

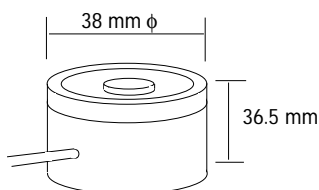
## Q203 RADIOMETER

The Q203 radiometer is versatile instrument for measuring light in quantum irradiance between 400 and 700nm (PAR) in  $\mu\text{mol.m}^{-2}.\text{s}^{-1}$  ( $\mu\text{E.m}^{-2}.\text{s}^{-1}$ ), irradiance between 400 and 1000nm in  $\text{W/m}^2$  and illuminance in Lux. The interchangeable cosine corrected filter rings adapt the responsivity of the detector to correspond to the PAR, radiometric and photometric spectral responses.

### FEATURES

- Compact and robust, ideal for field or laboratory use.
- Easy to operate with  $\mu$ -processor control.
- Spectral response filters give accurate measurements in both natural and artificial lighting conditions.
- Auto-ranging detector amplifier
- Direct reading for all three spectral units.
- High accuracy cosine corrected diffuser assemblies.
- Large  $4\frac{1}{2}$  digit LCD display.
- Battery operation.

### LABORATORY DETECTOR (SD222) WITH INTERCHANGEABLE FILTER RINGS

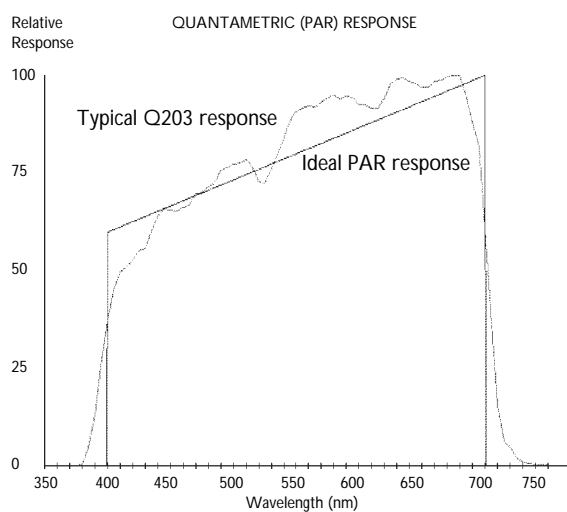


### APPLICATIONS

- Agriculture, horticulture and plant growth studies.
- Biology & Limnology research.
- Environmental measurements
- Illumination engineering.

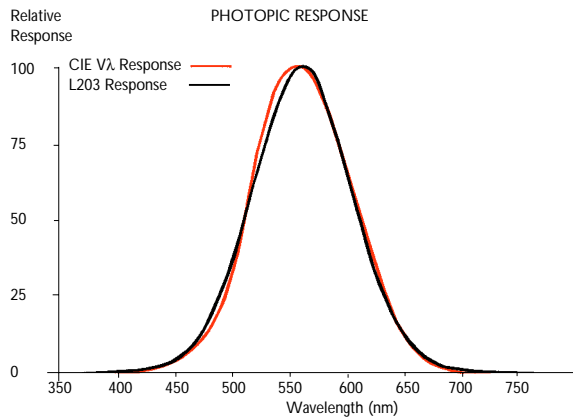
### OPTIONS / ACCESSORIES

- Levelling plate.
- Waterproof cosine and  $4\pi$  detector.
- Extension cable (5 to 25m).
- Sample PC software.



### PHOTOSYNTHETIC ACTIVE RADIATION

For plant science the spectral response of the Q203 detector is shaped to measure the number of quanta (photons) of light between 400 to 700nm incident on the leaf. Units  $\mu\text{mol.m}^{-2}.\text{s}^{-1} \equiv 6.02 \times 10^{23} \text{photons.m}^{-2}.\text{s}^{-1}$



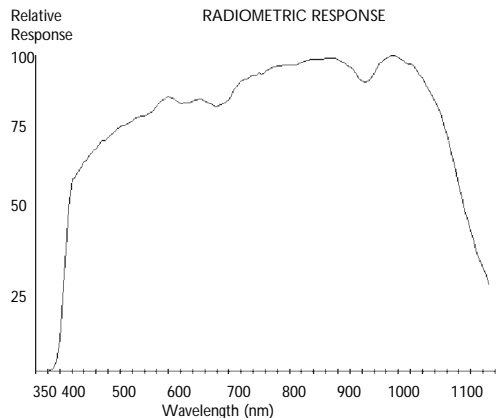
## RADIOMETRY & IRRADIANCE

The Q203 radiometer measures the radiant flux per unit area (irradiance) of light over the defined wavelength region in  $\mu\text{W}/\text{cm}^2$ . Macam has designed subtractive filters that are used with photodiode detectors to give a substantially flat response from 450 to 950nm.

## PHOTOMETRY & ILLUMINANCE

Photometry is the measurement of light as the human eye responds to it. The Commission Internationale de L'Eclairage (CIE) standard response function,  $V_\lambda$  known as the CIE Photopic Luminous Efficiency Curve is shown on the graph together with the Q203's photopic filter response.

Illuminance is measurement of the photopic flux falling on a surface. Units of illuminance are the Lux, lumens per square metre,



## SPECIFICATION

The Macam model Q203 photometer comprises of a Q203X display unit with lithium battery, SD222 laboratory detector and integral amplifier, PAR Cos-112 filter ring, CIE Cos-112 illuminance filter ring, RFF Cos-122 irradiance filter ring, RS232 interface cable, calibration certificate and CC-4 carrying case. Model Q102 PAR is supplied without the illuminance & irradiance filter rings for PAR measurements only.

### DISPLAY UNIT

Model:	Q203X
Design:	Portable $\mu$ processor controlled meter with back lit lcd display, auto or manual ranging, RS232 simple key pad operation, battery powered.
Ranges:	0 - 19.999; 0 - 199.99; 0 - 1999.9; 0 - 19999; 0 - 19999 x 10
Units:	$\mu\text{mol.m}^{-2}.\text{s}^{-1}$ ; Lux; $\text{W.m}^{-2}$ ; $\text{mW.m}^{-2}$
Accuracy:	$\pm 1\%$ , $\pm 1$ digit
Keypad Operations:	Power On / Off Hold display toggle action Zero offset Auto or manual ranging Units selects filter ring calibration Linear, Integrate, Average, Min & Max recording.
Display:	4½ digit lcd display with 10mm high numerals.
Power Supply:	PP3 Lithium battery. Operating life 50 to 100 hours.
Quantametric calibration:	Calibrated with a solar simulated uniform source and a Macam spectroradiometer.
Photometric calibration:	Illuminant A source.
Radiometric calibration:	Monochromatic source @ 555nm
Calibration standards:	Traceable to NPL optical metrology standards.
Calibration accuracy:	$\pm 5\%$ for <i>white light</i> sources.
Dimensions	80mm x 45mm x 150mm.
Weight	Approx. 0.3 Kg.

### LABORATORY DETECTOR

Model:	SD222
Design:	Silicon photodiode with integral detector amplifier and signal to frequency converter. Aluminium housing with removable filter rings and 1m cable.
Linearity	Better than 1% through ranges
Dimension:	38mm $\phi$ x 36.5mm with a filter ring fitted

### PAR FILTER RING

Spectral Response	Ref quantametric graph
Angular Response	$\pm 3\%$ to $70^\circ$

### ILLUMINANCE FILTER RING

Spectral Response	Ref photopic graph
Angular Response	$\pm 3\%$ to $70^\circ$

### IRRADIANCE FILTER RING

Spectral Response	Ref radiometric graph
Angular Response	$\pm 3\%$ to $70^\circ$

**Macam**

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