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ORC

OPERATING MANUAL XPS20S-03 POWER SUPPLY

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Order parts from:
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DECEMBER 1981
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LIST OF ILLUSTRATIONS/DRAWINGS

SECTION 1 - INTRODUCTION

1.1 SCOPE

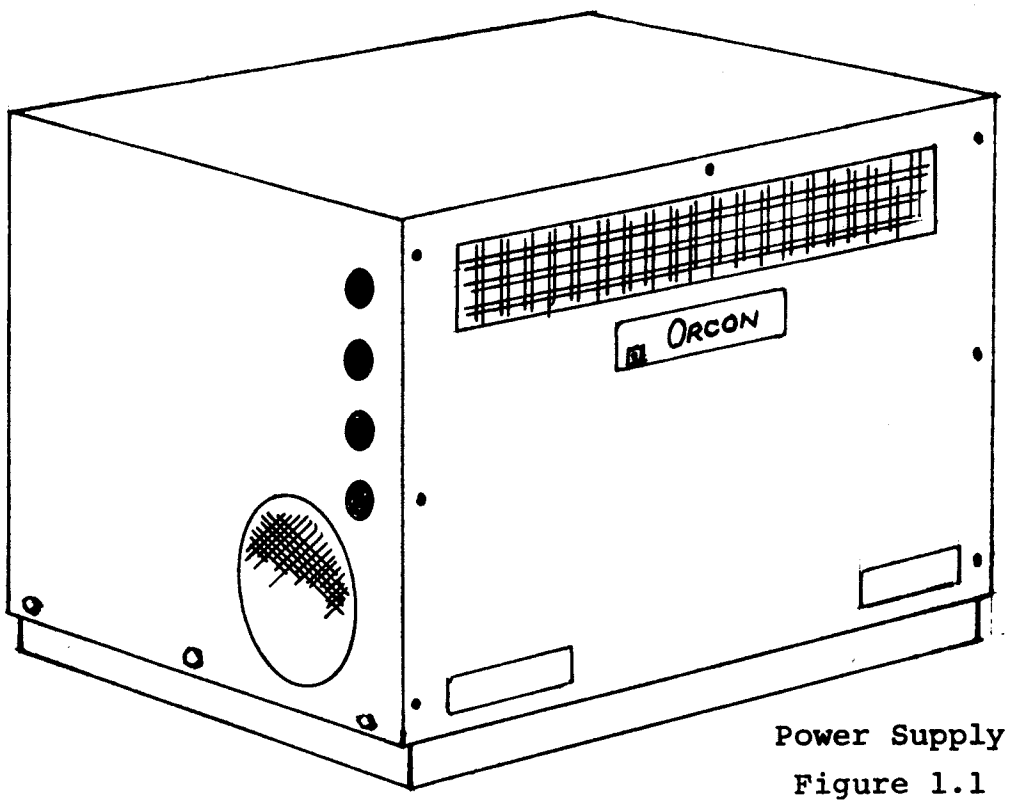
Provided in this manual are installation, operation and maintenance instructions for the Model XPS-20S-03 Orcon Xenon Power Supply. When requesting information, always furnish model and serial numbers to Optical Radiation Corporation (ORC), Azusa, California, U.S.A.

1.2 GENERAL DESCRIPTION

The Model XPS-20S-03 Xenon Power Supply is designed for use with various Orcon Lamphouses.

The XPS20S-03 (see Figure 1.1) is comprised of a power contactor, a three phase power transformer, a three phase silicon rectifier with capacitive filter, an open circuit voltage boost circuit. This power supply is designed for maximum reliability by utilizing rugged electro-magnetic components while maintaining a low ripple output for long bulb life and flicker-free presentation. The XPS20S-03 is designed to operate 2000 watt xenon lamps.

Current adjustment from 50 to 100 amperes DC can be made by changing the four coarse "W," "X," "Y," and "Z" taps and the four fine "1," "2," "3," and "4" incremental taps on the primary wiring of the main power transformer.



Power Supply
Figure 1.1

1.3 POWER SUPPLY SPECIFICATIONS

Power Supply Specification

Input Voltage	208/230V, 3 Phase, 60Hz
Maximum Input Current	20 Amps
Input Power	3.0 KW
Output Power	2.0 KW
Output DC Current Range	50-100 Amps
DC Current Ripple	1% RMS
Nominal Overall Dimensions (D x W x H in inches)	19.5 x 14.5 x 18
Power Supply Weight	125 lbs.

SECTION 2 - IMPORTANT SAFEGUARDS

- READ AND UNDERSTAND ALL INSTRUCTIONS -

2.1 **WARNING**

The above "WARNING" when appearing in this manual means: INSTALLATION, OPERATING AND MAINTENANCE PROCEDURES, PRACTICES, ETC., WHICH MAY RESULT IN PERSONAL INJURY OR LOSS OF LIFE IF NOT CAREFULLY FOLLOWED.

2.2 **CAUTION**

The above "CAUTION" when appearing in this manual means: INSTALLATION, OPERATING AND MAINTENANCE PROCEDURES, PRACTICES, ETC., WHICH MAY RESULT IN DAMAGE TO EQUIPMENT IF NOT CAREFULLY FOLLOWED.

2.3 NOTE

The above "NOTE" when appearing in this manual means: INSTALLATION, OPERATING AND MAINTENANCE PROCEDURES, PRACTICES, ETC., WHICH ARE ESSENTIAL TO EMPHASIZE.

2.4 SAFETY

2.4.1 Before attempting to make any connections or service to the system, make certain all power is disconnected from main power line.

2.4.2 Care must be taken as burns can occur from touching hot parts. Before servicing, wait at least 10 minutes for system to cool down.

2.4.3 Always disconnect all power from the system when not in use.

2.4.4 When taking any voltage measurements, caution should be exercised. Always avoid contact between any current carrying part of the system or power source and the human body.

2.4.5 When installing the power source to the system, be certain that a ground wire is connected from the stud labeled "ground" and power source.

SAVE THESE INSTRUCTIONS

SECTION 3 - INSTALLATION

3.1 RECEIVING-HANDLING

Remove all packing material from around the power supply and carefully inspect for damage that may have been caused by shipping. Any claims for loss or damage that may have occurred in transit must be filed by the buyer with the carrier. A copy of the bill of lading and freight bill will be furnished on request.

When requesting information concerning the equipment, be sure to furnish stock, serial and model numbers.

3.2 INSTALLING POWER SUPPLY

A good installation is essential if the power supply is to provide satisfactory and dependable service. Proper component operating temperatures are maintained by the air stream produced by the power supply blower. Therefore, the power supply should be located so that the air passing through the sides and rear of the power supply is not restricted. The back of the power supply should be located at least four inches from the wall so that the air passage from the blower will not be blocked.

The power supply should be located in an area where a minimum amount of dust or dirt will be drawn into the air stream. Preventive maintenance will consist of periodically removing the covers and blowing out the dust accumulation inside the power supply. For this reason, it is desirable to locate the unit so that the side covers can be easily removed without obstruction.

The distance between the power supply and lamphouse is not critical as long as adequate conductor size is used to prevent any noticeable voltage drop.

The input AC control and DC power enters the back of the unit as shown in Figures 3-1 and 3-3.

3.3 PRIMARY POWER TO POWER SUPPLY

The power supply is designed to operate on 208 or 230 volts 60 Hz, three phase AC power.

CAUTION

The power supply must be operated from a separately fused or circuit breaker protected branch circuit. The circuit should be protected for 20 Amps on each of the three line connections.

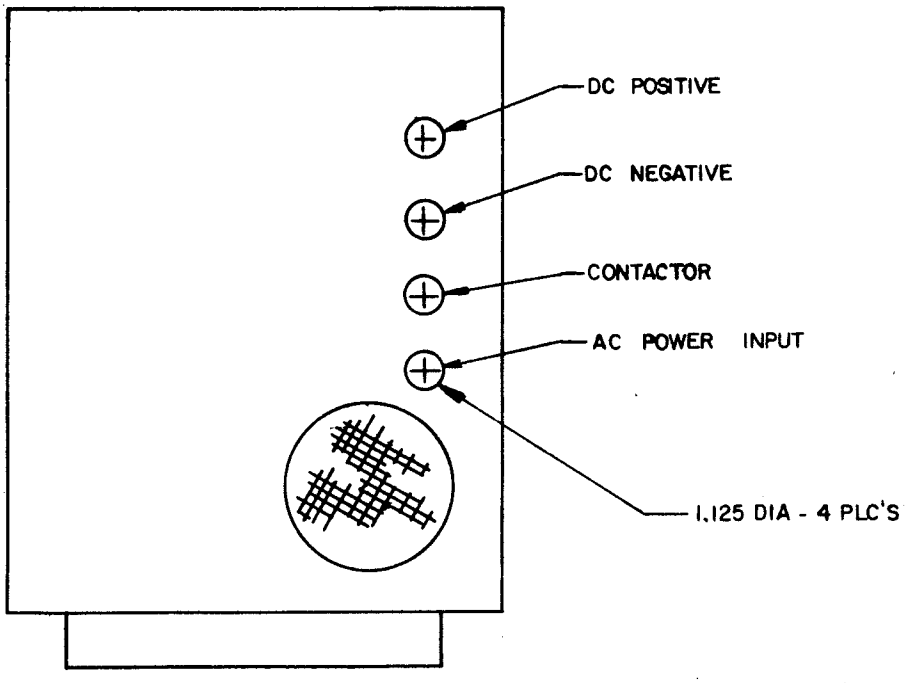


Figure 3-1

Cable Entrance Ports, XPS20S-03 Power Supply

Primary power connections are made to the three line terminals, L1, L2 and L3, on the power contactor. The interconnecting terminals are located directly behind the side cover closest to the cable entrance ports of the power supply. A standard size conduit hole is provided on the back panel to allow bringing the three primary power leads and ground into the power supply. The primary leads should be enclosed in solid or flexible conduit to meet the necessary electrical codes (see Figures 3-1, 3-2, and 3-3).

Ensure the ground wire is connected to the stud labeled GRD (ground), next to the negative DC heat sink. Refer to Table 3-1 for recommended primary wire and fuse sizes.

	Primary Wire Size - AWG	Fuse/Circuit Breaker* Size - Amps
XPS-20S-03	No. 10	20 High Inrush time-delay type

Table 3-1
Recommended Primary Wire and Fuse Sizes

WARNING

BE SURE THE GROUND WIRE IS CONNECTED TO THE GROUND TERMINAL IN THE LINE DISCONNECT SWITCH BOX. IF NOT, CONNECT IT TO A GROUNDING ROD, WATER PIPE, OR USE WHATEVER GROUNDING PROCEDURE THAT IS ACCEPTABLE TO THE LOCAL ELECTRICAL CODE AND INSPECTION. THE STUD, LABELED "GRD," IS CONNECTED TO THE POWER SUPPLY CHASSIS. DO NOT CONNECT ANY OF THE LINE LEADS TO THIS TERMINAL AS THIS WILL RESULT IN A HOT CHASSIS.

The power supply can be connected to either a 208VAC or 230VAC primary voltage source. Compensation is made by setting the coarse current adjust taps to the appropriate

*Note: A gauged three pole high-inrush current 20 amp hydraulic-magnetic circuit breaker is the preferred method of overload protection.

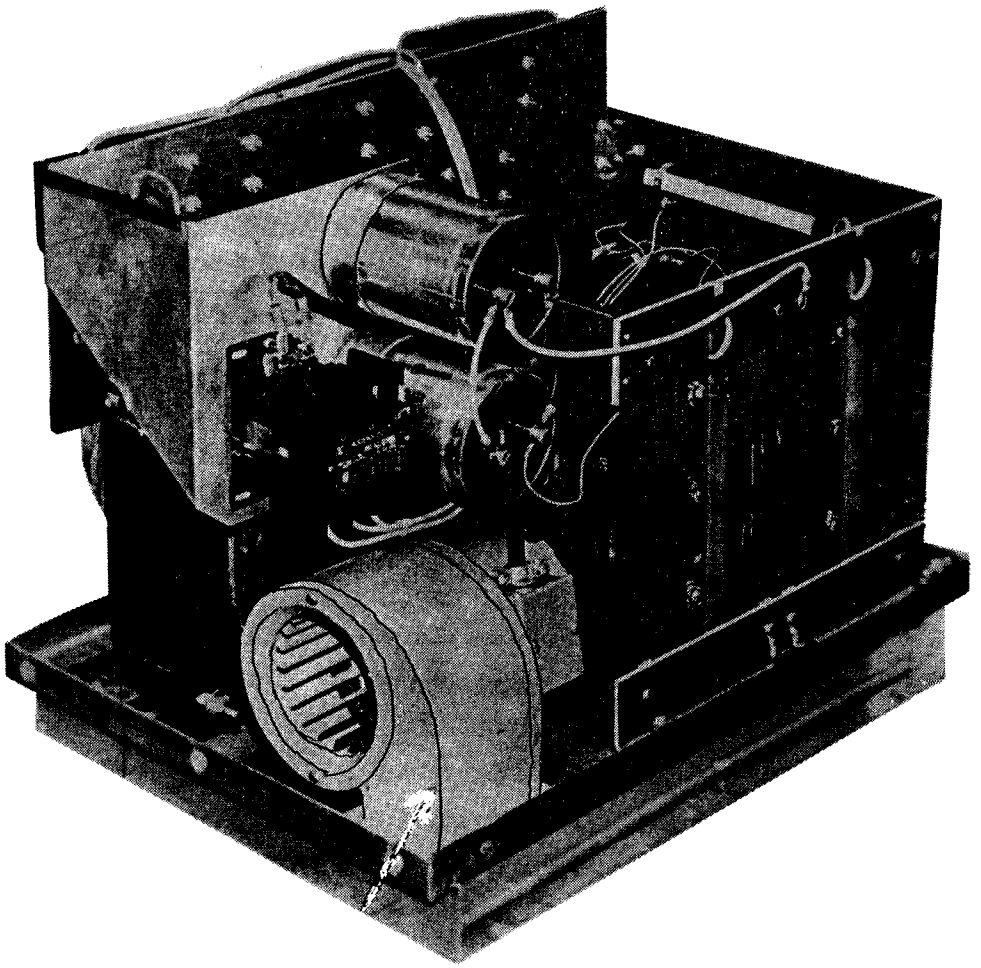


Figure 3-2
Power Supply - Cover Removed

terminals (WXYZ) as shown in Figure 4-1. Fine current adjustment is made by setting the fine current adjust taps from 1 (minimum) to 4 (maximum)(see tap adjustment procedure, Section 4.4).

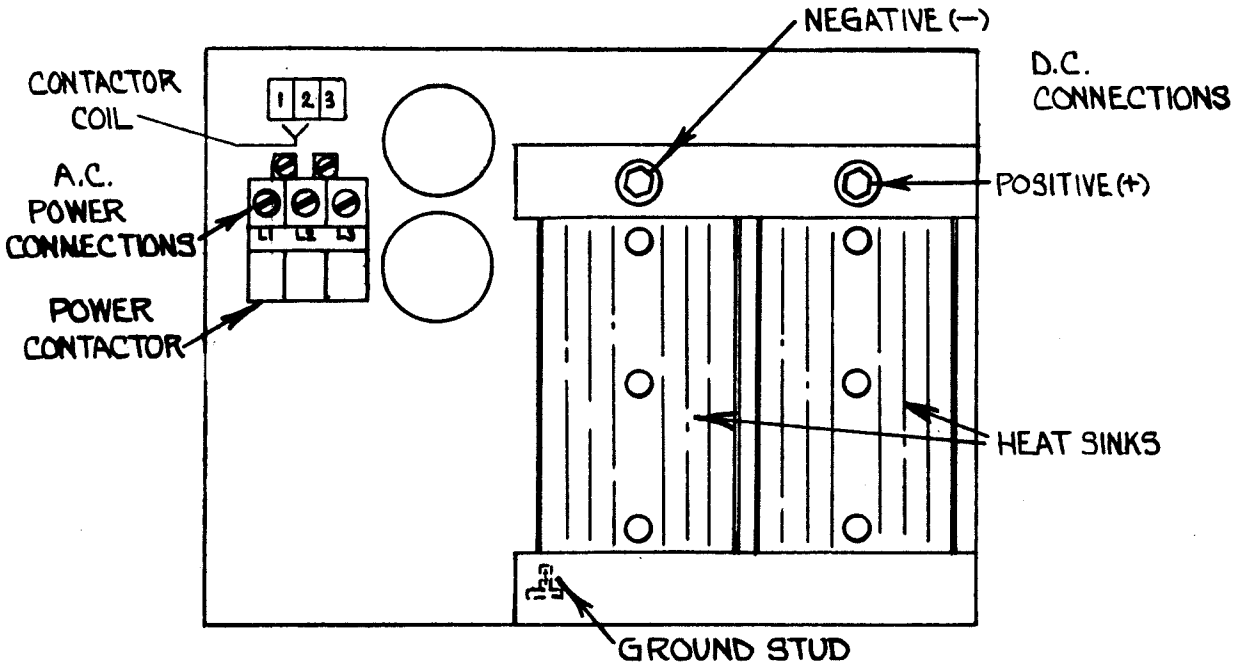


Figure 3-3

3.4 SECONDARY DC AND CONTROL CABLES

The minimum DC wire size recommended for the XPS-20S-03 power supply is No. 4 AWG. If the power supply is to be located a considerable distance from the lamphouse, heavier gauge wire should be used to minimize losses in the wire. Do not use damaged or frayed cables.

The secondary cables are connected to the 3/8 inch positive and negative terminals on the rectifier heat sinks. These terminals should be kept clean and checked periodically to insure that connections are tight.

Both ends of the negative DC cable should be marked with black tape or similar marking to ensure proper polarity of the lamphouse and power supply connections.

CAUTION

Be sure correct polarity is observed or ignition will immediately destroy the xenon bulb when power is applied.

Two No. 18 AWG control wires are required to connect 115VAC contactor power to the contactor terminal block above the power contactor. Contactor connections should be made to TB terminals 1 and 2. Refer to page 5-3. These wires terminate in the lamphouse and are described in the lamphouse manual.

An additional No. 18 AWG wire is required to connect the system ground to the ground stud at the bottom of the power supply frame.

SECTION 4 - OPERATION

4.1 GENERAL

Once installation is complete, the system is ready for operation. The following is a general description of the controls on the power supply.

4.2 POWER SUPPLY OVERLOAD CIRCUIT BREAKERS

The power supply must be protected with external power overload circuit breakers or fuses. All lines of the three phase voltage source should be breakered for 250VAC, 20 Amps maximum current. Note that these fuses or circuit breakers should be of the high inrush - time delay type to prevent nuisance tripping. (See Section 3.3)

4.3 CONTACTOR OPERATION

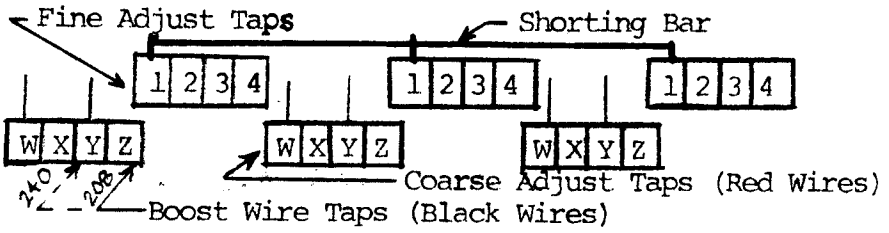
The power supply contactor coil is controlled by 115VAC from the lamphouse. Input to the contactor terminals is controlled by the power overload circuit breakers in the line disconnect box.

4.4 TAP ADJUSTMENT PROCEDURE

WARNING

BEFORE CHANGING CURRENT ON THESE SYSTEMS, DISCONNECT SYSTEM POWER AT THE MAIN BREAKER OR FUSE BOX.

Access to the current control taps is gained by removing the side cover opposite from the power connection points in the supply. The following is a general procedure for adjusting the current taps.



Coarse current changes are effected by moving each of the three wires to the appropriate letter on the "WXYZ" terminal strips. Note that "W" is the lowest current tap and "Z" is the maximum.

CAUTION

When changing the "WXYZ" taps, all three wires must be connected to the same relative terminal (W, X, Y, or Z). Failure to observe this rule will result in excessive lamp current ripple which will shorten bulb life.

Fine current adjustments are made by moving the shorting bar on the "1,2,3,4" terminal strips. The current increases with the higher numbers. Typical lamp current versus tap positions are shown in figure 4-2. Note that a one-step coarse adjustment is equivalent to five fine adjustment increments.

For initial alignment, it is recommended that the taps be set to the "W/1" positions for 240 Volt AC input, or the "X/1" positions for 208 Volt inputs. Refer to Paragraph 4.5 for boost wire positions.

4.5 BOOST RELAY CIRCUIT

The boost wires (black) are connected to the "Z" coarse-taps for 208 to 230 Volt AC input, and to the "Y" coarse-taps for 235 Volts AC and higher input. This is a one-time adjustment and need not be changed when lamp current is changed.

NOTE

On later power supplies, these boost wires are connected to the bottom terminals and are out of the way of normal course-tap terminals.

The boost relay circuit is added to improve lamp starting characteristics by boosting the lamp current for approximately two seconds after the lamp strikes. Relays K3 and K4 contacts are wired to transfer the three phase input to the high course-taps ("Y" or "Z") when they are energized. When K3 and K4 de-energize, the input is connected back to the normal operating course-tap.

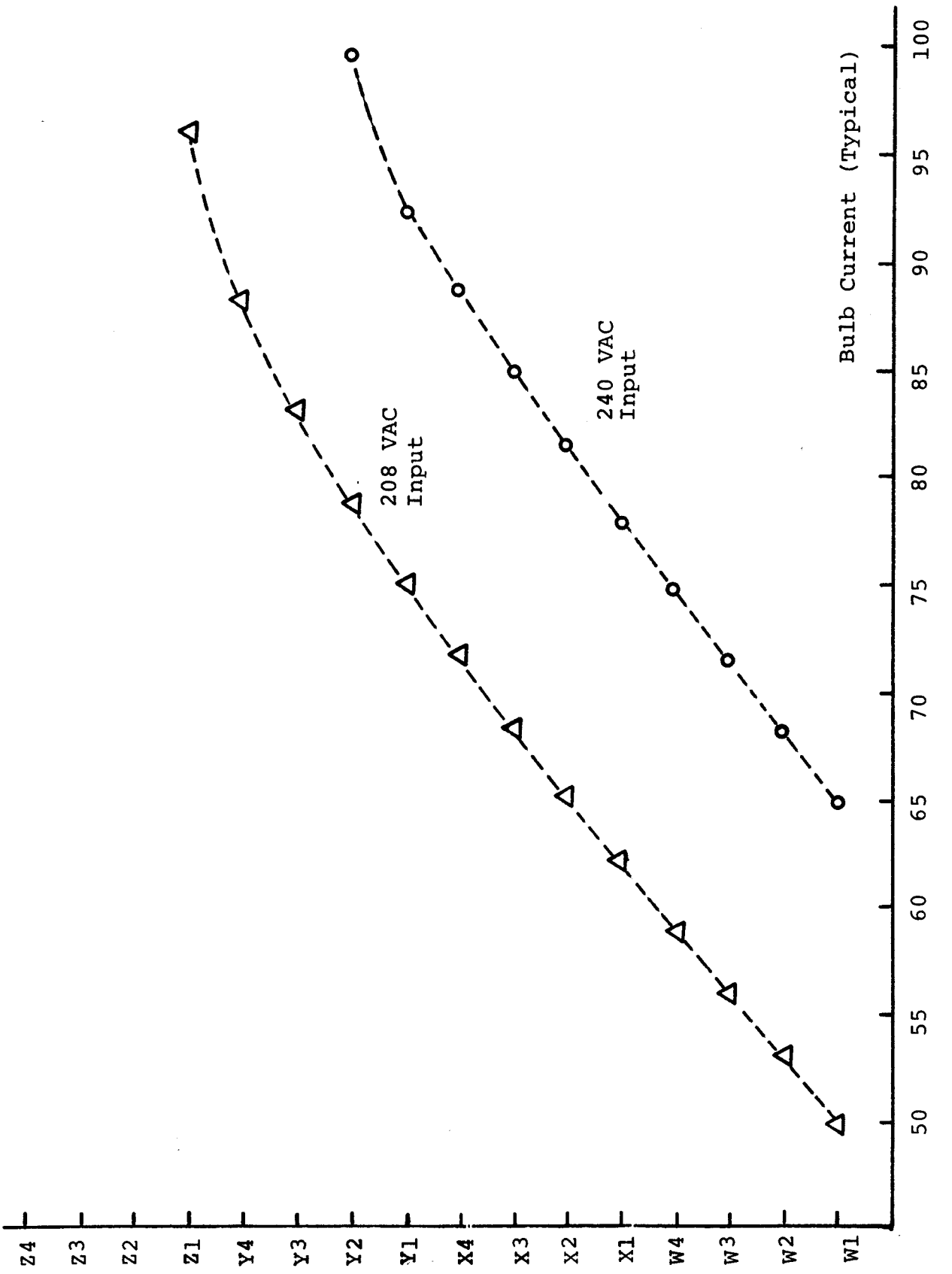


Fig. 4-2 Tap Position Versus Typical Bulb Current (XPS20S-03)

WARNING

OPEN THE BRANCH CIRCUIT OR MAIN DISCONNECT SWITCH OR REMOVE PRIMARY INPUT CIRCUIT FUSES BEFORE ATTEMPTING TO MAKE ANY INSPECTION OR PERFORM ANY WORK INSIDE THE POWER SUPPLY. PLACING THE POWER SWITCH IN THE OFF POSITION DOES NOT REMOVE VOLTAGE FROM THE POWER SUPPLY TERMINALS INSIDE THE POWER SUPPLY.

5.1 MAIN TRANSFORMER AND OTHER COMPONENTS

Clean the components inside the power supply with dry, compressed air.

5.2 PRIMARY POWER AND SECONDARY LEADS

Periodically check primary and secondary leads for tightness. The cables should be inspected frequently. Repair all breaks in the insulation or replace the cables.

Periodically check the secondary terminal connections to determine whether or not the connections are heating. If

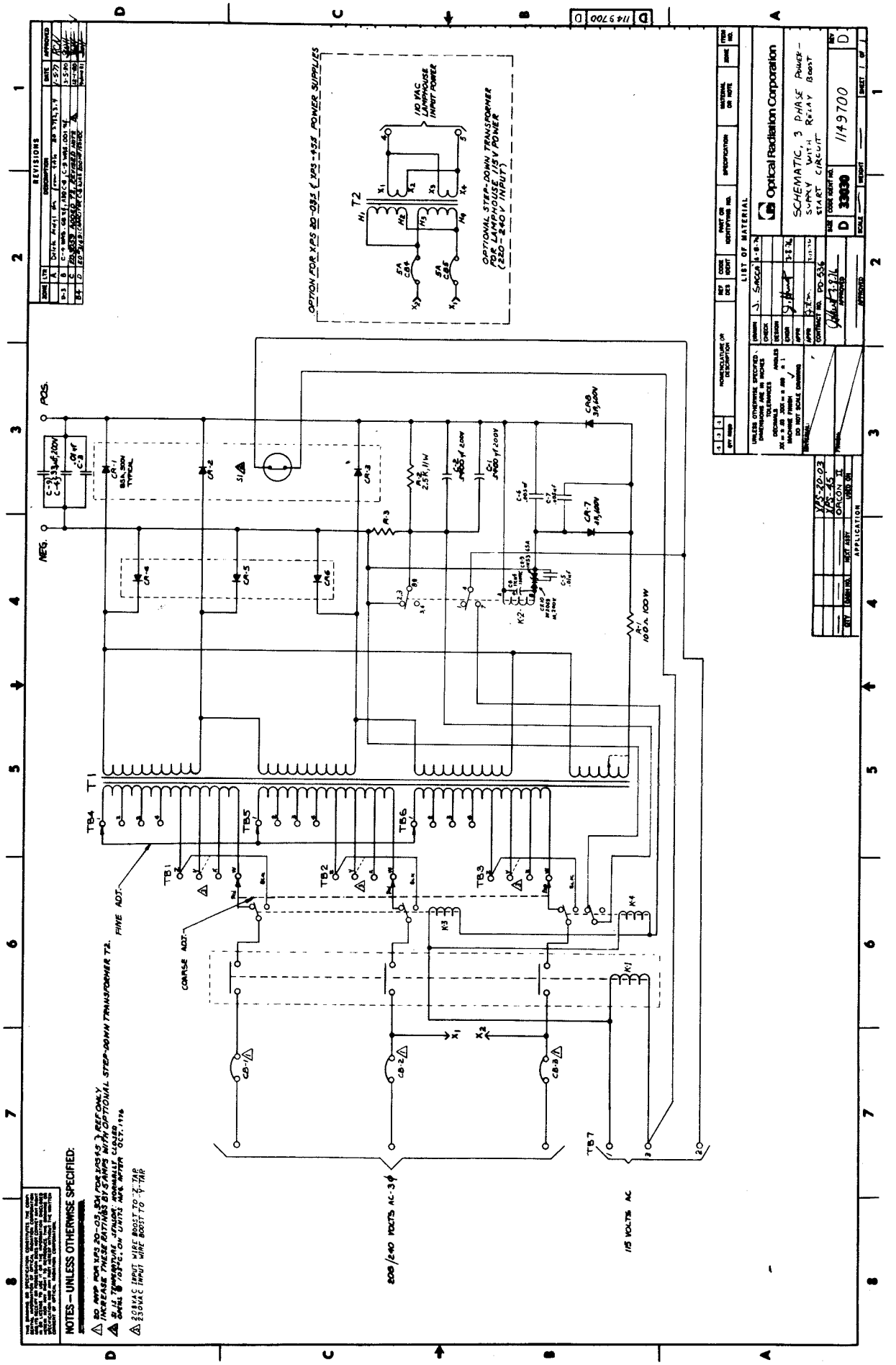
heating is occurring, take the connections apart and clean the metal. A chemical cleanser, such as Cameo or Brillo, should be used to clean the copper or aluminum connections. When chemicals are used to clean the copper or aluminum, they should be rinsed with hot water and covered with anti-oxidants, such as Mobilcote No. 203 or equivalent, to preserve the clean connections.

5.3 TROUBLESHOOTING

Whenever the power supply fails to operate properly, consult the schematic diagram, Dwg. No. 1147935 as a guide in determining the possible trouble. Consult lamphouse manual for troubleshooting procedures.

NOTE

EXCESSIVE HEAT ON POSITIVE DIODE HEATSINK WILL OPEN THERMAL SWITCH AND REMOVE POWER FROM K1 COIL. ALLOW UNIT TO COOL BEFORE RESTARTING. CHECK COOLING FANS FOR PROPER OPERATION.


Optical Radiation Corporation
SCHEMATIC, 3 PHASE POWER-SUPPLY WITH RELAY BOOST START CIRCUIT
1149700
D
13030
T1
T2
TB1
TB2
TB3
TB4
TB5
TB6
TB7
K1
K2
K3
K4
CB-1
CB-2
CB-3
CR-1
CR-2
CR-3
CR-4
CR-5
CR-6
CR-7
CR-8
COARSE ADJ.
FINE ADJ.
208/240 VOLTS AC-3φ
115 VOLTS AC
POS.
NEG.
OPTION FOR XPS 20-035 (XPS-155) POWER SUPPLIES
OPTIONAL STEP-DOWN TRANSFORMER FOR LOW-LINE (220-240 V INPUT)
120 VAC LARGE HOUSE INPUT POWER
NOTES — UNLESS OTHERWISE SPECIFIED:

The following list contains the majority of parts used in the XPS20S-03 power supply. When ordering spare or replacement parts, please specify complete part number, description, system to be used in, and quantity required. Consult your local dealer or Optical Radiation Corporation for prices.

P/N	QTY	CIRCUIT SYMBOL	DESCRIPTION	RECOMMENDED SPARE PART
4026-1840	1	B-1	Blower Fan	
2025-0C01	2	C-6/7	Capacitor (.005uf 300V)	
2043-3402	2	C-4/9	Capacitor (.33uf, 200V)	
2081-0155	1	C-8	Capacitor (1000uf, 150V)	
2085-4205	2	C-1/2	Capacitor (5400uf, 200V)	
2503-3085	2	K-3/4	Contactor	
2503-4086	1	K-1	Contactor	
2777-6031	2	CR-7/8	Diode (3A, 600V)	*
2787-4080	3	CR-1	Diode (85A, 300V)	*
2787-4081	3	CR-4	Diode (85A, 300V)	*
	1	R-3	Resistance Wire (Tophet A-14 AWG)	
2501-5150	1	K-2	Relay	
25B4-2535	1	R-2	Resistor (2.5K-11W)	
25M3-1045	1	R-1	Resistor (100Ω, 100W)	