D_2H and D_2H-2

Deuterium-Halogen Light Sources

INSTRUCTION MANUAL

Serial No._____

053101

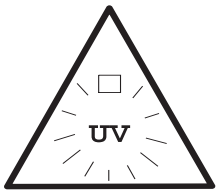
World Precision Instruments

D_2H and D_2H-2 Deuterium-Halogen Light Sources

Contents

General Warnings and Cautions

Read this manual before you attempt to use this instrument.



WARNING: PROTECTIVE EYE WEAR MUST BE WORN WHEN USING THIS INSTRUMENT — INTENSE ULTRAVIOLET RADIATION PRESENT.

USE EYE WEAR

Do not remove any safety device installed. This will void your warranty and create an unsafe operating condition.

WARNING: Dangerous voltages present. No serviceable parts inside unit. Instrument should be serviced by qualified service personal.

WARNING:

- All warnings on the unit and in the operating instructions should be adhered to.
- All the safety and operating instructions should be read before the unit is operated.
- Before using the instrument for the first time, check for transport damage.

Introduction

The **D_2H** is a combined deuterium and halogen light source for UV/VIS and NIR applications. This light source is ideally suited to work with WPI's spectrometer modules and sample cells. It supplies a continuous spectrum in the UV, VIS and NIR range. The **D_2H** is equipped with an integrated electrical shutter, which can be controlled by a switch or a TTL signal. Two models are available: the **D_2H** covering a spectral range of 215 nm to 1700 nm, and the **D_2H-2** covering a spectral range of 190 nm to 1700 nm for deep UV applications.

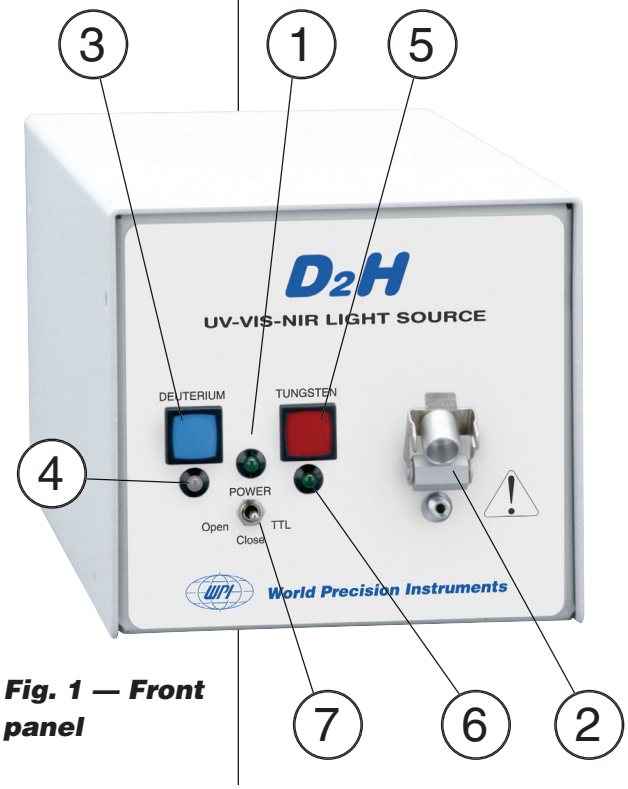


Fig. 1 — Front panel

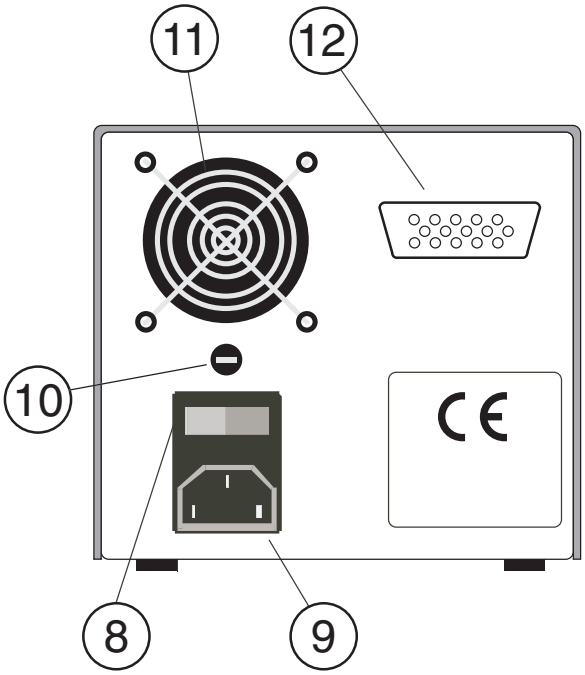


Fig. 2 — Rear panel.

Instrument Description

Front Panel (Fig.1)

① **Power On Light**

② **Mechanical Protector/SMA- Fiber-optic Connector**

The mechanical protector is a safety aide to prevent the user from unintentionally looking directly into the fiber-optic connector. The connector is for use only with SMA fiber-optic connectors.

③ **Deuterium Start/Stop**

By pressing the button ③, the Deuterium lamp will preheat. After a warm-up time of 20 sec. the Deuterium lamp will ignite automatically.

By pressing the button ③ again, the Deuterium lamp switches off.

④ **Two Color-LED Indicator for the Deuterium Lamp**

After successful ignition of the Deuterium lamp, the Two-Color-LED ④ lights up green and indicates that the Deuterium lamp is in operation. Should the Deuterium lamp not ignite, the Two Color-LED ④ lights up red. This indicates a malfunction of the lamp.

⑤ **Tungsten (Halogen) Start/Stop**

By pressing the button ⑤, the tungsten (halogen) lamp switches on.

By pressing the button ⑤ again, the tungsten (halogen) lamp switches off.

⑥ **LED Indicator for the Tungsten (Halogen) Lamp**

When lit, the LED ⑥ indicates the lamp is in operating mode.

⑦ **3-Way Toggle Switch**

With the toggle switch ⑦ to the right, the **TTL** mode is active, *i.e.* the shutter will be controlled by the computer. In the middle position, the shutter is **closed**. With switch to the left, the shutter is **open**.

Set-up

Rear Panel (Fig. 2)

⑧ Power Switch ON/OFF

When the power switch is turned ON, power is supplied to the unit. The unit automatically switches to the basic operating mode. The LED ① indicator is lighted up at this time.

⑨ Input Terminal for Power Cord

Input voltages AC 230...240V, 50/60 Hz (Version EUROPE)

Input voltages AC 110...115V, 50/60 Hz (Version USA)

⑩ Fuse

This compartment contains the fuse to protect the unit against overload.

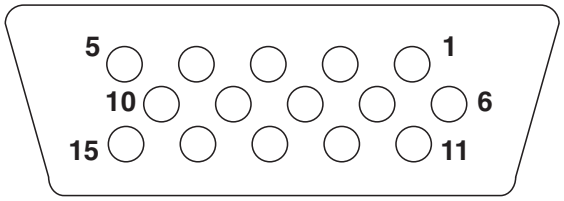
⑪ Cooling Fan

⑫ TTL Connection

Cable connection permits external control of the lamp shutter (HIGH=OPEN, LOW=CLOSED, TTL input max. 5 Hz).

Pin 10 Ground

Pin 13 TTL



Parts List:

1 - D_2H or D_2H-2 Deuterium-Halogen light source
1 - Power cord
1 - This manual
1 - UV Goggles

Unpacking

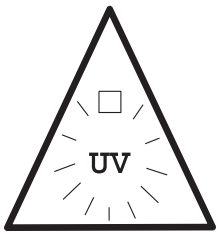
Warning: *In case of damage DO NOT USE THIS INSTRUMENT!*

Upon receipt of this instrument, make a thorough inspection of the contents and check for possible damage. Missing cartons or obvious damage to cartons should be noted on the delivery receipt before signing. Concealed loss or damage should be reported at once to the carrier and an inspection requested. Please read the section entitled “Claims and Returns” on the Warranty page of this manual.

Unpack your new power supply / deuterium lamp assembly carefully. Although the deuterium lamp is rigidly mounted, dropping this instrument can cause permanent damage.

Returns: Do not return any goods to WPI without obtaining prior approval and instructions from our Service Department. Goods returned (unauthorized) by collect freight may be refused. If a return shipment is necessary, use the original container. If the original container is not available, use a suitable substitute that is rigid and of adequate size. Wrap the instrument in paper or plastic surrounded with at least 100 mm (four inches) of shock absorbing material. Please read the section entitled “Claims and Returns” on the Warranty page of this manual.

Operating Instructions



WARNING:

This lamp produces ultraviolet radiation which can be harmful to the eyes. DO NOT LOOK INTO THE LIGHT BEAM. THIS CAN CAUSE PERMANENT EYE DAMAGE — WEAR PROTECTIVE EYE WEAR. This unit is supplied with a mechanical safety device — do not remove this safety device!

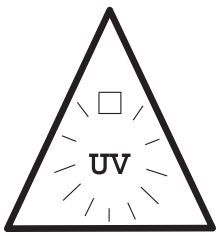
Operating Conditions

CAUTION: The unit must work in a horizontal position.

- Use this instrument in a ***clean laboratory environment.***
- **Moisture:** The unit is designed for operation only in rooms with average or below average humidity.
- **Ventilation:** The unit should be situated so that its location or position does not interfere with its proper ventilation. Do not obstruct cooling fan openings.
- **Heat:** The unit should be situated away from radiators, ovens or other heat sources.
- **Power sources:** The unit should be connected to a power supply only of the type described in the operating instructions or as marked on the unit.
- **Object and liquid entry:** Care should be taken that objects do not fall, or liquids spill, into the instrument through any of its openings.

1. Power on

After connecting the power supply to line voltage, turn on the power switch (8). The LED (1) indicates power on status.



2. Connect the fiber optic cable connector to the D_2H unit (2) (Fig. 3).

WARNING: Do NOT look into the fiber-optic connector. This lamp produces ultra violet radiation, which can be harmful to the eyes. **Connect your fiber-optic cable first before starting the deuterium lamp** (see side view of unit — Fig. 3). **Avoid direct radiation of skin and eyes at the fiber output end.**

3. TTL 3-way toggle switch (7)

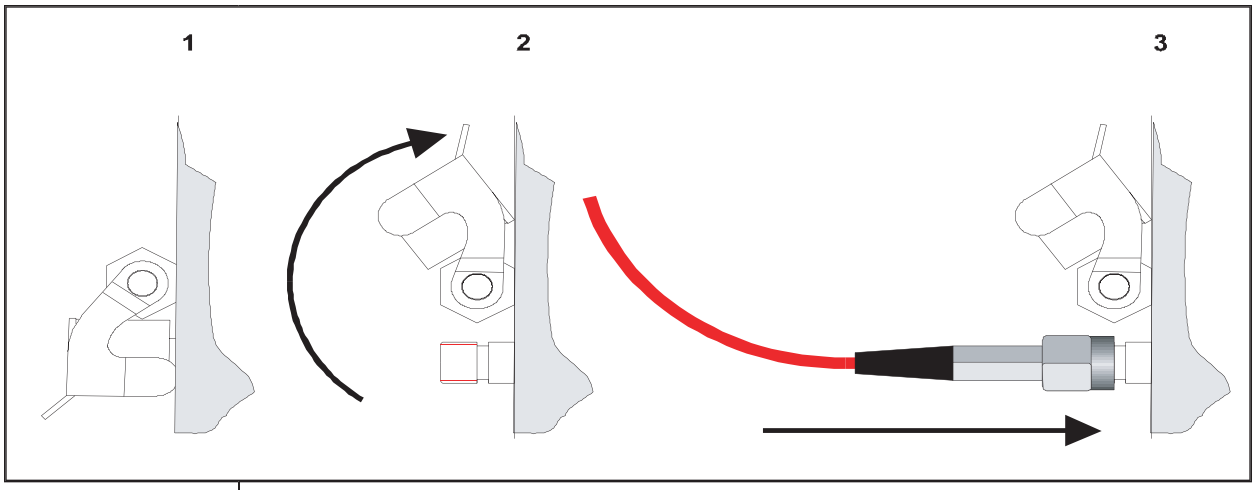


Fig. 3 — Connecting the fiber optic cable.

For automatic operation, connect your TTL control cable to the DB15 connector (cable not provided). See (12) on page 4 for details. If assistance is needed in identifying an appropriate cable, please contact Technical Support at WPI.

With the toggle switch (7) to the right, the **TTL** mode is active, *i.e.* the shutter will be controlled by the computer. In the middle position, the shutter is **closed**. With switch to the left, the shutter is **open**.

4. Turn on the deuterium lamp

By pressing the button (3), the deuterium lamp will preheat. After a warm-up time of 20 seconds, the deuterium lamp will ignite automatically. After successful ignition, the Two-Color-LED (4) lights up green and indicates that the deuterium lamp is in operation. Should the deuterium lamp not ignite, the Two-Color-LED (4) lights up red. This indicates a malfunction of the lamp. (See Troubleshooting). Press the button (3) again to reset the red LED.

The deuterium lamp can be switched off by pressing the button again.

5. Deuterium lamp warm-up

The Deuterium-Lamp typically needs 30 minutes to reach a thermal equilibrium. During this time the intensity of the UV-output varies. If applications require extreme intensity stability, the lamp should be warmed-up for an additional 15-30 min. After that time, the lamp will reach the specified drift values.

6. Turn on the tungsten (halogen) lamp

By pressing the button (5) the tungsten (halogen) lamp is switched on. The LED (6) lights up and indicates that the halogen lamp is in operation. Should the LED (6) not light up, this indicates a malfunction of the internal power supply. (See Troubleshooting).

The halogen lamp can be switched off by pressing the tungsten (halogen) button (5).

7. Tungsten (halogen) lamp warm-up

The halogen lamp needs 5 to 10 minutes to reach a thermal equilibrium. During this time the intensity of the output varies. If applications require extreme intensity stability, the lamp should be warmed-up for an additional 15 min. After that time, the lamp will reach the specified drift values.

Instrument Maintenance

Replacement of deuterium lamp

Warning: Disconnect the unit from mains connections (9)!

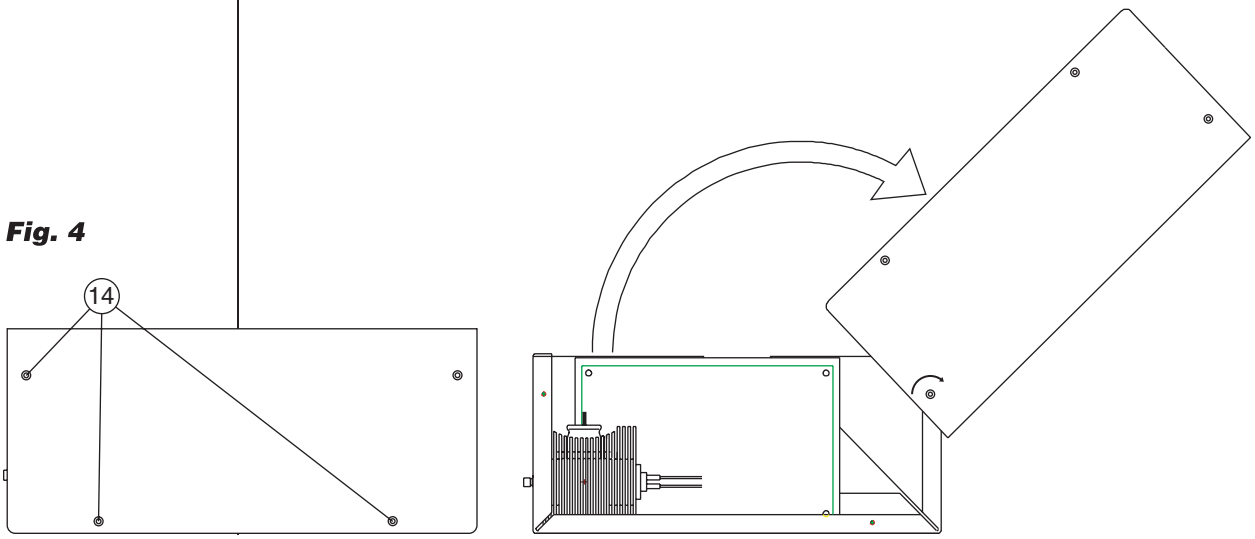
Warning: Connection of the power cord to the deuterium lamp MUST only be done when the power switch (8) is turned OFF. As the output of the power supply is not galvanically separated from the line voltage, the connecting lead for the Deuterium lamp can carry a voltage > 42 V when the power switch is turned ON.

Warning: During operation the lamp envelope reaches a temperature of approx. 250° C. Should you intend to change the lamp, please wait for at least 20 minutes for the lamp to cool before touching it. The lamp envelope (quartz glass) should not be touched with bare fingers, as this will decrease the lifetime of the lamp.

Warning: Use only the originally supplied deuterium lamp connection plugs (17).

1. Open the unit: remove the six slotted screws (14) and open the casing cover (Fig. 4).

Fig. 4



2. Remove screws (15) using the tool (18) provided with the spare bulb (16) (Fig. 5).

3. Disconnect and remove the defective deuterium lamp module.

4. Put in the new deuterium lamp module and reconnect the lamp plug.

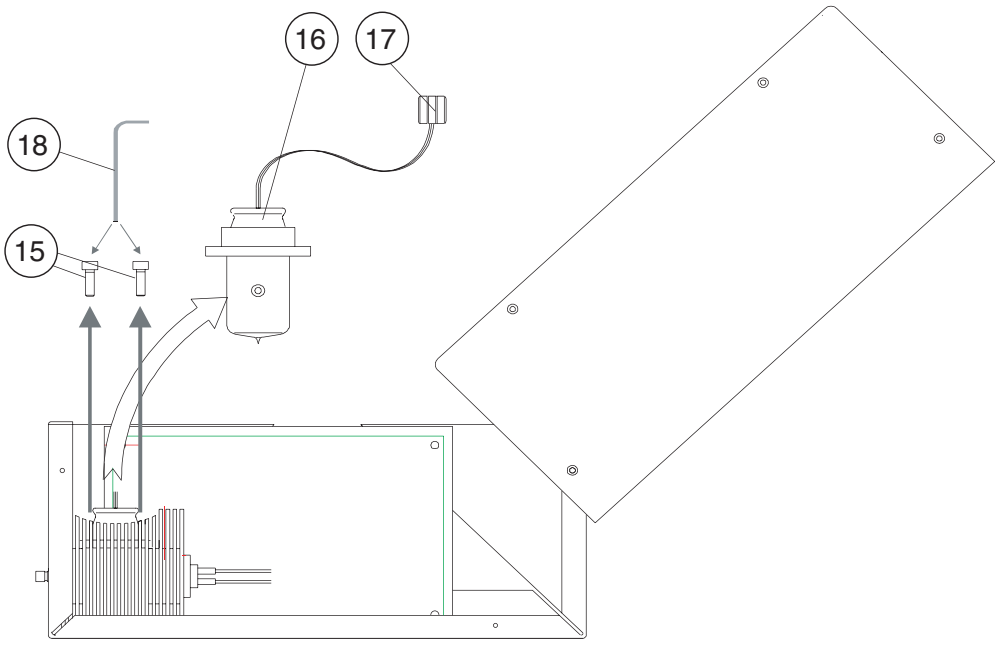


Fig. 5

Replacement of tungsten (halogen) lamp

Warning: Disconnect the unit from mains connections (9)!

Warning: Connection of the power cord to the deuterium Lamp MUST only be done when the power switch (8) is turned OFF.

Warning: During operation the lamp envelope reaches a temperature of approximately 250°C. Should you intend to change the lamp, please wait for at least 20 minutes for the lamp to cool before touching it. The lamp envelope (quartz glass) should not be touched with bare fingers, as this will decrease the lifetime of the lamp.

Warning: Use only the originally supplied halogen lamp connection plugs (18).

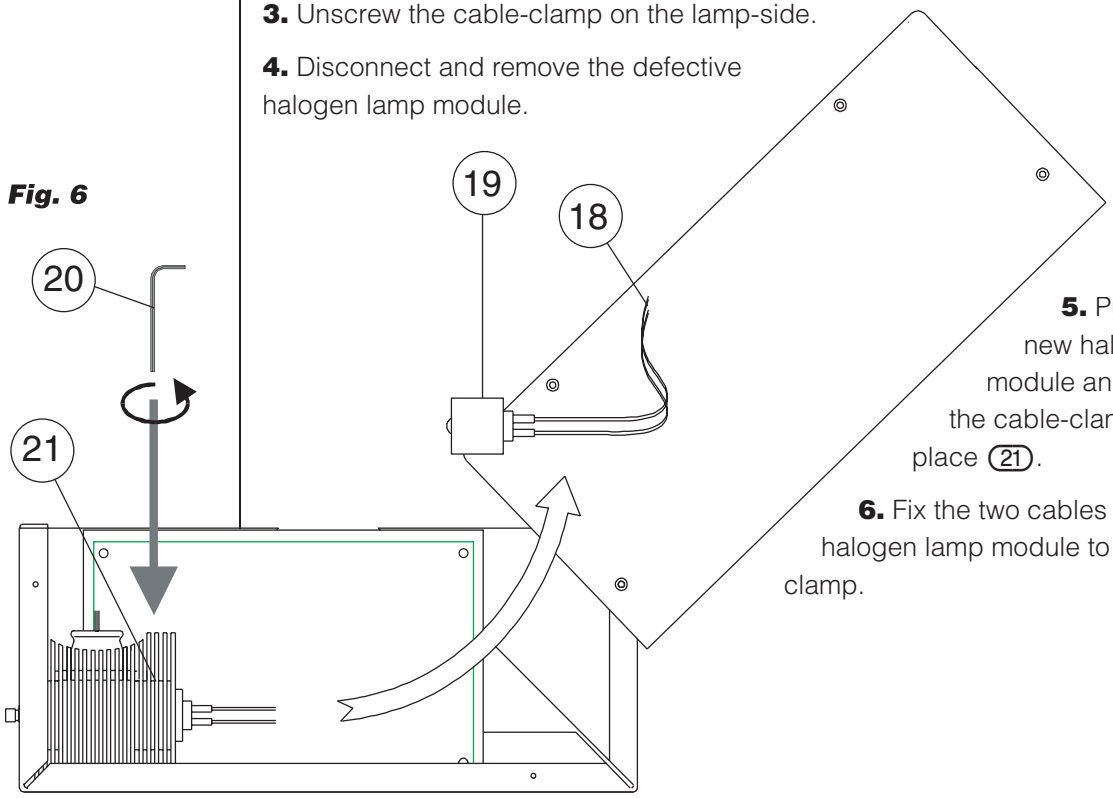
1. Open the unit: remove the six slotted screws (14) and open the casing cover (Fig. 4).

2. Remove the screw (21) using the tool (20) that is provided with the spare bulb (19) (Fig. 6).

3. Unscrew the cable-clamp on the lamp-side.

4. Disconnect and remove the defective halogen lamp module.

Fig. 6



5. Put in the new halogen lamp module and screw the cable-clamp back in place (21).

6. Fix the two cables of the halogen lamp module to the cable-clamp.

Replacement Parts

D2H-HB	Halogen replacement lamp
D2H-DB	Deuterium replacement lamp (>215 nm)
D2H-HBER	Deuterium replacement lamp (>190 nm)
13410	UV Safety Goggles

Troubleshooting

Deuterium Lamp: If the power supply or lamp does not seem to function properly, check the following:

FAULT	POSSIBLE CAUSE	REMEDY
Power switch on, however none of the LED's light	Line power not present	Check line voltage
	Fuse (10) defective	Check fuse
Deuterium Lamp does not ignite. The Two-Color-LED (4) lights up red (ERROR)	Deuterium Lamp too hot	Allow Deuterium Lamp to cool down. Press button (3) again to reset the Deuterium lamp, then press the (3) button to restart.
	Lifetime of Deuterium Lamp is over	Replace Deuterium Lamp
	Deuterium Lamp internal connection plug is not connected correctly	Open Unit (See Replacement of Deuterium Lamp) and check connector plug
Deuterium Lamp extinguishes during operation	When this fault appears always switch off the power (Power Switch (8) OFF) and then - after cool down - restart	

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

FAULT	POSSIBLE CAUSE	REMEDY
Halogen lamp does not work after pressing tungsten (halogen) button (5)	Deuterium lamp is preheating	Wait until the deuterium lamp has ignited and try again
	Halogen lamp is defective	Replace halogen lamp
	The two-color-LED (4) lights up red (deuterium lamp error)	Press button (3) to reset the deuterium lamp, then press the button (5) to restart halogen lamp.
LED (6) does not light up after switching on (10) Halogen lamp	Internal Power Supply is defective	Disconnect the unit from mains power and contact Technical Support at WPI.

Specifications

	Deuterium Light Source	Halogen Light Source
Wavelength Range	215 - 400 nm (**D_2H**) 190 - 400 nm (**D_2H-2**)	360 - 1100 nm
Current- Voltage- Stability	< $5x10^{-6}$ p-p (0.1-10Hz)	<0.4% of voltage
Current- Voltage- Drift	0.01 % / h	-
Warm-up time	30 min	20 min
Lamp Voltage/Current	Ignition 580 V / Operating 85 V / 0.3A	12V DC / 1.67A
Lamp Lifetime	1000 hours	900 hours
Power Consumption Internal	78 W / 0.35A max.	20 W / 1.64A
Driving Voltage Internal	84. . . 264 V 50/60 Hz	12VDC / 8A
Performance Guaranteed Temp	5°C - 35°C	
Humidity	5 - 95% without condensation at 40°C	
Total / Maximal Power	100 W /190 W (heating D-Lamp for 20 sec)	
Power Requirements		
European Version	230...240 V 50/60Hz	
US Version	110...115V 50/60Hz	
Shutter - Input	TTL-Input, max. 5Hz	
Fuses		
European Version	Miniature fuse 5 x 20 mm, 1 Amp slow blow	
US Version	Miniature fuse 5 x 20 mm, 2,5 Amp slow blow	
Markings, Directives	CE; VDI/VDE 0160; EN61010	
Weight	≈ 6 kg (13 lb)	

Warranty

WPI (World Precision Instruments, Inc.) warrants to the original purchaser that this equipment, including its components and parts, shall be free from defects in material and workmanship for a period of one year* from the date of receipt. WPI's obligation under this warranty shall be limited to repair or replacement, at WPI's option, of the equipment or defective components or parts upon receipt thereof f.o.b. WPI, Sarasota, Florida U.S.A. Return of a repaired instrument shall be f.o.b. Sarasota.

The above warranty is contingent upon normal usage and does not cover products which have been modified without WPI's approval or which have been subjected to unusual physical or electrical stress or on which the original identification marks have been removed or altered. The above warranty will not apply if adjustment, repair or parts replacement is required because of accident, neglect, misuse, failure of electric power, air conditioning, humidity control, or causes other than normal and ordinary usage.

To the extent that any of its equipment is furnished by a manufacturer other than WPI, the foregoing warranty shall be applicable only to the extent of the warranty furnished by such other manufacturer. This warranty will not apply to appearance terms, such as knobs, handles, dials or the like.

WPI makes no warranty of any kind, express or implied or statutory, including without limitation any warranties of merchantability and/or fitness for a particular purpose. WPI shall not be liable for any damages, whether direct, indirect, special or consequential arising from a failure of this product to operate in the manner desired by the user. WPI shall not be liable for any damage to data or property that may be caused directly or indirectly by use of this product.

Claims and Returns

• Inspect all shipments upon receipt. Missing cartons or obvious damage to cartons should be noted on the delivery receipt before signing. Concealed loss or damage should be reported at once to the carrier and an inspection requested. All claims for shortage or damage must be made within 10 days after receipt of shipment. Claims for lost shipments must be made within 30 days of invoice or other notification of shipment. Please save damaged or pilfered cartons until claim settles. In some instances, photographic documentation may be required. Some items are time sensitive; WPI assumes no extended warranty or any liability for use beyond the date specified on the container.

• WPI cannot be held responsible for items damaged in shipment en route to us. Please enclose merchandise in its original shipping container to avoid damage from handling. We recommend that you insure merchandise when shipping. The customer is responsible for paying shipping expenses including adequate insurance on all items returned.

• Do not return any goods to WPI without obtaining prior approval and instructions (RMA#) from our returns department. Goods returned unauthorized or by collect freight may be refused. The RMA# must be clearly displayed on the outside of the box, or the package will not be accepted. Please contact the RMA department for a request form.

• Goods returned for repair must be reasonably clean and free of hazardous materials.

• A handling fee is charged for goods returned for exchange or credit. This fee may add up to 25% of the sale price depending on the condition of the item. Goods ordered in error are also subject to the handling fee.

• Equipment which was built as a special order cannot be returned.

• Always refer to the RMA# when contacting WPI to obtain a status of your returned item.

• For any other issues regarding a claim or return, please contact the RMA department

Warning: This equipment is not designed or intended for use on humans.

** Electrodes, batteries and other consumable parts are warranted for 30 days only from the date on which the customer receives these items.*

World Precision Instruments, Inc.

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