PGx03 SERIES

Operating at kHz Repetition Rate

FEATURES

- *Picosecond pulses at **1 kHz** pulse repetition rate*
- *Hands-free wavelength tuning*
- *Tuning range from **210 nm** to **16000 nm***
- *Narrow linewidth **<6 cm^{-1}***
- *Low divergence <2 mrad*
- *Remote control via keypad*
- *PC control using USB (RS232 is optional) and LabVIEW™ drivers*

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 20 ps pulse duration.

Due to the unique broad tunability range from 210 to 16000 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.

APPLICATIONS

- *Time resolved pump-probe spectroscopy*
- *Laser-induced fluorescence*
- *Infrared spectroscopy*
- *Nonlinear spectroscopy: vibrational-SFG, surface-SH, CARS, 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 2300 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.
PG703	Model is targeted for infrared spectroscopy applications. The tuning range is from 1400 to 4450 nm and with an optional Difference Frequency Generator (DFG) stage it can be extended to 16000 nm.

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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 using a user-friendly remote control pad or through USB interface (RS232 is optional) from a personal computer (PC) using supplied LabVIEW™ drivers.

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

SPECIFICATIONS [1]

Model	PG403	PG403-SH	PG503	PG703	PG703-DFG
OPG SPECIFICATIONS					
Output wavelength tuning range					
SH	–	210–410 nm	–	–	
Signal	410–709 nm		700–1000 nm	1550–2020 nm	1550–2020 nm
Idler	710–2300 m		1150–2200 nm	2250–3350 nm	2250–3350 nm
DFG	–		–	–	3350–16000 nm
Output pulse energy [2]					
SH [3]	–	10 µJ	–	–	–
Signal	50 µJ		70 µJ	60 µJ	
Idler [4]	15 µJ		25 µJ	20 µJ	
DFG [5]	–		–	–	6 µJ
Pulse repetition rate	1000 Hz				
Linewidth	<12 cm^{-1}		<12 cm^{-1}	<6 cm^{-1}	
Typical pulse duration [6]	15 ps		20 ps	20 ps	
Scanning step, nm					
SH	–	0.05 nm	–	–	
Signal	0.1 nm				
Idler	1 nm				
DFG	–		–	–	1 nm
Typical beam size [7]	~3 mm				
Beam divergence [8]	<2 mrad				
Beam polarization [9]					
SH	–	vertical	–	–	
Signal	horizontal		horizontal	horizontal	
Idler	vertical		vertical	horizontal	vertical
DFG	–		–	–	vertical

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, 800 nm for PG503 units, and 1620 nm for PG703 units.

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 for PG40x units, 1620 nm for PG503 and 3000 nm for PG703 units.

5) Measured at 5000 nm.

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

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

8) Full angle measured at the FWHM level.

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

SPECIFICATIONS [1)]

Model	PG403	PG403-SH	PG503	PG703	PG703-DFG
PUMP LASER REQUIREMENTS					
Min pump energy [10)]					
at 1064 nm	–		–	0.9 mJ	
at 532 nm	–		0.45 mJ	–	
at 355 nm	0.3 mJ		–	–	
Pulse duration [11)]	10–30 ps				
Beam polarization at pump wavelength	vertical		horizontal	horizontal	
Beam size [11)]	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	PL2210A	PL2210A
PHYSICAL CHARACTERISTICS					
Size (W × L × H)	456 × 605 × × 273 mm	456 × 1026 × × 273 mm	456 × 605 × × 273 mm	456 × 605 × × 273 mm	456 × 1026 × × 273 mm
OPERATING REQUIREMENTS					
Room temperature	15–30 °C				
Power requirements	100–240 V single phase, 47–63 Hz				
Power consumption	<120 W				

[10)] Max pump energy is limited by available non-linear crystal sizes.

[11)] Should be specified while ordering if non-Ekspla pump laser is used.

TUNING CURVES

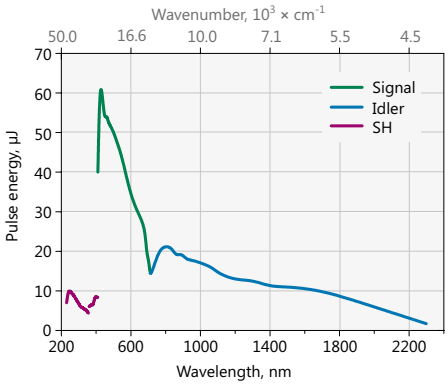

Fig 1. Typical PG403-SH model tuning curve.
Pump energy – 0.3 mJ at 355 nm

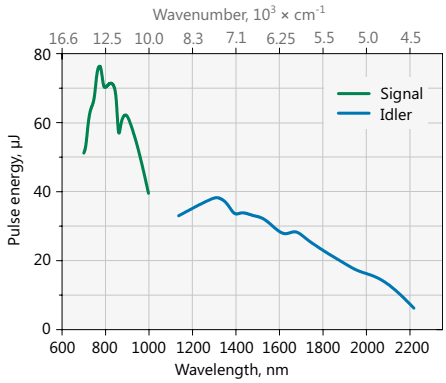

Fig 2. Typical PG503 model tuning curve.
Pump energy – 0.45 mJ at 532 nm

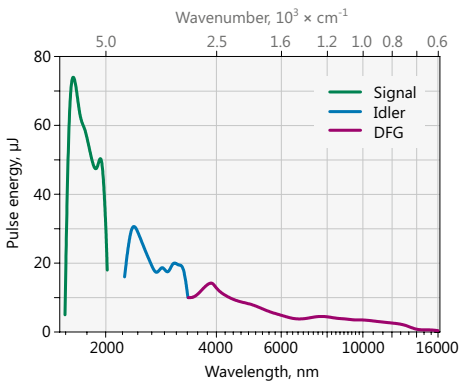

Fig 3. Typical PG703-DFG model tuning curve.
Pump energy – 0.9 mJ at 1064 nm

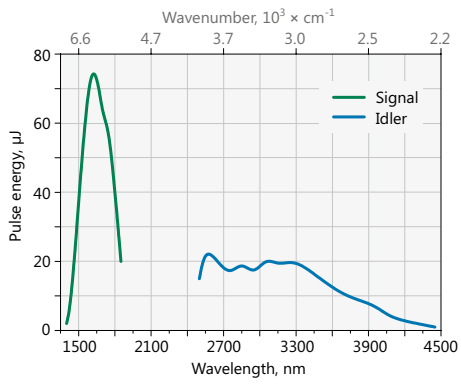

Fig 4. Typical PG703 model tuning curve.
Pump energy – 0.9 mJ at 1064 nm

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OUTLINE DRAWINGS

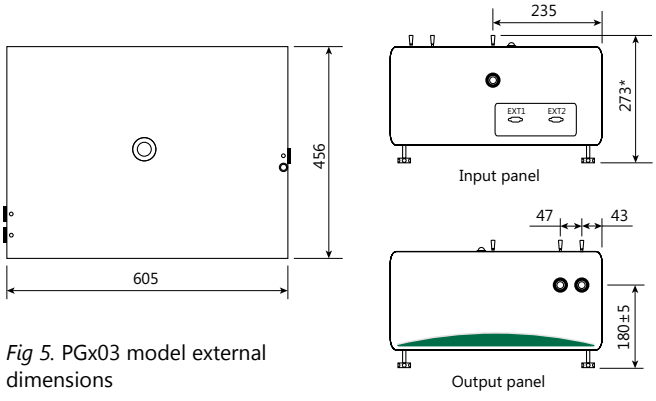

Fig 5. PGx03 model external dimensions

ORDERING INFORMATION

PG403-SH

Model	Optional tuning range extension
PG403 → 355 nm pump	SH → 210–410 nm
PG503 → 532 nm pump	DFG (PG703) → 3350–16000 nm
PG703 → 1064 nm pump	