HELIDA TECHNOLOGY PHOTON MODULE

SINGLE PHOTON COUTING MODULE

SPCM-01 frequency output detector

Introduction

The ultra-compact single photon counting module for extremely low light detect by Beijing HELIDA Scientific is composed of ultra-compact photomultiplier tubes, high-voltage generator modules, and high-speed Op-Amp circuits. The module has the following characteristics:

1   Positive pressure design is used to eliminate cathode potential difference.

2   In order to reduce the output bias, a Cockcroft-Walton driver circuit is used.

3   A metal shielded enclosure is used to reduce magnetic interference.

4   Single 5V power supply is used.

5   PMT high voltage controllable up to 1045V.

6   Unique single-photon detection technology is used to increase the dynamic range.

7   Can detect weak light signals with an input optical power of 10^{-15}---10^{-9}W.

8   Output signals use high-frequency shielded signal cables with SMA male connections.

SPCM-01-xxx

SPCM-01-20(cooling)

Typical Application：

1   SO2, NO, NO2 Analyzer

2   High Sensitivity Particle Analyzer

3   Biofluorescence analysis

4   LiDAR

5   FLIM

6   Photoluminescence (PL)

7   Electroluminescence (EL)

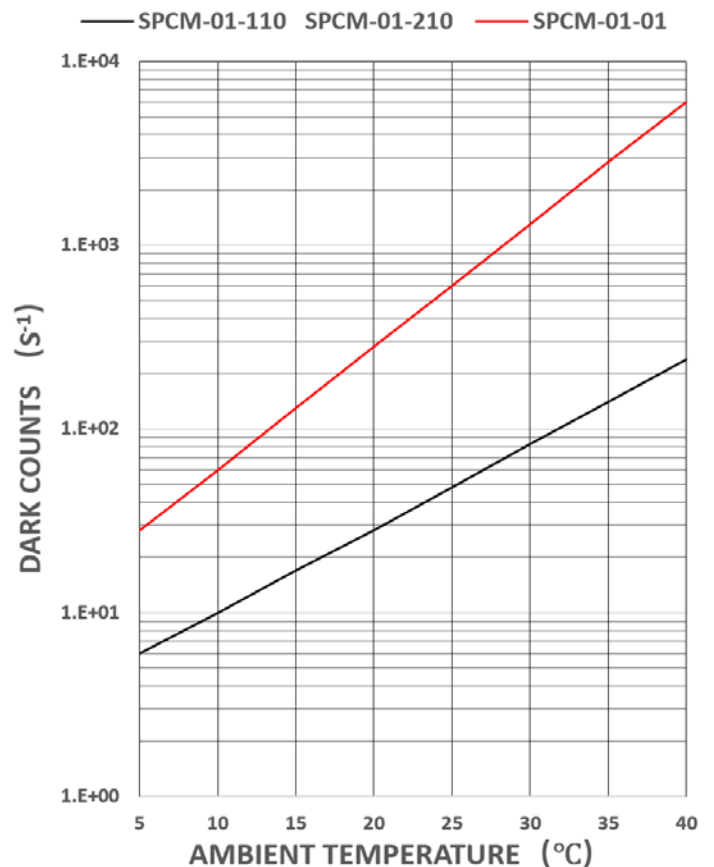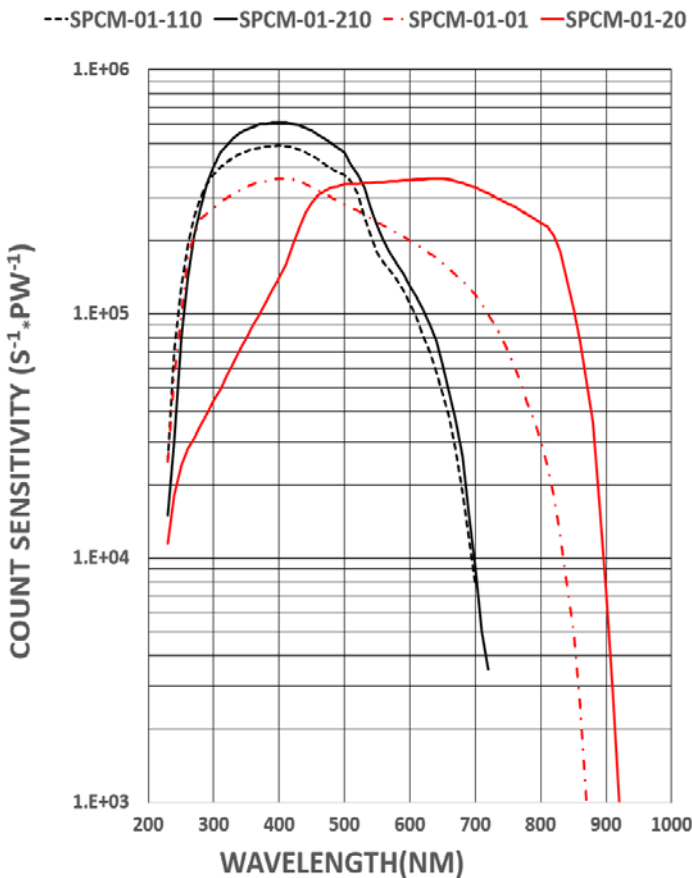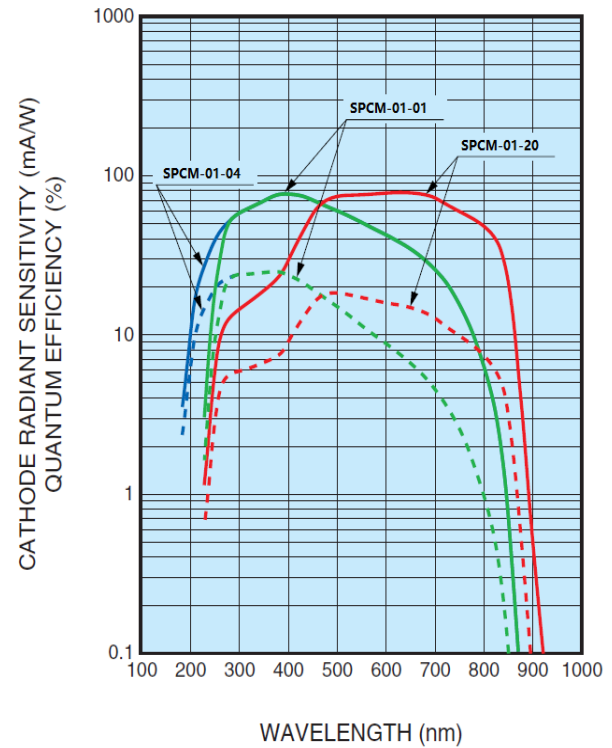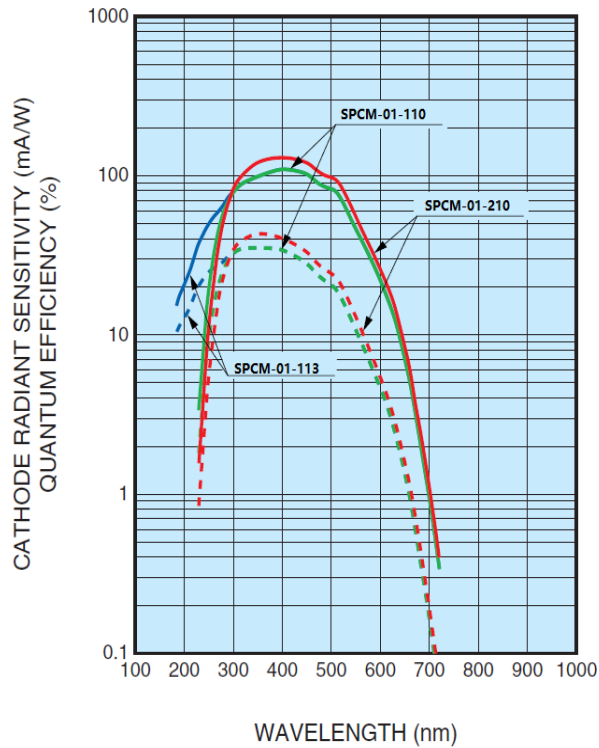HELIDA TECH

Productions

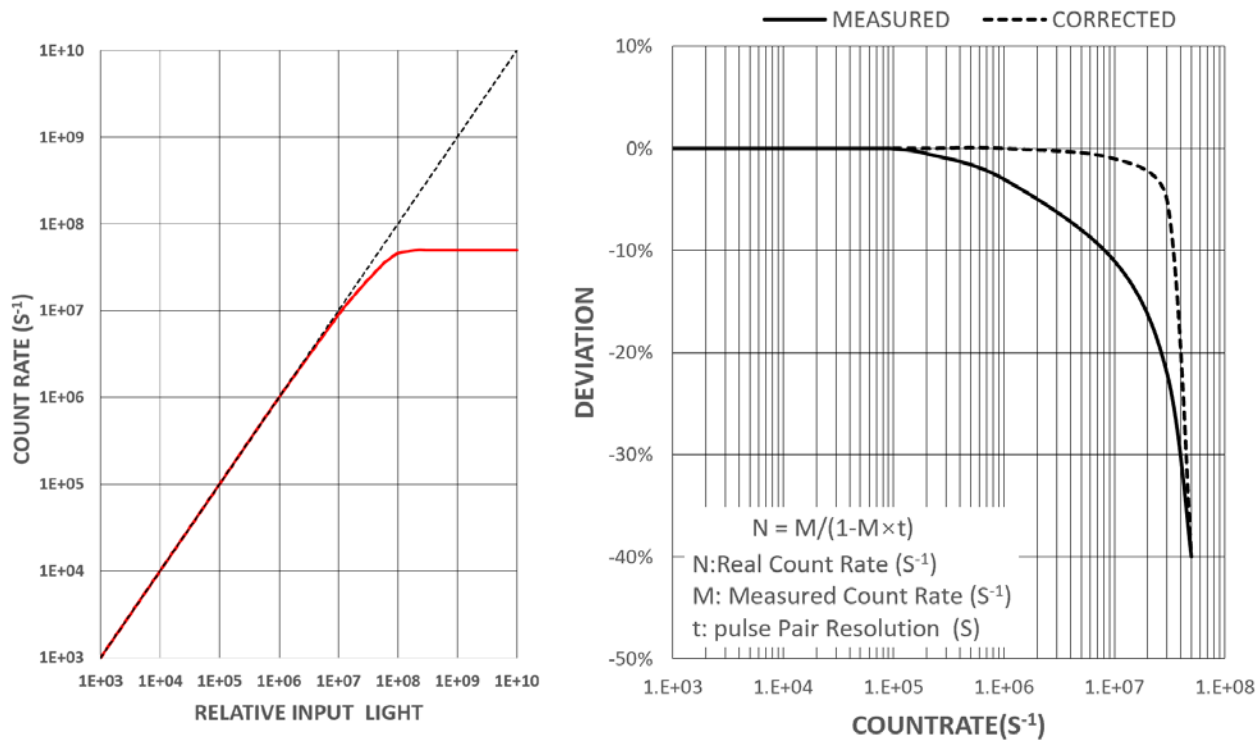| TYPE No.	Spectral Response	Features
SPCM-01-110	230 - 700nm	Super Bialkali Photocathode,high sensitivity in visible range
SPCM-01-113	185 – 700nm	Super Bialkali Photocathode,For UV to red range
SPCM-01-210	230 - 700nm	Ultra Bialkali photocathode,high sensitivity in visible range
SPCM-01-01	230 - 870nm	Multiakali Photocathode,For UV to near IR range
SPCM-01-04	185 – 870nm	Multiakali Photocathode,For UV to near IR range
SPCM-01-20	230 – 920nm	Multiakali Photocathode,For UV to near IR range

Specifications

Parameter	Min	Typ	Max		Unit
Supply voltage[1]	4.75	5	5.25		V
Supply current		0.1	0.2		A
Case operating temperature[2]			50		℃
Active area diameter		$\phi\,8$			mm
Peak Sensitivity Wavelength		400	650		nm
Count Sensitivity	SPCM-01-110	SPCM-01-210	SPCM-01-01	SPCM-01-20	
300nm	3.7×10^5	3.9×10^5	2.7×10^5	4.4×10^4	
400nm	4.9×10^5	6.1×10^5	3.6×10^5	1.4×10^5	
500nm	3.7×10^5	4.6×10^5	2.8×10^5	3.4×10^5	$S^{-1}*PW^{-1}$
600nm	1.1×10^5	1.3×10^5	2.0×10^5	3.5×10^5	
700nm	7.7×10^3	9.1×10^3	1.2×10^5	3.3×10^5	
800nm	--	--	3.0×10^4	2.4×10^5	
Dark Count[3]					
SPCM-01-110	10	50	100		Counts /
SPCM-01-113	15	55	110		second
SPCM-01-210	10	50	100		(CPS)
SPCM-01-01	100	600	1000		
SPCM-01-20(cooling)	200	300	500		
Output pulse width	4	6	10		ns
Dead time	16	20	22		ns
Recommended Load Resistance		50			Ω
Signal Output Logic		Positive logic			-
Output pulse amplitude @1K Ohm (50 Ohm)					V
TTL HIGH	4(2)	4.4(2.2)			V
TTL LOW			0.8		
Output count rate before saturation		50			Mc/s

1. Connection to incorrect voltage or reverse voltage may damage or destroy the module. The warranty is invalid should such damage occur. The green wire is analog voltage input for high voltage, the red wire is +5V and the black wire is GND.
2. No condensation.
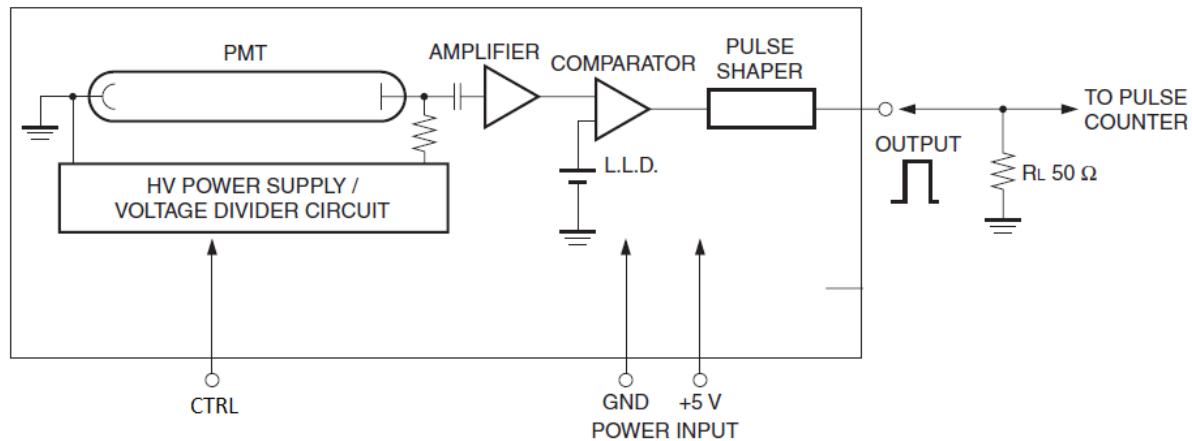3. After 30 minutes storage in darkness. SPCM-01-20 need cooling system.

Characteristics (Count Sensitivity, Dark count @1000V)

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Note: The above indicators are measured when the PMT high voltage is 1000V;

Module Block Diagram

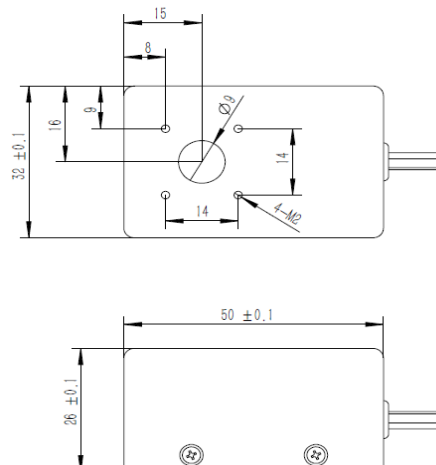# High Voltage Setting

Use the green terminal for PMT high voltage control; the PMT supply voltage satisfies the following equation:
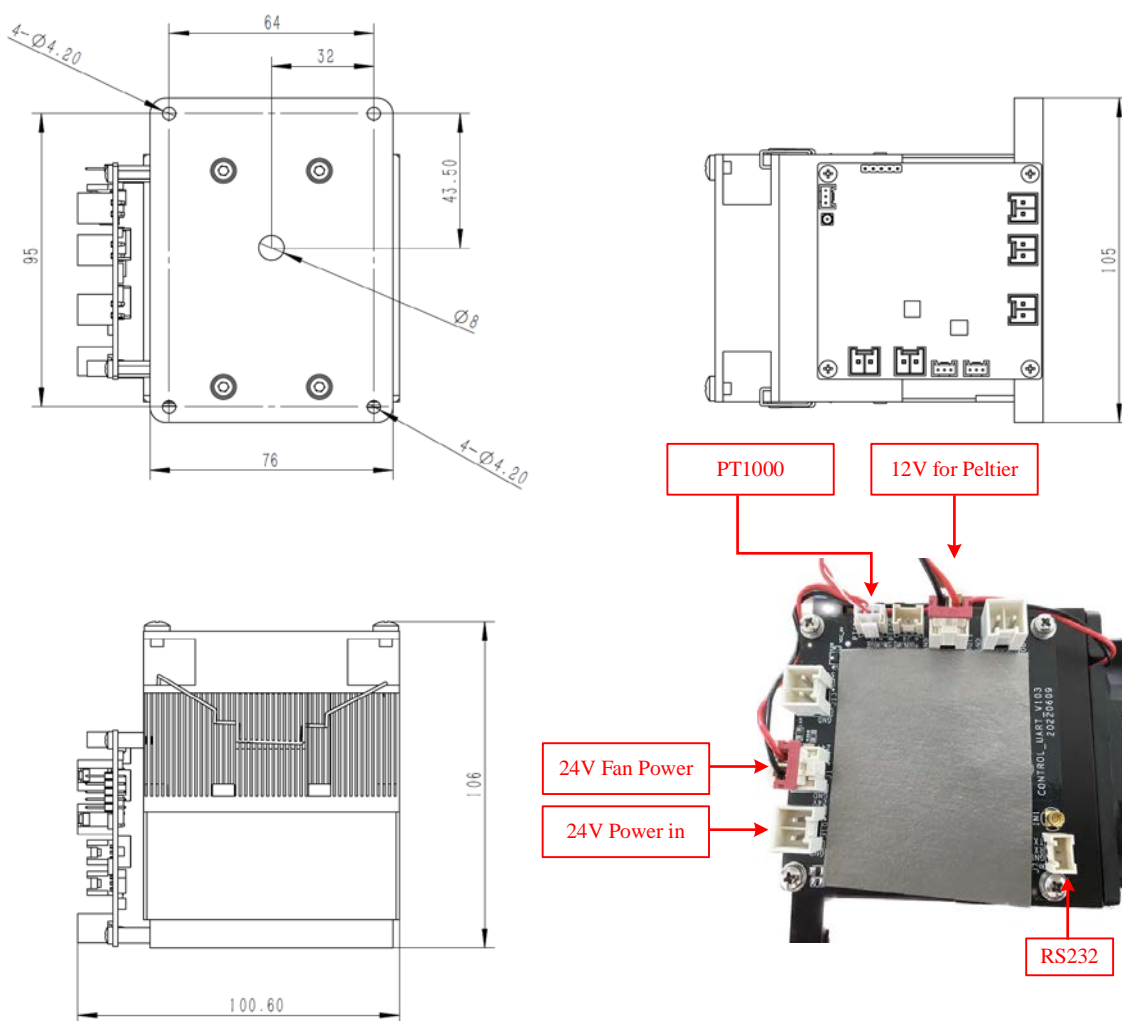
$$V_{PMT} = (3.558 - V_{CTRL}) \times 293.1 + 1.255.$$

Note: If running at maximum voltage (1045V), you can connect the green wire to GND; if the green wire is dangling, the internal voltage will be 733V; when $V_{CTRL} = 2V$, the internal high voltage will be about 460V.

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Dimensional Outline (unit : mm)

SPCM-01-xxx Dimension Drawing

PT1000

12V for Peltier

24V Fan Power

24V Power in

RS232

SPCM-01-20 (cooling) Dimension Drawing

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