

OPERATING MANUAL

HD208 series

Mini data logger



EN
V1.8



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1 Introduction

The data loggers of the series **HD208** are compact instruments for monitoring temperature, relative humidity (RH) and dew point temperature. Usable in a wide spectrum of applications, are available in various models:

- With 1 channel for temperature only (depending on the model, the sensor can be internal, external fixed or external with cable).
- With 1 channel for temperature and relative humidity (combined probe fixed or with cable).

All models can be supplied with or without LCD display.

The logging function is extremely versatile; logging can be started and stopped manually, by means of the front buttons, or the start and stop date and time of acquisition can be programmed. The delayed start capability allows starting the logging with a configurable delay time after pressing the button for the manual start.

For each quantity detected, two configurable alarm thresholds can alert the user if the measure exceeds the configured parameters.

The instrument automatically generates, after logging, a **PDF report** with charts of the variables collected and a **CSV file** with all measurements logged. The PDF and CSV files can then be copied to the PC via the USB port, without any dedicated software: the instrument is recognized as a USB flash drive.

The application software **HD35AP-S**, downloadable from the website, allows the configuration of the instrument, the real-time monitor of the measurements and the transfer of the acquired data into a database. The connection to the PC does not require any installation of USB drivers, thereby ensuring compatibility with all versions of the Windows® operating system.

The **HD35AP-CFR21** application software option allows the use of security features of the recorded data and configuration of the instrument in response to **FDA 21 CFR part 11** recommendations.

Powered by a **non-rechargeable** lithium-thionyl chloride battery (Li-SOCl₂).

The sensors are pre-calibrated and require no further calibration by the user. If necessary, the user can perform a new calibration using the HD35AP-S application software.

All versions can be ACCREDIA certified, upon quote.

The table below shows the available models:

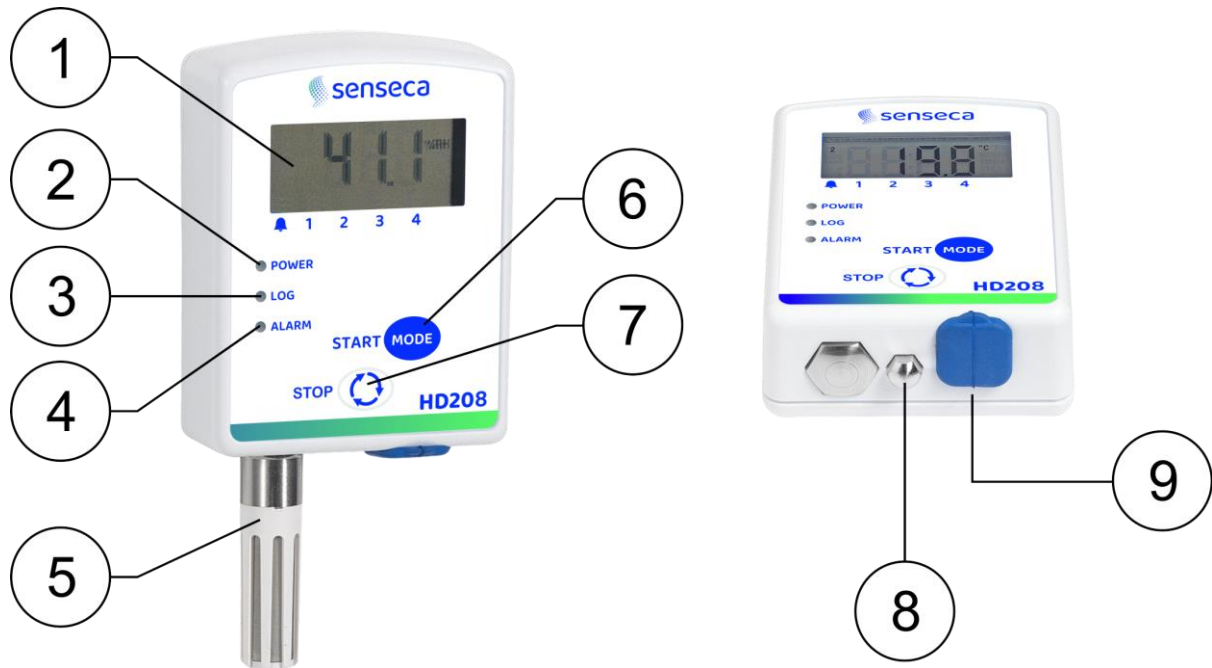
Model	Sensors		Probe		LCD
	Temperature	Relative humidity	Vertical fixed	With cable	
HD208[L]N	√ (internal)	--	--	--	Option L
HD208[L]NTV	√ (external)	--	√	--	
HD208[L]NTC	√ (external)	--	--	√	
HD208[L]1NTV	√ (external)	√	√	--	
HD208[L]1NTC	√ (external)	√	--	√	

2 Technical specifications

Relative Humidity	
Sensor	Capacitive
Measuring range	0...100 %RH
Resolution	0.1%RH
Accuracy	± 1.5 %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 operating temperature range
Long-term stability	1%/year
Temperature	
Sensor	NTC10kΩ @ 25 °C
Measuring range	-40...+105 °C In the case of internal sensor or external fixed probe, the measuring range is limited by the maximum operating temperature of the instrument.
Resolution	0.1 °C
Accuracy	± 0.3 °C in the range 0...+70 °C / ± 0.4 °C outside
Long-term stability	0.1 °C/year
Unit of measurement	°C or °F
Logging interval	1, 2, 5, 10, 15, 30 s / 1, 2, 5, 10, 15, 30, 60 min
Storable quantities	According to the model: <ul style="list-style-type: none"> • Temperature: internal sensor, fixed external probe or external sensor with cable; Mean Kinetic Temperature (MKT) calculated. • Relative Humidity. • Dew Point. • Battery Voltage.
Memory	Flash memory with circular management or stop logging when full. The PDF report is generated with the data stored in the Flash memory and the maximum number of samples (N _s) is: $N_s = \frac{921,600}{(1 + 0.75 \times N_g)}$ With N _g = number of stored quantities. Example: > 526,000 with one quantity stored (N _g =1) > 147,000 with seven quantities stored (N _g =7) The maximum number of samples in the CSV files is instead limited only by the capacity of the 4 GB SD memory.
Alarms	Two alarm thresholds (configurable) for each measured quantity
Power supply	3.6 V not rechargeable lithium-thionyl chloride internal battery (Li-SOCl ₂), size AA, 2-pole Molex 5264 connector.
Battery life	2 years typical, with logging interval 30 s
PC connection	USB port with mini-USB connector
Instrument operating temperature/humidity	-40...+75 °C / 0...100 %RH non condensing

Materials	ABS (with added UV filters) Probe filter in PBT and stainless steel grid
Dimensions	Case: 70 x 90 x 30 mm Size of the TV model with fixed probe: 70 x 138 x 30 mm
Protection degree	IP 64
Weight	150 g approx.
Installation	Wall mount

3 Description



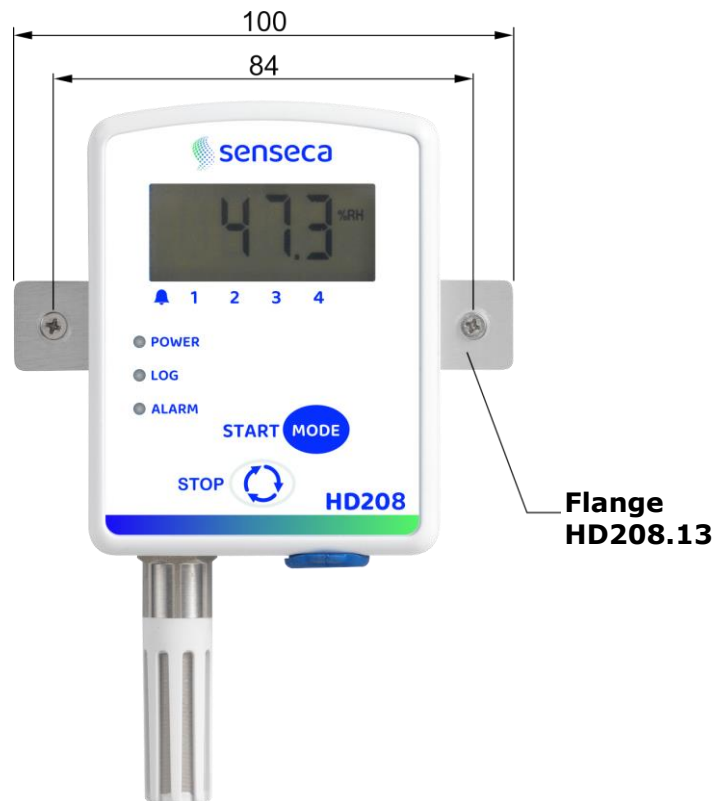
1. LCD.
2. **POWER** LED: briefly flashes every 10 seconds to indicate that the instrument is powered. It is steady on if the instrument is connected to the PC.
3. **LOG** LED: briefly flashes three times when logging starts and stops, and once every 10 seconds during logging.
4. **ALARM** LED: briefly flashes every 10 seconds if any of the measured quantities is in alarm.
5. Temperature or temperature/RH fixed probe (**HD208...TV** models). The **HD208...TC** models have connector for external probe with cable.
6. **START/MODE** button: by pressing it briefly, you change the type of information displayed (measures, date/time, alarm thresholds, logging settings); if pressed for more than 2 seconds, manually starts logging. In models without LCD, the button performs only the START function.
7. **STOP/Scroll** button: by pressing it briefly, you change the parameter displayed (the parameter depends on the type of information selected with the START/MODE button); if pressed for more than 2 seconds, manually stops logging. In models without LCD, the button performs only the STOP function.
8. Internal temperature sensor (**HD208N**).
9. USB port with protective cover.

4 Installation

The case of the instrument is provided with a hole on the back to fix it to a support (screw or hook) on the wall. Insert the head of the support in the lower part of the hole (width 10 mm) and lower the instrument so that the head of the support remains wedged in the upper part of the hole (width 6 mm). Make sure that the instrument cannot accidentally come out from the support.



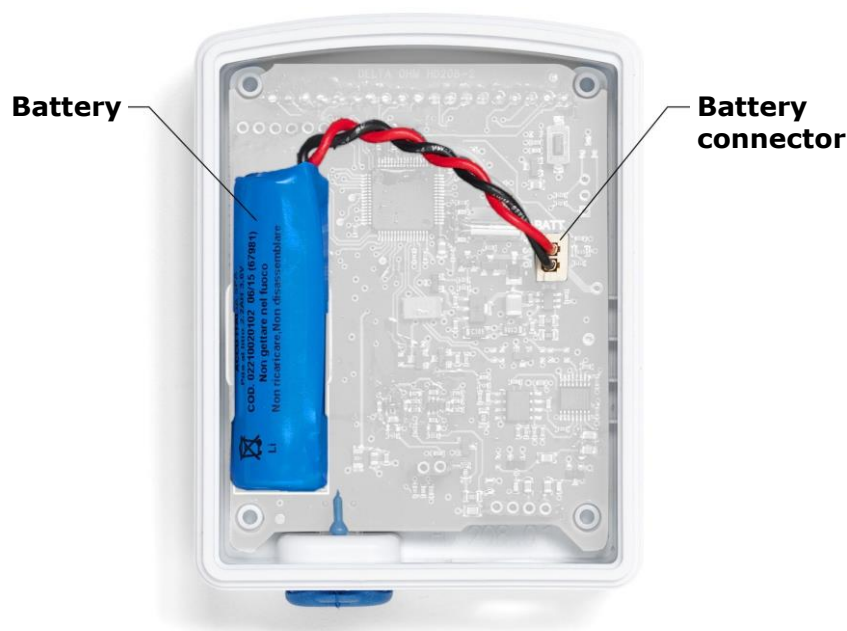
Alternatively, a fixed installation can be realized, using the **optional HD208.13** aluminium flange to be fixed on the back of the instrument case.



4.1 Battery

The instrument uses a 3.6 V **non-rechargeable** lithium-thionyl chloride (Li-SOCl₂) battery AA size. To connect the battery, or to replace a dead battery with a new one, proceed as follows:

1. Unscrew the 4 screws on the back of the case and remove the back cover.
2. In case of replacement, disconnect the battery connector from the circuit board and replace the battery with a new one of the same type.
3. Connect the battery connector to the circuit board, observing the correct polarity. The connector is equipped with a polarization key that prevents the possibility of a wrong insertion of the connector.
4. Close the case by fixing the 4 rear screws (pay attention to the correct placement of the battery, not to hinder the closing of the case).



The battery symbol at the bottom left of the display lights up when the battery is low; in this case, replace the battery as soon as possible.

4.2 Configuration

The instrument parameters (date/time, logging parameters, alarm thresholds, quantities to be acquired) are configurable by connecting the instrument to a PC and using the HD35AP-S application software (please see the instructions of the software) or, alternatively, a specially designed **PDF form** included in the HD35AP-S software package (file **HD208 configuration.pdf** in folder **PDF/Language/Config_HD208**).

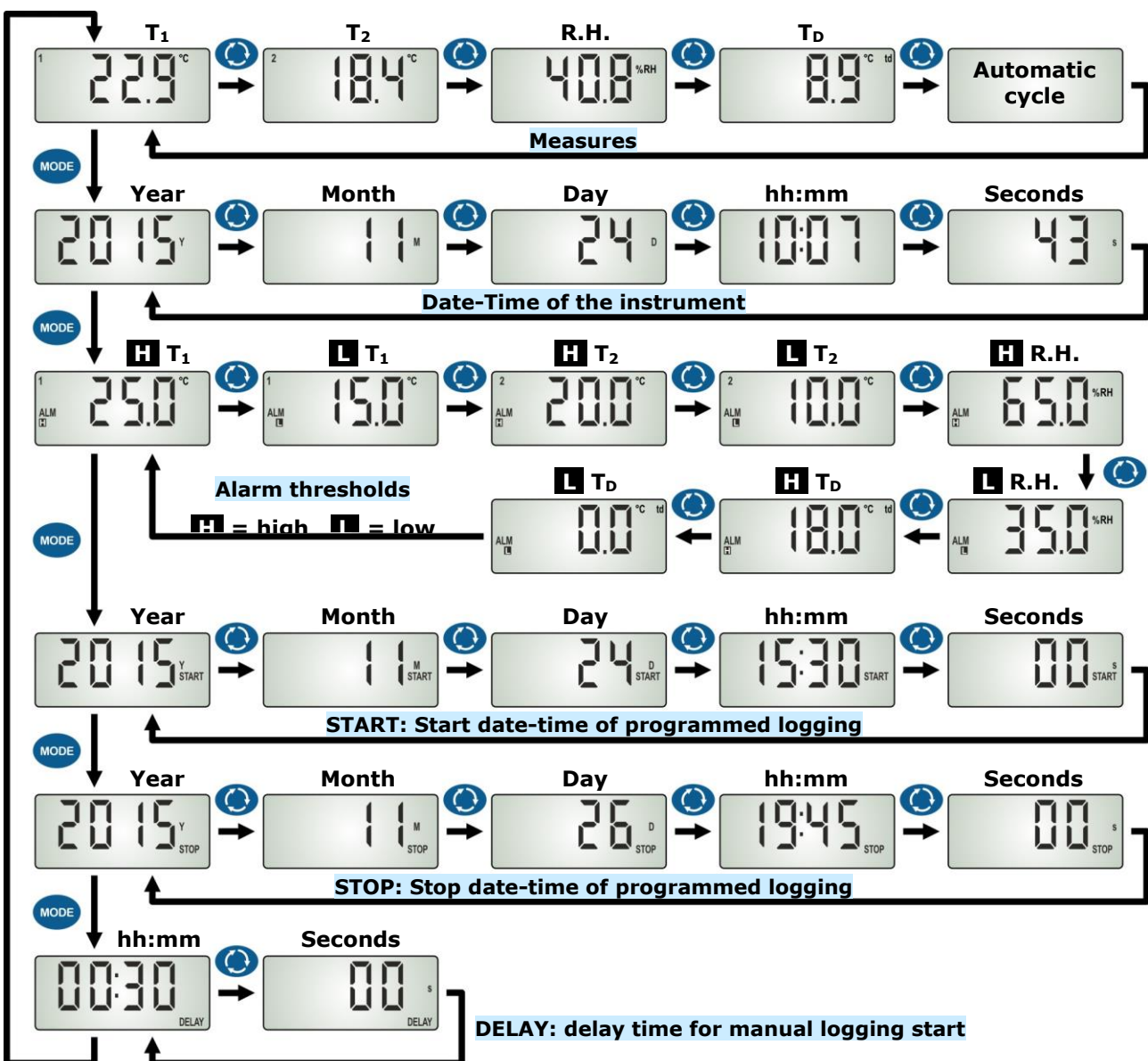
The use of the PDF form must be enabled with HD35AP-S software. For the use of the PDF form, please see the HELP button in the form.

5 Models with LCD

In models with LCD, **MODE** and **SCROLL** buttons allow viewing a variety of information. With the MODE button (short press) you choose the type of information: measurements, date and time of the instrument, alarm thresholds, start and stop instants of programmed logging, delay time for the manual start of logging. With the SCROLL button (short press) you navigate through the various fields of the type of information selected (see function diagram shown below). The buttons operation is cyclical.

If you press the SCROLL button when the display shows the last of the quantities available on the display, the instrument does not return immediately to the first quantity, but starts to automatically cycle through all the available quantities. Press SCROLL again to return to the permanent display of the first quantity.

If a parameter is not set, the instrument will display dashes.

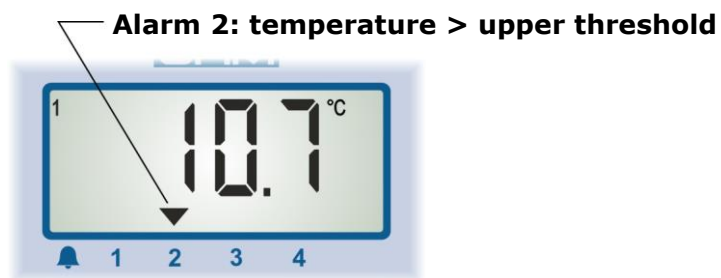


ALARM SYMBOLS ON DISPLAY

In addition to the alarm LEDs, there are four alarm indications on the display; an arrow lights up in correspondence of the alarms 1, 2, 3 and 4 if:

- Alarm **1**: the temperature is below the lower threshold configured.
- Alarm **2**: the temperature is above the upper threshold configured.
- Alarm **3**: the relative humidity is below the lower threshold configured.
- Alarm **4**: the relative humidity is above the upper threshold configured.

If the model measures two temperatures: external sensor (channel 1) and internal sensor (channel 2), alarms 1 and 2 refer to the temperature measured by the external sensor (channel 1).



ERROR MESSAGES ON DISPLAY

If a detected quantity is in error, the following indications appear on display:

UFL: the measured value is less than the minimum measurable (Underflow).

OFL: the measured value is greater than the maximum measurable (Overflow).

6 Logging

The start of logging can be:

- **Automatic**, by programming the start date and time.
- **Manual**, by pressing for more than 2 seconds the button START/MODE.
- **Delayed**: logging does not start immediately when you press the START/MODE button, but after the delay time set.

Logging stop can be automatic, by programming the stop date and time, or manually, by pressing for more than 2 seconds the STOP/Scroll button.

The programmed time and the delay time are set using the HD35AP-S software or the PDF form.

During logging, the LOG symbol on the display and the LOG LED flash. In case of delayed start, during the delay time the DELAY symbol appears on the display, indicating that the instrument is waiting to start logging.

6.1 PDF report

At the end of each logging session, the data logger automatically generates a PDF report, which can then be copied to the PC via the USB port of the instrument. When generating the report, the display of the instrument shows **PDF**.

The report includes the graphs of the detected quantities and information about the logging session: logging start and stop time, logging interval, number of samples acquired, alarm thresholds, minimum, average and maximum of each detected quantity.

The report includes the calculation of the **Mean Kinetic Temperature (MKT)**. The Mean Kinetic Temperature is an evaluation index of the cold chain used in the pharmaceutical field, and is calculated according to the Haynes equation as a function of all the temperature measurements acquired during the logging session. The Mean Kinetic Temperature is used to evaluate temperature fluctuations experienced by a biological substance during storage or transport, and corresponds to the storage temperature that, if maintained constant, produces on the biological substance the same effects of the actual temperature changes recorded in the time period considered (i.e. the duration of the logging). You can set the value of the activation energy, parameter necessary for the calculation of MKT.

In the graphs are shown in gray the areas of alarm (values that exceed the thresholds set).

The time required to generate the PDF file depends on the amount of data acquired, and can go from a few seconds (if the amount of data acquired is limited) up to about a minute.

Note: the PDF report is generated with the data stored in the Flash memory; the number of samples in the Flash memory may be less than the number of samples stored in the CSV file (please see the memory capacity in the technical specifications).

Note: if the ambient temperature is below zero or the battery level is low, the PDF report is not generated at the end of the logging session, but when the data logger is connected to the PC. At the end of the logging session, the "CON USB FOR PDF" message appears on the display.

The generation of the PDF report can be enabled/disabled by using the HD35AP-S software or, alternatively, by holding pressed the STOP button and then pressing the reset button located on the electronic board (above the battery connector).

7 Connection to PC

Pull out the protection of the USB output and connect the instrument to the PC by using the cable **CP23**. If the instrument is **not** logging, the PC detects it as a simple USB flash drive and appears the list of PDF and CSV files with the reports and the data of the logging sessions.

In order to transfer data from the internal memory of the instrument in a database in the PC, use the HD35AP-S application software following the on-line instructions of the software. The HD35AP-S software allows the **multi-client** connection to the database: 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.

During logging it is possible to connect through the HD35AP-S software and display the measurements in real time (Monitor), but you cannot copy the PDF and CSV files in the instrument.

The connection to the PC does not require any USB driver installation.

In order to disconnect the instrument from the PC, use the "Safely Remove Hardware" function provided by the operating system. When the instrument is not connected to the PC, reposition into place the protective cap of the USB output.

Note: during PDF report generation at the end of a logging session, the instrument does not respond to the PC; wait for the instrument to finish saving the PDF file.

7.1 Advanced software

The **HD35AP-CFR21** option allows, in addition to the features of the basic software, the protection of recorded data and configuration of the instrument 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 instrument.
- The management of users access for the instrument 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.

In order to activate the advanced mode, the hardware key supplied with the HD35AP-CFR21 option must be connected. The hardware key can be connected to any PC connected to the same local network of the PC in which the HD35AP-S software is installed (please see the instructions provided with the key).

8 Maintenance

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

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

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

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

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

9 Safety instructions

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

Do not use the instruments in places where there are:

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

User obligations

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

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

10 Probes and accessories ordering codes

The data logger is supplied with non-rechargeable battery and HD35AP-S software, downloadable from the website.

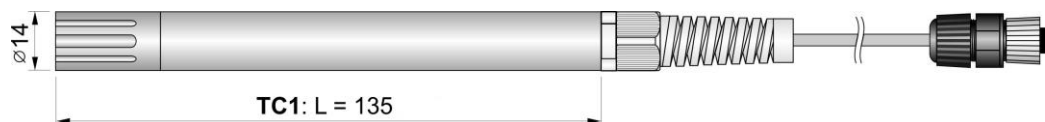
The USB cable CP23 and the external probes with cable must be ordered separately.

Probes

TP35N1.3/C Stainless steel temperature probe with NTC10K Ω sensor. Dimensions: \varnothing 5 x 40 mm. M12 4-pole female connector. Cable length 3 m.



HP3517TC1.2 Temperature and relative humidity combined probe. M12 4-pole female connector. PBT technopolymer body. Stem length 135 mm, cable length 2 m.



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 USB type A male connector on the PC side.

HD208.13 Aluminium flange for fixing the instrument to the wall.

Saturated solutions

HD75 Saturated solution for testing the relative humidity sensor at 75% RH. Includes screw adaptor for \varnothing 14 mm probes.

HD33 Saturated solution for testing the relative humidity sensor at 33% RH. Includes screw adaptor for \varnothing 14 mm probes.

HD11 Saturated solution for testing the relative humidity sensor at 11% RH. Includes screw adaptor for \varnothing 14 mm probes.

Spare parts

HD35-BAT3 3.6 V **non-rechargeable** lithium-thionyl chloride (Li-SOCl₂) battery, size AA, 2-pin Molex 5264 connector.

WARRANTY

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

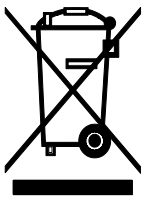
The manufacturer repairs the products that show defects of construction in accordance with the terms and conditions of warranty included in the manual of the product. For any dispute, the competent court is the Court of Padua. The Italian law and the "Convention on Contracts for the International Sales of Goods" apply.

TECHNICAL INFORMATION

The quality level of our instruments is the result of the continuous product development. This may lead to differences between the information reported in the manual and the instrument you have purchased.

We reserve the right to change technical specifications and dimensions to fit the product requirements without prior notice.

DISPOSAL INFORMATION



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

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



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