PNx Powerchip Series
High peak power sub-nanosecond lasers

KEY FEATURES

- **Up to 200 kW peak power**
- **Down to 350 ps pulse width**
- **1064 / 532 / 355 / 266 / 213 nm**
- **Single shot to 5 kHz**
- **TEM00, $M^2 < 1.3$**
- **Integrated air-cooled package**

The Powerchip Series delivers high-peak-power, sub-nanosecond pulses from 1064 nm to 213 nm in a compact, rugged, all-in-one platform. Combining passively Q-switched microchip technology, excellent beam quality and integrated air cooling, Powerchip lasers are designed for precision material processing, analytical instrumentation and advanced photonics applications.

APPLICATIONS

- Precision Micromachining & Selective Ablation
- PCB Repair & Electronics Processing
- Laser Micromarking & Thin-Film Patterning
- Laser Microdissection
- MALDI-TOF / Laser Desorption-Ionization
- LIBS / Micro-LIBS
- LIF & Time-Resolved Fluorescence
- Time-Resolved / Gated Raman Spectroscopy
- LIDAR, Laser Range Finding & 3D TOF Imaging
- Photoacoustic Imaging & Sensing

POWERCHIP KEY ADVANTAGES

High-peak-power, sub-nanosecond performance from IR to DUV

HIGH PEAK POWER

UP TO 200 kW

High optical intensity for ablation, plasma generation and optical excitation.

SUB-NANOSECOND PULSES

DOWN TO 350 ps

Concentrated energy delivery for localized interaction and reduced thermal diffusion.

WAVELENGTH COVERAGE

1064 / 532 / 355 / 266 / 213 nm

Five wavelength options spanning IR to DUV for different absorption and excitation requirements.

REPETITION RATE

SINGLE SHOT TO 5 kHz

Fixed and variable repetition-rate options for experiments, instrumentation and production.

BEAM QUALITY

TEM_{00} · $M^2 < 1.3$

Supports tight focusing, repeatable spot size and stable optical alignment.

SYSTEM INTEGRATION

AIR-COOLED PLATFORM

Designed to simplify OEM and laboratory integration in a compact turnkey system.

TECHNICAL SPECIFICATIONS – 1064 / 532 nm

	PNP-M08010-1x0	PNP-M05550-1x0	PNG-M02010-1x0	PNG-M04005-1x0	PNG-M01550-1x0
Wavelength	1064nm	1064nm	532nm	532nm	532nm
Max Repetition Rate RR_{max} (1)	1000Hz	5000Hz	1000Hz	500Hz	5000Hz
Constant Pulse width range (FWHM)	<500ps	<600ps	<400ps	<400ps	<500ps
Output energy	>80µJ	>50µJ	>20µJ	>35µJ	>15µJ
Peak Power	>160kW	>85kW	>50kW	>80kW	>30kW
Short term (10min) pulse to pulse stability 1σ	≤ 1 %	≤ 2 %	≤ 3 %	≤ 3 %	≤ 3 %
Long term (1h) output power stability (2)	± 3%	< 6%	± 3%	± 3%	± 3%
Beam profile	Gaussian TEM00	Gaussian TEM00	Gaussian TEM00	Gaussian TEM00	Gaussian TEM00
Beam divergence (Full@1/e²) Horizontal Vertical	2.0±0.5mrad 2.0±0.5mrad	1.5±1mrad 1.5±1mrad	1.8±0.5mrad 1.8±0.5mrad	5.0±1mrad 4.0±1mrad	3.4±1mrad 3.6±1mrad
M^2 (3)	<1.3	<1.3	<1.3	<1.3	<1.3
Beam ellipticity (4)	<1.3	<1.3	<1.3	<1.3	<1.3
Polarization	> 20 dB	> 20 dB	> 20 dB	> 20 dB	> 20 dB

NOTES >> see page 8.

TECHNICAL SPECIFICATIONS – 355 / 266 / 213 nm

	PNV-M02510 -1x0	PNV-M01050 -1x0	PNU-M01210 -1x0*	PND-M00210 -1xx
Wavelength	355nm	355nm	266nm	213nm + residual λ**
Max Repetition Rate RR_{max} (1)	1000Hz	5000Hz	1000Hz	1000 Hz
Constant Pulse width range (FWHM)	< 350ps	< 350ps	<350ps	<1000ps
Output energy	> 25µJ	> 10µJ	>12µJ	>2µJ
Peak Power	> 60kW	> 30kW	>35kW	>2kW
Short term (10min) pulse to pulse stability 1σ	≤ 3 %	≤ 3 %	≤ 3 %	< 2 %(6)
Long term (1h) output power stability (2)	± 5%	± 5%	± 5%	<10%(7)
Beam profile	Gaussian TEM00	Gaussian TEM00	See note (5)	Gaussian TEM00
Beam divergence (Full@1/e²)				
Horizontal	3.3±0.5mrad	4.4±1mrad	<0.9mrad	≤0.3mrad
Vertical	3.0±0.5mrad	4.0±1mrad	<0.9mrad	≤0.3mrad
M^2 (3)	<1.3	<1.3	<1.4	≤1.5
Beam ellipticity (4)	<1.3	<1.3	-	≤1.5
Polarization	> 20 dB	> 20 dB	> 20 dB	> 20 dB

*** This model is an OEM and has not followed the Performance Development Planning (PDP) process completely yet. For the moment, the specifications are preliminary, which means that the final laser parameters might be different than the current specifications.**

**** In addition with 213nm, the following residual wavelengths are present at the laser output of this laser model: 808nm, 1064nm, 532nm, 355nm. In order to select the 213nm wavelength only, the end-user needs to acquire a specific external filtering system and place it in front of the laser output.**
The 808nm signal comes from the pumping diode. The residual energy at the other wavelengths come from signals which have been partially converted nonlinearly.

NOTES >> see page 8.

COMPLEMENTARY INFORMATION & OPTIONS:

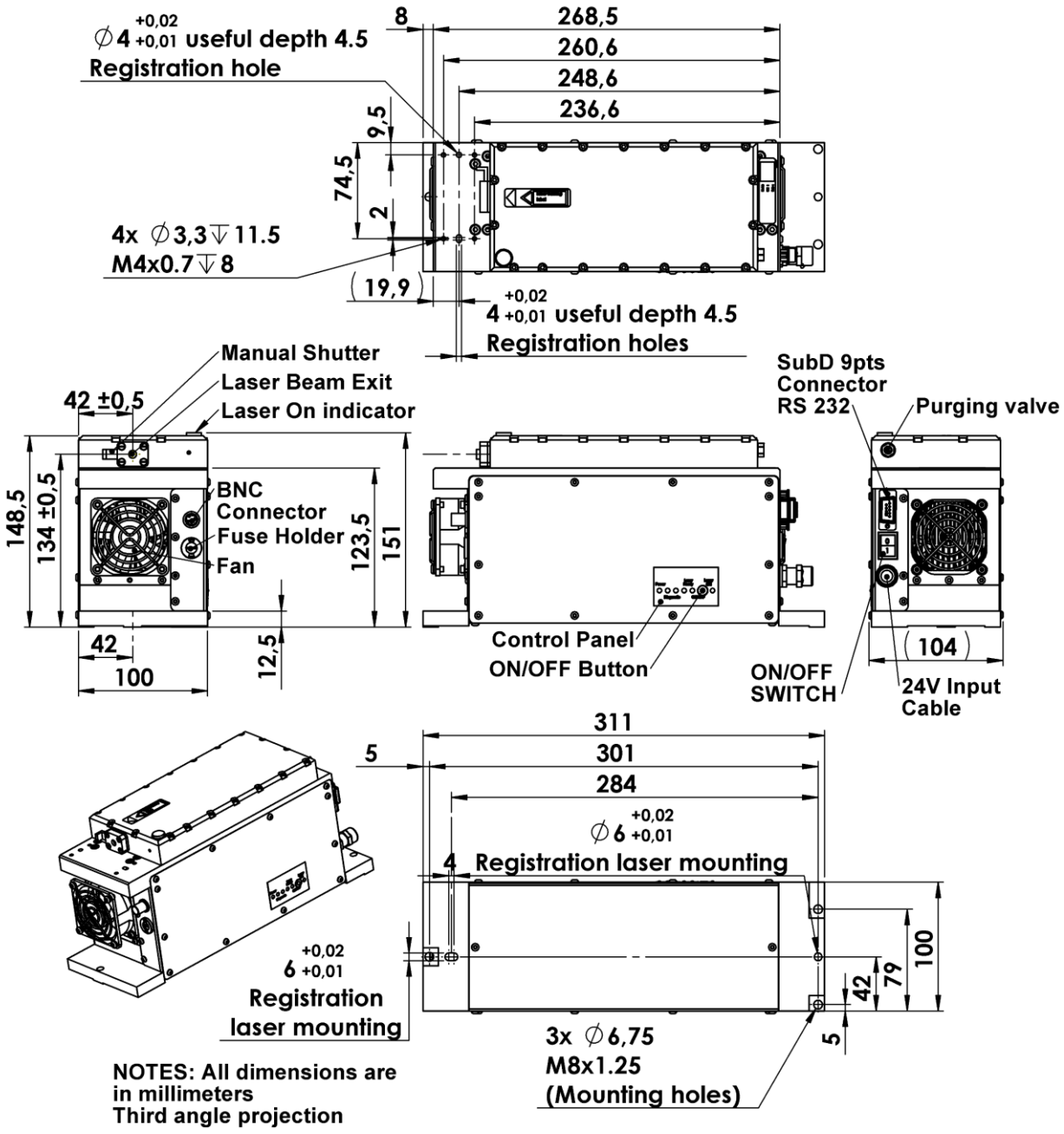
Environment parameters	
Operating Temperature	15-35 °C; 20-35°C for PND-series
Maximum Power Consumption	<75 W
Storage Temperature	0-50 °C
Shock of 11ms according to IEC 68-2-27, non operating	25 g
Vibration 5Hz to 500Hz sinusoidal according to IEC 68-2-6, non operating	2 g

Certification	
Laser Classification according to IEC 60825-1:2014	Class 3B Except PNU & PND-series : Class 4
CDRH	Yes if used with PCR-240500-100 power converter
RoHS	Yes

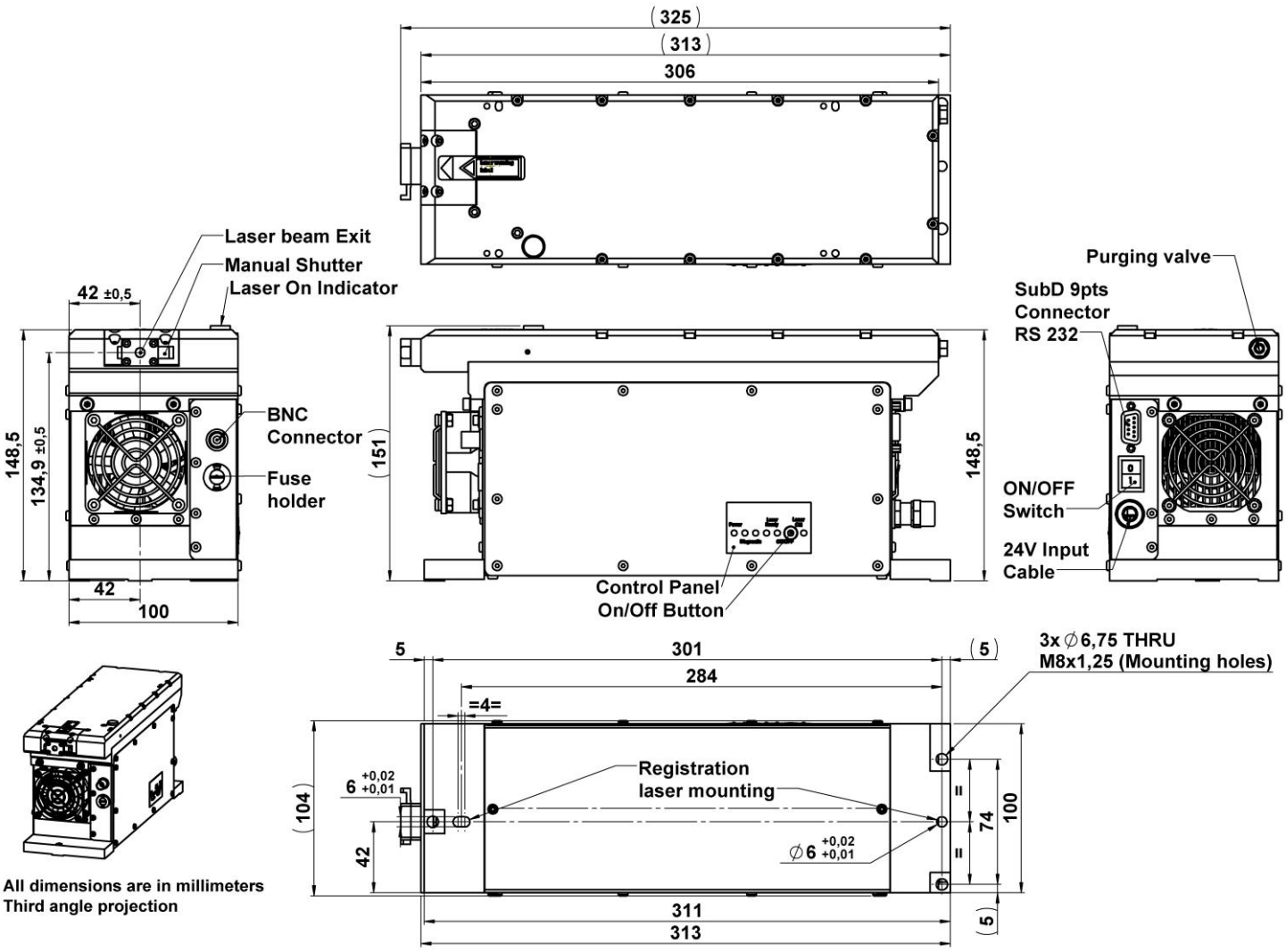
Package	
Laser Head dimensions, LxWxH(8)	311x100x149 mm
Laser Head Weight	5.5 kg
PCR-240500-100 AC/DC Converter Dimensions, LxWxH	315x262x77 mm
PCR-240500-100 AC/DC Converter Weight	3 kg

Options	
Fixed Repetition Rate = RR_{max}	-100 version *Option NOT available for the PNP-M05550-1x0, the PNG-M01550-1x0, nor the PNV-M01050-1x0*
Fixed Repetition Rate ≠ RR_{max}	-110 version ; RR to be chosen over 10Hz-Rr_{max} *Option NOT available for the PNP-M05550-1x0, the PNG-M01550-1x0, nor the PNV-M01050-1x0*
External Variable Repetition Rate	-120 version ; single shot to RR_{max}, 1 optimized RR value
External Variable Multi-Repetition Rate	-130 version ; single shot to RR_{max}, 3 optimized RR values

CDRH LASER HEAD MECHANICAL DRAWINGS : PNP-, PNG-, PNV- & PNU-SERIES

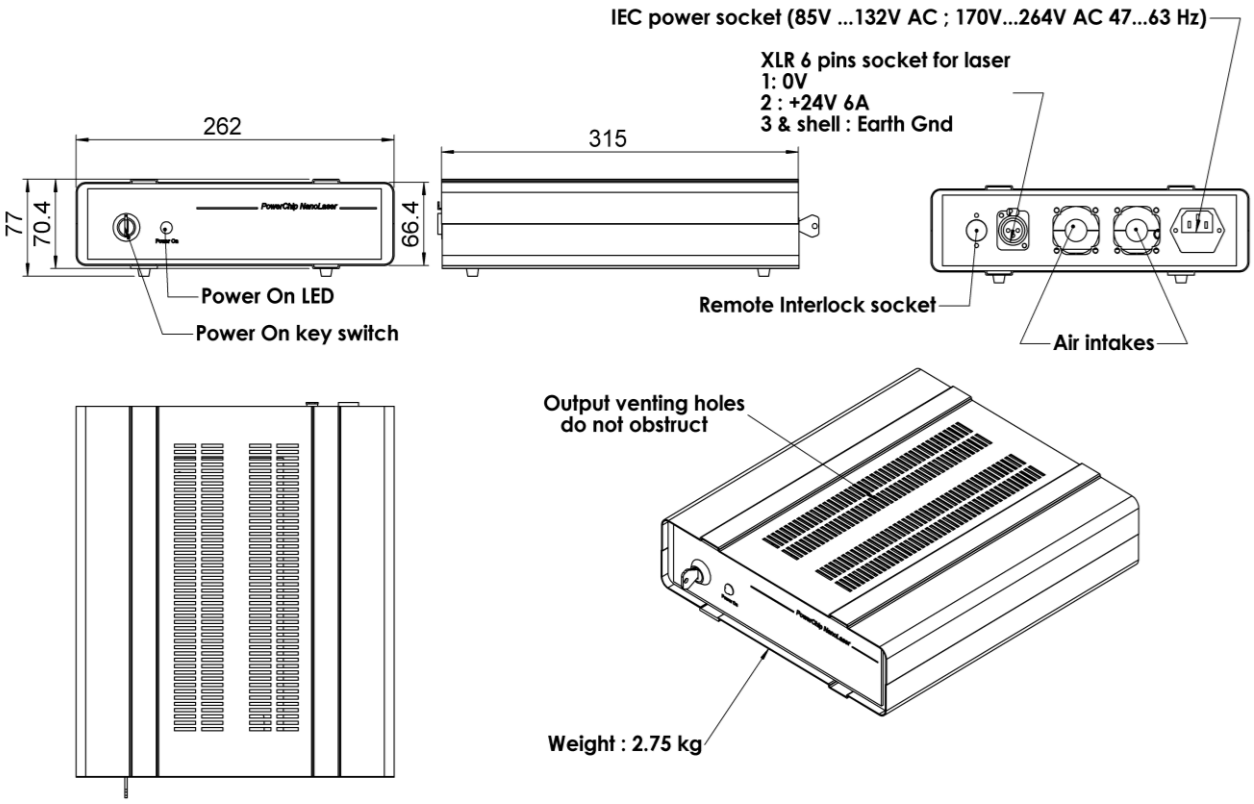


CDRH LASER HEAD MECHANICAL DRAWINGS : PND-M00210-1X0



All dimensions are in millimeters
Third angle projection

MECHANICAL DRAWINGS :
PCR-240500-100 (CDRH COMPLIANT AC/DC CONVERTER)



NOTES

(1) See options p5. Rep. rate <10 Hz is possible but specifications could vary.
(2) For temperature variation <±3°C and <3°C/hour.
(3) Mean average value M = √(XY), X and Y being respectively the major and minor axis of the ellipse.
(4) Beam ellipticity is calculated as the ratio of the main axis far-field divergence.
(5) Beam exhibits different profile in horizontal (Gaussian) and vertical ((sin x /x)² in far-field) plans.
(6) Short term energy stability (1000 pulses, RMS).
(7) Long term (4hr) average energy drift.
(8) More compact separated laser head and electronics package may be available upon request – Contact factory for further details.