



HD2010 UC

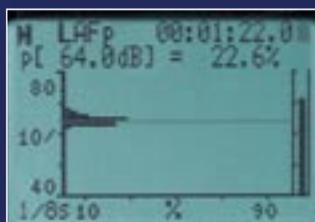
Integrating Sound Level Meter



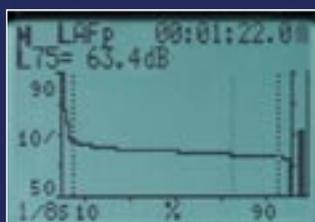
▶ Basic screen



▶ Time profile
("data logger" option)



▶ Statistical analysis: probability
distribution of sound levels
("advanced analyzer" option)



▶ Statistical analysis: percentile
levels ("advanced analyzer"
option)



ΗΧΟΠΑΡΕΜΒΑΣΗ □

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HD 2010UC

Integrating Sound Level Meter

The HD2010UC is an integrating portable sound level meter performing statistical analyses. The instrument has been designed combining price competitiveness and simplicity of use. Attention has been paid to the possibility of updating the instrument. Besides, the HD2010UC can be integrated with other options to extend its application scope at any time. The firmware can be upgraded directly by the user using the DeltaLog5 program supplied with the instrument.

Technical regulations:

- Class 1 or 2 sound level meter according to IEC 61672-1 of 2002 (Certificate of Compliance I.N.RI.M. No. 07-0124-02), IEC 60651 and IEC 60804.
- Class 1 or 2 acoustic calibrator according to IEC 60942:1988.

Applications:

- Assessment of the environmental noise level,
- Optional "data logging" function,
- Optional capture and analysis of sound events,
- Statistical analysis with the calculation of 3 percentile levels and optional full statistical analysis,
- Identification of impulsive noise,
- Measurements in the workplace,
- Selection of personal protective equipment (SNR and HML methods),
- Production quality control,
- Measurement of machine noise.

Application Kits

Measurements in the workplace

- **HD2010UC kit 2:** Includes class 2 Sound Level Meter HD2010UC, HD2010PNE2 preamplifier, UC52 microphone for free field, windscreen, 5m extension cable and RS232 serial or USB connection cable. DeltaLog5 PC program.
 - Acoustic calibrator HD9102
- **HD2010UC kit 1:** Includes class 1 Sound Level Meter HD2010UC, HD9101 calibrator, HD2010PNE2 preamplifier, UC52/1 microphone for free field, windscreen, 5m extension cable and RS232 serial or USB connection cable. DeltaLog5 PC program.

Environmental noise monitoring

- **HD2010UC kit 1:** Includes class 1 Sound Level Meter HD2010UC, HD9101 calibrator, HD2010PNE2 preamplifier, UC52/1 microphone for free field, windscreen, 5m extension cable and RS232 serial or USB connection cable. DeltaLog5 PC program.
 - Option 2: "Data Logger"
 - Option 5: "Advanced Analyzer"

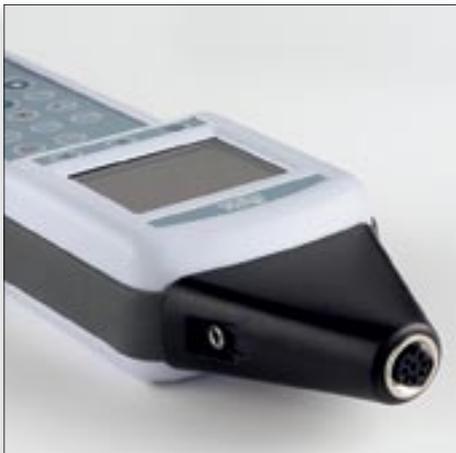
- **HD2010UC kit 1/IE:** Version for indoor and outdoor measurement. It includes class 1 Sound Level Meter HD2010UC, HD9101 calibrator, HDWME950N weatherproof microphone unit with UC52/1 microphone cartridge for free field, windscreen, HD2010PNE2 preamplifier, 5m extension cable and RS232 serial or USB connection cable. DeltaLog5 PC program.
 - Option 2: "Data Logger"
 - Option 5: "Advanced Analyzer"

Accessories

- Option 0 "Memory Expansion":** 4 MB memory expansion. It requires option 2.
- Option 2 "Data Logger":** recording of sound level profiles, continuously and at intervals. It includes a memory expansion from 2 MB to 4 MB.
- Option 5 "Advanced Analyzer":** Profile+report+event data logging, capture and analysis of events, full statistical analysis. Only for class 1 HD2010UC with option 2.
- Option 7 "SIT Calibration":** SIT calibration replaces ISO9001 reports. For new instruments only.
- Option "LCD":** Backlit display. For new instruments only.
- HD2110/CSM:** MiniDin to DB25 serial cable for interconnection modem.
- HD2110/CSP:** MiniDin to DB9 cable to connect a serial printer.
- SWD10:** Stabilized mains power supply with $V_{in}=100\div 230V_{ac}$ / $V_{out}=12V_{dc}/1000mA$.
- CPA/10:** 10m extension cable.
- VTRAP:** Tripod, max. height 1550 mm.
- HD2110/SA:** Support to fix the preamplifier to the tripod.
- S'print-BT:** Portable serial printer.
- HD2110/MC:** SD and MMC memory card interface.

Software for Windows® 95/98/ME/2000/XP operating systems.

- DeltaLog5 Monitor:** Acoustic monitoring and PC remote control. Scheduler and synchronized audio recording.
- DeltaLog5 Noise Studio:** The analysis functions are supplied as modules for specific applications:
 - Worker Protection analysis according to Legislative Decree No. 195 of 10/04/2006, European Directive 2003/10/CE of 06/02/2003, and UNI 9432:2002 standard.



- **Railway Traffic:** Analysis of sound events due to passing trains. The module processes the sound levels according to D.M. of 16/03/1998 and D.L. No.194 of 19/8/2005.

Using a HD2010UC you can measure the sound level by programming 3 parameters and freely selecting the frequency weightings and time constants. You can measure parameters such as Leq, SEL and maximum and minimum sound levels with integration times from 1 second to 99 hours. If an undesired sound event produces an overload indication, or simply alters the result of an integration, its contribution can be excluded using the versatile Back-Erase function.

The measured sound levels can be recorded in the large non-volatile memory in order to be transferred to a PC using the supplied Delta-Log5 program.

As a statistical analyzer, the HD2010UC samples the sound signal 8 times per second with A-frequency weighting and FAST constant, and it analyzes it statistically in 0.5 dB classes. It is possible to display up to 3 percentile levels between L_1 and L_{99} . The "Advanced Analyzer" option can be used to choose the sampling of the following: L_{Fp} , Leq and L_{pk} with A, C and Z -weightings (only C and Z for L_{pk}).

For further analysis, the LINE unweighted output allows recording the sound sample either on tape or directly on a PC equipped with a data acquisition card.

The high-speed USB interface combined with the flexible RS232 interface allows quick data transfers from the sound level meter to the PC mass storage, as well as controlling a modem or printer. For example, in case of lengthy recordings, you can activate the "Monitor" function. This function allows sending the displayed data to a PC via the RS232 serial interface, to be directly stored on the PC mass storage.

The sound level meter can be completely controlled by a PC through the multistandard serial interface (RS232 and USB) by using a special communication protocol. Through the RS232 interface, the sound level meter can also be connected to a PC via modem.

The calibration can be made either using the provided acoustic calibrator (complying with IEC 60942) or the built-in reference generator. The electrical calibration employs a special preamplifier and it checks the sensitivity of the measuring channel, microphone included. A protected area in the non-volatile memory, reserved for factory calibration, is used as a reference in the user's calibrations and it allows keeping instrument drifts under control and preventing the instrument from "going out of calibration".

The check of the complete sound level meter functionality can be made directly by the user, in the field, thanks to a diagnostic program.

The HD2010UC sound level meter can perform the measurements required to evaluate workers' noise exposure (Legislative Decree 10.04.06 No. 195). The selection of the personal protective equipment can be carried out through the comparison of the A and C -weighted equivalent levels that can be measured simultaneously (SNR method).

The **class 1** HD2010UC sound level meter with the "Data Logger" option is suitable for sound level monitoring and acoustic mapping. Using the "Advanced Analyzer" option, it can also perform assessments of the acoustic climate with capture and analysis of sound events. When measuring traffic noise near airports, railways and roads, the sound level meter can be used as a multi-parameter sound recorder, adding its statistical analyzer features. Remote electrical calibrations and diagnostic tests can be executed using its remote control capabilities.

Italian Laws

Workplace noise: D. Lgs 195/2006 and European Directive 2003/10/CE.

Airport environment noise: Decree of 31.10.97.

Entertainment noise: D.P.C.M. 215 of 16.04.99.

Machine noise emissions: D. Lgs. 262 of 4/9/2002.

Inputs and outputs

DC output corresponding to the A -weighted sound level with FAST constant time updated 8 times/s (\varnothing 2.5 mm jack). This output is not available for all models.

LINE unweighted output (\varnothing 3.5 mm jack).

Standard RS232C serial port complying with EIA/TIA574. Baud Rate from 300 to 115200 baud.

USB 1.1 serial port.

External power supply 9÷12Vdc (\varnothing 5.5 mm jack).

Options and accessories:

HD2110/MC reader (it requires the "Data Logger" option)

It allows interfacing SD and MMC memory cards with the sound level meter. This device is connected to the sound level meter through the serial interface that also gives the required power supply. In addition to the remarkable recording capacity, the interface allows quick downloading the data stored in the sound level meter internal memory. Cards up to a maximum capacity of 2 GB can be connected.

Option 2 "Data Logger":

It includes the internal memory expansion from 2 MB to 4 MB. Display and recording of the A -weighted sound level profile with FAST time constant, sampled 8 times per second. Recording of the profiles of 3 programmable parameters, sampled twice per second. For sound level monitoring, you can record 3 programmable parameters at intervals of 1 second to 1 hour. In this recording mode, you can store 3 parameters at intervals of 1 minute for over 80 days using the supplied memory (4 MB expandable to 8 MB).

The "Data Logger" option turns the HD 2010UC sound level meter into a sound level logger capable of storing 4 parameters for more than 23 hours.

Impulsive events can be easily identified thanks to the possibility of analyzing simultaneously the sound level profiles using the FAST, SLOW and IMPULSE constants.

When assessing traffic noise near airports, railways and roads, the sound level meter can be used as a multi-parameter sound recorder, exploiting its statistical analyzer features or the possibility of simultaneously recording the level profile with FAST time constant and the sound exposure level.

Option 5 "Advanced Analyzer" (it requires the "Data Logger" option)

This option completes the sound level analyzer functions with the following:

- Statistical analysis available graphically, both as probability distribution and cumulative distribution.
- Trigger function to capture sound events with programmable threshold and duration filter.
- Recording of measurement reports at intervals of 1s to 1 hour, with a dedicated set of parameters that includes full statistical analysis.
- Recording of event parameters with the possibility of setting the maximum time resolution for event recording and a lower resolution for background noise recording.
- Possibility of storing markers.
- Timer for a delayed start of the logging.

Software:

DeltaLog5

The DeltaLog5 application allows easily interfacing the sound level meter with the PC. Its main functions are:

- Transfer of the sound level meter data to the PC's memory.
- Display of the current data as a table or a graph.
- Export to Excel
- PC's acquisition control (with the "Data Logger" option).
- Sound level meter setup.
- Sound level meter firmware upgrade

Writing reports is easier, thanks to a convenient function that allows copying the DeltaLog5 graphs or tables to other applications.

DeltaLog5 Monitor (optional)

In addition to the functions provided by DeltaLog5, the DeltaLog5 Monitor program allows the complete control of the sound level meter using the PC. Its additional functions are:

- Possibility of connecting the sound level meter via modem.
- Management of the monitor function: real-time acquisition in the PC mass storage.
- Management of the calibration and diagnostic functions.
- Programming of automatic acquisitions and monitoring.
- **Possibility of recording the audio synchronized with the sound measurements, using a versatile trigger function.**
- Real-time display of the logged data as a table or a graph.

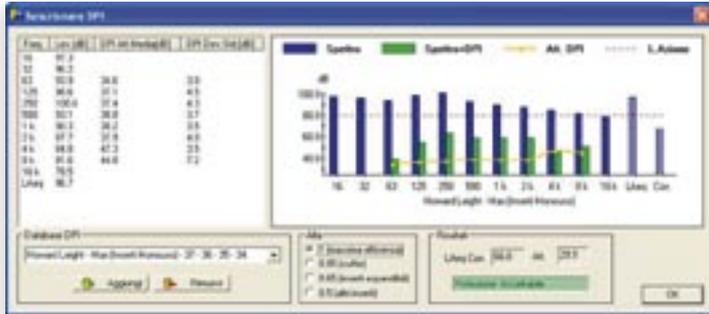
DeltaLog5 Noise Studio (optional)

DeltaLog5 Noise Studio is a post-processing program that can perform different types of analyses. The various analysis functions, specifically designed for a given application, are grouped in software modules that can be enabled using a licence.

The analysis environment gives several display functions (as a table or a graph) of the different sound measurements and processed results. All graphs and tables can be exported to other applications in the Windows® environment.

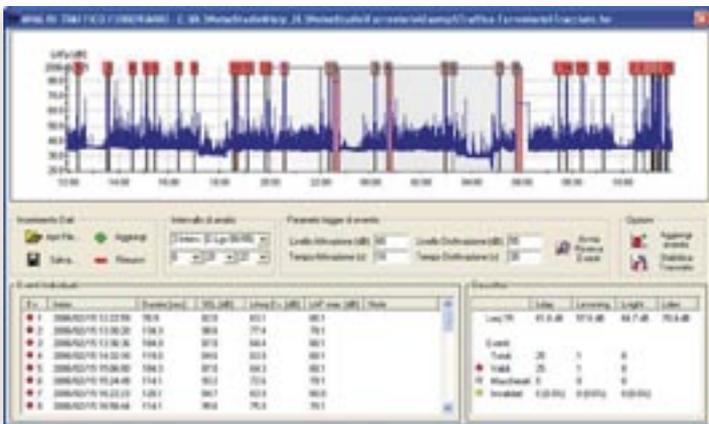
The modules currently available are:

- **Worker Protection:** Noise analysis in the workplace according to D. Lgs. 195/2006, European Directive 2003/10/CE and UNI 9432:2002 standard. The module can be updated in case of variation of law requirements.



DL5 Noise Studio: Worker protection: analysis of PPE efficacy

- **Railway Traffic:** Analysis of the sound profiles captured over a 24-hour span, with automatic search and analysis of the sound events due to passing trains. The module processes the sound levels according to D.M. of 16/03/1998 and D.L. No. 194 of 19/8/2005.



DL5 Noise Studio: Railway traffic module: 24-hour analysis with automatic transit search.

Order codes of the new kits and accessories

HD2010UC kit 1: Includes **class 1** HD2010UC Sound Level Meter, carrying case, HD2010PNE2 preamplifier, HD9101 calibrator, UC52/1 microphone, CPA/5 5m extension cable, HD SAV windscreen, DeltaLog5 software and serial cable for connection to a PC with COM (HD2110/CSNM) or USB (HD2101/USB) interface.

HD2010UC kit 1/E: Same as the HD2010UC kit 1 with weatherproof protection. Suitable for outdoor measurements.

It includes **class 1** HD2010UC Sound Level Meter, carrying case, HD2010PNE2W heated preamplifier with 5m connection cable, HD9101 calibrator, UC52/1 microphone, HDWME950/3 weatherproof protection, DeltaLog5 software and serial cable for connection to a PC with COM (HD2110/CSNM) or USB (HD2101/USB) interface.

HD2010UC kit 1/IE: Same as the HD2010UC kit 1 with weatherproof protection. Suitable for outdoor and indoor measurements.

It includes **class 1** HD2010UC Sound Level Meter, carrying case, HD2010PNE2W heated preamplifier with 5m connection cable, HD2010PNE2 preamplifier, CPA/5 5m extension cable, HD9101 calibrator, UC52/1 microphone, HDWME950/3 weatherproof protection, DeltaLog5 software and serial cable for connection to a PC with COM (HD2110/CSNM) or USB (HD2101/USB) interface.

HD2010UC kit 2: Includes **class 2** HD2010UC Sound Level Meter, carrying case, HD2010PNE2 preamplifier, UC52 microphone, CPA/5 5m extension cable, HD SAV windscreen, DeltaLog5 software and serial cable for connection to a PC with COM (HD2110/CSNM) or USB (HD2101/USB) interface.

HD2010UC kit 2/E: Same as the HD2010UC kit 2 with weatherproof protection. Suitable for outdoor measurements.

It includes **class 2** HD2010UC Sound Level Meter, carrying case, HD2010PNE2W heated preamplifier with 5m connection cable, UC52 microphone, HDWME950/3 weatherproof protection, DeltaLog5 software and serial cable for connection to a PC with COM (HD2110/CSNM) or USB (HD2101/USB) interface.

HD2010UC kit 2/IE: Same as the HD2010UC kit 2 with weatherproof protection. Suitable for outdoor and indoor measurements.

It includes **class 2** HD2010UC Sound Level Meter, carrying case, HD2010PNE2W heated preamplifier with 5m connection cable, HD2010PNE2 preamplifier, CPA/5 5m extension cable, UC52 microphone, HDWME950/3 weatherproof protection, DeltaLog5 software and serial cable for connection to a PC with COM (HD2110/CSNM) or USB (HD2101/USB) interface.

Option 0 "Memory Expansion": 4 MB memory expansion. It can be installed on the HD2010UC with "Data Logger" option.

Option 2 "Data Logger": recording of 4 profiles continuously and at programmable intervals of 1s to 1 hour. It includes memory expansion from 2 MB to 4 MB.

Option 5 "Advanced Analyzer": Profile+report+event data logging, capture and analysis of events, full statistical analysis. It can be installed on the **class 1** HD2010UC with "Data Logger" option.

Option 7 "SIT Calibration": SIT calibration replaces ISO9001 reports. Only for new instruments.

Option "LCD": Backlit LCD. Only for new instruments.

HD2101/USB: MiniDin to USB-A serial cable.

HD2110/CSNM: MiniDin to DB9 null-modem serial cable for interconnection.

HD2110/CSM: MiniDin to DB25 serial cable for interconnection modem.

HD2110/CSP: MiniDin to DB9 cable to connect a serial printer.

SWD10: Stabilized mains power supply with Vin=100÷230Vac / Vout=12Vdc/1000mA.

CPA/10: 10m extension cable for HD2010PNE2 preamplifier.

VTRAP: Tripod, max. height 1550 mm.

HD2110/SA: Support to fix the preamplifier to the tripod.

S'sprint-BT: Portable serial printer.

HD2110/MC: SD and MMC memory card interface. It requires the "Data Logger" option.

Codes of spare parts and other accessories

Upgrade 1: Conversion of HD2010UC into HD2010UC/A. It includes:

- Octave band spectrum analysis.
- Option 2 "Data Logger".

The sound level meter and filter ISO 9001 calibration report is included in the upgrade.

HD9101: Type 1 calibrator according to IEC60942:1988. Frequency: 1000Hz; sound level: 94dB/114dB.

HD9102: Type 2 calibrator according to IEC60942:1988. Frequency: 1000Hz; sound level: 94dB/114dB.

CPA/5: Microphone 5m extension cable.

HD SAV: Windscreen for 1/2" microphone.

HD SAV2: Windscreen with bird spikes for HDWME950 microphone unit.

HD SAVP: Rain shield for HDWME950 microphone unit.

HD2010PNE2: Microphone preamplifier with standard connection for 1/2" microphones. Provided with CTC device for electrical calibration.

HD2010PNE2W: Heated microphone preamplifier for HDWME950NE unit with standard connection for 1/2" microphones. It is heated and provided with CTC device for electrical calibration.

UC52/1: Class 1 Microphone for free field.

UC52: Class 2 Microphone for free field.



Technical characteristics

Standards	Class 1 or 2 group X according to IEC 61672:2002 and class 1 or 2 according to IEC 60651:2001 and IEC 60804:2000 type 1 or 2 according to ANSI S1.4-1983 and S1.43-1997
1/2 inch Microphone	UC52 condenser type, pre-polarized, for free field
Dynamic range	30 dBA ÷ 143 dB Peak
Linear Field	80 dB
Acoustic Parameters	Spl, Leq, SEL, LEP,d, Lmax, Lmin, Lpk, Dose, Ln
Frequency Weighting	Simultaneous A, C, Z (only C and Z for Lpk)
Temporal Weighting	Simultaneous FAST, SLOW, IMPULSE
Integration	From 1s to 99 hours with Back-Erase function
Statistical Analysis	It displays up to 3 percentile levels, from L ₁ to L ₉₉ "Data Logger" and "Advanced Analyzer" options Probability distribution and percentile level calculation from L ₁ to L ₉₉ • Parameter: L _{Fp} , Leq, L _{pk} A, C or Z -weighted(only C or Z for L _{pk}) • Sampling frequency: 8 samples/second • Classification: Classes of 0.5 dB
Analysis of Events	"Data Logger" and "Advanced Analyzer" options Calculation of 5 freely-programmable event parameters Calculation of statistical levels from L ₁ to L ₉₉ Event identification trigger with programmable threshold and duration filter Manual trigger
Profile Data Logging	"Data Logger" option 1 profile with programmable sampling from 1/8 s to 1 hour and 3 profiles with 2 samples/second
Display	Graphic display 128x64 • 3 parameters in numeric format "LCD" option • Backlit LCD "Data Logger" option • Profile L _{Fp} with 8 samples/second "Advanced Analyzer" option • Graph of sound level probability distribution • Graph of percentile levels from L ₁ to L ₉₉
Memory	Internal, equal to 2 MB, enough to store over 500 recordings "Data Logger" option • Internal, equal to 4 MB (1 profile for 23 hours or over 80 recording days of 3 parameters per minute). Expandable to 8 MB • External, via the HD2110MC memory card interface, using MMC or SD cards up to 2 GB
Input/Output	• RS232 serial and USB interfaces • AC output (LINE) • DC output
PC Programs	• DeltaLog5: PC interface for data download, setup and sound level meter management (supplied with the instrument) • DL5 Monitor: For real-time acquisition in the PC mass storage, scheduler, audio recording • DL5 Noise Studio: Analysis modular program • "Worker Protection": Analysis module according to decree 195/2006 • "Railway Traffic": Analysis module of train noise profiles according to the decree of 16/03/1998
Operating conditions	Working temperature -10÷50°C, 25÷90%RH (without condensation), 65÷108kPa. Protection degree: IP64
Power	• 4 alkaline or rechargeable NiMH type AA batteries or external 9÷12Vdc 300mA
Dimension and weight	• 445x100x50 mm equipped with preamplifier, 740 g (with batteries)

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