

### 4QD - VIS/UV/IR

- Most commonly used detector
- Highest resolution (down to < 100 nm)
- Fast position detection (up to 100 kHz)



Figure 1: Rear side of 4QD detector  
(The base plate is not included in the delivery.)

### Product description

The 4QD detector is a detector with a 4-quadrant diode. The position of a laser beam on the diode can be displayed without delay on an oscilloscope or, if MRC's beam stabilization system is used, in the plots of the software. Even fastest fluctuations are resolved. The 4QD detector measures the center of the power distribution. It differs from both, beam profilers, which do not show positions in real time and do thus not resolve fast motions, and fast photodiodes, which do not measure beam positions at all.

The 4QD detector is characterized by a very high spatial resolution. With suitable parameters, resolutions down to and even below 100 nm are possible (see figure 2). By using Invar, a material with a small coefficient of thermal expansion, the position is also maintained on long term. In combination with the *Compact* beam stabilization of MRC, it is the most commonly used detector.

For easy adjustment of the laser onto the sensor, the 4QD detector has position and intensity displays on the rear side.

A vacuum and a clean room version are also available.

### Specifications

Detector type	Wavelength	Detection area	Gap *
4QD standard	320 - 1100 nm	10 x 10 mm <sup>2</sup>	30 µm
UV 4QD 3x3	190 - 1000 nm	3 x 3 mm <sup>2</sup>	100 µm
IR 4QD InGaAs	900 - 1700 nm	∅ = 3 mm	45 µm
IR 4QD Germanium	800 - 2000 nm	5 x 5 mm <sup>2</sup>	20 µm

Resolution	Down to < 100 nm (see figure 2)
Bandwidth	Up to 100 kHz
Peak holder	For signal stretching with pulsed lasers
Sensitivity (power / pulse energy)	10-165 µW / 3-55 nJ @ 532 nm cw **
Optical filters in slot in front of sensor / dimension	2 pieces, exchangeable / 11.9 x 11.9 mm <sup>2</sup>
Position display / Intensity display at housing	LED cross with 9 LEDs / LED line with 10 LEDs
Signal scaling of position output	12.6 mV/µm @ d = 1 mm and I = 4 V ***
Electrical power consumption	max. 1.2 W (12 V, 110 mA)

\* The "Gap" designates the non-sensitive separation line between the four quadrants of the diode.

\*\* The specification refers to the values on the sensor. With optical filters in front of the sensor, significantly higher powers or energies can be used. The damage threshold of the detector is defined by these filters alone. Fine adjustment of the sensitivity is possible via a potentiometer.

\*\*\* Here d denotes the beam diameter and I the intensity hitting the sensor. A formula for calculating the position output for other parameters is given in the manual.

# Data sheet

## 4QD Detector



### General Data

Material	Anodized aluminium, Invar, etc.
Dimensions (H x W x D)	49.5 x 40 x 23.9 mm (without post and rod)
Weight	85 g (without post and rod)
Cables	Adapter cable: 4x MCX (at detector), length 16 cm Extension cable: LEMO → LEMO, length 4 m

### Resolution

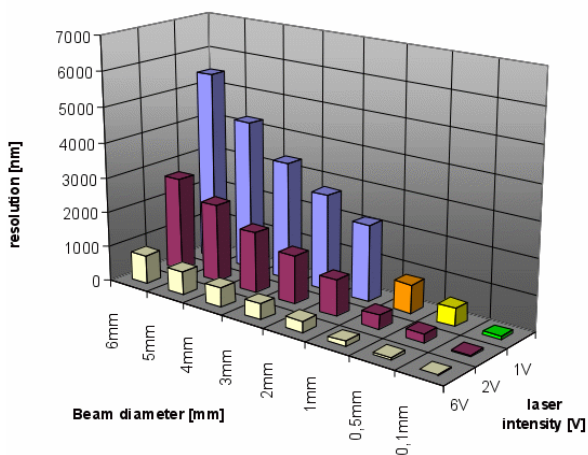
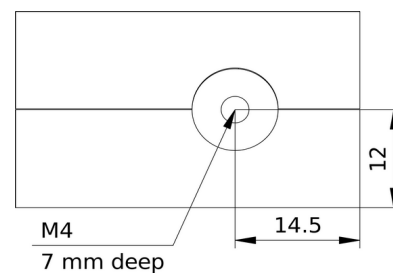
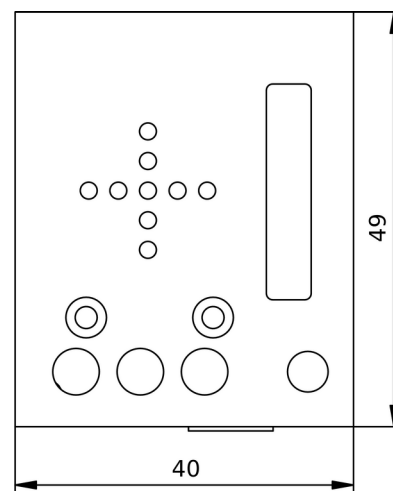


Figure 2: Resolution of a 4QD detector measured with a red He-Ne laser

### Technical drawings

Rear and bottom view of all detectors



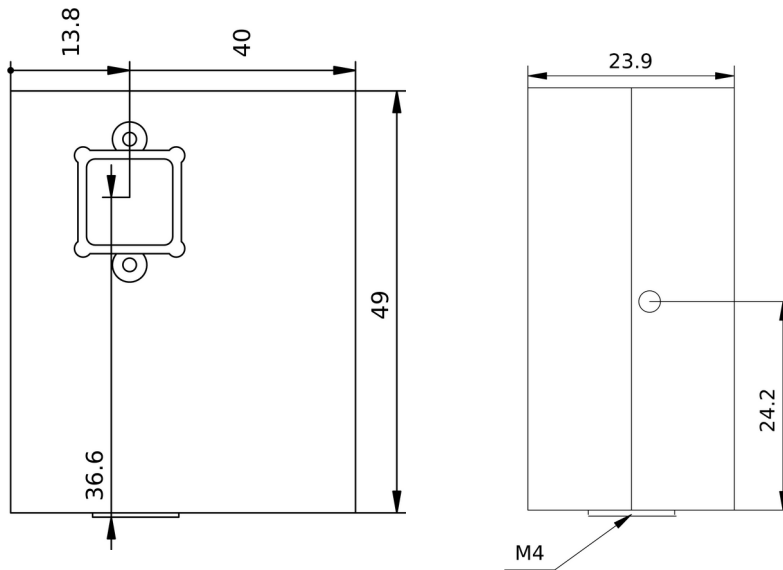
### Pin configuration FGG.0B.306.CLAD52

LEMO	Signal
Pin 1	GND
Pin 2	+ 12V
Pin 3	-
Pin 4	X position
Pin 5	Y position
Pin 6	Intensity

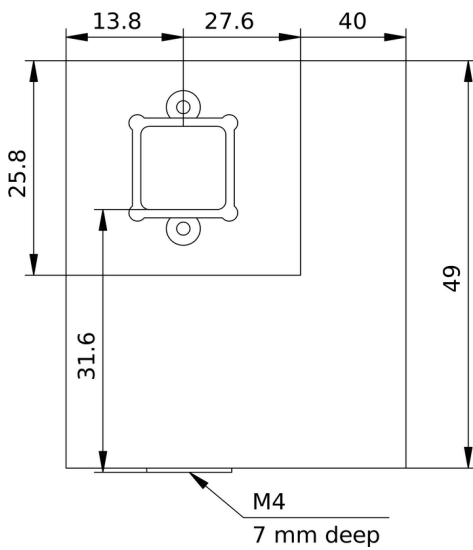
# Data sheet 4QD Detector



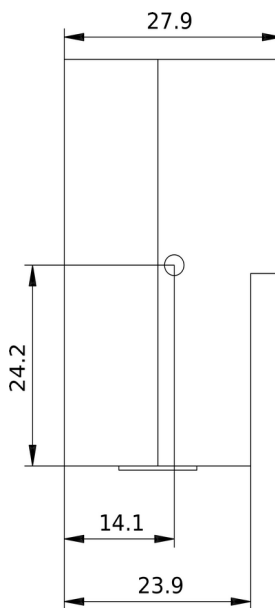
Frontal and side view of 4QD standard



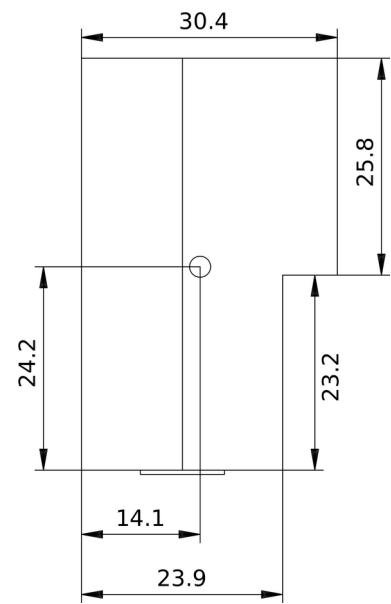
Frontal view of UV 3x3, IR Germanium and IR InGaAs



Side views  
UV 3x3 and IR Germanium



IR InGaAs



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Subject to change without prior notice.