Member of GHM GROUP

English

Operating manual

GSM/GPRS Data Logger

HD33[L]M.2

Companies / Brands of GHM

Members of GHM GROUP:

GREISINGER
HONSBERG
Martens
IMTRON
DeltaOHM
VAL.CO

www.deltaohm.com

Keep for future reference.

INDEX

1 INTRODUCTION

The HD33[L]M.2 data logger allows several physical quantities to be monitored in a large variety of application fields:

- Temperature
- Relative humidity
- Atmospheric pressure
- Solar radiation
- Rainfall quantity
- Wind speed and direction

It has 5 inputs:

- One input for relative humidity and temperature with NTC sensor combined probe or, alternatively, for temperature only probe with NTC sensor.
- One input for pyranometer.
- One input for rain gauge.
- One input for cup anemometer.
- One input for wind direction vane.

It detects the atmospheric pressure by means of an **optional** internal sensor.

If a relative humidity and temperature probe is connected, the dew point temperature is calculated.

Only one probe of each type can be connected. The probes are connected through M12 connectors.

On request, one of the inputs can be replaced by a 4…20 mA analog input for the connection of a transmitter with current output, this allows the monitoring capability to be extended to many other quantities in addition to the ones mentioned above (for example, a level sensor can be connected).

Thanks to GSM/GPRS 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 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 indicated by an audible signal of the data logger through an internal buzzer or signaled by alarm e-mails or SMS messages.

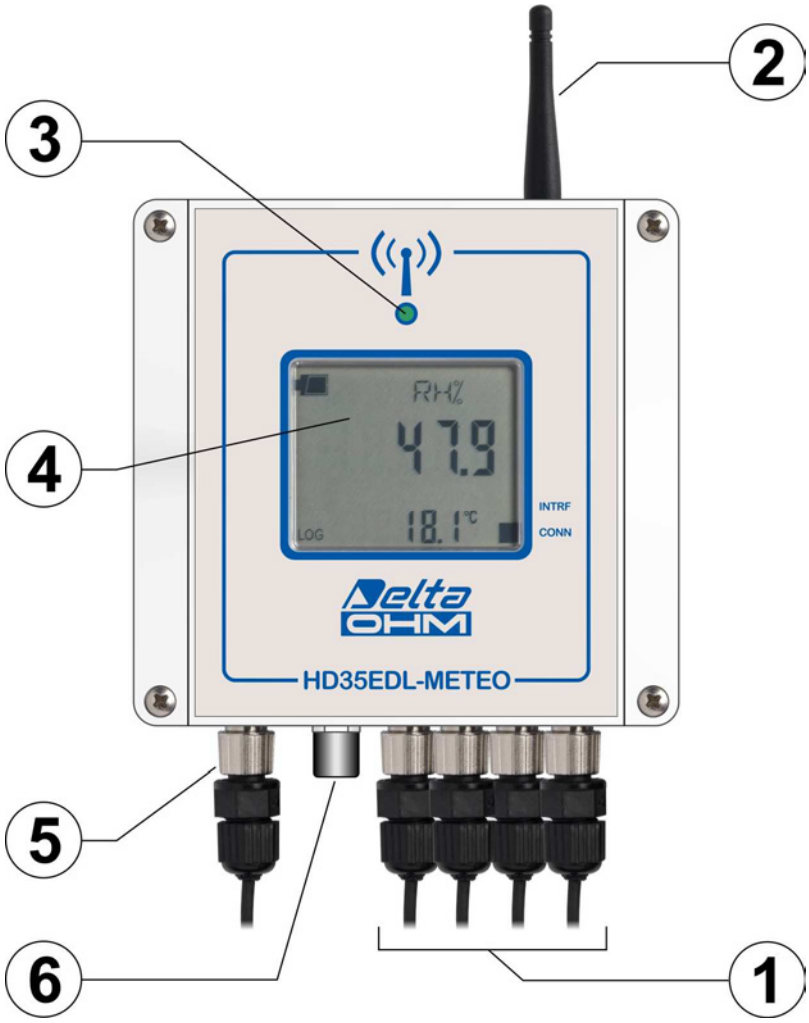
HD35AP-S PC software, downloadable free of charge from the Delta OHM website, allows configuration of data logger, displaying measurements in real time both in graphical and numerical format, data download. The data transferred to the PC are entered into a database.

The data logger operates with 7…30 Vdc direct power supply voltage and can be powered by a solar panel through an appropriate **optional** power supply unit.

IP 67 waterproof housing.

Optional custom LCD display.

2 DESCRIPTION



1. Probes connection (M12 connectors). The connectors are numbered (see the image below) and next to each connector is clearly indicated the type of probe to be connected.

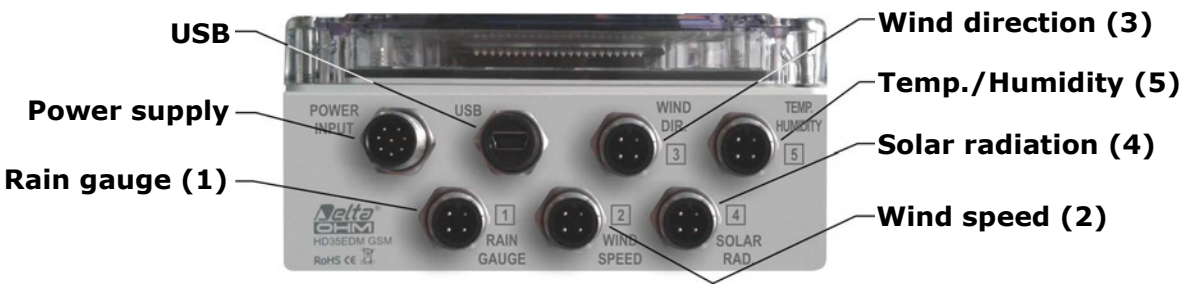
2. GSM Antenna.

3. Bicolor LED: red blinking indicates that the instrument is powered, blinks green to signal the GSM activity.

4. Custom LCD display. The cyclic automatic scrolling of the measurements can be set with the HD35AP-S software (see the instructions of the software).

5. Power supply: cable gland (standard) or M12 connector.

6. USB port with mini-USB connector (with protective cap).



3 TECHNICAL CHARACTERISTICS

Power supply	7…30 Vdc
Power consumption	< 2 mA during measurement < 0.8 A peak during GSM activity
Antenna	External
Measuring interval	1, 2, 5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min
Logging interval	1, 2, 5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min
Internal memory	Circular management or stop logging if memory is full. Number of samples: from 128,000 to 440,000 depending on the number of detected quantities.
Alarm	Acoustic through internal buzzer. Sending of alarm e-mail and SMS.
Display	Custom LCD (**optional**)
LED indicator	2-color LED: power on (blinks red), GSM activity (blinks green)
Connection to PC	USB port with mini-USB connector
Operating conditions	-20…+70 °C (with LCD) or -40…+70 °C (without LCD) / 0…100 %RH
Connectors for external probes	M12 connectors
Weight	1 kg approx. (including shield and fixing clamping)
Housing	Dimensions: 122 x 120 x 56 mm (excluding external antenna) Material: Polycarbonate (PC) Protection degree: IP 67 (with protective cap on the USB connector)
Installation	Fixing to a 40 mm diameter mast through the clamping HD2003.77/40 (**optional**). Protection shield against solar radiations (**optional**) for outdoor installation.

Measurement characteristics (instrument in line with sensor):

Temperature	
Sensor	NTC 10 kΩ @ 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	
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 ± (2 + 1.5% 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	±2% over the whole operation temperature range
Stability	1% / year
Calculated quantities	Dew Point

Atmospheric pressure	
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

Solar radiation	
Sensor	Thermopile
Measuring range	0…2000 W/m^2
Resolution (of the instrument)	1 W/m^2
Sensitivity	Configurable in mV/(kW m^{-2})
Calculated quantities	Daily Wh/m^2 (Wh = watt hour)

For the other characteristics, please refer to the data sheet of the chosen pyranometer.

Rainfall quantity	
Sensor	With contact output (configurable NC or NO in the data logger)
Resolution (of the instrument)	Configurable 0.1 – 0.2 – 0.5 mm/tipping
Calculated quantities	Rainfall rate in mm/h, rainfall quantity in the last day. The rainfall rate is calculated by referring the rainfall quantity in the last five minutes to an hourly value.

For the other characteristics, please refer to the data sheet of the chosen rain gauge.

A measurement compensation curve as a function of the rainfall rate can be configured.

Wind speed – Characteristics of the HD54.3 cup anemometer	
Sensor	Passive 3-cup anemometer
Measuring range	1…75 m/s
Resolution (of the instrument)	0.1 m/s
Accuracy	± 0.14 m/s @ 10 m/s installed on a flat terrain site
Offset	0.35 m/s
Gain	0.765 m s^{-1}/Hz
Distance constant (63% recovery)	2.55 m @ 5 m/s / 2.56 m @ 10 m/s (ASTM D 5096-02)
Calculated quantities	Felt air temperature as a function of the wind speed: **Wind Chill** index (only if the logger measures also temperature). **Wind gust**: maximum wind speed obtained from the 3 seconds averages of the measurements acquired once per second.

Wind direction – Characteristics of the HD54.D vane	
Sensor	continuous rotation potentiometric vane
Measuring range	0…359°
Resolution (of the instrument)	1°
Accuracy	< 1%
Dead band	4° typical, 8° max.
Threshold	1 m/s

4…20 mA input	
Shunt resistance	Internal (50 Ω)
Resolution	12 bit
Accuracy	± 2 µA

4 MEASURING PROBES

Relative humidity and temperature:

For the measurement of relative humidity and temperature, the combined probe **HP3517WTC...** with NTC 10KΩ @ 25 °C temperature sensor is used. Alternatively, to the same input can be connected the temperature only probe **TP350NTC...**.

The outdoor installation of the 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:

The optional sensor, if present, is inside the instrument.

Rainfall quantity:

The HD2013 (area 400 cm^2), HD2013R (area 400 cm^2, with heating), HD2015 (area 200 cm^2) and HD2015R (area 200 cm^2, with heating) tipping bucket rain gauges and the HD2016 (area 400 cm^2) and HD2016R (area 400 cm^2, with heating) weighing rain gauges are available.

Solar radiation:

The pyranometers LPPYRA02, LPPYRA03, LPPYRA10, LPSILICON-PYRA04, etc. with mV output signal can be connected.

Wind speed and direction:

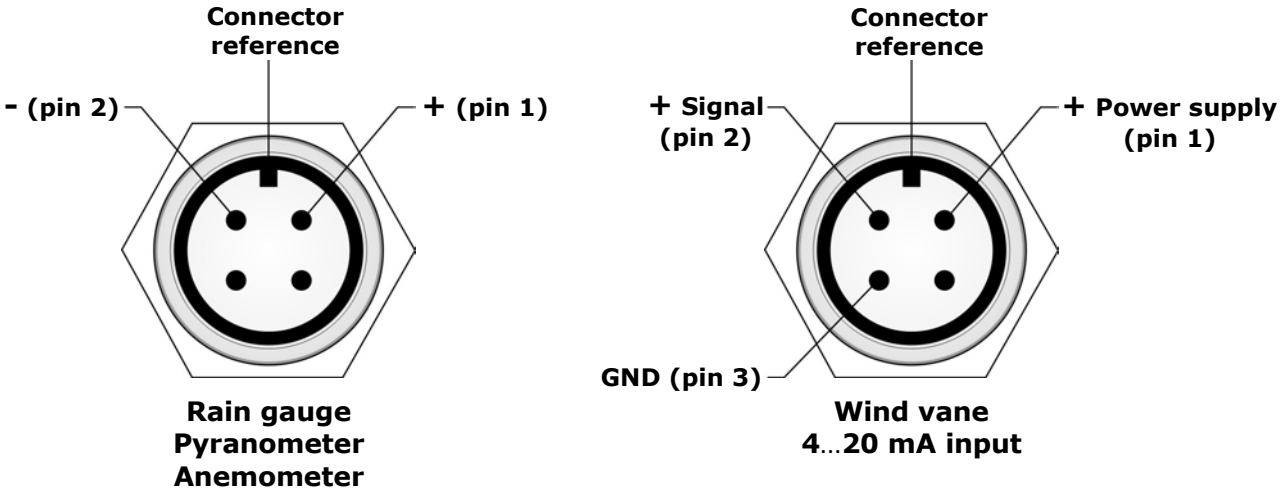
For the measurement of wind speed and direction, the cup anemometer **HD54.3** and the wind vane **HD54.D** are used.

The cup anemometr and the wind vance require a minimum threshold speed (typically 1÷1.5 m/s) to provide reliable indications. If the speed falls below the minimum threshold, the direction indication is frozen at the last value measured, while the speed indication is blocked to the threshold value or to zero (the behaviour is configurable by using the HD35AP-S software).

Other quantities:

For measuring other quantities, models with an analog input (option **X**), to which any transmitter with 4…20 mA active or passive current output can be connected, are available.

Probes connections:

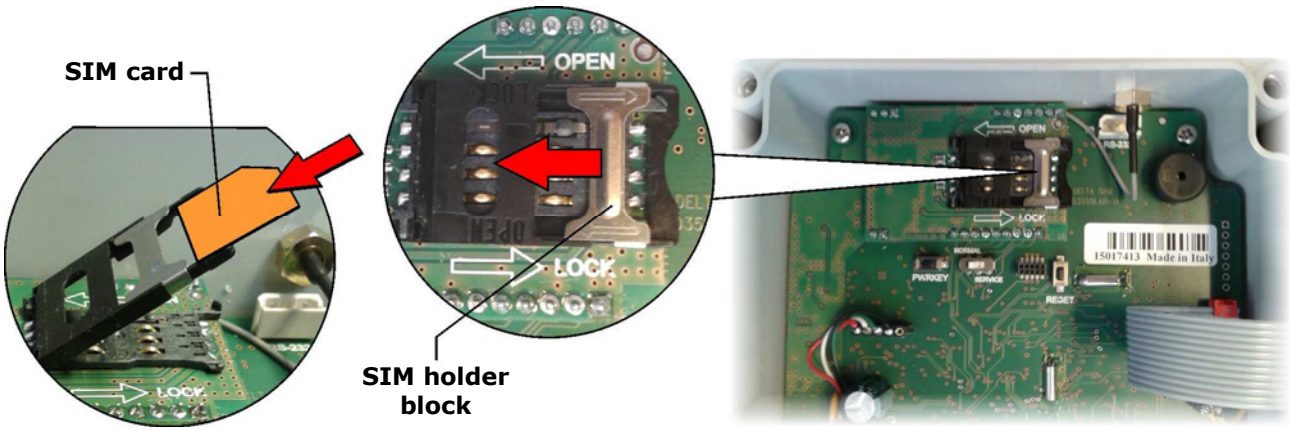


Data logger connectors viewed from outside

5 SIM CARD

In order to use the GSM 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 network in the place where the data logger will be installed. To insert the card, proceed as follows.

1. Disconnect the power supply.
2. Unscrew the 4 front screws on the housing and remove the cover.
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 again the housing by fixing the 4 front screws.

Through the HD35AP-S software, set the necessary information for GSM 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).

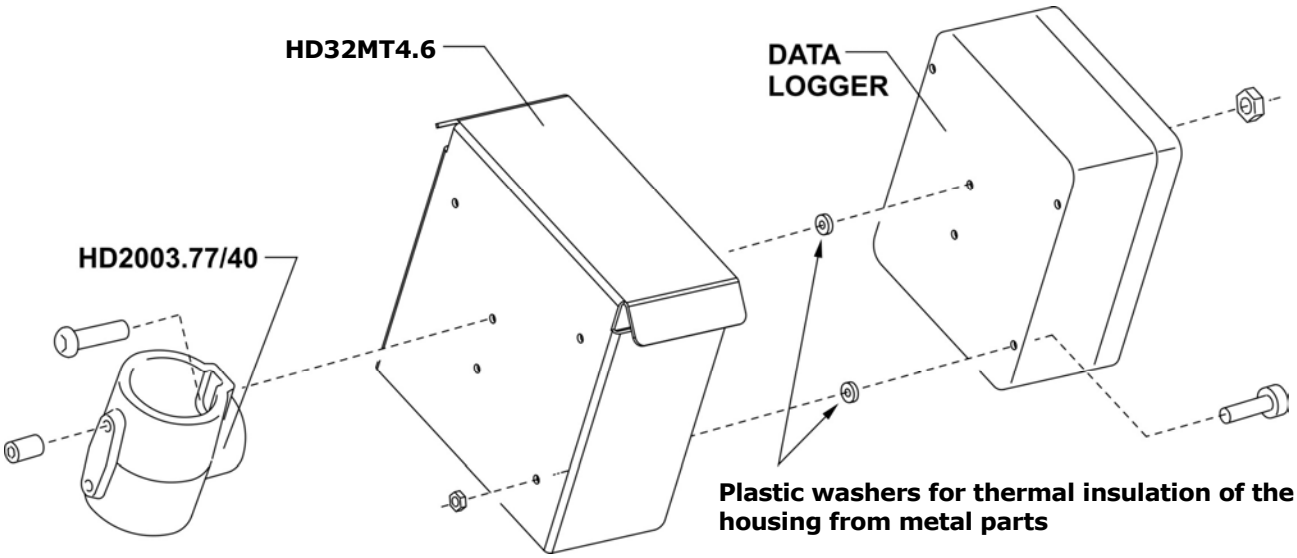
Note: the NORMAL/SERVICE switch located under the SIM card must be in NORMAL position. The SERVICE position and the PWRKEY button are used to update the GSM module firmware.

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 signal received.

6 INSTALLATION

The data logger can be fixed to a wall or, for outdoor installations, to a 40 mm diameter mast by means of HD2003.77/40 clamping.



For outdoor installations, use the optional protection shield against solar radiations.

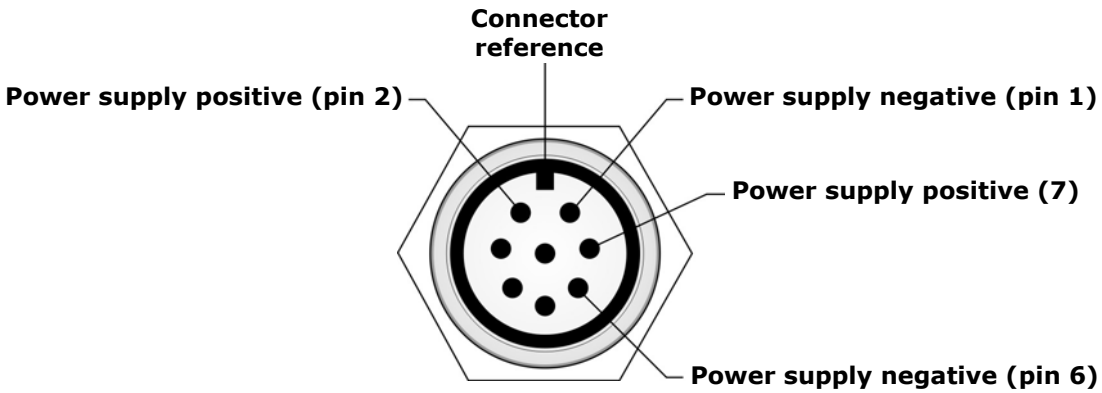
Data loggers supplied with clamping already mounted on the back of the housing are equipped with protection devices against over-voltages connected to the clamping. For a correct operation of the protecting devices, the yellow/green wire with fast-on connector connected to the clamping should be connected to ground.

7 POWER SUPPLY

The data logger operates with direct voltage from 7 to 30 Vdc and can be powered by mains, through the power supply unit **HD32MT.SWD**, or by a solar panel, through the power supply unit **HD32WSF.S12**, that includes a 12 Vdc / 7.2 Ah battery and a charge regulator.

If the power supply input is with cable gland (standard), connect the power cable to the internal terminals + V_{DD} (4) and GND (5).

If the power supply input is with M12 connector, the following figure shows the pinout.



Power supply connector viewed from the outside of the data logger

The data logger has an internal rechargeable backup battery that allows holding the date and

time even without external power supply.

In case of solar panel power supply with 12 V battery, in order to protect the battery from excessive discharge there is an option that disables the data logger GSM features when the power supply drops below 11.8 V (measurement and data logging continues instead regularly). The option can be set via the HD35AP-S software and is activated by default if the data logger is supplied with the HD32WSF.S12 power supply unit.

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 allows:

- Configuring the data logger: measurements to be displayed, alarm thresholds and hystereses, logging and transmitting intervals, date and time, etc. (see chapters "data loggers configuration", "Alarms configuration", "GSM settings" 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:

SMS 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= *period index*	Set the transmission interval via e-mail, where *period index*: 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= *format index*	Set the format of the data sent via e-mail, where *format index*: 1->log (format for database), 2->csv (format for Excel®), 3->log+csv
EMAIL-DL-START	Activates immediate data download by e-mail starting from the last measurement transmitted
EMAIL-DL-FROM=*YYYY/MM/DD HH:MM:SS*	Downloads data by e-mail starting from the specified date, where YYYY: year, MM: month, DD: day, HH: hour, MM: minutes, SS: seconds
EMAIL-DL-INTERVAL=*YYYY/MM/DD HH:MM:SS - YYYY/MM/DD HH:MM:SS*	Downloads by 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 by e-mail a report containing the measurements that can generate alarms
EMAIL-REPORT	Transmits by 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= *period index*	Set the transmission interval via FTP, where *period index*: 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= *format index*	Set the format of the data sent via FTP, where *format index*: 1->log (format for database), 2->csv (format for Excel®), 3->log+csv
FTP-DL-START	Activates immediate data download by FTP starting from the last measurement transmitted
FTP-DL-FROM=*YYYY/MM/DD HH:MM:SS*	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=*YYYY/MM/DD HH:MM:SS - YYYY/MM/DD HH:MM:SS*	Downloads by FTP all data between the specified dates, where YYYY: year, MM: month, DD: day, HH: hour, MM: minutes, SS: seconds
FTP-ALARM-REPORT	Transmits by FTP a report containing the measurements that can generate alarms
FTP-REPORT	Transmits by FTP a report containing the current measurements
FTP-HELP	Transmits by 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

Command	Description
SMS-DEVICE-ALARM-REPORT	Transmits via SMS a report of the measurements selected for SMS alarms
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 *period index*: -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
MEASURE-INTERVAL=*interval index*	Set the measuring interval, where *interval index*: 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 *interval index*: 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 GPRS TCP/IP CONNECTION

Through 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: -20…+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:

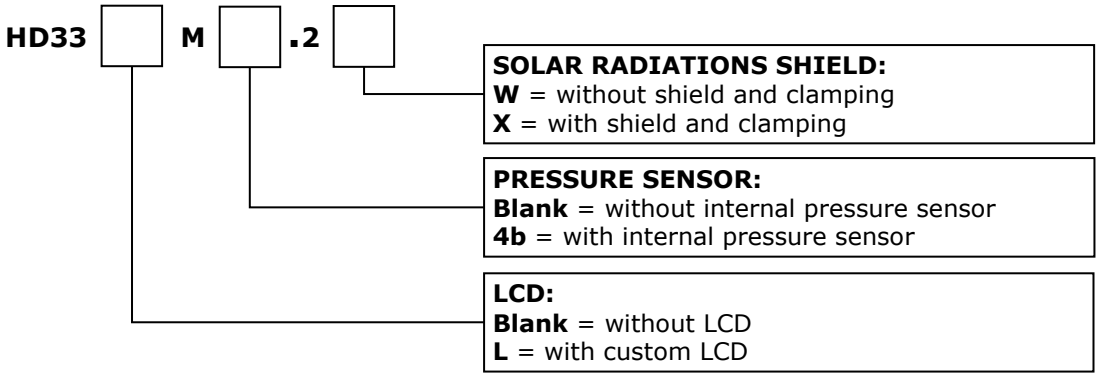
- EEC directives on workplace safety
- National low regulations on workplace safety
- Accident prevention regulations

14 ORDERING CODES

HD33M.2 GSM/GPRS data logger. It stores the measurements in the internal memory and transmits the acquired data via FTP, via e-mail or to an HTTP server (Cloud). **Optional** LCD Display. Alarm functions. Power supply: 7…30 Vdc. It includes **HD35AP-S** software downloadable from Delta OHM web site.

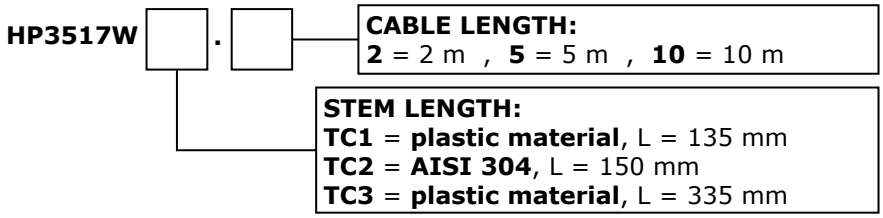
SIM card not included. External probes and USB cable CP23 have to be ordered separately. Specify upon ordering if the data logger should be supplied with protection shield against solar radiations and HD2003.77/40 clamping.

HD33M4b.2 HD33M.2 data logger equipped with an internal barometric sensor.

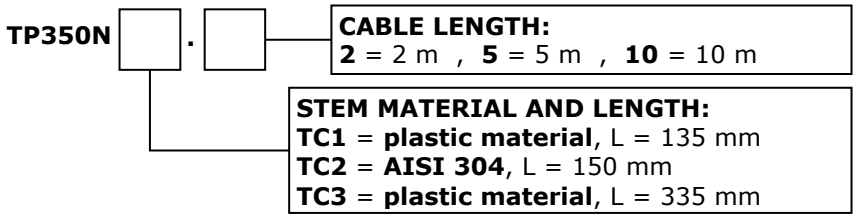


RELATIVE HUMIDITY AND TEMPERATURE PROBES

HP3517WTC… Relative humidity and temperature combined probe. R.H. measuring range: 0…100%. Temperature sensor: NTC 10KΩ. Temperature measuring range: -40…+105 °C. Cable length 2, 5 or 10 m standard. 4-pole M12 female connector.



TP350NTC… NTC10KΩ sensor temperature probe. Measuring range: -40…+105 °C. Cable length 2, 5 or 10 m standard. 4-pole M12 female connector.



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.

PYRANOMETERS

LPPYRA02 Spectrally Flat Class B (first class) pyranometer according to ISO 9060:2018. Output in μV/(Wm^{-2}). Supplied with: shade disk, cartridge with silica-gel crystals, 2 spare sachets, levelling device, connector and Calibration Report. On request cable with M12 connector.

LPPYRA03 Spectrally Flat Class C (second class) pyranometer according to ISO 9060:2018. Output in μV/(Wm^{-2}). Supplied with levelling device, connector and Calibration Report. On request cable with M12 connector and shade disk.

LPPYRA10 Spectrally Flat Class A (secondary standard) pyranometer according to ISO 9060:2018. Output in μV/(Wm^{-2}). Supplied with protection shield, cartridge for silica gel crystals, 2 spare charges, bubble level for alignment, connector and Calibration Report. On request cable with M12 connector.

LPSILICON-PYRA 04 Pyranometer with silicon photodiode for measuring the global solar irradiance, diffuser for cosine correction. Spectral range 400...1100 nm. Typical sensitivity: 20 μV/W m^{-2}. Measuring range: 0…2000 W/m^2. Fixed cable 5 m long, terminated with open wires.

LPSP2 Shade disk for LPPYRA03.

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

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

RAIN GAUGES

HD2013 Tipping bucket rain gauge, 400 cm^2 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, 400 cm^2 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%.

HD2015 Tipping bucket rain gauge, 200 cm^2 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, 200 cm^2 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%.

HD2016 Weighing rain gauge, area 400 cm^2. 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 cm^2. 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 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).

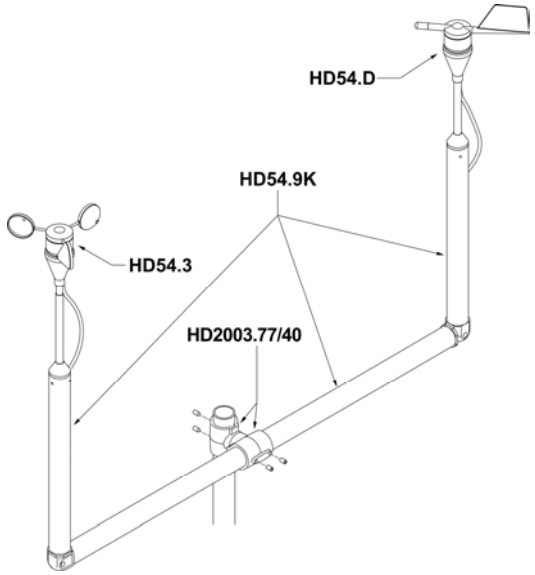
HD2003.78 Base for 40 mm diameter mast, to be fixed to the floor.

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 ∅ 40 mm and L=1500 mm, two extension bars ∅ 40 mm and accessories.



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.

HD32WSF.S12 Solar panel power supply unit with SDI-12 interface for reading the power supply voltage. Includes a 12 Vdc /7.2 Ah battery and a charge regulator. The power supply output is the unregulated voltage of the internal battery. IP 65 housing. Suitable for fastening to a rod. Includes fastening accessories.

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.

HD2005.20 Tripod kit with adjustable legs for installing environmental sensors (pyranometers, temperature and humidity, etc.). Material: anodized aluminum. Max. height 225 cm. 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 335 cm. 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

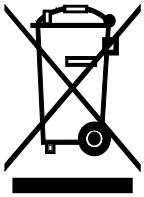
WARRANTY

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 reserves 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

Please note our new name:
Senseca Italy Srl
Via Marconi 5, 35030 Padua, Italy
Documents are in the process of being changed.