68831-M

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MODEL 68831
600 WATT RADIOMETRIC
POWER SUPPLY

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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I. INTRODUCTION

The Oriel model 68831 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 - 15A or 0 - 300W 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 connector 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 68831 provides remote metering capability, and direct connection to the ORIEL 68850 Light Intensity Controller. The 68850 is typically used when a high level of long term stability is required.

The following Oriel light sources may be operated with the model 68831:

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	55W Ceramic Element	11.00A, 5V nominal
6363	140W Infrared Emitter	11.67A, 12V, 140W nominal

II. SAFETY NOTES

- *Make all connections to or from the power supply with the power off. There may be up to 50 volts present at the output terminals; this could be dangerous if care is not exercised when the power supply is on.*

- *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.***

III. USING THE POWER SUPPLY

III.1 REAR PANEL CONNECTIONS

AC MAINS CONNECTION AND VOLTAGE SELECTION

Set the LINE VOLTAGE SELECT switch (**B in Figure 1**) on the rear panel for the AC voltage in your area. If your line voltage is between 95-132VAC set the switch to 115V. If your line voltage is between 190-264VAC set the switch for 230V. Verify that the front panel power switch is in the off position, then connect the provided AC cable between the IEC style socket (**A in Figure 1**) on the rear panel and the wall outlet.

INTERLOCK CONNECTION

The interlock connection (**C in Figure 1**) is the circular two pin socket on the rear panel. ORIEL lamp housings use this connection as a safety against accidental opening of access doors or against an excessive temperature rise within the lamp housing while the lamp is on. If you have an ORIEL lamp housing, use the provided interlock cable to connect to this socket. Otherwise, use the jumper plug that was shipped with the power supply. If the contacts are left open there will be no output and the “FAULT”indicator on the front panel will illuminate.

LAMP CONNECTIONS

Make the (+) and (-) connections from the output terminal block on the rear panel to the lamp housing adapter kit or rod mount with the cables that were provided (**D in Figure 1**). All lamp housing adapter kits and rod mounts available from ORIEL will have either two or four connections, depending on the model.

The 4-position terminal block located on the rear panel makes the connections to the lamp as shown below:

STANDARD 2-WIRE LAMP CONNECTION:

TERMINAL#	FUNCTION	CONNECTION
1 (top)	Main output (+)	LAMP
2	Main output (-)	LAMP
3	voltage sense (+)	JUMPER TO TERMINAL #1
4	voltage sense (-)	JUMPER TO TERMINAL #2

Terminals 1 and 2 are the main outputs and should both be connected to the lamp.

OPTIONAL 4-WIRE LAMP CONNECTION:

TERMINAL#	FUNCTION	CONNECTION
1 (top)	Main output (+)	LAMP +
2	Main output (-)	LAMP -
3	voltage sense (+)	LAMP +
4	voltage sense (-)	LAMP -

All connections are earth ground isolated. *Never make any electrical connections to these with the power supply on.*

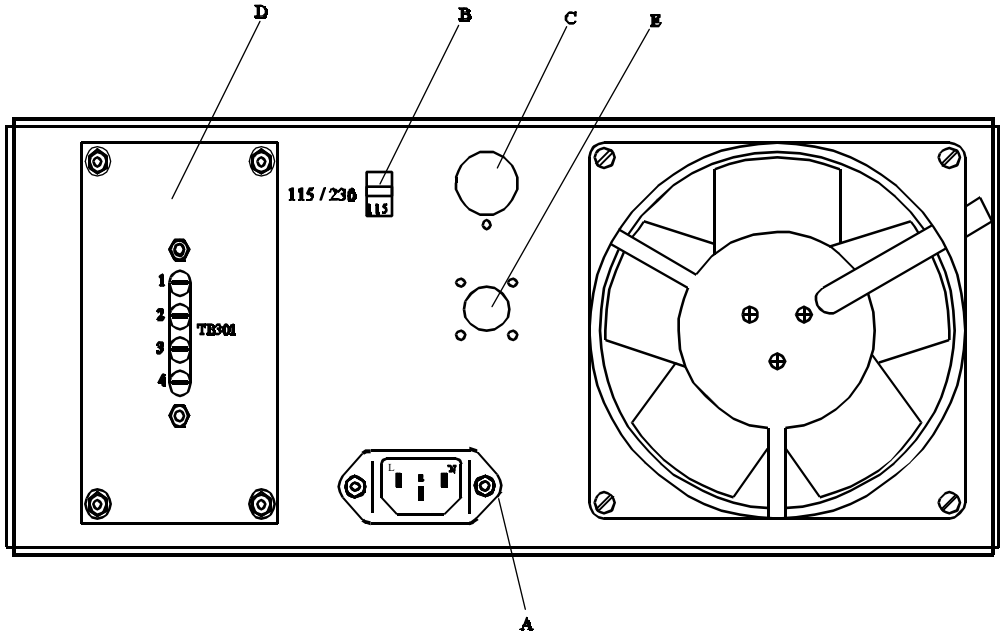

Figure 1 Rear Panel Display

REMOTE CONNECTOR

Access to the internal metering and control signals is provided through this connector (**E in Figure 1**). It is a twelve (12) pin circular connector with the following pin assignments:

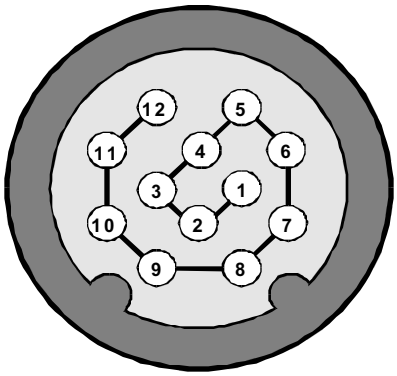

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Figure 2 Remote Connector Pin Assignment

Pin 1	External control input. A 2.5–5 volt DC signal will decrease the output current from the operating level to no output, if need be.
Pin 2	Not used.
Pin 3	Input control common.
Pin 4	Not used.
Pin 5	Remote start. Momentary contact with remote start common will start lamp.
Pin 6	Not used.
Pin 7	Remote start common
Pin 8	Not used.
Pin 9	Not used.
Pin 10	Remote meter output: Current. 0-1.5V indicates 0-15A.
Pin 11	Remote meter output: Voltage. 0-0.5V indicates 0-50V.
Pin 12	Remote meter output: Common.

III.2 FRONT PANEL CONTROLS AND DISPLAYS

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 3**). There is no output until the “LAMP ON” button is pressed.

DISPLAY WINDOW

The display window, (**B in Figure 3**), 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 3**, 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.

LAMP OFF/SETUP

If the lamp is on, pressing this button (**C in Figure 3**) 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 3**), 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 3**) is a digital encoder which provides a precise means of output current or power adjustment. The SET/ENTER button (**F in Figure 3**, 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.

III.3 SETUP MODE

Press the "LAMP OFF/SETUP" button for at least 3 seconds. This enters setup mode (**G in Figure 3**). 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.

III.4 LAMP OPERATING TIME FUNCTION

The 68831 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.

III.5 OPERATING THE LAMP

Please refer to **H in Figure 3**.

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.

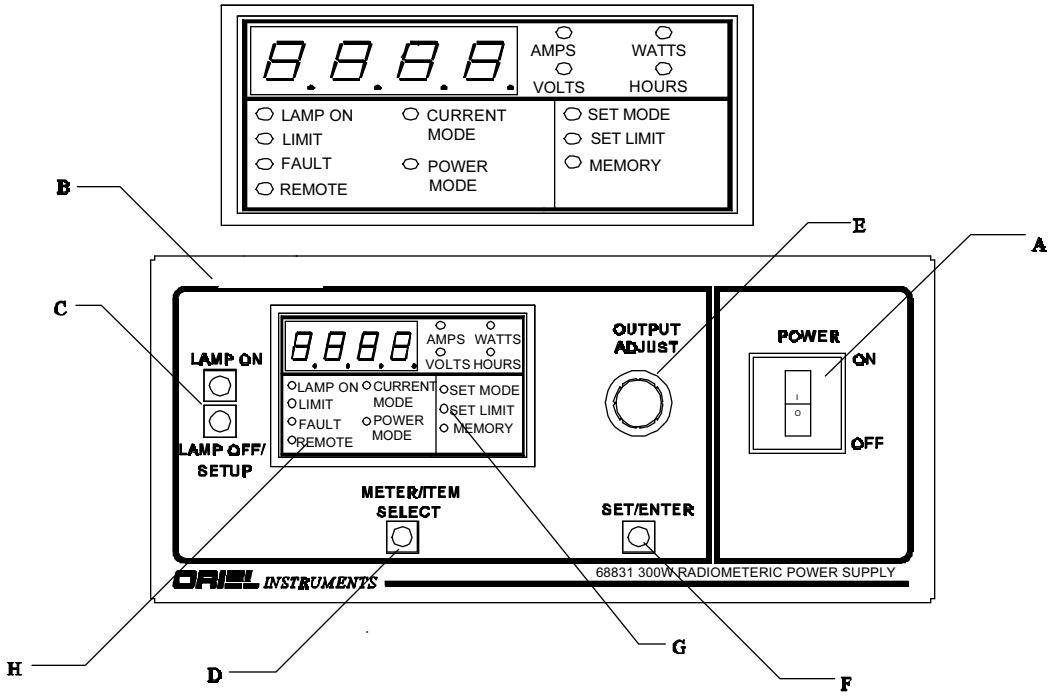

Figure 3 Front Panel Display

IV. APPLICATIONS

IV.I STANDARD LAMPS

The Oriel model 68831 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 68831 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

Terminals 3 and 4 on the output terminal block may be used for remote voltage sensing. This will compensate for the voltage drops in the interconnection wires to the lamp, and provide a more accurate reading of output voltage and power.

To use this feature, disconnect the provided jumper wires from terminals 3 and 4. Run a separate pair of wires to the lamp, as close to the lamp leads as possible. The polarity of the connections must be correct !! In other words, terminals 1 and 3 must both connect to one lamp lead (at the lamp), and terminals 2 and 4 must both connect to the other lamp lead (at the lamp). If the connections are backwards, the output will shut off.

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.