

ELGAR

MODELS
1001B & 1751B
POWER SOURCES

Instruction Manual

ELGAR ELECTRONICS CORPORATION

9250 Brown Deer Road
San Diego, CA 92121-2294
1-800-733-5427
Tel: (858) 450-0085
Fax: (858) 458-0267
Email: sales@elgar.com
www.elgar.com

©1985 by Elgar Electronics Corporation

This document contains information proprietary to Elgar Electronics Corporation. The information contained herein is not to be duplicated or transferred in any manner without prior written permission from Elgar Electronics Corporation.

July 1985

Document No. 104-712-BS Rev A

ELGAR



MODELS
1001B & 1751B
POWER SOURCES

Instruction Manual

ELGAR ELECTRONICS CORPORATION

9250 Brown Deer Road
San Diego, CA 92121-2294
1-800-733-5427
Tel: (858) 450-0085
Fax: (858) 458-0267
Email: sales@elgar.com
www.elgar.com

©1985 by Elgar Electronics Corporation

This document contains information proprietary to Elgar Electronics Corporation. The information contained herein is not to be duplicated or transferred in any manner without prior written permission from Elgar Electronics Corporation.

July 1985

Document No. 104-712-BS Rev A

ELGAR ONE-YEAR WARRANTY

Elgar Electronics Corporation (hereinafter referred to as Elgar) warrants its products to be free from defects in material and workmanship. This warranty is effective for one year from the date of shipment of the product to the original purchaser. Liability of Elgar under this warranty shall exist provided that:

- the Buyer exposes the product to normal use and service and provides normal maintenance on the product;
- Elgar is promptly notified of defects by the Buyer and that notification occurs within the warranty period;
- the Buyer receives a Return Material Authorization (RMA) number from Elgar's Repair Department prior to the return of the product to Elgar for repair, phone 800-73-ELGAR (800-733-5427), ext. 2295;
- the Buyer returns the defective product in the original, or equivalent, shipping container;
- if, upon examination of such product by Elgar it is disclosed that, in fact, a defect in materials and/or workmanship does exist, that the defect in the product was not caused by improper conditions, misuse, or negligence; and,
- that Elgar QA seal and nameplates have not been altered or removed and the equipment has not been repaired or modified by anyone other than Elgar authorized personnel.

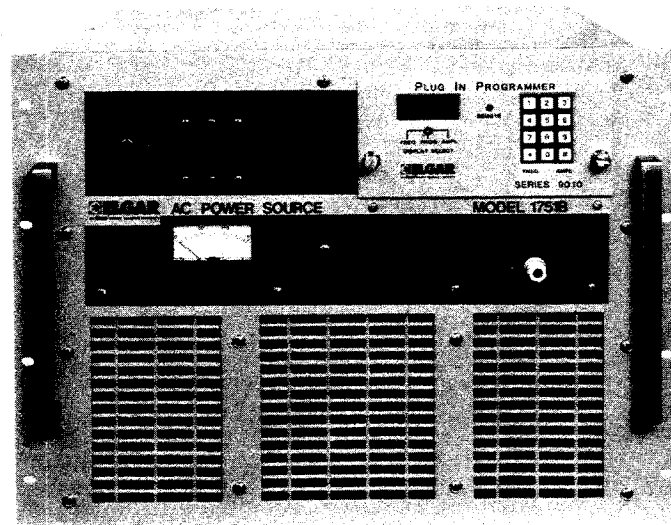
This warranty is exclusive and in lieu of all other warranties, expressed or implied, including, but not limited to, implied warranties of merchantability and fitness of the product to a particular purpose. Elgar, its agents, or representatives shall in no circumstance be liable for any direct, indirect, special, penal, or consequential loss or damage of any nature resulting from the malfunction of the product. Remedies under this warranty are expressly limited to repair or replacement of the product.

CONDITIONS OF WARRANTY

- To return a defective product, contact an Elgar representative or the Elgar factory for an RMA number. Unauthorized returns will not be accepted and will be returned at the shipper's expense.
- For Elgar products found to be defective within thirty days of receipt by the original purchaser, Elgar will absorb all ground freight charges for the repair. Products found defective within the warranty period, but beyond the initial thirty-day period, should be returned prepaid to Elgar for repair. Elgar will repair the unit and return it by ground freight pre-paid.
- Normal warranty service is performed at Elgar during the weekday hours of 7:30 am to 4:30 pm Pacific time. Warranty repair work requested to be accomplished outside of normal working hours will be subject to Elgar non-warranty service rates.
- Warranty field service is available on an emergency basis. Travel expenses (travel time, per diem expense, and related air fare) are the responsibility of the Buyer. A Buyer purchase order is required by Elgar prior to scheduling.
- A returned product found, upon inspection by Elgar, to be in specification is subject to an inspection fee and applicable freight charges.
- Equipment purchased in the United States carries only a United States warranty for which repair must be accomplished at the Elgar factory.

ELGAR

Committed to Quality...Striving for Excellence



MODELS 1001B & 1751B

| Paragraph | | Page |
|---|--|------|
| SECTION I | | |
| INTRODUCTION AND GENERAL DESCRIPTION | | |
| 1-1 | Scope of Manual | 1-1 |
| 1-3 | Introduction | 1-1 |
| 1-7 | General Description | 1-1 |
| SECTION II | | |
| SPECIFICATIONS | | |
| 2-1 | Chart of Specifications | 2-1 |
| SECTION III | | |
| OPERATION | | |
| 3-1 | Inspection | 3-1 |
| 3-3 | Installation and Operation | 3-1 |
| 3-6 | Input Power Reconnections | 3-3 |
| SECTION IV | | |
| THEORY OF OPERATION | | |
| 4-1 | Circuit Description | 4-1 |
| 4-7 | Power Supplies | 4-2 |
| 4-9 | Interconnections for Multiphase Operation | 4-2 |
| SECTION V | | |
| MAINTENANCE AND ADJUSTMENT | | |
| 5-1 | Service Information | 5-1 |
| 5-3 | Factory Repair | 5-1 |
| 5-5 | Test Points | 5-1 |
| 5-7 | Output Regulation Adjustment | 5-1 |
| 5-9 | Current Limit Adjustment | 5-1 |
| 5-12 | Periodic Maintenance | 5-2 |
| 5-14 | Troubleshooting | 5-2 |
| SECTION VI | | |
| PARTS LIST | | |
| 6-1 | General | 6-1 |
| 6-3 | Spare Parts Ordering | 6-1 |
| SECTION VII | | |
| DIAGRAMS | | |
| 7-1 | General | 7-1 |
| 7-3 | Diagrams (Overall Schematics for Models 1001B & 1751B) | 7-1 |

LIST OF ILLUSTRATIONS

| Figure | | Page |
|--------|---|------|
| 1-1 | Power Output Derating | 1-2 |
| 1-2 | Typical Harmonic Distortion at Rated Power | 1-2 |
| 3-1 | Rear Panel Terminal Strip Connections | 3-2 |
| 3-2 | Input Power Reconnections | 3-3 |
| 4-1 | Interconnections for Multiphase Operation (Model 1751B) | 4-3 |
| 4-2 | Interconnections for Multiphase Operation (Model 1001B) | 4-4 |
| 4-3 | Vector Diagram | 4-5 |
| 4-4 | SS Series or Quasi-Square Vector Diagrams | 4-6 |
| 4-5 | Signal Routing Plug-In Connections | 4-8 |
| 5-1 | Top View Model 1001B | 5-3 |
| 5-2 | Top View Model 1751B | 5-4 |
| 5-3 | Circuit Board Parts Layout | 5-5 |

LIST OF TABLES

| | | |
|-----|-----------------------------------|-----|
| 2-1 | Specifications Chart | 2-1 |
| 5-1 | Test Equipment Required | 5-2 |

SECTION I INTRODUCTION AND GENERAL DESCRIPTION

1-1. SCOPE OF MANUAL

1-2. This manual describes the Models 1001B and 1751B Power Sources manufactured by Elgar Electronics Corporation. It provides operating, maintenance, and adjustment instructions; circuit descriptions; schematic diagrams; and parts lists.

1-3. INTRODUCTION

1-4. The Elgar Power Sources described in this manual provide AC power at precise frequencies for testing, motor operation, and frequency conversion. The basic power amplifier consists of two DC supplies and a direct coupled amplifier driving a tapped output transformer. Nominal output voltages of the two units are: 1001B, 0-65, 0-130, 0-260 VAC; 1751B, 0-32, 0-130 and 0-260 VAC. Total available output power for the two units respectively is, 1000VA and 1750VA at full rated output voltage. Output power at less than full rated voltage is derated as illustrated in Figure 1-1. Figure 1-2 illustrates a typical harmonic distortion curve. Input power for the Model 1751B is 115/200V three phase 47-63 Hz or 230V delta. The Model 1001B may be wired for either 115 or 230V input power, 47-63 Hz single phase.

1-5. Output power frequency is established by a plug-in oscillator. Output frequency range for

these units is 45 Hz to 5 KHz. A variety of plug-in oscillators is available, with frequency accuracies up to .0001%.

1-6. These Elgar Power Sources facilitate equipment tests to meet military-specification operating requirements over the frequency range of 47 to 63 Hz or 47 to 425 Hz. The basic power source output is single phase, however, multi-phase power may be obtained by stacking two or three power sources, all driven by one multi-phase plug-in oscillator.

1-7. GENERAL DESCRIPTION

1-8. These Elgar Power Sources are contained in standard rack mount enclosures. A meter for output voltage monitoring, a power on indicator lamp, a voltage amplitude control and a power circuit breaker that applies line power to the unit are located on the front panel. Cooling air for the power amplifier is drawn through a front panel grill and exhausted at the rear of the enclosure.

1-9. The enclosure contains heatsink assemblies which comprise a two section power amplifier. Control circuitry is mounted on a plug-in circuit board with test points and adjustment controls available at the top of the board. Output power is available at a rear panel terminal block and at front-panel binding posts.

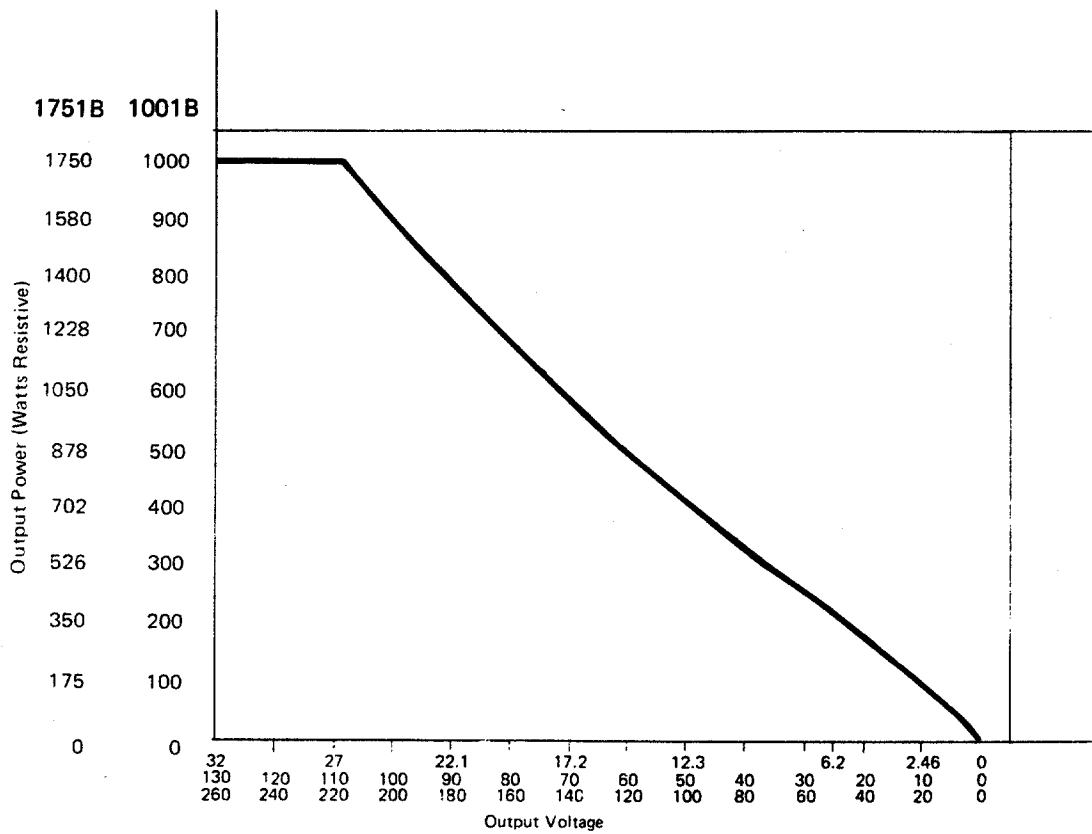


Figure 1-1. Power Output Derating

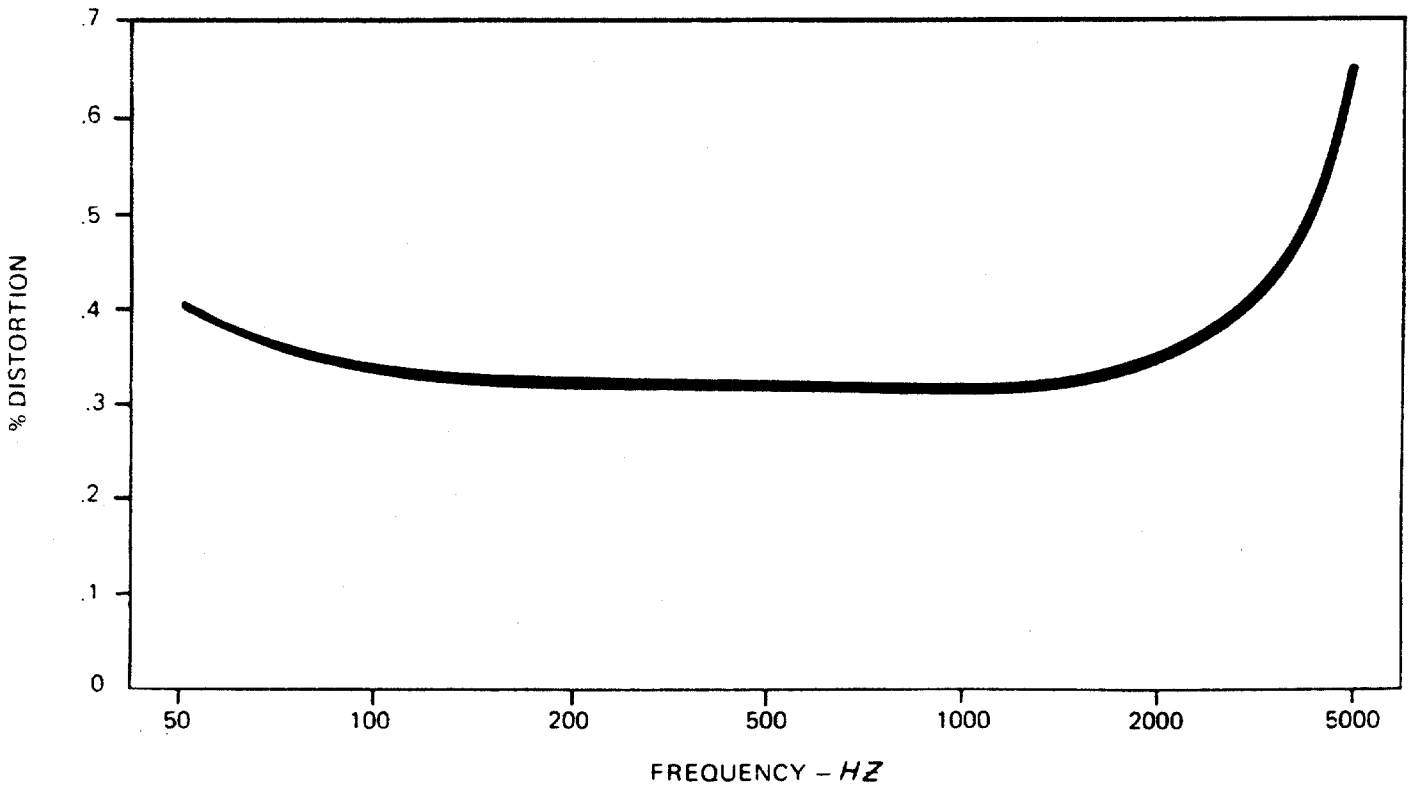


Figure 1-2. Typical Harmonic Distortion at Rated Power

**SECTION II
SPECIFICATIONS**

| | 1001B | 1751B |
|-----------------------------|---|-----------------------------------|
| Output Power | 0-1000VA | 0-1750VA |
| Power Factor | Unity to ± 7 | |
| Output Voltage (adjustable) | 0-65 0-130 0-260 | 0-32 0-130 0-260 |
| Output Frequency Range | 45 Hz – 5 kHz | |
| Output Distortion | Less than .9% 45 Hz – 5 kHz Less than .5% 100 Hz – 1 kHz | |
| Output Noise | 70 dB below full output | |
| Load Regulation | $\pm 1\%$, No load to full load over frequency range, adjustable to zero for specific load and frequency | |
| Line Regulation | $\pm .25\%$ for 10% input line change | |
| Output Protection | Overload and short circuit protected, output recovers immediately when overload or short is removed. | |
| Input Power | One Phase, 115 or 230VAC, 47- 63 Hz | 3 phase, 230 L-L, L-N, 208 L-L |
| Temperature Range | 0 – 50°C | |
| Dimensions | 12¼" x 19" x 20" deep | 14" x 19" x 20" deep |
| Approximate Weights | 190 lbs | 225 lbs |

SECTION III OPERATION

3-1. INSPECTION

3-2. The Elgar Power Source has been aligned and tested prior to shipment. The instrument is therefore ready for immediate use upon receipt. The following checks should be made, however, to assure that the instrument has suffered no damage during shipment.

1. Inspect the shipping container before accepting it from the carrier. If damage to the container is evident, remove the instrument from the container and visually inspect for damage to the instrument parts.

2. If any damage to the instrument or container is evident, a description of the damage should be noted on the carrier's receipt, and signed by the driver or carrier agent. Save all shipping containers and filler material for inspection.

3. Forward a report of any damage to the Elgar Repair Department, 9250 Brown Deer Road, San Diego, CA 92121-2294. Elgar will provide instructions for repair or replacement of the instrument.

3-3. INSTALLATION AND OPERATION

1. The Elgar Power Source is designed for installation in a standard electrical equip-

ment rack. Install the power source so that the flow of cooling air into the front panel grill and out the rear panel grill is unobstructed.

2. Insert the plug-in oscillator.

3. Connect the load to the appropriate terminal of the rear panel power output terminal block (See Figure 3-1). For bench mounted applications, the front panel binding posts may be used for 115 or 230V output on all models.

4. Connect an input power cord on the rear panel to an appropriate source of single phase power,* for the 1001B, or three phase power for the 1751B.

5. Turn front panel power switch on. The pilot lamp illuminates indicating power is applied to the unit.

6. Adjust the front panel AMPLITUDE control for the desired output voltage as indicated on the front panel voltmeter.

*See main schematic for 115V or 230V input connections.

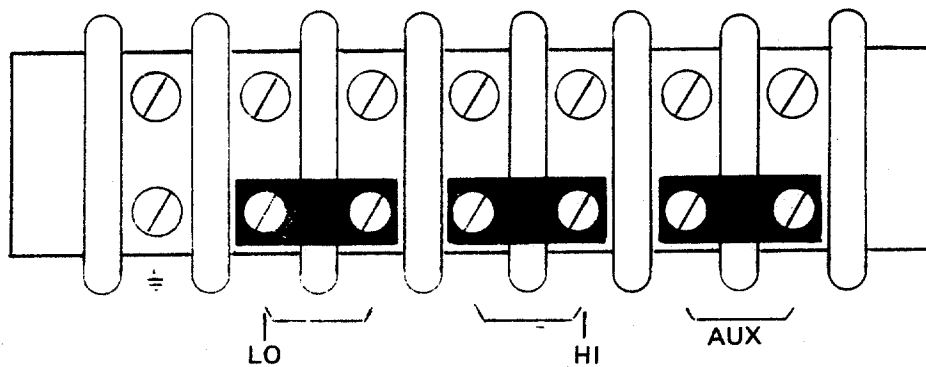
NOTE

Certain Elgar plug-in oscillators do not require the use of the front panel AMP-LITUDE control. Others are remotely programmed. Consult the oscillator instruction manual.

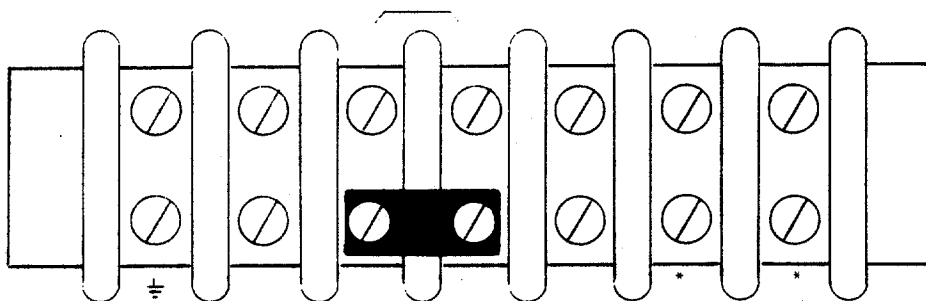
For the 0-260VAC connection, the meter indicates one half of the output voltage. When using the 0-30VAC output connection; 28V corresponds to a reading of approximately 115V on the front panel meter.

3-4. The front panel voltmeter is connected across a 0-130VAC winding of the output transformer.

3-5. The output of these units is floating with respect to ground. They may be operated in this mode, or with either output terminal grounded. In either case, the low side of the output should not be operated off ground in excess of 300V.



PARALLEL JUMPER CONNECTIONS FOR 0, 32, and 130 VAC OPERATION



SERIES JUMPER CONNECTIONS FOR 260 VAC OPERATION

* THESE CONNECTIONS NOT ON 1001B, SEE PAGE 4-4

Figure 3-1. Rear Panel Terminal Strip Connections

3-6. INPUT POWER RECONNECTIONS

A. To reconnect the 1001B for other input voltage – 115, 208, 230 ACV single phase available.

Model 1001B has input reconnection available inside the unit. (See schematic).

Remove top cover (refer to Figure 5-1) for location of TB2, the reconnection point. Rejumper per chart on schematic.

B. To reconnect Model 1751B for other input voltages (115V L-L, 115V L-N, 230V L-L, and 230V L-N three phase available).

Model 1751B has input reconnection available inside the unit. (See schematic).

Remove top cover (refer to Figure 5-2) for location of TB1, the reconnection point. Facing the left side of the unit, TB1 is designated 1 through 12, right to left. Rejumper per chart on schematic.

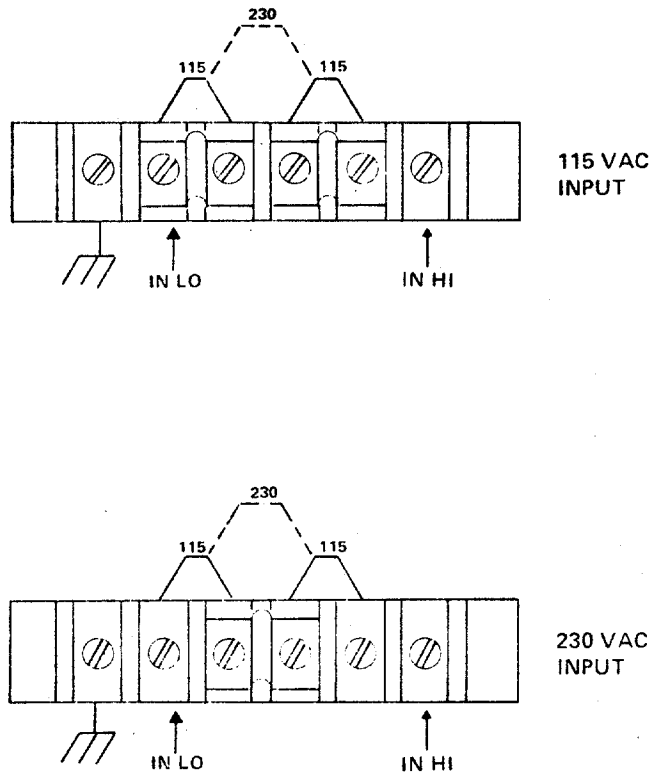


Figure 3-2. Input Power Reconnections

SECTION IV THEORY OF OPERATION

4-1. CIRCUIT DESCRIPTION

4-2. The input signal, approximately 3V RMS is normally supplied by an Elgar plug-in oscillator, however an external signal source may be used. For most oscillators, the input signal amplitude to the amplifier is controlled by front panel amplitude control R1. The oscillator signal is applied to the first amplifier stage consisting of differential amplifier Q101 and Q102. The differential amplifier receives feedback from the output amplifier, thereby maintaining approximately zero DC offset to the output transformer. The emitter currents are supplied by R106 from the +12V supply, regulated by CR101. The output of Q102 provides base drive for Q103, operating as a class A amplifier. Q103 supplied base drive for common emitter driver Q107 and emitter follower Q106. Diodes CR102-CR104 provide a small amount of forward bias to the output amplifier to minimize crossover distortion. Q106 and Q107 are drivers for emitter followers Q1 and Q2. These devices are located in the wind tunnel to provide the necessary cooling.

4-3. The power amplifier consists of a number of power transistors mounted on heatsink assemblies in the wind tunnel. The .22 ohm resistors in the emitter of each device are to ensure equal current sharing. The preamplifier and output stage are operated from nominal plus and minus 42 VDC supplies. Thermal switch S1 shown on heatsink No. 1 removes drive signal from the power amplifier in the event the amplifier overheats from excessive load or restricted airflow through the wind tunnel.

4-4. The power amplifier is also protected against overloads or short circuits on the output by current limit transistors Q104 and Q105. The current in the upper half of the power amplifier is sampled across R201 and applied to upper current limit adjustment potentiometer R126. The current signal is then applied to the base of Q104 through resistor R118. When the current signal at the base of Q104 reaches Q104's conduction threshold (approximately 0.6V), drive signal is diverted from Q106, preventing a further increase in output current delivered by the upper half of the power amplifier. Simultaneously the current in the lower half of the power amplifier is sampled across R7 and applied to the lower current limit adjustment potentiometer. This signal is then applied to the base of Q105 through resistor R119. When the current signal at the base of Q105 reaches Q105's conduction threshold, drive signal is diverted from the base of Q107, preventing a further increase in output current of the lower half of the power amplifier.

4-5. The amplifier output (TP-2) is connected to output transformer T2, which steps up the amplifier voltage (approximately 20VRMS) to the required output level. Negative AC feedback is taken from the amplifier output to the base of Q101 through resistor R109. Capacitor C105 across R109 helps stabilize the amplifier against high frequency instabilities.

4-6. Output load regulation is accomplished by passing the wire from the amplifier output through current transformer T3 to the output transformer. As load is applied to the output of the unit a positive

feedback signal is developed at the secondary of T3 and applied across shunt resistor R125 and regulation adjustment potentiometer R124. This signal is then applied to the input of the differential amplifier through R103. Capacitor C102 and resistor R102 comprise a boost network to increase the positive feedback at the higher output frequency ranges to maintain regulation.

4-7. POWER SUPPLIES

4-8. Plus and minus 42V DC for the amplifier is developed by full wave bridge rectification at the secondary of T1. Filter capacitors and supply bleeder resistors are connected across the output of the bridge.

4-9. INTERCONNECTIONS FOR MULTI-PHASE OPERATION

4-10. Two or three sources may be interconnected to generate two or three phase AC power. Two or three phase signals are developed by a multiphase oscillator installed in the A phase power amplifier.

Signals from the oscillator are routed to the B phase and/or C phase power amplifiers through a signal interconnect cable. These signals are then applied to the front panel amplitude control on each amplifier by the signal routing plug-in which must be installed in the unit(s). Upon initial calibration of the system the voltage of the A phase units is adjusted to some value (i.e.) 115VAC. The other phase amplifier(s) output voltages are then adjusted by means of their front panel amplitude controls to equal the output voltage of A phase. After this initial calibration has been accomplished, the voltage control on the A phase amplifier is used to vary the output voltage of all phases simultaneously and equally.

4-11. Two phase operation requires two power sources. Three phase operation may be accomplished with three power sources, two power sources in open delta configuration, or two power sources in phantom wye configuration. Refer to Figure 4-1 for output interconnect information for the various systems.

OUTPUT CONFIGURATION FOR MODEL 1751B

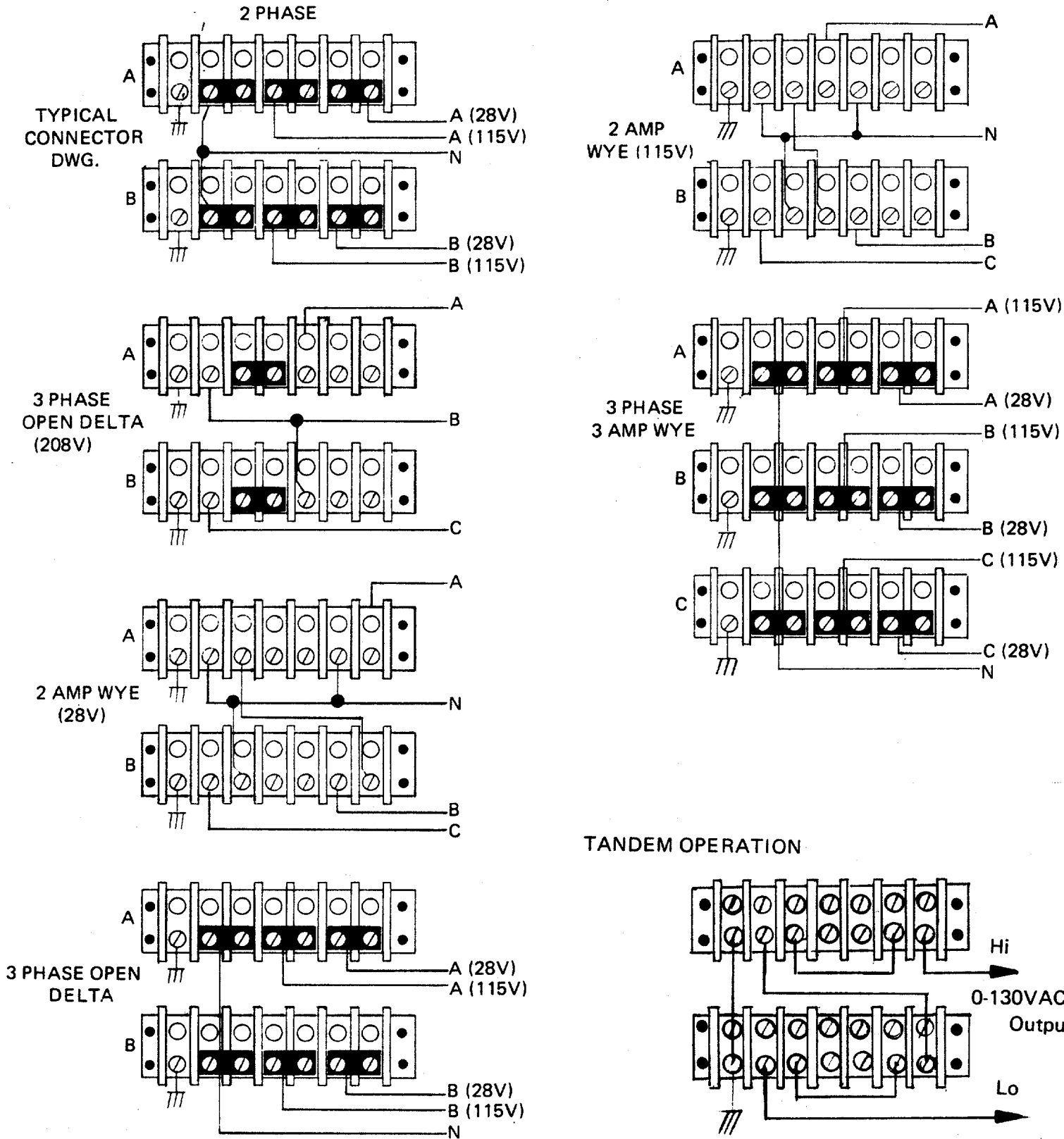
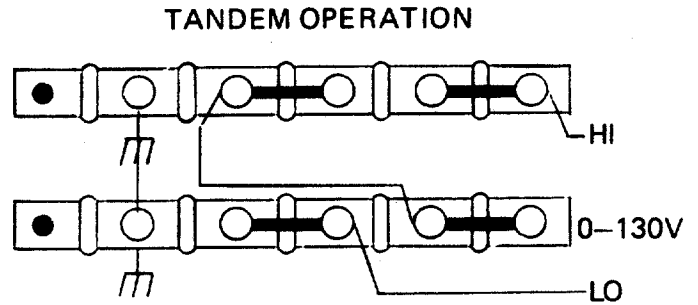
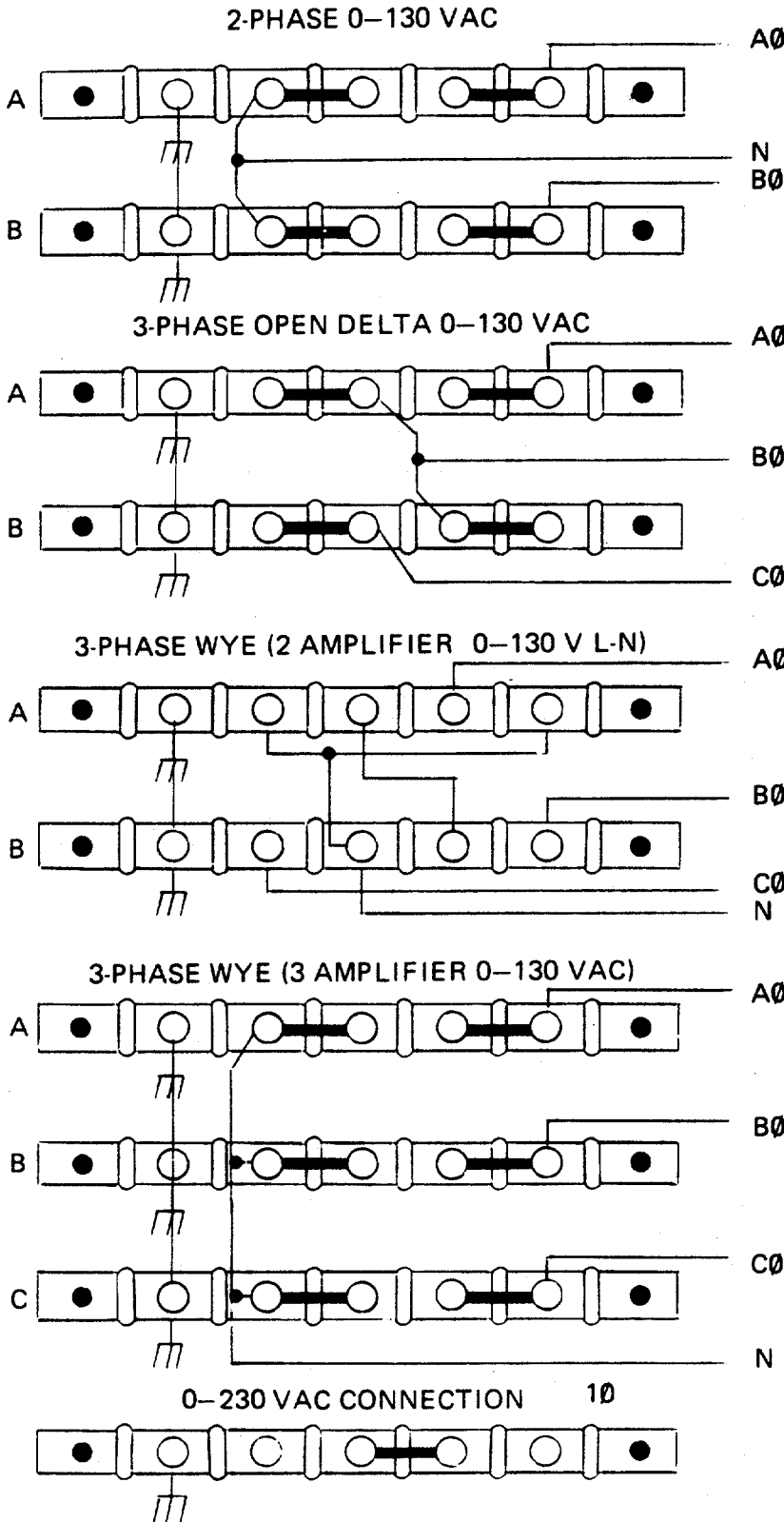


Figure 4-1. Interconnections for Multiphase Operation

OUTPUT CONFIGURATIONS FOR MODEL 1001B



NOTE: FOR TANDEM OPERATION INTERNAL JUMPERS FOR OUTPUT TRANSFORMER MUST BE CHANGED REFER TO 1001A SCHEMATIC

FOR TANDEM OPERATION, 260V OUTPUT USE STD. INTERNAL CONNECTIONS AND 0-130V OUTPUT. SEE FIG. 7-1

EACH AMPLIFIER PLUS INTERCONNECTION BETWEEN UNITS. VALID FOR ALL BUT 2 AMP WYE

Figure 4-2. Interconnections for Multiphase Operation

4-12. In the open delta configuration two power amplifiers of equal VA rating are driven by a standard three phase oscillator having 120° phase angle between $\emptyset A$, $\emptyset B$ and $\emptyset C$. An open delta requires that the two amplifiers have a 60° phase angle between them and this is accomplished by inverting the second amplifier.

4-13. In these systems the amplifier containing the plug-in oscillator is referred to as the master or A phase source. The second amplifier is referred to as the slave or B phase source.

4-14. The open delta hook-up shown in Figure 4-1 is shown below as a vector diagram, in Figure 4-3.

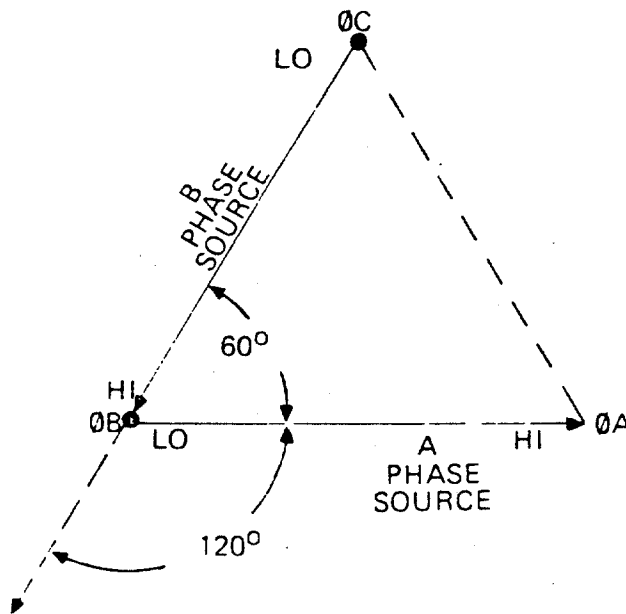


Figure 4-3. Vector Diagram

4-15. Certain specialized oscillators such as the Super-Stable (SS) series and the Quasi-Square wave series are designed only for the open delta configurations using two amplifiers and have the phase angle between the $\emptyset A$ and $\emptyset B$ drive signals

at 60° .

4-16. When using the SS series or quasi-square wave systems, the interconnections would be per Figure 4-4.

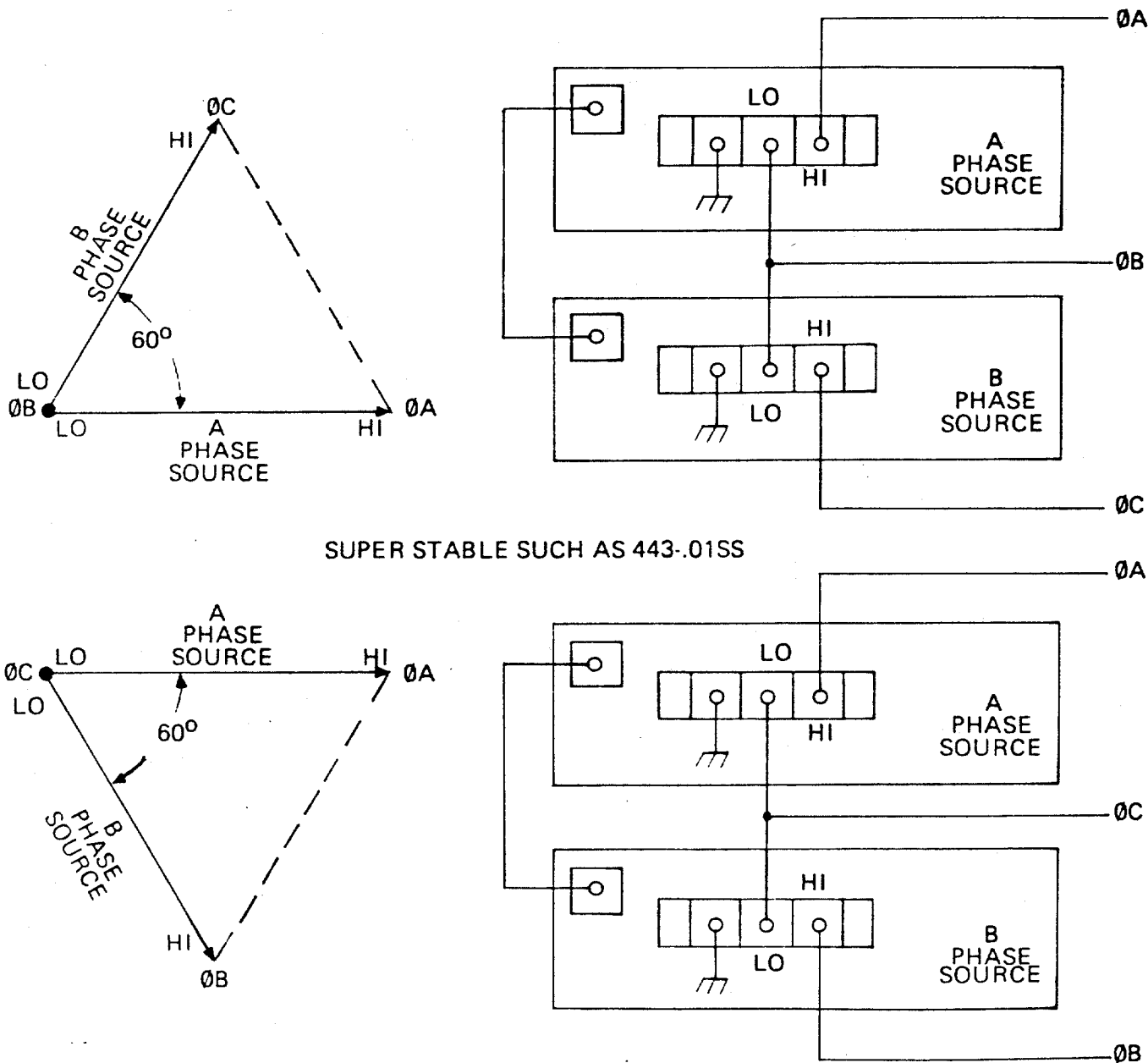


Figure 4-4. SS Series or Quasi-Square Vector Diagrams

4-17. The 400SR plug-in is a universal signal routing plug-in used in multi-phase systems to route drive signal from a master plug-in oscillator or an external oscillator source. The routing is accomplished by the closing of specific switches on the 8 pole single throw DIP switch. Standard plug-ins are as follows (for special configurations refer to the addendum):

- | | | | |
|-------------|---|-------------|---|
| Model 400-A | External oscillator adaptor. Has front panel phone jack and routes signal to power amplifier input. DIP Switch not necessary. If present, switches 7 & 8 must be ON connecting pins 14 to 21 and 16 to 12. | Model 400BT | Blank plug-in used in 2nd amplifier(s) in a Tandem System such as 2000-1. Also used in single phase TG704A systems or in phase A of multi-phase TG704A-3 systems. Switches 4, 7, 8 must be ON connecting pins 22 to 9, 21 to 14 and 16 to 12. |
| 400-B | Blank plug-in used in 2nd amplifier (B phase) of multi-phase system. Routes appropriate signal from oscillator in 1st amplifier in-put. Switches 6,7,8 must be ON, connecting pins 22 to 11, 21 to 14, 16 to 12. | 400DPA | Blank plug-in used in single phase DAP systems or in phase A of multi-phase DAP systems. Switches 4 & 8 must be ON, connecting pins 14 to 9, and 16 to 12. |
| 400-C | Blank plug-in used in 3rd amplifier (C phase) of 3 amplifier, 3 phase system. Routes appropriate signal from oscillator in 1st amplifier to 3rd amplifier input. Switches 5, 7, 8 must be ON, connecting pins 22 to 10, 21 to 14, 16 to 12. | 400DPB | Blank plug-in used in phase B of multi-phase DAP systems. Switches 1, 8 must be On connecting pins 14 to 11 and 16 to 12. |
| | | 400DPC | Blank plug-in used in phase C of multi-phase DAP systems. Switches 2, 8 must be ON connecting pins 14 to 10 and 16 to 12. |
| | | 400TGB | Plug-in used in single package 3Ø units such as 1753B when used with TG704A-3. It has front panel B and C phase amplitude pots. Switches 4,7,8 must be ON connecting pins 22 to 9, 21 to 14, and 16 to 12. |

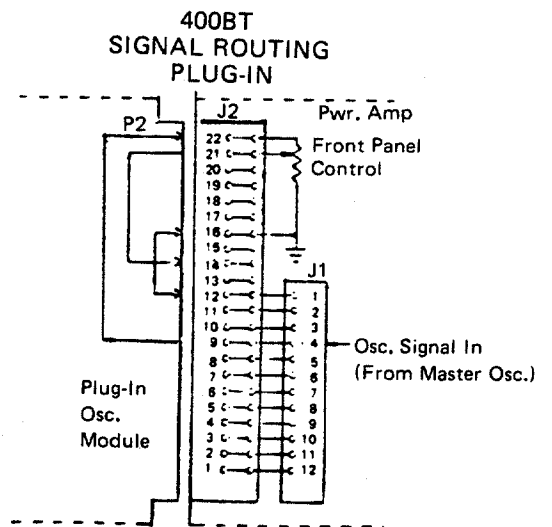
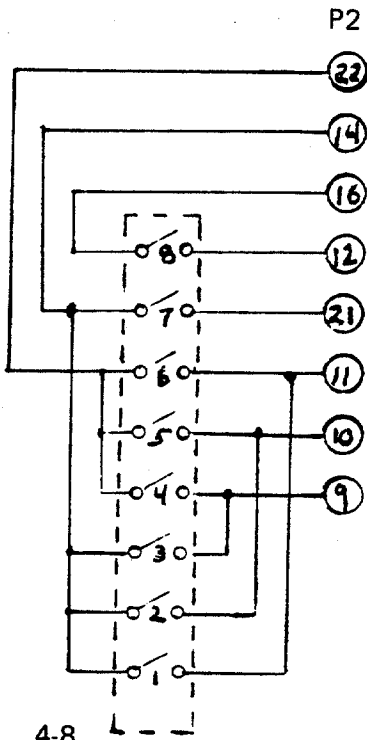
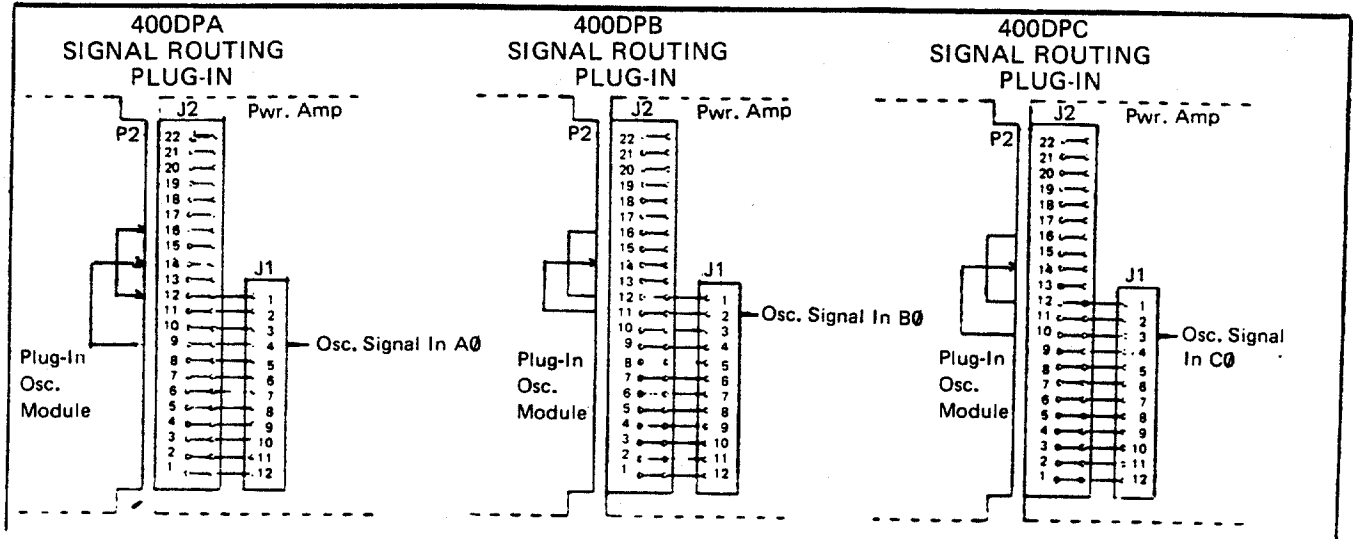
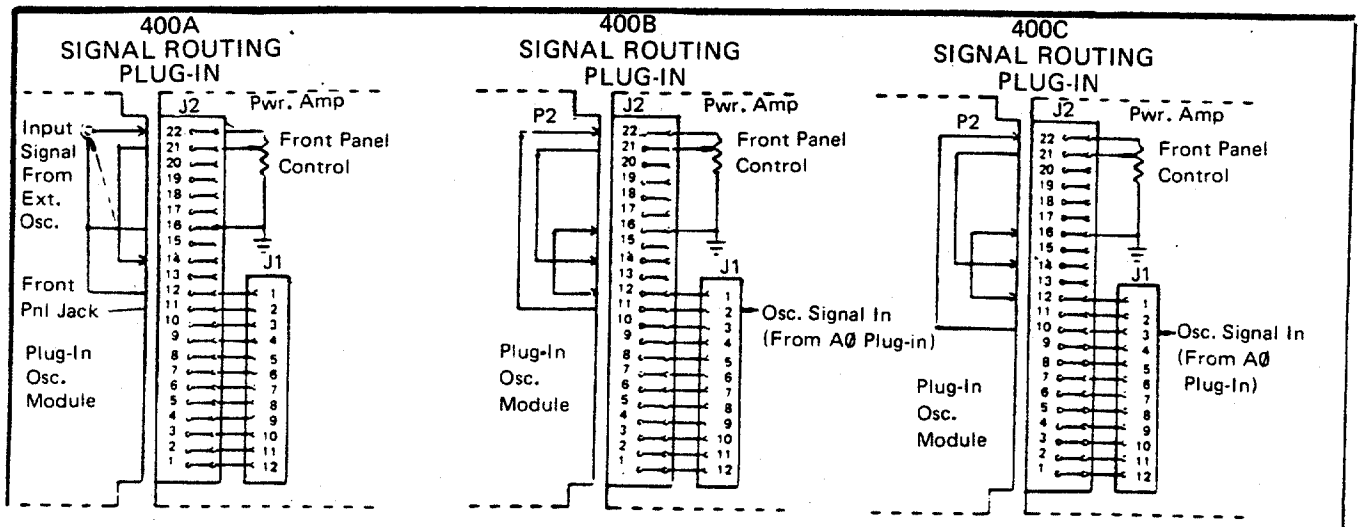


Figure 4-5. Signal Routing Plug-In Connections

SECTION V MAINTENANCE AND ADJUSTMENT

5-1. SERVICE INFORMATION

5-2. Questions concerned with the operation, repair or servicing of this instrument should be directed to the Elgar Repair Department. Include the Model and Serial number in any correspondence concerning this instrument.

5-3. FACTORY REPAIR

5-4. Should it be necessary to return an instrument to the factory for repair, please contact the Elgar Repair Department for authorization to make shipment.

DO NOT RETURN THE UNIT FOR REPAIR WITHOUT AUTHORIZATION.

ELGAR
Repair Department
9250 Brown Deer Road
San Diego, CA 92121-2294
1-800-733-5427
Tel: (858) 450-0085
Fax: (858) 678-4482
www.elgar.com

5-5. TEST POINTS

5-6. Test points and adjustment controls are conveniently provided at the top of the amplifier circuit board, accessible by removing the top cover of the instrument (see Figure 5-1). The test points are as follows:

TP1 – Circuit Common – Turret terminal
TP2 – Amplifier output – Red
TP3 - Oscillator signal – Orange

5-7. OUTPUT REGULATION ADJUSTMENT

5-8. The regulation adjustment, R124, is set at the factory of give $\pm 1\%$ load regulation over the full frequency range of the power source. The

regulation may require re-adjustment if the load is highly reactive or if zero regulation is desired for a specific load and frequency. To make this adjustment, disconnect the load and read the output voltage. Connect the load and adjust R124 until the same reading is obtained.

NOTE

If the load is heavy enough to cause current limit transistors Q104 and Q105 to conduct, the output voltage will be reduced, giving an indication of poor load regulation. Load voltage fall-off due to current limiting action should not be compensated by the regulation adjustment.

5-9. CURRENT LIMIT ADJUSTMENT

5-10. The current limits have been preset at the factory such that the unit will deliver full rated power at rated output voltage. Re-adjustment of the limits should not be performed unless a malfunction has occurred in the unit, parts have been misplaced and re-adjustment of the limit is indicated.

5-11. Current limit adjustment may be checked by observing the waveform at TP-2 with an oscilloscope.

1. Set the scope sensitivity to 10v/cm.
2. Turn the unit on and adjust output for 110 VAC as indicated on the front panel meter.

3. Connect 12.1 ohm load to output terminals of the 1001B, and 8.1 ohm load on the 1751B.
4. Adjust current limit pots CW until clipping is observed at TP-2. Adjust limit pots CCW until clipping just disappears.

5-12. PERIODIC MAINTENANCE

5-13. The only periodic maintenance required by the power source is occasional cleaning of the heatsinks. The heatsinks may be inspected through the front panel air grill. If enough dust and dirt have accumulated to restrict the air flow, an air jet should be directed through the front panel grill while the instrument is operating. If this does not dislodge the dirt, the heatsink must be removed to be cleaned.

5-14. TROUBLESHOOTING

5-15. **CIRCUIT BREAKER TRIPS.** If the circuit breaker trips at no load, a fault in either the power transistors or power rectifiers is indicated. Unplug both heatsinks and try the circuit breaker. If it does not trip, look for a shorted power transistor (power transistors can be tested with an ohmmeter). If the circuit breaker still trips, look for a shorted rectifier bridge. If all diodes and filter capacitors are good, a fault in the power transformer or wiring harness is indicated.

5-16. **OUTPUT DISTORTION.** Output distortion may be caused by overloading. Check the load current waveform with an oscilloscope since some high crest factor loads may draw considerably more peak current than is indicated by a load ammeter.

5-17. **OVERHEATING.** If overheating causes thermostat S1 to close, the output voltage will fall to zero. Overheating may be caused by restricted air flow or excessive environmental temperature (greater than 50° C).

TABLE 5-1. TEST EQUIPMENT REQUIRED

| Name | Manufacturer and Model Number |
|---|-------------------------------|
| Differential Voltmeter | Fluke 931AB |
| Distortion Analyzer | Hewlett-Packard 333A |
| Power Variac, capable of at least 30 amps | |
| Oscilloscope | Tektronix |
| AC Voltmeter | Weston 1240 |
| AC Ammeter | Weston 433 |
| Resistive Load | States Co. No. 33525 |
| Multimeter | Simpson 260 |
| Variable capacitive load | |
| Variable inductive load | |
| Capacitive substitution box | |
| Resistive substitution box | |

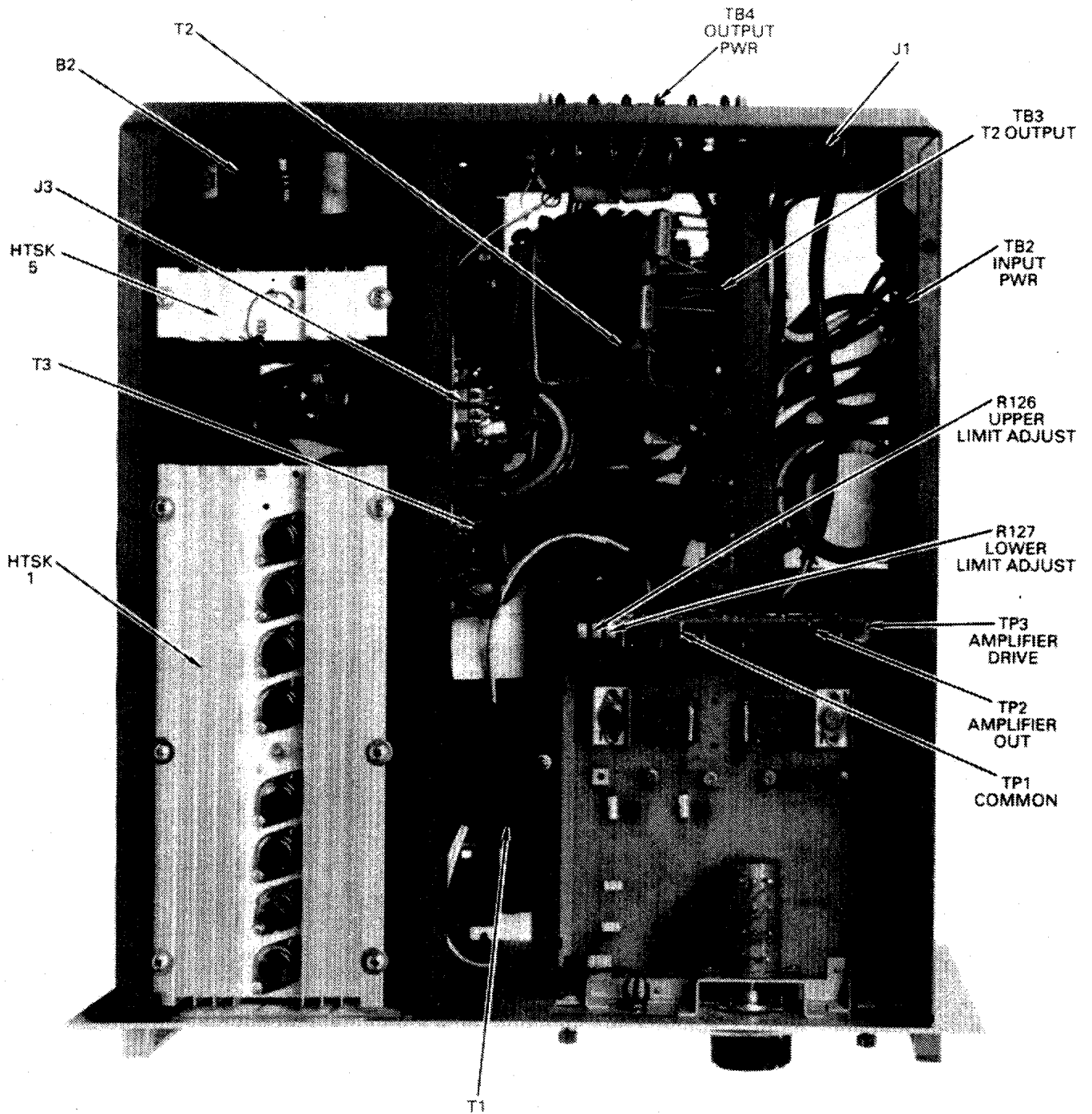


Figure 5-1. Top View, Model 1001B

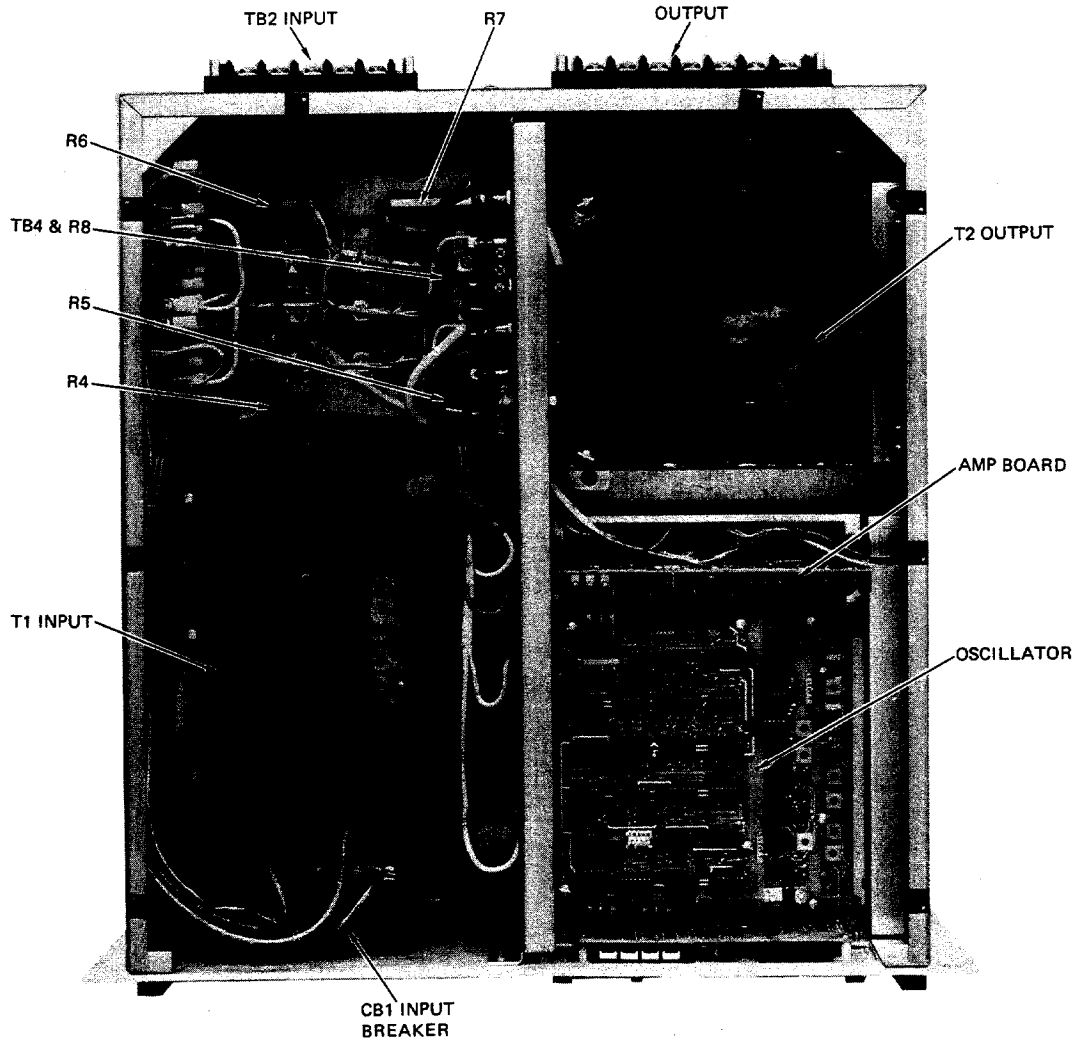


Figure 5-2. Top View, Model 1751B

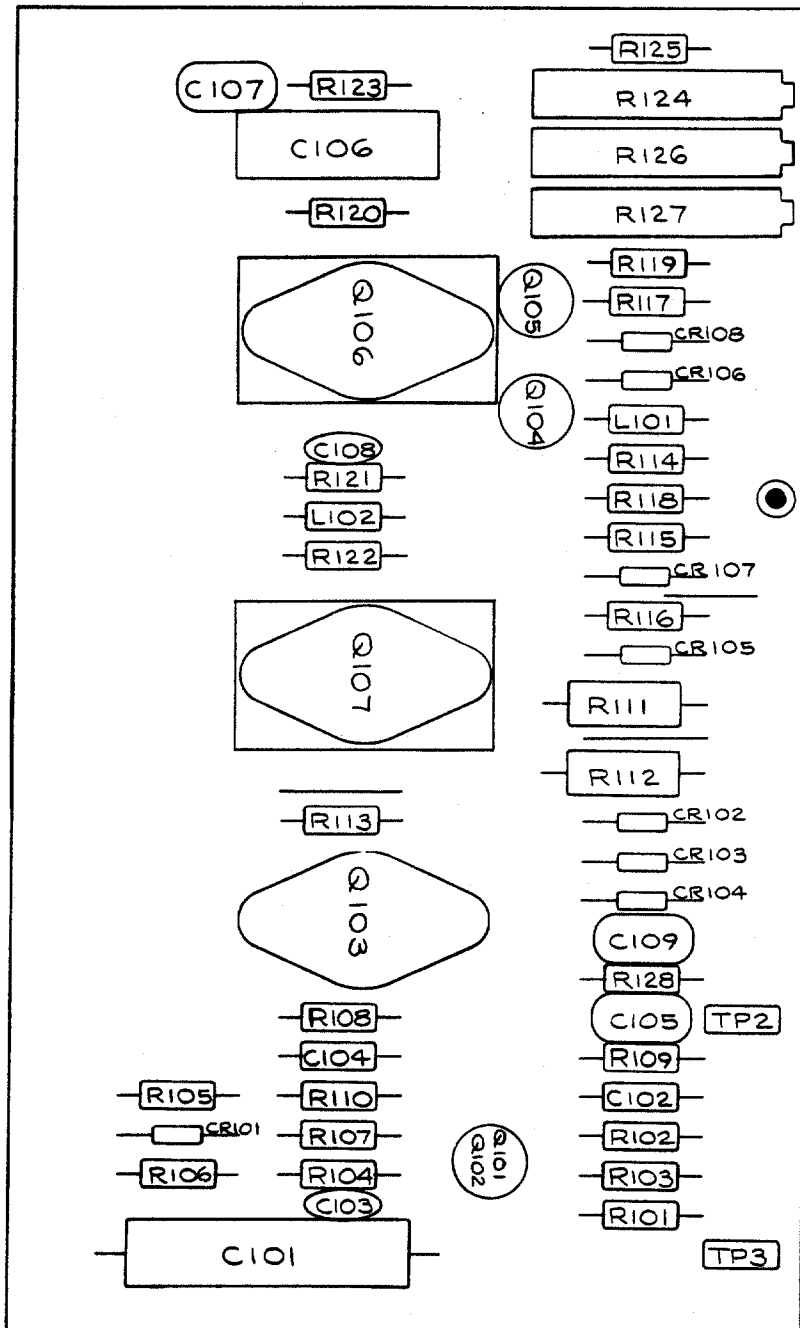


Figure 5-3. Circuit Board Layout

**SECTION VI
PARTS LISTS****6-1. GENERAL**

6-2. This section contains a listing of all parts necessary for factory-authorized repair of the unit. Parts are located on the diagrams in Section VII and correlated on the parts list by using their reference designators. Note that trimming capacitors are factory-selected parts and their replacement is considered beyond the scope of customer maintenance.

6-3. SPARE PARTS ORDERING

6-4. When ordering spare parts, specify part name, part number, manufacturer, component value and rating. If complete assemblies are desired contact Elgar Sales & Technical Support. Specify assembly number, instrument series number and instrument name when ordering.

ELGAR ELECTRONICS CORPORATION
Sales & Technical Support
9250 Brown Deer Road
San Diego, CA 92121-2294
1-800-733-5427
Tel: (858) 450-0085
Fax: (858) 458-0267
Email: sales@elgar.com
www.elgar.com

1001B CHASSIS ASSEMBLY

| SCHEMATIC DESIGNATION | VALUE | DESCRIPTION OR TYPE | RATING | MANUFACTURER | | ELGAR PART NUMBER |
|-----------------------|-----------|---------------------|----------|--------------|------------------|-------------------|
| | | | | NAME | PART NUMBER | |
| B1,2 | 23,200 uF | Fan | | Rotron | | 853-MA2-B4 |
| C1-4 | | Capacitor | 50V | Sprague | MR2B3 | 826-239-12 |
| C5-10 | .05 uF | Capacitor | 600V | Sprague | 6PS-S50 | 822-503-06 |
| CB1 | | Ckt. Breaker | 50A | Airpax | UPL1-1-6-1-503 | 852-503-52 |
| CR1,3 | | Diode | | I.R. | 70H20A | 845-702-0A |
| CR2,4 | | Diode | | I.R. | 70HR20A | 845-702-0R |
| DS1 | | Lamp | | Eldema | BG02-RCS-AIC-68K | 854-68K-22 |
| M1 | | Meter | | Jewell | 82T | 857-150-82 |
| Q1,2 | | Transistor | | RCA | 2N4348 | 841-434-8X |
| R1 | 10K | Potentiometer | | Spectrol | 534-9561-10 | 819-103-53 |
| R2,3 | 1K | Resistor | 10W, 5% | Dale | CW10-1K | 808-102-05 |
| R4 | 4.7 ohm | Resistor | 1/2W, 5% | Speer | RC20GF4R7J | 802-4R7-05 |
| R5,6 | 5.6 ohm | Resistor | 5W, 5% | Dale | CW5-5.6 | 807-5R6-05 |
| R7 | .025 ohm | Resistor | 50W, 5% | Dale | RH50 | 810-R02-05 |
| T1 | | Pwr. Xfmr | | Elgar | | 990-070-96 |
| T2 | | Output Xfmr. | | Elgar | | 990-407-90 |
| T3 | | Current Xfmr. | | Elgar | | 990-191-90 |
| C12 | .22 uF | Capacitor | 600V | Sprague | 6PS-P22 | 822-224-06 |
| CR201,301,401,501 | | HEATSINKS | | Westinghse. | A327B | 845-368-DX |
| Q201-208,301-308, | | Diode | | RCA | 2N4348 | 841-434-8X |
| 401-408,501-508 | | Transistor | | Dale | CW5-22 | 807-R22-05 |
| R201-208,301-308, | .22 ohm | Resistor | 5W, 10% | Elmwood | 2450-21-272 | 861-340-0X |
| 401-408,501-508 | | Thermostat | | P&B | R10E1X4 | 861-R10-E1 |
| S101 | | RELAY SOCKET | | P&B | 27E152 | 861-27E-15 |
| K1 | | RLY SPRING CLIP | | P&B | 20C250 | 861-20C-25 |

1751B CHASSIS ASSEMBLY

| SCHEMATIC DESIGNATION | VALUE | DESCRIPTION OR TYPE | RATING | MANUFACTURER | | ELGAR PART NUMBER |
|--|-----------|---------------------|---------|--------------|------------------|-------------------|
| | | | | NAME | PART NUMBER | |
| C1-4 | 20,000 uF | Capacitor | 50V | Cornell | FAHM-203-50-B6 | 826-213-11 |
| C5,6 | .22 uF | Capacitor | 600V | Sprague | 6PS-P22 | 822-224-06 |
| B1,2 | | Fan | | Rotron | | 853-MA2-B4 |
| CB1 | | Ckt. Breaker | 15A | Airpax | UPG111-6-1-153 | 852-153-54 |
| CR1-6 | | Diode | | I.R. | 1N1186A | 845-118-6A |
| CR7-12 | | Diode | | I.R. | 1N1186AR | 845-118-6R |
| DS1 | | Lamp | | Eldema | BG02-RCS-AIC-68K | 854-68K-22 |
| M1 | | Meter | | Jewell | 82T | 857-150-82 |
| R1 | 10K | Potentiometer | | Spectrol | 534-9561-10 | 819-103-53 |
| R2,3 | 10K | Resistor | 2W, 5% | Speer | RC42GF103J | 804-103-05 |
| R4,5 | 5.6 ohm | Resistor | 5W, 5% | Dale | CW5 | 807-5R6-05 |
| R6,7 | .025 ohm | Resistor | 50W, 5% | Dale | RH50 | 810-R02-05 |
| R8 | 4.7 ohm | Resistor | ½W, 5% | Speer | RC20GF4R7J | 802-4R7-05 |
| Q1,2 | | Transistor | | Motorola | MJ15003 | 841-150-03 |
| T1* | | Power Xfmr | | Elgar | | 990-497-90 |
| T2 | | Output Xfmr | | Elgar | | 990-244-90 |
| T3 | | Current Xfmr | | Elgar | | 990-137-90 |
| CR201,301,401,501, 601,701 | | HEATSINKS | | Westinghse. | 368D | 854-368-DX |
| Q201-208,301-308, 401-408,501-508, 601-608,701-708 | | Diode | | RCA | 2N6259 | 841-625-9X |
| R201-208,301-308, 401-408,501-508, 601-608,701-708 | .22 ohm | Transistor | | Dale | CW5 | 807-R22-05 |
| S101 | | Thermostat | | Elmwood | 2450-21-272 | 861-340-0X |
| *T1 New design Alternate Part | | Power Xfmr | | Elgar | | 5900288-01 |

AMPLIFIER BOARD 608-107-44

| SCHEMATIC DESIGNATION | VALUE | DESCRIPTION OR TYPE | RATING | MANUFACTURER | | ELGAR PART NUMBER |
|-----------------------|----------|---------------------|----------|--------------|-------------------|-------------------|
| | | | | NAME | PART NUMBER | |
| C101 | 10 uF | Capacitor | 200V | IMB | JA2A106K | 822-106-10 |
| C102,104 | FSV | Capacitor | | | | |
| C103 | 220 pF | Capacitor | 500V | ARCO | DM15-221J | 820-221-05 |
| C105 | 200 pF | Capacitor | 500V | ARCO | DM15-201J | 820-201-05 |
| C106 | 50 uF | Capacitor | 50V | Sprague | 500D506G050DD7 | 824-506-71 |
| C107 | 220 uF | Capacitor | 10V | Sprague | 196D227X0010MA3 | 823-227-61 |
| C108 | .0022 uF | Capacitor | 500V | Erie | 811-000-X5F0-222K | 821-222-00 |
| C109 | 300 pF | Capacitor | 500V | ARCO | DM15-301J | 820-301-05 |
| CR101 | | Zener | 12V | Motorola | 1N5242 | 843-524-2X |
| CR102-108 | | Rectifier | 200V | Motorola | 1N4003 | 845-400-3X |
| Q101,102 | | Diff. Amp. | | National | 2N3810 | 849-381-3X |
| Q103 | | Transistor | | RCA | 2N3583 | 839-358-3X |
| Q104 | | Transistor | | Fairchild | 2N3567 | 835-356-7X |
| Q105 | | Transistor | | Fairchild | 2N3638 | 834-363-8X |
| Q106 | | Transistor | | Motorola | 2N4912 | 839-491-2X |
| Q107 | | Transistor | | Motorola | 2N4900 | 838-490-0X |
| L101 | 150 uH | Choke | | Nytronics | SWD150 | 851-150-01 |
| L102 | 470 uH | Choke | | Nytronics | SWD470 | 851-470-01 |
| R101 | 3.32K | Resistor | 1/8W, 1% | Dale | RN60C3321F | 813-332-1F |
| R102,108,114 | FSV | Resistor | 1/2W, 5% | | | |
| R103 | 4.75K | Resistor | 1/8W, 1% | Dale | RN60C4751F | 813-475-1F |
| R104,123 | 4.7K | Resistor | 1/2W, 5% | Speer | RC20GF472J | 802-472-05 |
| R105,106 | 6.2K | Resistor | 1/2W, 5% | Speer | RC20GF622J | 802-622-05 |
| R107 | 1.2K | Resistor | 1/2W, 5% | Speer | RC20GF122J | 802-122-05 |
| R109 | 33.2K | Resistor | 1/8W, 1% | Dale | RN60C3322F | 813-332-2F |
| R110,115,117 | 10K | Resistor | 1/2W, 5% | Speer | RC20GF103J | 802-103-05 |
| R111,112 | 2.2K | Resistor | 1W, 5% | Speer | RC32GF222J | 803-222-05 |
| R113,128 | 33 ohm | Resistor | 1/2W, 5% | Speer | RC20GF330J | 802-330-05 |
| R116 | 1.8K | Resistor | 1/2W, 5% | Speer | RC20GF182J | 802-182-05 |
| R118,119 | 68 ohm | Resistor | 1/2W, 5% | Speer | RC20GF680J | 802-680-05 |
| R120,122 | 100 ohm | Resistor | 1/2W, 5% | Speer | RC20GF101J | 802-101-05 |
| R121,125 | 15 ohm | Resistor | 1/2W, 5% | Speer | RC20GF150J | 802-150-05 |
| R124 | 1K | Potentiometer | | Bourns | 3059Y | 819-102-30 |
| R126,127 | 10 ohm | Potentiometer | | Bourns | 3059Y | 819-100-30 |

**SECTION VII
DIAGRAMS****7-1. GENERAL**

7-2. This section contains the schematic diagrams for the AC power sources. The schematic diagram should be used to understand the theory of operation as an aid in troubleshooting the unit. Reference designators shown on schematics correspond to reference designators shown in parts lists, where exact component values are given.

Components identified as "trim" are factory-selected parts whose values are determined at time of final checkout.

7-3. DIAGRAMS

7-4. Diagrams included in this section are :
a. Overall Schematic, Model 1001B
b. Overall Schematic, Model 1751B

