OPERATING MANUAL

ENVIROsense

ETS series

Environmental transmitters



EN

V1.4

senseca

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1 Introduction

ENVIROsense is an environmental temperature, relative humidity and, optionally, barometric pressure transmitter with RS485 Modbus-RTU output.

Two optional additional 0…1 V, 0…5 V or 0…10 V (depending on model) analog outputs for temperature and relative humidity or dew point, with configurable temperature and humidity ranges.

Many calculated humidity quantities available:

- Dew point
- Wet bulb temperature
- Absolute humidity
- Mixing ratio
- Specific enthalpy
- Water vapour partial pressure
- Specific humidity
- Frost point temperature
- Saturation vapour pressure above water
- Saturation vapour pressure above ice

Rugged ∅14 mm compact housing in PBT. Optional protection shield from solar radiations for outdoor applications.

The transmitter is supplied factory-calibrated in multiple points for relative humidity, and it is ready to use. The transmitter can be optionally supplied with an ISO/IEC 17025 calibration certificate.

The different models differ in the presence or absence of the optional barometric sensor and analog outputs, in the different power supply voltage range and in the different application field:

ETS [ ] **M** [ ] [ ]

Barometric pressure:
0 = No
B = Yes

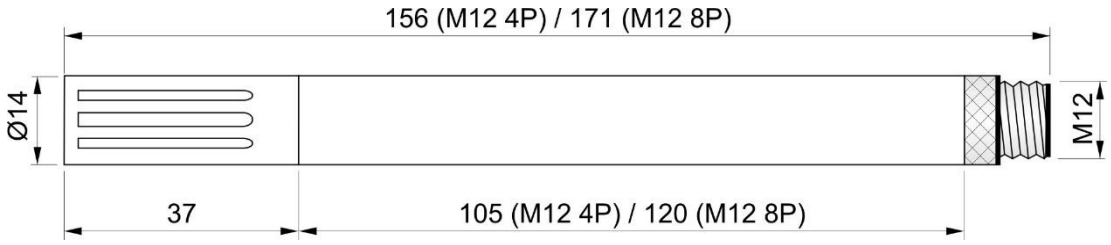
Output:
0 = RS485
9 = RS485 "Low Voltage"
W = RS485 + analog 0…1 V
X = RS485 + analog 0…5 V
Y = RS485 + analog 0…10 V

Application:
60 = HVAC/Indoor
68 = Clean rooms/High performance
80 = Meteorology/Renewable energies

2 Technical specifications

Sensor	RH	Capacitive
	Temperature	Pt100
	Pressure	Piezoresistive
Measuring range	RH	0…100%
	Temperature	-40…+80 °C
	Pressure	300…1100 hPa
Resolution	RH	0.01%
	Temperature	0.01 °C
	Pressure	0.1 hPa
Accuracy	RH	**ETS60…**: ±1.8% (0…85%) / ±2.5% (85…100%) @ T=15…35 °C ±(2 + 1.5% of measured value)% @ T= remaining range **ETS68…**: ±1.2% (0…85%) / ±2% (85…100%) @ T=5…50 °C ±(1.5 + 1.5% of measured value)% @ T= remaining range **ETS80…**: ±1.5% (0…90%) / ±2% (90…100%) @ T=15…35 °C ±(1.5 + 1.5% of measured value)% @ T= remaining range
	Temperature	±(0.1 °C + 0.1% of measured value)
	Pressure	±0.5 hPa typical @ T=25 °C ±1 hPa (500…1100 hPa) @ T= full range
RH response time (t_{63}, 10 → 80 %RH)		**ETS60…** / **ETS68…**: < 10 s **ETS80…**: < 13 s With P8 standard filter, air speed=2 m/s @ constant temp.
Warm-up time		600 ms
Long-term drift	RH	±0.5%RH/year
	Temperature	±0.03 °C/year
	Pressure	< ±1 hPa/year
Operating conditions		-40…+80 °C / 0…100 %RH
Output		RS485 Modbus-RTU or ASCII proprietary protocol 2 optional additional 0…1 V, 0…5 V or 0…10 V (depending on model) analog outputs for temperature and humidity
Power supply		7…30 Vdc (except ETSxxM9…) or 4.5…16 Vdc (only ETSxxM9…) for RS485 output 10…30 Vdc for 0…1 V and 0…5 V analog outputs 15…30 Vdc for 0…10 V output
Power consumption		1.2 mA @ 24 Vdc (except ETSxxM9…) 3 mA @ 5 Vdc (only ETSxxM9…)
Connection		4-pole M12 (ETSxxM0… / ETSxxM9…) 8-pole M12 (ETSxxMW… / ETSxxMX… / ETSxxMY…)
Weight		30 g approx.
Material		PBT
Protection degree		IP 65

Dimensions (mm)



3 Installation

For outdoor installation, use the HD9007A-1 or HD9007A-2 bracket with protection against solar radiations, suitable for fixing to a Ø30…50 mm mast.

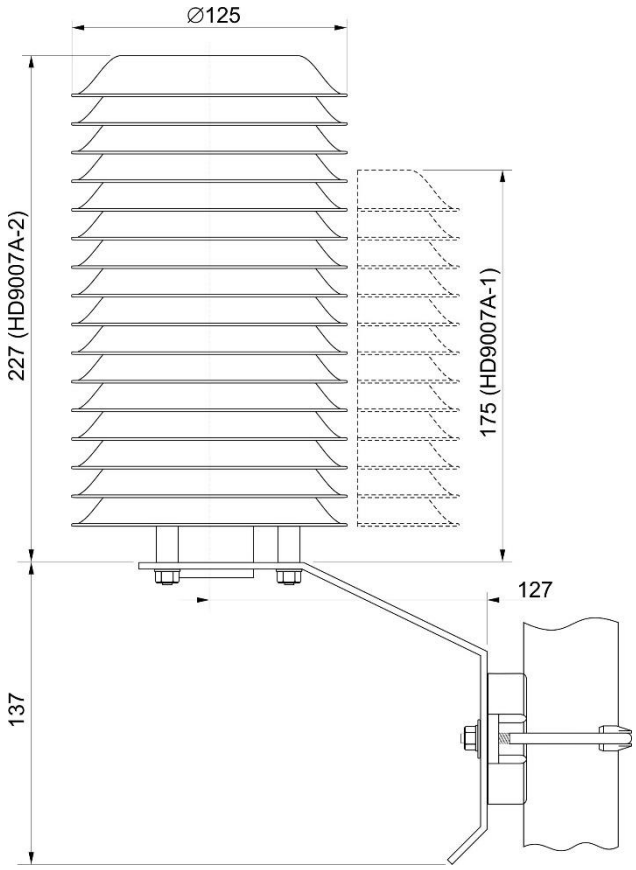
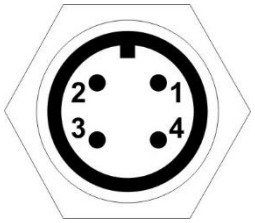


Fig. 3.1: HD9007A-x protection against solar radiations

3.1 Electrical connections

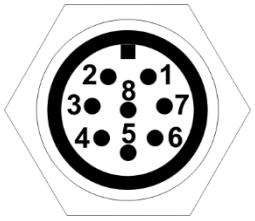
ETSxxM0… / ETSxxM9…

Transmitter male connector (external view)		Function	CPM12-5… wire color
	1	+Vdc (Power supply positive)	Brown
	2	GND (Power supply negative)	White
	3	DATA + (RS485)	Blue
	4	DATA – (RS485)	Black
	5	NC	Grey (*)
	Shell	Grounding (earthing)	Shield

NC = Not connected

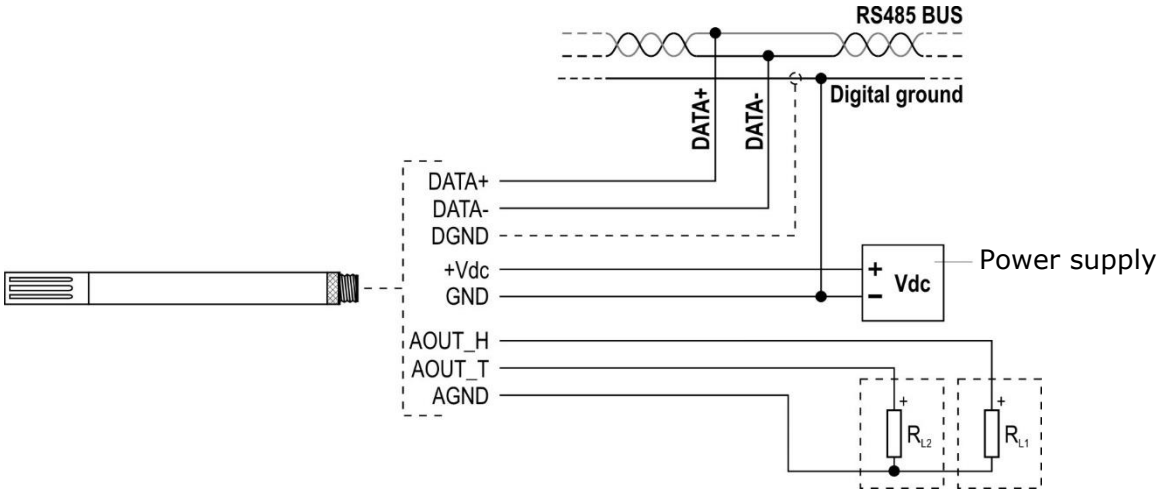
(*) The CPM12-5… 5-pole cable is compatible with the 4-pole transmitter connector. The grey wire connected to pin 5 (central) of the cable female connector is not used by the transmitter.

ETSxxMW... / ETSxxMX... / ETSxxMY...

Transmitter male connector (external view)		Function	CPM12-8... wire color
	1	GND (Power supply negative)	Brown
	2	+Vdc (Power supply positive)	White
	3	DGND (Digital ground)	Blue
	4	DATA – (RS485)	Black
	5	DATA + (RS485)	Grey
	6	AGND (Analog ground)	Pink
	7	AOUT_H (RH analog output positive)	Violet
	8	AOUT_T (Temperature analog output positive)	Orange
	Shell	Grounding (earthing)	Shield

Attention!

The color coding above is valid for cables supplied from 05/2025 and recognizable by the visible (not yellow/green) shield.



(*) DGND is present only in models with 8-pin connector; it can be used to connect the RS485 network ground to the transmitter, as an alternative to connecting to GND (DGND and GND are connected internally in the transmitter).

Fig. 3.2: electrical connections

RS485 output:

Before connecting the transmitter to the RS485 network, set the address and the communication parameters, if different from the factory preset (see "Configuration" chapter). The output is not isolated.

Analog outputs:

The load resistance R_L must be ≥ 100 kΩ. In the event of an anomaly in the measurement (detected measurement outside the measuring range), the output goes to a value 10% higher than the full scale (e.g., 11 V if the output is 0...10 V).

4 Configuration

The configuration of the transmitter can be done:

- By sending serial commands from a PC, via a standard communication program (see the chapter "ASCII proprietary protocol").
- Via the "Holding Registers" in Modbus-RTU mode (see the chapter "Modbus-RTU protocol").

Analog outputs (optional):

By default, the analog outputs correspond to the measuring ranges 0…100% RH and -40…+80 °C.

It is possible:

- to associate the analog outputs with different relative humidity and temperature ranges, within the full measuring range;
- to associate the humidity analog output with dew point, instead of relative humidity.
- to reverse the direction of the output, so that the output decreases as the measurement increases.

Connection to PC:

To connect the transmitter to a PC USB port, to check or change the configuration, the **CP24B-5** (5-pole) or **CP24B-8** (8-pole) optional cables can be used, which also allow the transmitter to be powered via the USB port.

To use the CP24B-x cables, the related USB drivers must be installed in the PC.

Alternatively, it is possible to use a standard RS485/USB or RS485/RS232 converter, powering the transmitter separately (respecting the minimum supply voltage of the transmitter).

Calibration:

The transmitter is supplied factory calibrated. The user can perform a new relative humidity calibration using CRHx serial commands (see the chapter "ASCII proprietary protocol") or the appropriate Modbus "Holding Registers" (see the chapter "Modbus-RTU protocol").

The transmitter provides information on the last five relative humidity user calibrations performed (only ASCII proprietary protocol).

In case of incorrect calibration, it is always possible to restore the factory calibration.

5 ASCII proprietary protocol

To communicate with the transmitter via the ASCII proprietary protocol:

1. Connect the transmitter to the PC and start a standard serial communication program.
2. In the serial communication program, set the Baud Rate 57600, the parameters 8N2 and the COM port number to which the transmitter is connected.
3. Power the transmitter (or power cycle if already powered) and send the command **@** within 10 seconds from the instrument power on (the transmitter replies **&|** if the command @ is recognized).

   Note: if the CP24B-x cable is used, to power cycle the transmitter, disconnect the cable for a few seconds from the PC USB port, then reconnect it.
4. Send the command **CAL USER ON** (the transmitter replies CAL USER ON;USER ON|) to enable the configuration change. The command CAL USER ON is not required only for reading the settings.
5. Send the commands described in the tables below.

The command CAL USER ON is automatically disabled after a few minutes of inactivity. The command CAL USER ON can be disabled immediately by sending the command CAL EXIT.

Note:
If the possibility to access the ASCII proprietary protocol in the first 10 seconds has been disabled (see **WCT** serial command), to access the protocol, it is necessary to re-enable, via Modbus protocol, the wait for the **@** command in the first 10 seconds by writing **1** in the holding register with address **82** (after writing the user password in the holding register with address **30002**) and power cycling the transmitter.

Transmitter general information:

Command	Reply	Description
G0	G0;*model*|	Model
G1	G1;*sub-model*|	Sub-model
G2	G2;nnnnnnnn|	Serial number
G3	G3;xx.yy|	Firmware revision
G4	G4;yyyy/mm/dd|	Firmware revision date
G5	G5;xx.yy|	Hardware revision
GD	GD;yyyy/mm/dd hh:mm:ss|	Factory calibration date and time

User code:

The user code is an alphanumeric string of up to 8 characters that the user can set to identify the transmitter with a mnemonic name.

Command	Reply	Description
CUCnnnnnnnn	CUC;&|	Sets nnnnnnnn as user code. Default=*blank*
RUC	RUC;nnnnnnnn|	Reads the user code.

Enabling/disabling the wait for the @ command at power up:

Command	Reply	Description
WCTn	WCT;&|	Enable/disable the 10-second wait for the @ command at power up: ▪ Disabled if n=0 ▪ Enabled if n=1 *Default* : Enabled (n=1)
RCT	RCT;n	Reads the enabling status of the 10-second wait for the @ command at power up.

Disabling the first 10 seconds, and thus immediately activating the Modbus-RTU protocol, is useful when the instrument is used in ON/OFF mode with the Modbus-RTU protocol, to limit power consumption (it is powered only for the time necessary to acquire the measurement). With the first 10 seconds disabled, the measurements are available **5 seconds after power up**.

RS485 Modbus-RTU communication parameters:

Command	Reply	Description
CMAn	CMA;&|	Sets the Modbus-RTU address (1…247) to n. Default=1
RMA	RMA;n|	Reads the Modbus-RTU address.
CMBn	CMB;&|	Sets the Baud Rate: ▪ 9600 if n=0 ▪ 19200 if n=1 (*default*) ▪ 38400 if n=2 ▪ 57600 if n=3 ▪ 115200 if n=4
RMB	RMB;n|	Reads Baud Rate setting.
CMPn	CMP;&|	Sets parity and stop bits (data bits = 8 fixed): ▪ 8N1 if n=0 ▪ 8N2 se n=1 ▪ 8E1 if n=2 (*default*) ▪ 8E2 se n=3 ▪ 8O1 if n=4 ▪ 8O2 se n=5
RMP	RMP;n|	Reads the setting of parity and stop bits.
CMWn	CMW;&|	Sets waiting time after transmission with Modbus-RTU protocol: ▪ Immediate reception if n=0 (violates protocol) ▪ Waiting 3.5 characters if n=1 (respects protocol) *Default* : Waiting 3.5 characters (n=1)
RMW	RMW;n|	Reads the setting of waiting time after transmission with Modbus-RTU protocol.

Units of measurement:

Changing the temperature units of measurement affects the Modbus protocol only. The temperature measurement provided by the ASCII proprietary protocol (commands S0/S1) is always in °C.

Command	Reply	Description
WUTn	WUT;&|	Sets the temperature unit of measurement: ▪ °C if n=0 (*default*) ▪ °F if n=1 ▪ K if n=2
RUT	RUT;n|	Reads the temperature unit of measurement.

Measurements reading:

Command	Reply	Description
S0	S0;*meas*|	Prints the measurements in the following sequence: ▪ Temperature in °C ▪ Relative humidity in % ▪ Specific humidity in g/kg ▪ Absolute humidity in g/m^3 ▪ Dew point in °C ▪ Frost point temperature in °C ▪ Wet bulb temperature in °C ▪ Mixing ratio in g/kg ▪ Water vapour partial pressure in hPa ▪ Saturation vapour pressure above water in hPa ▪ Saturation vapour pressure above ice in hPa ▪ Specific enthalpy in kJ/kg ▪ Barometric pressure in hPa If the automatic sending of the measurements is enabled (command S1), sending S0 disables the automatic sending.
S1	S1;*meas*|	Enables the automatic sending of the measurements, once per second.

Analog outputs (optional):

Command	Reply	Description
Humidity analog output		
CRPn	CRP;&|	Associates the humidity analog output with: ▪ Relative humidity (RH) if n=0 ▪ Dew Point (Td) if n=1 *Default* : Relative humidity (n=0)
RRP	RRP;n|	Reads the quantity associated with the humidity analog output.
CAAIn…n	CAAI;&|	Sets n…n as humidity minimum value for the analog output, in hundredths of %RH, if the output is associated with RH, or hundredths of the set temperature unit of measurement (°C, °F or K), if the output is associated with Td. Min=0 (%RH), -3500 (°C Td), -3100 (°F Td) or 23815 (K Td), default=0 (=0 %RH).
RAAI	RAAI;n…n|	Reads the humidity minimum value for the analog output, in hundredths of %RH, if the output is associated with RH, or hundredths of the set temperature unit of measurement (°C, °F or K), if the output is associated with Td.
CAAFn…n	CAAF;&|	Sets n…n as humidity maximum value for the analog output, in hundredths of %RH, if the output is associated with RH, or hundredths of the set temperature unit of measurement (°C, °F or K), if the output is associated with Td. Max=10000 (%RH), 8000 (°C Td), 17600 (°F Td) or 35315 (K Td), default=10000 (=100.00 %RH).
RAAF	RAAF;n…n|	Reads the humidity maximum value for the analog output, in hundredths of %RH, if the output is associated with RH, or hundredths of the set temperature unit of measurement (°C, °F or K), if the output is associated with Td.

Command	Reply	Description
CAAin	CAAi;&|	Sets the direct or reversed correspondence between analog output and humidity: ▪ If n=0: Min. output ⇒ Min. RH or Td Max. output ⇒ Max. RH or Td ▪ If n=1: Min. output ⇒ Max. RH or Td Max. output ⇒ Min. RH or Td *Default* : Direct correspondence (n=0)
RAAi	RAAi;n|	Reads the type of correspondence (direct or reversed) between analog output and humidity.
Temperature analog output		
CABIn…n	CABI;&|	Sets n…n as temperature minimum value for the analog output, in hundredths of the set unit of measurement (°C, °F or K). Min=-4000 (°C, °F) or 23315 (K), default=-4000 (=-40.00 °C).
RABI	RABI;n…n|	Reads the temperature minimum value for the analog output, in hundredths of the set unit of measurement (°C, °F or K).
CABFn…n	CABF;&|	Sets n…n as temperature maximum value for the analog output, in hundredths of the set unit of measurement (°C, °F or K). Max=8000 (°C), 17600 (°F) or 35315 (K), default=8000 (=80.00 °C).
RABF	RABF;n…n|	Reads the temperature maximum value for the analog output, in hundredths of the set unit of measurement (°C, °F or K).
CABin	CABi;&|	Sets the direct or reversed correspondence between analog output and temperature: ▪ If n=0: Min. output ⇒ Min. temperature Max. output ⇒ Max. temperature ▪ If n=1: Min. output ⇒ Max. temperature Max. output ⇒ Min. temperature *Default* : Direct correspondence (n=0)
RABi	RABi;n|	Reads the type of correspondence (direct or reversed) between analog output and temperature.

Relative humidity calibration:

Command	Reply	Description
CRHIn	CRHI;&|	Sets the type of calibration to be used: ▪ Factory calibration if n=0 (*default*) ▪ User calibration if n=1
RRHI	RRHI;n|	Reads the type of calibration in use.
CRH0nnnn	CRH0;&|	Calibrates the point Nr. 0 to the value nnnn in hundredths of %RH. nnnn =0…2500 (=0…25.00%).
CRH1nnnn	CRH1;&|	Calibrates the point Nr. 1 to the value nnnn in hundredths of %RH. nnnn =3000…3600 (=30.00…36.00%).
CRH2nnnn	CRH2;&|	Calibrates the point Nr. 2 to the value nnnn in hundredths of %RH. nnnn =3800…7000 (=38.00…70.00%).
CRH3nnnn	CRH3;&|	Calibrates the point Nr. 3 to the value nnnn in hundredths of %RH. nnnn =7200…7800 (=72.00…78.00%).
CRH4nnnn	CRH4;&|	Calibrates the point Nr. 4 to the value nnnn in hundredths of %RH. nnnn =8000…9500 (=80.00…95.00%).
WRD*date*	WRD;&|	Sets the user calibration date. The date should be written in the format yymmddhhmmss (yy=year, mm=month, dd=day, hh=hour, mm=minutes, ss=seconds).
WRHDn	WRHD;&|	Resets of the user calibration point number n (n=0…4) to the factory value. If n=5, all the points are reset.
DRH0	DRH0;&|	Disables the calibration point Nr. 0
DRH1	DRH1;&|	Disables the calibration point Nr. 1
DRH2	DRH2;&|	Disables the calibration point Nr. 2
DRH3	DRH3;&|	Disables the calibration point Nr. 3
DRH4	DRH4;&|	Disables the calibration point Nr. 4
SRH	SRH;*cal_hystory*	Provides the information of the last 5 user calibrations. 5 data sets are printed, each containing: • Calibration number (0…4, 0 is the most recent) • Calibration date (set with the command WRD) • Point Nr. 0 calibration (0=not calibrated, 2=calibrated) • Value measured before calibration (tenths of %RH) • Calibration value (tenths of %RH) • Calibration temperature (tenths of °C) • … • Point Nr. 4 calibration (0=not calibrated, 2=calibrated) • Value measured before calibration (tenths of %RH) • Calibration value (tenths of %RH) • Calibration temperature (tenths of °C)

Warning: if a calibration point is disabled with the DRHx command, the point must be recalibrated with the CRHx command to re-enable it.

6 Modbus-RTU protocol

By default, the transmitter has Modbus address **1** and communication parameters 19200, 8E1. The address and the communication parameters can be changed by using the appropriate serial commands of the proprietary protocol or, alternatively, directly with Modbus commands by changing the value of the Holding Registers described later.

By default, the Modbus-RTU protocol is activated after 10 seconds from the transmitter power on. It is possible to disable the first 10 seconds of waiting using the holding register with address 82 or the command WCT of the ASCII proprietary protocol.

To change the Holding Registers values, it is first necessary to enable the writing by entering the appropriate value in the register with address 30002 (see the description of the register in the Holding Registers table).

Below is the list of registers.

Input Registers:

Address	Description	Format
MEASUREMENTS		
0	Temperature in °C, °F or K (x100)	32-bit Integer
2	Relative humidity in % (x100)	32-bit Integer
4	Dew point in °C, °F or K (x100)	32-bit Integer
6	Wet bulb temperature in °C, °F or K (x100)	32-bit Integer
8	Absolute humidity in g/m^3 (x100)	32-bit Integer
10	Mixing ratio in g/kg (x100)	32-bit Integer
12	Specific enthalpy in kJ/kg (x100)	32-bit Integer
14	Water vapour partial pressure in hPa (x100)	32-bit Integer
16	Specific humidity in g/kg (x100)	32-bit Integer
18	Barometric pressure in hPa (x10)	32-bit Integer
20	Frost point temperature in °C (x100)	32-bit Integer
22	Saturation vapour pressure above water in hPa (x100)	32-bit Integer
24	Saturation vapour pressure above ice in hPa (x100)	32-bit Integer
ERROR REGISTERS The registers are normally at 0; other values indicate a measurement error: 1=not ready, 2=underflow, 3=overflow.		
32	Temperature	16-bit Integer
33	Relative humidity	16-bit Integer
34	Dew point	16-bit Integer
35	Wet bulb temperature	16-bit Integer
36	Absolute humidity	16-bit Integer
37	Mixing ratio	16-bit Integer
38	Specific enthalpy	16-bit Integer
39	Water vapour partial pressure	16-bit Integer

Address	Description	Format
40	Specific humidity	16-bit Integer
41	Barometric pressure	16-bit Integer
42	Frost point temperature	16-bit Integer
43	Saturation vapour pressure above water	16-bit Integer
44	Saturation vapour pressure above ice	16-bit Integer
TRANSMITTER GENERAL INFORMATION		
100…109	Model (20 characters)	String
110…119	Sub-model (20 characters)	String
120…123	Serial number (8 characters)	String
128…131	Firmware revision (8 characters)	String
132…135	Hardware revision (8 characters)	String

Notes on the registers format:

1) To read a **32-bit integer** value, two consecutive registers starting from the one indicated must be accessed. The register with lower address contains the most significant bits.

2) The alphanumeric **strings** are contained in a series of 16-bit registers. Each register contains 2 characters of the string: the most significant 8 bits contain the ASCII code of the first character, the least significant 8 bits contain the ASCII code of the next character. The start character of the string is in the register of the series with the lowest address.

   Example: the transmitter model, for ex. ETS80M00, is available in the registers with address from 100 to 109.

Register address	**100**		**101**		**102**		**103**		**104**		**105**		**106**		**107**		**108**		**109**	
Register content (Hex)	4554		5338		304D		3030		0000		0000		0000		0000		0000		0000	
Read value	E	T	S	8	0	M	0	0												

Holding Registers:

Indirizzo	Descrizione	Formato
0	RS485 Modbus-RTU Baud Rate: 0=9600 1=19200 (default) 2=38400 3=57600 4=115200	16-bit Integer
1	RS485 Modbus-RTU parity and stop bits: 0=8N1 1=8N2 2=8E1 (default) 3=8E2 4=8O1 5=8O2	16-bit Integer

Indirizzo	Descrizione	Formato
2	Modbus-RTU address (1…247, default=1).	16-bit Integer
5	Temperature unit of measurement: 0=°C (default) 1=°F 2=K	16-bit Integer
31	Type of calibration to be used: 0=Factory calibration (default) 1=User calibration	16-bit Integer
51	Calibrates the RH point Nr. 0 to the value entered in the register, in hundredths of %RH. The value must be in the range 0…2500 (=0…25.00%).	16-bit Integer
52	Value, in hundredths of %RH, measured before calibration of point Nr. 0 (*read only parameter*)	16-bit Integer
53	Temperature, in hundredths of °C, measured during calibration of %RH point Nr. 0 (*read only parameter*)	16-bit Integer
54	Enabling status of RH calibration point Nr. 0: 0=Not calibrated, 1=Disabled, 2=Calibrated	16-bit Integer
55	Calibrates the RH point Nr. 1 to the value entered in the register, in hundredths of %RH. The value must be in the range 3000…3600 (=30.00…36.00%).	16-bit Integer
56	Value, in hundredths of %RH, measured before calibration of point Nr. 1 (*read only parameter*)	16-bit Integer
57	Temperature, in hundredths of °C, measured during calibration of %RH point Nr. 1 (*read only parameter*)	16-bit Integer
58	Enabling status of RH calibration point Nr. 1: 0=Not calibrated, 1=Disabled, 2=Calibrated	16-bit Integer
59	Calibrates the RH point Nr. 2 to the value entered in the register, in hundredths of %RH. The value must be in the range 3800…7000 (=38.00…70.00%).	16-bit Integer
60	Value, in hundredths of %RH, measured before calibration of point Nr. 2 (*read only parameter*)	16-bit Integer
61	Temperature, in hundredths of °C, measured during calibration of %RH point Nr. 2 (*read only parameter*)	16-bit Integer
62	Enabling status of RH calibration point Nr. 2: 0=Not calibrated, 1=Disabled, 2=Calibrated	16-bit Integer
63	Calibrates the RH point Nr. 3 to the value entered in the register, in hundredths of %RH. The value must be in the range 7200…7800 (=72.00…78.00%).	16-bit Integer
64	Value, in hundredths of %RH, measured before calibration of point Nr. 3 (*read only parameter*)	16-bit Integer
65	Temperature, in hundredths of °C, measured during calibration of %RH point Nr. 3 (*read only parameter*)	16-bit Integer
66	Enabling status of RH calibration point Nr. 3: 0=Not calibrated, 1=Disabled, 2=Calibrated	16-bit Integer

Indirizzo	Descrizione	Formato
67	Calibrates the RH point Nr. 4 to the value entered in the register, in hundredths of %RH. The value must be in the range 8000…9500 (=80.00…95.00%).	16-bit Integer
68	Value, in hundredths of %RH, measured before calibration of point Nr. 4 (*read only parameter*)	16-bit Integer
69	Temperature, in hundredths of °C, measured during calibration of %RH point Nr. 4 (*read only parameter*)	16-bit Integer
70	Enabling status of RH calibration point Nr. 4: 0=Not calibrated, 1=Disabled, 2=Calibrated	16-bit Integer
71	Resets of RH user calibration to factory default: 0=Reset calibration point Nr. 0 1=Reset calibration point Nr. 1 2=Reset calibration point Nr. 2 3=Reset calibration point Nr. 3 4=Reset calibration point Nr. 4 5=Reset all points	16-bit Integer
72	Year of RH user calibration	16-bit Integer
73	Month of RH user calibration	16-bit Integer
74	Day of RH user calibration	16-bit Integer
82	Enabling of the 10-second wait for the @ command at power up: 0=Disabled (the transmitter starts directly in Modbus) 1=Enabled (the transmitter waits @ for 10 seconds) If the 10-second wait was disabled and 1 is set 1 in the register, the 10-second wait will occur the next time the transmitter is power cycled.	16-bit Integer
30002	Enabling writing in Holding Register: 9876=Enabled 8888=Disabled	16-bit Integer

Warning: if a calibration point is disabled, the point must be recalibrated to re-enable it.

Reading of transmitter general information (function 2Bh / 0Eh):

The Modbus function code 2Bh / 0Eh allows reading the basic general information of the transmitter, consisting of:

- Manufacturer
- Transmitter model
- Firmware version

For additional information regarding the protocol, visit the site "www.modbus.org".

7 Maintenance

In order to grant measurements high accuracy, it is necessary to clean the filter periodically.

To clean the filter, unscrew it from the transmitter body and wash it under running water with the help of a brush. Dry the filter and screw it back to the transmitter body.

Warning: after removing the filter, be careful not to touch the RH sensor with your hands, so as not to damage it irreparably.

If the filter is too dirty to be able to clean, it can be replaced with a new one.

8 Safety instructions

The transmitter proper operation and operating safety can be ensured only in the climatic conditions specified in this manual and if all standard safety measures as well as the specific measures described in this manual are followed.

Do not use the instrument in places where there are:

- Corrosive or flammable gases.
- Direct vibrations or shocks to the instrument.
- High-intensity electromagnetic fields, static electricity.

User obligations

The transmitter operator shall follow the directives and regulations below that refer to the treatment of dangerous materials:

- EU directives on workplace safety.
- National law regulations on workplace safety.
- Accident prevention regulations.

9 Accessories ordering codes

The transmitter is supplied with M12 female free connector (only if the optional cable is not ordered).

The cable and the protection shield from solar radiations must be ordered separately.

Installation cables

CPM12-5... Cable with 5-pole M12 connector on one end, open wires on the other end. Length 5 m (CPM12-5.5) or 10 m (CPM12-5.10). **For Versions with only RS485 Modbus-RTU output.**

CPM12-8... Cable with 8-pole M12 connector on one end, open wires on the other end. Length 5 m (CPM12-8.5) or 10 m (CPM12-8.10). **For versions with additional analog output.**

PC connecting cables

CP24B-5 PC connecting cable for the configuration of the transmitter. With built-in RS485/USB converter. 5-pole M12 connector on sensor side and A-type USB connector on PC side. **For Versions with only RS485 Modbus-RTU output.**

CP24B-8 PC connecting cable for the configuration of the transmitter. With built-in RS485/USB converter. 8-pole M12 connector on sensor side and A-type USB connector on PC side. **For versions with additional analog output.**

Solar shields

HD9007A-1 12-ring protection shield from solar radiations. Supplied with mounting bracket.

HD9007A-2 16-ring protection shield from solar radiations. Supplied with mounting bracket.

Saturated solutions

HD75 Saturated solution for checking the Relative Humidity sensor at 75% RH. Includes screw adaptor for ∅14 mm probes.

HD33 Saturated solution for checking the Relative Humidity sensor at 33% RH. Includes screw adaptor for ∅14 mm probes.

HD11 Saturated solution for checking the Relative Humidity sensor at 11% RH. Includes screw adaptor for ∅14 mm probes.

Spare parts

P8 Filter in PBT with 10 µm stainless steel grid.

HD9007T26.2 Adapter for Ø14 mm probes for HD9007A-1 and HD9007A-2 protections against solar radiations.

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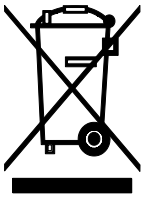
WARRANTY

The manufacturer is required to respond to the "factory warranty" only in those cases provided by Legislative Decree 6 September 2005 - n. 206. Each instrument is sold after rigorous inspections; if any manufacturing defect is found, it is necessary to contact the distributor where the instrument was purchased from. During the warranty period (24 months from the date of invoice) any manufacturing defects found will be repaired free of charge. Misuse, wear, neglect, lack or inefficient maintenance as well as theft and damage during transport are excluded. Warranty does not apply if changes, tampering or unauthorized repairs are made on the product. Solutions, probes, electrodes and microphones are not guaranteed as the improper use, even for a few minutes, may cause irreparable damages.
The manufacturer repairs the products that show defects of construction in accordance with the terms and conditions of warranty included in the manual of the product. For any dispute, the competent court is the Court of Padua. The Italian law and the "Convention on Contracts for the International Sales of Goods" apply.

TECHNICAL INFORMATION

The quality level of our instruments is the result of the continuous product development. This may lead to differences between the information reported in the manual and the instrument you have purchased.
We reserve the right to change technical specifications and dimensions to fit the product requirements without prior notice.

DISPOSAL INFORMATION



Electrical and electronic equipment marked with specific symbol in compliance with 2012/19/EU Directive must be disposed of separately from household waste. European users can hand them over to the dealer or to the manufacturer when purchasing a new electrical and electronic equipment, or to a WEEE collection point designated by local authorities. Illegal disposal is punished by law.

Disposing of electrical and electronic equipment separately from normal waste helps to preserve natural resources and allows materials to be recycled in an environmentally friendly way without risks to human health.

CE RoHS

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