

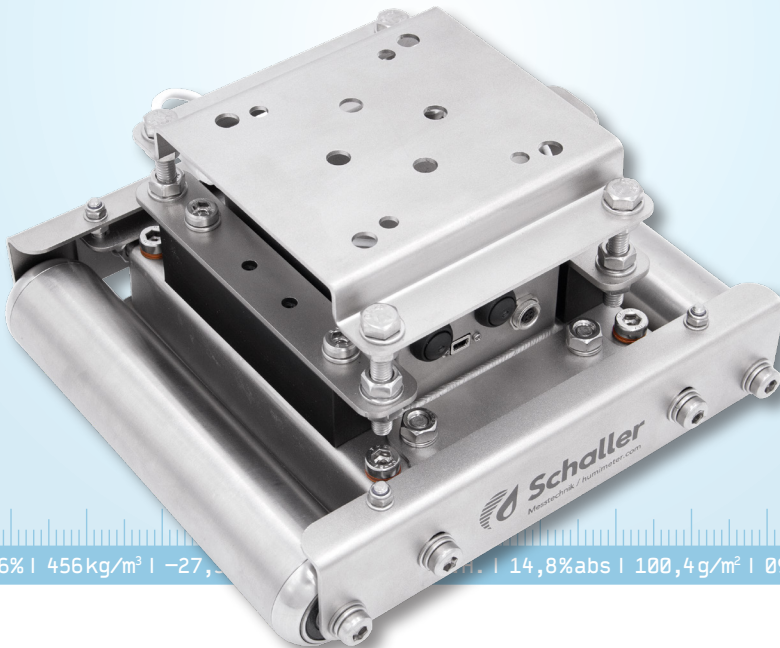
Moisture meter

User manual

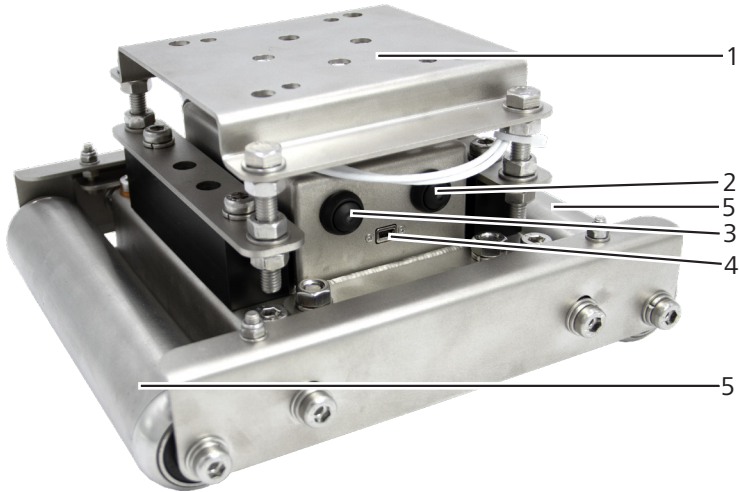
MF-P-HTD

Paper Moisture Sensor

Sensor for online moisture measurement of paper and cardboard



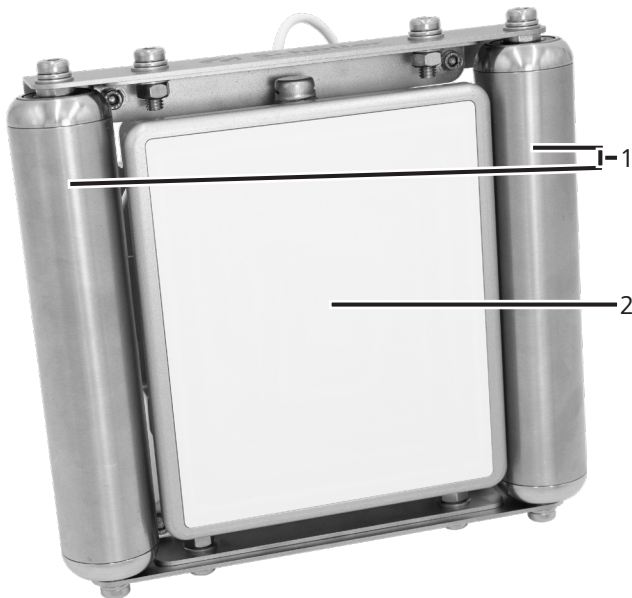
Overview of your MF-P-HTD Sensor



Overview top side

No	Name
1	Installation plate
2	Socket for external sensors (Option)
3	Button with green LED (Reset, Link)
4	USB interface for firmware Update
5	Button with red LED (Status, Adjust)
6	Paper guide rolls

Overview bottom side



No	Name
1	Paper guide rolls
2	Sensor plate



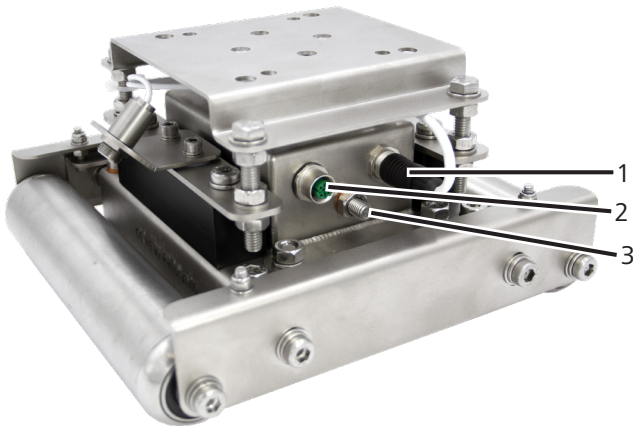
ATTENTION

Sensitive sensor plate

The white sensor surface consists of a thin ceramic plate. It can be damaged by mechanical loads!

- ▶ When installing the sensor, remove the provided transport protection as late as possible!

Overview connections



No	Name
1	Connection for digital interface option or power supply option and analog output.
2	Connection for IR temperature sensor
3	Ground connection

Overview transport protection



No	Name
1	Transport protection
2	Safety note

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1. Introduction

1.1 Information on this user manual

These user manual enables safe and efficient use of the MF-P-HTD. The user manual is an essential part of the device and must be kept close to the device and be accessible to the user at any time.

Before starting any work, the user must carefully read and understand this manual. Basic requirement for safe work is to follow all safety and handling instructions specified in this user manual.

1.2 Limitation of liability

All of the information and instructions provided in this user manual have been compiled on the basis of the current standards and regulations, the state of the art, and the extensive expertise and experience of Schaller Messtechnik GmbH.

Schaller Messtechnik GmbH does not accept any liability for damages associated with the following, which also voids the warranty:

- Non-observance of this user manual
- Improper use
- Inadequately qualified users
- Unauthorised modifications
- Technical changes
- Use of unapproved spare parts

This fast measuring procedure can be affected by a range of different factors. For this reason, we recommend periodically checking the device's measurements with a standardised oven-drying method.

1.3 Used symbols

All safety instructions in this user manual are identified by symbols.



ATTENTION

Non-observance can lead to physical damage.



Information

This symbol indicates important information that enables users to use the device more efficiently and cost effectively.

1.4 Customer support

For technical advice, please contact our customer service department at

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2. For your safety

The device complies with the following European directives:

- Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS)
- Electromagnetic compatibility (EMC)

The device corresponds to state-of-the-art technology. However, it is still associated with a number of residual hazards.

These hazards can be avoided through strict observance of our safety information.

2.1 Proper use

- Sensor for online moisture measurement of paper and cardboard
- For paper and cardboard with a grammage of 80 to 500 g/m²
- For paper and cardboard with a temperature of 0 to + 100 °C

2.2 Improper use

- The device should not be used in ATEX areas.
- Corrugated board cannot be measured.
- Papers and cardboard that have been carbon (graphite) blackened.
- Papers and cardboard with metallic coatings.
- In an environment with a temperature below 0 or above + 70 °C.

2.3 User qualifications

The device should only be handled by persons who are expected to carry out the work reliably. Persons whose reactions are influenced, by drugs, alcohol or medication, are not permitted to use the device.

Persons who use this device must have read and understood the user manual and follow its instructions.

2.4 General safety information

Follow the safety instructions below to avoid personal injury and material damage:

- If you notice loose parts or damage on the device contact your distributor.

All of the device's technical features have been inspected and tested before delivery. Every device has a serial number. Do not remove the tag with the serial number.

2.5 Warranty

Not covered by warranty:

- Damages caused by non-observance of the user manual
- Damages caused by third-party intervention
- Products that have been used improperly or modified without authorization
- Damages caused by force majeure, natural disasters, etc.
- Damages due to improper cleaning

3. First steps

3.1 Unpacking the device

- Unpack the device.
- Next, make sure that it is not damaged and that no parts are missing.
- **DO NOT** remove the transport protection from the device.

3.2 Checking the delivery content

Use the following list to check if the delivery is complete:

- MF-P-HTD Paper moisture sensor with installed IR temperature sensor and paper guide roller set
- user manual
- transport protection

Options:

- Modbus TCP interface for MF-P-HTD with power supply via Power over Ethernet (PoE)
- Analog output with 12-28 VDC power supply
- PC-Software MF-P-HTD SenseWare - Software for moisture calculation, type calibration, measured value display and measured data management (only possible in connection with Modbus TCP interface!)
- Power supply Power over Ethernet (PoE) (Only possible in connection with Modbus TCP interface!)

Installation instructions

Please follow these instructions:

- The installation position has to be chosen so that the sensor does not condense when operating. Be careful if installing in a cool environment, where the paper or cardboard is very warm!
- Avoid strong mechanical impacts or loads.
- Do not install the device near strong electromagnetic radiations.
- Ensure that the paper lies on the paper guide rollers of the MF-P-HTD sensor during operation.
- The sensor must always be installed above the paper web.
- Do not place any objects under the sensor! There must be a free space of 300 mm!

3.3 Mechanical installation



ATTENTION

Sensitive sensor plate

The white sensor surface consists of a thin ceramic plate. This can be destroyed by mechanical pressure!

- ▶ When installing the sensor, remove the provided transport protection as late as possible!

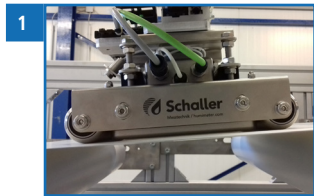
The MF-P-HTD sensor has to be fastened with the mounting plate to the machine. For this, different holes are placed on the mounting plate. Use four screws (M8 or M6) to attach the sensor to the machine.

The sensor can also be installed on a linear guide.

- » Please ensure that the sensor has to be mounted always above the paper web and that there must be a free space of 300 mm below the sensor!

1. The sensor has to be installed in such a position, that the two paper guide rollers always touch the paper web (image 1).

- » For this, the sensor must be tightened against the paper web.



Installation height of the sensor

Ensure the correct installation height of the sensor.

If the paper guide rollers do not always touch the paper web, incorrect measurements will occur.

2. For an easier installation, the mounting plate can also be completely unscrewed from the MF-P-HTD sensor (image 2).

- » Therefore, the four lowest M8 nuts have to be released (image 3).



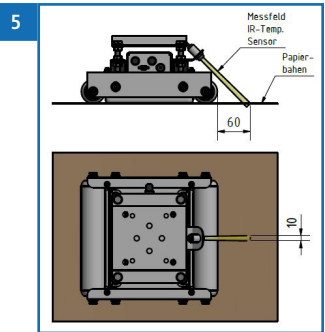
3. The height of the sensor can be adjusted with the four M8x50 hexagon screws.

- » First, release the two marked M8 hexagon nuts for each screw (image 4).
- » With these nuts the desired height can now be adjusted.
- Then tighten all the nuts again.

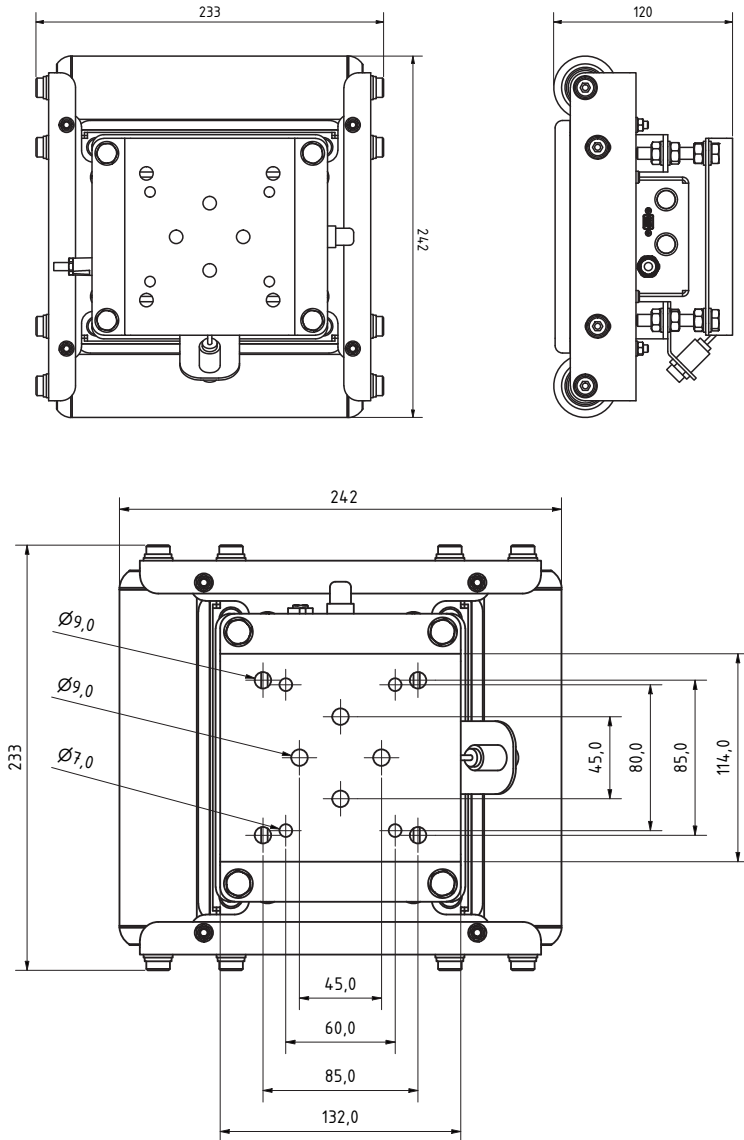


4. The contactless infrared temperature sensor has a 10:1 optics.

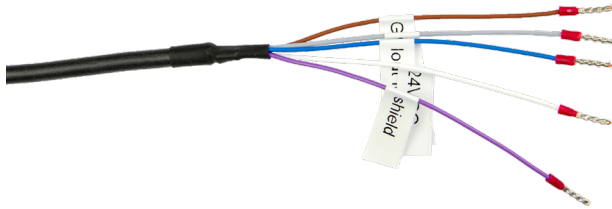
- » During the measurement, there must always be paper in the measuring field of the temperature sensor (image 5).



3.4 Sketch MF-P-HTD



3.5 Pin assignment power supply and analogue output (option)



Cable color	Pin No	Function
Brown	1	Power supply V- (0 VDC)
White	2	Power supply V+ (24 VDC)
Blue	3	Power output moisture 4 - 20 mA (optional)
Black	4	Ground power output & temperature (optional)
Grey	5	Power output temperature 4 - 20 mA (optional)
Purple	Housing	Potential equalisation GND (shielding)



ATTENTION

Electronic damage caused by incorrect cable connection

Incorrect assignments can cause serious electronic damages.

- ▶ Connect all cables correctly.

Electrical damages caused by extension problems

Extension problems can cause electronic damages.

- ▶ The cross-section of the extension may not be under 0.25 mm².



ATTENTION

Measuring signal interference caused by missing potential equalisation

A missing potential equalisation can transfer interference signals to the measuring signal.

- ▶ The potential equalisation GND (shielding) must be connected.

3.6 Pin assignment option digital interface with PoE

A 4-pole M12 connector with D-coding (M12-D) is required here.



Pin No	Function
1	TX+
2	RX+
3	TX-
4	RX-
Housing	Shielding

- A CAT 5e type cable is recommended. The cable must be shielded and the strands twisted in pairs.
- Every cable type must be equipped with a shielded M12 round plug D-coded on the sensor side.
- The Power Over Ethernet Injector must support Mode A. In PoE Mode A, the power supply is provided simultaneously with the data via pins 1, 2, 3 and 6.
- » The cable shield must be earthed in this installation setup!
- » The cable for the option is NOT included!

3.7 Laying the power supply or transmission line

- The cable cannot be laid in the range of interference fields.
- The transmitter cannot be used near electromagnetic interference fields.
- The cable should not be strongly bent.
- Permissible cross-sections for installation have to be considered.
- The cable length must be kept as short as possible.
- » Should an extension be necessary, the cross-section of the extension may not be under 0.25 mm².
- » The potential equalisation GND (shielding) must be connected.

4. Measurement

Requirement: The sensor is powered and running (the red LED flashes in 5 second intervals). An adjustment (adjust) was successfully completed in the last two weeks.

4.1 MF-P-HTD with Modbus TCP option and HumiSenseWare software

With these options it is possible to calculate, visualise and document the water content of the paper. However, this requires a paper calibration and the correct paper classification (grammage) in the HumiSenseWare software. The paper calibration is stored in the HumiSenseWare as well. This software also automatically compensates the different paper temperatures.

The HumiSenseWare manual can be found as a help file in this software.

4.2 MF-P-HTD with analogue output option

To calculate the water content with the analogue output option, a separate PLC programme is required. The value of the MF-P-HTD analogue output is not the water content, it is the internal value of the MF-P-HTD sensor!

5. Care and maintenance

Regular cleaning and maintenance will ensure that your device remains in perfect condition as long as possible.



ATTENTION

Sensitive sensor plate

The white sensor surface consists of a thin ceramic plate. This can be destroyed by mechanical pressure!

- ▶ When installing the sensor, remove the provided transport protection as late as possible!

5.1 Adjustment of the device

Every two weeks an adjustment must be run (adjust). This procedure guarantees a long term stability of the moisture measuring.

Requirement: The device must have a temperature between 20.0 °C and 26.0 °C and must be on for at least 30 minutes.

1. Remove the paper or cardboard under the sensor surface.
 - » Make sure there is nothing under the sensor surface.
2. Press the button with the red LED until the LED lights up constantly (image 8).
 - » When you release the button, the adjustment begins!
 - » During adjustment, the red LED flashes every second.
3. Once the adjustment is completed, the red LED goes out for a moment and then flashes again every 5 seconds.



5.2 Reset

- Press the button with the green LED (image 9).
- » The button with the green LED lights up for one second and the button with the red LED flashes rapidly for this period.
- The device will now restart.



5.3 Cleaning the device



ATTENTION

Device damage caused by wet cleaning

Water or cleaning products can damage the device if they get into the device.

- ▶ Only dry cleaning (compressed air) is recommended.



ATTENTION

Sensitive sensor plate

The white sensor surface consists of a thin ceramic plate. This can be destroyed by mechanical pressure!

- ▶ Take care of the sensitive sensor surface during cleaning!



ATTENTION

Scratching the IR temperature sensor

Cleaning the optical system with a tissue could cause scratches and irreparable damages.

- ▶ Clean only with dry compressed air!

6. Faults

If the following actions do not eliminate the faults or if other faults not listed here appear, please contact Schaller Messtechnik GmbH.

Fault	Cause	Remedy
Incorrect measurement	Paper or cardboard temperature beyond the application range: Material below 0 °C or above +100 °C	Use material with a temperature above 0 °C or below +100 °C
	Condensation on the sensor surface	Choose another installation location
	The distance to the paper web is not correct	Adjust the distance to the paper web correctly
	Insufficient grammage	Only paper with a grammage over 80 g/m ² can be measured
No measuring value output	Metals or similar conductive materials in the measuring field	Remove metals or similar conductive materials from the measuring field (metal or carbon coated papers cannot be measured)
	Microcontroller or microcontroller software have hung up	Reset (see "5.2 Reset")
	Incorrect adjustment	Material is behind the sensor plat (during the adjustment)
Dirty sensor surface		Clean the sensor surface (see "5.3 Cleaning the device")

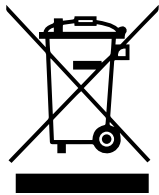
7. Storage and disposal

7.1 Storing the device

Store the device as follows:

- Store with the original transport cover.
- Do not store outdoors.
- Store dry and dust-free.
- Avoid mechanical shocks and impacts.
- Storage temperature: -20 °C to +70 °C

7.2 Disposal of the device



Devices marked with this symbol are regulated by the European Directive 2012/19/EU of the European Parliament and the Council of 4 July 2012 relating to waste of electrical and electronic equipment.

If the device is not used within the European Union, national disposal-regulations in the country of use must be observed.

Electrical devices should not be disposed of with household waste.

Please recycle the device in an environmentally friendly way using suitable recycling systems.

8. Device information

8.1 EC declaration of conformity

CE KONFORMITÄTSERKLÄRUNG DECLARATION OF CONFORMITY

Name/ Adresse des Herstellers: **Schaller Messtechnik GmbH**
Name/ address of manufacturer: **Max-Schaller-Straße 99**
A – 8181 St. Ruprecht

Produktbezeichnung: **Schaller**
Product designation:

Typenbezeichnung: **MF-P-HTD ; MF-S-HTD**
Type designation:

Produktbeschreibung: **Messgerät zur Bestimmung des Wassergehalts in Papier und Karton**
Product description **Measuring device for determining the water content in paper and board**

Das bezeichnete Produkt erfüllt die Bestimmungen der Richtlinien:
The designated product is in conformity with the European directives:

EMV - Richtlinie 2014/30/EC
RoHS - Richtlinie 2011/65/EG

EMC Directive 2014/30/EU
RoHS-Directive 2011/65/EU

Die Übereinstimmung des bezeichneten Produktes mit den Bestimmungen der Richtlinien wird durch die vollständige Einhaltung folgender Normen nachgewiesen:

Full compliance with the standards listed below proves the conformity of the designated product with the provisions of the above-mentioned EC Directives:

EN 61326-1:2013 Elektrische Mess-, Steuer-, Regel- und Laborgeräte - EMV-Anforderungen
Electrical equipment for measurement, control, and laboratory use – EMC requirements

EN IEC 63000:2019-05 Technische Dokumentation zur Beurteilung von Elektro- und Elektronikgeräten hinsichtlich der Beschränkung gefährlicher Stoffe.
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.
EN 50581:2012


Für das angeführte Produkt ist eine vollständige Dokumentation mit Betriebsanleitung in Originalfassung vorhanden.

For the mentioned product a complete documentation with manual of instruction in original version is available.

Bei Änderungen, die nicht vom Hersteller spezifiziert sind, verliert diese Konformitätserklärung die Gültigkeit.

In case of any changes not agreed upon with the manufacturer, this declaration of conformity loses its validity.

St. Ruprecht a.d. Raab, 31.07.2022

 **Schaller**
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.....
Bernhard Maunz
Rechtsverbindliche Unterschrift des Ausstellers
Legal binding signature of the issuer

**UK
CA****DECLARATION OF CONFORMITY**

Name/ address of manufacturer: **Schaller Messtechnik GmbH
Max-Schaller-Straße 99
A – 8181 St. Ruprecht**

Product designation: **Schaller**

Type designation: **MF-P-HTD ; MF-S-HTD**

Product description: **Measuring device for determining the water content in
paper and board**

The designated product is in conformity with the following directives:

- **Electromagnetic Compatibility Regulations 2016 Great Britain**
- **RoHS-Directive 2011/65/EU Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment**

Full compliance with the standards listed below proves the conformity of the designated product with the provisions of the above-mentioned Directives:

EN 61326–1:2013	Electrical equipment for measurement, control, and laboratory use – EMC requirements
EN IEC 63000:2019-05 replaced EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

For the mentioned product, a complete documentation with manual of instruction in original version is available.

In case of any changes not agreed upon with the manufacturer, this declaration of conformity loses its validity.

St. Ruprecht a.d. Raab, 31.07.2022

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.....
Bernhard Maunz
Legal binding signature of the issuer

8.2 Technical data

Measuring range moisture	1 % to 20 % water content (depending on material)
Measuring range temperature	0 °C to +100 °C
Paper grammage	80 to 500 g/m ²
Paper temperature	0 °C to +100 °C
Operating temperature	automatic
Environmental temperature	0 °C to +70 °C
Storage temperature	-20 °C to +70 °C
Power supply	12 to 28 VDC (optional PoE)
Power consumption	60 mA at 24 VDC (without options)
Device IP rating	IP 65
Dimensions	242 x 233 x 120 mm
Weight	4,9 kg



ATTENTION

Moisture calculation: Water content of the paper

The output signal of the sensor depends on material and grammage.

- ▶ To calculate and display the water content, the Modbus TCP interface and a separate PC software are required!



Climate
Environment



Material



Foods



Buildings



Bioenergy



Paper / Board

Schaller Messtechnik develops, produces and sells professional moisture meters and turnkey solutions.

Schaller Messtechnik GmbH

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