US4000

US4000
PHOTO-RADIOMETER

The US4000 is a portable instrument with a large LCD display. 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. The Max, Min and Avg function calculate the maximum, minimum or average values. Other functions include: the relative measurement REL, the HOLD function, and the automatic turning off that can also be excluded. **The instruments have IP67 protection degree.**

INSTRUMENT TECHNICAL CHARACTERISTICS

Instrument

Dimensions (Length x Width x Height)	140x88x38mm
Weight	160g (complete with batteries)
Materials	ABS
Display	2x4½ digits plus symbols - 52x42mm Visible area: 52x42mm

Operating conditions

Operating temperature	-5…50°C
Storage temperature	-25…65°C
Working relative humidity	0…90%RH without condensation
Protection degree	**IP67**

Power

Batteries	3 1.5V type AA batteries
Autonomy	200 hours with 1800mAh alkaline batteries
Power absorbed with the instrument off	20µA

Measuring unit	lux - fcd - µmol/m²·s - cd/m² - W/m² - µW/cm² µW/lumen

Connections

Input module for the probes	8-pole male DIN45326 connector

Technical characteristics of photometric and radiometric probes equipped with SICRAM module for the connection the instrument.

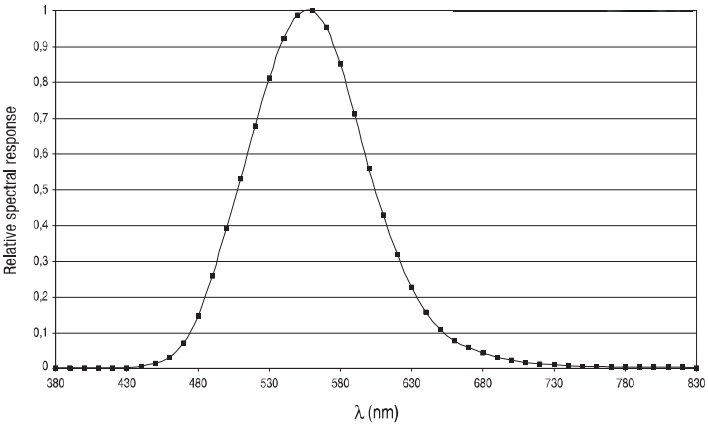
US4100 PHOT probe for the measure of ILLUMINANCE				
Measuring range (lux):	0.10…199.99	…1999.9	…19999	…199.99·10³
Resolution (lux):	0.01	0.1	1	0.01·10³
Spectral range:	in agreement with standard photopic curve V(λ)			
α (temp. coefficient) f_6 (T)	<0.05%K			
Calibration uncertainty:	<4%			
f'_1 (in 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			

Photometric probe for **ILLUMINANCE** measurement, spectral response in agreement with standard photopic vision, diffuser for cosine correction. Measurement range: 0.10 lux…200·10³ lux.

US4101 LUM2 probe for the measure of LUMINANCE				
Measuring range (cd/m²):	1.0…1999.9	…19999	…199.99·10³	…1999.9·10³
Resolution (cd/m²):	0.1	1	0.01·10³	0.1·10³
Optical angle:	2°			
Spectral range:	in agreement with standard photopic curve V(λ)			
α (temp. coefficient) f_6 (T)	<0.05%K			
Calibration uncertainty:	<5%			
f'_1 (in agreement with photopic response V(λ)):	<8%			
f_3 (linearity):	<1%			
f_4 (instrument reading error):	<0.5%			
f_5 (fatigue):	<0.5%			
Class	C			
Drift after 1 year:	<1%			
Working temperature:	0…50°C			
Reference Standards	CIE n.69 - UNI 11142			

Photometric probe for **LUMINANCE** measurement, spectral respor in agreement with standard photopic vision, vision angle 2°. Measurement range: 1.0 cd/m²…2000·10³ cd/m².

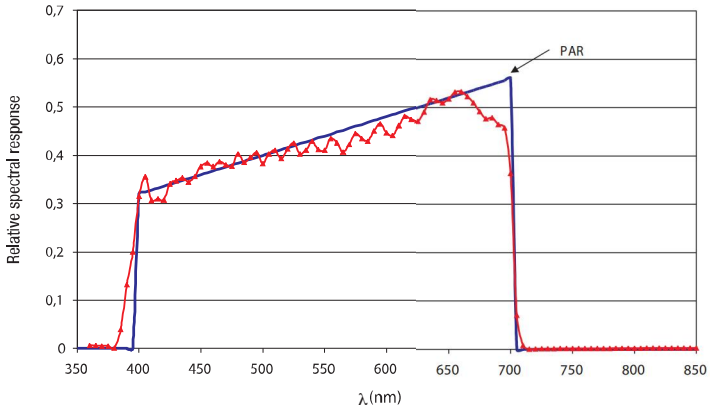
Typical response curve: US4100 PHOT and US4101 LUM2



US4102 PAR quantum radiometric probe for the measure of the photon flow across the chlorophyll range PAR			
Measuring range (μmol·m^{-2}s^{-1}):	0.10…199.99	200.0…1999.9	2000…10000
Resolution (μmol·m^{-2}s^{-1}):	0.01	0.1	1
Spectral range:	400nm…700nm		
Calibration uncertainty:	<5%		
f_2 (response according to the cosine law):	<6%		
f_3 (linearity):	<1%		
f_4 (instrument reading error):	±1digit		
f_5 (fatigue):	<0.5%		
Drift after 1 year:	<1%		
Working temperature:	0…50°C		

Quantum radiometric probe for the measurement of the photon flow across the chlorophyll range **PAR** (Photosynthetically Active Radiation 400nm…700nm), measurement in μmol/m^{2}s. Measurement range: 0.10 μmol·m^{-2}s^{-1}…10·10^3 μmol·m^{-2}s^{-1}.

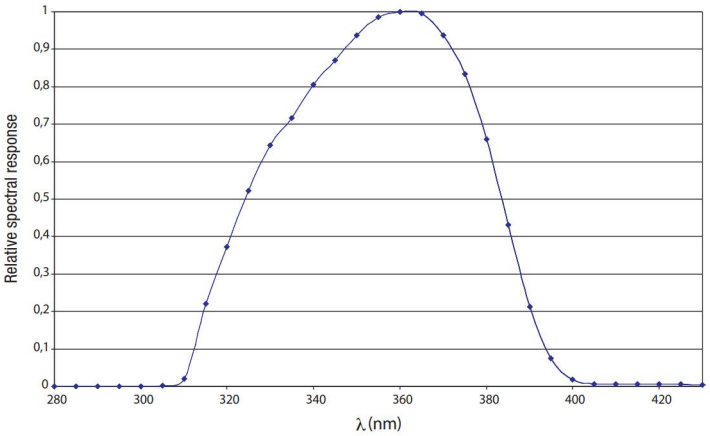
Typical response curve: US4102 PAR



US4103 UVA probe for the measure of UVA IRRADIANCE				
Measuring range (W/m^2):	1.0·10^{-3} …999.9·10^{-3}	1.000 …19.999	20.00 …199.99	200.0 …1999.9
Resolution (W/m^2):	0.1·10^{-3}	0.001	0.01	0.1
Spectral range:	315nm…400nm (Peak 360nm)			
Calibration uncertainty:	<5%			
f_3 (linearity):	<1%			
f_4 (instrument reading error):	±1digit			
f_5 (fatigue):	<0.5%			
Drift after 1 year:	<2%			
Working temperature:	0…50°C			

Radiometric probe for **IRRADIANCE** measurement, in the 315nm…400nm, peak 360nm, UVA spectral range. Measurement range: 1.0·10^{-3}W/m^2…2000W/m^2.

Typical response curve: US4103 UVA

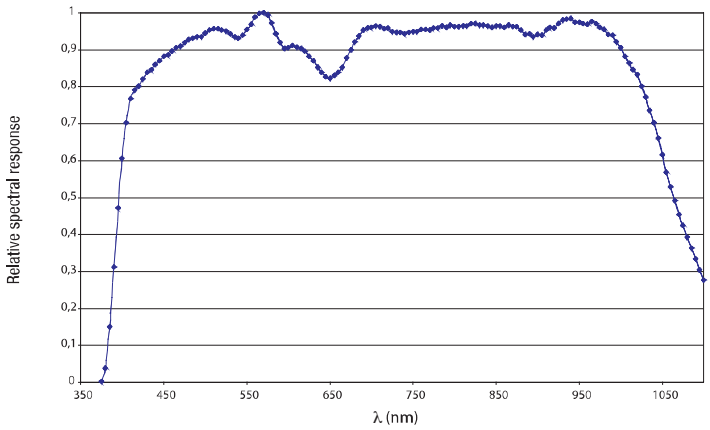


Light

US4109 RAD probe for the measure of IRRADIANCE				
Measuring range (W/m^2):	1.0·10^{-3} …999.9·10^{-3}	1.000 …19.999	20.00 …199.99	200.0 …1999.9
Resolution (W/m^2):	0.1·10^{-3}	0.001	0.01	0.1
Spectral range:	400nm…1050nm			
Calibration uncertainty:	<5%			
f_2 (response according to the cosine law):	<6%			
f_3 (linearity):	<1%			
f_4 (instrument reading error):	±1digit			
f_5 (fatigue):	<0.5%			
Drift after 1 year:	<1%			
Working temperature:	0…50°C			

Radiometric probe for **IRRADIANCE** measurement in the spectral range 400nm…1050nm, diffuser for cosine correction. Measurement range: 1.0·10^{-3}W/m^2…2000W/m^2.

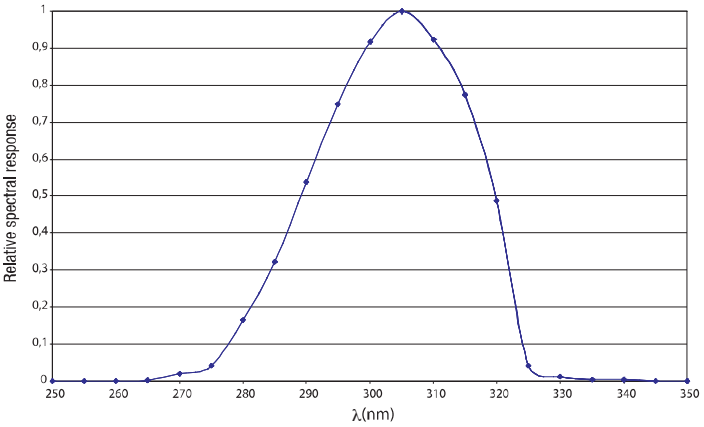
Typical response curve: US4109 RAD



US4104 UVB probe for the measure of UVB IRRADIANCE				
Measuring range (W/m^2):	1.0·10^{-3} …999.9·10^{-3}	1.000 …19.999	20.00 …199.99	200.0 …1999.9
Resolution (W/m^2):	0.1·10^{-3}	0.001	0.01	0.1
Spectral range:	280nm…315nm (Peak 305nm...310nm)			
Calibration uncertainty:	<5%			
f_3 (linearity):	<2%			
f_4 (instrument reading error):	±1digit			
f_5 (fatigue):	<0.5%			
Drift after 1 year:	<2%			
Working temperature:	0…50°C			

Radiometric probe for **IRRADIANCE** measurement, in the spectral range 280nm…315nm, peak 305nm ... 310nm, Measurement range: 1.0·10^{-3}W/m^2…2000W/m^2.

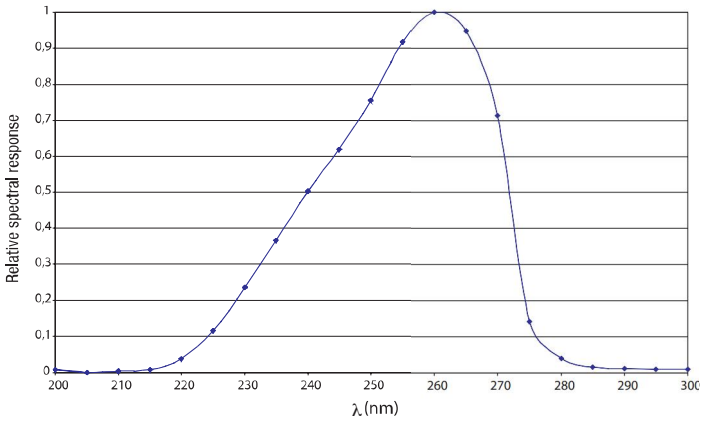
Typical response curve: US4104 UVB



US4105 UVC probe for the measure of UVC IRRADIANCE				
Measuring range (W/m²):	$1.0 \cdot 10^{-3}$ …$999.9 \cdot 10^{-3}$	1.000 …19.999	20.00 …199.99	200.0 …1999.9
Resolution (W/m²):	$0.1 \cdot 10^{-3}$	0.001	0.01	0.1
Spectral range:	220nm…280nm (Peak 260nm)			
Calibration uncertainty:	<5%			
f_3 (linearity):	<1%			
f_4 (instrument reading error):	±1digit			
f_5 (fatigue):	<0.5%			
Drift after 1 year:	<2%			
Working temperature:	0…50°C			

Radiometric probe for **IRRADIANCE** measurement, in the spectral range 220nm…280nm, peak 260nm, UVC. Measurement range: $1.0 \cdot 10^{-3}$W/m²…2000W/m².

Typical response curve: US4105 UVC



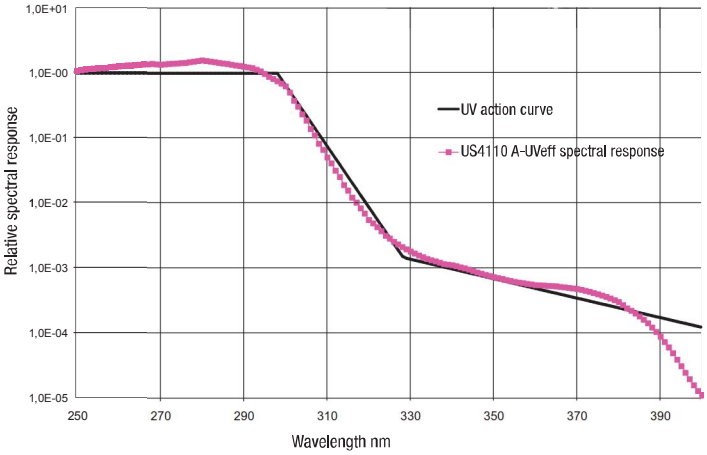
Combined probe US4107 P-A with two sensors for the measure of ILLUMINANCE and UVA IRRADIANCE				
Illuminance				
Measuring range (lux):	0.3…199.9	…1999.9	…19999	…$199.99 \cdot 10^3$
Resolution (lux):	0.01	0.1	1	$0.01 \cdot 10^3$
Spectral range:	in agreement with standard photopic curve V(λ)			
α (temp. 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			

Please refer to the spectral response of the US4100 PHOT probe

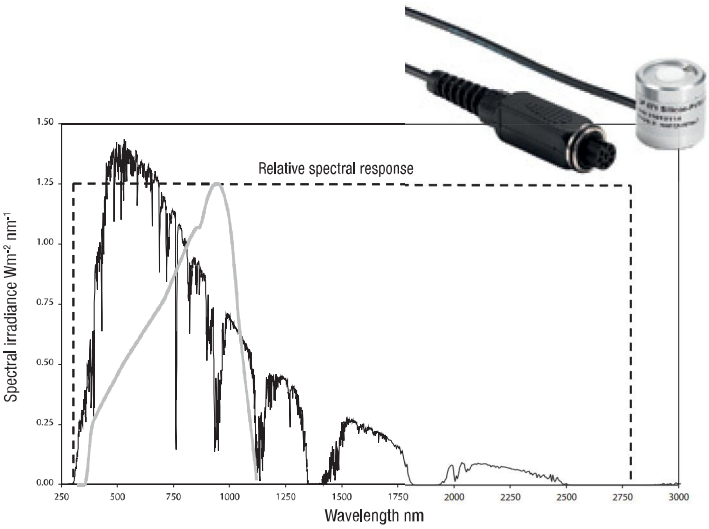
UVA Irradiance				
Measuring range (μW/cm²):	0.10…199.99	…1999.9	…19999	…$199.99 \cdot 10^3$
Resolution (μW/cm²):	0.01	0.1	1	$0.01 \cdot 10^3$
Spectral range:	315nm…400nm (Peak 360nm)			
Calibration uncertainty:	<5%			
f_2 (response according to the cosine law):	<6%			
f_3 (linearity):	<1%			
f_4 (instrument reading error):	±1digit			
f_5 (fatigue):	<0.5%			
Drift after 1 year:	<2%			
Working temperature:	0…50°C			

Please refer to the spectral response of the US4103 UVA probe

US4110 A-UVeff probe for the measure of TOTAL EFFECTIVE IRRADIANCE weighted according to the UV action curve (CEI EN 60335-2-27)	
Total Effective Irradiance	
Measuring range (W_{eff}/m²):	0.010 … 19.999
Resolution (W_{eff}/m²):	0.001
Spectral range:	UV action curve for measuring erythema (250 nm…400 nm)
Calibration uncertainty:	<15%
f_3 (linearity):	<3%
f_4 (instrument reading error):	±1 digit
f_5 (fatigue):	<0.5%
Drift after 1 year:	<2%
Working temperature:	0…50°C
Reference standard	CEI EN 60335-2-27
UVA Irradiance	
Measuring range (W_{eff}/m²):	0.01 … 1999.9
Resolution (W_{eff}/m²):	0.1
Spectral range:	315 nm … 400 nm
UV_BC Irradiance	
Measuring range (W_{eff}/m²):	0.010 … 19.999
Resolution (W_{eff}/m²):	0.001
Spectral range:	250 nm … 315 nm

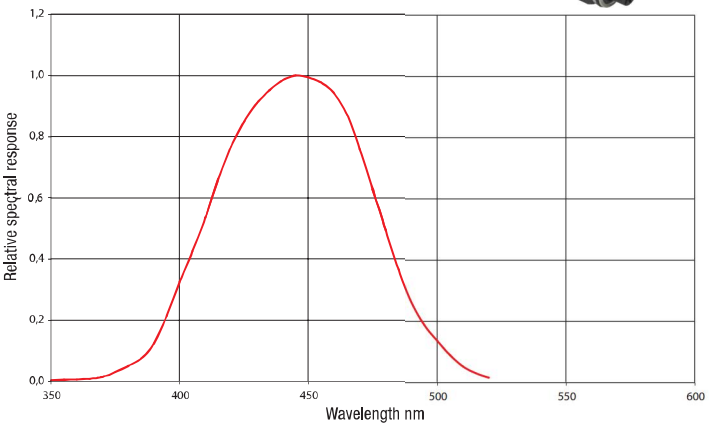


US4108 PYRA probe for the measure of GLOBAL SOLAR RADIATION				
Measurement range (W/m²):	$1.0 \cdot 10^{-3}$… $999.9 \cdot 10^{-3}$	1.000…19.999	20.00…199.99	200.0…1999.9
Resolution (W/m²):	$0.1 \cdot 10^{-3}$	0.001	.01	0.01
Spectral range:	400 nm … 1100 nm			
Calibration uncertainty:	<3%			
f_2 (response 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			



The radiometric probe LP 471-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. 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 380nm to 550nm. 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.

US4106 BLUE probe for the measure of IRRADIANCE in spectral band of BLUE LIGHT				
Measurement range (W/m²):	$1.0 \cdot 10^{-3}$… $999.9 \cdot 10^{-3}$	1.000…19.999	20.00…199.99	200.0…1999.9
Resolution (W/m²):	$0.1 \cdot 10^{-3}$	0.001	.01	0.01
Spectral range:	380 nm … 550 nm. Action curve for damages of Blue light B(λ)			
Calibration uncertainty:	<10%			
f_2 (response according to the cosine law):	<6%			
f_3 (linearity):	<3%			
f_4 (instrument reading error):	±1 digit			
f_5 (fatigue):	<0.5%			
Drift after 1 year:	<2%			
Working temperature:	0…50°C			



US4000: The kit consists of the instrument US4000, 3 1.5V alkaline batteries, operating manual, case. **The probes must be ordered separately**.

Light