

Moisture meter

# Operating Manual

## LF-TD Profinet

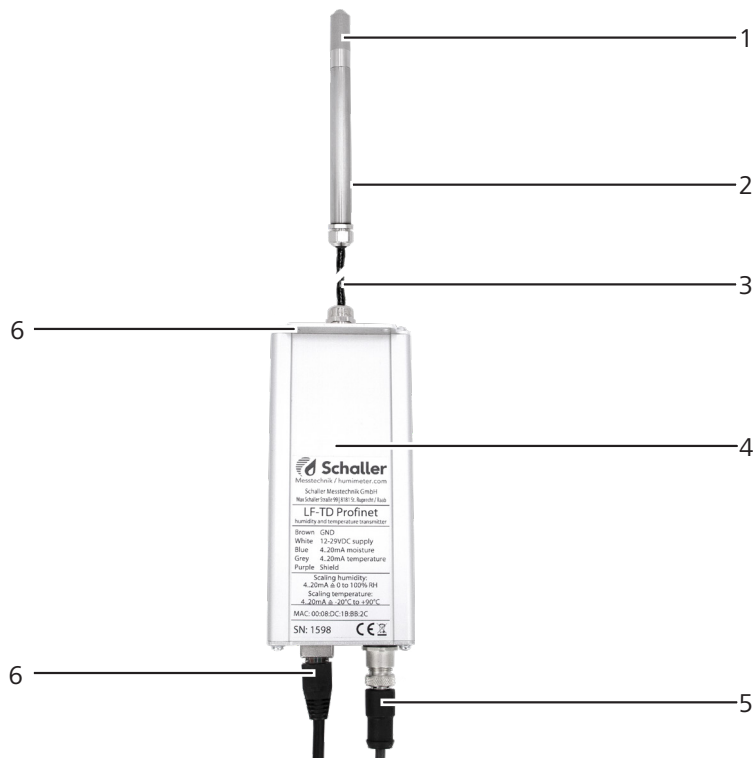
### Air humidity transmitter series



78,0 °F | 6,16% | 456kg/m<sup>3</sup> | -27,3td | 0,64aw | 51,9%r.H. | 14,8%abs | 100,4g/m<sup>2</sup> | 09m/s | 4,90Ug/L | 1

# Your LF-TD Profinet at a glance

## The main unit



| No. | Name                                |
|-----|-------------------------------------|
| 1   | Air humidity and temperature sensor |
| 2   | Sensor head                         |
| 3   | Sensor cable                        |
| 4   | Aluminium housing                   |
| 5   | Sensor plug                         |
| 6   | RJ45 plug                           |
| 7   | Mounting bracket                    |

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## 1. Introduction

### 1.1 Information about this operating manual

This operating manual is designed to enable you to use the LF-TD Profinet safely and effectively. It is part of the device, has to be stored nearby and must be easily accessible to users at all times.

All users are required to carefully read and make sure that they have understood this operating manual before using the LF-TD Profinet. All of the safety and operating instructions detailed in this manual have to be observed to ensure the safety of the device.

### 1.2 Limitation of liability

All of the information and instructions provided in this operating 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 damage associated with the following, which also voids the warranty:

- Non-observance of this operating 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.

We, as the manufacturer, do not accept any liability for any incorrect measurements and associated consequential damage

### 1.3 Symbols used in this manual

All of the safety information provided in this manual is shown with a corresponding symbol.



#### **ATTENTION**

It is essential to observe this warning. Non-compliance can lead to damage to property or equipment.



#### **Information**

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

### 1.4 Customer service

For technical advice, please contact our customer service department at:

**Schaller Messtechnik GmbH**

Max-Schaller-Straße 99

A - 8181 St.Ruprecht an der Raab

Telephone: +43 (0)3178 28899

Fax: +43 (0)3178 28899 - 901

E-Mail: [info@humimeter.com](mailto:info@humimeter.com)

Internet: [www.humimeter.com](http://www.humimeter.com)



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#### **Information**

Your purchased measuring instrument can be calibrated, and the adjustment checked by using suitable test ampoules / calibration ampoules. For this purpose, use only the calibration solutions distributed by Schaller Messtechnik GmbH. You can download a calibration certificate for your test ampoules / calibration ampoules with the batch number printed on the ampoul from <https://www.humimeter.com/certificates/>.

## 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

- Transducer for measuring and transmitting relative humidity and temperature in fixed installation
- The sensor technology used makes it possible to detect even small fluctuations in humidity and their tendencies quickly and reliably so that preventive actions can be taken.
- For some applications (e.g. installation in sewage pipes) it is necessary to use a remote measuring probe for the reason of temperature adjustment.

### 2.2 Improper use

- The device must not be used in ATEX.

### 2.3 User qualifications

The device must only be operated by people who can be expected to reliably take the measurements. The device must not be operated by people whose reaction times may be slowed due to, e.g. the use of drugs, alcohol or medication.

All persons using this device must have read, understood and follow the instructions provided in the operating manual.

## 2.4 General safety information

The following safety information has to be observed at all times to avoid damage to objects and injury to people:

- In case of damages or loose parts on the device, contact Schaller Messtechnik GmbH or your dealer.

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

The warranty does not apply to:

- Damage resulting from non-observance of the operating manual
- Damage resulting from third-party interventions
- Products that have been used improperly or modified without authorisation
- Products with missing or damaged warranty seals
- Damage resulting from force majeure, natural disasters, etc.
- Damage from improper cleaning

# 3. On receipt of your device

## 3.1 Taking the device out of its packaging

- Take the device out of its packaging.
- Next, make sure that it is not damaged and that no parts are missing.

## 3.2 Making sure that all of the components have been included

Make sure that all of the components have been included by checking the package contents against the following list:

### 3.2.1 Scope of supply

- LF-TD Profinet
- Connecting cable of 1.9 m length
- Operating manual

Optional accessories:

- Display for LF-TD
- Display with keypad for LF-TD
- Relay output for moisture for LF-TD
- Mounting bracket for LF-TD
- Brass sinter sensor cap
- Drip-catcher for LF-TD
- Stainless steel lattice filter
- Custom-made design - flat rate for air humidity transmitter series per order
- Factory calibration certificate, calibration equipment, certified calibration ampoules and reference devices - for continuous monitoring

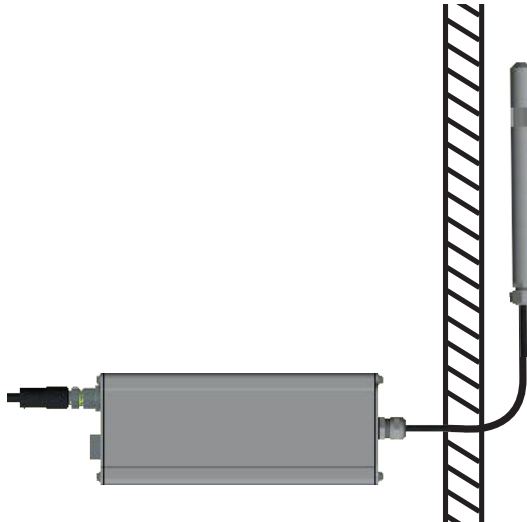
## 4. Installation of the transmitter

### 4.1 Laying of the supply line or transmission line

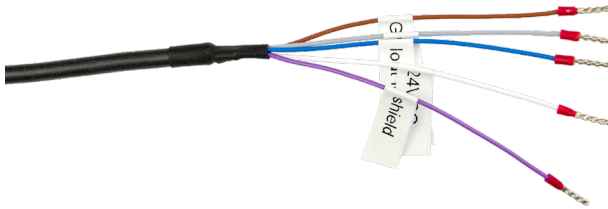
- The cable must not be laid in the area of interference fields.
- Do not operate the transmitter in the area of electromagnetic interference fields.
- The permissible cross-sections for the installation must be observed.
- The cable length must be kept as short as possible.
- » If an extension of the cable is required, the cross-section of the extension must not be below 0.25 mm<sup>2</sup>.
- If the electronics housing and the display electronics are grounded, an appropriate equipotential bonding conductor must be provided.

## 4.2 Mounting the transmitter

- The measuring probe must be positioned at a representative location.
  - » Avoid positions of draught and unnatural temperature fluctuations.
  - » Do not expose the device to direct sunlight.
- If the sensor tube is twisted, the tightness is no longer guaranteed.
- When there is a possibility of condensation, position the sensor probe slightly upwards (approx. 10 degrees angle).
  - » The condensation water can then flow away from the sensor probe towards the housing or cable and drain off.
  - » If it is impossible to place the unit at an upward angle, a drip nose (optional accessory) must be installed.
- Installation inside an air duct (or at mounting locations where temperature differences between sensor probe and sensor housing may occur):
  - » The sensor must be inserted fully into the opening until it stops, to avoid a temperature drop along the sensor tube. See sketch:



## 4.3 Pin assignment



| Cable color | Pin no. | Function                                         |
|-------------|---------|--------------------------------------------------|
| Brown       | 1       | Power supply V- (0 VDC)<br>Ground current output |
| White       | 2       | Power supply V+ (12 to 29 VDC)                   |
| Blue        | 3       | Analogue output humidity 4 - 20 mA               |
| Black       | 4       | n.c.                                             |
| Grey        | 5       | Analogue output temperature 4 - 20 mA            |
| Purple      | Housing | Equipotential bonding GND                        |



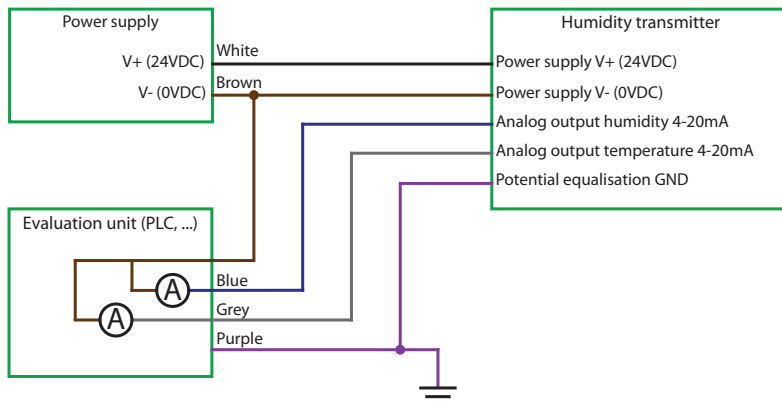
### ATTENTION

#### Damage to the electronics due to incorrect connected cables

Incorrect connected cables can lead to severe damage to the electronics.

- Connect all cables correctly.

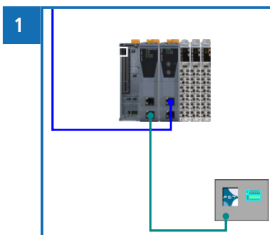
## 4.4 Wiring diagram



## 5. Integration into a B&R control system

### 5.1 GSD package

- The GSD package required for integration into a control system is provided by Schaller.
- The GSD package is a zip file containing the required GSD file and the instructions.
- » The integration was realised with a B&R controller.
- The Profinet sensor is connected to the Profinet master using a suitable Ethernet cable (figure 1).



### 5.2 Settings on the B&R Profinet master

#### 1. IP address of the master

net IO Device: NETX 100 RE/PM Vendor: Hilscher GmbH Device ID: 0x0203 Vendor ID: 0x011E

Navigation Area

- Settings
  - Ethernet Devices
    - Configuration
      - Controller Network Settings
      - Device Table
      - IP Address Table
      - Process Data
      - Address Table
      - FSU-/Port- Settings
      - Stations Timing
      - Controller Settings

**Controller Network Settings**

Name of station: controller

Description: X20IF10E1\_1

IP Settings

IP address: 192 . 168 . 100 . 1

Network mask: 255 . 255 . 255 . 0

Gateway address: 0 . 0 . 0 . 0

#### 2. Station name of the sensor: „schaller-lftd2020“

net IO Device: NETX 100 RE/PM Vendor: Hilscher GmbH Device ID: 0x0203 Vendor ID: 0x011E

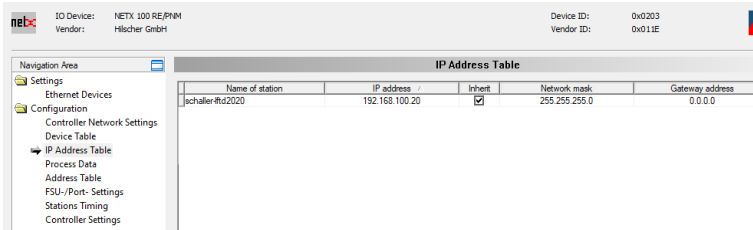
Navigation Area

- Settings
  - Ethernet Devices
    - Configuration
      - Controller Network Settings
      - Device Table
      - IP Address Table
      - Process Data
      - Address Table
      - FSU-/Port- Settings
      - Stations Timing
      - Controller Settings

**Device Table**

| Activate                            | Index | Name of station   | Device         | Description    |          |
|-------------------------------------|-------|-------------------|----------------|----------------|----------|
| <input checked="" type="checkbox"/> | 0     | schaller-lftd2020 | LFTD2020_V2_4X | LFTD2020_V2_4X | Schaller |

### 3. The IP address of the sensor is assigned by the controller:.



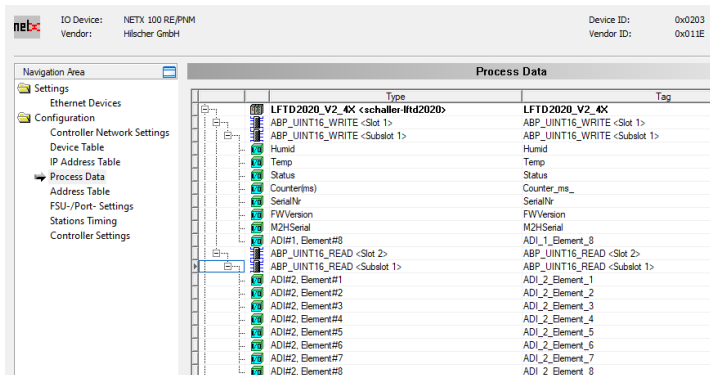
IO Device: NETX 100 RE/PNM  
Vendor: Hilscher GmbH  
Device ID: 0x0203  
Vendor ID: 0x011E

Navigation Area: Settings, Ethernet Devices, Configuration, Controller Network Settings, Device Table, IP Address Table (selected), Process Data, Address Table, FSU-/Port- Settings, Stations Timing, Controller Settings

| Name of station   | IP address     | Inherit                             | Network mask  | Gateway address |
|-------------------|----------------|-------------------------------------|---------------|-----------------|
| schaller-lftd2020 | 192.168.100.20 | <input checked="" type="checkbox"/> | 255.255.255.0 | 0.0.0.0         |

### 4. From the controller's point of view, 8 words (16BIT) are defined as inputs and 8 words (16BIT) as outputs.

- » These settings must be identical on the master and on the sensor for communication to work.

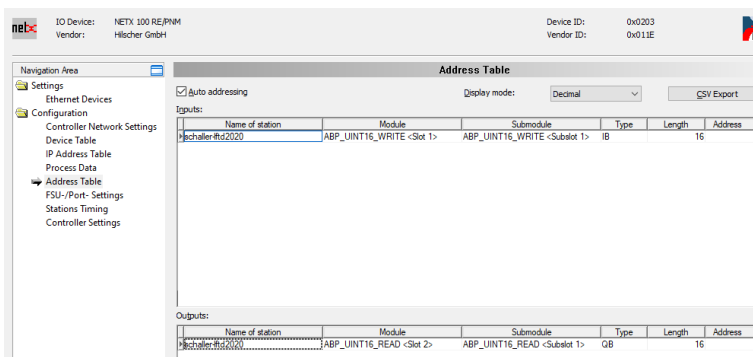


IO Device: NETX 100 RE/PNM  
Vendor: Hilscher GmbH  
Device ID: 0x0203  
Vendor ID: 0x011E

Navigation Area: Settings, Ethernet Devices, Configuration, Controller Network Settings, Device Table, IP Address Table, Process Data (selected), Address Table, FSU-/Port- Settings, Stations Timing, Controller Settings

| Type                               | Tag                          |
|------------------------------------|------------------------------|
| LFTD2020_V2_4X <schaller-lftd2020> | LFTD2020_V2_4X               |
| ABP_UINT16_WRITE <Slot 1>          | ABP_UINT16_WRITE <Slot 1>    |
| ABP_UINT16_WRITE <Subslot 1>       | ABP_UINT16_WRITE <Subslot 1> |
| Humid                              | Humid                        |
| Temp                               | Temp                         |
| Status                             | Status                       |
| Counter(m/s)                       | Counter_ms_                  |
| SerialNr                           | SerialNr                     |
| FWVersion                          | FWVersion                    |
| M2HSerial                          | M2HSerial                    |
| ADI#1, Element#8                   | ADI_1_Element_8              |
| ABP_UINT16_READ <Slot 2>           | ABP_UINT16_READ <Slot 2>     |
| ABP_UINT16_READ <Subslot 1>        | ABP_UINT16_READ <Subslot 1>  |
| ADI#2, Element#1                   | ADI_2_Element_1              |
| ADI#2, Element#2                   | ADI_2_Element_2              |
| ADI#2, Element#3                   | ADI_2_Element_3              |
| ADI#2, Element#4                   | ADI_2_Element_4              |
| ADI#2, Element#5                   | ADI_2_Element_5              |
| ADI#2, Element#6                   | ADI_2_Element_6              |
| ADI#2, Element#7                   | ADI_2_Element_7              |
| ADI#2, Element#8                   | ADI_2_Element_8              |

### 5. Overview address table Profinet stations „schaller-lftd2020“



IO Device: NETX 100 RE/PNM  
Vendor: Hilscher GmbH  
Device ID: 0x0203  
Vendor ID: 0x011E

Navigation Area: Settings, Ethernet Devices, Configuration, Controller Network Settings, Device Table, IP Address Table, Process Data, Address Table (selected), FSU-/Port- Settings, Stations Timing, Controller Settings

☒ Auto addressing      Display mode: Decimal      CSV Export

Inputs:

| Name of station   | Module                    | Submodule                    | Type | Length | Address |
|-------------------|---------------------------|------------------------------|------|--------|---------|
| schaller-lftd2020 | ABP_UINT16_WRITE <Slot 1> | ABP_UINT16_WRITE <Subslot 1> | IB   | 16     |         |

Outputs:

| Name of station   | Module                   | Submodule                   | Type | Length | Address |
|-------------------|--------------------------|-----------------------------|------|--------|---------|
| schaller-lftd2020 | ABP_UINT16_READ <Slot 2> | ABP_UINT16_READ <Subslot 1> | QB   | 16     |         |

## 5.3 Settings on the B&R Profinet-Slave

### 1. Overview Profinet sensor Schaller GmbH


IO Device: LFTD2020\_V2\_4X  
Vendor: Schaller Messtechnik GmbH

Device ID: 0x0010  
Vendor ID: 0x010C

Navigation Area

- Configuration
  - General
  - Modules
  - Description
  - Device Info
  - Module Info
  - GSDML Viewer

### General

Name of station: schaller-lftd2020  
Description: LFTD2020\_V2\_4X  
IP settings  
IP address: 192.168.100.20  
Network mask: 255.255.255.0  
Gateway address: 0.0.0.0  
Note: These values are set by the controller of the network!

### 2. 8 x Input Register (16BIT)


IO Device: LFTD2020\_V2\_4X  
Vendor: Schaller Messtechnik GmbH

Device ID: 0x0010  
Vendor ID: 0x010C

Navigation Area

- Configuration
  - General
  - Modules
  - Description
  - Device Info
  - Module Info
  - GSDML Viewer

### Modules

| Slot | Sub Slot | Module                          |
|------|----------|---------------------------------|
| 0    | 1        | LFTD2020_V2_4X [LFTD2020_V2_4X] |
|      | 32768    | Interface                       |
|      | 32769    | Port 1                          |
|      | 32770    | Port 2                          |
| 1    | 1        | ABP_UINT16_WRITE                |
|      | 1        | ABP_UINT16_WRITE                |
| 2    | 1        | ABP_UINT16_READ                 |
|      | 1        | ABP_UINT16_READ                 |

Add Module
Add Submodule
Remove

Use of slots: 3/65  
State of data length: Input 22/1440 Octets, Output 22/1440 Octets, In-Output 44/2880 Octets

Submodule details
Dataset: I/O data
Display mode: Decimal

| Direction | Consistence | Data type  | Text ID          | Length |
|-----------|-------------|------------|------------------|--------|
| INPUT     | -           | unsigned16 | Humid            | 2      |
| INPUT     | -           | unsigned16 | Temp             | 2      |
| INPUT     | -           | unsigned16 | Status           | 2      |
| INPUT     | -           | unsigned16 | Counter(ms)      | 2      |
| INPUT     | -           | unsigned16 | SerialNr         | 2      |
| INPUT     | -           | unsigned16 | FWVersion        | 2      |
| INPUT     | -           | unsigned16 | M2HSerial        | 2      |
| INPUT     | -           | unsigned16 | ADI#1, Element#8 | 2      |

### 3. 8 x Output Register (16BIT).



IO Device: LFTD2020\_V2\_4X  
Vendor: Schaller Messtechnik GmbH

Device ID: 0x0010  
Vendor ID: 0x010C



Navigation Area

- Configuration
  - General
  - Modules
- Description
  - Device Info
  - Module Info
  - GSDML Viewer

#### Modules

| Slot | Sub Slot | Module                          |
|------|----------|---------------------------------|
| 0    | 1        | LFTD2020_V2_4X [LFTD2020_V2_4X] |
|      | 32768    | Interface                       |
|      | 32769    | Port 1                          |
|      | 32770    | Port 2                          |
| 1    | 1        | ABP_UINT16_WRITE                |
| 2    | 1        | ABP_UINT16_READ                 |

Add Module Add Submodule Remove

Use of slots: 3/65  
State of data length: Input 22/1440 Octets, Output 22/1440 Octets, In-Output 44/2880 Octets

Submodule details

Dataset: I/O data Display mode: Decimal

| Direction | Consistence | Data type   | Text ID          | Length |
|-----------|-------------|-------------|------------------|--------|
| OUTPUT    | --          | unsigned 16 | ADI#2, Element#1 | 2      |
| OUTPUT    | --          | unsigned 16 | ADI#2, Element#2 | 2      |
| OUTPUT    | --          | unsigned 16 | ADI#2, Element#3 | 2      |
| OUTPUT    | --          | unsigned 16 | ADI#2, Element#4 | 2      |
| OUTPUT    | --          | unsigned 16 | ADI#2, Element#5 | 2      |
| OUTPUT    | --          | unsigned 16 | ADI#2, Element#6 | 2      |
| OUTPUT    | --          | unsigned 16 | ADI#2, Element#7 | 2      |
| OUTPUT    | --          | unsigned 16 | ADI#2, Element#8 | 2      |

### 4. Device information Anybus module Profinet



IO Device: LFTD2020\_V2\_4X  
Vendor: Schaller Messtechnik GmbH

Device ID: 0x0010  
Vendor ID: 0x010C

Navigation Area

- Configuration
  - General
  - Modules
- Description
  - Device Info
  - Module Info
  - GSDML Viewer

#### Device Info

| Name                        | Value                     |
|-----------------------------|---------------------------|
| Main family                 | General                   |
| Product family              | LFTD2020                  |
| DAP vendor name             | Schaller Messtechnik GmbH |
| DAP hardware release        | --                        |
| DAP software release        | V2.40                     |
| Extended address assignment | false                     |
| Physical slots              | 0..64                     |
| Max. IO data length         | 2880                      |
| Max. input data length      | 1440                      |
| Max. output data length     | 1440                      |
| Info text                   | Schaller Messtechnik GmbH |

## 5.4 Settings on the B&R software

- The inputs and outputs are automatically created in the project and must now be assigned to the corresponding process variables.

| Channel Name              | Process Variable | Data Type | Task Class | Inverse                  | Simulate                 | Source File       | Description [1]                    |
|---------------------------|------------------|-----------|------------|--------------------------|--------------------------|-------------------|------------------------------------|
| ModuleOk                  | LFTD20_Online    | BOOL      | Automatic  | <input type="checkbox"/> | <input type="checkbox"/> | \4PP065_0571_P... | Module status (1 = module present) |
| Module001_Humid           | LFTD20_IN1       | UINT      | Automatic  | <input type="checkbox"/> | <input type="checkbox"/> | \4PP065_0571_P... | ABP_UINT16_WRITE <Slot 1>          |
| Module001_Temp            | LFTD20_IN2       | UINT      | Automatic  | <input type="checkbox"/> | <input type="checkbox"/> | \4PP065_0571_P... | ABP_UINT16_WRITE <Slot 1>          |
| Module001_Status          | LFTD20_IN3       | UINT      | Automatic  | <input type="checkbox"/> | <input type="checkbox"/> | \4PP065_0571_P... | ABP_UINT16_WRITE <Slot 1>          |
| Module001_Counter_ms      | LFTD20_IN4       | UINT      | Automatic  | <input type="checkbox"/> | <input type="checkbox"/> | \4PP065_0571_P... | ABP_UINT16_WRITE <Slot 1>          |
| Module001_SerialNr        | LFTD20_IN5       | UINT      | Automatic  | <input type="checkbox"/> | <input type="checkbox"/> | \4PP065_0571_P... | ABP_UINT16_WRITE <Slot 1>          |
| Module001_FWVersion       | LFTD20_IN6       | UINT      | Automatic  | <input type="checkbox"/> | <input type="checkbox"/> | \4PP065_0571_P... | ABP_UINT16_WRITE <Slot 1>          |
| Module001_M2HSerial       | LFTD20_IN7       | UINT      | Automatic  | <input type="checkbox"/> | <input type="checkbox"/> | \4PP065_0571_P... | ABP_UINT16_WRITE <Slot 1>          |
| Module001_ADI_1_Element_8 | LFTD20_IN8       | UINT      | Automatic  | <input type="checkbox"/> | <input type="checkbox"/> | \4PP065_0571_P... | ABP_UINT16_WRITE <Slot 1>          |
| Module002_ADI_2_Element_1 |                  | UINT      |            |                          |                          |                   | ABP_UINT16_READ <Slot 2>           |
| Module002_ADI_2_Element_2 |                  | UINT      |            |                          |                          |                   | ABP_UINT16_READ <Slot 2>           |
| Module002_ADI_2_Element_3 |                  | UINT      |            |                          |                          |                   | ABP_UINT16_READ <Slot 2>           |
| Module002_ADI_2_Element_4 |                  | UINT      |            |                          |                          |                   | ABP_UINT16_READ <Slot 2>           |
| Module002_ADI_2_Element_5 |                  | UINT      |            |                          |                          |                   | ABP_UINT16_READ <Slot 2>           |
| Module002_ADI_2_Element_6 |                  | UINT      |            |                          |                          |                   | ABP_UINT16_READ <Slot 2>           |
| Module002_ADI_2_Element_7 |                  | UINT      |            |                          |                          |                   | ABP_UINT16_READ <Slot 2>           |
| Module002_ADI_2_Element_8 | LFTD20_CMD       | UINT      | Automatic  | <input type="checkbox"/> | <input type="checkbox"/> | \4PP065_0571_P... | ABP_UINT16_READ <Slot 2>           |

- Process variables:

| Name             | Type | Constant                 | Retain                   | Value | Description [1]             |
|------------------|------|--------------------------|--------------------------|-------|-----------------------------|
| LFTD20_Online    | BOOL | <input type="checkbox"/> | <input type="checkbox"/> |       |                             |
| LFTD20_Humid     | REAL | <input type="checkbox"/> | <input type="checkbox"/> |       |                             |
| LFTD20_Humid_INT | INT  | <input type="checkbox"/> | <input type="checkbox"/> |       |                             |
| LFTD20_Temp      | REAL | <input type="checkbox"/> | <input type="checkbox"/> |       |                             |
| LFTD20_Temp_INT  | INT  | <input type="checkbox"/> | <input type="checkbox"/> |       |                             |
| LFTD20_Cnt       | UINT | <input type="checkbox"/> | <input type="checkbox"/> |       |                             |
| LFTD20_IN1       | UINT | <input type="checkbox"/> | <input type="checkbox"/> |       | LFTD-AnybusCC[1] : Humidity |
| LFTD20_IN2       | UINT | <input type="checkbox"/> | <input type="checkbox"/> |       | LFTD-AnybusCC[2] : Temperc  |
| LFTD20_IN3       | UINT | <input type="checkbox"/> | <input type="checkbox"/> |       | LFTD-AnybusCC[3] : Status   |
| LFTD20_IN4       | UINT | <input type="checkbox"/> | <input type="checkbox"/> |       | LFTD-AnybusCC[4] : Counter  |
| LFTD20_IN5       | UINT | <input type="checkbox"/> | <input type="checkbox"/> |       | LFTD-AnybusCC[5] : SerialNr |
| LFTD20_IN6       | UINT | <input type="checkbox"/> | <input type="checkbox"/> |       | LFTD-AnybusCC[6]            |
| LFTD20_IN7       | UINT | <input type="checkbox"/> | <input type="checkbox"/> |       | LFTD-AnybusCC[7] : Version  |
| LFTD20_IN8       | UINT | <input type="checkbox"/> | <input type="checkbox"/> |       | LFTD-AnybusCC[8]            |
| LFTD20_CMD       | UINT | <input type="checkbox"/> | <input type="checkbox"/> |       | LFTD-AnybusCC[16] : Comma   |

## 5.5 Program code in ANSI C for integration

1. It is recommended to use the counter as a watchdog.
  - » The counter is incremented by the sensor every millisecond.
2. Thus, the function of the sensor can be monitored by means of the counter.
  - » If the counter does not change for a longer period of time, a restart of the communication with the module is necessary.
3. With the LFTD-Profinet (new) with display, the Profinet connection is cut when the measuring window is left or the module is deactivated.
  - » In contrast to the LFTD-Profinet (old) with AnybusIC, the device starts the measurement automatically after power-up.
4. With the variable "ModulOk" or "LFTD20\_Online" in connection with the counter "LFTD20\_Cnt", a reliable check of the function of the sensor and the communication can be realised.
  - » A measurement interval with the provision of data takes less than one second.

```
#include <bur/plctypes.h>

#ifdef _DEFAULT_INCLUDES
#include <AsDefault.h>
#endif

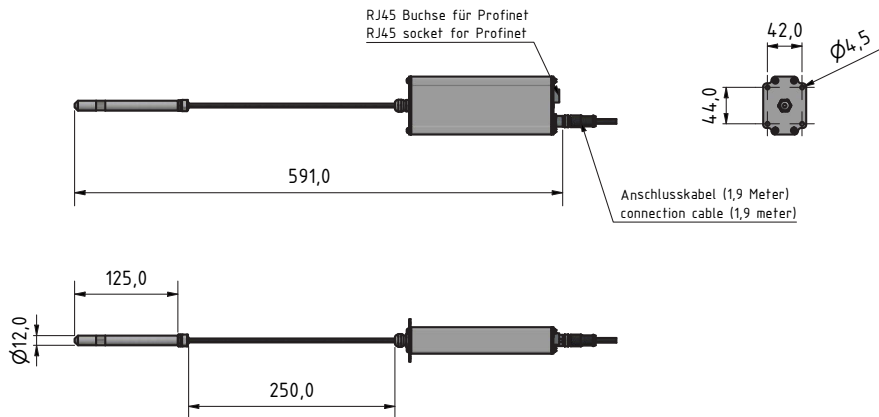
void _INIT C_TestInit(void)
{
    LFTD20_CMD = 0;
    LFTD20_IN1 = 0;
    LFTD20_IN2 = 0;
    LFTD20_IN3 = 0;
    LFTD20_IN4 = 0;
    LFTD20_IN5 = 0;
    LFTD20_IN6 = 0;
    LFTD20_IN7 = 0;
    LFTD20_IN8 = 0;

    LFTD20_Online = 0;
    LFTD20_Humid_INT = 0;
    LFTD20_Humid = 0.0;
    LFTD20_Temp_INT = 0;
    LFTD20_Temp = 0.0;
}

void _CYCLIC C_TestCyclic( void )
{
    LFTD20_Humid = ((float)(INT)LFTD20_IN1/128.0);
    LFTD20_Temp = ((float)(INT)LFTD20_IN2/128.0);
    LFTD20_Cnt = LFTD20_IN4;

    if( (LFTD20_Online==0) && LFTD20_CMD) {
        LFTD20_CMD = 0;
    }
}
```

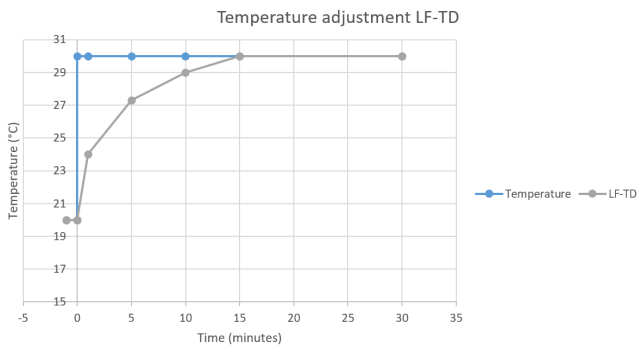
## 6. Technical drawing LF-TD Profinet



## 7. Adjustment behaviour of the sensor

In humidity and temperature measurement, several parameters are responsible for the adjustment behaviour (time until the actual measured value is displayed). The parameter responsible for the highest measuring error is a temperature discrepancy between the sensor resp. the whole measuring instrument and the material being measured resp. the air.

Therefore, let the device adjust until the displayed temperature corresponds to the actual temperature. The graph below shows how long it takes to adjust from 20 °C to 30 °C.



To demonstrate the importance of temperature adjustment, the table below shows the measuring errors due to a temperature difference between the measuring instrument and the material being measured of only 1 °C / 1.8 °F, at different ambient temperatures.

|           | 10 °C (50 °F) | 20 °C (68 °F) | 30 °C (86 °F) |
|-----------|---------------|---------------|---------------|
| 10 % r.h. | +/- 0.7 %     | +/- 0.6 %     | +/- 0.6 %     |
| 50 % r.h. | +/- 3.5 %     | +/- 3.2 %     | +/- 3.0 %     |
| 90 % r.h. | +/- 6.3 %     | +/- 5.7 %     | +/- 5.4 %     |

At room temperature (20 °C / 68 °F) and an assumed humidity value of 50 % relative humidity a temperature difference between the measuring sensor and the material being measured of 1 °C / 1.8 °F causes a measurement error of 3.2 % relative humidity. A temperature difference of 3 °C / 5.4 °F would cause a measurement error of more than 10 % relative humidity.

## 8. Definition relative humidity

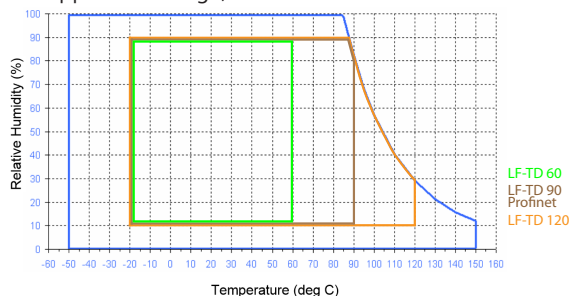
Indicates the relationship between the current water vapour pressure and the maximum possible, the so-called saturation vapour pressure.

The relative humidity shows the degree the air is saturated with water vapour.  
Examples:

50% relative humidity: At the current temperature and pressure, the air is half saturated with water vapour. 100% relative humidity means that the air is totally saturated with water vapour. If the air has more than 100% humidity, the excessive humidity would condense or precipitate as mist.

### 8.1 Application range

Within the normal application range (normal range) the accuracy of the device is as indicated. A long-term application beyond the normal application range (max. range), particularly at an air humidity of more than 80%, can lead to higher measuring errors. Back in the normal application range, the sensor will return to the indicated accuracy automatically.





## ATTENTION

In general, use is recommended at 1.013 bar ambient pressure. Overpressure consultation is possible up to 5 bar overpressure. It is not guaranteed that the sensor will provide a complete seal to the ambient pressure at overpressure.

## 9. Cleaning and maintenance

Regularly cleaning and maintaining the device will ensure that it will have a long service life and stay in good condition.

### 9.1 Care instructions

- Do not leave the device out in the rain.
- Do not immerse the sensor in water.
- Do not expose the device to extreme temperatures.
- Protect the device from strong mechanical shocks and loads.

### 9.2 Cleaning the device



## ATTENTION

### **Do not clean with fluids**

Water or cleaning fluid getting inside the device can destroy the device.

- ▶ Only clean with dry materials.

#### Aluminium housing and sensor tube

Clean the aluminium housing and the sensor tube with a dry cloth.

#### Air humidity and temperature sensor

The air humidity and temperature sensor cannot be cleaned. In case of a polluted sensor please contact your dealer.

## 10. Checking the calibration

**To do so:** Calibration equipment (art.no.10006) and calibration ampoules (humidity standards art.no. 10005) required. The device, the calibration equipment and the humidity standards must have a temperature between 20.0 °C and 26.0 °C. It is recommended to store the device, the calibration equipment and the calibration ampoules in a room with little temperature fluctuation for 24 hours.

### 10.1 Assembling the calibration equipment

1. If needed, place the sealing ring over the threads of the lower part like shown in figure 2.
2. Put the textile pad in the lower part (figure 3) and carefully pour the humidity standard onto the pad, beginning with the humidity standard of 35 % relative humidity.
3. Carefully place the upper part onto the lower part (figure 4) and tighten the upper part clockwise.
  - » Recommendation: Keep the lower part on the table while screwing on the upper part.
  - » If necessary, only lift the calibration equipment straight up and do not tilt or turn it over.
4. In case it has been lifted, carefully place the calibration equipment onto an even table.
5. Insert the sensor tube into the upper part of the calibration equipment (figure 5).
  - » Take care to lift the device with calibration equipment straight up and not to tilt or turn it over. Otherwise the sensor may be damaged.
  - » Leave the calibration equipment mounted on the sensor tube until explicitly stated otherwise.





## ATTENTION

### Damage to the sensor

By tilting or turning the device with mounted calibration equipment the sensor can be destroyed.

- Only lift the device with mounted calibration equipment straight up.

## 10.2 Determining the deviation

1. Let the sensor adjust to the humidity standard for at least 2 hours.
2. Then note down the measured relative humidity and temperature.
3. At ideal temperature conditions (device, calibration equipment and humidity standard have a temperature of 23 °C), the value printed on the humidity standard can be used as reference value.
4. In case of deviation from the factory temperature (23.0 °C), the real humidity value must first be determined according to the table below.

| Temperature | Humidity standards |        |        |
|-------------|--------------------|--------|--------|
|             | 35 %               | 50 %   | 80 %   |
| 20 °C       | 34.6 %             | 49.8 % | 79.9 % |
| 21 °C       | 34.8 %             | 49.8 % | 80.0 % |
| 22 °C       | 34.9 %             | 49.9 % | 80.0 % |
| 23 °C       | 35.0 %             | 50.0 % | 80.0 % |
| 24 °C       | 35.1 %             | 50.1 % | 80.0 % |
| 25 °C       | 35.2 %             | 50.2 % | 80.0 % |
| 26 °C       | 35.4 %             | 50.2 % | 80.1 % |

5. Note down the real humidity value.
6. Compare the noted displayed measuring value with the real humidity value.
  - » If the deviation revealed is below 1.5 % relative humidity, it is not recommended to recalibrate.
  - » If the deviation revealed is more than 1.5 % relative humidity, please contact your dealer.
7. Now remove the calibration equipment from the sensor tube and repeat the procedure from "[10.1 Assembling the calibration equipment](#)", optionally with the humidity standard 50 % relative humidity or the humidity standard 80 % relative humidity.

## 11. Faults

If the measures listed below fail to remedy any faults or if the device has faults not listed here, please contact Schaller Messtechnik GmbH.

| Fault           | Cause                                                                                         | Remedy                                                                                                            |
|-----------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Measuring error | The temperature is outside the operating temperature: lower than -20 °C or higher than +90 °C | Only use the device in temperatures between -20 °C and +90 °C.                                                    |
|                 | Measurement error due to too short temperature adjustment time                                | Let the device adjust to the surroundings (see "7. Adjustment behaviour of the sensor").                          |
|                 | Sources of heat or cold that do not correspond to the surrounding temperature                 | Reposition your device at a location that is representative for the room climate.                                 |
|                 | Dripping water or sprayed water                                                               | Direct contact of the sensor with dripping or sprayed water will destroy it.                                      |
|                 | Irreversible damage of the sensor due to aggressive gases                                     | Please contact your dealer.                                                                                       |
|                 | Condensation caused by a change in temperature                                                | Condensation on the sensor interferes with the calibration. Let the device adjust to the surrounding temperature. |
|                 | Polluted air humidity and temperature sensor                                                  | Please contact your dealer.                                                                                       |
|                 | Foreign particles on the sensor                                                               | Please contact your dealer.                                                                                       |

## 12. Repair

If your humimeter needs repair, please pack it securely for transport and send it to:  
Schaller GmbH  
Max-Schaller-Straße 99  
A - 8181 St.Ruprecht an der Raab

Download the repair form at [humimeter.com/reparatur](http://humimeter.com/reparatur). Please fill out the form completely and enclose it with your package. This will allow us to clearly identify your repair request and process it quickly.



### **WARNING**

For safety reasons, deeply discharged, damaged, or swollen rechargeable or non-rechargeable batteries are not allowed to be sent. Rechargeable and non-rechargeable batteries must be removed from the device before sending.

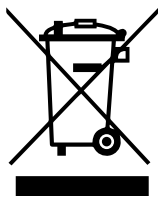
## 13. Storage and disposal

### 13.1 Storing the device

The device must be stored as follows:

- Do not store outdoors.
- Store in a dry and dust-free place.
- Protect the device from sunlight.
- Avoid mechanical shocks/loads.
- Storage temperature: -20 °C to +60 °C

### 13.2 Disposing of the device



Devices marked with this symbol are subject to Directive 2012/19/ EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE).

If the device is being operated outside the European Union, the national regulations on the disposal of such devices that apply in the country of use must be observed. Electronic devices must not be disposed of as domestic waste. The device must be disposed of appropriately using appropriate collection systems.

## 14. Device information

### 14.1 EC declaration of conformity

# 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: **LF-TD-A ; LF-TD 60 ; LF-TD 90 ; LF-TD 120 ; LF-TD 150; LF-TD 180 ; LF-TD-E ; LF-TD-U ; LF-TD-ER ; LF-TD Profinet ; LF-TD-H**

*Type designation:*

Produktbeschreibung: **Messgerät zur Bestimmung der rel. Feuchte und abgeleiteter Messgrößen**

*Product description* **Measuring instrument for determining relative humidity and derived measured variables**

Das bezeichnete Produkt erfüllt die Bestimmungen der Richtlinien:

*The designated product is in conformity with the European directives:*

**EMV - Richtlinie 2014/30/EC**

**EMC Directive 2014/30/EU**

**RoHS - Richtlinie 2011/65/EG**

**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**

**ersetzt / replaced**

**EN 50581:2012**

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.*

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**  
Messtechnik / humimeter.com  
Schaller Messtechnik GmbH  
MSE - Schaller / Spalim 99  
AT-8180 St. Ruprecht a.d. Raab  
www.humimeter.com | info@humimeter.com  
.....  
Bernhard Maunz  
Rechtsverbindliche Unterschrift des Ausstellers  
Legal binding signature of the issuer



## DECLARATION OF CONFORMITY

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

*Product designation:* **Schaller**

*Type designation:* **LF-TD-A ; LF-TD 60 ; LF-TD 90 ; LF-TD 120 ; LF-TD 150; LF-TD 180 ; LF-TD-E ; LF-TD-U ; LF-TD-ER ; LF-TD Profinet ; LF-TD-H**

*Product description:* **Measuring instrument for determining relative humidity and derived measured variables**

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

 **Schaller**  
Messtechnik / Humidimeter.com  
Schaller Messtechnik GmbH  
Ma - Schaller Strasse 99  
AT-8180 St. Ruprecht a.d. Raab  
www.humidimeter.com | info@humidimeter.com

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

## 14.2 Technical data

|                                      |                                                                                                                                                              |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measuring range<br>rel. air humidity | 0 % to 100 %                                                                                                                                                 |
| Calibration rel. air humidity        | 10 % to 90 %                                                                                                                                                 |
| Accuracy rel. air humidity           | +/- 2.0 % (at 25 °C)                                                                                                                                         |
| Measuring range temperature          | -20 °C to +90 °C                                                                                                                                             |
| Calibration temperature              | +10 °C to +60 °C                                                                                                                                             |
| Accuracy temperature                 | +/- 0.3 °C (at 25 °C) / +/- 0.5 °F (at 77 °F)                                                                                                                |
| Operating temperature                | -20 °C to +90 °C (sensor tube)<br>-20 °C to +85 °C (electronics)                                                                                             |
| Outputs                              | rel. air humidity (4 - 20 mA)<br>-Scaling (0 % to 100 %)<br>Temperature (4 - 20 mA)<br>-Scaling (-20 °C to +90 °C)<br>Working resistance < 500 Ohm (UB 24 V) |
| Temperature compensation             | Automatic                                                                                                                                                    |
| Power supply                         | 12 to 29 VDC                                                                                                                                                 |
| Current consumption                  | 18 mA (without interfaces, display or any<br>bus systems)                                                                                                    |
| Electrical connection                | Sensor plug with 1.9 m cable                                                                                                                                 |
| Housing dimensions                   | 70 x 32 x 120 mm                                                                                                                                             |
| Housing material                     | Anodised aluminium                                                                                                                                           |
| Sensor tube dimensions               | 12 x 125 mm                                                                                                                                                  |
| Sensor tube material                 | Stainless steel                                                                                                                                              |
| Sensor cap                           | Stainless steel sinter                                                                                                                                       |
| IP rating electronics housing        | IP 54                                                                                                                                                        |

# 15. Notes

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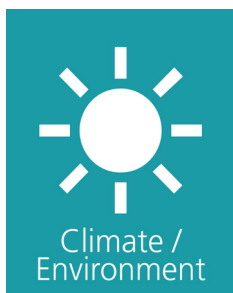
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Schaller Messtechnik develops, produces and sells professional moisture meters and turnkey solutions.

**Schaller Messtechnik GmbH**

Max-Schaller-Straße 99, A - 8181 St. Ruprecht an der Raab

Tel +43 (0)3178 - 28899 , Fax +43 (0)3178 - 28899 - 901

[info@humimeter.com](mailto:info@humimeter.com), [www.humimeter.com](http://www.humimeter.com)