



Gas Lasers

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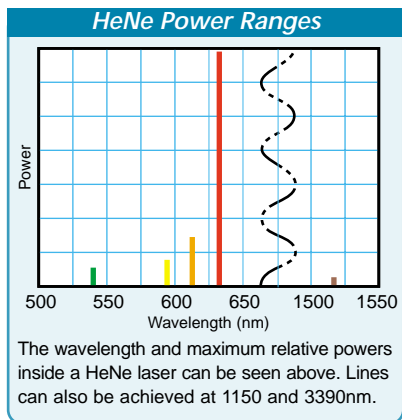


Laser 2000 Helium Neon lasers utilise the latest developments in state of the art optical coating fabrication techniques to deliver excellent performance in the quality of the laser emission and the laser lifetime. Innovative production techniques have led to superior performance in laser power, stability and wavelength selectability.

The beam from a HeNe is as close to a perfect gaussian intensity profile as is practically possible because it is essentially free from the thermal effects, such as astigmatism and wavefront distortions. Typical M² values are significantly less than 1.05.

The average life for Laser 2000 HeNe designs ranges from 15,000 to 50,000 hours of continuous operation.

A low current DC discharge provides excitation. Neon is the active lasing medium; Helium is used as a buffer gas to populate the upper the Neon energy levels through collisions. Creating and maintaining the proper ratio of Helium to Neon is critical to system performance.



Range of standard HeNe Lasers and CPS laboratory power supply

Stabilised Visible Systems

SL02/1 / SL02/2 / SL03/1

- Output 632.9914nm ±0.0003
- Very high long term stability

A HeNe laser can be designed with only two allowable longitudinal modes under the laser gain curve. As the laser cavity length changes and these modes sweep across the gain curve, the ratio of the power of these two modes varies from zero to infinity. By measuring the power in each of these modes and designing a feedback loop to control the cavity length, the power ratio (and thus the frequency of the modes) can be held constant, stabilising the performance of the HeNe. In the SL02/2 the two modes are orthogonally polarised, so it is an easy matter to separate one of the modes for single frequency output and form model SL02/1. The Laser 2000 stabilised HeNe systems demonstrate megahertz stability over days and even months.

The HeNe wavelength is fixed to 0.01nm (the Doppler bandwidth of the laser) and does not shift with operating temperature.

An internal thread at their beam exits may be used for installing mechanical shutters or various types of optical components.

The SL02/1 and SL02/2 are both supplied with an adaptor to plug directly into the wall socket.

The SL02 may be mounted using the LAS-00-472 detailed below right.

Visible and Infrared CW Systems

LHxx-

- TEM₀₀ or multimode
- Wavelengths from 543 to 3390nm
- 4 colours and IR available

Laser 2000 helium-neon lasers utilise the latest advancements in state of the art technology. Innovations in production techniques of low cost but custom designed laser mirrors have led to superior performance in He-Ne laser power, stability and wavelength selectability.

In addition to producing the highest quality red (633nm) lasers available, Laser 2000 also supplies single line lasers in the orange (612nm), yellow (594nm) and green (543 nm) spectral regions. Laser 2000 also offers line selectable lasers, infrared lasers (1152 nm, 1523nm and 3392nm), and red lasers with powers up to 35mW.

The Laser 2000 range of tubes and systems are sold worldwide and used in diverse markets. Specific applications include laser printers, colour lithography, two-colour interferometry, excitation of fluorescent dyes, testing of optical components and thin films, aircraft landing systems, educational demonstrations and particle counting and sizing detection measurements.

Mounting HeNe Lasers:

The cylindrical packages of the LHxx HeNe lasers in the Laser 2000 range may be mounted in the Laser 2000 HeNe mount. Three options are available:

Technical Data		Model SL 02/1	Model SL 02/2	Model SL03/1
Wavelength (nominal)	nm	632.9914 ± 0.0003		632.9910 ± 0.0002
Output power	mW	≥1.0	≥2.0	≥0.8
Amplitude noise (30 Hz - 10 MHz)	%	< 0.2	< 0.3	<0.2
Laser beam ripple (39 kHz)	%	< 0.2	< 0.3	<0.2
Amplitude stability 24 hrs / 1 min	%	<5 / <0.5		<5 / 0.5 (frequency stabilisation mode) <0.5 / 0.2 (amplitude stabilisation mode)
Beam diameter at 1/e ² power points (TEM ₀₀)	mm	0.63		0.55
Beam divergence, full angle (TEM ₀₀)	mrad	1.3		1.5
Beam polarisation		Single linearly polarised longitudinal mode	Two mutually orthogonal linearly polarised modes	Linearly polarised longitudinal mode
Longitudinal mode spacing	MHz	-		-
Warm-up time to achieve stable operation	min	-		<10
Frequency characteristics:				
Max. frequency drift vs. temperature	MHz / K	±4		±2
Maximum possible frequency change	MHz	±25		±5
Frequency stability 1 min / 1 hr / 24 hrs,		±2 x 10 ⁻⁹ / ±1 x 10 ⁻⁸ / ±2 x 10 ⁻⁸ (after 40 min. warm-up)		±1 x 10 ⁻⁹ / ±2 x 10 ⁻⁹ / ±1 x 10 ⁻⁸ (after 30 min. warm-up)
Maximum optical feedback ratio				<10 ⁻⁵
Maximum magnetic flux density at laser head:				
Alternating fields	T			<10 ⁻⁶
Static fields	T			<10 ⁻⁴
Ambient temperature (operating)	°C			+15 to +30
Ambient temperature (non-operating)	°C			-20 to +50
Expected lifetime	hrs	15000		≥15000
Power consumption when stabilised	W	approx. 20		<20
Operating voltage (AC)	V	95.-265		100 - 240
Laser size	mm	50 dia. x 410 long		Ø34.9 x 280 / 172 x 60 x 230
Internal thread size standard / optional		1.279" - 32 / 1.000" - 32		1.279" - 32
Cable length between laser and AC adaptor	m	1.5		0.8
Laser weight / AC adaptor weight	g	900 / 350		450 / 1200
CDRH Classification				3A



LAS-00-471.

This mounts directly to an optical table and has no direct height or angle adjustment. An option "-T", provides pitch and yaw via micrometer adjustment but is identical in every other respect. The Laser mount accepts any 44mm diameter HeNe laser.



LAS-00-472.

This mount is fully adjustable and provides x,y pitch and yaw adjustment fitting a variety of laser diode diameters via three clamping screws at each end. This mount accepts the longer diameter SL02.



LSTP-1010: Tuneable HeNe Laser

Tuneable HeNe Lasers

LSTP-1010

A tuneable system which allows the user to switch easily among green, yellow, two orange and one red line is also available. The LSTP-1010 is the only commercially available Helium-Neon laser that offers wavelength selectable operation.

Dual Output HeNe Lasers

LHYP-0501-115/339 LHIRP-0101-152/633

- Dual output 1150 & 3390nm
- Dual output 633 & 1520nm

The dual output wavelength Helium-Neon laser is particularly useful for far infrared applications. The two output beams are precisely collinear, a feature that makes the 1150nm (or 633nm) beam a useful alignment guide for the 3390nm (or 1520nm) beam. An optional output filter is available that allows selection of simultaneous output at 1150nm (633nm) and 3390nm (1520nm) or either wavelength independently.



LAS-00-473.
This mount clamps directly to an optical table top and allows for vertical mounting of the HeNe laser head and has an integral 45° mirror mount for a bending mirror. The height of the mirror mount may be adjusted to any position between 75mm to 375mm above the table surface.

Fibre Pigtailed HeNe Lasers

The model LHIP-0101-152 may be fibre pigtailed to provide an extremely stable reference source in the 1550nm region. The laser will deliver 0.5mW out of singlemode fibre at 1520nm.

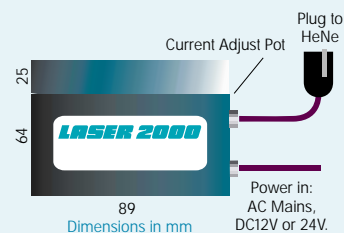


105x38x197mm

Laboratory Power Supply

CPS / CPSH1 / CPSH2

Power supplies suitable for operating all heads and tubes are available. The AC driven laboratory power supply is suited to end use applications and comes complete with keyswitch and interlock.

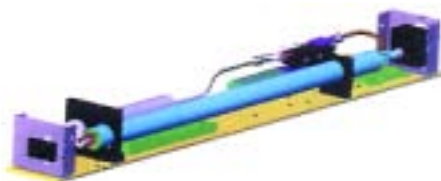


OEM Power Supply

OEMPS / OEMPSH1 / OEMPSH2

The OEM power supply has flying leads for the AC input voltage. Alternatively DC power supplies operate at 12V or 24V, these are only available in an OEM version.

Model Number	Operating Wavelength (nm)	Output Power (mW)	Mode Structure	Beam Diameter (mm)	Beam Diverg (mradian)	Polarisation Ratio	Mode Spacing (MHz)	Linewidth (GHz)	Size Ø x L (mm)	Power Supply		
										CPS	CPSH1	CPSH2
LHGR-0050	543	0.5	TEM ₀₀	0.64	1.07	Random	566	1.75	44 x 330	•		
LHGP-0051	543	0.5	TEM ₀₀	0.72	0.96	Lin 500:1	416	1.75	44 x 425	•		
LHGR-0100	543	1	TEM ₀₀	0.7	0.98	Random	441	1.75	44 x 425	•		
LHGP-0101	543	1	TEM ₀₀	0.83	0.84	Lin 500:1	303	1.75	44 x 533		•	
LHGR-0200	543	2	TEM ₀₀	0.83	0.84	Random	303	1.75	44 x 533		•	
LHGR-0050M	543	0.5	Multiple	-1.62	-4.02	Random	566	1.75	44 x 330	•		
LHGR-0100M	543	1	Multiple	-1.59	-3.35	Random	441	1.75	44 x 425	•		
LHGR-0200M	543	2	Multiple	-2.58	-4.68	Random	303	1.75	44 x 533	•		
LHYR-0100	594	1	TEM ₀₀	0.67	1.12	Random	566	1.60	44 x 330	•		
LHYP-0101	594	1	TEM ₀₀	0.74	1.03	Lin 500:1	416	1.60	44 x 425	•		
LHYR-0200	594	2	TEM ₀₀	0.72	1.05	Random	441	1.60	44 x 425	•		
LHYP-0201	594	2	TEM ₀₀	0.74	1.03	Lin 500:1	416	1.60	44 x 425	•		
LHYR-0100M	594	1	Multiple	-1.14	-2.83	Random	566	1.60	44 x 330	•		
LHYR-0200M	594	2	Multiple	-1.61	-3.41	Random	441	1.60	44 x 425	•		
LHYR-0600M	594	6	Multiple	-2.59	-4.48	Random	303	1.60	44 x 533		•	
LHOP-0201	612	2	TEM ₀₀	0.75	1.04	Lin 500:1	441	1.55	44 x 425	•		
LHOR-0250	612	2.5	TEM ₀₀	0.75	1.04	Random	441	1.55	44 x 425	•		
LHOR-0150M	612	1.5	Multiple	-1.70	-4.14	Random	566	1.55	44 x 330	•		
LHOR-0300M	612	3	Multiple	-1.57	-3.49	Random	441	1.55	44 x 425	•		
LHOR-0500M	612	5	Multiple	-1.90	-4.01	Random	385	1.55	44 x 483	•		
LHRR-0200	633	2	TEM ₀₀	0.81	1	Random	566	1.50	44 x 330	•		
LHRP-0201	633	2	TEM ₀₀	0.81	1	Lin 500:1	566	1.50	44 x 330	•		
LHRR-0500	633	5	TEM ₀₀	0.8	1.01	Random	441	1.50	44 x 425	•		
LHRP-0501	633	5	TEM ₀₀	0.8	1.01	Lin 500:1	441	1.50	44 x 425	•		
LHRR-1200	633	12	TEM ₀₀	0.88	0.92	Random	316	1.50	44 x 533		•	
LHRP-1201	633	12	TEM ₀₀	0.88	0.92	Lin 500:1	316	1.50	44 x 533		•	
LHRR-1700	633	17	TEM ₀₀	0.98	0.82	Random	252	1.50	44 x 660			•
LHRP-1701	633	17	TEM ₀₀	0.98	0.82	Lin 500:1	252	1.50	44 x 660			•
LHRR-0500M	633	5	Multiple	-2.75	-7.23	Random	566	1.50	44 x 425	•		
LHRR-0800M	633	8	Multiple	-1.90	-3.98	Random	441	1.50	44 x 425	•		
LHRR-1400M	633	14	Multiple	-2.91	-5.36	Random	316	1.50	44 x 533		•	
LHRR-1800M	633	18	Multiple	-1.98	-5.92	Random	252	1.50	44 x 660		•	
LSRP-3001	633	30	TEM ₀₀	1.22	0.66	Lin 500:1	163	1.50	95 x 1016			Built-in power unit
LSRP-3501	633	35	TEM ₀₀	1.22	0.66	Lin 500:1	163	1.50	95 x 1016			Built-in power unit
LHIP-0201-115	1150	1	TEM ₀₀	1.09	1.34	Lin 500:1	375	0.82	44 x 483		•	
LHIP-0101-152	1520	1	TEM ₀₀	1.36	1.43	Lin 500:1	316	0.62	44 x 533		•	
LHIP-0201-339	3390	2	TEM ₀₀	2.02	2.13	Lin 500:1	316	0.28	44 x 533		•	
LHIP-0501-115/339	1150/3390	2/3	TEM ₀₀	0.9/1.55	1.62/2.78	Lin 500:1	316	0.52/0.28	44 x 533		•	
LHIP-0101-152/633	633/1520	1/0.8	TEM ₀₀	0.88/1.36	0.92/1.43	Lin 500:1	316	1.50/0.62	44 x 533		•	
LSTP-1010	633	4.0	TEM ₀₀	0.77	1.05	Lin 500:1	428	1.50	96x120x 445			Built-in power unit
(Tuneable HeNe Laser System)	612	2.5	TEM ₀₀	0.76	1.03	Lin 500:1	428	1.55				
	604	0.5	TEM ₀₀	0.75	1.02	Lin 500:1	428	1.57				
	594	0.6	TEM ₀₀	0.74	1.02	Lin 500:1	428	1.60				
	543	0.3	TEM ₀₀	0.71	0.97	Lin 500:1	428	1.75				



Deep UV Lasers

30 & 70 Series

- **>200mW* power (Quasi CW)**
- **Wide range of deep UV wavelengths (224-272nm)**
- **Narrow line width <3GHz**
- **Instant warm-up (<10μs)**
- **Very compact**
- **Any operating orientation**
- **Very rugged and reliable**
- **Low power consumption (<100W)**
- **No standby or preheat power required**
- **Wide ambient operating environment**
- **No toxic chemicals**
- **Low cost**

The Photon Systems Deep UV laser product family is a revolutionary new family of deep ultraviolet laser products which provide the size, weight and the power consumption of a HeNe laser and the wavelengths and average power levels of table top excimer lasers, frequency doubled water cooled argon lasers, or fourth harmonic Nd:YAG lasers... at a fraction of the cost.

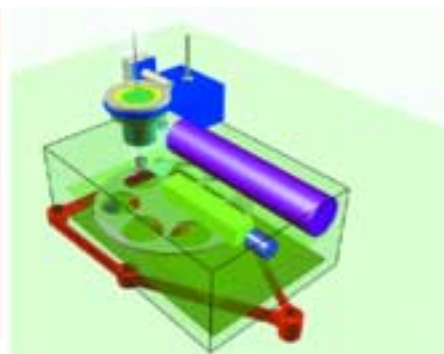
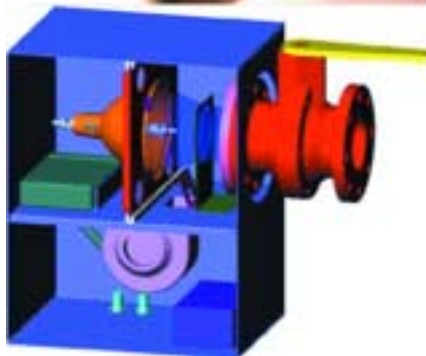
This new DUV product family utilises the same construction ideas that have made HeNe lasers so rugged and reliable with coaxial gain medium and internal mirrors. But these new lasers provide output at wavelengths from 224nm to 270nm in the deep ultraviolet.

These new lasers provide their UV output with input power levels less than 100W. Therefore there are no thermal management issues. No water cooling. No heat exchangers. The output of the lasers is quasi-steady with on-time duty cycles about 1% and on-time duration up to a few seconds. This compares to duty cycles for excimer, solid state or N² lasers of 10⁻⁷. The output from these lasers is like a chopped source rather than a pulsed source.

These lasers ave multimode transverse mode structure with M2 about 10. Therefore they can be focused to about 3 micron spot using a NA=0.5 lens.

Photon Systems welcomes the opportunity to work with the researcher or OEM system developer to provide the custom configuration suited to your needs.

* The specified power is the peak average output power of the laser during the on time pulse.



Preliminary Performance Specs for HeAg Laser @ 224.3nm

Model Number		HeAg 70-224SL	HeAg 30-224SL
Emission Wavelength	nm	224.3	224.3
Peak Power (Quasi CW)	mW	>70	>10
Laser Head Size	cm	10 x 10 x 70	7.6 x 7.6 x 28
System Weight	kg	3.6	1.4
Pulse Frequency	Hz	1 - 30	1
Long. Mode Spacing	MHz	257	642
Pulse Width	μsec	20 - 500, adjustable	
Duty Cycle	%	up to 1%, depending on laser line and burst mode	
Beam Diameter	mm	3	
Beam Divergence	mrad	0.3	
Oscillation Bandwidth	GHz	<3	
Power Consumption	W	<100	
Line Requirements		90 - 250VAC, 47 - 63Hz, single phase, 100mA or 24VDC @ 1A	

Preliminary Performance Specs for NeCu Laser @ 248.6nm

Model Number		NeCu 70-248SL	NeCu 30-248SL
Emission Wavelength	nm	248.6	248.6
Peak Power (Quasi CW)	mW	>250	>30
Laser Head Size	cm	10 x 10 x 70	7.6 x 7.6 x 28
System Weight	kg	3.6	1.4
Pulse Frequency	Hz	1 - 30	1
Long. Mode Spacing	MHz	257	642
Pulse Width	μsec	20 - 500, adjustable	
Pulse Frequency		single pulse to 20Hz, adjustable, internal or external synch	
Duty Cycle	%	up to 1%, depending on laser line and burst mode	
Beam Diameter	mm	3	
Beam Divergence	mrad	0.3	
Oscillation Bandwidth	GHz	<3	
Power Consumption	W	<100	
Line Requirements		90 - 128VAC, 47 - 63Hz, single phase, 1A or 24VDC	