DH-mini UV-Vis-NIR Deuterium-Halogen Light Source with Shutter

Installation and Operation Manual

For Products: DH-mini UV-Vis-NIR
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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. Handle this product with care. Do not use the unit if it is damaged in any way. Contact your dealer for repair or replacement information.
5. Do not stare into the light beam.
6. UV radiation is present. Direct contact with the light beam will cause injury.

FCC COMPLIANCE

This equipment has been tested and found to comply with the limit for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- **Reorient or relocate the receiving antenna.**
- **Increase the separation between the equipment and the receiver.**
- **Connect the equipment into an outlet on a circuit different form that to which the receiver is connected.**
- **Consult the dealer or an experienced radio/YV technician for help.**

Changes or modifications not expressly approved by the responsible party could void the user's authority to operate the equipment.

Table of Contents

About This Manual

Document Purpose and Intended Audience

This document provides you with information to get your light source set up and running, as well as how to operate the device and change the bulb. Specifications are also included.

What's New in this Document

This version of the *DH-mini Light Source Installation and Operation Manual* updates the FCC information.

Document Summary

Chapter	Description
Chapter 1: *Setup*	Contains instructions for setting up the unit.
Chapter 2: *Operation*	Provides instructions for operating the unit, including using Manual and TTL modes, as well as changing the intensity of the Halogen bulb.
Appendix A: *Specifications*	Contains operating environment specifications, as well as other physical details of the product.
Appendix B: *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 *Support → Technical Documents*, then choose the appropriate document from the available drop-down lists. .

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 Ocean Optics for specific instructions when returning a product.

Warranty

Our 3-Year Warranty covers Ocean Optics miniature fiber-optic spectrometers, spectral sensors, light sources and sampling accessories – regardless of the application – from manufacturing defects. It also covers fibers and probes for a full 12 months: http://oceanoptics.com/services/exclusive-3-year-warranty/.

This comprehensive warranty ensures you of the highest level of craftsmanship and reliability for years to come. No other manufacturer offers such a solid guarantee of quality and reliability.
The Ocean Optics 3-Year Warranty applies to Ocean Optics equipment (excluding OEM configurations) purchased on or after July 1, 2010. The warranty covers parts and labor needed to repair manufacturing defects that occur during the warranty period. We also will cover the costs of shipping warranty-related repairs from our customers to Ocean Optics and from us to our customers.

Chapter 1

Setup

Overview

The following sections provide instructions on unpacking and setting up your DH-mini Light Source.

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

Unpacking the DH-mini

► ***Procedure***

1. Unpack your lamp assembly carefully. 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. Contact your dealer for repair or replacement information, if necessary.
3. Use this instrument in a clean environment.

Contents

Your DH-mini package should contain the following:

- DH-mini Light Source
- Power supply – 12 Vdc @ max. 1500 mA
- Hexagonal socket screw key SW 2.0
- Hexagonal socket screw key SW 1.5
- TTL adapter cable 4-way Binder plug to DB-15 connector

Attaching to Ocean Optics Spectrometers

The following table shows accessories and pinouts for attaching the DT-mini light source to various Ocean Optics spectrometers.

DB15 Pin	DH Mini	HR/QE/Maya/NIRQuest	Flame	STS	USB2000+
Cables/Adapters Needed					
N/A		HR4-CBL-DB15	FLAME-CBL-DD4P-DB15P And M-F DB15 Gender Changer	JAZ-CBL-DB15	USB-ADP-BB (modified) + HR4-BB-ADP And HR4-CBL-DB15
Pinouts					
6	Halogen	GPIO 8	GPIO 1	RX (not supported)	GPIO 6
10	GND	GND	GND	GND	GND
13	Shutter	Lamp Enable	Lamp Enable	Lamp Enable	Lamp Enable
15	Deuterium	GPIO 7	GPIO 4	GPIO4 (GPIO3 in OceanView)	GPIO 7

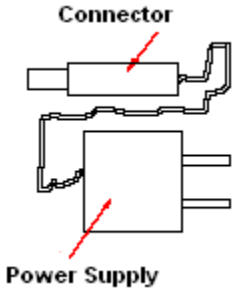
Setting Up the DH-mini Light Source

Use the following procedure to set up your light source.

► *Procedure*

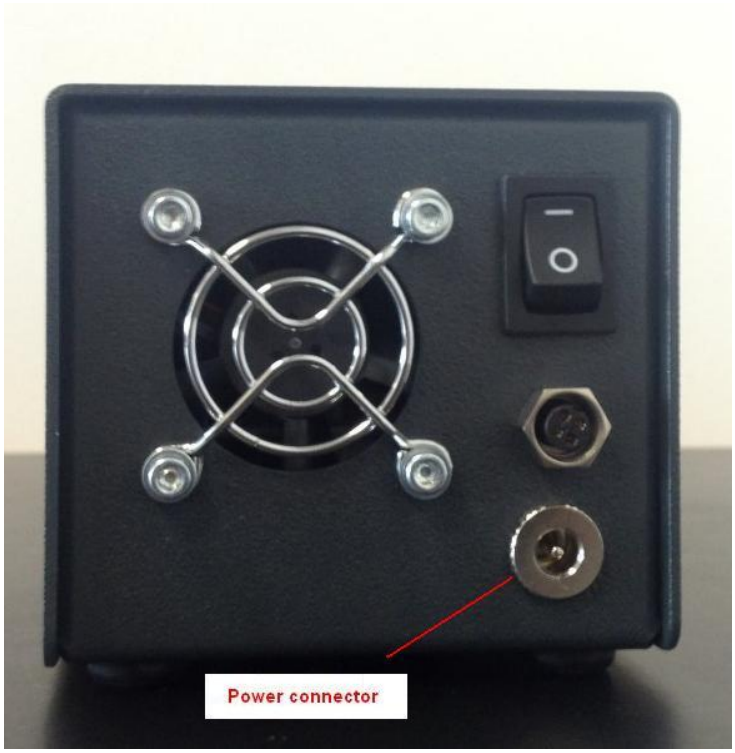
Perform the steps below to set up your DH-mini Light Source:

1. Plug the power supply into a wall outlet.



Power Supply

2. Plug the other end of the power supply cable into the socket on the rear panel of the DH-mini.



DH-mini Rear View

3. Connect the SMA connector of your fiber optic cable to the SMA plug on the front of the light source.

Note

For UV measurements, a solar-resistant fiber is recommended.

Chapter 2

Operation

Overview

The DH-mini Light Source includes both a deuterium and a halogen bulb for UV-VIS-NIR measurements. There are two ways to control the DH-mini: using the push buttons on the front panel or the TTL inputs on the rear panel. After power-on the Power LED will glow and the device will be in TTL control mode which is highlighted by the yellow TTL/ Manual LED.

Operating Modes

To toggle between Manual Mode and TTL Mode you have to push the TTL/Manual button on the front panel. The corresponding yellow LED next to the button toggles on and off with each push. A lit LED indicates TTL Mode. If the LED is off, the device is in Manual Mode.

- Manual mode – operates with the pushbuttons on the front panel
- TTL mode – operates with the TTL inputs on the rear panel.

Manual Mode

In this mode you can switch the bulbs and the shutter via the corresponding push buttons.

Control	Action
Deuterium	Press button to turn Deuterium bulb on. The LED lights. Observe the warm-up time of 6 minutes to ensure that the light source has reached a stable operating state before taking measurements. Press button again to turn the Deuterium bulb off. The LED extinguishes.
Halogen	Press button to turn Halogen bulb on. The LED lights. Observe the warm-up time of 6 minutes to ensure that the light source has reached a stable operating state before taking measurements. Press button again to turn the Halogen bulb off. The LED extinguishes.
Shutter	Press button to open shutter. The LED lights. Press button again to close the shutter. The LED extinguishes.
TTL/Manual	Press button to switch from Manual mode to TTL mode. The LED lights. See *TTL Mode*. Press button again to switch from TTL mode to Manual mode. The LED extinguishes.

TTL Mode

The DH-mini always starts up in TTL mode. You can also switch to TTL mode by pressing the TTL/Manual button (yellow LED is lit) if the light source is in Manual mode. The bulbs and the shutter assume the state of the corresponding TTL signal when the light source is in TTL mode.

Note

If there are no signals connected to the logic ports o rear of the device, the device reads a low signal (Deuterium bulb off, Halogen bulb off and shutter closed).

The pinout of the TTL connector is as follows:

Pin #	Function
1	Deuterium control (5 V bulb on)
2	Halogen control (5 V bulb on)
3	Shutter control (5V shutter open)
4	GND

There is a TTL adapter cable available to directly attach the DH-mini on an Ocean Optics spectrometer using a HR4-CBL-DB15 cable. The pinout on the male Sub-D-15 connector is as follows:

Pin #	Function
1	NC
2	NC
3	NC
4	NC
5	NC

Pin #	Function
6	Halogen control (5 V bulb on)
7	NC
8	NC
9	NC
10	GND
11	NC
12	NC
13	Shutter control (5 V shutter open)
14	NC
15	Deuterium control (5 V bulb on)

If you want to use OceanView to control the DH-mini via a spectrometer you can use the Strobe/Lamp Enable check box to control the shutter. See *Attaching to Ocean Optics Spectrometers* for more pinout information.

Change Intensity of Halogen Bulb

To change the intensity of the Halogen bulb, use trimmer screw on the left side of the device. Use a flathead screwdriver to turn the screw clockwise to increase the intensity, counterclockwise to decrease it. The full range can be set with approximately 30 screw rotations.

Appendix A

Specifications

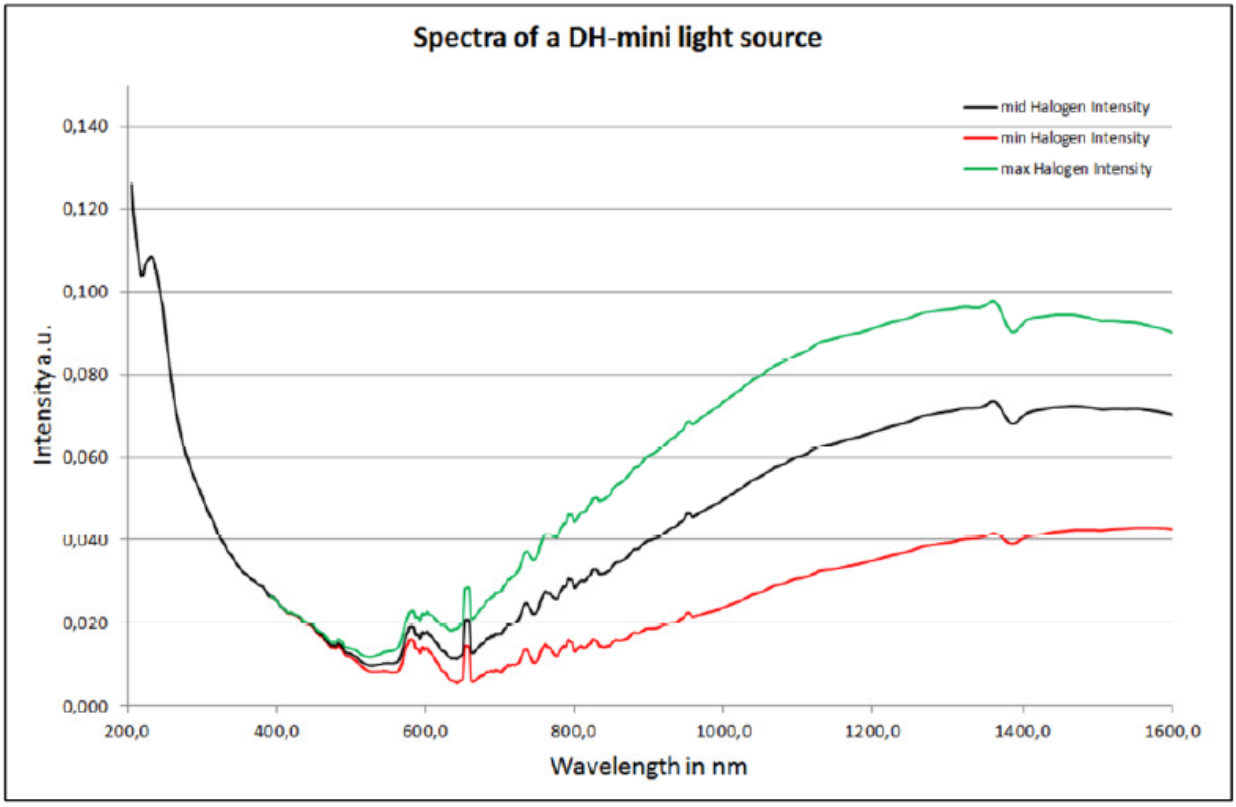
This section provides information on the operating environment, physical controls, and dimensions of the DH-mini Light Source. It also provides a parts list.

Specifications

Specification	Value
Spectral range	200 – 2500 nm
Light Output Stability Drift	 <0.2% (standard deviation for k = 1) <0.1% per hour (after 30 minutes stabilization)
Warm-up time	6 minutes at 20 °C
Power consumption	12 W
Optical fiber connection	SMA 905
Shutter input	TTL input, up to 2.5 Hz maximum
Pin position at SUB-D-15 pin adapter (all pins are galvanically isolated)	Shutter: Pin 13 Deuterium bulb: Pin 15 Halogen bulb: Pin 6 GND: Pin 10
Lifetime average/guaranteed	2000 hours/ 1000 hours
Input line	12 Vdc @ 1 A max
Dimensions	75 mm x 82 mm x 175 mm (2.95 in. x 3.23 in. x 6.89 in.)
Weight	0.5 kg (1.1 pounds)
Ambient operating temperature	5 – 35 °C
Relative humidity	Maximum 90%, noncondensing

Spectral Output

The following graph shows spectral outputs of a DH-mini recorded with three spectrometers. All spectrometers have measured irradiance spectra. The balance from the Deuterium spectrum (~200 – 400nm) to the Halogen spectrum (~400 – 1600 nm) can be changed by varying the intensity of the Halogen bulb (see *Change Intensity of Halogen Bulb*).



Parts List

Spare Parts / Order Information	Catalog Number
DH-mini UV-VIS-NIR Light Source	DH-mini
DH-mini Replacement bulb	DH-mini-B

Appendix B

Bulb Replacement

Overview

If the lifetime of either the Deuterium bulb or the Halogen bulb is reached or if one bulb is broken you can replace the bulbs. Both bulbs are arranged in one housing so the bulbs cannot be changed separately. To order replacement bulbs for the DH-mini, see *Spectral Output*.

Replacing the Bulb

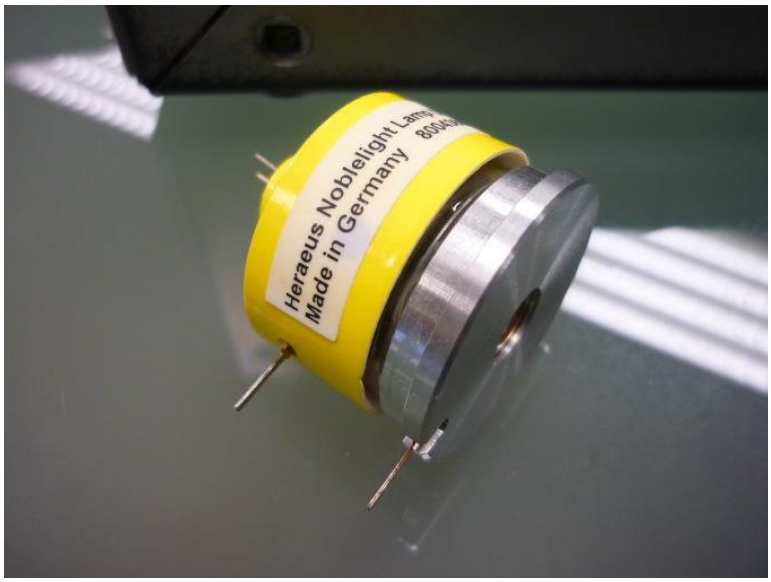
► ***Procedure***

To replace the bulbs,

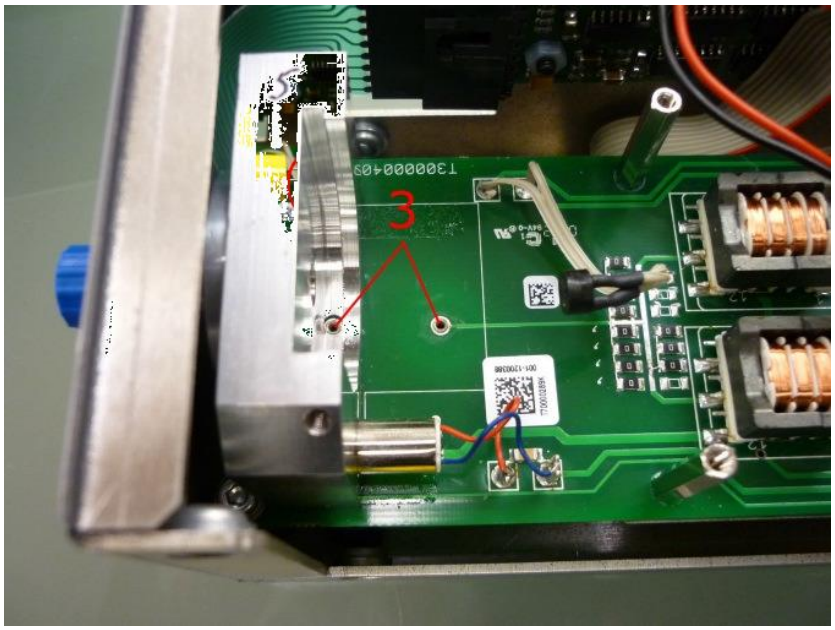
1. Remove all eight countersunk screws on each side of the light source housing with the provided Hexagonal socket screw key SW 2.0.

2. Lift the housing off of the light source.
3. To remove the bulb, disconnect the cable at the rear side of the lamp first (1). Then use the provided Hexagonal socket screw key SW 1.5 to loosen the stud screw (2).

4. Pull the bulb from the light source.



5. Insert a new bulb. Be careful to correctly align it with the connection holes on the PCB (3).



6. Replug the cable connection for the Halogen bulb on the rear side of the replacement bulb. The polarity of the connector doesn't matter.
7. Replace the housing and secure the housing with the eight screws.

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