Deuterium Light Source

D-2000 / D-2000-DUV / D-2000-S / D-2000-S-DUV

A Mikropack Product

Installation and Operation Manual

Document Number 000-10000-020-02-0505

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WARNING

Protective Eye Wear Must Be Worn
When Using This Instrument -
Intense Ultraviolet Radiation Present

See Important Safety Notices inside.

A HALMA GROUP COMPANY

Ocean Optics offers the most comprehensive, innovative and high-quality line of modular spectroscopy tools in the world. Mikropack, a leading supplier of spectroscopy and thin film components, is an essential and valuable partner in this enterprise. We have partnered with Mikropack because they are committed to the same goals of innovation and quality that inspire us here at Ocean Optics. As always, Ocean Optics conducts its business in an open, honest and technically available fashion. We invite you to contact us at Ocean Optics, Inc. (see front cover for contact information) or Mikropack GmbH with any technical questions, comments, or applications inquiries. Mikropack GmbH can be contacted at the following location:

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Important Safety Notices

1. Do not remove or modify any installed safety device on this equipment. Doing so will void your warranty and create an unsafe operating environment.
2. Dangerous voltages are present in this device. There are NO user serviceable parts inside.
3. Only allow qualified personnel to service this unit.
4. Do not use the unit if it is damaged in any way. Contact your dealer for repair or replacement information.
5. Always screw in the fiber optic cables before starting the instrument.

WARNING

Protective eyewear must be worn when using this equipment - Intense ultraviolet radiation present.
Never look directly into the light beam, as this can cause eye damage.

Warranty

Mikropack GmbH warrants to the original user of this instrument that it shall be free of any defects resulting from faulty manufacture of this instrument for a period of 12 months from the original data of shipment. There are no warranties for the D-2000-B (standard bulb) or D-2000-B-DUV (deep ultraviolet bulb).

This instrument should not be used for any Clinical or Diagnostic purposes. Data generated in these areas is not warranted in any way by Mikropack GmbH. Any defects covered by this Warranty shall be corrected either by repair or by replacement, as determined by Mikropack GmbH.

There are no warranties that extend beyond the description herein.

This Warranty is in lieu of, and excludes, any and all other warranties or representations expressed, implied, or statutory, including merchantability and fitness, as well as any and all other obligations or liabilities of Mikropack GmbH including, but not limited to, special or consequential damages. No person, firm, or corporation is authorized to assume for Mikropack GmbH. Any additional obligation or liability not expressed provided for herein except in writing duly executed by an officer of Mikropack GmbH:

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Table of Contents

About This Manual

Document Purpose and Intended Audience

This document provides you with an installation section to get your system up and running.

What's New in this Document

This version of the *Deuterium Light Source D-2000 / D-2000-DUV / D-2000-S / D-2000-S-DUV Installation and Operation Manual* adds our partnership agreement.

Document Summary

Chapter	Description
Chapter 1: *Setup*	Contains a list of package contents and unpacking instructions.
Chapter 2: *D-2000 Specifications*	Contains operating environment specifications, as well as other physical details of the product.
Chapter 3: *Operating Instructions*	Provides instructions for operating the D-2000 Light Source.
Chapter 4: *Troubleshooting*	Contains a table of troubleshooting information.
Appendix A: *Bulb Replacement*	Provides instructions for changing the bulb.

Product-Related Documentation

You can access documentation for Ocean Optics products by visiting our website at **http://www.oceanoptics.com**. Select *Technical → Operating Instructions*, then choose the appropriate document from the available drop-down lists. Or, use the **Search by Model Number** field at the bottom of the web page.

You can also access operating instructions for Ocean Optics products on the *Software and Technical Resources* CD included with the system.

Engineering-level documentation is located on our website at *Technical → Engineering Docs.*

Upgrades

Occasionally, you may find that you need Ocean Optics to make a change or an upgrade to your system. To facilitate these changes, you must first contact Customer Support and obtain a Return Merchandise Authorization (RMA) number. Please contact an Ocean Optics Application Scientist for specific instructions when returning a product.

Chapter 1

Setup

Overview

The following sections provide instructions on unpacking and setting up your D-2000 Deuterium Light Source.

Before using the D-2000 for the first time check for transport damage. Be sure to adhere to all warnings on the unit and in this manual.

Unpacking the D-2000

► ***Procedure***

1. Unpack your lamp assembly carefully. Although the lamp is rigidly mounted, dropping this instrument can cause permanent damage.
2. Inspect the outside of the instrument and make sure that there is no damage. Do not use the instrument if damage is present.
3. Use this instrument in a clean laboratory environment (see Operating Environment).

Contents

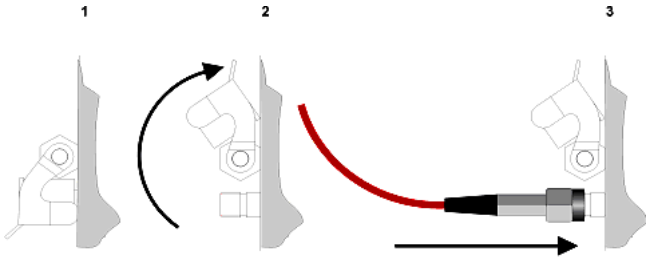
Your D-2000 package should contain the following:

- ❑ D-2000 unit
- ❑ Power cord
- ❑ UV safety goggles

Connecting the Fiber Optic Cable

► ***Procedure***

To connect the fiber optic cable to the D-2000,



1. Locate the cap on the front of the D-2000.
2. Lift the cap on the front of the D-2000 to expose the SMA connector.
3. Connect the fiber optic cable to the SMA connector.

Chapter 2

D-2000 Specifications

This section provides information on the operating environment, physical controls, and dimensions of the D-2000. It also provides a graph of spectral lines.

Operating Environment

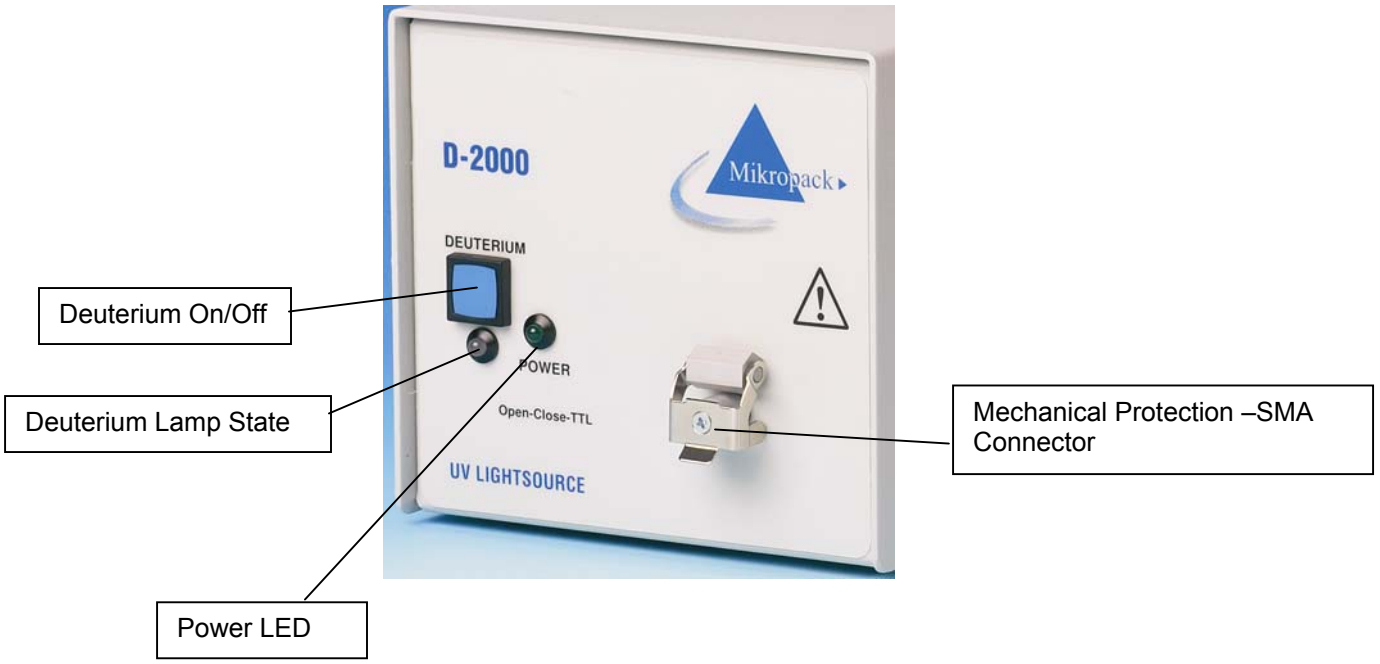
The following table provides information on optimizing the operating environment of your D-2000.

Operating Environment	The D-2000 Unit . . .
Moisture	Is designed for operation in dry rooms only.
Ventilation	Should be situated so that its location or position does not interfere with proper ventilation.
Heat	Should be situated away from any device that emits excessive heat.
Object and Liquid Entry	Should be positioned so that objects do not fall on top of the unit. Additionally, ensure that no liquids are spilled into the enclosure through openings.
Power Sources	Should be connected to a power supply with the following specifications: • Units manufactured since April 2003 are equipped with power supplies that can handle voltage input of 90 to 240 VAC. These units have a serial number formatted as 23XXXX. • Units manufactured before April 2003 are equipped with power supplies that can handle either 110 VAC or 240 VAC. These units have serial numbers formatted as 02000XXX. The power type should be listed on a sticker on the rear of the light source.

D-2000 Components

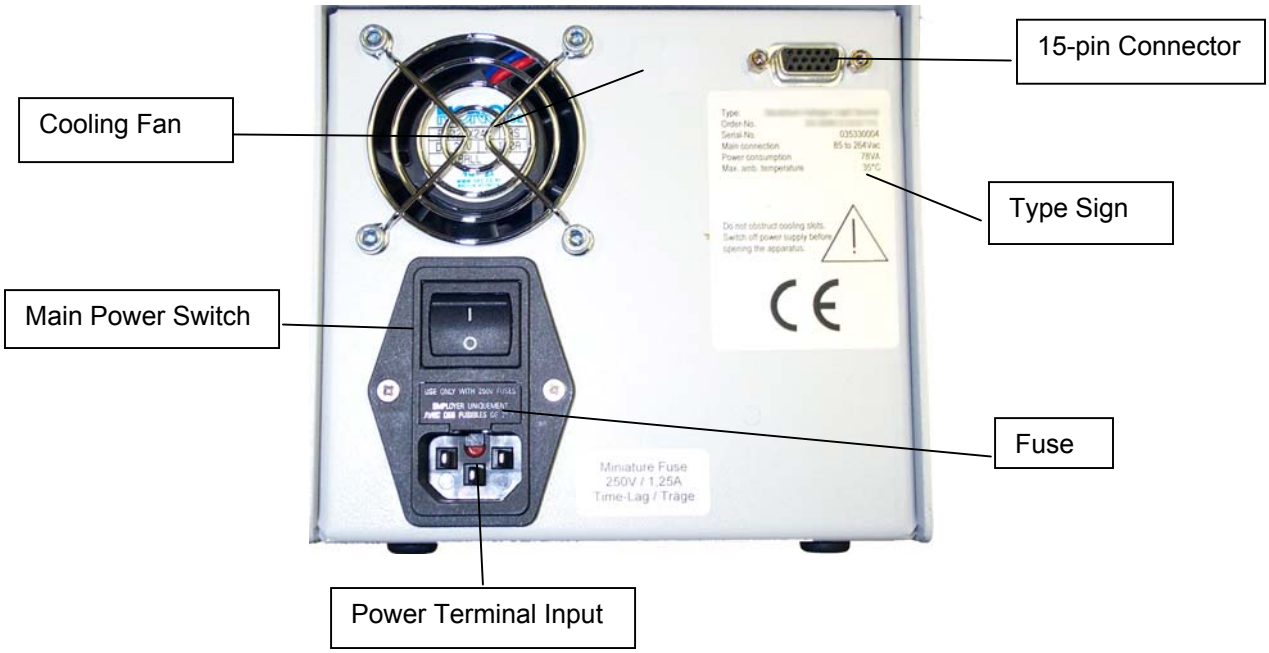
The following sections describe the components located on the front and rear of the D-2000 unit.

Front Panel



Component	Description
Deuterium On/Off	Press to turn the Deuterium lamp on or off. The bulb requires a warm-up time of 20 seconds before the Deuterium lamp is illuminated. You must allow the bulb to warm up to receive accurate data from the lamp. LED lights green upon successful illumination, or red to indicate lamp malfunction.
Power LED	Indicates the power state of the D-2000.
Mechanical Protection – SMA Connector	Covered to protect users from unintentionally looking directly at the beam of light. Used for SMA connections only. Connect the fiber cable to the D-2000 BEFORE turning the lamp on to avoid unnecessary exposure to UV radiation. Always wear proper eye protection when using the D-2000 lamp.

Rear Panel



Component	Description
Power Terminal Input	Connect power cable to provide voltage to D-2000: **Note**: Only connect the power cable to the lamp when the Main Power Switch is in the OFF position.
Main Power Switch	Turn on to supply power to the D-2000. The Power LED illuminates when this switch is in the On position.
Fuse	Contains the fuse to protect the unit against overload: European Fuse Type: Miniature fuse 5 x 20 mm, 1 Amp slow blow USA Fuse Type: Miniature fuse 5 x 20 mm, 2.5 Amp slow blow
Cooling Fan	Cools the interior of the D-2000. Do not obstruct.
Type Sign	Information about: – Type – Version – Order No. – Serial No. – Main connection – Max. Ambient. Temperature – Warnings – CE-Marking
15-pin Connector	Controls the lamp shutter (D-2000-S models only) via a TTL input signal. See *Pinout Information*.

Specifications

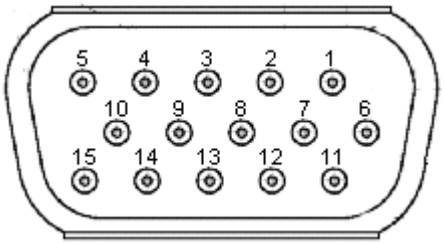
Specifications	Criteria
Wavelength Range	210–400 nm (190–400 nm DUV)
Current – Voltage – Stability	≤0,01 % / h
Current – Voltage – Drift	≤0,01 % / h
Warm-Up Time	40 minutes
Lamp Voltage Lamp Current	Ignition 580V / 20° Operating 85 V / 0.3A
Lamp Lifetime	1000 hours
Radiation Characteristics	Aperture 0.5mm NA26° (13°)
Performance Guaranteed Temperature	5°C–35°C
Shutter-Input (Only –S / -FHS versions)	TTL-Input, up to max. 5 Hz
Possible Filter Dimensions (Only –FHS versions)	Up to diameter or square 25mm x 4mm or 20 x 6 mm
Humidity	5–95% without condensation at 40°
Internal Power Consumption	25 W
Total Power Max. Power Consumption	100 Watt/190 Watt (Heating D-Lamp for 20sec)
Power Requirements: European Version (prior to 4/2003) USA Version (prior to 4/2003) All units manufactured after 4/2003	 230–240V 50/60 Hz 110–115V 50/60 Hz 90–240V 50/60 Hz See *Operating Environment* for specific information.
Markings / Directives	CE; VDI/VDE 0160; EN 61010
Weight	Approximately 6 kg
Size	150 x 135 x 319 mm

Pinout Information

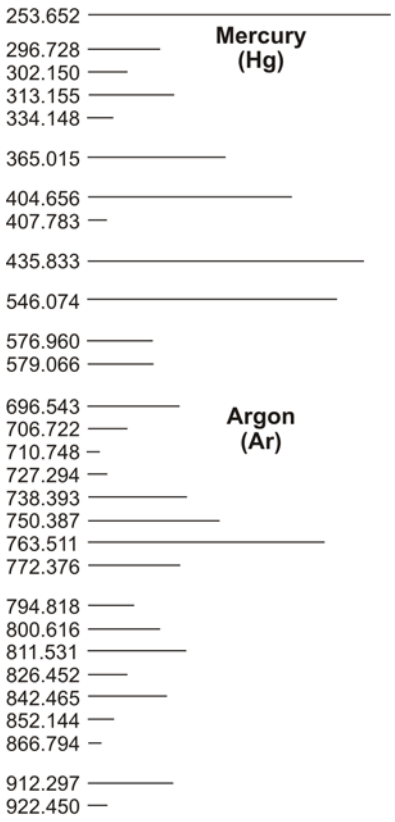
The following table contains pinout information for the D-2000 Light Source:

Pin	Description
1	na
2	na
3	na
4	na
5	na
6	na
7	na
8	na
9	na
10	Ground
11	na
12	na
13	TTL Signal – Shutter control
14	na
15	na
na = not applicable	

Pinout Diagram



Spectral Lines



Chapter 3

Operating Instructions

Operating the Lamp

The following sections provide instructions on operating the D-2000 Light Source.

Starting the Lamp

Press the Deuterium On/Off switch down to preheat the D-2000's Deuterium lamp. The bulb requires a 20 second preheating period. You must allow this warm up period in order to receive accurate data. After the warm up period, the Deuterium lamp will illuminate.

After successful illumination, the two-color LED beneath the Deuterium On/Off switch lights up green to indicate that the Deuterium lamp is on. Should the Deuterium lamp fail to light, the two-color LED glows red. This indicates a malfunction of the lamp. Press the Deuterium On/Off switch again to reset the lamp.

See *Troubleshooting* for more information.

WARNING

Protective eyewear must be worn when using this equipment - Intense ultraviolet radiation present.

Never look directly into the light beam, as this can cause eye damage.

Turning the Lamp Off

Turn the Deuterium lamp off by pressing the Deuterium On/Off switch.

Warming Up the Lamp

The Deuterium lamp requires 10–15 minutes of operation to reach a state of thermal equilibrium. During this warm-up period, the intensity of the UV output power can vary substantially.

If applications require extreme intensity stability, the lamp should be warmed up for an additional 30–45 minutes. Once warmed up for this amount of time, the lamp will reach specified drift values.

Chapter 4

Troubleshooting

If the power supply or lamp does not seem to functioning properly, check the following:

Issue	Probable Cause	Resolution
Power switches on, but no LEDs light.	Line power not present	Check line voltage
	Fuse defective	Check fuse
Deuterium lamp does not ignite. The two-color LED under the Deuterium On/Off switch lights up red, indicating an error.	Deuterium lamp too hot	Allow Deuterium lamp to cool down (20 minutes). Press On/Off switch again to reset the Deuterium lamp, then press again to restart.
	Deuterium lamp life exhausted	Replace Deuterium lamp
	Deuterium lamp's internal connection plug is not closed right	Open unit (see the *Bulb Replacement* appendix) and close connector plug.
Deuterium lamp turns off during operation.	Deuterium lamp too hot	Turn off the unit. Allow the unit to cool down for at least 20 minutes. Once the unit has cooled down, turn the Deuterium lamp back on.

Appendix A

Bulb Replacement

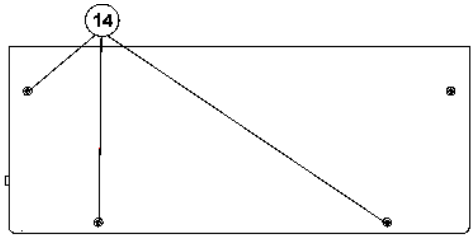
To order replacement bulbs for the D-2000, order the following item number(s):

- Standard bulb: D-2000-B
- Deep ultraviolet bulb: D-2000-B-DUV

Replacing the Deuterium Bulb

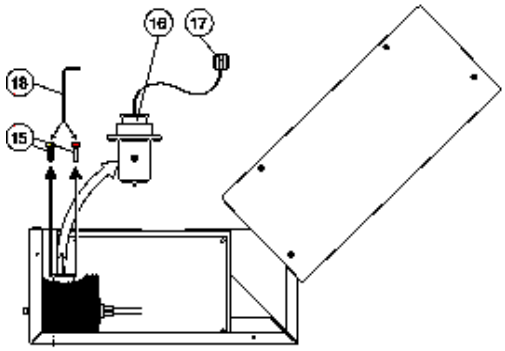
► ***Procedure***

1. Open the six slotted screws (14) and open the casing cover.



2. Open the screws (15) with the tool (18) that is delivered with the spare bulb (16).

3. Disconnect the old bulb and connect the new Deuterium lamp only with the originally supplied connection plugs (17).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