

# Q-TUNE-HR

## HIGH PULSE REPETITION RATE TUNABLE WAVELENGTH OPTICAL PARAMETRIC OSCILLATORS

### FEATURES

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Up to **100 kHz** pulse repetition rate

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Hands-free, automated wavelength tuning  
from **750 to 1800 nm**

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Up to **5 W** output power in IR range

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Can be adapted for user-supplied laser with  
532 nm or 1064 nm wavelength and  
up to **30 W @ 532 nm** input power

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Microprocessor controlled operation with  
self-optimization, self-calibration capability

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**Optional** air purging for long lifetime  
of OPO optics

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Powered from +12 VDC source or  
AC/DC adapter

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### APPLICATIONS

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Micromachining

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Raman spectroscopy & microscopy

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Infrared spectroscopy

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Remote sensing

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Q-TUNE-HR is Optical Parametric Oscillator (OPO) producing tunable wavelength in 750 – 1800 nm range with up to 100 kHz pulse repetition rate.

Up to 100 kHz pulse repetition rate make Q-TUNE-HR perfect coherent light source for micromachining, Raman spectroscopy, microscopy, remote sensing applications.

Q-TUNE-HR needs external pump source with > 350  $\mu$ J pulse energy, 5 – 7 ns FWHM pulse duration @ 532 nm. Pulse repetition rate can be in 10 – 100 kHz range, while pump power - in 3.5 – 30 W range. Contact us for more details about recommended pump sources.

By default OPO is optimized to produce maximum output in 1200 – 1800 nm range. As option, unit can be optimized for 750 – 950 nm range.

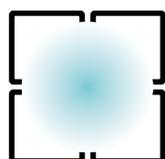
All laser electronics is integrated into housing of the Q-TUNE and the only external module is mains adapter that provides 12 VDC, 20 – 50 W power (depending on model).

OPO is controlled through single Ethernet port via build-in web-server. There is no need to install control software – any computer or even cell phone with modern web-browser will be able to control Q-TUNE. API is also provided for integration with user devices.

In addition to tunable wavelength output, the Q-TUNE provides bypass port for access to pump laser beam.

Optional extensions available by request:

- > Air purging for long lifetime of OPO optics.
- > Compact spectrometer for monitoring of OPO wavelength and linewidth.
- > Fiber coupled OPO output.



Quantum  
Light  
Instruments

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# SPECIFICATIONS <sup>1)</sup>

| MODEL  | Q-TUNE-HR                       |              |                                  |
|--|---------------------------------|--------------|----------------------------------|
|  | -G10K                           | -G100K       | -I10K                            |
| Wavelength range                               | 750 – 1800 nm                   |              | 1600 – 3200 nm                   |
| Pulse repetition rate <sup>2)</sup>            | 1 – 10 kHz                      | 10 – 100 kHz | 1 – 10 kHz                       |
| Typical conversion efficiency                  | > 20 % (signal + idler)         |              |                                  |
| Output pulse energy                            | > 50 µJ @ 1200 nm <sup>3)</sup> |              | > 100 µJ @ 1650 nm <sup>4)</sup> |
| Linewidth                                      | 20 – 100 cm <sup>-1</sup>       |              |                                  |
| Pulse duration <sup>5)</sup>                   | 5 – 7 ns                        |              |                                  |
| Typical pulse-to-pulse stability <sup>6)</sup> | 2 × pump laser                  |              |                                  |
| Typical power drift <sup>7)</sup>              | 2 × pump laser                  |              |                                  |
| Polarization                                   | horizontal                      |              |                                  |
| Typical beam diameter <sup>8)</sup>            | 3 mm                            |              |                                  |
| Typical beam divergence <sup>9)</sup>          | < 3 mrad                        |              | < 5 mrad                         |

## PUMP LASER REQUIREMENTS

|                       |               |         |
|-----------------------|---------------|---------|
| Pump wavelength       | 532 nm        | 1064 nm |
| Pulse duration        | 5 – 8 ns FWHM |         |
| Pulse energy          | > 350 µJ      | > 1 mJ  |
| Power                 | < 40 W        |         |
| M <sup>2</sup> factor | < 1.5         |         |

## DIMENSIONS

|                       |                                 |
|-----------------------|---------------------------------|
| Laser head (W×L×H)    | 390 × 620 × 135 mm <sup>3</sup> |
| Power adapter (W×L×H) | 50 × 125 × 33 mm <sup>3</sup>   |

## OPERATING REQUIREMENTS

|                                    |   |
|------------------------------------|---|
| Cooling requirements               | Air cooled (water-free)                               |
| Ambient temperature                | 15 – 30 °C  |
| Relative humidity (non-condensing) | 10 – 80 %   |
| Mains voltage                      | 90 – 230 VAC, single phase, 47 – 63 Hz <sup>10)</sup> |
| Average power consumption          | < 50 W  |

<sup>1)</sup> Due to continuous improvements all specifications are subject to change. Unless stated otherwise all specifications are measured at 1200 nm and max pulse repetition rate. The parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture

<sup>2)</sup> Determined by pulse repetition rate of pump source.

<sup>3)</sup> When pumped by 4 W @ 532 nm @ 10 kHz pulse repetition rate source. See tuning curves for pulse energies at other wavelengths.

<sup>4)</sup> When pumped by 10 W @ 1064 nm @ 10 kHz pulse repetition rate source.

<sup>5)</sup> FWHM level at 1200 nm, measured with 350 ps rise time photodiode.

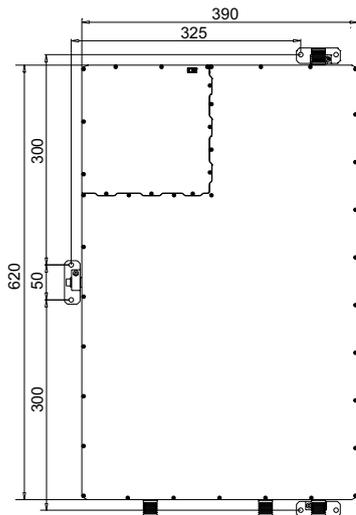
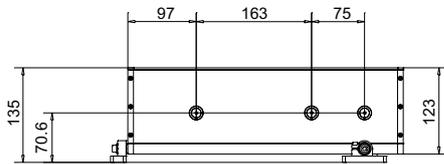
<sup>6)</sup> Measured during 30 seconds of operation after warm-up.

<sup>7)</sup> Over 8 hour period after 20 minutes of warm-up, when ambient temperature variation is less than ±2 °C. Power value is calculated every 1 second.

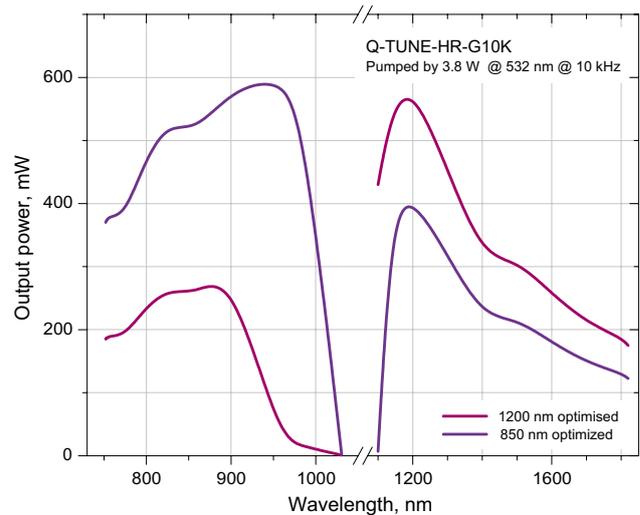
<sup>8)</sup> Beam diameter is measured 20 cm from laser output at the 4σ level.

<sup>9)</sup> Full angle measured at the 4σ level.

<sup>10)</sup> Laser can be powered from appropriate 12 or 28 VDC power source, depending on model. Please inquire for details.



Dimensional drawing of Q-TUNE-HR (in mm)



Q-TUNE-HR tuning curves