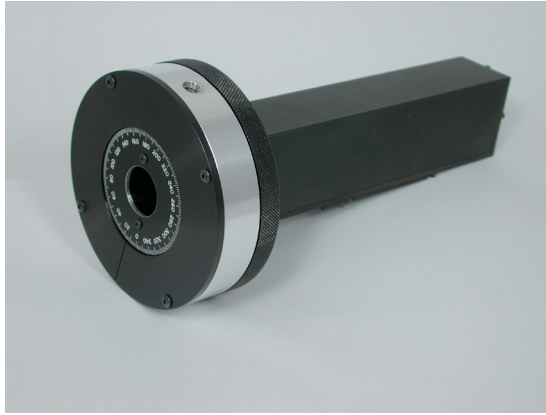


Series PAZ and PAG Polarizer-Analyzer-Attenuators



Features

- High extinction ratio
- Energy escape port
- Compact design

Function

- Polarization of unpolarized beams
- Analysis of the polarization properties of arbitrarily polarized beams
- Continuously variable attenuation of linear polarized beams
- Electro-optic modulation systems
- Other polarization-sensitive systems

Providing

- High CW power-handling capability and high pulse-damage threshold
- Visible transmission for ease of alignment (Series PAZ only)
- Low insertion loss (>98% transmission for Series PAZ, >95% for Series PAG)
- Minimum beam distortion; minimum beam deviation
- Modular construction
- Broadband operation, 2 to 14 μ m

More Compact Design

Even though these units now contain more plates, the basic concept has produced the most compact design possible. An added plus is the rectangular cross-section of the new units, which eliminates any guessing as to where the plane of polarization of the transmitted beam lies, since it is exactly parallel to the long dimension of the rectangle.

Energy Escape Port

Incorporated into the design concept is a user's option which allows the main portion of the rejected beam to exit the housing by simply removing a metal cover plate. This rejected beam can then be put to useful purpose (i.e., to fire a laser-triggered spark gap). Allowing the rejected beam to exit the housing also increases the power-handling capability. The rejected beam can be dumped into a water-cooled or heat-sink-cooled option. In addition, this rejected beam is almost perfectly polarized.

Series PAZ and PAG polarizer-analyzer-attenuators are specially tailored to the needs of the high-power CW and pulsed-laser user, although their rugged construction and ease of use makes them attractive for any polarization-sensitive IR application when reliability, versatility, and accuracy are important. The maximum power-handling capability of these units is at this time unknown—a 15-mm aperture H₂O-cooled PAZ has performed successfully in a 1,000-watt CW CO₂ laser beam; the 20-mm aperture PAZs should take much more. In the event a unit becomes damaged from excessive power levels, the unique modular construction allows quick repair or replacement of the damaged component, minimizing downtime and repair expense.



Standard units employ six Zinc Selenide (ZnSe) (Series PAZ) or Germanium (Ge) (Series PAG) Brewster windows as polarization-sensitive elements. These Brewster windows are used in transmission mode so that insertion loss in a collimated polarized beam is less than 0.1% and 0.6% per plate for ZnSe and Ge, respectively. Use of Brewster plates in this manner eliminates normal laser damage problems associated with coatings and wire grids, without the energy loss which occurs with reflective Brewster plate polarizers. Two- and four-plate units are also available as an option where extinction ratio is not as important.

The Brewster plates are fabricated such that angular deviation of the output beam with respect to the input beam is minimal, and the assembled unit has the windows arranged so that no lateral displacement of the output beam occurs. These two features combine to mean that, when a unit is rotated 360°, the transmitted beam will stay in one spot and not trace out a circle. This phenomenon can be quite annoying when working with small area detectors or in other applications where position of the transmitted beam is critical. At 10 cm from the output end, the center of a properly aligned transmitted beam will be displaced no more than 0.1 mm when the unit is rotated.

All standard units are post-mounted in a rotatable mount with a factory-set 360° angular readout dial.

For low repetition rate, pulsed lasers, low-power CW lasers (>10 watts CW), air-cooled PAZ (ZnSe), or PAG (Ge) versions may be used. For average powers in the 10- to 100-watt range, PAZs are recommended. The air-cooled version may be safely used up to about 50 watts CW, although at the higher power levels, the housing may become rather warm if left in the crossed position for an extended period of time. The heat-sink energy escape port is designed to increase the power handling capability of our standard air-cooled version. From 50 to 100 watts CW, heat-sink-cooled versions may be necessary unless run times are kept short. Above 100 watts CW, H₂O-cooled PAZs are recommended. Note that the power rating of all units is significantly increased from the above values when the rejected beam is allowed to exit the housing via the energy escape port. If the energy escape port cover is removed, proper measures must be taken to safely accommodate the rejected beam.

An attractive feature of Series PAZ is the visible transparency of ZnSe, allowing system alignment with a HeNe laser. The main advantage of Series PAG units over PAZs is the higher extinction ratio, a consequence of the high refractive index of Ge.

How to Order

Use of the Model Number PAX-y-z completely specifies a unit, where:

- x = window material Zinc Selenide (Z) or Germanium (G)
- y = clear aperture in millimeters (6, 10, 15, 20, 25, 30, and 35)
- z = Air-Cooled (AC) or Water-Cooled (WC) or Heat-Sink- (HS) Cooled

Example: A ZnSe, 10-mm aperture, air-cooled polarizer would be specified as: PAZ-10-AC.

Specifications	Model PAZ			Model PAG		
	Plates			Plates		
	6	4	2	6	4	2
Transmission @ 10.6µm (aligned in a collimated, polarized beam)	>98%	>98.5%	>99%	>95%	>96%	>98%
Beam Deviation	<1mr			<1mr		
Extinction Ratio	>500:1	>200:1	>30:1	>3000:1	>250:1	>100:1
Standard Apertures, Air-Cooled Version	6, 10, 15, 20, 25, 30, 35mm			6, 10, 15, 20mm		
Standard Apertures, H ₂ O-Cooled Version	6, 10, 15, 20, 25, 30, 35mm			Not available		
Wavelength Region	2 to 14µm			3 to 12µm		

