



Measuring Systems for Solids

◆ PRODUCT INDEX ◆

01

HUMY3000 / HUMY3019 / HUMY300
Continuous inline moisture
measuring system for bulk materials



MF3000
Mass flow measurement
for bulk materials

08

12

FS 510M
Continuous flow monitoring
for bulk materials



FS 700E / FS 710E
Dust monitoring for filter break

14

20

LC 510M
Contactless level monitoring
for bulk material



18

ORDER INFORMATION
HUMY3000 / HUMY3019 / HUMY300
MF3000 / FS 510M / 700E/710E / LC 510M

HUMY 3000/3019/300

Continuous inline moisture measuring system
for bulk materials



Application

The moisture in solids is an important parameter which strongly influences the quality of the product and can increase the economic efficiency of a production fundamentally. HUMY 3019 is in many processes, successfully in use among others at sugar, tobacco, grain, malt, flour, coal, sand, wood shavings, dried food, fertilizer, powder, pigments, plastic granules. As installation places conveyor belts, screw conveyors, silos, funnels are particularly suitable. The In-Line moisture measurement is also possible in batch processes.

At the measuring the relative permittivity and the high-frequency recession of the solid is measured in the high-frequency range. The measurement procedure makes a short and simple calibration as well as a high precision of up to 0.1% possible.

The measuring probe transmits the data digitally. This makes the measurement assignment disturbance insensitive and allows a distance of the sensor to the end judging unity up to 1000 m. The system supervising

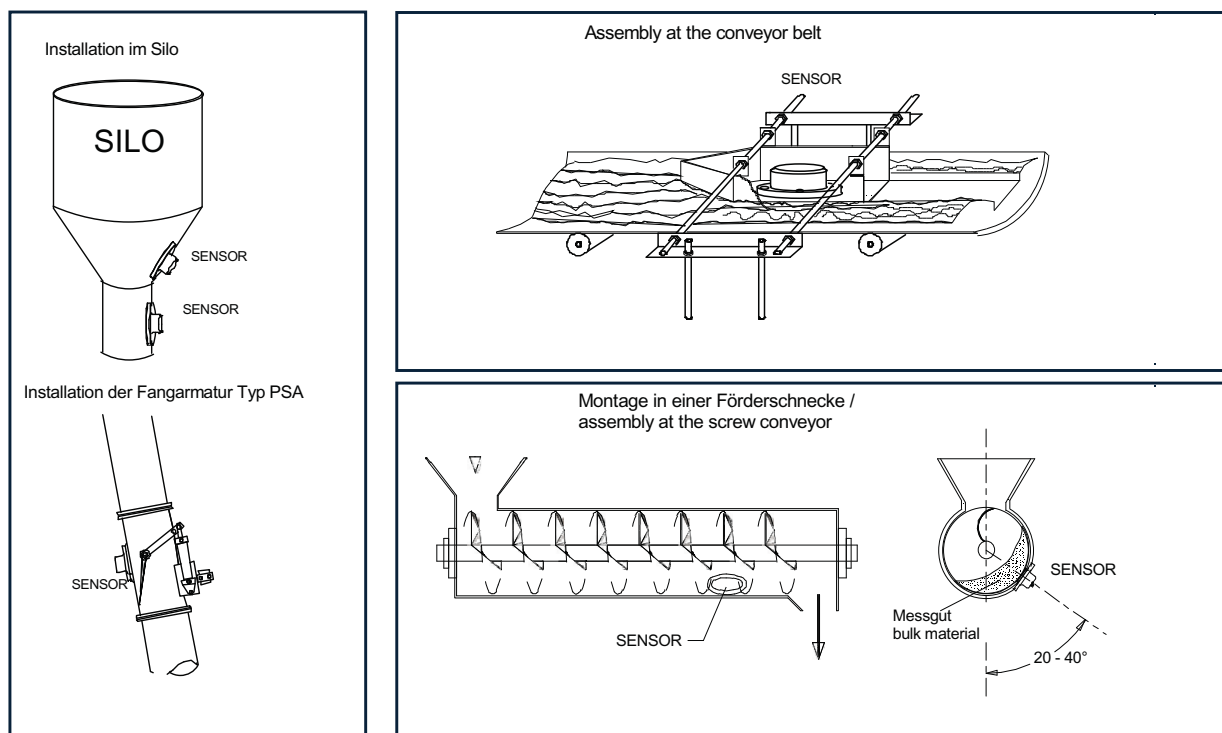
itself has an integrated data logger besides an automatic compensation of temperature and ageing drift, digital and alarm exits. The device is working by two analog output for the measured values and can be used

automatically by the two digital inputs or the RS485-interface. The calibration will be done by the included software. For product or process changes different product parameters can be stored.

Main Benefits

- No samples for the laboratory necessary
- Saving of energy costs
- Improvement on the product quality
- Very short amortization time
- High selective sensitiveness
- High measuring speed
- Precision better than 0,1% (under consideration of the product)
- Easy and economical installation
- Fast and simple calibration
- Optional ATEX-Version for Zone 20 und Zone 0

Examples for Installations



Application examples of successfully measured products

Chemicals and pharmaceutical

Fertilizer, plastics, phosphate, granules, absorber materials, melamine, powders, tablets, pasta, foils, salt, potash washing-powder, styrofoam, synthetic material, PVC, acryl pigments

Food- and animal food industry

Grain, rape, sunflower seeds, sugar beets, potato products, flour, starch, milk powder, yeast, bean oil production, casein, gluten, gelatine, malt, hops soya, corn, lenses rice, pasta, beans confectionery, cereals, food means, fish meal, dried food

Steel industry and power plants:

Ash, Aluminium oxide, iron, cole, coal, coal dust, coke, hydraded lime, sand, quartz, bricks (raw material), ceramic (raw material), gypsum

Wood and paper industry:

Cellulose, saw dust, wood chips, wood pellets

Construction material industry:

Cement, iron-II-sulfat, sand, quartz, gypsum, hydraded lime, limestone powder, bentonite, bricks (raw material), ceramic (raw material)

Other:

Tobacco, nuts, coffee and cacao beans, biscuits, cotton, leather, spices, blossoms

Application



Sand



Animal feed



Mounting in discharge screw
(wood-fired power plant)



Grain

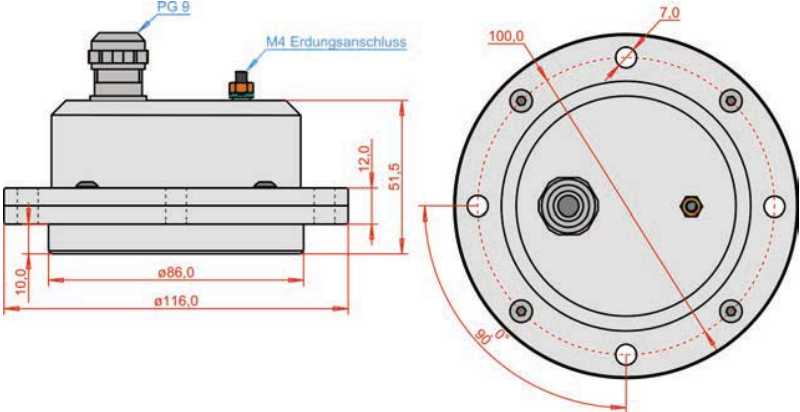


Cereals



Coal

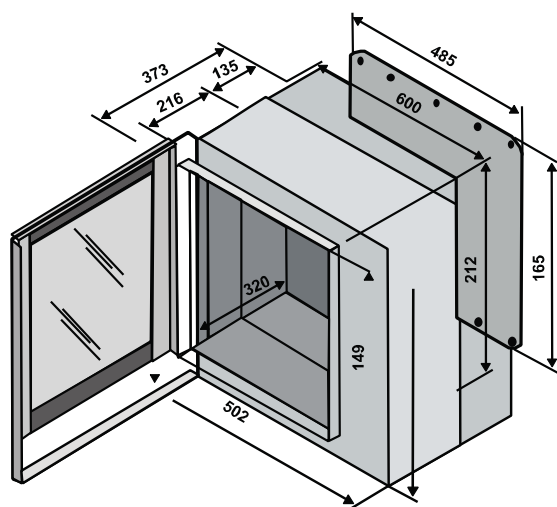
Technical Data Moisture Sesor

	
FMS 400 K	Measuring surface POM
FMS 400 C	Measuring surface ceramic
FMS 400 T	Measuring surface PTFE
Housing	Stainl. steel 1.4307
Weight	Approx. 1.050 g
Protection class	IP 67 according to EN 60529
Connection cable	Shielded 4-wires cable, 0.25 up to 0.5 mm ²
Cable length	max. 1000 m with 0.75 mm ²
Process-temp.	-10° ~ 90° C 140°C with cooling
Storage temp.	-10° ~ 80° C
Response time	Approx. 1 secont
Power consumption	0.4 Watt
Signal	RS 485
Pressure resistance	Up to 6 bar



Humy 3019 Technical Data Measuring Unit

Construction F	Field-/wall-mounting housing, B 265 x H 240 x T 250, weight approx. 6.500 g, with sight-door IP65
Construction T	Desk-housing B 236 x H 132 x T 330mm, weight approx. 4.500g, Option panel housing
Construction E	19"-plugin 3HE / 42 TE, weight approx. 2.000 g
Construction S	Panel housing with sight door B270 x H183 x T223, IP 58
Perm. temp.	-10° till + 60°C
Storage temp.	-10° till + 70°C
Perm. humidity while operation	10% till 95% (without condensation)
Digital resolution	20 Bit for 0-85,0% moisture and 15 - 100% dry substance
Measuring range temp.	Span min.: 0-5° C, Span max.: 0-120° C
Handling	Via Software Hu-Config
Accuracy	max. 0,02 % depending on the measured material
Averaging time	0-999 sec.
Memory	User-memory for storage of parameters of 24 different products.
Data logger	Storage of historical values up to 10 years. Real time clock for measurement record keeping.
Relay output 2X	Normally opened and normally closed contact for each Min- and Max-alarm relay Contact load: 30VDC or 62.5 VAC
Analog output 2X	0/4-20 mA with a max. load of 750 Ω or 0/2-10 V with a min. load of 50 kΩ Measuring value of residual moisture /dehydrated substance and product temperature
Analog input	mA- and PT 100- input for additional compensation
Digital output 2X	Galvanic isolated, 24 V open-drain(max. 50mA)
Digital input 2X	Galvanic isolated, active signals (8-36 V)
Interface	RS 232 (front socket connection to PC) RS 485 (half-duplex)
Power supply	230 V AC / 115 V AC or 24 V AC/DC
Power consumption	Max. 6W



Construction F



Humy 300 Technical Data Evaluation Unit

Housing	DIN-Rail Mounting
Material	PBT
Dimensions	22.5 mm x 114.5 mm x 99.0 mm (without clamps)
Protection class	IP20
Accuracy	Better than 0.1% (depending on product)
Weight	250 g
Perm. temp.	-10° ~ 60°C
Storage temp.	-10° ~ 60°C
Perm. humidity while operation	10% ~ 95% (without condensation)
Digital resolution	20 Bit for 0 - 85% moisture and 15 - 100% dry substance
Measuring range moisture	Min. 0,000 - 0,100%, max. 0,0 - 90%, with 1,-,2- or 3 digits behind the point
Handling	Via Software Hu-Config
Averaging	0-999 sec.
Memory	User-memory for storage of parameters of 24 different products.
Relay output	Nominally opened and nominally closed contact for max-alarm relay Contact load: 30VDC or 62,5 VAC
Analog output	Measuring value of residual moisture or dehydrated substance 0/4-20 mA, load 500 Ω.
Digital input	2x galvanic isolated, active signals (8-36 V)
Interface	USB-Interface for Hu-Config; RS 232 with connection for RxD, TxD, OV; RS 485
Software	Hu-Config (included)
Power supply	24 V AC/DC



MF 3000

Mass flow measurement for bulk materials




Function

Our solid flow meter MF 3000 is designed for flow measurement in metallic pipes from a few kg/h to many t/h. The system is suitable for on-line measurements of powders, dusts, pellets, and granules from 1 nm up to 2 cm in pneumatic or free fall conditions.

The measurement principle of the MF 3000 is based on the physical Doppler-Effect, whereas the sensor generates a uniform field in the microwave frequency range inside the pipe. These microwaves are being reflected by particles passing through the pipe. Calculation of frequency and amplitude changes allows for accurate determination of solid flow. Non-moving particles like dust accumulation are excluded from the calculation.

The installation is simple and cost effective via a welded branch, through which the sensor is screwed flush to the inside of the pipe. The sensor is connected to a DIN-rail mounted transmitter with 4...20 mA, RS232 and RS485 output. The calibration is easy by using our MF-SMART software and a reference flow value.

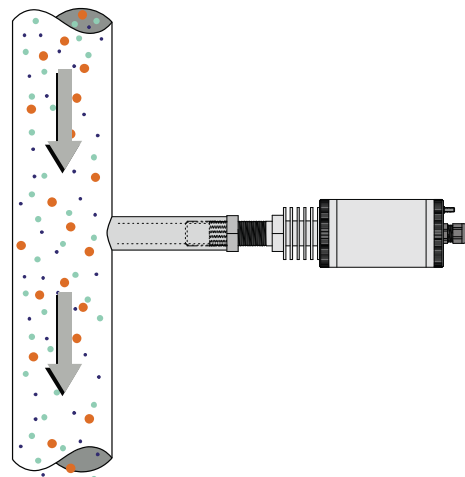
Main Benefits

- For pneumatic conveyors and free falling processes
- For all solid materials from a few kg/h to many t/h
- No armatures inside the pipe and inside flush fitting
- Very fast and contactless measurement
- Easy, quick and cost effective installation and start-up
- Galvanic separated DIN-Rail Transmitter with RS232- and RS485-Interface
- Robust stainless steel version, abrasion and maintenance free
- Limit value monitoring with alarm contact
- Sensor-transmitter distance up to 2.000 m
- Easy and quick calibration
- Adjustable sensitivity
- Optional: ATEX for Zone 20 and Zone 2 

Putting into work

A branch is welded onto the pipe. A 18 mm hole is drilled, the sensor is mounted flush with the inner diameter of the pipe. For commissioning and calibration a notebook with our MF-SMART software needed.

Calibration can be performed with either one or multiple reference flow amounts. The measurement value is output either analog or as digital signal. A serial COM interface is available at the front of the transmitter to connect a notebook computer and a RS485 interface for connection to a PLC system.



Application examples of successfully measured products

MF 3000 is measuring in pneumatic transportations and free falling processes. The product's grain size can be between 1 nm and 20mm.

The moisture of the measured material is allowed to be changed up to 12%

<p>Materials:</p> <p>All dust, powders, granulates, panels, threads etc. Also sticking or abrasive materials</p> <p>Industries:</p> <p>Animal feed industry Building materials industry Cement industry Chemical industry Detergent industry Engineering companies Food industry Glass production Metal production</p>	<p>Range of detection:</p> <p>from kg/h to many t/h</p> <p>Pharmaceuticals Pigment production Plastic industry Production of ceramics Production of rubber goods Production of textiles Tobacco industry Washing powder industry</p>
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Applications



Wood Dust



Jet Material



Plastic Granules



Coal Dust



Fertilizer



Iron-II-Sulfate

Process Data

MF 3000

Measurement start free fall :	Ca. 1 kg/h
Measurement start pneumatic transport	Ca. 1 kg/h
Max. pipe diameter	DN 300
Grain size	1 Nanometer up to 20 mm
Moisture	Depending on the product
Pressure	Up to 6 bar (Option up to 30 bar)
Process temperature	-20 up to +90°C (Option up to +750°C)

Technical Data

Sensor

Medium touched parts	Stainl. steel 1.4307 and PA 6.6
Process connecting	Welding flange
Housing material	Stainl. steel 1.4307 or ST52
Protection class	IP 65
Power supply	Via transmitter

Technical Data

Transmitter

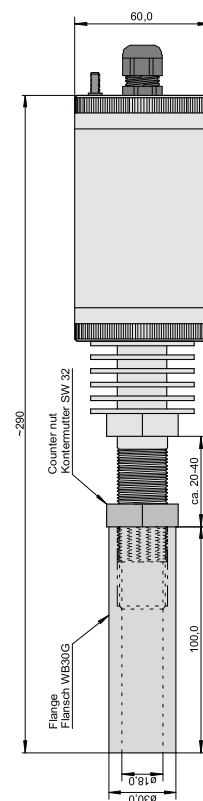
Construction	DIN-Rail, 22,5 mm
Auxiliary energy	24 V AC/DC
Power consumption	Max. 2W (+0,3 – 8,5W for thermocouple)
Ambient temperature	-10 to +60°C
Protection class	IP 30

System components

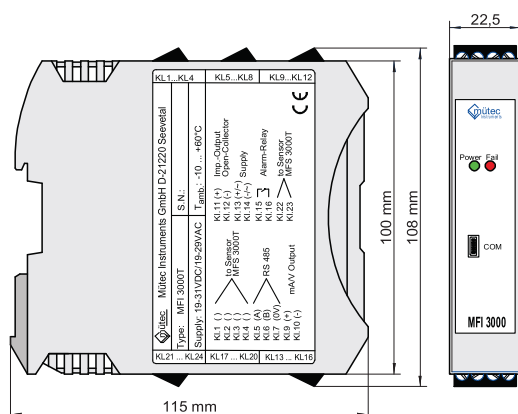


A complete measuring system MF3000 contains the sensor, a cable, a DIN-rail transmitter and the software MF-SMART .

Sensor



Transmitter



FS 510E

Continuous flow monitoring for bulk materials



Application

The FlowSwitch 510M is monitoring the conveying stream of solids.

Failures and problems during the transport or feeding of powders, dust, pellets or granules can be detected early with this device. This helps prevent serious difficulties that can occur due to clogged piping, material loss, or other technical problems with the system.

Scope of Use

Animal feed industry
Building materials industry
Production of ceramics
Chemical industry
Detergent industry
Food industry
Glass production
Metal production

Pharmaceuticals
Pigment production
Power plants
Production of rubber goods
Recycling industry
Synthetic materials
Production of textiles
etc.

Main Benefits

- Reliable, contactless microwave measurement
- For all bulk materials
- Monitors the mass flow in solid handling
- Adjustable sensitivity, damping, hysteresis and filter time
- Easy installation by compact form
- Process connection with welding nozzle

Function

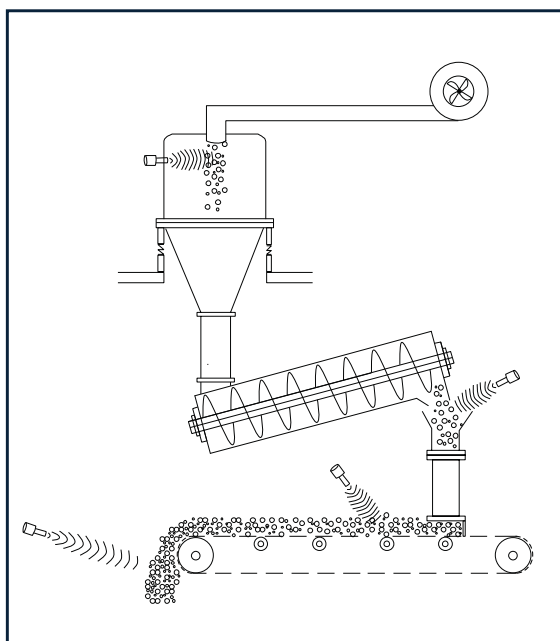
The measurement procedure of the FlowSwitch 510M is based on the physical principle of the Doppler-Effect.

Therefore the sensor sends out a microwave field. If solids move through this field, the microwaves are reflected and received by the sensor again. This is converted into a switching process.

All parameters, like sensitivity, damping, filter time and hysteresis are freely adjustable and, can be configured, due to the bargraph, with an exact value. This enables a variable determination of the switching point resp. a switching process for different mass flows.

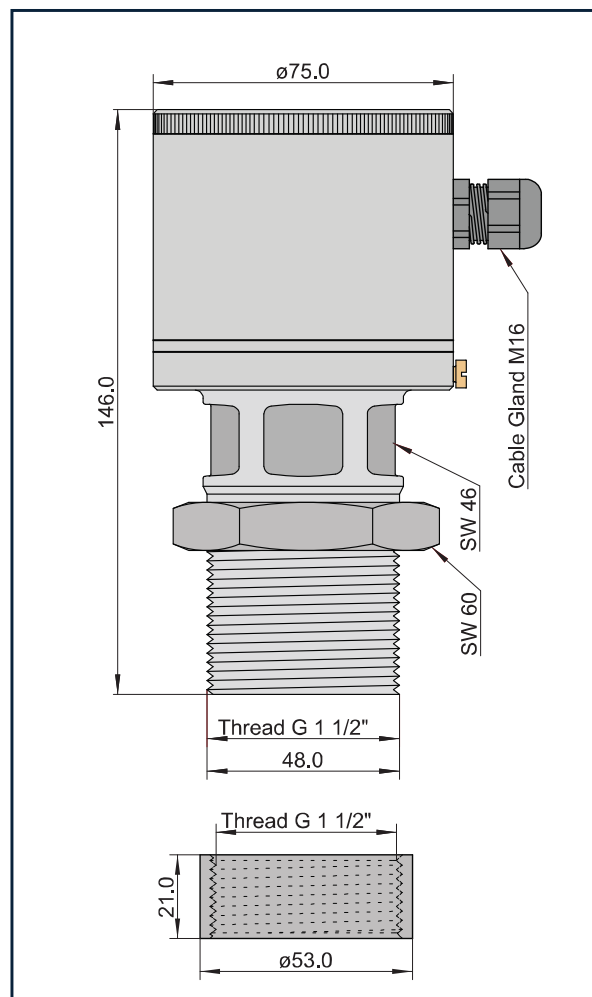
The installation can be carried out within pipes, on conveying belts, on fall plates, chutes or at similar transport facilities.

The assembly is simply, economical and easy also afterwards possible.



Technical Data

Housing material	Stainless steel
Sensor surface	Teflon (optional ceramic)
Protection class	IP65
Ambient temperature	-20°C to +60°C
Process temperature	-20°C to +80°C
Process pressure	2 bar (optional 25 bar)
Power supply	24 VDC (18 - 30 VDC)
Current consumption	Ca. 80 mA at 24 VDC
Transmitting power	10 dBm
Output (switching)	Relay contact (change-over contact, potential free)
Switching voltage	35 VAC or 45 VDC
Switching current	min. 10 µA & max. 1 A
Switching power	35 VA or 30 W
Electr. connection	Plug-in screw terminals
Adjustable parameter	Sensitivity, damping, filter, hysteresis, min / max switch
Parameterization	Direct at device via buttons
Indicators	LED green (working) LED yellow (switch) Bargraph (i.a. field intensity)



FS 700E

Dust monitoring for filter break



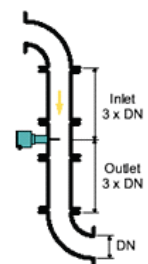
Application

The dust monitor FlowSwitch 700E is used for the detection of filter failure functions e.g. crack or defect in assembling.

By the triboelectric measuring principle a dust breakthrough can be recognized reliable.

Scope of Use

FlowSwitch 700E can be put in metallic pipes and channels which shall be monitored on dust.



Main Benefits

- Maintenance free
- Adjustable sensitivity
- Adjustable switch
- Condition indication with
- LED Stainless steel housing
- Compact form
- Easy installation

Function

The technology is based on a modified triboelectric principle detecting particles interacting with the sensing rod and such particles just passing the rod. Build up on the rod surface will not be detected, only moving particles generate a flow rate proportional signal which is monitored by the electronic.

Installation is done on the clean gas side downstream the filter at a metal duct by welding on of a thread bush boring through the duct wall and screwing in dust watch. On and off distance should be this 3-fold of the pipe diameter area, the sensor length 1/3 to 2/3 of the pipe diameter.

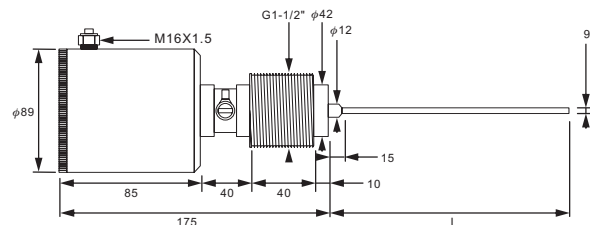
The device isn't usable at products, which build an electric conductive coating between sensing rod and pipe wall, caused of abrasion.

Technical Data

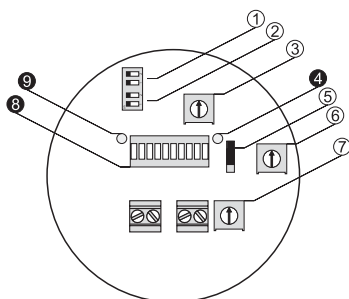
Material	Housing Sensor rod (standard) Isolation (standard) Sealing (standard)	Stainl. Steel 1.4571 Stainl. Steel 1.4571 Polyamide (PA) NBR
Ambient cond	temperature Protection class EMC	-20°C to +70°C IP 67 (EN 60529) According to EN 61326-1
Process	Temperature Pressure	Max. 90°C Max. 2 bar
Output	FlowSwitch_01 FlowSwitch_02 FlowSwitch_20	Max. 48 V AC/DC, 1A Logic high/low switchable Transistor: galvanic isolated Max. 31 V DC, 15 mA Logic high/low Switchable 4-20 mA, galvanic isolated, load < 500
Power supply	FlowSwitch_01/02 FlowSwitch_20	17...31 V DC, max. 60mA., 24 V DC ± 10 %, max. 80 mA
Adjustment	Sensitivity Damping Switchpoint Zero set	1...180.000 0...10 s 1...10 FlowSWITCH_01/02 4 mA, FlowSWITCH_GM20

Dimensions

(Unit: mm)

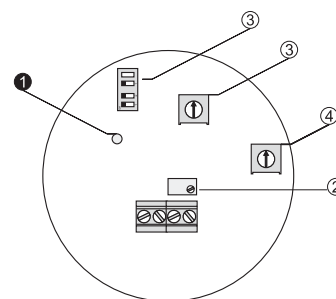


Indication/ Adjustment elements of output type 01 and 02



- | | |
|---------------------|-----------------------|
| Adjustment elements | Indicator elements |
| ① sensitivity 1 | ⑤ switching behaviour |
| ② sensitivity 2 | ⑥ damping |
| ③ sensitivity 3 | ⑦ limit value level |
| | ④ alarm |
| | ⑧ flow rate |
| | ⑨ power |

Indication/ Adjustment elements of output type 20



- | | |
|--------------------|---------------------|
| Indicator elements | Adjustment elements |
| ① power | ② zero adjustment |
| | ③ span adjustment |
| | ④ damping |

FS 710E

Dust monitoring for filter break

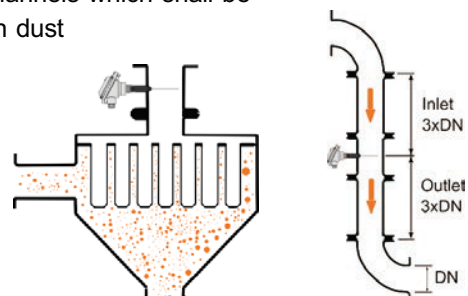


Application

The dust indicator FS710E is for the use on the clean air side to detect dust behind a filter. In this way, filter cracks, fractures or assembly errors are reported automatically and reliably.

Scope of Use

FlowSwitch 710E can be put in metallic pipes and channels which shall be monitored on dust



Function

The measurement system is based on the triboelectric effect: Particles collide permanently with each other or with other materials, e.g. the wall. Because of this process the particles will be charged in a natural way. If these electrically charged particles are flying next to the sensor rod of FS710E or even touch it, the particles are detected via the charge transfer. Resting particles, such as deposits etc., do not affect the measurement. Therefore a subsequent installation into existing exhaust ducts is possible without any problems.

Installation is quick and easy by welding a threaded socket. The sensor rod is inserted into the pipe and fixed by the thread. The sensor rod length should be at least 1/3 of the pipe diameter and must not touch the opposite side.

During operation, the emerging particle load is continuously gathered and classified in three different categories.

	Particle	Status	LED	Switch	Switch
Load	low	good	green	closed	closed
Load	medium	prealarm	yellow	opened	closed
Category II Load	high	main	red	closed	opened

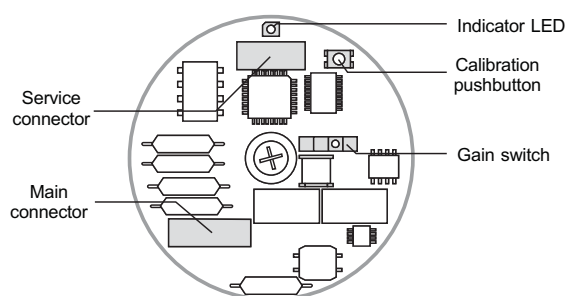


Figure 1 - View of board

GN		Calibration (IN)
GN-WH		Calibration (GND)
OG		Supply (+24V)
OG-WH		Supply (0V)
BU		Solid state relay1
BU-WH		Solid state relay1
BN		Solid state relay2
BN-WH		Solid state relay2

Figure 3 - Wiring

Main Benefits

- Automatic calibration
- Maintenance free
- Three-condition monitoring
- Two switching points via switching output
- Condition indication by different LED colors
- Compact form
- Protection class IP65
- Easy installation

Technical Data

Material	Housing	Aluminium
	Sensor rod (standard)	316Ti
	Protection class	IP 65 (EN 60529)
	Isolation (standard)	PPS
Process cond.	Temperature	-20°C to +150°C
	Pressure	0 to 2 bar
Power supply	Voltage	24 VDC
	Power consumption	max. 50 mA
	Power	< 2 W
	Storage	-20°C to +60°C
	EMC	According to EN 61326-1
Output	Switch1 and switch2	
	Switch output	Normally energized
	Switching voltage	60 VAC/DC
	Switching current	Max. 100 mA
	Switching capacity	6 W
Calibration	Precalibration and automatical recalibration	
Other	Ambient Temp.	-20°C to +50°C*
	Storage Temp.	-20°C to +70°C
	Cable	assembled

Dimensions

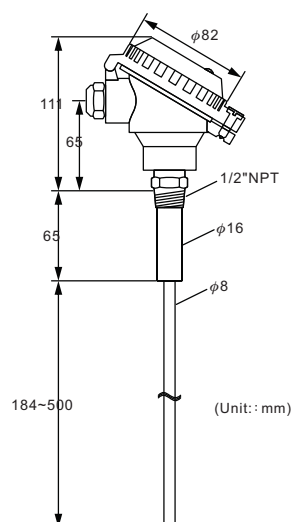


Figure 2 - Dimensions of sensor

LC 510M

Contactless level monitoring for bulk material



Application

The microwave barrier LevelCheck 510M is designed for level monitoring of solids in silos, container, bunkers, shafts, etc.

Furthermore it can be used for: blockage-report, for counting piece goods or for positioning items. The devices are certified up to ATEX Zone 20 and optionally authorized for a process pressure up to 25 bar.

Scope of Use

Animal feed industry	Pharmaceuticals
Building materials industry	Pigment production
Production of ceramics	Power plants
Chemical industry	Production of rubber goods
Detergent industry	Recycling industry
Food industry	Synthetic materials
Glass production	Production of textiles
Metal production	Etc.

Main Benefits

- Reliable, contactless microwave measurement
- For all bulk materials
- Monitors the mass flow in solid handling
- Adjustable sensitivity, damping, hysteresis and filter time
- Easy installation by compact form
- Process connection with welding nozzle

Function

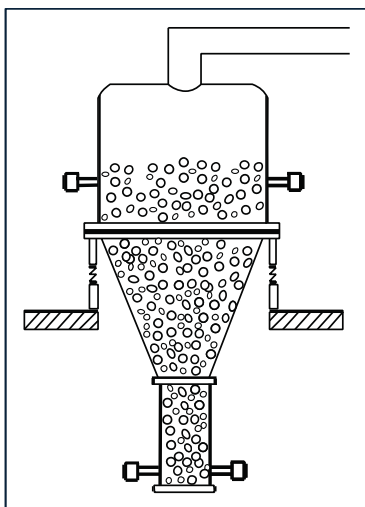
The measurement procedure of the FlowSwitch 510M is based on the physical principle of the Doppler-Effect.

Therefore the sensor sends out a microwave field. If solids move through this field, the microwaves are reflected and received by the sensor again. This is converted into a switching process.

All parameters, like sensitivity, damping, filter time and hysteresis are freely adjustable and, can be configured, due to the bargraph, with an exact value. This enables a variable determination of the switching point resp. a switching process for different mass flows.

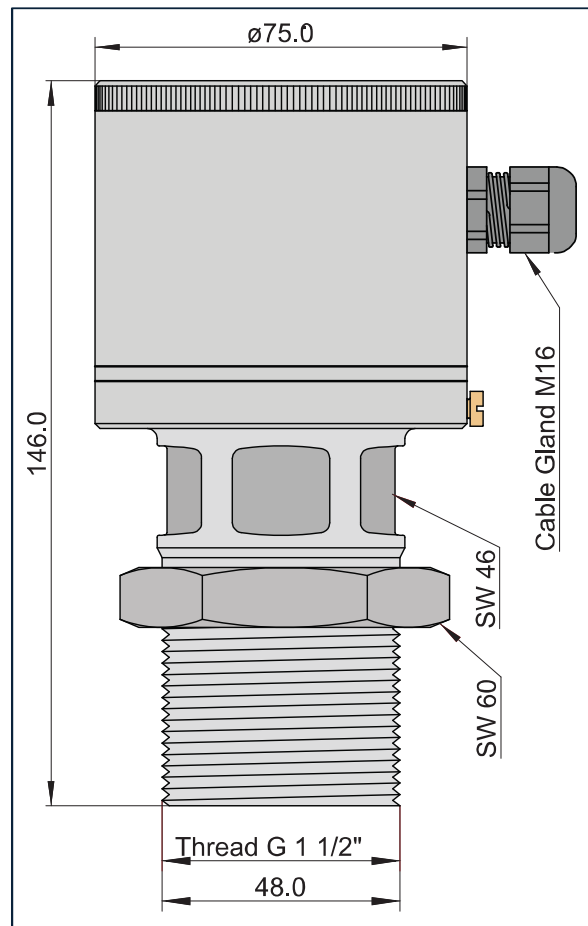
The installation can be carried out within pipes, on conveying belts, on fall plates, chutes or at similar transport facilities.

The assembly is simply, economical and easy also afterwards possible.



Technical Data

Housing material	Stainless steel
Sensor surface	Teflon (optional ceramic)
Protection class	IP65
Ambient temperature	-20°C till +60°C
Process temperature	-20°C till +80°C
Process pressure	2 bar (optional 25 bar)
Power supply	18-30 VDC (typical 24 VDC)
Current consumption	Ca. 80 mA at 24 VDC
Transmitting power	10 dBm
Output (switching)	2x Relay output (change-over contact, pot.-free) optional transistor
Switching voltage	45 VDC / 35 VAC
Switching current	Min. 10 µA & max. 1 A
Switching power	30W / 35 VA
Electr. connection	Screw terminals (behind a screw cap with cable gland)
Adjustable parameters	Sensitivity, filter time, hysteresis
Parameterization	via key buttons and switch
Indicators	LED green (power supply) LED orange (switch) Bargraph



ORDER INFORMATION

HUMY3000 ORDER INFORMATION

HUM 1 -

HUMY3000 _____

Model _____
 00: Standard type 02: Hi-temp. type

Certification _____
 00: N/A B: ATEX-Ex ia 1C: ATEX-Ex d

Probe material _____
 17: POM (Standard) 21: PTFE 32: Ceramic

Cable length _____
 0003: 3 mtr (Standard)
 0004: 4 mtr
 0005: 5 mtr
 ⋮
 1000: 1000 mtr (Max.)

Sensor housing _____
 A: 304L (Standard) B: 316Ti

Console _____
 E: Cabinet type T: Desktop type : Wall mounting type

Power supply _____
 F: AC110V(AC110V+DC24V)
 G: AC220V(AC220V+ DC24V)

HUMY3019 ORDER INFORMATION

HUM 2 **0 0** -

HUMY3019 _____

Model _____
 00: Standard type 02: Hi-temp. type

Probe material _____
 17: POM (Standard) 21: PTFE 32: Ceramic

Cable length _____
 0003: 3 mtr (Standard)
 0004: 4 mtr
 0005: 5 mtr
 ⋮
 1000: 1000 mtr (Max.)

Sensor housing _____
 A: 304L (Standard) B: 316Ti

Mounting case _____
 0: N/A 3: HUMY 3019-3-TR 6: HUMY 3019-6-TR

Plate Q'ty for controller _____
 00: N/A
 01: 1 pc
 ⋮
 10: 10 pcs

Power supply _____
 F: AC110V(AC110V+DC24V)
 G: AC220V(AC220V+ DC24V)

ORDER INFORMATION

HUMY300 ORDER INFORMATION

HUM 3 **00** -

HUMY300 _____

Model _____
 00: Standard type
 02: Hi-temp. type

Probe material _____
 17: POM (Standard)
 21: PTFE
 32: Ceramic

Cable length _____
 0003: 3 mtr (Standard)
 0004: 4 mtr
 0005: 5 mtr
 ⋮
 1000: 1000 mtr (Max.)

Sensor housing _____
 A: 304L (Standard)
 B: 316Ti

MF3000 ORDER INFORMATION

MFX 1 -

MF3000 _____

Model _____
 00: Standard type
 02: Hi-temp. type (Up to 150°C)
 08: Hi-temp. type (Up to 450°C)

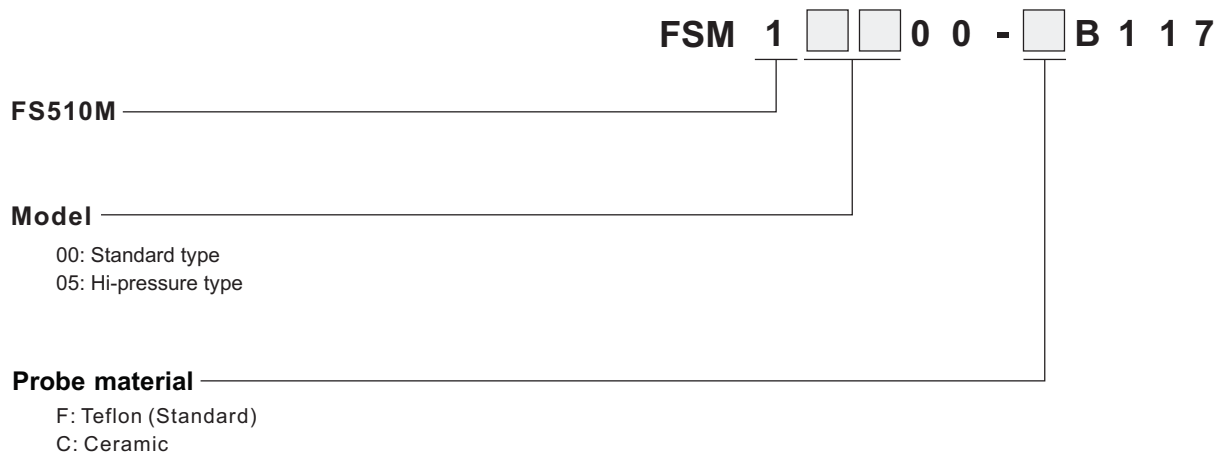
Certification _____
 00: N/A
 1D: ATEX-Dust

Housing material _____
 A: 304L (Standard)
 B: 316Ti

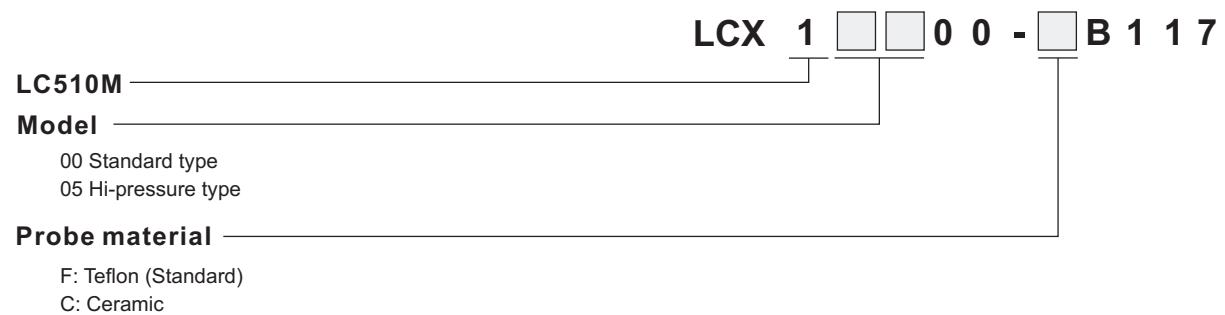
Operating pressure _____
 00: ATM
 02: 2Bar
 06: 6Bar(Standard)
 30: 30Bar
 (Hi-temp. type, pressure max 2bar)

ORDER INFORMATION

FS510M ORDER INFORMATION

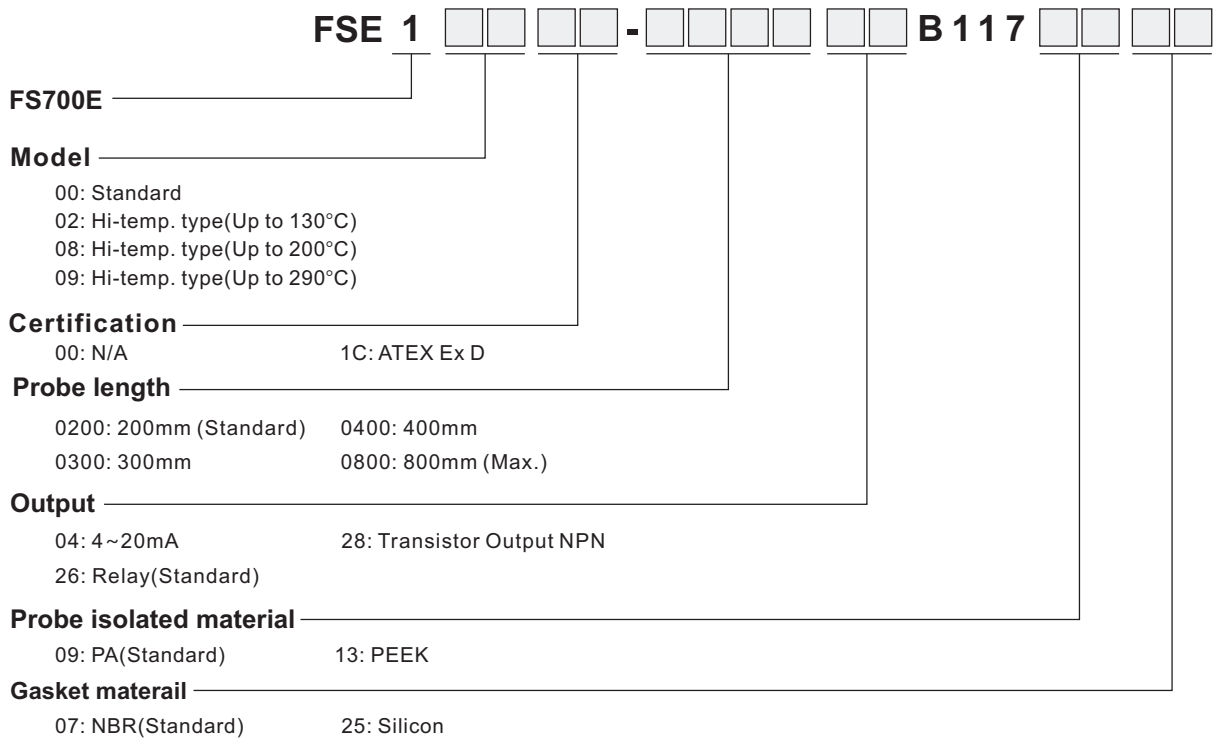


LC510M ORDER INFORMATION



ORDER INFORMATION

FS700 ORDER INFORMATION



FS710E ORDER INFORMATION

