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Stabilized Single Frequency Laser Operating Manual

Models 25-STP-910, 25-STP-912

L10698-1 REV: 9.21.7

NOTICE: This manual contains specifications, descriptions, and drawings for stabilized Helium Neon lasers manufactured by Pacific Lasertec.

Product specifications contained in this manual are subject to change without prior notice. The manufacturer will not be responsible for errors or omissions in this manual, or for incidental or consequential damages in connection with the furnishing or use of this information.

Comments or suggestions regarding this manual are appreciated and should be sent to the following address:

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1.0. Conventions Used in This Manual

Throughout this manual you will find information that is separated from the regular text by lines and labeled by an icon in the margin. Lasers are potentially dangerous devices, and some of this information is vital for your safety. The significance of the notations is explained below.

Lasers are electrical devices and improper use can expose the operator or others to potentially lethal voltages. The "Hazard" icon, represented by a triangle with a lightning bolt, identifies precautions needed to avoid *electrical* injury or damage to the equipment.

The series of laser systems which are covered by this manual are classified as Class II and IIIa devices as defined by the Center for Devices and Radiological Health of the United States Food and Drug Administration and Class 2 and 3R devices as defined by IEC 60825-1. The "Caution" icon, represented by a triangle with laser burst, identifies precautions needed to avoid *eye* injury to anyone in the area.

The "IMPORTANT" icon, represented by a triangle with an exclamation point, indicates information that is particularly important to the optimum performance of the laser system or information about the procedure or topic under discussion.

The following acronyms are used in this manual:

CDRH	Center for Devices and Radiological Health
cw	Continuous Wave
FCC	Federal Communications Commission
IEC	International Electrotechnical Commission
OEM	Original Equipment Manufacturer

The following abbreviations and symbols are used in this manual:

ac	alternating current
dc	direct current
in	inch
mm	millimeter
Vac	Volts ac
Vdc	Volts dc
kVdc	kilovolt dc
W	Watt
mW	milliwatt
A	Amp
mA	milliamp
nm	nanometers
mrad	milliradians
MHz	Megahertz
g	acceleration

2.0. Laser Safety and Precautions

- Avoid eye exposure to either direct or reflected beam radiation
- Do not place reflective components in the beam path
- Do not place reflective components or laser sources at or near eye-level
- Always wear appropriate protective eyewear during operation
- Devices should be operated only by personnel who are properly trained in laser safety protocol for the device classification in use.
- Laser light is bright and blinding – do not shine at aircraft or vehicles at any distance

Never look directly into the beam of the laser system.

One of two labels (a caution label or a danger label) is attached to the standard laser head to warn operators of the potential hazards. These labels are illustrated in Figure 1-1.

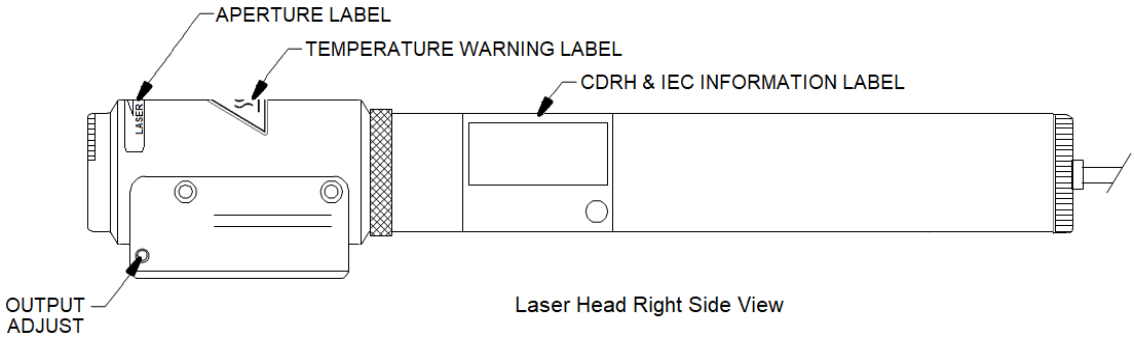


Figure 1-1. Standard Caution and Warning Labels

2.1. CDRH Regulations

The 25-STP series laser systems are CDRH certified according to the rules and regulations as outlined in part III of the Department of Health and Human Services, 21 CFR Parts 1000 and 1040 for laser products.

Under these guidelines, the Model 25-STP-912 conforms to Class IIIa (IEC 3R) certification, which allows maximum output power of up to 5mW continuous radiation at a visible wavelength of 633nm. The Model 25-STP-910 conforms to Class II (IEC 2), which allows maximum output power of up to 1mW. Other requirements include the use of special labeling, an external mechanical beam attenuator, and a pilot light indication during operation.

The 25-STP laser system is shipped from the factory with the necessary features to conform with the above regulations. These features are recorded for each individual unit and reported per CDRH regulations under the Accession number 9320815. Detailed information on these requirements may be obtained at: www.fda.gov/radiation-emitting-products/

2.2. Power Source and Grounding

The 25-STP series laser system includes either the 25-STP-910 or 25-STP-912 laser head attached to the single frequency adapter (SFA). They are supplied with the appropriate universal AC input power supply. The power supply is supplied with a grounding connection so that the laser head and adapter housing are grounded when they are plugged into the appropriate wall outlet.

Under no circumstances should the ground be defeated.

Both the laser head and single frequency adapter (SFA) can be powered from a single source of 12 to 15 VDC when using an optional OEM style laser power supply. Please contact the factory for further details regarding this option.

Verify the power common is at ground potential.

2.3. RoHS Compliance

ROHS-3 DIRECTIVE 2015/863/EU

The products covered by this manual comply with RoHS 3, Directive (EU) 2015/863, which adds 4 phthalates to previous RoHS 2 Directive 2011/65/EU. Specifically, the products containing the substances listed below are in concentrations below the MCV or are exempt. The products are therefore understood to be in compliance with Directive (EU) 2015/863 of the European Parliament and the Council of 4 June 2015 on the restriction on the use of certain hazardous substances in electrical and electronics equipment (RoHS Directive) in accordance with the definitions set forth.

Pacific Lasertec Part Numbers: 25-STP-xxx 05-STP-xxx

Substance	Compliance Reason
Lead (Pb)	The subject product does not contain substances in excess of the maximum concentration values tolerated by weight in homogeneous materials as listed in Annex II of the Directive, or per directive 2011/65/EU, Annex III, are exempted from the Restriction in Article 4(1), per 7(c)-I: "Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors."
Mercury (Hg)	There is no intentional use
Cadmium (Cd)	There is no intentional use
Hexavalent Chromium (Cr+6)	There is no intentional use
Polybrominated Biphenyls (PBB)	There is no intentional use
Polybrominated diphenyl ethers (PBDE)	There is no intentional use
Hexabromocyclododecane (HBCDD)	There is no intentional use
Bis (2-Ethylhexyl) phthalate (DEHP)	There is no intentional use
Dibutyl phthalate (DBP)	There is no intentional use
Benzyl butyl phthalate (BBP)	There is no intentional use
Diisobutyl phthalate (DIBP)	There is no intentional use

China RoHS

Hazardous Substance Table

氦氖激光器 Helium Neon Laser Systems	有毒有害物质 Hazardous Substance					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	铬6+ (Cr^{6+})	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
激光头 Laser Head	O	O	O	O	O	O
激光管 Laser Tube if Sold By Itself	X	O	O	O	O	O
电源供应器 Laser Power Supply	O	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T 11363-2006标准规定的限量要求以下
Expresses that this hazardous substance is below the specified limits as described in SJ/T 11363-2006.

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T 11363-2006标准规定的限量要求（企业可在此处，根据实际情况对上表中打"X"的技术原因进行进一步说明）
Expresses that this hazardous substance is above the specified limits as described in SJ/T 11363-2006.

除非另外特别的标注，此标志为针对所涉及产品的环保使用标志，某些零部件会有一个不同的环保使用期（例如，电池单元模块）贴在其产品上。
此环保使用期限只适用于产品是在产品手册中所规定的条件下工作。
The Environmentally Friendly Use Period (EFUP) for all enclosed products and their parts are per the symbol shown here, unless otherwise marked. Certain parts may have a different EFUP and are so marked to reflect such. The Environmentally Friendly Use Period is valid only when the product is operated under the conditions defined in the product manual.

This declaration is based on information obtained from suppliers and/or analytical material testing. The manufacturer makes every reasonable effort to ensure the accuracy of this information as of the date of publication. This declaration of conformity is used under sole responsibility of the manufacturer and is valid unless superseded by a revised certification at a later date.

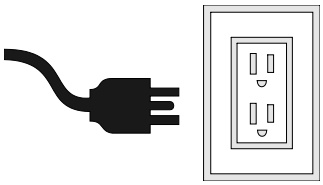
3.0. Installation Instructions

Do not energize system before reading the following sections.

3.1. Initial Inspection

Check the contents of the shipping container for any signs of damage that may have occurred during transportation. If the contents are damaged, a claim should be filed immediately with the carrier and the manufacturer in order to facilitate the repair or replacement.

3.2. Grounding



Before operating the laser system, the system must be connected to a protective earth ground conductor via the three-prong plug. The plug must be inserted into an outlet containing a protective earth contact.

Any interruption of the earth ground may result in high voltage being present on the laser housing.

3.3. Operating environment

The 25-STP frequency stabilized laser system may be safely operated in any orientation. However, operation should be discontinued if condensation forms on any part of the system. This is likely to occur when the system is brought from a cold to a warm environment.

Condensation may cause electrical shock if the housing is not properly grounded.

Even if proper grounding is provided, operation in the presence of condensation may cause irreparable damage to the laser head.

4.0. Operating Instructions

4.1. Assembly and Switching On

The single frequency adapter (SFA) mates with the 05-STP-910 and 05-STP-912 laser heads. The SFA and laser head are pre-assembled, calibrated and tested for optimum performance by Pacific Lasertec and should not be taken apart. The unit contains no user serviceable components. Disassembly of the unit may result in exposure to laser light or hazardous voltages as well as damage to the laser head or SFA. Unauthorized service will void the warranty.

IMPORTANT

The orientation of the laser head in relation to the SFA has been precisely adjusted and should not be changed. The arrow on the laser head should align with the indent on the SFA (Figure 1-2).

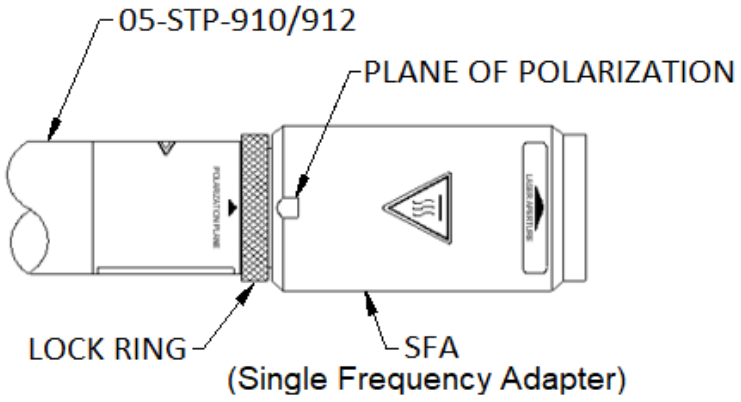


Figure 1-2. Plane of Polarization

Connect and operate the system as shown in Figure 1-3. Connect the main line voltage in accordance with Section 3.2. The main line voltage can be 80VAC minimum to 260VAC maximum and 47Hz minimum to 63Hz Maximum.

Find and observe the output beam with a white card or piece of paper. The beam intensity should noticeably increase and decrease in power initially at about once every two seconds and then at a slower rate as the unit warms-up. For the 25-STP-910, the minimum power will generally be zero. Do not mistake this behavior for the laser turning off.

IMPORTANT

Application of power to the single frequency adapter (SFA) in excess of 5 minutes with the laser head deenergized (laser head high voltage cable not connected to the power supply or laser tube not functioning) may damage the single frequency adapter.

The “Stable/OT” Green light should illuminate in approximately 5 to 10 minutes indicating that the unit has reached operating temperature and has stabilized.

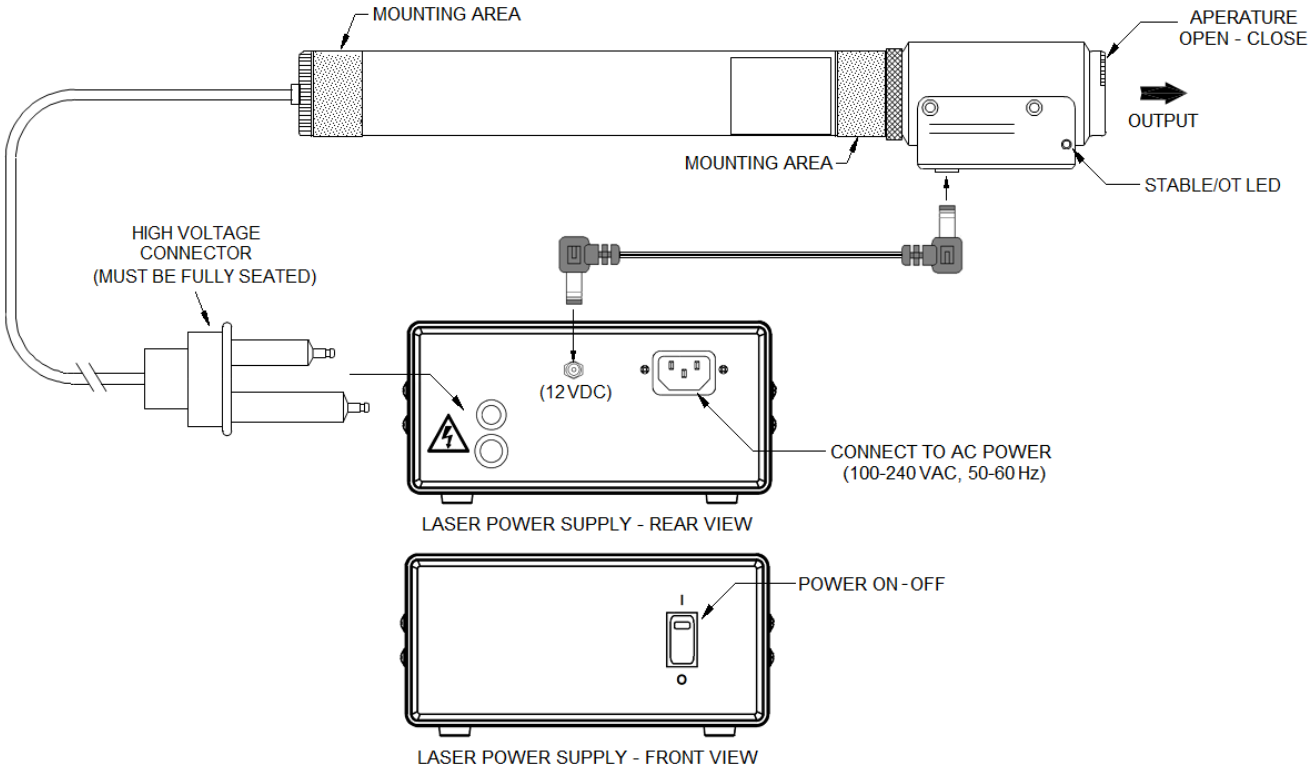


Figure 1-3. System Connection and Operation

4.2. Explanation of Controls and Indicators

4.2.1. Stable (Green) Indicator

When the 25-STP series laser system has attained proper operating temperature, the "Stable/OT" light is energized (green) indicating that closed loop output control is in operation, see Figure 1-5. The "Stable/OT" LED may extinguish briefly under the following conditions:

- During the initial 20 minutes warm-up period.
- During ambient temperature changes beyond the 10°C operating temperature range.
- Significant temperature changes to the laser head housing caused by mounting to a large thermal inertia after the unit has been through the warm-up period.
- Excessive optical cavity feedback due to back reflections from optics in front of the laser or outside instruments reflecting the beam back into the system.

Long term optical feedback (i.e. back-reflections into the laser) resulting in the inability of the SFA to maintain closed loop operation can result in laser and/or SFA failure.

4.2.2. OT (Red) Indicator

The same LED which energizes "green" indicating that the unit has reached stable operation may energize "red" when the following conditions prevail:

* Power to laser head switched off with power applied to SFA.
* Failure of laser head to reach reference output power.
* Failure of single frequency control to close output control loop.

The "red" light indicates that the laser has reached its maximum allowable temperature and the energy to the SFA has been shut down.

If this condition is not addressed, the SFA will cycle between the reset and maximum temperature limit. This will be indicated by the LED changing between its "green" and "red" indication.

4.2.3. Output Adjust

A multi-turn potentiometer is accessible from the front right side of the adapter, see Figure 1-5.

Adjustment should only be made with a plastic tuning screwdriver.

Full clockwise (CW) adjustment will increase the output power to typically 1.05mW for the 25-STP-912 or 0.7 to 0.9mW for the 25-STP-910 or within 400MHz of the center line frequency, see Sections 7.0 and 8.0. Full counter-clockwise (CCW) adjustment will decrease the output power to typically 0.5mW for the 25-STP-912 or 0.35mW for the 25-STP-910, see Sections 7.0 and 8.0 for how this adjustment affects the optical frequency. Each direction is torque protected (associated with a clicking sound) so that further rotation will result in no power change.

4.2.4. Principle of Operation

The 25-STP single frequency laser system works on the principle that a Doppler Broadened TEM_{00} output mode can be varied in power and frequency if the cavity length (distance between laser mirrors) can be controlled. In most single frequency lasers, heat conduction is used (usually over the entire cavity length) to expand and thus control the cavity length. The 25-STP lasers are unique in that they use induction heating to control the length of a specially designed mirror mount structure. In this way, a much smaller package can be accommodated, and more importantly, this technique allows for faster servo response. Figure 1-4 depicts the schematic block diagram of the induction servo control circuit.

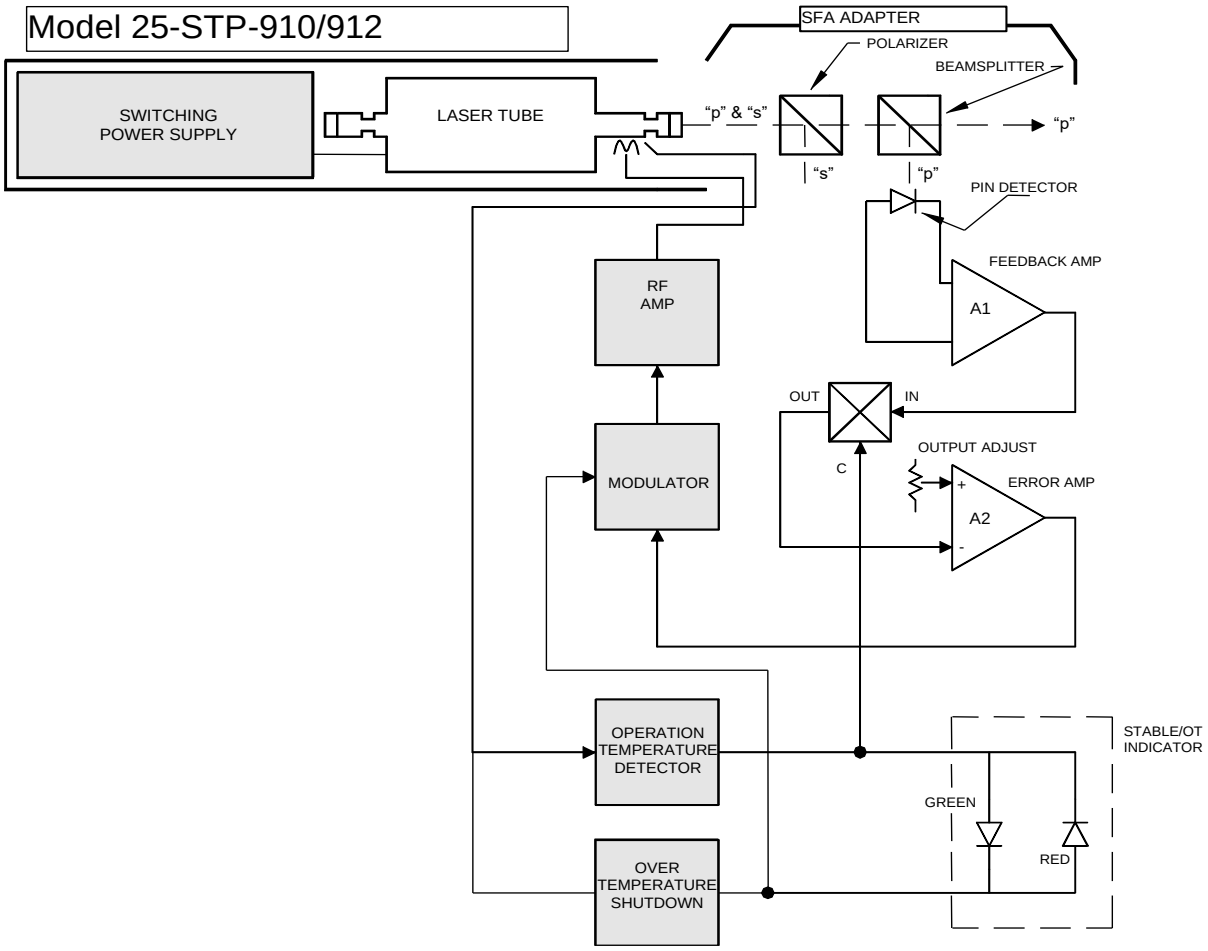


Figure 1-4. Schematic Block Diagram

When the SFA is mated to the Model 05-STP-910, or 05-STP-912 laser head, the output beam passes through two conditioning optics. The polarizer blocks the unwanted mode ("s" component) while allowing the "p" component to pass. The beamsplitter samples a portion of the "p" component for use as feedback to the control circuit. Since the beamsplitter is also highly polarization sensitive, this tandem arrangement allows for very high polarization extinction (typically greater than 1000:1).

A high-quality PIN detector is used to convert the sampled "p" component into an electrical current which is amplified by A1. A2 is a simple gain compensated error amplifier which provides the necessary error signal to the modulator. The modulator in turn drives an RF amplifier which couples up to 10 watts of power to the mirror mount via the induction coil. The mirror mount temperature, typically maintained at about 80°C, is monitored by a temperature detection circuit that controls the feedback signal to the error amplifier A2. Should the mount fall below a predetermined temperature, the feedback signal is removed from A2 providing full power, resulting cavity expansion. Within the predetermined temperature range, (indicated by the LED being green) feedback is restored to A2 and the circuit locks in the single mode output.

An over-temperature shutdown circuit is configured to remove power to the mirror mount if for some reason the output power control circuit fails to maintain closed loop control. When this temperature limit is reached, a "red" LED indication occurs.

4.2.5. Output Adjust and Operation Check

After the normal warm-up period, the output may be adjusted via the output adjust potentiometer. Carefully adjust the screw full clockwise and note that the output power attains at least 1mW for the 25-STP-912 or 0.80mW for the 25-STP-910. Next, adjust the screw fully counter-clockwise and verify that the output power decreases to less than 0.70mW for the 25-STP-912 or 0.40mW for the 25-STP-910. By adjusting the power over this range, the absolute frequency is also adjusted. In the case of the Model 25-STP-912, this output frequency span corresponds to about 50 to 600MHz and for the 25-STP-910, it corresponds to about 400 to 600MHz from the neon gain center. There is more on optical frequency adjustment and calibration in Section 8.0.

5.0. Preventative Maintenance

The laser head and adapter should never be stored or operated in an environment having a high concentration of airborne particulates. Exposure to this condition may cause interference with the feedback to the PIN detector that can ultimately cause performance degradation or failure. Periodic inspection of the SFA output optical surface is recommended.

The laser system must be turned off and disconnected from AC power before inspecting the SFA output surface.

Remove the shutter from the SFA and look through its aperture under a fluorescent light. The presence of any foreign matter is unacceptable. If it becomes necessary to clean the optical surface, the following procedure should be used. Using a clean cotton swab with reagent grade acetone or methanol. Gently clean the surface of the beam splitter. Repeat the process twice to insure a clean surface. Further service may be needed if a clean beam is not obtained.

Cleaning reagents may be hazardous. Please consult Material Safety Data Sheets in accordance with any substances in use.

Internal optics assemblies can only be serviced by a factory authorized service center.

6.0. Operating Specifications

Table 1-1. Operating Specifications for Model 25-STP Series

Electrical				
Parameter	**Minimum**	**Typical**	**Maximum**	**Units**
Model 25-STP-910 or 25-STP-912 Laser Power Supply				
Input Voltage	80		260	VAC
Input Current		1.2		A
Frequency	47		63	Hz
Model 05-STP-910 Laser Head				
Input Voltage		1220		VDC
Input Current		4.0		mA
Model 05-STP-912 Laser Head				
Input Voltage		1600		VDC
Input Current		4.0		mA
SFA				
Input Voltage		12		VDC
Input Current		2		A
Model 25-STP-910/25-STP-912 System EMI (AC lines)				
Conducted EMI 1-5 MHz		-50	-35	dbm

Table 1-1. Operating Specifications for Model 25-STP Series (cont'd)

Environmental				
Model 25-STP-910 and 25-STP-912 Single Frequency Laser Systems				
Temperature				
Operating	15		35	°C
Non-operating	-20		80	°C
Humidity				
Operating	0		90	%
Non-operating	0		90	%
Shock				
Impulse (IEC68.2.27)		30x11		gxmsec
Vibration (IEC68.2.6)	10		55	Hz
Warm-up		15	40	minutes
Optical				
Model 25-STP-910 Single Frequency Laser System				
Parameter	**Minimum**	**Typical**	**Maximum**	**Units**
Output Range				
Power (633 nm), Typical	0.35		0.70	mW
Frequency (v-$v_{o\,(1)}$)	400		600	MHz
Beam Diameter ($1/e^2$)		0.48		mm
Beam Divergence (Full Angle)		1.70		mrad
Spatial Mode (TEM_{00})	>99.9			%
Optical Noise			0.10	%RMS
Polarization	1000:1	5000:1		
Model 25-STP-912 Single Frequency Laser System				
Output Range				
Power (633 nm), Typical	0.60		1.40	mW
Frequency (v-$v_{o\,(1)}$)	50		600	MHz
Beam Diameter ($1/e^2$)		0.54		mm
Beam Divergence (Full Angle)		1.50		mrad
Spatial Mode (TEM_{00})	>99.9			%
Optical Noise			0.10	%RMS
Polarization	1000:1	5000:1		

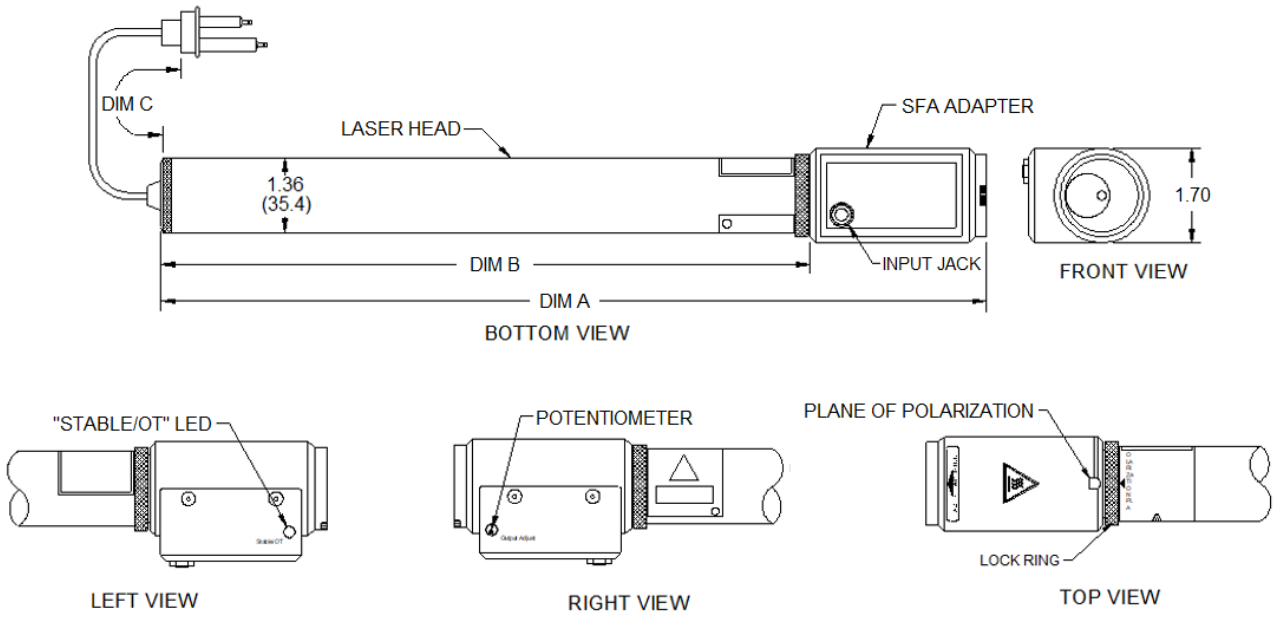
Table 1-1. Operating Specifications for Model 25-STP Series (cont'd)

Amplitude Stability				
1 Hour		±0.1		%
8 Hour		±0.1		%
1 month		±0.1	±0.2	%
Frequency Stability *				
1Hour		±1		MHz
8 Hour		±1		MHz
1 Month			±10	MHz

***Note:** See Section 9.0.

7.0. Mechanical Specifications

7.1. Laser Dimensions



MODEL	DIM A Inch (mm)	DIM B Inch (mm)	DIM C Inch (mm)
25-STP-910	10.20 (259.1)	6.96 (176.8)	72.00 (1828.8)
25-STP-912	11.89 (302.0)	8.65 (219.7)	72.00 (1828.8)

Figure 1-5. Mechanical Dimensions of Laser Head Models 25-STP-910 and 25-STP-912

7.1.1. Laser Head Mounting

The laser head can be mounted by cylindrical laser head holders or at the recommended mounting areas (Figure 1-6) by V-blocks.

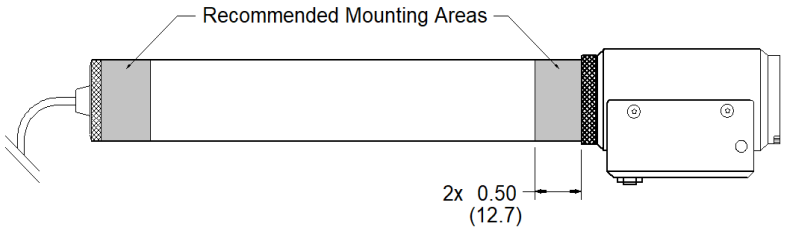


Figure 1-6. Recommended Mounting Areas

7.2. Power Supply Dimensions

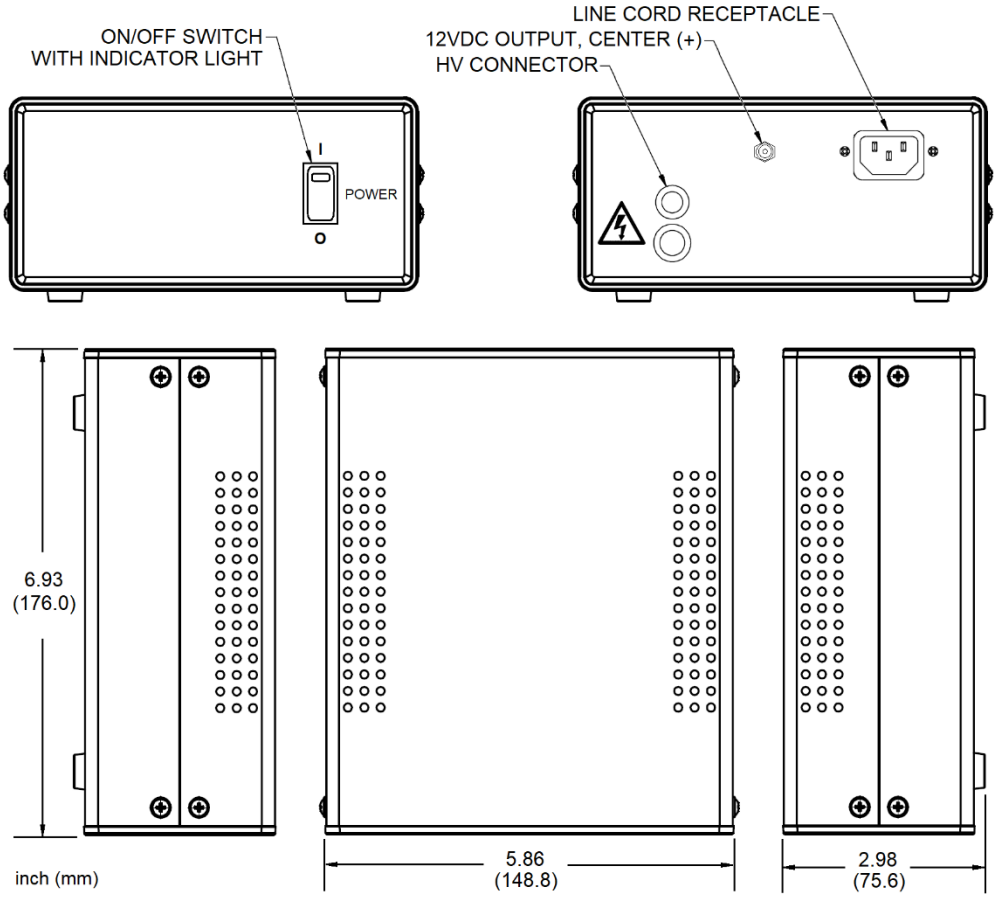


Figure 1-7. Mechanical Dimensions of the 25-STP-910 and 25-STP-912 Power Supply

8.0. Output Power/Frequency Function

The output power or frequency of the Models 25-STP-910 or 25-STP-912 system can be accurately tuned over a large portion of the available doppler gain profile.

Figure 1-8 shows actual output power versus optical frequency curves as measured for the 25-STP-910 and 25-STP-912.

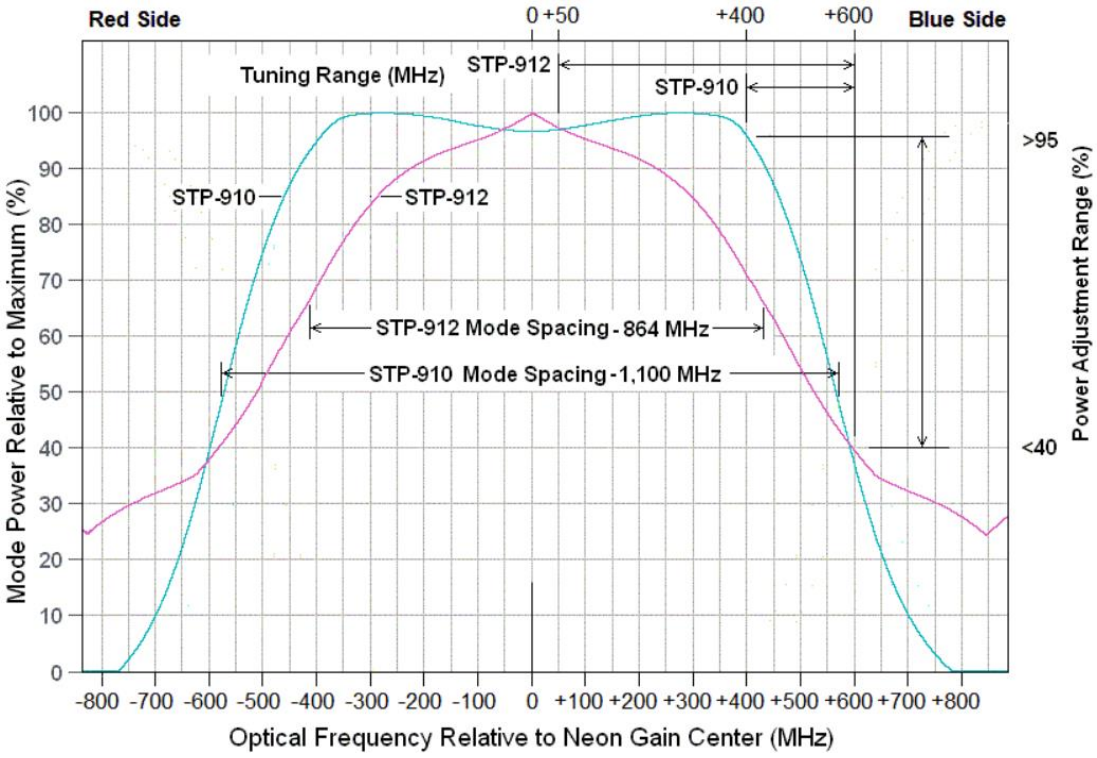


Figure 1-8. Output Power versus Optical Frequency Curves for the 25-STP-910 and 25-STP-912

The difference in the shape is due to the very short cavity of the 25-STP-910, resulting in a narrower adjustment range of optical frequency.

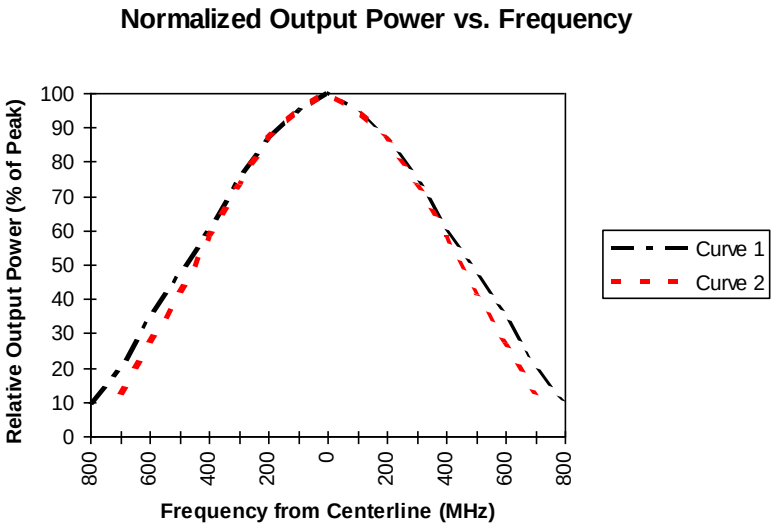


Figure 1-9. Normalized Output Power vs. Frequency normalized to have the same peak power.

Curve 1: New tube; Curve 2: Tube near end-of-life.

Curve 2 depicts the doppler profile that exists at the end of the operating life if the laser tube excitation parameter (total single pass gain/total losses) falls to 80% of its original value. This gain decrease may be from gas cleanup or increased absorption loss changes of the cavity mirrors. The peak output power available (at center-line) drops to nearly half its original value.

If one normalizes both curves in Figure 1-9, it can be noted that this extreme degradation does not appreciably affect the shape of the doppler curve. Thus, if one were to know the peak value of output power (at center-line), a reasonably accurate calibration of output frequency could be attained by using a power meter a calibration curve similar to Figure 1-8.

9.0. Frequency Calibration

As explained in Section 8.0, the Model 25-STP-910, 25-STP-912, single frequency laser system may be tuned over a wide range of frequencies from center-line. Using calibration curves, such as those shown in Figure 1-8, the output frequency can be calibrated to typically better than ±10% accuracy of a given frequency on the "Blue" side of the doppler output profile for the 632.991 nm transition in ^{20}Ne.

Figure 1-8 was constructed from measurements of a typical model 25-STP-910 system producing peak center-line power of about 1.3 mW and a typical model 25-STP-912 system producing peak center-line power of about 1.8 mW. As shown in Figure 1-9, the shape of these curves will not deviate substantially over the useful life of the laser.

A laser power meter may be used for calibration by noting the peak center-line power during the warm-up period while in the "Peak" detection mode. The desired frequency can then be adjusted by looking up on the ordinate of Figure 1-8, the appropriate

percentage of peak center-line power for the desired frequency. By multiplying this percentage by the peak level noted on the power meter, the output power may be adjusted for the desired frequency.

10.0. Troubleshooting

Although the unit is designed for years of trouble-free operation the Single Frequency laser system has two basic failure mechanisms. No output beam is usually a failure of the 25-STP-910 or 25-STP-912 laser head, while inability to attain or maintain stable output is likely a fault in the SFA, refer to Table 1-2 and Table 1-3.

Table 1-2. No Output Beam and related Symptoms and Causes

Symptom	Possible Cause	Action / Remedy
No power indication on laser power supply	Electrical outlet is not live or voltage does not match line voltage setting, loose or defective line cord, defective indicator lamp, defective or missing interlock plug, defective power switch or it is off, blown main power fuse, defective laser power supply.	Check outlet, line cord, voltage setting, interlock, power switch. Else will need service.
No power indication on SFA power supply.	Electrical outlet is not live, loose or defective power cord, defective SFA power supply.	Check outlet, line, cord, and power switch. Else will need service.
No laser output even after 15 seconds from power on, not even a blue glow on white card placed in front of output aperture.	Shutter closed	Open Shutter
	Laser power supply defective.	Confirm laser power supply condition using it to power a similar laser.
	Poor connection	Confirm that the high voltage connector is inserted all the way and fully seated.
	Laser slow to start	If it does not light in 15 seconds, power off, wait 10 seconds, and power back on. If after doing this a couple times it still does not start, service will be required.
Only blue glow appears at output – use white card to confirm.	Laser mirrors are misaligned or it is end-of-life.	Service or replacement will be required.

Table 1-3. Inability to Attain or Maintain Stable Output Symptoms and Causes

Symptom	Possible Cause	Action / Remedy
Output beam flickers rapidly.	Line voltage incorrect, bad connection, defective laser and power supply combination, defective power supply or end-of-life tube	Confirm correct line voltage setting and make sure connections are secure. Confirm that the output voltage range of the power supply covers the operating voltage range of the laser and the output current of the power supply matches the operating current of the laser. Else, service will be required. DO NOT allow this condition to continue as damage to the laser may occur.
Laser power varies smoothly between low (or off) and high during warmup (status LED off)	This is normal behavior. As the laser tube expands, the longitudinal modes move through the neon gain curve and after the internal polarizer, vary in intensity.	
Laser power cycles between low (or off) or is unstable (Status LED is green).	Back-reflections from the experimental setup interfering with laser operation,	Eliminate back reflections.
Green Status LED on (Does not cycle to red)	Beam reflection from external optics back into the SFA. Block the beam and monitor with a laser power meter and see if it settles down	Remedy interference from excessive feedback by tilting reflective optics or adding an optical isolator.
Status LED cycles from green to red	Laser tube output power is below the specified value.	Tube failure or detuned laser tube mirror mount. Service will be required.
Power Stable at low setting but will not lock at high setting	Output power of 25-STP-912 laser head less than 1.15mW or 25-STP-910 laser head is less than 0.7 to 0.9mW (see output power range on certification sheet).	Tube failure or detuned laser tube mirror mount. Service will be required.

11.0. Instructions for Warranty Service

These products are guaranteed for a period of 12 months after the date of purchase. There is no limit to the operational hours during this time. The only exception to this warranty is obvious misuse, damage or breakage for the laser tube or housing. Should the power level of this laser fall below the specified minimum power level within the time limit, it will be repaired or replaced free of charge. Neither the laser head nor power supply are user serviceable by the user.

Before returning your laser for warranty or normal service, contact a customer service representative for a return authorization number as specified in Section 11.1.

We will provide you with a convenient shipping address at that time. In the case of non-warranty service, a quote will be provided for the cost of repair (after receipt and inspection) for your approval before any work is done.

When returning the laser for service, please repack the laser carefully in the original shipping container. This container has been carefully designed to protect your laser during transit, and we strongly urge you to use it. If the original container is no longer available, please advise us of this when you contact us for your return authorization number. We will be pleased to ship a new, empty container (for a nominal charge) for use in returning the laser to us.

11.1 Sales, Service and Technical Support Center

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