

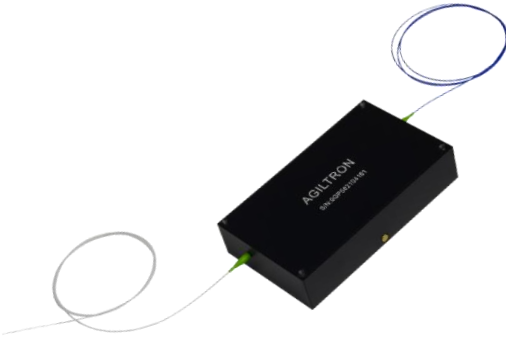
# Precision High Speed Optical Attenuator

450nm to 2300nm, up to 20W, USB or Analog



DATASHEET

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## Applications

- Laser Power Regulation
- Surge Power Prevention
- Power Balance
- Instrumentation

## Features

- No Moving Parts
- High Reliability
- High Speed
- Precision
- Up to 10W

The Precision High-Speed Optical Attenuator maintains a constant attenuation or output power, regardless of the environmental fluctuations. The attenuation level can be varied at a fast speed. This is achieved by integrating two tap detectors at the fiber input and output of a NanoSpeed™ attenuator and controlling the ratio or output power using a feedback closed-loop circuit. The device has about 20dB dynamic control range in which the corresponding optical power range is preset. The control input can be 0~5 V or through USB/GUI. The attenuation is proportional to the 0-5V control signal which is input via a SMA connector. The USB input is micro-USB. Because of the control loop, the response speed is reduced, in which power control is much faster than attenuation. Wavelength below 800nm requires special crystals that is more expensive.

USB control reduces the response to 1ms due to computer CPU.

The module can also compensate slow polarization-dependent loss changes and fast optical power surges since the tap detectors will sense these changes. The non-mechanical device has passed the most stringent mil-spec and space flight qualifications and is designed for over 20 years of continuous operation. The module comes with a wall-plug 12V power supply.

## Specifications

Parameter	Min	Typical	Max	Unit	
Central Wavelength	760		2000	nm	
Insertion Loss [1]	1260 -1650nm	1.4	2.4	dB	
	960 - 1100nm	1.6	2.6	dB	
	760 – 960nm	1.8	2.8	dB	
Dynamic Range	Single Stage	18	20	25	dB
	Dual Stage	30		35	dB
	3 Stages			50	dB
Return Loss	45	50		dB	
Response Time [2]			1	μs	
Attenuation Adjustment Resolution		Continuous		dB	
Operating Optical Power (CW)		0.5	20	W	
Polarization Extinction Ratio	20	24	32 [2]	dB	
Electrical Control Signal (SMA Connector)	0		5	V	
Power Supply	11	12	13	V	
Operating Temperature	-5		70	°C	
Storage Temperature	-40		85	°C	
Weight		0.7		lb	

### Notes:

[1]. Excluding connectors. The connector adds 0.3dB each. Including the power tapping for feedback control.

[2]. High ER version need special order

**Note:** The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [click this link](#):

**Warning:** The device mounted on the PCB is an OEM module designed for system integration only, not for general uses. Do not touch the PCB by hand. The electrical static can kill the chips even without a power plug-in, and unpleasant electrical shock may also be felt. For laboratory use, please buy a protected Turnkey system.

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+1 781-935-1200

[sales@photonwares.com](mailto:sales@photonwares.com)

[www.agiltron.com](http://www.agiltron.com)

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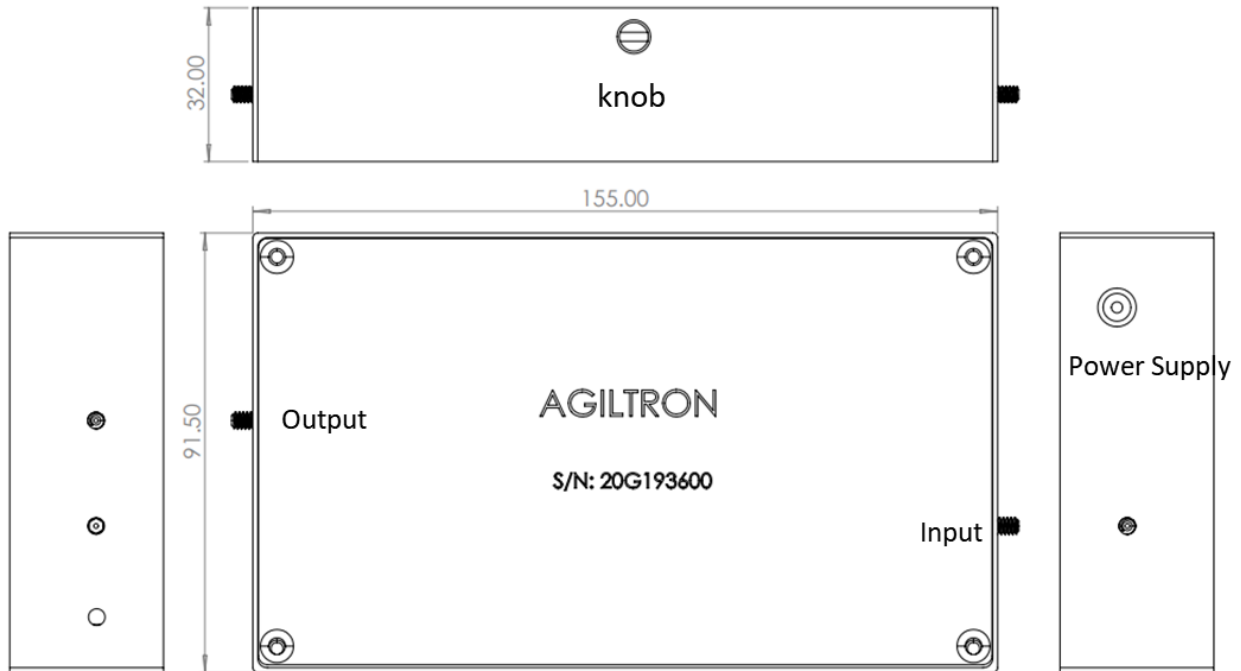
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## Dimension of Module (mm) for Power <0.5W



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

## Operation Instruction

- Plug in the accompanied power supply.
- Apply 0-5V control signal through the SMA connector
- The module output should vary from maximum to minimum corresponding and proportionally to the 0-5V control signal.
- With a fixed control voltage, the module maintains a constant attenuation which is defined as  $\text{Input Optical Power} - \text{Output Optical Power}$ , independent of time and environment changes.

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### Ordering Information

Prefix	Input Power	Control Type	Wavelength	Attenuation Range	Control Input	Fiber Type	Fiber Cover	Fiber Length	Connector <sup>[1]</sup>
PNSA-	0.5W = S 10W = T 1W = 1 2W = 2 5W = 5 20W = 6	Power = 1 Attenuation = 2	1060 = 1 2000 = 2 1310 = 3 1480 = 4 1550 = 5 1625 = 6 780 = 7 850 = 8 650 = E 550 = F 400 = G Special = 0	1-18 = 1 1-35 = 2 1-50 = 3 Special=0	0-5V = 1 USB = 2	SMF-28 = 1 HI1060 = 2 HI780 = 3 50/125 = A PM1550 = 5 PM850 = 8 PM980 = 9 SM1950 = 6 PM1950 = 7 Special = 0	0.9mm Tube = 3 Special = 0	0.25m = 1 0.5m = 2 1.0 m = 3 Special = 0	None = 1 FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 LC/APC = A LC/UPC = U Special = 0

[1]: High power connector may be available per request, please contact sales.

RED is Special Order

**Note:**

- PM1550 fiber works well for 1310nm

### Application Notes

**Fiber Core Alignment**

Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

**Fiber Cleanliness**

Fibers with smaller core diameters (<5 μm) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

**Maximum Optical Input Power**

Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the how handling by expanding the core side at the fiber ends.

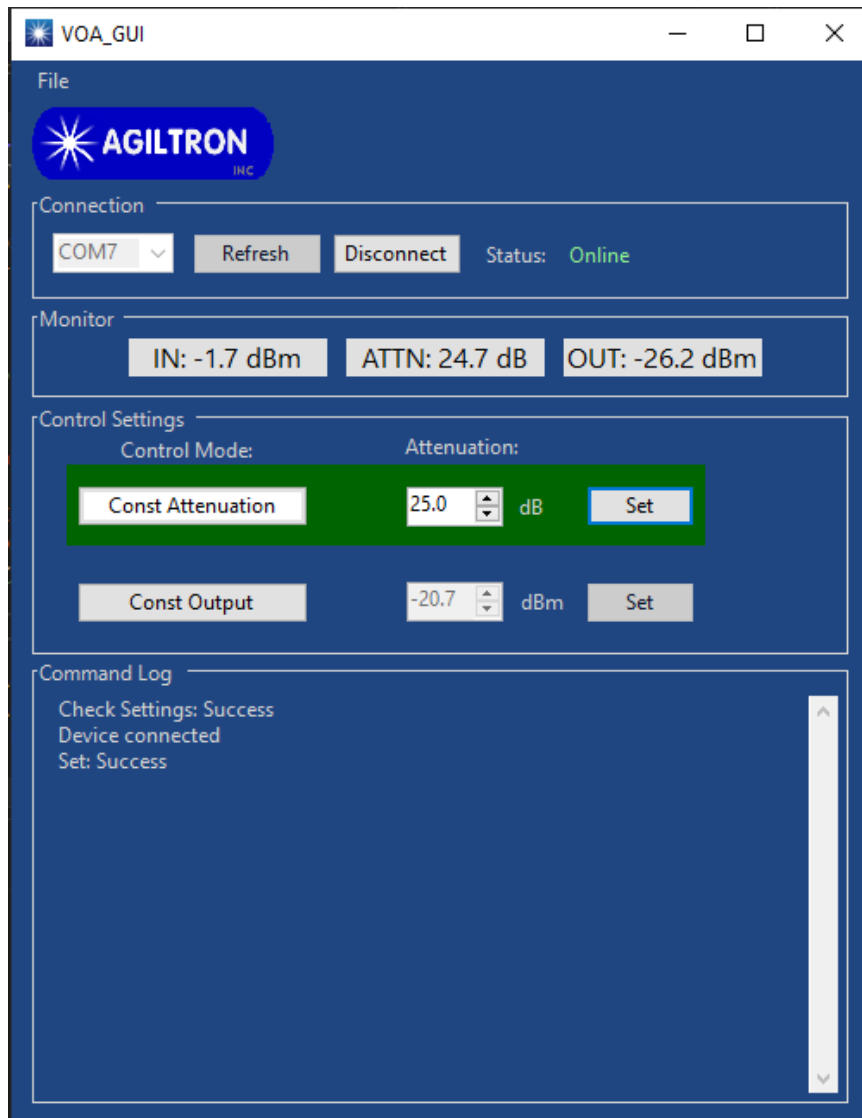
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## GUI



## Operation Manual

- Plug in the power supply
- Connect to a computer using the accompanying cable
- Load the GUI and make the connection between the device and the computer
- Input laser with the power level according to the part number
- Adjust the output on the GUI, and the monitor windows should show the corresponding reading. (The setting is repeatable; however, the power reading may not be accurate)