PGx03 SERIES

kHz Repetition Rate Broadly Tunable OPA

FEATURES

- *Picosecond pulses at **1 kHz** pulse repetition rate*
- *Hands-free wavelength tuning*
- *Tuning range from **210 nm** to **2300 nm***
- *Narrow linewidth **<6 cm^{-1}***
- *Low divergence <2 mrad*
- *PC control using USB (RS232 is optional) and LabVIEW™ drivers*
- *Remote control via keypad*

PGx03 series Optical Parametric Generators (OPG) are designed to be pumped by 1 kHz mode-locked lasers with 1 W average power. An excellent choice is the PL2210A series mode-locked picosecond laser from EKSPLA.

The optical design is optimized to produce low divergence beams with moderate linewidth (typically 12 cm^{-1}) at approximately 15 – 20 ps pulse duration. Due to the unique broad tunability range from 210 to 2300 nm these devices are an excellent choice for many spectroscopic applications.

Upon request the optical layout can be easily modified for pumping by other mode-locked lasers with high pulse energy or longer pulse duration.

Three models designed for pumping by up to the 3rd harmonic of Nd:YAG laser are available.

Microprocessor based control system provides automatic positioning of relevant components for hands free operation. Nonlinear crystals, diffraction grating and filters are rotated by ultra-precise stepper motors in the microstepping mode, with excellent reproducibility. Precise nonlinear crystal temperature stabilization ensures long-term stability of generated wavelength and output power.

For customer convenience the system can be controlled through its USB type PC interface (RS232 is optional) with LabView™ drivers or a remote control pad. Both options allow easy control of system settings.

Available standard models are summarized in a table below. Please inquire for custom-built versions.

APPLICATIONS

- *Time resolved pump-probe spectroscopy*
- *Laser-induced fluorescence*
- *Infrared spectroscopy*
- *Nonlinear spectroscopy: vibrational-SFG, surface-SH, Z-scan*
- *Other laser spectroscopy applications*

Available models

Model	Features
PG403	Model has a tuning range from 410 to 2300 nm and is optimized for providing the highest pulse energy in the visible part of the spectrum. When combined with an optional Second Harmonic Generator (SHG), it offers the widest possible tuning range – from 210 to 2300 nm.
PG503	Model has a tuning range from 700 to 2200 nm and the highest pulse energy in the near-IR spectral range. PG503 is a cost-effective alternative to the narrow-band mode-locked Ti:S lasers.

New Laser and PG in one housing – see page 46

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SPECIFICATIONS [1]

Model	PG403	PG403-SH	PG503
OPA SPECIFICATIONS			
Output wavelength tuning range			
SH	–	210 – 410 nm	–
Signal	410 – 709 nm		700 – 1000 nm
Idler	710 – 2300 nm		1150 – 2200 nm
Output pulse energy [2]			
SH [3]	–	10 µJ	–
Signal	50 µJ		70 µJ
Idler [4]	15 µJ		25 µJ
Pulse repetition rate	1000 Hz		
Linewidth	< 12 cm^{-1}		
Typical pulse duration [5]	15 ps		20 ps
Scanning step			
SH	–	0.05 nm	–
Signal	0.1 nm		
Idler	1 nm		
Typical beam size [6]	~ 3 mm		
Beam divergence [7]	< 2 mrad		
Beam polarization [8]			
SH	–	horizontal	–
Signal	horizontal		
Idler	vertical		
PUMP LASER REQUIREMENTS			
Min pump energy [9]			
at 532 nm	–		0.45 mJ
at 355 nm	0.3 mJ		–
Pulse duration [10]	30 ps		
Beam size [10]	2 – 3 mm		
Beam divergence	< 1 mrad		
Beam profile	homogeneous, without hot spots, Gaussian fit > 90 %		
Recommended pump source	PL2210A-TH	PL2210A-TH	PL2210A-SH
PHYSICAL CHARACTERISTICS			
Size (W × L × H)	456 × 820 × 273 mm		456 × 632 × 273 mm
OPERATING REQUIREMENTS			
Room temperature	15 – 30 °C		
Power requirements	100 – 240 V single phase, 47 – 63 Hz		
Power consumption	< 120 W		

1) Due to continuous improvement, all specifications are subject to change without notice. Parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise, all specifications are measured at 450 nm for PG403 units, at 800 nm for PG503 units and for basic system without options.

2) Pulse energies are specified at selected wavelengths. See typical tuning curves for pulse energies at other wavelengths.

3) Measured at 250 nm.

4) Measured at 1000 nm.

5) Estimated assuming 30 ps at 1064 nm pump pulse. Pulse duration varies depending on wavelength and pump energy.

6) Beam diameter at the $1/e^2$ level. Can vary depending on the pump pulse energy.

7) Beam divergence measured at 450 nm.

8) Separate output ports for SH, signal and idler ranges.

9) Max pump energy is limited by available non-linear crystal sizes.

10) Should be specified while ordering if non-Ekspla pump laser is used.

TUNING CURVES

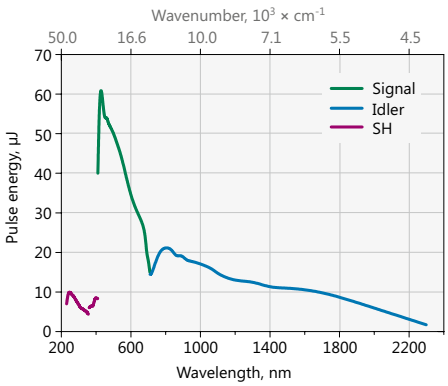

Fig 1. Typical PG403-SH model tuning curve.
Pump energy – 0.3 mJ at 355 nm

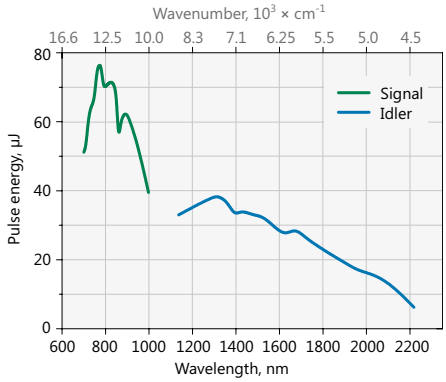

Fig 2. Typical PG503 model tuning curve.
Pump energy – 0.45 mJ at 532 nm

RECOMMENDED UNITS ARRANGEMENT ON OPTICAL TABLE

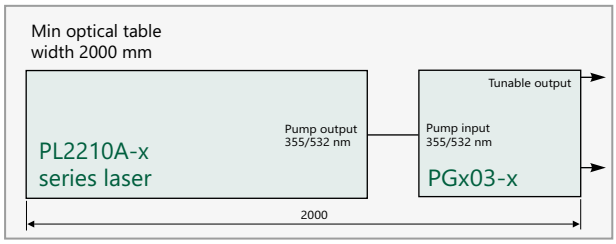

Fig 3. Arrangement of pump laser and PGx03 unit on optical table

OUTLINE DRAWINGS

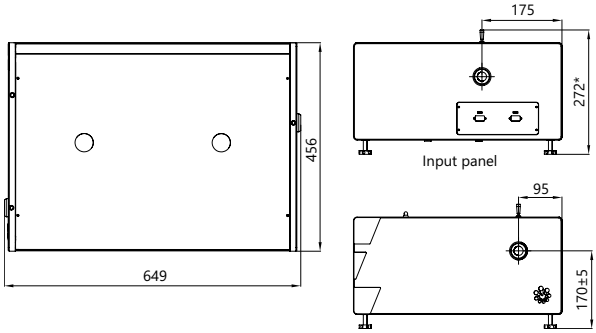

Fig 4. PGx03 model external dimensions

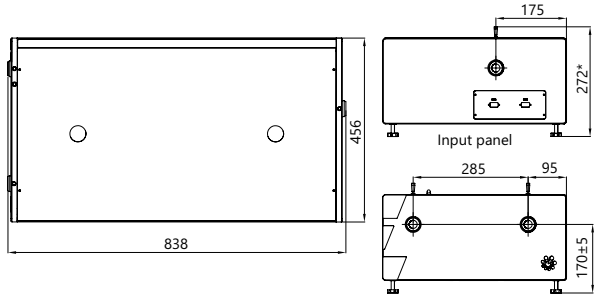

Fig 5. PGx03-SH model external dimensions

ORDERING INFORMATION

Note: Laser must be connected to the mains electricity all the time. If there will be no mains electricity for longer that 1 hour then laser (system) needs warm up for a few hours before switching on.

PG403-SH

Model	Optional tuning range extension
PG403 → 355 nm pump	SH → 210–410 nm
PG503 → 532 nm pump	

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