

SPCM-AQRH Series Single Channel Photon Counting Modules



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Introduction

Excelitas Technologies' SPCM-AQRH Single Photon Counting Module detects single photons over the wavelength range of 400nm to 1060nm with performance parameters superior to other solid state or vacuum-tube based single photon counters.

The SPCM-AQRH uses a unique silicon avalanche photodiode with a circular active area, achieving peak photon detection efficiency greater than 70% at 650nm over a 180 μ m diameter with unmatched uniformity over the full active area. A TTL-level pulse is generated for each photon detected and the signal is available at the BNC connector at the rear of the module.

The photodiode is both thermoelectrically cooled and temperature controlled, ensuring stabilized performance despite ambient temperature changes. The module (case temperature) will function between 5°C and 40°C.

The module can be ordered with various optional configurations including free space window, FC fiber adaptor, C-mount adaptor or tube cage mount bracket/adaptor options.

The minimum dead time is less than 25ns, thereby increasing linearity and improving the dynamic range of the module. Timing resolution of better than 225ps can be achieved with some models. All SPCM-AQRH models have internal protection circuitry that protects the avalanche photodiode and the module electronics from damage due to accidental overload from exposure to ambient lighting.

Excelitas' series of photon counting modules are designed and built to be fully compliant with the European Union's RoHS Directive 2015/863/EU.

Warnings and Cautions

It is essential that the user of this manual is aware of the potential hazards associated with the unit and its accessories. All operators should be familiar with the safety precautions and warnings given in this manual prior to attempting to operate the unit. If the unit fails to function properly, contact the factory for more information.



The SPCM-AQRH contains a **high voltage power supply**. Users may be injured if the case is opened. All internal settings are pre-set; there are no user adjustments. The SPCM modules are to be serviced by Excelitas only. There are no user serviceable parts in the SPCM module.



Units that appear defective or have suffered mechanical damage should not be used because of possible electrical shorting of the high voltage power supply. Opening the case may damage sensitive components and expose the user to the risk of electrical shock. If the unit is used in a manner not specified by Excelitas, the protection provided by the equipment may be impaired. Please contact factory for repairs.

Models and General Specifications

This guide applies to the following SPCM-AQRH models of single channel photon counting modules.

The basic SPCM part number has the general form SPCM-AAAA-WX-TR-OPT for standard catalogue items (refer to the online data sheets for specific details).

Where (see ordering guide and module data sheets)

AAAA = AQRH for standard modules or 780, 800, 850, 900 for wavelength selection.

W = 1, 2, 3, 4, 5 or 6 (Output options – pulse width, pulse height, dead time).

X = 0, 1, 2, 3, 4, 5 or 6 (Dark count)

TR = Timing resolution option.

OPT = FC, BR1, BR2 (Optional optical mount if installed)

The following general specification apply to all models covered by this document. For complete performance specifications, refer to the data sheet for the particular model purchased.

Table 1 - Specifications of SPCM-AQRH modules @ 22°C, all models, unless otherwise indicated.

Parameter	Min	Typ	Max	Unit
Supply voltage ⁽¹⁾	4.75	5.0	5.25	V
Supply current		0.4	1.2	A
Power cable total resistance		0.1	0.2	Ω
Case operating temperature ⁽³⁾	5		40	°C
Active area (diameter) at minimum PDE	170	180		μm
Photon detection efficiency (PDE) (without FC adaptor) ^(11,12) at:				
400nm	2	5		%
650nm	50	65		%
830nm	35	45		%
1060nm	1	2		%
Refer to SPCM-NIR family datasheet for red – NIR wavelengths.				
Dark Count ^(4, 5, 6)				
SPCM-AQRH-W0			1500	Counts / second
SPCM-AQRH-W1			1000	
SPCM-AQRH-W2			500	
SPCM-AQRH-W3			250	
SPCM-AQRH-W4			100	
SPCM-AQRH-W5			50	
SPCM-AQRH-W6			25	
See Ordering Guide.				

SPCM-AQRH Series

Single Photon Counting Module

Parameter	Min	Typ	Max	Unit
Output pulse width ⁽⁹⁾ SPCM-AQRH-1X, SPCM-AQRH-4X SPCM-AQRH-2X, SPCM-AQRH-5X SPCM-AQRH-3X, SPCM-AQRH-6X See Ordering Guide.		10 18 28		ns ns ns
Dead time ⁽⁸⁾ (count rate below 5M/c) SPCM-AQRH-1X, SPCM-AQRH-4X SPCM-AQRH-2X, SPCM-AQRH-5X SPCM-AQRH-3X, SPCM-AQRH-6X See Ordering Guide.		22 28 42		ns ns ns
Output pulse amplitude ⁽¹⁰⁾ : SPCM-AQRH-1X, SPCM-AQRH-2X, SPCM-AQRH-3X TTL HIGH TTL LOW See Ordering Guide.	1.5 -0.1	2.2	0.8	V V
SPCM-AQRH-4X, SPCM-AQRH-5X, SPCM-AQRH-6X TTL HIGH TTL LOW	3.0 -0.1	4.4	0.8	V V
Average dark count variation at constant case temperature (6 hrs. at 25 °C) ^(4, 5, 6) SPCM-AQRH-W0, W1, W2, W3 SPCM-AQRH-W4, W5, W6			± 10 ± 1	% σ
Variation of average dark count rate at 5°C to 40°C case temperature for ^(4, 5, 6) SPCM-AQRH-W0, W1, W2, W3 SPCM-AQRH-W4, W5, W6			± 20 ± 2	% σ
Single photon timing resolution (at 825nm) ⁽¹³⁾ Please refer to SPCM-AQRH-TR family for optimized timing modules.		350		ps
Output count rate before saturation ^(7, 8)	12	37		Mc/s
Afterpulsing probability ⁽¹⁴⁾		0.5	1	%
Setting time following power up (1% stability) at 1 Mc/s and 25°C		15	20	s
Linearity correction factor ⁽⁷⁾ at 200 Kc/s 1 Mc/s 5 Mc/s 10 Mc/s 20 Mc/s 25 Mc/s		1 1.02 1.16 1.40 2.35 3.32		
Threshold setting required on counter for digital output pulse (terminated into 50Ω load)		1.0		V
Gating turn on/off (50Ω output) Disable = TTL low (<0.8V) Enable = TTL high (>2.0V)		40 60	45 65	ns ns
Gating threshold voltage (at V supply = 5V) Low level (sink current >90mA)	0		0.4	V

Single Photon Counting Module

Parameter	Min	Typ	Max	Unit
High level (sink current >30mA)	2.0		5.25	V

Table 2 - Absolute Maximum Ratings

Supply voltage ⁽¹⁾	5.5 V
Maximum count rate	Maximum count rate can be sustained if case temperature is maintained within specified limits.
Peak light intensity	maximum 10 ⁴ photons / pulse, pulse width < 1ns
Case temperature ⁽³⁾	-20°C/+85°C storage, +5°C /+40°C operating.

Refer to Operating Instructions below for noted items

Operating Instructions

1. Connection to incorrect voltage or reverse voltage may damage or destroy the module. The warranty is invalid should such damage occur. The center contact of the barrel type power connector (corresponding to the white stripe on the wire) is +5V.
2. These modules are not qualified for shock or vibration other than normal instrumentation environments.
3. The module dissipates a mean power of 2.0W and a maximum power of 6W at high count rate and 40°C. Adequate heat sinking must be provided by clamping the module to a suitable heat sink via the holes in the module base. To meet specified performance, the module case temperature should not exceed 40°C. See *Figure 9* for stability of probability of detection vs. temperature.
4. On a small percentage of delivered modules, bi-stability of the dark count has been observed. Research indicates this bi-stability is probably due to transitions at a single impurity site between a low energy and a high energy state.

The phenomenon is seen as an abrupt change in the dark count rate, e.g., 350 to 390 c/s., and the dark count switches between the two states at a rate dependent upon the detector temperature. Multilevel switching has also been observed, where more than one impurity site is switching.

5. Long-term bi-stability is related to fundamental semiconductor physics and is beyond Excelitas' control. Warranty claims will not be considered against bi-stability alone.

Warranty claims will only be considered if the high level of the dark count exceeds the maximum level in the specification.

6. In the dark, the module generates random counts that follow a Poisson distribution. In a Poissonian process, the standard deviation is equal to the square root of the average count. In this specification the "dark count variation" refers to the stability of the average count of the module.

7. The actual photon rate could be calculated using the following equation, as indicated in Figure #1 in the box below. This parameter applies to the modules with dark counts of 100cps or higher.

Figure 1 Actual photon rate

$$\text{ACTUAL COUNT RATE}_{\text{Photons}} = \frac{(\text{OUTPUT Module Count Rate} \times \text{CORRECTION FACTOR @ the Module Count Rate}) - \text{DARK COUNT Module}}{\text{PHOTON DETECTION EFFICIENCY Module}}$$

The theoretical value, at low count rate, of the Correction Factor follows this equation:

$$\text{Correction Factor} = \frac{1}{1 - (t_d \times C_R)} \quad \text{Where: } t_d = \text{Module Dead Time}$$

$$C_R = \text{Output Count Rate}$$

The deviation from an ideal linear system is another way of looking at the saturation effect. The following equations show how to calculate this departure from the linearity:

$$\text{LINEARITY} = \left[\frac{\text{OUTPUT Module Count Rate}}{(\text{PHOTONS Actual Count Rate} \times \text{PHOTON DETECTION EFFICIENCY Module}) + \text{DARK COUNT Module}} \right]^{-1}$$

$$= \left[\frac{1}{\text{Correction Factor}} \right]^{-1}$$

8. For the typical dead time setting of 24ns, typical maximum count rate is 35Mc/s before saturation. If the output pulse width option is set to 28ns, the typical maximum count rate is 30Mc/s before saturation. If the maximum dead time setting is used, about 62ns, typical maximum count rate would be about 12Mc/s. Note that using a longer dead time will degrade linearity.
9. Output pulse width is set at the standard of 11ns ± 3ns at 2.2V. Other output pulse widths can be set. Please refer to Ordering Guide for which model number to order.
10. Output pulse height standard is set to 2.2V ± 0.4V. Optional output pulse height is 4.4V. Please refer to Ordering Guide for which model number to order.
11. If needed, an FC fibre adaptor can be factory installed on the SPCM-AQRH module allowing optical fibres to be used. The FC adaptor is optimized for use at 550 nm and with a 100µm core multimode fibre. If other wavelengths or fibre sizes are needed, please contact the factory for availability. The addition of an FC adaptor will cause a small drop in the effective PDE of the module. The amount of the loss will depend on the wavelength and the diameter of the fibre used to provide optical input to the module. Typically, one can expect around a 5% loss with a 100µm core fibre at 550nm.
12. Red-NIR wavelength photon detection efficiency can be optimized. PDE is enhanced over the 700-900nm wavelength range. Please refer to the Product Brief of the SPCM-NIR series. See Figure 3 for the typical photon efficiency of standard PDE modules.
13. Timing resolution is measured using a 10µm diameter light spot, at 825nm, and with case temperature at 22°C. For timing resolution requirements of larger spot size measurement, or at different wavelengths, please contact Excelitas. For timing resolution optimized modules, please refer to the Product Brief of the SPCM-AQRH-TR series.
14. Afterpulse is measured for the first 500ns (excluding the first 75ns) on the timeline of the afterpulse curve, at an average light count rate of 100kc/s ± 20kc/s.
15. Gate operation. The module is gated "OFF" by grounding the gate input. The user's gate driver circuit must be capable of sinking 100mA to ground to gate the module "OFF". When the module is gated "OFF", the APD is no longer in active quench mode. But if a photon arrives just before the module is gated back on, an output pulse will be generated at one deadtime (~24ns) after the module is enabled. However, the temporal information will be lost and the pulse cannot be time tagged. It is recommended that the user discard any pulses occurring within one deadtime (~24ns) of the module being enabled from a gating event.

Additional Notes

Saturation

At saturation, the module count rate will no longer increase and instead a sustained oscillation will occur. Due to diode heating at high count rates, the count rate may decrease a little. While the module is protected against light overload, precautions should be taken to avoid any excessive light level that will damage the SPCM module. After an over exposure, the dark count of the module could increase temporarily for up to an hour. For faster recovery, it is recommended to power off the module and leave it in the dark for one to two minutes prior to restarting.

Fibre Connection Option

The SPCM-AQRH-WX-FC has an “FC” fibre-optic receptacle pre-aligned to the optical detector. Optical fibres with an FC connector on one end are available separately, (see Ordering Guide 2). The standard fibre lens is optimized for 550nm. Though the fibre / GRIN in the standard module will function through the complete range of 400nm to 1060nm, due to the wavelength-dependence of the graded index coupling lens, improvements to operating wavelengths other than 550 nm are special orders. The photon detection efficiency of connectorized modules is about 95% of that quoted for standard modules at 550nm due to losses in the lens etc.

Fibre Shielding

When used with optical fibres, both the fibre jacket and the connector shrouds must be completely opaque. Otherwise, stray light will increase the count rate. The SPCM-QCX pigtails conform to this requirement (see Ordering Guide).

Gating Function

A gating function is provided with each module – useful for viewing a signal that occurs only in a small timeframe window. Also, in some applications the background light flux is higher than the signal. In this case, the gating option could be used to improve the S/N ratio by opening a window only when the light signal is present. The output of the module and the active quench function are disabled when a TTL low level is applied to the module gate input. When a TTL high level is applied to the module gate input, the output of the module and the active quench circuit are enabled again. Any photon detection that occurs less than 2 μ s before the module gate input changes can result in an output pulse. However, this output pulse has lost timing accuracy.

Light Emission during Photon Detection

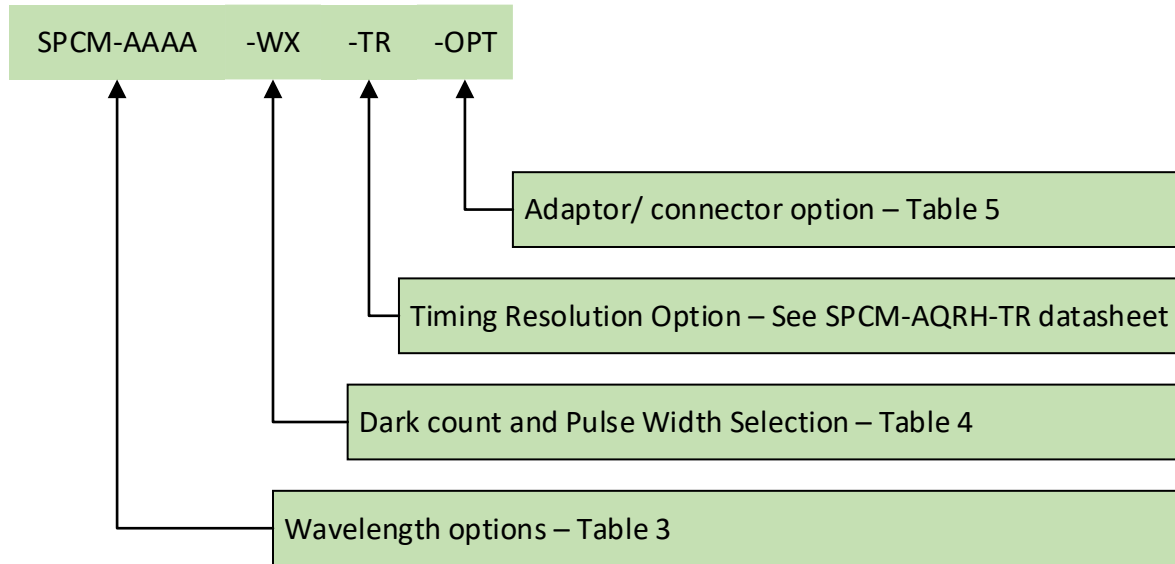
One peculiarity of silicon avalanche photodiodes operating in Geiger mode is that as an incoming photon is detected a small amount of light is emitted from the avalanche region. The emitted light has a broad spectral distribution. In most cases, this is not a problem. However, it can cause some confusion if another detector is monitoring light, or if the optical system is such that light emitted from the SPCM-AQRH is reflected back on itself. If these photons return more than 20 ns after the initial event, they will be detected.

Power Supply

The SPCM is relatively insensitive to power supply noise. It can handle +/- 50mV of ripple without much difficulty. A low impedance path for the ground line to the module is desirable. Generally, any reasonable quality power supplies are acceptable. The power supply must be able to support between 4.75V – 5.25V, and up to 1.2A current. Whether it's a linear or switching type of supply is not critical as long as the ripple and noise is kept below 50mV.

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SPCM Part Ordering Guide



Example: SPCM-AQRH-43 = 10ns output pulse width, 22ns dead time, 4.4V output pulse height, dark count < 250cps.

Table 3 - Wavelength options:

SPCM-AAAA	Wavelength	Min PDE
SPCM-AQRH (no FC)	650nm	50%
SPCM-AQRH (w/FC)	650nm	46%
SPCM-780	780nm	64%
SPCM-800	800nm	62%
SPCM-850	850nm	54%
SPCM-900	900nm	41%

Table 4 – Dark count and pulse width options:

Order Part #	W - Output Pulse Options			X - Maximum Dark Count Rates (cps)						
SPCM-AQRH-WX	Output Pulse Width (ns)	Dead Time (ns)	Output Pulse Height (V)	-W0	-W1	-W2	-W3	-W4	-W5	-W6
-1X	10	24	2.2	1500	1000	500	250	100	50	25
-2X	18	28	2.2	1500	1000	500	250	100	50	25
-3X	28	42	2.2	1500	1000	500	250	100	50	25
-4X	10	24	4.4	1500	1000	500	250	100	50	25
-5X	18	28	4.4	1500	1000	500	250	100	50	25
-6X	28	42	4.4	1500	1000	500	250	100	50	25

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Table 5 – Optical bracket/adaptor options:

Order Part #	YY - adaptor/bracket options
WX-OPT	-FC, -BR1 or -BR2 ⁽¹⁾
SPCM-AAAA-WX	free space window, no adaptor/bracket
SPCM-AAAA-WX-FC	with FC/PC adaptor for fiber pigtails
SPCM-AAAA-WX-BR1	with bracket for 1" tube mount (1.035" x 40 TPI) and 30mm cage mount system
SPCM-AAAA-WX-BR2	with bracket for C-mount system (1.0" x 32 TPI) and 30mm cage mount system

(1) See figure 10 and figure 11

Table 6 - Fibre Ordering Guide

Part Number	Fibre Type	Connector Type	Diameter			Numerical Aperture
			Core	Cladding	Outer	
SPCM-QC4	Multimode	FC/bare	62.5um	125um	2.5mm	0.27
SPCM-QC6	Multimode	FC/bare	100um	140um	2.5mm	0.29
SPCM-QC8	Multimode	as SPCM-QC6 but 905 SMA on free end	100um	140um	2.5mm	0.29
SPCM-QC9	Multimode	as SPCM-QC6 but FC connector on free end	100um	140um	2.5mm	0.29

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Figure 2 Electrical Connections

OUTPUT CONNECTOR

The digital OUTPUT pulse (BNC connector, TTL levels, >1.5V) must be terminated into a 50Ω load to avoid distortion and ringing. A 1.0V triggering level is recommended on counters and oscilloscopes to avoid triggering on noise. Note that TTL stands for Transistor-Transistor Logic.

GATE CONNECTOR

The GATE input (BNC connector) impedance is 50Ω and is internally connected to the +5 volt supply through a 50Ω pull-up resistor (standard module versions). It can be driven by standard TTL level signals. The gate drive must be capable of sinking 100 mA to gate the module “off” (5V/50Ω). Operation: TTL high – module counts, TTL low – counting disabled.

POWER CONNECTOR

The +5V power connector is a standard barrel connector (2.5mm I.D., 5.5mm O.D.) with an 18 AWG cable. The center stripe corresponds to the center of the barrel and connects to the positive terminal of the 5V supply. Reversal of the wires may damage the module.

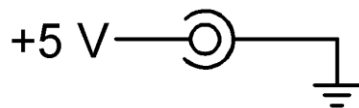


Figure 3 Typical SPCM-AQRH PDE Scan at 650 nm

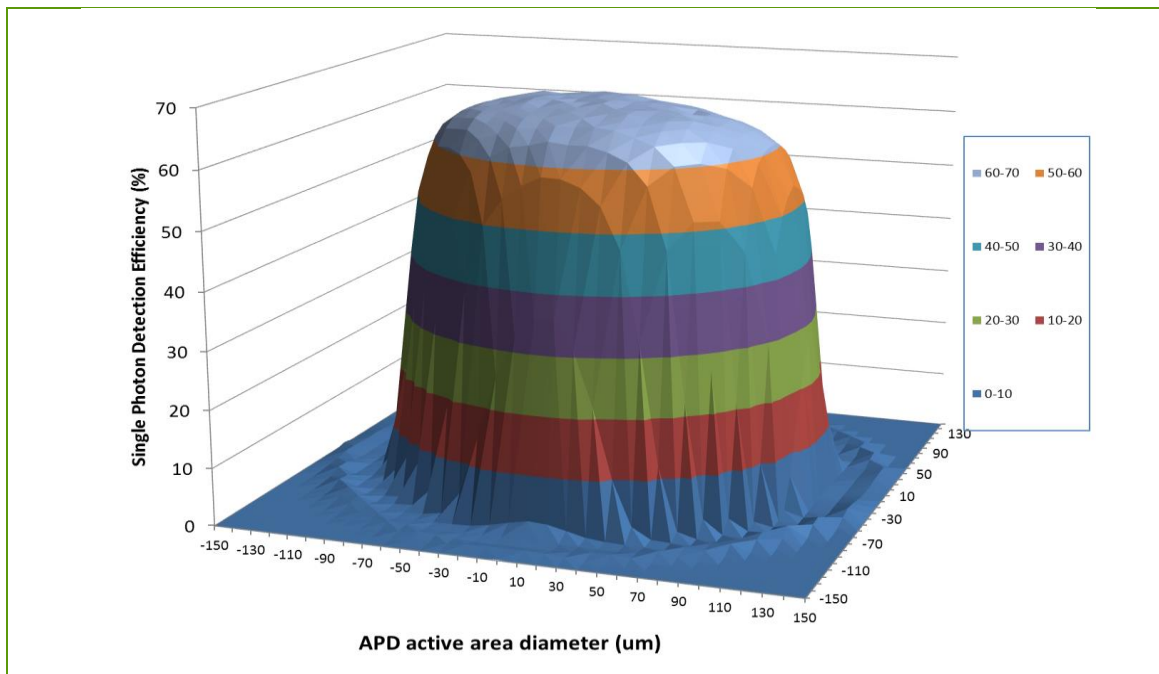


Figure 4 Typical SPCM-AQRH Detection Efficiency

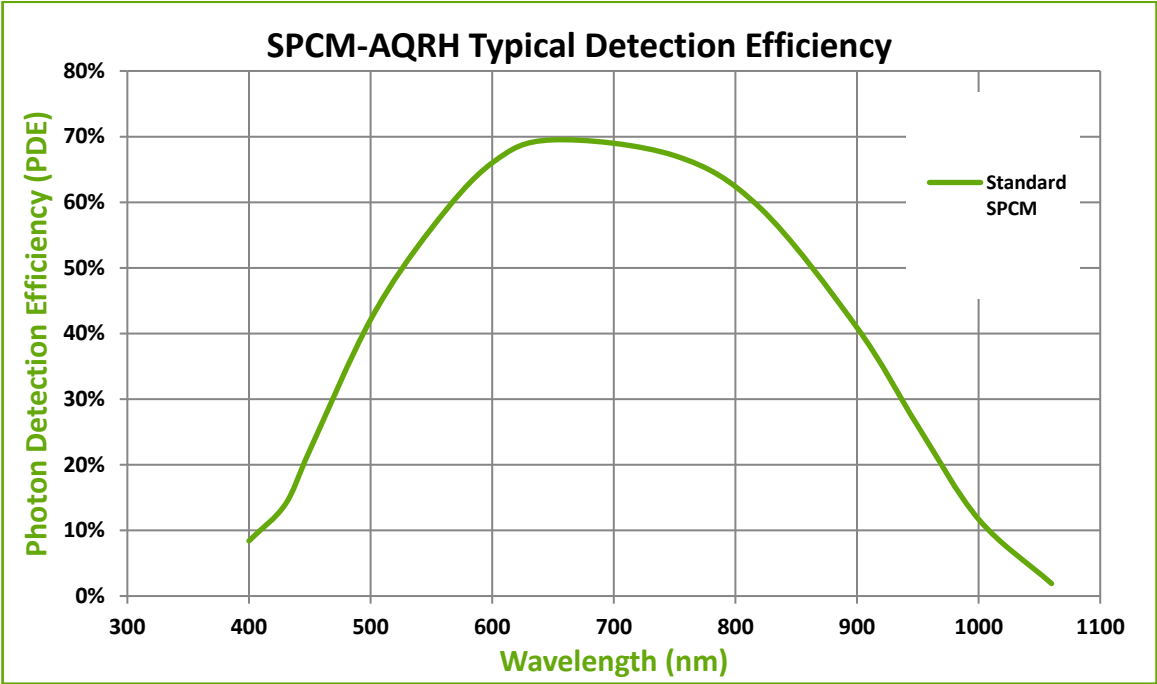


Figure 5 Photon detection probability (PD) uniformity vs. Light spot size

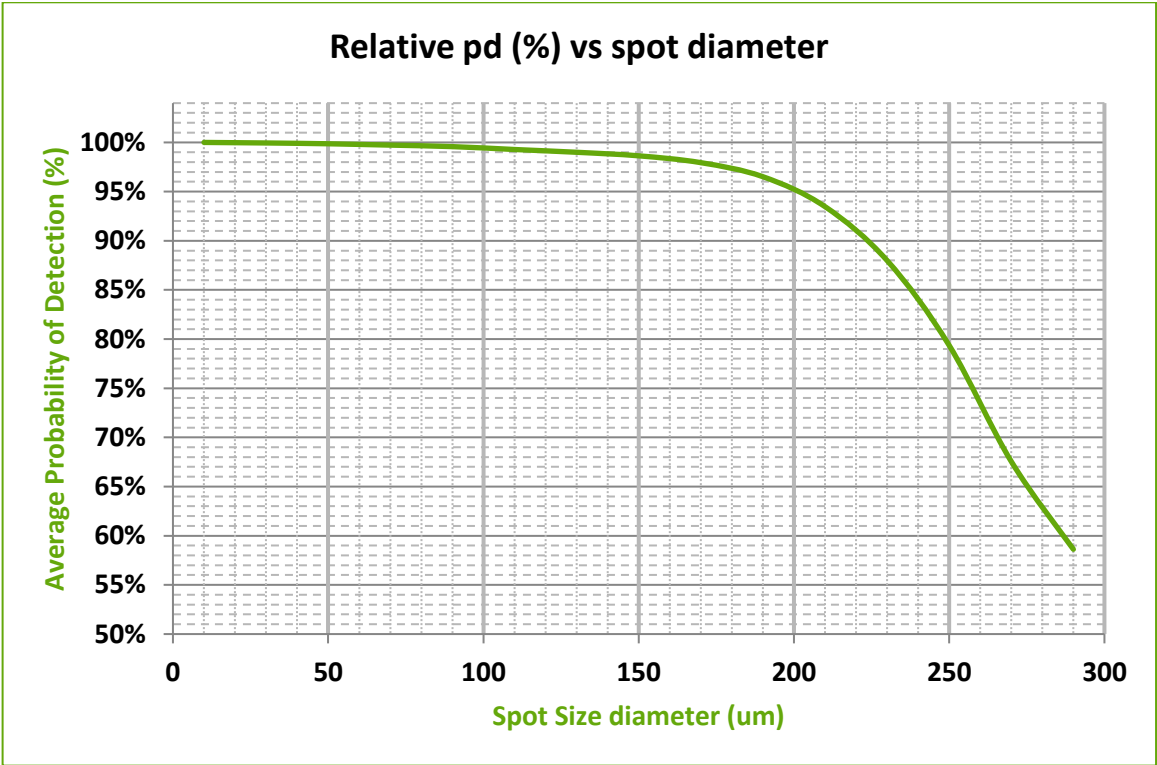


Figure 6 Typical Dead Time Correction Factor

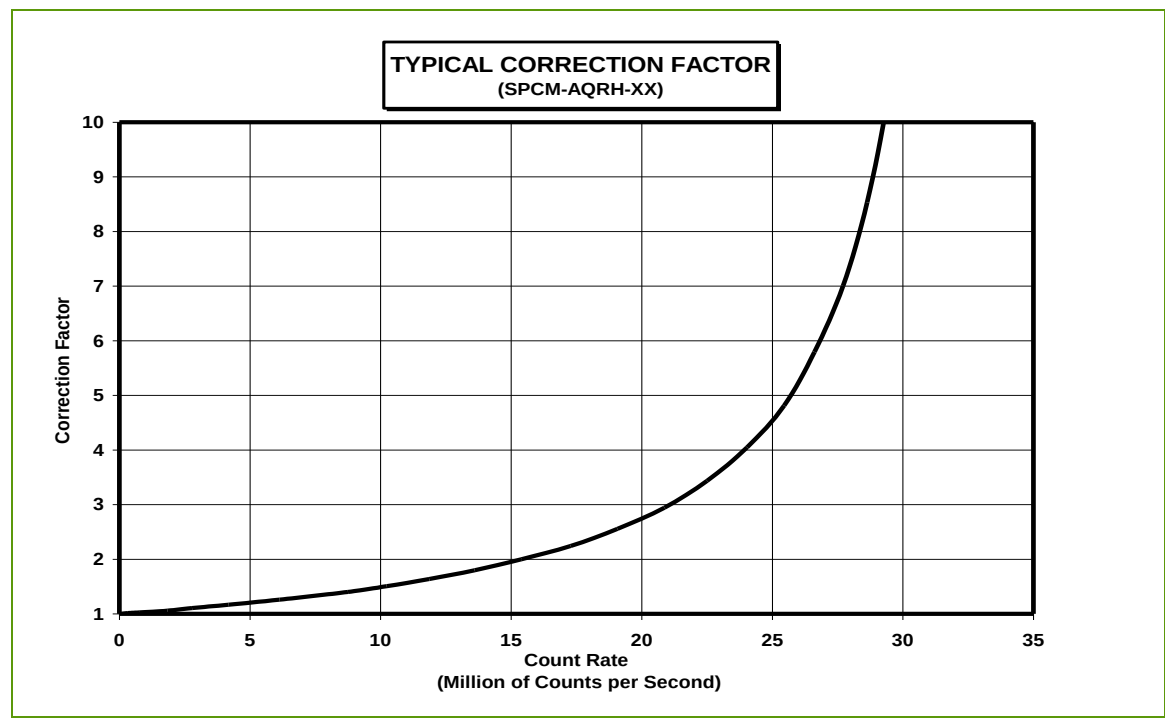


Figure 7 Count Rate Linearity

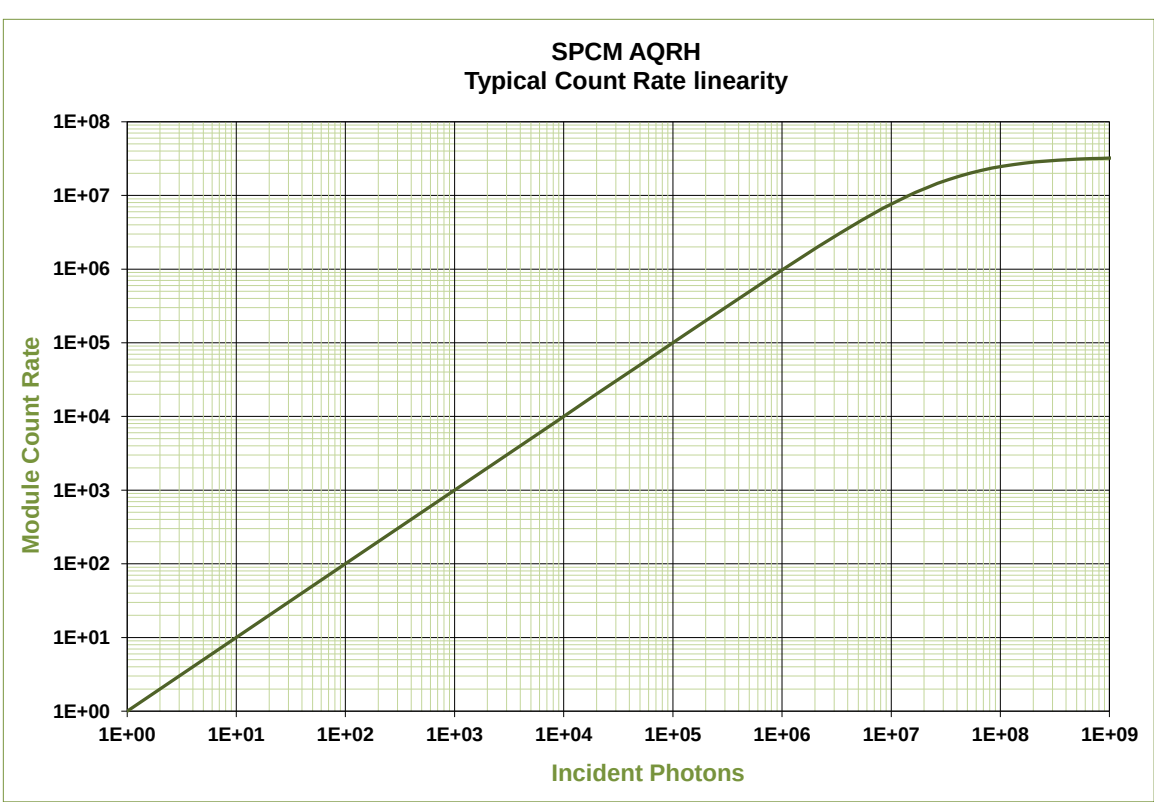


Figure 8 Optical Power vs. Number of Photons

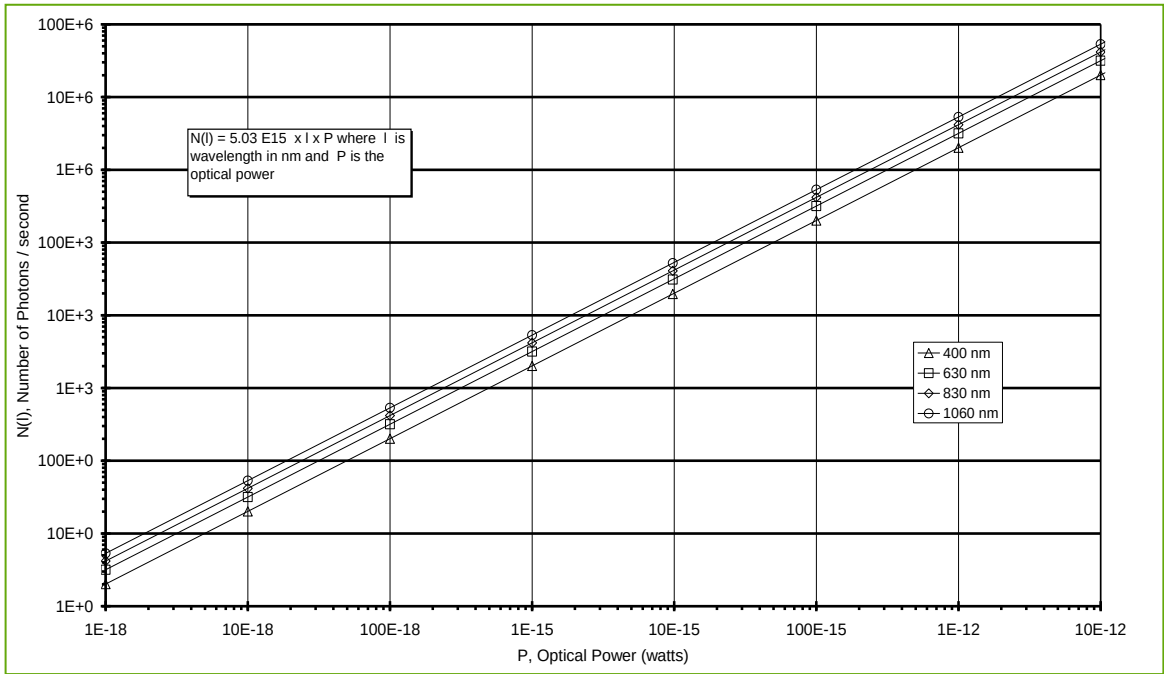
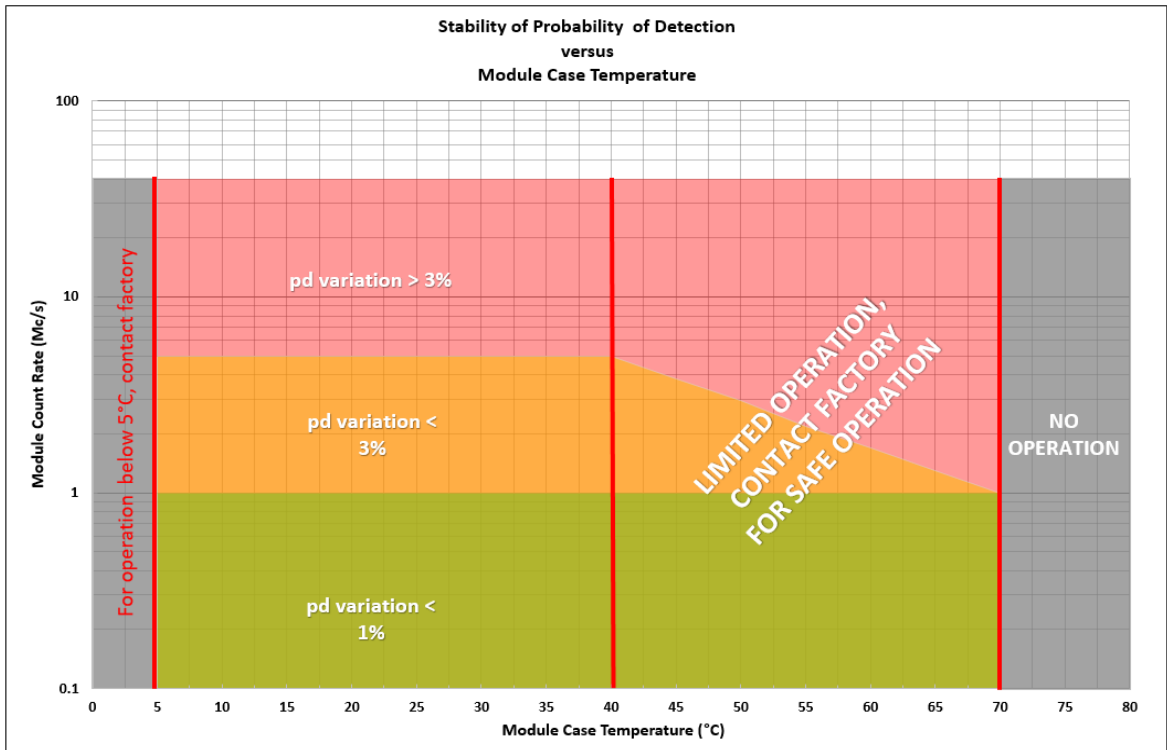
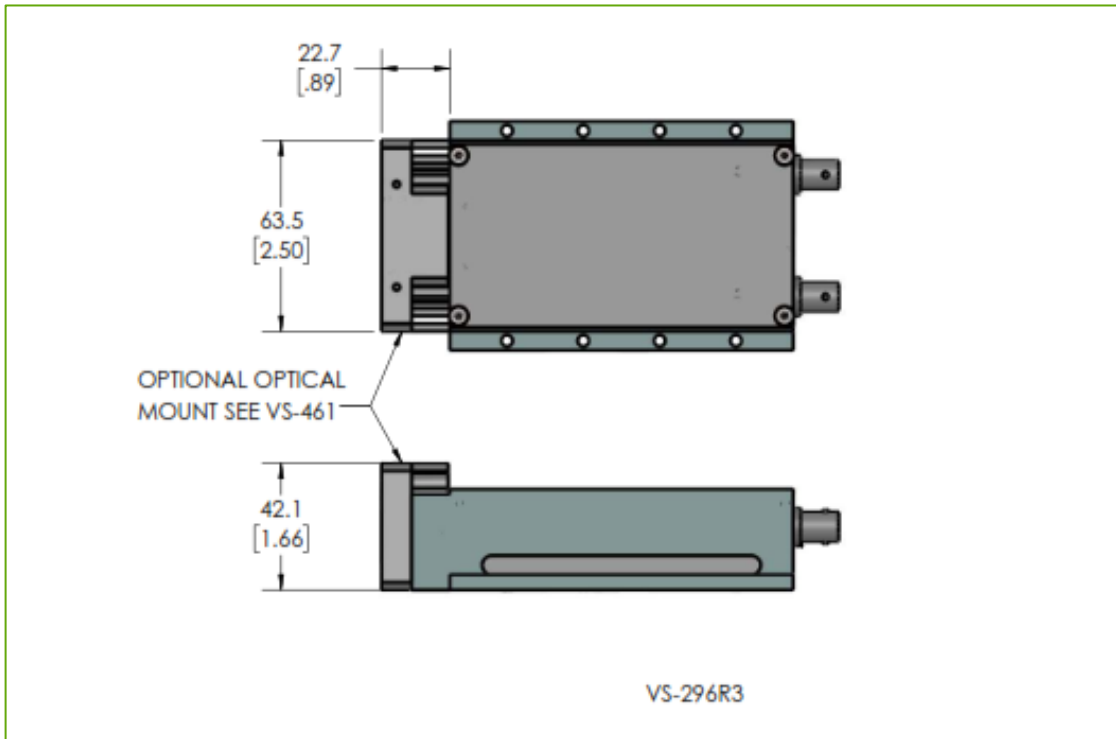
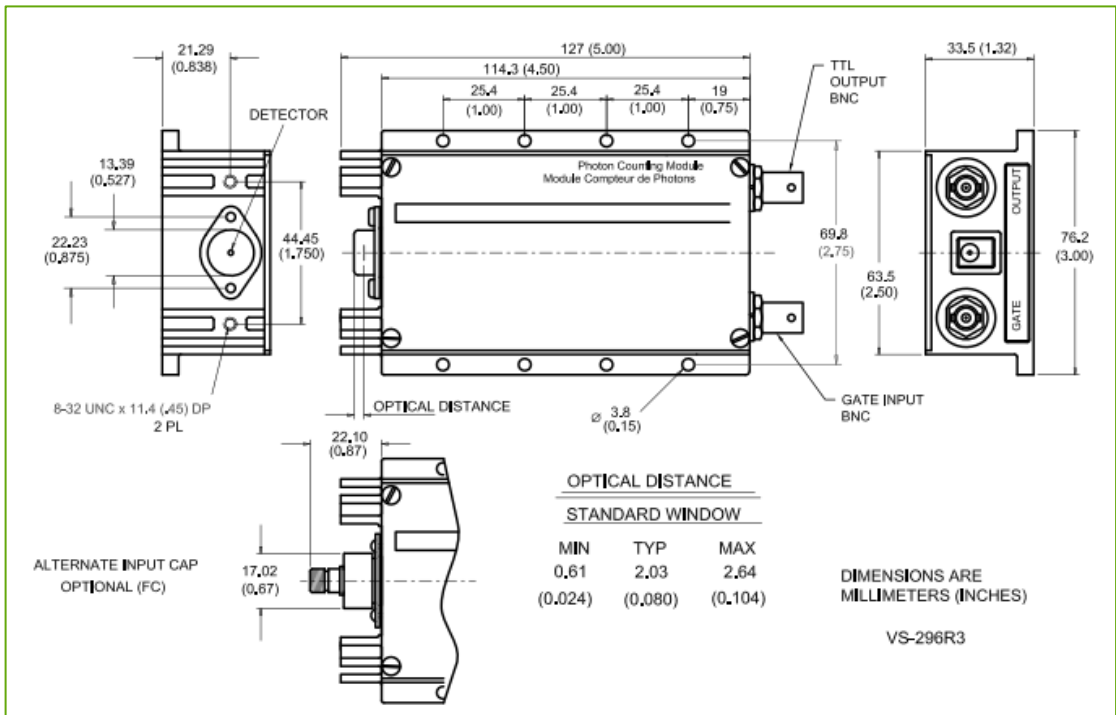


Figure 9 Probability of Detection Variation vs. Module case Temperature



Mechanical & package information

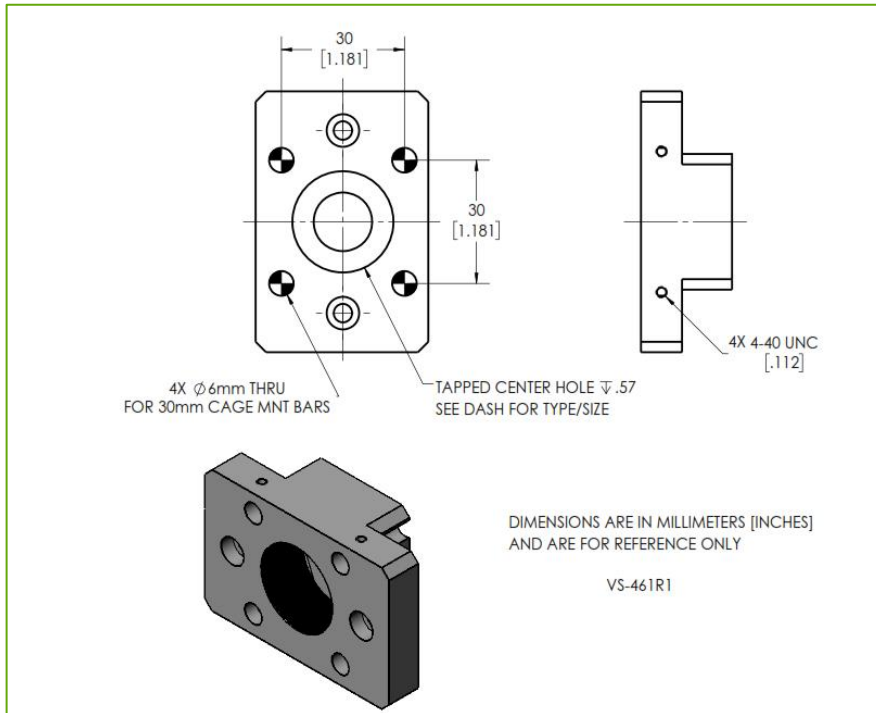
Figure 10 Dimensional Outline



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Figure 11 Optical Bracket / Adaptor Outline



SPCM-AQRH-WX-BR1:
with bracket for 1" tube (1.035" x 40TPI)
and 30mm cage mount



SPCM-AQRH-WX-BR2:
with bracket for C-mount (1.0" x 32TPI)
and 30mm cage mount

Optical Mount Bracket Options

There are two optical mounting bracket options available to the module. The mounting brackets are factory installed and cannot be removed by end users without risk of damaging the detector, thus voiding the warranty to the module.

These mounting brackets are for industry standard C-mount and Cage Mount systems, such as those offered by Excelitas' Qioptiq division: a [tube system](#) and a [cage system](#) called Microbench that can be attached to the mounting brackets. These systems provide a high flexibility in building customized setups tailored to any specific need. In addition, a vast portfolio of optical components that can be integrated into these systems is offered by Qioptiq. There is also an [adapter](#) that allows a combination of the metric Microbench system with other cage systems based on the SM1 standard or vice versa.

Certifications

RoHS Compliance

This series of avalanche photodiode modules are designed and built to be fully compliant with the European Union Directive 2015/863/EU and the UKCA legislation for the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS). Exemption 7(a) is claimed on certain models



China RoHS

This document certifies that all components and all homogeneous sub-components which are manufactured by Excelitas Technologies Canada comply with the current China RoHS 2 standard.



The green "e" symbol signifies that the product does not contain restricted substances and is a green, environmentally friendly product which can be recycled



The orange “number” symbol signifies that the product contains certain hazardous substances, can be used safely during its environmental protection use period (EPUP), as indicated by the number of years in the center, and should enter the recycling system after its EPUP. Manufacturers and importers shall also provide a declaration table of the hazardous substances present in the product, in accordance with standard SJ/T 11364-2014.

For modules that contain the orange symbol, our products contain the substances as shown in the table (exemption claimed in Annex 2, exemption 8.1)

Part Name	Toxic and hazardous substances and elements					
	Pb	Hg	Cd	Cr(VI)	PBB	PBDE
PCB	X	0	0	0	0	0
ENCLOSURE	0	0	0	0	0	0
CABLE	0	0	0	0	0	0

REACH

We declare that the part numbers listed in this document conform to the requirements of Registration, Evaluation, Authorisation, and Restriction of Chemicals (REACH) Regulation (EC 1907/2006). This directive requires the identification of Substances of Very High Concern (SVHC) contained in articles above the threshold 0.1% w/w.

Warranty

A standard 12-month warranty following shipment applies. Any warranty is null and void if the module case has been opened. Warranty is null and void if the module input exceeds 5.5 V or the polarity of the +5 V supply is reversed.

ESD Warning

Modules should only be handled at an ESD-safe work station.

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Individual Module Test Data

Each module is supplied with test data indicating the module's dark count, dead time, pulse width, correction factor and any other data required by the specific module being purchased.

Declaration of Conformity

For safety, this product is eligible to bear the ETL mark with adjacent indicator 'C' and 'US'. The Intertek control number is 4010815.



Or the Nemko mark. Depending on the particular model purchased.



Products:

CLASS 8721 85 ELECTRICAL EQUIPMENT FOR LABORATORY USE – Certified to US standards

CLASS 8721 84 ELECTRICAL EQUIPMENT FOR LABORATORY USE – Certified to US standards

CLASS 8721 04 LABORATORY EQUIPMENT – Electrical

CLASS 8721 04 LABORATORY EQUIPMENT – Electrical

Single photon counting module SPCM-AAAA-WX-TR-OPT for standard catalogue items (refer to the online data sheets for specific details).

Where

AAAA = AQRH for standard or 780, 800, 850, 900 for wavelength selection.

W = 1, 2, 3, 4, 5 or 6 (Output options – pulse width, pulse height, dead time).

X = 0, 1, 2, 3, 4, 5 or 6 (Dark count)

TR = Timing resolution option.

OPT = FC, BR1, BR2 (Optional optical mount if installed)

are not affecting safety certification), rated 5Vdc, 1.2A.

Single photon counting module SPCM-CDXXXXY (where X = can be 0000 to 9999, Y could be a letter from A to Z, not affecting safety certification), rated 5Vdc, 1.2A.

Altitude of Operation: 0 – 5000 Meters.

Humidity of Operation: 15% - 95% relative humidity, non-condensing Equipment class III, measurement category I, pollution degree 2.

Single Photon Counting Module

APPLICABLE REQUIREMENTS: CAN/CSA C22.2# 61010-1 Issue: 2012/05/11 Ed:3 SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE -PART 1: GENERAL REQUIREMENTS.

UL 61010-1 Issued: 2012/05/11 Ed:3 SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE - PART 1: GENERAL REQUIREMENTS.

Additional uses of the CE and UKCA marks:

This product is eligible to bear the CE and UKCA marks in accordance with:



EN 61326-1:2013 Electrical equipment for measurement, control and laboratory use

EN 61010-1:2012 Safety requirements for electrical equipment for measurement, control and laboratory use

This product has been tested as per the following standards:

- Emission CISPR 11
- IEC 61000-4-2 ESD
- IEC 61000-4-3 Radiated susceptibility
- IEC 61000-4-4 Burst
- IEC 61000-4-5 Surge
- IEC 61000-4-6 Conducted susceptibility
- IEC 61000-4-11 Voltage dips and interruptions

The object of the declaration described herein is in conformity with the relevant EU legislation: EMC Directive 2004/108/EC (through April 19, 2016) and EMC Directive 2014/30/EU (from April 20, 2016).

This equipment is intended for Indoor Use Only. There is no applicable maintenance manual.

Excelitas Technologies reserves the right to make changes, improvements, modifications and corrections to its products without notice. Excelitas Technologies reserves the right to discontinue its products. Buyers should obtain the latest information about the product before placing orders. This product is not certified for use in critical medical equipment where component failure could cause serious bodily injury or death.

About Excelitas Technologies

Excelitas Technologies is a global technology leader focused on delivering innovative, customized solutions to meet the detection, lighting, and other high-performance technology needs of OEM customers.

From analytical instrumentation to clinical diagnostics, medical, industrial, safety and security, and aerospace and defense applications, Excelitas Technologies is committed to enabling our customers' success in their end-markets. Excelitas Technologies has approximately 5,000 employees in North America, Europe and Asia, serving customers across the world.

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