Precision No-Gap Broadband Fiber VOA

(all fiber types, build-in position sensor, high setting precision, no drift)

AGILTRON ®

(US patent 8,666,218 and other patents pending)

The High Precision Series Variable Optical Attenuator (PVOA) offers exceptional performance with an ultra-low insertion loss of 0.2 dB and a wide operational range from 300 to 2100 nm. It features a continuous light path with no gaps, ultra-high setting stability of 0.1 dB, and a linear response that is independent of input optical power. Built on an innovative micro-electro-mechanical system (MEMS) platform with a fast piezo actuator, integrated laser, and optical position sensor, the PVOA delivers precise and stable attenuation controlled by an electrical signal, maintaining accuracy despite environmental variations. Unlike typical feedback control VOAs, it does not tap signal light that increases loss and maintains precision even at low optical power levels, ensuring uninterrupted light transmission thanks. This makes it ideal for interferometric sensors, ultra-high-speed data transmissions up to 200 Gb/s, and applications requiring extensive wavelength coverage. It is compatible with fibers having a 125-micron outer diameter, with other diameters available upon request. The PVOA can be precisely controlled up to 30 dB, with attenuation levels reaching up to 65 dB when precision is not required. The PVOA is also available as a component with four fiber ports: two for the VOA, one for laser light input, and one for connection to a detector. The laser and detector pair form a feedback control loop to precisely manage attenuation.

Features

- 0.2dB Low Loss
- 0.1dB Repeatable
- 300-2100 Broadband
- 65dB Attenuation
- SM,PM,MM,106um
- 1W Optical Power
- Linear Response

Applications

- Sensor
- Channel Balance
- Instrumentation

Specifications

Parameter	Min	Typical	Max	Unit
Operation Wavelength	300		2500	nm
Insertion Loss [1]	0.1	0.2	0.5	dB
Polarization Dependent Loss		0.1	0.3	dB
Wavelength Dependence Loss		0.01	0.1	dB
Attenuation Accuracy/Repeatability 0.5-30dB		0.1	0.2	dB
Attenuation Setting Repeatability			0.1	dB
Extinction Ratio (PM version only)	19	25	28	dB
Polarization Mode Dispersion (SM version only)		0.01	0.05	ps
Return Loss [2]		55		dB
Response Time		5	50	ms
Power Consumption			4	W
Optical Power handling [3]		600		mW
Operating Temperature	-5		75	ºC
Storage Temperature	-40		85	ºC
Package		40x25x10		mm

Note:
[1]. Without connector and at room temperature. For fiber core> 8mm, smaller fiber core loss is higher
[2]. For SM fiber
[3]. For fiber with core size >8 mm. For small core see the curve at the end

P +1 781-935-1200   E sales@photonwares.com   W www.agiltron.com
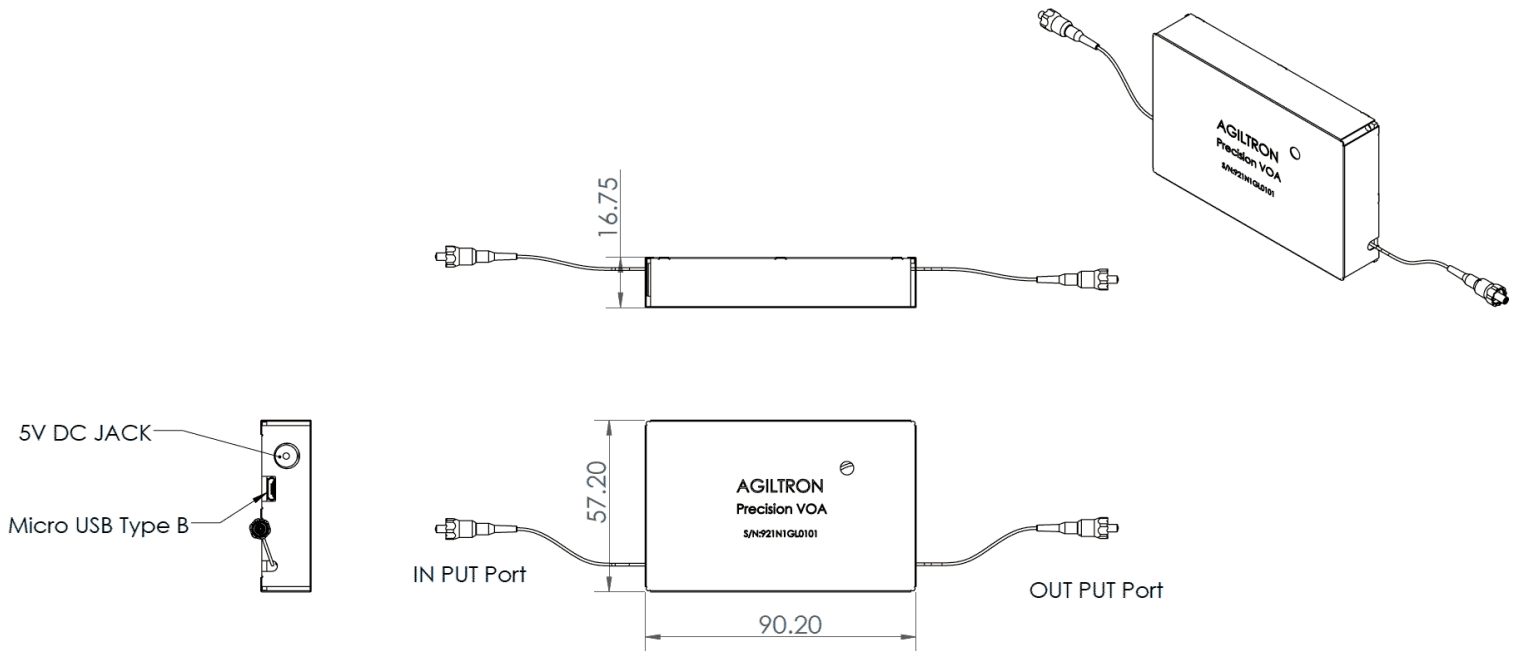
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Mechanical Footprint Dimensions (with Driver) (Unit: mm)

16.75

5V DC JACK

Micro USB Type B

57.20

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Precision VOA
S/N:921N1GL0101

IN PUT Port

OUT PUT Port

90.20

*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

Electrical Control Interface

The VOA (Variable Optical Attenuator) can be controlled through either USB or RS232 interfaces:

- A 5V power supply from Agiltron must be connected to the device via a connector on the board.
- **USB Control:** Use a USB Type A to Micro USB Type B cable to control the device. The VOA accepts UART commands and is recognized as a serial device by the PC.
- **RS232 Control:** Use an RS232 to Micro USB Type B cable to control the device.
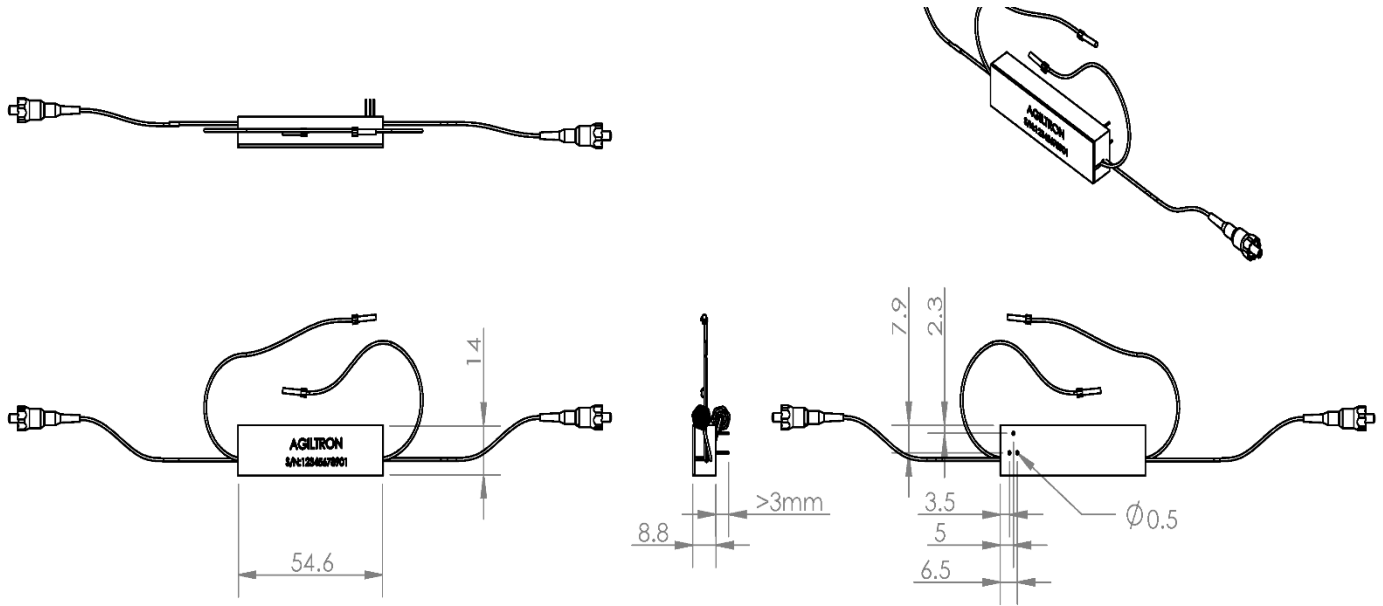
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Mechanical Footprint Dimensions For Component (Unit: mm)

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Electrical Control Interface

- + Pin
- - Pin
- Applying a voltage <60V

Operation Instruction

- Avoid touching the bare PCB by hand, as this can damage the semiconductor chips due to electrostatic discharge. This is an OEM version intended for professional use. We offer a benchtop unit with metal casing and electrical grounding protection for general use.
- Connect the included power supply to the power source on the unit.
- Use the provided cable to connect the unit to a computer.
- Launch the supplied GUI software.
- Establish a connection with the unit via the GUI.
- Operate the unit using the GUI

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Ordering Information

	Type	Controller	Optical Power	Test Wavelength	Fiber Type	Fiber Cover	Fiber Length	Connector
☐	☐	☐	☐	☐	☐ ☐	☐	☐	☐
Prefix	**Type**	**Controller**	**Optical Power**	**Test Wavelength**	**Fiber Type**	**Fiber Cover**	**Fiber Length**	**Connector**
PVOA-	Piezo = 2 Special = 0	USB = 1 Component = C RS232 = 2 Special = 0	Regular = 1	350 = U 488 = 4 532 = 5 630 = 6 780 = 7 850 = 8 980 = 9 1060 = 1 1310 = 3 1550 = C 2000 = 2	Pick from below table	Bare fiber = 1 900um tube = 3 Special = 0	0.25m = 1 0.5m = 2 1.0m = 3 Special = 0	None = 1 FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 Special = 0

Note:

❑ PM1550 fiber works well for 1310nm

Fiber Type Selection Table:

01	SMF-28	34	PM1550	67	OM1 (MMF 62.5/125μm)
02	SMF-28e	35	PM1950	68	OM2 (MMF 50/125μm)
03	Corning XB	36	PM1310	69	OM3 (MMF 50/125μm)
04	SM450	37	PM400	70	OM4 (MMF 50/125μm)
05	SM1950	38	PM480	71	GIF50 (GIF 50/125μm)
06	SM600	39	PM630	72	GIF625 (GIF 62.5/125μm)
07	Hi780	40	PM850	73	105/125μm
08	SM800	41	PM980	74	FG105LCA
09	Hi980	42	PM780	75	FG50LGA
10	Hi1060	43	PM350	76	FG10LDA
11	SM300	44	PM405	77	
12	SM400	45	PM460	78	
13		46		79	

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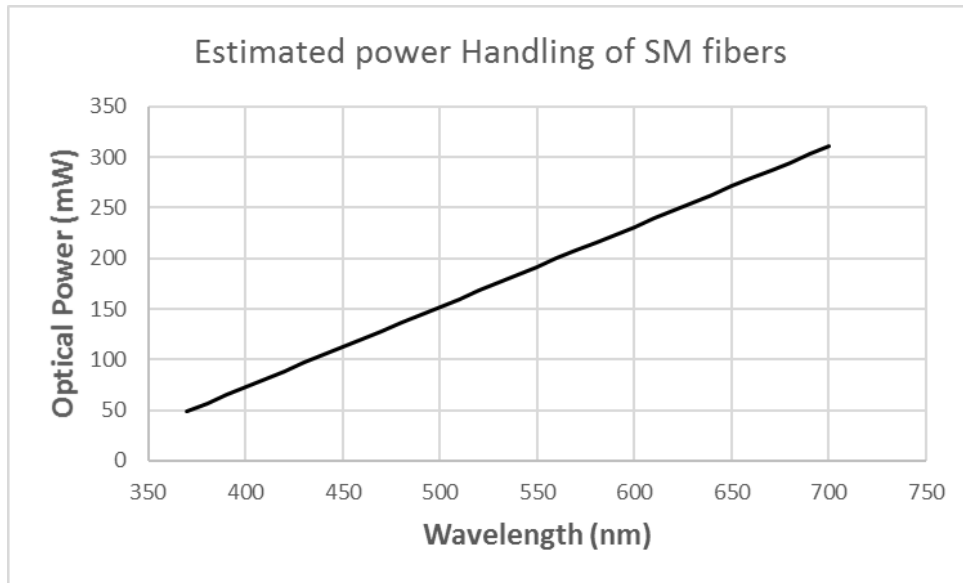
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Optical Power Handling vs Wavelength For Single-Mode Fibers

Estimated power Handling of SM fibers

(Graph: Optical Power (mW) vs Wavelength (nm). Y-axis from 0 to 350 mW, X-axis from 350 to 750 nm. Line rising from approximately 50 mW at 370 nm to approximately 310 mW at 700 nm.)

Typical Insertion Loss vs Wavelength (1240-1630nm)

1x2 MEMS Switch

(Graph: SIGNAL(DB) vs WAVELENGTH(NM). Y-axis from -4 to 3 dB, X-axis from 1240 to 1590+ nm. Signal trace near 0 dB across the range.)

Typical Wavelength Dependence @20dB Attenuation

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▽PK  :1553.220nm -19.764dB    SPACING:                      A:FIX      /DSP
▽001:1520.000nm -19.573dB        -33.220nm      0.190dB      B:WRITE    /BLK
▽002:1570.000nm -19.442dB         50.000nm      0.131dB      C:B-A      /DSP
▽003:

  10.0dB/D         RES: 0.1nm    SENS:HIGH 1       AVG:   1   SMPL:AUTO
-30.0                                                                    -18.8




-50.0 REF                                                              M2
dBm                                                                     -19.4
                                                                        dB

-70.0                                                                   -20.0



-90.0



-110.0                                                                  -21.2
1520.00nm                    1545.00nm        5.00nm/D    1570.00nm

  SWP                          AUT
  INT                          SRC
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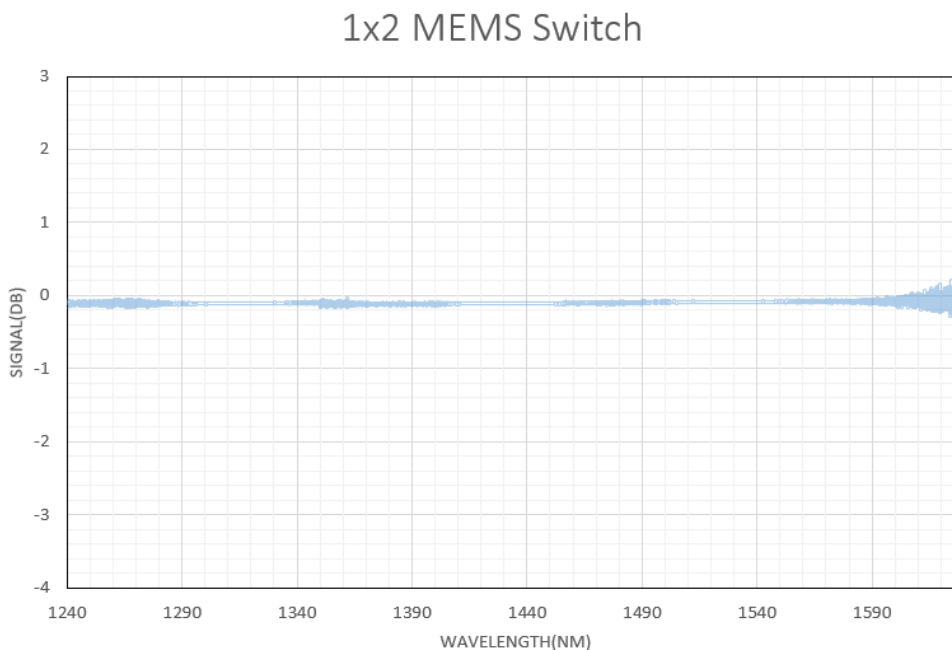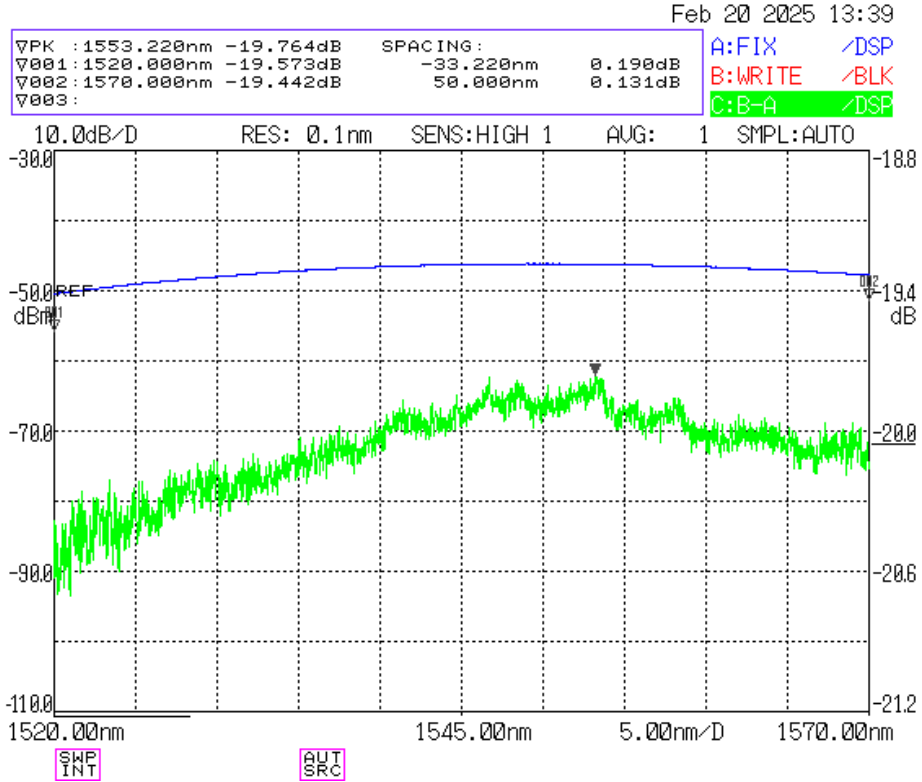
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GUI