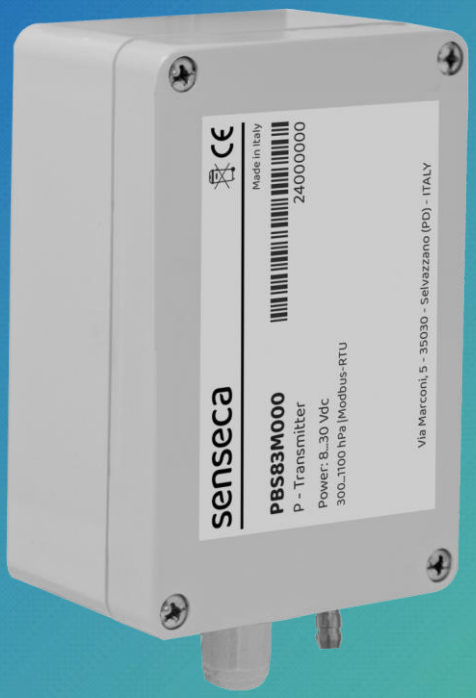
OPERATING MANUAL

BAROsense

PBS83M series

Barometric transmitters



EN

V2.1

senseca

Contents

1 Introduction 3
2 Technical specifications 4
3 Installation 6
3.1 Electrical connections 7
4 Configuration and measurement 9
5 ASCII proprietary protocol 10
6 Modbus-RTU protocol 15
7 Maintenance 19
8 Safety instructions 19
9 Accessories ordering codes 20

1 Introduction

BAROsense is a barometric transmitter equipped with a precision piezo-resistive pressure sensor with integrated temperature sensor. The pressure and temperature measurements are digitally processed to obtain a pressure output value compensated over the whole transmitter temperature operating range.

The sensor is factory calibrated in multiple points and has excellent time stability and repeatability.

The pressure can be expressed in different user-selectable units of measurement.

The instrument has a digital **RS485** output with **MODBUS-RTU** or proprietary protocol. As option, it can be supplied with an **additional analog output, which can be selected by the user in current or voltage** via an internal jumper. The current output is user configurable 0...20 mA or 4...20 mA (default), while the voltage output must be defined when ordering (0...1 V, 0...5 V or 0...10 V).

The transmitter digital output enables the transmission of the measurements over long distances and connects the transmitter to sensors networks.

Optional **LCD** display.

Optional input for combined temperature and relative humidity probe. With the external probe connected, the instrument calculates the dew point, the absolute humidity and the wet bulb temperature.

Available as an accessories a **static port** with support bracket to minimize the effect of dynamic pressure due to the wind in open field measurements.

The table below highlights the features included in the various models of the series.

	Output		T/RH probe	LCD
Model	**Digital RS485**	**Analog**		
PBS83M00...	√	--	--	…=**0** no …=**L** yes
PBS83M0C...			√	
PBS83MW0...	√	Configurable 4…20 mA (default), 0…20 mA or 0…1 V	--	
PBS83MWC...			√	
PBS83MX0...	√	Configurable 4…20 mA (default), 0…20 mA or 0…5 V	--	
PBS83MXC...			√	
PBS83MY0...	√	Configurable 4…20 mA (default), 0…20 mA or 0…10 V	--	
PBS83MYC...			√	

2 Technical specifications

Barometric pressure	
Sensor	Piezoresistive
Measuring range	300…1100 hPa Configurable for the analog output: default 600…1100 hPa
Resolution	See table below
Accuracy	± 0.5 hPa (700...1100 hPa) @ 20 °C ±1 hPa (500…1100 hPa) / ±1.5 hPa (300…500 hPa) @ T=(0…60 °C)
Long-term stability	< ±1 hPa/year
Relative humidity (*optional – external T/RH probe is required*)	
Sensor	Capacitive
Measuring range	0…100%
Resolution	0.1%
Accuracy	± 2.5% (0..85%) / ± 3.5% (85…100%) @ T=23 °C
Temperature drift	0.05%/K (0…60 °C)
Sensor operating temp.	-40…+105 °C (R.H. max=[100-2*(T-80)] @ T=80…105 °C)
Response time	T_{63} < 4 s (air speed = 2 m/s, without filter)
Long-term stability	< 1%/year (@ 23 °C and 30…70%)
Temperature (*optional – external T/RH probe is required*)	
Sensor	PTAT integrated in humidity module
Measuring range	-40…+105 °C
Resolution	0.1 °C
Accuracy	± 0.2 °C in the range 0…+60 °C ± (0.2 – 0.05 * T) °C in the range T=-40…0 °C ± [0.2 + 0.032 * (T-60)] °C in the range T=+60…+105 °C
Long-term stability	0.05 °C/year
Calculated quantities (*optional – external T/RH probe is required*)	
Dew point, absolute humidity and wet bulb temperature	
General specifications	
Output	RS485 with Modbus-RTU or ASCII proprietary protocol Optional analog output, selectable in current (0/4…20 mA) or voltage (0…1 V, 0…5 V or 0…10 V, depending on the model) Current output load resistance: R_L < (Vdc-7)/0,022) Voltage output load resistance: R_L > 10 kΩ
Power supply	**PBS83M0...**: 7…30 Vdc **PBS83MW...** and **PBS83MX...**: 8…30 Vdc **PBS83MY...**: 15…30 Vdc
Consumption	4 mA @ 24 Vdc (+ output current if current output is used)
Connection	Internal screw terminal header / PG7 cable gland for power supply and output. Optional M12 connector for the T/RH external probe.
Operating conditions	-40…+60 °C (-20…+60 °C con LCD) / 0…100%RH

Compatible media	Air and dry gases
Materials	Transmitter: Polycarbonate, pressure input in nickel-plated brass Static port (optional): ASA Support bracket (optional): Aluminium alloy
Housing dimensions	120 x 80 x 55
Weight	250 g approx. 570 g approx. the static port with support bracket
Protection degree	IP65

Units of measurement available and corresponding resolution

With the MODBUS-RTU protocol, two different input registers are available for the pressure measurement, with different resolution: IR 0 (32-bit) and IR 2 (16-bit).

With the ASCII proprietary protocol, the resolution is unique.

	Resolution	
Unit of measurement	**ASCII proprietary protocol Modbus protocol IR 0 (32-bit)**	**Display Modbus protocol IR 2 (16-bit)**
Pa	1 Pa	10 Pa
hPa	0.01 hPa	0.1 hPa
kPa	0.001 kPa	0.01 kPa
mbar	0.01 mbar	0.1 mbar
bar	0.00001 bar	0.0001 bar
atm	0.00001 atm	0.0001 atm
psi	0.0001 psi	0.001 psi
mmHg	0.01 mmHg	0.1 mmHg
inHg	0.001 inHg	0.01 inHg
mmH_2O	0.1 mmH_2O	1 mmH_2O
inH_2O	0.01 inH_2O	0.1 inH_2O
kg/cm^2	0.00001 kg/cm^2	0.0001 kg/cm^2
Torr	0.01 Torr	0.1 Torr

3 Installation

The transmitter is wall mounted using the two holes on the back (open the cover to access the holes and the terminal header for electrical connections).

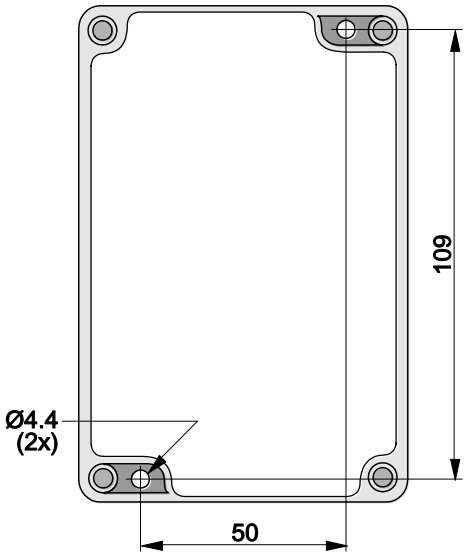


Fig. 3.1: fixing holes

It is advisable to mount the transmitter so that the pressure input is facing downwards, in order to reduce the accumulation of dust and dirt on the input.

For outdoor installation, the use of the optional static pressure port is recommended, in order to minimize the measurement error caused by the wind flow on the pressure input (the measurement deviation due to wind is less than 0.3 hPa @ 20 m/s if the static port is used). The static port includes a support bracket suitable for fixing to a Ø30…50 mm mast.

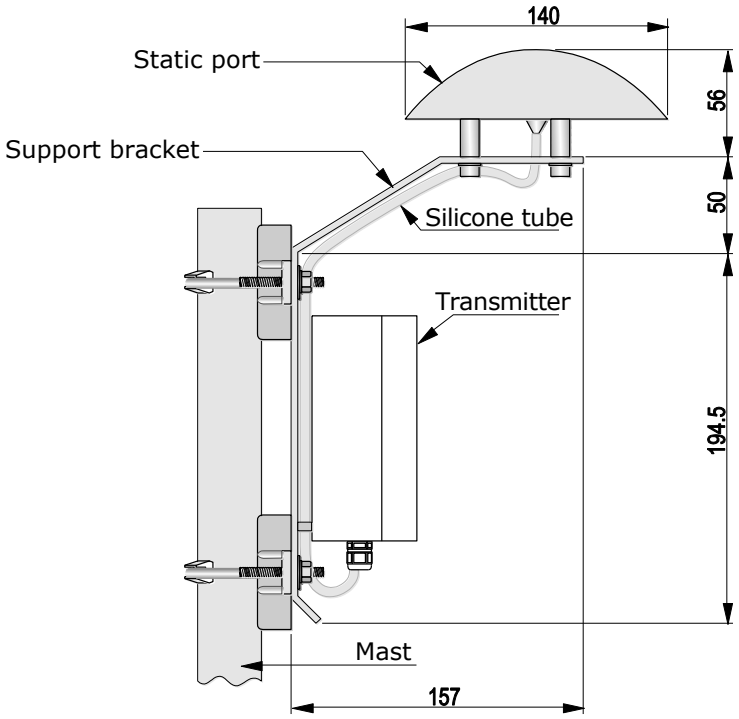


Fig. 3.2: transmitter with static pressure port

3.1 Electrical connections

The transmitter has an internal screw terminal header for connecting the power supply and the outputs, and optionally an M12 connector for connecting the external temperature and relative humidity probe.

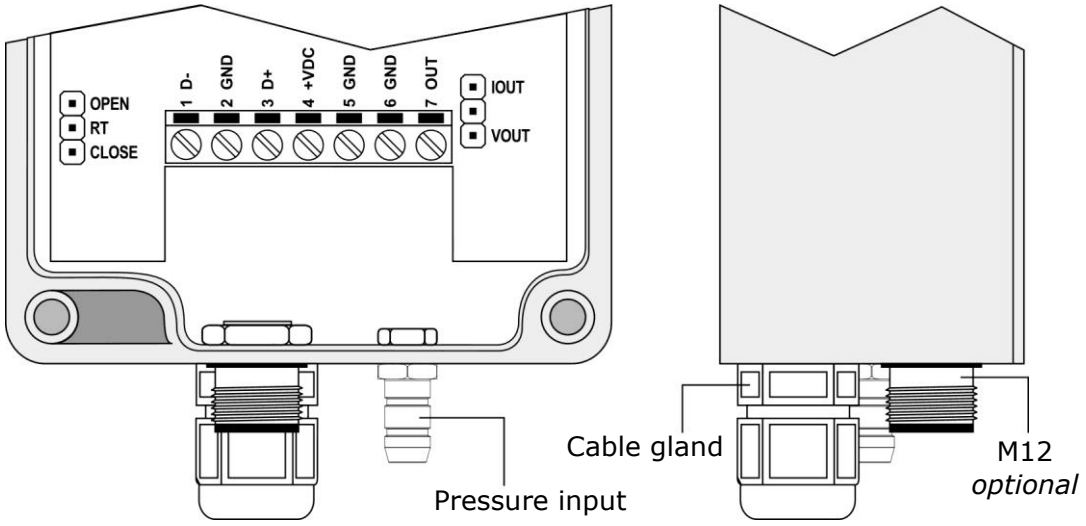


Fig. 3.3: inputs and selection jumpers

Terminal N°	Function
1	RS485 D-
2	GND
3	RS485 D+
4	Power supply positive (+Vdc)
5	GND
6	GND
7	Analog output (OUT)

The analog output, if present, can be in current or voltage, configurable via the jumper to the right of the terminal header.

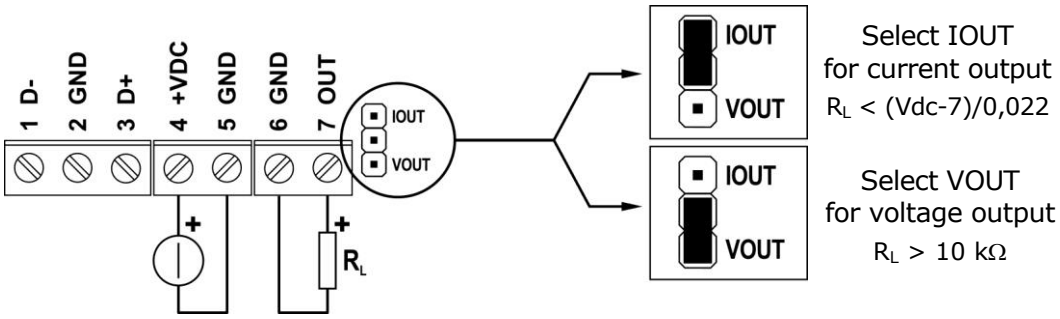


Fig. 3.4: analog output connection

To the left of the terminal header there is a built-in line termination that can be connected or removed through a short jumper. To connect the termination, place the short jumper between the "RT" and "CLOSE" indications. To remove the termination, place the short jumper between the "RT" and "OPEN" indications.

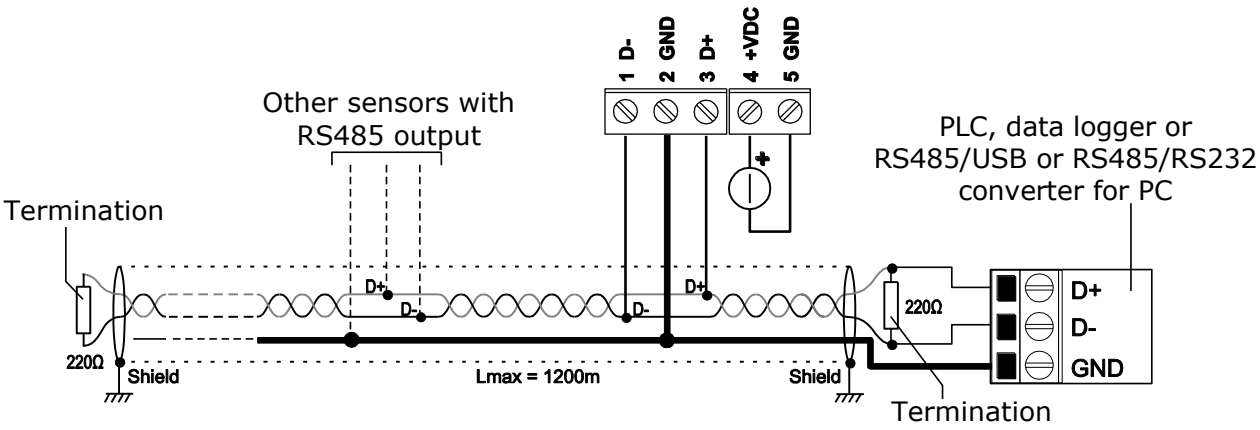


Fig. 3.5: RS485 connection

4 Configuration and measurement

The configuration of the instrument and the reading of the measurements can be done via the RS485 serial output, both with the proprietary protocol and with the MODBUS-RTU protocol.

In the first 10 seconds after the instrument power on, it is always active the proprietary protocol. After 10 seconds from power on, the operating protocol is activated, which by default is the MODBUS-RTU protocol.

It is possible to keep the proprietary protocol active even after 10 seconds from power on by sending, before the 10 seconds expire, the command **@** of the proprietary protocol. The proprietary protocol can be set as operating protocol by means of the DP0 command.

By default, the instrument has MODBUS address **1** and communication parameters 19200, 8E1. Different parameters can be set using the proprietary protocol or the MODBUS-RTU protocol.

The commands of the proprietary protocol and the registers of the MODBUS-RTU protocol are described in detail in the following chapters.

Analog output:
The output is current or voltage depending on the configuration of the IOUT / VOUT jumper on the board. By default, the current output is 4...20 mA and the voltage output is 0...1, 0...5 V or 0...10 V depending on the model.

The analog output is preset to correspond to the pressure range 600…1100 hPa.

Using the proprietary protocol or the MODBUS-RTU protocol it is possible:

- to associate the analog output to a different pressure range, within the full measuring range;
- to associate the analog output to the temperature or relative humidity measured by the optional external probe or to the calculated humidity quantities;
- to add/remove an offset to the output minimum value (e.g., change from 0…10 V to 2…10 V or from 4…20 mA to 0…20 mA);
- to reverse the direction of the output, so that the output decreases as the measurement increases.

In the event of a measurement error, the output goes to a value 10% higher than the full scale (e.g., 11 V if the output is 0...10 V or 22 mA if the output is current).

Status of the transmitter:
The transmitter version with LCD option has two front LEDs: the **green** LED indicates the presence of the external power supply (blinks once per second), the **red** LED indicates the presence of any measurement errors (normally off, it blinks twice per second if in error).

5 ASCII proprietary protocol

To use the ASCII proprietary protocol, it is necessary to connect the instrument to the PC via a RS485/USB or RS485/RS232 converter and use a standard serial communication program. In the serial communication program, set the COM port number to which the instrument is connected and the communication parameters as follows:

- If the MODBUS-RTU protocol is set as the operating protocol in the instrument (default), set the Baud Rate 57600 and the parameters 8N2 in the serial communication program, then power cycle the instrument and send the command **@** within 10 seconds from the instrument power on.
- If the proprietary protocol is already set as the operating protocol in the instrument, it is possible to operate with Baud Rate 57600 and parameters 8N2 by sending the command **@** within 10 seconds from the instrument power on, or you can let the 10 seconds pass without sending the command **@** and operate with the communication parameters set in the instrument (default 19200, 8E1).

To change the instrument configuration, the serial command **CAL USER ON** must be sent first (the instrument replies with USER CAL MODE ON). The command CAL USER ON is automatically disabled after a few minutes of inactivity. If the settings should be only read, the command CAL USER ON is not required.

Below is the list of the serial commands.

Instrument information:

Command	Reply	Description
G0	*Model*	Instrument model
G1	&*Revision*|	Instrument hardware revision
G2	SN=nnnnnnnn	Instrument serial number
G3	Firm.Ver.=x.y	Instrument firmware revision
G4	Firm.Date=yyyy/mm/dd	Date of firmware revision

Protocol:

Command	Reply	Description
@	&|	Keeps the proprietary protocol operational even after 10 seconds from instrument power on. It must be sent within 10 seconds from instrument power on.
DPn	&|	Sets the operating protocol: ▪ Proprietary if n=0 ▪ MODBUS-RTU if n=1 *Default* : MODBUS-RTU (n=1)
GP	& n|	Reads the operating protocol set in the instrument.
SM	&|	Activates the MODBUS-RTU protocol immediately.
CMAn	&|	Sets the MODBUS-RTU address (1…247) to n. *Default* : 1
RMA	& n|	Reads the MODBUS-RTU address.

Warning: after sending the DP1 command, the instrument remains with the proprietary protocol. Send the command SM to activate the MODBUS-RTU protocol immediately, or power cycle the instrument.

RS485 communication parameters:

Command	Reply	Description
CMBn	&|	Sets the Baud Rate: ▪ 1200 if n=0 ▪ 19200 if n=4 ▪ 2400 if n=1 ▪ 38400 if n=5 ▪ 4800 if n=2 ▪ 57600 if n=6 ▪ 9600 if n=3 ▪ 115200 if n=7 *Default* : 19200 (n=4)
RMB	& n|	Reads Baud Rate setting
CMPn	&|	Sets parity and stop bits: ▪ 8N1 if n=0 [No parity, 1 stop bit] ▪ 8N2 if n=1 [No parity, 2 stop bits] ▪ 8E1 if n=2 [Even parity, 1 stop bit] ▪ 8E2 if n=3 [Even parity, 2 stop bits] ▪ 8O1 if n=4 [Odd parity, 1 stop bit] ▪ 8O2 if n=5 [Odd parity, 2 stop bits] The number of data bits is fixed to 8. *Default* : 8E1 (n=2)
RMP	& n|	Reads the setting of parity and stop bits.
CMWn	&|	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* : Immediate reception (n=0)
RMW	& n|	Reads the setting of waiting time after transmission with MODBUS-RTU protocol.

Measurements reading:

Command	Reply	Description
S0	&|	Disables the sending of the measurements enabled with S1.
S1	&|	Enables the sending of the measurements at regular intervals. To set the sending interval, use the command MT.
S2	& *Measurements*	Prints the measurements in the following sequence: ▪ Pressure ▪ Environmental temperature (*optional T/RH probe*) ▪ Relative humidity (*optional T/RH probe*) ▪ Dew Point (*calculated from T/RH*) ▪ Absolute humidity (*calculated from T/RH*) ▪ Wet bulb temperature (*calculated from T/RH*) ▪ Power supply voltage ▪ Internal temperature ▪ Error status (*value to be converted into binary*): Bit 0 = 1 ⇒ Pressure measurement error Bit 1 = 1 ⇒ Internal temperature measurement error Bit 2 = 1 ⇒ Environ. temperature measurement error Bit 3 = 1 ⇒ Relative humidity measurement error The measurements are expressed in the set meas. units.
MTn	&|	Sets the measurement interval to n seconds (1…30 s). *Default*: 1
NT	& n|	Reads the measurements sending interval.

Units of measurement:

Command	Reply	Description
CUn	&|	Sets the pressure unit of measurement of index n: ▪ Torr if n=0 ▪ Pa if n=1 ▪ hPa if n=2 ▪ kPa if n=3 ▪ mbar if n=4 ▪ psi if n=5 ▪ kg/cm^2 if n=6 ▪ mmH_2O if n=7 ▪ mmHg if n=8 ▪ inH_2O if n=9 ▪ inHg if n=10 ▪ atm if n=11 ▪ bar if n=12 *Default*: 2 ⇒ hPa
RU	& n|	Reads the pressure unit of measurement.
TTn	&|	Sets the temperature unit of measurement of index n: ▪ °C if n=0 ▪ °F if n=1 *Default*: 0 ⇒ °C
HT	& n|	Reads the temperature unit of measurement.

Quantities displayed on LCD:

Command	Reply	Description
DLx_1;…;x_6	&|	Enabling/disabling of the quantities to be displayed. x_1;…;x_6 is a sequence of 0 (disable) and 1 (enable) separated by semi-colons, where each "x" indicates a quantity in the order: P, T_{amb}, RH, DP, AH, T_{wet} Example: 1;0;1;0;0;0 enables pressure and RH.
RL	& n|	Reads the enabled/disabled quantities on LCD.

Pressure measurement offset:

Command	Reply	Description
COn	&|	Adds the offset n to the measured pressure value. For the value n to be entered, see **Note 1** on pag.14. The offset must be within the ±10 hPa range or equivalent range in the set unit of measurement, if different from hPa. *Default*: 0
RO	& n|	Reads the pressure measurement offset (see **Note 1** on pag.14).

Restoring the factory configuration:

Command	Reply	Description
DFLT	&|	Restores the factory configuration.

Analog output:

Command	Reply	Description
		Current output
CATn	&|	Associates the current analog output with: ▪ Pressure if n=0 ▪ Environmental temperature (T/RH probe) if n=1 ▪ Relative humidity (T/RH probe) if n=2 ▪ Dew Point (calculated) if n=3 ▪ Absolute humidity (calculated) if n=4 ▪ Wet bulb temperature (calculated) if n=5 *Default* : Pressure (n=0)
RAT	& n|	Reads the physical quantity associated with the current analog output.
CAOn	&|	Enable/disable the offset of the current analog output: ▪ Offset disabled if n=0 (0…20 mA) ▪ Offset enabled if n=1 (4…20 mA) *Default* : Offset enabled (n=1)
RAO	& n|	Reads the setting of the offset for the current analog output.
CASOn	&|	Sets the direct or reversed correspondence between current analog output and associated physical quantity: ▪ If n=0: Min. mA ⇒ Min. quantity Max. mA ⇒ Max. quantity ▪ If n=1: Min. mA ⇒ Max. quantity Max. mA ⇒ Min. quantity *Default* : Direct correspondence (n=0)
RASO	& n|	Reads the type of correspondence (direct or reversed) between current analog output and associated physical quantity.
CALn	&|	Sets n as the minimum value of the quantity associated with the current analog output. For the value n to be entered, see **Note 1** on pag.14. *Default* : 60000 (=600.00 hPa). See **Note 2**.
RAL	& n|	Reads the minimum value of the quantity associated with the current analog output (see **Note 1** on pag.14).
CAHn	&|	Sets n as the maximum value of the quantity associated with the current analog output. For the value n to be entered, see **Note 1** on pag.14. *Default* : 110000 (=1100.00 hPa). See **Note 2**.
RAH	& n|	Reads the maximum value of the quantity associated with the current analog output (see **Note 1** on pag.14).
RAF	& 0 *Minimum value* *Maximum value*	Simultaneously provides the information obtainable with the RAL e RAH commands.

Command	Reply	Description
Voltage output		
CVTn	&|	Associates the voltage analog output with: ▪ Pressure if n=0 ▪ Environmental temperature (T/RH probe) if n=1 ▪ Relative humidity (T/RH probe) if n=2 ▪ Dew Point (calculated) if n=3 ▪ Absolute humidity (calculated) if n=4 ▪ Wet bulb temperature (calculated) if n=5 *Default* : Pressure (n=0)
RVT	& n|	Reads the physical quantity associated with the voltage analog output.
CVOn	&|	Enable/disable the offset of the voltage analog output: ▪ Offset disabled if n=0 (0…1/0…5/0…10 V) ▪ Offset enabled if n=1 (0,2…1/1…5/2…10 V) *Default* : Offset disabled (n=0)
RVO	& n|	Reads the setting of the offset for the voltage analog output.
CVSOn	&|	Sets the direct or reversed correspondence between voltage analog output and associated physical quantity: ▪ If n=0: Min. mA ⇒ Min. quantity Max. mA ⇒ Max. quantity ▪ If n=1: Min. mA ⇒ Max. quantity Max. mA ⇒ Min. quantity *Default* : Direct correspondence (n=0)
RVSO	& n|	Reads the type of correspondence (direct or reversed) between voltage analog output and associated physical quantity.
CVLn	&|	Sets n as the minimum value of the quantity associated with the current voltage output. For the value n to be entered, see **Note 1**. *Default* : 60000 (=600.00 hPa). See **Note 2**.
RVL	& n|	Reads the minimum value of the quantity associated with the voltage analog output (see **Note 1**).
CVHn	&|	Sets n as the maximum value of the quantity associated with the voltage analog output. For the value n to be entered, see **Note 1**. *Default* : 110000 (=1100.00 hPa). See **Note 2**.
RVH	& n|	Reads the maximum value of the quantity associated with the voltage analog output (see **Note 1**).
RVF	& 0 *Minimum value* *Maximum value*	Simultaneously provides the information obtainable with the RVL e RVH commands.

Note 1: The value is an integer, expressed in the set unit of measurement and must take into account the resolution corresponding to the set unit of measurement (*see the column "ASCII proprietary protocol" of the table on page 5*). For example, if the set unit of measurement is hPa, the value is in hundredths of hPa (60000 equals 600.00 hPa. The number is automatically converted if the unit of measurement is changed (which must therefore be set first).

Note 2: The defaults changes automatically if the quantity associated with the output changes. The defaults are -400 (=-40.0 °C) / 600 (=60.0 °C) for temp. measurements, 0/1000 (=100.0%) for RH.

Date/time:

The setting of the date and time is necessary in case a relative humidity user calibration is performed, as the transmitter stores the date of the user calibration.

Date and time must be set before performing a user calibration.

Date and time are not retained in case of power failure.

Command	Reply	Description
DA*date time*	&|	Sets the transmitter date and time Date and time format = yyyy/mm/dd hh:mm:ss (e.g., DA2024/07/12 09:25:00)
GA	*Date and time*	Reads current date/time

Relative humidity calibration:

In the models with T/RH probe, a 2-point user RH calibration can be performed with the CRH1 and CRH2 commands.

User calibration must be enabled by sending the CAL USER ON command, and the calibration type in use must be set to "user" (CC1 command).

Before performing calibration, check that the date set in the transmitter is correct. In case the date is not set, the transmitter will not allow calibration.

Command	Reply	Description
CCn	&|	Sets the type of RH calibration to be used: ▪ Factory calibration if n=0 (*default*) ▪ User calibration if n=1
GC	(*)	Reads the date of factory calibration, the date of user calibration and the type of RH calibration in use.
CRH1nnn	&|	Calibrates the lower RH point to the value nnn in tenths of %RH (e.g., 33.0% ⇒ nnn=330).
CRH2nnn	&|	Calibrates the higher RH point to the value nnn in tenths of %RH (e.g., 75.0% ⇒ nnn=750).
CRHD	&|	Reset of user RH calibration.

(*) Reply to GC command:
Fact.Calib.Date=yyyy/mm/dd User.Calib.Date=yyyy/mm/dd Cal.Mode=Factory or User

6 Modbus-RTU protocol

By default, the instrument 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 Coils and Holding Registers described later.

The MODBUS-RTU protocol, if set as the operating protocol (default), is active after 10 seconds from the instrument power on.

In order to change the instrument configuration using the MODBUS-RTU protocol, the value 1 must be written first in the *Coil* with address 1.

Below is the list of registers.

Input Registers:

Address	Description	Format
0	Pressure in the set unit of measurement (*see table on page 5 for the resolution*).	32-bit Integer (**Note 3**)
2	Pressure in the set unit of measurement (*see table on page 5 for the resolution*).	16-bit Integer
3	Power supply voltage in Volt [x10]	16-bit Integer
4	Internal temperature in the set unit of measurement [x10]	16-bit Integer
5	Error register: Bit 0 = 1 ⇒ Pressure measurement error Bit 1 = 1 ⇒ Internal temperature measurement error Bit 2 = 1 ⇒ Environ. temperature measurement error Bit 3 = 1 ⇒ Relative humidity measurement error	16-bit Integer
11	Environmental temperature (T/RH probe) in the set unit of measurement [x10]	16-bit Integer
12	Relative humidity (T/RH probe) in % [x10]	16-bit Integer
13	Dew Point (calculated from T/RH) in the set unit of measurement [x10]	16-bit Integer
14	Absolute humidity (calculated from T/RH) in g/m^3 [x10]	16-bit Integer
15	Wet bulb temperature (calculated from T/RH) in the set unit of measurement [x10]	16-bit Integer

Coils:

Address	Description	Format
0	Set 1 to restore the factory configuration. Bit zeroing is automatic.	Bit
1	Enable configuration change: 0=no (default), 1=yes. The changes to *Coils* and *Holding Registers* will be accepted only if this register is set to 1.	Bit
2	Sets waiting time after transmission with MODBUS-RTU protocol: 0=immediate reception (default); 1=waiting 3.5 characters.	Bit

Address	Description	Format
3	Enable/disable the offset of the current analog output: 0=offset disabled (0…20 mA) 1=offset enabled (default, 4…20 mA)	Bit
4	Sets the direct or reversed correspondence between current analog output and associated physical quantity: 0=direct (default): Min. mA ⇒ Min. quantity Max. mA ⇒ Max. quantity 1=reversed: Min. mA ⇒ Max. quantity Max. mA ⇒ Min. quantity	Bit
6	Enable/disable the offset of the voltage analog output: 0=offset disabled (default, 0…1/0…5/0…10 V) 1=offset enabled (0,2…1/1…5/2…10 V)	Bit
7	Sets the direct or reversed correspondence between voltage analog output and associated physical quantity: 0=direct (default): Min. mA ⇒ Min. quantity Max. mA ⇒ Max. quantity 1=reversed: Min. mA ⇒ Max. quantity Max. mA ⇒ Min. quantity	Bit

Holding Registers:

Address	Description	Format
0	RS485 Baud Rate: 0=1200 4=19200 (default) 1=2400 5=38400 2=4800 6=57600 3=9600 7=115200	16-bit Integer
1	RS485 parity and stop bits: 0=8N1 3=8E2 1=8N2 4=8O1 2=8E1 (default) 5=8O2 [N=no parity, E=even parity, O=odd parity]	16-bit Integer
2	Instrument address for the MODBUS-RTU protocol (1…247, default=1).	16-bit Integer
3	Pressure unit of measurement: **0** ⇒ Torr, **1** ⇒ Pa, **2** ⇒ hPa, **3** ⇒ kPa, **4** ⇒ mbar, **5** ⇒ psi, **6** ⇒ kg/cm^2, **7** ⇒ mmH_2O, **8** ⇒ mmHg, **9** ⇒ mmH_2O, **10** ⇒ inHg, **11** ⇒ atm, **12** ⇒ bar *Default*: 2 ⇒ hPa	16-bit Integer
4	Offset added to the measured pressure value. For the value, see **Note 4**. The offset must be within the ±10 hPa range or equivalent range in the set unit of measurement, if different from hPa. *Default*: 0.	16-bit Integer
5	Temperature unit of measurement: **0** ⇒ °C, **1** ⇒ °F *Default*: 0 ⇒ °C	16-bit Integer
6	Measurement interval in seconds (1…30, default=1).	16-bit Integer

Address	Description	Format
8	Minimum value of the quantity associated with the current analog output. For the value, see **Note 4**. *Default* : 60000 (=600.00 hPa). See **Note 5**.	32-bit Integer (**Note 3**)
10	Maximum value of the quantity associated with the current analog output. For the value, see **Note 4**. *Default* : 110000 (=1100.00 hPa). See **Note 5**.	32-bit Integer (**Note 3**)
13	Minimum value of the quantity associated with the voltage analog output. For the value, see **Note 4**. *Default* : 60000 (=600.00 hPa). See **Note 5**.	32-bit Integer (**Note 3**)
15	Maximum value of the quantity associated with the voltage analog output. For the value, see **Note 4**. *Default* : 110000 (=1100.00 hPa). See **Note 5**.	32-bit Integer (**Note 3**)
17	Setting of the type of RH calibration to be used: 0=user calibration; 1=factory calibration (default).	16-bit Integer
18	Enabling/disabling of the quantities to be displayed. Set the bit corresponding to the quantity to 1 if you wish to include the quantity in the viewing cycle: Bit 0: P Bit 1: T_{amb} Bit 2: UR Bit 3: T_{dew} Bit 4: UA Bit 5: T_{wet}	16-bit Integer

Note 3: The value is a 32-bit integer; two consecutive registers starting from the one indicated must be accessed to read it. The register with lower address contains the least significant bits.

Note 4: The value is an integer, expressed in the set unit of measurement and must take into account the resolution corresponding to the set unit of measurement (*see the column "Modbus protocol IR 0" of the table on page 5*). For example, if the set unit of measurement is hPa, the value indicates hundredths of hPa (60000 equals 600.00 hPa. The number is automatically converted if the unit of measurement is changed (which must therefore be set first).

Note 5: The defaults changes automatically if the quantity associated with the output changes. The defaults are -400 (=-40.0 °C) / 600 (=60.0 °C) for temp. measurements, 0/1000 (=100.0%) for RH.

7 Maintenance

it is recommended to perform a calibration check of the instrument annually at accredited laboratories.

Do not use aggressive cleaning agents or incompatible with the materials indicated in the technical specifications. For cleaning, use a soft dry cloth or slightly dampened with clean water.

8 Safety instructions

The instrument 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 instruments 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 instrument 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 models with input for T/RH probe are supplied with HP3517ITC1.2 probe, HD9007A-1 protection from solar radiations (for the probe) and HD9007T26.2 fitting (for fixing the probe to the solar protection).

FIXB001 Static port with support bracket and silicone tube.

SWD10F 100…240 Vac / 12 Vdc – 1A power supply. Includes adapter cable with jack connector on the power supply side and free wires on the instrument side.

Spare parts

HP3517ITC1.2 **Spare** temperature and relative humidity combined probe. 4-pole M12 connector. Stem dimensions: Ø14 x 135 mm. Material: PBT. Cable length: 2 m.

HD9007A-1… **Spare** 12-ring protection from solar radiations. Supplied with mounting bracket. For the HP3517ITC1.2 probe.

HD9007T26.2 **Spare** fitting for Ø 14 mm probes for the protection from solar radiations HD9007A-1.

NOTES

NOTES

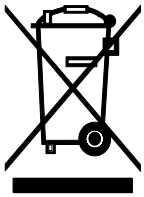
WARRANTY

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

senseca.com

Senseca Italy S.r.l.
Via Marconi, 5
35030 Selvazzano Dentro (PD)
ITALY
info@senseca.com

senseca