



D4H

Deuterium/Halogen Fiber Light Source

www.wpiinc.com

INSTRUCTION MANUAL

Serial No. _____

050411

World Precision Instruments

INSTRUCTION MANUAL
High Power UV-VIS
Fiber Light Source
L10290

- Read this instruction manual carefully before attempting to operate or service this product.
- Do not attempt to operate or service this product until you completely understand the contents of this instruction manual.
- Attempting to operate this product by methods different from those described in this instruction manual may cause serious accidents.
- Those responsible for this product must not allow personnel to operate or service it unless they thoroughly understand this instruction manual.
- Keep this instruction manual near the product for easy reference when needed.
- If this instruction manual is lost or damaged, promptly order a replacement copy from our company or sales office.
- If transferring this product to another party, make sure that this instruction manual is included along with the product.

HAMAMATSU

HAMAMATSU PHOTONICS K.K.
Electron Tube Division

@O1-0046-3

Third edition, Oct 2008

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The contents of this manual are subject to change without prior notice.
No part of this manual may be reproduced or copied without permission of Hamamatsu Photonics.
If any of the following problems are found, please contact our sales office so we can quickly take corrective measures.

- When omissions, errors or dubious points are found in the text
- When problems such as the wrong page order or missing pages are found
- When this manual was lost, soiled or damaged

Warranty

Thank you for purchasing this light source. This product is warranted under the following conditions.

(1) Warranty period

This product is warranted for a period of one year from the date of delivery.

(2) Warranty description

If any failure or defect is found in the workmanship or materials used for this product within this warranty period, Hamamatsu will repair or replace the defective parts free of charge. The warranty is limited to repair or replacement of defective parts

(3) Exception to warranty

The warranty shall not apply to failure in the following cases.

- (1) Failure or trouble was caused by misoperation, mishandling or dropping due to not following the instructions and precautions described in this manual.
- (2) Failure or trouble was caused by electrical or mechanical modifications, repair or disassembly not approved by Hamamatsu Photonics or our sales representatives.
- (3) Failure or trouble was not caused by this product but by other equipment.
- (4) Failure or trouble was caused by accidents such as natural or man-made disasters.
- (5) Manufacturer warranty period has expired for components with a specified operating life.

(4) Disposal

When disposing of this product, take appropriate measures in compliance with applicable regulations regarding waste disposal and correctly dispose of it yourself, or entrust proper disposal to a licensed industrial waste disposal company. In any case, be sure to comply with the regulations in your country or state to ensure correct disposal.

Safety precautions

This light source is an IEC Safety Class I product (with a protective grounding terminal). To use this product safely and correctly, be sure to read this instruction manual carefully and follow the safety precautions. Using this product in a way not specified in this manual may impair the protective function of this product. Failure or problems caused by failing to observe the precautions will not be covered by our warranty.

Warning symbol and signal words

Warning symbols and signal words used in this manual are classified as explained below. Make sure that you fully understand their meaning and comply with the instructions.



When you see this warning symbol in this manual, be alert to the possibility that incorrect handling may cause serious bodily injury or damage this product.



WARNING

"WARNING" indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

"CAUTION" indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury or damage to the equipment.



NOTE

Explains key points to enhance work efficiency and helps you understand the descriptions in this manual.

● This product uses the following symbol marks.



"Warning Label" - This label is affixed to the product to indicate a position where you must refer to the instruction manual for correct handling.



AC (alternating current)



Protective grounding terminal



ON (power)



OFF (power)

 **CAUTION**

● **General precautions**

- Fully implement necessary safety measures to prevent possible damage that may occur if this product malfunctions.
- If this product is used outside its rated specifications or modified, we will not guarantee the product functions and performance.
- When this product is used in combination with other equipment, the functions and performance might be unsatisfactory, depending on the operating conditions and environment. In such cases, take the surrounding system into account.
- Do not allow abrupt temperature changes including in peripheral units. Moisture condensation might occur.

 **WARNING**  **CAUTION**

● **About the using**

- Never disassemble or modify any part of this product. Disassembly or modifications may cause abnormal operation, resulting in malfunction, breakdown, fire or electrical shock.
- Excessive vibration and shock may damage this product or make internal adjustment unreliable causing malfunction, breakdown, fire or electrical shock.
- Install this product so that the warning label affixed to this product can be easily seen during operation. If the label peels off or becomes dirty or illegible, replace it with a new label. For a new warning label (available at an extra cost), please contact our sales office or sales representative.

● **Usage environments and conditions**

- To use this product correctly and safely, avoid installing it in the following locations. Fire, electrical shock or malfunction may otherwise occur.
 - Locations with poor ventilation, high temperature, high humidity or excessive dust.
 - Locations subject to direct vibrations or impacts.

● **If an accident or abnormality occurs**

- If any of the following accidents or abnormalities occurs, immediately disconnect the electrical connection to this product. Continuous operation under such abnormal conditions may lead to fire, electrical shock or malfunction.
- Consult our sales office when repair is needed.
 - When water or foreign matter enters this product.
 - When this product was dropped.
 - When smoke or unusual odor is emitted from this product

1. Overview

1.1 Checking the package contents

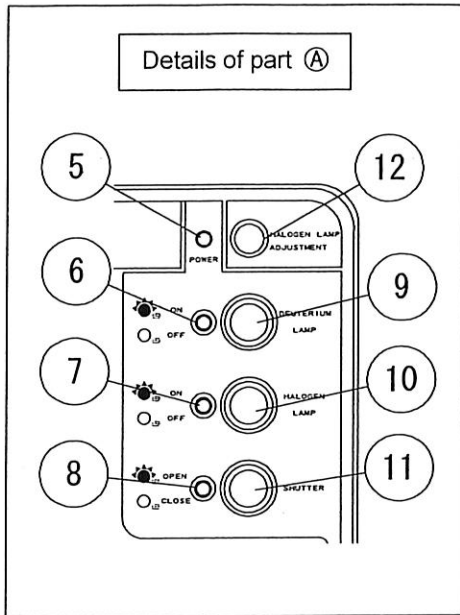
This product comes with the following items. After unpacking, first check that all items are included.

- L10290 (main unit) 1
- L10295 (deuterium lamp) 1
- Instruction manual (this manual) 1
- AC cable 1
- Spare fuse 1 (located in AC power inlet)

We carefully check and pack each item before shipping. However, if any item is damaged or missing, please contact us as soon as possible.

1.2 Overview

This product is a UV-visible fiber light source that incorporates a deuterium lamp (hereafter D2 lamp) and a halogen lamp. The optimum combination of the internal lamp housing and dedicated power supply allows light emission with high intensity and stability over extended periods of time. The internal optical system is also designed to efficiently guide the emitted light into an optical fiber.



- ⑤ **Power LED**
Lights up when the main power is turned on.
- ⑥ **D2 lamp LED**
Lights up when the D2 lamp turns on.
- ⑦ **Halogen lamp LED**
Lights up when the halogen lamp turns on.
- ⑧ **Shutter LED**
Lights up when the shutter is open.
- ⑨ **D2 lamp switch**
Use this switch to turn the D2 lamp on or off.
- ⑩ **Halogen lamp switch**
Use this switch to turn the halogen lamp on or off.
- ⑪ **Shutter switch**
Use this switch to open or close the shutter.
- ⑫ **Halogen lamp intensity adjustment trimmer**
Use this trimmer to adjust the halogen lamp intensity.

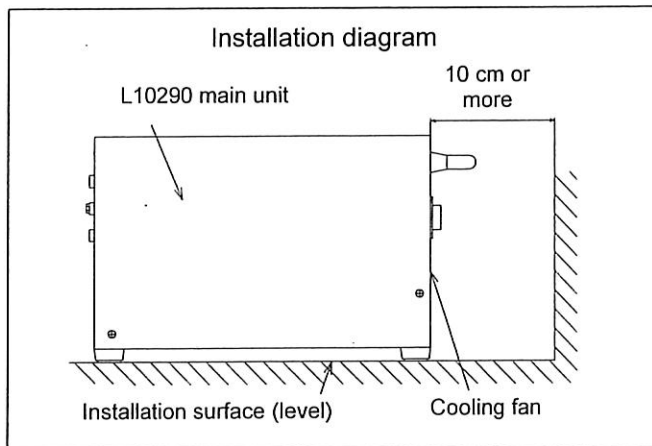
2. Setup

2.1 Installation



CAUTION

- Install this product in a stable location, with the rubber feet facing down. Avoid using this product in an unstable location or in a tilted position. Ignoring this instruction may cause abnormal operation.
- Do not install this product near devices that generate strong electromagnetic noise. Such noise may lower performance of this product and cause undesired operation of the lamps.
- Keep the ambient temperatures as constant as possible to minimize temperature fluctuations.
- Leave at least 10 cm around this product for ventilation.
- Do not block the holes on the bottom of this product.
- Avoid installing this product in locations where exhaust heat from the cooling fan remains around it. (See below for correct installation.)



2.2 Connection

When using this light source for the first time, the D2 lamp supplied with this light source must first be installed. Refer to page 11 for instructions of how to install the D2 lamp. The halogen lamp is already installed at the factory.

■Connecting the power cable



CAUTION

- Before connecting the power cable, always make sure the main power switch on the rear panel is off.
- Be sure to ground this product properly to ensure safe use.

■Connecting an optical fiber (sold separately)

Insert an optical fiber into the SMA connector (① on front panel) and securely tighten the screw on the optical fiber.

	Type No.	Core diameter (mm)	Connector	Length (m)	Allowable bending radius (mm)
Single-mode UV-resistant quartz fiber	A7969-06AS	0.6	SMA (both ends)	1	150
	A7969-08AS	0.8			200



CAUTION

- Do not touch the fiber end face with bare hands.
- Do not apply excessive shock such as drop impact to the optical fiber. Do not place any object on the optical fiber. Doing so may break the optical fiber.
- When bending the optical fiber during use or storage, always observe the allowable bending radius. Excessive bending may break the optical fiber.

■Installing a filter holder (sold separately)

A filter holder (type No. : A10394) can be installed into this light source. For the installation method, refer to the separate instruction manual that comes with the A10394 filter holder.

3. Operation

- (1) Make sure this light source is correctly installed and connected as explained in sections 2-1 and 2-2.
- (2) Turn on the main power switch (③ on rear panel).
- (3) Use the switches (⑨⑩⑪) on front panel) to operate the D2 lamp, halogen lamp and shutter.

■ D2 lamp

● To turn on:

- (1) Turn on the D2 lamp switch (⑨ on front panel).
- (2) Wait for about 25 seconds until the lamp's filament is preheated.
- (3) After about 25 seconds, the trigger voltage and anode current are supplied to the lamp and the lamp will light up.

● To turn off:

Turn off the D2 lamp switch (⑨ on front panel).

■ Halogen lamp

● To turn on:

Turn on the halogen lamp switch (⑩ on front panel).

● To turn off:

Turn off the halogen lamp switch (⑩ on front panel).

■ Shutter

Press the shutter switch (⑪ on front panel) to open or close the shutter.

■ Adjustment of halogen lamp light intensity

The halogen lamp intensity can be adjusted with the trimmer (⑫ on front panel) . Use a precision Phillips screwdriver to make adjustment. The light intensity can be adjusted within $\pm 20\%$ of the center value.

- To increase the light intensity, turn the trimmer clockwise.
- To reduce the light intensity, turn the trimmer counterclockwise.

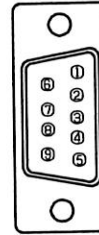


NOTE

- Avoid turning on and off each lamp at short intervals. Doing so may shorten the lamp's service life.
- The D2 lamp, halogen lamp and shutter operations can be checked by the LED indicators (⑥⑦⑧ on front panel).
- When you want to operate the D2 lamp, halogen lamp and shutter by external control, see section 4 (page 11).
- When you want to check the D2 lamp, halogen lamp and shutter operations externally, see section 4 (page 11).

4. External control

Use the external control connector (② on rear panel) to operate this light source by external control.



(Details of external control connector ②)

External control functions

Pin No.	Signal name	Description
①	D2 lamp ON/OFF	D2 lamp turns off when 5 Vdc is applied across pins ① and ⑨. D2 lamp turns on when pins ① and ⑨ are open (0 Vdc). *1
②	Halogen lamp ON/OFF	Halogen lamp turns off when 5 Vdc is applied across pins ② and ⑨. Halogen lamp turns on when pins ② and ⑨ are open (0 Vdc). *1
③	Shutter open/close	Shutter opens or closes each time 5 Vdc is applied across pins ③ and ⑨.
④	D2 lamp status signal	Pins ④ and ⑨ are shorted together when D2 lamp is on. Pins ④ and ⑨ are open when D2 lamp is off. The maximum voltage and current supplied across pins ④ and ⑨ are 50 V and 20 mA.
⑤	Halogen lamp status signal	Pins ⑤ and ⑨ are shorted together when halogen lamp is on. Pins ⑤ and ⑨ are open when halogen lamp is off. The maximum voltage and current supplied across pins ⑤ and ⑨ are 50 V and 20 mA.
⑥	Main power input status signal	Pins ⑥ and ⑨ are shorted together when main power input is on. Pins ⑥ and ⑨ are open when main power input is off. The maximum voltage and current supplied across pins ⑥ and ⑨ are 50 V and 20 mA.
⑦		N.C. (no connection)
⑧		N.C. (no connection)
⑨	GND	Signal input/output COM (common)

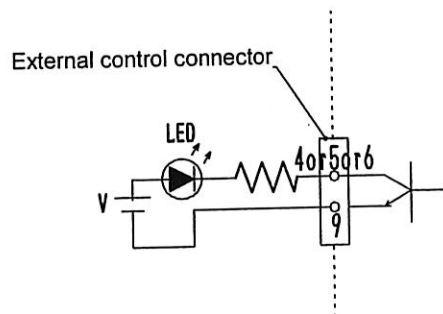
*1: The switch (⑨⑩ on front panel) of each lamp must be on to operate it by external control. External control is not possible if the lamp switch is off.



CAUTION

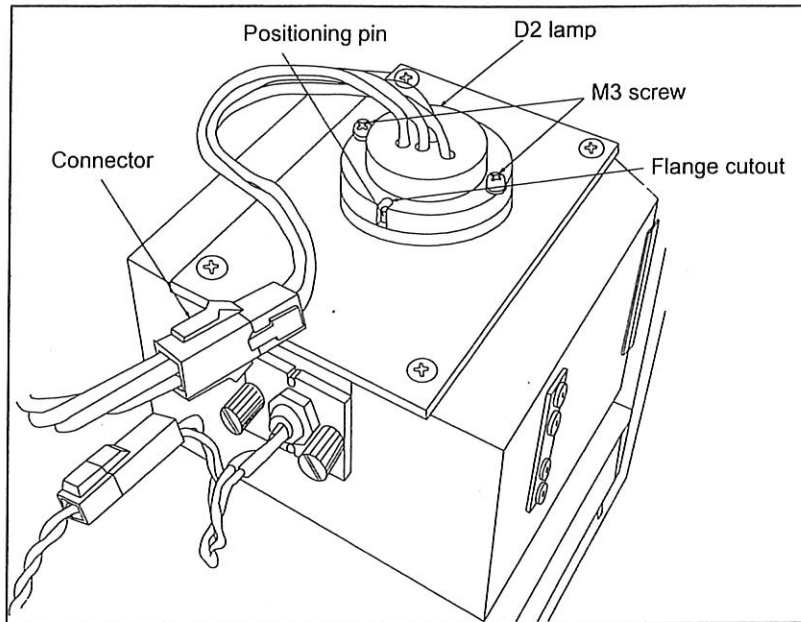
- The external control connector is a pin type connector (male). Use the following mating connector to make connection.
 - D-sub 9-pin female connector (socket contact)

Lamp status signal circuits (examples)



5. Replacing the lamp

5.1 Replacing the D2 lamp



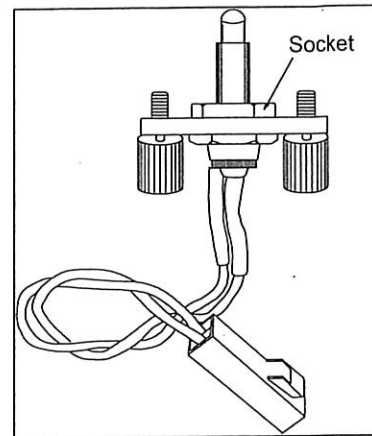
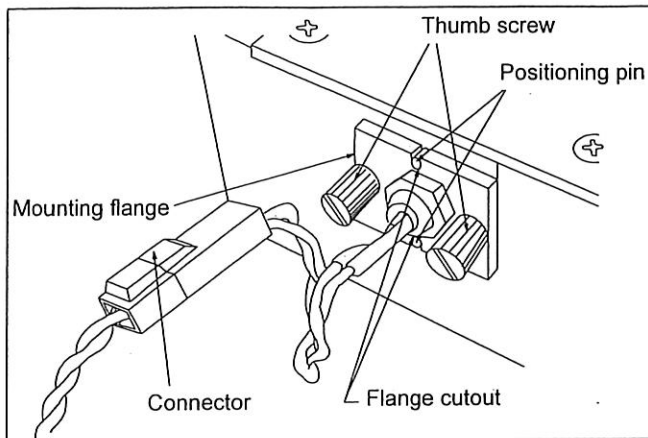
- (1) After making sure that the power cable is disconnected from the power outlet, remove the screws (6 places) holding the cover and remove the cover.
- (2) Unplug the connector and then remove the M3 screws holding the flange.
- (3) Pull straight up to remove the D2 lamp.
- (4) Insert the new D2 lamp into the lamp housing from the top and fit the lamp in place while aligning the flange cutout with the positioning pin. Then tighten the M3 screws to secure the lamp.
- (5) Reconnect the connector and reattach the cover.



CAUTION

- Always use the "L10295" D2 lamp as a replacement lamp for this light source.
- Do not touch the D2 lamp window (glass bulb) with bare hands. Operating the lamp with dirt or grime on the glass bulb can cause permanent prints or loss of transmittance, leading to a decrease in the radiated output intensity. If the glass bulb becomes dirty from contact with fingers or other objects, wipe the bulb off using gauze or absorbent cotton moistened with high-quality alcohol or acetone and tightly wrung out, before operating the lamp.
- After turning off the lamp, allow at least 30 minutes for the lamp to cool down before replacing it. The internal parts and lamp remain very hot for a while after being turned off.

5.2 Replacing the halogen lamp



- (1) After making sure that the power cable is disconnected from the power outlet, remove the screws (6 places) holding the cover and remove the cover.
- (2) Unplug the connector, loosen the thumb screws, and remove the mounting flange.
- (3) Remove the halogen lamp and then install the new halogen lamp into the socket securely, making sure there is no looseness.
- (4) Tighten the thumb screws securely while aligning the flange cutouts with the positioning pins.
- (5) Reconnect the connector and reattach the cover.



CAUTION

- Always use the "L10296" halogen lamp as a replacement lamp for this light source.
- Do not handle the halogen lamp with bare hands. Operating the lamp with dirt or grime on the lamp can cause loss of transmittance or shorten the lamp service life or damage the lamp.
- After turning off the lamp, allow at least 30 minutes for the lamp to cool down before replacing it. The internal parts and lamp remain very hot for a while after being turned off.
- Insert the halogen lamp all the way into the socket so that it fits in securely. Failure to do so may result in a reduction in the lamp service life.

6. Specifications

6.1 Product specifications

Input		
Voltage (AC)	100 V to 240 V	
Power consumption	140 VA or less	
Rated frequency	50 Hz / 60 Hz	
Light output		
Wavelength range	200 nm to 1100 nm	
Stability	0.004 %p-p Typ. * ¹	
Drift	± 0.3 %/h Typ. * ¹	
Guaranteed lamp service life	2000 h * ²	
Main unit		
Dimensions	Approx. 178 × 157 × 250 mm	
Weight	Approx. 4 kg	
Interface	ON-OFF control	<Lamp> Turns off when 5 Vdc is applied. 5 Vdc, 25 mAdc max.
		<Shutter> Opens or closes each time 5 Vdc is applied. 5 Vdc, 25 mAdc max.
	Status signal	Turns on when main power input is on or lamp turns on. 50 Vdc max., 20 mAdc max.
Ambient temperature and humidity		
Operation	Temperature	0°C to 40 °C
	Humidity	Below 80 % RH (no condensation)
Storage	Temperature	-10°C to 60 °C
	Humidity	Below 85 % RH (no condensation)
Others		
Location of use	Indoor	
Altitude of use	2000 meters or below	
Overvoltage category	II	
Pollution degree	2	
Applicable EMC standards	IEC 61326(Class A)	
Applicable safety standards	IEC 61010-1	

*1: Measured under our standard conditions.

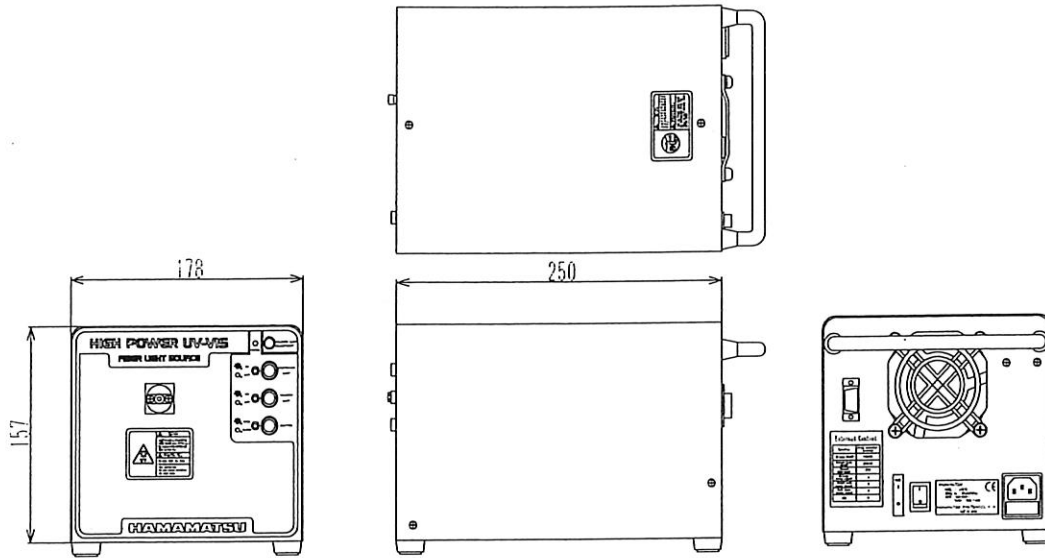
(Deuterium lamp at 230nm, Halogen Lamp at 600nm)

*2: The life end is defined as the time when the radiant output falls to 50% of the initial value or
When output fluctuation exceeds 0.05%(p-p).

(Deuterium lamp at 230nm, Halogen Lamp at 600nm)

6.2 Dimensional outlines

L10290 main unit



Unit:mm

7. Troubleshooting

Symptom	What's probably wrong	What to do
Main power doesn't turn on.	Fuse has blown.	Replace the fuse with the spare fuse and check the operation. (See page 6.)
Lamp doesn't light up.	Lamp reached the end of its service life.	Order a replacement lamp from us. If the lamp is still within the warranty period, please contact us with a description of the trouble. (See page 17.)
	Lamp connection is wrong.	Check the lamp connection. (See pages 12 and 13.)
Lamp light intensity is low.	Lamp reached the end of its service life.	Order a replacement lamp from us. If the lamp is still within the warranty period, please contact us with a description of the trouble. (See page 17.)
	Lamp is not correctly installed.	Check that the lamp is installed correctly. (See pages 12 and 13.)
Lamp light intensity is unstable.	Lamp reached the end of its service life.	Order a replacement lamp from us. If the lamp is still within the warranty period, please contact us with a description of the trouble.
	Operating or installation conditions are not met.	Read the precautions for use and installation again and comply with the instructions. (See pages 3 to 8.)
	Lamp is not correctly installed.	Check that the lamp is installed correctly. (See pages 12 and 13.)
Lamp cannot be operated by external control.	5 Vdc is not applied across terminals on the external control connector.	Check that the specified 5 Vdc is securely applied. (See page 11.)
	Lamp switch (⑨ or ⑩ on the front panel) is off.	Turn on the lamp switch (⑨ or ⑩ on the front panel). (See pages 7 and 11.)
	Incorrect wiring to external control terminals.	Check that the terminals are correctly wired and used. (See page 11.)
Does not show lamp status.	Incorrect wiring (wrong polarity connection, etc.) to status signal terminals.	Check that the terminals are correctly wired and used. (See page 11.)
Filter holder cannot be installed.	Shutter is open.	Close the shutter and then install the filter holder.

If you encounter trouble when using this product, please check the above points before asking us for repair. If the problem cannot be corrected even after checking the above points, please contact us with a description of the trouble and the operating conditions when trouble occurred (explain specifically).

D4H

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.

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