

Q-TUNE-IR

AIR COOLED, DIODE PUMPED, TUNABLE WAVELENGTH Q-SWITCHED LASER FOR INFRARED SPECTROSCOPY

FEATURES

Seamless laser and Optical Parametric Oscillator (OPO) integration

Remote control via PC

Turnkey performance due water-free pump laser design

Guaranteed > 2 Gshot pump diode lifetime

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

Hands-free, automated tuning from 1380 to 4500 nm

> 15 mJ pulse energy at the peak of tuning curve

< 10 cm⁻¹ linewidth (broadband ~200 cm⁻¹ version is available)

Up to 20 Hz pulse repetition rate

Internal or external triggering modes

Separate output port for access to pump laser beam

Low power consumption – from 50 to 100 W depending on model

Can be powered from +12 VDC or +28 VDC source

APPLICATIONS

Infrared spectrophotometry

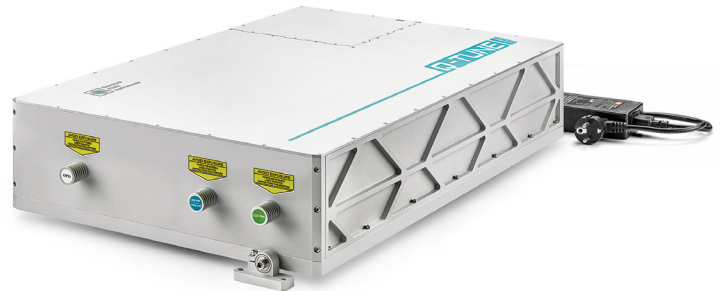
Cavity ring-down spectroscopy

Gas spectroscopy

Single molecule vibrational spectroscopy

Scanning near-field optical microscopy

Remote sensing



Q-TUNE-IR is high peak power coherent light source for infrared spectroscopy, infrared spectrophotometry, metrology, single molecule vibrational microscopy, remote sensing.

Q-TUNE-IR is using Optical Parametric Oscillator (OPO) to produce tunable wavelength in 1380 – 4500 nm range with linewidth less than 10 cm⁻¹. Broadband version with linewidth up to 200 cm⁻¹ is available by request.

QLI breakthrough water-free laser crystal pumping technology allows to produce high quality pumping beam with up to 100 mJ pulse energy. Advanced laser design resulted in very compact, user-friendly turnkey system that requires little maintenance. There is no chillers or bulky power supplies that one needs to fit under the table. All laser electronics are integrated into housing of the Q-TUNE-IR and the only external module is mains adapter that provides 12 or 28 VDC, 50 – 150 W power (depending on model).

Both pump laser and OPO are 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-IR. API is also provided for integration with user devices. In addition to tunable wavelength output, the Q-TUNE-IR provides an extra port for the access to pump laser beam.

Optional extensions available by request:

- > Compact spectrometer for monitoring of OPO wavelength and linewidth.
- > Build-in broadband attenuator for pulse energy control.
- > Dispersive wavelength selector for spectrally pure output.

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SPECIFICATIONS ¹⁾

| MODEL | Q-TUNE-IR | | |
|--|---|--------------------|------------------|
| | -C10 | -F10 | -F20 |
| Wavelength range, nm | 1380-4500 nm | | |
| Pulse repetition rate ²⁾ | 10 Hz | | 20 Hz |
| Pulse energy ³⁾ | ≥ 2 mJ @ 3500 nm | ≥ 6.5 mJ @ 3500 nm | ≥ 5 mJ @ 3500 nm |
| Linewidth | <10 cm ⁻¹ (<200 cm ⁻¹ optional) | | |
| Pulse duration ⁴⁾ | 3 – 4 ns typical | | |
| Pulse-to-pulse stability ⁵⁾ | < 4.5 % RMS | | |
| Power drift ⁶⁾ | ± 3.0 % | | |
| Polarization | horizontal, linear | | |
| Typical beam diameter ⁷⁾ | 3 mm | 5 mm | |
| Typical beam divergence ⁸⁾ | < 7 mrad | < 5 mrad | |
| Jitter ⁹⁾ | < 0.5 ns RMS | | |

PUMP LASER OUTPUT

Max pulse energy at ¹⁰⁾

| Fundamental | 15 mJ | 80 mJ | 60 mJ |
|-------------|-------|-------|-------|
|-------------|-------|-------|-------|

DIMENSIONS

| | | | |
|--|---------------------------------|--------------------------------|--|
| Laser head (W×L×H) | 390 × 620 × 153 mm ³ | | |
| Power adapter (W×L×H) ^{11) 12)} | 52 × 116 × 32 mm ³ | 192 × 178 × 46 mm ³ | |

OPERATING REQUIREMENTS

| | | | |
|---------------------------|---|--------|---------|
| Cooling requirements | air cooled (water-free) | | |
| Ambient temperature | 15 – 30 °C | | |
| Relative humidity | 10 – 80 % (non-condensing) | | |
| Mains voltage | 90 – 230 VAC, single phase, 47 – 63 Hz ¹²⁾ | | |
| Average power consumption | < 50 W | < 80 W | < 100 W |

¹⁾ Due to continuous improvements all specifications are subject to change. Unless stated otherwise all specifications are measured at 3500 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

²⁾ Factory-set pulse repetition rate in internal triggering mode. Pulse repetition rate can be divided-down to 1 Hz.

³⁾ See tuning curves for pulse energies at other wavelengths.

⁴⁾ FWHM level at 1506 nm, measured with 350 ps rise time photodiode.

⁵⁾ Measured during 30 seconds operation after warm-up.

⁶⁾ 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.

⁷⁾ Beam diameter is measured 20 cm from laser output at the 4σ level at 1506 nm using photoburn method.

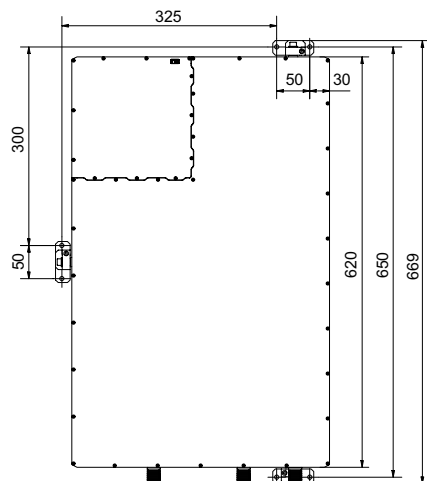
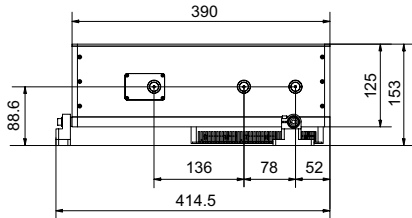
⁸⁾ Full angle measured at the 4σ level using knife edge method.

⁹⁾ In respect to falling edge of pump diode triggering pulse.

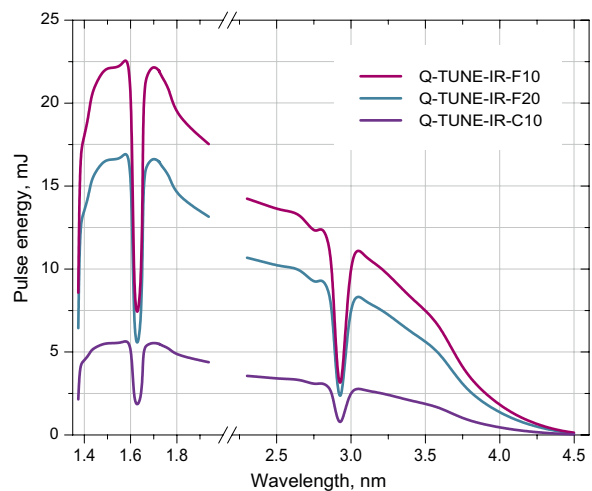
¹⁰⁾ Laser pulse energy is optimized for OPO pumping may differ from stand-alone laser specifications indicated here.

¹¹⁾ Power adapter size depends of Q-TUNE-IR model.

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



Dimensional drawing of Q-TUNE-IR-F10/F20 (in mm)



Q-TUNE-IR tuning curves