

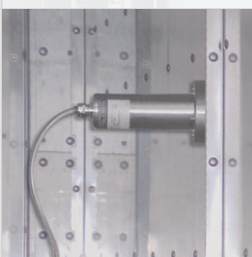


Introduces a new line of products by



M-Sens 2

Online-Moisture Meter
for Solids



Using

M-Sens 2 is especially designed for continuous moisture measurement of solids of:

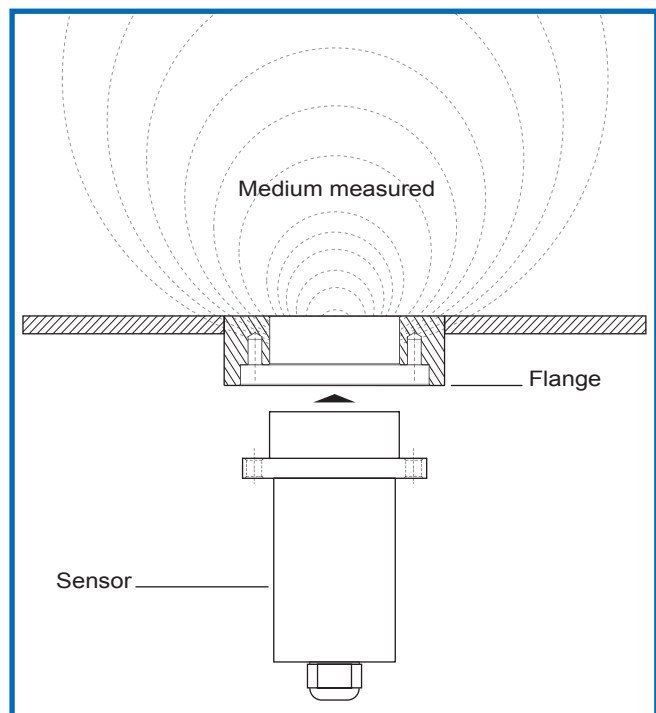
- all types of dust, powder, granulates and other bulk solids
- in different mounting positions

M-Sens 2 is characterized by its uncomplicated installation as well as by its simple calibration. Due to its hygrostability and its resistance to mechanical shocks and abrasion, the entire sensor is very fail-safe and allows for a long service life. The sensor face is protected by a ceramic disc which is resilient to abrasion and pressure.



Function

The M-Sens 2 sensor functionality is based on precise high-frequency measurement and direct digitalization of measured values which results in very high resolution. As the materials surface and capillary moisture influences strongly its specific conductive capacity, the moisture can be measured exactly by a constant averaged bulk density. The calibration can be done very simply by pressing the button and entering the referenced moisture contents. In this context it is convenient that measured value fluctuations by bulk density variations are balanced by an internal filter function. Additionally, measured value fluctuations by temperature variations are compensated automatically by the sensor.

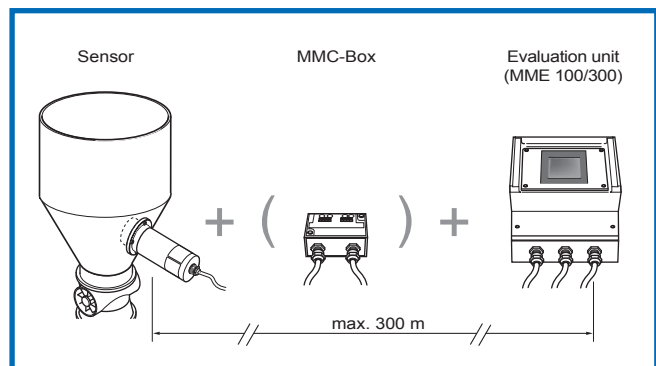


System

A complete measurement unit consists of the following components:

- welding flange
- 1 to 3 sensors, each with a 2 m connection cable
- Evaluation unit MME 100 or MME 300 (for 2 or 3 sensors)
- MMC box for the connection between sensor(s) and evaluation unit

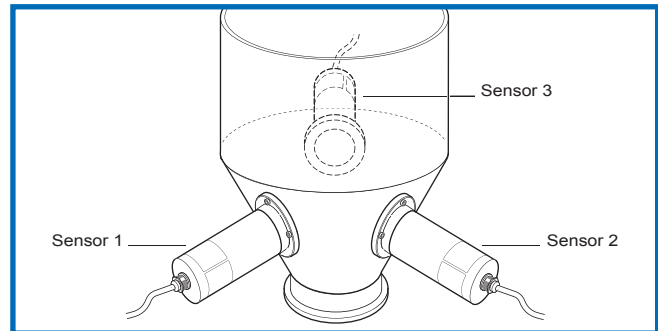
The sensor probe is connected to the evaluation unit by a shielded, 4-wired cable. The maximum distance between the two components can be up to 984' (300 m).



Using more than 1 sensor

Up to 3 sensors can be connected to a MME 300 evaluation unit to average measurements caused by inhomogeneity.

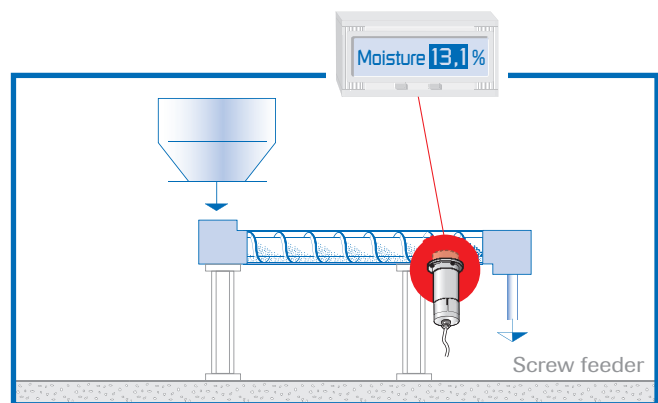
At the same time there is reduction of the influence of bulk density variations which normally exist over the whole measurement zone.



Applications - Practical Examples

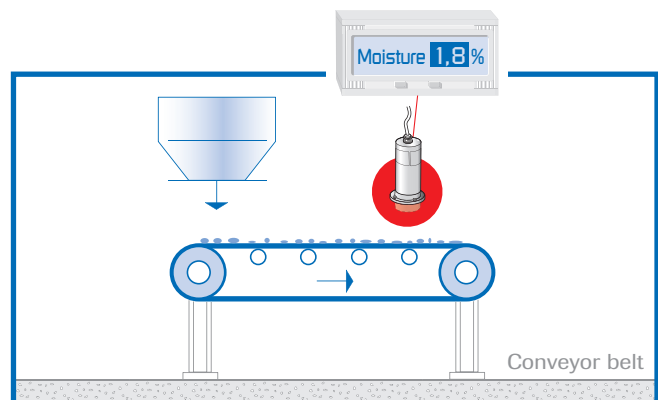
• Installation in screw feeders

The installation of a moisture sensor in screw feeders proved to be very advantageous, since the material passes by the sensor window in even intervals and with relatively constant bulk density.



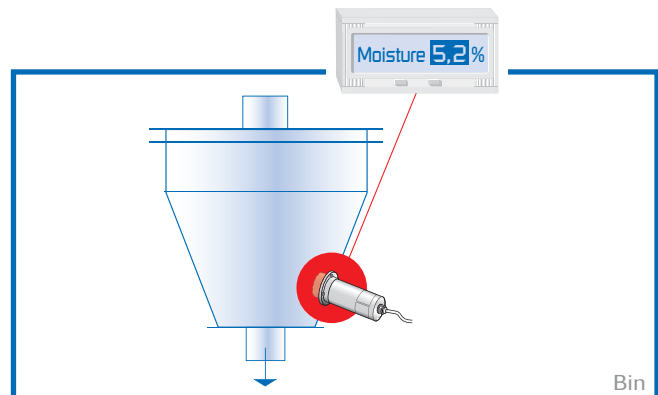
• Installation on conveyor belts

By means of the online moisture measurement of solids on a conveyor belt, the operator can react in due time if the material is too humid or too dry. In consequence, plugging of subsequent aggregates can be prevented.



• Installation in bins

Another installation alternative is to mount a sensor at the bins outlet. Due to constant bulk density of a filled bin, the sensor finds an almost unchanging measuring field for monitoring the residual moisture. Thus, M-Sens 2 prevents damp material reaching the next production level or packaging area.



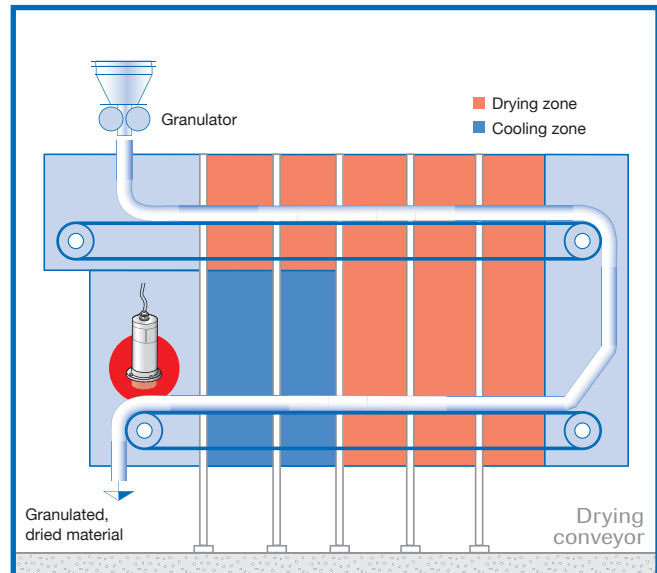
- **Control of dryer by means of an online moisture measurement**

After the material, lying on the belt, has passed through the dryer tunnel, it gets withdrawn from the hot air zone. At the end of the belt the dried material falls in a screw conveyor which transports it to the processing.

The operator queries the following points:
 Has the material reached the desired residual moisture value? That is, has he chosen the right cycle time and temperature?

M-Sens 2 provides accurate and reliable online moisture values for process control, by which constant moisture in close tolerances of the output material can be met.

This process optimization enables the operator to manage high savings and quality improvements.

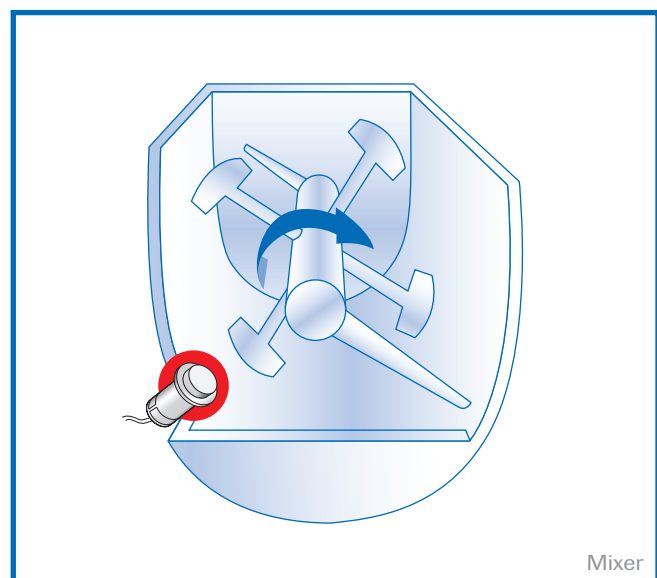


- **Moisture measurement in a mixer**

M-Sens 2 can be installed in all types of mixers. The measured values are determined from within the moving material during the mixture procedure.

With the measured moisture value of the material in the dryer, process parameters like detention time and dosage quantity can be controlled.

For this purpose M-Sens 2 is connected to a PLC or another process control system.



Uncomplicated commissioning

M-Sens 2 is calibrated by means of any number of reference points which are easy to enter. Even with only one reference point you get a sufficiently accurate display of the relative moisture.

The more reference points you enter, the more accurately the M-Sens 2 evaluation unit measures automatically the instantaneous relative moisture contents of your product.

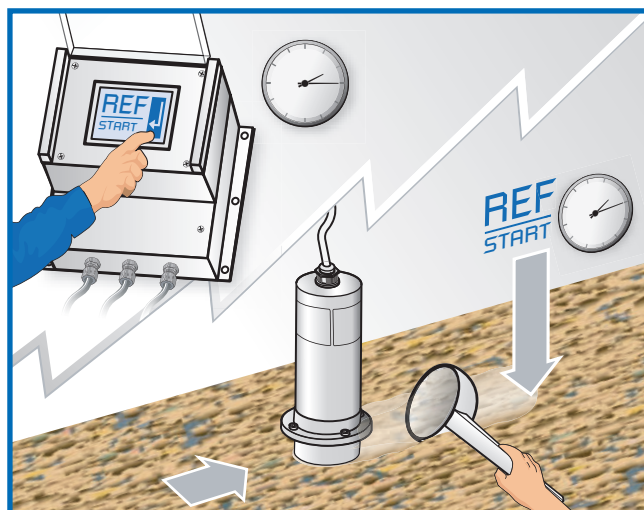
1 Sampling

In order to calibrate M-Sens 2, start the reference point entry at the evaluation unit.

This reference point measurement takes 1 min.

During this time, when the material is moving, e.g. on conveyor belts, take a sample out of the material flow after the sensor. Ideally you take several small samples from the material flow during this time.

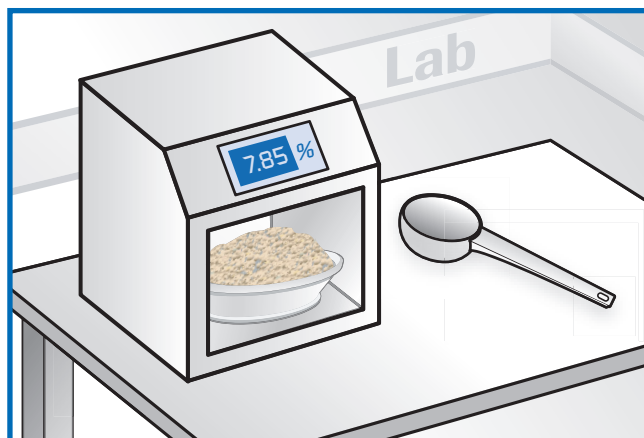
If the point of your sampling is located more distantly from the sensor (e.g. measurement in a silo or in a screw conveyor) then wait for the material, which was under the sensor at the start, to arrive at this point.



2 Laboratory test

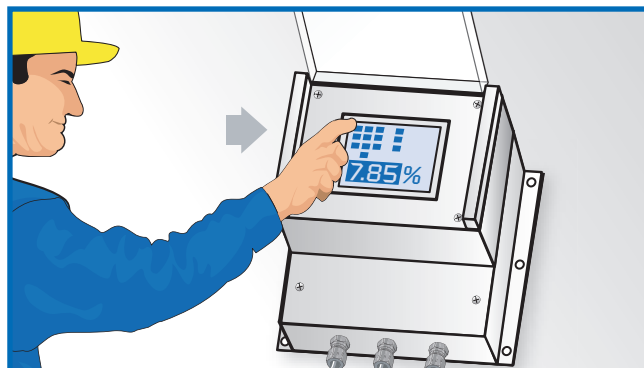
Determine the relative moisture contents of the extracted sample by a laboratory test.

The better the sample taken from the zone directly under the sensor during the reference point measurement, the more accurate the calibration of M-Sens 2.



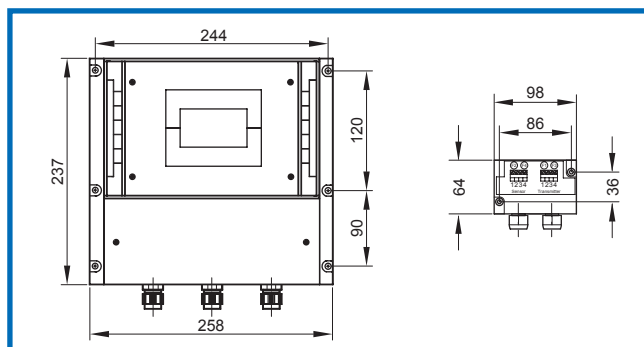
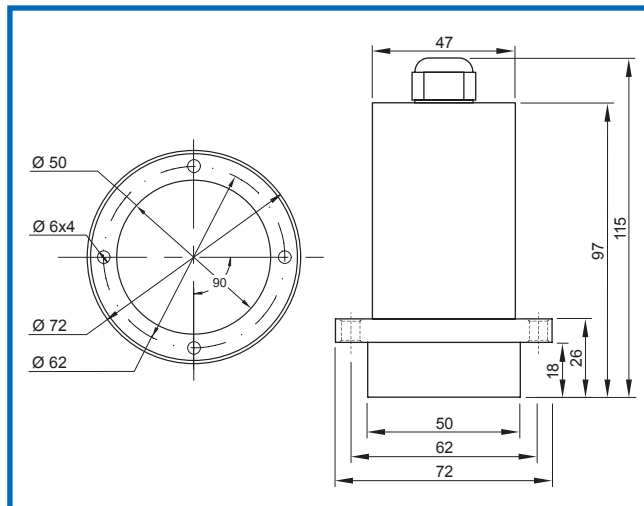
3 Entry of the moisture value

When the reference point measurement of 1 min is over, enter the determined relative moisture value in the control panel of the evaluation unit.



Technical Data

Sensor	
Housing	Stainless steel 1.4571
Sensor surface	Ceramic
Ex-protection	Zone 22 (dust), zone 2 (gas)
Protection Category	NEMA 6 (IP 67 to EN 60529)
Operating temperature (Standard)	0 ... +80 °C (32 - 176° F)
High Temp. Sensor	0 ... +120 °C (32 - 248° F)
Working pressure	Max. 145 psi (10 bar)
Response time	0.1 sec.
Weight	Approx. 1000 g (2.2 pounds)
Measuring range	0 ... 85 % residual moisture
Accuracy	0.1 % of calibrated measuring range
Connection cable	shielded cable 4-wired, 0.25mm ² (23 awg)
Evaluation unit	
Supply voltage	110/230 VAC (60/50 Hz) / 24 VDC
Power consumption	20 W / 24 V
Current consumption	Max. 1 A @ 24 V
Protection Category	NEMA 4x (IP 67 to EN 60529)
Operating temperature	-10 ... +45 °C (14 - 113)
Dimensions	258 x 237 x 174 mm (WxHxD)
Weight	Approx. 2.5 kg (5.5 pounds)
Interface	RS232, RS485
Cable glands	3 x M16 (4.5-10 mm Ø) (177 - 393)
Cable cross section	0.2-2.5 mm ² [AWG 24-14]
Current output signal or voltage output signal	2 x 4 ... 20 mA (0 ... 20 mA), load < 700 Ω or 2 ... 10 V (0 ... 10 V), load > 2 kΩ
Switched output measuring alarm	Relay with two-way contact max. 250 VAC, 1A
Digital inputs	2 inputs for active external control signals
Data protection	Flash



Electrical Connection (MMC-Box)

L / +24 V*	N / 0 V*	Ground	Output 1 +	Output 1 -	Output 2 +	Output 2 -	Rel N.O.	Rel Com	Rel N.C	TX	RX	GND	Not in use	Not in use	B	A	GND	Input 1 +	Input 1 -	Input 2 +	Input 2 -	Slot 1	Slot 2	Slot 3	Slot 4
Current			U/I Output 2x		Min/Max Relay		RS232		Not in use		RS485		Digital Input 2x		Sensor										

* 230 VAC / 110 VAC / 24 VDC according to the version

