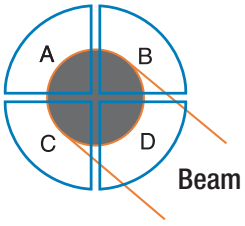
Quadrant Position-Sensing Detectors

PDQ80A

Features

- Measure X and Y Coordinates of a Beam's Position
- Auto Alignment of Beam Possible in Closed-Loop Mode
- 2 Models for the 400 – 1700 nm Range
- SM05 Lens Tube Compatible
- 100 mW/cm² Damage Threshold

Quadrant Detectors



Quadrant Sensor

Our quadrant detectors are based on quadrant photodiodes, which are segmented into four quadrants, each of which produces a photocurrent that is proportional to the power of the incident beam. By closely spacing the four quadrants of the detector, the X and Y displacement of a laser beam can be calculated by comparing the photocurrent produced by each quadrant. Note that since the detector locates the center of the power distribution, these detectors are best suited for use with beams that have even power distributions.

A beam's position is determined based on the sum of the X and Y signal components. For example, in the image to the left that shows four quadrants, the Y position of the beam is calculated by (A + B) – (C + D), while the horizontal location of the beam is (A + C) – (B + D). These difference signals, along with the sum signal (A + B + C + D) are outputted via a 6-pin Hirose connector.

PDQ Series Detectors

Thorlabs offers two quadrant detectors, each with broad wavelength ranges. The PDQ80A utilizes a Ø7.8 mm silicon detector for light detection in the 400 to 1050 nm range. This large sensor is ideally suited for use with beams between Ø1 mm and Ø3.9 mm. The InGaAs version has a Ø3.0 mm detector for use in the 1000 to 1700 nm range. Due to its smaller sensor, this version should be used with beams between Ø0.2 mm and Ø0.5 mm. Focusing optics may be used to achieve the necessary beam diameter.

The PDQ series of detectors feature internal SM05 threading (0.535"-40), which allows for simple integration and compatibility with many SM05-mounted optics such as ND filters. These detectors also have an 8-32 tap for post mounting (M4 adapter included).

SPECIFICATIONS	PDQ80A	PDQ30C
Sensor Type	Si	InGaAs
Wavelength Range	400 – 1050 nm	1000 – 1700 nm
Sensor Size	Ø7.8 mm	Ø3.0 mm
Gap Size	42 µm	45 µm
Responsivity	0.4 A/W (@ 633 nm)	1 A/W (@1630 nm)
Detector Bandwidth	150 kHz	
Dark Current (VReverse = 10 V)	5 nA	2.0 nA (Typical) 100 nA (Max)
Rise Time @ 5 V	40 ns	24 ns (Typical)
Breakdown Voltage	15 V	10 V
Damage Threshold	100 mW/cm²	
Housing Dimensions	2.00" x 1.20" x 0.65" (50.8 mm x 30.5 mm x 16.5 mm)	
Operating Temperature	10 – 40 °C	
Cable Length	5' (1.5 m)	
Mounting Threads	8-32 (M4 Adapter Included)	

T-Cube Interface Controller

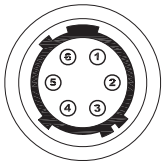
The TQD001 is a T-Cube Interface for use with our quadrant detectors. Its top overlay has a 9-light display that indicates a beam's position on the sensor. The unit has three SMA connections for monitoring the X and Y difference signals as well as the sum signal. These connections allow a position detector 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

Pin Configuration



6 Pin Hirose

PIN #	ASSIGNMENT
1	X-Axis
2	Y-Axis
3	Sum
4	+V (5 to 15 V)
5	Common
6	-V (-5 to -15 V)

ITEM #	$	£	€	RMB	DESCRIPTION
PDQ80A	$ 480.00	£ 345.60	€ 417,60	¥ 3,825.60	Si Quadrant Detector, 400 – 1050 nm
PDQ30C	$ 795.00	£ 572.40	€ 691,65	¥ 6,336.15	InGaAs Quadrant Detector, 1000 – 1700 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