

# Head-on PMT

## Photon Counting Head H9319 Series



The H9319 series photon counting heads are designed to perform photon counting by just connecting to a PC. The H9319 series includes a 25-mm (1") diameter head-on photomultiplier tube, a photon counting circuit, a high-voltage power supply circuit, counter and a microprocessor. Data transfer, measurement time and other necessary adjustments can be controlled by commands from the PC through the RS-232C interface.

Since the H9319 series performs linearity correction by the internal microprocessor, it provides excellent count linearity within a range of  $\pm 1\%$  at  $20 \times 10^6 \text{ s}^{-1}$ .

### Product Variations

Type No.	Spectral Response	Sample Program	Prescaler
H9319-01	300 nm to 650 nm	yes	1/4
H9319-11		no	1/4
H9319-02	300 nm to 850 nm	yes	1/4
H9319-12		no	1/4

This product can't be used at vacuum environment or reduced pressure environment.

### Specifications

(at +25 °C)

Parameter		H9319-01	H9319-11	H9319-02	H9319-12	Unit
Input Voltage		+4.75 to +5.25				V
Max. Input Voltage		+6				V
Max. Input Current		60				mA
Effective Area		$\phi 22$				mm
Peak Sensitivity Wavelength		420				nm
Count Sensitivity	Typ.	300 nm	$2.3 \times 10^5$		$2.1 \times 10^5$	$\text{s}^{-1} \cdot \text{pW}^{-1}$
		400 nm	$4.1 \times 10^5$		$2.5 \times 10^5$	
		500 nm	$3.4 \times 10^5$		$2.0 \times 10^5$	
		600 nm	$5.7 \times 10^4$		$1.3 \times 10^5$	
		700 nm	—		$7.8 \times 10^4$	
Count Linearity *1		$20 \times 10^6$				$\text{s}^{-1}$
Dark Count *2	Typ.	150		10 000		$\text{s}^{-1}$
	Max.	300		15 000		
PMT Operating Voltage Range		+300 to +1200				V
Integration Time		10 to 1000				ms
Settling Time		1 *3				s
		5 *4				s
Input Signal (External Trigger Input) *5		TTL level signal				—
Output Signal (User Line Output) *6		TTL level signal				—
Interface		RS-232C, 9600 baud, Parity none, 8 data bit, 1 stop bit				—
Operating Ambient Temperature *7		+5 to +50				°C
Storage Temperature *7		-20 to +50				°C
Weight *8		280				g

\*1: Random pulse, within  $\pm 1\%$  count loss (by count linearity compensation)

\*2: After 30 minutes storage in darkness

\*3: The time required for the output to reach a stable level following a change in the control voltage from 500 V to 1000 V in darkness

\*4: The time required for the output to reach a stable level following a change in the control voltage from 1000 V to 500 V in darkness

\*5: Selectable ECR mode or LCR mode (refer to command list)

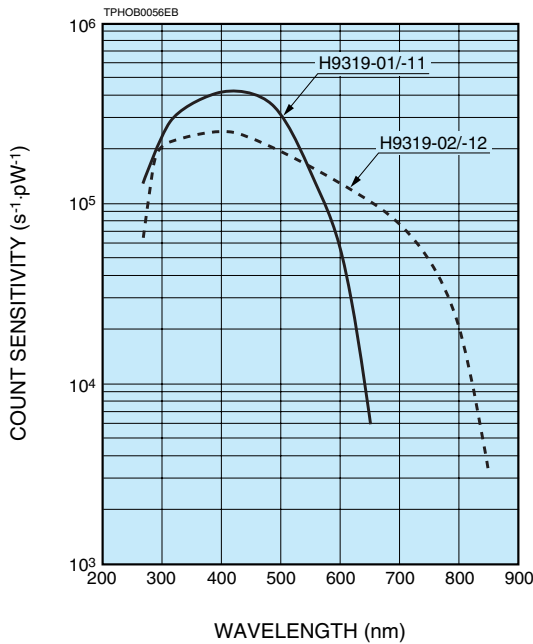
\*6: Controllable by RS-232C command

\*7: No condensation

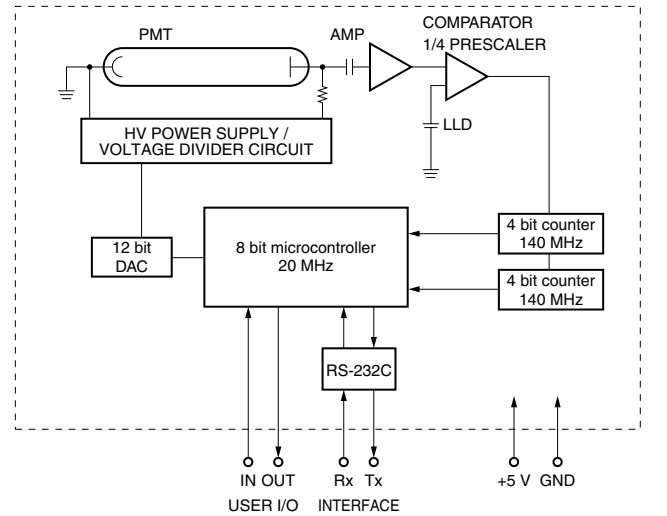
\*8: Main body: Approx. 180 g

# Photon Counting Head with CPU+Interface

## Characteristic (Count sensitivity)



## Block Diagram



## Command List

Action	Command *9	Explanation	Argument	Response *10
Set the Integration Time	P#C <sub>R</sub>	Set the number of 10 msec intervals to sum. Same as integration time for 1 reading.	1 to 100	VA, BC, BA
Set the Sequence of Readings	R#C <sub>R</sub>	Set sequence of readings, where each reading uses the integration time set with the P command.	1 to 255	VA, BC, BA
Set the PMT Input Voltage	V##C <sub>R</sub>	Change the high voltage applied to the tube.	300 to 1200	VA, BC, BA
	D C <sub>R</sub>	Re-set the default high voltage to the tube	—	VA, BC
Set the Output of the User Line	O#C <sub>R</sub>	Set the output of the user digital output line. 0: Low level output 1: High level output	0 or 1	VA, BC, BA
	S C <sub>R</sub>	Start the reading sequence	—	4 byte/reading
Start the Reading Sequence	C C <sub>R</sub>	Start a continuous reading process. Will continue indefinitely until a STOP character (C <sub>R</sub> ) is sent.	—	4 byte/reading
	E C <sub>R</sub>	Start a reading sequence for each positive-edge TTL transition applied to the purple stripe user line.	—	4 byte/reading
	L C <sub>R</sub>	Start a reading sequence for each positive-level TTL transition applied to the purple stripe user line.	—	4 byte/reading

\*9: The Response acknowledgment is returned having two bytes.

\*10: VA: valid command, BC: bad command, BA: bad argument

## Dimensional Outlines (Unit: mm)

