

Preinstallation Manual
Verdi™ V-2/V-5/V-6
Diode-Pumped Lasers



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Should you experience any difficulties with your laser or need any technical information, please visit our web site www.coherent.com. Additional support can be obtained by contacting our Technical Support Hotline at 800-367-7890 (408-764-4557 outside the U.S.) or E-mail (clg.tech.services@coherent.com). Telephone coverage is available Monday through Friday (except U.S. holidays and company shutdowns).

If you call outside our office hours, your call will be taken by our answering system and will be returned when the office reopens.

If there are technical difficulties with your laser that cannot be resolved by support mechanisms outlined above, please E-mail or telephone Coherent Technical Support with a description of the problem and the corrective steps attempted. When communicating with our Technical Support Department, via the web or telephone, the model and Laser Head serial number of your laser system will be required by the Support Engineer responding to your request.

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If you are located outside the U.S. visit our web site for technical assistance or contact, by phone, our local Service Representative. Representative phone numbers and addresses can be found on the Coherent web site, www.coherent.com

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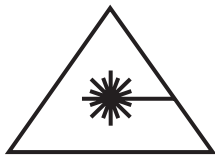
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Preface

This manual contains user information for the Verdi™ V-2/V-5/V-6 Diode-Pumped Lasers.



Read the Operator's Manual carefully before operating the laser for the first time. Special attention should be given to the material in Section One, Laser Safety, that describes the safety features built into the laser.



Use of controls or adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.



Use of the system in a manner other than that described herein may impair the protection provided by the system.

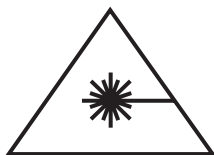
U.S. Export Control Laws Compliance

It is the policy of Coherent to comply strictly with U.S. export control laws.

Export and re-export of lasers manufactured by Coherent are subject to U.S. Export Administration Regulations, which are administered by the Commerce Department. In addition, shipments of certain components are regulated by the State Department under the International Traffic in Arms Regulations.

The applicable restrictions vary depending on the specific product involved and its destination. In some cases, U.S. law requires that U.S. Government approval be obtained prior to resale, export or re-export of certain articles. When there is uncertainty about the obligations imposed by U.S. law, clarification should be obtained from Coherent or an appropriate U.S. Government agency.

Symbols Used in This Manual and on the Laser System



This symbol is intended to alert the operator to the danger of exposure to hazardous visible laser radiation.



This symbol is intended to emphasize the presence of important operating instructions.

Introduction

The purpose of this document is to assist the user in establishing a suitable location and operating environment for optimum Verdi V-2/V-5/V-6 performance.

Receiving and Inspection

Inspect shipping containers for signs of rough handling or damage. Indicate any such signs on the bill of lading. Report any damage immediately to the shipping carrier, and to Coherent Order Administration Department (800-438-6323) or to an authorized Coherent representative.



Retain shipping containers. The containers will be required if the system is returned to the factory for service. The containers may also be needed to support a shipping damage claim.

Coherent recommends that three people unpack and transport the Verdi V-2/V-5/V-6. The power supply weighs 70 pounds and should be lifted by two people while the laser head, which weighs 22.2 pounds, can be lifted by the third person. The laser head and power supply are connected by the umbilical.

Installation Kit

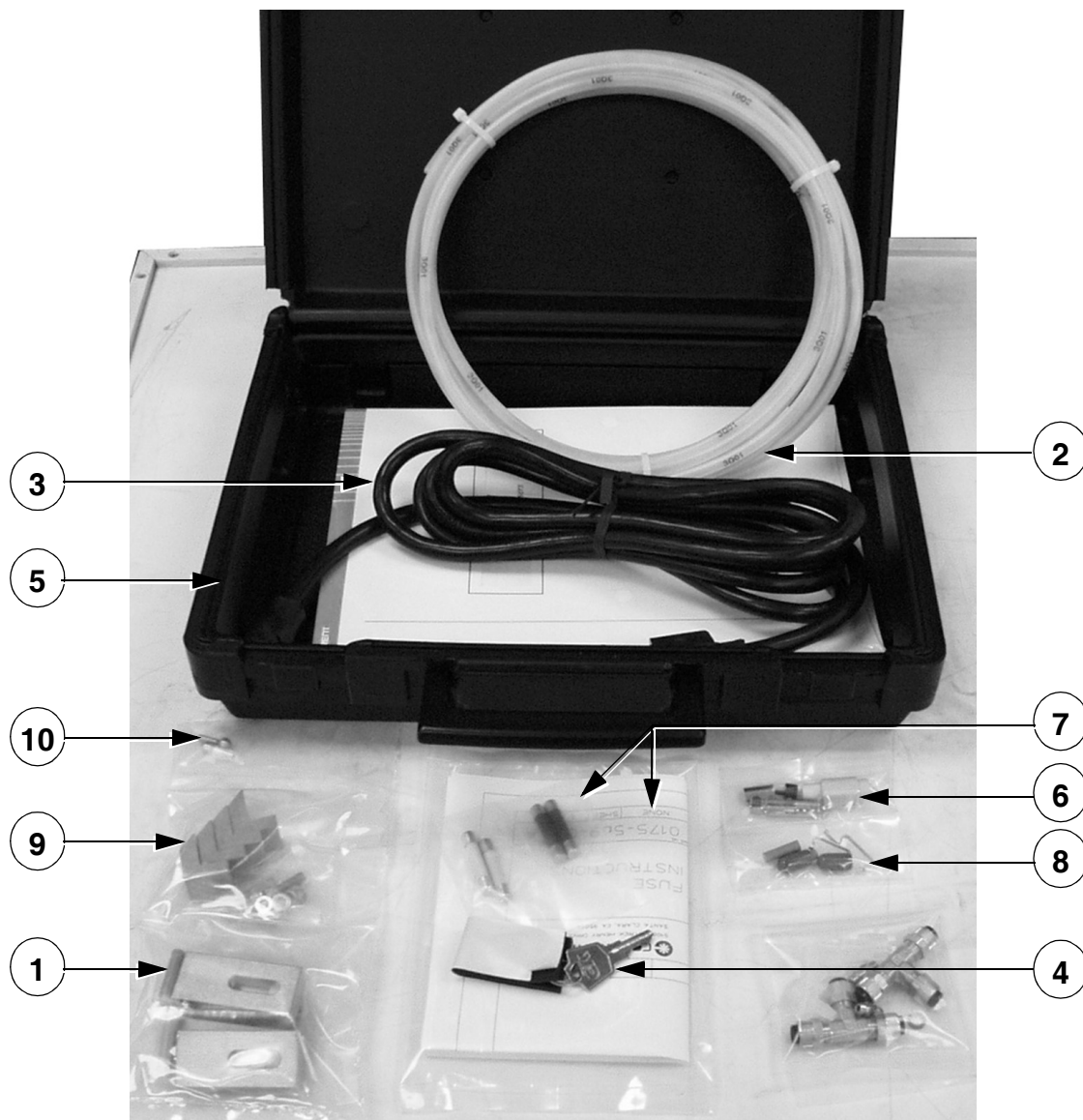
The installation kit contains the necessary hardware for Verdi installation. See Figure 1-1 for details.

Installing the Laser Head

The laser head is shipped with either a passive or a water-cooled riser/heat sink. This riser/heat sink maintains the Verdi output beam at a suitable height for pumping a laser such as the Coherent Mira.

A passive riser/heat sink when mounted on a thermally conductive surface (such as an optical table) provides sufficient heat dissipation for the laser head under normal ambient conditions. The temperature of the laser head baseplate is monitored by the Verdi power supply and can be displayed on the power supply front panel. Power dissipation through the baseplate is typically 20 to 25 Watts (30 Watts maximum). The Verdi will shut down if the baseplate temperature exceeds 55°C.

An optional water-cooled riser/heat sink is available for use with a chiller.



- | | |
|--|--|
| 1. Riser/heat sink installation hardware | 6. Interlock-disassembled |
| 2. Operator's manual | 7. Fuses and instructions |
| 3. AC power cord | 8. FAP-I installation hardware, including shorting clips, end caps, etc. |
| 4. Power supply key | 9. Laser head/heat sink mounting hardware |
| 5. Installation kit case | 10. Dowel pins – laser head/heat sink |

Figure 1-1. Installation Kit

The laser head is shipped with a protective plastic plate installed over the baseplate. Leave the plastic plate in place until laser head is ready for installation.

1. Remove the packing material from the riser/heat sink (Figure 1-2).
2. Insert two dowel pins (Figure 1-1 , item 12) into the riser/heat sink dowel holes (Figure 1-2, item 1), ball-end up.



Avoid damage to the laser head baseplate, which is milled to a flatness of ± 0.1 mm. This tolerance provides maximum thermal conduction between the baseplate and the mounting surface.



Keep the umbilical as straight as possible while avoiding rotating the laser head with respect to the power supply.



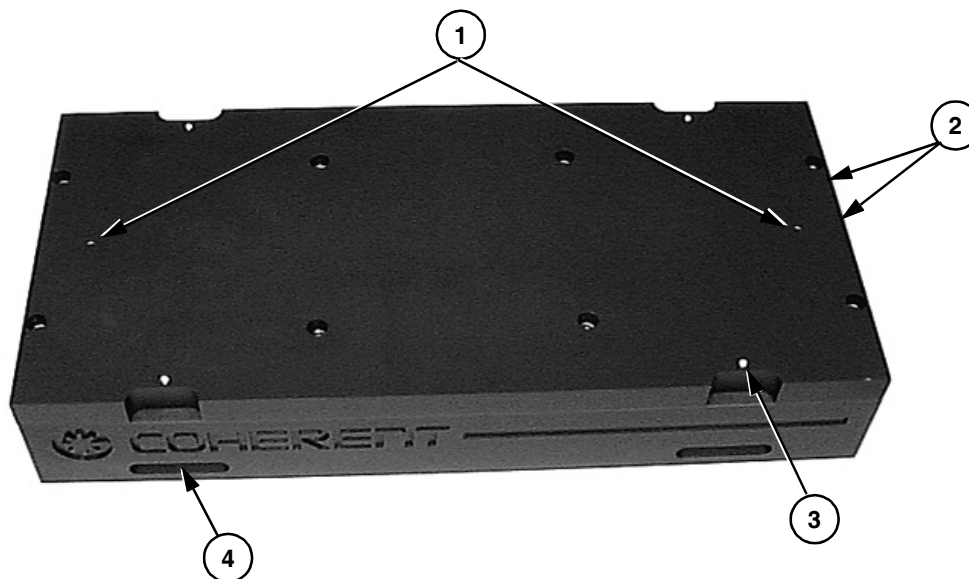
Do not apply thermal compound or any other material on the laser head baseplate or on the riser/heat sink.

3. Remove the laser head and power supply from the shipping crate. Place the laser head on its side and on a protected surface to avoid scratching the cover as shown on Figure 1-3. Remove the three screws (Figure 1-3, item 2) securing the protective plastic cover (item 4) to the laser head baseplate. Any scratches, damage, or contamination of the baseplate will reduce the thermal conduction between the baseplate and the mounting surface.
4. Refer to Figure 1-4 for the laser head dowel pin positions. Carefully place the laser head over the riser/heat sink and onto the dowel pins.



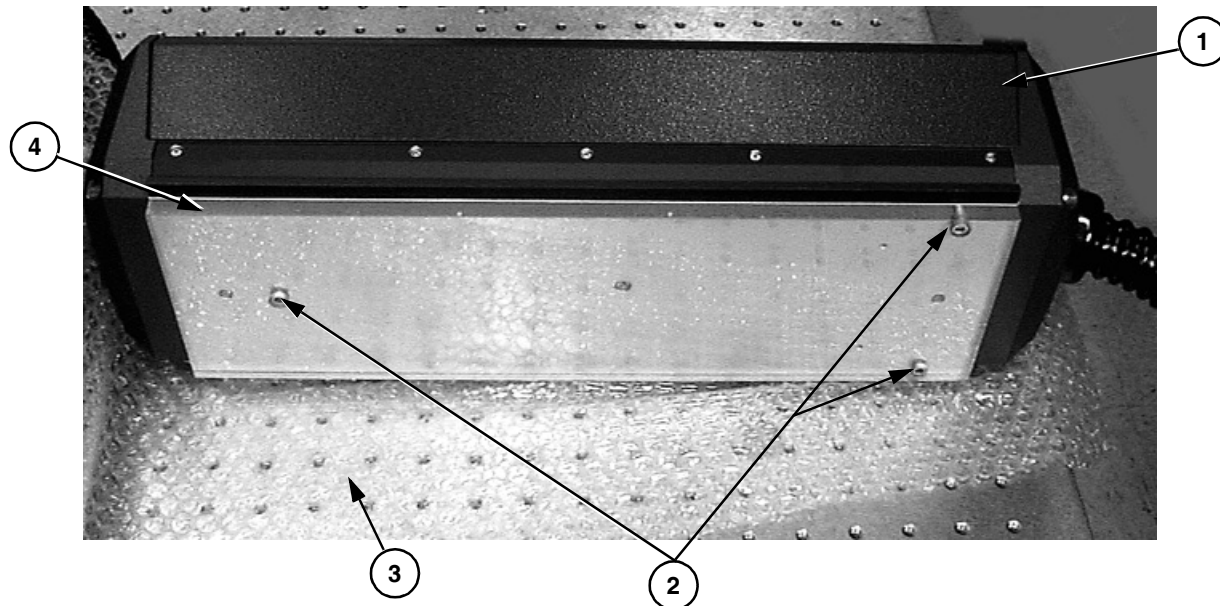
Do not use excessive force when clamping the Verdi to the riser/heat sink.

5. Use four laser head clamps (Figure 1-1 item 9) to secure the laser head to the riser/heat sink. Tighten the 4 clamps firmly using an Allen head wrench.



- | | |
|---|-------------------------------------|
| 1. Dowel holes (2) | 3. Laser head clamp screw holes (4) |
| 2. Cooling water inlet and outlet (if included) | 4. Optical table clamp mounts (4) |

Figure 1-2. Riser/Heatsink



- | | |
|--|-----------------------------|
| 1. Laser head | 3. Protective material |
| 2. Protective plastic cover retaining screws (3) | 4. Protective plastic cover |

Figure 1-3. Laser Head Base – Protective Cover Installed

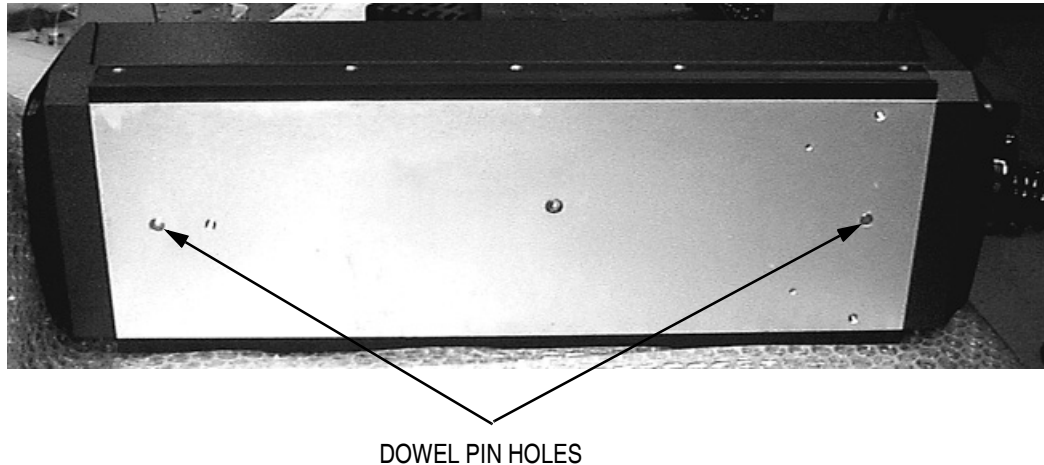


Figure 1-4. Laser Head Base – Protective Cover Removed

6. Proceed to the paragraph titled, “Installing the Power Supply”. The riser/heat sink clamps and chiller connection will be installed during the final installation procedures.

Installing the Power Supply

1. Move the power supply to an accessible-friendly location, preferably away from heat producing sources. Ensure the cooling intake and exhaust (rear, top, and left side) are not blocked or obstructed.

If storing the power supply in a 19 in. (48 cm) equipment rack, allow a minimum horizontal clearance of 17.937 in. (45.56 cm) for the front panel of the power supply.



The system will not operate with the interlock open. For additional information on the interlock, including the connection of an external interlock circuit, refer to the paragraph titled, “External Interlock”.

2. Connect the interlock connector (Figure 1-1, item 6) on the rear of the power supply.

The interlock connector may be located in the installation kit or may be attached to the umbilical.

3. Connect the AC power cord on the rear of the power supply. Do not connect the AC power cord at this time.

Each customer must inspect the power cord and install the proper connector if necessary. The connector should be installed in a properly grounded outlet with a maximum of 10 Ampere service @ 110 V and 11 Ampere service @ 220 V for proper overcurrent and earth fault protection.

4. Proceed to the paragraph titled, “Final Installation and Initial Turn-On Procedures”.

Final Installation and Initial Turn-On Procedures

After installing the laser head and power supply in accordance with paragraphs titled, “Installing the Laser Head” and “Installing the Power Supply”, complete the installation as follows:

1. Position the power supply and laser head in the operating position with the umbilical as straight as possible. Ensure that the umbilical has a bend radius of 5 inches or greater. A distance of 6 to 24 inches is recommended between the Verdi output and any laser being pumped.



Excessively tight umbilical bends (less than a 5 inch radius) can cause permanent damage to the optical fiber.

2. If a water-cooled system is used, position the chiller in the operating position. Fill and prepare the chiller in accordance with the chiller user’s manual.
3. Cut the user-supplied cooling water lines to the appropriate lengths and use the water line hardware (Figure 1-1, item 9) to connect the riser/heat sink to the chiller (Figure 1-6). Apply teflon tape to the hardware threads and install the washers from the installation kit over the threads when connecting the stainless steel ferrule to the riser/heat sink. Check the system for leaks.
4. If a passive riser/heat sink will be used, ensure the riser/heat sink is mounted on a thermally conductive surface (such as an optical table) that provides sufficient heat dissipation to maintain the laser head baseplate below 55°C, preferably below 40°C.
5. Use four riser/heat sink clamps (Figure 1-1, item 1) to secure the system to the optical table. Tighten the two front clamps firmly using an Allen head wrench. Tighten the two rear clamps finger tight only.
6. Connect power supply to facility power. Ensure all packing materials have been removed.

7. Perform the procedure in paragraph titled, “Turn-on (Cold-Start)” in the Operator’s Manual.

External Interlock

The system will not operate with the interlock open. An interlock connector is located on the power supply rear panel. The interlock status is monitored by the CPU. If the interlock is open, the message, “External Interlock Fault” will be displayed on the power supply front panel.

An external interlock circuit can be connected to the laser system and wired to a door switch to provide additional operating safety. When the door is opened, the laser will shut down. Press MENU EXIT key to clear the fault and continue operation.

To incorporate an external safety interlock circuit into the laser system, perform the following steps:

1. Turn off the laser system. Locate and remove the Interlock connector from the back of the Verdi power supply. This type of connector is called a “three pin mini-DIN”.
2. Slide the plastic cover off of the connector. Locate the two pins that have a wire soldered between them. These are pins 1 and 2. Remove the shorting wire and solder your interlock wires to these two pins. Make sure the wires have adequate strain relief.
3. Solder the other ends of the wires to an interlock switch. You can use many types of switches. The switch must be of a type that has its contacts **closed** when it is safe to operate the laser and open when it is not safe.
4. Figure 1-5 shows the wiring diagram for the switch. One wire runs from pin 1 of the connector to the normally open contact of the switch. The other wire runs from pin 2 to the common terminal of the switch. The switch is shown in the open position. This is the condition in which you do not want the laser beam to operate.

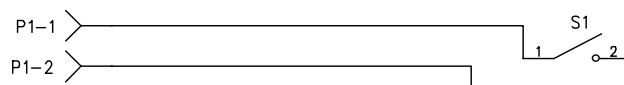


Figure 1-5. External Interlock

5. The interlock circuit in Verdi operates from a +/-12 VDC circuit. Its current is limited to around 1 mA. For these ratings, a “dry-circuit” type switch will give the most reliable operation.

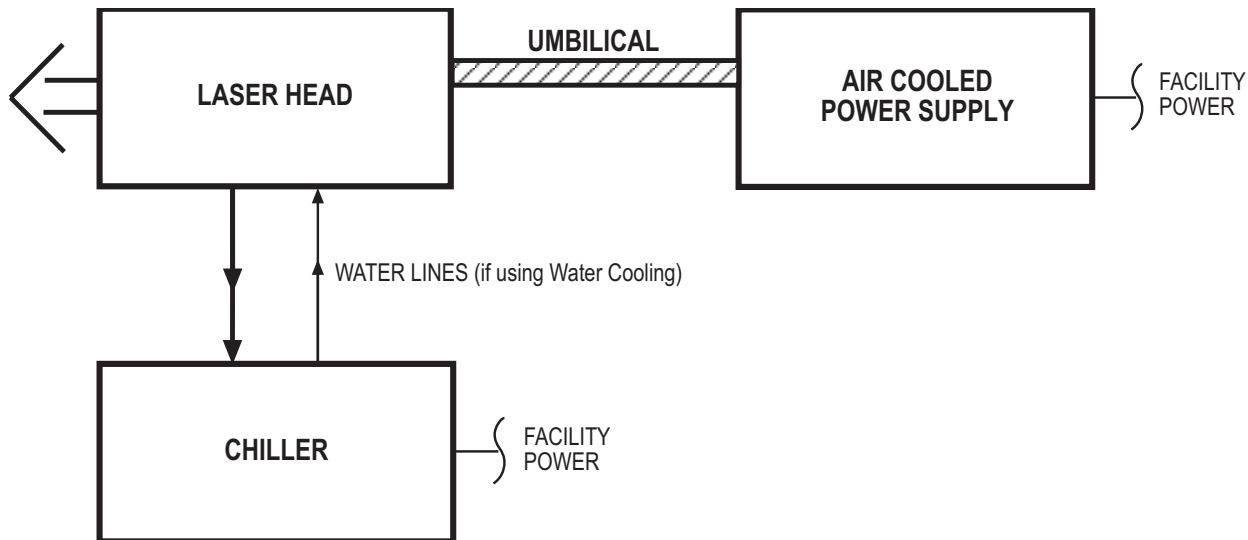


Figure 1-6. Interconnect Diagram

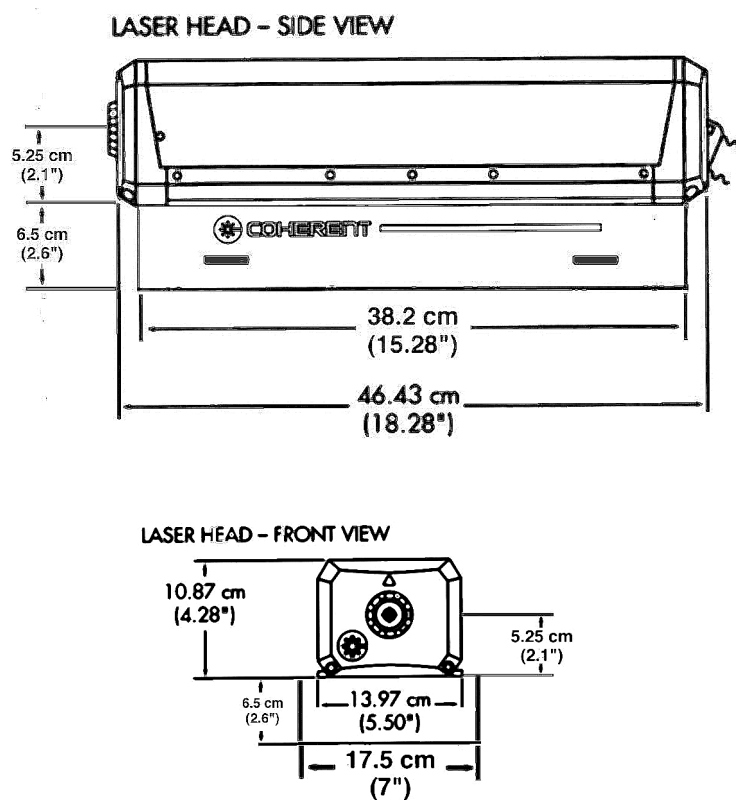
Table 1-1. Utility Requirements

PARAMETER	REQUIREMENT
Power Requirements	100 to 240 VAC ^{[1][2]}
Maximum Current	6.5 Amps @ 100 VAC 7 Amps @ 220 VAC
Cooling: Laser head: Power supply:	Riser/heat sink ^[3] Air-cooled with ambient air
<p>Note: All specifications and requirements are subject to change without notice.</p> <p>[1] The power supply is autoranging and will accommodate the full range of input voltages without hardware changes.</p> <p>[2] The electrical service should have a main power disconnect switch located in close proximity to the laser. The main power disconnect switch shall be clearly marked as the disconnecting device for the laser, and shall be within easy reach of the operator.</p> <p>[3] The passive riser/heat sink must be mounted on a conductive surface capable of maintaining the laser head base-plate at less than 55°C. An optional riser/heat sink and chiller or chill plate can also be used. Refer to the paragraph titled, Installing the Laser Head, for additional information on removing waste heat from the laser head.</p>	

Table 1-2. Environmental Requirements

PARAMETER	REQUIREMENT
Operating temperature	15 to 35°C (59 to 95°F)
Relative humidity	5 to 95% (non condensing)
Altitude	Sea level to 10,000 feet

Dimensions

**Figure 1-7. Laser Head Dimensions**

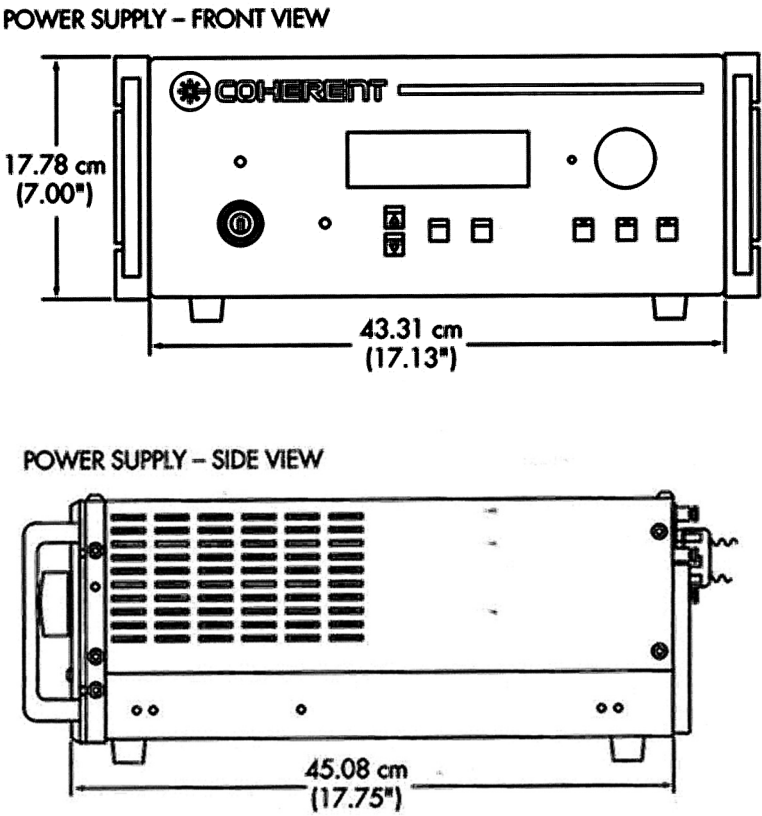


Figure 1-8. Power Supply Dimensions

