mütec Instruments

Measuring Systems for Solids

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♦ PRODUCT INDEX ♦

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 serials is in many processes successfully in use, e.g. for 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. On the LC diaplay are represented the measurement analongusly and digitally.

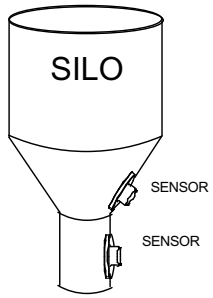
A simple control and parameter setting of all function is carried out via soft keys. For product or process changes different product parameters can be stored.

Main Benefits

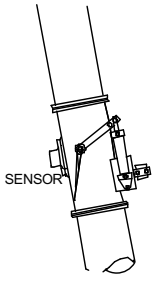
- No samples for the laboratory necessary
- Saving of energy costs
- Improvement on the product quality
- Very short amortization time
- High selective sensitiveness
- High measuring speed
- Precision better than 0.1% (Depends on product)
- Easy and economical installation
- Fast and simple calibration
- Optional ATEX-Version for Zone 20 and Zone 0

Examples for Installations

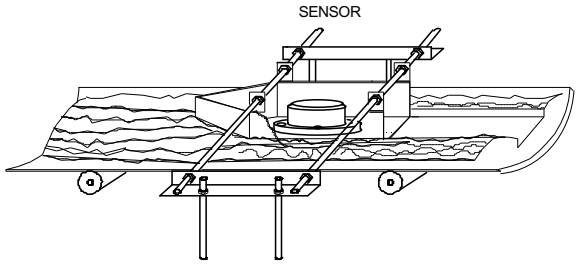
Installation in hopper



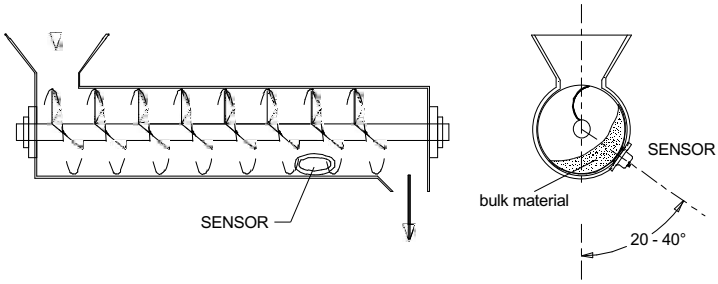
Installation in a free full application



Installation on a conveyor belt



Assembly of the moisture measurement sensor at the scleu conveyor's exit



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

Humy 3000 Technical Data Measuring Unit

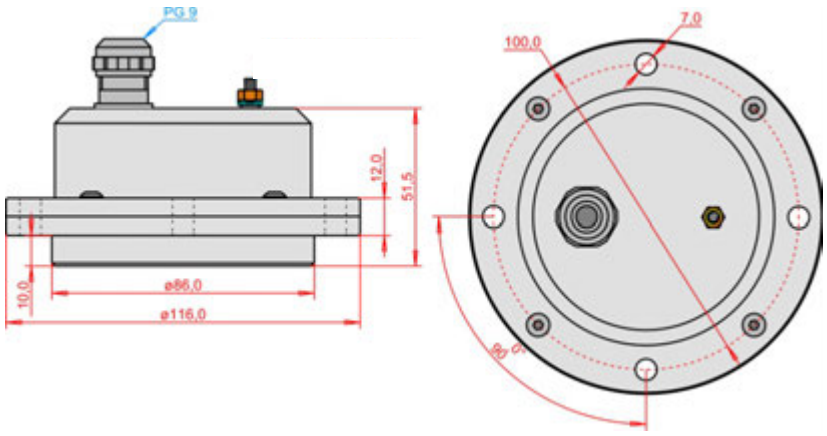
Construction E

Construction T

Construction S

Construction F	Field-/wall-mounting housing, B 265 x H 240 x T 250, weight approx. 6.5 kg, with sight-door IP6
Construction T	Desk-housing B 236 x H 132 x T 330mm, weight approx. 4.5 kg, Option panel housing
Construction E	19“-plugin 3HE / 42 TE, weight approx. 2 kg
Construction S	Panel housing with sight door B270 x H183 x T223, IP 58
Indication	1/4 VGA-LC-Display 100 x 77 mm, 320 x 240 colour-pixel. For analogue and digital measurement representation
Display	Date, time, kind of product, temperature, value of residual, moisture or value of dehydrated substance, Min- and Max-alarm values, analog bar graph indication, dragging pointer width of deviation of measuring value with intensified indication of width of deviation of measuring value, digital indication and description of Min-/Max-limit values and the softkeys
Digital resolution	20 Bit for 0-85,0% moisture and 15 - 100% dry substance
Measuring range moisture	Min. 0.02 – 0.10%, max. 0.02 – 90.00%, with 1-,2- or 3 digits behind the point
Measuring range temp.	Span min.: 0-5° C, Span max.: 0-120° C
Accuracy	Max. 0.1 % in accordance to material to be measured
Handling	Foil-keyboard with each 4 pcs. 10-Block + Function keys + Softkeys
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	Normally opened and normally closed contact for each Min- and Max-alarm relay Contact load: 30VDC or 62.5 VAC
Analog outpu	Measuring value of residual moisture or dehydrated substance 0/4-20 mA (load 750 Ω. measuring value of product temperature, 0/4-20 mA, max. load 750 Ω.
Analog input	mA- and PT 100- input
Digital output	2x galvanic isolated, 24 V open-drain(max. 50mA)
Digital input	2x galvanic isolated, active signals (8-36 V)
Interface	RS 232 with connection for RxD, TxD, OV and RS-485
Power supply	230 V AC / 115 V AC or 24 V AC/DC All supplies can be available simultaneously (230 VAC and 24 VAC/DC or 115 VAC and 24 VAC/DC).

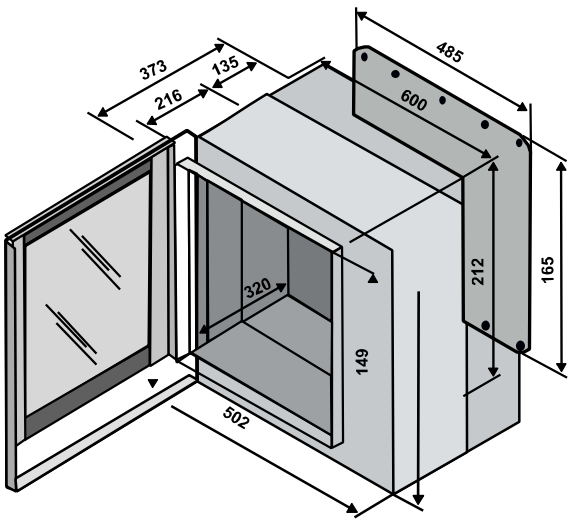
Technical Data Moisture Sensor



FMS 400 K	Measuring surface POM
FMS 400 C	Measuring surface ceramic
FMS 400 T	Measuring surface PTFE
Housing	Stainless steel 1.4307
Weight	Approx. 1.05 kg
Protection class	IP 67 according to EN 60529
Connection cable	Shielded 4-wires cable, 0.25 up to 0.5 mm²
Cable length	max. 1000 m with 0.75 mm²
Process-temp.	-10° ~ 90° C 140°C with cooling
Storage temp.	-10° ~ 80° C
Response time	Approx. 1 seconds
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. 6.5 kg, with sight-door IP65
Construction T	Desk-housing B 236 x H 132 x T 330mm, weight approx. 4.5 kg, Option panel housing
Construction E	19“-plugin 3HE / 42 TE, weight approx. 2 kg
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 % 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 outpu 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 20mm 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.

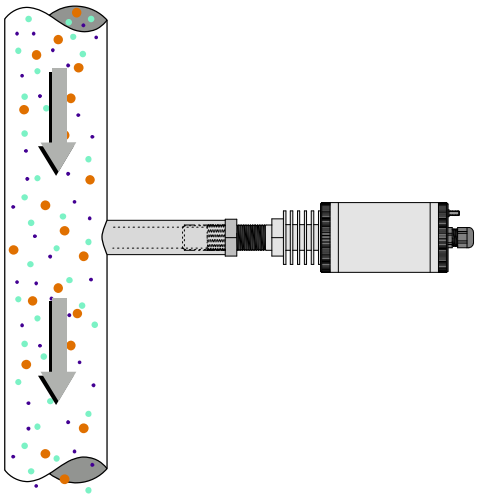
Main Benefits

- 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 2000 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 measure-ment 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%

Materials:

All dust, powders, granulates, panels, threads etc. Also sticking or abrasive materials

Range of detection:

from kg/h to many t/h

Industries:

Animal feed industry
Building materials industry
Cement industry
Chemical industry
Detergent industry
Engineering companies
Food industry
Glass production
Metal production
Pharmaceuticals
Pigment production
Plastic industry
Production of ceramics
Production of rubber goods
Production of textiles
Tobacco industry
Washing powder industry

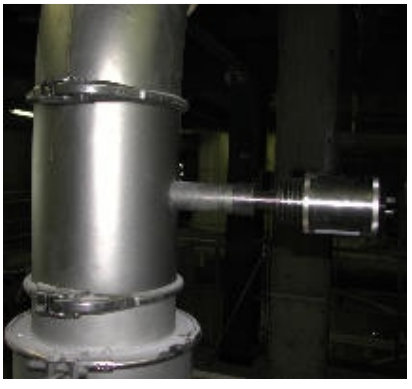
Applications

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 nm 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)

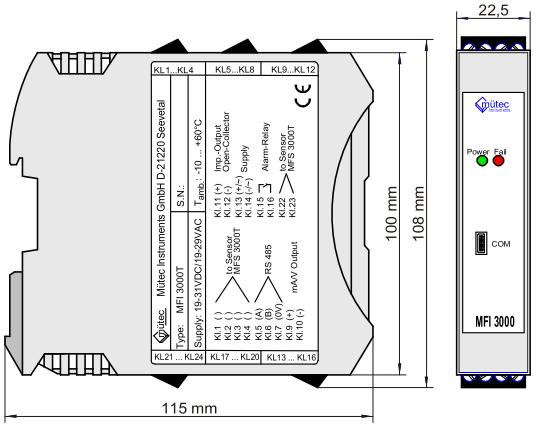
Technical Data Sensor

Medium touched parts	Stainless steel 1.4307 and PA 6.6
Process connecting	Welding flange
Housing material	Stainless 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

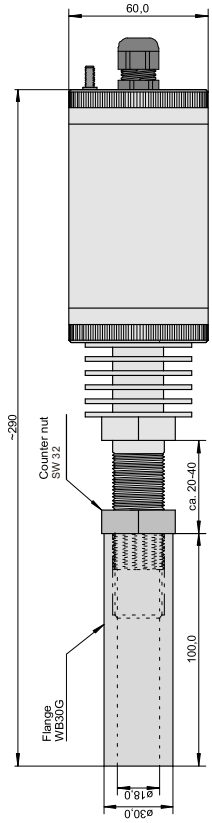
Transmitter



System components

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

Sensor



FS 510M

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

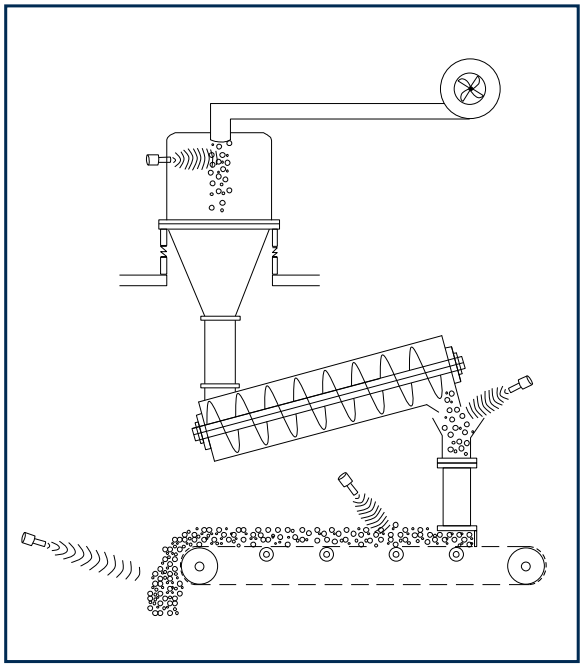
The measurement procedure of the FlowSwitch 510M is based on the physical principle of the Doppler-Effect.

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.

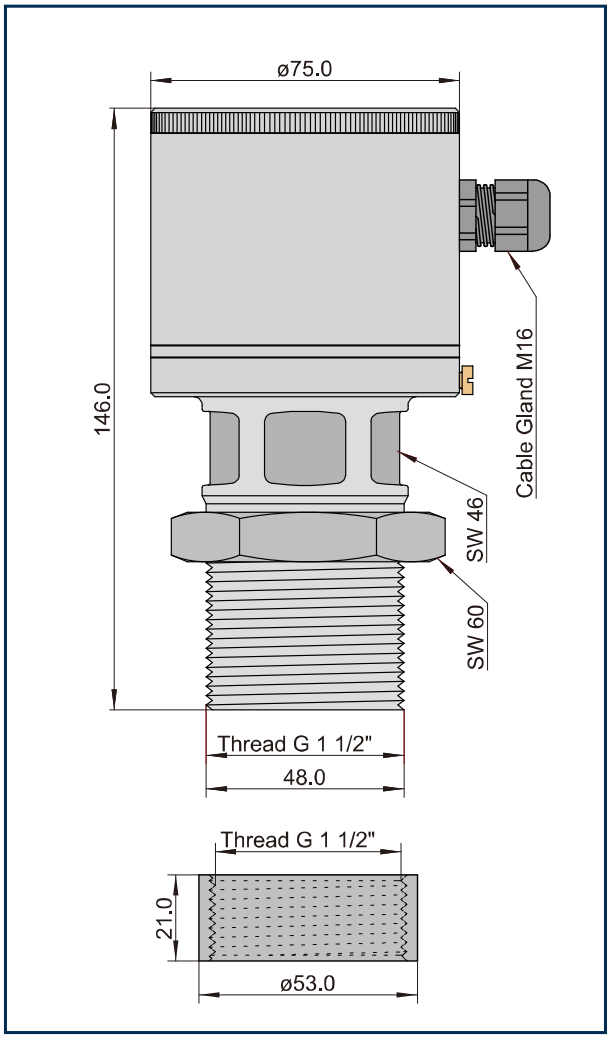
The installation can be carried out within pipes, on conveying belts, on fall plates, chutes or at similar transport facilities.

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
Electronic 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

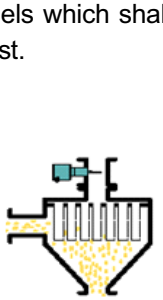
Application

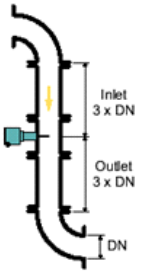
The dust monitor FlowSwitch 700E is used for the detection of filter failure functions e.g. crack or defect in assembling.

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 this 3-fold of the pipe diameter area, the sensor length 1/3 to 2/3 of the pipe diameter.

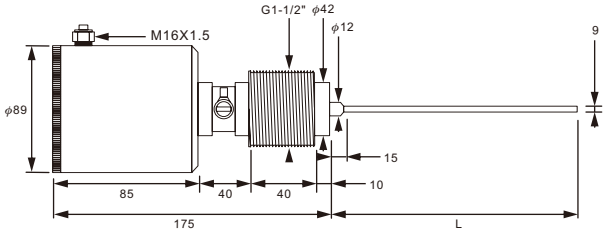
The device isn't usable at products, which build an electric conductive coating between sensing rod and pipe wall, caused of abrasion.

Technical Date

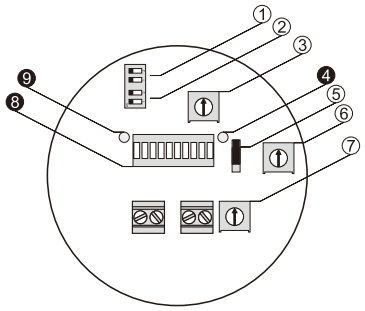
Material	Housing Sensor rod (standard) Isolation (standard) Sealing (standard)	Stainl. Steel 1.4571 Stainl. Steel 1.4571 Polyamide (PA) NBR
Ambient Condition	temperature Protection class EMC	-20°C to +70°C IP 67 (EN 60529) According to EN 61326-1
Process	Temperature Pressure	Max. 90°C Max. 2 bar
Output	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



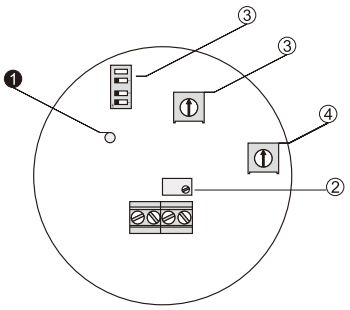
Ajustment elements

① sensitivity 1
② sensitivity 2
③ sensitivity 3
⑤ switching behaviour
⑥ damping
⑦ limit value level

Indicator elements

❹ alarm
❽ flow rate
❾ power

Indication/ Adjustment elements of output type 20



Indicator elements

❶ power

Adjustment elements

② zero adjustment
③ span adjustment
④ damping

FS 710E

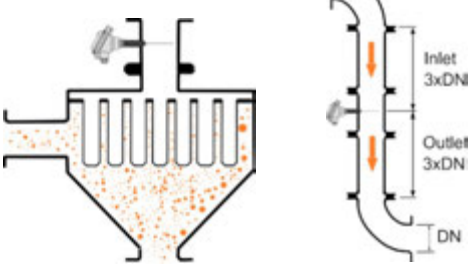
Dust monitoring for filter break

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 load	Status	LED	Switch output1	Switch output2
Load category I	low	good	green	closed	closed
Load category II	medium	prealarm	yellow	opened	closed
Load category III	high	main	red	closed	opened

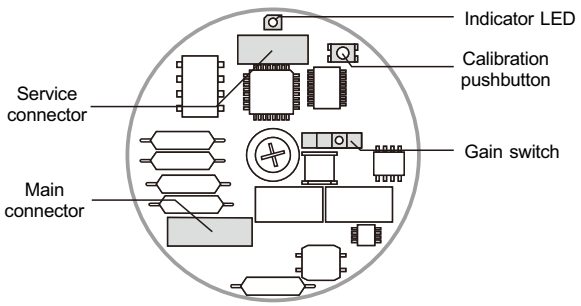


Figure 1 - Vew of board

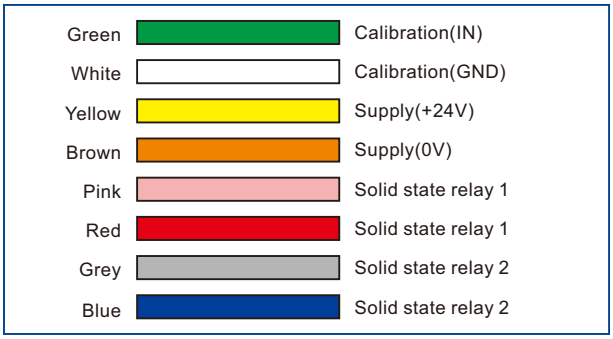


Figure 3 - Wiring

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)	316
	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

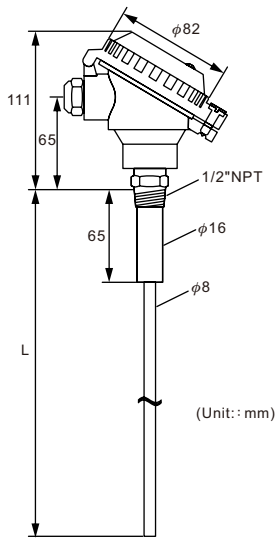


Figure 2 - Dimensions of sensor

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
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 microwave measuring principle.
- Self-monitoring with additional relay.
- For level monitoring.
- Adjustable sensitivity, damping, hysteresis and filter time.
- Adjustable via 2 key buttons and bargraph.
- Easy installation by compact form.
- Process connection with flange, thread, etc.

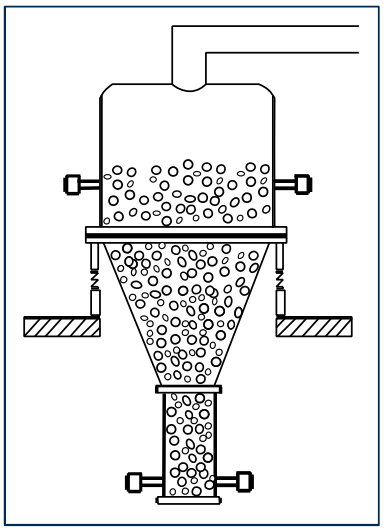
Function

The measurement procedure of the LevelCheck 510M is based on the newest microwave technology. Therefore the sensor sends out a microwave signal. The signal is analyzed by the opposite receiver. Material, which has built up within this field, put a damp on the signal effect. This is con-verted into a switching process. The measurement is contactless.

Sensitivity, signal damping and hysteresis of the microwave barrier can be adjusted continuously and exactly by use of the bargraph. This enables a variable determination of the switching point resp. a switching process for different process applications.

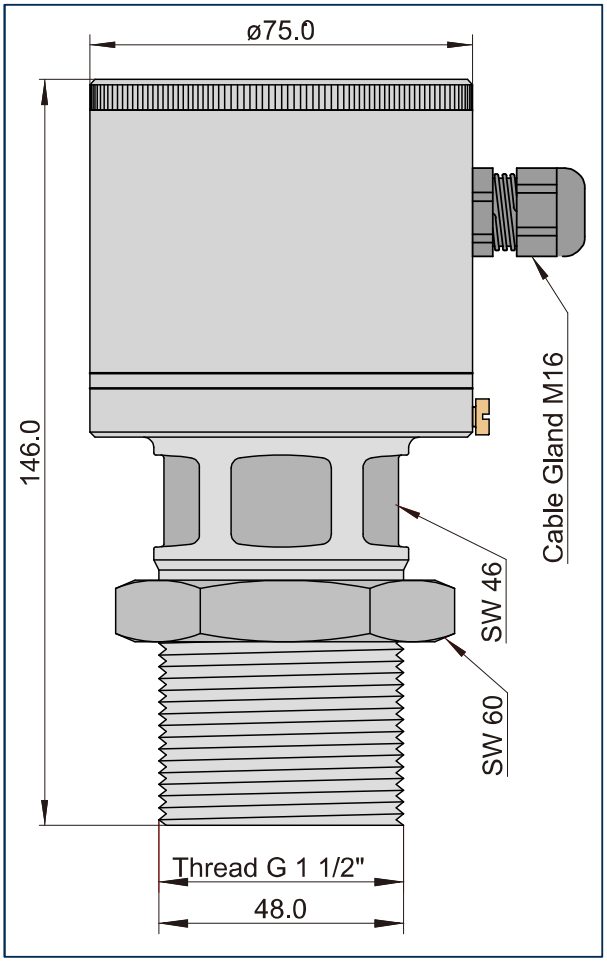
The installation can be carried out within silos, bunkers, pipe systems or at similar transport facilities.

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



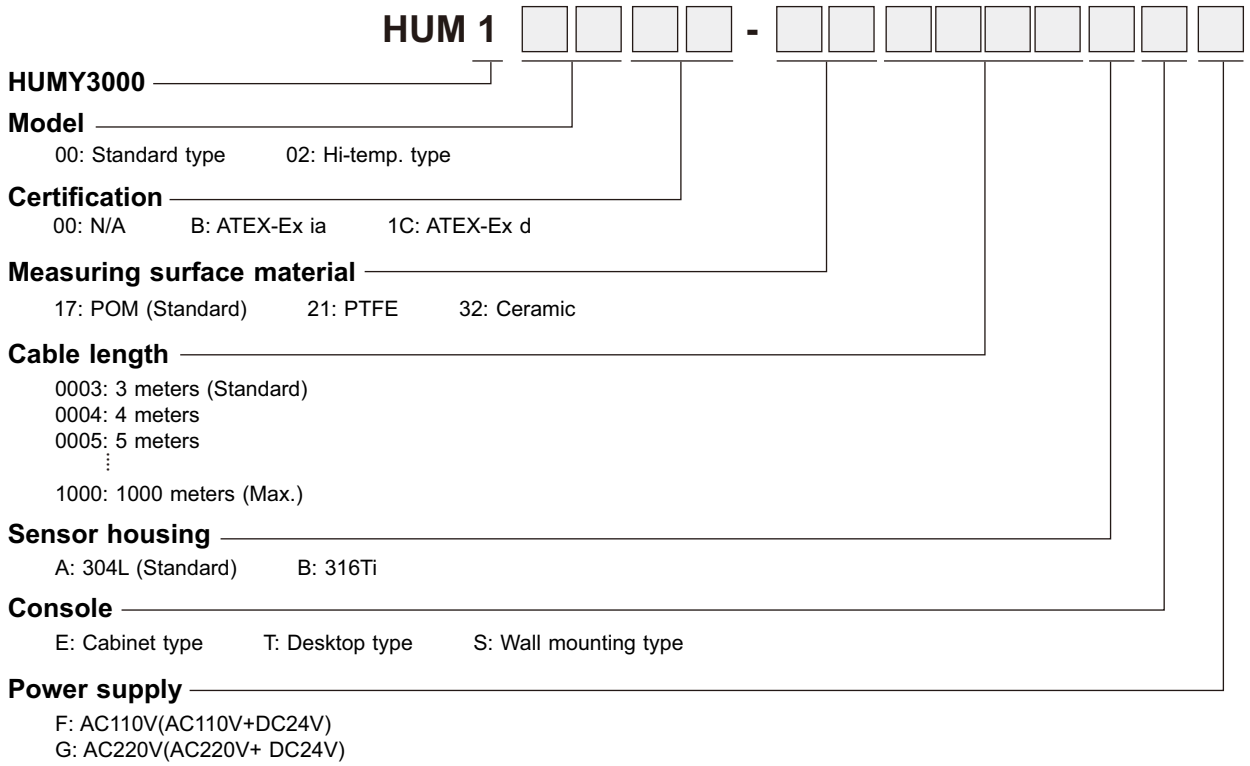
Technical Data

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
Electronic connection	Screw terminals (behind a screw cap with cable gland)
Adjustable parameters	Sensibility, filter time, hysteresis
Parameterization	via key buttons and switch
Indicators	LED green (power supply) LED orange (switch) Bargraph



ORDER INFORMATION

HUMY3000 ORDER INFORMATION



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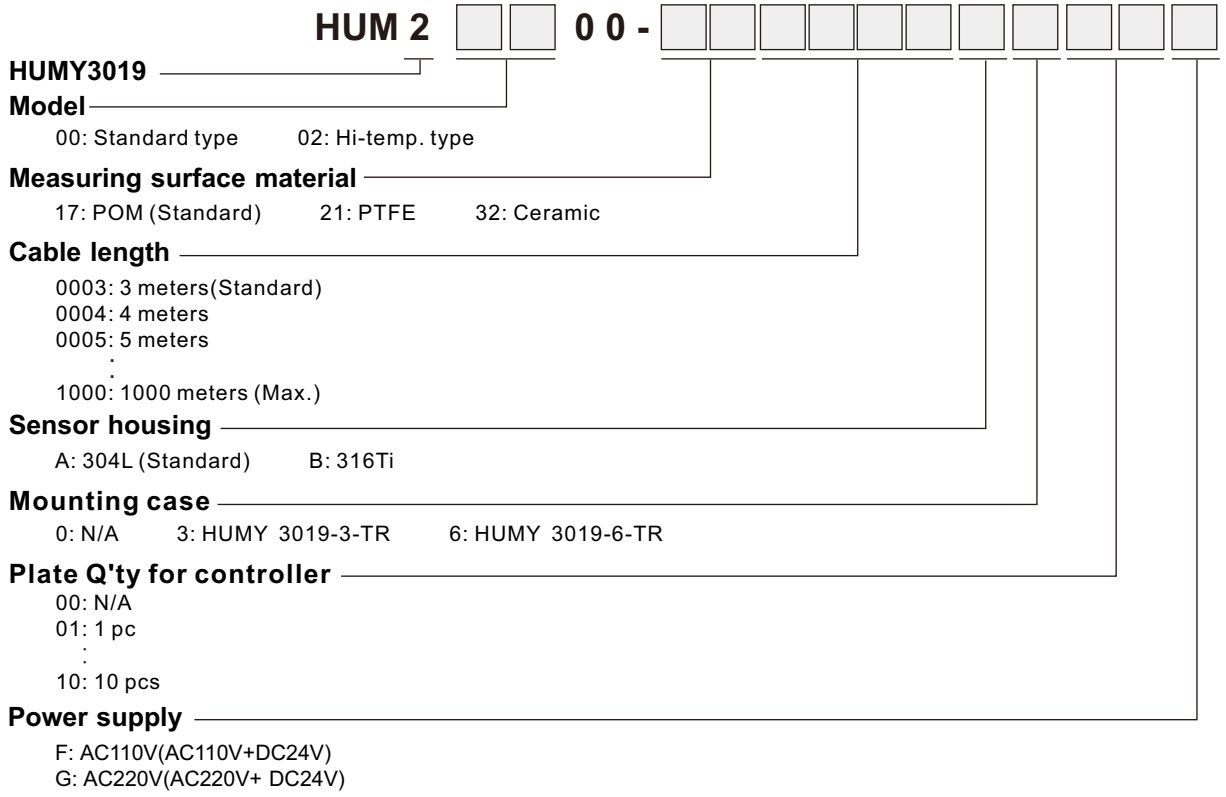
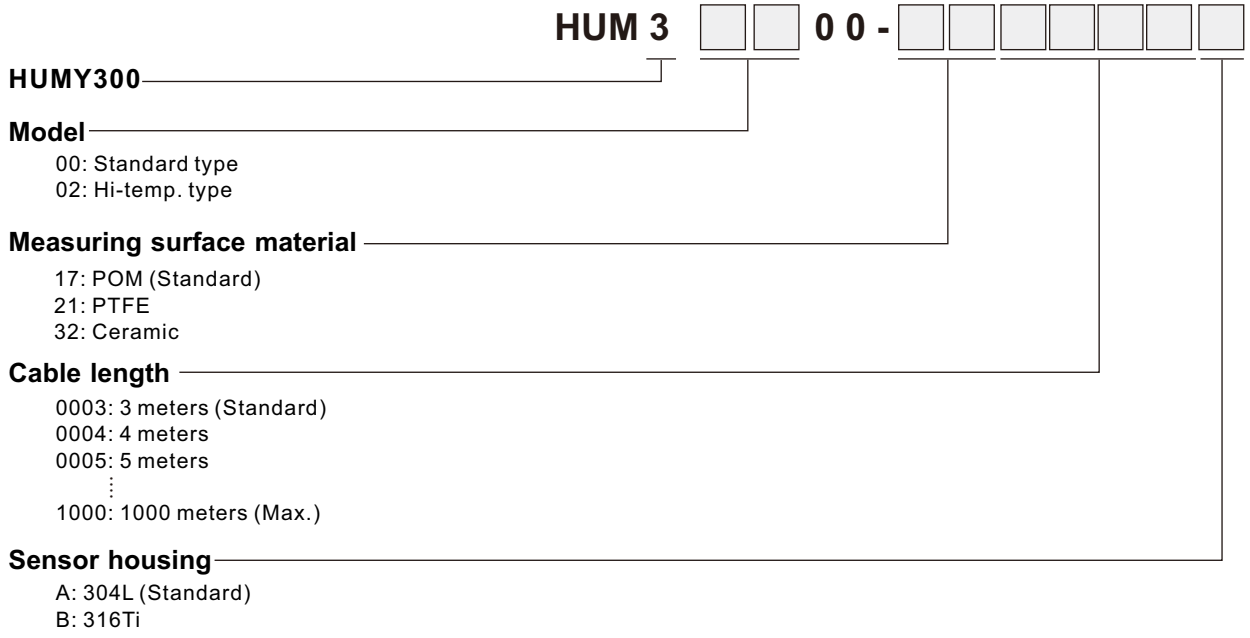
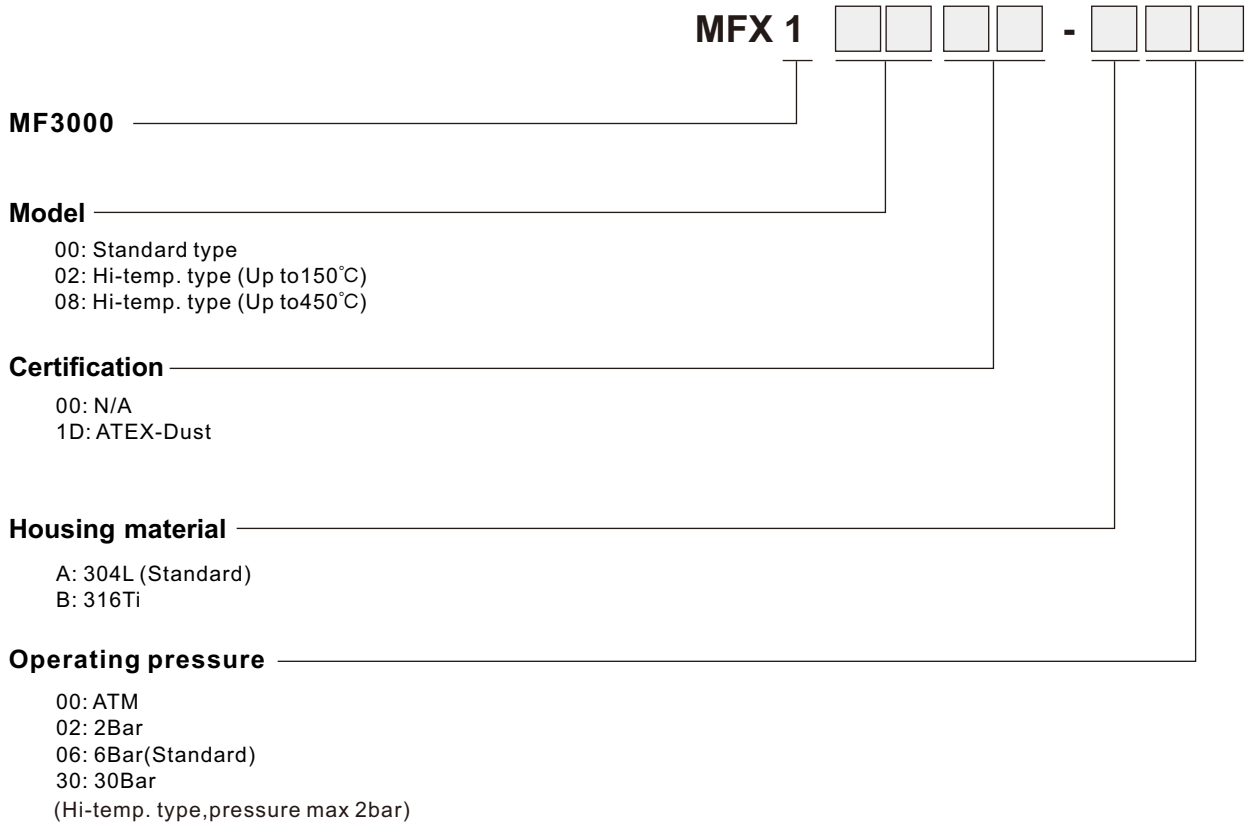


ORDER INFORMATION

HUMY300 ORDER INFORMATION

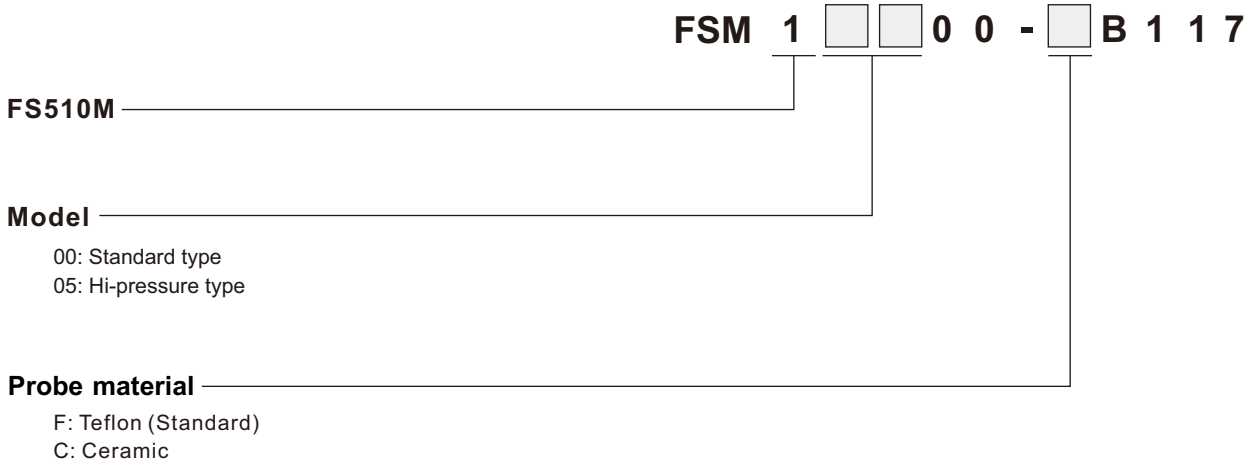


MF3000 ORDER INFORMATION

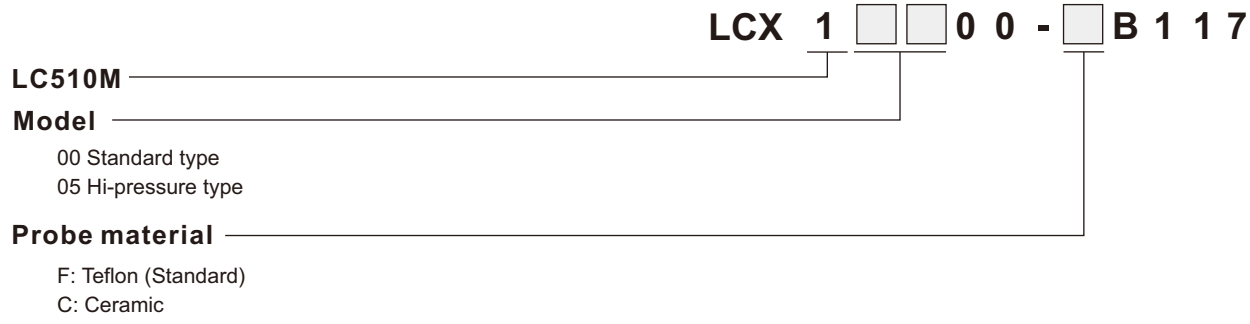


ORDER INFORMATION

FS510M ORDER INFORMATION



LC510M ORDER INFORMATION



ORDER INFORMATION

FS700 ORDER INFORMATION

FSE 1 □□ □□ - □□□□ □□ B117 □□ □□

FS700E

Model

00: Standard
02: Hi-temp. type(Up to 130°C)
08: Hi-temp. type(Up to 200°C)
09: Hi-temp. type(Up to 290°C)

Certification

00: N/A
1D: ATEX - Dust Explosion (00:Standard only)

Probe length

0200: 200mm (Standard)
0300: 300mm
0400: 400mm
0800: 800mm (Max.)

Output

04: 4~20mA
26: Relay(Standard)
28: Transistor Output NPN

Probe isolated material

09: PA(Standard)
13: PEEK

material of seals

07: NBR(Standard)
25: Silicon

FS710E ORDER INFORMATION

FSE 2 0000 - □□□□ - A5 □□

FS710E

Probe length(L)

0249: 249mm (Standard)
0200: 200mm
0300: 300mm
0400: 400mm
0400: 400mm
0500: 500mm (Max.)

Process connection

07: NPT
17: G

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