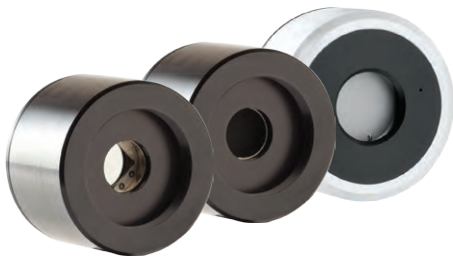


# PRESENTATION

## OVERVIEW OF THE DIFFERENT MODELS

Our pyroelectric energy meters cover a very wide range, going from nanojoules to several tens of joules per pulse. We also have them either in standalone formats, where the electronics are integrated in the device, or as standard sensors that you hook up to an energy meter.



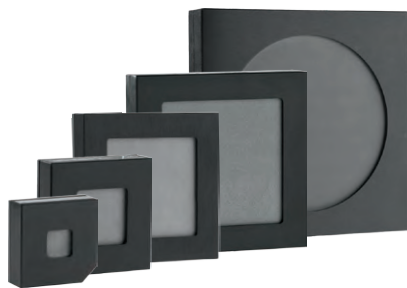
See page 38

### QE-B

- Small Compact Detectors
- 8 and 23 mm  $\varnothing$  Apertures
- Organic Black or Metallic Coatings with Spectral Ranges from DUV to Far-IR
- Noise Levels as low as 50 nJ, without the need of a photo detector.

### COMPACT PYROELECTRIC DETECTORS

**NOISE LEVEL AS LOW AS 50 nJ**



See pages 40 to 48

### QE-MB

- Standard (Broadband) Coating
- Available in 5 sizes:
 

|            |                     |
|------------|---------------------|
| 12 x 12 mm | 65 x 65 mm          |
| 25 x 25 mm | 95 mm $\varnothing$ |
| 50 x 50 mm |                     |
- Low Noise Levels and Possibility to Extend the Response for Long (ms) Pulses

### STANDARD COATING, LONG PULSE CAPABILITY



See pages 40 to 44

### QE-MT

- Metallic (High Repetition Rate) Coating
- Available in 3 sizes:
 

|            |
|------------|
| 12 x 12 mm |
| 25 x 25 mm |
| 50 x 50 mm |
- Pulse-to-Pulse Response up to 6000 Hz

### METALLIC COATING, HIGH REP RATES



See our Special Products Section at page 130 for more details.

### MACH SERIES

- High Speed Digital Joulemeters:
  - Mach 5: Measures EVERY PULSE at 130 kHz
  - Mach 6: Measures EVERY PULSE at 200 kHz
- Capture and Store up to 4 Million Pulses at the Maximum Repetition Rate
- Track Missing Pulses and Pulses below Threshold
- Wide Energy Range: Measure from pJ to mJ

### 130 & 200 KHZ ENERGY METERS

# QED ATTENUATOR

## DESCRIPTION

The QED attenuators increase the energy, energy density, average power and average power density capabilities of the QE Series detectors. They are engineered to typically transmit 35% (@1.064 $\mu\text{m}$ ) of the incident radiation to the detector in a near Lambertian pattern (very wide diffusion pattern). Their slide-in casing make them easy to install and remove and they are held securely in place with the use of simple set screws. Since they become part of the detector, it is important to understand how they will affect the calibration.

### Calibration with a QED Attenuator

3 options are available in terms of calibration:

1. Typical calibration is performed on the QE detector alone and an extra calibration is done with the QED Attenuator in place. This extra calibration is done at one wavelength only, either 532 nm or 1064 nm.
2. The QE detector is calibrated with the QED Attenuator only, offering the full range of sensitivities between 532 nm and 1064 nm. This option is favored when you intend to always use the QE with the QED Attenuator in place and never remove it.
3. Typical calibration is performed on the QE detector alone and the QED calibration is performed by the user (not factory calibrated), using the calibration method described in the user manual.

For more detailed information about the calibration with a QED Attenuator, please contact us at [info@gentec-eo.com](mailto:info@gentec-eo.com).

## SPECIFICATIONS

| OPTICAL CHARACTERISTICS              | QED-12                   | QED-25               | QED-50               | QED-65               | QED-95                |
|--------------------------------------|--------------------------|----------------------|----------------------|----------------------|-----------------------|
| Spectral Range                       | 0.19 – 2.5 $\mu\text{m}$ |                      |                      |                      |                       |
| Transmittance (Typical) <sup>a</sup> |                          |                      |                      |                      |                       |
| 1064 nm                              |                          |                      | 35%                  |                      |                       |
| 266 nm                               |                          |                      | 30%                  |                      |                       |
| Reflectance (Typical)                |                          |                      |                      |                      |                       |
| 1064 nm                              |                          |                      | 45%                  |                      |                       |
| 266 nm                               |                          |                      | 50%                  |                      |                       |
| DAMAGE THRESHOLDS                    |                          |                      |                      |                      |                       |
| Maximum Energy Density               |                          |                      |                      |                      |                       |
| 1064 nm, 7 ns, Single Shot           |                          |                      | 16 J/cm <sup>2</sup> |                      |                       |
| 1064 nm, 7 ns, 10 Hz                 |                          |                      | 8 J/cm <sup>2</sup>  |                      |                       |
| 532 nm, 7 ns, 10 Hz                  |                          |                      | 6 J/cm <sup>2</sup>  |                      |                       |
| 266 nm, 7 ns, 10 Hz                  |                          |                      | 1 J/cm <sup>2</sup>  |                      |                       |
| PHYSICAL CHARACTERISTICS             |                          |                      |                      |                      |                       |
| Effective Aperture                   | 9 X 9 mm                 | 22 X 22 mm           | 47 X 47 mm           | 62 X 62 mm           | 90 mm $\emptyset$     |
| Dimensions                           | 30.5H x 41W x 12.5D mm   | 44H x 55W x 12.5D mm | 69H x 80W x 12.5D mm | 85H x 97W x 12.5D mm | 115H x 127 x 12.5D mm |
| For use with                         | QE12                     | QE25                 | QE50                 | QE65                 | QE95                  |
| ORDERING INFORMATION                 |                          |                      |                      |                      |                       |
| Full Product Name                    | QED-12                   | QED-25               | QED-50               | QED-65               | QED-95                |
| Product Number                       | 201200                   | 201199               | 201198               | 201282               | 201323                |

a. See the full transmittance curve on page 52.

## COMPARISON TABLE

| MODEL                 | $E_{max}$<br>^ | Noise Level | $P_{max}$ | $\lambda_{min}$ | $\lambda_{max}$ | MAX REP RATE | ABSORBER TYPE | APERTURE            | SEE PAGE |
|-----------------------|----------------|-------------|-----------|-----------------|-----------------|--------------|---------------|---------------------|----------|
| QE8SP-B-BL            | 20 mJ          | 200 nJ      | 500 mW    | 100 nm          | 20 $\mu$ m      | 400 Hz       | Black         | 7.8 x 7.8 mm        | 38       |
| QE8SP-B-MT            | 20 mJ          | 50 nJ       | 500 mW    | 100 nm          | 20 $\mu$ m      | 1000 Hz      | Metallic      | 7.8 x 7.8 mm        | 38       |
| QE23SP-B-MT           | 200 mJ         | 100 nJ      | 15 W      | 100 nm          | 20 $\mu$ m      | 1000 Hz      | Metallic      | 23 mm $\varnothing$ | 38       |
| QE12SP-S-MT           | 700 mJ         | 800 nJ      | 3 W       | 190 nm          | 20 $\mu$ m      | 6000 Hz      | Metallic      | 12 x 12 mm          | 40       |
| QE12SP-H-MT           | 700 mJ         | 800 nJ      | 5 W       | 190 nm          | 20 $\mu$ m      | 6000 Hz      | Metallic      | 12 x 12 mm          | 40       |
| QE12LP-S-MB           | 850 mJ         | 700 nJ      | 3 W       | 190 nm          | 20 $\mu$ m      | 300 Hz       | Broadband     | 12 x 12 mm          | 40       |
| QE12LP-H-MB           | 850 mJ         | 700 nJ      | 5 W       | 190 nm          | 20 $\mu$ m      | 300 Hz       | Broadband     | 12 x 12 mm          | 40       |
| QE12SP-S-MT + QED-12  | 1.6 J          | 25 $\mu$ J  | 7.5 W     | 190 nm          | 2.5 $\mu$ m     | 6000 Hz      | Metallic      | 9 x 9 mm            | 40       |
| QE12SP-H-MT + QED-12  | 1.6 J          | 25 $\mu$ J  | 12.5 W    | 190 nm          | 2.5 $\mu$ m     | 6000 Hz      | Metallic      | 9 x 9 mm            | 40       |
| QE25SP-S-MT           | 3 J            | 2 $\mu$ J   | 5 W       | 190 nm          | 20 $\mu$ m      | 6000 Hz      | Metallic      | 25 x 25 mm          | 42       |
| QE25SP-H-MT           | 3 J            | 2 $\mu$ J   | 10 W      | 190 nm          | 20 $\mu$ m      | 6000 Hz      | Metallic      | 25 x 25 mm          | 42       |
| QE25LP-S-MB           | 3.8 J          | 4 $\mu$ J   | 5 W       | 190 nm          | 20 $\mu$ m      | 300 Hz       | Broadband     | 25 x 25 mm          | 42       |
| QE25LP-H-MB           | 3.8 J          | 4 $\mu$ J   | 10 W      | 190 nm          | 20 $\mu$ m      | 300 Hz       | Broadband     | 25 x 25 mm          | 42       |
| QE12LP-S-MB + QED-12  | 3.9 J          | 3 $\mu$ J   | 7.5 W     | 190 nm          | 2.5 $\mu$ m     | 300 Hz       | Broadband     | 9 x 9 mm            | 40       |
| QE12LP-H-MB + QED-12  | 3.9 J          | 3 $\mu$ J   | 12.5 W    | 190 nm          | 2.5 $\mu$ m     | 300 Hz       | Broadband     | 9 x 9 mm            | 40       |
| QE25SP-S-MT + QED-25  | 10 J           | 6 $\mu$ J   | 15 W      | 190 nm          | 2.5 $\mu$ m     | 6000 Hz      | Metallic      | 22 x 22 mm          | 42       |
| QE25SP-H-MT + QED-25  | 10 J           | 6 $\mu$ J   | 30 W      | 190 nm          | 2.5 $\mu$ m     | 6000 Hz      | Metallic      | 22 x 22 mm          | 42       |
| QE50SP-S-MT           | 13 J           | 10 $\mu$ J  | 10 W      | 190 nm          | 20 $\mu$ m      | 4000 Hz      | Metallic      | 50 x 50 mm          | 44       |
| QE50SP-H-MT           | 13 J           | 10 $\mu$ J  | 20 W      | 190 nm          | 20 $\mu$ m      | 4000 Hz      | Metallic      | 50 x 50 mm          | 44       |
| QE50LP-S-MB           | 15 J           | 10 $\mu$ J  | 10 W      | 190 nm          | 20 $\mu$ m      | 200 Hz       | Broadband     | 50 x 50 mm          | 44       |
| QE50LP-H-MB           | 15 J           | 10 $\mu$ J  | 20 W      | 190 nm          | 20 $\mu$ m      | 200 Hz       | Broadband     | 50 x 50 mm          | 44       |
| QE25LP-S-MB + QED-25  | 23 J           | 15 $\mu$ J  | 15 W      | 190 nm          | 2.5 $\mu$ m     | 300 Hz       | Broadband     | 22 x 22 mm          | 42       |
| QE25LP-H-MB + QED-25  | 23 J           | 15 $\mu$ J  | 30 W      | 190 nm          | 2.5 $\mu$ m     | 300 Hz       | Broadband     | 22 x 22 mm          | 42       |
| QE65ELP-S-MB          | 25 J           | 20 $\mu$ J  | 12 W      | 190 nm          | 20 $\mu$ m      | 20 Hz        | Broadband     | 65 x 65 mm          | 46       |
| QE65ELP-H-MB          | 25 J           | 20 $\mu$ J  | 40 W      | 190 nm          | 20 $\mu$ m      | 20 Hz        | Broadband     | 65 x 65 mm          | 46       |
| QE95LP-S-MB           | 35 J           | 15 $\mu$ J  | 20 W      | 190 nm          | 20 $\mu$ m      | 40 Hz        | Broadband     | 95 mm $\varnothing$ | 48       |
| QE95LP-H-MB           | 35 J           | 15 $\mu$ J  | 40 W      | 190 nm          | 20 $\mu$ m      | 40 Hz        | Broadband     | 95 mm $\varnothing$ | 48       |
| QE50SP-S-MT + QED-50  | 44 J           | 30 $\mu$ J  | 25 W      | 190 nm          | 2.5 $\mu$ m     | 4000 Hz      | Metallic      | 47 x 47 mm          | 44       |
| QE50SP-H-MT + QED-50  | 44 J           | 30 $\mu$ J  | 45 W      | 190 nm          | 2.5 $\mu$ m     | 4000 Hz      | Metallic      | 47 x 47 mm          | 44       |
| QE65LP-S-MB           | 50 J           | 10 $\mu$ J  | 12 W      | 190 nm          | 20 $\mu$ m      | 100 Hz       | Broadband     | 65 x 65 mm          | 46       |
| QE65LP-H-MB           | 50 J           | 10 $\mu$ J  | 40 W      | 190 nm          | 20 $\mu$ m      | 100 Hz       | Broadband     | 65 x 65 mm          | 46       |
| QE95ELP-S-MB          | 70 J           | 30 $\mu$ J  | 20 W      | 190 nm          | 20 $\mu$ m      | 10 Hz        | Broadband     | 95 mm $\varnothing$ | 48       |
| QE95ELP-H-MB          | 70 J           | 30 $\mu$ J  | 40 W      | 190 nm          | 20 $\mu$ m      | 10 Hz        | Broadband     | 95 mm $\varnothing$ | 48       |
| QE50LP-S-MB + QED-50  | 85 J           | 30 $\mu$ J  | 25 W      | 190 nm          | 2.5 $\mu$ m     | 200 Hz       | Broadband     | 47 x 47 mm          | 44       |
| QE50LP-H-MB + QED-50  | 85 J           | 30 $\mu$ J  | 45 W      | 190 nm          | 2.5 $\mu$ m     | 200 Hz       | Broadband     | 47 x 47 mm          | 44       |
| QE65LP-S-MB + QED-65  | 125 J          | 30 $\mu$ J  | 30 W      | 190 nm          | 2.5 $\mu$ m     | 100 Hz       | Broadband     | 62 x 62 mm          | 46       |
| QE65LP-H-MB + QED-65  | 125 J          | 30 $\mu$ J  | 90 W      | 190 nm          | 2.5 $\mu$ m     | 100 Hz       | Broadband     | 62 x 62 mm          | 46       |
| QE95LP-S-MB + QED-95  | 150 J          | 45 $\mu$ J  | 45 W      | 190 nm          | 2.5 $\mu$ m     | 40 Hz        | Broadband     | 90 mm $\varnothing$ | 48       |
| QE95LP-H-MB + QED-95  | 150 J          | 45 $\mu$ J  | 90 W      | 190 nm          | 2.5 $\mu$ m     | 40 Hz        | Broadband     | 90 mm $\varnothing$ | 48       |
| QE65ELP-S-MB + QED-65 | 200 J          | 60 $\mu$ J  | 30 W      | 190 nm          | 2.5 $\mu$ m     | 20 Hz        | Broadband     | 62 x 62 mm          | 46       |
| QE65ELP-H-MB + QED-65 | 200 J          | 60 $\mu$ J  | 90 W      | 190 nm          | 2.5 $\mu$ m     | 20 Hz        | Broadband     | 62 x 62 mm          | 46       |
| QE95ELP-S-MB + QED-95 | 250 J          | 90 $\mu$ J  | 45 W      | 190 nm          | 2.5 $\mu$ m     | 10 Hz        | Broadband     | 90 mm $\varnothing$ | 48       |
| QE95ELP-H-MB + QED-95 | 250 J          | 90 $\mu$ J  | 90 W      | 190 nm          | 2.5 $\mu$ m     | 10 Hz        | Broadband     | 90 mm $\varnothing$ | 48       |


# COMPARISON TABLE


## ENERGY RANGES


You can use the graph below to compare the energy ranges of our pyroelectric energy detectors. Ranges go from the noise level to the maximum energy reading (including attenuator when available).

Table 1. Comparison of the energy ranges of the pyroelectric energy detectors



 Black Absorber  
(Low Rep Rates, Up to 400 Hz)

 Metallic Absorber  
(High Rep Rates, Up to 6000 Hz)

 Broadband Absorber  
(Low Rep Rates, Up to 300 Hz +  
Long Pulses, Up to 5 ms)

# QE-B

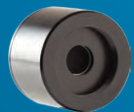
50 nJ - 200 mJ, Ultra-Low Energy Measurements



## KEY FEATURES

- 1 Very Low Noise Levels**  
Noise levels of a photo detector, but with the high energies of a pyroelectric:
  - 50 nJ with the QE8 Series
  - 100 nJ with the QE23SP-B-MT
- 2 Measure at up to 40 000 Hz**  
With the metallic coated (MT) versions, using the analog power module (APM)
- 3 2 Sizes Available**
  - QE8SP-B: 8 x 8 mm pyroelectric sensor, with black or metallic coating
  - QE23SP-B-MT: 23 mm Ø pyroelectric sensor with metallic coating
- 4 Smart Interface**  
Containing all the calibration data

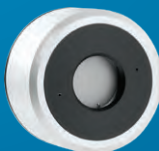
## AVAILABLE MODELS



QE8SP-B-BL  
(8 mm-Organic Black)



QE8SP-B-MT  
(8 mm-Metallic)



QE23SP-B-MT  
(23 mm-Metallic)

## BNC IN OPTION



Available in option: QE8-BNC model with a BNC output for direct measurements with an oscilloscope. To get the specifications of this model, please ask a Gentec-EO representative or check the user manual.

## ACCESSORIES



Stand with Delrin Post  
(Model Number: 200428)



Removable IR Windows  
(Various types available)



APM Analog Power Supply  
(Model Number: 201495)



Pelican Carrying Case

## SEE ALSO

|                         |     |
|-------------------------|-----|
| TECHNICAL DRAWINGS      | 50  |
| COMPATIBLE MONITORS     |     |
| MAESTRO                 | 18  |
| S-LINK-2                | 26  |
| M-LINK                  | 30  |
| LIST OF ALL ACCESSORIES | 174 |

|                                      |  |
|--------------------------------------|--|
| APPLICATION NOTES                    |  |
| MEASUREMENT LIMITS USING JOULEMETERS |  |
| <a href="#">121D-201932</a>          |  |

# QE-B

## SPECIFICATIONS



Approved or in the process of being approved \*

| MODELS                   | QE8SP-B-BL   | QE8SP-B-MT <sup>a</sup> | QE23SP-B-MT |
|--------------------------|--------------|-------------------------|-------------|
| MAX MEASURABLE ENERGY    | 20 mJ        | 20 mJ                   | 200 mJ      |
| MAX REPETITION FREQUENCY | 400 Hz       | 1000 Hz                 | 1000 Hz     |
| EFFECTIVE APERTURE       | 7.8 x 7.8 mm | 7.8 x 7.8 mm            | 23 mm Ø     |

| MEASUREMENT CAPABILITY <sup>b</sup>                   |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|
| Spectral Range  | 0.1 - 20 µm           | 0.1 - 20 µm           | 0.1 - 20 µm           |
| Max Measurable Energy                                 | 20 mJ                 | 20 mJ                 | 200 mJ                |
| Noise Equivalent Energy                               | 200 nJ                | 50 nJ                 | 100 nJ                |
| Sensitivity   | N/A                   | N/A                   | 500 V/J               |
| Max Repetition Frequency                              | 400 Hz                | 1000 Hz               | 1000 Hz               |
| Max Pulse Width                                       | 10 µs                 | 10 µs                 | 10 µs                 |
| Rise Time (0-100%)                                    | 15 µs                 | 15 µs                 | 15 µs                 |
| Calibration Uncertainty                               | ± 3.0%                | ± 3.0%                | ± 3.0%                |
| Repeatability   | ± 0.5%                | ± 0.5%                | ± 0.5%                |
| DAMAGE THRESHOLDS                                     |                       |                       |                       |
| Maximum Average Power                                 | 0.5 W                 | 0.5 W                 | 15 W                  |
| Maximum Average Power Density<br>1064 nm, 7 ns, 10 Hz | 1 W/cm <sup>2</sup>   | 1 W/cm <sup>2</sup>   | N/A                   |
| Maximum Energy Density<br>1064 nm, 7 ns, 10 Hz        | 50 mJ/cm <sup>2</sup> | 50 mJ/cm <sup>2</sup> | 50 mJ/cm <sup>2</sup> |
| PHYSICAL CHARACTERISTICS                              |                       |                       |                       |
| Effective Aperture                                    | 7.8 x 7.8 mm          | 7.8 x 7.8 mm          | 23 mm Ø               |
| Sensor  | Pyroelectric          | Pyroelectric          | Pyroelectric          |
| Absorber  | BL                    | MT                    | MT                    |
| Connector   | DB-15                 | DB-15                 | DB-15                 |
| Dimensions  | 38.1 Ø X 27.4D mm     | 38.1 Ø X 27.4D mm     | 63.5 Ø X 33.8D mm     |
| Weight  | 80 g                  | 80 g                  | 227 g                 |
| ORDERING INFORMATION                                  |                       |                       |                       |
| Full Product Name                                     | QE8SP-B-BL            | QE8SP-B-MT            | QE23SP-B-MT           |
| Product Number  | 202017                | 201968                | 202112                |

a. This model is available in option with a BNC output.

Model name: QE8SP-B-MT-C0

Model number: 202084

For more information, including technical specifications, please ask your Gentec-EO representative or check the user manual.

b. Specifications may vary with the monitor used.

Specifications are subject to change without notice

\* For details, contact your Gentec-EO representative

# QE12

12 x 12 mm, 0.7  $\mu$ J - 3.9 J



## KEY FEATURES

- 1 Modular Concept**  
Increase the power capability of your detector:  
2 different cooling modules
- 2 Low Noise Level**  
0.7  $\mu$ J for the MB coating
- 3 QED Attenuator Available**
  - Measure up to 5X higher energies
  - Available with optional calibration, all wavelengths between 532 & 1064 nm, or single wavelength
- 5 Available with Metallic Absorber**  
High Repetition Rate (6000 Hz)
- 6 Test Target Included**  
With the MB models
- 7 Smart Interface**  
Containing all the calibration data

## AVAILABLE MODELS



QE12LP-S-MB  
(Broadband-Convection)



QE12LP-H-MB  
(Broadband-Heatsink)



QE12SP-S-MT  
(Metallic-Convection)



QE12SP-H-MT  
(Metallic-Heatsink)

## ACCESSORIES



Stand with Delrin Post  
(Model Number: 200428)



DB-15 to BNC Adaptor  
(Model Number: 200036)



QED-12 Attenuator  
(Model Number: 201200)



Pelican Carrying Case

## SEE ALSO

|                         |     |
|-------------------------|-----|
| HOW IT WORKS            | 10  |
| CALIBRATION             | 6   |
| TECHNICAL DRAWINGS      | 50  |
| ABSORPTION CURVES       | 52  |
| QED ATTENUATOR          | 35  |
| COMPATIBLE MONITORS     |     |
| MAESTRO                 | 18  |
| S-LINK-2                | 26  |
| M-LINK                  | 30  |
| LIST OF ALL ACCESSORIES | 174 |

MONITORS

ENERGY DETECTORS

POWER DETECTORS

PHOTO DETECTORS

THZ DETECTORS

OEM DETECTORS

CALORIMETERS

SPECIAL PRODUCTS

BEAM DIAGNOSTICS

# QE12

## SPECIFICATIONS



\*Also traceable to NRC-CNRC

| MODELS   | QE12LP-S-MB | QE12LP-H-MB | QE12SP-S-MT | QE12SP-H-MT |
|--|-------------|-------------|-------------|-------------|
| <b>MAX MEASURABLE ENERGY (WITH ATTENUATOR)</b> | 3.9 J       | 3.9 J       | 1.6 J       | 1.6 J       |
| <b>MAX REPETITION FREQUENCY</b>                | 300 Hz      | 300 Hz      | 6000 Hz     | 6000 Hz     |
| <b>EFFECTIVE APERTURE</b>                      | 12 x 12 mm  | 12 x 12 mm  | 12 x 12 mm  | 12 x 12 mm  |

### MEASUREMENT CAPABILITY

| Spectral Range <sup>a</sup>            | 0.19 – 20 $\mu\text{m}$        |            | 0.19 – 20 $\mu\text{m}$        |            | 0.19 – 20 $\mu\text{m}$ <sup>b</sup> |            | 0.19 – 20 $\mu\text{m}$ <sup>b</sup> |            |
|--|--------------------------------|------------|--------------------------------|------------|--------------------------------------|------------|--------------------------------------|------------|
|  | Alone                          | Attenuator | Alone                          | Attenuator | Alone                                | Attenuator | Alone                                | Attenuator |
| Maximum Measurable Energy <sup>c</sup> |                                |            |                                |            |                                      |            |                                      |            |
| 1064 nm, 7 ns, 10 Hz <sup>d</sup>      | 0.85 J                         | 3.9 J      | 0.85 J                         | 3.9 J      | 0.70 J                               | 1.60 J     | 0.70 J                               | 1.60 J     |
| 266 nm, 7 ns, 10 Hz                    | 0.70 J                         | 0.81 J     | 0.70 J                         | 0.81 J     | 0.10 J                               | 0.25 J     | 0.10 J                               | 0.25 J     |
| Noise Equivalent Energy <sup>e</sup>   | 0.7 $\mu\text{J}$              |            | 0.7 $\mu\text{J}$              |            | 0.8 $\mu\text{J}$                    |            | 0.8 $\mu\text{J}$                    |            |
| Sensitivity <sup>f, g</sup>            | 60 V/J                         |            | 60 V/J                         |            | 100 V/J                              |            | 100 V/J                              |            |
| Max Repetition Frequency               | 300 Hz                         |            | 300 Hz                         |            | 6000 Hz                              |            | 6000 Hz                              |            |
| Maximum Pulse Width (typical)          | 400 $\mu\text{s}$ <sup>*</sup> |            | 400 $\mu\text{s}$ <sup>*</sup> |            | 10 $\mu\text{s}$                     |            | 10 $\mu\text{s}$                     |            |
| Rise Time (typical 0-100 %)            | 550 $\mu\text{s}$              |            | 550 $\mu\text{s}$              |            | 20 $\mu\text{s}$                     |            | 20 $\mu\text{s}$                     |            |
| Calibration Uncertainty <sup>h</sup>   | $\pm 3\%$                      |            | $\pm 3\%$                      |            | $\pm 3\%$                            |            | $\pm 3\%$                            |            |
| Repeatability                          | <0.5 %                         |            | <0.5 %                         |            | <0.5 %                               |            | <0.5 %                               |            |

### DAMAGE THRESHOLDS

| Maximum Average Power         | All Wavelengths       |                       | All Wavelengths                   |                       | All Wavelengths        |                        | All Wavelengths                   |                        |
|-------------------------------|-----------------------|-----------------------|-----------------------------------|-----------------------|------------------------|------------------------|-----------------------------------|------------------------|
|                               | Alone                 | Attenuator            | Alone                             | Attenuator            | Alone                  | Attenuator             | Alone                             | Attenuator             |
| Maximum Energy Density        |                       |                       |                                   |                       |                        |                        |                                   |                        |
| 1064 nm, 7 ns, single shot    | 0.6 J/cm <sup>2</sup> | 16 J/cm <sup>2</sup>  | 0.6 J/cm <sup>2</sup>             | 16 J/cm <sup>2</sup>  | 0.50 J/cm <sup>2</sup> | 4 J/cm <sup>2</sup>    | 0.50 J/cm <sup>2</sup>            | 4 J/cm <sup>2</sup>    |
| 1064 nm, 7 ns, 10 Hz          | 0.6 J/cm <sup>2</sup> | 8 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup>             | 8 J/cm <sup>2</sup>   | 0.50 J/cm <sup>2</sup> | 2 J/cm <sup>2</sup>    | 0.50 J/cm <sup>2</sup>            | 2 J/cm <sup>2</sup>    |
| 532 nm, 7 ns, 10 Hz           | 0.6 J/cm <sup>2</sup> | 6 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup>             | 6 J/cm <sup>2</sup>   | 0.07 J/cm <sup>2</sup> | 0.35 J/cm <sup>2</sup> | 0.07 J/cm <sup>2</sup>            | 0.35 J/cm <sup>2</sup> |
| 266 nm, 7 ns, 10 Hz           | 0.5 J/cm <sup>2</sup> | 1 J/cm <sup>2</sup>   | 0.5 J/cm <sup>2</sup>             | 1 J/cm <sup>2</sup>   | 0.07 J/cm <sup>2</sup> | 0.30 J/cm <sup>2</sup> | 0.07 J/cm <sup>2</sup>            | 0.30 J/cm <sup>2</sup> |
| Maximum Average Power Density | 10 W/cm <sup>2</sup>  | 600 W/cm <sup>2</sup> | 10 W/cm <sup>2</sup> <sup>i</sup> | 600 W/cm <sup>2</sup> | 10 W/cm <sup>2</sup>   | 600 W/cm <sup>2</sup>  | 10 W/cm <sup>2</sup> <sup>i</sup> | 600 W/cm <sup>2</sup>  |

### PHYSICAL CHARACTERISTICS

| Effective Aperture (with Attenuator) | 12 X 12 mm (9 X 9 mm) |  |                    |  |                    |  |                    |  |
|--------------------------------------|-----------------------|--|--------------------|--|--------------------|--|--------------------|--|
| Absorber                             | Multi-Band            |  | Multi-Band         |  | Metallic           |  | Metallic           |  |
| Dimensions                           | 36H x 36W x 14D mm    |  | 36H x 36W x 33D mm |  | 36H x 36W x 14D mm |  | 36H x 36W x 33D mm |  |
| Weight                               | 87 g                  |  | 117 g              |  | 87 g               |  | 117 g              |  |

### ORDERING INFORMATION

| Full Product Name                | QE12LP-S-MB | QE12LP-H-MB | QE12SP-S-MT | QE12SP-H-MT |
|----------------------------------|-------------|-------------|-------------|-------------|
| Product Number (Including stand) | 200508      | 200510      | 200511      | 200512      |

\*Also available on special order: The Extra Long Pulse Series QE12ELP-MB for pulse widths up to 2 msec, custom-tuned for rep. rate, sensitivity, and pulse width.

a. 0.19 - 2.5  $\mu\text{m}$  with QED Attenuator.  
 b. Detectors with the MT coating can be used within the range 0.19 to 20  $\mu\text{m}$ , however the absorption in the IR wavelengths decreases significantly. This, in turn, reduces the sensitivity and increases the noise level.  
 c. Not exceeding Maximum Average Power.  
 d. Increasing pulse width increases the maximum measurable energy.

e. Nominal value, actual value depends on electrical noise in the measurement system.  
 f. Load: 1 M $\Omega$  and  $\leq 30$  pF.  
 g. Maximum output voltage = sensitivity x maximum energy.  
 h. Excludes non-linearities.  
 i. At 3 W. Maximum Average Power Density is 10 W/cm<sup>2</sup> @ 5 W for -H versions.

Specifications are subject to change without notice

# QE25

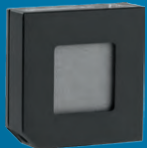
25 x 25 mm, 2  $\mu$ J - 23 J



## KEY FEATURES

- 1 Modular Concept**  
Increase the power capability of your detector:  
2 different cooling modules
- 2 Low Noise Level**  
2  $\mu$ J for the MT coating
- 3 QED Attenuator Available**
  - Measure up to 5X higher energies
  - Available with optional calibration, all wavelengths between 532 & 1064 nm, or single wavelength
- 4 Available with Metallic Absorber**  
High Repetition Rate (6000 Hz)
- 5 Test Target Included**  
With the MB models
- 6 Smart Interface**  
Containing all the calibration data

## AVAILABLE MODELS



QE25LP-S-MB  
(Broadband-Convection)



QE25LP-H-MB  
(Broadband-Heatsink)



QE25SP-S-MT  
(Metallic-Convection)



QE25SP-H-MT  
(Metallic-Heatsink)

## ACCESSORIES



Stand with Delrin Post  
(Model Number: 200428)



DB-15 to BNC Adaptor  
(Model Number: 200036)



QED-25 Attenuator  
(Model Number: 201199)



Pelican Carrying Case

## SEE ALSO

|                         |     |
|-------------------------|-----|
| HOW IT WORKS            | 10  |
| CALIBRATION             | 6   |
| TECHNICAL DRAWINGS      | 50  |
| ABSORPTION CURVES       | 52  |
| QED ATTENUATOR          | 35  |
| COMPATIBLE MONITORS     |     |
| MAESTRO                 | 18  |
| S-LINK-2                | 26  |
| M-LINK                  | 30  |
| LIST OF ALL ACCESSORIES | 174 |

# QE25

## SPECIFICATIONS



\*Also traceable to NRC-CNRC

| MODELS   | QE25LP-S-MB | QE25LP-H-MB | QE25SP-S-MT | QE25SP-H-MT |
|--|-------------|-------------|-------------|-------------|
| <b>MAX MEASURABLE ENERGY (WITH ATTENUATOR)</b> | 23 J        | 23 J        | 10 J        | 10 J        |
| <b>MAX REPETITION FREQUENCY</b>                | 300 Hz      | 300 Hz      | 6000 Hz     | 6000 Hz     |
| <b>EFFECTIVE APERTURE</b>                      | 25 x 25 mm  | 25 x 25 mm  | 25 x 25 mm  | 25 x 25 mm  |

### MEASUREMENT CAPABILITY

| Spectral Range <sup>a</sup>            | 0.19 – 20 $\mu\text{m}$ |            | 0.19 – 20 $\mu\text{m}$ |            | 0.19 – 20 $\mu\text{m}$ <sup>b</sup> |            | 0.19 – 20 $\mu\text{m}$ <sup>b</sup> |            |
|--|-------------------------|------------|-------------------------|------------|--------------------------------------|------------|--------------------------------------|------------|
|  | Alone                   | Attenuator | Alone                   | Attenuator | Alone                                | Attenuator | Alone                                | Attenuator |
| Maximum Measurable Energy <sup>c</sup> |                         |            |                         |            |                                      |            |                                      |            |
| 1064 nm, 7 ns, 10 Hz <sup>d</sup>      | 3.8 J                   | 23 J       | 3.8 J                   | 23 J       | 3.0 J                                | 10 J       | 3.0 J                                | 10 J       |
| 266 nm, 7 ns, 10 Hz                    | 3.1 J                   | 4.8 J      | 3.1 J                   | 4.8 J      | 0.44 J                               | 1.5 J      | 0.44 J                               | 1.5 J      |
| Noise Equivalent Energy <sup>e</sup>   | 4 $\mu\text{J}$         |            | 4 $\mu\text{J}$         |            | 2 $\mu\text{J}$                      |            | 2 $\mu\text{J}$                      |            |
| Sensitivity <sup>f, g</sup>            | 10 V/J                  |            | 10 V/J                  |            | 20 V/J                               |            | 20 V/J                               |            |
| Max Repetition Frequency               | 300 Hz                  |            | 300 Hz                  |            | 6000 Hz                              |            | 6000 Hz                              |            |
| Maximum Pulse Width (typical)          | 400 $\mu\text{s}$ *     |            | 400 $\mu\text{s}$ *     |            | 10 $\mu\text{s}$                     |            | 10 $\mu\text{s}$                     |            |
| Rise Time (typical 0-100 %)            | 550 $\mu\text{s}$       |            | 550 $\mu\text{s}$       |            | 20 $\mu\text{s}$                     |            | 20 $\mu\text{s}$                     |            |
| Calibration Uncertainty <sup>h</sup>   | $\pm 3\%$               |            | $\pm 3\%$               |            | $\pm 3\%$                            |            | $\pm 3\%$                            |            |
| Repeatability                          | <0.5 %                  |            | <0.5 %                  |            | <0.5 %                               |            | <0.5 %                               |            |

### DAMAGE THRESHOLDS

| Maximum Average Power         | Alone                 |                       | Alone                             |                       | Alone                  |                        | Alone                             |                        |
|-------------------------------|-----------------------|-----------------------|-----------------------------------|-----------------------|------------------------|------------------------|-----------------------------------|------------------------|
|                               | Attenuator            | Attenuator            | Attenuator                        | Attenuator            | Attenuator             | Attenuator             | Attenuator                        | Attenuator             |
| All Wavelengths               | 5 W                   | 15 W                  | 10 W                              | 30 W                  | 5 W                    | 15 W                   | 10 W                              | 30 W                   |
| Maximum Energy Density        | Alone                 |                       | Alone                             |                       | Alone                  |                        | Alone                             |                        |
|                               | Attenuator            | Attenuator            | Attenuator                        | Attenuator            | Attenuator             | Attenuator             | Attenuator                        | Attenuator             |
| 1064 nm, 7 ns, single shot    | 0.6 J/cm <sup>2</sup> | 16 J/cm <sup>2</sup>  | 0.6 J/cm <sup>2</sup>             | 16 J/cm <sup>2</sup>  | 0.50 J/cm <sup>2</sup> | 4 J/cm <sup>2</sup>    | 0.50 J/cm <sup>2</sup>            | 4 J/cm <sup>2</sup>    |
| 1064 nm, 7 ns, 10 Hz          | 0.6 J/cm <sup>2</sup> | 8 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup>             | 8 J/cm <sup>2</sup>   | 0.50 J/cm <sup>2</sup> | 2 J/cm <sup>2</sup>    | 0.50 J/cm <sup>2</sup>            | 2 J/cm <sup>2</sup>    |
| 532 nm, 7 ns, 10 Hz           | 0.6 J/cm <sup>2</sup> | 6 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup>             | 6 J/cm <sup>2</sup>   | 0.07 J/cm <sup>2</sup> | 0.35 J/cm <sup>2</sup> | 0.07 J/cm <sup>2</sup>            | 0.35 J/cm <sup>2</sup> |
| 266 nm, 7 ns, 10 Hz           | 0.5 J/cm <sup>2</sup> | 1 J/cm <sup>2</sup>   | 0.5 J/cm <sup>2</sup>             | 1 J/cm <sup>2</sup>   | 0.07 J/cm <sup>2</sup> | 0.30 J/cm <sup>2</sup> | 0.07 J/cm <sup>2</sup>            | 0.30 J/cm <sup>2</sup> |
| Maximum Average Power Density | 10 W/cm <sup>2</sup>  | 600 W/cm <sup>2</sup> | 10 W/cm <sup>2</sup> <sup>i</sup> | 600 W/cm <sup>2</sup> | 10 W/cm <sup>2</sup>   | 600 W/cm <sup>2</sup>  | 10 W/cm <sup>2</sup> <sup>i</sup> | 600 W/cm <sup>2</sup>  |

### PHYSICAL CHARACTERISTICS

|                                      |                         |  |                      |  |                    |  |                      |  |
|--------------------------------------|-------------------------|--|----------------------|--|--------------------|--|----------------------|--|
| Effective Aperture (with Attenuator) | 25 X 25 mm (22 X 22 mm) |  |                      |  |                    |  |                      |  |
| Absorber                             | Multi-Band              |  | Multi-Band           |  | Metallic           |  | Metallic             |  |
| Dimensions                           | 50H x 50W x 14D mm      |  | 50H x 50W x 52.5D mm |  | 50H x 50W x 14D mm |  | 50H x 50W x 52.5D mm |  |
| Weight                               | 120 g                   |  | 187 g                |  | 120 g              |  | 187 g                |  |

### ORDERING INFORMATION

|                                  |             |             |             |             |
|----------------------------------|-------------|-------------|-------------|-------------|
| Full Product Name                | QE25LP-S-MB | QE25LP-H-MB | QE25SP-S-MT | QE25SP-H-MT |
| Product Number (Including stand) | 200312      | 200313      | 200310      | 200311      |

\*Also available on special order: The Extra Long Pulse Series QE25ELP-MB for pulse widths up to 4 msec, custom-tuned for rep. rate, sensitivity, and pulse width.

a. 0.19 - 2.5  $\mu\text{m}$  with QED Attenuator.  
 b. Detectors with the MT coating can be used within the range 0.19 to 20  $\mu\text{m}$ , however the absorption in the IR wavelengths decreases significantly. This, in turn, reduces the sensitivity and increases the noise level. Nevertheless, each detector is individually scanned and the wavelength correction factor (PWC) is NIST traceable in the range of 248 nm to 2.5  $\mu\text{m}$ .  
 c. Not exceeding Maximum Average Power.

d. Increasing pulse width increases the maximum measurable energy.  
 e. Nominal value, actual value depends on electrical noise in the measurement system.  
 f. Load: 1 M $\Omega$  and  $\leq$  30 pF.  
 g. Maximum output voltage = sensitivity x maximum energy.  
 h. Excludes non-linearities.  
 i. At 5 W. Maximum Average Power Density is 10 W/cm<sup>2</sup> @ 10 W for -H versions.

Specifications are subject to change without notice

# QE50

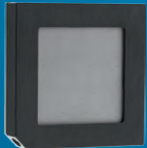
50 x 50 mm, 10  $\mu$ J - 85 J



## KEY FEATURES

- 1 Modular Concept**  
Increase the power capability of your detector:  
2 different cooling modules
- 2 Low Noise Level**  
10  $\mu$ J for both coatings
- 3 QED Attenuator Available**
  - Measure up to 5X higher energies
  - Available with optional calibration, all wavelengths between 532 & 1064 nm, or single wavelength
- 4 Available with Metallic Absorber**  
High Repetition Rate (4000 Hz)
- 5 Test Target Included**  
With the MB models
- 6 Smart Interface**  
Containing all the calibration data

## AVAILABLE MODELS



QE50LP-S-MB  
(Broadband-Convection)



QE50LP-H-MB  
(Broadband-Heatsink)



QE50SP-S-MT  
(Metallic-Convection)



QE50SP-H-MT  
(Metallic-Heatsink)

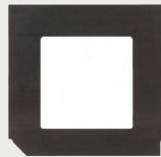
## ACCESSORIES



Stand with Delrin Post  
(Model Number: 200428)



DB-15 to BNC Adaptor  
(Model Number: 200036)



QED-50 Attenuator  
(Model Number: 201198)



Pelican Carrying Case

## SEE ALSO

|                         |     |
|-------------------------|-----|
| HOW IT WORKS            | 10  |
| CALIBRATION             | 6   |
| TECHNICAL DRAWINGS      | 50  |
| ABSORPTION CURVES       | 52  |
| QED ATTENUATOR          | 35  |
| COMPATIBLE MONITORS     |     |
| MAESTRO                 | 18  |
| S-LINK-2                | 26  |
| M-LINK                  | 30  |
| LIST OF ALL ACCESSORIES | 174 |

# QE50

## SPECIFICATIONS



\*Also traceable to NRC-CNRC

| MODELS   | QE50LP-S-MB | QE50LP-H-MB | QE50SP-S-MT | QE50SP-H-MT |
|--|-------------|-------------|-------------|-------------|
| <b>MAX MEASURABLE ENERGY (WITH ATTENUATOR)</b> | 85 J        | 85 J        | 44 J        | 44 J        |
| <b>MAX REPETITION FREQUENCY</b>                | 200 Hz      | 200 Hz      | 4000 Hz     | 4000 Hz     |
| <b>EFFECTIVE APERTURE</b>                      | 50 x 50 mm  | 50 x 50 mm  | 50 x 50 mm  | 50 x 50 mm  |

### MEASUREMENT CAPABILITY

| Spectral Range <sup>a</sup>            | 0.19 – 20 $\mu\text{m}$        |            | 0.19 – 20 $\mu\text{m}$        |            | 0.19 – 20 $\mu\text{m}$ <sup>b</sup> |            | 0.19 – 20 $\mu\text{m}$ <sup>b</sup> |            |
|--|--------------------------------|------------|--------------------------------|------------|--------------------------------------|------------|--------------------------------------|------------|
|  | Alone                          | Attenuator | Alone                          | Attenuator | Alone                                | Attenuator | Alone                                | Attenuator |
| Maximum Measurable Energy <sup>c</sup> |                                |            |                                |            |                                      |            |                                      |            |
| 1064 nm, 7 ns, 10 Hz <sup>d</sup>      | 15 J                           | 85 J       | 15 J                           | 85 J       | 13 J                                 | 44 J       | 13 J                                 | 44 J       |
| 266 nm, 7 ns, 10 Hz                    | 12.5 J                         | 22 J       | 12.5 J                         | 22 J       | 1.8 J                                | 6.5 J      | 1.8 J                                | 6.5 J      |
| Noise Equivalent Energy <sup>e</sup>   | 10 $\mu\text{J}$               |            | 10 $\mu\text{J}$               |            | 10 $\mu\text{J}$                     |            | 10 $\mu\text{J}$                     |            |
| Sensitivity <sup>f, g</sup>            | 3 V/J                          |            | 3 V/J                          |            | 4 V/J                                |            | 4 V/J                                |            |
| Max Repetition Frequency               | 200 Hz                         |            | 200 Hz                         |            | 4000 Hz                              |            | 4000 Hz                              |            |
| Maximum Pulse Width (typical)          | 675 $\mu\text{s}$ <sup>*</sup> |            | 675 $\mu\text{s}$ <sup>*</sup> |            | 10 $\mu\text{s}$                     |            | 10 $\mu\text{s}$                     |            |
| Rise Time (typical 0-100 %)            | 900 $\mu\text{s}$              |            | 900 $\mu\text{s}$              |            | 20 $\mu\text{s}$                     |            | 20 $\mu\text{s}$                     |            |
| Calibration Uncertainty <sup>h</sup>   | $\pm 3\%$                      |            | $\pm 3\%$                      |            | $\pm 3\%$                            |            | $\pm 3\%$                            |            |
| Repeatability                          | <0.5 %                         |            | <0.5 %                         |            | <0.5 %                               |            | <0.5 %                               |            |

### DAMAGE THRESHOLDS

| Maximum Average Power         | Alone                 |                       | Alone                             |                       | Alone                  |                        | Alone                             |                        |
|-------------------------------|-----------------------|-----------------------|-----------------------------------|-----------------------|------------------------|------------------------|-----------------------------------|------------------------|
|                               | Attenuator            | Attenuator            | Attenuator                        | Attenuator            | Attenuator             | Attenuator             | Attenuator                        | Attenuator             |
| All Wavelengths               | 10 W                  | 25 W                  | 20 W                              | 45 W                  | 10 W                   | 25 W                   | 20 W                              | 45 W                   |
| Maximum Energy Density        | Alone                 |                       | Alone                             |                       | Alone                  |                        | Alone                             |                        |
|                               | Attenuator            | Attenuator            | Attenuator                        | Attenuator            | Attenuator             | Attenuator             | Attenuator                        | Attenuator             |
| 1064 nm, 7 ns, single shot    | 0.6 J/cm <sup>2</sup> | 16 J/cm <sup>2</sup>  | 0.6 J/cm <sup>2</sup>             | 16 J/cm <sup>2</sup>  | 0.50 J/cm <sup>2</sup> | 4 J/cm <sup>2</sup>    | 0.50 J/cm <sup>2</sup>            | 4 J/cm <sup>2</sup>    |
| 1064 nm, 7 ns, 10 Hz          | 0.6 J/cm <sup>2</sup> | 8 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup>             | 8 J/cm <sup>2</sup>   | 0.50 J/cm <sup>2</sup> | 2 J/cm <sup>2</sup>    | 0.50 J/cm <sup>2</sup>            | 2 J/cm <sup>2</sup>    |
| 532 nm, 7 ns, 10 Hz           | 0.6 J/cm <sup>2</sup> | 6 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup>             | 6 J/cm <sup>2</sup>   | 0.07 J/cm <sup>2</sup> | 0.35 J/cm <sup>2</sup> | 0.07 J/cm <sup>2</sup>            | 0.35 J/cm <sup>2</sup> |
| 266 nm, 7 ns, 10 Hz           | 0.5 J/cm <sup>2</sup> | 1 J/cm <sup>2</sup>   | 0.5 J/cm <sup>2</sup>             | 1 J/cm <sup>2</sup>   | 0.07 J/cm <sup>2</sup> | 0.30 J/cm <sup>2</sup> | 0.07 J/cm <sup>2</sup>            | 0.30 J/cm <sup>2</sup> |
| Maximum Average Power Density | 10 W/cm <sup>2</sup>  | 600 W/cm <sup>2</sup> | 10 W/cm <sup>2</sup> <sup>i</sup> | 600 W/cm <sup>2</sup> | 10 W/cm <sup>2</sup>   | 600 W/cm <sup>2</sup>  | 10 W/cm <sup>2</sup> <sup>i</sup> | 600 W/cm <sup>2</sup>  |

### PHYSICAL CHARACTERISTICS

|                                      |                         |  |                    |  |                    |  |                    |  |
|--------------------------------------|-------------------------|--|--------------------|--|--------------------|--|--------------------|--|
| Effective Aperture (with Attenuator) | 50 X 50 mm (47 X 47 mm) |  |                    |  |                    |  |                    |  |
| Absorber                             | Multi-Band              |  | Multi-Band         |  | Metallic           |  | Metallic           |  |
| Dimensions                           | 75H x 75W x 15D mm      |  | 75H x 75W x 44D mm |  | 75H x 75W x 15D mm |  | 75H x 75W x 44D mm |  |
| Weight                               | 209 g                   |  | 338 g              |  | 209 g              |  | 338 g              |  |

### ORDERING INFORMATION

|                                  |             |             |             |             |
|----------------------------------|-------------|-------------|-------------|-------------|
| Full Product Name                | QE50LP-S-MB | QE50LP-H-MB | QE50SP-S-MT | QE50SP-H-MT |
| Product Number (Including stand) | 200307      | 200308      | 200305      | 200306      |

\*Also available on special order: The Extra Long Pulse Series QE50ELP-MB for pulse widths up to 4 msec, custom-tuned for rep. rate, sensitivity, and pulse width.

a. 0.19 - 2.5  $\mu\text{m}$  with QED Attenuator.b. Detectors with the MT coating can be used within the range 0.19 to 20  $\mu\text{m}$ , however the absorption in the IR wavelengths decreases significantly. This, in turn, reduces the sensitivity and increases the noise level. Nevertheless, each detector is individually scanned and the wavelength correction factor (PWC) is NIST traceable in the range of 248 nm to 2.5  $\mu\text{m}$ .

c. Not exceeding Maximum Average Power.

d. Increasing pulse width increases the maximum measurable energy.

e. Nominal value, actual value depends on electrical noise in the measurement system.

f. Load: 1 M $\Omega$  and  $\leq$  30 pF.

g. Maximum output voltage = sensitivity x maximum energy.

h. Excludes non-linearities.

i. At 5 W. Maximum Average Power Density is 10 W/cm<sup>2</sup> @ 10 W for -H versions.

Specifications are subject to change without notice

# QE65

65 x 65 mm, 10  $\mu$ J - 200 J



## KEY FEATURES

- 1 Modular Concept**  
Increase the power capability of your detector:  
2 different cooling modules
- 2 Large Aperture**  
Effective aperture of 65 x 65 mm
- 3 QED Attenuator Available**
  - Measure up to 5X higher energies
  - Available with optional calibration, all wavelengths between 532 & 1064 nm, or single wavelength
- 4 Low Noise Level**  
10  $\mu$ J for the MB coating
- 5 Test Target Included**  
With the MB models
- 6 Smart Interface**  
Containing all the calibration data

## AVAILABLE MODELS



QE65LP-S-MB  
(Broadband-Convection)



QE65LP-H-MB  
(Broadband-Heatsink)



QE65ELP-S-MB  
(XLong Pulse-Convection)



QE65ELP-H-MB  
(XLong Pulse-Heatsink)

## ACCESSORIES



Stand with Delrin Post  
(200428, For -S Model)



Stand with Delrin Post  
(201284, For -H Model)



DB-15 to BNC Adaptor  
(Model Number: 200036)



QED-65 Attenuator  
(Model Number: 201282)



Pelican Carrying Case

## SEE ALSO

|                         |     |
|-------------------------|-----|
| HOW IT WORKS            | 10  |
| CALIBRATION             | 6   |
| TECHNICAL DRAWINGS      | 50  |
| ABSORPTION CURVES       | 52  |
| QED ATTENUATOR          | 35  |
| COMPATIBLE MONITORS     |     |
| MAESTRO                 | 18  |
| S-LINK-2                | 26  |
| M-LINK                  | 30  |
| LIST OF ALL ACCESSORIES | 174 |

MONITORS ENERGY DETECTORS POWER DETECTORS PHOTO DETECTORS THZ DETECTORS OEM DETECTORS CALORIMETERS SPECIAL PRODUCTS BEAM DIAGNOSTICS

# QE65

## SPECIFICATIONS



\*Also traceable to NRC-CNRC

| MODELS   | QE65LP-S-MB | QE65LP-H-MB | QE65ELP-S-MB | QE65ELP-H-MB |
|--|-------------|-------------|--------------|--------------|
| <b>MAX MEASURABLE ENERGY (WITH ATTENUATOR)</b> | 200 J       | 200 J       | 200 J        | 200 J        |
| <b>MAX REPETITION FREQUENCY</b>                | 100 Hz      | 100 Hz      | 20 Hz        | 20 Hz        |
| <b>EFFECTIVE APERTURE</b>                      | 65 x 65 mm  | 65 x 65 mm  | 65 x 65 mm   | 65 x 65 mm   |

### MEASUREMENT CAPABILITY

| Spectral Range <sup>a</sup>                     | 0.19 – 20 μm |            | 0.19 – 20 μm |            | 0.19 – 20 μm |            | 0.19 – 20 μm |            |
|---|--------------|------------|--------------|------------|--------------|------------|--------------|------------|
|   | Alone        | Attenuator | Alone        | Attenuator | Alone        | Attenuator | Alone        | Attenuator |
| Maximum Measurable Energy <sup>b,c</sup>        |              |            |              |            |              |            |              |            |
| 1064 nm, 150 μs pulse, Single shot <sup>d</sup> | 50 J         | 200 J      | 50 J         | 200 J      | 50 J         | 200 J      | 50 J         | 200 J      |
| 1064 nm, 7 ns, 10 Hz                            | 25 J         | 125 J      | 25 J         | 125 J      | 25 J         | 125 J      | 25 J         | 125 J      |
| 266 nm, 7 ns, 10 Hz                             | 20 J         | 35 J       | 20 J         | 35 J       | 20 J         | 35 J       | 20 J         | 35 J       |
| Noise Equivalent Energy <sup>e</sup>            | 10 μJ        |            | 10 μJ        |            | 20 μJ        |            | 20 μJ        |            |
| Sensitivity <sup>f,g</sup>                      | 4 V/J        |            | 4 V/J        |            | 1.5 V/J      |            | 1.5 V/J      |            |
| Max Repetition Frequency                        | 100 Hz       |            | 100 Hz       |            | 20 Hz        |            | 20 Hz        |            |
| Maximum Pulse Width (typical)                   | 0.7 ms       |            | 0.7 ms       |            | 5 ms         |            | 5 ms         |            |
| Rise Time (typical 0-100 %)                     | 1 ms         |            | 1 ms         |            | 6 ms         |            | 6 ms         |            |
| Calibration Uncertainty <sup>h</sup>            | ±3 %         |            | ±3 %         |            | ±3 %         |            | ±3 %         |            |
| Repeatability                                   | <0.5 %       |            | <0.5 %       |            | <0.5 %       |            | <0.5 %       |            |

### DAMAGE THRESHOLDS

| Maximum Average Power                 | Alone                 |                       | Alone                             |                       | Alone                 |                       | Alone                             |                       |
|---------------------------------------|-----------------------|-----------------------|-----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------------------|-----------------------|
|                                       | Attenuator            | Attenuator            | Attenuator                        | Attenuator            | Attenuator            | Attenuator            | Attenuator                        | Attenuator            |
| All Wavelengths                       | 12 W                  | 30 W                  | 40 W                              | 90 W                  | 12 W                  | 30 W                  | 40 W                              | 90 W                  |
| Maximum Energy Density                | Alone                 |                       | Alone                             |                       | Alone                 |                       | Alone                             |                       |
|                                       | Attenuator            | Attenuator            | Attenuator                        | Attenuator            | Attenuator            | Attenuator            | Attenuator                        | Attenuator            |
| 1064 nm, 150 μs, 10 Hz                | 1.2 J/cm <sup>2</sup> | 14 J/cm <sup>2</sup>  | 1.2 J/cm <sup>2</sup>             | 14 J/cm <sup>2</sup>  | 1.2 J/cm <sup>2</sup> | 14 J/cm <sup>2</sup>  | 1.2 J/cm <sup>2</sup>             | 14 J/cm <sup>2</sup>  |
| 1064 nm, 7 ns, single shot            | 0.6 J/cm <sup>2</sup> | 16 J/cm <sup>2</sup>  | 0.6 J/cm <sup>2</sup>             | 16 J/cm <sup>2</sup>  | 0.6 J/cm <sup>2</sup> | 16 J/cm <sup>2</sup>  | 0.6 J/cm <sup>2</sup>             | 16 J/cm <sup>2</sup>  |
| 1064 nm, 7 ns, 10 Hz                  | 0.6 J/cm <sup>2</sup> | 8 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup>             | 8 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup> | 8 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup>             | 8 J/cm <sup>2</sup>   |
| 532 nm, 7 ns, 10 Hz                   | 0.6 J/cm <sup>2</sup> | 6 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup>             | 6 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup> | 6 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup>             | 6 J/cm <sup>2</sup>   |
| 266 nm, 7 ns, 10 Hz                   | 0.5 J/cm <sup>2</sup> | 1 J/cm <sup>2</sup>   | 0.5 J/cm <sup>2</sup>             | 1 J/cm <sup>2</sup>   | 0.5 J/cm <sup>2</sup> | 1 J/cm <sup>2</sup>   | 0.5 J/cm <sup>2</sup>             | 1 J/cm <sup>2</sup>   |
| Maximum Average Power Density (@12 W) | 10 W/cm <sup>2</sup>  | 600 W/cm <sup>2</sup> | 10 W/cm <sup>2</sup> <sup>i</sup> | 600 W/cm <sup>2</sup> | 10 W/cm <sup>2</sup>  | 600 W/cm <sup>2</sup> | 10 W/cm <sup>2</sup> <sup>i</sup> | 600 W/cm <sup>2</sup> |

### PHYSICAL CHARACTERISTICS

|                                      |                         |                    |                    |                    |
|--------------------------------------|-------------------------|--------------------|--------------------|--------------------|
| Effective Aperture (with Attenuator) | 65 X 65 mm (62 X 62 mm) |                    |                    |                    |
| Absorber                             | Multi-Band              | Multi-Band         | Multi-Band         | Multi-Band         |
| Dimensions                           | 90H x 90W x 20D mm      | 90H x 90W x 94D mm | 90H x 90W x 20D mm | 90H x 90W x 94D mm |
| Weight                               | 440 g                   | 900 g              | 440 g              | 900 g              |

### ORDERING INFORMATION

|                                  |             |             |              |              |
|----------------------------------|-------------|-------------|--------------|--------------|
| Full Product Name                | QE65LP-S-MB | QE65LP-H-MB | QE65ELP-S-MB | QE65ELP-H-MB |
| Product Number (Including stand) | 201255      | 201256      | 201324       | 201325       |

a. 0.19 - 2.5 μm with QED Attenuator.  
 b. Not exceeding Maximum Average Power.  
 c. Maximum measurable energy depends on the monitor.  
 d. Increasing pulse width increases the maximum measurable energy.  
 e. Nominal value, actual value depends on electrical noise in the measurement system.

f. Load: 1 MΩ and ≤ 30 pF.  
 g. Maximum output voltage = sensitivity x maximum energy.  
 h. Excludes non-linearities.  
 i. At 12 W. Maximum Average Power Density is 5 W/cm<sup>2</sup> @ 40 W

Specifications are subject to change without notice

# QE95

95 mm Ø, 15 µJ - 250 J



## KEY FEATURES

- 1 Modular Concept**  
Increase the power capability of your detector:  
2 different cooling modules
- 2 Extra Large Aperture**  
Effective aperture of 95 mm Ø
- 3 QED Attenuator Available**
  - Measure up to 5X higher energies
  - Available with optional calibration, all wavelengths between 532 & 1064 nm, or single wavelength
- 4 Low Noise Level**  
15 µJ for the MB coating
- 5 Test Target Included**  
With the MB models
- 6 Smart Interface**  
Containing all the calibration data

## AVAILABLE MODELS



QE95LP-S-MB  
(Broadband-Convection)



QE95LP-H-MB  
(Broadband-Heatsink)



QE95ELP-S-MB  
(Long Pulse-Convection)



QE95ELP-H-MB  
(Long Pulse-Heatsink)

## ACCESSORIES



Stand with Delrin Post  
(200428, For -S Model)



Stand with Delrin Post  
(201284, For -H Model)



DB-15 to BNC Adaptor  
(Model Number: 200036)



QED-95 Attenuator  
(Model Number: 201323)



Pelican Carrying Case

## SEE ALSO

|                         |     |
|-------------------------|-----|
| HOW IT WORKS            | 10  |
| CALIBRATION             | 6   |
| TECHNICAL DRAWINGS      | 50  |
| ABSORPTION CURVES       | 52  |
| QED ATTENUATOR          | 35  |
| COMPATIBLE MONITORS     |     |
| MAESTRO                 | 18  |
| S-LINK-2                | 26  |
| M-LINK                  | 30  |
| LIST OF ALL ACCESSORIES | 174 |

# QE95

## SPECIFICATIONS



\*Also traceable to NRC-CNRC

| MODELS   | QE95LP-S-MB | QE95LP-H-MB | QE95ELP-S-MB | QE95ELP-H-MB |
|--|-------------|-------------|--------------|--------------|
| <b>MAX MEASURABLE ENERGY (WITH ATTENUATOR)</b> | 150 J       | 150 J       | 250 J        | 250 J        |
| <b>MAX REPETITION FREQUENCY</b>                | 40 Hz       | 40 Hz       | 10 Hz        | 10 Hz        |
| <b>EFFECTIVE APERTURE</b>                      | 95 mm Ø     | 95 mm Ø     | 95 mm Ø      | 95 mm Ø      |

### MEASUREMENT CAPABILITY

| Spectral Range <sup>a</sup>                     | 0.19 – 20 µm |            | 0.19 – 20 µm |            | 0.19 – 20 µm |            | 0.19 – 20 µm |            |
|---|--------------|------------|--------------|------------|--------------|------------|--------------|------------|
|   | Alone        | Attenuator | Alone        | Attenuator | Alone        | Attenuator | Alone        | Attenuator |
| Maximum Measurable Energy <sup>b,c</sup>        |              |            |              |            |              |            |              |            |
| 1064 nm, 150 µs pulse, Single shot <sup>d</sup> | 70 J         | 250 J      | 70 J         | 250 J      | 70 J         | 250 J      | 70 J         | 250 J      |
| 1064 nm, 7 ns, 10 Hz                            | 35 J         | 150 J      | 35 J         | 150 J      | 35 J         | 150 J      | 35 J         | 150 J      |
| 266 nm, 7 ns, 10 Hz                             | 30 J         | 50 J       | 30 J         | 50 J       | 30 J         | 50 J       | 30 J         | 50 J       |
| Noise Equivalent Energy <sup>e</sup>            | 15 µJ        |            | 15 µJ        |            | 30 µJ        |            | 30 µJ        |            |
| Sensitivity <sup>f,g</sup>                      | 2 V/J        |            | 2 V/J        |            | 0.6 V/J      |            | 0.6 V/J      |            |
| Max Repetition Frequency                        | 40 Hz        |            | 40 Hz        |            | 10 Hz        |            | 10 Hz        |            |
| Maximum Pulse Width (typical)                   | 1.5 ms       |            | 1.5 ms       |            | 5 ms         |            | 5 ms         |            |
| Rise Time (typical 0-100 %)                     | 2 ms         |            | 2 ms         |            | 6 ms         |            | 6 ms         |            |
| Calibration Uncertainty <sup>h</sup>            | ±3 %         |            | ±3 %         |            | ±3 %         |            | ±3 %         |            |
| Repeatability                                   | <0.5 %       |            | <0.5 %       |            | <0.5 %       |            | <0.5 %       |            |

### DAMAGE THRESHOLDS

| Maximum Average Power                 | Alone                 |                       | Alone                             |                       | Alone                 |                       | Alone                             |                       |
|---------------------------------------|-----------------------|-----------------------|-----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------------------|-----------------------|
|                                       | Attenuator            | Attenuator            | Attenuator                        | Attenuator            | Attenuator            | Attenuator            | Attenuator                        | Attenuator            |
| All Wavelengths                       | 20 W                  | 45 W                  | 40 W                              | 90 W                  | 20 W                  | 45 W                  | 40 W                              | 90 W                  |
| Maximum Energy Density                | Alone                 |                       | Alone                             |                       | Alone                 |                       | Alone                             |                       |
|                                       | Attenuator            | Attenuator            | Attenuator                        | Attenuator            | Attenuator            | Attenuator            | Attenuator                        | Attenuator            |
| 1064 nm, 7 ns, single shot            | 0.6 J/cm <sup>2</sup> | 16 J/cm <sup>2</sup>  | 0.6 J/cm <sup>2</sup>             | 16 J/cm <sup>2</sup>  | 0.6 J/cm <sup>2</sup> | 16 J/cm <sup>2</sup>  | 0.6 J/cm <sup>2</sup>             | 16 J/cm <sup>2</sup>  |
| 1064 nm, 7 ns, 10 Hz                  | 0.6 J/cm <sup>2</sup> | 8 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup>             | 8 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup> | 8 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup>             | 8 J/cm <sup>2</sup>   |
| 532 nm, 7 ns, 10 Hz                   | 0.6 J/cm <sup>2</sup> | 6 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup>             | 6 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup> | 6 J/cm <sup>2</sup>   | 0.6 J/cm <sup>2</sup>             | 6 J/cm <sup>2</sup>   |
| 266 nm, 7 ns, 10 Hz                   | 0.5 J/cm <sup>2</sup> | 1 J/cm <sup>2</sup>   | 0.5 J/cm <sup>2</sup>             | 1 J/cm <sup>2</sup>   | 0.5 J/cm <sup>2</sup> | 1 J/cm <sup>2</sup>   | 0.5 J/cm <sup>2</sup>             | 1 J/cm <sup>2</sup>   |
| Maximum Average Power Density (@12 W) | 10 W/cm <sup>2</sup>  | 600 W/cm <sup>2</sup> | 10 W/cm <sup>2</sup> <sup>i</sup> | 600 W/cm <sup>2</sup> | 10 W/cm <sup>2</sup>  | 600 W/cm <sup>2</sup> | 10 W/cm <sup>2</sup> <sup>i</sup> | 600 W/cm <sup>2</sup> |

### PHYSICAL CHARACTERISTICS

|                                      |                      |  |                      |  |                      |  |                      |  |
|--------------------------------------|----------------------|--|----------------------|--|----------------------|--|----------------------|--|
| Effective Aperture (with Attenuator) | 95 mm Ø (90 mm Ø)    |  |                      |  |                      |  |                      |  |
| Absorber                             | Multi-Band           |  | Multi-Band           |  | Multi-Band           |  | Multi-Band           |  |
| Dimensions                           | 122H x 122W x 20D mm |  | 122H x 122W x 98D mm |  | 122H x 122W x 20D mm |  | 122H x 122W x 98D mm |  |
| Weight                               | 0.78 kg              |  | 1.2 kg               |  | 0.78 kg              |  | 1.2 kg               |  |

### ORDERING INFORMATION

|                                  |             |             |              |              |
|----------------------------------|-------------|-------------|--------------|--------------|
| Full Product Name                | QE95LP-S-MB | QE95LP-H-MB | QE95ELP-S-MB | QE95ELP-H-MB |
| Product Number (Including stand) | 201315      | 201316      | 201317       | 201318       |

a. 0.19 - 2.5 µm with QED Attenuator.  
 b. Not exceeding Maximum Average Power.  
 c. maximum depends on monitor.  
 d. Increasing pulse width increases the maximum measurable energy.  
 e. Nominal value, actual value depends on electrical noise in the measurement system.

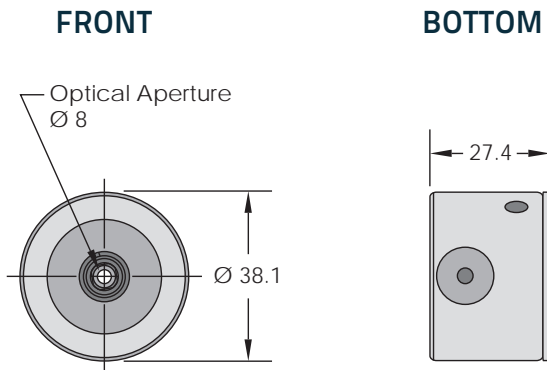
f. Load: 1 MΩ and ≤ 30 pF.  
 g. Maximum output voltage = sensitivity x maximum energy.  
 h. Excludes non-linearities.  
 i. At 12 W. Maximum Average Power Density is 5 W/cm<sup>2</sup> @ 40 W

Specifications are subject to change without notice

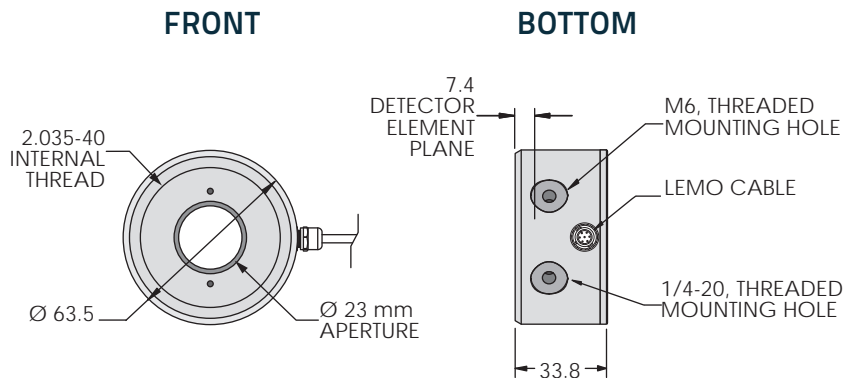
# TECHNICAL DRAWINGS

MONITORS  
ENERGY DETECTORS  
POWER DETECTORS  
PHOTO DETECTORS  
THZ DETECTORS  
OEM DETECTORS  
CALORIMETERS  
SPECIAL PRODUCTS  
BEAM DIAGNOSTICS

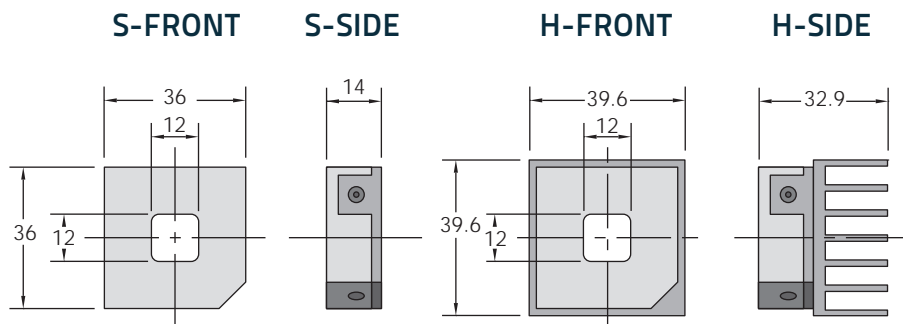
## QE8-B



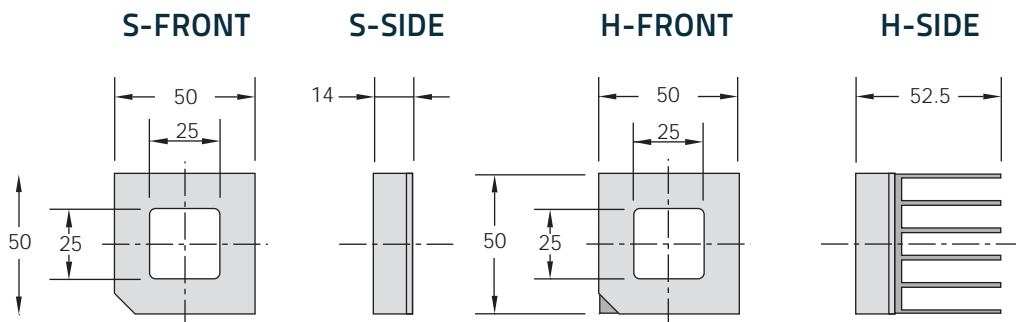
## QE23-B



## QE12



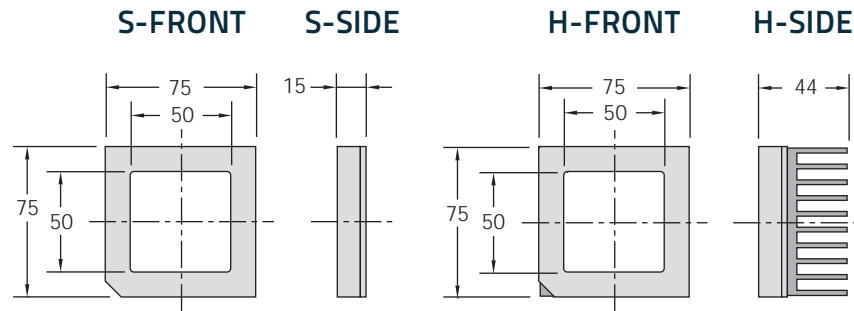
## QE25



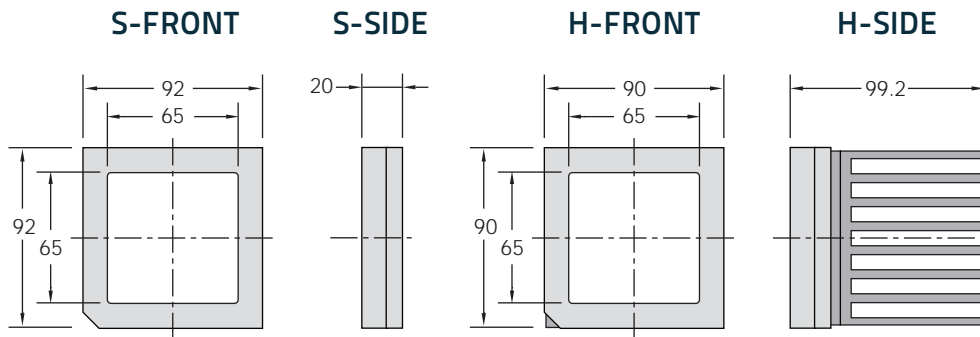
All dimensions in mm

# TECHNICAL DRAWINGS

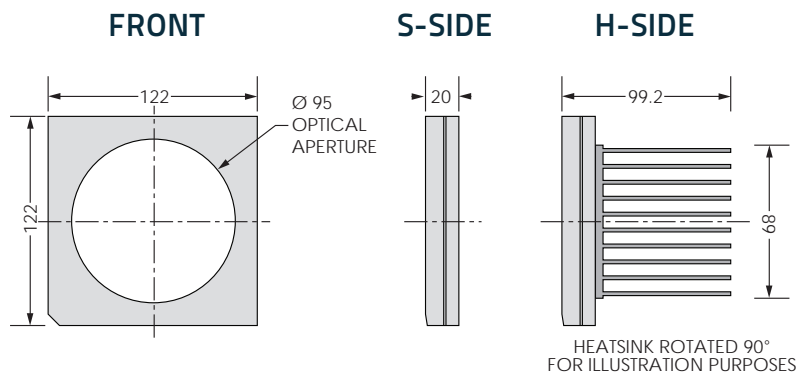
## QE50



## QE65



## QE95



All dimensions in mm

# ABSORPTION CURVES

MONITORS

ENERGY DETECTORS

POWER DETECTORS

PHOTO DETECTORS

THZ DETECTORS

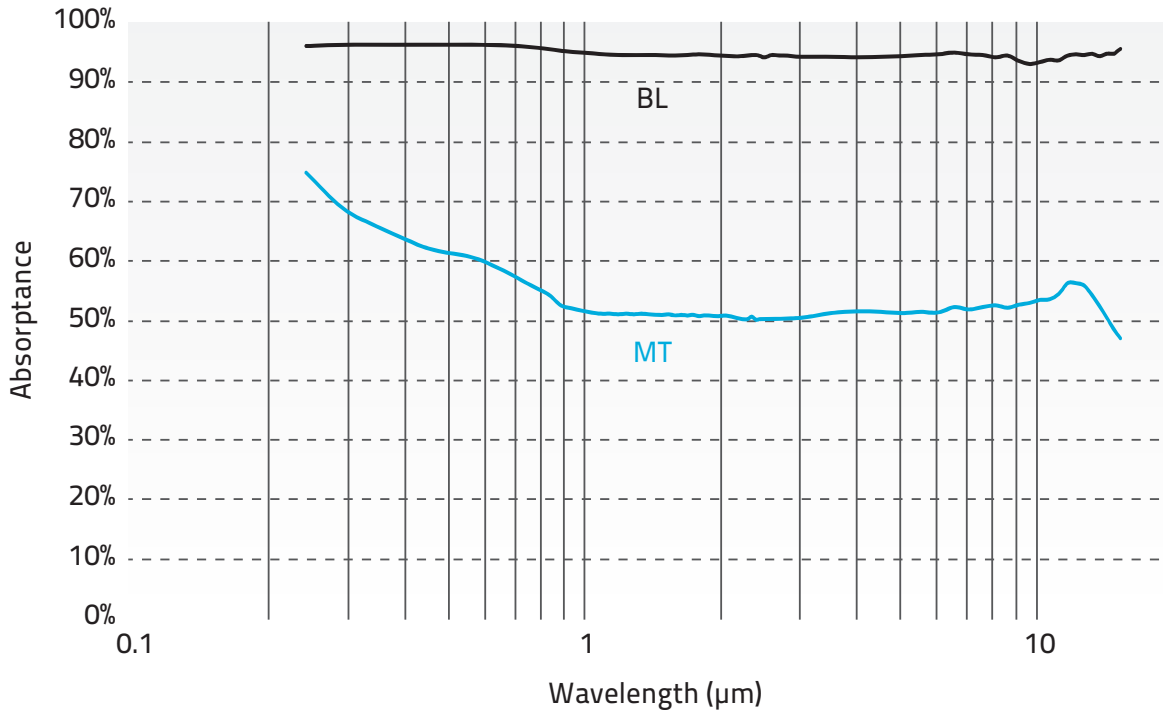
OEM DETECTORS

CALORIMETERS

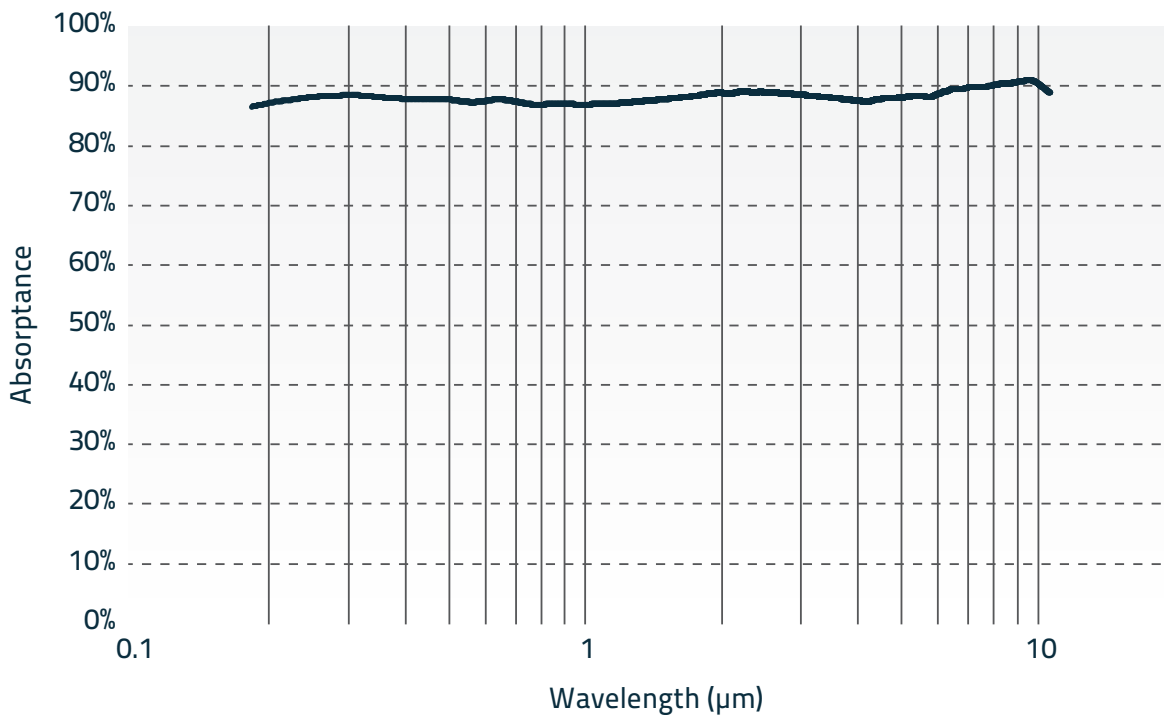
SPECIAL PRODUCTS

BEAM DIAGNOSTICS

## QE-B

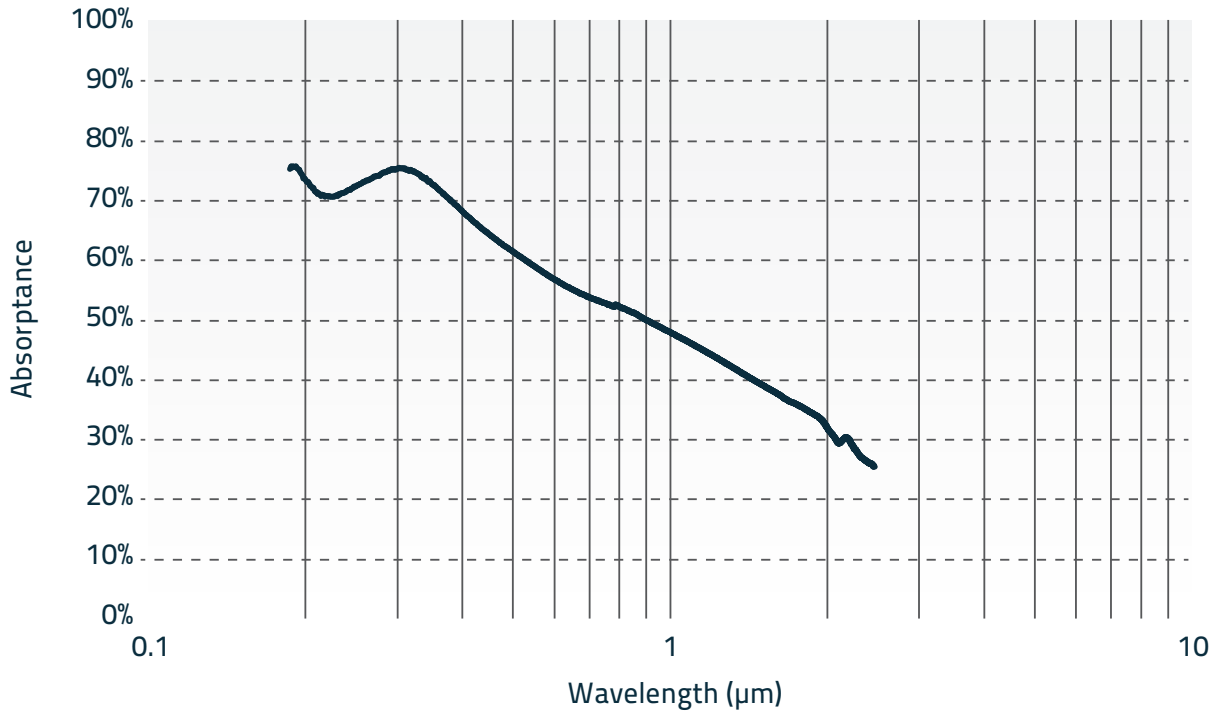


## QE-MB



# ABSORPTION CURVES

## QE-MT



## QED ATTENUATOR

