HD33[L]M.2
HD33[L]M-MB.2
## GSM/GPRS data loggers for weather stations

- Temperature, relative humidity, dew point, atmospheric pressure, solar radiation, rainfall quantity, wind speed and direction data logging
- Available in two versions: with input for standard RS485 MODBUS-RTU sensors or with inputs for dedicated Delta OHM sensors
- GSM/GPRS module for the remote monitoring
- Sending of data via e-mail, FTP and to an HTTP server (for example the Delta OHM Cloud)
- PC software for configuration, monitor and data download in a database
- Software option available for compliance to **FDA 21 CFR part 11** recommendations
- Alarm notification via e-mail and SMS when configurable measurement thresholds are exceeded
- **IP 67** waterproof housing
- Optinal custom LCD
- It can be powered by mains or by a solar panel (with optional external power supply unit)

DESCRIPTIONS

The **HD33[L]M.2** and **HD33[L]M-MB.2** data loggers are equipped with a GSM/GPRS module and allow several physical quantities to be monitored remotly in a large variety of application fields. You can monitor, for example, temperature, humidity, atmospheric pressure, solar radiation, rainfall quantity, wind speed and direction.

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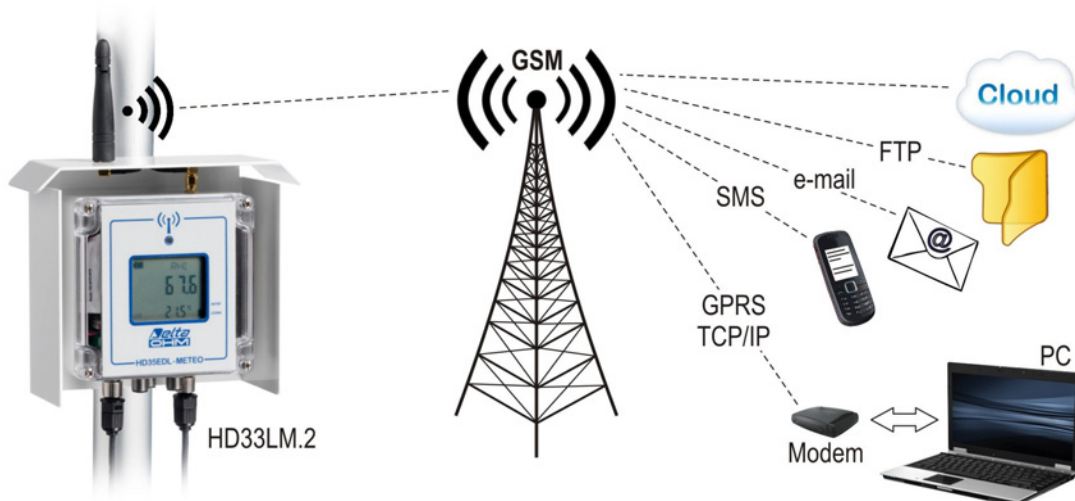
The data logger GSM functions can be remotely controlled by sending SMS messages.

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.

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

If a pyranometer is connected, the daily Wh/m² (Wh = watt hour) are calculated.

If a rain gauge is connected, a measurement compensation curve as a function of the rainfall rate can be configured. The data logger calculates the rainfall rate in mm/h (by referring the rainfall quantity in the last five minutes to an hourly value) and the rainfall quantity in the last day.

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 mains (with **optional HD32MT.SWD** external power supply unit) or by a solar panel (with **optional HD32WSF.S12** external power supply unit).

IP 67 waterproof housing.

Optional custom LCD display.
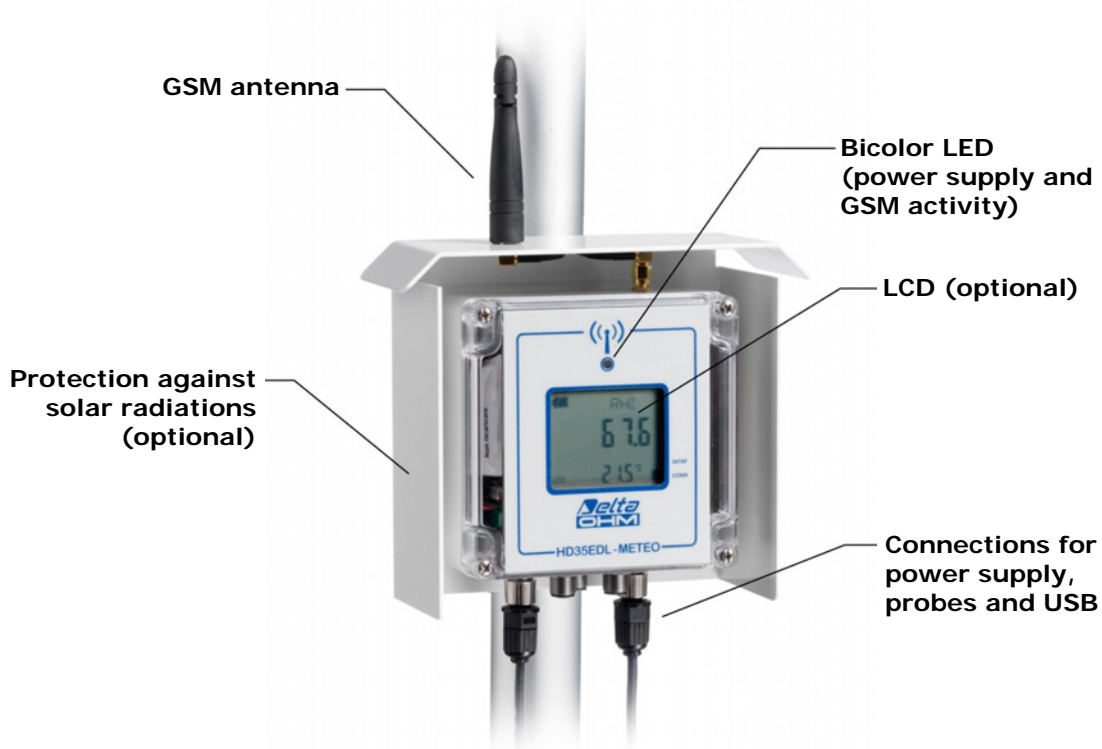

HD33[L]M.2

The **HD33[L]M.2** data logger has 5 inputs with M12 connectors:

- 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 an anemometer is connected, the data logger calculates the **Wind gust** and **Wind chill** (only if the data logger also measures the temperature) parameters.

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).

The **HD33[L]M-MB.2** data logger is equipped with a "Master" **RS485 MODBUS-RTU** input to which a network of sensors with "Slave" RS485 MODBUS-RTU output can be connected (e.g. an anemometer of the HD52.3D… series can be connected).

As an alternative to the Modbus-RTU protocol, a proprietary protocol can be used to connect the HD2003 anemometer.

A voltage-free contact input allows connecting a rain gauge with contact output.

It is equipped with a switched power supply output to power the sensors only when the measurement has to be carried out. The power output, when enabled, has the same value as the power input.

In the version with LCD, a button at the bottom of the data logger allows you to manually scroll the various quantities on the display.
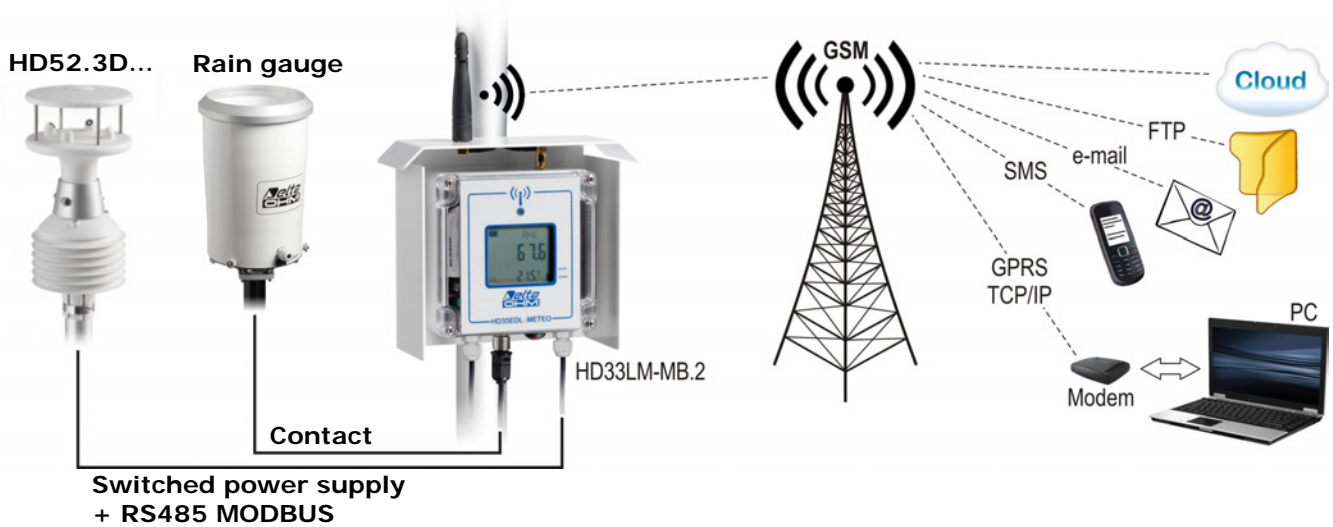
CLOUD

The data logger can automatically send, at regular intervals, the data to an HTTP server, and in particular to the Delta OHM portal "**www.deltaohm.cloud**". This allows you to view the data from anywhere in the world, even by using mobile devices (tablet, smartphone, notebook), simply having an Internet connection and using a web browser. The data sending interval is configurable.

The PC software **HD35AP-S** allows configuring the data logger, viewing the real time measurements both graphically and numerically, downloading the data in a database. The data can be downloaded automatically, at regular intervals, or upon user request.

Real time measurements

Table of measurements

Selection of devices and quantities

DATABASE

Graph of measurements

The database functions allow viewing the data coming from multiple data loggers simultaneously. The connection to the database is **multi-client**: it is possible to store the data in a remote database on the local network to which the PC is connected, and the data can be viewed from any PC on the network via the HD35AP-S software.

The **HD35AP-CFR21** option (enabled by a USB hardware key to be connected to any PC connected to the same local network of the PC in which the HD35AP-S software is installed) allows, in addition to the features of the basic software, the protection of recorded data and configuration in response to **FDA 21 CFR part 11** recommendations. In particular become available:

- The traceability of activities (audit trail) performed with the software; for example, which users connected and what changes were possibly made to the configuration of the data logger.
- The management of users access for the data logger configuration and viewing of data in the database. Each user can be assigned a different password for using the software. There are also three levels of access (Administrator, Super-user and standard User); for each level, the allowed operations can be defined.

TECHNICAL SPECIFICATIONS

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. The number of samples depends on the number of detected quantities: • from 128,000 to 440,000 for HD33[L]M.2 • from 120.000 to 424.000 for HD33[L]M-MB.2
Alarm	Acoustic through internal buzzer. Sending of alarm e-mail and SMS.
Display	**Optional** custom LCD
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
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 (Only for HD33[L]M.2 in line with the probes. For HD33[L]M-MB.2 the measurement characteristics depend exclusively on the sensors connected):

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

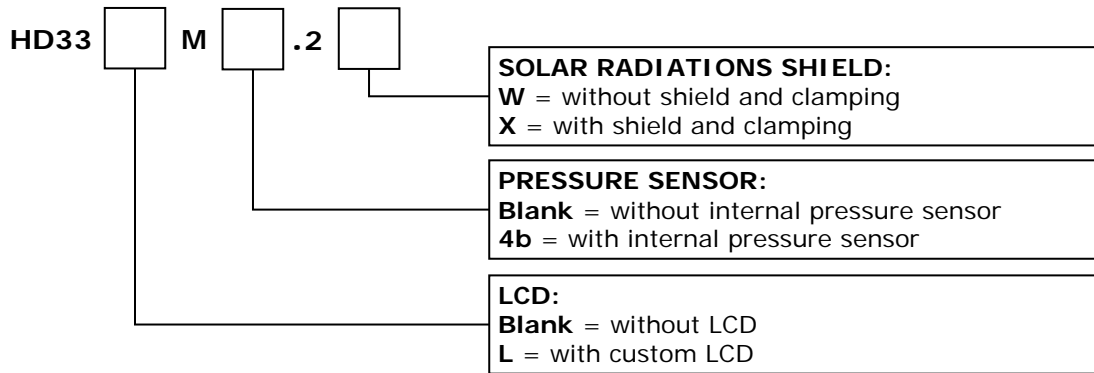| **Atmospheric pressure**	
Sensor	Piezoresistive
Measuring range	300...1100 hPa
Resolution (of instrument)	0.1 hPa
Accuracy	± 0.5 hPa (800...1100 hPa) @ T=25°C ± 1 hPa (300...1100 hPa) @ T=0...50°C
Stability	1 hPa / year
Temperature drift	±3 hPa tra -20...+60 °C

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.

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…359.9°
Resolution (of the instrument)	0.1°
Accuracy	< 1%
Dead band	4° typical, 8° max.
Threshold	1 m/s

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

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.

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HD33 [  ] M [  ] .2 [  ]
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SOLAR RADIATIONS SHIELD:
W = without shield and clamping
X = with shield and clamping

PRESSURE SENSOR:
Blank = without internal pressure sensor
4b = with internal pressure sensor

LCD:
Blank = without LCD
L = with custom LCD

HD33M-MB.2   GSM/GPRS data logger. RS485 MODBUS-RTU input and contact input for rain gauge. 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: 7...30 Vdc. It includes **HD35AP-S** software downloadable from Delta OHM web site.
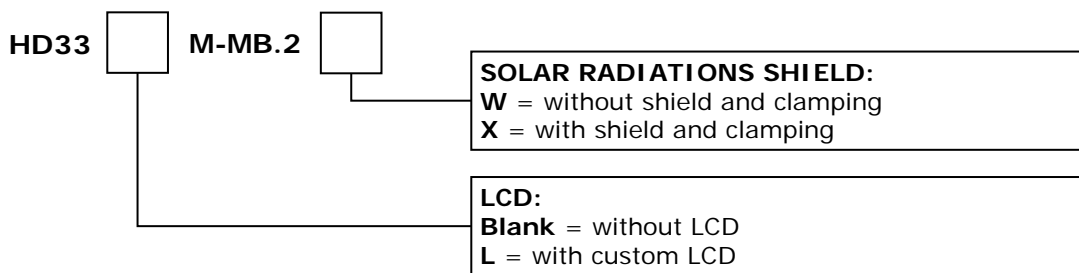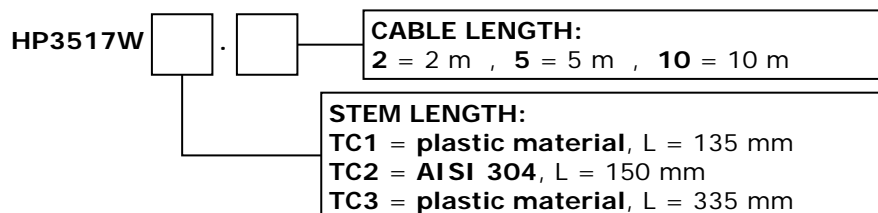
      SIM card not included. External probes and USB cable CP23 have to be ordered separately. Specify upon ordering if the data logger should be supplied with protection shield against solar radiations and HD2003.77/40 clamping.

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HD33 [  ] M-MB.2 [  ]
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SOLAR RADIATIONS SHIELD:
W = without shield and clamping
X = with shield and clamping

LCD:
Blank = without LCD
L = with custom LCD

RELATIVE HUMIDITY AND TEMPERATURE PROBES FOR HD33[L]M.2

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.

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HP3517W [  ] . [  ]
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CABLE LENGTH:
2 = 2 m , **5** = 5 m , **10** = 10 m

STEM LENGTH:
TC1 = **plastic material**, L = 135 mm
TC2 = **AISI 304**, L = 150 mm
TC3 = **plastic material**, L = 335 mm

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

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TP350N [   ] . [   ]            CABLE LENGTH:
                               2 = 2 m , 5 = 5 m , 10 = 10 m

                               STEM MATERIAL AND LENGTH:
                               TC1 = plastic material, L = 135 mm
                               TC2 = AISI 304, L = 150 mm
                               TC3 = plastic material, L = 335 mm
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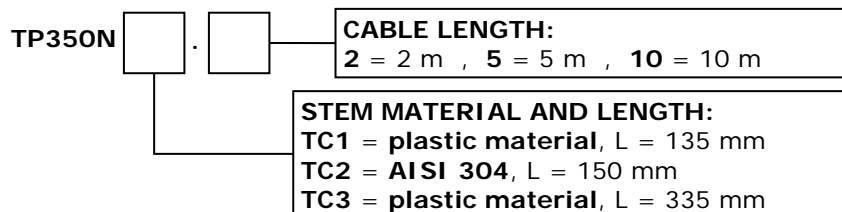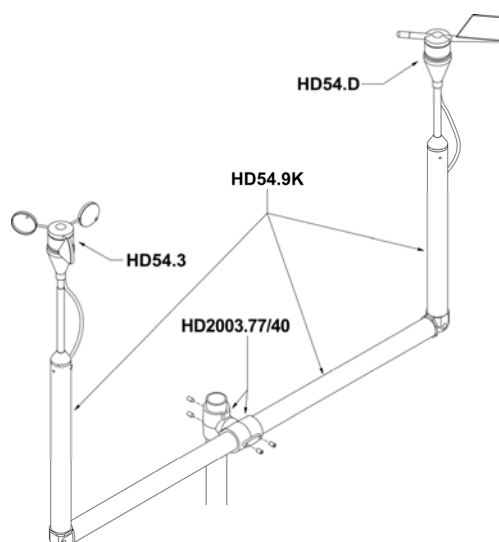
HD9007A-1   12-ring protection against solar radiations. Includes support bracket.

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.

SOLAR RADIATION SENSORS FOR HD33[L]M.2

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 5 or 10 m cables with 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 5 or 10 m cables with connector and shade disk.

LPPYRA10   Spectrally Flat Class A (secondary standard) 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 5 or 10 m cables with 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   LPPYRA02... and LPPYRA10... attachment bracket, suitable for mast Ø 40 ÷ 50 mm.

LPS3   LPPYRA03... attachment bracket, suitable for mast Ø 40 ÷ 50 mm.

WIND SPEED AND DIRECTION SENSORS FOR HD33[L]M.2

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

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.

SENSORS WITH MODBUS-RTU OUTPUT FOR HD33[L]M-MB.2

Delta OHM has a wide range of sensors with MODBUS-RTU output for measuring environmental physical quantities. Please visit www.deltaohm.com or contact Delta OHM directly.

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 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.