

Spectro radiometer data logger

HD30.1

ENGLISH

The quality of our instruments is the result of a continuous evolution of the product itself. There may be differences between what is written in this manual and the instrument that you have purchased. We cannot entirely exclude errors in the manual, for which we apologize.

The data, figures and descriptions contained in this manual cannot be enforced legally. We reserve the right to make changes and corrections without notice.

1 DESCRIPTION

The HD30.1 is an instrument made by Delta Ohm for the spectral analysis of light in the visible range and ultraviolet.

The instrument has been designed by combining the maximum flexibility of use, cost reduction and ease of use.

It consists of two elements connected together by a cable: the data logger-indicator HD30.1 (fig. 1) and the measurement sensors (fig. 2) HD30.S1 (spectral range between 380nm-780nm) and HD30.S2 (field spectrum between 220nm-400nm).



Fig.1 datalogger-indicator HD30.1



Fig.2 Sensor HD30.S1
, Sensor HD30.S2

The datalogger-indicator HD30.1, based on the Linux operating system, makes processing and data management. It has a large touch screen color display, which allows for an easy implementation of the measures, as well as their display and storage. The spectra and the derived parameters can be saved both in the internal memory (150MB) and in the external memory (micro-SD card¹ or USB key). The export format is compatible with the most common programs for the analysis and processing of data. In addition to the data backup, the software allows to save images of the graphs.

The main quantities of photo-radiometric interest are calculated directly from the HD30.1 by the supplied software.

The analyzed spectral range varies depending on the sensor used to measure:

- Visible spectral region (380nm-780nm) by means of the sensor HD30.S1,
- Ultraviolet spectral region (220nm-400nm) by means of the sensor HD30.S2.

The measuring sensors are interchangeable and calibrated (the calibration file is stored within each probe).

The sensor HD30.S1 analyzes the visible spectral range (380nm-780nm) and calculates the following photo-colorimetric quantities:

Illuminance [lux], **Correlated Color Temperature CCT** [K], **Trichromatic Coordinates** [x,y] (CIE 1931) or [u',v'](CIE1978), **CRI** (color rendering index, R1...R14, Ra) , **PAR** [$\mu\text{mol}/\text{m}^2/\text{s}$] (fig. 3)

¹ Delta Ohm grants it works on products supplied by Delta Ohm only.

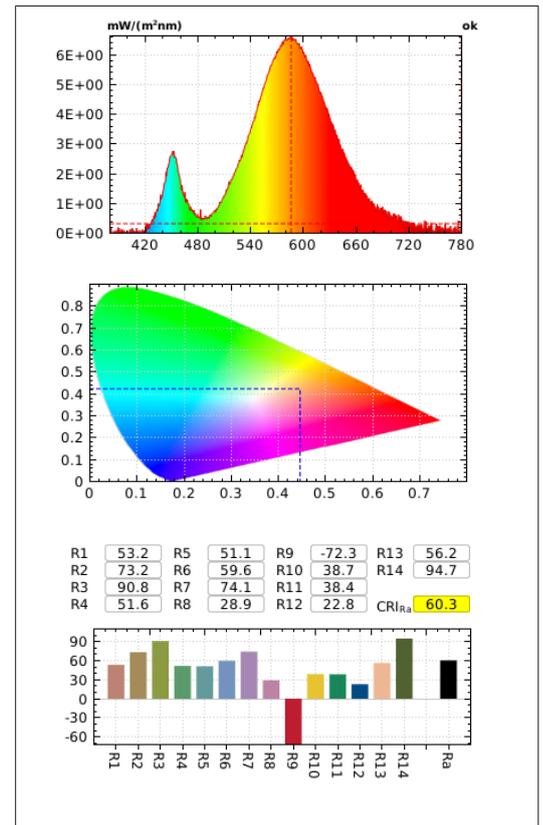
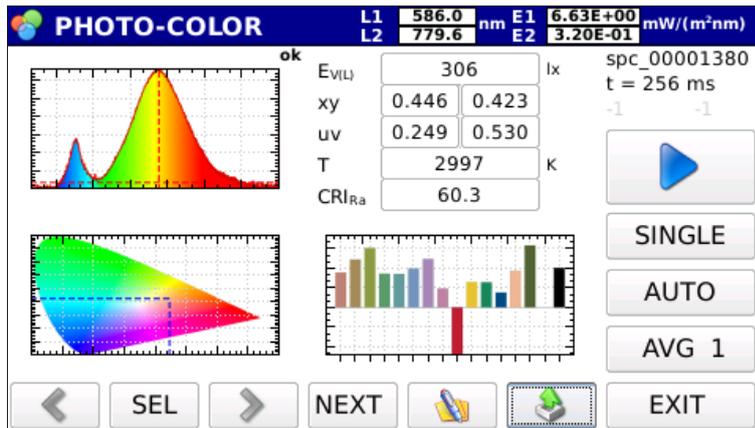


Fig. 3

The sensor HD30.S2 analyzes the spectral band ultraviolet (220 nm-400 nm) and calculates the following radiometric quantities:

UVA irradiance (W / m²), **UVB irradiance** (W / m²) and **UVC irradiation** (W / m²) (fig. 4).

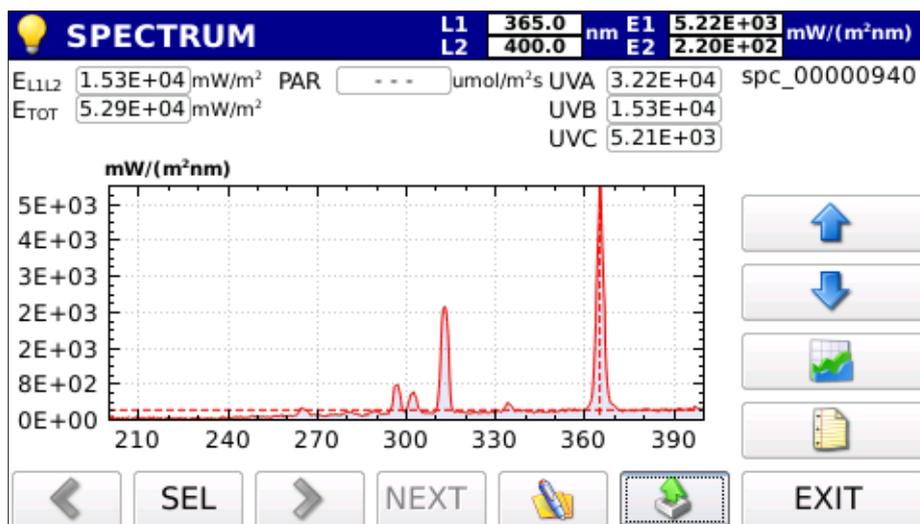


Fig. 4

Both sensors have an optical input equipped with a new generation of diffuser that optimizes the response according to the cosine law and does not introduce any spectral deformation.

The data relating to the calibration of each probe are stored in the permanent memory and are read by the indicator.

The system works with internal batteries (rechargeable, 3.3V, 6.6Ah) or connected to the external power supply (SWD06), which has the dual function of powering the unit and charging the battery.

The battery life while the instrument is working is approximately 10 hours, which may increase the particular conditions of use.

2 APPLICATIONS

Data logger-indicator HD30.1 with the probe HD30.S1 (visible):

In recent years in the lighting field, we are witnessing the advent of LED lighting. The advantages from the point of view of energy compared to conventional systems is not in doubt, even if the performance in terms of color rendering (CRI) are not uniform between different production batches and may vary from manufacturer to manufacturer. With traditional light meters you can just check the level of Illuminance [lux] but not the quality of the illumination produced.

Therefore, it is necessary to accurately control the colorimetric characteristics of the sources installed in order to evaluate not only the quantity but also the quality.

In the industrial environment, a high color rendering reduces the fatigue of visual field and, in cosmetics, a high color rendering is needed to enhance the quality of the exhibits.

Even more important is the control of the spectrum of the sources installed in the museum environment where the quality of lighting has the dual task of ensuring the optimum viewing of the exhibits (high CRI) and a low emission of blue-violet light that may degrade the materials of the exhibits.

Some neonatal therapies are based on lamps that emit blue light, the appropriate level of radiation can be measured by using the HD30.1. In this case, the light emitted out of the useful spectral band not only decreases the effectiveness of the therapy but can be harmful.

Data logger-indicator HD30.1 with the probe HD30.S2 (ultraviolet):

The ultraviolet light is used in the most various industrial and civil sectors. Quite often it is not enough to know the total emission of the source, but it is crucial to know how this light is distributed in the spectrum. This is because many processes (sterilization, polymerization and others) are very sensitive to the wavelength of the incident light and not only to its intensity.

In the medical field, some diseases of the skin are treated with the use of UV lamps (UVB), also in this case not only the intensity of light that reaches the skin is important but also its wavelength.

3 SPECIFICATIONS

MODELLO	HD30.1 + HD30.S1	HD30.1 + HD30.S2
Sensor	CCD linear (2048 elements)	CCD linear (2048 elements)
Spectral Field	380 nm – 780 nm	220 nm – 400 nm
Type of spectrometer	Based on diffraction grating in transmission	
Numerical Aperture	0.16	
Inlet Slit	125µm	70µm
Band-pass	4.5nm	2.5 nm
Wavelength accuracy	0.3 nm	
Reproducibility of the wavelength	0.1 nm	
integration Time	From 1ms to 4 s	
Measuring Mode	Automatic/manual	
Diffused Light	<0.03%	<0.03%
Measuring Mode	Spectral Irradiance, Irradiance, Illuminance [lux], PAR , Correlated Colour Temperature, Trichromatic coordinates CIE 1931 (x,y) & CIE 1976 (u',v'),CRI, Spectral Transmittance	Spectral Irradiance, UVA Irradiance, UVB Irradiance, UVC Irradiance, Spectral Transmittance
Type of Measure	Single , single acquisition with data backup Continue , continuous acquisition with data backup Monitor , acquisition continues without saving data Logging , acquisition at time intervals (from 3min to 60min) with data backup	
Optical input dimensions (opaline quartz diffuser)	Φ 11.8 mm	
Cosine correction	By means of opaline quartz diffuser (3mm)	By means of opaline quartz diffuser (2mm)
Calibration	Halogen Lamp Sample	Deuterium Lamp Sample
Working field	Illuminance 5-70000 lux	
Uncertainty	Spectral Irradiance ±5 % Illuminance ±4% PAR ±4% CCT ±45K x,y ±0.002 CRI ±1.5	Spectral Irradiance ±15 % UVA Irradiance ±6% UVB Irradiance ±8% UVC Irradiance ±10%
Operating System	Linux 	
Display	4.3" touch screen (480x272 pixel)	
Data Storage	Internal (150 MB), micro SD card, USB key (not supplied)	
PC connection	via Ethernet cable, via mini USB connector.	
Power Supply	Rechargeable 6600 mA/h battery Li-po, 3.7V or external power supply SWD06 (6Vdc)	
Exported data format	Compatible with the best known management software /data analysis	
Dimensions/weight of the indicator HD30.1	135x 156 x H 42 mm 440 g	
Dimensions/weight of the probe	75x150x H74, cable length 1.5m 370 g	

Working temperature	0°C-40°C
Upgrade	automatic via internet

4 PURCHASING CODES

PART NUMBER	DESCRIPTION
HD30.1 + probe HD30.S1	Datalogger-indicator HD30.1 equipped with the HD30.S1 probe for measuring the visible spectral band (380nm-780nm), 4GB micro SD card, power supply/battery charger SWD06, case and CD with User's Manual and Software.
HD30.S2	HD30.S1 probe for measuring the ultraviolet spectral range (220nm-400nm).
ACCESSORIES	
SWD06	power supply/battery charger for HD30.1
BAT30	6600mA, 3.7V replacement battery for HD30.1,
Micro SD	4GB Micro SD card
HD30S	Additional copy of the software