

photodetector module P25USB-01

1 description

The P25USB-01 is a plug-and-play photodetector module configured for photon counting. It comprises a selected 25 mm diameter end window photomultiplier tube with a red sensitive S20 photocathode with ultra-low dark counts, a positive high voltage power supply, a high speed amplifier-discriminator, a counter, and a micro-controller. All are encapsulated within a cylindrical mumetal* case, providing a high level of immunity from the effects of external magnetic fields. Low voltage and signal output connections to the module are by flying leads. The photomultiplier high voltage is factory set.

2 application

- intended for ultra-low light measurements requiring single photon detection via a USB interface to a host PC.

3 features

- simplicity of operation
- minimal set up time
- compact cylindrical assembly
- electrostatic and magnetic shielding
- USB interface
- 100 MHz count rate capability
- automatic dead time correction
- operates from +5V supply
- preset discriminator level and HV
- fully enclosed high voltage
- only 600 mW total power dissipation (typical)
- discriminator threshold preset to -2 mV
- HV factory set for optimum operating voltage
- will operate with any PC running Windows® 2000, XP, Vista or Windows® 7

4 user manual

A manual giving detailed installation, start-up software and programming procedures is supplied with every module.

5 test data

Each module is supplied with test data including photocathode parameters and dark counts.



6 characteristics

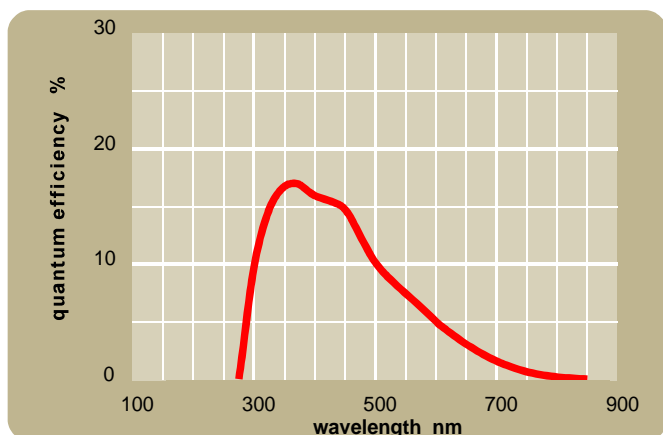
| | |
|---|--------------------------|
| photocathode type | S20 |
| photocathode active diameter | 22 mm |
| spectral response range | see curves |
| peak QE (typ) | see curves |
| output | USB |
| control | see user manual |
| discriminator level | -2 mV |
| dark counts at 20 °C (typ.) | 1000 s ⁻¹ |
| (max.) | 5000 s ⁻¹ |
| power input at 10⁶ s⁻¹ | +5 V, 125 mA |
| warm up time | less than 2 s |
| input voltage | +4.75 V to +5.25 V |
| temperature (operating) | +5 °C to +55 °C |
| (storage) | -40 °C to +55 °C |
| humidity (non-condensing) | 93 % RH maximum at 30 °C |
| weight | 230 g |
| operating position | any |
| finish | matt black |

7 user I/O connections

TTL input and output lines are available for control of the module and to command peripheral operations.

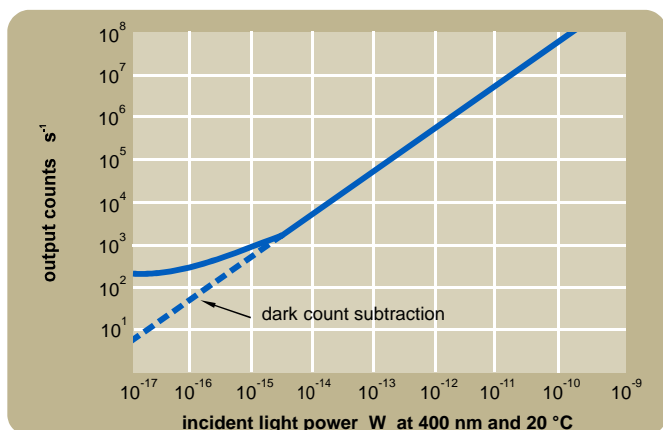
| | |
|-----------------------------|--|
| trigger input (grey) | start command for cycle defined by software |
| user output (violet) | start command for user applications. For example: activate shutter; busy indicator |

8 photocathode spectral response

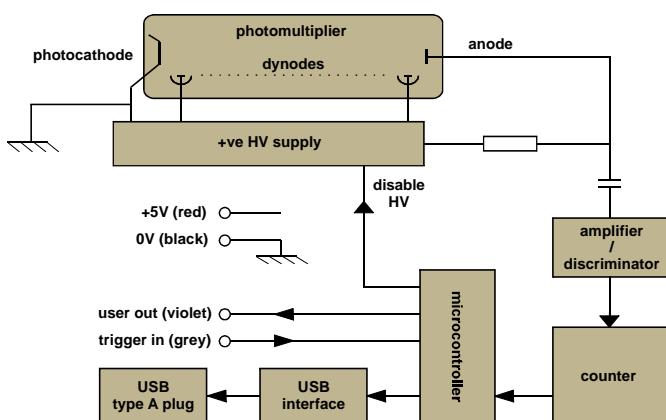


9 dynamic range

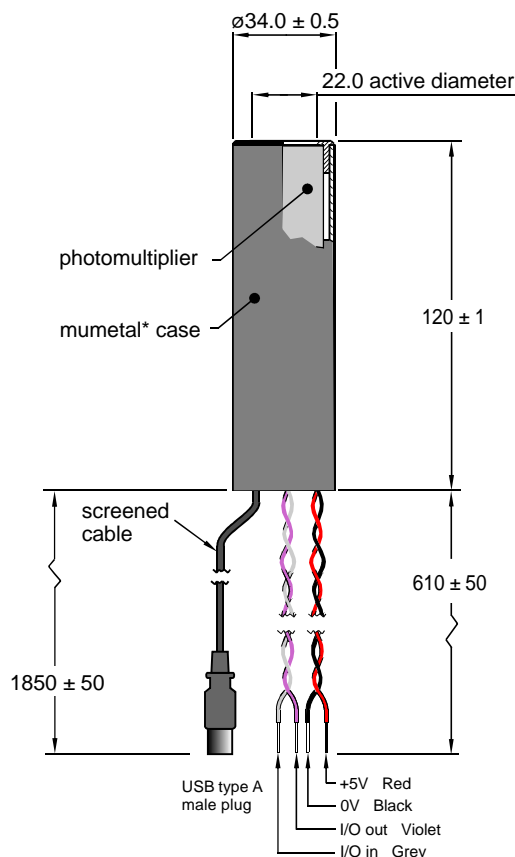
Typical counting sensitivity for P252USB at 400 nm. Note that automatic dead time correction has been applied at high count rates. The dynamic range can be further extended at low count rates by dark count subtraction by the user.



10 functional diagram



11 outline drawing mm



12 installation and operation

Each module is supplied with test data. Wherever possible installation should be carried out in subdued light.

Remove the protective cap from the module. If necessary, clean the photomultiplier window using a lens tissue moistened with alcohol. Do not use any other solvent. Mount the module and make power input and signal connections.

Do not expose the photomultiplier tube photocathode to strong lights while the module is energised.

13 warning

Do not attempt to repair or dismantle this product. High voltage used within the module presents an electric shock hazard.

Do not operate beyond the maximum ratings, or reverse the input voltage; this may result in loss of performance or permanent damage to the product.

*mumetal is a registered trademark of Magnetic Shield Corporation