

photodetector module

P30CW5 data sheet

1 description

The versatile P30CW5 photodetector module can be used for all three modes of photomultiplier operation - pulse counting, analogue detection or photon counting. It comprises a 30 mm diameter, fast end-window photomultiplier (pmt) with a blue-green sensitive bialkali photocathode and a -HV power supply, encapsulated within a cylindrical mumetal* case. The signal output is connected directly to the pmt anode allowing the user freedom to work into a range of electronic circuitry.

The effective photocathode diameter is 25 mm. The pmt high voltage is set by any one of the two methods described in section 7.

Variants of the P30CW5, available to special order, include photomultipliers with uv transmitting windows and with enhanced green or infra-red photocathode response.

2 applications

- battery powered instruments
- portable instruments
- industrial instruments
- university research

3 features

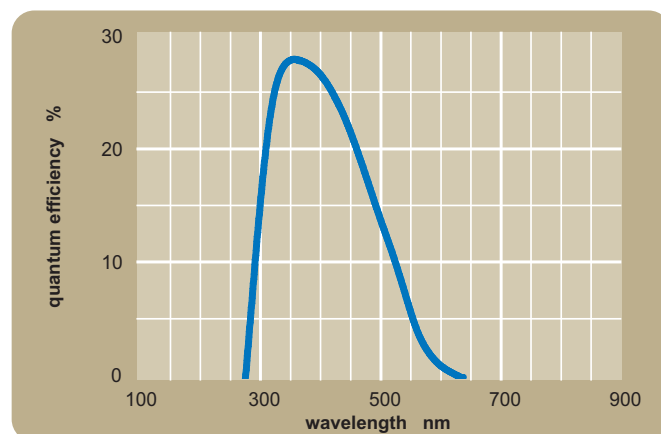
- easy to operate
- compact cylindrical geometry
- 2 modes of HV control
- direct connection to the anode

4 characteristics

photocathode type	bialkali
photocathode active diameter	25 mm
spectral response range	280 to 630 nm, see curve
peak QE (typ)	28 %
output pulse (into 50 Ω):	
output pulse rise time	4.5 ns
output pulse fwhm	7.5 ns
output impedance	$>10^8 \Omega$
dark counts at 20 °C (typ.)	100 s ⁻¹
(max.)	200 s ⁻¹
power input (typ.)	+5 V, 35 mA
HV/control voltage	1000:1
warm up time	less than 10 s
ratings	
temperature (operating)	+5 °C to +55 °C
(storage)	-40 °C to +55 °C
weight	285 g
operating position	any
finish	matt black



5 photocathode spectral response



6 modes of operation

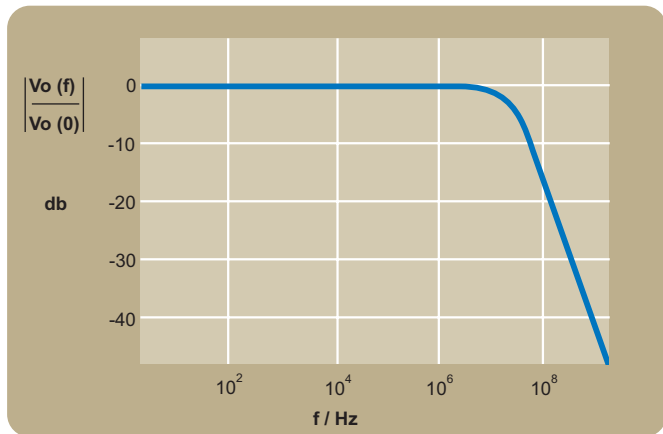
pulsed applications

To observe fast pulses, either with an oscilloscope or via a fast voltage amplifier connect the free end of the coaxial cable to 50 Ω . For slow pulses of rise time $\sim 1 \mu\text{s}$, the terminating resistor may be increased to 1 - 10 k Ω to give higher amplitude pulses.

analogue applications

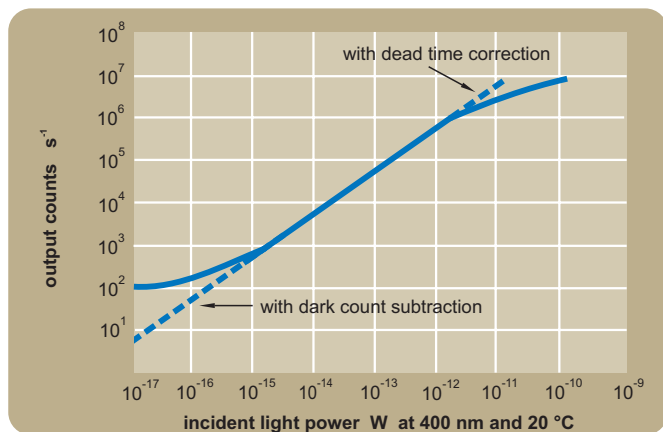
The bandwidth attainable with 50 Ω termination is given in the figure. Lower bandwidths may be realised by a parallel combinations of R and C connected to the anode lead. If more gain is required, or a low impedance drive capability, then the RC combination must be placed in the feedback path of a transimpedance amplifier.

frequency response



photon counting

The module may be used for photon counting by connecting it to an external amplifier-discriminator. Extended dynamic range can be obtained by dark count subtraction and by dead time correction to compensate for departure from linearity at high count rates.



7 installation and operation

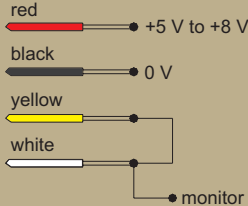
Each module is supplied with test data. Wherever possible installation should be carried out in subdued light. Exposure to strong lights, particularly those containing a high uv content, can result in a temporary increase in dark counts.

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

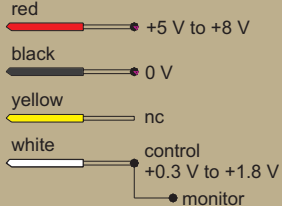
Mount the module and make power input and signal connections. Where the signal lead is longer than 200 mm, it should be terminated into 50 Ω . Do not expose the photomultiplier tube photocathode to strong lights while the module is energised.

programming options for internal high voltage power supply

A. internal potentiometer
(access from end
face of package)



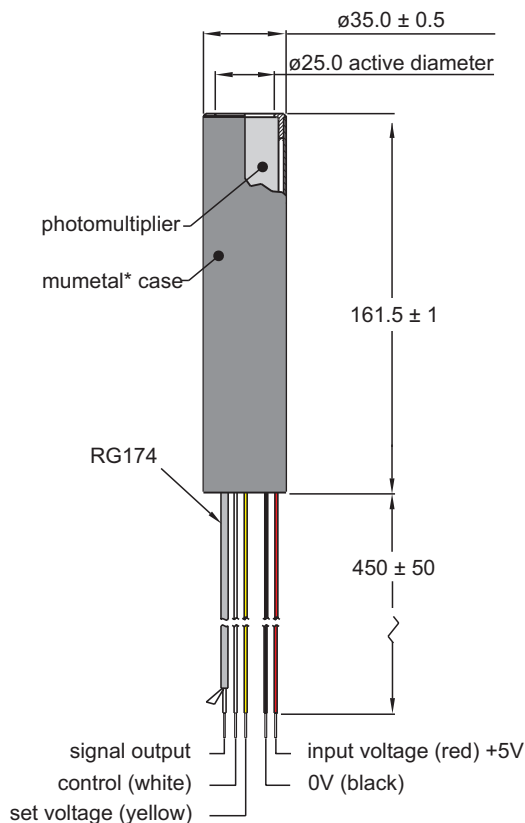
B. external voltage



nc: no connection - isolated lead

monitor: 1/1000 of voltage applied to photomultiplier

8 outline drawing mm



9 warning

The pmt cathode is operated at -HV. To guarantee stable performance and for safety reasons, the entire window must be isolated by a distance of at least 3 mm from any ground plane. The use of PTFE for insulation purposes is recommended.

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.

*mumetal is a registered trademark of Magnetic Shield Corporation