HD 4807T… HD 4907T…
HD 48V07T… HD 4901T...
HD 4801T... HD 4917T...
HD 48V01T... HD 4977T...
HD 4817T...
HD 48V17T...
HD 4877T...
HD 48V77T...

HD 4807T…, HD 48V07T…, HD 48S07T…, HD 4801T...,
HD 48V01T..., HD 4817T..., HD 48V17T..., HD 4877T... HD 48V77T...,
HD 4907T…, HD 4901T..., HD 4917T..., HD 4977T...
PASSIVE OR ACTIVE TEMPERATURE, RELATIVE HUMIDITY, RELATIVE HUMIDITY AND TEMPERATURE, TEMPERATURE AND DEW POINT TRANSMITTERS

HD48.. and HD49.. series of transmitters measure temperature, relative humidity and dew point. Versions with only standard analog output or with only RS485 output with **MODBUS-RTU** protocol are available. The models with analog output provide a signal suitable for transmission to a remote display, recorder or PLC. The models with RS485 output are suitable for connection to a PC or PLC.

The models of the HD48.. series are active transmitters and accept both direct and 24Vac alternating power supply; they have standard current (4…20mA) or voltage (0…10V) outputs, or a serial RS485 output, depending on the model. **The models of the HD49.. series are passive transmitters** instead, and thus suitable to be inserted in a 4…20mA current loop.

The HD48.. and HD49.. series of transmitters are designed for temperature and humidity control in conditioning and ventilation applications (HVAC/BEMS) in the following sectors: pharmacy, museums, clean rooms, ventilation ducts, industrial and civil sectors, crowded places, canteens, auditoria, gyms, high-density farms, greenhouses, etc.

The HD48.. and HD49.. transmitters measure relative humidity with a well proven temperature compensated capacitive sensor that assures precise and reliable measurements in the course of time. The transmitters of the HD48.. and HD49.. series are available in two probe temperature ranges:

standard -20…+80°C and extended -40…+150°C for the most critical applications. A stainless steel 20µm filter protects the sensors against dust and particles (other filters are available for different applications).

The transmitters are factory calibrated and no further adjustments are required.

Each series is available in three different versions: with horizontal probe for duct mounting (HD48...TO..., HD49…TO…), with vertical probe for wall mounting (HD48...TV..., HD49…TV…) or with remote probe connected to the transmitter by means of a cable (HD48...TC..., HD49…TC…), cable lengths available are 2, 5 and 10m or for the measure of compressed air in pipelines (HD48…T480, HD49…T480).

The probes can be supplied in two different lengths (135mm or 335mm).

Various accessories are available for the installation: for example to fix the probe to the duct, it can be used the HD9008.31 flange, a 3/8" universal biconical connection or a PG16 metal cable gland (⌀10…14mm). A 4-digit optional LCD ("L" model) allows to display the measured parameters in a continuous or sequential mode.

Technical specifications

	STANDARD RANGE	EXTENDED RANGE
Relative Humidity		
Sensor	Capacitive	
Measuring range	0…100%RH	
Accuracy @ T = 15..35°C	±1.5%UR (0..90%RH), ±2.0 % RH (90…100%RH)	
Accuracy @ rest of T range	±(1.5+1,5% of the measure)%RH	
Repeatability	0.4%RH	
Sensor working temperature	-20…+80°C	-40…+150°C
Temperature		
Measuring range	-20…+80°C	-40…+150°C
Sensor	NTC 10kΩ	Pt100 class A
Accuracy	±0.3°C (0..+70°C) ±0.4°C (-20..0°C, +70..+80°C)	±0.3°C
Repeatability	0.05°C	0.05°C
Dew Point		
Sensor	Parameter calculated from relative humidity and temperature	
Measuring range	-20…+80°C DP	
Accuracy	See table TAB.1 below	
Repeatability	0.5°C DP	
Output type (depending on model)		
Models HD4807T..	Temperature	4…20mA (-20...+80°C), R_L < 500Ω 22mA outside the measuring range
Models HD4807ET..	Temperature	4…20mA (-40...+150°C), R_L < 500Ω 22mA outside the measuring range
Models HD48V07T..	Temperature	0…10Vdc (-20...+80°C), R_L > 10kΩ 11Vdc outside the measuring range
Models HD48V07ET..	Temperature	0…10Vdc (-40...+150°C), R_L > 10kΩ 11Vdc outside the measuring range
Models HD48S07T.. HD48S07ET..	Temperature	Only RS485 with MODBUS-RTU protocol
Models HD4907T..	Temperature	4…20mA (-20...+80°C), R_LMax = (Vdc-12)/0,022 22mA outside the measuring range
Models HD4907ET..	Temperature	4…20mA (-40...+150°C), R_LMax = (Vdc-12)/0,022 22mA outside the measuring range
Models HD4801T.. HD4801ET..	Relative Humidity	4…20mA (0...100%RH), R_L < 500Ω 22mA outside the measuring range
Models HD48V01T.. HD48V01ET..	Relative Humidity	0…10Vdc (0...100%RH), R_L > 10kΩ 11Vdc outside the measuring range
Models HD48S01T.. HD48S01ET..	Relative Humidity	Only RS485 with MODBUS-RTU protocol
Model HD4901T.. HD4901ET..	Relative Humidity	4…20mA (0...100%RH), R_LMax = (Vdc-12)/0.022 22mA outside the measuring range
Models HD4817T..	Relative Humidity	4…20mA (0...100%RH), R_L < 500Ω 22mA outside the measuring range
	Temperature	4...20mA (-20...+80°C), R_L < 500Ω 22mA outside the measuring range
Models HD4817TV..	Relative Humidity	4…20mA (0...100%RH), R_L < 500Ω 22mA outside the measuring range
	Temperature	4...20mA (0...+60°C), R_L < 500Ω 22mA outside the measuring range
Models HD4817ET..	Relative Humidity	4…20mA (0...100%RH), R_L < 500Ω 22mA outside the measuring range
	Temperature	4...20mA (-40...+150°C), R_L < 500Ω 22mA outside the measuring range
Models HD48V17T..	Relative Humidity	0…10Vdc (0...100%RH), R_L > 10kΩ 11Vdc outside the measuring range
	Temperature	0…10Vdc (-20...+80°C), R_L > 10kΩ 11Vdc outside the measuring range
Models HD48V17ET..	Relative Humidity	0…10Vdc (0...100%RH), R_L > 10kΩ 11Vdc outside the measuring range
	Temperature	0…10Vdc (-40...+150°C), R_L > 10kΩ 11Vdc outside the measuring range
Models HD48S17T.. HD48S17ET..	Relative Humidity Temperature	Only RS485 with MODBUS-RTU protocol
Models HD4917T..	Relative Humidity	4…20mA (0...100%RH), R_LMax = (Vdc-12)/0.022 22mA outside the measuring range
	Temperature	4...20mA (-20...+80°C), R_LMax = (Vdc-12)/0.022 22mA outside the measuring range
Models HD4917TV..	Relative Humidity	4…20mA (0...100%RH), R_LMax = (Vdc-12)/0.022 22mA outside the measuring range
	Temperature	4...20mA (0...+60°C), R_LMax = (Vdc-12)/0.022 22mA outside the measuring range
Models HD4917ET..	Relative Humidity	4…20mA (0...100%RH), R_LMax = (Vdc-12)/0.022 22mA outside the measuring range
	Temperature	4...20mA (-40...+150°C), R_L Max = (Vdc-12)/0.022 22mA outside the measuring range
Models HD4877T..	Dew Point	4...20mA (-20...+80°C DP), R_L < 500Ω 22mA outside the measuring range
	Temperature	4...20mA (-20...+80°C), R_L < 500Ω 22mA outside the measuring range
Models HD48V77T..	Dew Point	0…10Vdc (-20...+80°C DP), R_L > 10kΩ 11Vdc outside the measuring range
	Temperature	0…10Vdc (-20...+80°C), R_L > 10kΩ 11Vdc outside the measuring range
Models HD48S77T..	Dew Point Temperature	Only RS485 with MODBUS-RTU protocol
Models HD4977T..	Dew Point	4...20mA (-20...+80°C DP), R_LMax = (Vdc-12)/0.022 22mA outside the measuring range
	Temperature	4...20mA (-20...+80°C), R_LMax = (Vdc-12)/0.022 22mA outside the measuring range
Models HD4877T480	Dew Point	4...20mA (-40...+60°C DP), R_L< 500Ω 22mA outside the measuring range
	Temperature	4...20mA (-40...+60°C), R_L< 500Ω 22mA outside the measuring range

Models HD48V77T480	Dew Point	0…10Vdc (-40...+60°C DP), R_L > 10kΩ 11Vdc outside the measuring range
	Temperature	0…10Vdc (-40...+60°C), R_L > 10kΩ 11Vdc outside the measuring range
Models HD48S77T480	Dew Point	Only RS485 with MODBUS-RTU protocol
	Temperature	
Models HD4977T480	Dew Point	4...20mA (-40...+60°C DP), R_LMax = (Vdc-12)/0.022 22mA outside the measuring range
	Temperature	4...20mA (-40...+60°C), R_LMax = (Vdc-12)/0.022 22mA outside the measuring range

Power supply and connections		
	HD48..	HD49..
Power supply	16...40Vdc or 24 Vac ±10%	12...40Vdc
Electrical connections	Screw type terminal block, max 1,5mm², M16 cable gland for input cable	
General specifications		
.. TV probe working temperature	0...+60°C	
…TO, …TC probe working temperature	STANDARD RANGE	EXTENDED RANGE
	-20…+100°C	-40…+150°C
T480 working temperature	-40...+60°C	
Storage temperature	-20…+80°C	
electronics protection class	IP66	
Case dimensions	80x84x44	

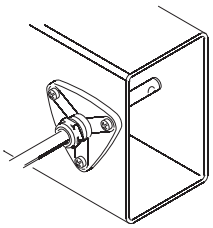
TAB.1 - Accuracy of dew point measurement:

Temperature °C \ DP °C	-20	-10	0	10	20	30	40	60	80
-20	≤±1								
-10	≤±1	≤±1							
0	≤±1	≤±1	≤±1						
10	≤±3	≤±1	≤±1	≤±1	DP LIMIT				
20	≤±4	≤±2	≤±1	≤±1	≤±1				
30		≤±3	≤±1,5	≤±1	≤±1	≤±1			
40				≤±2	≤±1	≤±1	≤±1		
60	NOT SPECIFIED			≤±5	≤±2,5	≤±2	≤±1	≤±1	
80						≤±4	≤±2	≤±1	≤±1

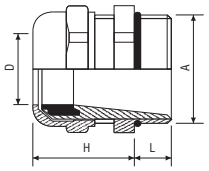
For example at 20°C a Dew Point value of 0°C DP is measured with an accuracy better than 1°C DP.

Installation notes

To fix the probe inside a ventilation duct, a pipe, etc., use for example the HD9008.31 flange, a PG16 metal cable gland (Ø10…14mm) or a 3/8" universal biconical connection.



HD9008.31 Flange



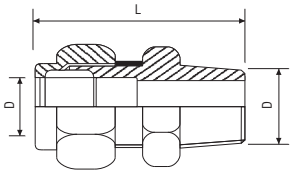
PG16 metal cable gland

D = 10…14mm

L = 6.5mm

H = 23mm

A = PG16



Universal biconical connector

L = 35mm

D = 14mm

A = 3/8"

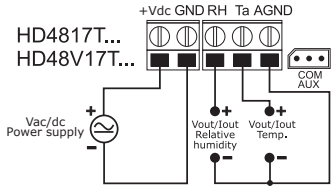
Electrical connections

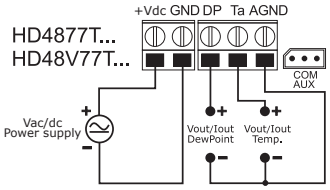
HD48.. series with analog output

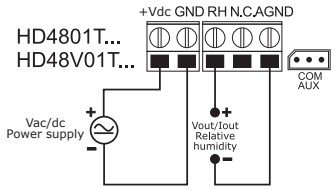
Power the instrument as shown in the below connection schemes, the power supply terminals are marked as +Vcc and GND.

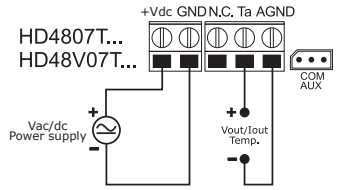
Depending on the model, the output signal is available between:

- Ta and AGND terminals for the transmitters of the HD4807T.. and HD48V07T.. series
- RH% and AGND terminals for the transmitters of the HD4801T.. and HD48V01T.. series
- RH% and AGND, Ta and AGND terminals for the transmitters of the HD4817T.. and HD48V17T.. series
- DP and AGND, Ta and AGND terminals for the transmitters of the HD4877T.. and HD48V77T.. series.



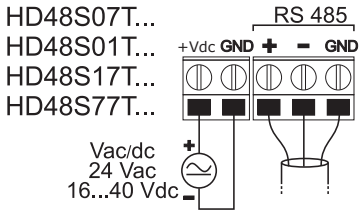




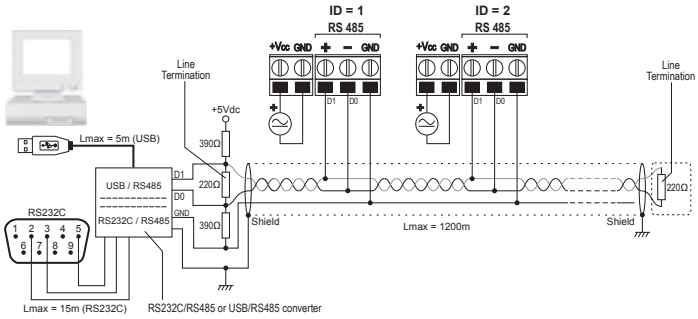


HD48.. series with RS485 output

Connect the instrument as shown in the below connection schemes, the power supply terminals are marked as +Vcc and GND.

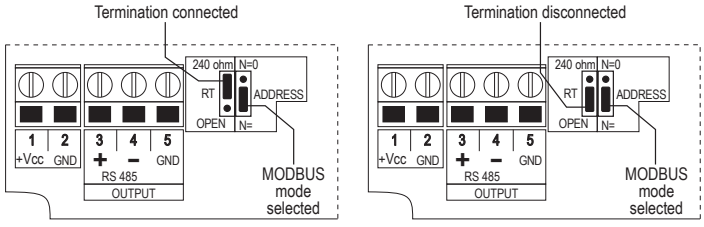


Thanks to RS485 output, several instruments can be connected to form a network, consisting of a minimum of 1 instrument to a maximum of **247**, connected in a sequence through a shielded cable with twisted pair for signals and a third wire for the common.



Line termination must be set at the two network ends. To polarize the line during nontransmission periods, resistors are connected between signal and power supply lines.

The maximum number of devices that can be connected to the (Bus) line RS485 depends on the load characteristics of the devices to be connected. The standard RS485 requires that the total load does not exceed 32 Unit Loads. The load of a HD48S.. transmitter is equal to ¼ of the unit load. If the total load is more than 32 unit loads, divide the net in segments and insert a signal repeater between one segment and the next one. At the beginning and at the end of each segment a line termination must be connected. The instrument has a built in line termination that can be connected or removed through a short jumper placed next to the terminal block. If the instrument is the last or the fi rst device of a network group, connect the termination placing the short jumper between the "RT" and "240 ohm" indications. If the instrument is not at the end of a network group, remove the termination placing the short jumper between the "RT" and "OPEN" indications.



The cable shield must be connected to both line ends. The cable should have the following features:

- Characteristic impedance: 120 ohm
- Capacity: less than 50pF/m
- Resistance: less than 100 ohm/km
- gauge: 0,22 mm² (AWG24) at least

The cable maximum length depends on baud rate and cable characteristics. Typically, the maximum length is 1200m. The data line must be kept separated from any power lines in order to prevent interferences on the transmitted signal.

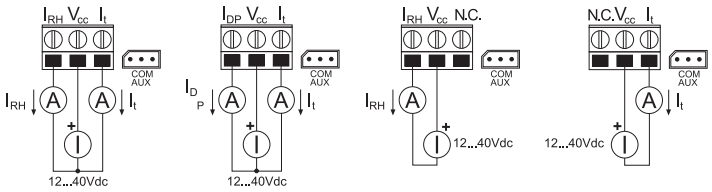
For connection to a PC, a RS232/RS485 or a USB/RS485 converter must be used.
To operate with the MODBUS-RTU protocol be sure that the ADDRESS short jumper is between "ADDRESS" and "N=" indications.
Each transmitter of the network is univocally identified by an address. The address must be between 1 and 247. **Transmitters having the same address shall not be present in the network**. The address must be configured before connecting the instrument to the network. To set the instrument address use the **HD48STCAL** kit. The kit includes the **RS48** cable with built- in USB/RS485 adapter and a CD- ROM for Windows® operating systems. To configure the instrument it is necessary to move the ADDRESS short jumper between the "ADDRESS" and "N=0" indications to select the setup mode. After the configuration, move the short jumper back between the "ADDRESS" and "N=" indications.
In MODBUS mode it is possible to read the values measured by the instrument using code function 04h (Read Input Registers). Table 2 lists the variables available with the appropriate register address

Table 2 – Modbus Registers

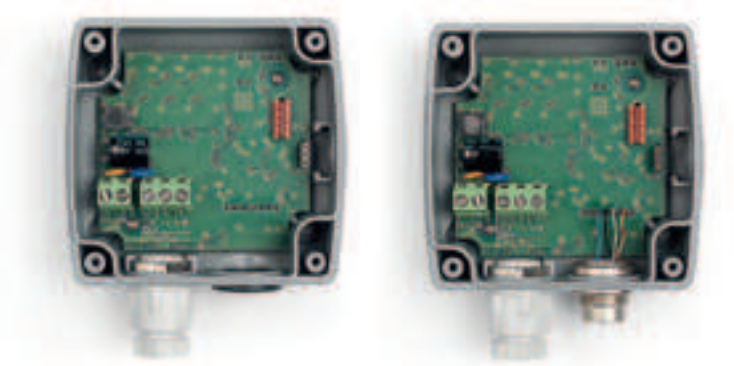
Address	Quantity	Format
0	Temperature in °C (x10)	Full 16 bit
1	Temperature in °F (x10)	Full 16 bit
2	Relative Humididity in % (x10)	Full 16 bit
3	Dew Point in °C (x10)	Full 16 bit
4	Dew Point in °F (x10)	Full 16 bit
5	Status register bit 0 = 1 ⇒ temperature measurement error bit 1 = 1 ⇒ relative humidity measurement error bit 2 = 1 ⇒ dew point temperature calculation error bit 3 = 1 ⇒ configuration data error	Full 16 bit

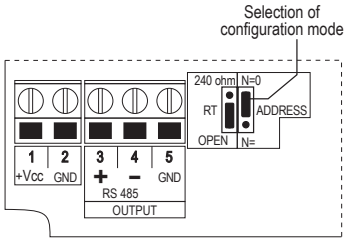
HD49.. series
Follow the connection schemes shown below, the maximum load resistance that can be connected to each 4…20mA output depends on the power supply Vcc applied, according to the relation:
RLMax = (Vcc-12)/0.022, e.g. if Vcc=24Vdc the max load is R_LMax =545 ohm.

HD4917T... HD4977T... HD4901T... HD4907T...

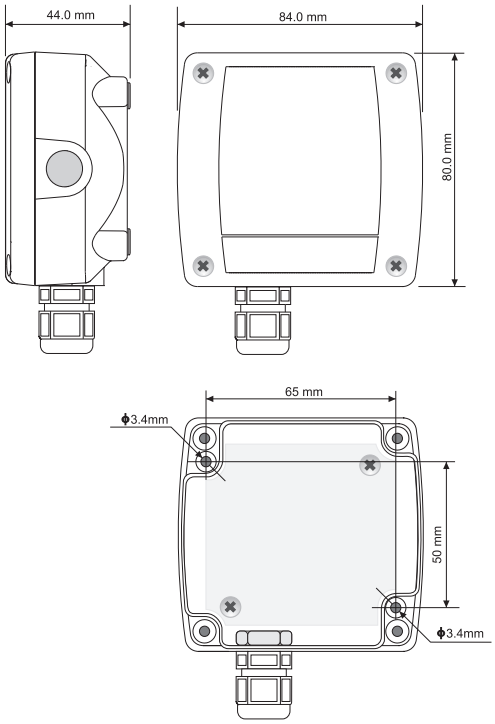


Relative humidity probe calibration
The HD48.. and HD49.. transmitters are supplied factory calibrated and ready to use. If necessary, it is possible to calibrate the relative humidity sensor using the saturated salt solutions HD75 (75% RH saturated salt solution) and HD33 (33% RH saturated salt solution) and connecting the instrument to the PC using the HD48TCAL kit.
The HD48TCAL kit includes the CP27 with incorporated convertor USB/RS232 for the transmitters connection to the PC and a CD-ROM for Windows operating systems, that guides the user in the relative humidity probe calibration procedure.
For RS485 output models use the HD48STCAL. The kit includes the RS48 with incorporated convertor USB/RS485 for the transmitters connection to the PC and a CD-ROM for Windows operating systems, that guides the user in the relative humidity probe calibration procedure.
To calibrate the instrument it is necessary to move the ADDRESS short jumper between the "ADDRESS" and "N=0" indications to select the setup mode. After the calibration, move the short jumper back between the "ADDRESS" and "N=" indications.

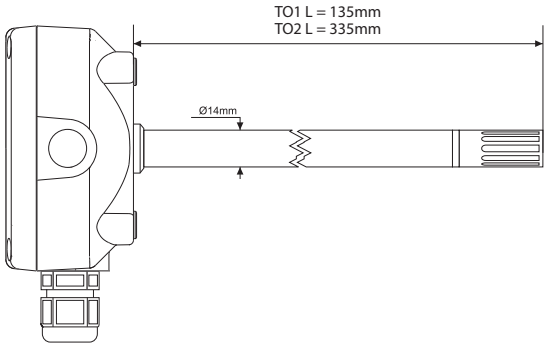




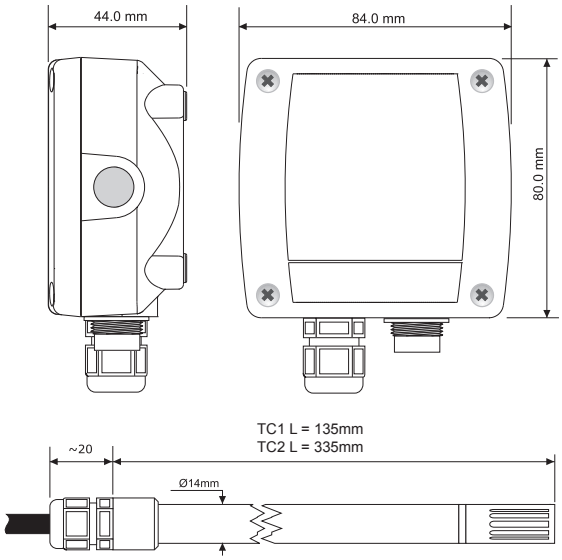
Case dimensions



Probe dimensions:
TO series



TC series



Ordering codes

HD48 / HD49 | | | | **T / T** | | | **L / L**

L = with LCD display

Cable length
2 = 2m
5 = 5m
10 = 10m
Note: T480 version is available only with a cable 2m long.

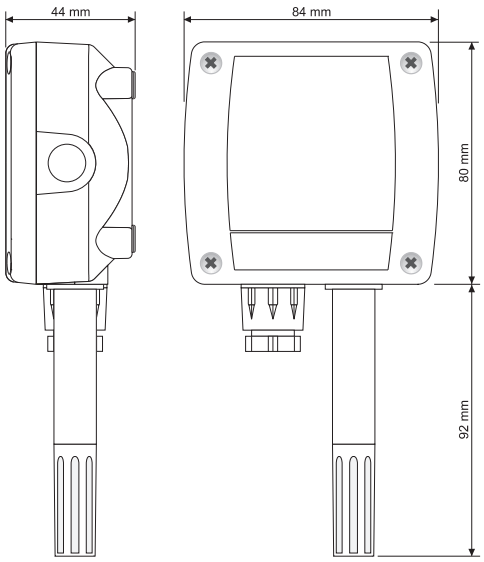
Probe type
T01 = 135mm
T02 = 335mm
TC1 = 135mm
TC2 = 335mm
TV = wall mounting Probe L=92mm
T480 = for compressed air

No sign = standard range –20…+80°C
(-40…+60°C for the T480 version)
E = extended range –40…+150°C (models TV excluded)

07 = temperature output
01 = %RH output
17 = Temperature and %RH outputs
77 = Temperature and dew point outputs

No sign = 4…20mA analogue output
V = 0…10Vdc analog output (only HD48.. models)
S = only RS485 output with MODBUS-RTU protocol
Note: Versions with analogue output have one analogue output for each measured quantity.

TV series



Ordering code examples

HD4801TV: Wall mounting digital active relative humidity transmitter.
Relative humidity range 0...100%RH. Analog output: 4…20mA (0...100%RH).
Probe working range -20...+80°C. Power supply 16...40Vdc or 24Vac.

HD4917T01: Digital passive (current loop) temperature and relative humidity transmitter for duct mounting. AISI304 steel probe, diameter 14mm and stem length 135mm, joined to the electronics enclosure.
Relative humidity range 0...100%RH, temperature range -20...+80°C.
Analog outputs: 4…20mA (0...100%RH) for RH and 4...20mA (-20...+80°C) for temperature. Probe working range -20...+80°C. Power supply 12...40Vdc.

HD4817TC25L: Digital active temperature and relative humidity transmitter with LCD display. AISI304 steel probe, diameter 14mm and stem length 335mm, connected to the electronics enclosure through a 5m cable.
Relative humidity range 0...100%RH, temperature range -20...+80°C.
Analog outputs: 4…20mA (0...100%RH) for RH and 4...20mA (-20...+80°C) for temperature. Probe working range -20...+80°C. Power supply 16...40Vdc or 24Vac.

HD48V17ETC25: Digital active temperature and relative humidity transmitter, extended range. AISI304 steel probe, diameter 14mm and stem length 335mm, connected to the electronics enclosure through a 5m cable.
Relative humidity range 0...100%RH, temperature range -40...+150°C.
Analog outputs: 0…10V (0...100%RH) for RH and 0...10V (-40...+150°C) for temperature. Probe working range -40...+150°C. Power supply 16...40Vdc or 24Vac.

HD48S17TC25L: Digital active temperature and relative humidity transmitter with LCD. AISI304 steel probe, diameter 14mm and stem length 335mm, connected to the electronics enclosure through a 5m cable.
Relative humidity range 0...100%RH, temperature range -20...+80°C.
RS485 output only. Probe working range -20...+80°C. Power supply 16...40Vdc or 24Vac.

HD4877T02: Digital active temperature and dew point transmitter for duct mounting. AISI304 steel probe, diameter 14mm and stem length 135mm, joined to the electronics enclosure.
Dew point range -20...+80°C DP, temperature range -20...+80°C.
Analog outputs: 4…20mA (-20...80°C DP) for DP and 4...20mA (-20...+80°C) for temperature. Probe working range -20...+80°C. Power supply 16...40Vdc or 24Vac.

HD4977T02: Digital passive (current loop) temperature and dew point transmitter for duct mounting. AISI304 steel probe, diameter 14mm and stem length 335mm, joined to the electronics enclosure.
Dew point range -20...+80°C DP, temperature range -20...+80°C.
Analog outputs: 4…20mA (-20...+80°C DP) for DP and 4...20mA (-20...+80°C) for temperature. Probe working range -20...+80°C. Power supply 12...40Vdc.

Accessories

HD48TCAL: The kit includes the **CP27** connection cable with built-in USB/RS232 converter and CD-ROM for Windows operating systems that guides the user in the relative humidity probe calibration procedure. The cable is complete of USB connector on the PC side and a COM AUX connector on the instrument side. The kit is suitable only for analog output models.

HD48STCAL: The kit includes the **RS48** cable with built-in USB/RS485 converter and CD-ROM for Windows operating systems that guides the user in the relative humidity probe calibration procedure. The cable is complete of USB connector on the side of the PC and of 3 separate wires on the instrument part. The kit is suitable only for RS485 output models.

RS48: Cable for RS485 serial connection with buit-in USB/RS485 converter.

CP27: Connection/converter cable from COM AUX serial port to USB.

HD75: 75% RH saturated solution for the verification of the relative humidity sensor, complete of screw adaptors for probes with Ø 14mm and Ø 26mm.

HD33: 33% RH saturated solution for the verification of the relative humidity sensor, complete of screw adaptors with Ø 14mm and Ø 26mm.

HD9008.31: Wall flange with cable gland to fix Ø 14mm probes.

PG16: AISI304 steel cable gland for Ø 14mm probes.

P6: 10µm sintered stainless steel protection for Ø 14mm probes.

P7: 20µm PTFE protection for Ø 14mm probes.

P8: 20µm stainless steel grid and Pocan for Ø 14mm probes.