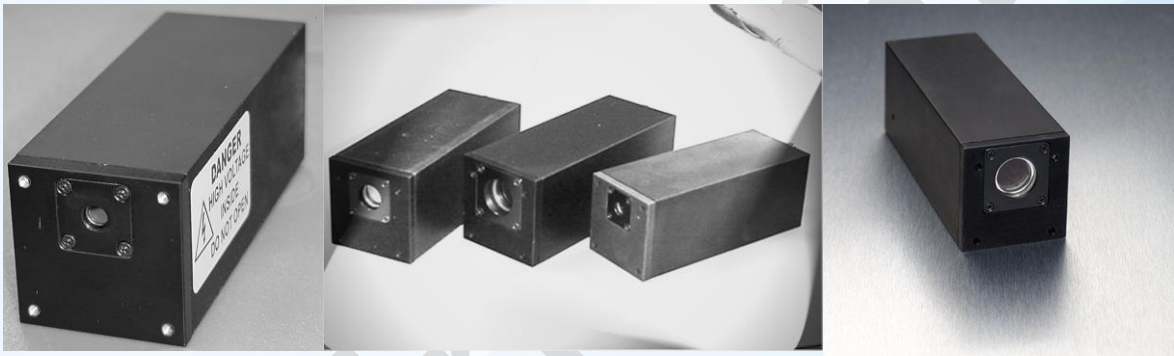


# *Customized Photon Counting Module*

## *PV- CM 9XZ / 13XZ /19XZ series*

*based on CPM Technology*

*Preliminary Datasheet*



*Single Photon Detection to 15 Megacounts/s*  
*Spectral Range from UV to IR*

### APPLICATIONS

- ❖ Photon counting
- ❖ Luminescence & fluorescence spectroscopy
- ❖ Microplate readers
- ❖ Clinical diagnostics
- ❖ DNA & cell analysis
- ❖ Particle measurements
- ❖ Industrial spectroscopy
- ❖ Nucleic acid amplification (PCR)

### FEATURES

- ❖ Extremely low background noise
- ❖ Best low light level detection limits
- ❖ High dynamic range & gain
- ❖ Low microphonic & magnetic sensitivity
- ❖ Compact size & rugged design
- ❖ Multiple photocathode and window selections
- ❖ Plug and play for shortest design-in and time-to-market
- ❖ Customizations and added features available

The Photon Counting Module series CM is designed for applications in all fields of single photon detection, e.g. chemoluminescence, bioluminescence, in-vitro assay, environmental measurements or pure research. It is an easy to use module, containing the Customized Photo Multiplier, a high voltage power supply, a discrimination amplifier and a pulse shaper for fast output pulses (TTL).

An installed active quenching system automatically avoids over-illumination to the detector. It is also possible to apply an external gate function for time correlated photon counting.

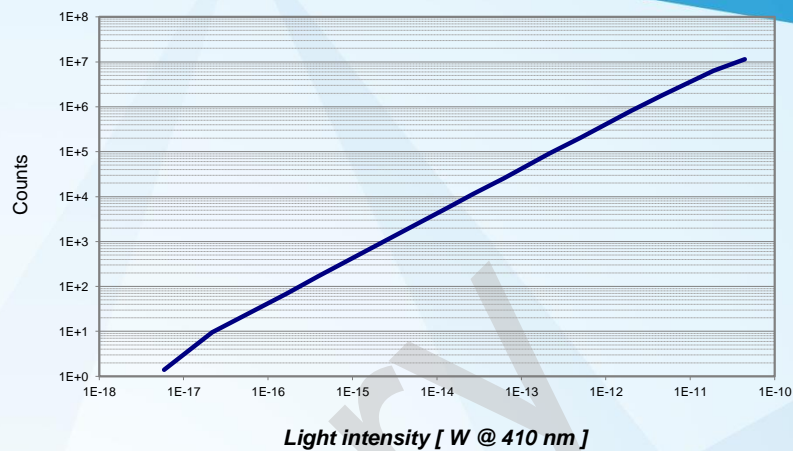
Strong variations in light levels are possible due to the high dynamic range of the installed CPM.



Typical output pulse of the CM series

The exceptional low noise and high sensitivity facilitates detection of extremely weak light levels. The modules can be equipped with various Customized Photo Multipliers in respect to spectral sensitivity and active area.

### Count Rate Linearity



### Module Specification

|                                      |  |
|--------------------------------------|--|
| Linear count rate:                   | 10 Mega Counts (20 Mcps max. count rate*)  |
| Output Signal:                       | TTL-Pulse, positive  |
| Over-illumination protection**):     | Active quenching control (Gate enabled, no output signal)<br>Reset: Via external TTL high or power supply switch off – switch on |
| Output impedance:                    | 50 Ohms  |
| Supply voltage                       | +5 V to +5.5 V DC  |
| Gating (electronic shutter function) | TTL-Pulse, active high   |
| Gate timing characteristics          | Gate On (including Delay): 340 ns (typ.)<br>Gate Off (including Delay): 180 ns (typ.)  |
| Output pulse width                   | 15 ns (typ), (optional: 130 ns, 300 ns)  |
| Input current at max. count rate     | < 250 mA   |
| <b>Maximum ratings</b>               |  |
| Input voltage                        | +5.5 V   |
| Operating temperature                | +5 to +40 °C   |
| Storage temperature                  | -20 to +50 °C  |
| Weight                               | ~ 350g / 420g / 450g<br>(CM 9XZ / CM 13XZ / CM 19XZ)   |

\* ) for long term operation: max. average output countrate of < 100 Kcps (anode current of <100 nA) is recommended

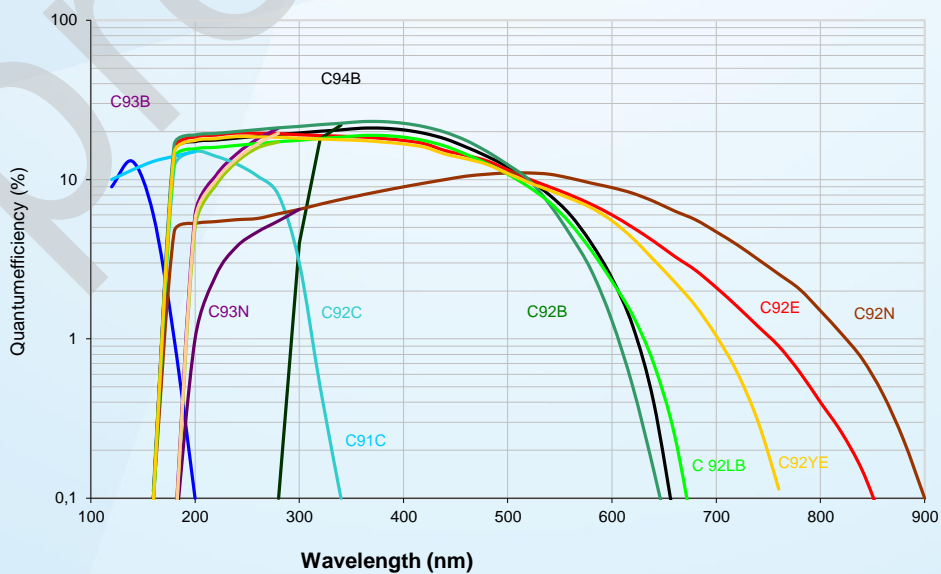
\*\* ) Module will start counting only after external reset pulse or power off/on

List of Available Variations

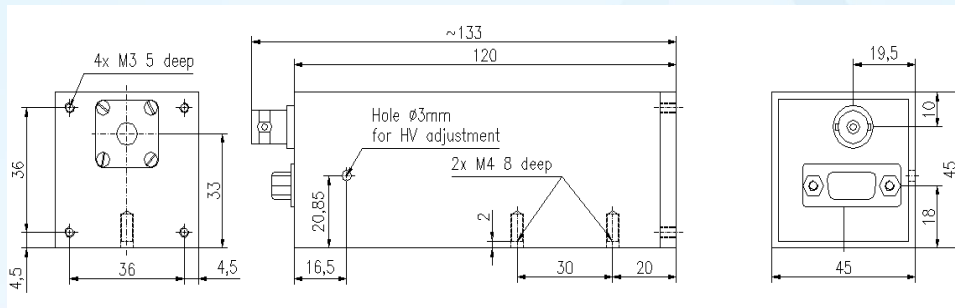
| Model<br>(also order no.)     | Detector type                     | Photocathode diameter | Photocathode material | Window material         | Spectral response / nm | Quantum efficiency                     | Typ. dark counts per second (cps) |                     |
|-------------------------------|-----------------------------------|-----------------------|-----------------------|-------------------------|------------------------|--|-----------------------------------|---------------------|
| CM 92B<br>CM132B<br>CM192B    | Customized Photo Multiplier (CPM) | min. 5mm              | Bialkali (B)          | Quartz (2)              | 165-650                | Peak value 20% typical (S25: 10% typ.) | 10<br>40<br>100                   |                     |
| CM 93B<br>CM133B<br>CM193B    |                                   |                       | Bialkali (B)          | UV Glass (3)            | 185-650                |  | 10<br>40<br>100                   |                     |
| CM 92E<br>CM132E<br>CM192E    |                                   |                       | S20 (E)               | Quartz (2)              | 165-850                |  | 100<br>400<br>1000                |                     |
| CM 93E<br>CM133E<br>CM193E    |                                   |                       | S20 (E)               | UV Glass (3)            | 185-850                |  | 100<br>400<br>1000                |                     |
| CM 92N<br>CM132N<br>CM192N    |                                   |                       | CM 13XZ               | S25 (N)                 | Quartz (2)             |  | 165-900                           | 500<br>2000<br>5000 |
| CM 93N<br>CM133N<br>CM193N    |                                   |                       | min. 9mm              | S25 (N)                 | UV Glass (3)           |  | 185-900                           | 500<br>2000<br>5000 |
| CM 92LB<br>CM132LB<br>CM192LB |                                   |                       | CM 19XZ               | Low Noise Bialkali (LB) | Quartz (2)             |  | 165-650                           | 3<br>10<br>25       |
| CM 93LB<br>CM133LB<br>CM193LB |                                   |                       | min. 15mm             | Low Noise Bialkali (LB) | UV Glass (3)           |  | 185-650                           | 3<br>10<br>25       |
| CM 92YE<br>CM132YE<br>CM192YE |                                   |                       | Yellow Enhanced (YE)  | Quartz (2)              | 165-750                |  | 10<br>40<br>100                   |                     |
| CM 93YE<br>CM133YE<br>CM193YE |                                   |                       | Yellow Enhanced (YE)  | UV Glass (3)            | 185-750                |  | 10<br>40<br>100                   |                     |

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Subject to change without notice

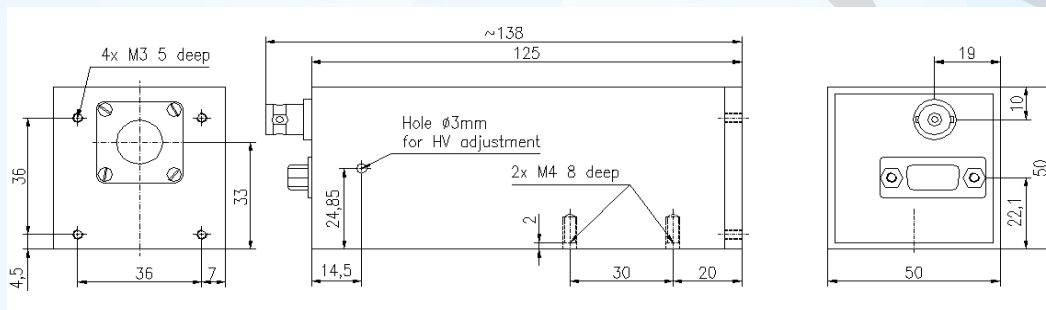
Spectral response of various CPM types



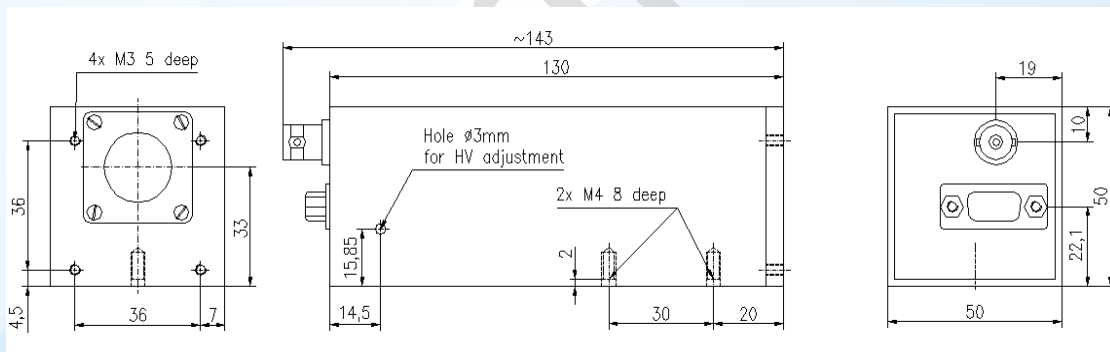
Module Dimensions (mm) for Different CPM Formats



PV- CM 9XZ



PV- CM 13XZ



PV- CM 19XZ

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| <i>Window Material X for</i> |    | <i>Photocathode Type Z for</i> |     |
|------------------------------|----|--------------------------------|-----|
| MgF <sub>2</sub>             | =1 | Cesium Iodid                   | =CI |
| UV-Glass                     | =2 | Cesium Tellurid                | =C  |
| Quartz                       | =3 | Bialkali                       | =B  |
| Borosilicat                  | =4 | LowNoise Bialkali              | =LB |
|                              |    | S20                            | =E  |
|                              |    | S25                            | =N  |
|                              |    | YellowEnhanced                 | =YE |