

# Free-Space Electro-Optical Modulator

(2.5mm aperture, 400nm to 2000nm, DC-MHz)



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## Features

- High Performance
- Compact Package
- Easy integration
- Customize Available
- Low cost

## Applications

- Laser Modulation
- Holography
- Metal cutting/engraving
- Microfabrication

Agiltron's Free-space Electro-optic modulator (FEOM) is an easy-to-use tool to modify the phase, polarization, or amplitude of a free-space laser covering a wide wavelength range. For general applications, the device uses a pair of compensated LiNbO<sub>3</sub> crystals. For high-power and short-wavelength applications, the device uses a special crystal pair to overcome LiNbO<sub>3</sub> instability. The device should be driven by applying  $\pm$  alternative high voltage to avoid internal charge build-up.

We provide driving electronics with modulation ranges from DC to MHz; the modulation depth is related to frequency due to limited amplification power.

Polarization cubes can be aligned and installed at both input and output ports to form an intensity modulator.

For amplitude modulation, polarized light is essential because the modulation process relies on controlling the intensity of light based on its polarization state. By incorporating input and output polarizers, the extinction ratio (ER) of the device is significantly improved.

## Specifications

Parameter	Min	Typical	Max	Unit
Wavelength Range	W1	400	600	nm
	W2	600	900	
	W3	900	1250	
	W4	1250	1650	
Clear Aperture	3			mm
Halfwave Voltage, non-resonant		205V @ 633nm		
Extinction Ratio <sup>[1]</sup>	10			dB
Input impedance, resonant		50		ohms
Input capacitance, non-resonant		14		pF
Max Optical Power Density	532nm	2	10 <sup>[2]</sup>	W
	1064nm	5	20 <sup>[2]</sup>	W
Dimension		86 x 32 x 32		mm
Temperature	-20		50	°C

### Notes:

[1]: Characterized @ 633nm

[2]: High power version, please call us.

**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](#):

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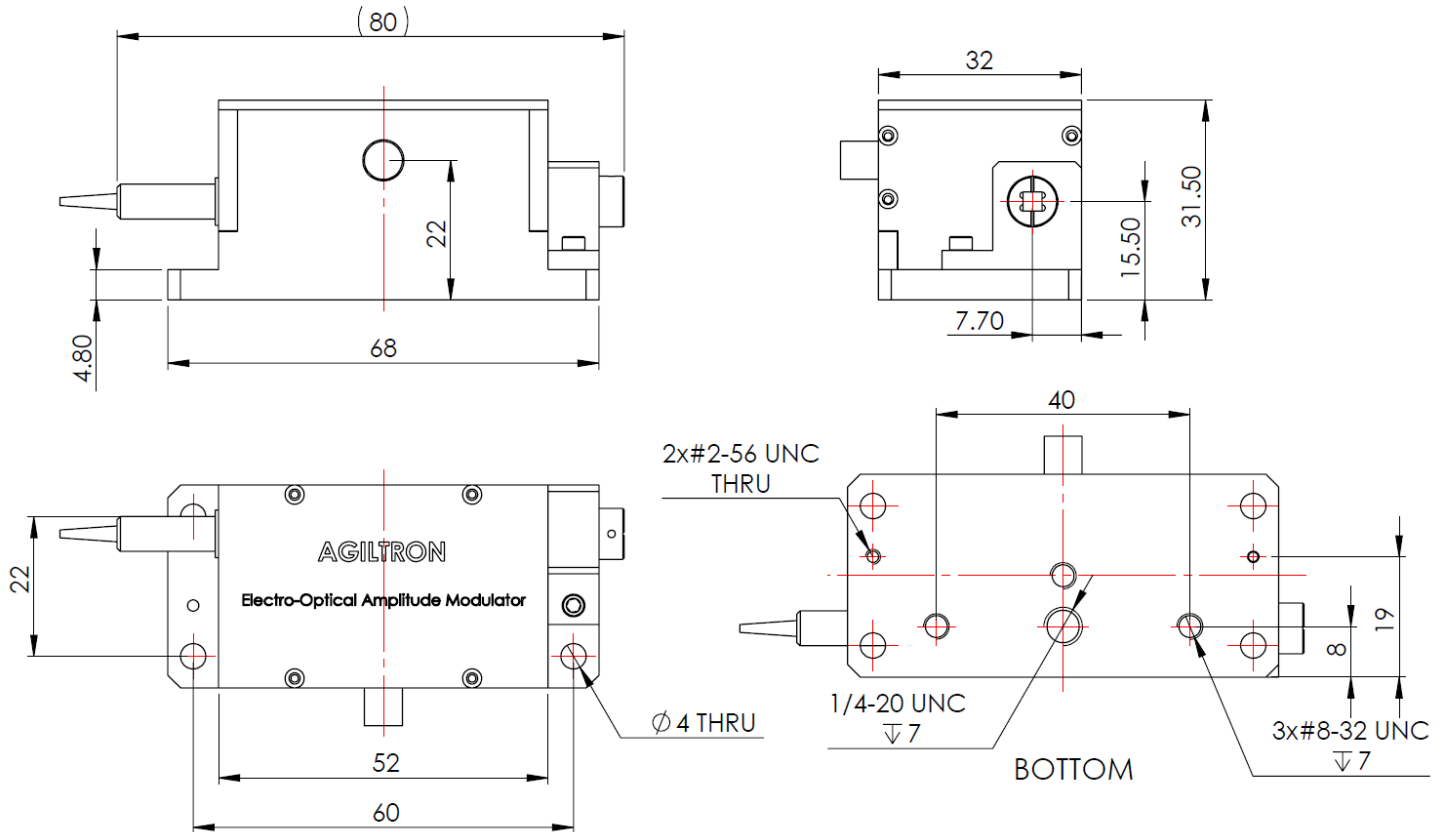
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## Mechanical Drawing (mm)



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

## Operation Instructions

### 1. Input Alignment

Direct the laser beam through the device, ensuring proper alignment along the optical axis without hitting the crystal walls.

### 2. Input Polarizer Setup

Place a vertical polarizer at the input side. Adjust the input laser polarization direction to achieve maximum output intensity.

### 3. Output Polarizer Setup

Place a horizontal polarizer at the output side of the device. Carefully adjust the orientation of the output polarizer to achieve minimum transmitted output intensity (extinction condition).

### 4. Apply Control Voltage

Gradually apply voltage to the device and observe changes in the output intensity. At the operating voltage ( $V_p$ ), the output intensity will reach its maximum.

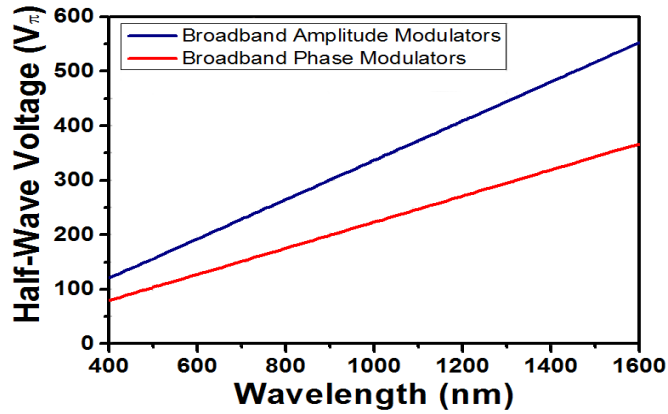
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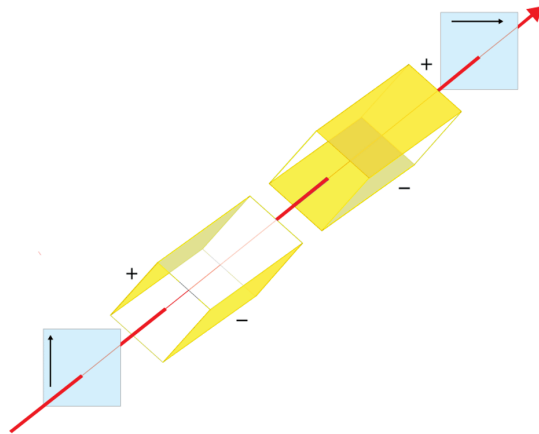


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### Modulator Half-Wave Voltage



### Amplitude Electro-Optic Crystal Configuration (yellow indicates electrode)



### Typical Resonance Response (sine wave)



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### Ordering Information

Prefix	Type	Wavelength	Optical Power	Config	Input Cube <sup>[1]</sup>	Output Cube <sup>[1]</sup>	F 0
<b>FEOM-</b>	Amplitude = 5 Phase = 6	400~600 nm = 05 600~900 nm = 07 900~1250 nm = 09 1250~1650 nm = 14	Regular = 1 High Power = 2	Standard = 1 Special = 0	No = 1 Polacore = 3 PBS = 4 Glan-Thompson = 5	No = 1 Polacore = 3 PBS = 4 Glan-Thompson = 5	Non-resonant version = F0

[1]. Polacore – CW 10W/cm<sup>2</sup>  
 PBS – CW 15W/cm<sup>2</sup>  
 Glan-Thompson – CW 2kW/cm<sup>2</sup>

#### Polarizer's prices:

Polacore	\$256
PBS	\$240
Glan Thompson	\$485

### Polarizer

