

PGx03

PG403 • PG503 • PG703

SERIES OPTICAL PARAMETRIC GENERATORS

1 kHz Picosecond OPG

FEATURES

- Picosecond pulses at **1 kHz** pulse repetition rate
- Hands-free wavelength tuning
- Spectral range of **230 nm to 16 000 nm**
- Narrow linewidth $<6 \text{ cm}^{-1}$
- Low divergence
- Remote control via keypad
- PC control using USB (RS232 is optional) and LabView™ drivers

APPLICATIONS

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



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 of 210 to 16 000 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.

PG403 model has a tuning range of 410 nm to 2300 nm and is optimized for providing 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 nm to 2300 nm.

PG503 model has a tuning range of 700 nm to 2300 nm and 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 1450 nm to 4450 nm and with an optional difference frequency generator (DFG) stage it can be extended to 16 000 nm.

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.

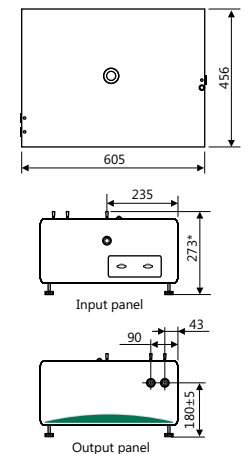
For customer convenience the system can be controlled using a user-friendly remote control pad or through USB interface (RS232 is optional) from a personal computer (PC) using supplied LabView drivers.

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

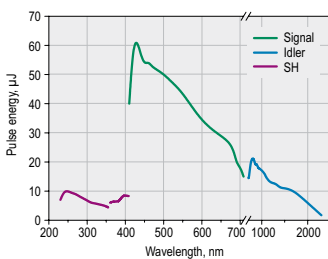
SPECIFICATIONS ¹⁾

MODEL	PG403	PG403-SH	PG503	PG703	PG703-DFG
OPG SPECIFICATIONS					
Output wavelength tuning range					
SH	–	0.23-0.41 μm	–	–	–
Signal	0.41-0.709 μm		0.700-1.0 μm	1.4-1.85 μm	1.45-2.02 μm
Idler	0.710-2.3 μm		1.15-2.2 μm	2.5-4.45 μm	2.25-4.0 μm
DFG	–		–	–	4-16 μm
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	
DFG	–		–	–	vertical
PUMP LASER REQUIREMENTS					
Min energy					
at 1064 nm	–	–	–	0.9 mJ	
at 532 nm	–	–	0.45 mJ	–	
at 355 nm	0.3 mJ		–	–	
Pulse duration ¹⁰⁾	10-30 ps				
Beam polarization at pump wavelength	vertical		horizontal	horizontal	
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	PL2210A	PL2210A
PHYSICAL CHARACTERISTICS					
Size (W×H×L)	456×273×605 mm	456×273×1026 mm	456×273×605 mm	456×273×605 mm	456×273×1026 mm
OPERATING REQUIREMENTS					
Room temperature	15-30 °C				
Mains voltage	100-240 V single phase, 47-63 Hz				
Power consumption	<120 W				

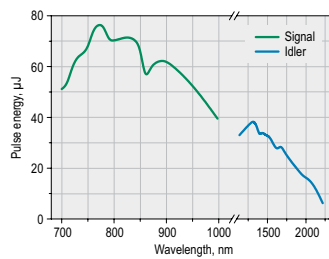
- ¹⁾ All specifications are subject to change without notice. Parameters marked typical are not specifications. They are indications of typical performance and will vary with each unit we manufacture. Unless stated otherwise all specifications are measured at 450 nm for PG403 units, 800 nm for PG503 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 FWHM point. Can vary depending on the pump pulse energy.
- ⁸⁾ Full angle measured at the 1/e² point.
- ⁹⁾ Separate output ports for SH, signal, idler and DFG ranges.
- ¹⁰⁾ Should be specified when ordering if non-Ekspla pump laser is used.



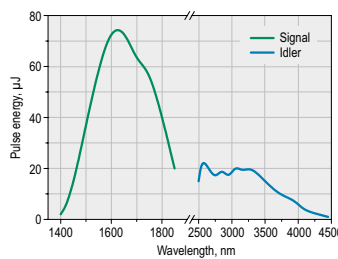
PGx03 model external dimensions



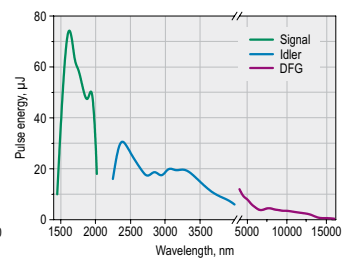
Typical PG403-SH model tuning curve
Pump energy - 0.3 mJ at 355 nm



Typical PG503 model tuning curve
Pump energy - 0.45 mJ at 532 nm



Typical PG703 model tuning curve
Pump energy - 0.9 mJ at 1064 nm



Typical PG703-DFG model tuning curve
Pump energy - 0.9 mJ at 1064 nm



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