photodetector module
PDM02-9111-TTL data sheet

ET Enterprises electron tubes

1 description

The PDM02-9111-TTL is a photon counting module incorporating a high sensitivity, low noise, 25mm diameter photomultiplier, a fast amplifier-discriminator, and a low power high-voltage supply. The combination of high-speed electronics and fast photomultiplier with low dark counts enables a wide dynamic range to be achieved. A positive polarity high-voltage supply is used for maximum count rate stability at very low light levels and a mumetal* rectangular housing provides a high level of immunity to external magnetic fields.

The spectral range of the PDM02-9111-TTL is 280-600nm. Other versions are available with a wider range, for example the PDM02-9111W-TTL, which extends the UV sensitivity to 200nm. The effective photosensitive diameter of 22mm makes efficient collection of incident light relatively easy and combining this with a maximum dark count of only 200 cps at 20 deg C results in a unique detection capability.

The photomultiplier high-voltage and discriminator threshold level are pre-set for optimum performance, enabling photon counting operation simply by connecting to a +5V supply. The fixed pulse-width TTL output is fully compatible with the ET Enterprises MCS-CT3 multi-channel scaler/counter-timer. When used together, these units can be controlled and powered from a pc USB port, subject to the USB port current limitations.

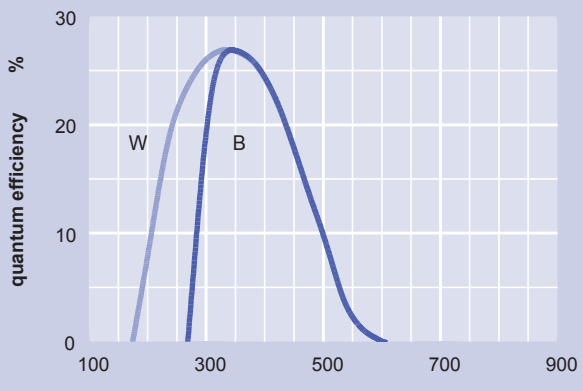
2 applications

- fluorescence spectroscopy
- luminometry
- hygiene monitoring
- portable photon counting equipment

3 features

- pre-configured for optimum performance and ease of use
- wide dynamic range, up to 100 Mcps
- operation from a single +5V supply
- integral magnetic and electrostatic shielding
- only 600mW power dissipation (maximum)
- spectral range options
- 22mm diameter photosensitive input area

4 photocathode spectral response



5 characteristics

	unit	min	typ	max
photocathode: bialkali				
active diameter	mm		22	
quantum efficiency at peak	%		28	
spectral range	nm	280		630
output pulse (terminated)**:**				
TTL active high level	V	3.3		
rise and fall time	ns		1.2	
pulse width	ns		17	
pulse-pair resolution	ns		25	
signal count rate:				
without dead time correction	cps			30M
with dead time correction	cps			100M
output impedance	Ω		50	
discriminator level	mV		-2	
dark counts (@ 20°C)	cps		100	200
supply voltage	V	4.5		5.5
supply current (@ 5V, no signal)	mA		40	
supply current				
(@ 5V, signal = 150Mcps)	mA		120	
warm-up time	s		1	
temperature (operating)	°C	5		55
temperature (storage)	°C	-40		60
humidity (non-condensing)	%			93
weight	g		210	
finish: grey				

*mumetal is a registered trademark of Magnetic Shield Corporation

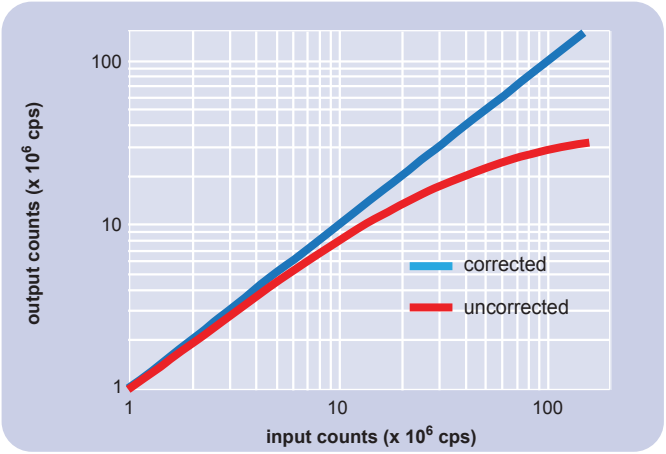
6 dynamic range

Extended dynamic range can be obtained by dead time correction to compensate for departure from linearity at high count rates due to pulse pile-up. Dead time may be corrected for, as follows:

$$N = n/(1-nT)$$

where: N is the true count rate (cps),
n is the measured count rate (cps),
T is the count rate correction factor (25 x 10^{-9}s),

Using this correction, deviation from linearity is typically within ±5% at 100Mcps.



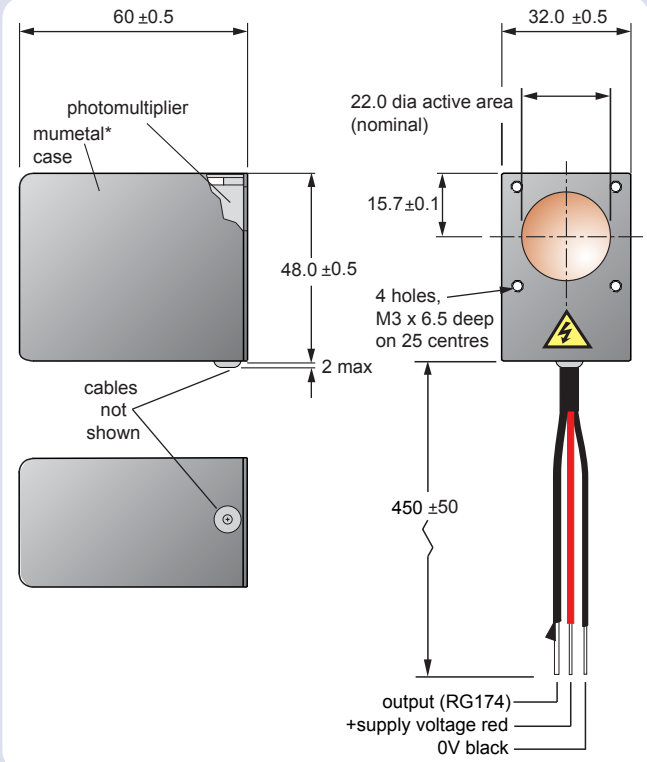
7 installation and operation

Each module is supplied with test data. Wherever possible, installation should be carried out in subdued light. Exposure to strong lights, particularly those containing a high UV content, can result in a temporary increase in dark counts during subsequent operation.

Remove the protective cap or cover from the package. If necessary, the photomultiplier window can be cleaned using a lens tissue moistened with alcohol. Do not use any other solvent.

Mount the module and make power input and signal output connections. The signal lead should be terminated into 50Ω. Do not expose the photomultiplier photocathode to strong light while the module is energised.

8 outline drawing (mm)



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9 ordering information

PDM02-9111-TTL	visible range (280-630nm)
PDM02-9111W-TTL	extended UV (200-630nm)

Variants are available with connectors fitted to cables, for example to power from an MCS-CT3.

10 warning

No attempt must be made to repair or dismantle this product. High voltage used within the module may present an electric shock hazard.

Operation beyond the maximum ratings, or reversal of the input voltage may result in loss of performance or permanent damage to the product.

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