Optical Attenuators

Optical attenuator is an optical component that can change the output power of laser continuously. It is consisted of a half-wave plate (or an electro-optic crystal) and a polarizer. The polarization state of incident light is modulated by the half-wave plate (or electro-optic crystal) therefore to vary the degree of attenuation. The polarizer can divide the light further into two beams at a specific ratio. Optical attenuators are ideal for the applications in precision laser processing, laser detection, laser sensing etc., especially in ultra-fast and ultra-short pulse laser systems.

CASTECH provides two types of attenuators according to different modulating principles：mechanical and electro-optical type.

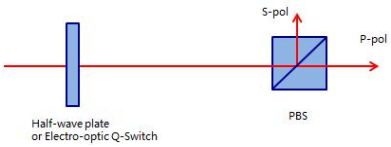
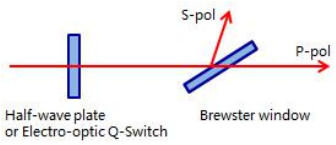
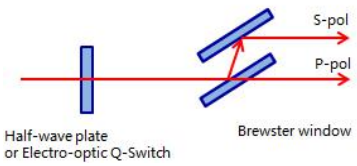
Mechanical attenuator modifies the polarization state of light by rotating the half-wave plate. It is characterized by compact structure and adaptability.

Electro-optical attenuator can be used as a high-speed optical switch which can accomplish a modulation in nanoseconds.

CASTECH's optical attenuator has two control schemes, electric and manual. Attenuator can be equipped with PBS, Brewster window, or removable optical trap as optional accessaries.

Applications

- **Laser industrial processing**
- **Laser sensing system**
- **Ultrafast laser system**

Diagram of Optical Path	Polarizer Type	Advantage	Disadvantage
	PBS	● High extinction ratio ● P-light and S-light are perpendicular to each other	● Limited aperture ● Relatively low laser damage threshold
	Single Brewster window	● Relatively high LIDT ● Large aperture	● P-light and S-light have a certain angle between ● Strict angle limit
	Double Brewster windows	● Relatively high LIDT ● Large aperture ● P-light and S-light are perpendicular to each other	● Strict angle limit

Mechanical Attenuators Model Number：COA-Oc-b-a-p-λ-h					
Control mode(c)	Polarizer(b)	Aperture(a)	Power(p)	Wavelength(λ)	Housing (h)
A (automatic) M (manual)	B (Brewster window) P (PBS)	5 mm 10 mm 12 mm 20 mm 40 mm ...	100 (≤100 W) 200 (≤200 W) 1000* (≤1000 W)	266 nm 355 nm 515 nm 532 nm 800 nm 1030 nm 1064 nm 1550 nm ...	P01 P02 ...

Electro-Optical Attenuators Model Number：COA-Ec-b-a-p-λ-h					
Control mode(c)	Polarizer(b)	Aperture(a)	Power(p)	Wavelength(λ)	Housing (h)
A (automatic)	B (Brewster window) P (PBS)	5 mm 10 mm 12 mm 20 mm ...	100 (≤100 W) 200 (≤200 W)	266 nm 355 nm 515 nm 532 nm 800 nm 1030 nm 1064 nm 1550 nm ...	P04 ...

***Only suitable for Brewster window polarizer type products**

Typical Specifications				
Type	Aperture	LIDT	Wavelength	Response time
Mechanical	20 mm	10 J/cm² 10 ns,10 Hz	1064 nm	ms
Electro-optical	10 mm	3 J/cm² 10 ns,10 Hz	532 nm	ns

Housing dimensions(mm)：

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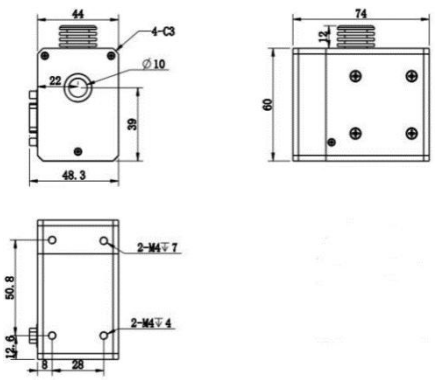

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