

PT200 SERIES



PT200 series laser systems integrate a picosecond optical parametric oscillator and DPSS pump laser into a single compact housing. Mounting the components into one frame provides a cost-effective and robust solution with improved long-term stability and reduced maintenance costs.

The MHz pulse repetition rate enables the photon-counting detection method in numerous non-linear spectroscopy and microscopy applications.

PT257 and PT259 are targeted for CARS and two photon fluorescence applications. The tuning range of PT257 and PT259 supports Raman shift measurements in the 1000–4000 cm^{-1} range. An optional second harmonic generator extends the PT259 tuning range to UV, enabling time-resolved laser-induced fluorescence measurements.

The PT277 model produces approximately 0.5 W power in mid-IR range from 2.5 to 3.4 μm with nearly Fourier transform limited linewidth. Applications include infrared spectroscopy and vibrational spectroscopy on surfaces.

All models produce nearly diffraction limited divergence beams, with M^2 measured as <1.3 over the tuning range.

The microprocessor-controlled wavelength tuning is fully automatic. The wavelength controlling elements are mounted on precise micro-stepping motors. The temperature of the non-linear crystal is controlled by a precise thermocontroller with a bidirectional Peltier element, resulting in the fast tuning of crystal temperature.

The lasers may be controlled from a remote keypad or via USB (RS232 is optional) interface from a personal computer using LabView™ drivers.

Single Housing NIR-IR Range Tunable Picosecond Laser

FEATURES

- ▶ **690–3400 nm** tuning range
- ▶ *Optional tuning range extension to UV*
- ▶ *Nearly Fourier transform-limited linewidth*
- ▶ *Nearly diffraction limited divergence*
- ▶ *Up to 5 kW pulse peak power*
- ▶ *Collinear output of two tunable wavelengths for CARS applications (optional)*
- ▶ *Output wavelength monitoring (optional)*
- ▶ *PC control via USB (RS232 is optional) and LabView™ drivers*

APPLICATIONS

- ▶ *CARS microscopy and spectroscopy*
- ▶ *Two-photon fluorescence microscopy*
- ▶ *Second harmonic generation microscopy*
- ▶ *Laser induced fluorescence microscopy*
- ▶ *Infrared spectroscopy*

PT200 series available models

| Model | Features |
|-------|---|
| PT259 | 1 MHz pulse repetition rate, >25 mW power at 800 nm, 7 ps pulse duration |
| PT257 | 87 MHz pulse repetition rate, >400 mW power at 800 nm, <7 ps pulse duration |
| PT277 | 87 MHz pulse repetition rate, nearly Fourier transform limited ($<0.3 \text{ cm}^{-1}$) linewidth, 70 ps pulse duration |

SPECIFICATIONS ¹⁾

| Model | PT259 | PT257 | PT277 |
|--|-------------------------------------|---------------------|-----------------------|
| OPO/OPG | | | |
| Pulse repetition rate ²⁾ | 1 MHz | 87 MHz | |
| Tuning range | | | |
| Signal | 700–1000 nm ³⁾ | 690–900 nm | 1550–2020 nm |
| Idler | 1150–2200 nm | | 2250–3400 nm |
| SH (optional) | 350–500 nm | — | |
| Output power ⁴⁾ | | | |
| OPO/OPG ⁵⁾ | 25 mW | 400 mW | 300 mW |
| SH ⁶⁾ | 1 mW | — | |
| Linewidth ⁵⁾ | <8 cm ⁻¹ | <7 cm ⁻¹ | <0.3 cm ⁻¹ |
| Typical pulse duration ^{5) 7)} | 7 ps | <7 ps | 70 ps |
| Typical time bandwidth product | <0.8 | | |
| Scanning step | | | |
| Signal | 0.1 nm | | |
| Idler | 1 nm | | |
| SH | 0.05 nm | — | |
| Polarization | | | |
| Signal beam | horizontal | | |
| Idler beam | horizontal | | |
| SH | vertical | — | |
| Typical beam diameter ^{5) 8)} | 2 mm | ~4.5 mm | 2 mm |
| Typical beam divergence ^{5) 9)} | <2 mrad | | |
| M ² | <2 ¹⁰⁾ | | |
| PUMP LASER ¹¹⁾ | | | |
| Pump wavelength | 532 nm | | 1064 nm |
| Max pump power ¹²⁾ | 0.45 W | 3 W | 5 W |
| Pulse repetition rate | 1 MHz | 87 MHz | |
| Pulse duration ¹³⁾ | <10 ps | | 80–100 ps |
| Beam quality | Gaussian >90% fit | | |
| Beam divergence ⁹⁾ | <2 mrad | | |
| PHYSICAL CHARACTERISTICS | | | |
| Unit size (W × L × H) | 455 × 1220 × 260 mm | 330 × 735 × 175 mm | 455 × 1220 × 260 mm |
| Power supply size (W × L × H) | 365 × 395 × 290 mm | 555 × 525 × 530 mm | |
| Umbilical length | 2.5 m | | |
| OPERATING REQUIREMENTS | | | |
| Cooling | air | | |
| Room temperature | 22±2 °C | | |
| Relative humidity | 20–80 % (noncondensing) | | |
| Power requirements | 100–240 V AC, single phase 50/60 Hz | | |
| Power consumption | <1 kVA | | |

¹⁾ Due to continuous improvement, all specifications are subject to change without notice. Parameters marked 'typical' are indications of typical performance (not specifications) and will vary with each unit we manufacture. Unless stated otherwise, all specifications are measured at 1064 nm.
²⁾ Inquire for custom pulse repetition rates.
³⁾ Tuning range extension to 620 nm is optional.
⁴⁾ Output powers are specified at selected wavelengths. See typical tuning curves for power at other wavelengths.
⁵⁾ Measured at 800 nm for PT25x models, and at 1620 nm for PT277 model at signal range.
⁶⁾ Measured at 400 nm.

⁷⁾ Pulse duration can vary depending on wavelength and pump energy.
⁸⁾ Beam diameter at the 1/e² level and can vary depending on the pump pulse energy.
⁹⁾ Full angle measured at the FWHM level.
¹⁰⁾ Specified only for signal output.
¹¹⁾ Separate output port for the pump beam is standard. Output ports for other available harmonics are optional.
¹²⁾ Data represents typical values. Laser output will be optimised for OPO operation and specification may vary with each unit we manufacture.
¹³⁾ Measured at 1064 nm.



TUNING CURVES

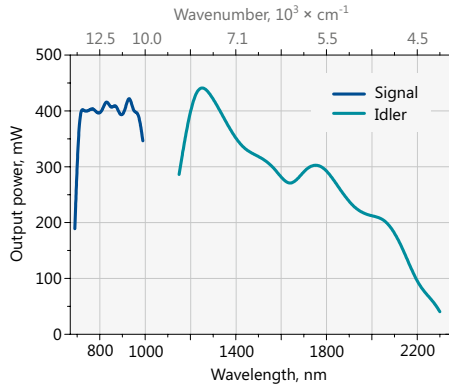


Fig 1. Typical output power of PT257 tunable laser.
The power is shown only at the wavelengths where ambient air absorption is negligible

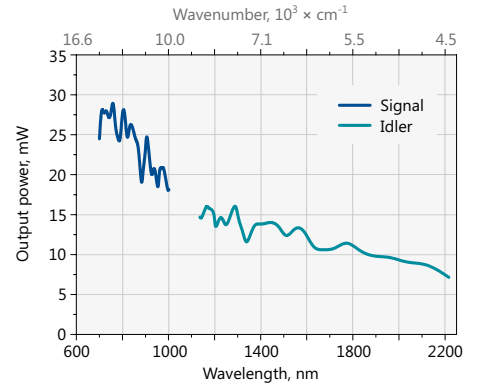


Fig 2. Typical output power of PT259 tunable laser

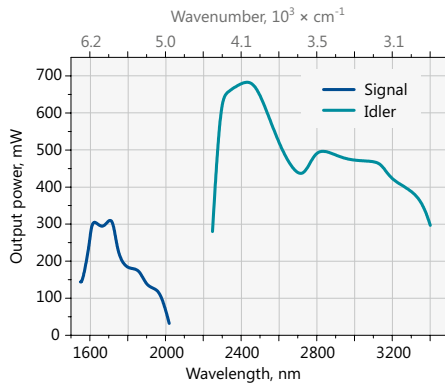


Fig 3. Typical output power of PT277 tunable laser.
The power is shown only at the wavelengths where ambient air absorption is negligible

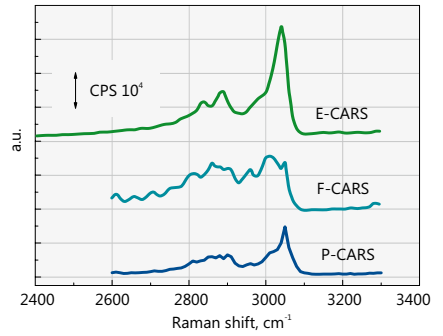


Fig 4. E-CARS, F-CARS, P-CARS spectra of a polystyrene bead (1.1 μm in diameter) measured with PT259 laser. The average pump and Stokes powers were 0.26 mW and 0.6 mW, respectively

OUTLINE DRAWINGS

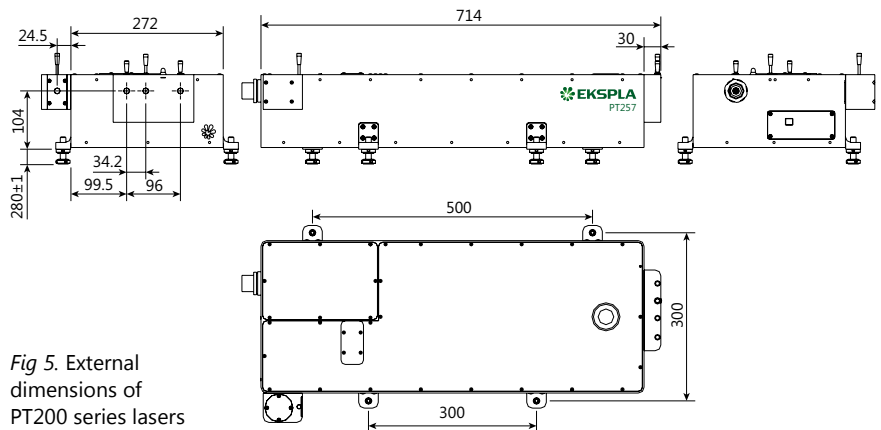


Fig 5. External dimensions of PT200 series lasers