



PM300 SERIES

Power Master

OPERATING AND SERVICE MANUAL

Manufactured by
SHURE BROTHERS INC.
222 Hartrey Avenue
Evanston, Illinois 60204 U.S.A.

PM300 SERIES SPECIFICATIONS

Amplifier Type	All silicon transistor power amplifier
Power Output	100 watts continuous (RMS) to 8 ohm load (see Figure 3, Page 4)
Voltage Gain	30 db (8 ohm load)
Sensitivity	1.0 volt (8 ohm load, full rated output)
Frequency Response	± 0.3 db, 100 Hz. to 10,000 Hz. (typical) ± 1.5 db, 35 Hz. to 25,000 Hz. (typical)
Input Impedance	40,000 ohms
Distortion.....	5% maximum at rated output at 1 KHz.
Hum and Noise	80 db below rated output
Speaker Load Impedance	Nominal 8 ohms (Operational 5.3 ohms minimum, see Page 4)
Dimensions	178 mm height x 429 mm width x 229 mm depth (7 in. x 16-7/8 in. x 9 in.)
Weight: PM300	10 kg (22 lb)
PM300E and PM300E6	10.45 kg (23 lb)
Finish	Gray, black and bright metal
Ambient Temperature Range	-7° C. to 43° C. (20° F. to 110° F.) without derating
Power Supply: PM300	120 volts, 60 Hz.
PM300E	120/240 volts, 50/60 Hz.
PM300E6	100, 120, 140, 200, 220, or 240 volts, 50/60 Hz. switch selectable
Power Consumption40 watts with no signal; 160 watts with 1 KHz. signal and 100 watts output. 400 watts maximum.

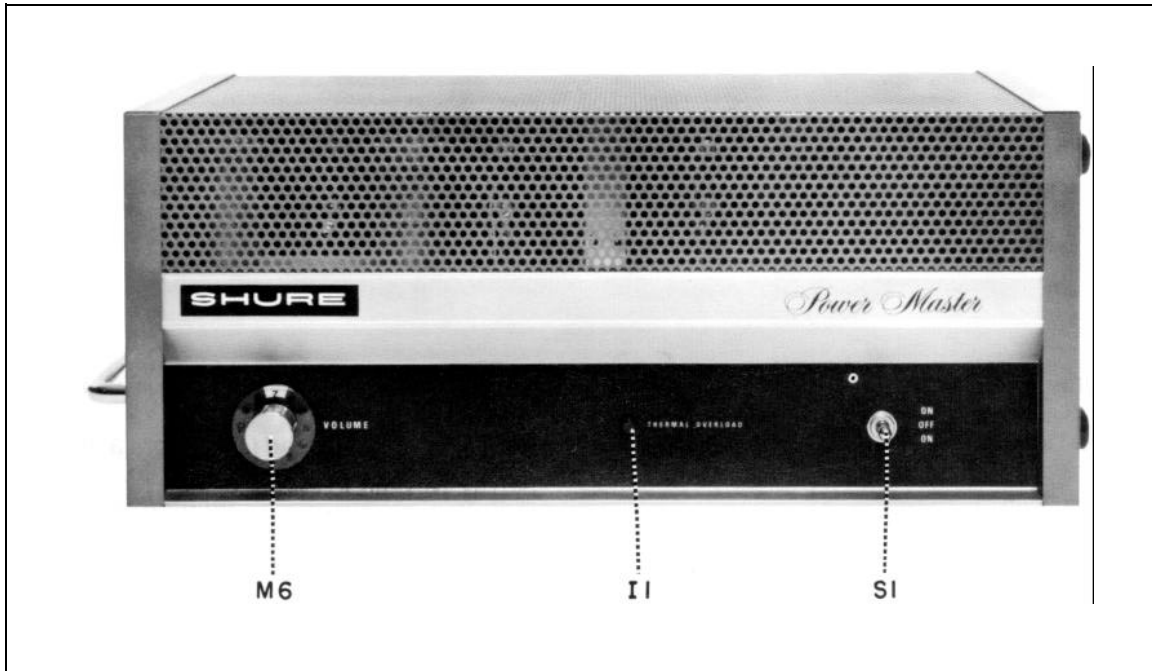


FIGURE 1.

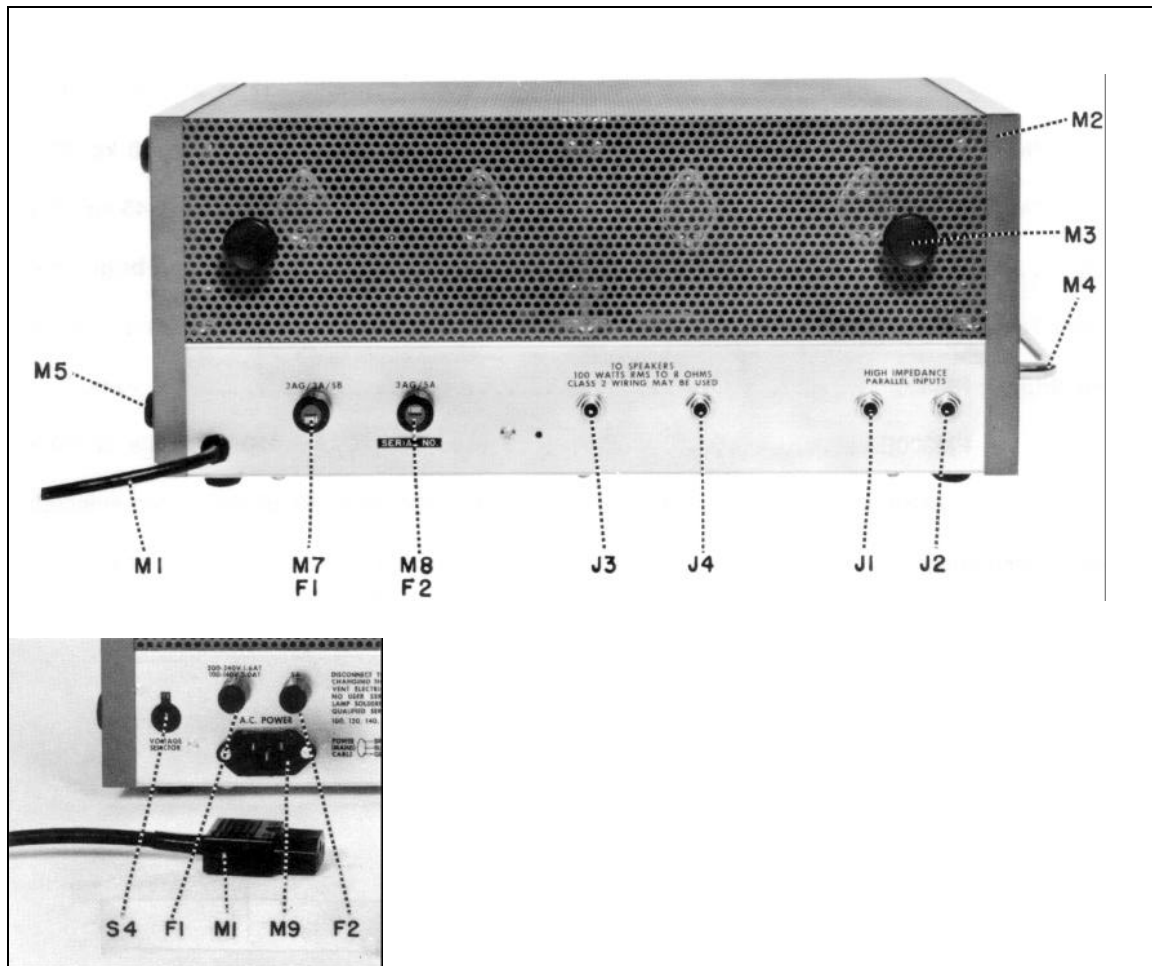


FIGURE 2.

DESCRIPTION

The Shure Power Master is a solid state booster power amplifier capable of delivering 100 watts RMS to an 8-ohm load. It has been designed specifically for use in conjunction with the Shure VA300-C and VA302-C Series Vocal Master Amplifiers.

When used as a booster amplifier in conjunction with the Shure Vocal Master Amplifier, the Power Master will effectively increase area coverage, provide higher sound levels and increase reserve power. Several Power Master Amplifiers may be interconnected to provide even greater power when required. This unit is ideally suited for use in theatres, auditoriums, stadiums, college field houses, hotel ballrooms, convention halls and wherever maximum coverage with reserve power is required.

Silicon transistors and similar solid-state devices are used throughout the unit. The circuitry design protects the solid-state components and eliminates the need for special operating precautions. All components are of the highest quality and are operated well within their respective tolerances to assure maximum stability under normal use conditions.

The PM300 is listed by Underwriters' Laboratories, Inc., and CSA Testing Laboratories listed as certified.

EQUIPMENT DESIGNED FOR USE WITH THE PM300 SERIES POWER MASTER AMPLIFIERS

VA300-C	Vocal Master Console
VA302-C	Vocal Master Console
VA302E-C	Vocal Master Console
VA302E6-C	Vocal Master Console
VA300-S	Vocal Master Speaker Column
VA301-S	Vocal Master Monitor Speaker
P300R	Rack Panel Mount Accessory

GUARANTEE: This Shure product is guaranteed in normal use to be free from electrical and mechanical defects for a period of one year from the date of purchase. Please retain proof of purchase date. This guarantee includes all parts and labor.

SHIPPING INSTRUCTIONS: Carefully repack the unit and return it prepaid to the factory. If outside the United States, return the unit to your authorized Shure Service Center for repair. The unit will be returned to you prepaid.

SERVICE: If information or service should be required, contact your local Shure Vocal Master dealer explaining your difficulty in detail. In addition, the Shure factory service department will be ready to assist you immediately upon request.

PM300 Series Power Master Operating Instructions

Input Connections:

Two parallel-wired input connectors are provided on the rear panel of the Power Master. These connectors are standard phone jacks (J1 and J2).

The Power Master may be driven to full rated output, to an 8-ohm load, by any control-center amplifier, preamplifier, or microphone mixer which is capable of delivering one volt across a 40,000-ohm load.

When using a Shure VA300-C or VA302 Series Vocal Master Console as the control amplifier, connect the cable supplied with the Power Master to the jack marked "To Tape Recorder" on the VA300-C,* or to the jack marked "Aux. Hi Level Output" on the VA302 Series Console, connect the other end of the cable to one of the jacks marked "High Impedance Parallel Inputs" on the Power Master.

Since the two input jacks of the Power Master are wired in parallel, one jack may be used as an auxiliary, high level, output to feed the signal to another Power Master or other booster amplifier. Tape recorders may also be fed from one of the input jacks of the Power Master to the recorder's high impedance auxiliary input. (When used in this manner, the inputs are serving as a junction or "Y" connector for the Power Master source.)

Additional Power Master Amplifiers may be added to the system by interconnection from an input jack on one Power Master to an input jack on another Power Master.

When used in conjunction with a Shure VA300-C or VA302 Series Vocal Master Console, a setting of approximately "7" on the volume control (M6) of the Power Master will provide equal output from the Vocal Master Console and the Power Master when each is connected to equivalent speaker loads.

Up to a total of 15m (50 ft) of single conductor, shielded, low capacitance cable (such as Belden #8401, 8410, or 8411) may be used to interconnect the Power Master Amplifiers and the preamplifier. Where longer cable lengths are required, it is suggested that the Power Master Amplifiers be driven by a 600-ohm line from a mixer or control center amplifier, such as the Shure M67 or M63, to avoid high frequency signal loss.

Output Connections:

Two parallel-wired output connectors are provided on the rear panel of the Power Master. These connectors are standard phone jacks (J3 and J4).

Full rated output of the amplifier is obtained when the speaker load is 8 ohms (two VA300-S Speakers). Speaker loads of less than 5.3 ohms (more than three VA300-S Speakers) should not be used with this amplifier. No damage to the speakers or amplifier will occur, but thermal shutoff of the amplifier may result. NOTE: With the amplifier driven at or near full power, pilot lamp will dim or vary in brightness; this is a normal condition.

It should be noted that various speaker loads will affect the output power of the amplifier. See Figure 3, Page 4 to determine amplifier output power for the given speaker load.

WARNING: Do not interconnect the speaker *output* jacks or the speaker cables between two Power Master Amplifiers or the Power Master and any other amplifier. This may result in damage to one or both amplifiers, and is not covered by the Guarantee.

*NOTE: Although most VA300-C Vocal Master Consoles have a "phone-type" "To Tape Recorder" jack, a limited number of early production Consoles have a "phono-type" jack for this function. If an early Vocal Master Console is used, an adapter (such as the Switchcraft No. 336A) should be added, or one end of the connecting cable rewired with a phono plug (such as a Switchcraft No. 3502).

The Power Master does not use speaker output matching transformers and thus avoids the distortion, power loss and added weight inherent in such transformers. The speaker output voltage is 28.3 volts, to an 8-ohm load, for 100 watts. This allows long speaker lines with wiring practices consistent with those used for 25-volt speaker lines.

Up to 30 m (100 ft) of #18 gauge two-conductor cable (such as Belden #8452, 8478, 8460, or 8461) may be used to connect from the Power Master to each 16-ohm (VA300-S) speaker. Greater cable lengths require heavier gauge wire to avoid appreciable power loss in the speaker cable. For 30 to 51 m (100 to 170 ft), use #16 gauge; 51 to 81 m (170 to 270 ft), use #14 gauge; and 81 to 128 m (270 to 425 ft), use #12 gauge wire. To maximize the power to each speaker, a separate cable should be used to connect each speaker to the Power Master.

Speakers:

Selection of speakers for use in a vocal music system is most critical. The factors which most significantly contribute to an outstanding vocal speaker system are correct frequency range, distortion-free reproduction, and enough sound power to fully penetrate the audience area.

The Shure VA300-S Speaker Column has been designed to provide all of these features. It is recommended that VA300-S Speaker Columns be used in pairs, each column having a nominal impedance of 16 ohms, which provides an impedance of 8 ohms when two are used. Each column utilizes two special 10-inch speakers and four special 8-inch speakers, and has a total speaker cone area of 2,310 cm² (358 in²) per column. The VA300-S Speaker Column delivers virtually uniform penetrating power over a 140° angle in the horizontal plane and a 65° angle in the vertical plane. The rear-ported enclosure of the VA300-S contributes to its highly directional pattern, which is critical in achieving maximum audience penetration and reduction of feedback.

The Shure VA301-S Speaker Column is intended primarily for use as an "on-stage monitor." While this speaker meets all of the criteria for an excellent vocal system speaker, its area of coverage is more localized than that of the VA300-S. The nominal impedance of the VA301-S is 32 ohms, so that when used in conjunction with two VA300-S Speaker Columns, the total system impedance becomes 6.4 ohms. An integral volume control on the VA301-S permits its use on-stage as a monitor at the highest possible sound level without feedback.

The following list shows various speaker combinations and the resultant impedance loads which are suitable for use with the Power Master:

QUANTITY and SPEAKER MODEL	IMPEDANCE OHMS (NOMINAL)
1 VA300-S	16
2 VA300-S	8
3 VA300-S	5.3
1 VA301-S	32
2 VA301-S	16
3 VA301-S	10.6
4 VA301-S	8
5 VA301-S	6.4
6 VA301-S	5.3
1 VA300-S and 1 VA301-S	10.6
1 VA300-S and 2 VA301-S	8
1 VA300-S and 3 VA301-S	6.4
1 VA300-S and 4 VA301-S	5.3
2 VA300-S and 1 VA301-S	6.4
2 VA300-S and 2 VA301-S	5.3

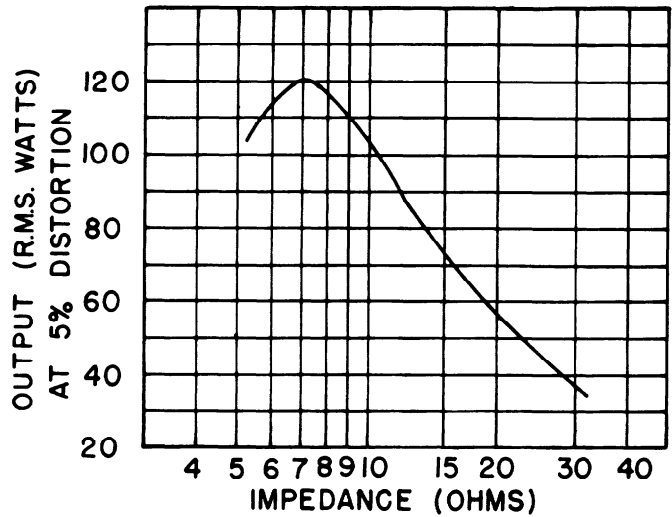


FIGURE 3. Typical output power vs. speaker load impedance for the Power Master

PM300 Power Requirements:

The PM300 Power Master is furnished with a three conductor power cable and three-prong plug. Connect the power cable to an outlet which supplies 120 ±10% volts A.C., 60 Hz power. The three-position toggle switch on the front panel controls power to the amplifier. This switch (S1) is also used to reverse line polarity, for minimum hum. If extension cords are required to supply power to the PM300, a high quality #18 gauge or larger cord should be used.

PM300E Power Requirements:

The PM300E Power Master is furnished with a three-conductor power cable without a plug. To connect a plug to the power cable, attach the brown lead to the live (+) terminal of the plug, attach the blue lead to the neutral (-) terminal of the plug, and attach the green-yellow lead to the earth-ground terminal of the plug.

The PM300E is factory wired for operation from a nominal 240 volt power supply. Connect the power cable to an outlet which supplies 240 ±10% volts A.C., 50 to 60 Hz power. The three-position toggle switch on the front panel controls power to the amplifier. This switch (S1) is also used to reverse line polarity, for minimum hum. If extension cords are required to supply power to the PM300E, a high quality cable with conductors of 0.75 square millimeters cross-section or larger should be used.

An internal modification performed by competent personnel will allow the PM300E to be used with 120 volt, 50 to 60 Hz power. To change the power supply wiring for 120 volt operation, do the following:

1. UNPLUG THE AMPLIFIER POWER (MAINS) CABLE.
2. Remove the bottom plate as described on page 6.
3. With the amplifier upside down, note the six wires from the power transformer T1.
4. Unsolder the yellow-black transformer lead wire and the red-black transformer lead wire from their solder-lug.
5. Resolder the yellow-black lead wire to the solder-lug to which the all-black transformer lead wire is already attached.

6. Resolder the red-black lead wire to the solder-lug to which the green-black transformer lead wire is already attached.
7. Reinstall the bottom plate.
8. Remove the four screws from the nameplate on the handle end of the amplifier. Turn the nameplate over and reinstall. The nameplate nomenclature will now be suitable for 120 volt use.

To change the PM300E back for use with 240 volt power, reverse the above steps. Be careful to reconnect the yellow-black and red-black transformer lead wires to an UNUSED-UNGROUNDING solder-lug. A pictorial diagram of the transformer lead wire connections is located on the inside of the bottom cover. The circuit diagram for both 120 volt and 240 volt operation is shown on page 10 of this manual.

PM300E6 Power Requirements:

The Model PM300E6 is supplied with a detachable three-conductor A.C. power (mains) cable without a connector on the "mains" end. To attach a connector, connect the brown conductor of the cable to the "live" terminal of the connector, the blue conductor to the "neutral" terminal, and the green-yellow conductor to the "earth" (⊕) terminal.

The PM300E6 is designed to operate from 100, 120, 140, 200, 220, or 240 volts, 50 to 60 Hertz power (mains). An integral voltage-selector switch, located on the rear panel, allows selection of the proper voltage.

As shipped from the factory, the PM300E6 is set to operate from 240 volts.

The A.C. fuseholder, located nearest the voltage-selector switch, contains a 1.6 ampere slow-blow fuse (1.6 AT) which should be used when the unit is operated from 200 through 240 volts. When operated from 100 through 140 volts, this fuse should be changed to a 3 ampere slow-blow type (3.0 AT). The fuseholder located farthest from the voltage-selector switch contains a 5 ampere (5.0 A) fuse which should not be replaced by other values under any circumstances. Each of the three fuses mentioned is a 5mm x 20mm type, and two of each value are supplied with the unit.

CAUTION - DO NOT CHANGE VOLTAGE-SELECTOR SWITCH SETTING OR ATTEMPT TO REPLACE FUSES WITHOUT FIRST DISCONNECTING THE A.C. POWER (MAINS) CABLE.

Ventilation:

The Power Master has been designed to operate in a horizontal position and minimum heat rise in the amplifier will occur when mounted in this manner. Forty-four and one-half millimeters (1¾ in.) minimum clearance should be provided on front, back, and the top of the amplifier to insure adequate air circulation. The Power Master may

be operated in an ambient temperature range from -7°C to 43°C (20°F to 110°F) for continuous duty without de-rating.

Thermal Overload:

The Power Master is equipped with thermal sensing switches on the heat-sinks of the output transistors. The thermal switches are set to shut off AC power to the amplifier when a temperature of 90°C (194°F) is attained on the heat-sinks; the switches will automatically recycle and return AC power when the heat-sink temperature reaches 73°C (164°F). A thermal overload light (II), located on the front panel of the Power Master, will indicate if thermal cycling has occurred. Thermal cycling may occur if air is not allowed to circulate through the grilles of the amplifier or if there is a prolonged short-circuit on the speaker output.

Rack Mounting:

The accessory Rack Panel Kit, Model P300R, allows the Power Master to be rack mounted in standard 19-inch audio equipment cabinet racks. To insure adequate air circulation, a 44.5 mm (1¾ in.) space should be provided at the top of the amplifier. The rack mounted Power Master requires seven inches of height plus the air space. The Rack Panel Kit is to be installed by qualified service personnel only.

Connecting a VU Meter:

An external VU meter may be connected to the speaker wires of the Power Master with a resistor attenuator (see Figure 4, Page 5). Use a true VU meter (such as Simpson Model No. 1349) and three resistors connected as shown. The resistors should be ½-watt carbon 5%, or 1% if available.

With an 8-ohm speaker load (two VA300-S) zero VU is 50 watts. Output power for other VU readings is shown in the table below.

VU	Power to 8-ohm load
+3	100 watts
0	50
- 3	25
- 7	10
-10	5

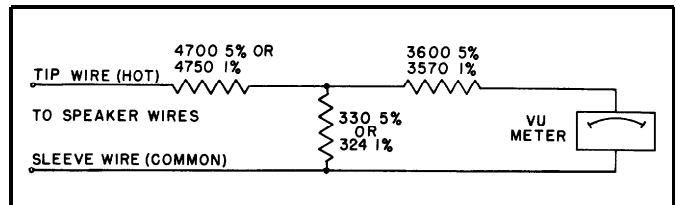


FIGURE 4.

PM300 Series Power Master

Service Instructions

Amplifier Service (See Guarantee):

The Power Master uses components of the highest quality, operating well within their respective ratings to assure long life. **CAUTION:** There are no user serviceable parts inside. Refer servicing to qualified service personnel.

Replacement Parts:

Parts that are readily available through local electronic parts distributors are not shown on the accompanying Parts

List. Their values are shown on the circuit diagram. The special custom made parts are shown on the Parts List.

The commercial alternates shown on the Parts List are not necessarily equivalents, but may be used in the event that direct factory replacements are not immediately available. To maintain the highest possible performance and reliability, Shure factory replacement parts should be used. When ordering replacement parts, specify the Shure Replacement Kit Number, description, product model number and serial numbers.

Bottom Removal:

To remove the chassis bottom plate, turn the amplifier upside down and remove the ten screws located at the edges of the chassis.

Cover Removal:

For servicing of the components on the top of the chassis, remove the two screws on the handle end of the cover, and the two screws within the plastic feet nearest the bottom on the other end of the cover. Uncoil the A.C. line cord from the storage spindles and slide off the cover.

Small Signal and Predriver Transistors:

Transistors Q1 through Q3, Figure 6, Page 7, are mechanically supported by their leads. When replacing these transistors, it is imperative that proper lead configuration be followed. A minimum of soldering heat should be used to avoid damage to the transistor. Refer to the lower right corner of the circuit diagram, Figure 7, Page 9 for lead code.

Driver Transistors:

The driver transistors Q4 and Q5, Figure 5, Page 6, are located on the amplifier chassis. Before removing these transistors, write down the lead color and location at each transistor solder junction. If replacing transistors, apply type 120 Wakefield thermal joint compound to each side of the insulating wafer to provide good thermal transfer from transistor to chassis. After replacement and before connecting transistor leads, check transistors with an ohmmeter between case and chassis; there should be no continuity. Be sure that these transistors are not inverted in

the circuit; they are not identical devices. Q4 is an NPN transistor, while Q5 is a PNP transistor. Refer to the lower right corner of the circuit diagram, Figure 7, Page 9 for terminal code. NOTE: When replacing driver transistors, perform the following modification (if not already performed): place insulated tubing over the leads of a 3.3k, 1/2W resistor and solder it across the terminals to which the white and black leads of transformer T2 are connected. Solder a .01 µF, 100V disc capacitor from terminal "A" (see Figure 6, Page 7) to the terminal strip chassis mounting lug next to terminal "A".

Output Transistors:

The output transistors Q6 through Q9, Figure 5, Page 6, are located on the black finned heat sinks. Replacement procedure is the same as that used for the driver transistors, Q4 and Q5.

NOTE: The output transistors, Q6 through Q9 must be matched for current gain. When replacing output transistors be sure to replace with devices which have the same gain code *and part number* as the original transistors. Shure transistors are coded either by a color dot or a letter stamped on the top of the transistor.

Blue Dot	= A	Brown Dot	= F
Red Dot	= B	Pink Dot	= G
Orange Dot	= C	Violet Dot	= H
Yellow Dot	= D	Black Dot	= J
Green Dot	= E	White Dot	= K

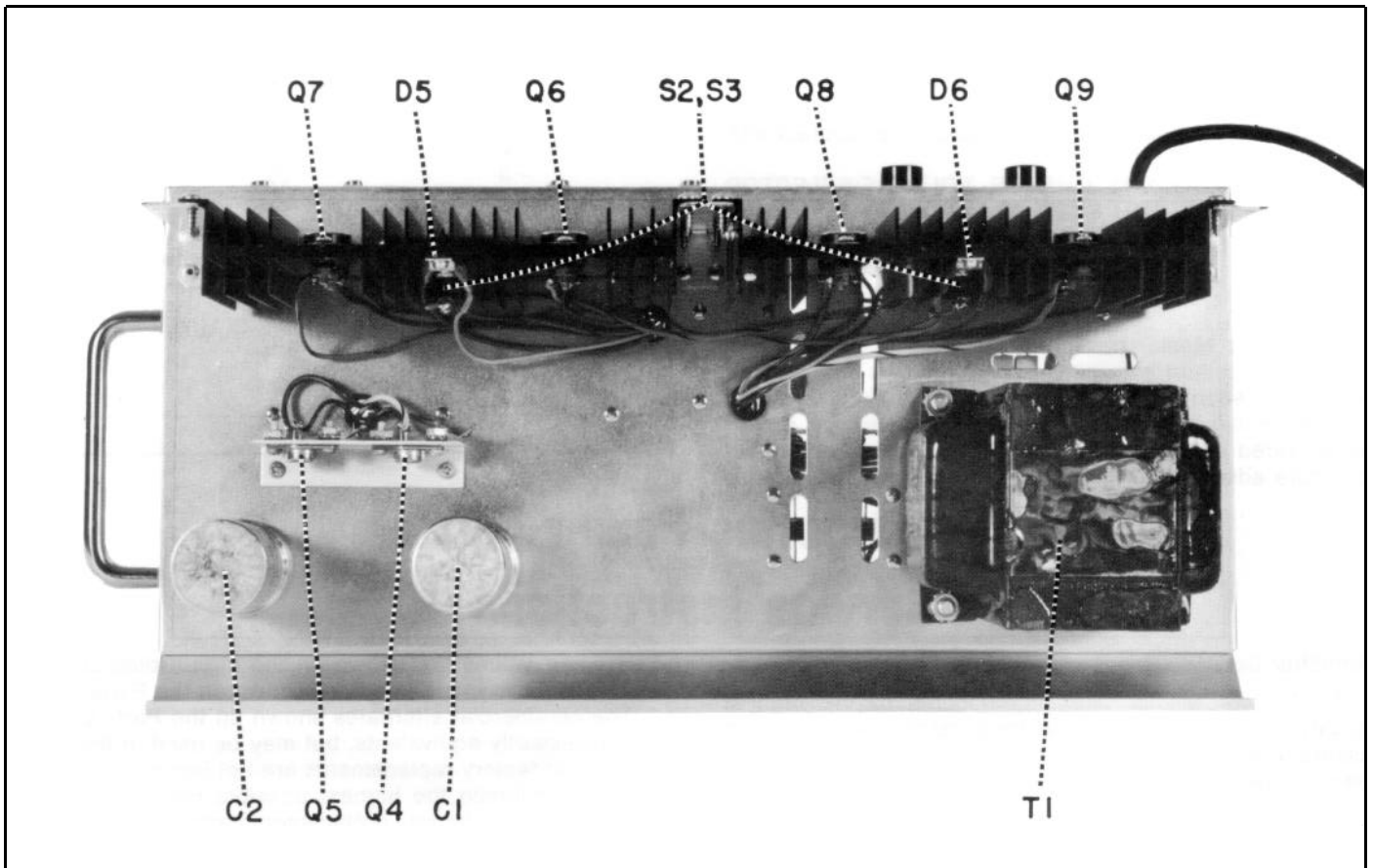


FIGURE 5.

Diodes:

Diodes D5 and D6, see Figure 5, Page 6, are located on the black finned sinks with the output transistors. Special care is required to insulate these diodes from the heat sink while providing good thermal transfer from sink to diode. Heat shrinkable tubing or "spaghetti" should be placed over the diode and connecting leads; the diode should be securely clamped to the heat sink with the clamp provided.

Check Transistors and Diodes:

Defective transistors and diodes may be located by use of an ohmmeter. Polarity of the ohmmeter must be verified before these checks are made.

With a known diode orientation, measure the diode resistance in the forward and reverse directions. The lowest meter reading will establish the probe at the cathode end (schematic symbol arrow points to cathode) as the "minus" probe while the other probe will be "plus." Some ohmmeters are not polarized in this manner with relation to "volts plus probe" and "volts minus probe."

To check transistors, the ohmmeter should be set to the 100-ohm or 1,000-ohm scale. Small signal transistors (Q1 through Q3) must be removed from the circuit before testing. Transistors mounted with screws (Q4 through Q9) may be tested in place; however, the base and emitter leads to these transistors must be removed.

If all conditions in the above table are met, the transistor may be considered free of any gross defect; if any of the following conditions are not met, the transistor should be replaced. See lower right corner of circuit diagram, Figure 7, Page 9 for transistor terminal code,

With the ohmmeter "plus" probe on the anode end of a diode, and the "minus" probe on the cathode end, the ohmmeter should read approximately 2,000 ohms or less. With the meter probes reversed, a reading of about 10,000 ohms or more should occur. If either of these conditions is not met, the diode should be replaced.

Power Drain Resistor (R_{SEL}):

The following condition may occur after replacement of driver transistors Q4 and Q5, output transistors Q6 through Q9, or diodes D5 and D6. If the unit appears to operate at an excessively high temperature or thermally recycles after about 10 minutes with no signal input, the "cold" standby power drain may be excessive (up to 20 watts higher than normal; a higher power drain indicates further circuitry problems). The nominal power drain under these conditions should be 40 watts; if the measured figure exceeds 55 watts, insert a resistor (R_{SEL}) in parallel with the 56-ohm resistor between the base of transistor Q4 and the junction of diodes D5, D7 and D8 (figure 7, page 9). R_{SEL} (½ W, 10%) should be either 180 ohms to decrease the power consumption by 20 watts, or 82 ohms to decrease the power consumption by 30 watts.

Lamp Replacement:

The lamp 12, Figure 6, Page 7, which provides illumination of the front panel controls, is soldered and epoxied into the molded plastic lamp socket in order to meet Underwriters' Laboratories requirements. The assembly may be removed by unsoldering the lamp leads at the terminal strip and removing the screw that holds the socket to the chassis.

Ohmmeter Connections		Ohmmeter Reading	
"Plus" Lead	"Minus" Lead	N.P.N. Transistor	P.N.P. Transistor
Collector	Emitter	High	High
Emitter	Collector	High	High
Collector	Base	High	Low
Emitter	Base	-	Low
Base	Collector	Low	High
Base	Emitter	Low	-

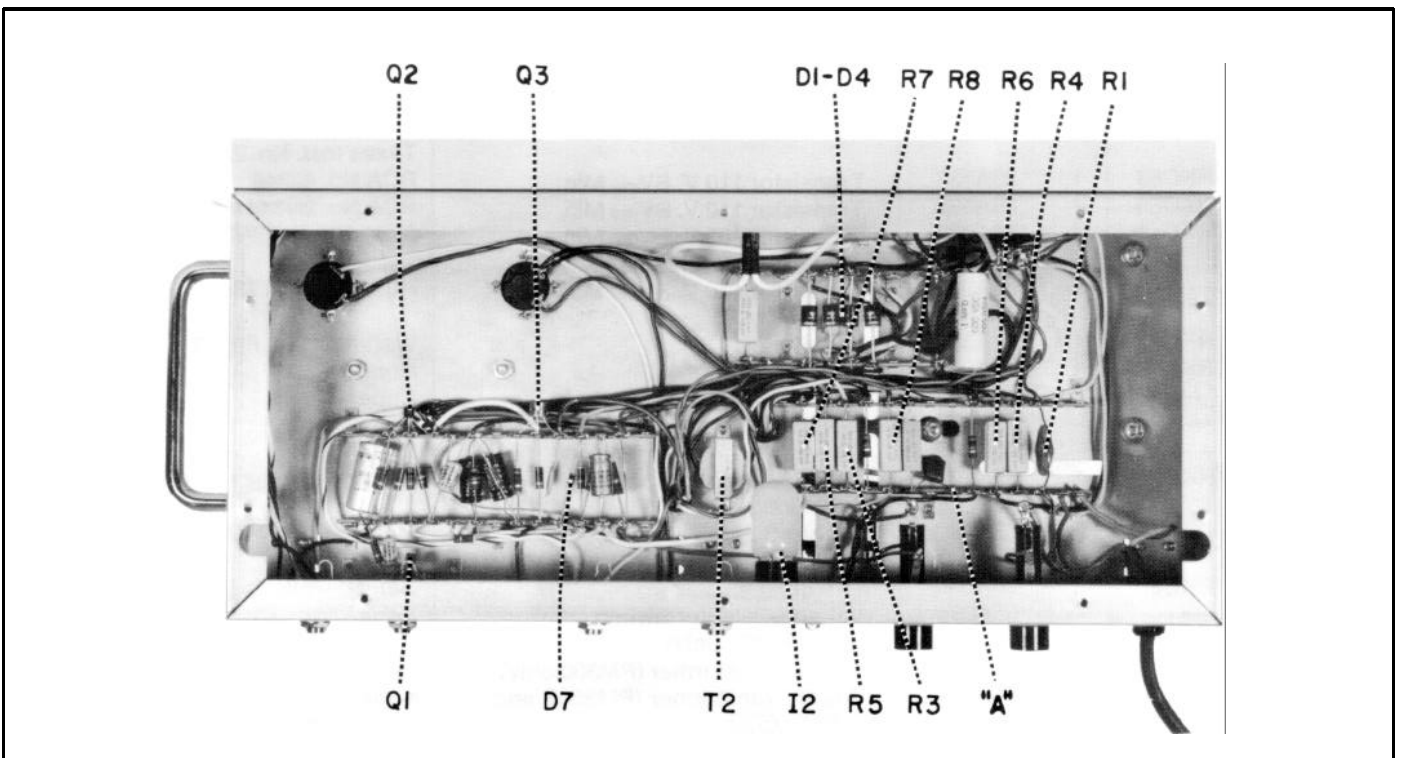


FIGURE 6.

REPLACEMENT PARTS LIST FOR PM300 SERIES AMPLIFIERS

Item	** Repl. Kit No.	Replacement Kit Consists of:			Commercial Alternate
		Qty.	Part No.	Description	
C1	RKC26	1	86A631	Capacitor, 2500 x 100	None
C2	RKC27	1	86B631	Capacitor, 4000 x 60	None
D1-D4	RKC46	4	86A406	Silicon Rectifier, 3A., 200 V.	Motorola No. 1N4721
D5, D6	RKC50	2	86A410	Silicon Rectifier, ½A., 100 V.	Motorola No. 1N4002
D7, D8	RKC23	1	86A409	Zener Diode, 3.6 V., 1 W., 5%	Motorola No. 1N4729A
F1	RKC62	5	80A159	A.C. Fuse (PM300 and PM300E)	Littelfuse 3AG/3A/SB (Slo-Blo)
F1	- - -	-	80A258	A.C. Fuse (PM300E6 only) for 200-240 volts	Wickmann 5 x 20mm 1.6 AT, 250 V.
F1	- - -	-	80B258	A.C. Fuse (PM300E6 only) for 100-140 volts	Wickmann 5 x 20mm 3.0 AT, 250 V.
F2	RKC62	5	80A160	D.C. Fuse (PM300 and PM300E)	Littelfuse 3AG/5A
F2	- - -	-	80A259	D.C. Fuse (PM300E6 only)	Wickmann 5 x 20mm 5.0 A, 250 V.
F3	- - -	-	80A269	Wired in A.C. Fuse (PM300 only)	Bussmann MDV/5A/SB (Slo-Blo) Pig-Tail
I1	RKC45	1	80A79	Pilot Lamp (PM300 only)	Leecraft No. 36N1311-6
I1	RKC78	1	80Z251	Pilot Lamp (PM300E and PM300E6)	Leecraft No. 36HN-1311-7W
I2	RKC34	2	90A1463	Lamp Assembly	None
J1-J4	RKC68	1	95B446	Phone Jack	Switchcraft No. 11
M1	RKC82	1	95A510	3 Wire A.C. Line Cord and Plug (PM300 only)	None
M1	RKC88	1	70A3071	Line Cord (PM300E only)	None
M1	- - -	-	90A1888	Line Cord and Connector (PM300E6 only)	None
M2	RKC69	1	90A1681	Housing Assembly (Cover and Spindle)	None
M3	RKC70	1	32A627	Knob and Screw (Line Cord Storage Spindle)	None
M4	- - -	1	90BC2600	Handle and Nuts	Bud No. H9115
M5	RKC39	4	65A685	Bumper (Plastic Foot)	None
M6	RKC49	3	90B2285	Volume Control Knob Assembly	None
M7, M8	RKC72	1	95A500	Fuse Holder (PM300 and PM300E)	Littelfuse No. 341001
M7, M8	- - -	-	95A604	Fuse Holder 5x20 mm (PM300E6 only)	Schurter Type FEB
M9	- - -	-	95A568	A.C. Chassis Power Connector (PM300E6 only)	Switchcraft No. EAC-301
M10	- - -	-	90A1522	Input Interconnecting Cable	None
Q1-Q2	RKC9	4	86A349	Transistor (Replaces 86A327)	Motorola No. MPS-6521, Texas Inst. No. 2N3711
Q3	RKC53	1	86A333	Transistor 110 V. BVCEO Min.	RCA No. 40349
Q4	RKC55	1	86A338	Transistor 110 V. BVCEO Min.	RCA No. 2N3441
Q5	RKC54	1	86A339	Transistor 105 V. BVCEO Min. (Mutually Interchangeable)	Motorola No. 2N3741 Selected
Q6-Q9	- - -	-	86A332* 86B332*	Transistor 110 V. BVCEO Min. 150 W.	RCA No. 2N3773
R1	RKC47	1	45A38	Resistor	Workman No. FRT-2
R2	RKC73	1	46A025	Potentiometer, 50K.	None
R3-R6	- - -	-	45EC439B	Resistor, 0.43 ohms, 5 W.	None
R7	- - -	-	45EC209B	Resistor, 0.20 ohms, 5 W.	None
R8	- - -	-	45EC129B	Resistor, 0.12 ohms, 5 W.	None
S1	RKC61	1	55A72	Toggle Switch (PM300 and PM300E)	Cutler-Hammer No. 7563K5
S1	- - -	-	55A98	Toggle Switch, 2 position (PM300E6 only)	Marquardt Type No. 0132
S2, S3	RKC37	1	95A551	Thermostat	None
S4	- - -	-	55A99	Voltage-Selector Switch (PM300E6 only)	None
T1	RKC35	1	51A215	Power Transformer (PM300 only)	None
T1	RKC147	1	51A241	Power Transformer (PM300E and PM300E6)	None
T2	RKC28	1	51A217	Feed back Transformer	None

NOTE: The Commercial Alternates shown above are not necessarily equivalents, but may be used in the event that direct factory replacements are not immediately available. To maintain the highest possible performance and reliability, Shure Factory Replacement Parts should be used.


*When ordering 86A332 or 86B332, specify current gain code. See page 6.

**Parts listed as RKC Kits should be ordered by that kit number. Any orders received for piece parts where RKC Kit number is shown will be shipped in RKC quantities.

NOTES TO THE CIRCUIT DIAGRAM


D.C. Voltage Measurements:

Check the DC voltages before checking AC voltages because transistors Q2 through Q9 are direct coupled and any deviation from the nominal voltages will affect the AC voltages. The four key DC voltages are +94, +20, the emitter of Q1, and the split voltage at the junction of R3, R5, R7, and R8. If these four key DC voltages are correct, then proceed with the AC voltage measurements.

The numbers within the symbol  on the circuit diagram denote the DC voltage at that point with the following test condition:

1. Voltages measured at points indicated with respect to chassis, unless otherwise specified.
2. Line voltage PM300: 120 V. 60 Hz.; PM300E: 120/240 V. 50/60 Hz.; PM300E6: 100, 120, 140, 200, 220, or 240 V. 50/60 Hz.
3. No input signal applied.
4. DC voltage measurements may vary $\pm 20\%$ from the values shown.
5. Measured with a VTVM of 11-megohms input impedance.

A.C. Voltage Measurements:

The numbers within the symbols  on the circuit diagram denote the AC voltage at that point with the following test conditions:


1. Voltages measured at points indicated with respect to chassis, unless otherwise specified.
2. Line voltage as specified above.
3. 1,000 Hz. signal applied to one of the high impedance parallel inputs at 300 millivolts (.3 volts).
4. Measured with an AC VTVM of 1.0 megohms or greater input impedance.
5. Noninductive load of 8 ohms, 200 watts connected to speaker output jack.
6. Volume control set to maximum.
7. AC voltage measurements may vary $\pm 20\%$ from the values shown.

Shure part numbers are not shown in the Parts List, accompanying the circuit diagram, if parts are readily available through local electronic parts supply distributors. In these instances, the circuit diagram will show the values of the standard parts.

All capacitor values are shown in microfarads. All non-electrolytic capacitors are to be 100 volts or more unless otherwise specified in the circuit diagram. Electrolytic capacitors are shown in microfarads and volts.

All resistor values are shown in ohms. Resistors are all to be 10% tolerance unless specifically noted on the circuit diagram.

All resistors are 1/2 watt unless otherwise specified.

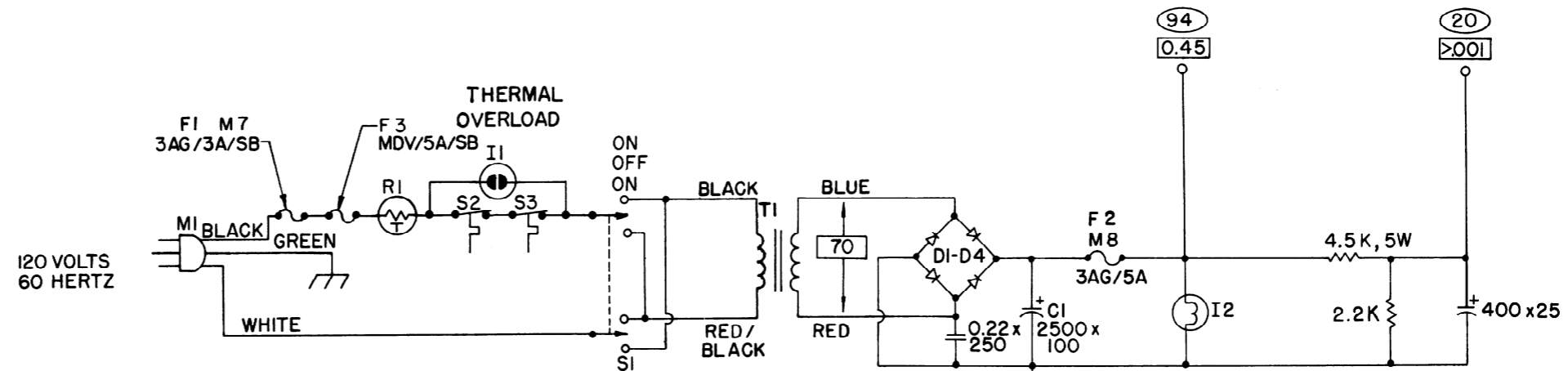
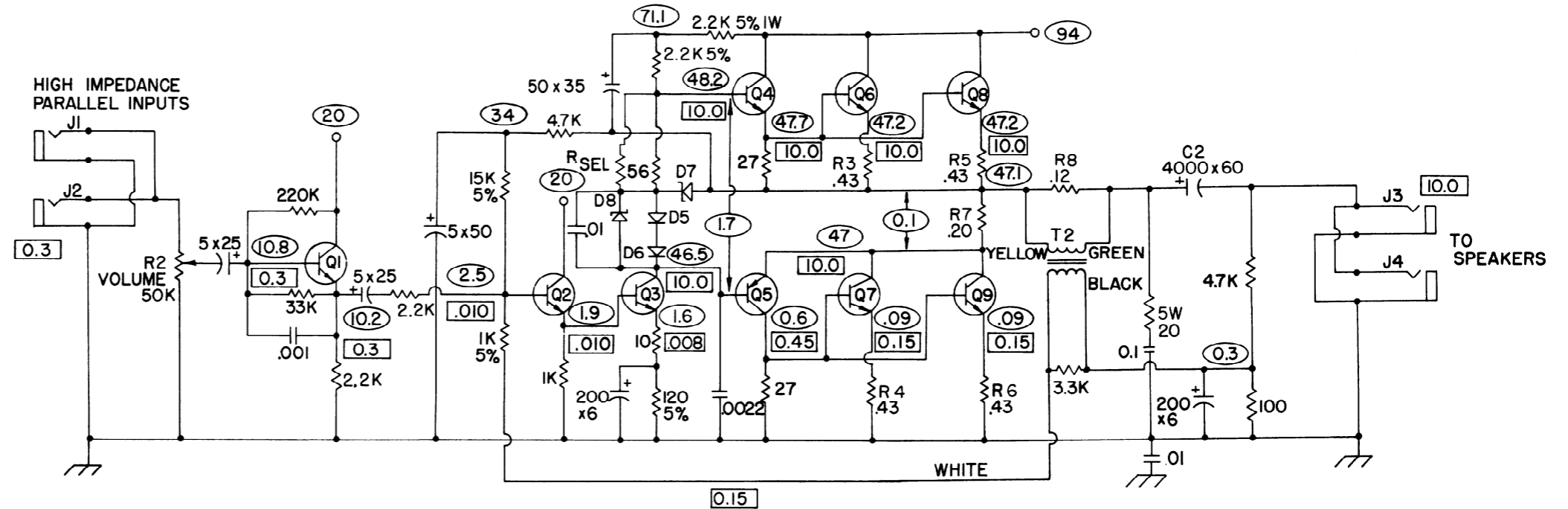
The following ground symbol denotes chassis ground: 

Ohmmeter Measurements:



With the A.C. line cord unplugged and the power switch in the "OFF" position, the following ohmmeter measurements may be made.

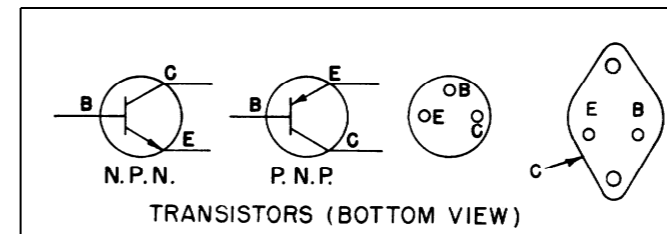
1. B+ to ground approximately 100 ohms.
2. Ohmmeter plus probe to the junction of R3, R5, R7, and R8, ohmmeter minus probe to ground; greater than 120 ohms.
3. Ohmmeter plus probe to B+, ohmmeter minus probe to the junction of R3, R5, R7, and R8: greater than 120 ohms.
4. To test transistors and diodes, see page 7.

PM300 CIRCUIT DIAGRAM



NOTES:

1. ALL CAPACITORS IN MFD AND 100 VOLTS OR MORE UNLESS SHOWN. ELECTROLYTIC CAPACITORS SHOWN IN MFD x VOLTS.
2. ALL RESISTORS 10%, 1/2 WATT, UNLESS OTHERWISE INDICATED. R3 THRU R8 10%, 5 WATT.
3. THE FOLLOWING SYMBOLS DENOTE:
 DC VOLTAGE  AC VOLTAGE
 WITH RESPECT TO CHASSIS UNLESS OTHERWISE SHOWN.
4. R_{SEL} MAY BE 180 OR 82 OHMS, OR NOT USED, DEPENDING ON POWER DRAIN (SEE PAGE 7).



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FIGURE 7.

PM300E POWER SUPPLY CIRCUIT DIAGRAM

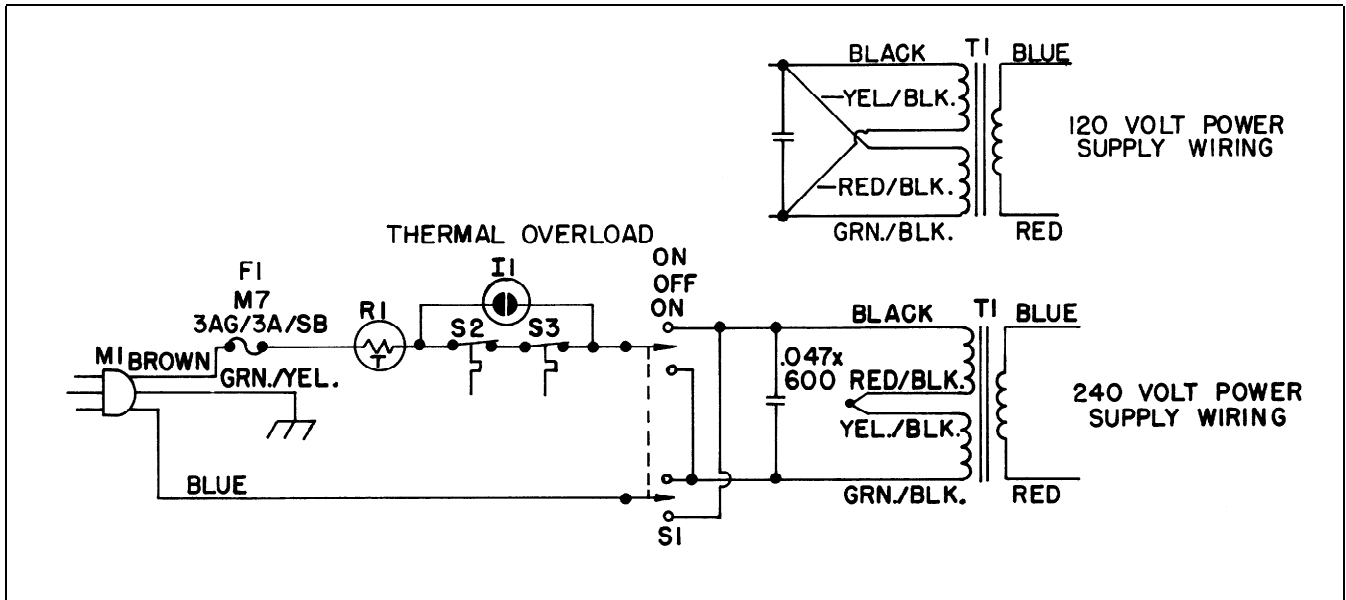


FIGURE 8.

PM300E6 POWER SUPPLY CIRCUIT DIAGRAM

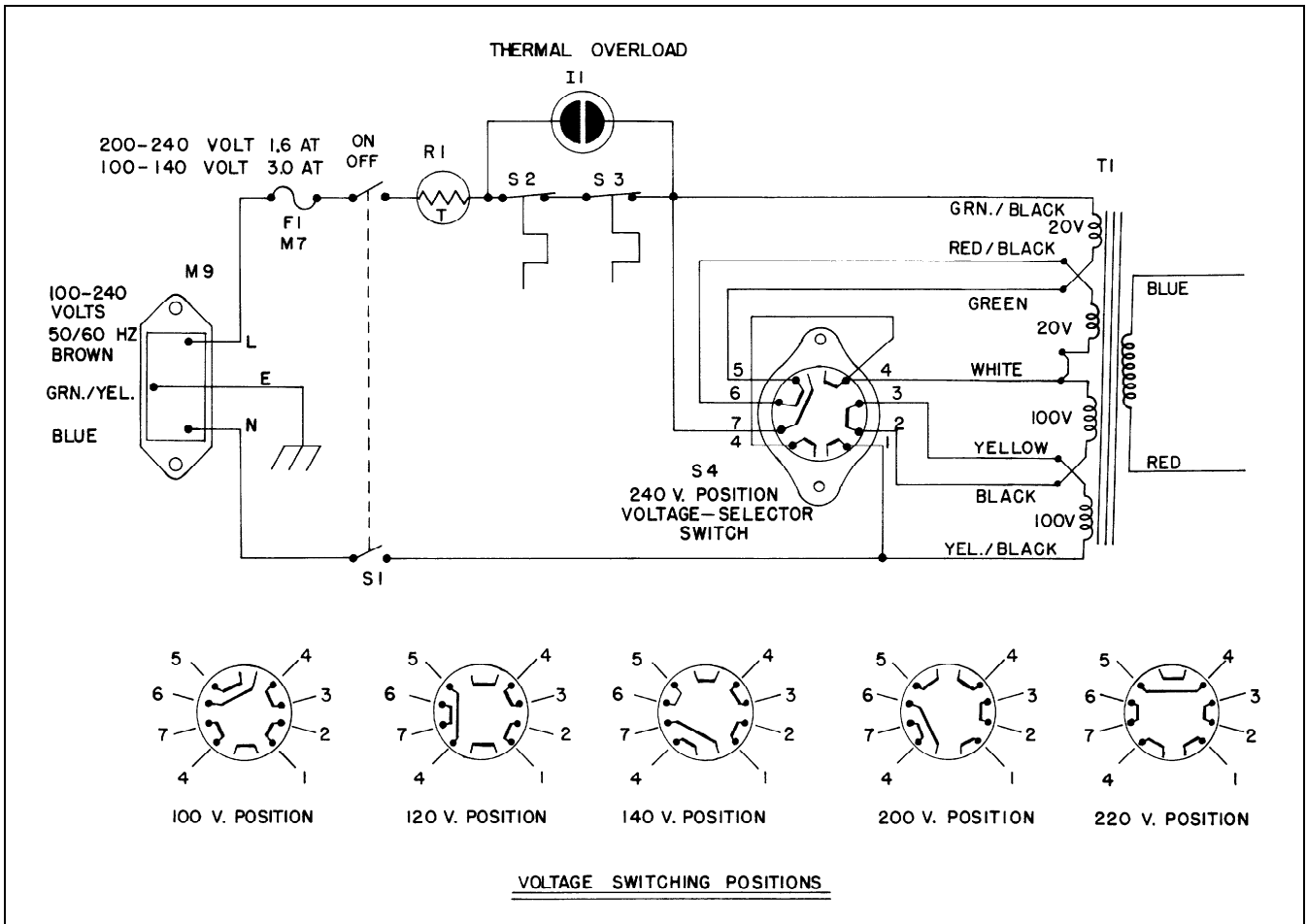


FIGURE 9.