



HD2101.1 AND HD2101.2 HYGRO-THERMOMETERS

The **HD2101.1** and **HD2101.2** are portable instruments with a large LCD display. They measure relative humidity and temperature using a Pt100 sensor or thermocouple humidity/temperature combined probe. Temperature only is measured by immersion, penetration air or contact probes. The sensor can be a Pt100 or Pt1000.

When the humidity/temperature combined probe is connected, the instrument calculates and displays the absolute humidity, the dew point, the partial vapour pressure, the wet bulb temperature, the mixing ratio, the enthalpy and the **comfort indices**.

The probes are fitted with an automatic detection module, with the factory calibration data already stored inside.

The HD2101.2 is a **datalogger**. It stores up to 38,000 samples which can be transferred from the instrument connected to a PC via the RS232C and USB 2.0 serial ports. The storing interval, printing, and baud rate can be configured using the menu. Both models are fitted with an RS232C serial port and can transfer the acquired measurements in real time to a PC or to a portable printer.

The Max, Min and Avg function calculate the maximum, minimum or average values. Other functions include: the relative measurement REL, the HOLD function, and the automatic turning off that can also be excluded.

The instruments have IP66 protection degree.

INSTRUMENT TECHNICAL CHARACTERISTICS

Instrument

Dimensions	185x90x40mm
(Length x Width x Height)	470g (complete with batteries)
Weight	ABS, rubber
Materials	2x4½ digits plus symbols
Display	Visible area: 52x42mm

Operating conditions

Operating temperature	-5...50°C
Storage temperature	-25...65°C
Working relative humidity	0...90%RH without condensation

Protection degree IP66

Power

Batteries	4 1.5V type AA batteries
Autonomy	200 hours with 1800mAh alkaline batteries
Power absorbed with instrument off	20µA
Mains	Output mains adapter 12Vdc / 1000mA

Measuring unit

°C - °F - %RH - g/kg - g/m³ - hPa - J/g - Td
Tw - DJ - NET

Security of stored data

Unlimited, independent of battery charge conditions

Time

Date and time	In real time
Accuracy	1min/month max drift

Measured values storage - model **HD2101.2**

Type	2000 pages containing 19 samples each
Quantity	Total of 38000 samples
Storage interval	1,5,10,15,30s; 1,2,5,10,15,20,30min; 1hour

Serial interface RS232C

Type	RS232C electrically isolated
Baud rate	Can be set from 1200 to 38400 baud
Data bit	8
Parity	None
Stop bit	1
Flow Control	Xon/Xoff
Serial cable length	Max 15m
Print interval	Immediate or 1,5,10,15,30s; 1,2,5,10,15,20,30min; 1hour

USB interface - model **HD2101.2**

Type	1.1 - 2.0 electrically isolated
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Connections

Input module for the probes	8-pole male DIN45326 connector
Serial interface	8-pole MiniDin connector
USB Interface	Mini USB type B
Mains adapter	2-pole connector (positive at centre)

Measurement of relative humidity by Instrument

Measurement range	0...100%RH
Resolution	0.1%RH
Accuracy	±0.1%RH
Drift after 1 year	0.1%RH/year



Measurement of temperature by Instrument

Pt100 measurement range	-200...+650°C
Pt1000 measurement range	-200...+650°C
Resolution	0.1°C
Accuracy	±0.1°C
Drift after 1 year	0.1°C/year

Relative humidity and temperature probes using SICRAM module

Model	Temperature sensor	Working range		Accuracy	
		%RH	Temperature	%RH	Temp
HP472ACR	Pt100	0...100%RH	-20°C...+80°C	±1,5%RH (10...90%RH)	±0.3°C
HP572ACR	Thermocouple K	0...100%RH	-20°C...+80°C	±2,0%RH (in the remaining range) for T= 15...35°C	±0.5°C
HP473ACR	Pt100	0...100%RH	-20°C...+80°C	-----	±0.3°C
HP474ACR	Pt100	0...100%RH	-40°C...+150°C	-----	±0.3°C
HP475ACR	Pt100	0...100%RH	-40°C...+150°C	±(1,5+1.5% of the displayed value) %RH	±0.3°C
HP475AC1R	Pt100	0...100%RH	-40°C...+180°C	in the remaining temperature range	±0.3°C
HP477DCR	Pt100	0...100%RH	-40°C...+150°C	-----	±0.3°C
HP478ACR	Pt100	0...100%RH	-40°C...+150°C	-----	±0.3°C

Common characteristics

Relative humidity

Sensor	Capacitive
Measuring range	0÷100%RH
Temperature drift @ 20°C	Max 0.02%RH/°C
Response time %RH at constant temperature	10sec (10÷80%RH; air speed=2m/s) at constant temperature

Temperature with sensor Pt100

Temperature drift @ 20°C	0.003%/°C
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Temperature with thermocouple K - HP572ACR

Temperature drift @ 20°C	0.02%/°C
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Same specifications reported above apply for **HP480** probe (for measuring humidity of the air in pipes), with the following exceptions:

HP480		
Temperature	Measuring range	-40...+60°C
Humidity	Dew point	-40...+60°C DP
Environmental Conditions	Working temperature	-40...+60°C
	Working pressure	16bar max

TECHNICAL DATA OF PROBES AND MODULES EQUIPPED WITH INSTRUMENT
Temperature probes Pt100 sensor with SICRAM module

Model	Type	App. range	Accuracy
TP472I	Immersion	-196°C...+500°C	±0.25°C (-196°C...+300°C) ±0.5°C (+300°C...+500°C)
TP472I.0 <i>1/3DIN - Thin film</i>	Immersion	-50°C...+300°C	±0.25°C
TP473P.I	Penetration	-50°C...+400°C	±0.25°C (-50°C...+300°C) ±0.5°C (+300°C...+400°C)
TP473P.0 <i>1/3DIN - Thin film</i>	Penetration	-50°C...+300°C	±0.25°C
TP474C.I	Contact	-50°C...+400°C	±0.3°C (-50°C...+300°C) ±0.5°C (+300°C...+400°C)
TP474C.0 <i>1/3DIN - Thin film</i>	Contact	-50°C...+300°C	±0.3°C
TP475A.0 <i>1/3DIN - Thin film</i>	Air	-50°C...+250°C	±0.3°C
TP472I.5	Penetration	-50°C...+400°C	±0.3°C (-50°C...+300°C) ±0.6°C (+300°C...+400°C)
TP472I.10	Penetration	-50°C...+400°C	±0.30°C (-50°C...+300°C) ±0.6°C (+300°C...+400°C)
TP49A.0 <i>Class A - Thin film</i>	Immersion	-70°C...+250°C	±0.3°C (-70°C...-50°C) ±0.25°C (-50°C...+250°C)
TP49AC.0 <i>Class A - Thin film</i>	Contact	-70°C...+250°C	±0.3°C (-70°C...-50°C) ±0.25°C (-50°C...+250°C)
TP49AP.0 <i>Class A - Thin film</i>	Penetration	-70°C...+250°C	±0.3°C (-70°C...-50°C) ±0.25°C (-50°C...+250°C)
TP875.I	Globethermometer Ø150mm	-30°C...+120°C	±0.25°C
TP876.I	Globethermometer Ø 50mm	-30°C...+120°C	±0.25°C
TP87.0 <i>1/3DIN - Thin film</i>	Immersion	-50°C...+200°C	±0.25°C
TP878.0 <i>1/3DIN - Thin film</i> TP878.1.0 <i>1/3DIN - Thin film</i>	For solar panel	+4°C...+85°C	±0.25°C
TP879.0 <i>1/3DIN - Thin film</i>	For compost	-20°C...+120°C	±0.25°C

Common characteristics

Temperature drift @ 20°C	0.003%/°C
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4 wire Pt100 and 2 wire Pt1000 Probes

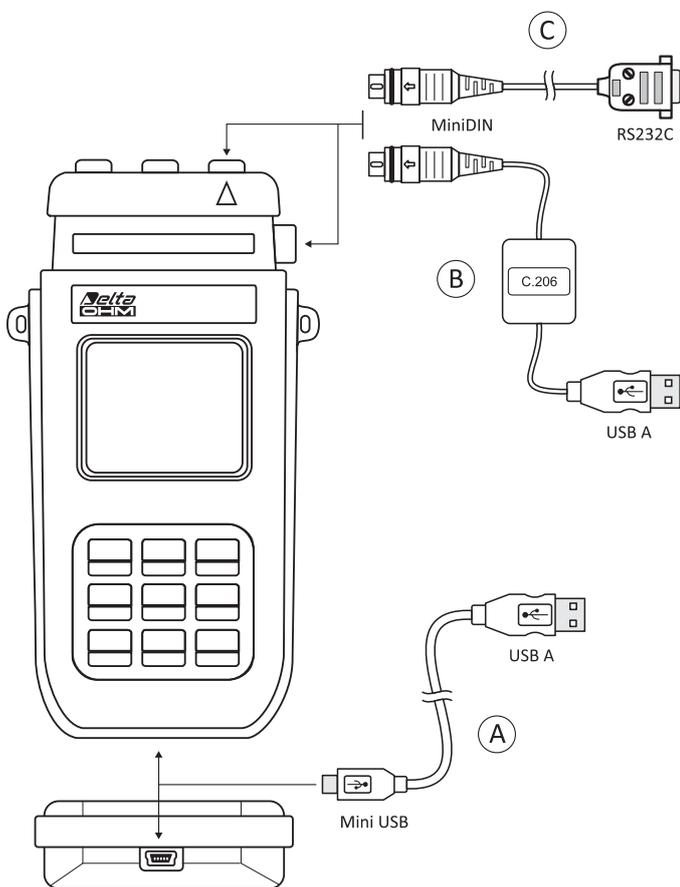
Model	Type	Application range	Accuracy
TP47.100.0 <i>1/3DIN - Thin film</i>	Pt100 4 wires	-50...+250°C	1/3DIN
TP47.1000.0 <i>1/3DIN - Thin film</i>	Pt1000 2 wires	-50...+250°C	1/3DIN
TP87.100.0 <i>1/3DIN - Thin film</i>	Pt100 4 wires	-50...+200°C	1/3DIN
TP87.1000.0 <i>1/3DIN - Thin film</i>	Pt1000 2 wires	-50...+200°C	1/3DIN

Common characteristics

Temperature drift @ 20°C	
Pt100	0.003%/°C
Pt1000	0.005%/°C



Humidity



A All models of the portable data logger series **HD21 2** have been implemented with a new serial miniUSB port type HID (Human Interface Device). To connect to the PC with the USB cable Type A - Mini USB B-type code CP23, **it is not required to install any USB drivers.**

B For connecting the **HD21..1** models to the USB port of a PC, USB/serial converter **C.206** is available.

The converter is provided with its own drivers that have to be installed before connecting to the PC. (see the details in the CDRom provided with the converter).

C All models are fitted with a serial RS232C port using MiniDIN connector. It can be used for connecting to a RS232C serial port of a PC or to the HD40.1 portable printer with the cable HD2110CSNM.

ORDER CODES

HD2101.1: The kit is composed of the instrument HD2101.1, 4 1.5V alkaline batteries, operating manual, case and DeltaLog9 software. **Probes and cable must be ordered separately.**

HD2101.2: The kit is composed of the HD2101.2 datalogger, 4 1.5V alkaline batteries, operating manual, case and DeltaLog9 software. **The probes and cable must be ordered separately.**

HD2110CSNM: 8-pole connection cable MiniDin - Sub D 9-pole female for RS232C.

C.206: Cable for instruments series HD21..1 to connect directly to the USB Input of a PC.

CP23: Connection cable USB 2.0 connector type A - Mini USB type B

DeltaLog9: Software for download and management of the data on PC using Windows operating systems.

SWD10: Stabilized power supply at 230Vac/12Vdc-1000mA mains voltage.

HD40.1: Portable, serial input, 24 column thermal printer, 58mm paper width. It uses the cable HD2110 CSNM (optional).

Relative humidity and temperature probes complete with SICRAM module

HP472ACR: %RH and temperature combined probe, dimensions \varnothing 26x170 mm. 2 m connecting cable.

HP572ACR: %RH and temperature combined probe, **K thermocouple sensor.** Dimensions \varnothing 26x170 mm. 2 m connecting cable.

HP473ACR: %RH and temperature combined probe. Dimensions: handle \varnothing 26x130 mm, probe \varnothing 14x120 mm. 2m connecting cable.

HP474ACR: %RH and temperature combined probe. Dimensions: handle \varnothing 26x130 mm, probe \varnothing 14x215 mm. 2m connecting cable.

HP475ACR: %RH and temperature combined probe. 2 m connecting cable. Handle \varnothing 26x110 mm. Stainless-steel tube \varnothing 12x560 mm. Terminal tip \varnothing 14x75 mm.

HP475AC1R: %RH and temperature combined probe. 2 m connection cable. Handle \varnothing 26x80 mm. Stainless steel stem \varnothing 14x480 mm.

HP477DCR: %RH and temperature combined sword probe. 2 m connecting cable. Handle \varnothing 26x110 mm. Probe tube 18x4 mm, length 520 mm.

HP478ACR: %RH and temperature combined probe. Dimensions \varnothing 14x130 mm. 5m connection cable.

HP480: Probe for the measurement of air humidity in pipes. 2m connecting cable. 1/4" Italian Standard quick coupling. AISI 304 measuring chamber.

Temperature probes complete with SICRAM module

TP472I: Wire wound Pt100 sensor, immersion probe. Stem \varnothing 3 mm, length 300 mm. Cable length 2 m.

TP472I.0: Thin film Pt100 sensor, immersion probe. Stem \varnothing 3 mm, length 230 mm. Cable length 2 m.

TP473P.I: Wire wound Pt100 sensor, penetration probe. Stem \varnothing 4mm, length 150 mm. Cable length 2 m.

TP473P.0: Thin film Pt100 sensor, penetration probe. Stem \varnothing 4mm, length 150 mm. Cable length 2 m.

TP474C.I: Wire wound Pt100 sensor, contact probe. Stem \varnothing 4mm, length 230mm, contact surface \varnothing 5mm. Cable length 2 m.

TP474C.0: Thin film Pt100 sensor, contact probe. Stem \varnothing 4mm, length 230mm, contact surface \varnothing 5mm. Cable length 2 m.

TP475A.0: Thin film Pt100 sensor, air probe. Stem \varnothing 4mm, length 230mm. Cable length 2 m.

TP472I.5: Thin film Pt100 sensor, penetration probe. Stem \varnothing 6mm, length 500 mm. Cable length 2 m.

TP472I.10: Thin film Pt100 sensor, penetration probe. Stem \varnothing 6mm, length 1000mm. Cable length 2 m.

TP49A.0: Thin film Pt100 sensor, immersion probe. Stem \varnothing 2,7mm, length 150mm. Cable length 2 m. Aluminium handle

TP49AC.0: Thin film Pt100 sensor, contact probe. Stem \varnothing 4mm, length 150mm. Cable length 2 m. Aluminium handle

TP49AP.0: Thin film Pt100 sensor, penetration probe. Stem \varnothing 2,7mm, length 150mm. Cable length 2 m. Aluminium handle

TP875.I: Wire wound Pt100 sensor, 150mm diameter globe-thermometer equipped with handle. Cable length 2 m.

TP876.I: Wire wound Pt100 sensor, 50mm diameter globe-thermometer equipped with handle. Cable length 2 m.

TP87.0: Thin film Pt100 sensor, immersion probe. Stem \varnothing 3 mm, length 70 mm. Cable length 2 m.

TP878.0: Thin film Pt100 sensor, contact probe for solar panels. Cable length 2 m.

TP878.1.0: Thin film Pt100 sensor, contact probe for solar panels. Cable length 5 m.

TP879.0: Thin film Pt100 sensor , penetration probe for compost. Stem \varnothing 8mm, length 1000mm. Cable length 2m.

Temperature probes without SICRAM module

TP47.100.0: Thin film Pt100 sensor, immersion probe. Stem \varnothing 3mm, length 230mm. Connection cable 4 wires with connector, length 2 m.

TP47.1000.0: Thin film Pt1000 sensor, immersion probe. Probe's Stem \varnothing 3mm, length 230mm. Connection cable 2 wires with connector, length 2 m.

TP47: Module for the connection of Pt100 4-wire and Pt1000 2-wire probes.

TP87.100.0: Thin film Pt100 sensor, immersion probe. Stem \varnothing 3mm, length 70mm. 4-wires connection cable with connector, length 1 m.

TP87.1000.0: Thin film Pt1000 sensor, immersion probe. Stem \varnothing 3mm, length 70mm. 2-wires connection cable with connector, length 1 m.

Accessories

HD33: Saturated solution at 33.0%RH@20°C for calibration of relative humidity probes, fixing adapter M24x1.5, M12x1.

HD75: Saturated solution at 75.4%RH@20°C for calibration of relative humidity probes, fixing adapter M24x1.5, M12x1.

Protection for humidity probes Ø 26 M24x1,5

- P1:** Stainless steel 200µ grid protection for probes Ø 26 mm.
- P2:** 20µ sintered polyethylene PE protection for probes Ø 26 mm.
- P3:** 20µ sintered bronze protection for probes Ø 26 mm.
- P4:** 20µ sintered PE complete cap for probes Ø 26 mm.

Protection for humidity probes Ø 14 M12x1

- P6:** 10µm sintered complete protection made of AISI 316 stainless steel for probes Ø 14 mm.
- P7:** 20µm sintered complete protection made of PTFE for probes Ø 14 mm.
- P8:** 20µm stainless steel grid and Poca protection for probes Ø 14 mm.

HP480 - T480.1 - S.TC2.480.2 PROBES FOR THE MEASUREMENT OF THE DEW POINT IN COMPRESSED AIR SYSTEMS

Compressed air is used for several purposes, many of which require compressed air with low a humidity level, and so comes the need to know the dew point (Dew Point - DP) of water vapour in the compressed air that circulates in the system. The **HP480**, **T480.1** and **S.TC2.480.2** probes are designed specifically for this purpose.

The use of dew point measurement in order to limit moisture in compressed air distribution systems has many advantages:

- prevents corrosion of metal pipes;
- in cold areas, prevents the formation of ice inside the pipes leading to obstruction of the pipes themselves;
- prevents bacterial growth in plants for medical use
- reduces maintenance costs of pneumatic drives, maintaining the proper lubrication of moving parts;
- improves the quality of products coming into contact with air, for example in the drying process of granulates.

The probes can be installed in any position. The connection to the compressed air can be achieved with a threaded connection or with a quick connection.

The connection allows for quick installation and removal of the probe without stopping the system. There are 3 different couplings supplied: 1/4" Italian, German, and American standard.

All models are equipped with a filter made of sintered steel, stainless steel measuring chamber and control valve of the air flow.

Suitable for measurement of compressed air with dew point up to class 3 according to standard ISO8573-1.

The probes are available for different instruments that can be connected:

HP480: Interchangeable probe with SICRAM module. Can be connected to any of the portable instruments **HD2101.1**, **HD2101.2**, **HD2301.0**, **D02003** and **D09847**.

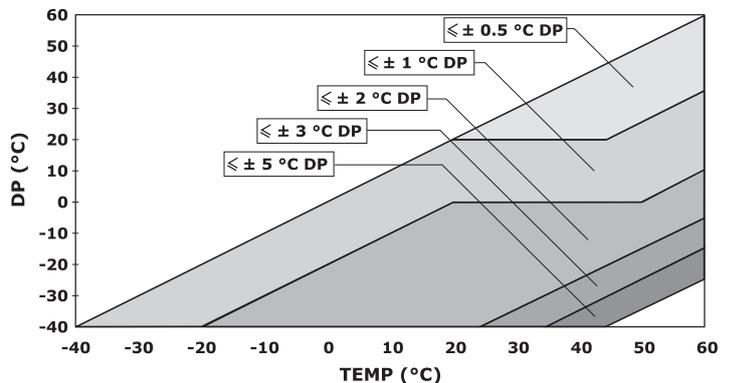
T480.1: Probe **connected directly to the instrument**. It is used with the transmitters for humidity and temperature of the series and **HD4977T..** and **HD4877T ...**

S.TC2.480.2: Interchangeable probe with **SICRAM 2** module. It can be connected to the transmitters of the series **HD2817T..** and **HD2717T...**

SPECIFICATIONS

Relative humidity	
Sensor	capacitive
Measuring range	0...100%RH
Accuracy (@ T = 15...35 °C)	± 1,5%RH (0..90%RH), ± 2%RH (remaining field)
Accuracy (@ T = -40...+60 °C)	± (1,5 + 1,5% of the measured value)%RH
Long term stability	< 1%RH/year
Temperature	
Sensor	Pt100
Measuring range	-40...+60 °C
Accuracy	± 0,25 °C
Dew point	
Sensor	Parameter calculated from the measurement of temperature and relative humidity
Measuring range	-40...+60 °C DP
Accuracy (@ T = 20 °C)	± 2 °C DP (-40...-20 °C DP) ± 1,5 °C DP (-20...0 °C DP) ± 1 °C DP (0...+20 °C DP) ± 0,5 °C DP (+20...+60 °C DP)
Accuracy (@ T = -40...+60 °C)	See graph 1
General features	
Regulation of the air flow	From 0,2 to 3 l/min
Cable length	2m
Filter	Sintered 15µ AISI 316 steel
Material of the measuring chamber	AISI 304 stainless steel
Operating temperature of the probe	-40...+80 °C
Operating pressure of the probe	Up to 16 bar
Protection degree	IP65

Humidity



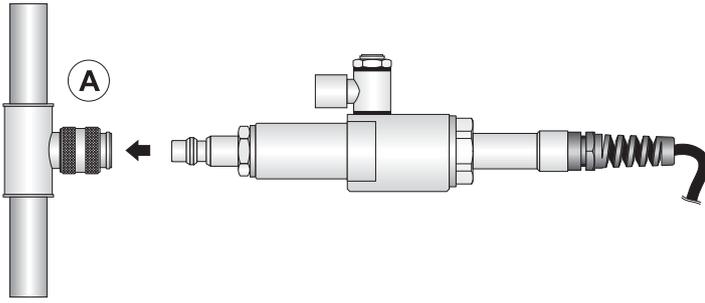
Graph 1: accuracy of the dew point measurement (DP)

INSTALLATION

The probe can be connected to the compressed air in three ways:

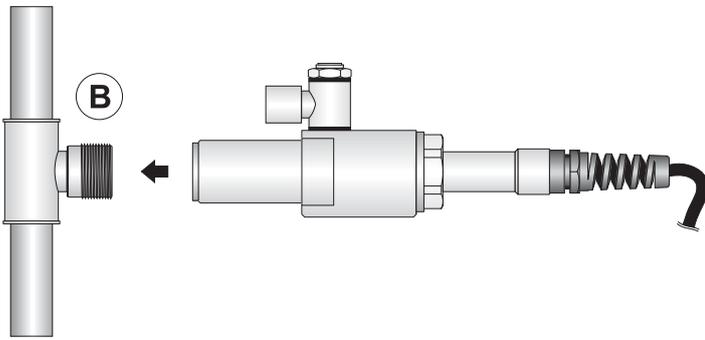
- A.** by using the measuring chamber with a quick coupling;
- B.** by using the measuring chamber with a threaded G 1/4" connection;
- C.** directly (without measuring chamber) with a threaded G 1/2" connection.

Connection with measuring chamber and quick coupling:



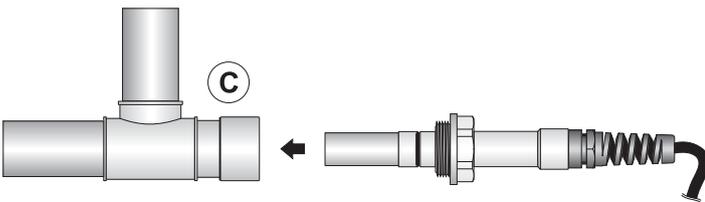
To connect with quick coupling, you can use one of the standard 1/4" couplings provided. Other couplings than those supplied can be used, provided that they have a G 1/4" thread on the side that fits into the probe.

Connection with measuring chamber and threaded connection:



For the connection by treaded coupling, the connection must have an external G 1/4" thread on the side which will be placed in the probe. The connection must be airtight. When installing or removing the probe, it is necessary to depressurize the system.

Direct connection (without measuring chamber) and threaded connection:

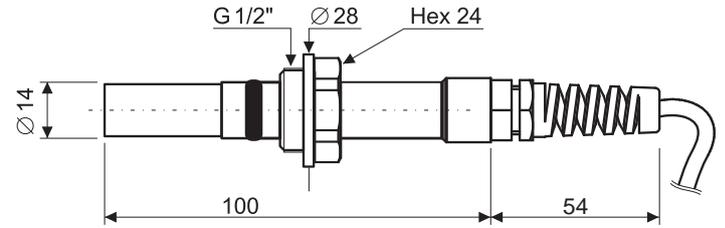


For direct connection of the probe, use a fitting with internal G 1/2" thread on the side which will be placed in the probe. The connection must be airtight. When installing or removing the probe, it is necessary to depressurize the system. Ensure that the probe does not obstruct the normal flow of air through the distribution line.

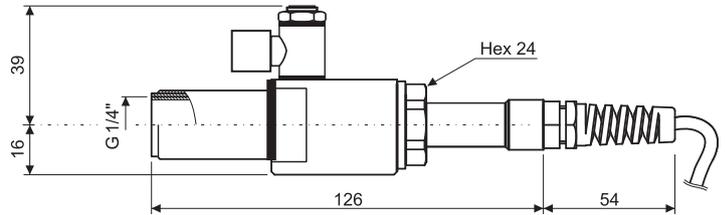
In all modes of installation, it is recommended that you place in the plant, upstream of the sensor, a safety valve to be closed manually in case of maintenance of the probe. Periodically check the cleanliness of the sintered filter of the probe, in order to maintain optimum response characteristics of the probe. The filter can be washed with a detergent that leaves no traces.

DIMENSIONS

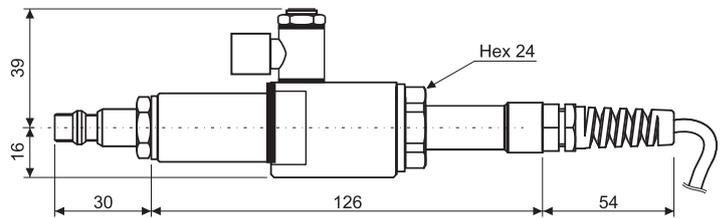
Dimensions (mm) of the probe without measuring chamber:



Dimensions (mm) of the probe with measuring chamber, without quick coupling:



Dimensions (mm) of the probe with measuring chamber and quick coupling:



ORDERING CODES:

HP480: Interchangeable temperature and humidity probe, complete with **SICRAM** module. Connection cable 2m. Equipped with 15µ sintered AISI 316 stainless steel filter, measuring chamber, air flow regulation valve, and three 1/4" quick couplings (standard Italian, German, and American). For portable instruments **HD2101.1**, **HD2101.2**, **HD2301.0**, **D02003** and **D09847**.

T480.1: Humidity and temperature probe, **connected directly to the instrument**. Connection cable 2m. Equipped with 15µ sintered AISI 316 stainless steel filter, measuring chamber, air flow regulation valve, and three 1/4" quick couplings (standard Italian, German, and American). For humidity and temperature transmitters of the series **HD4877T...** and **HD4977T...**

S.TC2.480.2: Interchangeable humidity and temperature probe, complete with **SICRAM 2** module. Connection cable 2m. Equipped with 15µ sintered AISI 316 stainless steel filter, measuring chamber, air flow regulation valve, and three 1/4" quick couplings (standard Italian, German, and American). For the transmitters of the series **HD2717T...** and **HD2817T...**