

HUGHES LF Series 1 & 2 mW Helium-Neon Lasers

PROVEN OEM PERFORMANCE

- Hughes hardseal construction
- Rugged coaxial internal mirror construction
- Specially developed hard glass

OEMs depend on the LF Series stable performance, long trouble-free operation and high reliability.

OEMs depend on Hughes world reputation for leading the way in lasers.

Hughes LF Series lasers are backed by a 12-month warranty (18 months for qualified OEMs). Specifications are subject to change without notice.

HUGHES

HUGHES AIRCRAFT COMPANY

INDUSTRIAL PRODUCTS DIVISION
CARLSBAD, CALIFORNIA

LASER SPECIFICATIONS

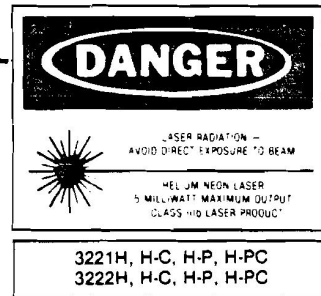
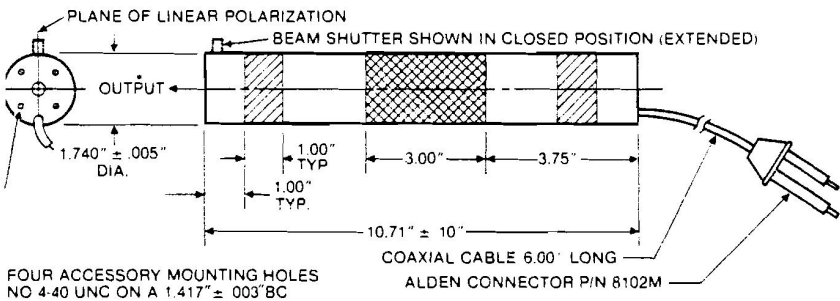
	LASER HEAD MODEL NO.		LASER PLASMA TUBE MODEL NO.		
	3221H 3221H-C 3221H-P 3221H-PC	Flying Leads High Voltage Conn. Polarized/Flying Leads Polarized/High Voltage Conn.	3222H 3222H-C 3222H-P 3222H-PC	3121H 3121H-P	3122H 3122 H-P
Minimum output power TEM ₀₀ at 632.8 nm (mW)	1.0	2.0	1.0	2.0	
Beam diameter 1/e ² (mm)	0.64	0.64	0.64	0.64	
Beam divergence (mrad)	1.3	1.3	1.3	1.3	
Longitudinal mode spacing c/2L (MHz)	685	685	685	685	
Operating voltage (Vdc ± 100)	1730	1730	1340	1340	
Recommended power supply resistance (kΩ)	50	50	50	50	
Recommended series anode ballast (kΩ)	Included in head	Included in head	60 to 75	60 to 75	
Connection with power source	Flying leads or high voltage connector Alden #8102M	Flying leads or high voltage connector Alden #8102M	—	—	

COMMON SPECIFICATIONS

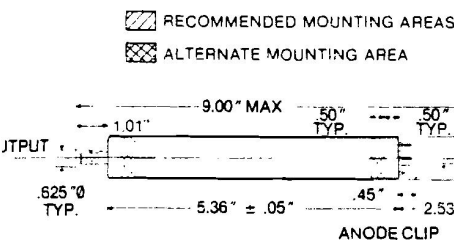
Amplitude Noise (30 Hz-10 Mhz) < 1% rms
 Note: Ripple is generally higher with dc power supply
 Long term drift ± 5% (in any 8 hr. period following 15 min.
 warm-up)
 Starting voltage < 10.0 kVdc
 Optimum operating current 6.5 ± 0.2 mA
 Static alignment (head) centered to outer cylinder to ≤ 0.010
 in, parallel to outer cylinder to ≤ 1 mrad
 Angular drift < 0.2 mrad from cold start at 25°C < 0.03 mrad
 after 15-minute warm-up
 Polarization Linear, 500:1
 ("P" models only) extinction ratio

COMMON ENVIRONMENTAL SPECIFICATIONS

	OPERATING	NON-OPERATING
Temperature	-20°C to 50°C	-40°C to 80°C
Altitude	0-10,000 ft.	0-70,000 ft.
Relative humidity without condensation	0-100%	0-100%
Shock		50g for 1 ms 15g for 11 ms



1 & 2 mW MODELS WITH H.V. CABLE AND CONNECTOR AND BEAM SHUTTER



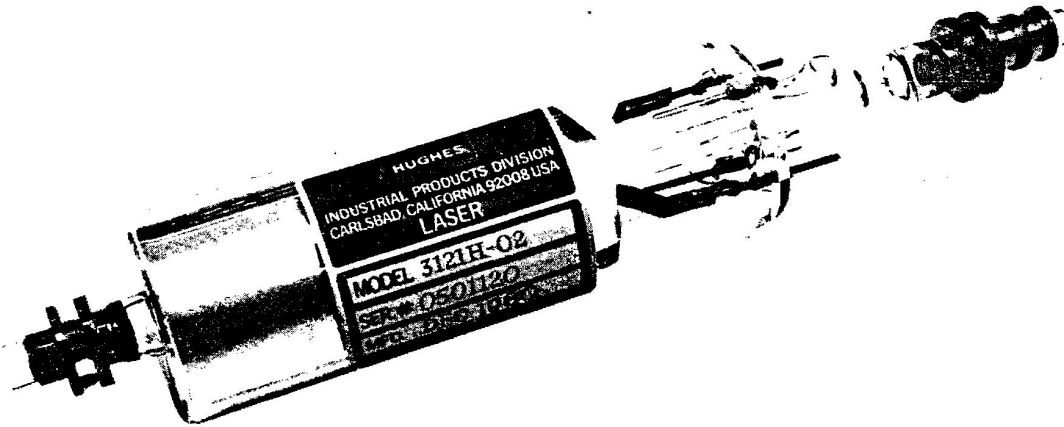
1 & 2 mW MODELS WITH FLYING LEADS

INTERNAL MIRROR PLASMA TUBE



HUGHES AIRCRAFT COMPANY • Industrial Products Division
 8155 El Camino Real • Carlsbad, CA 92008 Tel: (714) 438-9191, Ext. 584 TWX: 910-322-1393

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 Clive House, 12-18 Queens Road, Weybridge, Surrey KT13 9XD, England
 Tel: (0932) 53180 • TLX: 929727



HUGHES LF Series Model 3121H-02 Helium-Neon Lasers

PROVEN OEM PERFORMANCE

- Hughes hardseal construction
- Rugged coaxial internal mirror construction
- Specially developed hard glass
- Random and linear polarization available
- Less than 8-inch overall length

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INDUSTRIAL PRODUCTS DIVISION
CARLSBAD, CALIFORNIA

LASER SPECIFICATIONS

INTERNAL MIRROR PLASMA TUBE MODELS

3121H-02

3121H-P-02

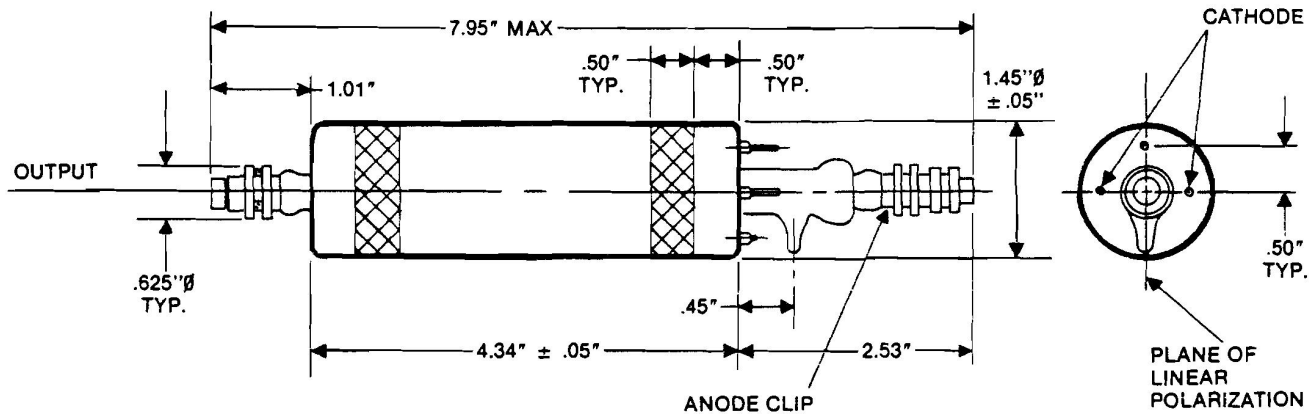
Minimum output power TEM ₀₀ at 632.8 nm (mW)	1.0 nom., 0.5 mW min.	1.0 nom., 0.5 mW min.
Beam diameter 1/e ² (mm)	.91	.91
Beam divergence (mrad)	.89	.89
Longitudinal mode spacing (c/2L) (MHz)	781	781
Operating voltage (Vdc ± 100)	990 ± 100	990 ± 100
Recommended power supply resistance (kΩ)	50	50
Recommended series anode ballast (kΩ)	60 to 75	60 to 75
Polarization	Random	Linear, 500:1 min. extinction ratio

COMMON SPECIFICATIONS

Amplitude noise (30 Hz-10 Mhz) < 2% rms
 Note: Ripple is generally higher with dc power supply
 Long term drift ± 5% (in any 8-hr. period following 15-min. warm-up)
 Starting voltage < 8.0 kVdc
 Optimum operating current 5.0 ± 1.0 mA
 Angular drift < 0.2 mrad from cold start at 25°C < 0.03 mrad after 15-minute warm-up

COMMON ENVIRONMENTAL SPECIFICATIONS

	OPERATING	NON-OPERATING
Temperature	- 20°C to 50°C	- 40°C to 80°C
Altitude	0-10,000 ft.	0-70,000 ft.
Relative humidity without condensation	0-100%	0-100%
Shock		50g for 1 ms 15g for 11 ms



 RECOMMENDED MOUNTING AREAS

BUREAU OF RADIOLOGICAL HEALTH

Laser models on this data sheet are sold only on an OEM or export basis and have not been certified relative to BRH performance standard 21CFR1040. It is the user's responsibility to certify product compliance where applicable.

Specifications are subject to change without notice



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