GRUBATEC

MESS- UND REGELTECHNIK

Operating and installation instructions

PFT series transmitters for relative humidity and temperature

combined transmitter for the HVAC sector

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1. General safety instructions

1.1 Signal words for warnings

The safety instructions in this user manual are for hazard prevention. They are located in the operating instructions before any action/work/activity is described that could potentially cause a hazard.

CAUTION	Identification of a low-risk hazard that may result in property damage or minor bodily injury.

A NOTICE	Signal word for important product information that should be highlighted in particular.

Danger word	**Type of hazard** Source of danger Hazard prevention

1.2 Pictograms and symbols used

The following symbols are used in this guide:

General hazard symbol (Danger, warning, caution)	General note

1.3 General Information

A NOTICE	This instruction manual contains information on the proper installation and operation of the PFT series and is intended exclusively for the operator and authorized personnel. Following this manual will help to avoid hazards and downtime.

2. Product description

The products in the PFT series are combined transmitters for measuring relative humidity and temperature. Features of the individual devices:

PFT22 - two analog outputs:
1. Temperature with four switchable measuring ranges
2. relative humidity

PFT25 - two analog outputs:
1. Temperature -30...+50
2. relative humidity, dew point temperature, enthalpy

Special version: Absolute humidity

PFT28 - Display
- Selectable analog output: 0/2...10 V or 0/4...20 mA
- two analog outputs:
1. Temperature -30...+50
2. relative humidity, dew point temperature, enthalpy;

Special version: Absolute humidity

For the application areas of sewer/pipe systems, indoor areas or outdoors.
For damp rooms, we offer various designs and housings.

The PFT22 / PFT25 electronics are available in either two-wire configuration with two output signals of 4...20 mA or in three-wire configuration with two outputs of 0...10 V. The supply voltage for two-wire configurations is 15...30 Vdc, while three-wire configurations require 24 Vdc or 24 Vac. The PFT28 is powered by either 15...30 Vdc or 24 Vac, and a jumper allows switching the output signals from 0/2...10 V to 0/4...20 mA.

2.1 Intended Use

The combined transmitters of the PFT series are used for measuring / transmitting signals of relative humidity and temperature in the heating, air conditioning and ventilation application area.

2.2 Functional description

For measuring relative humidity and temperature, our PFT devices are equipped with a single-chip sensor. Depending on the application, the sensor chip is located in a stainless steel probe tube or directly in an ABS plastic housing.
The sensor chip contains two sensors (a capacitive sensor for relative humidity and a semiconductor sensor for temperature), a signal amplifier, a 14-bit analog-to-digital converter, and a two-wire digital interface. The calibration data for both sensors is stored in an OTP memory, also located on the sensor chip. Signal transmission from the sensor to the evaluation electronics in the housing is handled by a [missing information - likely a specific electronic component or component

The process is digital. The sensor itself can be easily replaced, as no readjustment of the electronics is necessary after replacement.

2.3 Measured variables at output 2 for PFT25 / PFT28

Relative humidity (% RH)

Relative humidity refers to the percentage difference between the existing humidity and the maximum possible humidity at that temperature.

Dew point temperature (°C)

The dew point temperature is the temperature at which the cooling of moist air leads to condensation.

Wet-bulb temperature (°C)

The wet-bulb temperature indicates the temperature to which a thermometer exposed to a current can cool, provided it has a moist coating and radiation shielding.
is.

Enthalpy (kJ/kg)

Enthalpy (heat content) is the heat energy that the moist air has stored.
It is proportional to the temperature of the humid air and also depends on the water vapor content.

Absolute humidity (g/m³) *(optional)*

Absolute humidity is a direct measure of the amount of water vapor contained in a given volume of air. The room sensor for indoor measurements can be mounted on a wall or directly onto a flush-mounted electrical box. When mounting, ensure the sensor is positioned "at the top" (inside the housing).

3. Assembly

A mounting flange is included for installation in a duct. The outdoor sensor version is equipped with a short, double-walled sensor tube for radiation and rain protection; wall mounting is achieved using the included wall bracket.

The room sensor for indoor measurements can be mounted on a wall or directly on a flush-mounted switch box. When mounting, the sensor must be positioned "at the top" (inside the housing).

CAUTION

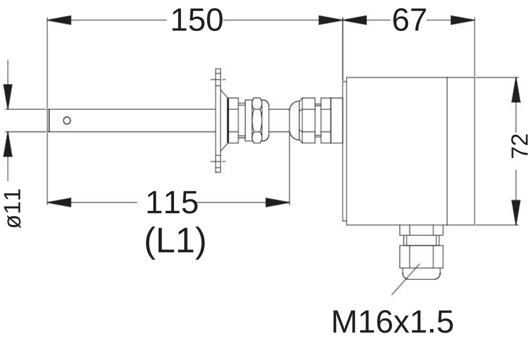
Property damage

Read the operating instructions carefully before assembly and commissioning. The device may only be connected and commissioned by experienced personnel.

3.1 Dimensions

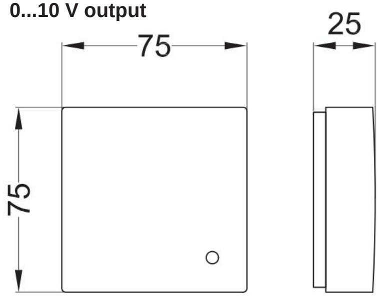
All dimensions in mm.

PFT22K / PFT25K

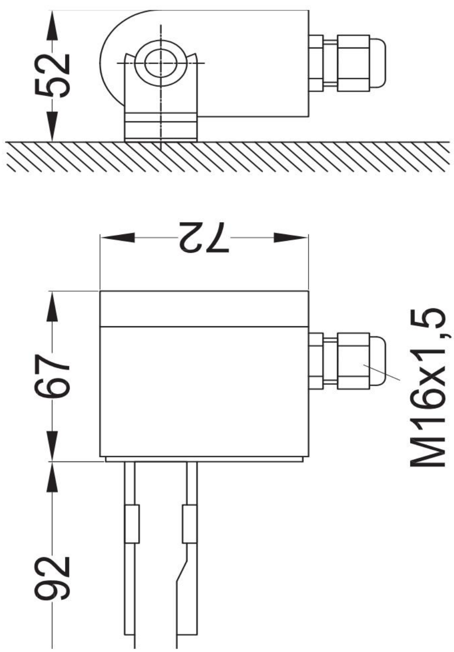


PFT22R / PFT25R with

0...10 V output

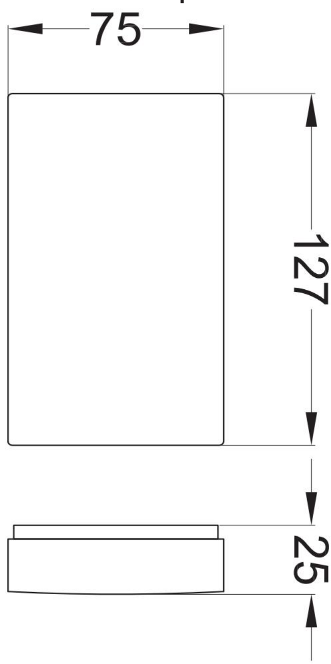


PFT22A / PFT25A

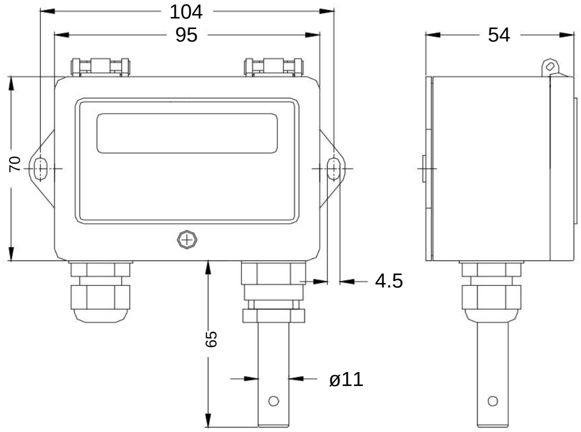


PFT22R / PFT25R

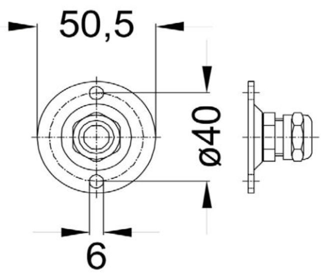
with 4...20 mA output



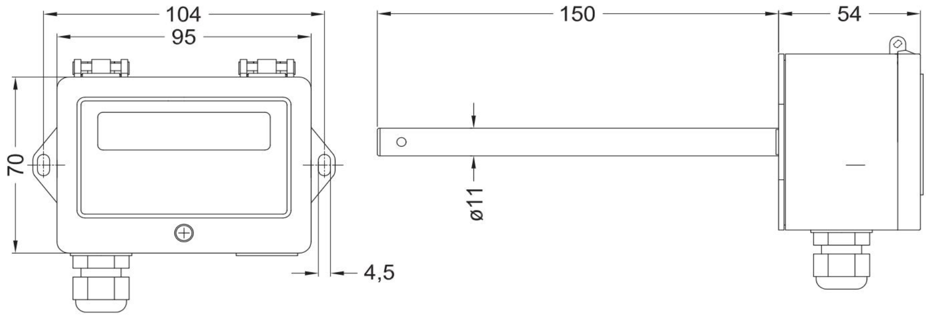
Dimensions of the PFT28R as a room sensor



Mounting flange MF-M90

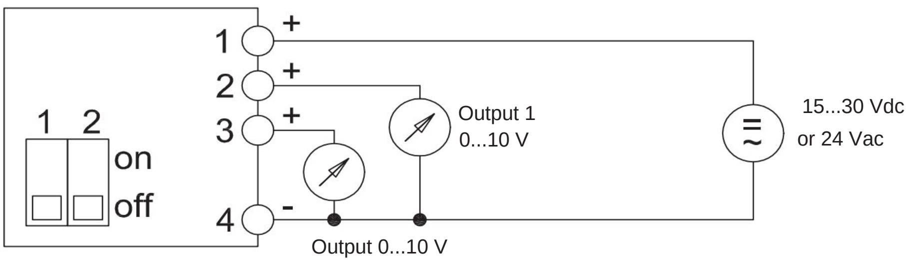


Dimensions of the PFT28K as a duct sensor

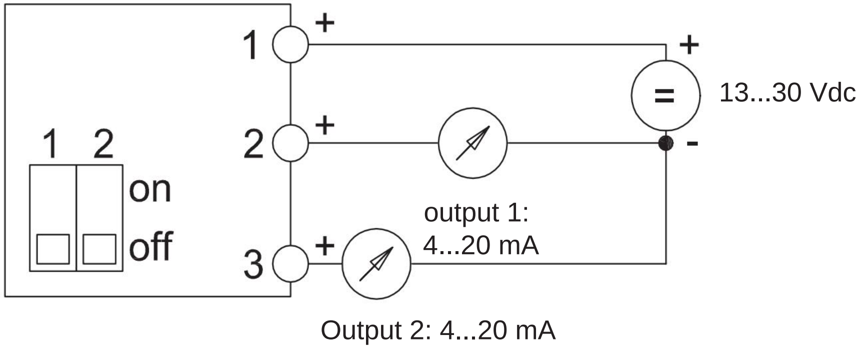


4. Electrical connection

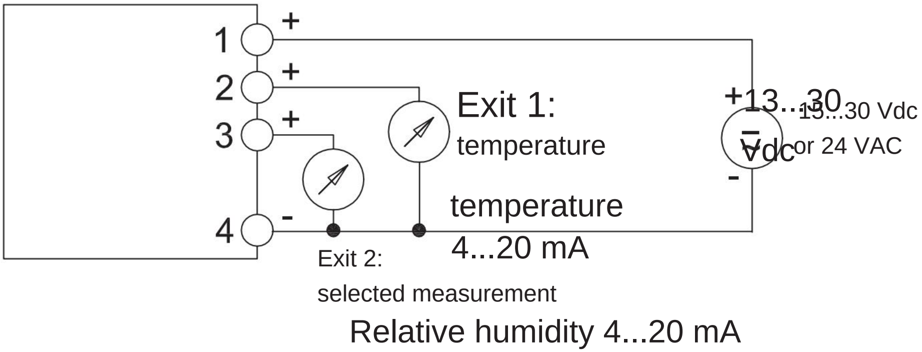
2 x voltage output PFT22 / PFT25 - 0...10 V output



2 x current output PFT22 / PFT25 - 4...20mA output



2 x voltage output PFT28



Connection terminals:

1+ 4- Supply voltage 15...30 Vdc or 24 Vac (±15%)
2+ 4- Output 1: 0/2...10 V or 0/4...20 mA
3+ 4- Output 2: 0/2...10 V or 0/4...20 mA

Output 1:
temperature

15...30 Vdc
or 24 VAC

5. Operation

5.1 Commissioning

Output 2:
selected variable

To put the device into operation, please remove the cover to access the controls. You can then use the DIP switches and jumper to make the desired settings and put the device into operation.

5.1.1 PFT28 - Selection of the measured quantity

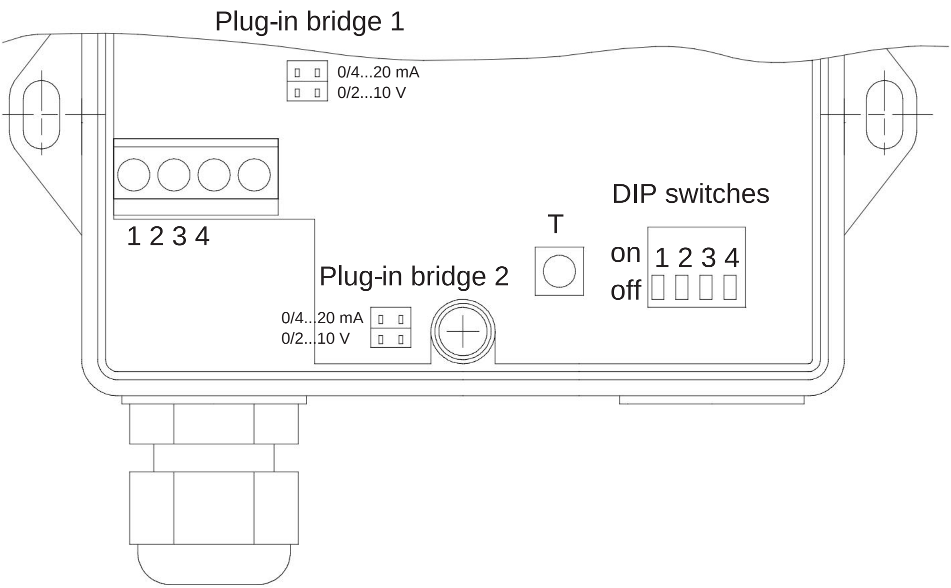
Please select the measurement parameter at output 2 using DIP switches No. 3 and 4. The selected measurement parameter will be displayed in the second line of the display.

		DIP No. 3	DIP No. 4
Measurement parameter: relative humidity	rH = 0...100 %rH =	out of	out of
Dew point temperature	-30...+50 °C td =	to	out of
wet-bulb temperature	-30...+50 °C tf E =	out of	to
Enthalpy	0...200 kJ/kg	to	to

Signal range of the analog outputs:

Voltage output: DIP No.	Current output:
1 off 0...10 V DIP No. 1 on 2...10	0...20 mA
V	4...20 mA

Selection of analog outputs: The two analog outputs can be switched from voltage (0/2...10 V) to current (0/4...20 mA) using the jumpers (see below).



Plug-in bridge 1	- Output 1 -	Plug-in bridge 2	- Output 2 -
top	0/4...20 mA -	top	0/4...20 mA -
below	0/2...10 V	below	0/2...10 V

5.1.2 PFT22 - Selection of PFT22 measured variables

Selecting the temperature measuring range at output 1

DIP switches

DIP No. 1	DIP No. 2	Measuring range:
off	off	-40...+120°C
on	off	-30...+70°C
off	on	0...+100°C
on	on	0...+50°C

Special measuring ranges are possible!

5.1.3 PFT25 - Selection of PFT25 measured variables

Selecting the temperature measuring range at output 2

DIP switches

DIP No. 1	DIP No. 2	Measurement parameter:		
off	off	relative humidity	rF	= 0...+100 %rF
on	off	Dew point temperature	td	= -30...+50 °C
off	on	wet-bulb temperature	tf	= -30...+50 °C
on	on	Enthalpy	E	= 0...+200 kJ/kg

The measurement of absolute humidity is available on request (0...50.0 g/m³).

5.2 Selection options via T key (PFT28)

The T button (see Figure 1) allows you to cycle through the different measured values on the display.

The first line always displays the temperature t (°C).

DIP switches 3 and 4 are used to select the measured value that is output to analog output 2. This measured value is displayed on the second line of the display.

Changing the DIP switches also changes the display of the second line. The T button is now used to toggle the display independently of the analog output. If the T button is held down, the measured value on the display changes every second.

1.) Relative humidity
2.) Dew point temperature
3.) Wet-bulb temperature
4.) Enthalpy

As long as the T key remains pressed, this sequence will be repeated continuously.

To confirm a measurement on the display, the T button must be released when the desired measurement is visible. Once a measurement has been selected, the displayed measurement will not change when using DIP switches No.

Buttons 3 and 4 change the analog output. The selection made by button T remains active as long as the power supply is maintained.

5.3 Protective function at high humidity (PFT28)

The PFT28 has a protective function in high humidity environments.
When the relative humidity exceeds 98% RH, an additional heating element is activated on the sensor. At this point, a relative humidity of 100% is displayed, and the measured temperature increases. Below 93% RH, the heating element switches off automatically.

6. Maintenance

The PFT series devices contain no wear parts or consumables. Maintenance is not required. Upon request, Arthur Grillo GmbH offers annual calibration with a factory certificate.

You can obtain further information from:

7. Warranty

Warranty and liability claims for personal injury and property damage are excluded if they are due to one or more of the following causes:

• Improper use of the device.
• Improper assembly, commissioning, operation, and maintenance of the device. • Unauthorized structural modifications to the device beyond its intended purpose.
For the purpose of going out.
• Improperly performed repairs.
• Disasters caused by foreign bodies and force majeure.

8. Error messages / malfunctions

Description	measure
The display shows nothing.	Check electrical connection
Incorrect measurement	Check sensor element
Errors persist	Contact manufacturer

9. Disposal

When disposing of electronic components and devices, please observe the legal regulations in the user's country regarding their disposal.

10. Technical Data

Sensor:	Single-chip sensor for relative humidity and temperature with digital signal transmission and calibration memory on the chip.	
Optional sensor protection: (Order No.: 72194)	Sensor tip on the sensor element with a filter made of sintered Bronze for protection against direct moisture and dust (filter class) CA75)	
Relative humidity:		
Resolution:	12-bit	
Characteristic curve:	linear (digital linearization)	
Response time:	approx. 4 seconds (63% of the time, slightly moving	
Long-term stability:	air) typically < 1% RH per year	
	Standard Sensor:	Sensor with tight tolerance:
Reproducibility:	±0.1% RH	±0.1% RH
Tolerance:	±3.5% RH at 30...70% RH	±2.0% RH at 10...90% RH
	±5.0% RH at 0...29% RH	±4.0% RH at 0...9% RH
	±5.0% RH at 71...100% RH	±4.0% RH at 91...100% RH

TECHNICAL DATA

~~Temperature:~~

Resolution: 14-bit

Characteristic curve: linear

Response time: approximately 20 seconds

	Standard Sensor:	~~Sensor with tight tolerance:~~
Reproducibility:	±0.1 °C	±0.1 °C
Tolerance:	±0.5 °C at 25 °C	±0.3 °C at 25 °C
	±2.0 °C at -40 °C	±1.5 °C at -40 °C
	±3.0 °C at +120 °C	±2.0 °C at +120 °C

PFT28:

Housing: Ultramid with hinged lid made of ABS

Attached sensor tube for mounting the sensor IP 54

Protection class: according to EN 60529; UL 94 HB

Mass: 95 x 70 x 54 [mm] (WxHxD)

Storage temperature: -25...+60 °C

Weight: approx. 300 g

Supply voltage: 15...30 Vdc; 24 Vac (±15 %)

Power consumption: approx. 14 mA @ 24 Vac at 0...10 V output

Display: two-line alphanumeric LCD display, 2x16 characters

Exits: 0/2...10 V or 0/4...20 mA switchable via DIP switch and jumper

Exit 1: Temperature -30...+50 °C (other measuring ranges possible)

Exit 2: four selectable measurement parameters (DIP switches):

- Relative humidity: RH = 0...100%
- Dew point temperature: tf td = -30...+50 °C
- Wet bulb temperature: = -30...+50 °C
- Enthalpy: E = 0...200 kJ/kg

Special measuring range: Absolute humidity: aF = 0...50 g/kg

Channel sensor: Stainless steel sensor tube, 11 mm Ø, mounting flange on the

Assembly: back for attachment to the duct

Temperature range: Sensor: -40...+120 °C

Electronics -10...+50 °C

Room sensor: Stainless steel sensor tube, 11 mm Ø at the front

Assembly: Wall mounting

Temperature range: Sensor: -40...+120 °C

Electronics -10...+50 °C

Cable sensor: Stainless steel sensor tube, 11 mm Ø with 2 m cable, permanently mounted

Assembly: Mounting the housing on the wall, mounting flange for the Sensor tube

EMC: Tested according to EN 61000-6-2, EN 61000-6-3, CE marking

PFT22:

Characteristic curve:	Linear (digital linearization)
Exit 1:	four selectable measuring ranges (DIP switches): -40...+120 °C; -30...+70 °C; 0...100 °C; 0...50°C
Special measuring range:	in the range of -40...+120 °C according to customer specifications Relative humidity 0...100 %rH
Exit 2:	2 x 0...10 V in three-wire circuit, four connection terminals 2 x 4...20 mA in two-wire circuit, three connection terminals
Supply voltage:	15...30 Vdc or 24 Vac in a three-wire circuit; 13...30 Vdc in two-wire technology

PFT25:

Characteristic curve:	linear
Exit 1:	Temperature -30...50 °C
Exit 2:	four selectable measurement parameters (DIP switches): • Relative humidity: RH = 0...100% • Dew point temperature: tf = td = -30...+50 °C • Wet bulb temperature: Enthalpy: -30...+50 °C • E = 0...200 kJ/kg
Special measuring range:	Absolute humidity: aF = 0...50 g/kg
Output current:	2 x 0...10 V in a three-wire circuit; 2 x 4...20 mA in two-wire technology
Supply voltage:	15...30 Vdc or 24 Vac in a three-wire circuit; 13...30 Vdc in two-wire technology

PFT versions:

Channel sensor:	Sensor tube made of stainless steel, 11 mm Ø; connection head made of ABS plastic; Cable gland M16x1.5
External sensor:	Double-walled sensor tube with wall bracket; plastic connection head ABS; cable gland M16 x 1.5
Room sensor:	Plastic housing for mounting on a flush-mounted switch box or Surface-mounted wall mounting
Cable sensor:	Stainless steel sensor tube, 11 mm Ø with 2 m cable permanently mounted; mounting flange for the sensor tube; ABS plastic connection head with wall bracket; M16 x 1.5 cable gland

10.1 CE marking

As electrical equipment, PFTs fall within the scope of Directive 2004/108/EC (EMC Directive). The following standards were applied within the framework of the EMC Directive:

DIN EN 61000-6-2:2006-03 Correction 1:2011-06	Electromagnetic compatibility (EMC) - Part 6-2: Technical standards - Immunity to interference for industrial areas
DIN EN 61000-6-3:2011-09	Electromagnetic compatibility (EMC) - Part 6-3: Technical basic standards - Interference emission for residential areas, Business and commercial sectors as well as small businesses

You can request the declaration of conformity here:

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