

Operating manual

GSM/3G Data Logger
HD33[L]MT.GSM
HD33[L]MT.3G



Companies / Brands of GHM

Members of GHM GROUP:

GREISINGER

HONSBERG

Martens

IMTRON

Delta OHM

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www.deltaohm.com

Keep for future reference.

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1 INTRODUCTION

The HD33[L]MT.GSM (with GSM/GPRS module) and HD33[L]MT.3G (with 3G module) data loggers are specifically designed for use in weather stations. Many types of sensors can be connected thanks to its standard terminal header inputs. The data loggers are equipped with:

- 4 analog independently configurable inputs (0...50 mV, -50...+50 mV, 0...1 V, 0...10 V, 0...20 mA or 4...20 mA, Pt100, Pt1000, thermocouple, potentiometer, pyrogeometer).
- 2 voltage-free counting contact inputs (e.g. a tipping bucket rain gauge and a cup anemometer can be connected).
- One RS485 "Master" port with Modbus-RTU protocol.
- One SDI-12 "Master" port compatible with version 1.3 of SDI-12 protocol.
- 2 voltage-free contact alarm outputs.

They detect the atmospheric pressure by means of an **optional** internal sensor.

On request, input with M12 connector for relative humidity and temperature with NTC sensor combined probe or, alternatively, for temperature only probe with NTC sensor.

Optional custom LCD display.

Thanks to GSM/GPRS or 3G transmission, the user will not have to remove the data logger from its position or reach the place where the data logger is installed to download the data measured with the PC: the instrument can send the data via **e-mail** or **FTP** and can upload the data on an **HTTP** server (for example the Delta OHM portal "**www.deltaohm.cloud**"). You can also make a direct GPRS/3G TCP/IP connection with a remote PC which has an Internet connection.

The data logger GSM functions can be remotely controlled by sending SMS messages.

For each detected quantity, the user can set two alarm thresholds (high threshold and low threshold), the alarm hysteresis and a delay in the generation of the alarm. The overrun of the thresholds can be signaled by alarm e-mails or SMS messages. Two voltage-free contact alarm outputs are also available.

HD35AP-S PC software, downloadable free of charge from the Delta OHM website, allows configuration of data logger, displaying measurements in real time both in graphical and numerical format, data download. The data transferred to the PC are entered into a database.

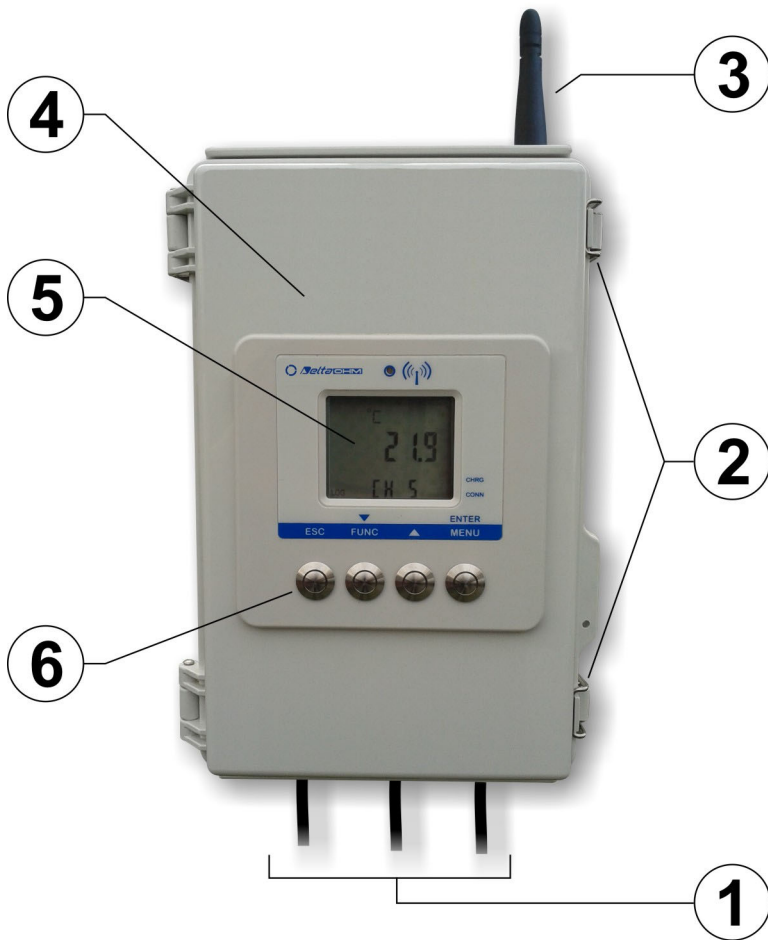
The internal clock of the data logger has high accuracy and is extremely stable in the whole operating temperature range of the instrument. It supports the **automatic time synchronization** with an HTTP or NTP reference server.

The **optional** 12 V / 3.4 Ah rechargeable backup battery to be installed inside the case prevents the loss of recordings in case of no external power supply. The battery charger is integrated in the instrument. The data logger can be powered by a solar panel and is designed to be **low power**: can operate for weeks even in absence of battery recharging from the solar panel. Power supply 18...28 Vdc if the rechargeable battery is used or 7...28 Vdc if the rechargeable battery is not used.

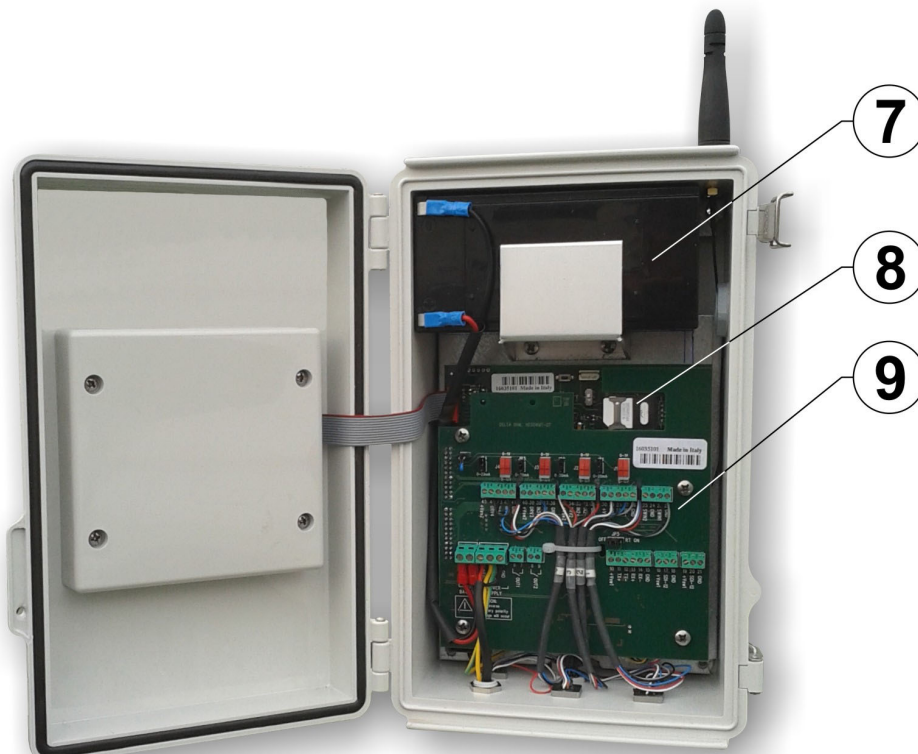
A switched power supply output allows powering the sensors only when measurements have to be taken.

IP 65 housing.

2 DESCRIPTION



1. Cable glands, M12 connectors and USB port with mini-USB connector
2. Housing closing hooks
3. GSM/3G Antenna
4. Housing cover
5. LCD (optional)
6. Push-buttons
7. Battery (optional)
8. SIM holder
9. Internal terminal header



3 TECHNICAL CHARACTERISTICS

<i>Power supply</i>	If the rechargeable battery is used: 18...28 Vdc (from a 12 V solar panel or from a DC power supply) If the rechargeable battery is not used: 7...28 Vdc (from a DC power supply)
<i>Power consumption</i>	< 3 mA during measurement < 1 A peak during GSM/3G activity
<i>Battery</i>	Optional internal lead 12 V / 3.4 Ah. Maximum charge current 1 A. The autonomy depends on the number and type of sensors connected.
<i>Switched power supply output</i>	If the data logger is powered by a solar panel (+Vpanel input), the output is equal to the voltage of the internal lead battery (nominal 12 V). If the data logger is powered by the +Vdc input, the output is equal to the voltage of the +Vdc input. The output is active only when the external sensors have to be powered.
<i>Antenna</i>	External
<i>Measuring interval</i>	1, 2, 5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min
<i>Logging interval</i>	1, 2, 5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min
<i>Internal memory</i>	Circular management or stop logging if memory is full. Number of samples: from 242,850 to 858,070 depending on the number of detected quantities.
<i>Alarm</i>	Sending of alarm e-mail and SMS. Two voltage-free normally open (NO) contact alarm outputs. Max 300 mA @ 30 Vdc resistive charge.
<i>Display</i>	Optional custom LCD
<i>LED indicator</i>	2-color LED: power on (blinks red), GSM/3G activity (blinks green)
<i>Connection to PC</i>	USB port with mini-USB connector
<i>Internal clock drift</i>	± 2 ppm (0...+40 °C) / ± 5 ppm (-40...+70 °C)
<i>Operating conditions</i>	-40...+70 °C / 0...100 %RH for the version without LCD -20...+70 °C / 0...100 %RH for the version with LCD
<i>Connectors for external probes</i>	M12 connectors or cable glands
<i>Weight</i>	1 kg approx.
<i>Housing</i>	Dimensions: 270 x 170 x 110 mm (excluding external antenna) Material: Polycarbonate (PC) Protection degree: IP 65 (with protective cap on the USB connector)
<i>Installation</i>	Fixing to a 40 mm diameter mast.

Measurement characteristics:

Temperature (instrument in line with the probe HP3517TC... or TP350NTC...)

Sensor	NTC 10 k Ω @ 25 °C
Measuring range	-40...+105 °C
Resolution (of instrument)	0.1 °C
Accuracy	± 0.3 °C in the range 0...+70 °C / ± 0.4 °C outside
Stability	0.1 °C / year

Relative Humidity (instrument in line with the probe HP3517TC ...)

Sensor	Capacitive
Measuring range	0...100 %RH
Resolution (of instrument)	0.1 %
Accuracy	± 1.8 %RH (0...85 %RH) / ± 2.5 %RH (85...100 %RH) @ T=15...35 °C $\pm (2 + 1.5\% \text{ measure})\%$ @ T=remaining range
Sensor operating temperature	-40...+80 °C
Response time	T ₉₀ < 20 s (air speed = 2 m/s, without filter)
Temperature drift	$\pm 2\%$ over the whole operation temperature range
Stability	1% / year
Calculated quantities	Dew Point

For the measurement of relative humidity and temperature, the combined probe **HP3517TC2** with NTC 10K Ω @ 25 °C temperature sensor is used, if requested. Alternatively, to the same input can be connected the temperature only probe **TP350NTC2**. The outdoor installation of the combined temperature and relative humidity probe requires HD9007A-1 or HD9007A-2 protection against solar radiations. **Replacement of the humidity probe requires recalibration of the instrument in line with the new probe.**

Atmospheric pressure (optional)

Sensor	Piezoresistive
Measuring range	300...1100 hPa
Resolution (of instrument)	0.1 hPa
Accuracy	± 0.5 hPa (800...1100 hPa) @ T=25°C ± 1 hPa (300...1100 hPa) @ T=0...50°C
Stability	1 hPa / year
Temperature drift	± 3 hPa tra -20...+60 °C

Pt100/Pt1000

Measuring range	-200...+650 °C
Resolution	0.1 °C
Accuracy	± 0.1 °C (excluding probe error)
Sensor coefficient	$\alpha=0.00385$ °C ⁻¹
Connection	2, 3 or 4 wires

Thermocouple

Thermocouple type	K, J, T, N, E. The inputs are not isolated, use thermocouples with isolated hot junction.	
Measuring range	type K : -200...+1370 °C type J : -100...+750 °C type E : -200...+750 °C type T : -200...+400 °C type N : -200...+1300 °C	
Resolution	0.1 °C	
Accuracy (excluding probe error)	type K : ± 0.1 °C (< 600 °C) type E : ± 0.1 °C (< 300 °C) ± 0.2 °C (> 600 °C) ± 0.2 °C (> 300 °C) type N : ± 0.1 °C (< 600 °C) type J : ± 0.1 °C ± 0.2 °C (> 600 °C) type T : ± 0.1 °C	

0/4...20 mA input

<i>Shunt resistance</i>	Internal (50 Ω)
<i>Resolution</i>	16 bit
<i>Accuracy</i>	$\pm 2 \mu\text{A}$

Inputs 0...50 mV / -50...50 mV / 0...1 V / 0...10 V

<i>Input Resistance</i>	100 M Ω
<i>Resolution</i>	16 bit
<i>Accuracy</i>	$\pm 0.01\%$ f.s.

Inputs for counting the switchings of a voltage-free contact

<i>Switching frequency</i>	50 Hz max.
<i>Hold Time</i>	10 ms min.

Potentiometer input

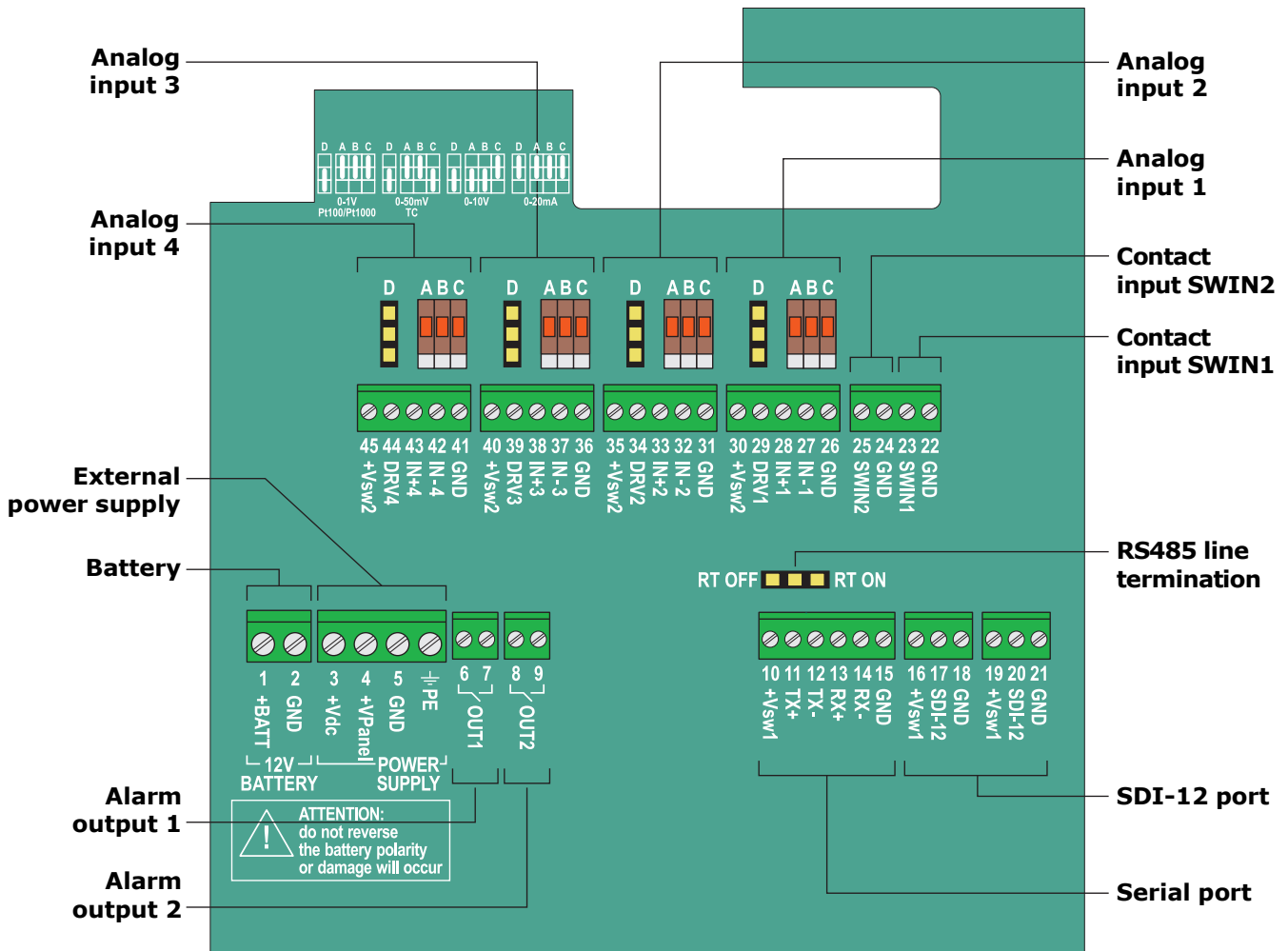
<i>Potentiometer</i>	Typically 10 k Ω
<i>Resolution</i>	16 bit
<i>Accuracy</i>	$\pm 0.01\%$ f.s.

Rainfall measurement

The data logger can record:

- Maximum rainfall rate
- Daily rainfall
- Total rainfall
- Amount of rainfall which has fallen in the logging interval

4 INTERNAL CONNECTIONS



Power supply:

To power the data logger with a solar panel, connect the panel to the +VPanel and GND terminals. To power the data logger with a direct voltage power supply unit, (for example HD32MT.SWD), connect the power supply unit to the +Vdc and GND terminals.

ATTENTION: connect the PE terminal to ground through the cable gland at the bottom of the housing.

If a direct voltage power supply unit is used and the data logger is equipped with a rechargeable lead battery, the battery can be charged by shorting the +Vdc and +Vpanel terminals (provided that +Vdc is within the range 18...27 Vdc).

Analog inputs:

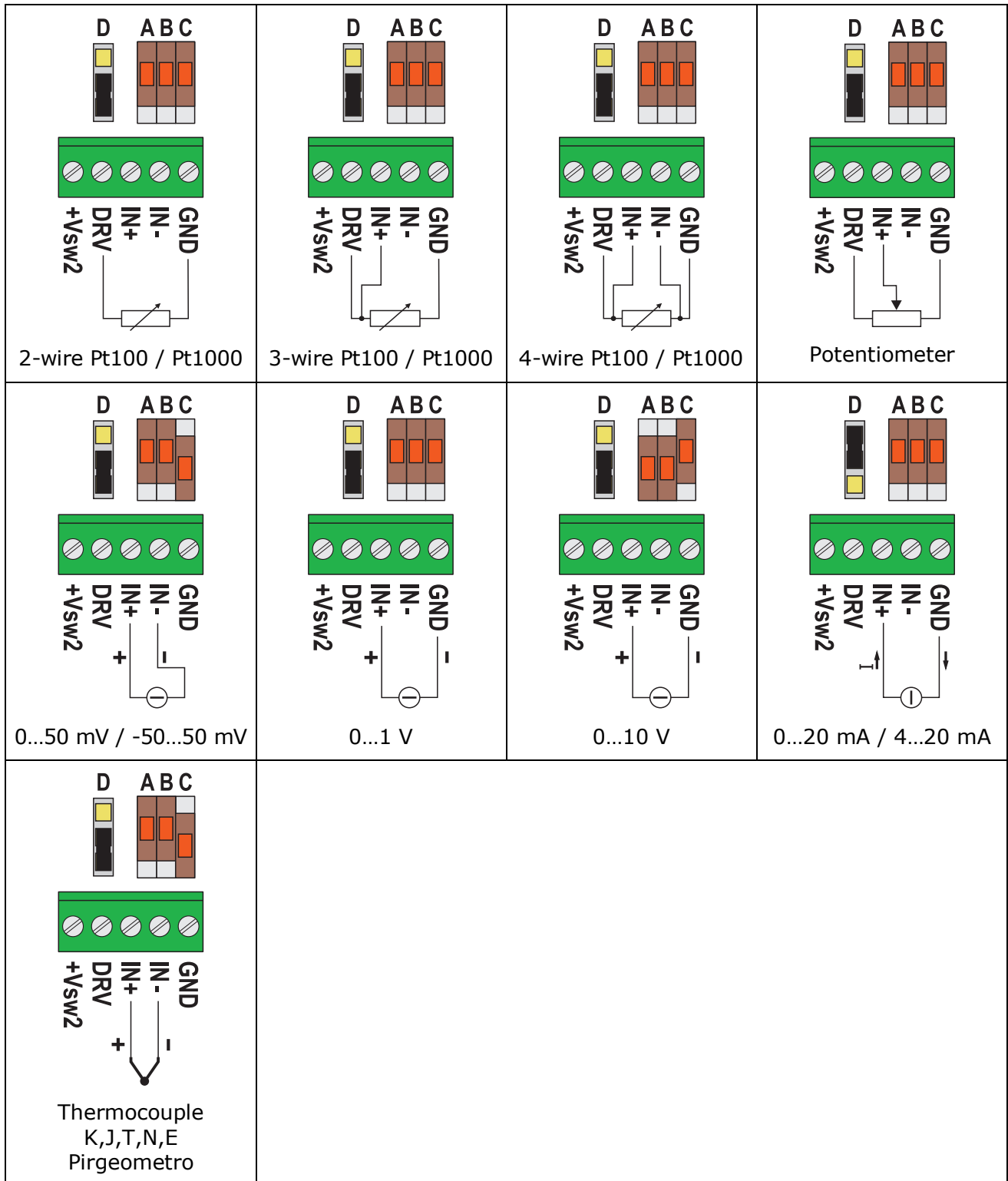
Each analog input can be configured as a Pt100/Pt1000, thermocouple, 0/4...20 mA (shunt resistance inside), 0...50 mV, -50...50 mV, 0...1 V, 0...10 V or potentiometric input. A pyrgometer can also be connected.

The current input accepts any value in the range 0 to 20 mA.

The switched power supply output **+Vsw2** can be used to power the sensors and can be configured as always active, active only during measurements acquisition or always disabled (if only passive sensors are used). When active, it has the same value as the battery voltage if the data logger is powered by a solar panel (+Vpanel input), while it is equal to the voltage of the +Vdc input if the data logger is powered by a direct voltage power supply unit (+Vdc input).

Configuration of inputs is done with the HD35AP-S software.

Below are the connections in the various configurations.



SWIN1 contact input for rain gauge: connect the rain gauge output to the terminals SWIN1 and GND. The rain gauge must be connected to this input to have the calculated quantities (e.g. rainfall rate, ...) available.

SWIN2 contact input: connect the output contact of the sensor between the terminals SWIN2 and GND. The default contact state can be configured: Normally Open (NO) or Normally Closed (NC). The open state is logged as 1, while the closed state is logged as 0. The

logged contact state depends on how long the contact remains in the non-default state during the logging interval. If the contact remains in the non-default state for more than a given time (configurable and expressed as a percentage of the logging interval), the non-default state is logged. Vice versa, if the contact remains in the non-default state for less than the set time, the default state is logged.

Example 1: if the contact default state is Normally Open, the logging interval is 30 seconds and the time set for the contact state change is 50% of the logging interval, 0 is logged (contact closed, non-default state) if the contact remains closed for more than 15 seconds during the logging interval, otherwise 1 is logged (contact open, default state).

Example 2: if the contact default state is Normally Closed, the logging interval is 1 minute and the time set for the contact state change is 10% of the logging interval, 1 is logged (contact open, non-default state) if the contact remains open for more than 6 seconds during the logging interval, otherwise 0 is logged (contact closed, default state).

On request, the SWIN2 contact input can be factory set up for connecting a cup anemometer.

Serial port:

The port allows connecting a network of sensors with RS485 MODBUS-RTU output. Connect the signals **DATA+** and **DATA-** from the network of sensors to the terminals **TX+** and **TX-** respectively. Connect the ground of the network of sensors to the terminal GND.

The switched power supply output **+Vsw1** can be used to power the sensors and can be configured as always active, active only during measurements acquisition or always disabled. When active, it has the same value as the battery voltage if the data logger is powered by a solar panel (+Vpanel input), while it is equal to the voltage of the +Vdc input if the data logger is powered by a direct voltage power supply unit (+Vdc input).

OUT1 / OUT2 alarm outputs: the instrument is equipped with 2 voltage-free contact alarm outputs that can be handled automatically by the data logger or manually. When handled automatically, the alarm conditions that activate the outputs can be configured by using the HD35AP-S software (see the instructions of the software). When handled manually, the alarm output states can be additionally configured via display and/or SMS commands.

WARNING:

Use the switched power supply output **+Vsw** only to power sensors having a maximum power supply greater or equal to:

- the battery voltage, if the data logger is powered by a solar panel (+Vpanel input);
- the +Vdc input voltage, if the data logger is powered by a direct voltage power supply unit (+Vdc input).

5 FRONT PANEL



1. Bicolor LED: red blinking indicates that the instrument is powered, blinks green to signal the GSM/3G activity.
2. **ESC** button: exits the selected function.
3. **FUNC/▼** button: in normal operation, it displays the maximum (MAX), the minimum (MIN) and the average (AVG) of the measurements; it scrolls downwards the available options or decreases the set value in the menu.
4. **▲** button: in normal operation, it scrolls the quantities measured by the data logger; it scrolls upwards the available options or decreases the set value in the menu.
5. **MENU/ENTER** button: allows access to the configuration menu; confirm the selected option or the set value in the menu.

Manual reset of the statistical values (MAX, MIN, AVG):

- 1) In measurement mode, press **FUNC** until the reset request appears.
Note: the reset request appears only if the manual reset, not the daily automatic reset, is enabled.
- 2) Select Yes by using the **▲** button.
- 3) Press **ENTER**.

6 CONFIGURATION MENU

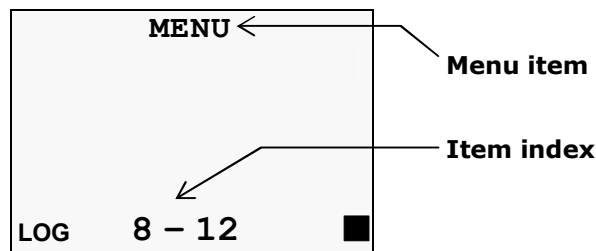
The menu allows displaying the data logger information and changing operation parameters. The menu is structured in levels, with main categories and submenus.

To access the menu you need to enter the **user password** (configurable through the appropriate menu item) or the **administrator password** (supplied with the system and not editable). Entering the user password makes some settings not changeable.

The instrument exits automatically the menu if no key is pressed for 3 minutes. After exiting the menu, the password remains active for a few minutes, during which you may enter the menu again without re-entering the password. It is possible to exit the menu by disabling immediately the password by performing a password level reset in the *Password* menu.

To access a menu parameter proceed as follows:

1. Press **MENU**, the first digit of the password will blink.
2. Using **▼/▲** keys, set the first digit and confirm with **ENTER**, the second digit of the password will blink. Set all the password digits in the same way.
3. Using **▼/▲** keys, select a main category in the menu and confirm with **ENTER**. Menu items appear one at a time in the upper part of the display; the lower part of the display shows the position of the item in the menu and the total number of items in the menu (for ex. "8 - 12" means the eighth item in a menu of 12 items).



4. If the selected main category has a submenu, select the desired item using **▼/▲** keys and confirm with **ENTER**. Scrolling the submenus displays also the parameter current setting.
5. To change the selected parameter, if allowed, use **▼/▲** keys to select the desired setting and confirm with **ENTER**. If you are setting a numeric value, you can fast forward by keeping **▼** or **▲** keys depressed.

To exit the main menu or a sub menu, select EXIT item (last menu item) or press ESC key.

If it is not allowed to change a parameter, the notice N/A (Not Available) will appear when pressing ENTER to select it.

Menu structure

The complete structure of the main menu with the relevant submenus is shown below.

1) DEV_INFO (information)

It lists the general information of the instrument: model, serial number, user code, group name, firmware version, calibration date, etc. Information is shown in the upper part of the display.

2) FUNC_MENU (statistics reset mode and test mode)

- 1) **FUNC_RST_MODE**: statistical info (MAX, MIN, AVG) reset mode. Select 0 (*MAN_RST*) for the manual reset; select 1 (*AUTO_RST*) for the daily automatical reset at 6 am.
- 2) **TEST_MODE**: enables or disables the test mode. Select *On* to activate the test mode. In test mode, the instrument temporarily suspends the logging activities and the calculation of the integral and statistical functions until the test mode is exited. The instrument automatically exits the test mode after 1 hour.

- 3) **EXIT**: returns to the main menu.

3) **RELY_MENU** (relay settings)

- 1) **RELY_ONE_MODE**: relay "one" functioning mode. Select *0 (AUTO_MODE)* to enable the data logger automatic relay control as a function of the measurement alarm thresholds and other alarm conditions; select *1 (MAN_MODE)* to control the relay status manually.
- 2) **RELY_ONE_STAT**: Reset or set relay "one" status when relay "one" is handled manually. Select *Off/On* to respectively reset/set relay status.
- 3) **RELY_TWO_MODE**: relay "two" functioning mode. Select *0 (AUTO_MODE)* to enable the data logger automatic relay control as a function of the measurement alarm thresholds and other alarm conditions; select *1 (MAN_MODE)* to control relay status manually.
- 4) **RELY_TWO_STAT**: Reset or set relay "two" status when relay "two" is handled manually. Select *Off/On* to respectively reset/set relay status.
- 5) **EXIT**: returns to the main menu.

4) **GSM_MENU** (GSM/3G settings)

- 1) **SMS_ALARM**: enables or disables the alarm via SMS. Select *On* to enable the sending of alarm SMSes.
- 2) **EML_ALARM**: enables or disables the alarm via e-mail. Select *On* to enable the sending of alarm e-mails.
- 3) **EML_DATA_TX**: enables or disables the periodic sending of data via e-mail. Select *On* to enable the sending of data via e-mails.
- 4) **EML_DATA_TX_TIME**: e-mail data sending interval.
 - 1 (*REAL TIME*): immediately after logging
 - 0 (*15 min*): every 15 minutes
 - 1 (*30 min*): every 30 minutes
 - 2 (*1 h*): every hour
 - 3 (*2 h*): every 2 hours
 - 4 (*4 h*): every 4 hours
 - 5 (*8 h*): every 8 hours
 - 6 (*12 h*): every 12 hours
 - 7 (*1 d*): once a day
 - 8 (*2 d*): every 2 days
 - 9 (*4 d*): every 4 days
 - 10 (*1 w*): once a week
- 5) **EML_DATA_TX_MODE**: format of the data sent via e-mail.
 - 0 (*LOG*): only internal LOG format (for database)
 - 1 (*CSV*): only standard CSV format (for Excel®)
 - 2 (*LOG+CSV*): both internal LOG and standard CSV formats
- 6) **FTP_DATA_TX**: enables or disables the periodic sending of data via FTP. Select *On* to enable the sending of data via FTP.
- 7) **FTP_DATA_TX_TIME**: FTP data sending interval.
See the item *EML_DATA_TX_TIME* above for the available intervals.
- 8) **FTP_DATA_TX_MODE**: format of the data sent via FTP.
See the item *EML_DATA_TX_MODE* above for the available formats.
- 9) **HTTP_DATA_TX**: enables or disables the periodic sending of data via HTTP. Select *On* to enable the sending of data via HTTP.
- 10) **HTTP_DATA_TX_TIME**: HTTP data sending interval.
See the item *EML_DATA_TX_TIME* above for the available intervals.

11) **EXIT**: returns to the main menu.

5) **THLD_MENU** (alarm thresholds)

Note: the menu items depend on the data logger configuration.

- 1) **CH1_Input Type_DOWN_THLD**: lower alarm threshold of the quantity measured by the analog input 1.
- 2) **CH1_Input Type_UP_THLD**: higher alarm threshold of the quantity measured by the analog input 1.
- 3) **CH2_Input Type_DOWN_THLD**: lower alarm threshold of the quantity measured by the analog input 2.
- 4) **CH2_Input Type_UP_THLD**: higher alarm threshold of the quantity measured by the analog input 2.
- 5) **CH3_Input Type_DOWN_THLD**: lower alarm threshold of the quantity measured by the analog input 3.
- 6) **CH3_Input Type_UP_THLD**: higher alarm threshold of the quantity measured by the analog input 3.
- 7) **CH4_Input Type_DOWN_THLD**: lower alarm threshold of the quantity measured by the analog input 4.
- 8) **CH4_Input Type_UP_THLD**: higher alarm threshold of the quantity measured by the analog input 4.
- 9) **ATM_PRES_DOWN_THLD_unit**: lower alarm threshold of the atmospheric pressure in the set unit of measurement.
- 10) **ATM_PRES_UP_THLD_unit**: higher alarm threshold of the atmospheric pressure in the set unit of measurement.
- 11) **BATT_DOWN_THLD_V**: lower alarm threshold of the battery voltage in V.
- 12) **BATT_UP_THLD_V**: higher alarm threshold of the battery voltage in V.
- 13) **VOLT_PWR_SPLY_DOWN_THLD_V**: lower alarm threshold of the external power supply in V.
- 14) **VOLT_PWR_SPLY_UP_THLD_V**: higher alarm threshold of the external power supply in V.
- 15) **MAX_RAIN_RATE_DOWN_THLD_unit**: lower alarm threshold of the rainfall rate in the set unit of measurement.
- 16) **MAX_RAIN_RATE_UP_THLD_unit**: higher alarm threshold of the rainfall rate in the set unit of measurement.
- 17) **CURR_RAIN_DOWN_THLD_unit**: lower alarm threshold of the rainfall quantity in the set unit of measurement.
- 18) **CURR_RAIN_UP_THLD_unit**: higher alarm threshold of the rainfall quantity in the set unit of measurement.
- 19) **THLD_ALARM**: enables or disables the buzzer when measurement thresholds are exceeded.
- 20) **EXIT**: returns to the main menu.

6) **HYST_MENU** (hysteresis of the alarm thresholds)

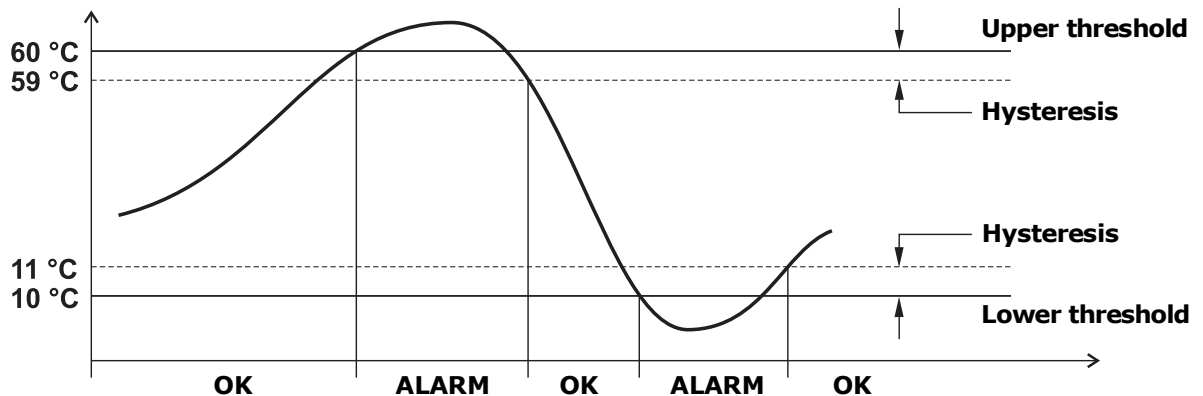
Note: the menu items depend on the data logger configuration.

- 1) **CH1_Input Type_HYST%**: hysteresis of the alarm thresholds of the quantity measured by the analog input 1.
- 2) **CH2_Input Type_HYST%**: hysteresis of the alarm thresholds of the quantity measured by the analog input 2.
- 3) **CH3_Input Type_HYST%**: hysteresis of the alarm thresholds of the quantity measured by the analog input 3.

- 4) **CH4_Input Type_HYST%**: hysteresis of the alarm thresholds of the quantity measured by the analog input 4.
- 5) **ATM_PRES_HYST%**: hysteresis of the alarm thresholds of the atmospheric pressure.
- 6) **BATT_HYST%**: hysteresis of the alarm thresholds of the battery voltage.
- 7) **VOLT_PWR_SPLY_HYST%**: hysteresis of the alarm thresholds of the external power supply.
- 8) **MAX_RAIN_RATE_HYST%**: hysteresis of the alarm thresholds of the rainfall rate.
- 9) **CURR_RAIN_HYST%**: hysteresis of the alarm thresholds of the rainfall quantity.
- 10) **EXIT**: returns to the main menu.

The width of the hysteresis is a percentage (0 ... 100%) of the difference between the two alarm thresholds.

For example, if Hysteresis=2%, Lower threshold=10 °C and Upper threshold=60 °C, the hysteresis is $(60-10) \times 2 / 100 = 1$ °C:



7) **ALRM_DELY_MENU** (delay, in seconds, for alarm activation)

Note: the menu items depend on the data logger configuration.

- 1) **CH1_Input Type_ALARM_DELY**: delay for alarm activation of the quantity measured by the analog input 1.
- 2) **CH2_Input Type_ALARM_DELY**: delay for alarm activation of the quantity measured by the analog input 2.
- 3) **CH3_Input Type_ALARM_DELY**: delay for alarm activation of the quantity measured by the analog input 3.
- 4) **CH4_Input Type_ALARM_DELY**: delay for alarm activation of the quantity measured by the analog input 4.
- 5) **ATM_PRES_ALARM_DELY**: delay for alarm activation of the atmospheric pressure.
- 6) **BATT_ALARM_DELY**: delay for alarm activation of the battery voltage.
- 7) **VOLT_PWR_SPLY_ALARM_DELY**: delay for alarm activation of the external power supply.
- 8) **MAX_RAIN_RATE_ALARM_DELY**: delay for alarm activation of the rainfall rate.
- 9) **CURR_RAIN_ALARM_DELY**: delay for alarm activation of the rainfall quantity.
- 10) **EXIT**: returns to the main menu.

If the measured value drops below the lower threshold or exceeds the upper threshold, the alarm is generated after the time set. The alarm is generated immediately if 0 is set. If the alarm condition ends before the delay time is elapsed, the alarm is not generated.

8) **MEAS_UNIT_MENU** (measurement unit)

- 1) **TEMP_UNIT_MEAS**: temperature unit of measurement.
 - 0 (°C)
 - 1 (°F)
- 2) **PRES_UNIT_MEAS**: atmospheric pressure unit of measurement.
 - 0 (mbar)
 - 1 (bar)
 - 2 (Pa)
 - 3 (hPa)
 - 4 (kPa)
 - 5 (atm)
 - 6 (mmHg)
 - 7 (mmH₂O)
 - 8 (inHg)
 - 9 (inH₂O)
 - 10 (kgf/cm²)
 - 11 (PSI)
- 3) **RAIN_UNIT_MEAS**: rainfall quantity unit of measurement.
 - 0 (mm)
 - 1 (inches)
 - 2 (counts)
- 4) **EXIT**: returns to the main menu.

9) **LOG_MENU** (logging)

- 1) **LOG_STAT**: enables or disables the logging.
- 2) **LOG_CYCL**: choice between cyclical management (the new data overwrite the old ones when the memory is full) or non-cyclical management (logging stops when the memory is full) of the data logger memory. Select *YES* for the cyclical management.
- 3) **LOG_TIME**: choice of logging interval. If it is higher than the measuring interval, the average of the measurements acquired during the interval will be stored (except for the measurements for which the average is meaningless; e.g., the maximum rainfall rate, the total rainfall, etc.).
- 4) **MEAS_TIME**: choice of the measurements acquisition interval. It is forced to the value *LOG_TIME* if a higher value is set.
- 5) **LOG_DEL**: deletes all stored measurements from the data logger memory. Select *YES* to delete the memory.
- 6) **EXIT**: returns to the main menu.

10) **CLK_MENU** (clock)

- 1) **YEAR**: year.
- 2) **MON**: month.
- 3) **DAY**: day.
- 4) **HOUR**: hour.
- 5) **MIN**: minutes.
- 6) **AUTO_TIME_SYNC**: enables or disables the automatic synchronization of the internal clock with a reference server. Select *On* to activate the automatic synchronization.
- 7) **AUTO_TIME_ZONE**: enables or disables the automatic setting of the time zone. Select *On* to activate the automatic setting.
- 8) **TIME_ZONE**: manual setting of the time zone.

9) **EXIT**: returns to the main menu.

11) PSW_MENU (password)

- 1) **RST_PSW_LVL**: exits the menu and deactivates immediately the password (the password will not remain active for some minutes as it normally happens when exiting the menu: you will need to re-enter the password even if you re-access immediately the menu).
- 2) **SET_NEW_PSW**: sets user-level password.
- 3) **EXIT**: returns to the main menu.

12) CAL_MENU (calibration) – *Only available with administrator password*

Note: the availability of the menu items depends on the data logger configuration.

- 1) **RH_75%_CAL**: relative humidity sensor calibration at 75%RH.
- 2) **RH_33%_CAL**: relative humidity sensor calibration at 33%RH.
- 3) **RAIN_TIP_mm**: tipping bucket rain gauge resolution in mm.
- 4) **RST_ALL_RAIN_CNTR**: reset of all the rainfall counters. Select *YES* to reset the counters.
- 5) **CONT_INP_DFLT_STAT**: setting of the default state of the SWIN2 contact input as Normally Open (NO) or Normally Closed (NC).
- 6) **dt%_CONT_INP_STAT_CHNG**: setting of the time required to accept the state change of the SWIN2 contact, expressed as a percentage of the logging interval.
- 7) **CAL_TYPE**: choice between user calibration (*USER*) or factory calibration (*FACT*).
- 8) **EXIT**: returns to the main menu.

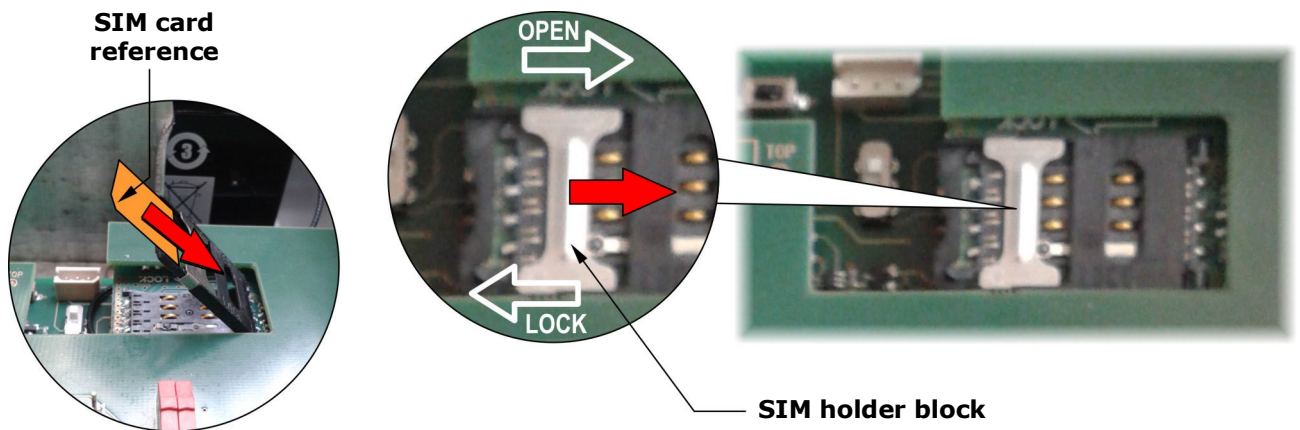
13) EXIT

Returns to measurement mode.

7 SIM CARD

In order to use the GSM/3G functionalities, a **SIM** card enabled for data transmission must be inserted into the data logger. The card should be requested to an operator that has an adequate coverage of the GSM/3G network in the place where the data logger will be installed. To insert the card, proceed as follows.

1. Disconnect the power supply.
2. Open the housing.
3. Push the metal block of the SIM tray in the direction of the arrow OPEN, and rotate the tray upward.



4. Insert the SIM card into its tray so as the SIM card contacts face down and correspond to the contacts on the electronic board. The SIM has to be inserted between the metal block and the plastic part.
5. Put the SIM tray back in place and push the metal block in the direction of the arrow LOCK.
6. Close the housing.

Through the HD35AP-S software, set the necessary information for GSM/3G operation: SIM PIN, name of the APN access point, e-mail account and addresses, FTP address, telephone numbers, data transmission mode, etc. (see chapter "GSM Options" of the software online help).

Note: the switch located on the left of the SIM card must be set upwards. The downwards position and the PWRKEY button are used to update the 3G or GSM module firmware.

The connection symbol (CONN) on the display is ON when the instrument is connected to the GSM network (the symbol blinks while connecting).

Among the information that you can scroll on display with the button in the lower part of the data logger, there is also the strength RSSI (Received Signal Strength Indication) in dBm of the GSM/3G signal received.

8 USB CONNECTION

The data logger can be connected to a PC through the mini-USB connector located at the bottom of the housing. Remove the connector protective cap and connect the **CP23** cable.

USB connection doesn't require the installation of drivers: when the data logger is connected to a PC, Windows® operating system automatically recognizes the instrument as an HID device (Human Interface Device) and uses the drivers already included in the operating system.

The data logger must be powered separately, it is not powered by the PC USB port.

When the data logger is not connected to the PC, replace the mini-USB connector protective cap to ensure the watertight integrity of the instrument.

9 HD35AP-S SOFTWARE

The HD35AP-S software, downloadable free of charge from the Delta OHM website, allows:

- Configuring the data logger: measurements to be displayed, alarm thresholds and hystereses, logging and transmitting intervals, date and time, etc. (see chapters "HD35ED... data loggers configuration", "Alarms configuration", "GSM Options" and "Clock setting" of the software online help).
- Transferring stored data to PC (see chapters "Data download" and "Data download from FTP" of the software online help).
- Displaying measurements in real time, also in graphic format (see chapter "Monitor" of the software online help).
- Managing the graphical representation, print and export of acquired data (see chapter "Displaying data in the database" of the software online help).
- Calibrating the sensors (see chapter "Calibration" of the software online help).

For the connection of the data logger to the HD35AP-S software see chapter "Connection" of the software online help.

10 SMS COMMANDS

SMS messages containing commands can be sent by a mobile phone to the data logger. The SMS must be sent to the number of the SIM card inserted into the data logger. The following table lists the available commands:

Command	Description
RESET	Reset of the device
EMAIL-ON	Activates periodic download of measurement data via e-mail
EMAIL-OFF	Deactivates periodic download of measurement data via e-mail
EMAIL-PERIOD= <i>period index</i>	Set the transmission interval via e-mail, where <i>period index</i> : -1→Real time, 0→15 min, 1→30 min, 2→1 hour, 3→2 hours, 4→4 hours, 5→8 hours, 6→12 hours, 7→24 hours, 8→2 days, 9→4 days, 10→1 week
EMAIL-FORMAT= <i>format index</i>	Set the format of the data sent via e-mail, where <i>format index</i> : 1→log (format for database), 2→csv (format for Excel®), 3→log+csv
EMAIL-DL-START	Activates immediate data download via e-mail starting from the last measurement transmitted
EMAIL-DL-FROM= <i>YYYY/MM/DD HH:MM:SS</i>	Downloads data via e-mail starting from the specified date, where YYYY: year, MM: month, DD: day, HH: hour, MM: minutes, SS: seconds
EMAIL-DL-INTERVAL= <i>YYYY/MM/DD HH:MM:SS - YYYY/MM/DD HH:MM:SS</i>	Downloads via e-mail all data between the specified dates, where YYYY: year, MM: month, DD: day, HH: hour, MM: minutes, SS: seconds
EMAIL-ALARM-REPORT	Transmits via e-mail a report containing the measurements that can generate alarms
EMAIL-REPORT	Transmits via e-mail a report containing the current measurements
EMAIL-HELP	Transmits an e-mail containing a list of all SMS commands
FTP-ON	Activates the periodic download of measurement data via FTP
FTP-OFF	Deactivates the periodic download of measurement data via FTP
FTP-PERIOD= <i>period index</i>	Set the transmission interval via FTP, where <i>period index</i> : -1→Real time, 0→15 min, 1→30 min, 2→1 hour, 3→2 hours, 4→4 hours, 5→8 hours, 6→12 hours, 7→24 hours, 8→2 days, 9→4 days, 10→1 week
FTP-FORMAT= <i>format index</i>	Set the format of the data sent via FTP, where <i>format index</i> : 1→log (format for database), 2→csv (format for Excel®), 3→log+csv
FTP-DL-START	Activates immediate data download via FTP starting from the last measurement transmitted
FTP-DL-FROM= <i>YYYY/MM/DD HH:MM:SS</i>	Downloads data via FTP starting from the specified date, where YYYY: year, MM: month, DD: day, HH: hour, MM: minutes, SS: seconds
FTP-DL-INTERVAL= <i>YYYY/MM/DD HH:MM:SS - YYYY/MM/DD HH:MM:SS</i>	Downloads via FTP all data between the specified dates, where YYYY: year, MM: month, DD: day, HH: hour, MM: minutes, SS: seconds
FTP-ALARM-REPORT	Transmits via FTP a report containing the measurements that can generate alarms
FTP-REPORT	Transmits via FTP a report containing the current measurements
FTP-HELP	Transmits via FTP a file containing a list of all SMS commands
SMS-ALARM-ON	Activates the transmission of alarm SMS for the overrun of the measurement thresholds (if the device is selected for sending alarm SMS)
SMS-ALARM-OFF	Deactivates the transmission of alarm SMS for the overrun of the measurement thresholds for the selected devices
EMAIL-ALARM-ON	Activates the transmission of e-mail measurements alarms (if the device is selected for sending alarm e-mail)
EMAIL-ALARM-OFF	Deactivates the transmission of e-mail alarms for measurement alarms
SMS-ALARM-REPORT	Indicates whether the measurements are in alarm. Only the selected measurements are taken into consideration for SMS alarms
SMS-DEVICE-ALARM-REPORT	Transmits via SMS a report of the measurements selected for SMS alarms

Command	Description
SMS-DEVICE-REPORT	Transmits via SMS a report of the measurements of the device
SMS-HELP	Transmits an SMS containing the list of all SMS commands
TCP-SERVER-ON	Activates a TCP connection with AP acting as a TCP server
TCP-SERVER-OFF	Deactivates the TCP connection with the device acting as a TCP server
TCP-CLIENT-ON	Activates a TCP connection with the device acting as a TCP client
TCP-CLIENT-OFF	Deactivate the TCP connection with the device acting as a TCP client
TCP-SERVER-ADDRESS="server address"	Specifies the server address for TCP connection when the device acts as TCP client. The server-address string can be a domain or a IP address
TCP-SERVER-PORT=port number	Specifies the number of the TCP port used by the remote server to accept connections with the device when the device acts as TCP client
TCP-LISTEN-PORT=port number	Specifies the number of the TCP listening port used by the device when the device acts as TCP server
HTTP-ON	Activates the periodic upload of measurement data on the HTTP server
HTTP-OFF	Deactivates the periodic upload of measurement data on the HTTP server
HTTP-PERIOD= period index	Set the transmission interval via HTTP, where <i>period index</i> : -1→Real time, 0→15 min, 1→30 min, 2→1 hour, 3→2 hours, 4→4 hours, 5→8 hours, 6→12 hours, 7→24 hours, 8→2 days, 9→4 days, 10→1 week
HTTP-DL-START	Activates immediate data upload on the HTTP server starting from the last measurement transmitted
HTTP-DL-FROM=YYYY/MM/DD HH:MM:SS	Uploads data on the HTTP server starting from the specified date, where YYYY: year, MM: month, DD: day, HH: hour, MM: minutes, SS: seconds
HTTP-DL-INTERVAL=YYYY/MM/DD HH:MM:SS - YYYY/MM/DD HH:MM:SS	Uploads on the HTTP server all data between the specified dates, where YYYY: year, MM: month, DD: day, HH: hour, MM: minutes, SS: seconds
ADD-PHONE="phone number"	Adds a phone number to the list of numbers considered for SMS alarms
CANC-PHONE	Delete my phone number and don't consider it any more for SMS alarms. The primary phone number cannot be deleted
ERASE-PHONE=phone number index	Deletes the phone number with specified index. This command is accepted only by the primary phone number
RELAY-1-AUTO	Set relay 1 to be handled automatically
RELAY-1-MANUAL	Set relay 1 to be handled manually
RELAY-1-RESET	Reset relay 1 status when the relay is handled manually
RELAY-1-SET	Set relay 1 status when the relay is handled manually
RELAY-2-AUTO	Set relay 2 to be handled automatically
RELAY-2-MANUAL	Set relay 2 to be handled manually
RELAY-2-RESET	Reset relay 2 status when the relay is handled manually
RELAY-2-SET	Set relay 2 status when the relay is handled manually
MEASURE-INTERVAL=interval index	Set the measuring interval, where <i>interval index</i> : 0→1 s, 1→2 s, 2→5 s, 3→10 s, 4→15 s, 5→30 s, 6→1 min, 7→2 min, 8→5 min, 9→10 min, 10→15 min, 11→30 min, 12→1 hour
LOG-INTERVAL= interval index	Set the logging interval, where <i>interval index</i> : 0→1 s, 1→2 s, 2→5 s, 3→10 s, 4→15 s, 5→30 s, 6→1 min, 7→2 min, 8→5 min, 9→10 min, 10→15 min, 11→30 min, 12→1 hour

Up to 16 commands can be written in the same text message, separated by spaces or commas.

For safety, commands are executed only if they are coming from the cell numbers set in the HD35AP-S software and if the SMS text starts with a user-defined key word. The key word is set through the HD35AP-S software, going to the menu "GSM options" at the item "SMS recipients" and setting the field "SMS keyword" (see chapter "GSM settings" of the software online help).

Example: supposing you entered the string ">>>" in the *SMS keyword* field and you wish to activate periodic download via e-mail of the measured data with an interval of 1 hour, you will have to send the following text message:

>>> EMAIL-ON EMAIL-PERIOD=2

With the commands EMAIL-HELP, FTP-HELP and SMS-HELP you can ask the base unit to send respectively by e-mail, to an FTP address and through SMS the complete list of the available SMS commands.

11 3G/GPRS TCP/IP CONNECTION

Through 3G/GPRS TCP/IP protocol, it is possible to interact with the data logger from a remote PC with an Internet connection.

The connection can be of two types:

1) **Data Logger = Client , PC = Server**

The data logger acts as TCP client and requests the connection to the PC, the PC acts as TCP server and waits for the connection request. The server IP address (PC or Router) must be public and can be either static or dynamic; if the IP address is dynamic, it is convenient to register the server to a DDNS (Dynamic Domain Name System) service.

2) **Data Logger = Server , PC = Client**

The PC acts as TCP client and requests the connection to the data logger, the data logger acts as TCP server and waits for the connection request. The server IP address (data logger) must be public and static.

Connection Data Logger = Client , PC = Server

1. Open a port (port forwarding) in the Modem/Router through which your PC connects to Internet (follow the instructions of your Modem/Router).
2. Connect the data logger to a PC USB port and perform the connection procedure with the HD35AP-S software.
3. In the HD35AP-S software select *Instruments setup >> GSM options >> GPRS TCP/IP client settings* and set the server IP address or domain name and port number (number of the port opened in the Modem/Router).
4. Disconnect the data logger from the USB port.
5. In the HD35AP-S software select *Tools >> Type of connection*, select the *TCP server* option and set the number of the port opened in the Modem/Router.
6. In the HD35AP-S software, select the *Connect* icon.
7. Send to the data logger the SMS command **TCP-CLIENT-ON**.

If the connection is not established within 30 minutes after sending the SMS command TCP-CLIENT-ON, the command must be sent again.

Alternatively, the server IP address or domain name and port number can be set in the data logger without connecting the data logger to the PC and without the HD35AP-S software by using the SMS commands **TCP-SERVER-ADDRESS** and **TCP-SERVER-PORT**.

Connection Data Logger = Server , PC = Client

1. Open a listening port in the data logger by using the SMS command **TCP-LISTEN-PORT** (for example, TCP-LISTEN-PORT=2020).
2. Send to the data logger the SMS command **TCP-SERVER-ON**.
3. The data logger replies with a first SMS to confirm that the command has been accepted. Wait for a second SMS with the confirmation that the *TCP server* functionality has been activated and with the IP address (and port number) assigned to the data logger.
4. In the HD35AP-S software select *Tools >> Type of connection*, select the *TCP client* option and set the IP address and port number of the datalogger.
5. In the HD35AP-S software, select the *Connect* icon.

If the connection is not established within 1 hour after sending the SMS command TCP-SERVER-ON, the command must be sent again.

12 STORAGE OF INSTRUMENTS

Storage conditions of the instruments:

- Temperature: -40...+70 °C.
- Humidity: less than 90 %RH no condensation.
- For storage, avoid places where:
 - There is a high level of humidity;
 - Instruments are exposed to direct sun radiation;
 - Instruments are exposed to a high temperature source;
 - There are strong vibrations;
 - There is vapor, salt and/or corrosive gases.

13 SAFETY INSTRUCTIONS

General instructions for safety

These instruments have been manufactured and tested in compliance with the safety standards EN61010-1:2010 for electronic instruments of measure and left the factory in perfect safety technical conditions.

The regular functioning and operational safety of these instruments can be ensured only if all normal safety measures, as well as the specific measures described in this manual, are followed.

The regular functioning and operational safety of the instruments can only be guaranteed under the climatic conditions specified in the manual.

Do not use the instruments in places where there are:

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

Obligations of the User

The user of the instruments must ensure compliance with the following standards and guidelines for the treatment of hazardous materials:

- EEC directives on workplace safety
- National low regulations on workplace safety
- Accident prevention regulations

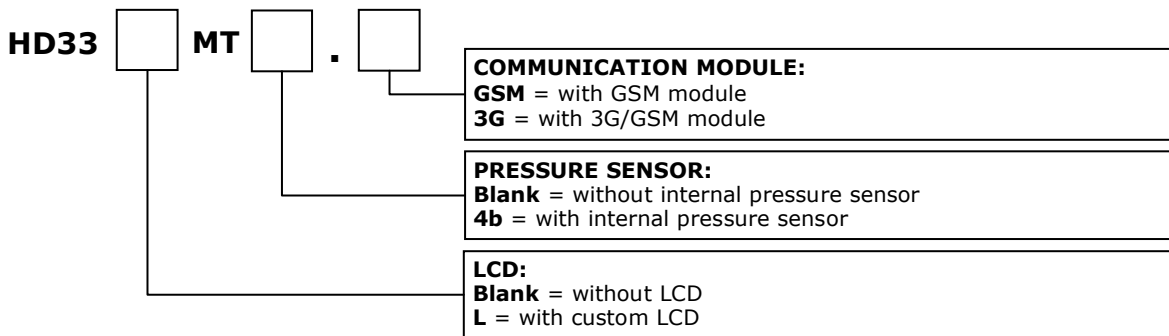
14 ORDERING CODES

HD33MT.GSM GSM data logger. Stores measurements in the internal memory. Transmits the acquired data via FTP, via e-mail or to an HTTP server (Cloud). **Optional** LCD Display. Alarm functions. Power supply: 18...28 Vdc if the rechargeable battery is used or 7...28 Vdc if the rechargeable battery is not used. It includes **HD35AP-S** software downloadable from Delta OHM web site.
The battery, the probes and the USB cable CP23 have to be ordered separately. SIM card not included.

HD33MT4b.GSM HD33MT.GSM data logger equipped with an internal barometric sensor.

HD33MT.3G Like HD33MT.GSM but with 3G/GSM module.

HD33MT4b.3G HD33MT.3G data logger equipped with an internal barometric sensor.



RELATIVE HUMIDITY AND TEMPERATURE PROBES

HP3517TC2... Relative humidity and temperature combined probe. R.H. measuring range: 0...100%. Temperature sensor: NTC 10KΩ. Temperature measuring range: -40...+105 °C. R.H. sensor operating temperature: -40...+80 °C. Probe stem: AISI 304, Ø 14 mm, length 150 mm. Cable length 2, 5 or 10 m standard. 4-pole M12 female connector.



TP350NTC2... NTC10KΩ sensor temperature probe. Measuring range: -40...+105 °C. Probe stem: AISI 304, Ø 14 mm, length 150 mm. Cable length 2, 5 or 10 m standard. 4-pole M12 female connector.



HD9817TVS Relative humidity and temperature transmitter, Pt100 sensor. RS485 MODBUS-RTU output. Temperature measuring range: -40...+60 °C. Relative humidity measuring range: 0...100%. Power supply 5...30 Vdc. AISI 304 housing. IP 65 probe protection degree. Dimensions Ø14 x 155 mm. Output with 8-pole M12 male connector. Supplied with CP9817.3 cable, length 3 m.

HD9007A-1 12-ring protection against solar radiations. Includes support bracket.

HD9007A-2 16-ring protection against solar radiations. Includes support bracket.

HD9007T26.2 Adapter for Ø 14 mm probes for protections against solar radiations HD9007A-1 and HD9007A-2.

TP32MTT.03 Temperature probe with seven Pt100 1/3 DIN sensors for temperature measurement to a depth of: 0, -5 cm, -10 cm, -20 cm, -50 cm, -1 m with respect to ground level, according to OMM indications. RS485 MODBUS-RTU

output. 8-pole M12 male connector. 5...30 Vdc power supply. CPM12 AA8... cable has to be ordered separately.

TP32MTT.03.1 Temperature probe with seven Pt100 1/3 DIN sensors for temperature measurement to a depth of: +5 cm, 0, -5 cm, -10 cm, -20 cm, -50 cm with respect to ground level, according to OMM indications. RS485 MODBUS-RTU output. 8-pole M12 male connector. 5...30 Vdc power supply. CPM12 AA8... cable has to be ordered separately.

HD3910.1 2-electrode probe for the measurement of the soil volumetric water content. With integrated NTC 10 k Ω temperature sensor. RS485 MODBUS-RTU output. Cable length 5 or 10 m.

HD3910.2 3-electrode probe for the measurement of the soil volumetric water content in restricted volumes. With integrated NTC 10 k Ω temperature sensor.

SOLAR RADIATION SENSORS

LPPYRA02... First Class pyranometer according to ISO 9060. Output in $\mu\text{V}/(\text{Wm}^{-2})$. Supplied with: shade disk, cartridge with silica-gel crystals, 2 spare sachets, levelling device, connector and Calibration Report. On request 5 or 10m cables with connector.

The pyranometer is available with mV output (LPPYRA02), 4...20 mA output (LPPYRA02AC), 0...1/10 V output (LPPYRA02AV), RS485 Modbus-RTU output (LPPYRA02S) or SDI-12 output (LPPYRA02S12).

LPPYRA03... Second Class pyranometer according to ISO 9060. Output in $\mu\text{V}/(\text{Wm}^{-2})$. Supplied with levelling device, connector and Calibration Report. On request 5 or 10m cables with connector and shade disk.

The pyranometer is available with mV output (LPPYRA03), 4...20 mA output (LPPYRA03AC), 0...1/10 V output (LPPYRA03AV), RS485 Modbus-RTU output (LPPYRA03S) or SDI-12 output (LPPYRA03S12).

LPPYRA10... "Secondary standard" pyranometer according to ISO 9060. Output in $\mu\text{V}/(\text{Wm}^{-2})$. Supplied with protection shield, cartridge for silica gel crystals, 2 spare charges, bubble level for alignment, connector and Calibration Report. On request 5 or 10 m cables with connector.

The pyranometer is available with mV output (LPPYRA10), 4...20 mA output (LPPYRA10AC), 0...1/10 V output (LPPYRA10AV), RS485 Modbus-RTU output (LPPYRA10S) or SDI-12 output (LPPYRA10S12).

LPSILICON-PYRA 04 Pyranometer with silicon photodiode for measuring the global solar irradiance, diffuser for cosine correction. Spectral range 350...1100 nm. Typical sensitivity: 10 $\mu\text{V}/\text{W m}^{-2}$. Measuring range: 0...2000 W/m^2 . Fixed cable 5m long, terminated with open wires.

LPSP2 Shade disk for LPPYRA03.

LPS1 Attachment bracket for LPPYRA02 and LPPYRA10, suitable for mast \varnothing 40 ÷ 50 mm.

LPS3 Attachment bracket for LPPYRA03, suitable for mast \varnothing 40 ÷ 50 mm.

LPSD18.1 Sensor for the measurement of the solar radiation duration, referred to the 120 W/m^2 threshold of direct radiation, according to OMM indications. The sensor has no moving parts. RS485 MODBUS-RTU output and free-potential contact output. 7...30 Vdc power supply. It can be fastened to a rod with a proper accessory, or installed on a horizontal surface by means of the optional fixing base. Integrated bubble level for alignment. It doesn't require position adjustments during the year. Equipped with anti-condensation system (1W @ 12 Vdc if connected). 8-pole M12 connector. Upon request, standard 2, 5 or 10 m cables with female connector. Heating option available.

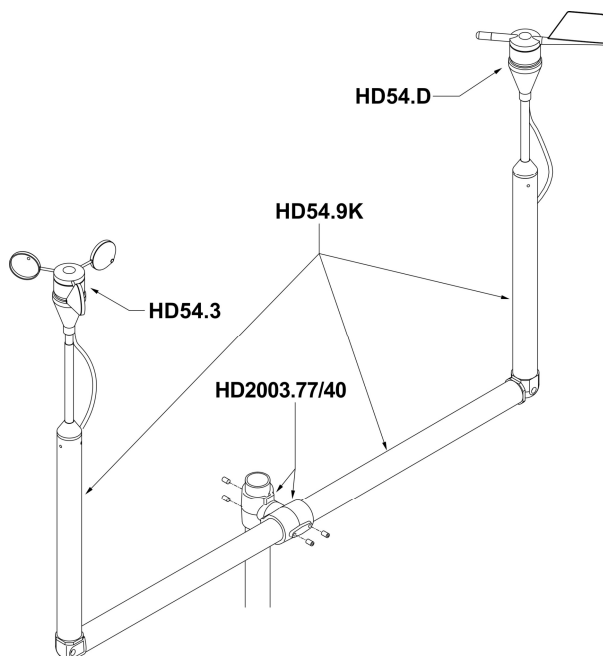
CP18.5 12-pole cable. Length: 5 m. 8-pole M12 connector on one side, free wires on the other. For LPSD18.1.

- LPSD18.O** Base for installation of the sunshine duration sensor on a horizontal surface. Two adjustable feet and one fixed foot. Allows sensor inclination up to 80° to the vertical, in order to adapt it to the sun position at the latitude of the installation site.
- LPSD18.V1** Support for installation of the sunshine duration sensor on a Ø 40 mm rod. Allows sensor inclination up to 80° to the vertical, in order to adapt it to the sun position at the latitude of the installation site.
- LPSD18.19K** Basic support for installation of the LPSD18... sensor on a flat base. The Sunshine Duration Sensor has a fixed inclination of 45° with respect to the fixing plane.
- LPPYRHE16S** First Class Pyrheliometer according to ISO 9060. Supplied with: light shade, cartridge with silica-gel crystals, 3 spare sachets, 8-pole M12 movable connector and Calibration Report. RS485 MODBUS-RTU serial output. Power supply 5...30 Vdc. On request 5 or 10 m CPM12-8D... cables with connector.
- RAIN GAUGES**
- HD2013** Tipping bucket rain gauge, 400cm² area, for temperature ranging from 4 °C to +60 °C. Standard resolution 0.2 mm. 0.1 or 0.5 mm on request with order. Normally closed output contact.
- HD2013R** Tipping bucket rain gauge, 400cm² area, with heater for temperature ranging from -20 to +60 °C. Standard resolution 0.2 mm. 0.1 or 0.5 mm on request with order. Normally closed output contact. Power supply: 12 Vdc or 24 Vdc ± 10% / absorbed power 165 W.
- HD2015** Tipping bucket rain gauge, 200cm² area, for temperature ranging from 4 °C to +60 °C. Standard resolution 0.2 mm. 0.1 or 0.5 mm on request with order. Normally closed output contact.
- HD2015R** Tipping bucket rain gauge, 200cm² area, with heater for temperature ranging from -20 to +60 °C. Standard resolution 0.2 mm. 0.1 or 0.5 mm on request with order. Normally closed output contact. Power supply: 12 Vdc or 24 Vdc ± 10% / absorbed power 50 W.
- HD2016** Weighing rain gauge, area 400 cm². 3000 cc collecting reservoir. Automatic water discharge when the amount of water collected exceeds a configurable percentage of the reservoir capacity (by default 10%, corresponding to 300 cc). Operating temperature from +4 °C to +60 °C. RS485 Modbus-RTU or SDI-12 output. Voltage-free output contact (NO). Power supply: 10...15 Vdc. Adjustable feet for ground installation included in the kit.
- HD2016R** Weighing rain gauge, area 400 cm². 3000 cc collecting reservoir. Automatic water discharge when the amount of water collected exceeds a configurable percentage of the reservoir capacity (by default 10%, corresponding to 300 cc). Operating temperature from -20 °C to +60 °C. RS485 Modbus-RTU or SDI-12 output. Voltage-free output contact (NO). Power supply: 10...15 Vdc for the measuring circuit, 12 Vdc / 90 W for the heater. Adjustable feet for ground installation included in the kit.
- HD2013.18** Bird dissuader.
- HD2013.5K** Kit of accessories for the installation of the HD2013 rain gauge raised 500 mm from the ground and the levelling.
- HD2013.5K.1** Kit of accessories for the installation of the HD2013 rain gauge raised 1 m from the ground and the levelling.
- HD2015.5K** Kit of accessories for the installation of the HD2015 rain gauge raised 500 mm from the ground and the levelling.
- HD2015.5K.1** Kit of accessories for the installation of the HD2015 rain gauge raised 1 m from the ground and the levelling.

- HD2016.33K** Kit of accessories for the installation of the HD2016 rain gauge raised 500 mm from ground and the levelling.
- HD2016.33K.1** Kit of accessories for the installation of the HD2016 rain gauge raised 1 m from ground and the levelling.
- HD2003.75** Base for 40 mm diameter mast, with tip to be driven into the ground (only for HD2013 and HD2015).
- HD2003.78** Base for 40 mm diameter mast, to be fixed to the floor.

WIND SPEED AND DIRECTION SENSORS

- HD54.3** Passive cup anemometer. Measuring range: 1...75 m/s. Operating conditions: -45...+60 °C / 0...100% RH. Rod mounting. Height 81 mm assembled.
- HD54.D** Wind direction vane probe. Measuring range: 0...360°. Dead band: typical 4°, maximum 8°. Threshold: 1 m/s. Operating conditions: -40...+60 °C / 0...100% RH. Rod mounting. Dimensions: 210 x 120 mm.
- HD54.9K** Transverse mast kit including: transverse mast \varnothing 40 mm and L=1500 mm, two extension bars \varnothing 40 mm and accessories.



- HD2003** 3-axes static ultrasonic anemometer for the measurement of wind speed and direction, air temperature, relative humidity and barometric pressure. wind speed U-V-W cartesian components, sonic temperature. Interfaces available RS232, RS485 MODBUS-RTU, RS422. Power supply: 12...30 Vdc. To be mounted on a mast. Free connector included.
- HD2003R** HD2003 with heating option.
- HD2003.1** 3-axes static ultrasonic anemometer for the measurement of wind speed and direction. wind speed U-V-W cartesian components, sonic temperature. Interfaces available RS232, RS485 MODBUS-RTU, RS422. Power supply: 12...30 Vdc. To be mounted on a mast. Free connector included.
- HD2003.1R** HD2003.1 with heating option.
- CP2003/5** 26-pole connection cable with watertight connector on one side, free wires on the other. L = 5 m. For HD2003...
- CP2003/10** 26-pole connection cable with watertight connector on one side, free wires on the other. L = 10 m. For HD2003...

- HD52.3D...** 2-axes static ultrasonic anemometer for the measurement of wind speed and direction, relative humidity and temperature (**optional**), diffuse solar radiation (**optional**) and barometric pressure (**optional**). RS232, RS485, RS422 and SDI-12 serial outputs, NMEA, MODBUS-RTU and SDI-12 communication protocols. **Heating option** available. Power supply: 10...30 Vdc. Installation on Ø 40 mm external and Ø 36 mm internal mast. Input with 19-pole M23 male connector and 19-pole M23 free female connector.
- CP52.5** 12-wire connection cable with 19-pole M23 free female connector on one side, free wires on the other. L = 5 m. For HD52.3D...
- CP52.10** 12-wire connection cable with 19-pole M23 free female connector on one side, free wires on the other. L = 10 m. For HD52.3D...

ACCESSORIES

- HD35AP-CFR21** Advanced version of the HD35AP-S software for the management of the data logging system in accordance with the **FDA 21 CFR part 11 recommendations**.
- CP23** Direct USB connection cable with mini-USB male connector on the instrument side and A-type USB male connector on the PC side.
- HD32MT.SWD** 100...240 Vac / 24 Vdc (adjustable) power supply unit with switch. IP 65 housing. Suitable for fastening to a rod. Includes fastening accessories.
- BAT12V-3.4A** 12 V / 3.4 Ah lead-acid rechargeable battery.
- HD2003.2.14** Three sectors flange for Ø 40 mm tube, 6 inputs Ø 16 mm.
- HD2005.20** Tripod kit with adjustable legs for installing environmental sensors (pyranometers, temperature and humidity, etc.). Material: anodized aluminum. Max. height 2 m. It can be fixed on a flat base with screws or to the ground with pegs. Foldable legs for the transport.
- HD2005.20.1** Tripod kit with adjustable legs for installing environmental sensors (pyranometers, temperature and humidity, etc.). Material: anodized aluminum. Max. height 3 m. It can be fixed on a flat base with screws or to the ground with pegs. Foldable legs for the transport.

DELTA OHM metrology laboratories LAT N° 124 are accredited ISO/IEC 17025 by ACCREDIA for Temperature, Humidity, Pressure, Photometry / Radiometry, Acoustics and Air Velocity. They can supply calibration certificates for the accredited quantities.

NOTES

**DICHIARAZIONE DI CONFORMITÀ UE
EU DECLARATION OF CONFORMITY**

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Documento Nr. / Mese.Anno: **5091 / 02.2018**
Document-No. / Month.Year :

Si dichiara con la presente, in qualità di produttore e sotto la propria responsabilità esclusiva, che i seguenti prodotti sono conformi ai requisiti definiti nelle direttive del Consiglio Europeo:
We declare as manufacturer herewith under our sole responsibility that the following products are in compliance with the requirements defined in the European Council directives:

Codice prodotto: **HD33[L]MT.GSM – HD33[L]MT.3G**
Product identifier :

Descrizione prodotto: **Datalogger con modulo 3G/GSM/GPRS**
Product description : **Data logger with 3G/GSM/GPRS module**

I prodotti sono conformi alle seguenti Direttive Europee:
The products conform to following European Directives:

Direttive / Directives	
2014/53/EU	Direttiva apparecchiature radio / <i>Radio Equipments Directive (RED)</i>
2011/65/EU	RoHS / <i>RoHS</i>

Norme armonizzate applicate o riferimento a specifiche tecniche:
Applied harmonized standards or mentioned technical specifications:

Norme / Standards	
EN 61010-1:2010	Requisiti di sicurezza elettrica / <i>Electrical safety requirements</i>
EN 61326-1:2013	Requisiti EMC / <i>EMC requirements</i>
EN 62479:2010	Esposizione umana a campi elettromagnetici / <i>Human exposure to EMF</i>
ETSI EN 301 511 V12.5.1	Dispositivi GSM / <i>GSM Devices</i>
ETSI EN 301 489-1 V2.1.1	EMC per dispositivi radio / <i>EMC for radio equipments</i>
ETSI EN 301 489-52 V1.1.0	EMC per dispositivi radio mobili di comunicazione cellulare / <i>EMC for Cellular Communication Mobile radio equipments</i>
EN 50581:2012	RoHS / <i>RoHS</i>

Il produttore è responsabile per la dichiarazione rilasciata da:
The manufacturer is responsible for the declaration released by:

Johannes Overhues

Amministratore delegato
Chief Executive Officer

Caselle di Selvazzano, 15/02/2018

Questa dichiarazione certifica l'accordo con la legislazione armonizzata menzionata, non costituisce tuttavia garanzia delle caratteristiche.

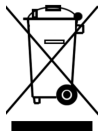
This declaration certifies the agreement with the harmonization legislation mentioned, contained however no warranty of characteristics.

GUARANTEE



TERMS OF GUARANTEE

All DELTA OHM instruments are subject to accurate testing, and are guaranteed for 24 months from the date of purchase. DELTA OHM will repair or replace free of charge the parts that, within the warranty period, shall be deemed non efficient according to its own judgement. Complete replacement is excluded and no damage claims are accepted. The DELTA OHM guarantee only covers instrument repair. The guarantee is void in case of incidental breakage during transport, negligence, misuse, connection to a different voltage than that required for the appliance by the operator. Finally, a product repaired or tampered by unauthorized third parties is excluded from the guarantee. The instrument shall be returned FREE OF SHIPMENT CHARGES to your dealer. The jurisdiction of Padua applies in any dispute.



The electrical and electronic equipment marked with this symbol cannot be disposed of in public landfills. According to the Directive 2011/65/EU, the european users of electrical and electronic equipment can return it to the dealer or manufacturer upon purchase of a new one. The illegal disposal of electrical and electronic equipment is punished with an administrative fine.

This guarantee must be sent together with the instrument to our service centre.
IMPORTANT: Guarantee is valid only if coupon has been correctly filled in all details.

Instrument Code: **HD33[L]MT.GSM** **HD33[L]MT.3G**

Serial Number _____

RENEWALS

Date _____	Date _____
Inspector _____	Inspector _____
Date _____	Date _____
Inspector _____	Inspector _____
Date _____	Date _____
Inspector _____	Inspector _____



The quality level of our instruments is the result of the constant development of the product. This may produce some differences between the information written in this manual and the instrument you have purchased. We cannot completely exclude the possibility of errors in the manual, for which we apologize.

The data, images and descriptions included in this manual cannot be legally asserted. We reserve the right to make changes and corrections with no prior notice.

V2.10
22/10/2018