

HYGRASGARD® RPFF-xx
HYGRASGARD® RPFTF-xx

GB Operating Instructions, Mounting & Installation

Pendulum room humidity and temperature sensors
($\pm 1,8\%$ / $\pm 2,0$), calibratable, with multi-range switching
and active output



RPFF
RPFTF
($\pm 2,0\%$)



RPFF-SD
($\pm 2,0\%$)

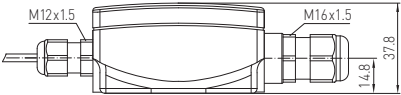
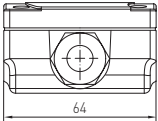


RPFF-25
RPFTF-25
($\pm 1,8\%$)

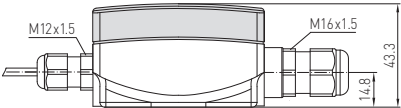
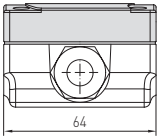
Dimensional drawing

RPFF / RPFTF (± 2,0 %) (Tyr 1)

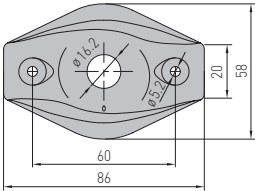
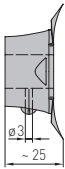
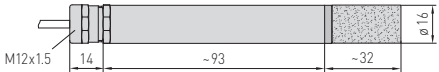
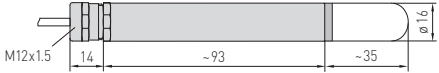
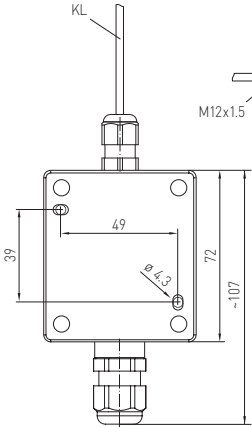
without display



with display



KL



SF-K
plastic sinter filter (standard)



SF-M
Metal sinter filter (optional)



MF-16-K
Mounting flange, plastic (optional)

The calibratable pendulum room humidity sensor **HYGRASGARD® RPFF-SD** (± 2,0 %) with plastic sinter filter measures the relative humidity of air. It converts the measurand humidity into a standard signal of 4...20 mA. Relative humidity (in % r.H.) is the quotient of water vapour partial pressure divided by the saturation vapour pressure at the respective gas temperature.

The sensor applied in non-aggressive dust-free atmospheres in refrigeration, air conditioning, ventilation and clean room technology, hotels, technical rooms, meeting rooms and convention centres. These measuring transducers are designed for precise detection of humidity. A digital long-term stable sensor is used as a measuring element for humidity measurement. This sensor is suitable for duct installation, as a pendulum sensor, or for integration in equipment.

TECHNICAL DATA	
Power supply:	15...36 V DC depending on working resistance, residual ripple stabilised ± 0.3 V
Working resistance:	$R_a \text{ (Ohm)} = (U_b - 14 \text{ V}) / 0.03 \text{ A}$ $R_a < 500 \text{ Ohm}$
Power consumption:	< 1.1 VA / 24 V DC
Sensors:	digital humidity sensor small hysteresis, high long-term stability
Sensor protection:	plastic sinter filter, Ø 16 mm, L = 35 mm, exchangeable (optional metal sinter filter, Ø 16 mm, L = 32 mm)
Measuring range, humidity:	0...100 % r.H. (output corresponding to 4...20 mA)
Operating range, humidity:	0...95 % r.H. (without formation of dew)
Deviation, humidity:	typically ± 2.0 % (20...80 % r.H.) at +25 °C, otherwise ± 3.0 %
Output, humidity:	4...20 mA, see load resistance diagram
Ambient temperature:	storage -25...+50 °C operation -5...+55 °C
Long-term stability:	± 1 % per year
Electrical connection:	2-wire connection (see connecting diagram), 0.14 - 1.5 mm²
Connection cable:	PVC, LiYY, 2 x 0.25 mm², KL = approx. 1.5 m (other lengths optional)
Protective tube:	stainless steel , Ø 16 mm, NL = 142 mm
Protection class:	III (according to EN 60730)
Protection type:	IP 65 (according to EN 60529)
Standards:	CE conformity, according to EMC directive 2014 / 30 / EU, according to EN 61326-1, according to EN 61326-2-3

2-wire connection

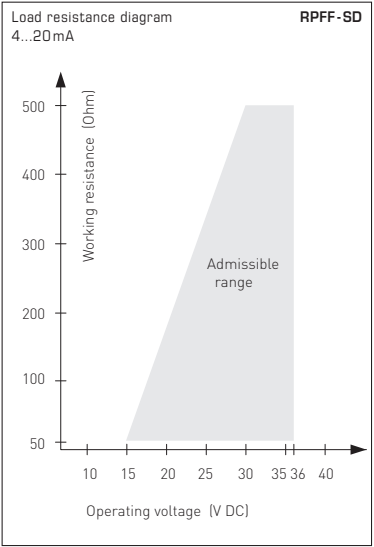
RPFF-SD-I
(Transmitter)

 brown

 white

+UB 24V DC

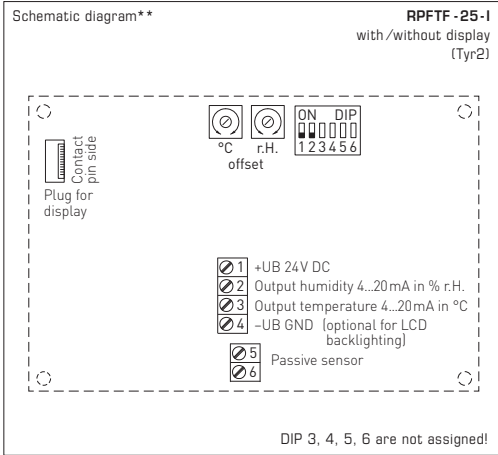
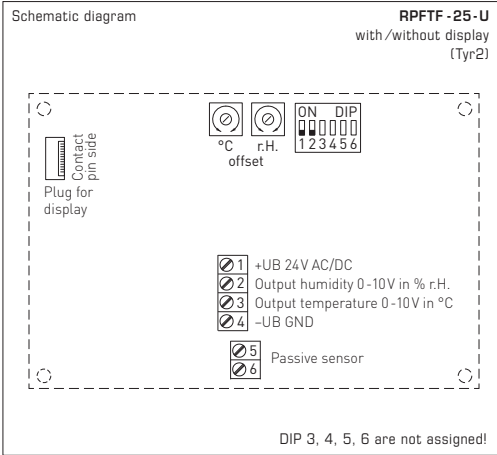
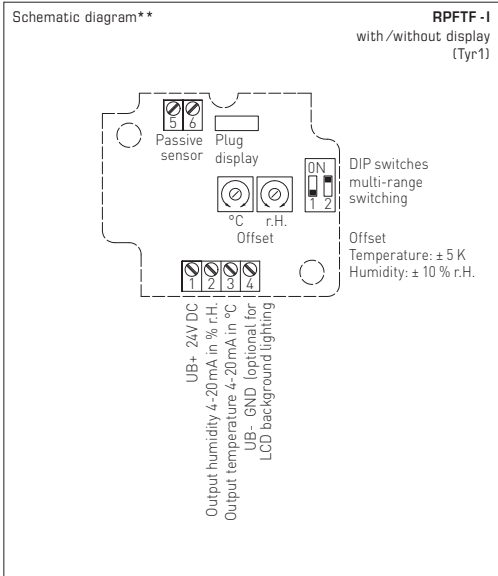
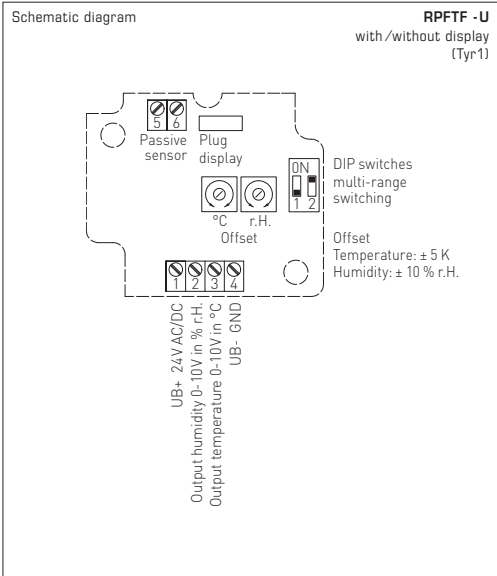
Output humidity in % r.H. 4-20mA



The calibratable pendulum room humidity and temperature sensor **HYGRASGARD® RPFF / RPFTF (±2,0%)** with plastic sinter filter or **RPFF-25 / RPFTF-25 (±1,8%)** with pluggable metal sinter filter, terminal box enclosure made of impact-resistant plastic, **with/without optional display**. It measures the relative humidity and/or the temperature of the air and converts the measurands into a standard signal of 0-10V or 4...20 mA. It is equipped with four switchable temperature ranges. Relative humidity (in % r.H.) is the quotient of water vapour partial pressure divided by the saturation vapour pressure at the respective gas temperature. The sensor is applied in non-aggressive dust-free atmospheres in refrigeration, air conditioning, ventilation and clean room technology, hotels, technical rooms, meeting rooms and convention centres. These measuring transducers are designed for exact detection of temperature and humidity. A digital long-term stable sensor is used as a measuring element for humidity and temperature measurement. Fine adjustment by the user is possible. The sensor is appropriate for ceiling and duct installation, or for integrating it into equipment.

TECHNICAL DATA	
Power supply:	Power supply: 24V AC (±20%); 15...36V DC for U variant 15...36V DC for I variant, depending on working resistance, residual ripple stabilised ±0.3V
Working resistance:	R _a (ohm) = (U _b -14V) / 0.02A for I variant
Load resistance:	R _L > 5kOhm for U variant
Power consumption:	< 1.1 VA / 24V DC; < 2.2VA / 24V AC
Sensors:	digital humidity sensor with integrated temperature sensor , low hysteresis, high long-term stability
Sensor protection:	RPFF / RPFTF: plastic sinter filter, Ø 16mm, L=35mm, exchangeable (optional metal sinter filter, Ø 16mm, L=32mm) RPFF-25 / RPFTF-25: pluggable measuring head (probe) with metal sinter filter, Ø 16mm, L=88.5mm, exchangeable
HUMIDITY	
Measuring range, humidity:	0...100% r.H. (output corresponding to 0-10V or 4...20 mA)
Operating range, humidity:	0...95% r.H. (without formation of dew)
Deviation, humidity:	RPFF / RPFTF: typically ±2.0% (20...80% r.H.) at +25 °C, otherwise ±3.0% RPFF-25 / RPFTF-25: typically ±1.8% (10...90% r.H.) at +25 °C, otherwise ±2.0%
Output, humidity:	0 - 10V for U variant 4...20mA for I variant, see load resistance diagram
TEMPERATURE	
Measuring range, temperature:	multi-range switching with 4 switchable measuring ranges (see table) -35...+35 °C; -35...+75 °C; 0...+50 °C; 0...+80 °C (output corresponding to 0 -10V or 4...20mA)
Operating range, temperature:	-35...+80 °C
Deviation, temperature:	±0.2 K at +25 °C
Output, temperature:	0-10V or 4...20mA or Ohm value
Ambient temperature:	RPFF / RPFTF: storage -5...+60 °C; operation -5...+60 °C RPFF-25 / RPFTF-25: storage -35...+85 °C; operation -30...+70 °C
Long-term stability:	± 1 % per year
Enclosure:	plastic, UV-stabilised, material polyamide, 30% glass-globe reinforced, with quick-locking screws (slotted / Phillips head combination), colour traffic white (similar to RAL9016), enclosure cover for display is transparent!
Enclosure dimensions:	RPFF / RPFTF: 72 x 64 x 37,8 mm (Tyr1 without display) 72 x 64 x 43,3 mm (Tyr1 with display) RPFF-25 / RPFTF-25: 126 x 90 x 50 mm (Tyr2)
Cable gland:	M 16 x 1.5, including strain relief, exchangeable, max. inner diameter 10.4 mm
Electrical connection:	2-, 3-, or 4-wire connection (see connecting diagram), 0.14 - 1.5 mm² via terminal screws on circuit board
Connection cable:	RPFF / RPFTF: PVC, LiYY, 6 x 0.14 mm², KL = approx. 2 m (other lengths optional) RPFF-25 / RPFTF-25: KL = 2 m
Protective tube:	stainless steel , RPFF / RPFTF: Ø = 16 mm, L = 142 mm RPFF-25 / RPFTF-25: Ø = 18 mm (16 mm), L = 120 mm
Protection class:	III (according to EN 60730)
Protection type:	IP 65 (according to EN 60529)
Standards:	CE conformity, according to EMC directive 2014 / 30 / EU, according to EN 61326-1, according to EN 61326-2-3
Optional:	display with illumination , for displaying ACTUAL temperature and / or ACTUAL humidity RPFF / RPFTF: two-line, cutout approx. 36 x 15 mm (W x H), (Tyr 1) RPFF-25 / RPFTF-25: three-line, cutout approx. 70 x 40 mm (W x H), (Tyr 2)

HYGRASGARD® RPFF / RPFTF (± 2,0 %), RPFF-25 / RPFTF-25 (± 1,8 %)



Temperature measuring ranges (adjustable)	DIP 1	DIP 2
-35...+75 °C	ON	ON
-35...+35 °C	OFF	OFF
0...+50 °C (default)	OFF	ON
0...+80 °C	ON	OFF

* 2-wire connection for devices with /without display (not illuminated)
3-wire connection for devices with illuminated display

** 3-wire connection for devices with /without display (not illuminated)
4-wire connection for devices with illuminated display

At the I variant the humidity path must necessarily be connected !

HYGRASGARD® RPFF / RPFTF (± 2,0 %), RPFF-25 / RPFTF-25 (± 1,8 %)

3-wire connection

RPFF -U
RPFF -25 -U

1

2

3

4

+UB 24V AC/DC

Output humidity in % r.H. 0-10V

Free

-UB-GND

2- or 3-wire connection*

RPFF -I
RPFF -25 -I
[Transmitter]

1

2

3

4

+UB 24V DC

Output humidity in % r.H. 4-20mA

Free

-UB-GND (optional for backlighting)

4-wire connection

RPFTF -U
RPFTF -25 -U

1

2

3

4

+UB 24V AC/DC

Output humidity in % r.H. 0-10V

Output temperature in °C 0-10V

-UB-GND

3- or 4-wire connection**

RPFTF -I
RPFTF -25 -I
[Transmitter]

1

2

3

4

+UB 24V DC

Output humidity in % r.H. 4-20mA

Output temperature in °C 4-20mA

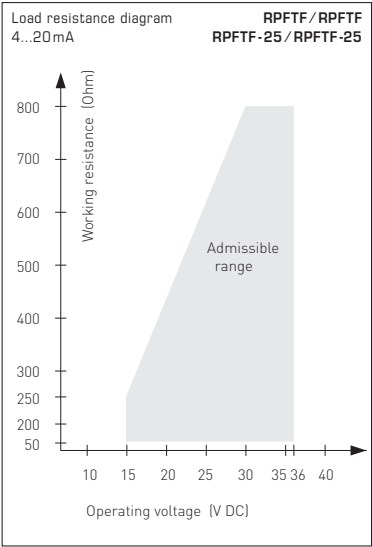
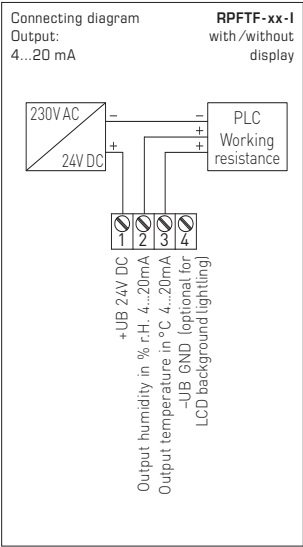
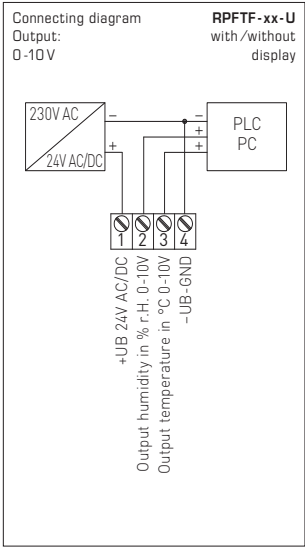
-UB-GND (optional for backlighting)

NOTE

At transmitters with current output the humidity output (Pin 2) must categorically be connected!

NOTE

For 4...20mA devices, DC voltage must be used (without residual ripple, see permissible range of load resistance diagram). Do not use pulsating DC voltage.

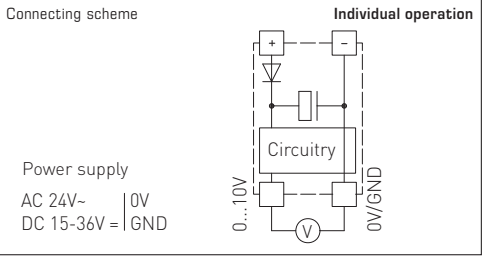


SUPPLY VOLTAGE:

For operating voltage reverse polarity protection, a one-way rectifier or reverse polarity protection diode is integrated in this device variant. This internal one-way rectifier also allows operating 0-10V devices on AC supply voltage.

The output signal is to be tapped by a measuring instrument. Output voltage is measured against zero potential (0V) of the input voltage!

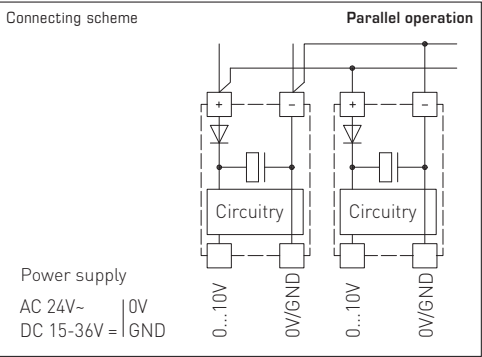
When this device is operated on **DC supply voltage**, the operating voltage input UB+ is to be used for 15...36V DC supply and UB- or GND for ground wire!



When several devices are supplied by one 24V **AC voltage supply**, it is to be ensured that all "positive" operating voltage input terminals (+) of the field devices are connected with each other and all "negative" operating voltage input terminals (-) (= reference potential) are connected together (in-phase connection of field devices). All outputs of field devices must be referenced to the same potential!

In case of reversed polarity at one field device, a supply voltage short-circuit would be caused by that device. The consequential short-circuit current flowing through this field device may cause damage to it.

Therefore, pay attention to correct wiring!



Temperature table
MR: -35...+75 °C

°C	U _A in V	I _A in mA
-35	0.0	4.0
-30	0.5	4.7
-25	0.9	5.5
-20	1.4	6.2
-15	1.8	6.9
-10	2.3	7.6
-5	2.7	8.4
0	3.2	9.1
5	3.6	9.8
10	4.1	10.5
15	4.5	11.3
20	5.0	12.0
25	5.5	12.7
30	5.9	13.5
35	6.4	14.2
40	6.8	14.9
45	7.3	15.6
50	7.7	16.4
55	8.2	17.1
60	8.6	17.8
65	9.1	18.5
70	9.5	19.2
75	10.0	20.0

Temperature table
MR: -35...+35 °C

°C	U _A in V	I _A in mA
-35	0.0	4.0
-30	0.7	5.1
-25	1.4	6.3
-20	2.1	7.4
-15	2.9	8.6
-10	3.6	9.7
-5	4.3	10.9
0	5.0	12.0
5	5.7	13.1
10	6.4	14.3
15	7.1	15.4
20	7.9	16.6
25	8.6	17.7
30	9.3	18.9
35	10.0	20.0

Temperature table
MR: 0...+50 °C

°C	U _A in V	I _A in mA
0	0.0	4.0
5	1.0	5.6
10	2.0	7.2
15	3.0	8.8
20	4.0	10.4
25	5.0	12.0
30	6.0	13.6
35	7.0	15.2
40	8.0	16.8
45	9.0	18.4
50	10.0	20.0

Temperature table
MR: 0...+80 °C

°C	U _A in V	I _A in mA
0	0.0	4.0
5	0.6	5.0
10	1.3	6.0
15	1.9	7.0
20	2.5	8.0
25	3.1	9.0
30	3.8	10.0
35	4.4	11.0
40	5.0	12.0
45	5.6	13.0
50	6.3	14.0
55	6.9	15.0
60	7.5	16.0
65	8.1	17.0
70	8.8	18.0
75	9.4	19.0
80	10.0	20.0

Humidity table
MR: 0...100% r. H.

% r.H.	U _A in V	I _A in mA
0	0.0	4.0
5	0.5	4.8
10	1.0	5.6
15	1.5	6.4
20	2.0	7.2
25	2.5	8.0
30	3.0	8.8
35	3.5	9.6
40	4.0	10.4
45	4.5	11.2
50	5.0	12.0
55	5.5	12.8
60	6.0	13.6
65	6.5	14.4
70	7.0	15.2
75	7.5	16.0
80	8.0	16.8
85	8.5	17.6
90	9.0	18.4
95	9.5	19.2
100	10.0	20.0

HYGRASGARD® RPFF – Pendulum room humidity sensors (±2,0%), *Premium*
HYGRASGARD® RPFTF – Pendulum room humidity and temperature sensors (±2,0%), *Premium*

Type / WG01	Measuring Range / Readout		Output		Item No.
	Humidity	Temperature	Humidity	Temperature	
RPFF-I					
RPFF-I	0...100% r. H.	–	4...20 mA	–	1201-1172-0000-100
RPFF-U					
RPFF-U	0...100% r. H.	–	0-10 V	–	1201-1171-0000-100
RPFTF-I					
RPFTF-I	0...100% r. H.	–35...+75 °C –35...+35 °C 0...+50 °C 0...+80 °C	4...20 mA	4...20 mA	1201-1172-1000-100
RPFTF-U					
RPFTF-U	0...100% r. H.	–35...+75 °C –35...+35 °C 0...+50 °C 0...+80 °C	0-10 V	0-10 V	1201-1171-1000-100

HYGRASGARD® RPFF-25 – Pendulum room humidity sensors, pluggable (±1,8%), *Deluxe*
HYGRASGARD® RPFTF-25 – Pendulum room humidity and temperature sensors, pluggable (±1,8%), *Deluxe*

Type / WG02	Measuring Range / Readout		Output		Display	Item No.
	Humidity	Temperature	Humidity	Temperature		
RPFF-25-I						
RPFF-25-I	0...100% r. H.	–	4...20 mA	–		1201-7122-0000-100
RPFF-25-I DISPLAY	0...100% r. H.	–	4...20 mA	–	■	1201-7122-0400-100
RPFF-25-U						
RPFF-25-U	0...100% r. H.	–	0-10 V	–		1201-7121-0000-100
RPFF-25-U DISPLAY	0...100% r. H.	–	0-10 V	–	■	1201-7121-0400-100
RPFTF-25-I						
RPFTF-25-I	0...100% r. H.	–35...+75 °C –35...+35 °C 0...+50 °C 0...+80 °C	4...20 mA	4...20 mA		1201-7122-1000-100
RPFTF-25-I DISPLAY	0...100% r. H.	(4x as above)	4...20 mA	4...20 mA	■	1201-7122-1400-100
RPFTF-25-U						
RPFTF-25-U	0...100% r. H.	–35...+75 °C –35...+35 °C 0...+50 °C 0...+80 °C	0-10 V	0-10 V		1201-7121-1000-100
RPFTF-25-U DISPLAY	0...100% r. H.	(4x as above)	0-10 V	0-10 V	■	1201-7121-1400-100

HYGRASGARD® RPFF-SD – Pendulum room humidity sensors (±2,0%), *Standard*

Type / WG01	Measuring Range	Output	Item No.
	Humidity (relative)	Humidity (relative)	
RPFF-SD-I			
RPFF-SD-I	0...100% r. H.	4...20 mA	1201-1172-0000-150

Accessories

SF-M	Metal sinter filter, Ø 16 mm, L = 32 mm, exchangeable stainless steel (VA 1.4404)	7000-0050-2200-100
MSK-25	Pluggable measuring head (sensor), stainless steel, metal sinter filter, Ø 16 mm, L = 88,5 mm, exchangeable, as replacement element for RPFF-25 / RPFTF-25	7201-1131-0000-000
MF-16-K	Mounting flange, plastic	7100-0030-0000-000

General notes

- This device may only be used in pollutant-free non-precipitating air without above-atmospheric or below-atmospheric pressure at the sensor element.
- On outdoor and duct sensors, the sinter filter of the sensor element protects the humidity sensor against potential dust exposure. In case of pollution/contamination, this filter should be cleaned on a regular basis.
- Dust and pollution falsify measurement results and are to be avoided. Slight pollution and dust sediments can be removed by using compressed air.
- Touching the humidity element is under any circumstances to be avoided, as that would result in considerable mismeasurements.
- In case of pollution, we recommend cleaning and recalibration in the factory.
- In any case, the sensor must not get in contact with chemicals or other cleaning agents.
- The relative humidity of 0...100% is indicated by an output signal of 0-10V or 4...20mA. The device operating range covers 10.0...99.9% r.H. Outside of that range, mismeasurements or increased deviations may occur.
- When several sensors [0 -10V] are connected to one voltage supply of 24V AC, correct polarity must be regarded as otherwise the alternating voltage source may be short-circuited.
- The voltage outputs are short-circuit proof. Applying overvoltage or voltage supply to the voltage output will destroy the device.
- If this device is operated beyond the specified range, all warranty claims are forfeited.

Our "General Terms and Conditions for Business" together with the "General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry" (ZVEI conditions) including supplementary clause "Extended Retention of Title" apply as the exclusive terms and conditions.

In addition, the following points are to be observed:

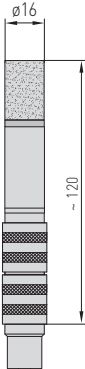
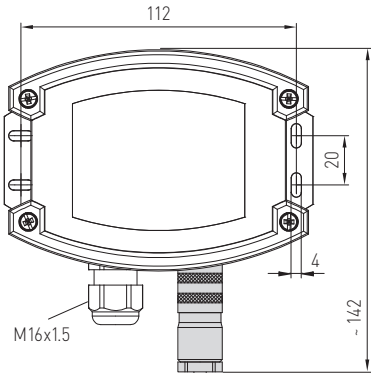
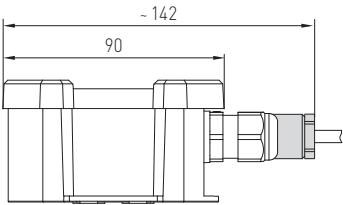
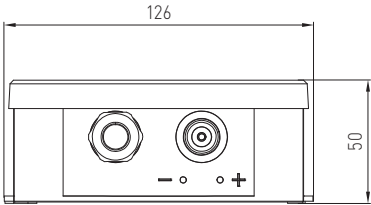
- These instructions must be read before installation and putting in operation and all notes provided therein are to be regarded!
- Devices must only be connected to safety extra-low voltage and under dead-voltage condition. To avoid damages and errors the device (e.g. by voltage induction) shielded cables are to be used, laying parallel with current-carrying lines is to be avoided, and EMC directives are to be observed.
- This device shall only be used for its intended purpose. Respective safety regulations issued by the VDE, the states, their control authorities, the TÜV and the local energy supply company must be observed. The purchaser has to adhere to the building and safety regulations and has to prevent perils of any kind.
- No warranties or liabilities will be assumed for defects and damages arising from improper use of this device.
- Consequential damages caused by a fault in this device are excluded from warranty or liability.
- These devices must be installed by authorised specialists only.
- The technical data and connecting conditions of the mounting and operating instructions delivered together with the device are exclusively valid. Deviations from the catalogue representation are not explicitly mentioned and are possible in terms of technical progress and continuous improvement of our products.
- In case of any modifications made by the user, all warranty claims are forfeited.
- This device must not be installed close to heat sources (e.g. radiators) or be exposed to their heat flow. Direct sun irradiation or heat irradiation by similar sources (powerful lamps, halogen spotlights) must absolutely be avoided.
- Operating this device close to other devices that do not comply with EMC directives may influence functionality.
- This device must not be used for monitoring applications, which serve the purpose of protecting persons against hazards or injury, or as an EMERGENCY STOP switch for systems or machinery, or for any other similar safety-relevant purposes.
- Dimensions of enclosures or enclosure accessories may show slight tolerances on the specifications provided in these instructions.
- Modifications of these records are not permitted.
- In case of a complaint, only complete devices returned in original packing will be accepted.

These instructions must be read before installation and putting in operation and all notes provided therein are to be regarded!

HYGRASGARD® RPFF-25
HYGRASGARD® RPFTF-25

Dimensional drawing

RPFF-25 / RPFTF-25 (± 1,8 %)
(Tyr 2)



with **metal sinter filter**
and **pluggable** measuring head

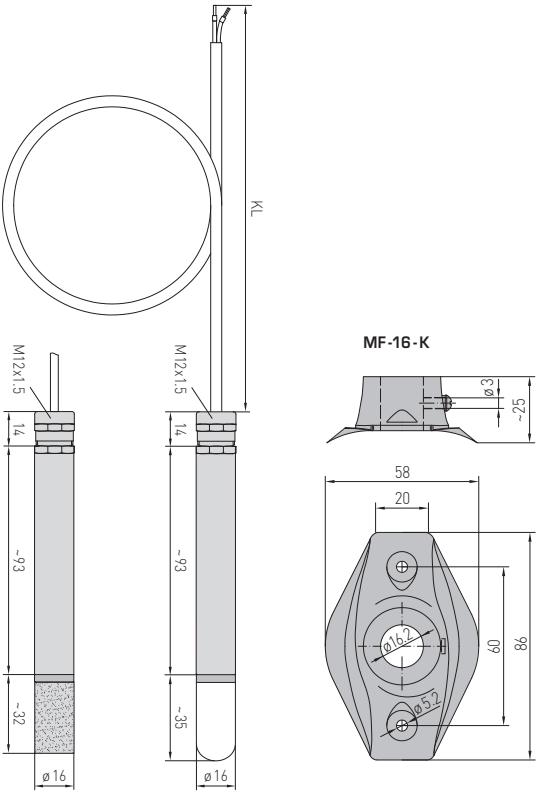


RPFF-SD

with plastic sinter filter (standard)

Dimensional drawing

RPFF-SD ($\pm 2,0\%$)



SF-M
Metal sinter filter
(optional)



MF-16-K
Mounting flange, plastic
(optional)