

# Reliable moisture measuring system

Litronic-FMS

# LIEBHERR

Liebherr-Mischtechnik GmbH





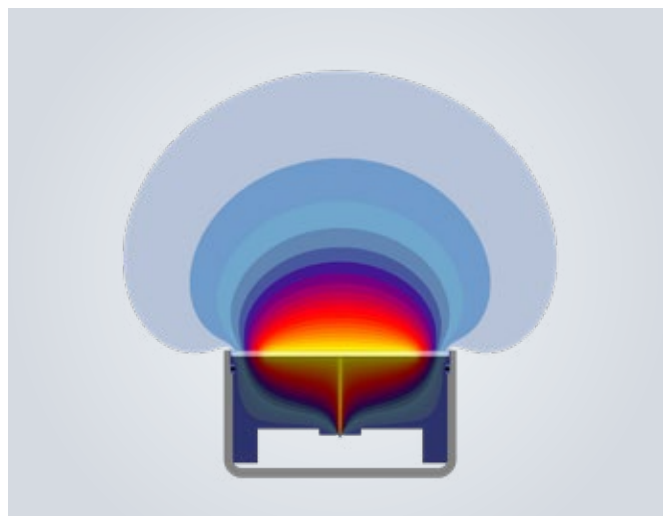
„Made in Germany“

# Hightech sensors

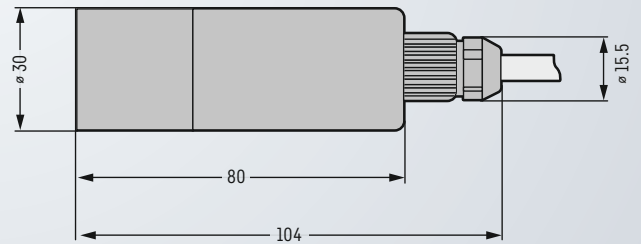
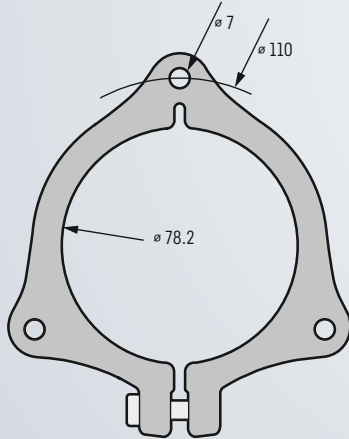
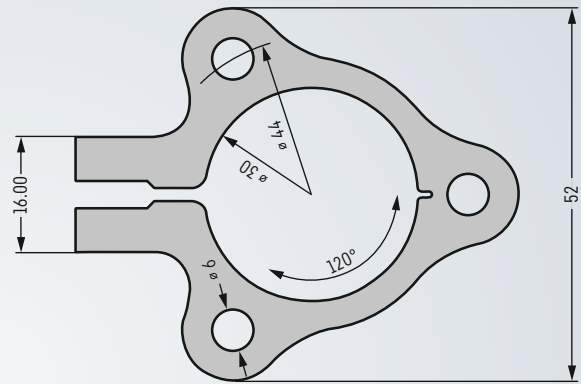
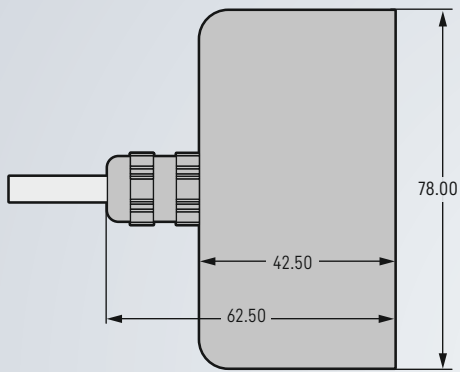
Since 1985 Liebherr develops, produces and distributes efficient moisture measurement systems for the industrial automation around the world. At the Liebherr factory in Bad Schussenried the sensors are produced and calibrated in an ESD-protected production line. Each sensor will be tested separately in a several hour process across the entire working temperature range before leaving the factory.

## Development

Sensor development at Liebherr includes the total R&D value chain from the physical idea to the final solution, from the first concept to the finished product. The competent electronic development and the experience from the field of construction machines under extreme conditions guarantee a very high reliability and a long life time of the sensors.



During the development phase FEM-simulations allow accurate statements about the future characteristics of the sensors.



Sensor P78 with clamping flange

Sensor P30 with clamping flange

## Sensor / Electronic module

Typ	Modul (mm)
Measuring range	0–100 % moisture content
Physical principle	Capacity determination with high-frequency leakage field
Field Frequency	20 MHz
Cycle of up-date	32,64 ms
Sampling rate	16 – 25 × 10 <sup>6</sup>
Measured value transmission	digital EIA485, RS485
Max. number of sensors at bus	16
Max. bus cable length	1.200 m
Ambient temperature sensor	-20 – 80 °C (100 °C optional)
Working temperature electronic	-20 – 80 °C
Protection class	IP68
Wearing protection	ZrO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> / PEEK
Material shell / flange	V4A (1.4404)
Temperature measurement	NTC 10k plus / minus 1%, R/T 8016 <sup>1.)</sup>

1.) Mixing temperature - medium, work environment

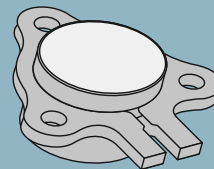
# System Overview

An autonomous stand-alone-system with almost unlimited possibilities. Highest quality and best results during process are guaranteed by the exact material moisture measurement.

The Litronic-FMS will meet your requirements in any case. An easy-to-use PC software enables a fast and exact calibration.

## Features

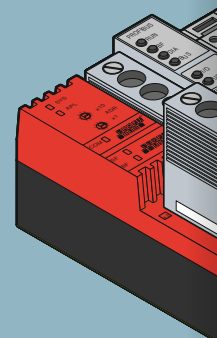
- Modular expandable construction
- Fully reproducible sensors
- Adjustable measuring range
- Material curves change over
- Material temperature compensation
- Suitable for high material flow
- Interference-free digital signal transmission
- Installation of electronic components on DIN mounting rail (TS-35)
- Suitable for batch and continuous processes
- High connectivity
- Temperature measurement (sensor P78 only)
- Optional:
  - Process display
  - Sensor with ATEX, IECEx and UKEX explosion protection category 2D and 3D



**Litronic-FMS planar sensor**

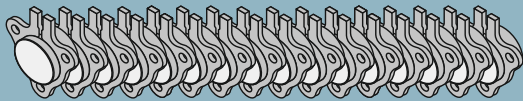
P78 with temperature measurement and clamping flange

**PROFI  
NET**

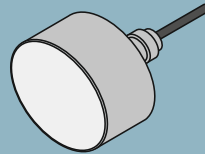


**WLAN-AP**

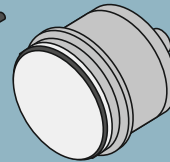
Parameterisation and visualisation  
by Litronic-FMS PC-software



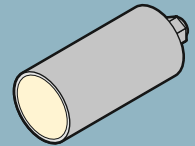
Up to 16 sensors



Planar sensor  
P78-E21 / E22

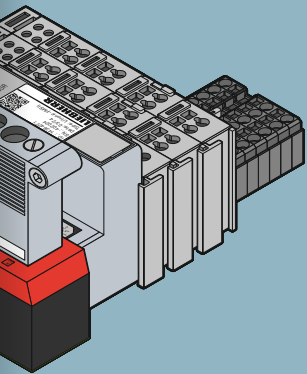


Planar sensor P71-HD  
(hygienic design)

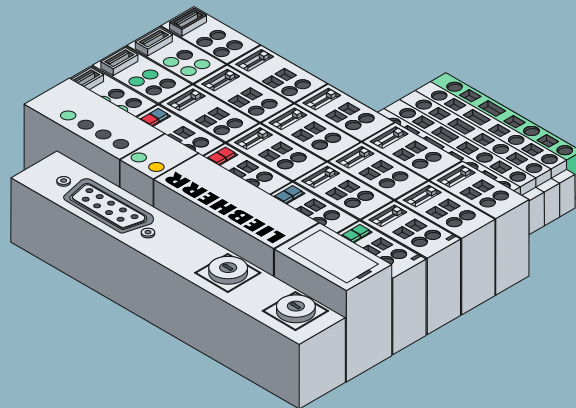


Planar sensor P30

Evaluation via Profinet or  
Profibus DP possible



**PROFI  
BUS**



Measure-  
ment value  
transfer  
moisture /  
temperature

Profinet or  
Profibus DP

Analogue  
output  
0-10 V 12 bit  
or  
0/4-20 mA 12 bit

Digital outputs  
for limit signal

Digital inputs  
for start /  
stop control  
and material  
curves change  
over

modularly  
expandable

Ethernet

— = Standard

— = Option



# Application examples



Sensor installed in material chute under silo outlet



In the paper and cardboard industry



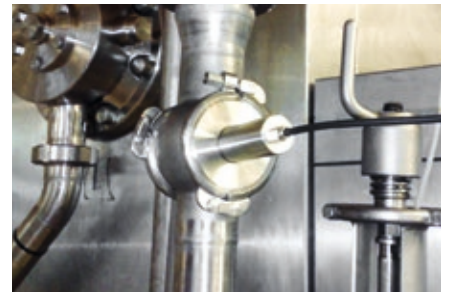
For sand and other aggregates



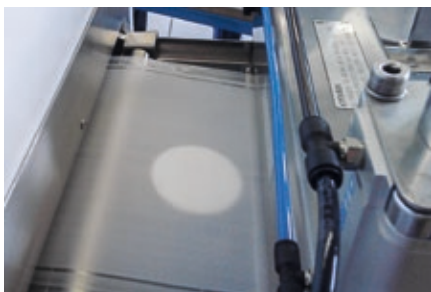
With DN 80 flange for diesel, oil and other emulsions



In sliding shoe for cullet (recycling glass)



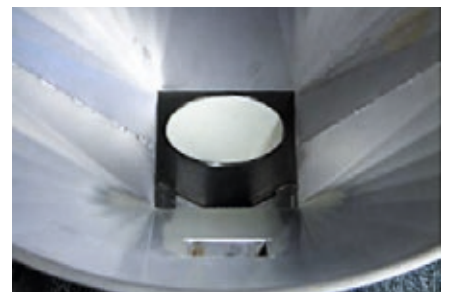
Food compliant execution e.g. for margarine



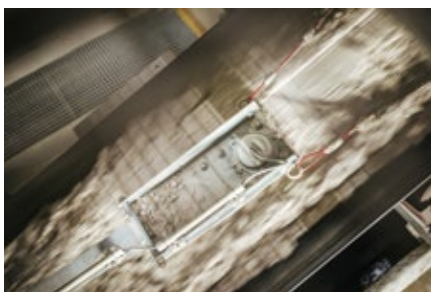
Fleece-, film- and felt webs



For wooden chips, sawdust, etc.



View in a bulk funnel with installed sensor



In sliding shoe for quartz sand (glass, building material and ceramic industry)



Use in the fluidised bed dryer in seed production



Story water detectives  
<https://go.liebherr.com/uqa31j>

## Bulk materials

- |  |  |   |
|--|--|---|
| <ul style="list-style-type: none"> <li>- Sand, quartz sand</li> <li>- Shattered glass, soda</li> <li>- Incineration and flue ash</li> <li>- Ore, minerals, sinter</li> <li>- Dust, slag</li> <li>- Aggregates</li> <li>- Faundry sand</li> <li>- Raw materials, filter cake</li> <li>- Ceramic powder</li> <li>- Coal, coke, charcoal</li> <li>- Gypsum, talc</li> <li>- Lime, loam, clay</li> <li>- Granulates</li> <li>- Fertilizer</li> <li>- Earth, Soils</li> <li>- Recycled materials</li> </ul> | <ul style="list-style-type: none"> <li>- Carton and paper webs</li> <li>- Fleece, plastic film, felt webs</li> <li>- Plastic granules</li> <li>- Shredded plastic</li> <li>- Different pellets</li> <li>- Colour pigments</li> <li>- Washing powder, detergent</li> <li>- Cork</li> <li>- Wood fibre,-slab,-chips</li> <li>- Sawdust</li> <li>- Cat litter</li> <li>- Pet litter</li> <li>- Silage, forage</li> <li>- Biomass, digestates, straw</li> <li>- Silica</li> <li>- Pet food (dry + liquid)</li> </ul> | <ul style="list-style-type: none"> <li>- Coarse grain, cereals, mash</li> <li>- Food and luxury food</li> <li>- Fruit shavings, marc</li> <li>- Seed, sugar beet pulp</li> <li>- Sprouts</li> <li>- Corn, maize, malt</li> <li>- Rice</li> <li>- Sugar, salt</li> <li>- Flour</li> <li>- Marzipan</li> <li>- Coffee, cocoa</li> <li>- Tea</li> <li>- Gelatine, -capsules</li> <li>- Tobacco</li> <li>- Lactose, cellulose</li> <li>- ...</li> </ul> |
|--|--|---|

## Emulsions

- |  |  |   |
|--|--|---|
| <ul style="list-style-type: none"> <li>- Diesel, biodiesel</li> <li>- Oil, crude oil, hardening oil</li> <li>- Wax, resin</li> <li>- Margarine</li> <li>- Coolants and lubricants</li> </ul> | <ul style="list-style-type: none"> <li>- Sludge</li> <li>- Methyl, ethanol, acetone</li> <li>- Grease</li> <li>- Glue</li> <li>- Paint and colour</li> </ul> | <ul style="list-style-type: none"> <li>- Solvents</li> <li>- Ceramic slurry</li> <li>- ...</li> </ul> |
|--|--|---|

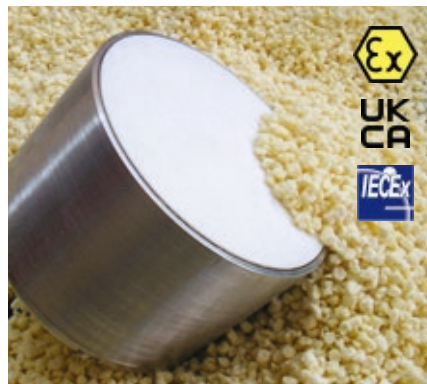
## Installation places

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>- Silo outlets</li> <li>- Material chutes</li> <li>- Buffle plates</li> </ul> | <ul style="list-style-type: none"> <li>- Conveyor belts</li> <li>- Transfer points</li> <li>- Dryers</li> </ul> | <ul style="list-style-type: none"> <li>- Screw conveyor</li> <li>- Pipes</li> <li>- Tanks</li> </ul> |
|--|---|--|

## Options and accessories



Sliding shoe



Sensor with explosion protection category 2D and 3D



Weld-on fitting for P30



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Conveyor belts



Measuring technology



Mixing systems



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contact



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