M68942

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DEUTERIUM LAMP POWER SUPPLY
MODEL 68942

USER MANUAL

Please read these instructions completely before operating this equipment. The specification and operating instructions apply only to the model(s) covered by this manual. If there are any questions or problems regarding the use of this equipment, please contact Newport or the representative from whom this equipment was purchased.

Rev: 10.08.12

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I SAFETY

There are four potential hazards in the operation of systems employing these power supplies.

Electrical Shock

Radiation

Ozone

Heat

I.1 ELECTRICAL SHOCK HAZARDS

Power supply internal circuitry is at high potential. Do not operate this power supply with the cover removed or without the lamp connected.

The terminals of the lamp are accessible. Make sure they are properly covered before operating the supply. The power supply provides a safety interlock circuit. When using an open air / rod mount we strongly recommend attaching interlock circuitry through the lamp cable. The interlock circuitry of Oriel lamp housings used in conjunction with this power supply will protect the user.

Never attempt to operate a broken lamp; high voltages are present at the lamp electrodes.

I.2 RADIATION

The high intensity UV radiation of these lamps can permanently damage the cornea, lens, and retina of the eye, even causing blindness. Prolonged exposure cans also cause delayed erythematic and mutagenesis. Damage may not be immediately apparent.

Because the output is mainly UV and the eye does not detect UV, you do not automatically react with the normal protective responses to high intensity light beams. Because high intensities can enter the eye or fall on bare skin undetected, wear safety glasses or face mask and protective clothing when working near an open lamp or when working with the UV output beam of a lamp housing.

Recommendations:

- ***Never look directly into the output beam of a housing when operating a lamp.***
- ***Never look at a specular (mirror) reflection of the beam, even for short periods of time.***
- ***Use the interlock system to prevent access to a working lamp.***
- ***Always wear UV safety eyewear or face mask, and protective clothing for exposed areas of skin.***

I.3 OZONE

Shortwave ultraviolet light photolyses oxygen to produce ozone. There is no simple way of predicting the ozone concentration (or its impact on you) e.g., operation in a small enclosed area may lead to high concentrations; etc.. Operation of the same system in a large, well ventilated laboratory may not be a problem.

Recommended maximum exposures are typically:

- ***ppm for 8 hours of exposure***
- ***ppm for a 2 hour exposure***

A very sensitive nose can detect 0.015 ppm. 1 ppm produces a strong and obnoxious odor. As a rule of thumb, if you can easily smell ozone, the level is too high for prolonged exposure.

Recommendations:

- ***Operate the system in a large ventilated area.***
- ***Use a fan to dissipate the ozone.***

I.4 HEAT

These lamps become very hot after several minutes of operation, and remain very hot for up to 10 minutes after they are shut off. Touching the lamp with bare hands before it has cooled will burn you.

Recommendations:

- ***Do not touch the lamp with your hands during operation or for at least 10 minutes after it has been shut off.***

I.5 HANDLING THE LAMP

The lamps are a little more rugged than domestic light bulbs, but you can destroy them with excessive torque or shock. You can seriously compromise performance by touching the output section of the envelope. Invisible finger oils become permanently etched into the envelope material by ultraviolet radiation. The transmittance will be reduced. Wear clean room gloves when handling the lamp.

If the transmitting section of the lamp has finger oils or other contaminants on it, clean the COLD lamp with mild detergent and alcohol. Dry off any cleaning solution before starting the lamp.

II INTRODUCTION

The model **68942** is a constant current, highly regulated, power supply for deuterium lamps. The power supply will operate any of the Oriel 30 watt deuterium lamps (see table), providing the high voltage necessary for starting the lamp and then running it at 300 mA.

The following items make up a **68942**:

the **68942** power supply,
a mains power cord,
this manual

Oriel 30 watt deuterium lamps

all lamps have 10 volt, directly heated filament, 60-90 V anode voltage @ 300 mA and 350 V starting voltage

Model No.	Lamp Type	Arc Diameter (mm)	Envelope or Window Material	Life* (hours)
63161	high uniformity, ozone free	1.0	UV Glass	1200
63162	high uniformity, full spectrum	1.0	Synthetic Quartz	1400
63163	high irradiance, full spectrum	0.5	Synthetic Quartz	1400
63164	high irradiance, ozone free	0.5	UV Glass	1300
63165	high irradiance/stability, ozone free	0.5	UV Glass	1300
63945	irradiance standard, calibrated from 200 - 400 nm, with mount	1.0	Synthetic Quartz	1400**
63946	same as 63945 without calibration data	1.0	Synthetic Quartz	1400**

***** To half of initial intensity in UV range, at 300 mA.

****** Lamp life; calibration lifetime depends on usage and acceptable error limits.

The model **68942** is frequently used together with an Oriel Lamp Housing or Rod Mount Holder in order to make up a complete ultraviolet light source. Here are the housing/holder choices.

- model **66145** rod mount, including cable
- model **60093** interface kit for the Oriel Series Q housing
- model **73903** lamp mount for the Oriel model **7340/7341** Monochromator Illuminator

We also offer these predefined sources which include the **68942** power supply:

- model **63979** calibrated source including lamp, mount, **68942** power supply and all cables
- model **66080** F/1.5 Q housing based source with **60093** interface kit, choice of lamp, **68942** power supply and all cables

III SET UP AND OPERATION

After opening the power supply packaging, be sure to check for evidence of damage in shipment. Any damage should be reported as soon as possible.

Before operating the power supply, be sure that the line voltage select switch is set properly and the unit is connected to a grounded AC line.

While operation is very straightforward (connect lamp, turn on the power supply), please follow the sequence given below to avoid problems.

- Read the Safety section in this manual.
- Gently wipe the emitting side of the lamp (between the metal posts) with an alcohol moistened lens tissue.
- Mount and wire the lamp as described in the lamp data sheet.
- Check that the power supply is set to the correct input voltage (115V or 230 V).

> *** * * CAUTION** * * *
> Make sure the power is off before connecting or disconnecting the lamp. High voltage (600 V peak) may be present if the power supply is on.
>
> *The lamp will start when the power supply is turned on* if the power supply interlock is satisfied. Oriel lamp mounts are wired to simulate a "good" interlock and the Oriel Q Series housings complete the interlock when closed. At this time *you should be wearing your UV protection*. Now is also the last opportunity to *wire a lamp mount interlock circuit to a door or other safety interlock switch.*

- Connect the lamp to the power supply through the OUTPUT connector.
- Connect the mains power cord to the power supply and then plug into your mains receptacle.
- Turn the power on.
- The heater will start glowing quickly and about 90 seconds later the arc will be struck. High Intensity UV light will be present immediately. If the lamp does not start, 4 more attempts will be made at 20 second intervals before the process is aborted.
- Use the power switch to turn the lamp and power supply off.

WARMUP PERIOD AFTER IGNITION

Until the deuterium lamp reaches thermal equilibrium, the radiated output varies. After approximately 10 to 15 minutes the output will be almost completely stable. For applications requiring extreme stability, an additional 15 to 30 minutes of warm up may be required. **This is particularly important when using the 63345 Irradiance Standard.**

IV POWER SUPPLY INDICATORS AND CONNECTIONS

IV.1 FRONT PANEL

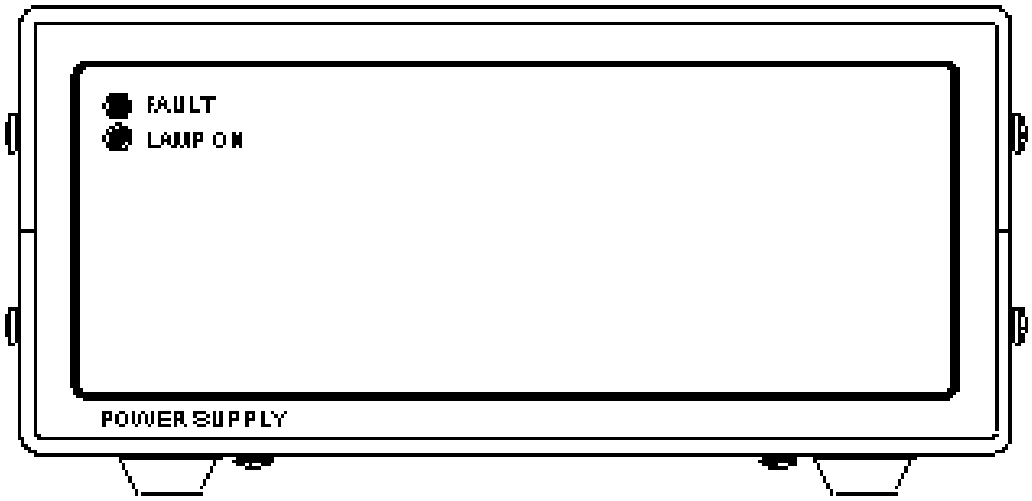


Figure 1 : Front Panel

There are 2 LEDs on the 68942 front panel. Whenever the power supply is turned on, one of the LEDs should be lighted to indicate the power supply status.

FAULT LED
- **the red LED** FLASHING indicates that the interlock circuit is broken or there is no lamp (heater) attached to the power supply. No attempt will be made to start the lamp until the interlock and/or lamp connection is completed. The lamp start sequence will begin as soon as the interlock and/or lamp connection is satisfied.
- **the red LED** ON indicates that the lamp start sequence has failed. Check connections to the lamp. The interlock had to be OK for the ignition cycle to have been initiated.

LAMP ON LED
- **the green** LED FLASHING slowly indicates that the lamp start sequence is in process. Filament voltage warms the lamp for about 30 seconds and then high voltage pulses are applied to breakdown the gas and create the arc.
- **the green** LED ON indicates that the lamp has been ignited and is running.

IV.2 REAR PANEL

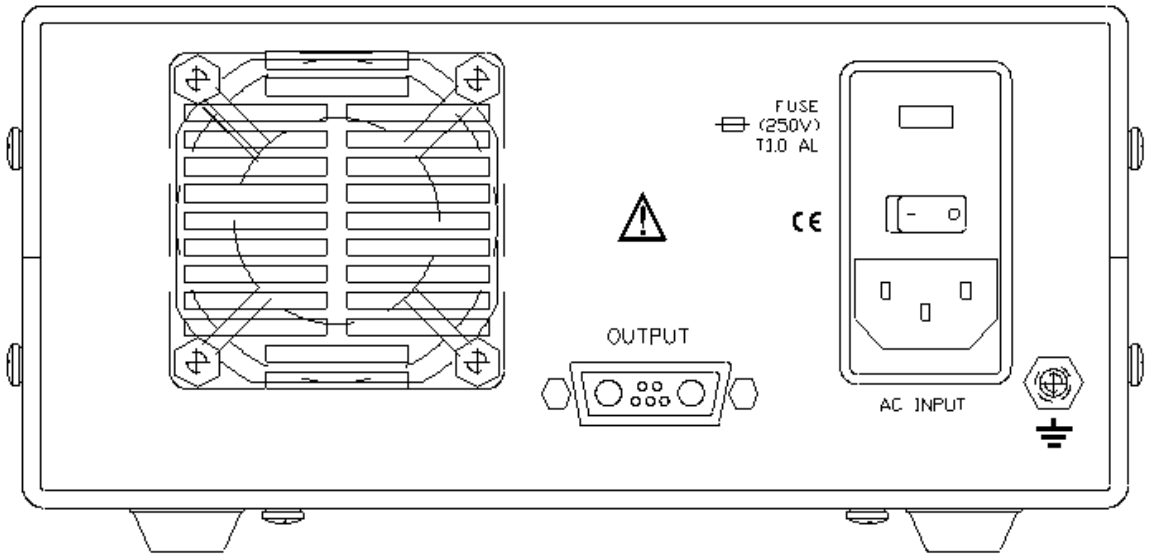


Figure 2 : Rear Panel

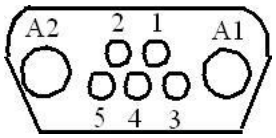
AC INPUT - this power entry module provides the mains switch, an IEC 320 mains receptacle, mains voltage selection and fuse holder. To access the voltage selector/fuse module, remove the mains cord; pry off the fuse/voltage select cover. Pull out the module to get at the fuses or rotate the module to change the mains voltage selection. Reinsert the module, close the cover and **check that the appropriate mains voltage is displayed** in the window.

OUTPUT - this combination D-sub provides power to the lamp and feeds back the interlock status to the power supply.

IV.3 OUTPUT CONNECTOR

If you want to run a Deuterium lamp/system not configured for this power supply, you will need to adapt its wiring to the **68942** output. **!!Be sure the lamp anode and filament specifications are compatible with this supply!!** The mating combination D-sub is available from a variety of manufacturers. The 68942 output female connector part number is, ITT CANNON P/N DAM7W2SA197. A1 & A2 contacts are P/N DM53744-1. Use a Standard 15-pin D-SUB backshell to secure the connector.

PIN	SIGNAL	DESCRIPTION
A1	cathode/heater	connection to lamp cathode/heater terminal
A2	heater	connection to lamp heater terminal
1	GND	ground for interlock
2	INTERLOCK (+)	connected to +5 V to satisfy interlock
3	+5 V	dc voltage for interlock
4	anode	connected to lamp anode terminal
5	INTERLOCK (-)	connected to GND to satisfy interlock



Output Connector Pin Assignment
(looking at rear of power supply)

NOTE: both INTERLOCK (+) and INTERLOCK (-) must be satisfied for the power supply to function.

Alternatively, you can purchase the cable we use for our lamp mounts, Oriel part number 10-60-022 that mates with the output connector and provides unterminated wires for connection to your system.

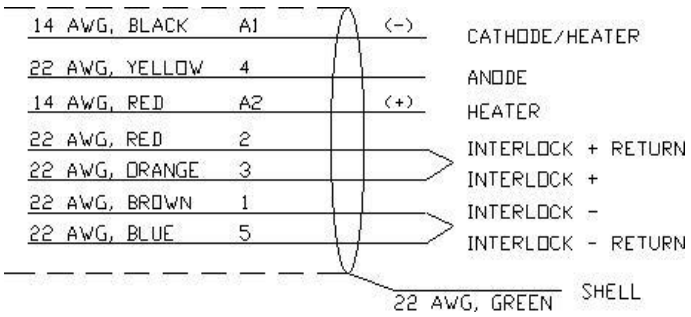
IV.4 INTERLOCK

We strongly recommend that the interlock feature of the power supply be used to minimize the potential exposure to UV energy and high voltages.

The Q series housing contains interlock switches which are connected through the cable back to the power supply. This provides protection from electrical hazards, but the UV hazard still exists. UV protective eyewear and clothing and control of the output beam are still required.

The open air mounts and the monochromator illuminator lamp holder are wired so that the **68942** interlock is satisfied by default. The user must provide appropriate interlock devices and connect them to the cable at the lamp mount.

The cable includes 2 pairs of interlock wires which are tied together to represent a satisfied interlock condition. If an interlock is desired, separate the brown and blue wires at the lamp/element end of the cable and tie into your interlock system. A contact closure is required to satisfy the interlock, enabling the power supply output. If a second, independent, interlock is required, the red (22 AWG) and yellow wires can be used in a similar fashion.



IV.5 LAMP CONNECTIONS

The table below shows the lamp mount cable and typical lamp wire colors. Always check documentation provided with the lamp and lamp mount/housing before proceeding.

CABLE WIRE COLORS		TYPICAL DEUTERIUM LAMP WIRE COLORS				
YELLOW	(ANODE)	RED or ORANGE				
BLACK	(CATHODE/HEATER)	BLACK	or	BLACK	or	BLUE
RED	(HEATER)	BLUE		BLACK		BLUE
GREEN	(EARTH GROUND)	CONNECT TO LAMP HOUSING CHASSIS				

If the cathode/heater and heater wires are the same color, they are interchangeable.

The **63345** Irradiance Standard will only provide the specified irradiance levels if the polarity of the heater supply is preserved. The lamp comes mounted and pre-wired so that, when used with the Oriel **68942** power supply, proper operating conditions are maintained. Be sure to observe lamp polarity if using another manufacturer's power supply.

Make sure lamp connections are tight. Significant current will flow in the lamp when it is warming up.

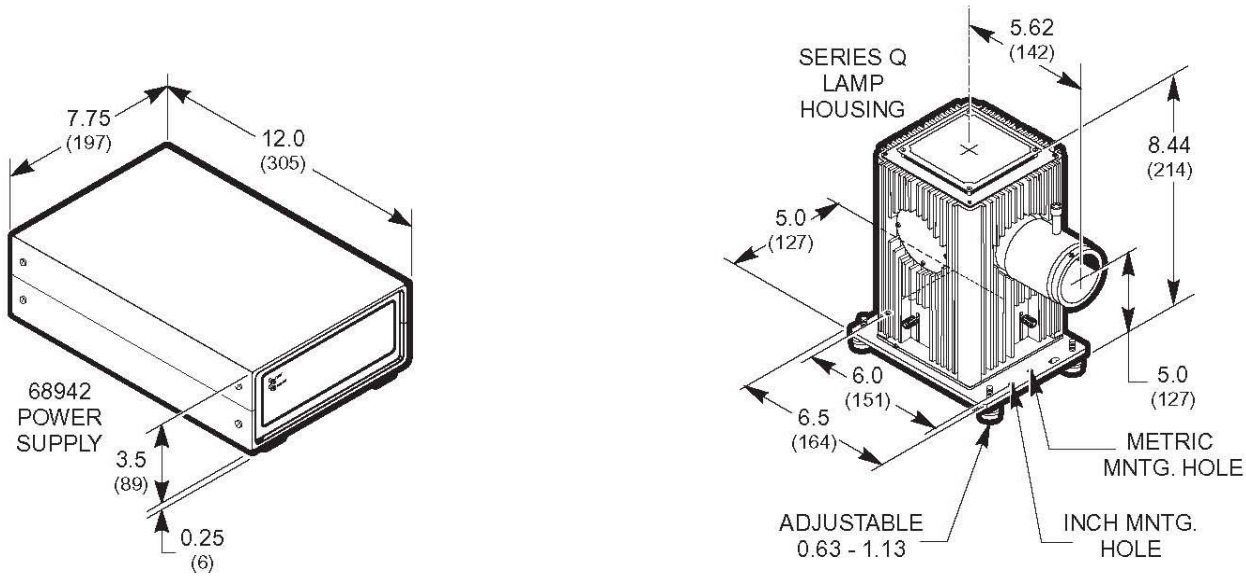


Figure 3 : Dimensional diagram of 66080 Deuterium Source components

V SPECIFICATIONS

V.1 ANODE CIRCUIT

• Output Current	300 mAdc
• Output Voltage(warm-up)	100 Vdc
• Output Voltage(running)	60 - 90 Vdc
• Output Trigger Voltage	570 ± 30V peak
• Line/Load Regulation	± 0.05% Max.
• Noise	0.05% p-p Max.
• Drift	± 0.05% Max. (after 30 minute warm-up)

V.2 HEATER (FILAMENT) CIRCUIT

• Output Voltage(warm up)	10 Vdc ±5%
• Output Voltage(running*)	6.5 Vdc ±5%
• Line/Load Regulation	± 0.1% Max.
• Noise	0.1% Max.
• Drift	± 0.1% Max.

V.3 GENERAL

• Line Voltage	95-132/190-264 VAC
• 50/60 Hz, 220W max.	
• Fuses (2 req.)	1 A, type T (slow blow), 5x20 mm
• Operating Temperature	0 to 40EC
• Dimensions (WxHxL)	7.8" x 3.4" x 12" (198 x 86 x 305 mm)
• Weight	8.0 lbs. (3.6 kg)

V.4 START SEQUENCE

- power on
- check interlock and heater connections
- warm up for 32 seconds
- ignite (If ignition fails, wait 12 seconds then try to ignite again, after 6 failed attempts turn the eater off and the FAULT LED on)
- reduce heater voltage after lamp on for 16 seconds

NOTE: If you are using lamps not supplied by Newport, be sure that the heater (filament) and anode specifications are compatible.

VI TROUBLESHOOTING

IF the FAULT LED flashes

The interlock circuit is broken or no lamp is connected to the power supply OUTPUT connector. Check:

- ✓ the lamp cable is connected to the OUTPUT connector of the power supply
- ✓ the lamp is correctly wired to its mount/holder
- ✓ all interlock/safety contacts are closed

The power supply, if left on while troubleshooting this problem, will initiate a lamp start sequence (green LED flashing) as soon as the problem is resolved. This green LED can be a useful indicator, but care must be taken to ensure safety once the start sequence has begun.

IF the FAULT LED stays on

The lamp start sequence has failed. The power supply has progressed through the warm up cycle and provided six separate bursts of ignition voltage, but the lamp has not started.

- ✓ Turn the power supply off.
- ✓ Check the wiring to the lamp.

  NOTE: a lamp may not ignite if it is hot. Wait at least 5 minutes before attempting to start a **hot** lamp.
- ✓ Turn the power supply on to try to start lamp again.
- ✓ If the lamp still does not ignite, it may need to be replaced. As a lamp ages, the required starting voltage, which is initially at about 350 V, increases. The **68942** provides 570 V so that even older lamps should start reliably, but, at some point, even that may not be sufficient.

IF the light output is unstable

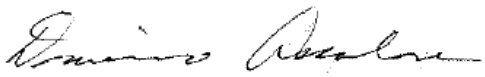
The primary contributors to lamp stability are:

- ✓ **mechanical vibration**. Make sure the lamp is isolated from mount vibrations or acoustic (airborne) noise. Even the small fan on the **68942** Power Supply can modulate the light output when mounted on the same surface as the lamp.
- ✓ **thermal instability**. Be sure that the lamp is not exposed to drafts or other significant air flow.
- ✓ **poor electrical connections**. Check that all connections to the lamp and power supply are tight.

VII DECLARATION OF CONFORMITY

EC DECLARATION OF CONFORMITY

Manufacturer's name:	Newport Corporation
Manufacturer's address:	150 Long Beach Boulevard
	Stratford, CT 06615 USA
Declares that the product:	
Product Name:	Deuterium Lamp Power Supply
Model Number:	68942
Type of equipment:	Electrical equipment for measurement, control and laboratory use in industrial locations
conforms to the following Product Specifications:	
Safety:	EN 61010-1:2010
EMC:	EN 61326-1:2006 +cor:2008 +cor:2010
complies with the following Directives:	
	2004/108/EC EMC Directive
	2006/95/EC Low Voltage Directive
and accordingly, carries the CE mark	
CE mark affixed:	Beaune; 12/01/2010



Domenic Assalone

Site Manager, Oriel Products Division

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Group Director, PPT Instrument and Motion Europe

Micro-Controle Division of Newport Corporation

Zone Industrielle

45340 Beaune la Rolande, France

VIII WARRANTY AND RETURNS

Newport warrants that all goods described in this manual (except consumables such as lamps, bulbs, filters, ellipses, etc.) shall be free from defects in material and workmanship. Such defects become apparent within the following period:

1. All products described here, except spare parts: one (1) year or 3000 hours of operation, whichever comes first, after delivery of the goods to the buyer.

2. Spare parts: ninety (90) days after delivery of goods to the buyer.

Newport's liability under this warranty is limited to the adjustment, repair and/or replacement of the defective part(s). During the above listed warranty period, Newport shall provide all materials to accomplish the repaired adjustment, repair or replacement. Newport shall provide the labor required during the above listed warranty period to adjust, repair and/or replace the defective goods at no cost to the buyer ONLY IF the defective goods are returned, freight prepaid, to a Newport designated facility. If goods are not returned to Newport, and the user chooses to have repairs made at their premises, Newport shall provide labor for field adjustment, repair and/or replacement at prevailing rates for field service, on a portal-to-portal basis.

Newport shall be relieved of all obligations and liability under this warranty of:

1. The user operates the device with any accessory, equipment or part not specifically approved or manufactured or specified by Newport unless buyer furnishes reasonable evidence that such installations were not the cause of the defect. This provision shall not apply to any accessory, equipment or part which does not affect the safe operation of the device.

2. The goods are not operated or maintained in accordance with Newport's instructions and specifications.

3. The goods have been repaired, altered or modified by other than authorized Newport personnel.

4. Buyer does not return the defective goods, freight prepaid, to a Newport facility within the applicable warranty period.

IT IS EXPRESSLY AGREED THAT THIS WARRANTY SHALL REPLACE ALL WARRANTIES OF FITNESS AND MERCHANTABILITY. BUYER HEREBY WAIVES ALL OTHER WARRANTIES, GUARANTEES, CONDITIONS OR LIABILITIES, EXPRESSED OR IMPLIED, ARRISING BY LAW OR OTHERWISE, WHETHER OR NOT OCCASIONED BY NEWPORT'S NEGLIGENCE.

This warranty shall not be extended, altered or varied except by a written document signed by both parties. If any portion of this agreement is invalidated, the remainder of the agreement shall remain in full force and effect.

CONSEQUENTIAL DAMAGES
Newport shall not be responsible for consequential damages resulting from misfunctions or malfunctions of the goods described in this manual. Newport's total responsibility is limited to repairing or replacing the misfunctioning or malfunctioning goods under the terms and conditions of the above described warranty.

INSURANCE
Persons receiving goods for demonstrations, demo loan, temporary use or in any manner in which title is not transferred from Newport, shall assume full responsibility for any and all damage while in their care, custody and control. If damage occurs, unrelated to the proper and warranted use and performance of the goods, recipient of the goods accepts full responsibility for restoring the goods to their condition upon original delivery, and for assuming all costs and charges.

RETURNS
Before returning equipment to Newport for repair, please call the Customer Service Department at (203) 377-8282. Have your purchase order number available before calling Newport. The Customer Service Representative will give you a Return Material Authorization number (RMA). Having an RMA will shorten the time required for repair, because it ensures that your equipment will be properly processed. Write the RMA on the returned equipment's box. Equipment returned without a RMA may be rejected by the Newport Receiving Department. Equipment returned under warranty will be returned with no charge for the repair or shipping. Newport will notify you of any repairs not covered by the warranty, with the cost of the repair, before starting the work.
Please return equipment in the original (or equivalent) packaging. You will be responsible for damage incurred from inadequate packaging, if the original packaging is not used.
Include the cables, connector caps and antistatic materials sent and/or used with the equipment, so that Newport can verify correct operation of these accessories