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68931-M

ORIEL INSTRUMENTS

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Stratford, CT 06497-0872
Phone: (203) 377-8282
Fax: (203) 378-2457
E-MAIL res_sales@oriel.com

RADIOMETRIC POWER SUPPLY

MODEL 68931

Please read these instructions completely before operating this equipment. If there are any questions or problems regarding the use of this equipment, please contact: ORIEL INSTRUMENTS - or - the representative from whom this equipment was purchased.

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TABLE OF CONTENTS

I. INTRODUCTION 1

II. SAFETY NOTES 2

III. USING THE POWER SUPPLY 3
- III.1 REAR PANEL CONNECTIONS 3
- III.2 FRONT PANEL CONTROLS AND DISPLAYS 6
- III.3 SETUP MODE 9
- III.4 LAMP OPERATING TIME FUNCTION 10
- III.5 OPERATING THE LAMP 11

IV. APPLICATIONS 12
- IV.1 STANDARD LAMPS 12
- IV.2 REMOTE CONNECTOR 12
- IV.3 REMOTE VOLTAGE SENSING 12

V. SPECIFICATIONS 13

VI. DECLARATION of CONFORMITY 14

WARRANTY AND RETURNS

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I. INTRODUCTION

The Oriel model 68931 power supply was designed to meet the needs of the researcher who demands a highly regulated source of current for proper operation of QTH and IR light sources. Constant current operation of these sources of radiation is usually required whenever a radiometric measurement is being made or whenever highly stable light output is needed. Constant power generation will prevent element overdrive in case of varying impedance conditions.

Features include:

- Adjustable output from 0 - 15 A or 0 - 300 W with preset so that the output can be set before running the lamp.
- Digital display is included for precise monitoring of current, voltage, power and lamp running time.
- LED indicators show the status of important power supply functions.
- Start/stop control gradually ramps the current up to and down from the preset value to minimize stress on the lamp.
- Safety interlock provides a way of safeguarding against accidental exposure to UV light when used with an ORIEL lamp housing.
- Remote I/O connector on the rear panel of the 68931 provides remote metering capability, and direct connection to the ORIEL 68850 Light Intensity Controller. The 68850 is typically used when long term stability is critical.

The following Oriel light sources may be operated with the model 68931:

MODEL	DESCRIPTION	ELECTRICAL RATINGS
6318	10W QTH Lamp	1.67A, 6V, 10W nominal
6319	20W QTH Lamp	3.34A, 6V, 20W nominal
6332/6337	50W QTH Lamp	4.17A, 12V, 50W nominal
6351/6353/6354/6355	75W QTH Lamp	6.25A, 12V, 75W nominal
6333/6359	100W QTH Lamp	8.34A, 12V, 100W nominal
6334	250W QTH Lamp	10.42A, 24V, 250W nominal
63358/63361	45W Calibrated QTH Lamp	6.50A
63355/63356	200W Calibrated QTH Lamp	6.50A
6575	Ceramic Element	7,50A, 3V nominal
6363	Infrared Emitter	11.67A, 12V, 140W nominal

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II. SAFETY NOTES ⚠

- *Make all connections to or from the power supply with the power off. The 15 ampere output current is considered hazardous. Any metal contacting the lamp output wires/terminals may be extremely hot. Care must be taken with the lamp wires/terminals when the power supply output is active. The 50 volt maximum present at the output does not pose a hazard.*

- *Do not use the power supply without its cover in place. Lethal voltages are present inside.*

CAUTION

- ***Never touch the lamp envelope or element with uncovered fingers, even during installation, or its lifetime and performance can be negatively affected.***

- ***Do not run the lamp more than 10% above its current or power rating. Source lifetime will decrease dramatically at higher operating point.***

- ***Never run calibrated lamps at any setting other that specified in the calibration certificate.***

- ***Always connect calibrated lamps with the specified polarity to preserve calibrated output.***

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III. USING THE POWER SUPPLY

III.1 REAR PANEL CONNECTIONS

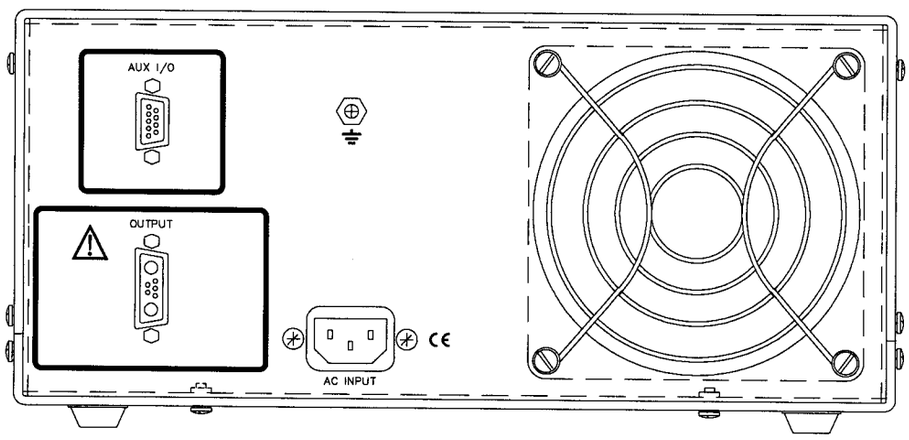


Figure 3 68931 Rear Panel

LAMP CONNECTIONS

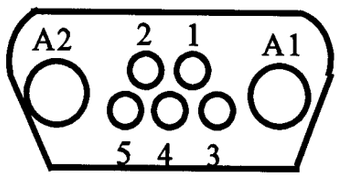
With the power supply off, connect the cable from the Oriel lamp housing/mount to the OUTPUT connector which provides all the signals necessary to interface this power supply to Oriel lamp housing and rod mounts.

PIN	SIGNAL	
A1	LAMP (-)	connection to lamp negative terminal
A2	LAMP (+)	connection to lamp positive terminal
1	GND	ground for interlock (fan/elapsed time indicator if in housing)
2	INTERLOCK (+)	connected to +12V to satisfy interlock
3	+12V	dc voltage for interlock (fan/elapsed time indicator if in housing)
4	SENSE (-)	connected to LAMP (-)
5	INTERLOCK (-)	connected to GND to satisfy interlock

MATING CONNECTOR:

Body: ITT# DAM-7W2P-K87 (includes pins 1-5)
Pins: ITT# DM 53745-1 (requires 2 per connector, A1 and A2)
Backshell: standard 15-pin D-SUB

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

AC MAINS CONNECTION

Verify that the front panel power switch is in the off position, then connect the provided AC cable between the IEC style socket on the rear panel and the wall outlet. For mains voltages between 95 and 132 Vac and between 190 and 264 Vac the 68931 will automatically select the correct mains configuration

INTERLOCK

The 68931 has a safety interlock feature which must be satisfied before the power supply output will activate and which, if broken during operation, will disable the power supply.

When connected to an Oriel Research, Q series or Photomax housing, the housing must be closed properly and any over temperature sensor satisfied for the power supply to drive the lamp .

The cable used for the other applications (rod mounts, cylindrical/rod mount housings and the monochromator illuminator) includes 2 pairs of interlock wires which are shorted together to represent a satisfied interlock condition. If an interlock is desired with these configurations, separate the brown and blue interlock wires at the lamp/element end of the cable and tie them into the interlock system. A contact closure is required to satisfy the interlock.

AUX I/O CONNECTOR

Access to the internal metering and control signals is provided through this High Density 15 pin female D-SUB connector, with the following pin assignments:

INTENSITY CONTROL

A control input is included at the AUX I/O connector, which is intended for use with the Oriel Model 68850 Intensity Controller. When the 68850 is connected, a sample of the light at all or selected wavelengths is compared to a reference. Any difference between the two is sent into the power supply to compensate for this change. The result will be improved stability in light output over time.

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SIGNAL MONITORING AND REMOTE START

The signals which are available at the AUX connector allow you to monitor the power, current, and voltage output of the supply from a remote location via a meter or an A/D converter and a computer. There is also a remote start input so that the lamp can be started with a simple contact closure at a remote location.

Pin 1	External control input. An approximately 2.5-5 volt DC signal will decrease the output current from the operating level to no output, if need be. Input impedance is 5K.
Pin 2	Remote start common
Pin 3	External control input common.
Pin 5	Remote start common.
Pin 7	Remote start. Momentary contact with Pin 2 or 5 will start the lamp.
Pin 9	Remote meter output: Power. 0-1.25V indicates 0-250W.
Pin 10	Remote meter output: Current. 0-1.25V indicates 0-12A.
Pin 11	Remote meter output: Voltage. 0-2.0V indicates 0-100V.
Pin 12	Remote meter output: Common.

Pins 4, 6, 8, 13, 14, 15 are not used

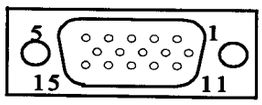


Figure 3 AUX I/O Connector Pin Assignment

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III.2 FRONT PANEL CONTROLS AND DISPLAYS

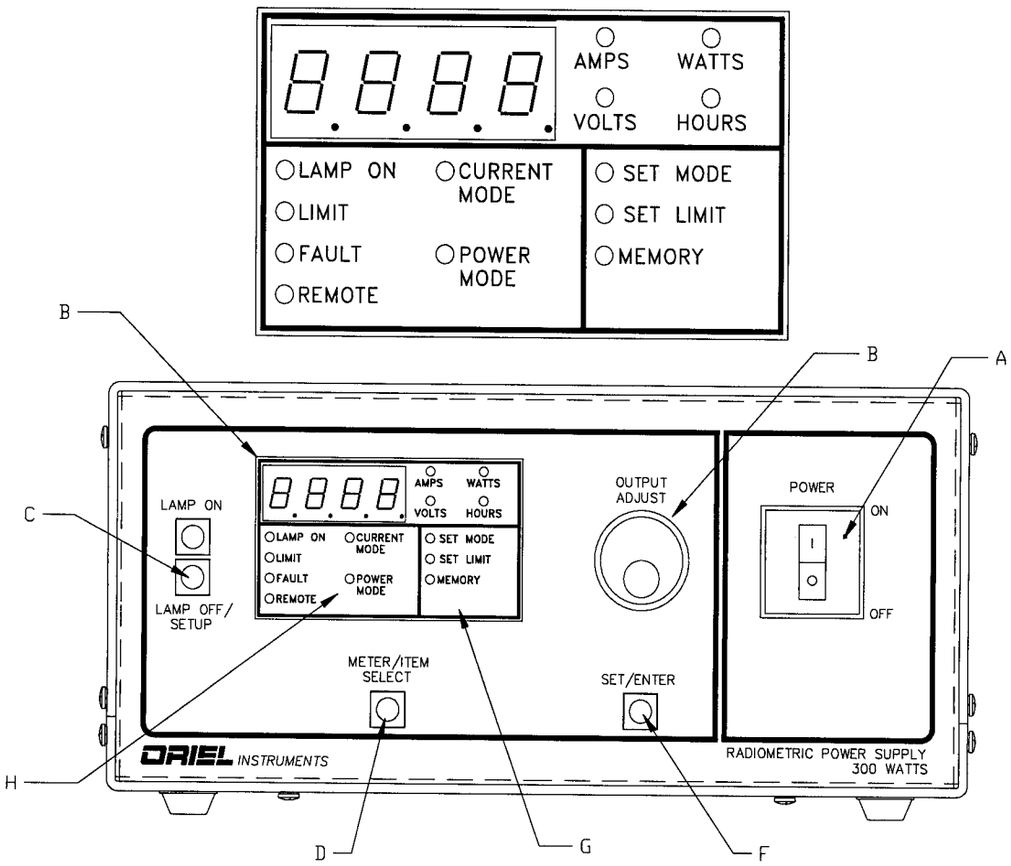


Figure 6 68931 Front Panel

POWER

This is the AC mains power switch and circuit breaker. In the "ON" position ac power will be switched into the main circuitry of the power supply, and an integral indicator lamp will glow to indicate that the power is on (**A in Figure 6**). There is no output until the "LAMP ON" button is pressed.

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DISPLAY WINDOW

The display window, (**B in Figure 6**), consists of a multi-function LED display and several LED indicators. It is divided into three areas - meter (upper), status (lower left), and setup (lower right).

The METER AREA contains the display and units indicators. It normally displays one of four parameters; current (Amps), power (Watts), voltage (Volts) and operating time (Hours). It is also used when setting current/power preset, current/power limit, and user memory load/save.

The STATUS AREA contains six indicators:

LAMP ON flashes while ramping up to and down from the preset current or power level, and illuminates continuously when the output is at the preset value.

LIMIT illuminates when the output current/power reaches the limit.

FAULT illuminates when the safety interlock loop is open.

REMOTE illuminates when the remote input is active, typically when the ORIEL 68850 Intensity Controller is connected.

CURRENT MODE illuminates when the power supply is set to regulate output current.

POWER MODE illuminates when the power supply is set to regulate output power.

The SETUP AREA is only active in setup mode. Each of the three indicators flash while advancing through the parameters. See section III.2 for a detailed description of setup mode.

LAMP ON

This button, **C in Figure 6**, begins a gradual ramp-up to the preset current or power level, as long as there are no fault conditions. During the ramp-up, the "LAMP ON" indicator will flash until the output current or power stabilizes, then stays on. The ramp-up time is approximately 30 seconds and is independent of the preset current. As an example, the ramp-up time to 5.00A is the same as the ramp-up time to 10.00A.

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LAMP OFF/SETUP

If the lamp is on, pressing this button (**C in Figure 6**) begins a gradual ramp-down from the preset current to 0A. The "LAMP ON" indicator will flash until the output current reaches 0A, then goes off. The ramp-down time is approximately 30 seconds.

If this button is held in for approximately 3 seconds and the "LAMP ON" indicator is off, the power supply enters SETUP MODE, which is covered in section III.2. Pressing the button again exits SETUP MODE.

METER/ITEM SELECT

Each time you press and release this button (**D in Figure 6**), the digital meter and associated units indicators switch between one of four functions - current (Amps), voltage (Volts), power (Watts), and lamp operating time (Hours).

SET/ENTER and OUTPUT ADJUST

The OUTPUT ADJUST control (**E in Figure 6**) is a digital encoder which provides a precise means of output current or power adjustment. The SET/ENTER button (**F in Figure 6**, directly below OUTPUT ADJUST) must be depressed while adjusting the current or power, otherwise OUTPUT ADJUST has no effect. This is to prevent inadvertently changing the settings. Rotating OUTPUT ADJUST clockwise increases the output current/power, while rotating it counter-clockwise decreases the output current/power. The factory default range for current is 0 - 15.00A, and the factory default range for power is 0 - 300W. These limits may be changed in SETUP MODE.

The OUTPUT ADJUST control is velocity sensitive. Rotating it slowly changes the current or power in 0.01A or 1W increments, while rotating it quickly changes in larger increments. The SET/ENTER button temporarily overrides the present meter selection and displays current (in current mode) or power (in power mode) to avoid confusion when changing the settings.

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III.3 SETUP MODE

Press the "LAMP OFF/SETUP" button for at least 3 seconds. This enters setup mode (**G in Figure 6**). Pressing "LAMP OFF/SETUP" again exits setup mode at any time. Once in setup mode, there are three main items that may be set up - MODE, LIMIT, and MEMORY.

SET MODE
The "SET MODE" indicator should flash. This allows you to change from the default current regulation mode to power regulation mode. To change the mode, hold "SET/ENTER" in and rotate "OUTPUT ADJUST" in either direction. This will alternately illuminate the "CURRENT MODE" and "POWER MODE" indicators. Press "METER/ITEM SELECT" to move on to the next item.

SET LIMIT
The "SET LIMIT" indicator should flash. This allows you to change the current limit and power limit within the range of 0.00 - 15.00 Amps. The display shows the current limit in AMPS. To change the current limit, hold the SET/ENTER button in and rotate the OUTPUT ADJUST control until the desired current limit is displayed.

Press the METER/ITEM SELECT button. The display now shows the power limit in WATTS. To change the power limit, hold the SET/ENTER button in and rotate the OUTPUT ADJUST control until the desired power limit is reached. Press "METER/ITEM SELECT" to move on to the next item.

MEMORY
The "MEMORY" indicator should flash. This allows you to load and save up to ten front panel setups. The display shows "L-01", which means "load from memory 01". Holding in the SET/ENTER button and rotating the "OUTPUT ADJUST" control advances the display to "L-02", then "L-03" and so on. To load a setup from memory, choose the desired memory location, then hold in "SET/ENTER" and press "METER/ITEM SELECT". This will perform the load. Press "METER/ITEM SELECT" to go to the next item.

Pressing the "METER/ITEM SELECT" button causes the display to show "S-01" which means "save to memory 01". Again, holding in the "SET/ENTER" button and rotating the "OUTPUT ADJUST" control advances to "S-02", then "S-03" and so on. To save the present setup to memory, choose the desired memory location, then hold in "SET/ENTER" and press "METER/ITEM SELECT". This will perform the save. Press "METER/ITEM SELECT" to go back to the first item (SET MODE) or "LAMP OFF/SETUP" to exit.

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III.4 LAMP OPERATING TIME FUNCTION

The 68931 keeps track of operating time whenever the lamp is running. The digital display shows operating time from 0 - 9999 hours. This function may help you determine when to replace the lamp, and monitor the performance over time.

To reset the operating time to 0 hours, shut off the lamp (if it is presently running) and set the display to read operating time. Then hold in the LAMP OFF/SETUP button, and immediately afterward press the METER/ITEM SELECT button until the display reads '0'. Note that if you hold in LAMP OFF/SETUP for too long before pressing METER/ITEM SELECT, you will enter setup mode. If this happens, exit setup mode and try again.

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III.5 OPERATING THE LAMP

Please refer to **H in Figure 6**.

CURRENT MODE:
If you are not using an ORIEL light source, use the manufacturers specifications. If the lamp operating power and voltage are known, but the operating current is not, then determine the current setting by using Ohm's Law: amperes = power ÷ volts.

Turn on the power supply. The 'CURRENT MODE' LED should illuminate. If not, switch to CURRENT MODE (see section III.2). Set the display to read current (AMPS). Rotate the OUTPUT ADJUST control while holding the SET/ENTER button in until the display reads the desired current. Once you release the SET/ENTER button, the display will go back to 0.00 since the output is off. You can push the SET/ENTER button at any time to view the preset current.

Push the LAMP ON button. The 'LAMP ON' indicator will flash which indicates that the current is gradually ramping up to the preset level. Once the preset level is reached, the 'LAMP ON' indicator will illuminate continuously. You can use METER/ITEM SELECT to display current, voltage, power or operating time. To shut off the lamp, push the LAMP OFF/SETUP button. The 'LAMP ON' indicator will flash as the current is ramping down to 0. Once the output reaches 0, the 'LAMP ON' indicator goes off.

POWER MODE:
Turn on the power supply. The 'POWER MODE' LED should illuminate. If not, switch to POWER MODE (see section III.2). Rotate the OUTPUT ADJUST control while holding the SET/ENTER button in until the display reads the desired power. Once you release the SET/ENTER button, the display will go back to 0 since the output is off. You can push the SET/ENTER button at any time to view the preset power.

Push the LAMP ON button. The "LAMP ON" indicator will flash which indicates that the power is gradually ramping up to the preset level. Once the preset level is reached, the "LAMP ON" indicator will illuminate continuously. You can use METER/ITEM SELECT to display current, voltage, power or lamp operating time. To shut off the lamp, push the LAMP OFF/SETUP button. The 'LAMP ON' indicator will flash as the power is ramping down to 0. Once the output reaches 0, the 'LAMP ON' indicator goes off.

NOTE: In power mode, the front panel microprocessor monitors output current and voltage in order to maintain the power preset. Under certain load conditions, it may not be able to "settle" at the preset value. In this case the display will toggle between two readings.

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IV. APPLICATIONS

IV.1 STANDARD LAMPS

The Oriel model 68931 power supply is an excellent tool for radiometric applications. Most standard lamps are calibrated with a constant current source as specified by NIST. The calibration data is valid when the lamp is operated at the current level used by the calibration laboratory.

The 68931 will operate the 63355/63356 45W calibrated lamps at 6.50A , and the 63358/63361 200W calibrated lamps at 6.50A. For best stability, let the power supply and lamp run at operating current for at least 5 minutes.

IV.2 REMOTE CONNECTOR

The signals which are available at the remote connector allow you to monitor the current and voltage output of the supply from a remote location via a meter or an A/D converter and a computer. There is also a remote start input so that the lamp can be started with a simple contact closure at a remote location.

A control input is also included at the remote connector, which is intended for use with the Oriel Model 68850 Intensity Controller. When the 68850 is connected, a sample of the light at all or selected wavelengths is compared to a reference. Any difference between the two is sent into the power supply to compensate for this change. The result will be improved stability in light output over time.

When the control input is active, the front panel 'REMOTE' LED will illuminate. At this time the preset value of current/power becomes a maximum setting, and is otherwise overridden by the control input. The LAMP ON, LAMP OFF/SETUP and METER/ITEM SELECT functions are always active.

IV.3 REMOTE VOLTAGE SENSING

Many of the lamps driven by this power supply require significant current so that the voltage at the lamp may be significantly different from the voltage at the power supply output because of voltage loss through the interconnect system. Since the 68931 drives the load with a constant current, operation is not affected by these losses. All Oriel housings and mounts intended for use with this power supply connect the LAMP (-) and the SENSE (-) leads (pins A1 and 4 of the power supply output connector) together at the lamp so that the voltage (and, therefore, the power) displayed by the 68931 represents the voltage at the lamp.

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V. SPECIFICATIONS

AC Mains Input:	95 - 132 VAC/ 8A max 190 - 264 VAC/ 4A max 50/60 Hz
DC Current Output:	Adjustable from 0.00 - 15.00A In 0.01A increments
DC Power Output: (see note)	Adjustable from 0 - 300W In 1W increments
DC Voltage Output:	Load dependent, 50V max
Light Output Ripple:	Typically 0.05% R.M.S.
Meter Accuracy:	± 0.1% of full scale
Line / Load Regulation:	± 0.05%
Operating Temperature:	10 - 40°C

NOTE: In power mode, the front panel microprocessor continuously monitors the output current and voltage. It will vary the output current in discrete increments of 0.005A in order to maintain the preset power level. Under certain load conditions, the microprocessor may not be able to "settle" at the preset. In this case the display will toggle between two readings.

In applications where extremely precise measurements are being made, it may be preferable to use current mode.

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VI. DECLARATION of CONFORMITY

Manufacturer's Name: Oriel Instruments

Manufacturer's Address: 150 Long Beach Boulevard
Stratford, CT 06615
USA

declares that the product

Product Name: 300 W Radiometric Power Supply

Model Number: 68931

conforms to the following Product Specifications:

Safety: EN 61010-1: 1993 + A2/ IEC 1010-1: 1990 + A1 + A2

EMC: EN 50081-1: 1992
EN 55022: 1994/ EN 55011: 1993 Class B

EN 50082-1: 1992
IEC 801-2: 1991/ IEC 1000-4-2: 1995
ENV 50140:1993/ EC 1000-4-3:1995/ EN 61000-4-3: 1995
IEC 801-4: 1988/ IEC 1000-4-4: 1995

complies with the following Directives:

- the EMC Directive 89/336/EEC

- the Low Voltage Directive 73/23/EEC

and, accordingly, carries the CE mark.

Stratford, CT April, 1998

George Buzel (Signature)

George Buzel (Name)

Director of Engineering (Title)

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WARRANTY AND RETURNS

WARRANTY

Oriel Instruments 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 must become apparent within the following period:

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

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

3. Repaired items: ninety (90) days after delivery of goods to buyer.

Oriel Instruments' liability under this warranty is limited to the adjustment, repair and/or replacement of the defective part(s). During the above listed warranty period, Oriel Instruments shall provide all materials to accomplish the repaired adjustment, repair or replacement. Oriel Instruments 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 an Oriel Instruments designated facility.

Oriel Instruments shall be relieved of all obligations and liability under this warranty if:

1. The user operates the device with any accessory, equipment or part not specifically approved or manufactured or specified by Oriel Instruments unless buyer furnishes reasonable evidence that such installations were not a cause of the defect.

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

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

4. Buyer does not return the defective goods, freight prepaid, to an Oriel repair 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, GUARANTIES, CONDITIONS OR LIABILITIES, EXPRESSED OR IMPLIED, ARISING BY LAW OR OTHERWISE, WHETHER OR NOT OCCASIONED BY ORIEL'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 -

Oriel Instruments shall not be responsible for consequential damages resulting from misfunctions or malfunctions of the goods described in this manual. Oriel'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 Oriel, shall assume full responsibility for any and all damage to the goods while they are in their care, custody and control. If damage occurs which is unrelated to the proper and warranted use and performance of the goods, then the 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 Oriel for repair, please call the Customer Service Department at (203) 377-8282. Have your purchase order number available before calling Oriel. The Customer Service Representative will give you a Return Material Authorization number (RMA). Having an RMA will shorten the time required for the 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 Oriel Receiving Department. Equipment returned under warranty will be returned with no charge for the repair or shipping. Oriel will notify you of the cost of repairs not covered by warranty before starting out of warranty repairs.

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 Oriel can verify correct operation of these accessories.

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