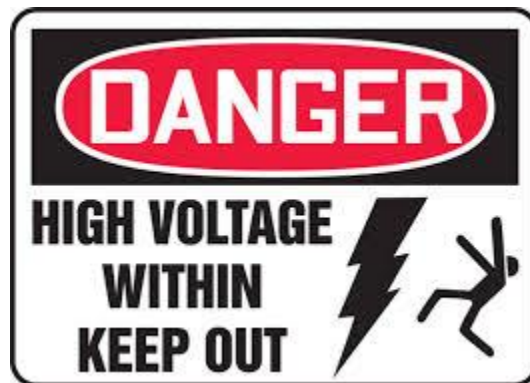


INSTRUCTION MANUAL REPS HIGH CURRENT POWER SUPPLY



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SECTION 1

SPECIFICATIONS

1.1 INTRODUCTION

The Thermionics Laboratory, Inc. model REPS is a conventional high current, closed loop AC power supply. A nineteen inch rack mountable chassis contains the circuits controlling the primary power to an external filament transformer. This transformer may be mounted to the frame inside vacuum evaporator equipment or in a stand alone enclosure depending upon the manufactured configuration.

1.2 GENERAL DESCRIPTION

The REPS Power Supply consists of the following:

- One High Current power supply chassis.
- One Filament Transformer (Enclosure).
- One Hand Held Remote Control.
- All Connecting Cables.

1.3 HIGH CURRENT POWER SUPPLY CHASSIS

19" W x 12" D x 7" H rack mountable power supply chassis.
Input Power: 208/240 VAC, Single Phase, 50/60 Hz, 30 Amps.
Output Voltage: 0 – 208/240 VAC SCR controlled.
Regulation: The output will vary less than 1 % for line changes of +/- 10 % or load changes of +/- 50 %.

1.4 FILAMENT TRANSFORMER (ENCLOSURE)

1 kVA: 8"x 8" x 8" Transformer, (11"x18"x11" enclosure).
2 kVA: 8"x 12"x 11" Transformer, (14"x19"x12" enclosure).
Output Voltage: 0 –10 VAC (5, 20, 40 V taps available).

1.5 HAND HELD REMOTE CONTROL

A hand held remote control is provided for operation of the power supply up to 12 feet away.

On – off control, emission level control, current readout and interlock status are standard features.

1.6 CONNECTING CABLES

Power input cable 12' long with Nema L6-30P plug.

REPS to remote control cable 12' long.

When the filament transformer is mounted in a stand alone enclosure:

One 12' cable for control of the source select relays and current monitoring.

One 12' cable for delivering the SCR controlled primary input power to the transformer.

SECTION 2

THEORY OF OPERATION

2.1 INTRODUCTION

This section should be read and fully understood prior to operation of the power supply. Reference figure 1 on page 6 of 15.

2.2 PRIMARY CIRCUITS

Input power is applied to a 30 Amp circuit breaker providing full primary protection. Its output is connected to the primary of the transformer through back to back phase angle controlled SCRs. This type of control turns on the appropriate SCR for a portion of each half cycle. As they are turned on earlier in each cycle, the AC power applied to the filament transformer is increased. Since the two half cycles are controlled symmetrically, no DC bias results in the transformer primary and no saturation occurs.

2.3 SECONDARY CIRCUITS

The secondary output of the filament transformer provides the power to the resistive heated evaporation source. It is controlled from zero to approximately 97 % of full rated power. One secondary lead passes through a current transducer. The output of the current transducer is a DC signal proportional to the output current. This signal provides the feedback for the closed loop control and current metering.

Fig. 1 Simplified Interlock and Control Diagram

2.5 EMISSION CONTROL

A zero to 10 VDC error signal controls the firing angle of SCR1. The greater the applied positive signal to the SCR, the more AC power is applied to the filament transformer. A current transducer, positioned in the return line of the secondary output of the filament transformer provides the feedback signal for the regulator amplifier. The regulator amplifier is located on the SCR Driver PCB (Reference drawing # 633-0040 Page 10 of 12).

The DC output signal from the current transducer is connected to the non-inverting amplifier (U1), the gain of which is 5. The positive going output of this amplifier is applied to an inverting summing amplifier (U2). Either the hand held emission potentiometer or the zero to 10 VDC negative signal from an optional deposition rate controller provides the second input of this amplifier. This negative going reference signal is applied to the non-inverting input of U4. The output of U2 is applied to the non-inverting input of a unity gain buffer amplifier (U4). The output of U4 provides the error signal to SCR1.

2.6 EXTERNAL EMISSION CONTROL

The REPS power supply is designed to accept the zero to negative 10 VDC signal from an (optional) deposition rate controller. The rate controller output is connected to J5 on the REPS chassis rear panel. This is the BNC connector labeled Rate Control. When the front panel toggle switch is placed into the Ext. Sig. position, a deposition rate controller can control the rate of evaporation.

2.7 SOURCE SELECT SWITCHING

A front panel mounted rotary switch allows the user to select one of up to three sources. Optional high current relays can be added for this purpose. When the rotary switch is in position A, 24 VDC is applied to pins 1 and 2 of the rear panel connector J6 labeled Control Out. When the rotary switch is in position B, 24 VDC is applied to pins 3 and 4 of J6. When the rotary switch is in position C, 24 VDC is applied to pins 5 and 6 of J6. These are points for connecting the coils of the high current relays.

2.8 METERING CIRCUIT

A digital LED meter on the hand-held remote control unit provides the current readout. The display is in amperes. It monitors the secondary output of the filament transformer. It obtains a signal from the current transducer. This signal is calibrated inside the hand-held remote control such that 1 VDC is equal to 200 amps AC.

SECTION 3

INSTALLATION

3.1 MECHANICAL

The power supply chassis is designed to mount into a 19" rack. Tightly screw the chassis into the rack space desired support. The power supply chassis is designed to mount into a standard 19" rack. The front panel of the chassis will not support the weight of the power supply. Whenever a power supply is mounted in a rack, the chassis must be supported within the rack from below, using support rails for example. The front panel of the chassis should then be secured to the desired rack space with suitable fasteners.

If the filament transformer is not already installed into a piece of equipment such as a vacuum evaporator, it may come within its own enclosure. This enclosure is mounted on castors to allow it to be located near the vacuum chamber. The transformer enclosure must be located within 6 feet of the customer provided feed through connectors.

3.2 ELECTRICAL

Connect the hand-held remote control unit to the front panel of the power supply chassis using the 12 foot cable provided.

Connect the output of the power supply to the filament transformer. This output connector is labeled J6 and is located on the rear panel of the power supply chassis. If the transformer is located in an enclosure, the 12 foot cable will have two 3 pin circular connectors on it.

Connect the power supply chassis to a source of 208 – 240 VAC capable of delivering 30 Amps with a suitable ground.

Connect cables to the power feedthroughs of the vacuum system. These are the feedthroughs that are connected to the resistive evaporation source, for example, a boat, filament, or other resistive evaporation device. Check all connections for continuity and are tight and secure.

SECTION 4

OPERATION

4.1 TURN ON

With the Rate Control toggle switch in the “LOCAL” position, set the emission potentiometer fully counterclockwise. With the Rate Control toggle switch in the “EXT. SIG.” position, ensure the deposition rate controller is set for zero output.

Turn on the main power circuit breaker. Yellow “POWER ON” and green “READY” indicators should be lit on the front panel. If the “READY” indicator is not on, check vacuum, door or water interlocks for closures.

Yellow “ZERO START” and green “READY” indicators are lit on the hand held remote control. If the “ZERO START” indicator is not on, double check emission potentiometer or rate controller.

Depress the “ON” pushbutton and slowly turn the emission potentiometer clockwise or increase the output of the deposition rate controller to the desired output current as indicated by the meter on the hand held remote control unit.

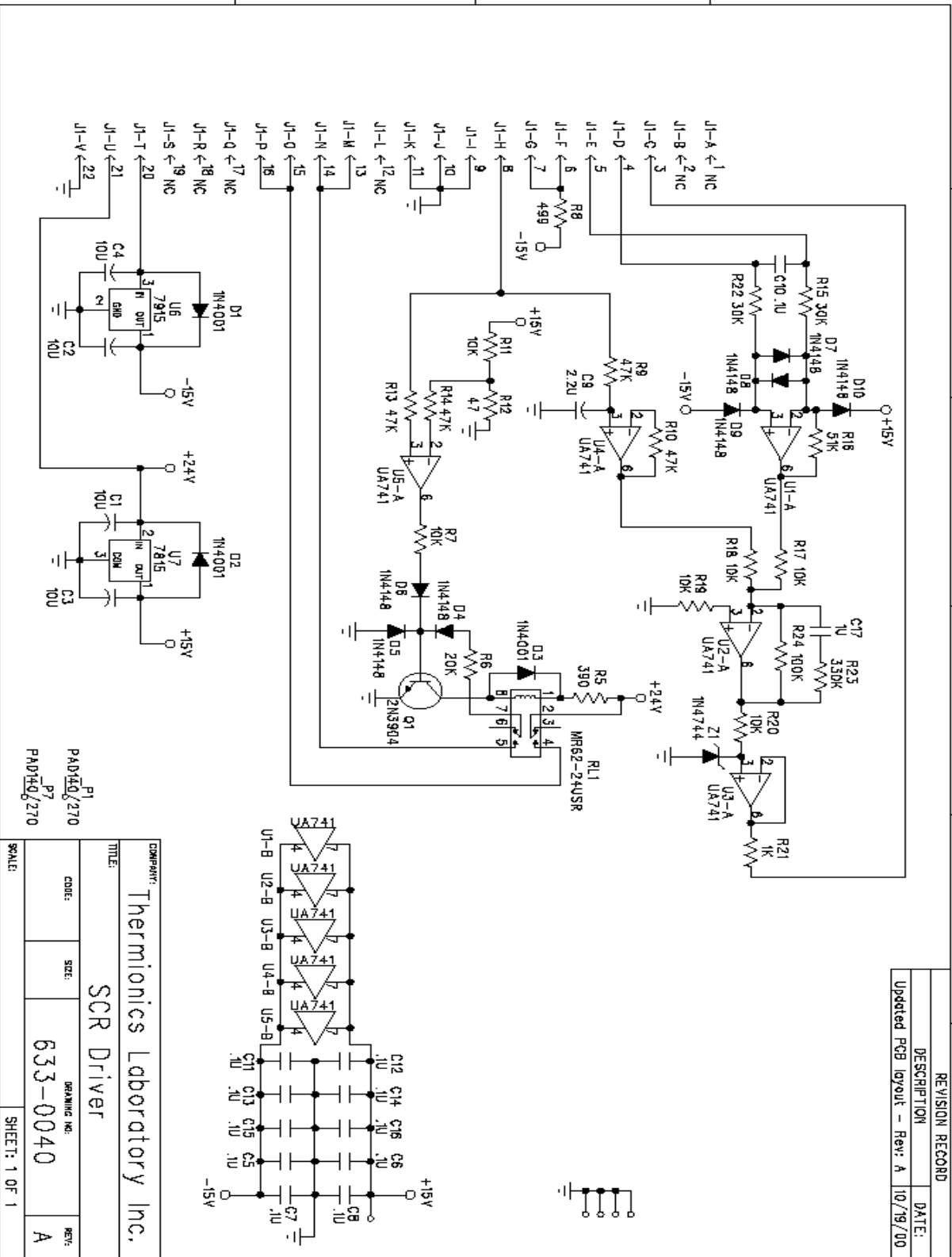
4.1 TURN OFF

Depress the “OFF” pushbutton.

Rotate emission potentiometer fully counterclockwise or turn off rate controller.

Allow several minutes for cooling and turn off the “Main” circuit breaker.

REVISION RECORD	
DESCRIPTION	DATE
Updated PCB layout - Rev: A	10/19/00



COMPANY: Thermionics Laboratory Inc.

TITLE: SCR Driver

CODE: 633-0040

SIZE: DRAWING NO. 633-0040

REV: A

SCALE: SHEET: 1 OF 1

THERMIONICS' WARRANTY

I. Thermionics Vacuum Products (herein call THERMIONICS) warrants to the original purchaser.

A. Standard catalog products manufactured by THERMIONICS against defects in workmanship for a period of one (1) year from the date the goods are received at the customer's facility.

B. Special products and electronic components are covered for a period of one (1) year from the date goods are received at the customer's facility.

II. Scope

A. Liability under this warranty is expressly limited to repair or replacement defective parts. THERMIONICS, at its sole option, may at any time discharge its warranty as to any of its products by refunding the purchase price and taking back the products(s).

B. This warranty applies only to parts manufactured and labor provided by THERMIONICS.

C. Valid warranty claims must be received by THERMIONICS within the warranty period and are subject to the terms and conditions herein.

D. All warranty replacement or repairs of parts shall be limited to equipment malfunctions which, at the sole discretion of THERMIONICS are due or traceable to defects in original material or workmanship.

E. Malfunctions, which in the sole opinion of THERMIONICS, are caused by abnormal wear and tear, lack of maintenance, abuse, operation, maintenance or care inconsistent with the product manual, accident, or neglect of equipment are expressly not covered by this warranty. It is the responsibility of the user to operate the equipment in a reasonable and prudent manner, consistent with the stated intended use.

F. In-warranty repaired or replaceable parts are warranted only for the remaining portion of the original warranty period, applicable to the parts which have been repaired or replaced, and the total equipment is warranted for the balance of the one (1) year period. After expiration of the applicable warranty period, the buyer shall be charged at THERMIONICS' current prices for parts and labor, plus freight and per diem, when applicable.

G. Expendable component parts, including, but not limited to, pump elements, cold cathode gauges, bellows, thermocouple gauge, hot cathode gauges, sublimator filaments, emissive filaments, heaters, elastomers, bearings, and gaskets, etc., are guaranteed for their expected service life,. If the expendable component parts fail to give reasonable service, as determined solely by THERMIONICS, they will be repaired or replaced at our discretion.

III. CONDITIONS

A. THERMIONICS expressly disclaims responsibility for any loss or damage caused by the use of its products, when not used in accordance with proper operating and safety procedures in accordance with specifications, or if the equipment is used without the proper recommended maintenance. reasonable care must be taken by the user to avoid hazards.

B. Except as stated herein. THERMIONICS makes no warranty, express or implied, either in fact or by operation of law; and, as stated herein, THERMIONICS shall have no liability under any warranty, express or implied, either in fact by operation of law.

C. THERMIONICS shall have no liability for special or consequential damages of any kind, or from any cause arising out to the sale, installation, or use of any of its products. Statements made by any person, including representatives of THERMIONICS, which are inconsistent or in conflict with the terms of this warranty shall not be binding upon THERMIONICS unless reduced to writing and approved by an authorized officer of THERMINICS.

D. This warranty does not cover normal maintenance requirements which are the customer's responsibility.

E. This warranty does not extend to equipment that

- a) someone other than Thermionics approved personnel have disassembled or attempted to repair,
- b) has been modified or altered, or
- c) has been contaminated with hazardous material or induced activation.

IV. PROCEDURES

A. If you wish to return equipment for repair, contact the THERMIONCS DIVISION which sold you the product in question. You will be given an RMA Authorization Number and instructions on how and by what means to ship the products to the factory. **NO SHIPMENT WILL BE ACCEPTED WITHOUT PRIOR APPROVAL** and completed RMA Authorization Form.

B. In the first year, goods must be returned, freight prepaid, to the factory and will be returned, freight prepaid, to the customer. After the first year, all freight costs must be paid by the customer.

