

INTEGRATING SOUND LEVEL METER



HIGHLIGHTS:

- Acoustic normative IEC61672, IEC 61260, IEC61094-4



HD-2010-UC-1

Art. no. 700060

integrating sound level meter

General:

HD-2010-UC-1 is an integrating portable sound level meter performing statistical analysis. The instrument has been designed combining maximum low cost and simplicity of use. Attention has been paid to the possibility of adjusting the instrument and adding options at any time to the HD-2010-UC-1 so to extend its applications. The user can upgrade the firmware directly by means of the Noise Studio programme supplied with the instrument. HD-2010-UC-1 is equipped with a backlit graphic display.

Application:

- Assessment of the environmental noise level
- Optional "advanced data logging"
- Optional capture and analysis of sound events
- Statistical analysis with the calculation of 3 percentile level and optional full statistical analysis
- Noise monitoring ("Advanced data logger" option required)
- Identification of impulsive noises
- Measurements in workplaces (Analysis of the noise and vibrations exposure)
- Selection of personal protective equipment (SNR and HML methods)
- Production quality control
- Measurement of machine noise, sound power measurements
- Vehicles noise emission

With HD-2010-UC-1 sound level meter it is possible to measure the sound pressure level by programming 3 parameters with the possibility of freely selecting the frequency weightings and the time constants. The measured sound levels can be recorded in the large non-volatile memory in order to be transferred to a PC using the supplied Noise Studio software package.

The class 1 HD-2010-UC-1 sound level meter with the "Advanced Data Logger" option is suitable for performing noise monitoring and acoustic mapping and, also assessments of the acoustic climate with capture and analysis of sound events function. When measuring traffic noise in the proximity of airports, railways and roads, the sound level meter can be used as a multi-parameter sound recorder, combining statistical analyzer features. Remote electrical calibrations and diagnostic tests can be executed by using its remote control capabilities.

Specifications:

½" Microphone:	UC52 free field, pre-polarized, condenser type
Dynamic range:	30 dBA ... 143 dB peak
Linearity range:	80 dB
Acoustic Parameters:	Spl, L _{eq} , L _{eq} L, SEL, L _{EP,d} , L _{max} , L _{min} , L _{pk} , Dose, L _n
Frequency weightings:	simultaneous A, C, Z (only C and Z for L _{pk})
Time weightings:	simultaneous FAST, SLOW, IMPULSE
Integration:	from 1 s ... 99 h with erasing function (Back-Erase)
Statistical Analysis:	It displays up to 3 percentile levels, from L ₁ to L ₉₉ Probability distribution and percentile level calculation from L ₁ to L ₉₉ • Parameter: L _{F99} , L _{eq} , L _{pk} weighted A, C or Z (only C or Z for L _{pk}) • Sampling frequency: 8 samples/s • Classification: Classes of 0.5 dB
Display:	Graphic LCD backlit display 128 x 64 • 3 parameters in numeric format
Memory:	• 4 MB internal, memory for more than 500 records
Input / Output:	• RS232 serial and USB interfaces • AC output (LINE) • DC output

PC Programs:

Noise Studio (provided with the instrument): PC interface for data download, set up and instrument management. Licensed software modules to be enabled by hardware key.
• NS4 "Monitor" module. PC based real time acquisition. Synchronized audio recording. Remote monitoring and data capture. Remote connection also via Modem. The program allows programming of measurements and calibrations with timer and performs events audio recording with programmable triggers levels.

Operating conditions:

• Working temperature -10 ... +50 °C, 25 ... 90 % RH, (without condensation), 65 ... 108 kPa. Protection rating: IP64

Power supply:

• 4 alkaline or rechargeable NiMH type AA batteries or external 9 ... 12V dc 300 mA

Dimensions:

445 x 100 x 50 mm equipped with preamplifier (H x W x D)

Scope of supply:

Class 1 sound level meter HD-2010-UC-1, HD2010PNE2 preamplifier, UC52/1 free field prepolarized microphone, windscreen, USB connection cable. Noise Studio PC software, carrying case and paper instruction manual. Supplied with DAKS individual calibration Certification, according to IEC 61672.

NECESSARY ACCESSORY:

HD-2020

Art. no. 700062

Class 1 sound level calibrator according to IEC 60942:2003 (Page 97)

Accessories:

HD 2110-USB

Art. no. 700038

serial connection cable, for PC connection: USB 2.0 type A

SWD-10

Art. no. 700039

Plug in power supply for devices of the HD-handhelds, 12V DC 1.0 A

CPA/10

Art. no. 700061

Microphone extension cable 10 m

HD 40.1

Art. no. 700056

Portable thermal printer with SWD-10 power supply and 5 paper rolls

HD 2110-RS

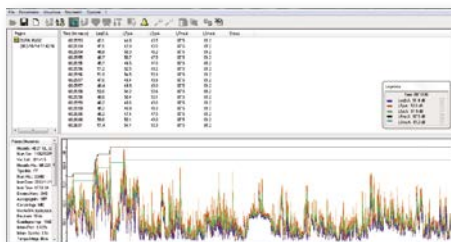
Art. no. 700057

serial connection cable, printer connection: 9-pin Sub-D jack

RCT

Art. no. 475423

spare paper, 4 rolls thermopaper, 57 mm width



Noise Studio: NS4 "Monitor" module; PC based noise acquisition with synchronized audio recording (for later playback).

Noise Studio NS4

Art. no. 475424

NS4 Monitor module (demo version incl. in HD2010 scope of supply)

General:

This software module allows to control the sound level meter with PC in remote location. The main features are:

- Real time display of acquired data, in graphical and tabular form
- Possibility to remotely connect to the sound level meter via modem
- Acquisition of sound level data directly into the mass memory of the PC (monitor function)
- Management of diagnostic and calibration functions
- Automatic acquisition and monitoring programme
- Possibility to log synchronized audio along with the sound level meter measurements, by using the easy trigger function

IMPORTANT INFORMATION:

Device supply with calibration certificate. Customer must be specified when ordering.

ACOUSTIC CALIBRATOR

ACCREDIA

ISO



HIGHLIGHTS:

- The 1000 Hz frequency allows calibrating sound level meters with any weighting
- Independent of atmospheric pressure
- The 114 dB sound level allows performing calibrations even in high background noise environments
- Simple to use

HD-2020

HD 2020

Art. no. 700062

Class 1 sound level calibrator, according to IEC 60942:2003

General:

The HD-2020 sound level calibrator is a portable, battery operated sound source, suitable for sound level meters (portable and laboratory) and acoustic stations. It allows calibrating ½" microphones with mechanical dimensions according to IEC 61094-1. The calibration pressure levels of 94 dB and 114 dB can be selected by the keypad. If the microphone is absent or not inserted correctly into the calibrator cavity, the sound level will blink on the display. The clock/calendar allows you to set the number of years and months of validity of the calibration from the date of adjusting: at the expiration time, an appropriate symbol flashes on the display.

Specifications:

Coupling cavity:	for standard 1/2" microphones (12.7 ±0.03 mm) according to IEC 61094-1 and IEC 61094-4
Frequency:	1.000 Hz
Frequency tolerance:	1 % in the range -10 ... +50 °C and 10 ... 90 % RH
Sound pressure level:	94.0 dB and 114.0 dB ±0.2 dB at 1 kHz (referred to 101.3 kPa, 23 °C ±3 °C and 65 % RH)
Reference conditions:	20 °C, 50 % RH, 101,3 kPa, 10 mm ³ cartridge volume
Reaction speed:	10 s
Total distortion:	<1 %
Ambient condition influence	
Temperature and humidity influence:	<0.3 dB in the range -10 ... +50 °C and 10 ... 90 % RH
Static pressure influence:	<0.1 dB in the range -65 ... 108 kPa
Operating conditions	
Working temperature:	-10 ... +50 °C
Relative humidity:	≤90 % RH
Storage temperature:	-25 ... +70 °C
Microphone equivalent volume:	5 ... 250 mm
Power supply:	9 V alkaline battery IEC type 6LR61. 9 V rechargeable batteries are also allowed.
9 V battery autonomy:	48-hour continuous functioning with good quality alkaline batteries
Display:	3½ LCD, battery symbol
Watch / date-indicator:	internal with 3 V lithium buffer battery
Case material:	ABS
Dimensions:	83 x 43 x 53 mm (H x W x D)
Protection rating:	IP64
Effects of electro-magnetic fields:	<0.3 dB
Scope of supply:	HD-2020 calibrator, 1x 9 V alkaline battery, manual. ACCREDIA individual calibration certification included.

IMPORTANT INFORMATION:

Device supply with calibration certificate. Custome must be specified when ordering.

PHOTO-RADIOMETER

ACCREDIA

ISO



HIGHLIGHTS:

- Measurement of many different light values, lighting strength, luminance, radiation strength
- Wide range of sensors, interchangeable sensors

ILLUMINANCE, LUMINANCE PHOTONS FLOW UVA-, UVB-, UVC-IRRADIANCE IRRADIANCE IN SPECTRAL BAND OF BLUE LIGHT GLOBAL SOLAR RADIATION

HD 2302.0

Art. no. 700063

Photo-Radiometers

General:

It measures illuminance, luminance, PAR and irradiance (across VIS-NIR, UVA, UVB and UVC spectral regions or measurement of irradiance effective according to the UV action curve). The probes are equipped with the SICRAM automatic detection module: in addition to detection, the unit of measurement selection is also automatic. The factory calibration data are already memorized inside the instruments.

Application:

Measurement of lighting strength and radiation strength in workplaces with high exposure and/or adjacent traffic routes and work stations. Additional applications for museum and not destructive testing, for tanning / aesthetic centers, photovoltaic and aging chamber

Specifications:

Instrument	
Dimensions:	140 x 88 x 38 mm (H x W x D)
Material:	ABS
Display:	2 x 4½ digits plus symbols - 52 x 42 mm (visible area)
Operating conditions	
Working temperature:	-5 ... +50 °C
Storage temperature:	-25 ... +65 °C
Working relative humidity:	0 ... 90 % RH without condensation
Protection rating:	IP67
Power	
Batteries:	3 1.5 V type AA batteries
Autonomy:	200 h with 1800 mAh alkaline batteries
Power absorbed with the instrument off:	20 µA
Measuring unit:	lux – fcd – µmol/m ² ·s – cd/m ² – W/m ² – µW/cm ² – µW/lumen
Connections:	Input module for the probes 8-pole male DIN45326 connector
Scope of supply:	Instrument HD-2302-0, 3 1.5 V alkaline batteries, manual, case. The probes must be ordered separately.

Accessories:

- LP 471-PHOT
- LP 471-LUM2
- LP 471-PAR
- LP 471-UVA
- LP 471-UVB
- LP 471-UVC
- LP 471-P-A
- LP 471-BLUE
- LP 471-SILI-PYRA

Specification see following pages

PHOTOMETRIC AND RADIOMETRIC PROBES



ILLUMINANCE

LP 471-PHOT

Art. no. 700064
Probe for the measure of Illuminance

Application:				
Measurement of lighting strength at workplaces / work stations, traffic and escape routes				
Specifications:				
Measuring range (lux):	0.10 ... 199.99	... 1.999.9	... 19.999	... 199.99·10 ³
Resolution (lux):	0.01	0.1	1	0.01·10 ³
Spectral range:	in agreement with standard photopic curve V(λ)			
α (temp. coefficient) f₆ (T):	<0.05 % K			
Calibration uncertainty:	<4 %			
f₁ (in agreement with photopic response V(λ)):	<6 %			
f₂ (response according to the cosine law):	<3 %			
f₃ (linearity):	<1 %			
f₄ (instrument reading error):	<0.5 %			
f₅ (fatigue)	<0.5 %			
Class:	B			
Working temperature:	0 ... 50 °C			

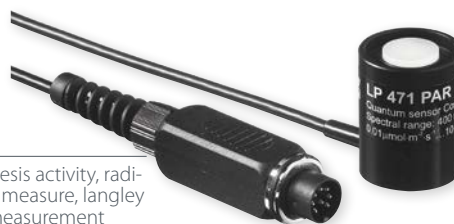


LUMINANCE

LP 471-LUM 2

Art. no. 700065
Probe for the measure of Luminance

General:				
Spectral response according to the photopic curve, angular field 2°. Measuring range: 1.0 cd / m ² ... 2.000·10 ³ cd / m ² .				
Application:				
Sensor measures luminance like a human eye, e. g. monitors and lamps, etc. Diaphanoscop, X Ray plates reader, PC monitors light radiations and reflection by white surfaces				
Specifications:				
Measuring range (cd / m²):	1.0 ... 1.999.9	... 19.999	... 199.99·10 ³	... 1999.9·10 ³
Resolution (cd / m²):	0.1	1	0.01·10 ³	0.1·10 ³
Optical angle:	2°			
Spectral range:	in agreement with standard photopic curve V(λ)			
α (temp. coefficient) f₆ (T):	<0.05 % K			
Calibration uncertainty:	<5 %			
f₁ (in agreement with photopic response V(λ)):	<8 %			
f₃ (linearity):	<1 %			
f₄ (instrument reading error):	<0.5 %			
f₅ (fatigue):	<0.5 %			
Class:	C			
Drift after 1 year:	<1 %			
Working temperature:	0 ... 50 °C			
Reference Standards:	CIE n.69 – UNI 11142			



PHOTONS FLOW

HIGHLIGHTS:

- Photosynthesis activity, radiation (PAR) measure, langley radiation measurement

LP 471-PAR

Art. no. 700066
Quanten-radiometrische Sonde

General:				
For measuring the photons flow in the chlorophyll field PAR (Photosynthetically active radiation 400 ... 700 nm), μmol m ⁻² s ⁻¹ measure, cosine correction diffusor. Measuring range 0.10 μmol m ⁻² s ⁻¹ ... 10·10 ³ μmol m ⁻² s ⁻¹				
Application:				
Plants, agriculture, greenhouses				
Specifications:				
Measuring range (μmol·m⁻²·s⁻¹):	0.10 ... 199.99	200.0 ... 1.999.9	2.000 ... 10.000	
Resolution (μmol·m⁻²·s⁻¹):	0.01	0.1	1	
Spectral range:	400 ... 700 nm			
Calibration uncertainty:	<5 %			
f₂ (response according to the cosine law)	<6 %			
f₃ (Linearity):	<1 %			
f₄ (instrument reading error):	±1 digit			
f₅ (fatigue):	<0.5 %			
Drift after 1 year:	<1 %			
Working temperature:	0 ... 50 °C			

HIGHLIGHTS:

- Control of UV lamps in cosmetic tanning systems
- To check the control of cosmetic tanning systems
- Measurement of UVA radiation strength with penetration testing according to DIN EN ISO 3059 (crack/surface testing)



UVA IRRADIANCE

LP 471-UVA

Art. no. 700067
Probe for the measure of UVA irradiance

General:				
Radiometric probe for measuring the irradiance in the UVA spectral range 315 ... 400 nm, peak at 360 nm, quartz diffuser for cosine correction. Measuring range: 1.0·10 ⁻³ W / m ² ... 2.000 W / m ² .				
Application:				
Timing Light to ward off eye problems. For casting and welding control, Polymerization of varnishes, resins, adhesives				
Specifications:				
Measuring range (W/m²):	1.0·10 ⁻³ ... 999.9·10 ⁻³	1.000 ... 19.999	20.00 ... 199.99	200.0 ... 1.999.9
Resolution (W/m²):	0.1·10 ⁻³	0.001	0.01	0.1
Spectral range:	315 ... 400 nm (Peak 360 nm)			
Calibration uncertainty:	<5 %			
f₃ (linearity):	<1 %			
f₄ (instrument reading error):	±1 digit			
f₅ (fatigue):	<0.5 %			
Drift after 1 year:	<2 %			
Working temperature:	0 ... 50 °C			

PHOTOMETRIC AND RADIOMETRIC PROBES



HIGHLIGHTS:

- Psoriasis light treatment by UVB lamps

UVB IRRADIANCE

LP 471-UVB

Art. no. 700068

Probe for the measure of UVB irradiance

General:

Radiometric probe for measuring the irradiance in the UVB spectral range 280 ... 315 nm, peak at 305 ... 310 nm, quartz diffuser for cosine correction.
Measuring range: $1.0 \cdot 10^{-3} \text{ W/m}^2$... 2.000 W/m^2 .

Application:

Polymerization of varnishes, resins, adhesives. Quality control by UV Lamps. For Offset and lithography & electronic, Casting and welding control, Timing light to ward off eye problems

Specifications:

Measuring range (W/m²):	1.0·10 ⁻³ ... 999.9·10 ⁻³ 1.000 ... 19.999 20.00 ... 199.99 200.0 ... 1.999.9			
Resolution (W/m²):	0.1·10 ⁻³	0.001	0.01	0.1
Spectral range:	280 ... 315 nm (Peak 305 nm ... 310 nm)			
Calibration uncertainty:	<5 %			
f₃ (linearity):	<2 %			
f₄ (instrument reading error):	±1 digit			
f₅ (fatigue):	<0.5 %			
Drift after 1 year:	<2 %			
Working temperature:	0 ... 50 °C			



HIGHLIGHTS:

- Control of UV Lamps during pasteurization, air and water sterilization

UVC IRRADIANCE

LP 471-UVC

Art. no. 700069

Probe for the measure of UVC irradiance

General:

For measuring in the UVC spectral range 220 ... 280 nm, peak at 260 nm, quartz diffuser for cosine correction.
Measuring range: $1.0 \cdot 10^{-3} \text{ W/m}^2$... 2.000 W/m^2 .

Specifications:

Measuring range (W/m²):	1.0·10 ⁻³ ... 999.9·10 ⁻³ 1.000 ... 19.999 20.00 ... 199.99 200.0 ... 1.999.9			
Resolution (W/m²):	0.1·10 ⁻³	0.001	0.01	0.1
Spectral range:	220 ... 280 nm (Peak 260 nm)			
Calibration uncertainty:	<5 %			
f₃ (linearity):	<1 %			
f₄ (instrument reading error):	±1 digit			
f₅ (fatigue):	<0.5 %			
Drift after 1 year:	<2 %			
Working temperature:	0 ... 50 °C			



IRRADIANCE IN SPECTRAL BAND OF BLUE LIGHT

LP 471-BLUE

Art. no. 700070

Probe for the measure of irradiance in spectral band of blue light

General:

The radiometric probe LP471-BLUE measures irradiance (W/m²) in spectral band of blue light. The probe consists of a photodiode plus an appropriate filter and it is provided with diffuser for proper measure in accordance with the cosine law.

Application:

The spectral response curve of the probe allows to measure the radiation effective for damages caused by blue light (curve B(λ)) according to the standards ACGIH / ICNIRP in the spectral range from 380 ... 550 nm. The radiation optics in this portion of the spectrum can produce photochemical damage to the retina. Another field of application is the monitoring of the probe irradiance from blue light used in the treatment of neonatal jaundice.

Specifications:

Measuring range (W/m²):	1.0·10 ⁻³ ... 999.9·10 ⁻³ 1.000 ... 19.999 20.00 ... 199.99 200.0 ... 1.999.9			
Resolution (W/m²):	0.1·10 ⁻³	0.001	0.01	0.1
Spectral range:	380 ... 550 nm. Action curve for damages of Blue light B(λ)			
Calibration uncertainty:	<10 %			
f₂ (response according to the cosine law):	<6 %			
f₃ (linearity):	<3 %			
f₄ (instrument reading error):	±1 digit			
f₅ (fatigue):	<0.5 %			
Drift after 1 year:	<2 %			
Working temperature:	0 ... 50 °C			

PHOTOMETRIC AND RADIOMETRIC PROBES



HIGHLIGHTS:

- Non destructive material measurement by ISO 3059:2001

ILLUMINANCE AND
UVA IRRADIANCE

LP 471 P-A

Art. no. 700071

Combined probe LP 471 P-A with two sensors for the measure of illuminance and UVA irradiance

General:

Combined probe for measuring illuminance (lux), with standard photopic response, and irradiance ($\mu\text{W}/\text{cm}^2$) in the UVA spectral range (315 ... 400 nm, with peak at 360 nm). Both the sensors are equipped with diffuser for the correction according to the cosine law. Illuminance measuring range: 0.10 ... 200·10³ lux
Irradiance measuring range: 1.0 mW/m² ... 2.000 W/m².

This probe provides the ratio between UVA irradiance and illuminance in $\mu\text{W}/\text{lumen}$ (quantity of interest in museums). The probe is equipped with SICRAM module and cable 2 m long.

Application:

Lighting conditions and protection from UVA radiation in museums. Measurement of lighting strength and UVA radiation strength with penetration testing according to DIN EN ISO 3059 (crack/surface testing), ...

Specifications Illuminance:

Measuring range (lux): 0.10 ... 199.99 ... 1.999.9 ... 19.999 ... 199.99·10³

Resolution (lux): 0.01 0.1 1 0.01·10³

Spectral range: in agreement with standard photopic curve V(λ)

α (temp. coefficient) f_6 (T): <0.05 % K

Calibration uncertainty: <4 %

f_1 (in agreement with photopic response V(λ)): <6 %

f_2 (response according to the cosine law): <3 %

f_3 (linearity): <1 %

f_4 (instrument reading error): <0.5 %

f_5 (fatigue): <0.5 %

Class: B

Drift after 1 year: <1 %

Working temperature: 0 ... 50 °C

Reference standards: CIE n.69 – UNI 11142

Specifications UVA Irradiance:

Measuring range ($\mu\text{W}/\text{cm}^2$): 0.10 ... 199.99 ... 1.999.9 ... 19.999 ... 199.99·10³

Resolution ($\mu\text{W}/\text{cm}^2$): 0.01 0.1 1 0.01·10³

Spectral range: 315 ... 400 nm (Peak 360 nm)

Calibration uncertainty: <5 %

f_2 (response according to the cosine law): <6 %

f_3 (linearity): <1 %

f_4 (instrument reading error): ± 1 digit

f_5 (fatigue): <0.5 %

Drift after 1 year: <2 %

Working temperature: 0 ... 50 °C



GLOBAL SOLAR RADIATION

LP 471-SILI-PYRA

Art. no. 700072

Probe for the measure of global solar radiation

General:

Solarmeter with silicon photodiode for measuring the global solar irradiance, diffuser for cosine correction. Spectral range 400 ... 1100 nm. Measuring range: 1.0·10⁻³ ... 2.000 W/m². The probe is equipped with a SICRAM module and a 5 m cable.

Application:

Efficiency control of photovoltaic panels in home and industrial solar power applications.

Specifications:

Measuring range (W/m²): 1.0·10⁻³ ... 999.9·10⁻³ 1.000 ... 19.999
20.00 ... 199.99 200.0 ... 1.999.9

Resolution (W/m²): 0.1·10⁻³ 0.001 .01 0.01

Spectral range: 400 ... 1.100 nm

Calibration uncertainty: <3 %

f_2 (response according to the cosine law): <3 %

f_3 (linearity): <1 %

f_4 (instrument reading error): ± 1 digit

f_5 (fatigue): <0.5 %

Drift after 1 year: <2 %

Working temperature: 0 ... 50 °C

3-CHANNEL MULTI-FUNCTION DATA LOGGER

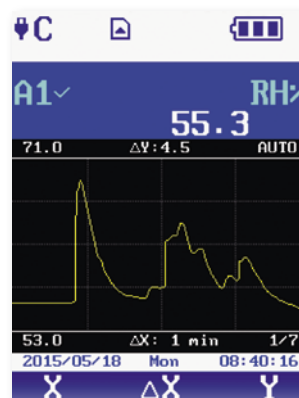


HIGHLIGHTS:

- Three independent sensor inputs with automatic probe recognition
- Graphic colour display
- Data logger with SD card
- Automatic creation of PDF logs
- Mobility with rechargeable batteries



Connections



HD 31

Universeller 3-Kanal Multifunktions Datenlogger mit grafischem Display

General:

Universal 3-channel multi-function data logger with graphic display

The HD 31 is a universal data logger with the capacity to connect up to 3 "SICRAM" probes. All relevant data (serial number, type, calibration data) is stored in the SICRAM plugs, so the probes can be connected in any arbitrary manner. The connected probe is recognised automatically by the HD 31. Additional variables can be derived from the measured values. For example, the dewpoint temperature, wet-bulb temperature, absolute humidity, etc. can be calculated from the temperature and humidity. There is a total of 36 different measured variables available.

Large-format colour display for presentation of three measurements in numerical form or a real-time graphic.

The data is stored in CSV format on an SD card (buffer storage for several months, even if multiple measured variables are logged each second). The HD 31 can be connected via the optional USB cable directly to a PC and is recognised as a mass storage device. The HD 31 also generates automatic PDF logs, which are also stored on the SD card.

Application:

The variety of measuring sensors and the derived measured variables enable a wide spectrum of applications, such as heating, ventilation and air conditioning or clean room applications. The following measuring variables can be detected:

- Temperature
- Relative humidity
- Pressure (absolute, relative or differential pressure)
- Air speed
- Lighting strength (Lux)
- Irradiance (W/m²)
- CO₂

Numerous variables can be calculated from the aforementioned measurements and stored. This includes, for example, the absolute humidity in g/m³ (from temperature and relative humidity) or with measurement in ventilation ducts of the volume flow (from the speed and the dimensions of the ventilation duct), etc

There are also SICRAM modules available for connection of external sensors with analogue output signals:

VP 473:

SICRAM plug module for signal recording of external measuring transducers with voltage output, measuring range ± 20 VDC, input impedance 1 M Ω

IP 472:

SICRAM plug module for signal recording of external measuring transducers, measuring range 0 ... 24 mA, input impedance 25 Ω

VP 472:

SICRAM plug module for connection of pyranometers and albedometers with non-amplified signal output (adjustable sensitivity from 5 ... 30 μ V per W/m²)

Our product data sheet available online at www.ghmgroup.de provides a complete overview

Specifications (basic unit HD31):

Power supply:	Rechargeable internal 3.7 V Lithium battery, capacity 2250 mA/h, JST 3-pole connector. (optional SWD05 power supply)
Battery autonomy:	18 hours of continuous operation with three Pt100 probes (The effective autonomy depends on the number and type of connected sensors)
Logging interval:	1, 5, 10, 15, 30 s; 1, 2, 5, 10, 15, 20, 30 min; 1 h
Storage capacity:	SD memory card with capacity up to 4 GB. The logging duration depends on the number of logged quantities and on the capacity of the SD card employed.
Inputs:	3 SICRAM connections (8-pin, DIN 45326) for connection of measuring sensors with intelligent SICRAM plugs (up to 36 measured variables)
Accuracy:	± 0.02 % of the measure (Based on HD31 basic device)
Clock stability:	1 min / month maximum drift
Display:	Color graphic LCD. Visible area 43 x 58 mm
USB Connection:	mini USB connector, USP Port (HID)



Hartgummi Schutzhülle (55 SHORE) mit Aufsteller und Magnet für den Einsatz in rauen Umgebungen

3-CHANNEL MULTI-FUNCTION DATA LOGGER

RS232C connection:	1 serial RS232C output with RJ12 connector for connecting to a serial printer
Auto-Off:	Configurable after 2, 5, 10, 15, 20 or 30 min
Operating conditions:	-10 ... +60 °C, 0 ... 85 % RH without condensation (Instrument)
Storage temperature:	-25 ... +65 °C (Instrument)
Protection rating:	IP64
Housing:	ABS plastic, 55 SHORE hard rubber (sides and protective casing)
Dimensions:	165 x 88 x 35 mm (without protective casing)
Weight:	approx. 400 g (including battery and protective casing)
Scope of supply:	Batteries, SD card, DeltaLog 9 software, CP31, HD31.28 and case. Connection module, measuring sensors and mains adapter are optional and not included in the scope of supply.

Accessories and spare parts:

CP23	Art. no. 700050 USB connection cable, USB 2.0, Mini USB socket type B
SWD05	Stabilised mains adapter, 100 ... 240 VAC, 5 VDC, output type A USB plug
HD31.28	Protective casing, durable SHORE 55 rubber, stand and magnet

SELECTION OF SENSORS: THE FOLLOWING IS ONLY AN SAMPLING OF THE AVAILABLE MEASURING SENSORS. FOR A COMPLETE OVERVIEW OF THE AVAILABLE MEASURING SENSORS FOR THE VARIOUS PARAMETERS, VISIT WWW.GHM-GROUP.DE

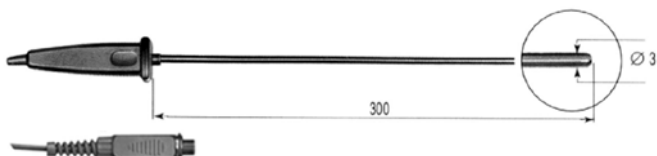
TEMPERATURE SENSORS:

Temperature sensors with thermocouples and Pt100/1000 are available. They are available either as a complete sensor with SICRAM plug or as a SICRAM module for connection of external sensors (including thermocouples of the type K, J, T, E, N, R, S, B).



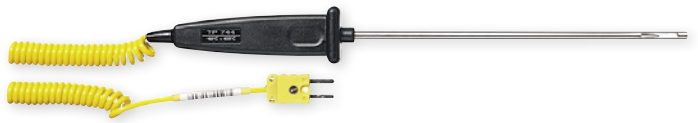
Example:
TP 472 I (Pt100, immersion sensor)

Immersion probe, -196 ... +500 °C, ±0.25 °C (-196 ... +300 °C), Ø 3 mm, sensor length 300 mm, cable length 2 m

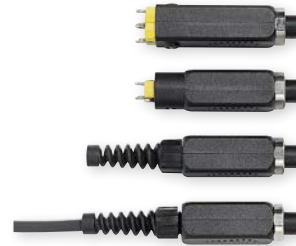


Example:
TP 744 I (type K, air sensor)

Air sensor, up to 400 °C, Ø 4 mm, sensor length 180 mm, cable length 2 m



SICRAM modules TP 471, TP 471 Do, TP 471 D and TP 471 D1 for connection of external sensors

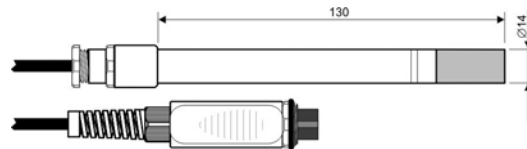


COMBINED HUMIDITY AND TEMPERATURE SENSORS

There are currently nine different sensors available with SICRAM plugs. Temperature measuring range, up to 180 °C depending on the version, humidity measuring range 0 ... 100 % RH

Example:
TP 478 ACR (Pt100, capacitive)

Measuring range: -40 ... +150 °C, 0 ... 100 % RH, sensor length 130 mm, cable length 5 m



PRESSURE SENSORS (ABSOLUTE, RELATIVE AND DIFFERENTIAL PRESSURE)

PP 471:
SICRAM module for connection of pressure sensors from the TP 704 / TP 705 series (absolute, relative and differential pressure, measuring range from 10 mbar to 500 bar depending on the probe)

PP 472:
SICRAM probe for measurement of barometric pressure (600 ... 1100 mbar, ±0.3 mbar, operating range -10 ... +60 °C.

PP 473 S1 ... S8:
SICRAM probes (differential pressure, measuring range from 10 mbar ... 2000 bar depending on the probe)

HANDHELD INSTRUMENTS

SOFTWARE

ACCESSORIES

ALARM / PROTECTION, LEVEL

3-CHANNEL MULTI-FUNCTION DATA LOGGER

AIR SPEED SENSORS:

After various measuring processes (heat wire or impeller anemometer and pilot probes).

Heat wire probes:

Direction-dependent (measuring range 0.1 ... 40 m/s) or omnidirectional for measurement of thermal comfort (0.1 ... 5 m/s)



Impeller probes:

Measuring range 0.6 ... 25 m/s (Ø 100 mm) or 0.4 ... 20 m/s (Ø 60 mm)



Pitot dynamic pressure probes:

Measuring ranges, 2 ... 40 m/s to 2 ... 130 m/s, depending on probe version (T1 to T4) and SICRAM differential pressure module (AP 473 S1...S4)



... Refer to HD 31 data sheet for details..

PHOTOMETRIC AND RADIOMETRIC PROBES:

Wide assortment of photometric and radiometric probes (ready for connection with SICRAM plugs) for measurement of:

- Lighting strength (Lux)
- Luminance (cd/m²)
- UVA, UVB, UVC irradiance (W/m²)
- U_{eff} irradiance, weighted (W/m²)
- Irradiance in the visible and NIR range, 400 ... 1050 nm (W/m²)
- "PAR" photosynthetically active radiation (W/m²)
- Irradiance of blue light, 380 ... 550 nm (W/m²)
- Global solar radiation (W/m²)



LP 471 PYRA02.5

for measurement of solar radiation (Class 2 pyranometer according to WMO. Further pyranometers according to Class 1, secondary standard or low-cost version with silicone sensor on request)



CO₂ PROBE

CO₂ probe (NDIR) with SICRAM plug, measuring range 0 ... 5000 ppm CO₂, operating temperature -5 ... +50 °C



Please visit our website www.ghm-group.de for complete information about our HD 31 multi-function data logger. You will also find a complete overview of all compatible probes for the specified parameters.

ANEMOMETER (AND THERMOMETER)

THERMAL ANEMOMETER PROBES / IMPELLER PROBES



HD-2303-0



AP-471-S1

AP-471-S2

AP-472-S2

HD 2303.0239,90

Art. no. 700073

Anemometer

General:

The HD-2303-0 is designed for use in the fields of air conditioning, heating, ventilation and environmental comfort. It uses hotwire or vane probes to measure air speed, flow rate, and temperature inside pipelines and vents. Temperature only is measured by immersion, penetration air or contact probes. The temperature sensor used can be chosen from the Pt100, Pt1000. The probes are equipped with the SICRAM module, with the factory calibration data stored inside.

Specifications:

Instrument

Dimensions:	140 x 88 x 38 mm (H x W x D)
Material:	ABS
Display:	2 x 4½ digits plus symbols, Visible area: 52 x 42 mm

Operating conditions

Working temperature:	-5 ... +50 °C
Storage temperature:	-25 ... +65 °C
Working relative humidity:	0 ... 90 % RH, without condensation
Protection rating:	IP67

Power supply

Batteries:	3 1.5 V type AA batteries
Battery operation:	200 h with 1800 mAh alkaline batteries
Power absorbed with instrument off:	<20 µA

Measuring unit: °C – °F – m/s – km/h – ft/min – mph – knot – l/s
m³/min – m³/h – ft³/s – ft³/min

Connections

Input module for the probes:	8-pole male DIN45326 connector
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Measurement of temperature by Instrument

Pt100 measurement range:	-200 ... +650 °C
Pt1000 measurement range:	-200 ... +650 °C
Resolution:	0.1 °C
Accuracy:	±0.1 °C

Scope of supply: Instrument HD-2303-0, 3 1.5 V alkaline batteries, manual, case.
Probes must be ordered separately.

AP 471-S1

Art. no. 700074

Anemometer probes for air speed

AP 471-S2

Art. no. 700075

Anemometer probes for air speed

Specifications:	AP-471-S1	AP-471-S2
Type of measure:	Air speed, calculated flow rate, air temperature	
Type of sensor		
Speed:	NTC thermistor	Omnidirectional NTC thermistor
Temperature:	NTC thermistor	NTC thermistor
Measurement range		
Speed:	0.1 ... 40 m/s	0.1 ... 5 m/s
Temperature:	-25 ... +80 °C	-25 ... +80 °C
Measurement resolution		
Speed:	0.01 m/s – 0.1 km/h – 1 ft/min – 0.1 mph – 0.1 knot	
Temperature:	0.1 °C	
Measurement accuracy		
Speed:	±0.2 m/s (0 ... 0.99 m/s) ±0.4 m/s (1.00 ... 9.99 m/s) ±0.8 m/s (10.00 ... 40.0 m/s)	±0.2 m/s (0 ... 0.99 m/s) ±0.3 m/s (1.00 ... 5.00 m/s)
Temperature:	±0.8 °C (-10 ... +80 °C) ±0.8 °C (-10 ... +80 °C)	
Minimum speed:	0.1 m/s	
Air temperature compensation:	0 ... 80 °C	
Sensor working conditions:	Clean air, RH <80 %	
Battery life:	Approx. 20 hours @ 20 m/s with alkaline batteries	Approx. 30 hours @ 5 m/s with alkaline batteries
Unit of Measurement		
Speed:	m/s – km/h – ft/min – mph – knot	
Flow rate:	l/s – m³/s – m³/min – m³/h – ft³/s – ft³/min	
Pipeline section for flow rate calculation:	0.0001 ... 1.9999 m²	
Cable length:	~ 2 m	
Scope of supply:	Hot-wire telescopic probe	Omnidirectional hot-wire probe

AP 472-S2

Art. no. 700076

Anemometer probes for air speed, Impeller

Specifications:	
Type of measure:	Air speed, calculated flow rate
Diameter:	60 mm
Type of measurement	
Speed:	Vane
Measurement range	
Speed (m/s):	0.5 ... 20
Temperature (°C):	-25 ... +80 (*)
Resolution	
Speed:	0.01 m/s – 0.1 km/h – 1 ft/min – 0.1 mph – 0.1 knot
Accuracy	
Speed:	±(0.4 m/s +1.5 % f.s.)
Minimum speed:	0.5 m/s
Unit of Measurement	
Speed:	m/s – km/h – ft/min – mph – knot
Flow:	l/s – m³/s – m³/min – m³/h – ft³/s – ft³/min
Pipeline section for flow rate calculation:	0.0001 ... 1.9999 m²
Cable length:	~ 2 m
Scope of supply:	Vane probe

(*) The indicated value refers to the vane's working range.

PHONOMETER



GSH 8922

Art. no. 602739

Phonometer

General:

Compensation of the background-noise for measuring sound-sources in the fore-ground. Weighting of the sound level via two weighting-filters according to the IEC standard. Assignment of the max/min value during one measuring period.

Specifications:

Measuring range:	30 ... 130 dB (6 ranges) 30 ... 80, 40 ... 90, 50 ... 100, 60 ... 110, 70 ... 120, 80 ... 130 dB manual or automatic selection of range
Resolution:	0.1 dB
Accuracy:	±1.5 dB
Norms:	ANSI S1.4 and IEC 651 Typ 2
Frequency rate weighted:	31.5 Hz ... 8 kHz
Evaluation weight filter:	2, selectable
Type A:	evaluation of the spectrum in accordance with the perceptive faculties of the human ear. (Sound insolation establishment, environ- mental analysis)
Type C:	linear evaluation of spectrum (sonic-analysis of engines or machines)
Weight of time factor:	fast or slow
Microphone:	6 mm Electret condensator
Display:	3½-digit LCD-backlight display, ad- ditionally quasi-analog bar graph
Analog output:	AC: 0.707 Vrms, DC: 10 mV DC / dB
Working temperature:	4 ... +50 °C
Relative humidity:	10 ... 90 % RH
Storage temperature:	-20 ... +60 °C
Interface:	RS232, (2400BD8N1)
Power supply:	9 V battery, external 9 V power supply
Operating time:	20 hours (with alkaline)
Housing:	256 x 80 x 38 mm (H x W x D)
Weight:	approx. 240 g (device)
Scope of supply:	Device with analog output, battery, case, manual

ROTATION SPEED MEASURING DEVICE



VELOCITY AND LENGTH MEASUREMENT
VIA MEASURING WHEEL

rotaro 3

Art. no. 603861

Speed Indicator via light and reflecting label or measuring tip

Application:

The handheld tachometer rotaro 3 is useful at the installation and setup of plants and machinery as well as for service application, monitoring production processes or use at development laboratory. The rotaro 3 can measure rotary speed of for example motors, turbines, pumps as well as stirring devices, centrifuges and haulage installations, foil or textile manufacturing units, coil and transformer winding machines, machine tools, etc. Furthermore it can measure running speed and length of foils and band of all kind.

Specifications:

Measuring range:	rpm: 1.00 ... 99.999 min ⁻¹ (optical measurement) 1 ... 19.999 min ⁻¹ (mechanical measurement)
Velocity:	Ø 0.1 m: 0.10 ... 1999 m / min Ø 6": 0.10 ... 1524 m / min (other units possible: m / s, ft / min, in / min ...)
Length:	0 ... 99999 m / ft / in
Accuracy	rpm: ±0.02 % of m.v. (±1 digit)
Measuring distance:	max. 600 mm
Measuring principle:	optical / mechanical
Memory function:	min- / max- value memory, average and last value
Power-off:	automatically after 30 s
Display:	5-digit LCD display with 10 mm height of digits and floating point at range change
Power supply:	2 x AA battery or accumulator
Working temperature:	0 ... 50 °C
Storage temperature:	-20 ... +70 °C
Housing:	plastic ABS
Approval:	CE
Dimensions:	175 x 60 x 28 mm (H x W x D)
Weight:	250 g
Scope of supply:	Rotation speed measuring device incl. reflecting labels, measuring tip, hollow tip, measuring wheels (Ø 0.1 m and Ø 6"), extension shaft, calibration certificate, case, battery, manual

ROTATION SPEED MEASURING DEVICE



VIA LIGHT AND
REFLECTING LABEL

ecotach

Art. no. 603673

Speed Indicator via light and reflecting label

Application:

The handheld tachometer ecotach is useful at the installation and setup of plants and machinery as well as for service application, monitoring production processes or use at development laboratory. It can measure rotary speed of for example motors, turbines, pumps as well as stirring devices, centrifuges and haulage installations.

Specifications:

Measuring range:	1 ... 60.000 rpm
Accuracy:	±0.02 % of m.v. (±1 digit)
Measuring distance:	max. 450 mm
Measuring principle:	optical
Power-off:	automatically after 30 s
Display:	5-digit LCD display for measuring value with floating point, measuring unit, trigger signal, low-battery warning, notification when battery is low
Power supply:	2 x AA battery or accumulator
Working temperature:	0 ... 50 °C
Housing:	plastic ABS
Approval:	CE
Dimensions:	145 x 60 x 28 mm (H x W x D)
Weight:	147 g
Scope of supply:	Rotation speed measuring device incl. reflecting labels, transportati- on slip case, battery, manual

