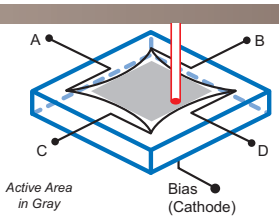
Lateral Effect Position-Sensing Detector

PDP90A

Post and Base Sold Separately

- 2D Lateral Effect Position-Sensing Detector
- Insensitive to Beam Shape and Power Density
- Ideal Spot Sizes Between Ø0.2 and Ø7 mm
- Broad, 320 – 1100 nm Wavelength Range
- SM05 Lens Tube Compatible



Tetra Lateral Sensor Schematic

The PDP90A Position Sensor utilizes a pincushion tetra lateral sensor to accurately measure the displacement of an incident beam relative to the calibrated center. It is ideal for measuring the movement of a beam or the distance traveled; it can also provide feedback for alignment purposes.

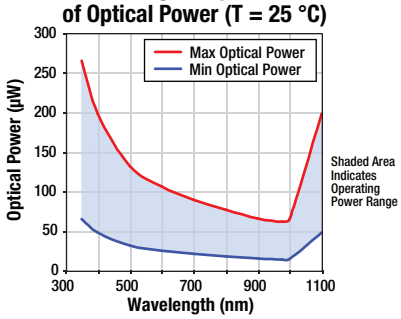
A large detection surface can accommodate beam diameters up to 9 mm; however, our recommended range is Ø0.2 to Ø7 mm. Unlike quadrant sensors, which require beam overlap in all quadrants, the lateral sensor provides positional information of any spot within the detector region, independent of beam shape, size, or power distribution. The PDP90A has a very low noise figure of <2 mV_{pp}, which corresponds to a peak-to-peak detection error of <2.3 µm.

Our PDP90A is post mountable via an 8-32 threaded hole, but an M4 x 0.7 adapter is included for metric applications. While the 2D lateral effect detectors are sold individually, they need to be used with the TQD001 controller, which provides stand-alone operation and a computer interface via USB.

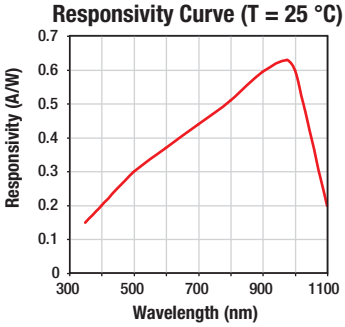
ITEM #	PDP90A
Sensor Type	Pincushion Tetra Lateral Sensor
Wavelength Range	320 – 1100 nm
Sensor Size	9 mm x 9 mm (035" x 0.35")
Peak Responsivity	0.6 A/W @ 960 nm
Bandwidth	15 kHz
Resolution*	0.675 µm
Voltage Noise	<2 m Vpp, <300 µVrms
Displacement Noise	<2.25 µm
Transimpedance Gain	100 kV/A
Photocurrent	40 µA (Max)
Output Voltage Range	±4 Vmin
Signal Output Offset	0.3 mVtyp (7 mVmax)
Recommended Spot Size	Ø0.2 mm - Ø7 mm
Operating/Storage Temperature	10 to 40 °C/ -20 to 80 °C
Housing Dimensions	2.00" x 1.20" x 0.65" (50.8 mm x 30.5 mm x 16.5 mm)
Cable Length	5' (1.5 m)
Mounting	8-32 (M4 Adapter Included)

*Resolution is dependent on input optical power and assumes a photocurrent of 40 µA.

Wavelength Dependence of Optical Power (T = 25 °C)



Responsivity Curve (T = 25 °C)



Optical Power Handling

When using the PDP90A, it is necessary to have an appropriate amount of optical power. Graphs of the suggested optical power versus wavelength and the responsivity of the sensor are shown to the left. As the responsivity of the sensor increases, the maximum power decreases. The minimum power that will ensure a sufficient photocurrent for accurate beam position detection is also shown on the graph. As a note, the 0.675 µm resolution is specified with a 40 µA photocurrent, which is also the maximum photocurrent.

T-Cube Controller

The TQD001 is a T-Cube Interface for use with the PDP90A position sensing detector. Its top overlay has a 9-light display that indicates a beam's position on the sensor. The unit has three SMA connections for monitoring the X and Y difference signals as well as the sum signal. These connections allow a position detector to be used in a closed-loop application, such as with our Galvo Scanning Mirror (see page 364).

The T-Cube can also interface with a computer via USB1.1 and uses our APT software. Due to the variety of power supply options available for our T-Cubes, we do not include a power supply with the unit. Two power supply options, the TPS002 two connection supply and the TCH002 six connection power supply and USB hub, are offered below.

CONTROLLER SPECIFICATIONS	
Interface	USB1.1
X & Y Difference Outputs*	-10 to 10 V
Sum Outputs*	0 to 10 V
Position Sensing Connection	6-Pin Hirose
X & Y Position Demand Outputs*	0 to 10 V
Closed-Loop X & Y Position Control	PID
Closed-Loop Bandwidth	200 Hz (Typical)
Dimensions (W x D x H)	60 mm x 60 mm x 47 mm (2.4" x 2.4" x 1.9")
Weight	160 g (5.5 oz)

*SMA Connectors

ITEM #	$	£	€	RMB	DESCRIPTION
PDP90A	$ 380.00	£ 273.60	€ 330,60	¥ 3,028.60	Lateral Effect Detector, 320 – 1100 nm
TQD001	$ 637.50	£ 459.00	€ 554,63	¥ 5,080.88	T-Cube Interface for Position Sensing Detectors
TPS002	$ 105.00	£ 75.60	€ 91,35	¥ 836.85	Power Supply for up to Two TQD001
TCH002	$ 726.90	£ 523.37	€ 632,40	¥ 5,793.39	Power Supply/USB Hub for up to Six T-Cubes