

Quadrant Detectors (Page 1 of 2)

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 right 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 400-1050 nm range. Its large sensor is ideally suited for use with beams between Ø1 mm and Ø3.9 mm. An InGaAs version is also available, which has a Ø3 mm detector for light in the 1-1.7 µm. 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 are SM05 lens tube compatible (see pages xxx – xxx), which allows for simple system integration and compatibility with many mounted optics such as ND filters.

These position sensing detectors are sold without an interface, which is necessary for operation. We offer two interface options, a 4-port interface or a T-Cube interface, that can be used with any of our PDP or PDQ position sensing detectors.

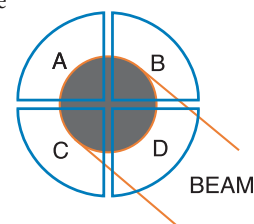
4-Port Interface

The PDH100 4-Port Interface has connections for up to four PDP lateral effect or PDQ quadrant detectors. In its stand-alone mode, the PDH100 interface will light an LED when the beam is centered on the sensor. Alternatively, the PDH100 can be connected to a computer via its USB2.0 connection, and the position of each beam can be viewed graphically with the included graphical user interface (GUI); a screen shot is shown below. The PDH100 is powered through its USB2.0 connection; thus when used in stand-alone mode, it will need to be connected to an AC-to-USB power supply (5 VDC, 500 mA) or to a computer for power.

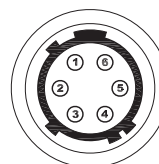
Features:

- 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
- Two Quadrant Detector Interfaces Offered
- 100 mW/cm² Damage Threshold

Quadrant Sensor



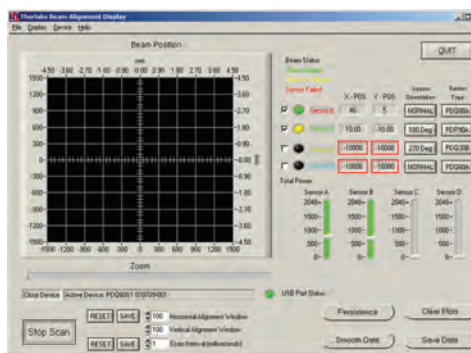
Pin Configuration



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#	PDH100
Interface	USB2.0
A/D Resolution	12 Bit
Maximum Scan Rate	1000 Scans per Second
LED Accuracy	3.8% of Sensor Range
Position Sensing Connection	6 Pin Hirose (4X)
Dimensions	3.6" x 2.4" x 1.3"
Operating Temperature	10 to 40 °C
Input Voltage	+5 VDC (from USB)



PDH100 GUI

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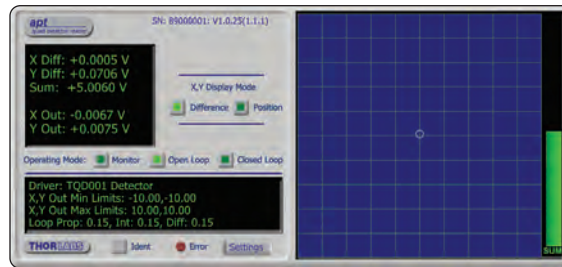
T-Cube Interface

The TQD001 is a T-Cube Interface for our position sensing detectors. Its top overlay has a 9-light display that indicates a beam's position on the sensor. Unlike the PDH100, only one detector can be connected to the T-Cube at a time. However, 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 new Galvo Scanning Mirror (see page 1384). The T-Cube can also interface with a computer via USB1.1 and uses our APT software; a screen shot is shown below. 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.



TQD001

ITEM#	TQD001
Interface	USB1.1
X & Y Difference Outputs*	-10 to 10 V
Sum Output*	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	1 kHz
Dimensions (W x D x H)	60 mm x 60 mm x 47 mm
Weight	160 g (5.5 oz)



TQD001 GUI

*SMA Connectors

ITEM#	PDQ80A	PDQ30C
Sensor Type	Si	InGaAs
Wavelength Range	400-1050 nm	1000-1700 nm
Photodiode Diameter	Ø7.8 mm	Ø3.0 mm
Gap Size	42 µm	45 µm
Detector Bandwidth	150 kHz	
Responsivity	0.45 A/W (@ 633 nm)	1 A/W (@ 1630 nm)
Dark Current (V _{Reverse} = 10 V)	5 nA	2.0 nA (Typ.) 100 nA (Max)
Rise Time @ 5 V	40 ns	24 ns (Typ.)
Breakdown Voltage	15 V	10 V
Housing Dimensions	2.0" x 1.2" x 0.65"	
Damage Threshold	100 mW/cm ²	
Cable Length	5 Feet	
Mounting Threads	#8-32 (M4 Adapter Included)	

Polaris Ø1" Mirror Mount

- Excellent Temperature Stability
- High Repeatability Adjuster Design
- Made with Heat Treated Materials
- 100 TPI Ultra-Fine Adjusters
- ±9.5° Adjustment



POLARIS-K1

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ITEM#	\$	£	€	RMB	DESCRIPTION
PDQ80A	\$ 480.00	£ 332.80	€ 426,20	¥ 4,053.20	Si Quadrant Detector, 400-1050 nm
PDQ30C	\$ 795.00	£ 551.20	€ 705,90	¥ 6,713.00	InGaAs Quadrant Detector, 1000-1700 nm
PDH100	\$ 446.00	£ 309.20	€ 396,00	¥ 3,766.10	4-Port Interface for Position Sensing Detectors
TQD001	\$ 637.50	£ 442.00	€ 566,00	¥ 5,383.10	T-Cube Interface for Position Sensing Detectors
TPS002	\$ 105.00	£ 72.80	€ 93,30	¥ 886.70	Power Supply for up to Two TQD001
TCH002	\$ 726.90	£ 504.00	€ 645,40	¥ 6,138.00	Power Supply/USB Hub for up to Six T-Cubes

NEW

NEW

Galvo Scanning Mirror System

- 1D and 2D Systems Available
- Great for OCT Imaging
- Compatible with TQD001 for Closed-Loop Operation
- Easy OEM Integration

Our new Galvo Scanning Mirrors use galvo motors to rapidly scan a laser beam across one or two dimensions. Independent galvo control boards control each axis, thus allowing for the TQD001 T-Cube's X and Y axis position signals to be connected to the galvo control boards. When used in closed-loop mode, the galvo mirrors will continuously adjust so that the laser beam is centered on the position detector. This type of application is useful when a laser beam must stay aligned to a moving object.

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GVS002