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# ML-020 series Small Sensors

## High performance

Combining the special designed filters with the high efficient detector makes it possible to characterize "spectral response" which is close to the ideal response. Temperature dependence is quite small, max. 1%, in actual measurement.

## Small and lightweight

The sensors are suitable for the use in limited space and at multi point measurement.

## High durability

The sensors are designed to use continuously in all weather condition.

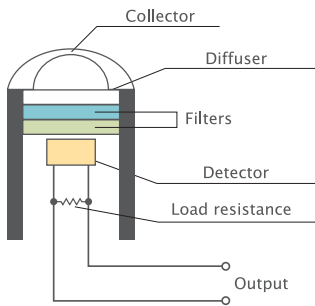


When creatures or plants receive natural and artificial light as illuminance or light energy, reactions are very big difference spectrally depends on the types. Human eye reacts to illuminance and plants react to number of photon. According to this fact, natural and artificial light should be selected very carefully for measurement of fundamental study of applied research. Based on these backgrounds, we have developed three sensors for such individual measuring purpose by taking our advantage of long experience for energy measuring.

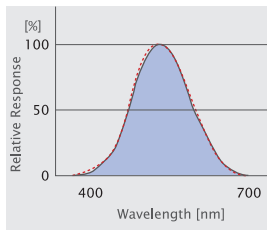


with option leveling plate

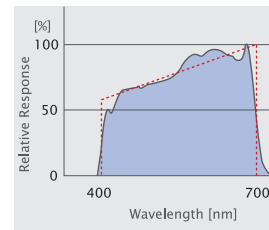
## PRINCIPLE OF MEASUREMENT



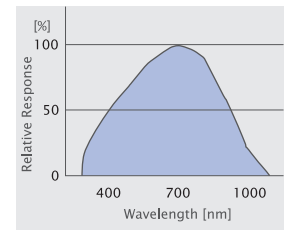
## PSPECTRAL CHARACTERISTICS



Luxmeter  
ML-020S-1, ML-020S-0



Photon sensor  
ML-020P



Pyranometer  
ML-020VM

Special designed collector and diffuser are mounted on the upper part of the detector. This optical component realizes excellent character for cosine response and sensitivity. The transmitting light flux reached to the filters whose spectral response coincides for individual measuring purpose illuminance, photon number and irradiance, as shown in the following figure, the Si-photodiode detects the flux through the filters and converts accurately to electric signal proportional to the flux.

## Specifications

	Luxmeter		Photon sensor	Pyranometer
	ML-020S-0 High illuminance	ML-020S-1 Low illuminance	ML-020P	ML-020VM
Spectral response	CIE Photopic Curve		Photosynthetically Photon Flux Density	Solar Irradiance (300 to 1100nm)
Measuring range	~150,000	~30,000	~3000	~1.4
Unit	lx	lx	$\mu\text{mol}\cdot\text{s}^{-1}\cdot\text{m}^{-2}$	$\text{kW}/\text{m}^2$
Output	~30mV	~30mV	~10mV	~10mV
Internal resistance	280 $\Omega$	1.3 k $\Omega$	160 $\Omega$	10 $\Omega$
Temperature response (-10 to +50 )	0.4%	0.4%	1.1%	0.5%
COS response (at 30/60/80 deg.)	1 / 1.5 / 17%			
Spectral error	2.3%	2.3%	7.7%	—
Output cable	5m, standard			

