

## Peak Power Ultras

Ultra performance now extends to pulsed lasers with high peak power. You get the same compact and versatile detector as the rest of the Ultra family. This is the choice for pulsed lasers that deliver high peak power density that is too much for the robust Ultra surface absorbers. These detectors combine a broad-band high-energy volume absorber with our new Ultra disk technology. The result is a detector you can use from Deep UV to NIR that can handle peak powers up to 100 GW/cm<sup>2</sup>. It is perfect for low repetition rate Q-switched lasers with high power pulses. With the fast ultra disk this detector responds faster than almost all other volume absorbing detectors on the market. It is hard to do better than our NIST traceable calibration and *Personal wavelength correction*<sup>™</sup> that is measured uniquely for each detector. Ultra performance means versatile too. The family includes a low profile detector for measurement up to 15W and a 30 W head with a small heat sink in the back. Optional fiber adapters are available for these detectors.

## Select your absorber

We offer you 2 types of absorber. The **VM (HIGH PEAK POWER)** absorber is good to 110 W/cm<sup>2</sup> and can take an 11 J/cm<sup>2</sup> long pulse. The **VH (VERY HIGH PEAK POWER)** absorber is designed to take higher energy density, and long pulses up to 30 J/cm<sup>2</sup>.

## Replacement Volume Absorbers

Volume absorbers can withstand from hundreds of MW/cm<sup>2</sup> to GW/cm<sup>2</sup> of peak power density by spreading the energy through a volume rather than on a surface. Too much average power though, (repetition rate too high for example) can damage the material. Irregular and non-circular beams can have spikes of energy that may also damage the absorber. Accidentally hitting the aperture with a tool might damage it. Whatever the reason, we know how important it is for you to have as little downtime as possible. We provide replacements to give you the option to change the absorber in the field.

## Calorimeter mode

All our VM and VH detectors can measure single shot pulse energies as well as average power from 0.55 mJ up to 35 J long pulse.

## OEM Ultras

The large Ultra family, including these high peak power detectors, accommodates a wide range of OEM requirements. Use a Gentec-EO monitor or your own electronics (requires our internal circuit board). We offer several output signal options and several output connector options. Contact Gentec-EO for more information on the OEM versions. If we don't already have what you need we will provide you with a custom solution.



UP19K-30H-VM



UP19K-15S-VH

# POWER DETECTORS

## High Peak Power

- Compact Size
- Full NIST Traceability
- Peak Power Density to 100 GW/cm<sup>2</sup>
- Suitable for OEM Applications
- Smart Interface



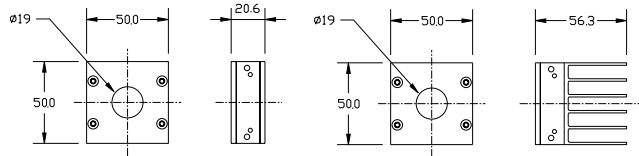
# ULTRA SERIES UP19K-VM/VH SPECIFICATIONS

## TYPICAL LASERS

- AgF, ArF
- KrCl, KrF
- Q-switched Nd: YAG harmonics
- Flash lamp pulsed YAG
- XeCl, XeF
- Pulsed Dye Lasers
- Ruby
- Alexandrite

## COMMON APPLICATIONS

- Gynecology
- Ophthalmology
- Oncology
- Angioplasty
- Dentistry
- Plastic Surgery
- Laser cleaning, restoration
- Photolithography
- UV Micromachining
- Annealing
- Seam welding
- Microelectronics soldering
- Resistor trimming
- Photodeposition



All dimensions in mm

## 15S-VM

## 30H-VM

## 15S-VH

## 30H-VH

## MEASUREMENT CAPABILITY

Spectral range	0.19 - 2.5 $\mu\text{m}$	0.19 - 2.5 $\mu\text{m}$	0.19 - 1.44 $\mu\text{m}$ Use VM specs from 600 to 925 nm	0.19 - 1.44 $\mu\text{m}$ Use VM specs from 600 to 925 nm
Maximum Measurable Power	15 W	30 W	15 W	30 W
Minimum Detectable Power <sup>a</sup>	1 mW	1 mW	1 mW	1 mW
Rise Time (nominal) <sup>b</sup>	1.8 sec	1.8 sec	2.5 sec	2.5 sec
Sensitivity <sup>c</sup>	0.8 mV/W	0.8 mV/W	0.7 mV/W	0.7 mV/W
Calibration Uncertainty <sup>d</sup>	$\pm 2.5\%$	$\pm 2.5\%$	$\pm 2.5\%$	$\pm 2.5\%$
Repeatability	$\pm 0.5\%$	$\pm 0.5\%$	$\pm 0.5\%$	$\pm 0.5\%$
Power Resolution	$\pm 0.5\%$	$\pm 0.5\%$	$\pm 0.5\%$	$\pm 0.5\%$
<b>Calorimeter Mode</b>				
Sensitivity	0.3 mV/J	0.3 mV/J	0.14 mV/J	0.14 mV/J
Maximum Measurable Energy <sup>e</sup>	28 J	28 J	35 J	35 J
Minimum Measurable Energy	0.55 J	0.55 J	1 J	1 J
Minimum Repetition Period	8 sec	8 sec	30 sec	30 sec
Maximum Pulse Width	300 ms	300 ms	330 ms	330 ms
Accuracy with energy calibration option	$\pm 5\%$	$\pm 5\%$	$\pm 5\%$	$\pm 5\%$
Beam Size Dependence <sup>f</sup>	$\pm 0.5\%$	$\pm 0.5\%$	$\pm 0.5\%$	$\pm 0.5\%$

## DAMAGE THRESHOLDS

Max Average Power (continuous)	15 W	30 W	15 W	30 W
Max Average Power (2 minutes)	23 W	40 W	20 W	35 W
Max Average Power Density <sup>g</sup>	110 W/cm <sup>2</sup>	110 W/cm <sup>2</sup>	300 W/cm <sup>2</sup>	300 W/cm <sup>2</sup>
<b>Pulsed Laser Damage Thresholds</b>	Max Energy Density	Peak Power Density	Max Energy Density	Peak Power Density
1.064 $\mu\text{m}$ , 360 $\mu\text{s}$ , 10 Hz	11 J/cm <sup>2</sup>	30 kW/cm <sup>2</sup>	30 J/cm <sup>2</sup>	83 kW/cm <sup>2</sup>
1.064 $\mu\text{m}$ , 7 ns, 10 Hz	4 J/cm <sup>2</sup>	571 MW/cm <sup>2</sup>	5 J/cm <sup>2</sup>	714 MW/cm <sup>2</sup>
532 nm, 7 ns, 10 Hz	3 J/cm <sup>2</sup>	428 MW/cm <sup>2</sup>	3 J/cm <sup>2</sup>	428 MW/cm <sup>2</sup>
266 nm, 7 ns, 10 Hz	1 J/cm <sup>2</sup>	143 MW/cm <sup>2</sup>	1 J/cm <sup>2</sup>	143 MW/cm <sup>2</sup>
Max Peak Power Density <sup>h</sup>	100 GW/cm <sup>2</sup>	100 GW/cm <sup>2</sup>	100 GW/cm <sup>2</sup>	100 GW/cm <sup>2</sup>

## PHYSICAL CHARACTERISTICS

Effective Aperture Diameter	18 mm $\emptyset$	18 mm $\emptyset$	18 mm $\emptyset$	18 mm $\emptyset$
Absorber	High Peak Power – VM		Very High Peak Power – VH	
Dimensions	50 H x 50 W x 20.6 D mm	50 H x 50 W x 56.3 D mm	50 H x 50 W x 20.6 D mm	50 H x 50 W x 56.3 D mm
Weight (head only)	0.16 kg	0.21 kg	0.16 kg	0.21 kg
Effective Area	2.54 cm <sup>2</sup>	2.54 cm <sup>2</sup>	2.54 cm <sup>2</sup>	2.54 cm <sup>2</sup>

a. Nominal value, actual value depends on electrical noise in the measurement system.  
 b. With Gentec-EO TPM 300CE, DUO, SOLO or P-LINK monitor.  
 c. Maximum output voltage = sensitivity x maximum power.  
 d. Including linearity with power.

e. Higher pulse energy possible when customized for long pulses (ms), less for short pulses (ns). Contact Gentec-EO.  
 f. Beam centered.  
 g. At 1064 nm, 10W CW.  
 h. For picosecond and femtosecond pulses.  
 At 1064 nm, 7 ns and 10 Hz : Maximum Peak Power Density = 570 MW/cm<sup>2</sup>.

Specifications subject to change without notice



GENTEC ELECTRO-OPTICS INC.  
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