



OPERATING AND SERVICE INSTRUCTIONS

**COMMUNICATIONS
TRANSCEIVER
MODEL SR-2000**



Figure 1. Hallicrafters' Model SR-2000 Transceiver.

154-007095

SECTION I GENERAL DESCRIPTION

1-1. INTRODUCTION.

The Hallicrafters Model SR-2000 Transceiver is a precision built, compact, high performance transceiver of advanced design. The transceiver utilizes 19 tubes plus one voltage regulator and 22 diodes in a double conversion heterodyning system for transmission and reception of single sideband (SSB) and continuous wave (CW) code signals on the 80, 40, 20, 15, and 10 meter amateur bands.

With the Model P-2000 Power Supply and an antenna, key and microphone, the equipment represents a complete desk top amateur station capable of operating at a power level equal to the maximum legal limit. The final amplifier tubes are rated at 800 watts plate dissipation.

A special feature of the Model SR-2000 is the Receiver Incremental Tuning (RIT) control. This control enables the operator to unlock the receiver frequency and tune the receiver approximately 3 KC either side of the transmitter frequency without disturbing the transmitter tuning. Flipping the RIT switch OFF automatically returns the equipment to the transceiver condition.

Another desirable feature of the Model SR-2000 is the Amplified Automatic Level Control (AALC) which functions in the transmit mode. The AALC circuitry prevents splatter, due to severe flat-topping of the final amplifier signal, by providing about 15 DB of compression at the point when flat-topping begins to occur.

Other features of the Model SR-2000 Transceiver include:

- Noise blanker circuit operating ahead of the IF filter for effective noise limiting action.
- Choice of VOX or PTT control for SSB operation and a choice of manual or automatic break-in control for CW operation.
- Upper and lower sideband operation with common carrier frequency on all bands.
- Smooth gear driven tuning mechanism with one kilocycle readout display.

- An accurately calibrated VFO with excellent mechanical and temperature stability.
- Constant tuning rate on all bands.
- Crystal lattice 1650 KC filter with 6 poles for optimum selectivity and single sideband response.
- Product detector with crystal controlled beat frequency oscillator injection for maximum stability.
- Keyed sidetone for monitoring CW transmissions.
- Excellent cross modulation and overload characteristics.
- Complete metering for the final amplifier tubes — Separate plate voltage, plate current and screen current meters.
- "S" meter for receiver and RFO metering for transmitter tuning convenience.
- Built-in 100 KC crystal calibrator for exact dial calibration.

1-2. TVI (TELEVISION INTERFERENCE) SUPPRESSION.

The Model SR-2000 Transceiver has been designed and constructed to suppress spurious radiation that may cause television interference. The TVI problem was given full consideration in the design and layout of the chassis. Components specifically selected to avoid undesired resonances and arranged to prevent parasitic oscillation have been used throughout.

There are, however, some types of TVI that cannot be prevented within the transmitter itself. This is particularly true in fringe reception areas. In such cases, a good commercial low-pass filter connected at the transceiver antenna connector is recommended. For a more complete discussion of measures that may be used to handle special problems of this type, refer to the "Radio Amateur's Handbook" published by the American Radio Relay League.

IMPORTANT

Do not attempt to operate the Model SR-2000 equipment before becoming completely familiar with the instructions contained within this manual.

SECTION II TECHNICAL SPECIFICATIONS

TUBES AND FUNCTIONS

V1	12DK6	Receiver RF Amplifier	V10	OA2	Voltage Regulator
V2	7059	Receiver and Transmitter 1st Mixer	V11	7059	2nd Transmitter Mixer and 100 KC Crystal Oscillator
V3	7059	IF Amplifier and AALC Amplifier	V12	7056	Heterodyne Oscillator
V4	12AT7	2nd Receiver Mixer and VFO Amplifier	V13	12BA6	VFO
V5	7059	Noise Amplifier and Pulse Amplifier	V14	12AT7	BFO/Carrier Oscillator and 3rd Mic. Amplifier
V6	6GX6	1st 1650 KC IF Amplifier and Blanker	V15	6AQ5	Audio Output
V7	7059	2nd 1650 KC IF Amplifier and Side Tone Amplifier	V16	8122	Transmitter Power Amplifier
V8	7059	AGC Amplifier and Meter Amplifier	V17	8122	Transmitter Power Amplifier
V9	12AT7	Product Detector and 1st Audio Amplifier	V18	12BY7A	Transmitter Driver
			V19	12AT7	1st Mic. Amplifier and 2nd Mic. Amplifier
			V20	12AT7	VOX Amplifier and Relay Amplifier

GENERAL.

Tuning Ranges Full frequency coverage of the amateur bands in eight ranges as follows:

80M	3.5 to 4.0 MC
40M	7.0 to 7.5 MC
20M	14.0 to 14.5 MC
15M	21.0 to 21.5 MC
10M	28.0 to 28.5 MC
10M	28.5 to 29.0 MC
10M	29.0 to 29.5 MC
10M	29.5 to 30.0 MC

Heterodyne Oscillator Crystals Type CR-18A/U in HC-6 holder

Band	Frequency
3.5	10,000.000 KC
7.0	13,500.000 KC
14.0	10,250.000 KC
21.0	13,750.000 KC
28.0	17,250.000 KC
28.5	17,500.000 KC
29.0	17,750.000 KC
29.5	18,000.000 KC

Types of Emission SSB - Selectable USB/LSB with suppressed carrier.

CW - Keyed RF carrier.

Frequency Control Self-contained VFO for transmit and receive modes. Separate transmitter frequency control available with Model HA-20 DX Adaptor unit.

Transmission Control Single Sideband Operation

MOX - Manual (Push-to-talk).

VOX - Voice control.

CW Operation.

MOX - Manual.

VOX - Automatic break-in.

Dial Calibration. One KC increments, 500 KC tuning range.

Calibration Accuracy. Less than 2 KC error across the dial after indexing at high frequency end of the dial. Band to band calibration error less than ± 2 KC. Internal 100 KC crystal controlled calibrator.

Frequency Stability Less than 250 cycles drift in first hour, after a fifteen minute warm-up, and less than 100 cycles per hour thereafter.

Tube and Diode Complement 19 tubes plus one voltage regulator and 22 diodes. See table of Tubes and Functions.

Cable Connector Data	Front Panel
	MIC connector - Amphenol type 80-MC2M.
	PHONES jack - Standard 1/4-inch two conductor phone plug.
	Rear Cabinet
	KEY jack - Standard 1/4-inch two conductor phone plug.
	ANTENNA connector - Mil. No. PL-259 (49190) UHF series.
	RCVR AUDIO (500 OHMS) connector - Standard RCA phono plug.
	POWER connector - Cinch-Jones type S-312-CCTL (12-pin plug).
	HI-VOLTAGE connector - Cinch-Jones type S-2402-CCT (2-pin plug).
	ACCESSORY connector - Amphenol type 86-PM11 (11-pin plug).
Power Supply Requirements	Model P-2000 (Refer to data for Model P-2000 Power Supply).
Construction	Light weight aluminum.
Dimensions (HWD)	7-3/4 x 16-1/2 x 15 inches.
Net Weight	26 pounds.
Shipping Weight	30 pounds.
TRANSMITTER	
Power Input*	SSB HIGH POWER - 2000 watts PEP.
	SSB LOW POWER - 1000 watts PEP.
	CW - 900 watts maximum.
Power Output*	SSB HIGH POWER - 1000 watts PEP.
	SSB LOW POWER - 500 watts PEP.
	CW - 500 watts.
*Slightly lower on 15M and 10M bands.	
Output Impedance	50 ohms nominal. Adjustable, 40 to 70 ohms essentially non-reactive.
Type of Sideband Generation	Solid state modulator with 1650 KC, 6 pole crystal filter. (Nominal 3 DB BW = 2.1 KC.)
Microphone Input	High impedance. Input sensitivity of 5 millivolts RMS or less for PEP output.

Audio Response Overall	500 to 2400 CPS (6 DB).
Distortion Products	30 DB signal to distortion ratio.
Unwanted Sideband Rejection.	50 DB below desired output at 500 to 2500 CPS input.
Carrier Suppression Capability.	60 DB below PEP output.
Spurious Emission	50 DB or more below PEP output.
CW Side Tone	800 CPS nominal.

RECEIVED

Antenna Input	50 ohms nominal.
Audio Output Impedance	3.2 ohms and 500 ohms.
Sensitivity	One microvolt or less for 20 DB signal to noise ratio.
Audio Output	One watt with less than 10% distortion.
Dual Conversion System	First IF = 6 MC to 6.5 MC Second IF = 1650 KC with crystal lattice filter.
Crystal Lattice Filter	Six pole, symmetrical passband. Center frequency = 1650 KC. B/W = 2.1 KC (3 DB). B/W = 4.2 KC (50 DB). Carrier frequencies: USB = 1651.550 KC. LSB = 1648.550 KC.
AVC Figure of Merit	60 DB or more RF input change for less than 10 DB change in audio output.
RIT Frequency Range	4 KC minimum.
In Band Tweets	Less than one microvolt equivalent CW signal.
First IF Rejection	Better than 46 DB (4.0 MC and 7.0 MC). Better than 60 DB at all other frequencies.
Image and Spurious Rejection	Better than 50 DB.

ACCESSORIES

Model P-2000 Power Supply

Styled as a companion unit to the Model SR-2000 Transceiver, the power supply also contains the speaker and final amplifier plate metering facilities for the transceiver. The speaker is a 3 X 5-inch unit with a frequency response optimized for the voice frequency range.

Two meters provide for monitoring the final amplifier plate current (0 to 1 ampere) and plate voltage (0 to 5 kilovolts). The metering circuits employed, permit the meter cases to operate at ground potential thereby avoiding a shock hazard.

Solid state silicon rectifiers are employed throughout for cool, maintenance free operation.

The low voltage circuits such as heater supply, low B+, receiver audio, etc. are carried in one cable with a 12-pin connector while the final amplifier plate and screen supply voltages are carried in a separate cable and plug termination to provide a maximum safety factor.

The power supply is shipped from the factory with the line cord wired and fitted with the plug for 115V, 2-wire service. A line cord plug is also supplied for use with 230V, 3-wire service.

Line protection is provided by two 12-ampere fuses wired so that they operate in series from a 230-volt AC source and in parallel from a 115-volt AC source. The use of one size fuse for either source voltage avoids the possibility of incorrect line protection.

Diode Complement - 9 silicon diodes.

Fuse Ratings -

12 Ampere 250V type 3 AB.
3 Ampere 250V type 3 AC.

Power Supply Requirements -

115V, 2-wire or 230V, 3-wire AC,
60 cycles, single phase.

Input Power Requirements -

Transmit - 2300 Watts.
Receive - 175 Watts

Dimensions (HWD) - 7-3/4 x 10-5/6 x 15 inches.

Net Weight - 61 pounds.

Shipping Weight - 65 pounds.

Model HA-20 DX Adapter

Styled to complement the Model SR-2000 Transceiver, the DX adapter contains a VFO unit equal to the VFO in the Model SR-2000 and a VSWR bridge.

The VFO in the DX adapter provides separate transmitter frequency control which will allow reception with the Model SR-2000 VFO outside the American Amateur bands and transmission, via the DX adapter VFO, within the American bands. Dial calibration of the DX adapter VFO, through the Model SR-2000 Transceiver and calibrator, provides transmitter frequency control equal to that of the Model SR-2000 Transceiver.

The VSWR bridge metering and forward/reverse RF power switching are contained within the DX adapter. The bridge module connected into the antenna transmission line is designed to handle the full PEP output of the Model SR-2000. With a continuous VSWR check available, the operator knows at all times whether his antenna system is functioning properly.

The DX adapter receives power from its own 115V AC line cord. The control and signal circuits are carried to the Model SR-2000 through the ACCESSORY cable connector.

Power Supply Requirements -

115V AC, 60 cycles, 20 watts.

Dimensions (HWD) - 7 x 10-5/8 x 8 inches.

Net Weight - 9 pounds.

Shipping Weight - 12 pounds.

SECTION III INSTALLATION

3-1. UNPACKING.

After unpacking the Model SR-2000 Transceiver and Model P-2000 Power Supply, examine them carefully for possible damage that may have occurred in transit. If the equipment has been damaged, file a claim immediately with the carrier, stating the extent of the damage. Carefully check all shipping labels and tags for special instructions before removing or destroying them.

The power supply unit is shipped on a wood platform to support its weight. To remove the shipping platform, carefully turn the power supply unit over and set it down bottom side up. When handling the power supply, keep in mind that it weighs around 60 pounds. Remove the four shipping platform mounting screws (No. 10 x 3/4 - inch) and lift the platform clear. Mount the four cabinet feet with the No. 10 x 1/2 - inch screws

and flat washers supplied. The cabinet feet are fastened to the cabinet and chassis in the same mounting holes that were used for attaching the shipping platform. Be sure to install the flat washers between cabinet feet and the heads of the screws. DO NOT USE THE No. 10 x 3/4 - INCH SHIPPING PLATFORM HARDWARE TO FASTEN THE CABINET FEET.

Set the power supply unit back on its feet.

3-2. LOCATION.

The Model SR-2000 Transceiver and Model P-2000 Power Supply are, for operating convenience, designed to be placed side by side. The power supply may be located on either side of the transceiver unit as desired. It is very important that the transceiver be placed in an operating position that provides unobstructed circulation of

air directly behind and at the top of the unit. The air intake for the cooling blower is located at the rear of the cabinet and the unit exhausts the warm air out the top of the cabinet. **UNDER NO CIRCUMSTANCES SHOULD ANY OBJECT BE PLACED ON TOP OF EITHER CABINET WHICH WOULD OBSTRUCT NORMAL FLOW OF THE COOLING AIR.**

3-3. POWER SOURCE.

The Model P-2000 Power Supply for the Model SR-2000 Transceiver is designed to operate from either 115-volt, 2-wire, or 230-volt, 3-wire 60 cycle single phase service. Operation from 230-volt, 2-wire service, available in many countries will necessitate the use of an additional conversion transformer. Details for this type installation may be obtained by contacting The Hallicrafters International Division, 4401 W. 5th Avenue, Chicago, Illinois, 60624.

Under peak power input conditions, the equipment may draw in excess of 10 amperes from 230-volt service or in excess of 20 amperes from 115-volt service. This power requirement will generally exceed the capabilities of most home 115-volt wall outlets. If the station is to operate from a 115-volt outlet, a separate circuit rated at 30 amperes should be provided.

3-4. PRIMARY POWER CONNECTIONS.

The power supply is shipped from the factory with the line cord wired for 115-volt service outlets. The junction box wiring for the line cord may be exposed for inspection by removing the back cover of the power supply. The cover is held in place with two screws. See figure 2.

Note that the line cord wiring for 115-volt service requires that one side of the line shall be connected to terminals 1, 2 and 5 and the other side of the line shall be connected to terminals 3 and 4. The ground pin of the line cord plug is wired to the ground bolt on the chassis (Green lead).

If the equipment is to operate from a 230-volt, 3-wire, 60 cycle single phase service outlet, make the following changes in the power supply terminal strip wiring.

A. Disconnect the line cord leads (three leads) and all jumpers connected to the terminal strip and to the chassis ground bolt. Retain the jumper wires for possible re-use.

B. Connect terminal 2 to terminal 3, using the short jumper wire just removed in step A.

C. Connect the green line cord lead to terminal 5. This is the neutral wire of the three wire system.

D. Connect one of the two remaining line cord leads (black or white) to terminal 1 and the other to terminal 4. This completes the terminal strip wiring for 230-volt operation.

E. Disconnect and remove the line cord plug supplied for 115-volt service. A 230-volt service plug has been supplied with the power supply for this purpose. Install and wire the 230-volt service plug, connecting the green neutral lead to the neutral pin and the black and white leads to each of the blade contacts. If the 230-volt service outlet does not match the style plug supplied, obtain a matching plug and wire as required. Make sure the green line cord lead is connected to the neutral terminal of the service outlet.

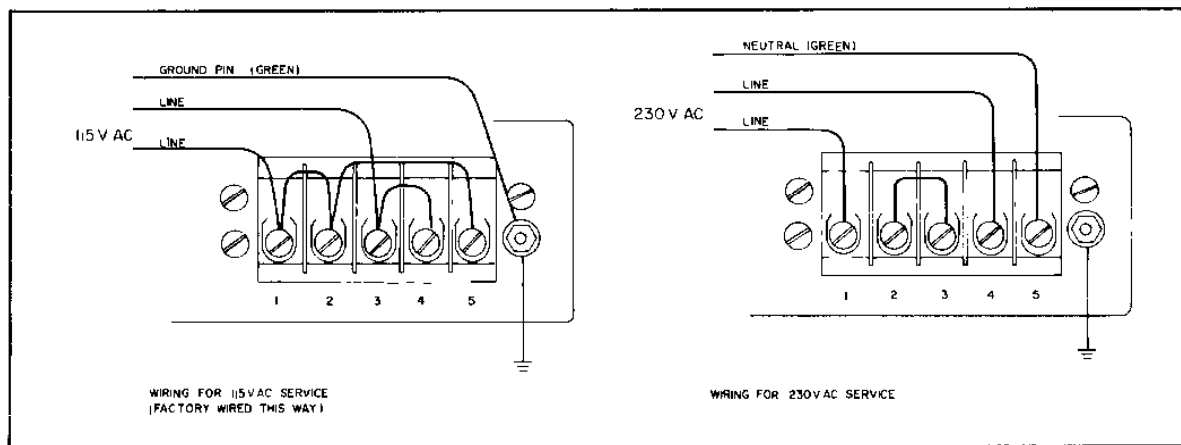


Figure 2. Model P-2000 Power Supply, Primary Power Connections.

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CAUTION

THE VOLTAGES USED IN THE MODEL SR-2000 AND MODEL P-2000 ARE LETHAL. NEVER DEFEAT THE SAFETY INTERLOCK OR WORK INSIDE THE CABINETS OF EITHER UNIT WITH PRIMARY POWER CONNECTED.

3-5. INTER-CONNECTING THE TRANSCEIVER AND POWER SUPPLY.

The line cord must not be connected to the service outlet while interconnecting the two units. Interconnect the two units as follows:

A. Plug the 12-pin low voltage cable connector into the transceiver receptacle marked POWER, located at the rear of the transceiver cabinet.

B. Plug the 2-pin high voltage/screen voltage cable connector (two wire cable) into the mating receptacle at the rear of the transceiver cabinet near the top.

C. Interconnect the GROUND studs of the transceiver and power supply with the lugged ground braid supplied. Clamp the lugs of the braid between the flat washers of the ground studs and tighten the stud nuts securely. This braided ground strap acts as a safety bond between the power supply and transceiver units since it backs up the ground wire in the low voltage cable. Reference should be made to figures 3, 4, and 5 when interconnecting the two units.

3-6. GROUND CONNECTION.

In the interest of safety, it is strongly recommended that the Model SR-2000 and Model P-2000 units be grounded to a cold water pipe or good electrical earth ground. Station equipment that is left unbonded between units or between the equipment and ground may assume potential differences that could present a shock hazard.

In addition to the braided bond between the transceiver and power supply, connect a No. 14 ground wire or 1/8 inch tubular braid between the power supply ground stud and a cold water pipe or outside ground stake.

3-7. ACCESSORY CONNECTOR.

As shipped from the factory, the Model SR-2000 ACCESSORY receptacle will have a jumper plug (P1) installed to permit normal operation of the transceiver. Should the Model HA-20 DX

Adaptor be added to the station set-up, remove the jumper plug and connect the mating cable connector from the Model HA-20 in its place.

3-8. ANTENNA CONNECTION.

The Model SR-2000 Transceiver is designed to terminate in a 50-ohm unbalanced transmission line.

While a non-reactive 50-ohm load is preferred for optimum results, a VSWR of 2:1 can be accommodated by the transmitter with acceptable results. Many of the popular di-pole or beam antennas using 50-ohm transmission lines will give excellent results.

For more detailed information on the subject of antennas, refer to the "Radio Amateur's Handbook" or the "ARRL Antenna Book" both published by the American Radio Relay League.

IMPORTANT

Some form of lightning protection should be provided which will comply with local code requirements.

The ANTENNA connector located on the rear chassis apron of the Model SR-2000 Transceiver mates with a Mil. No. PL-259 (49190) UHF series coaxial connector. Use 52-ohm Mil. No. RG-6/U coaxial cable or equivalent for the feed line to the station antenna system.

Antenna systems with terminating impedance other than 50 ohms will require an impedance matching device capable of handling RF power of better than one kilowatt PEP.

CAUTION

NEVER OPERATE THE MODEL SR-2000 TRANSCEIVER AS A TRANSMITTER WITHOUT A MATCHED ANTENNA OR ADEQUATE DUMMY LOAD TERMINATION. ILLUMINATING LAMPS WILL NOT PRESENT A CONSTANT LOAD IMPEDANCE. DAMAGE TO THE POWER AMPLIFIER TUBES AND PI NETWORK COMPONENTS IS POSSIBLE IF THE EQUIPMENT IS OPERATED AS A TRANSMITTER UNLOADED. DO NOT OPERATE THE TRANSMITTER INTO AN ANTENNA SYSTEM HAVING A HIGH VSWR ON ITS TRANSMISSION LINE.

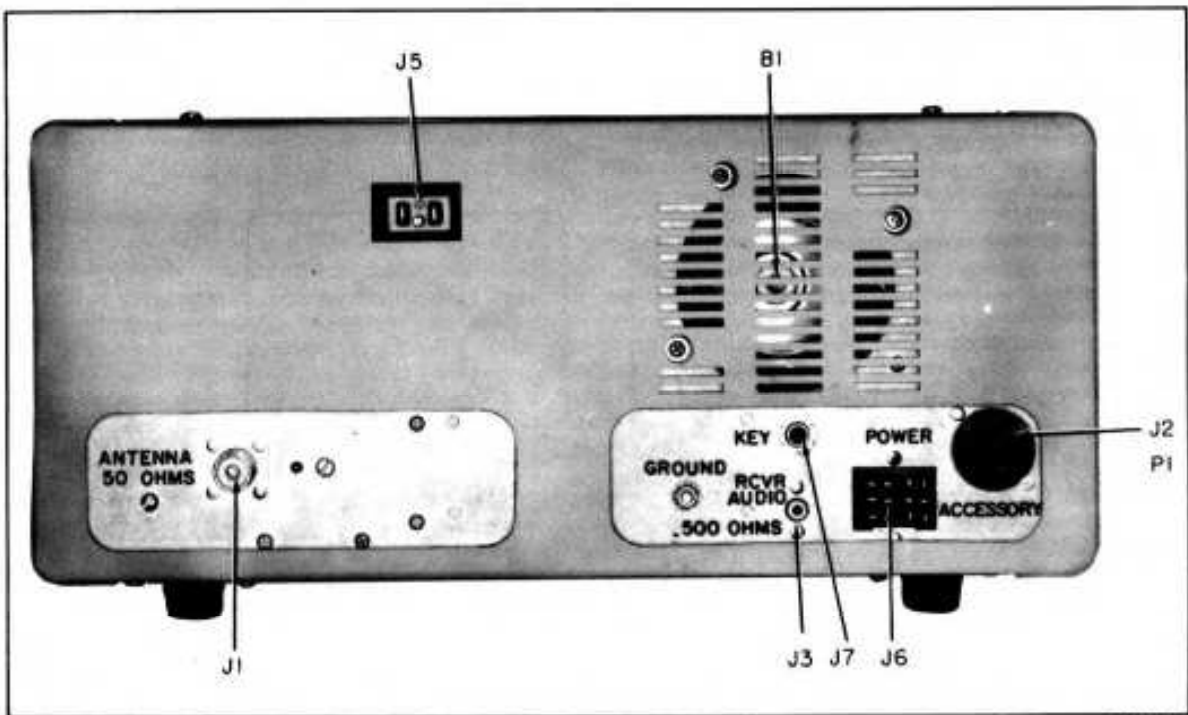


Figure 3. Model SR-2000 Transceiver, Rear View.

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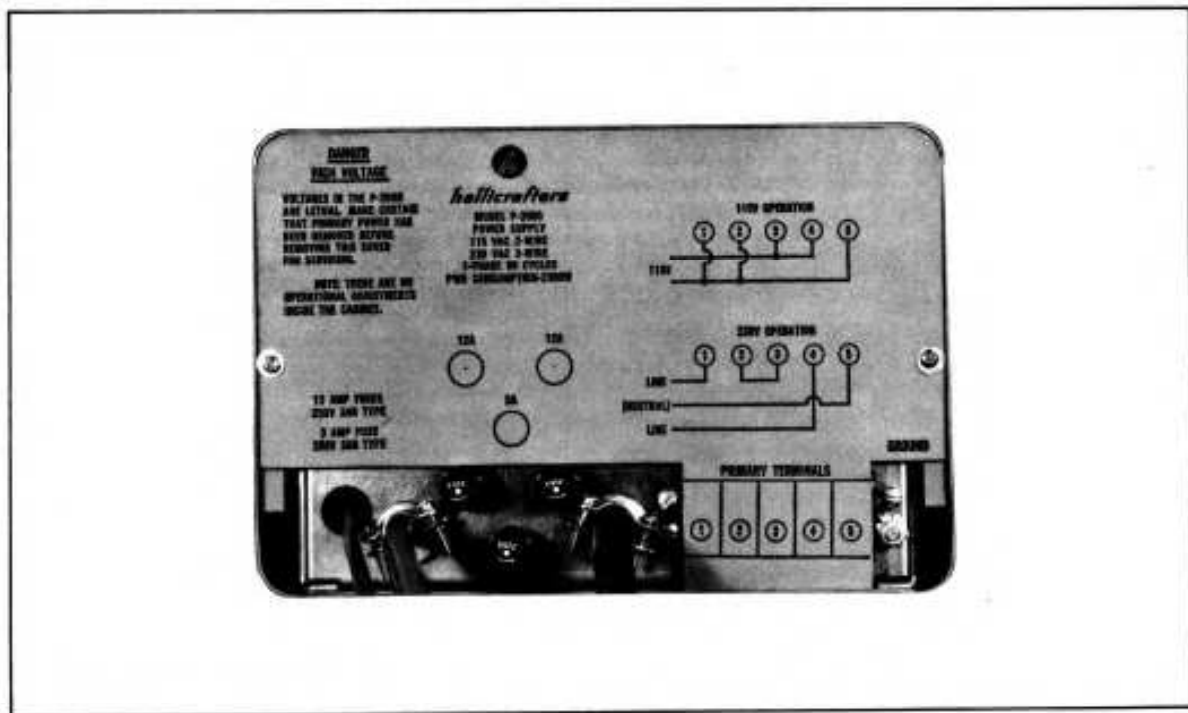


Figure 4. Model P-2000 Power Supply, Rear View.

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