normal installation cables are sufficient for making the connections.
- Contact rating: max. 30 VDC / 0.3 W

Note:
- The signal inputs (active/passive) can only be used alternatively. A double connection from input x active and passive can not be used.
- The minimum start pulse length is 200 ms.

Operating conditions

Sensing weight

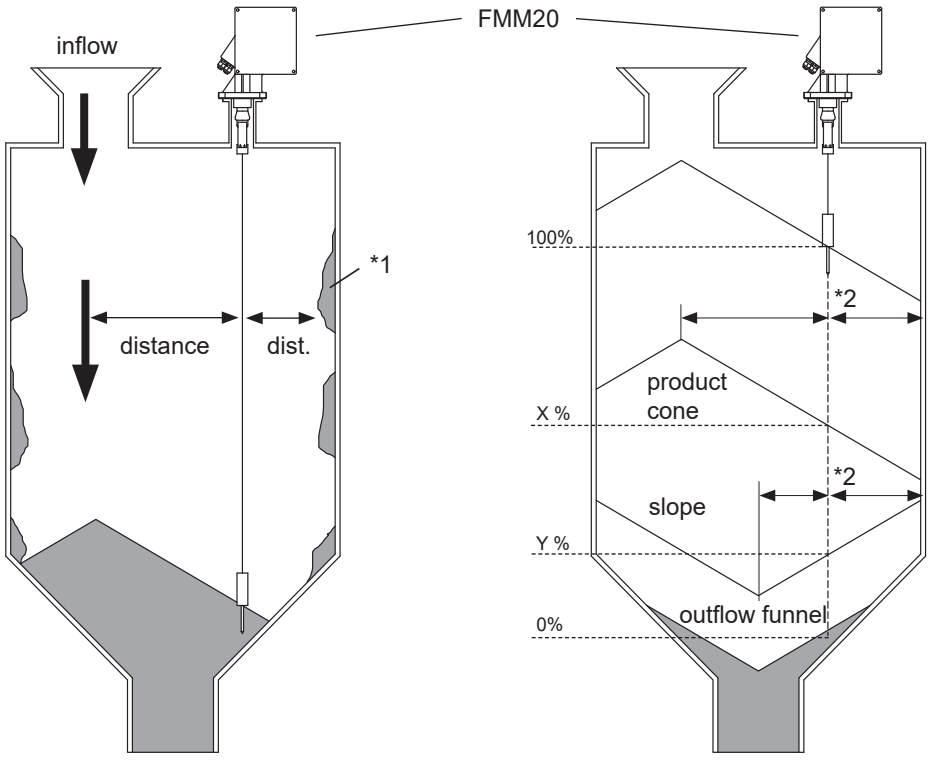
Sensing weights (see appropriate section)

Please note the following when selecting the sensing weight:
- The sensing weight must not sink into the product nor be diverted by contact with the product cone during the measuring procedure.
- The sensing weight must be suited to the chemical characteristics of the product and the temperature in the bunker/silo.

Special versions for special applications are available on request.

Mounting location

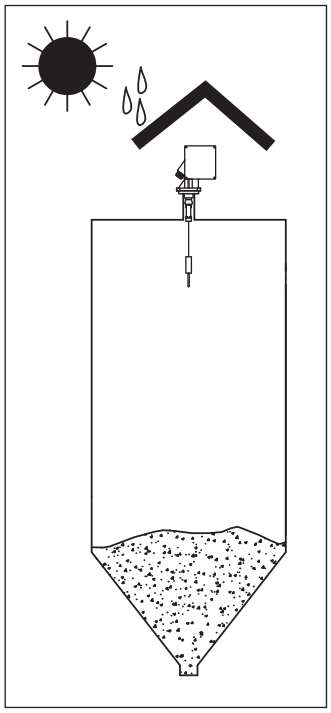
Planning the mounting location
Select the mounting location on the bunker or silo roof in such a way that falling product during filling or collapsing cornices cannot spill the sensing weight and cannot damage the measuring tape.
Observe the shape and the position of the product cone and/or outlet hopper in the container.
The measurement section should not run too close to internals and struts, so that the measuring tape does not touch them when the sensing weight is swinging.
The length of the wiper should be selected in such a way that the sensing weight protrudes out of the mounting connection.



*1 Cornices (product build-up on the container wall)

*2 Select a measuring point approximately in the middle of the slope

Installation preparation

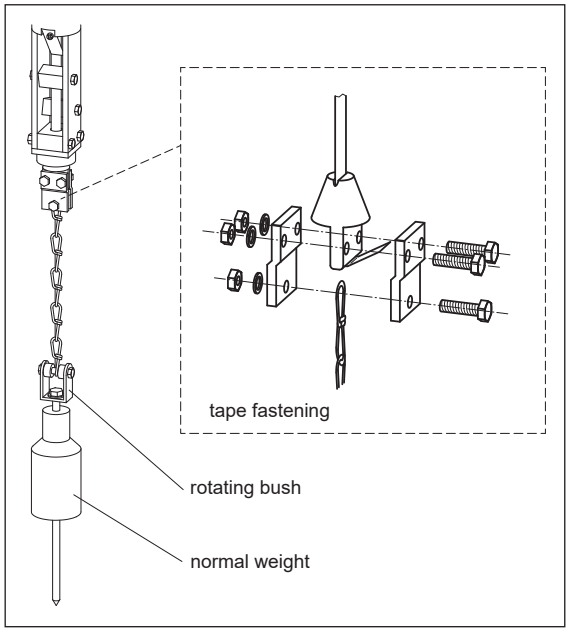


The FMM20 is best mounted on a counter flange DN100 PN16 (connection dimensions acc. to EN 1092-1) or a flange with the same connection dimensions. This counter flange must be exactly horizontal so that the FMM20 can also be mounted horizontally (maximum angle of inclination 2°).

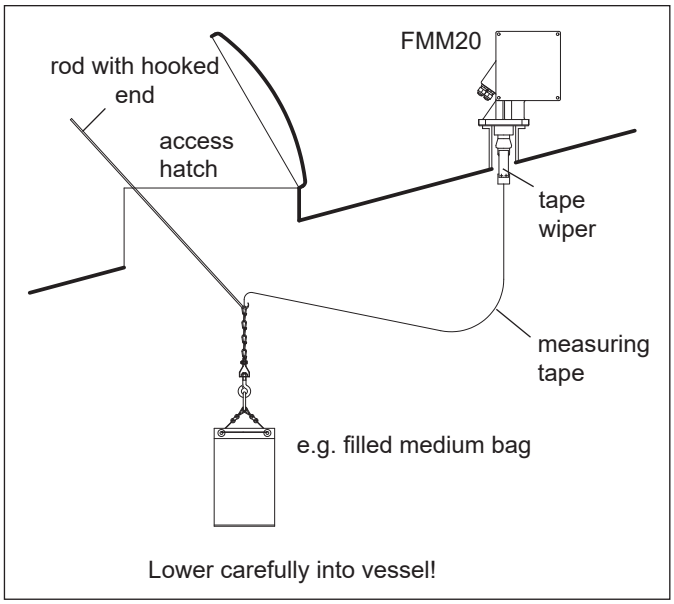
Note:
When installing outside, fit the protective hood available as an accessory or mount a weather protection cover.

Mounting the sensing weight

Normal weights, umbrella weights and bags (see overview in the “Sensing weights” section) can be passed into the bunker or silo via the DN100 mounting flange.
The measuring tape is pressed into the tape border by two M6 screws. A third screw secures the chain. A rotating bush is mounted at the bottom end of the chain to accommodate any turning motion of the sensing weight.
The tape border, chain and rotating bush are made from galvanized steel or stainless steel.



When using larger sensing weights, such as a filled medium bag for example, a point must be present in the design of the bunker or silo where these weights can be installed (see figure). Please refer to the Operating Instructions for information on mounting!



Mounting the FMM20

Fit a sealing ring on the flange (particularly if there is overpressure in the bunker/silo). Carefully guide the sensing weight into the bunker/silo.

Now place the FMM20 onto the flange and secure it using four M16 bolts of a suitable length. Please note the following when doing so:
- Install the FMM20 horizontally (see “Installation preparation” section).
- Pay attention to the position of the cable entries for the electrical connection.

Note:
When using in bunkers/silos with severe dust emission, you can connect a compressed air line to the mounting flange of the FMM20 to generate a slight overpressure at the FMM20 (air volume as required). A G¼ bore is provided for this purpose (see housing dimensions).

Ambient conditions

Ambient temperature at the FMM20:
- -20 to +60°C,
- -40 to +60°C when using the self-regulating device heater

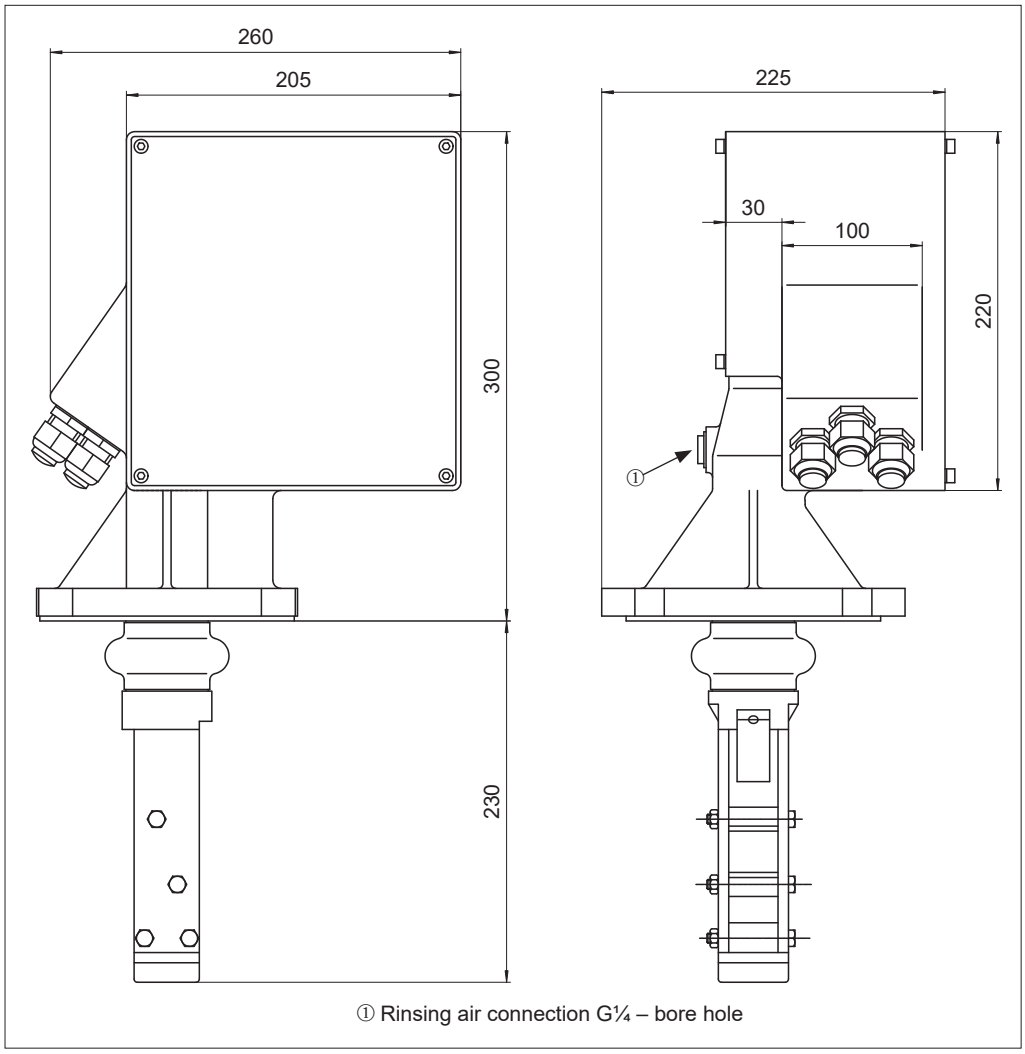
Process conditions

Process temperature:
- -20 to +70°C (standard version)
- -20 to +150°C

Line pressure (in bunker/silo):
- 0.8 to 1.1 bar absolute

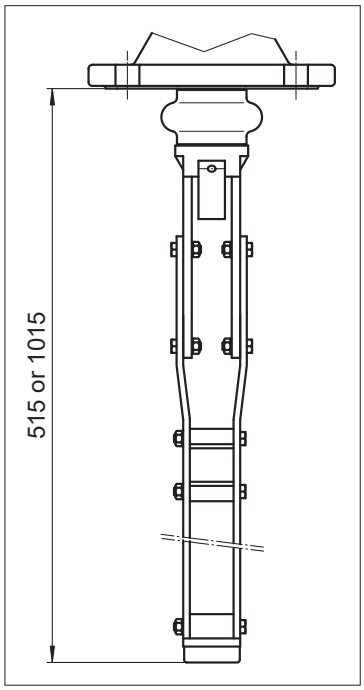
Dimensions

Housing (with standard wiper 230 mm)

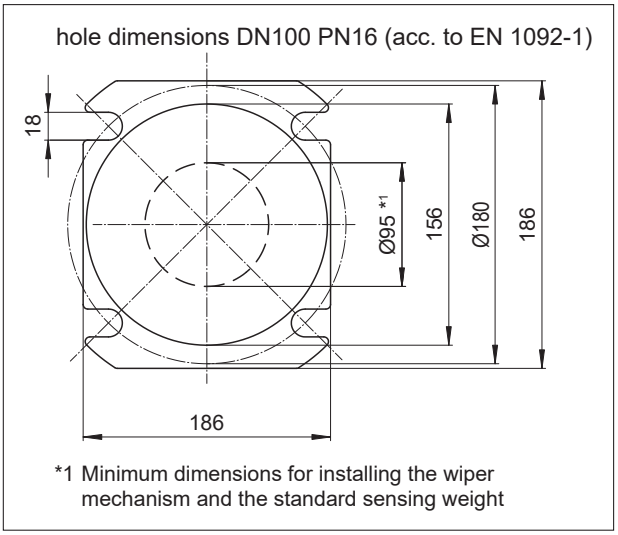


① Rinsing air connection G¼ – bore hole

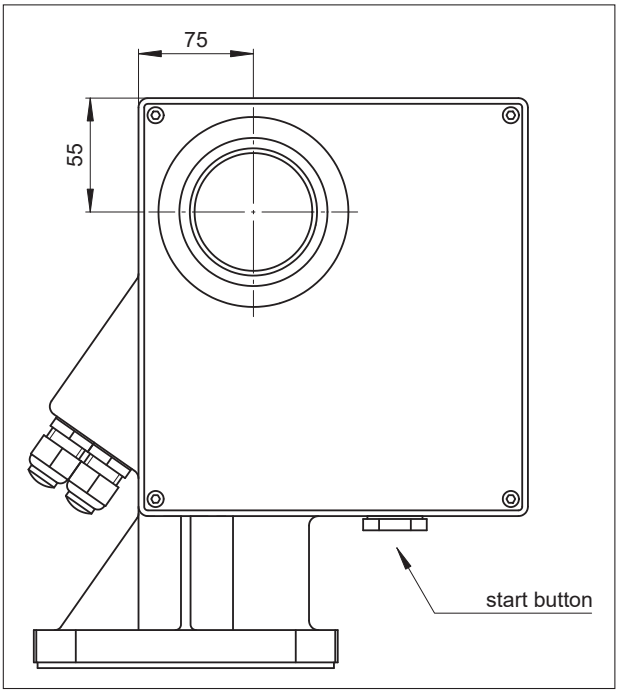
Extended tape wiper



Process connection (standard version)



Optional window and external start button



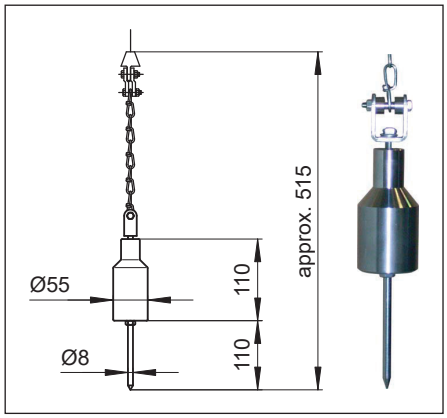
Sensing weights

Selection recommendation

You should note the following when selecting the sensing weight:

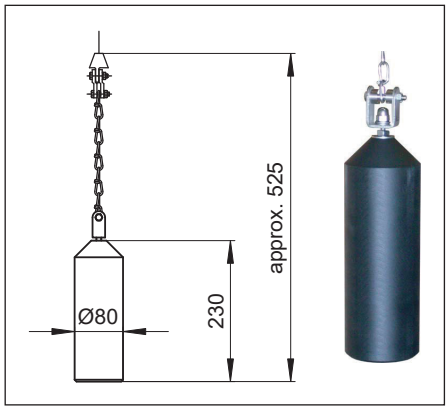
- The sensing weight must not sink into the product nor be diverted by contact with the product cone during the measuring procedure.
- The sensing weight must be suited to the chemical characteristics of the product and the temperature in the bunker/silo.

Normal weight (option B/C)



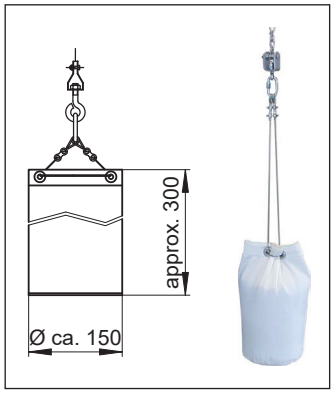
- Application: For granules and compressed bulk solids.
- The spike can be removed.
- If a crushing or milling system is downstream from the silo, we recommend using the electrical signal function “**tape breakage**” to avoid damaging the system in the event of the sensing weight breaking free.
- Materials: Steel or stainless steel (316TI)
- Maximum permitted temperature: +150°C
- Weight: 1.5 kg

Plastic weight (option N)



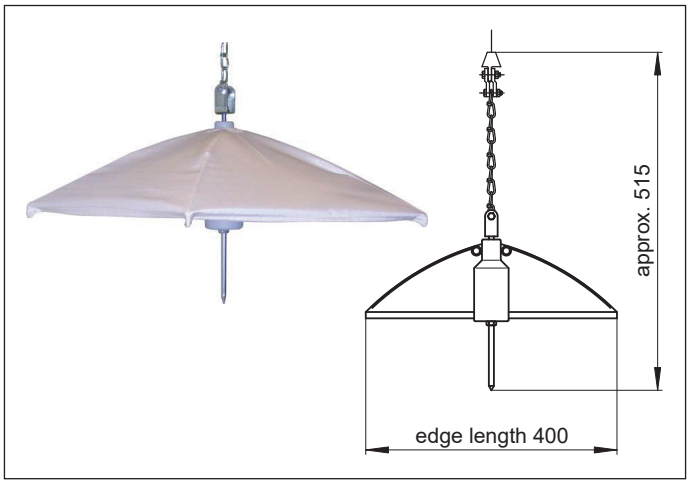
- Application: For granules and compressed bulk solids.
- If a crushing or milling system is downstream from the silo, we recommend using the electrical signal function “**tape breakage**” to avoid damaging the system in the event of the sensing weight breaking free.
- Materials: Plastic, all metal parts made of steel
- Maximum permitted temperature: +70°C
- Use of the plastic sensing weight is not permitted in the „dust ignition-proof“ version
- Weight: 1.5 kg

Bag weight (option G)



- Application: In bunkers where mills are located downstream.
- The bag contains whichever product is contained within the bunker.
- Maximum permitted temperature: +150°C
- Materials: Polyester, all metal parts made of stainless steel (316)
- Weight:
  - 0.25 kg (empty)
  - 1.50 kg (with filling)
- Bind the bag closed at the top so that the contents cannot fall out if the bag tips over on the slope of a product cone.

Umbrella weight (option D/E)



- Application: For very light and loose bulk solids, e g. flour or coal-dust.
- The umbrella weight has a large square surface area which prevents it from sinking deeply into the product.
- When folded closed, the weight can be passed into the bunker via the mounting flange DN100.
- Maximum permitted temperature: +150°C
- Materials:
  - Steel or stainless steel (316TI)
  - Polyester
- Weight: 1.5 kg

Controls and instrumentation

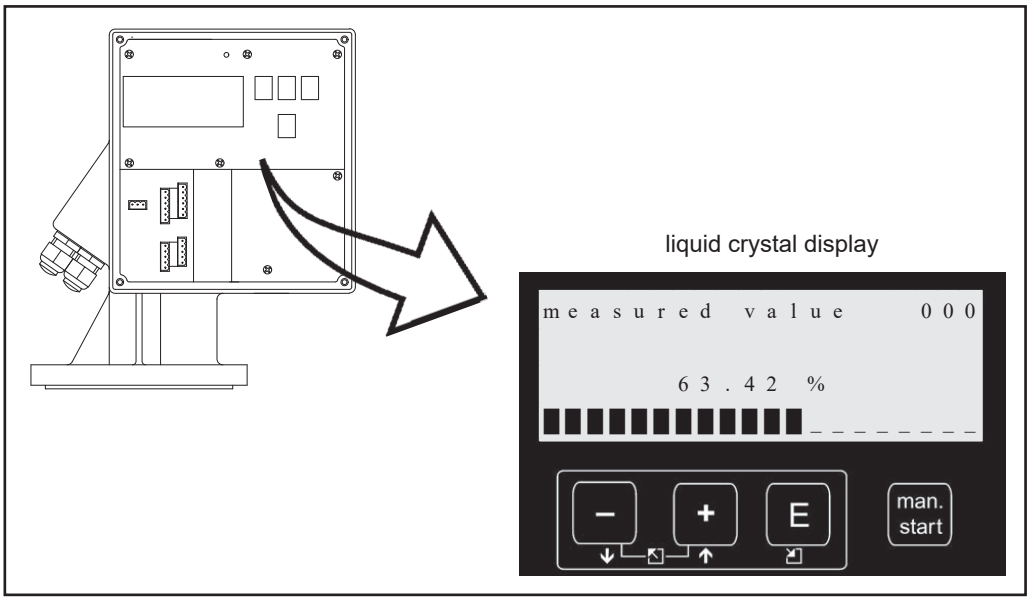
Control concept

Parameters for the FMM20 are set locally using a large 4-line text display, which can also display the existing measured values.

The menu guidance and integrated help texts ensure quick and safe commissioning.

Display

Liquid crystal display (LC-display)
- Four lines
- 20 characters per line
- Display contrast adjustable by using a key combination



Controls

The control elements are located within the housing (exception: external start button) and can be operated after opening the electronics cover.

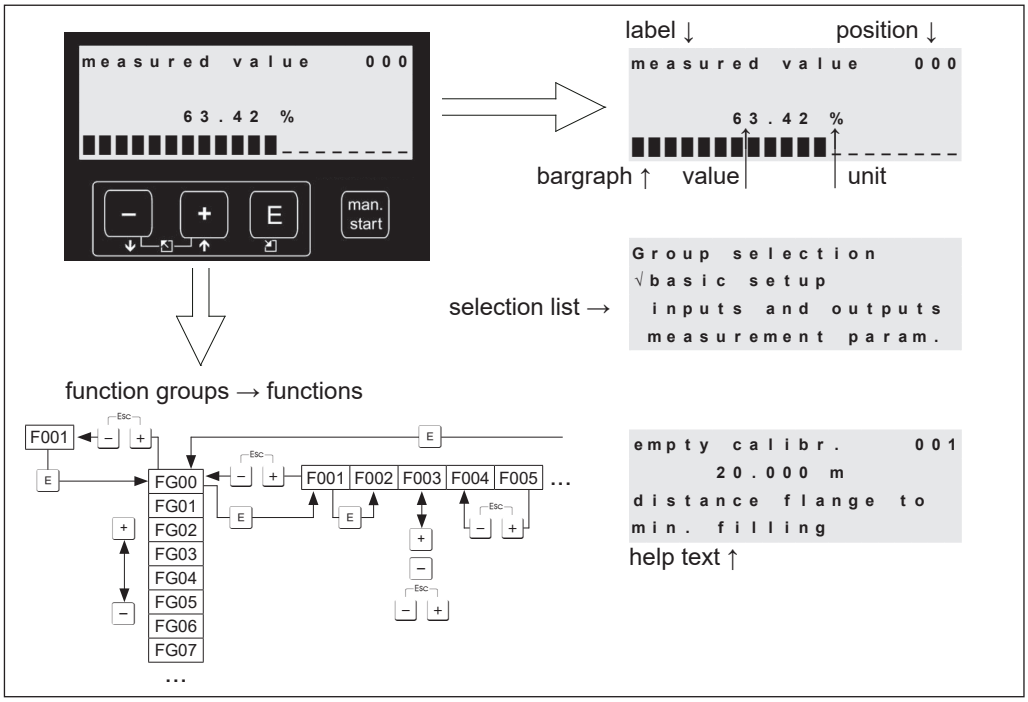
Note:
The FMM20 may only be operated with closed cover in areas subject to explosion hazards!

Function of the keys

Key(s)	Function
+ or ↑	- Navigation upward within the menu list - Editing of numerical values within a function
– or ↑	- Navigation downward within the menu list - Editing of numerical values within a function
Esc – + or ↖	- Navigation to the left within a function group
E	- Navigation to the right within a function group - Enter
+ and E or – and E	Contrast settings of the LCD - + and E increase the contrast - – and E decrease the contrast
E	- Start measuring (only in function 000)

Local control

The LC-display can be used for configuration direct to the FMM20 using 3 keys. A menu control is used to set all unit functions. The menu comprises function groups and functions. Application parameters can be displayed and set within the functions. The user is guided through the complex start-up procedure.



Safety instructions

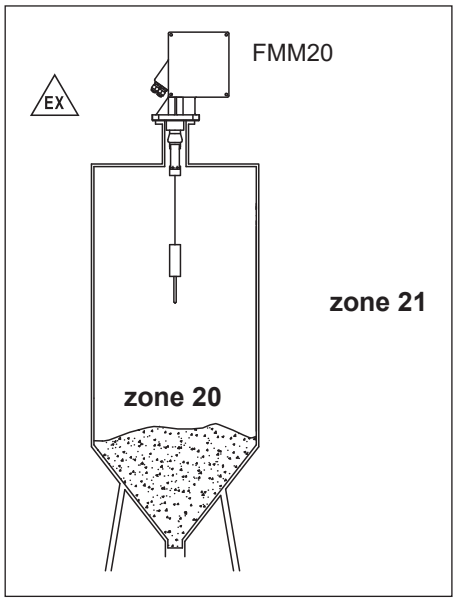
Features of the ATEX version

- Marking:
  II 1/2D Ex ta/tb IIIC T99°C Da/Db IP6X
  II 2D Ex tb IIIC T99°C Db IP6X
- Certification number:
  BVS 05 ATEX E 001

Use in accordance with directives

- Operation of the FMM20 in areas subject to explosion hazards is only permissible with the housing closed.
- The FMM20 with “Ex” design may only be repaired by the manufacturer.
- The requirements of the EN 60079, e.g. with respect to dust deposits and temperatures must be adhered to under all circumstances.
- Please take care that the ambient temperature will not be greater than +60°C, even if the process temperature range is between +70°C and +150°C. Select possible mounting position to keep this condition.

Assembly instructions



Ordering information

Ordering information FMM20

10	**Approval:**								
	A	Non-hazardous area							
	B	ATEX II 1/2D Ex ta/tb IIIC T99°C Da/Db IP6X							
		ATEX II 2D Ex tb IIIC T99°C Db IP6X							
	Y	Special version, to be specified							
20		**Housing:**							
		1	Aluminum						
		2	Aluminum, coated						
		9	Special version, to be specified						
30			**Measurement range:**						
			4	15 m, tape, stainless steel (301, modified)					
			5	32 m, tape, stainless steel (301, modified)					
			6	42 m, tape, stainless steel (301, modified)					
			9	Special version, to be specified					
40				**Max. connection height; wiper:**					
				A	230 mm, aluminum/steel				
				B	230 mm, stainless steel (304)				
				C	500 mm, aluminum/steel				
				D	500 mm, stainless steel (304)				
				E	1000 mm, aluminum/steel				
				F	1000 mm, stainless steel (304)				
				Y	Special version, to be specified				
50					**Power supply:**				
					1	90 - 253 VAC, 50/60 Hz			
					3	20 - 28 VDC			
					9	Special version, to be specified			
60						**Output:**			
						A	0/4 - 20 mA + 2x relay, adjustable		
						C	0/4 - 20 mA + 4x relay, adjustable		
							Relay function: counting pulse, reset pulse, maintenance, run-up, upper limit position, alarm or measurement active		
						Y	Special version, to be specified		
70							**Ambient temperature:**		
							D	Range -20 to +60°C	
							E	Range -40 to +60°C + heating	
							F	Range -20 to +60°C + extended climate resistance	
							Y	Special version, to be specified	

Ordering information FMM20, continued

80	**Process temperature:**	
	1	Range -20 to +70°C
	2	Range -20 to +150°C
	9	Special version, to be specified

90	**Sensing weight:**	
	A	None
	B	Steel
	C	Stainless steel (316TI)
	D	Steel + umbrella
	E	Stainless steel (316TI) + umbrella
	G	Medium bag
	N	Plastic
	Y	Special version, to be specified

100	**Additional equipment:**	
	1	Basic version
	2	Window + start push button, external
	9	Special version, to be specified

FMM20- ☐☐☐☐☐☐☐☐☐☐ Product designation

Comments regarding the product structure

The following limitations apply to devices with an ATEX license:
- **Sensing weights (90)**: only (**A**) to **(G)**
- **Additional equipment (100)**: only (**1**)

The following limitations apply to devices with a process temperature range of up to +150°C:
- **Sensing weights (90)**: only (**A**) to **(G)**

Note:
Use a nozzle of 500 mm height with process temperatures from +70°C up to 150°C (**FMM20-*******2****) for a temperature reduction. In this case a wiper length of 500 mm must be used.

Other limitations:
- **Ambient temperature (70)**, **option F**: only in conjunction with coated housing

User-specific settings

All settings of the FMM20 can optionally be preset at the factory according to the customers requirements. When ordering, chose the relevant unit type (**FMM20-*********9**) and complete the form “**User-specific settings**” (ad048010en, preprint see next page), which has to accompany the order.

Kundenspezifische Einstellungen

Kirchgaesser
Industrieelektronik GmbH

Die optionale Bestellmöglichkeit des FMM20 mit kundenspezifischen Einstellungen setzt voraus, dass sämtliche benötigten Parameter bzw. Auswahloptionen angegeben werden. Bei fehlenden Angaben wird der Defaultwert verwendet. Dieses ausgefüllte Blatt muss jeder Bestellung beigelegt werden!

Gerätetyp: **FMM20 -** | | | | | | | | | | |

Einstellungen Grundabgleich, Anzeige und System

001 Abgleich leer	003 Abgleich voll	020 Messart	021 Zeitintervall	022 Zeiteinheit	023 Betriebsart	024 Wartungsint.
_____ m/ft/in	_____ m/ft/in	❑ **Einzelmessung** ❑ Periodisch	_____ [022]	❑ **Min.** ❑ h	❑ **normal** ❑ kurz	_____

028 Hochlauflänge	060 Sprache	061 Zur Startseite	062 Nachkomma.	080 Messstelle	083 Längeneinh.
_____ m/ft/in	❑ **English** ❑ Deutsch ❑ Français ❑ ニホンゴ	_____ s (Default: 100)	❑ X ❑ X.X ❑ **X.XX** ❑ X.XXX	_____ (max. 16 Zeichen)	❑ **m** ❑ ft ❑ in

Einstellungen Eingänge und Stromausgang

010 Eingang 1	012 Eingang 2	033 Strombereich
❑ **keine Funktion** ❑ Start Messung ❑ Verriegelung	❑ **keine Funktion** ❑ Start Messung ❑ Verriegelung	❑ **4-20 mA** ❑ 0-20 mA

Einstellungen Relaisausgänge

014 Relais 1	01A Relais 2	01B Relais 3	01C Relais 4
❑ **Alarm** ❑ Hochlauf ❑ obere Endlage ❑ Messung aktiv ❑ Wartungsintervall ❑ Zählimpulse ❑ Rückstellimpuls	❑ Alarm ❑ Hochlauf ❑ obere Endlage ❑ Messung aktiv ❑ **Wartungsintervall** ❑ Zählimpulse ❑ Rückstellimpuls	❑ Alarm ❑ Hochlauf ❑ obere Endlage ❑ **Messung aktiv** ❑ Wartungsintervall ❑ Zählimpulse ❑ Rückstellimpuls	❑ Alarm ❑ Hochlauf ❑ **obere Endlage** ❑ Messung aktiv ❑ Wartungsintervall ❑ Zählimpulse ❑ Rückstellimpuls

015 Impulswertigk.	016 Zählimpulsl.	019 Rückstellimp.
_____ (Default: 1)	_____ ms (Default: 50)	_____ ms (Default: 300)

Einstellungen Sicherheit und Linearisierung

040 Strom bei Alarm	041 Strom bei Alarm	042 Min. Sicherheit	043 Sicherheitsabstand	044 im Sicherh. abst.
❑ **MIN (0/3.6mA)** ❑ MAX (22mA) ❑ halten ❑ anwenderspezifisch	_____ mA	_____ [083]	_____ [083]	❑ **Warnung** ❑ Alarm

045 in Min. Sicherh.	050 Füllst./Restvol.	056 Kundeneinheit		057 Endwert Messber.
❑ **Warnung** ❑ Alarm	❑ **Füllstand TE** ❑ Restvolumen TE ❑ Füllstand m/ft/in ❑ Restvolumen m/ft/in	❑ **%** ❑ kg ❑ t ❑ m^3	❑ ft^3 ❑ m ❑ ft ❑ in	_____ [056]

Erläuterungen:
- Die fett markierte Auswahloption kennzeichnet den Defaultwert.
- Einstellungen wie "_____ [123]" beziehen sich auf die in Funktion 123 angewählte Auswahl.

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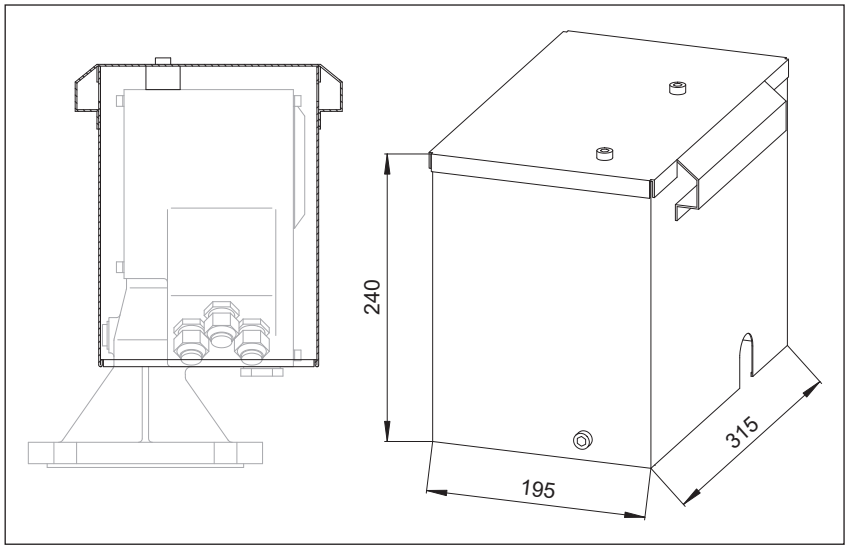
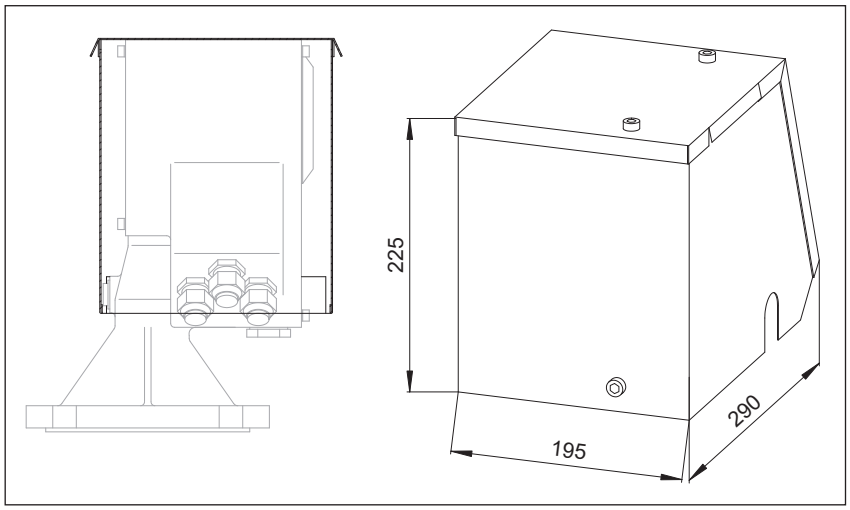
Accessories

Protective hood

- Stainless steel protective hood
  - Order No.: 71028956
  - Material: stainless steel 304 (1.4301)
  - Weight: 4.2 kg
  - The delivery contains suitable mounting screws.



- Aluminium protective hood
  - Order No.: 71075962
  - Material: aluminium
  - Weight: 0.7 kg
  - The delivery contains suitable mounting screws.



Note:
A minimum space of 240 mm above the unit is necessary to remove the protection hood.

Technical data

Mechanical

- Weight:
  - Approx. 10 kg without sensing weight
  - Approx. 11.5 kg with sensing weight
- Housing:
  - Material: Aluminum
  - Optional coating (RAL 5012, cover RAL 7035)
- Wiper:
  Material: aluminum/steel or stainless steel (304)
- Ambient temperature range:
  -20 to +60°C standard version
  -40 to +60°C with self-regulating heater
- Dimensions of standard version [mm]:
  300 x 260 x 225 [HxBxD]
- Measuring tape
  - Material: stainless steel (301, modified)
  - Length: max. 42 m
- Traction power:
  Max. 150 N
- Tape run-off speed:
  - Min. 0.16 m/s
  - Max. 0.25 m/s
- Degree of protection:
  IP67 as per EN 60529
- Angle of inclination:
  Max. 2°

Electrical

- Power supply:
  90 - 253 VAC, 50/60 Hz or
  20 - 28 VDC
- Power consumption:
  - Without heater: max. 150 VA
  - With heater (optional): max. 170 VA
- Inputs:
  - Active: input voltage range 12 – 24 VDC
  - Passive: contact load max. 30 VDC / 0.3 W
  - Start pulse length: min. 200 ms
- Outputs:
  - Current output 0/4 – 20 mA, active
  - Relay outputs, max. 250 VAC / 6 A
  - Optocoupler output (optional when 4 relays are selected), max. 30 VDC / 10 mA
- Terminals:
  Max. 2.5 mm^2

Subject to change without notice!

Certificates and approvals

CE symbol

The FMM20 measuring unit complies with the legislative requirements of EC guidelines. By applying the CE symbol we declare that the unit was tested successfully.

Ex approvals

See “**Safety instructions**”

External standards and directives

- **EN 60529**
  Types of protection housings (IP code)
- **EN 61010-1**
  Safety directives for electrical measuring, control, regulating and laboratory devices
- **EN 61326**
  Interference emissions (Equipment class B) and interference resistance (Attachment A - industrial systems)
- **EN 60079-31**
  Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure “t”
- **2014/30/EU**
  EMC directive
- **2014/34/EU**
  ATEX directive
- **2014/35/EU**
  Low-voltage directive

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