



Genesis-355 Customer Datasheet

Model: Genesis-355-20 Aria (ELF)
P/N: 1178347
S/N: TS5909

System Data:

	Laser Head	Power Supply
Part Number	1154542	1178344
Serial Number	TL5909	OPS972
System Hours:	0	

Laser Performance:

Parameter	Specification	Measured	
Operating output power (mW)	20.0	20.0	
Diode current (A)	-	15.2	
Wavelength	355 nm +/- 2 nm	354.82	
RMS noise	< 1.0% (10Hz - 1MHz)	0.09%	
Laser Beam Parameters:		<u>Horizontal:</u>	<u>Vertical:</u>
M ²	< 1.2	0.99	1.02
Waist diameter	Horiz: 0.975 +/- 0.25, Vert: 0.915 +/- 0.25	0.94	0.89
Waist location	+/- 0.325 m from aperture	-0.285	-0.235
Divergence	< 1.2 mrad	0.48	0.52
Beam position	< +/- 1 mm	0 +/- 1mm	0 +/- 1mm
Beam angle	< +/- 8 mrad	0 +/- 8 mrad	0 +/- 8 mrad
Asymmetry	0.85 - 1.05	0.95	
Polarization ratio	linear, > 100:1	338:1	
Polarization Orientation	vertical, +/- 7 deg.	2	

Technician: *[Signature]*

Approved: *[Signature]*

Date: 2-01-2012

*Operator's Manual
Genesis-355 Aria and LSR2
Laser Systems*

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 **COHERENT.**
5100 Patrick Henry Drive
Santa Clara, CA 95054

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In the U.S.:

Should you experience any difficulties with your laser or need any technical information, please visit our Web site www.Coherent.com. Should you need further assistance, please contact Coherent Technical Support via e-mail Product.Support@Coherent.com or telephone, 1-800-367-7890 (1-408-764-4557 outside the U.S.). Please be ready to provide model and laser head serial number of your laser system as well as the description of the problem and any corrective steps attempted to the support engineer responding to your request.

Telephone coverage is available Monday through Friday (except U.S. holidays and company shutdowns). Inquiries received outside normal office hours will be documented by our automatic answering system and will be promptly returned the next business day.

Outside the U.S.:

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TABLE OF CONTENTS

Preface	vii
U.S. Export Control Laws Compliance	vii
Symbols Used in This Manual and on the Laser System	viii
Section One: Laser Safety	1-1
Optical Safety	1-1
Electrical Safety	1-2
Laser Safety Requirements	1-2
Laser Emission and Classification	1-2
Laser Radiation Emission Indicator	1-3
Interlock	1-3
Hazardous Radiation Exposure	1-3
Waste Electrical and Electronic Equipment (WEEE, 2002)	1-3
CDRH and Regulatory Compliance	1-4
Sources of Additional Information	1-8
Laser Safety Standards	1-8
Equipment and Training	1-8
Section Two: Description and Specifications	2-1
System Description	2-1
Specifications	2-2
Dimensions	2-2
Section Three: Installation	3-1
Receiving and Inspection	3-1
Interconnections	3-2
Power shorting jumper	3-2
Interlocks	3-3
External Interlock	3-3
Computer Control	3-4
Analog Control	3-7
Section Four: Controls, Indicators and Features	4-1
Laser Head	4-1
Power Supply	4-4
Section Five: Operation	5-1
Operation	5-1
Control	5-1
Enable switch	5-2

5-6.	Command Table	5-10
5-7.	DLL Error Code Table	5-11
5-8.	Binary Fault Code Table	5-12

Preface

This manual contains user information for the Genesis-355 Aria and LSR2 Optically Pumped Semiconductor Laser (OPSL).



Read this manual carefully before operating the laser for the first time. Special attention should be given to the material in Section One: Laser Safety, which 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.

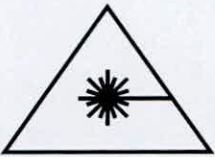
Export and re-export of lasers manufactured by Coherent are subject to U.S. Export Administration Regulations, which are administered by the Commerce Department. In addition, shipments of certain components are regulated by the State Department under the International Traffic in Arms Regulations.

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.

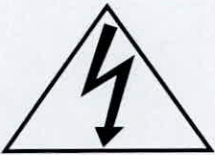
Symbols Used in This Manual and on the Laser System



This symbol is intended to alert the operator to the presence of important operating and maintenance instructions.



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



This symbol is intended to alert the operator to the presence of dangerous voltages within the product enclosure that may be of sufficient magnitude to constitute a risk of electric shock.



This symbol is intended to alert the operator to the danger of Electro-Static Discharge (ESD) susceptibility.

SECTION ONE: LASER SAFETY

Optical Safety

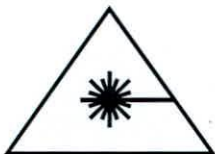
Laser light, because of its special properties, poses safety hazards not associated with light from conventional sources. The safe use of lasers requires that all laser users, and everyone near the laser system, are aware of the dangers involved. The safe use of the laser depends upon the user being familiar with the instrument and the properties of coherent, intense beams of light.



Direct eye contact with the output beam from the laser will cause serious damage and possible blindness.

Laser beams can ignite volatile substances such as alcohol, gasoline, ether and other solvents, and can damage light-sensitive elements in video cameras, photomultipliers and photodiodes. Reflected beams may also cause damage. For these reasons, and others, the user is advised to follow the precautions below.

1. Observe all safety precautions in the operator's manual (this document).
2. Extreme caution should be exercised when using solvents in the area of the laser.
3. Limit access to the laser to qualified users who are familiar with laser safety practices and who are aware of the dangers involved.
4. Never look directly into the laser light source or at scattered laser light from any reflective surface. Never sight down the beam into the source.
5. Maintain experimental setups at low heights to prevent inadvertent beam-eye encounter at eye level.



Laser safety glasses can present a hazard as well as a benefit; while they protect the eye from potentially damaging exposure, they block light at the laser wavelengths, which prevents the operator from seeing the beam. Therefore, use extreme caution even when using safety glasses.

6. As a precaution against accidental exposure to the output beam or its reflection, individuals using the system should wear laser safety glasses as required by the wavelength being generated.
7. Use the laser in an enclosed room. Laser light remains collimated over long distances and therefore presents a potential hazard if not confined.
8. Post warning signs in the area of the laser beam to alert individuals present.
9. Advise all individuals using the laser of these precautions. It is good practice to operate the laser in a room with controlled and restricted access.

Electrical Safety

The Genesis laser does not contain hazardous voltages. Do not disassemble the enclosure. There are no user-serviceable components inside. All units are designed to be operated as assembled. Warranty will be voided if the enclosure is disassembled.

Laser Safety Requirements

This laser product is intended to be sold to an original equipment manufacturer of electronic products for use as a component (or replacement thereof) in such electronic products. As such, this product is exempt from DHHS performance standard for laser products in accordance with paragraph 1040.10(a)(1).

The following information is provided to assist the OEM in complying with radiation safety standards. The FDA accession number is 91R0252-96.

Laser Emission and Classification

The Genesis-355 Aria and LSR2 laser is classified by the United States National Center for Device and Radiological Health (CDRH) as a CLASS IIIB laser product. It emits INVISIBLE LASER RADIATION of 355 nm; collinear radiation at 532 and 1064 nm may also be present.

Laser Radiation Emission Indicator

A yellow indicator light is provided on the front of the laser subsystem. This light is illuminated when the laser pump diode is energized. This light may not meet the IEC-825 requirement that warning laser lights must be fail safe or redundant. The Genesis-355 Aria and LSR2 OEM power supply has been designed to accommodate a warning light that is fail safe or redundant and meets the IEC-825 requirements. This light is part of the interlock system and must be supplied by the laser user. Refer to the description of the interlock circuit in Section Three for further details.

Interlock

A normally closed remote interlock switch can be installed on the Genesis OEM power supply. Refer to the description of the interlock circuit in Section Three for further details.

Hazardous Radiation Exposure

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

Waste Electrical and Electronic Equipment (WEEE, 2002)

The European Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC) is represented by a crossed-out garbage container label (see Figure 1-1). The purpose of this directive is to minimize the disposal of WEEE as unsorted municipal waste and to facilitate its separate collection.



Figure 1-1. Waste Electrical and Electronic Equipment Label

CDRH and Regulatory Compliance

The Genesis-355 Aria and LSR2 is an OEM product designed for incorporation into other equipment. Accordingly, Coherent has provided CDRH with a supplemental report for compliance. The user is responsible for full CDRH compliance and/or other regulatory compliance in the location of use.

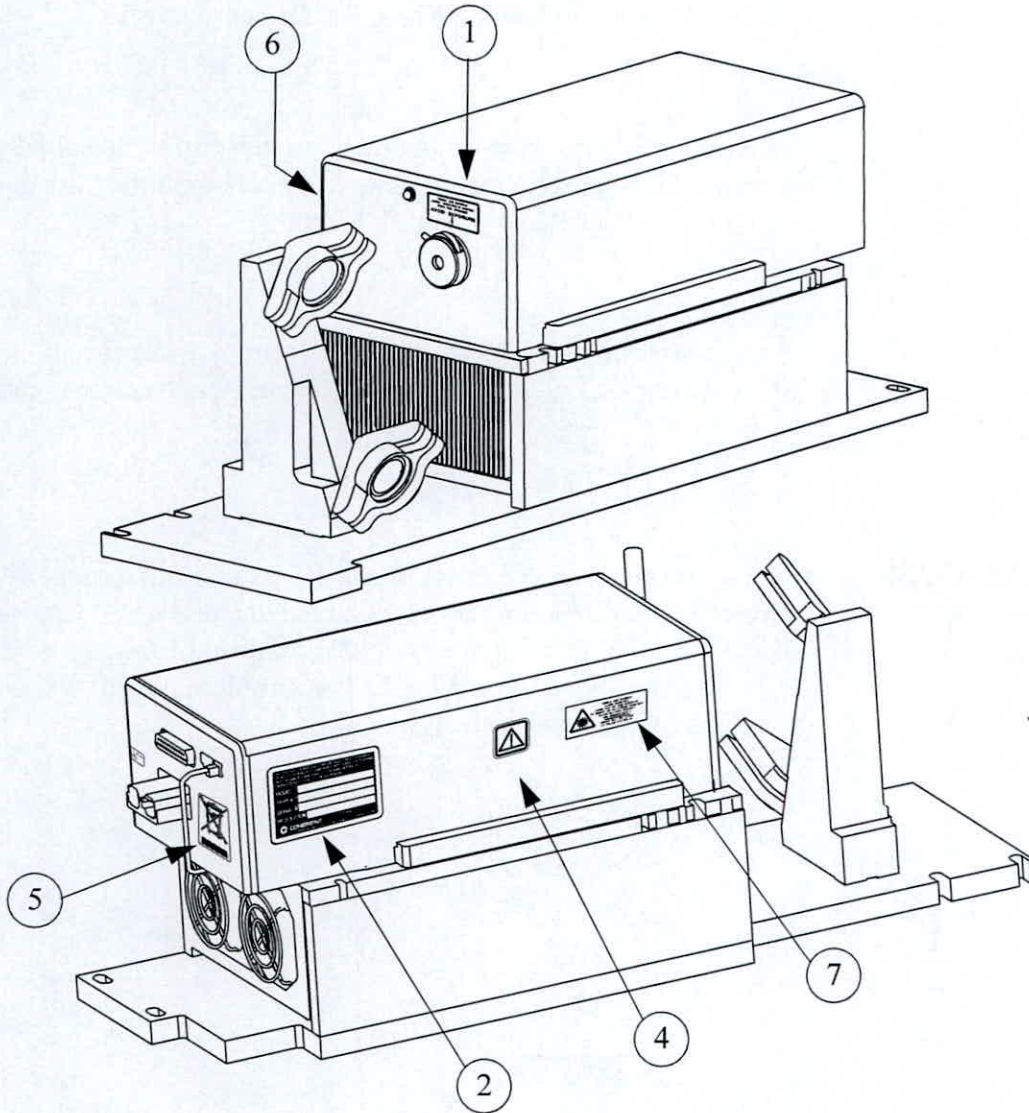


Figure 1-2. Laser Label Locations

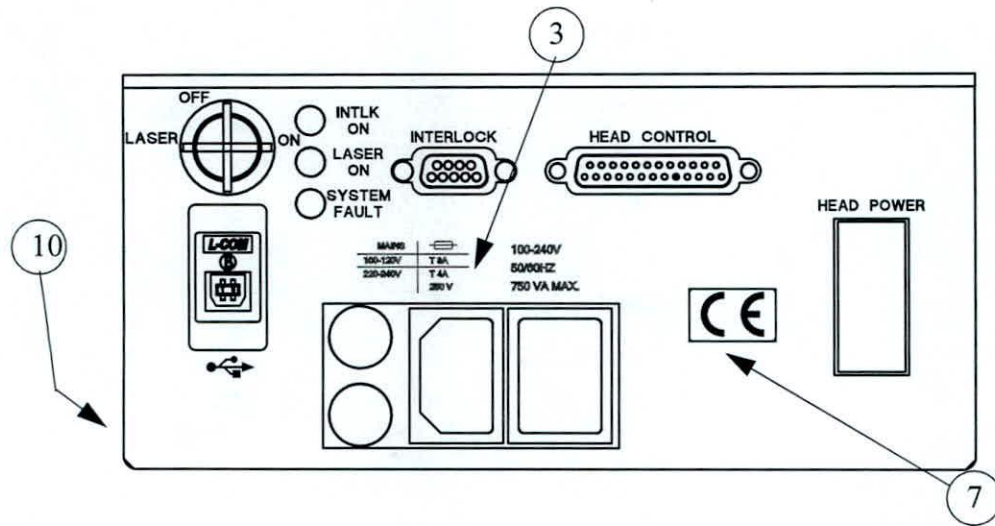
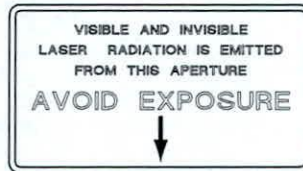



Figure 1-2. Laser Label Locations



1. AVOID EXPOSURE



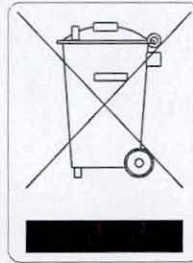
2. SERIAL NUMBER IDENTIFICATION

100-240V ~	
50/60HZ	
660 VA MAX.	
<hr/>	
MAINS	
100-120V ~	T 6.3A
220-240V ~	T 3.15A
	250 V ~


3. VOLTAGE RATING



4. CAUTION MARK



5. WEEE (WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT)

	VISIBLE AND INVISIBLE LASER RADIATION.
	AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION.
	CLASS 3b LASER PRODUCT PER EN60825-1(2004)
	495mW MAX CW LASER AT 355, 532 AND 1064 nm

6. RADIATION WARNING



7. CE CERTIFICATION

<p>CAUTION CLASS 4 INVISIBLE AND VISIBLE LASER RADIATION WHEN OPEN AND INTERLOCK DEFEATED. AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION.</p>
--

8. RADIATION WARNING

**WARRANTY VOID
IF SEAL
BROKEN**

9. VOID WARRANTY



10. SERIAL NUMBER IDENTIFICATION

Sources of Additional Information

The following are sources for additional information on laser safety standards and safety equipment and training.

Laser Safety Standards

Safe Use of Lasers

Document Z136.1

American National Standards

Institute (ANSI)

1430 Broadway

New York, NY 10018

Tel: (212) 354-3300

Guidelines for Laser Safety and

Hazard Assessment

Directives PUB 8-1.7

Occupational Safety and Health

Administration (OSHA)

U.S. Department of Labor

200 Constitution Avenue N.W.

Washington, DC 20210

A Guide for Control of Laser Hazards

American Conference of Governmental

and Industrial Hygienists (ACGIH)

6500 Glenway Avenue, Bldg. D-7

Cincinnati, OH 45211

Tel: (513) 661-7881

Laser Safety Guide

Laser Institute of America

12424 Research Parkway, Suite 130

Orlando, FL 32826

Tel: (407) 380-1553

Equipment and Training

Laser Focus Buyer's Guide

Laser Focus World

One Technology Park Drive

P.O. Box 989

Westford, MA 01886-9938

Tel: (508) 692-0700

Photonics Spectra Buyer's Guide

Photonics Spectra

Berkshire Common

Pittsfield, MA 01202-4949

Tel: (413) 499-0514

Lasers and Optronics Buyer's Guide

Lasers and Optronics

301 Gibraltar Dr.

P.O. Box 650

Morris Plains, NJ 07950-0650

Tel: (210) 292-5100

SECTION TWO: DESCRIPTION AND SPECIFICATIONS

System Description

The Genesis-355 Aria and LSR2 are 355 nm Optically Pumped Semiconductor Laser sources that are well-suited for scientific and bio-instrumentation applications due to their excellent beam quality and low noise performance. They consist of a laser subsystem and a power supply that may be controlled remotely. The laser subsystem consists of a laser head, an air-cooled heatsink, and a periscope to position the output beam.

Genesis is a true continuous wave, all-solid-state UV laser. The UV light is generated by a nonlinear optical process called harmonic generation. A portion of the 1064 nm lasing radiation of an Optically Pumped Semiconductor (OPS) Laser is first converted to 532 nm in a nonlinear crystal by second harmonic generation (SHG). The 532 and 1064 nm radiation are then combined in a second crystal to produce the 355 nm output by third harmonic generation (THG).

The optical layout of Genesis is shown in Figure 2-1.

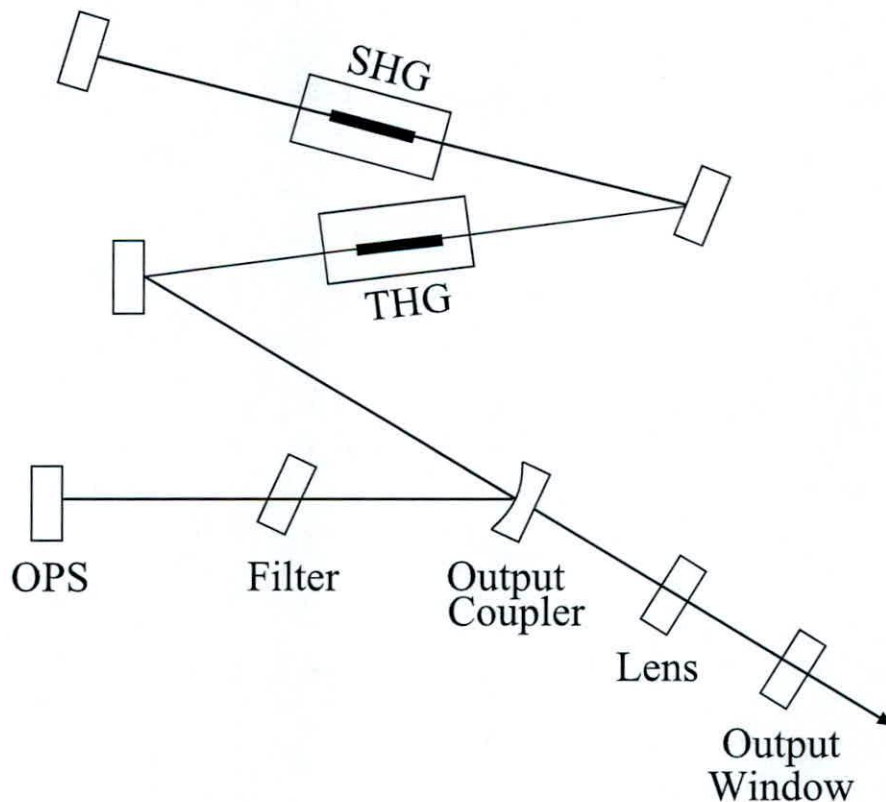


Figure 2-1. Optical Layout

Specifications

Refer to the data sheet supplied with the product for performance specifications for the Genesis-355 Aria and LSR2 laser.

Table 2-1. Utility Requirements, Dimensions and Weights

PARAMETER	VALUES
ELECTRICAL	
Input voltage (single phase)	100 - 240 VAC
Frequency	50 - 60 Hz
Power Consumption	500 W
CE Mark	IEC 61010-1/EN 61010-1
DIMENSIONS	
Laser Head ^[1] (L x W x H)	305 x 140 x 89 mm
OEM Power Supply (LxWxH)	290 x 210 x 90 mm
Cables (interconnect)	2 m
WEIGHTS	
OEM Power Supply	8.0 lbs.
Laser Subsystem	24.6 lbs.
ENVIRONMENTAL SPECIFICATIONS	
Ambient Temperature: Operation	10 - 40 °C (50-104°F)
Non-Operation	-10 - 70 °C (14 - 158 °F)
Warm-up time	< 10 min.
Relative humidity, non condensing:	5 - 95 %
[1] Back connector not included in laser head length dimension.	

Dimensions

The dimensions of the Genesis-355 Aria and LSR2 laser subsystems and the OEM Power Supply are shown in Figure 2-2 through Figure 2-4.

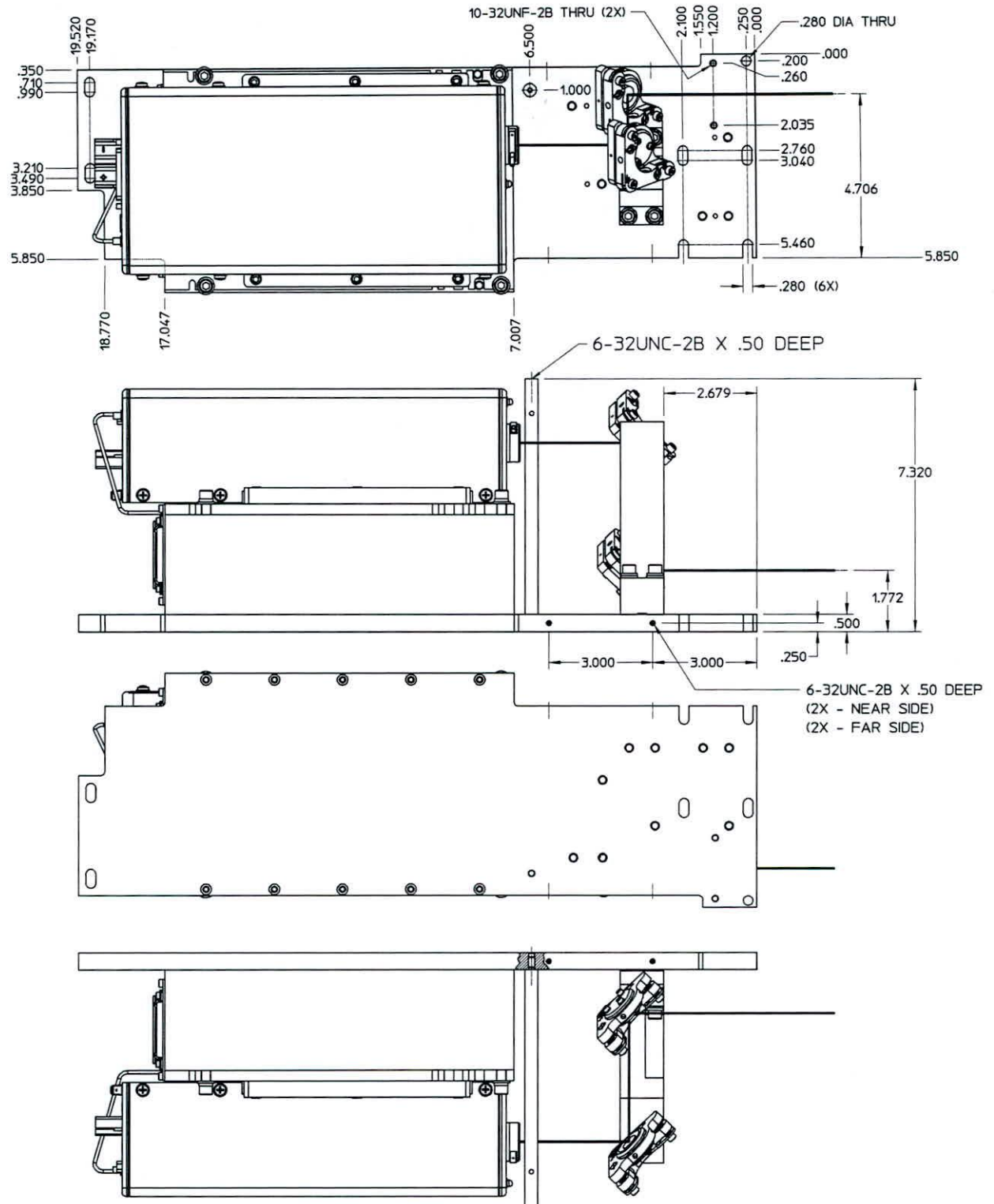


Figure 2-2. Genesis-355 Aria

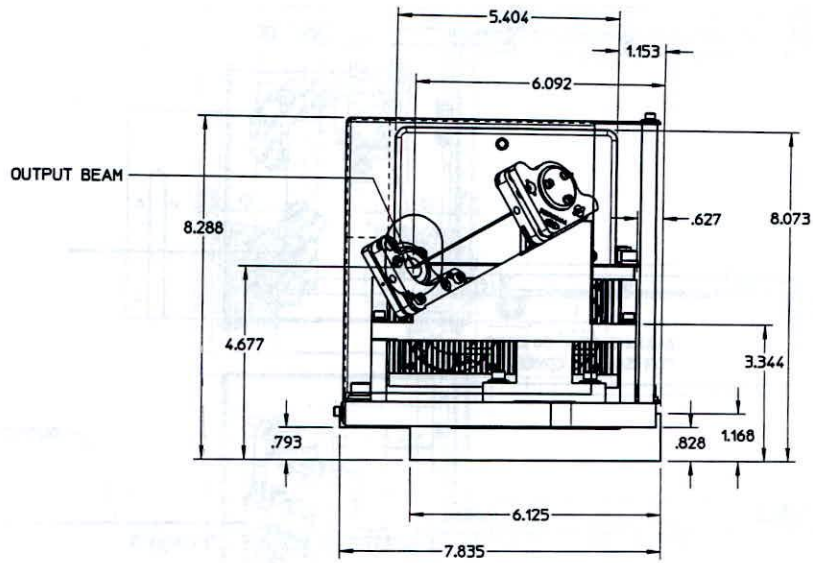


Figure 2-3. Genesis-LSR II Low Beam (Continued)

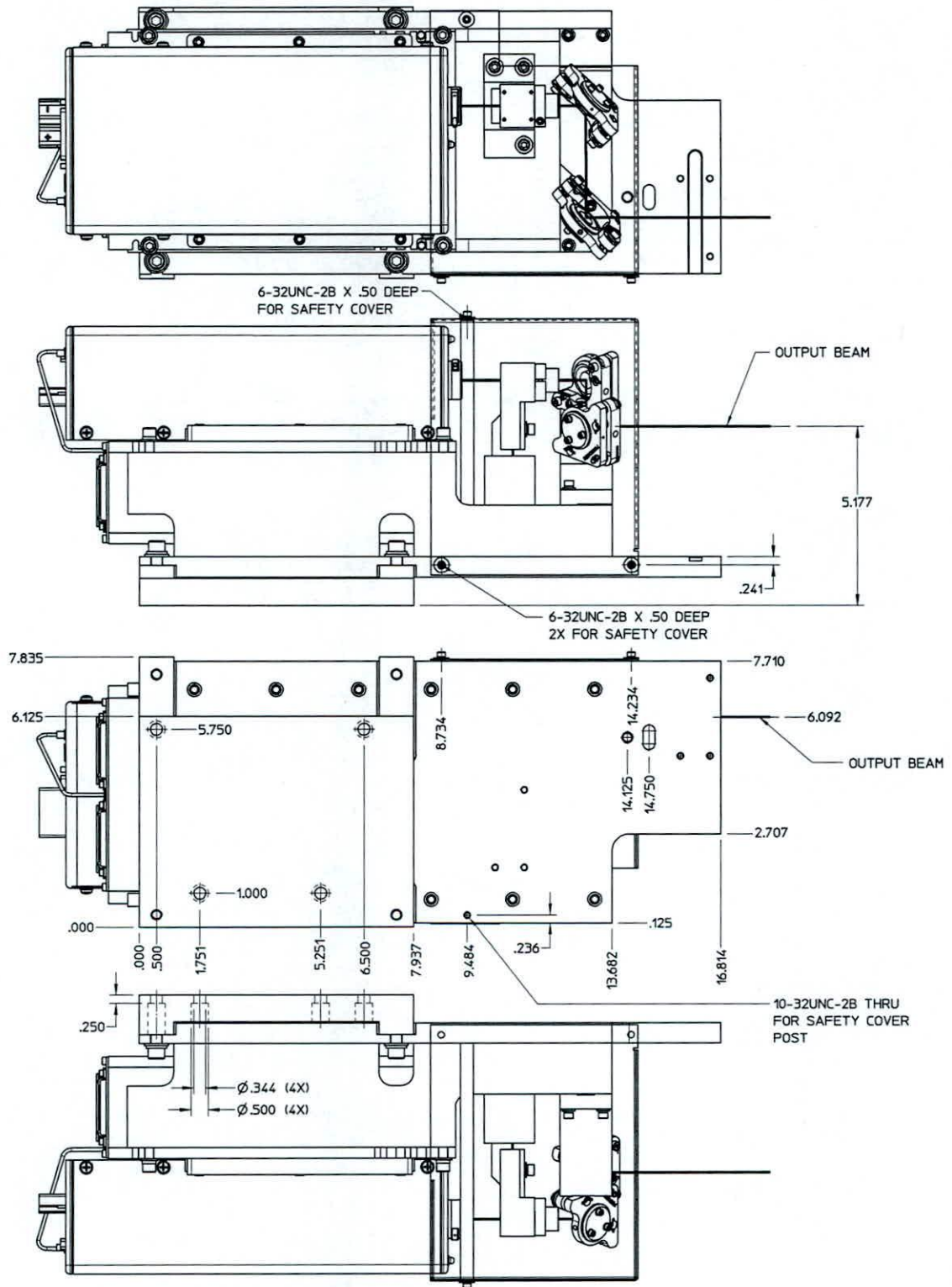


Figure 2-4. Genesis-LSR II High Beam

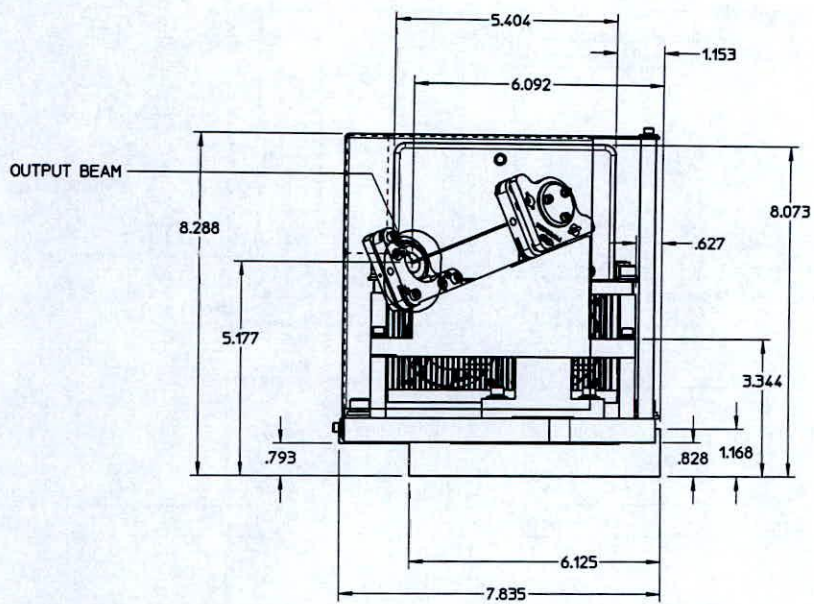


Figure 2-4. Genesis-LSR II High Beam (Continued)

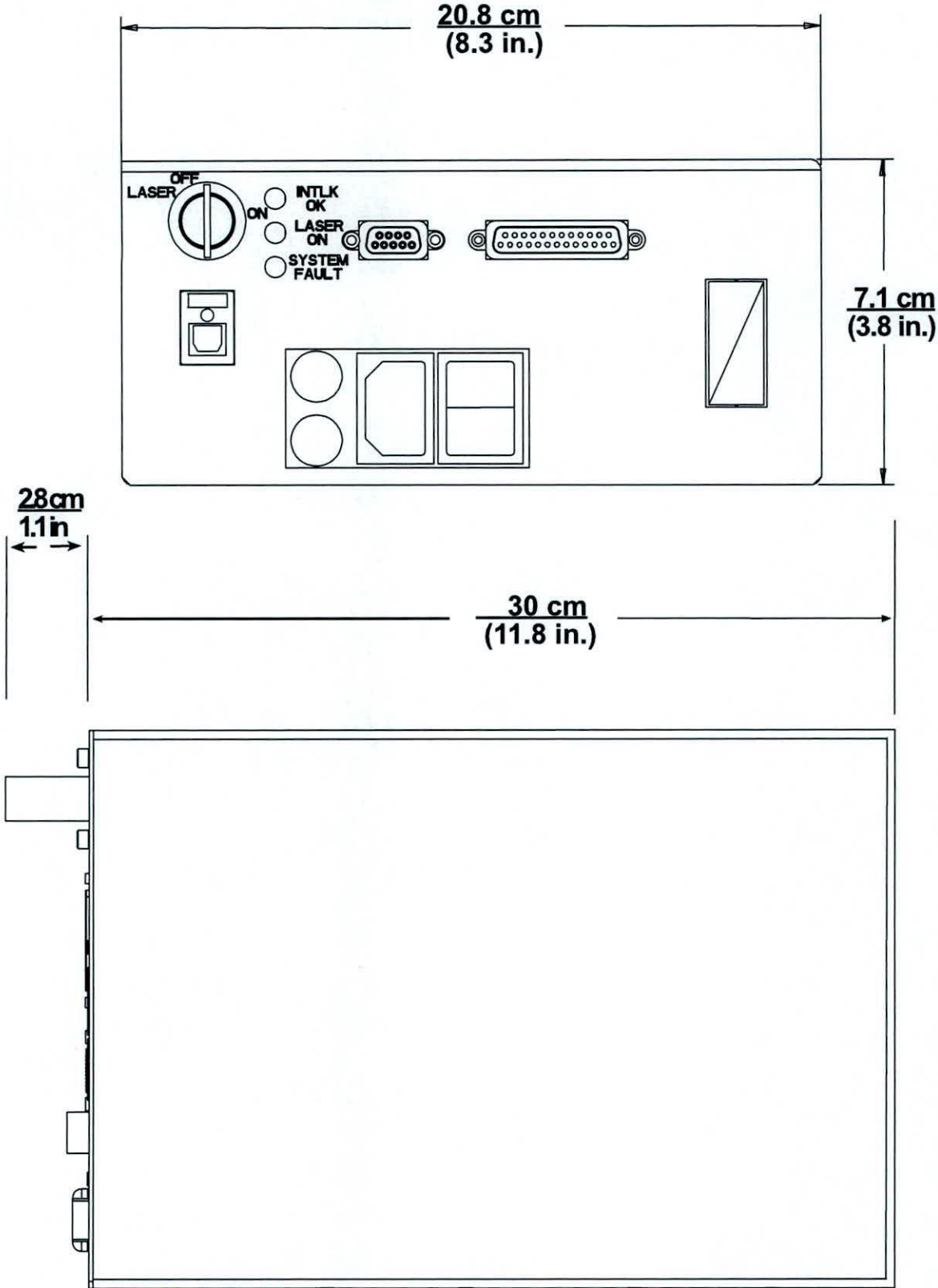


Figure 2-5. OEM Power Supply

SECTION THREE: INSTALLATION

Receiving and Inspection

Inspect shipping containers for signs of rough handling or damage. Indicate any such signs on the bill of landing. 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.

The installation procedure includes the following steps:

- Connect the system components.
- Connect a means of controlling (and monitoring) the laser system.
- Connect the system power to a properly grounded AC outlet.

The above tasks are described in the following paragraphs. After performing all of the tasks, the laser may be turned on and operated in accordance with the description presented later in this section.



Note: The detachable power cord is the mains disconnect device, accessibility to either should not be obstructed.

At least 3 inches of clearance should be provided at the intake and exhaust of the heatsink to allow sufficient air-flow through the heatsink.

Interconnections



Warning: Always make sure the unit is powered off before connecting/disconnecting these cables.

1. Connect the control cable (DB25 male connectors) to the laser head and power supply.
2. Connect the power cable (APP SB50 connectors) to the power supply. Make sure the connector is completely pushed in.
3. Connect both Ground leads to ground lugs.



The following ESD precautions are required to prevent damage to the laser when the power shorting jumper is not installed in the laser and the laser is not connected to the power supply with the power cable.

Power shorting jumper

1. Place the laser in direct contact with a grounded surface.
2. Ground the body of the operator to this surface using an appropriate ESD wrist band and grounding cord.
3. Remove the power shorting jumper from the laser head.
4. Connect the power cable to the laser head. Make sure the connector is completely pushed in.
5. The laser may now be removed from the grounded surface and handled safely without a grounding strap.
6. Connect the AC power cord to the power supply and to an AC line outlet.
7. Remove protective caps from the external telescope mirrors.

Interlocks

View of Front Panel Connector Interface w/male D-Sub 9 Pin Plug

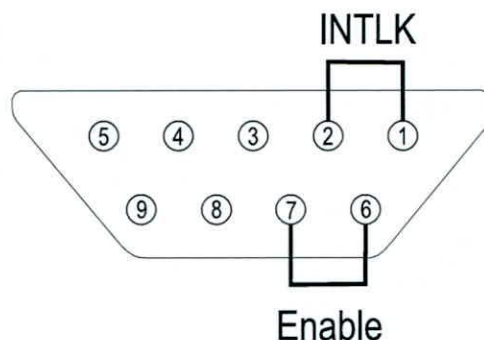


Figure 3-1. External Interlock

External Interlock

The system is shipped with a panel interlock connector. The laser will not operate without the interlock connection in place, and the system will not operate with any of the interlocks open. The interlock status is monitored by the internal electronics. If the interlock is open, laser emission will terminate, and the SYSTEM FAULT LED (Red) will illuminate. Ensure the external interlock shorting connector or user-furnished interlock is installed prior to turn on.

To incorporate an external safety interlock circuit into the laser system, turn-off the laser and remove the interlock plug on the front panel. Attach a user furnished external interlock circuit to this connector. Any external interlock circuit should be equivalent to a mechanical closure of the circuit. When the interlock is opened, the unit will terminate laser emission.

Pin 1 & 2 = Intlk – Interlock latches off. Pin 6 & 7 = Enable – Enable does not latch and gives 5 second on delay.

Computer Control

Installation:

1. Insert the supplied CD in the computer
2. Power up the laser and connect the USB cable to the computer. Shortly afterwards the system will recognize a new device and the "Found new hardware" wizard window will open.
3. Decline the option to connect to windows upgrade see Figure 3-2.



Figure 3-2. Decline Option

4. Select the option to look for drivers in a specific location, see Figure 3-3

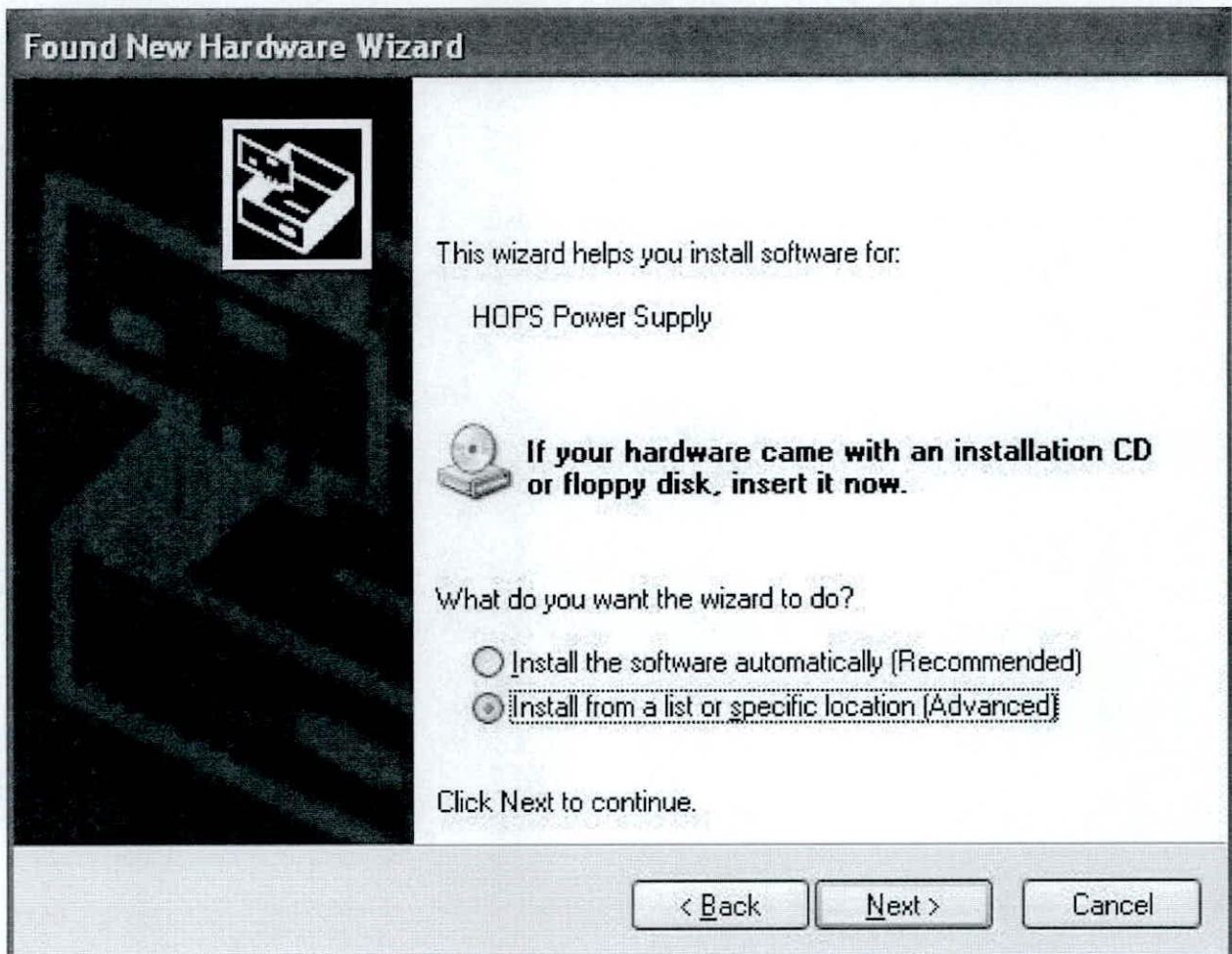


Figure 3-3. Software Location

5. Browse to the location of the driver folder in the CD "CDM 2.02.06 WHQL Certified", see Figure 3-4.

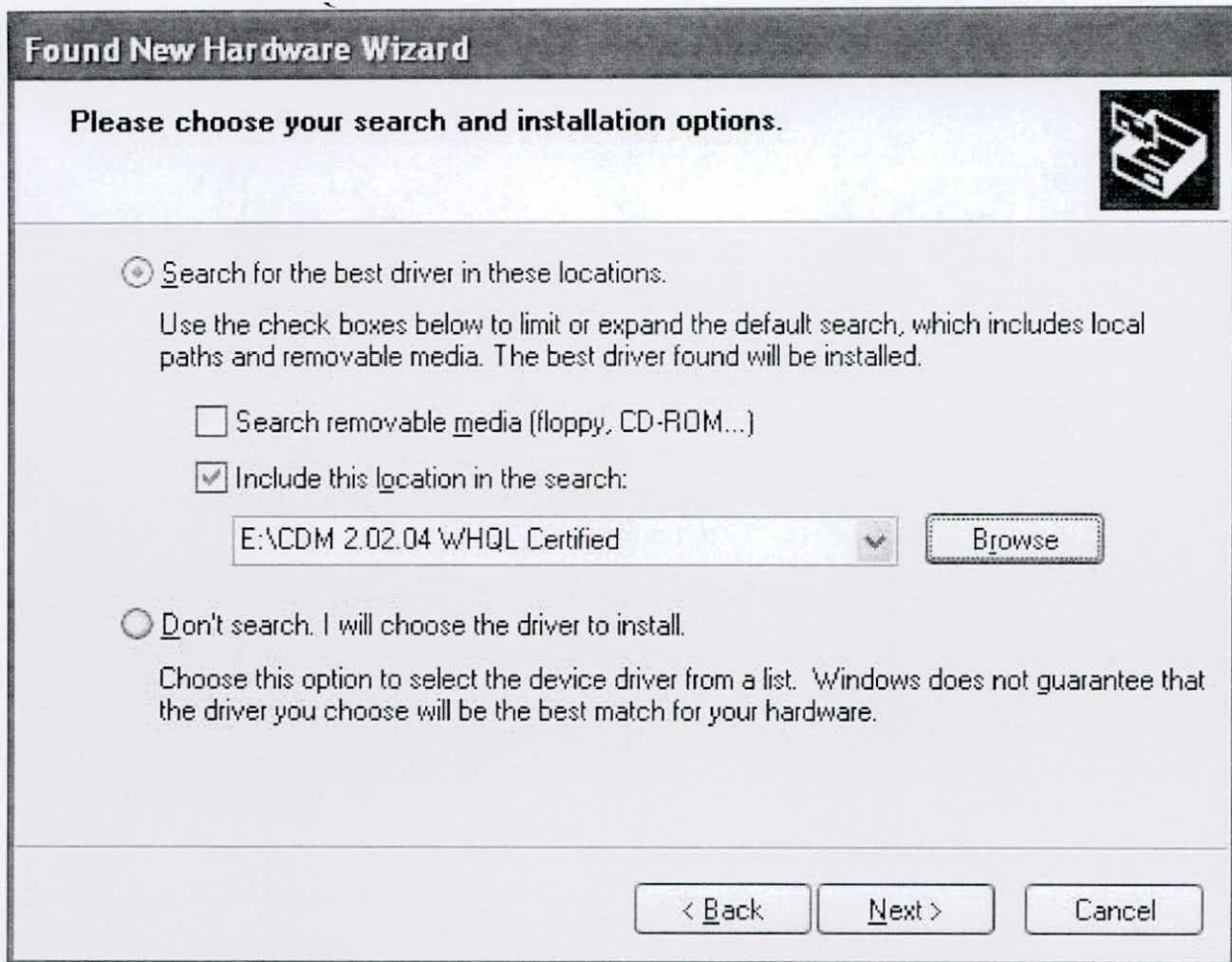


Figure 3-4. Driver Location

6. After clicking next the installation of the drivers is complete, the next step is the installation of the software.

For software installation run the "setup.exe" program on the CD. This triggers the execution of two installation wizards.

- The first one installs the OPSL laser control software and the control DLLs necessary for user developed laser control software.
- The second one starts automatically after the first one is complete and installs the Labview runtime routine, necessary for the OPSL laser control program

Analog Control

The laser can also be controlled by means of suitable signals at the interlock connector, as shown in figure x-x.

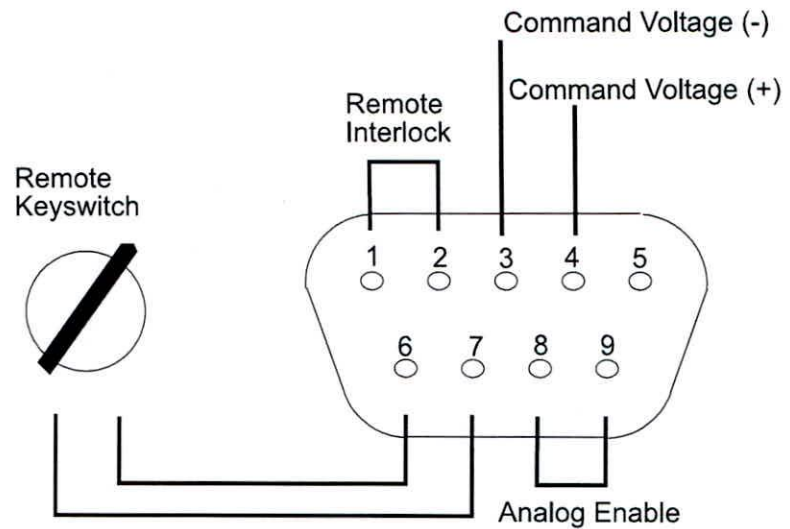


Figure 3-5. Interlock Connector

- The Remote interlock pins 1 & 2 need to be shorted, either at the connector or from a remotely located safety switch.
- The function of the key-switch on the unit can be replicated remotely by connecting a switch to pins 6 & 7. This connection is in series with the key-switch on the unit, both need to be closed for the laser to be enabled.
- The output power from the laser can be controlled by a command voltage applied between pins 3 & 4. The scale factor is 20 mW/V.
- The command voltage will be ignored unless it is enabled by shorting pins 8 & 9.

The different tabs give access to different functions of the program..

- Main: Basic information: the power and current at any given time.
- Data: Parameter values for serial number, hours of operation, temperature setpoints and actuals .
- Status: Status indicators for different internal systems of the laser.
- Control: Allows the user to change the status of the power command selector.
- USB: functions dealing with the USB interface. The program will automatically go to this tab is there is any communication problem.

Front Panel Operation:

The power supply front panel has three LEDs to indicate the status of the laser system, and a key switch used to enable laser operation.

LED indicators:

Interlock OK (yellow): This indicator lights up when the interlock circuit is closed, this happens only when both of the following conditions are met

- The user has closed the external interlock loop by means of an external switch or using the supplied shorting connector.
- The internal sensors indicate that the laser is ready to be used (crystals at temperature, etc)

The emission indicator on the laser head is connected to the same circuit.

Laser ON (Green): This indicator lights up when the laser diode driver is enabled, and laser radiation is being emitted. The indicator blinks during the safety delay period after the keyswitch is turned on

System Fault (Red): This indicator lights up when an unsafe condition has been detected and the laser has been disabled. It lights up when the interlock loop is open and if the unsafe situation happens during operation, the error condition latches and it can only be cleared by cycling the keyswitch off

Beam shutter

Open the mechanical shutter to allow the laser beam to exit the laser head.

Beam Alignment

The Genesis output beam is pre-aligned at the factory to the position shown in figure 2-2 within the tolerances specified

in Table 2-1. Mounting slots are provided in the laser subsystem interface plate to allow for rough alignment of the horizontal beam position. A periscope with 2 adjustable mirror mounts is provided for final optimization of the beam alignment.

CohrHOPS.DLL

The installation program copies several files in the installation directory, among them a Windows DLL file containing functions to control the laser. The DLL can be called from user programs written in any language. A Labview library with calls to the DLL is included for convenience of users creating Labview VIs.

Notes:

- The DLL is written in Visual Studio 2005 C++ without using .NET Framework for wider compatibility.
- Maximum number of devices=20.
- Strings are character arrays of length=100.

Table 5-1. Files

FILE	DESCRIPTION
CDM 2.02.04 WHQL Certified.	Folder in the CD containing USB device driver to be installed by "Found New Hardware"
CohrFTCI2C.DLL	USB functions
CohrHOPS.DLL	This DLL
CohrHOPS.H	C/C++ header file for this DLL
HOPS.lib	Labview (Version 6.0) library containing calls to the DLL

GETDLLVersion

This function returns the DLL version. Version string is up to 100 characters.

Table 5-2. GETDLLVersion

DECLARATION	
INT32 GetDLLVersion(LPSTR version)	
PARAMETER DESCRIPTION	
return value	always 0
output: version	DLL version string. (For example: "CohrHOPS 1.0.0")
EXECUTION TIME	
Fast	

CheckForDevices

This function updates the list of USB Coherent HOPS Power Supplies found. The ordering of handles in the array may change if devices are detached and re-attached. There is no report if a device's USB cable is detached and then re-attached between calls to CheckFor Devices. Similarly, there is no report if a device is powered-off and then powered-on between calls to CheckForDevices. There can be up to 100 devices.

Table 5-3. CheckForDevices

DECLARATION	
INT32 CheckForDevices(LPDWORD devicesConnected, LPDWORD numberOfDevicesConnected, LPDWORD devicesAdded, LPDWORD numberOfDevicesAdded, LPDWORD devicesRemoved, LPDWORD numberOfDevicesRemoved)	
PARAMETER DESCRIPTION	
return value	Error code, or 0 for no error
output: devicesConnected	Array of handles to all USB HOPS Power Supplies connected to the PC.
output: numberOfDevicesConnected	Number of USB HOPS Power Supplies connected to the PC
output: devicesAdded	Array of USB HOPS Power Supplies added since previous call to CheckForDevices
output: numberOfDevicesAdded	Number of USB HOPS Power Supplies added since previous call to CheckForDevices
output: devicesRemoved	Array of USB HOPS Power Supplies removed since previous call to CheckForDevices
output: numberOfDevicesRemoved	Number of USB HOPS Power Supplies removed since previous call to CheckForDevices
EXECUTION TIME	
Rough estimates: 700ms per device added since last call plus 200ms per device connected.	

InitializeHandle This function initializes the USB HOPS Power Supply

Table 5-4. InitializeHandle

DECLARATION	
INT32 InitializeHandle(DWORD handle, LPSTR headType)	
PARAMETER DESCRIPTION	
return value	Error code, or 0 for no error
input: handle	Handle obtained from CheckForDevices
output: headType	For example, "Tina" or "MiniX"
EXECUTION TIME	
Rough estimates: Typical hundreds of ms. Maximum 5s	

SendCommand This function provides a single entry point for executing commands on any Coherent HOPS Power Supply. Command and response strings are up to 100 characters.

Table 5-5. SendCommand

DECLARATION	
INT32 SendCommand(DWORD handle, LPSTR command, LPSTR response);	
PARAMETER DESCRIPTION	
return value	Error code, or 0 for no error
input: handle	Handle obtained from CheckForDevices
input command	Command string
output response	Response string. Always terminated with carriage return-line feed.
EXECUTION TIME	
Rough estimates: Typical 100 ms. Maximum 5s	

Table 5-6. Command Table

COMMAND	DESCRIPTION	UNITS
?TMAIN	Measured main TEC temperature	deg C
?TSHG	Measured SHG heater temperature	deg C
?TBRF	Measured BRF heater temperature	deg C
?TTHG	Measured THG heater temperature	deg C
?TMAINCMD	Main TEC temperature command	deg C
?TSHGCMD	SHG heater temperature command	deg C
?TBRFCMD	BRF heater temperature command	deg C
?TTHGCMD	THG heater temperature command	deg C
?MAIND	Main TEC drive	
?SHGD	SHG heater drive	
?BRFD	BRF heater drive	
?THGD	THG heater drive	
?P	Output power measured and computed from photodiode	mW
?PCMD PCMD=	Output power setpoint	mW
?PLIM	Maximum output power limit	mW
?C	Measured LDD current	A
?CLIM	Maximum LDD current limit	A
?FF	16-bit fault code	hex
?HID	Head serial number (up to 16 characters)	string
?L	LDD enable state: 0=disabled, 1=enabled	0 or 1
?SHCMD SHCMD=	Shutter command: 0=closed, 1=open	0 or 1
?SH	Shutter actual: 0=closed, 1=open	0 or 1
?KSWCMD KSWCMD=	Key switch command: 0=off, 1=on	0 or 1
?KSW	Key switch actual: 0=off, 1=on	0 or 1
?INT	Interlock status: 0=not OK, 1=OK	0 or 1

Table 5-6. Command Table

COMMAND	DESCRIPTION	UNITS
?HH	Head hours	hrs
?CMODECMD CMODECMD=	Photo or current mode command: 1=current mode, 0=photomode	0 or 1
?CMODE	Photo or current mode actual: 1=current mode, 0=photomode	0 or 1
?ANACMD ANACMD=	Analog input enable command: 0=disabled, 1=enabled	0 or 1
?ANA	Analog input actual: 0=disabled, 1=enabled	0 or 1
?PSDIO	Power supply digital input/output	hex
?PSGLUEIN	Power supply glue input	hex
?PSGLUEOUT	Power supply glue output	hex
?HEADDIO	Head digital input/output	hex
?REM REM=	Enable remote control: 0=disabled, 1=enabled	0 or 1

Table 5-7. DLL Error Code Table

ERROR CODE	DESCRIPTION
0	No error
-1	Invalid handle
-2	Invalid head
-3	Invalid command
-4	Invalid data
-5	I2C
-6	USB error
-100	CohrFTCI2C.DLL file not found
-101	CohrFTCI2C.DLL function not found
-999	Other error or unexpected error

Table 5-8. Binary Fault Code Table

BIT	DESCRIPTION
0001h	not used
0002h	not used
0004h	not used
0008h	Main TEC error
0010h	not used
0020h	Interlock fault
0040h	not used
0080h	not used
00100h	Shutter board error
00200h	Glue board error
00400h	not used
00800h	LDD at current limit or photo energy fault
1000h	not used
2000h	not used
4000h	not used
8000h	not used

SECTION SIX: MAINTENANCE AND SERVICE



Do not open the Genesis-355 Aria and LSR2 laser subsystem. There are no user-serviceable components or adjustments inside. There are hazardous levels of laser energy inside the laser head.

Troubleshooting

The following table list symptoms, causes and solutions for troubleshooting the Genesis laser system. The table spans across two pages.

ITEM	PHYSICAL SYMTOM	LED'S	SOFTWARE SYMTOM
1	Does not turn on	All OFF	Invisible to PC
2	Green LED does not turn on with software key	Yellow ON	
3	Laser off	Red ON Yellow OFF	All normal (no red LEDs ON, Xtal Temp OK LEDs on, yellow LDD at limit on)
4	Laser off	Normal	Current stays at zero, otherwise normal
5	Laser off	Normal	Current rails, yellow LDD at Limit LED on with key on
6	Laser off	All ON	All normal
7	Laser off	Red ON Yellow Neither Head ON	ON Status LEDs Main TEC error Main TEC Fan ON
8	Power is low	Normal	Current rails, yellow LDD at Limit LED on with key on
9	Normal	Normal	Error: Invalid head
10	Normal	Normal	Error: I2C error
11	Bad power calibration (reads higher)	Normal	All normal
12	Bad power calibration (reads lower)	Normal	All normal
13	Laser Off	Red ON Yellow OFF	ON Status LEDs Main TEC error Main TEC Fan ON OFF Status LEDs SHG Temp OK BRF Temp OK
14	Laser Off	Red ON Yellow OFF	OFF Status LED BRF Temp OK or SHG Temp OK

	POSSIBLE CAUSE	POSSIBLE SOLUTION
1	No DC power	
2	The enable loop is open, check the external enable jumper.	If not using the Coherent supplied Interlock plug, verify that it works with the supplied plug and then consult manual for information regarding the Interlock interface.
3	Main interlock chain open: check the connection of all external interlock or interlock jumpers	If not using the Coherent supplied Interlock plug, verify that it works with the supplied plug and then consult manual for information regarding the Interlock interface.
4	Head power cable disconnected	Make sure the DC power is OFF and then check the connection
5	Diode shorted (shorting clip left on), dead laser head	Remove the shorting clip
6	Interlock was triggered while the laser was on, and has since solved itself. If the laser was unattended clear the fault by switching the key off. Now you can key on and try to observe the problem	Please contact Coherent Technical Support .
7	System overheated: If it has a fan it will be on at maximum speed. Interlock condition will remain until head temperature goes below 27 °C.	Excessive ambient temperature, fan disconnected or defective, chiller off, defective TEC or TEC driver. check TEC cable connection.
8	Laser head has degraded, temperature setpoints changed from original factory settings, system running hot, but not enough to trigger fault	Please contact Coherent Technical Support.
9	Memory values corrupted, head communication damaged	Please contact Coherent Technical Support.
10	USB cable disconnected, or DC power lost. Damaged digital chip	Please contact Coherent Technical Support.
11	Coarse photocell calibration jumper removed, memory values corrupted	Please contact Coherent Technical Support.
12	Memory values corrupted	Please contact Coherent Technical Support.
13	Check cable connection between head and headboard L	
14	Crystal(s) not at temperature	This is normal for a few minutes after power on, if the condition remains it indicates a problem in the laser head

PARTS LIST AND ACCESSORIES

DESCRIPTION	PART NUMBER
Fuses:	
100 - 120 V: 8.0 A 250 V Time Lag Fuse	1110487
220 - 240 V: 4.0 A 250 V Time Lag Fuse	1150221
Operator's Manual	1149281
Power Cord, 10 A, 125 V, 8 ft.	1129257
USB 2.0 Cable Assy, 2 M	1161784
DB25 Male/Male Cable Assy, 6 ft.	1093409
Diode Power Cable	1150727
Shipping Carton w/Foam	1152267

PACKING PROCEDURES

Packing Procedure

In the event that a system needs to be shipped back for service, it must be packed properly in order to avoid damage that may occur during shipping.

1. Keyoff and power off the laser and unplug the AC cord from wall outlet.



Use static control precautions before disconnecting diode cable.

2. Disconnect all cables and place the shorting pin on the head and the interlock plug in the power supply. Close shutter and place the two mirror caps onto the periscope mirrors.

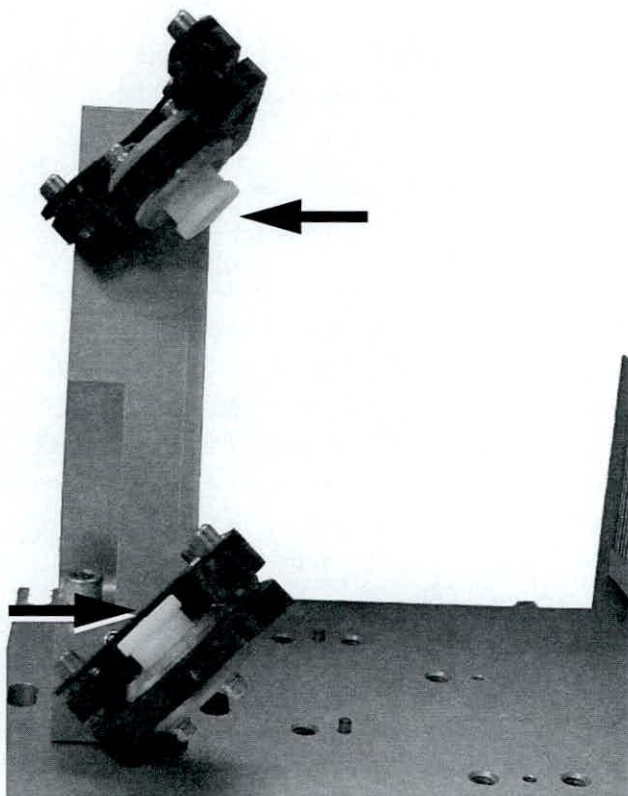


Figure B-1. Mirror Caps (shown on LSRII)

3. Coil the cables. Note 5 inch minimum bend radius.

4. For LSRII only, remove the safety cover rod.

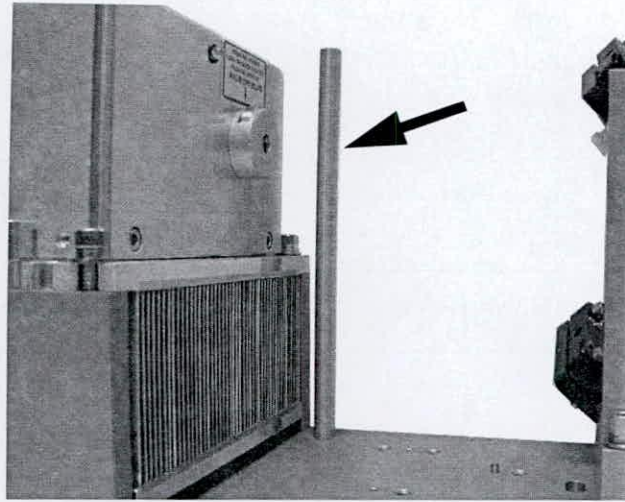


Figure B-2. Remove Cover Rod (LSRII only)

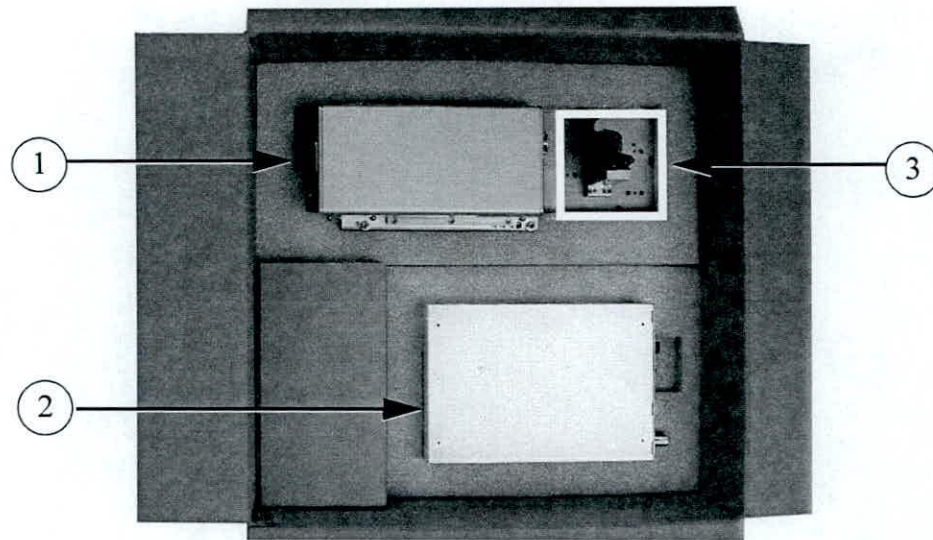
5. Place all the cables and the safety cover rod¹ in bag, secure with tape, and place bag in the small cardboard box in the shipping kit.
6. Wrap the laser head and power supply separately in the PE bags provided and secure with tape.



The following figures are shown without the plastic cover to illustrate the orientation of the items to be placed in the box. For actual shipment, place the head and power supply inside a polyethylene (PE) bag prior to placing in the box.

7. Place the laserhead and power supply in the shipping box in the proper orientation shown in Figure B-3.
8. Confirm the orientation of the upper packing foam is correct and place on top of the laser head and the power supply.
9. Take the box of cables from step 3 and place on top of the top packing foam of the power supply.
10. Include necessary paperwork for return shipment.

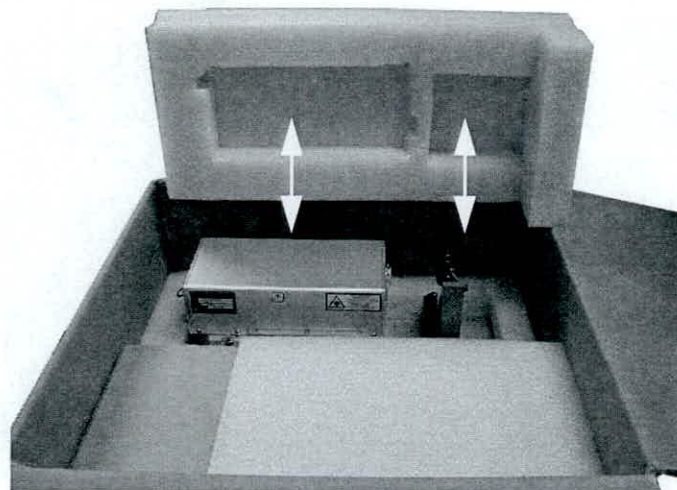
1. For LSRII. Aria does not have the safety cover rod.



Note: Photo shows head and power supply without the PE wrap to illustrate the orientation of the head and power supply. The head and power supply must be wrapped in PE bags.

- 1. Laser Head
- 2. Power Supply
- 3. Periscope

Figure B-3. Orientation of Head and Power Supply in Shipping Box



- 1. Top packing foam for power supply
- 2. Top packing foam placed on power supply

Figure B-4. Confirm Orientation of Packing Foam

- 11. Close and seal box with tape. Apply appropriate shipping label and shipback to Coherent using company approved freight vendor.

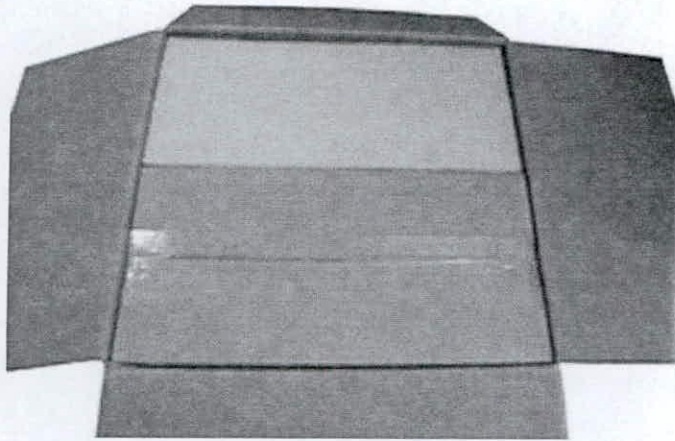


Figure B-5. Box of Cables on Top of Power Supply



Figure B-6. Return Paperwork

WARRANTY

Warranty

Coherent, Inc. warrants the Genesis Laser to the original purchaser (the Buyer) only. Coherent warrants that the laser system, that is the subject of this sale, (a) conforms to Coherent's published specifications and (b) is free from defects in materials and workmanship.

For specific warranty terms and conditions for your Genesis laser system, refer to your sales contract.

Conditions of Warranty

For warranty service requiring the return of any product to Coherent, the product must be returned to a service facility designated by Coherent. The Buyer is responsible for all shipping charges, taxes and duties.

Parts replaced under warranty shall become the property of Coherent and must be returned to Coherent, Inc., Santa Clara, or to a facility designated by Coherent. All laser systems must be carefully packed in a suitable shipping container(s). Coherent does not assume responsibility for components broken in shipment due to improper packaging or handling. The Buyer will be obligated to issue a purchase order for the value of the replaced parts and Coherent will issue credit when the parts are received.

Responsibilities of the Buyer

The Buyer is responsible for providing the appropriate utilities and an operating environment as outlined in the product literature. Damage to the laser system caused by failure of Buyer's utilities or failure to maintain an appropriate operating environment, is solely the responsibility of the Buyer and is specifically excluded from any warranty, warranty extension, or service agreement.

The Buyer is responsible for prompt notification to Coherent of any claims made under warranty. In no event will Coherent be responsible for warranty claims made later than seven (7) days after the expiration of warranty.

In the event of warranty repair, the Buyer is responsible for packing the unit in the original shipping container. If warranty returns are packed improperly, the warranty may be voided.

Limitations of Warranty

The foregoing warranty shall not apply to defects resulting from any of the following:

- Components and accessories manufactured by companies other than Coherent, which have separate warranties
- Improper or inadequate maintenance by the Buyer
- Buyer-supplied interfacing
- Operation outside the environmental specifications of the product
- Unauthorized modification or misuse
- Improper site preparation and maintenance
- Opening the housing

Coherent assumes no responsibility for customer-supplied material. The obligations of Coherent are limited to repairing or replacing, without charge, equipment which proves to be defective during the warranty period. Replacement sub-assemblies may contain reconditioned parts. Repaired or replaced parts are warranted for the duration of the original warranty period only. The warranty on parts purchased after expiration of system warranty is ninety (90) days. Our warranty does not cover damage due to misuse, negligence or accidents, or damage due to installations, repairs or adjustments not specifically authorized by Coherent.

Warranty applies only to the original purchaser at the initial installation point in the country of purchase, unless otherwise specified in the sales contract. Warranty is transferable to another location or to another customer only by special agreement which will include additional inspection or installation at the new site. Coherent disclaims any responsibility to provide product warranty, technical or service support to a customer that acquires products from someone other than Coherent or an authorized representative.

THIS WARRANTY IS EXCLUSIVE IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL OR IMPLIED, AND DOES NOT COVER INCIDENTAL OR CONSEQUENTIAL LOSS. COHERENT SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

GLOSSARY

°C	Degrees centigrade or Celsius
°F	Degrees Fahrenheit
μ	Microns
μrad	Microradian(s)
μsec	Microsecond(s)
1/e ²	Beam diameter parameter
A	Amperes
AC	Alternating current
Amp(s)	Amperes
CDRH	Center for Devices and Radiological Health
CFR	Code of Federal Regulation
cm	Centimeter(s)
DC	Direct current
EEPROM	Electrically erasable programmable read only memory
EMC	Electromagnetic Compliance
FAP-IT [™]	Fiber array package-integrated
FSR	Free spectral range
I/O	Input/output
kg	Kilogram(s)
LD	Laser diode
LED	Light emitting diode
LVD	Low Voltage Directive
m	Meter(s)
mA	Milliampere(s)
MHz	Megahertz
mm	Millimeter(s)
mrad	Milliradian(s)
ms	Millisecond(s)
mV	Millivolt(s)
mW	Milliwatt(s)
Nd:YAG	Neodymium:Yttrium Aluminum Garnet
Nd:YVO ₄	Neodymium:Yttrium Orthovanadate
nm	Nanometer(s)
OEM	Original equipment manufacturer
RMS	Root mean square
TEC	Thermo-electric cooler
TEM	Transverse Electromagnetic Mode (cross-sectional laser beam mode)
VAC	Volts, alternating current
VDC	Volts, direct current

W Watt(s)

INDEX

C

CDRH compliance 1-4
Classification, laser 1-2
Collinear radiation 1-2

D

Dimensions 2-2

E

Electrical 2-2
Electrical safety 1-2
Environmental specifications 2-2
 Relative humidity 2-2
 Temperature 2-2

F

Fuses A-1

G

Glossary Glossary-1

H

Hazardous radiation exposure 1-3

I

Input voltage 2-2
Installation 3-1, 3-2
 Receiving and inspection 3-1
Interlock 1-3

L

Laser emission and classification 1-2
Laser radiation emission indicator 1-3
Laser safety
 Requirements 1-2
Laser Safety (see Safety)
Limitations of Warranty Warranty-2

M

Maintenance and service 6-1

O

Operation 4-1, 5-1
Optical safety 1-1
 Safety glasses 1-1

P

Power consumption 2-2

R

Radiation exposure 1-3
Receiving and inspection 3-1
Regulatory compliance 1-4
Relative humidity 2-2
Requirements
 Laser safety 1-2
Responsibilities of the Buyer Warranty-1

S

Safety
 Electrical 1-2
 Glasses 1-1
 Optical 1-1
 Requirements 1-2
Specifications 2-2
 Environmental 2-2
System description 2-1

T

Temperature 2-2
Time A-1

U

U.S. Export Control Laws Compliance vi

W

Weights 2-2



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