DATE 12-11-63	TMC SPECIFICATION NO. S-910	8
SHEET 1 OF 51		
S.D. COMPILED	S.D. CHECKED	TITLE: [illegible] 200K
F.B. APPROVED		

COMPLETE TEST INSTRUCTIONS

FOR

200K SECTION

NOTE: THIS SPEC SHOULD BE USED
IN CONJUNCTION WITH S540.

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0

S.D. COMPILED | CHECKED | APPROVED

TITLE: GPT-200K

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200K SCHEMATIC DIAGRAMS

CK-610	(Size 4)	Schematic Diagram , Crowbar
CK-611	(Size 4)	Schematic Diagram , Bias Supply
CK-612	(Size 4)	Schematic Diagram , High Voltage Rectifier (H.V.R.)
CK-630	(Roll)	Schematic Diagram , Final Amplifier
CK-631	(Roll)	Schematic Diagram , Power Supply "A"
CK-632	(Roll)	Schematic Diagram , Power Supply "B"
CK-633	(Size 8)	Schematic Diagram , Buffer Section
CK-634	(Size 4)	Schematic Diagram , SWR-Retune (DC Amplifier)
CK-635	(Size 8)	Schematic Diagram , Relay Panel "A"
CK-636	(Size 8)	Schematic Diagram , Relay Panel "B"
CK-637	(Size 2)	Schematic Diagram , Blower Delay

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I. INTRODUCTION:

The TMC Model GPT-200K is a high powered General Purpose Transmitter which provides SSB, ISB, AM, CW, FSK and FAX modes of operation in the frequency range of 2 to 28 megacycles. It is conservatively rated at 200 KW PEP and 100 KW average power output.

Two (2) MACHLETT ML 8317 air cooled tubes are used as the final amplifiers. The "final" tubes are operated grounded grid class AB_1. Plate voltage is approximately 20KV with the plate dissipation being 60KW. Each "final" tube has its own power supply and is completely isolated from the other. This feature may be utilized for single tube operation in the event of component failure in any one supply. Of course, the power output would be reduced by one half. When used together, both "finals" may be considered as being in parallel RF wise. Plate current, grid current and grid voltage in each tube is individually monitored to assure proper power distribution.

The output tuning network is a double PI configuration to achieve desired harmonic rejection. The output is either 50 ohms unbalanced or 600 ohms balanced. A broadband transformer is used to match 50 ohms to 600 ohms for balanced operation.

Due to large amounts of power being consumed by the 200K Transmitter, mis-wiring and loose connections can account for consequences which may prove to be costly, time consuming and dangerous to the operator. Of major importance is the careful inspection of the primary wiring to the main breakers, contactors, primary transformers and associated control circuits. Utmost care must be taken in the MECHANICAL INSPECTION and PRELIMINARY ELECTRICAL INSPECTION before power is connected to the unit.

Under operating conditions the RF voltages encountered will be such that grounds are very important. No braid should be used for ground return of any external equipment. Copper straps are recommended for grounding.

All sub-units must be carefully inspected before installation within the GPT-200K Transmitter.

Under no condition should the operation of the shorting relays be taken for granted. Always short out HV capacitors with the shorting sticks that are provided with the equipment, before attempting any checking or repairs.

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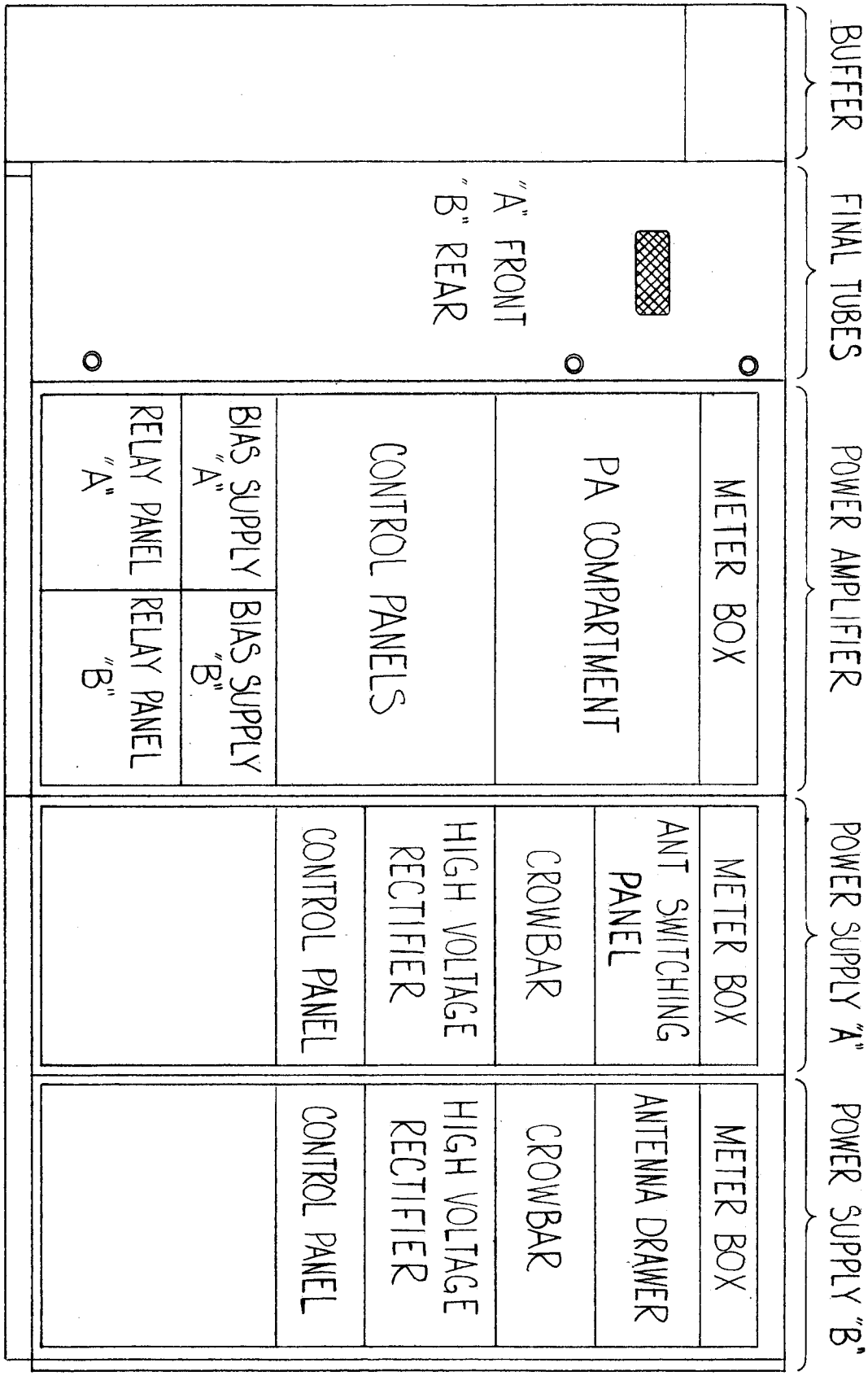
S.D. COMPILED / CHECKED	TITLE: GPT-200K	
APPROVED	FIGURE 1: EQUIPMENT LAYOUT	



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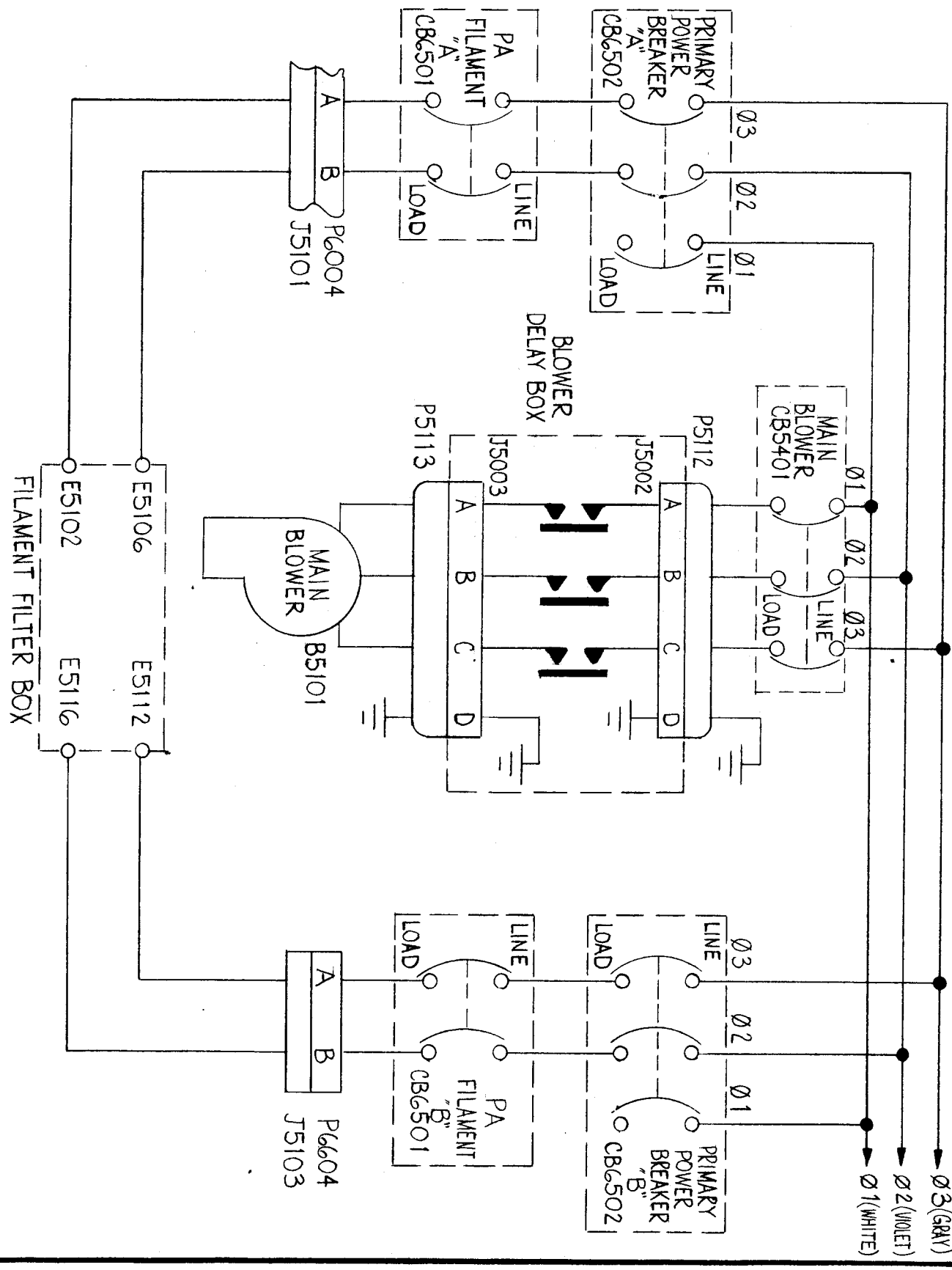
APPROVED		FIGURE 2: 3 PHASE PRIMARY WIRING	



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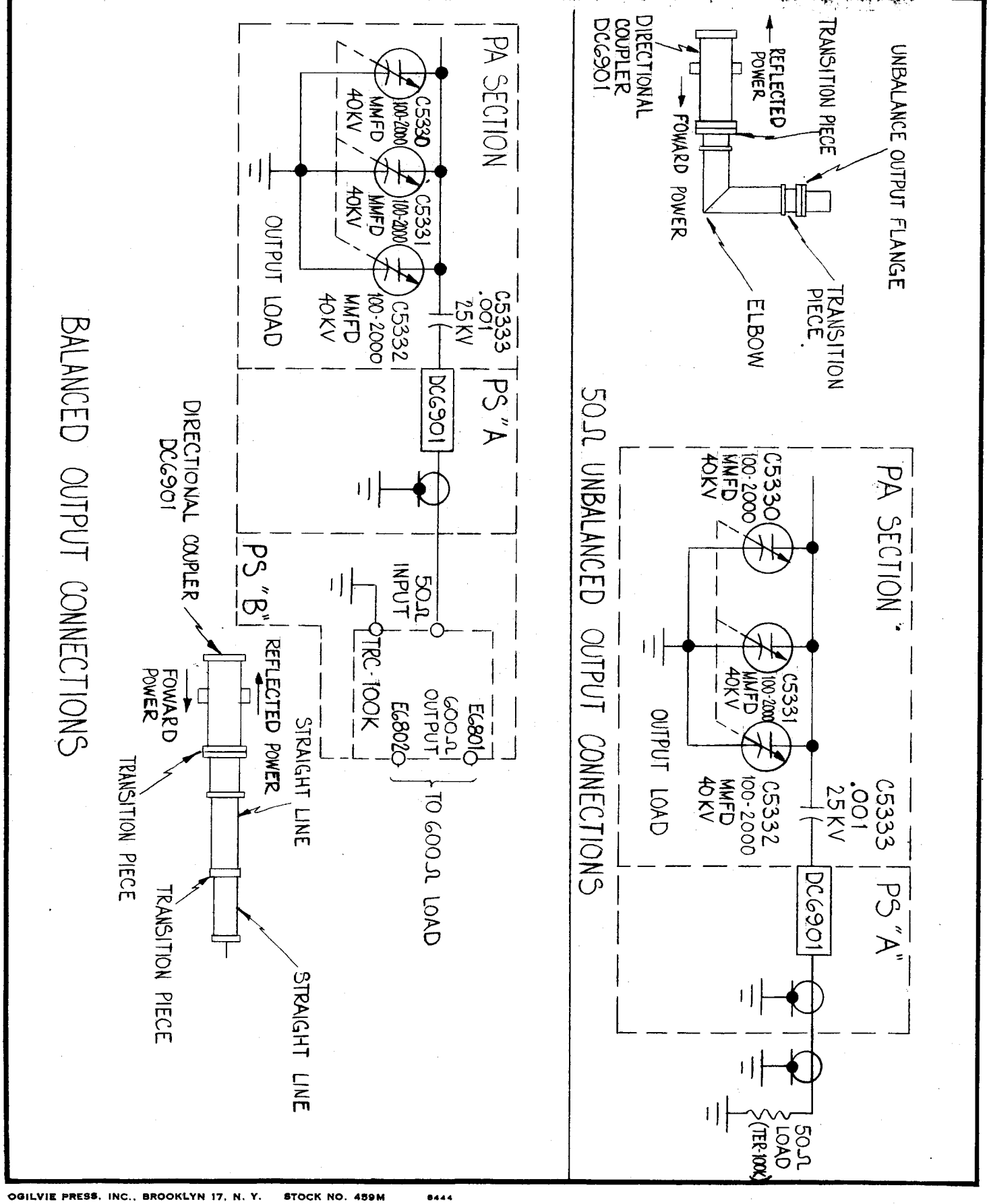
APPROVED	FIGURE 3: BALANCE AND UNBALANCE OUTPUT CONNECTIONS	



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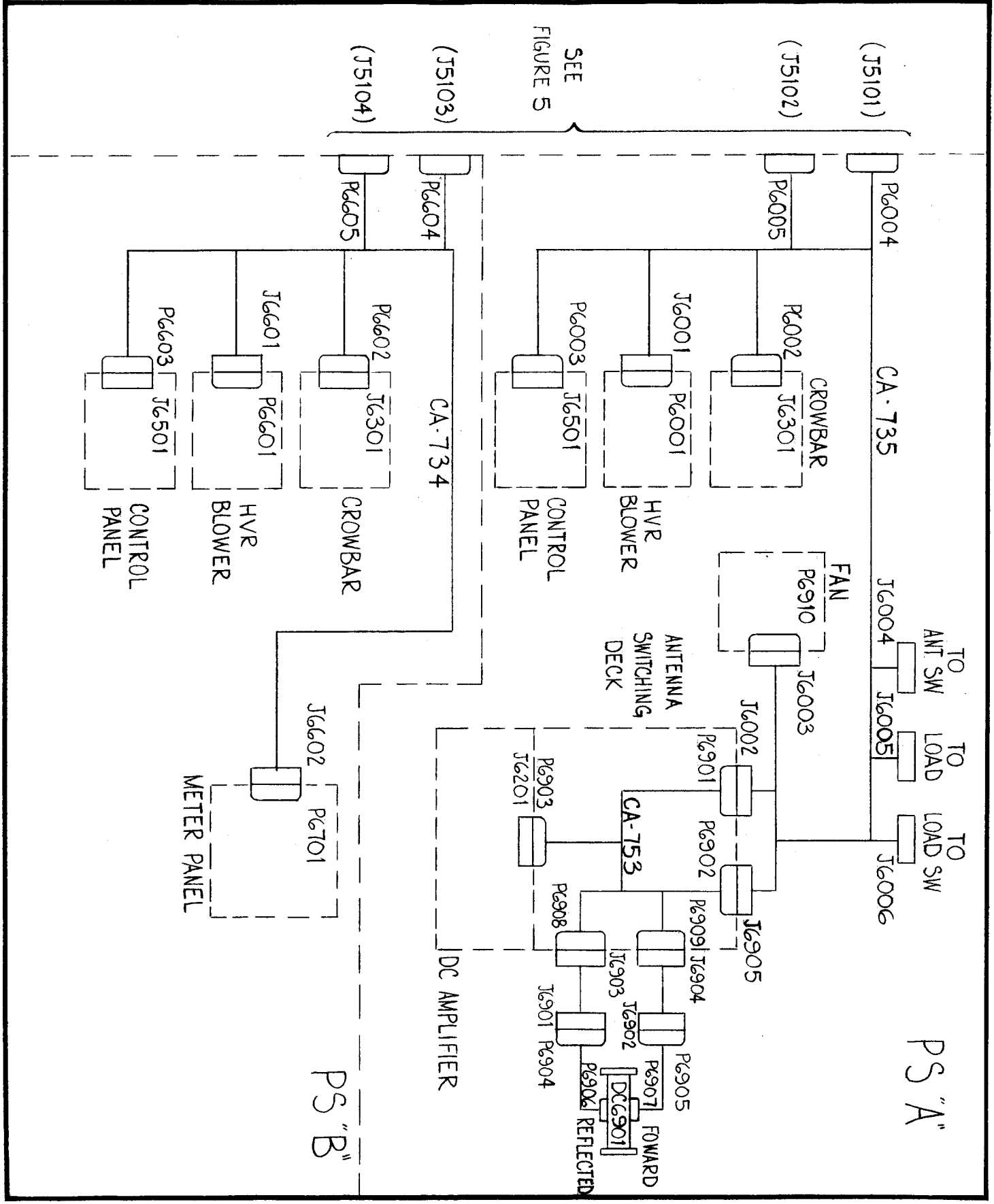
S.D. COMPILED / CHECKED	TITLE: GPT-200K	
APPROVED	FIGURE 4: CONNECTOR DIAGRAM PS "A" AND PS "B"	



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APPROVED	FIGURE 6: HIGH VOLTAGE AND B- TERMINATIONS	

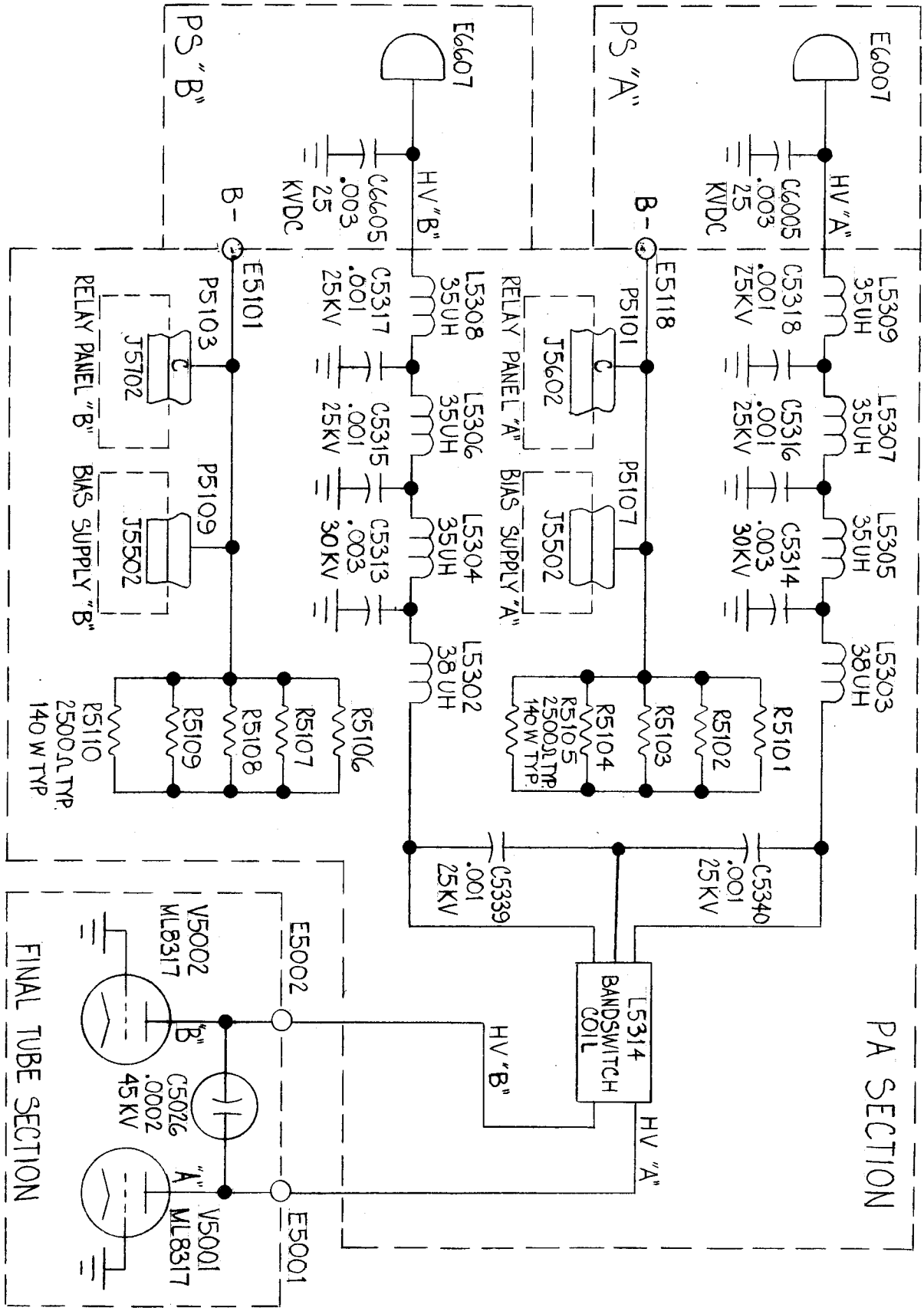

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FIGURE 5: CONNECTOR DIAGRAM, PA, FINAL TUBE AND BUFFER SECTIONS

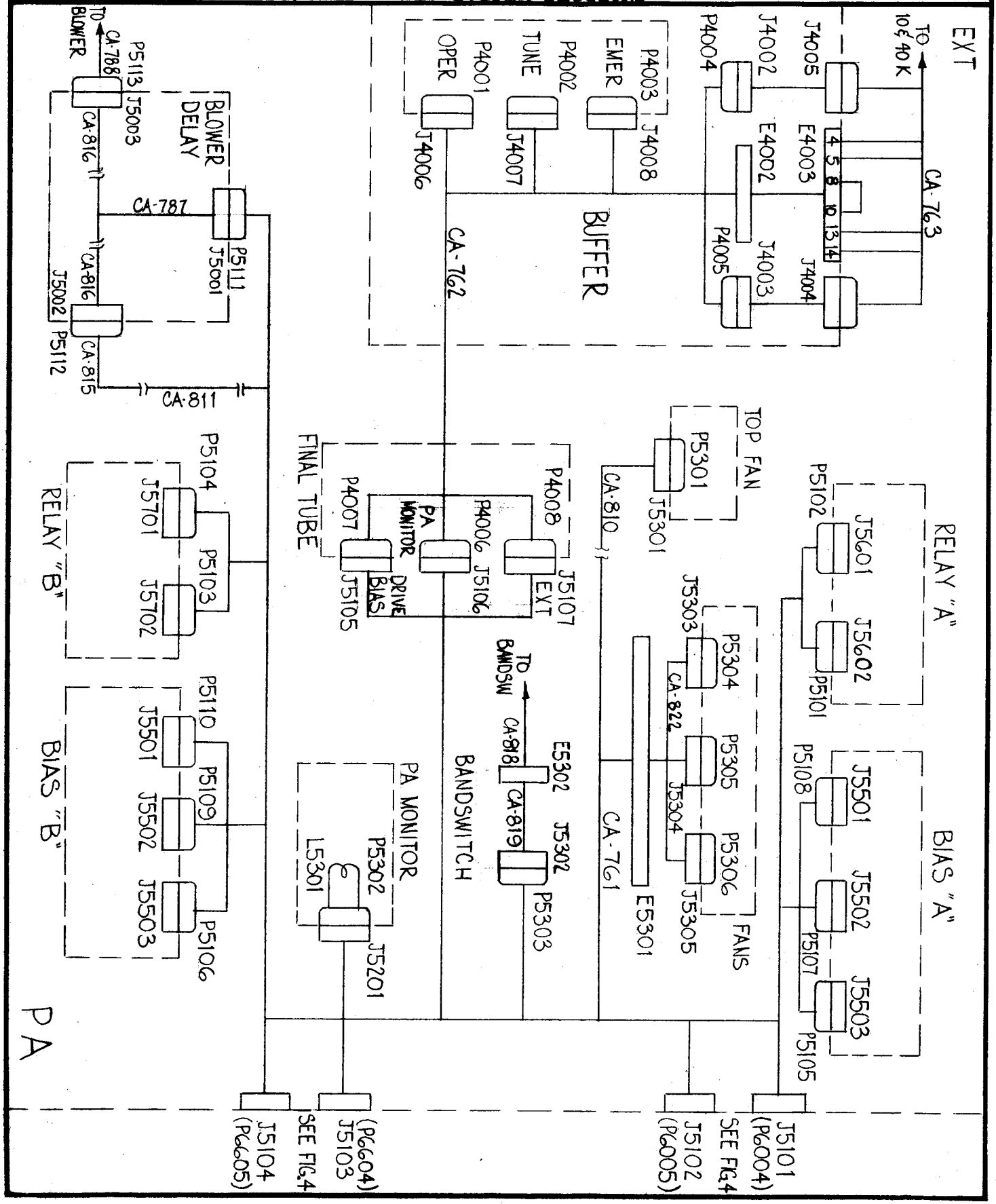

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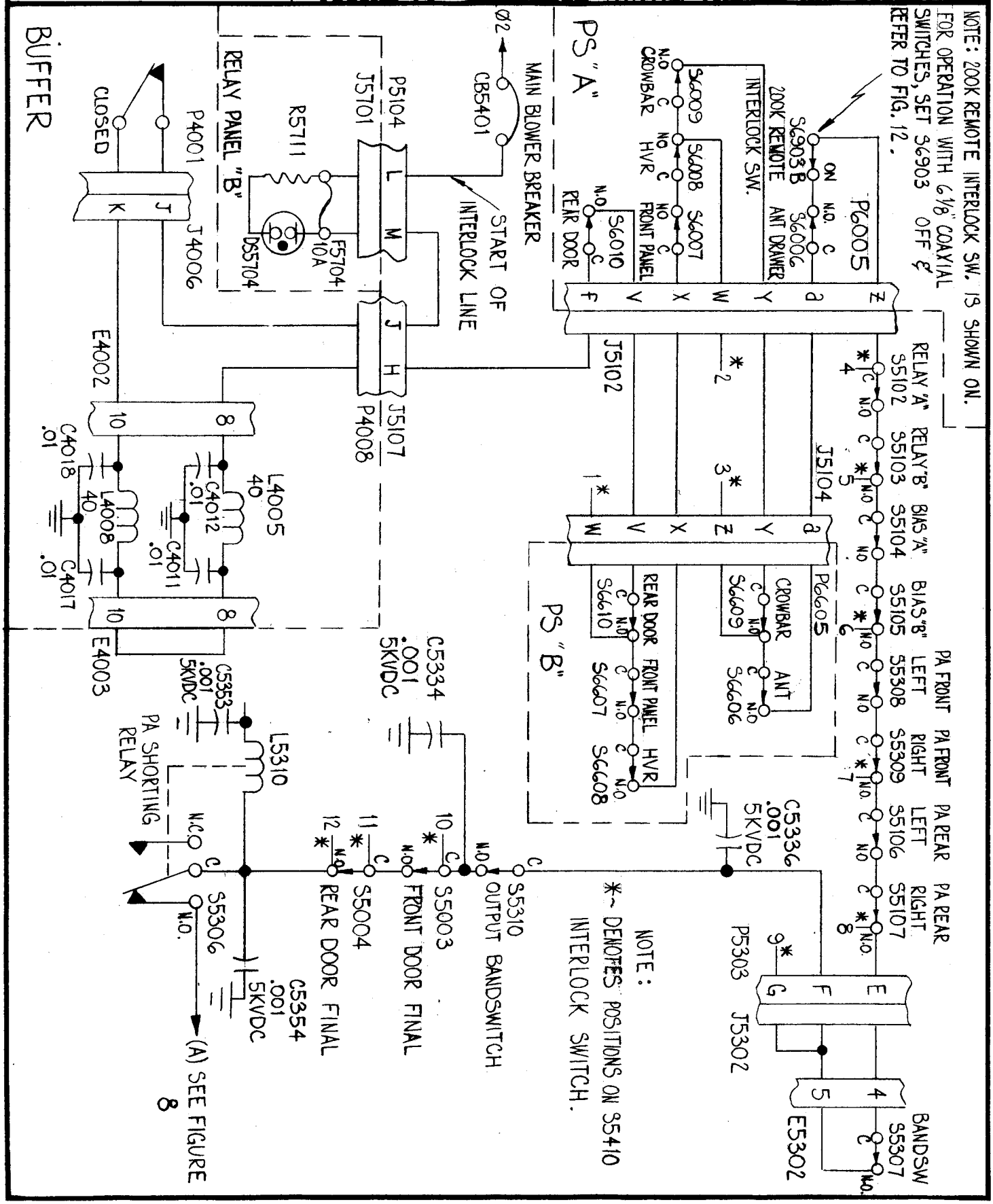
FIGURE 7: INTERLOCK SYSTEM (PANELS AND DOORS)



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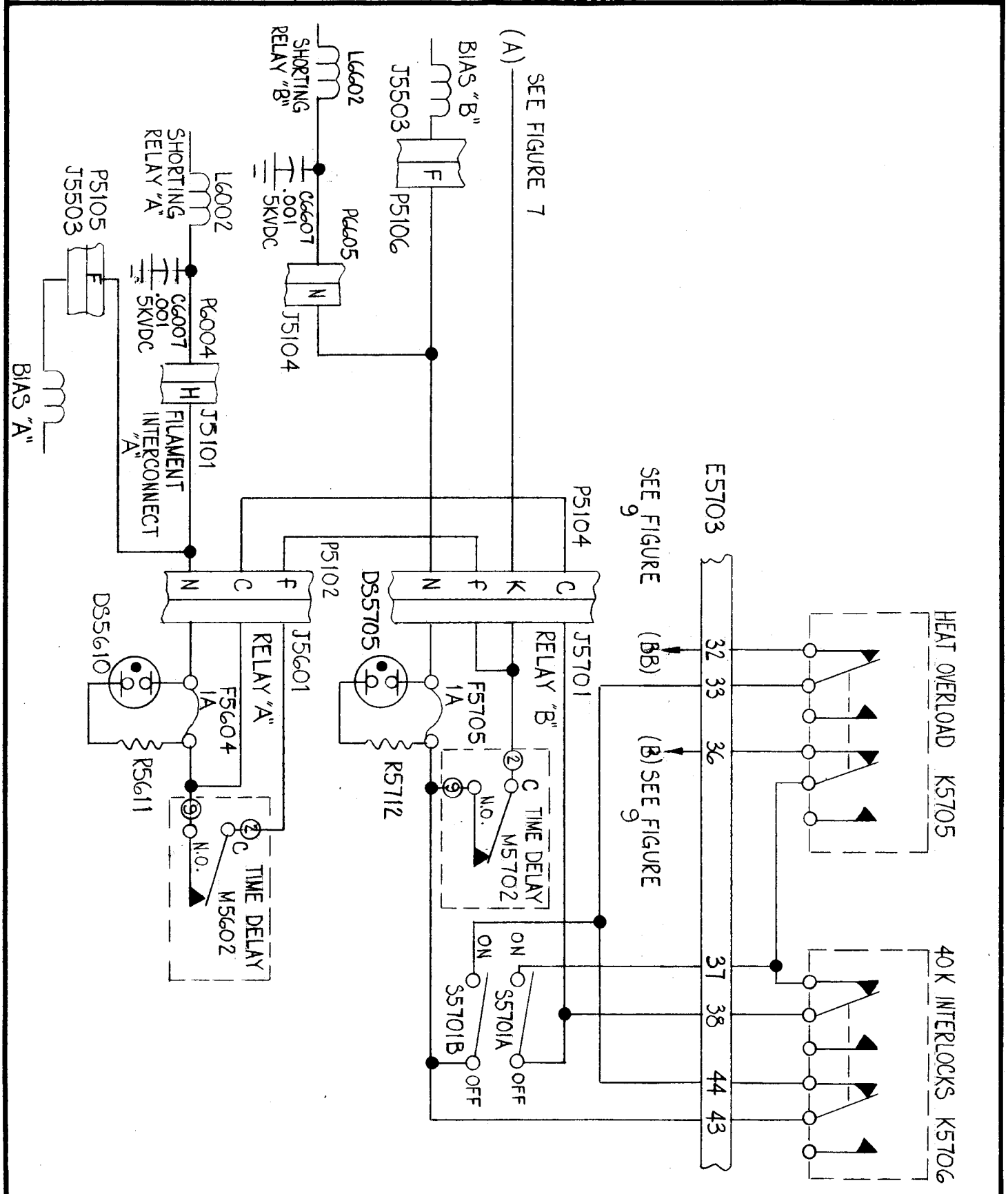
APPROVED	FIGURE 8: INTERLOCK SYSTEM (SEPARATION OF "A" AND "B" SECTIONS)	



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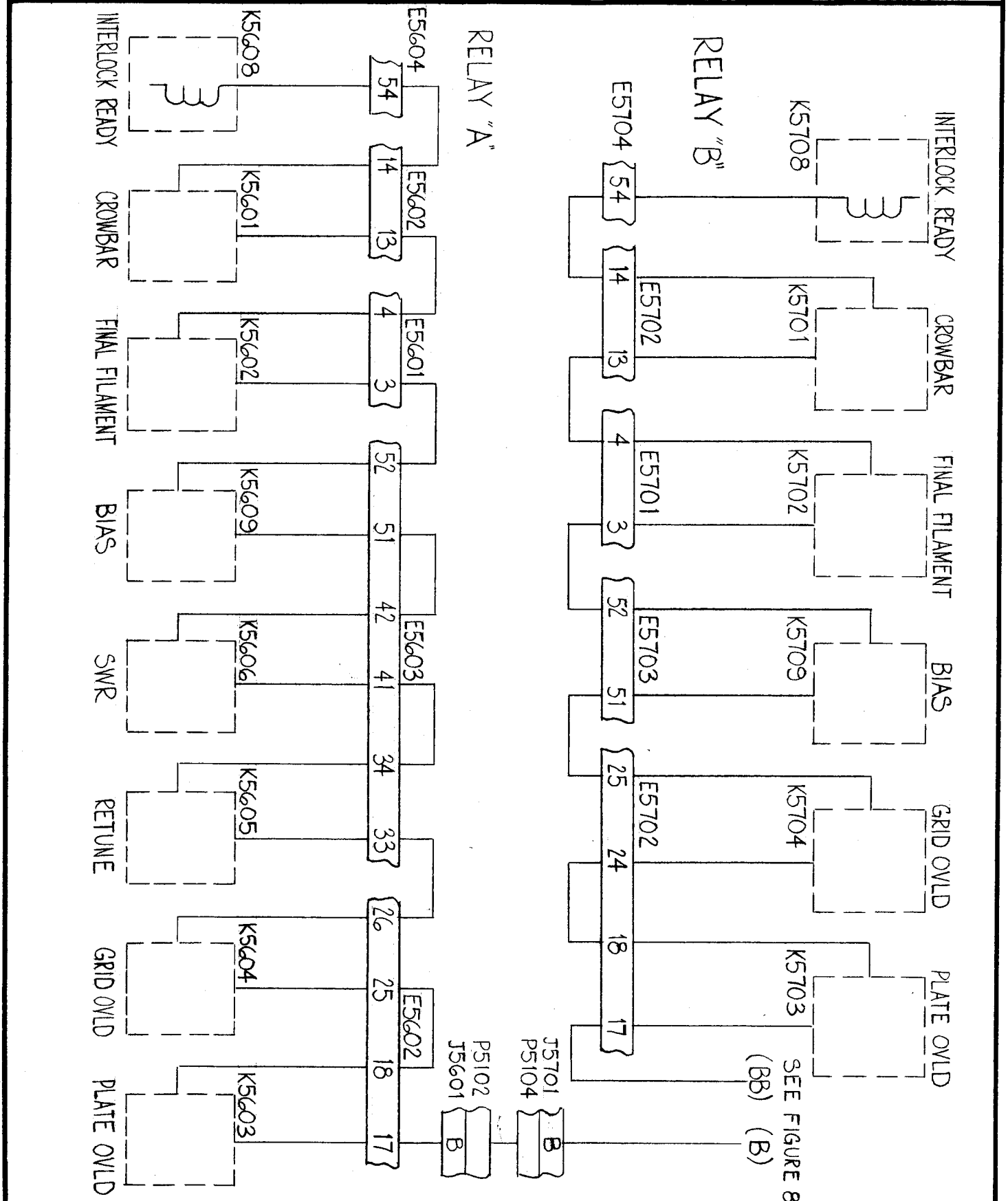
S.D. COMPILED / CHECKED	TITLE: GPT-200K	
APPROVED	FIGURE 9: INTERLOCK SYSTEM (OVERLOAD SECTION)	



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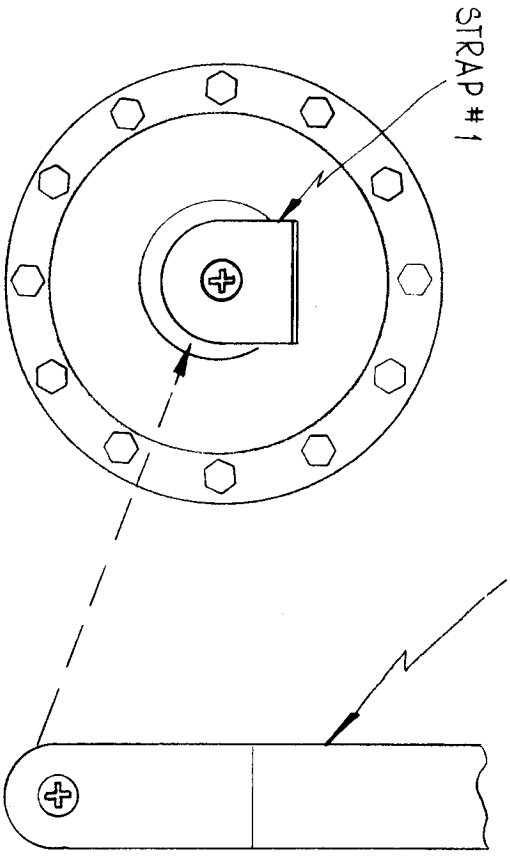
S.D. COMPILED / CHECKED	TITLE: GPT-200K	
APPROVED	FIGURE 10: EMERGENCY OUTPUT CONNECTIONS	

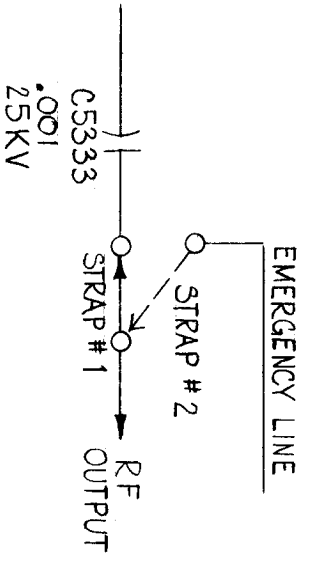


~FOR EMERGENCY OPERATION~

STEP 1~ REMOVE STRAP #1 FROM TRANSITION PIECE & CAPACITOR (C5333).

2~ REMOVE SCREW FROM STRAP #2.

3~ SWING STRAP #2 OVER & CONNECT TO TRANSITION PIECE.



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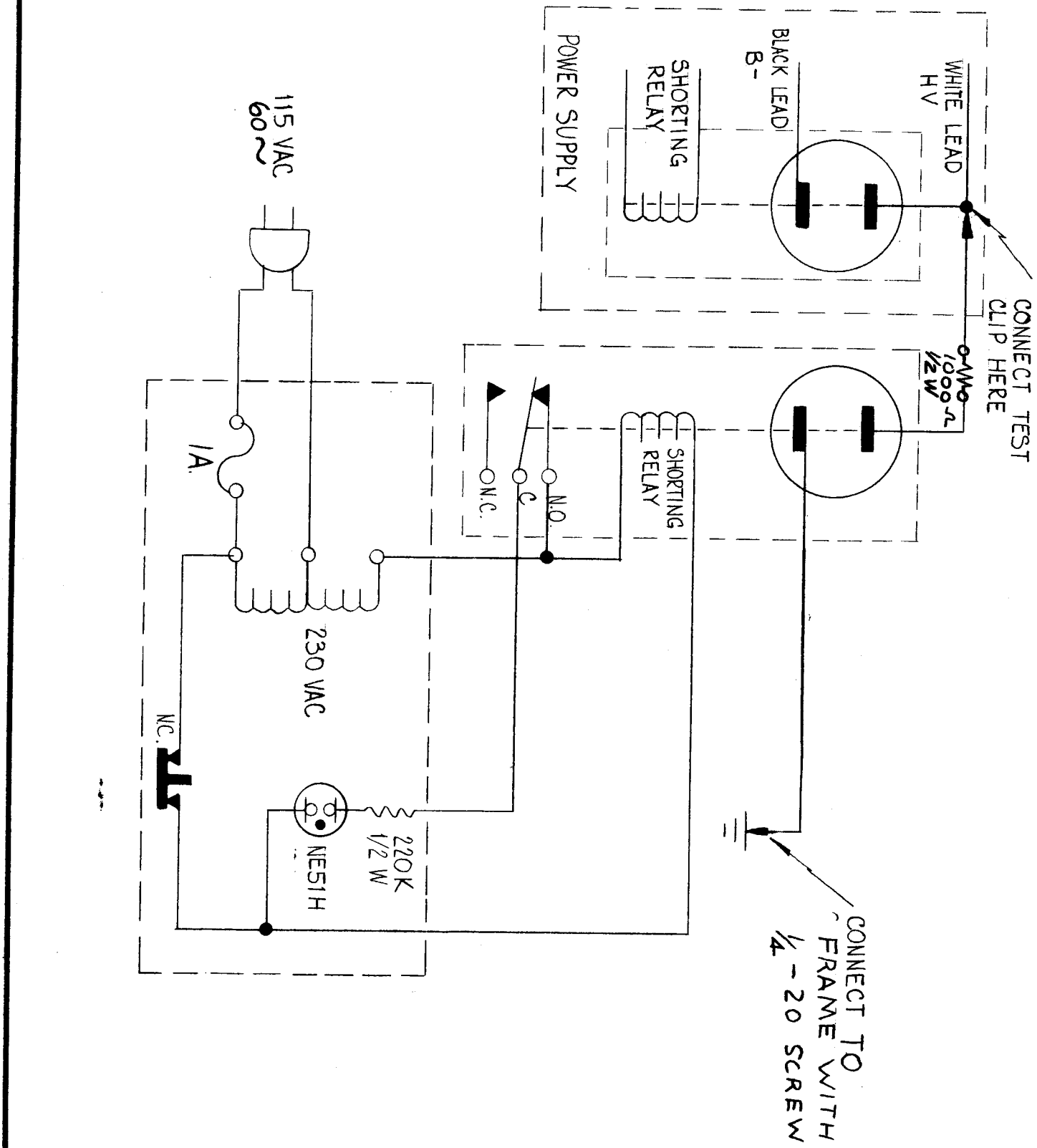
APPROVED	FIGURE 11: CROWBAR OVERLOAD TEST CONNECTIONS	



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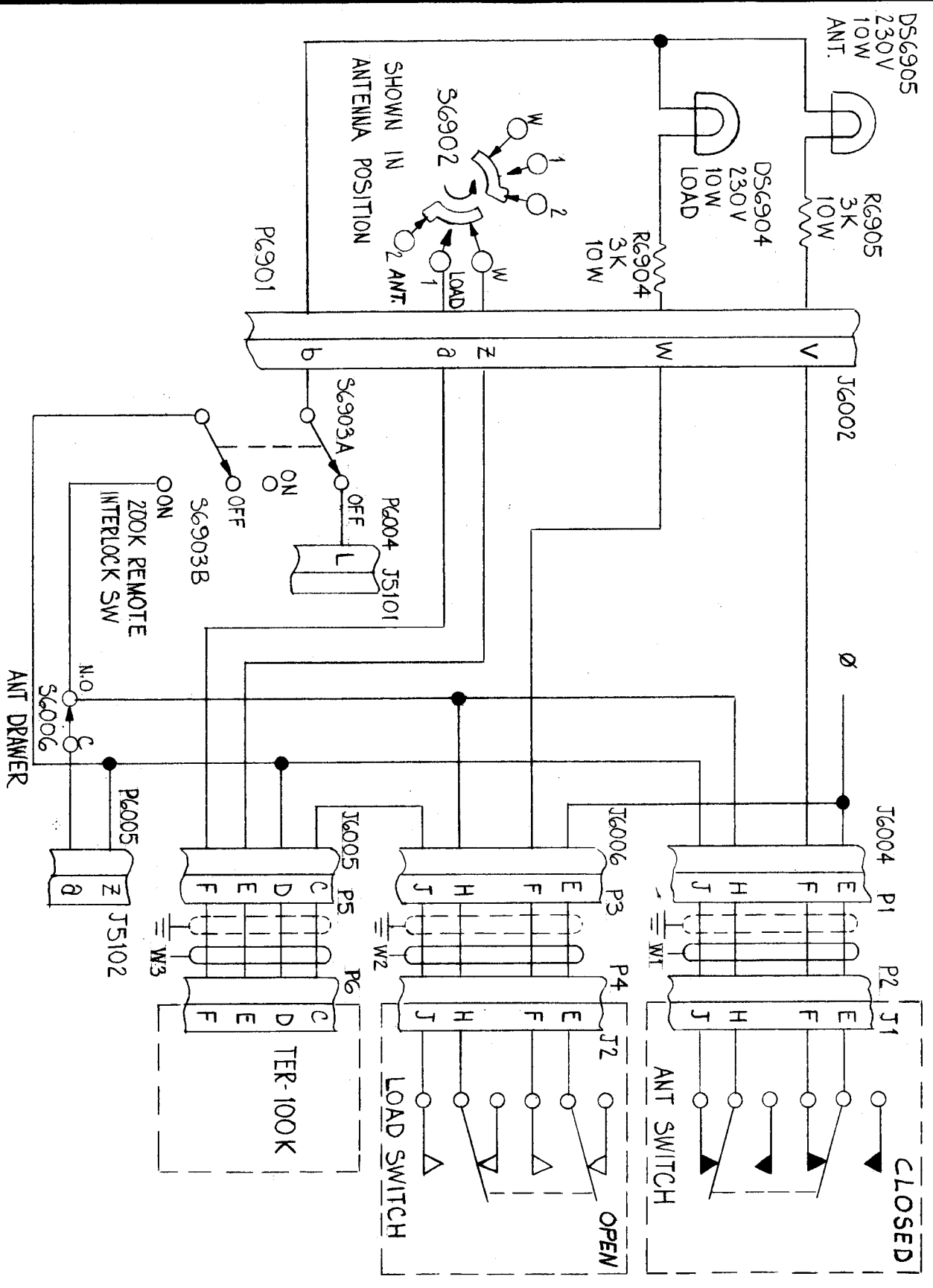
S.D. COMPILED / CHECKED	TITLE: GPT-200K	
APPROVED	FIGURE 12: 200K REMOTE INTERLOCK SYSTEM	



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II EQUIPMENT REQUIRED

A. Simpson Model 260 Multimeter
B. TMC Model PTE-3 RF Spectrum Analyzer
C. TMC Model TER-100K-50/U Dummy Load (50 Ohms)
D. TMC Model TRC-100K Broadband Transformer
E. TMC Model MR-159 RF AMP Meter (2 Req.)

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III MECHANICAL INSPECTION:

A. POWER SUPPLY "A"

1. Check for loose fuse holders.
2. Check all knobs and switches for proper operation.
3. Check for loose connections and obvious mis-wiring. (Refer to CK-631, Power Supply "A" Schematic Diagram)
4. Indicate acceptance of power supply "A" mechanical inspection by placing a check mark in the space provided on page 50.

B. POWER SUPPLY "B"

1. Check for loose fuse holders.
2. Check all knobs and switches for proper operation.
3. Check for loose connections and obvious mis-wiring. (Refer to CK-632, Power Supply "B" Schematic Diagram)
4. Check BALANCE and ANT MATCHING controls for a counter reading of 000 corresponding to minimum capacitance.
5. Indicate acceptance of power supply "B" mechanical inspection by placing a check mark in the space provided on page 50.

C. POWER AMPLIFIER SECTION

1. Check for loose fuse holders.
2. Check all knobs and switches for proper operation.
3. Check for loose connections and obvious mis-wiring. (Refer to CK-630, Final Amplifier Schematic Diagram)
4. Check TUNE, LOAD and OUTPUT LOAD controls for a counter reading of 000 corresponding to minimum capacitance.
5. Check to see that the BANDSWITCH and OUTPUT BANDSWITCH counter settings correspond to their proper positions.
6. Give bandswitch and output bandswitch a careful visual inspection.
7. Indicate acceptance of power amplifier section mechanical inspection by placing a check mark in the space provided on page 50.

D. FINAL TUBE SECTION

1. Check ML-8317 final tubes for proper seating in the air distributer. The final tubes must be properly positioned in the air distributer so that vent holes on the tubes are positioned directly over the air ducts.

   As an added check, the final tube PLATE ring has a vertical slot which must line up with a corresponding slot on the air distributer.
2. Check to see rubber boots that connect between main blower and final tubes are properly secured.
3. Intake and exhaust air ducts should be free of all obstructions.

4. Check for obvious mis-wiring and loose connections. (Refer to CK-630, Final Amplifier Schematic Diagram)
5. Indicate acceptance of final tube section mechanical inspection by placing a check mark in the space provided on page 50.

E. BUFFER SECTION

1. Check for obvious mis-wiring and loose connections. (Refer to CK-630, Final Amplifier Schematic Diagram)
2. Check to see that 40K load resistors are secure.
3. Insulation on walls and panels must be firmly secured. The insulation must not be damaged in any manner.
4. Check SWR INPUT TUNING control for a counter reading of 000 corresponding to minimum capacitance.
5. Indicate acceptance of buffer section mechanical inspection by placing a check mark in the space provided on page 50.

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IV. PRELIMINARY ELECTRICAL INSPECTION:

A. POWER SUPPLY "A"

1. Measure 3 phase primary wiring to ground for shorts. (Refer to Fig. 2, Page 8.)
2. Manually operate shorting relay and measure HV to ground (white lead on top of shorting relay). Resistance should be approximately 250K OHMS.(± 10%).
3. Measure B- to ground (black lead on lower section of shorting relay). Resistance should be approximately 500 OHMS(± 10%).
4. Check shorting relay. Contacts MUST short HV to B-.
5. Check 6 1/8" coaxial lines for 50 ohms unbalanced output connection. Check for tight connection from DC coupler through transition piece to elbow and further through transition piece on output flange. (Refer to Fig. 3, Page 9.)
6. Check the proper installation and termination of the following units making sure they are fused properly and fitted with the required lamps. (Refer to Fig. 1, Page 7.)

   (a) HIGH VOLTAGE RECTIFIER
   (b) CROWBAR
   (c) ANTENNA SWITCHING PANEL

7. Check for proper termination of all connectors. (Refer to Fig. 4, Page 10.) Removal of DC AMPLIFIER will enable technician to observe proper termination of meter panel connectors located directly behind the Antenna Switching Panel. This would include the forward and reflected coax terminations. It should also be noted here that the 200K REMOTE INTERLOCK switch must be set according to the proper mode of operation. In order to operate the 200K transmitter without the use of the 6 1/8" coaxial switches, the 200K REMOTE INTERLOCK must be ON. This would complete the 200K interlock line from the ANTENNA DRAWER interlock to the RELAY PANEL "A" interlock in the PA frame. After proper connections are made, the DC AMPLIFIER may be re-installed.
8. Set HV TIME DELAY for a setting of 5-7 seconds.
9. Indicate acceptance of power supply "A" preliminary electrical inspection by placing a check mark in the space provided on page 50.

B. POWER SUPPLY "B"

1. Measure 3 phase primary wiring to ground for shorts. (Refer to fig. 2, page 8.)
2. Manually operate shorting relay and measure HV to ground (white lead on top of shorting relay). Resistance should be approximately 250K OHMS (± 10%).
3. Measure B- to ground (black lead on lower section of shorting relay). Resistance should be approximately 500 OHMS (± 10%).
4. Check shorting relay. Contacts MUST short HV to B-.
5. Check the proper installation and termination of the following units which must be fused properly and fitted with the required lamps. (Refer to fig. 1, Page 7.)
   (a) HIGH VOLTAGE RECTIFIER
   (b) CROWBAR
   (c) METER PANEL
6. Check for proper termination of all connectors. (Refer to fig. 4, Page 10.) On the Meter Panel, the quick disconnect connector should be seated properly within its mate and the B- contacts should be firmly engaged.
7. Set HV TIME DELAY for a setting of 8-10 seconds.
8. Indicate acceptance of power supply "B" preliminary electrical inspection by placing a check mark in the space provided on page 50.

C. POWER AMPLIFIER SECTION

1. Check for proper termination of HV and B- wires. (Refer to fig. 6, page 12.)
2. Check for proper phasing to filament transformers. (Refer to CK-630 Final Amplifier Schematic Diagram)
3. Shorting relay MUST short OUTPUT LOAD bank of capacitors to ground when de-energized.
4. Check the proper installation and termination of the following units which must be fused properly and fitted with the required lamps. (Refer to fig. 1, page 7.)
   (a) BIAS SUPPLIES (2 req.)
   (b) RELAY PANEL "A"
   (c) RELAY PANEL "B"
5. Check for proper termination of all connectors including the PA MONITOR coil. (Refer to fig. 5 page 11.)
6. Set the TIME DELAY timer pointer on both relay panels to its minimum setting. (1.2 minutes)
7. Indicate acceptance of power amplifier preliminary electrical inspection by placing a check mark in the space provided on page 50.

D. FINAL TUBE SECTION

1. Check Plate, Grid and Filament connections of ML-8317 final tubes. (Refer to CK-630, Final Amplifier Schematic Diagram.)
2. Check for proper termination of all connectors including the fusing of the blower delay box. (Refer to Fig. 5 , Page 11 .)
3. Set blower delay TIMER for approximately one half (½) minute.
4. Indicate acceptance of final tube section preliminary electrical inspection by placing a check mark in the space provided on page 50 .

E. BUFFER SECTION

1. Check 3 1/8" coaxial switches and lines for proper termination. (Refer to CK-630, Final Amplifier Schematic Diagram.)
2. Check for proper termination of all connectors. (Refer to Fig. 5 , Page 11 .)
3. Check EXT strip for a jumper between terminals 8 and 10.
4. Check resistance of 40K load resistors to ground. (Resistance should be 47 OHMS ± 10%.)
5. Indicate acceptance of buffer section preliminary electrical inspection by placing a check mark in the space provided on page 50 .
6. Connect the 3 phase power input lines to the MOTORIZED PRIMARY MAIN breakers in power supply "A" and power supply "B". The phasing of the power supplies must be as per Fig. 2 , Page 8 .

V. PROCEDURE FOR SECTION "A"

The following procedure is provided for tests up to and including the turning On of HIGH VOLTAGE in SECTION "A". The tests would include POWER SUPPLY "A", BIAS SUPPLY "A", RELAY PANEL "A", FINAL TUBE "A" and any common circuitry required of the PA section. All references to switches and controls pertain to the sections and units mentioned above.

All shields, covers, panels and doors must be installed and secure on the transmitter before any power is turned on. The only exceptions would be RELAY PANEL "A" and RELAY PANEL "B" covers. It cannot be stressed often enough that care must be taken while working on the 200K transmitter. Hazardous voltages exist which are fatal if encountered. NO repair work should be done while there is A.C. power on any part of the 200K. Remove all power when making repairs. When there is more than one person testing the transmitter; be sure everyone is accounted for, before power is turned ON. Never allow anyone behind the transmitter when there is power ON.

Turn main power to On and proceed with the following checks.

A. PRIMARY POWER BREAKER OPERATION

1. Motorized Primary Main breaker must go ON or OFF with PRIMARY POWER breaker operation to ON or OFF.
2. Meter lights should go ON.
3. Top fan and HVR blower should operate. Rotation of fan should be CCW as viewed from bladed end. Rotation of blower should be CW as viewed from bladed end.
4. The following lights must be On in the relay panel:
   (a) BIAS
   (b) FINAL FILAMENT
5. Unlatch the plate overload, grid overload, retune and SWR relays; their respective lights should go ON.
6. Push the RESET "A" push button. The above latch relays should reset and their respective lights should go OFF. The Motorized Main breaker should also reset by pushing the RESET "A" push button.

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B. MAIN BLOWER BREAKER OPERATION

Set MAIN BLOWER breaker to ON and check the following:

1. Main blower and PA fans should operate. Rotation of main blower should be CW as viewed from extended armature end.* Rotation of fans should be CCW as viewed from bladed end.
2. PA Meter lights should go ON.
3. The DC AMPLIFIER should go ON.
4. AC ON lamp should indicate.
5. Set ALARM switch to ON (up) for sounding ALARM.* Set ALARM switch to OFF (down).
6. Push BANDSWITCH RELEASE push button; the bandswitch solenoid should energize, releasing the bandswitch stop.
7. Push OUTPUT BANDSWITCH RELEASE push button; the output bandswitch solenoid should energize, releasing the output bandswitch stop.

C. BLOWER DELAY "A"

1. Set PRIMARY POWER breaker to OFF. Main blower and PA fans should stay ON and blower TIME DELAY should start working. When the TIME DELAY reaches zero, the main blower and PA fans should go OFF with the TIME DELAY timer being de-activated.* The PA FANS INDICATOR should not go ON.
2. Set blower TIME DELAY at five (5) minutes for normal operation.
3. Set PRIMARY POWER breaker to ON.

D. PA FILAMENT BREAKER OPERATION

Set PA FIL breaker to ON and check the following:

1. FILAMENT PRIMARY meter should indicate filament transformer primary voltage.
2. HVR should go ON.
3. CROWBAR should go ON. Adjust RESERVOIR voltage to value stamped on thyratron tube base. If stamping on thyratron tube base is obscured or missing, set the RESERVOIR voltage to the lower limit shown on the RESERVOIR meter marked RESERVOIR SETTING (3VAC). Set TRIGGER ADJ to its mid setting.
4. BIAS SUPPLY should go ON.
5. CROWBAR and FINAL FILAMENT relays should operate and the FINAL FILAMENT lamp will go OFF.
6. TIME DELAY timer should start operating.
7. FILAMENT TIME meter should start operating.
8. Fan behind ANTENNA SWITCHING panel must operate. Rotation should be CCW as viewed from bladed end.
9. Final tube ML-8317 filament should be ON. A glow from the filament may be observed through window on final amplifier door.

* RECORD ON TEST DATA SHEET

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E. FILAMENT PROTECT "A"

1. Set MAIN BLOWER breaker to OFF.
   NOTE: PA FIL BREAKER MUST TRIP*
   CAUTION: IF PA FIL BREAKER DOES NOT TRIP. SET MAIN POWER BREAKER TO OFF IMMEDIATELY. ANY DELAY IN DOING SO MAY RESULT IN DAMAGE TO ML-8317.
2. Set MAIN BLOWER and PA FIL breakers to ON.
3. Manually defeat front air switch on main blower. PA FIL breaker must trip.*
4. Set PA FIL breaker to ON.

F. PRIMARY ADJUST "A"

PRIMARY ADJUST switch sets up A.C. inputs to HIGH VOLTAGE RECTIFIER, CROWBAR, BIAS SUPPLY, FINAL FILAMENT relay and filament transformer. Switching PRIMARY ADJUST should cause voltage to go up or down. FILAMENT PRIMARY meter monitors this voltage and is always set at 230 VAC. The PRIMARY ADJUST knob will always indicate approximately the value of the line voltage.*

EXAMPLE: When PRIMARY ADJUST switch is set at 210 VAC and the FILAMENT PRIMARY meter indicates 230 VAC, the 3 phase line input to the transmitter is 210 VAC.

Set PRIMARY ADJUST switch midway between two positions and note if HIGH VOLTAGE RECTIFIERS, CROWBAR, BIAS SUPPLY and FINAL FILAMENT relay lose A.C. power.

G. 200K "MODE" SWITCH

Check the TUNE-OPERATE-EMERGENCY 200K mode switch for control of 3 1/8" coaxial switches according to TABLE I shown below. FOR each closed coaxial switch, its corresponding indicator lamp should light.*
The 200K mode switch employs a positive shorting, momentary contact, 60° detented rotor for pulsing of the coaxial switches. To set up the desired mode of operation, slowly rotate the mode switch to the desired position; the indicator lamps will light corresponding to the desired position.

NOTE: Only ONE (1) of the three (3) lamps (TUNE-OPERATE-EMERGENCY) should be ON for the desired mode of operation. If any two (2) lamps are on, rotate the mode switch to its preceeding position and then back to the desired position. The above procedure should also be followed in case all of the lamps are off.

* RECORD ON TEST DATA SHEET

* RECORD ON TEST DATA SHEET

TABLE I

MODE SWITCH (S5407) POSITION	3 1/8" Coaxial Switch Position (K4003) Emergency	(K4002) Tune	(K4001) Operate
EMERGENCY	CLOSED	OPEN	OPEN
TUNE	OPEN	CLOSED	OPEN
OPERATE	OPEN	OPEN	CLOSED

H. INTERLOCKS

The INTERLOCK INDICATOR and Switch are connected in such a manner that the INTERLOCK INDICATOR will be ON if all interlocks are activated. To find an open interlock, always turn interlock switch to extreme CCW position (DOORS PS FRAMES) and rotate interlock switch in CW direction to first position where the INTERLOCK INDICATOR light goes OUT. This is the open interlock. In cases where there is more than one interlock open, the above procedure has to be repeated until all interlocks are activated.

1. External jumper on rear of buffer frame has to be connected across terminal 8 and 10 to complete external interlocks.
2. Turn mode switch (TUNE-OPERATE-EMERGENCY) to OPERATE.
3. Activate the interlocks shown in Figure 7, Page 13.
4. Turn INTERLOCK switch to extreme CCW position (DOORS PS FRAMES).
5. INTERLOCK INDICATOR light should be ON. Turn mode switch to TUNE and then EMERGENCY; INTERLOCK INDICATOR light should go OFF. Turn mode switch back to Operate.
6. Upon activation of all interlocks, the PA shorting relay must operate.*

I. TIME DELAY "A"

The TIME DELAY timer in the relay panel should be at Zero (O) minutes. Removal of bias supply A.C. fuse should de-energize this timer.
Due to a mechanical clock mechanism within the TIME DELAY, a 5 amp micro-switch will be held normally open for a period of 15 seconds before being released. During this time, the black pointer on the TIME DELAY dial will slowly progress toward the red pointer ie: the time delay setting.

1. Reinsert the A.C. fuse in the bias supply.
2. Slide out bias supply. The TIME DELAY timer should de-energize.

3. Slide the bias supply back in the compartment and lock.
4. With the TIME DELAY at zero (0) minutes, the power supply shorting relay must operate and the HV REAR red lamp on the rear of the power supply should light.
5. The HV REAR red lamp must be controlled by the rear door micro switch. When the rear door is closed, the red lamp must go OFF.
6. In the bias supply, the bias relay should operate and the BIAS ON lamp should light.
7. In the relay panel, the BIAS relay should operate and the BIAS lamp should go OFF.
8. BIAS VOLTS meter will indicate 350 to 550 VDC. Set BIAS ADJUST pot in the bias supply to 450 VDC.*

CAUTION: Never touch any exposed parts of transmitter under above conditions. When shorting relay is energized DC voltage from the bias supply is on B- line.

J. INTERLOCK READY "A"

Set 40K INTERLOCK switch to ON (up) and check to see that HEAT OVLD relay in relay panel "B" is latched.

1. INTERLOCK READY relay should operate. Set 40K INTERLOCK to OFF (down). INTERLOCK READY relay should de-energize.
2. Set HV "A" breaker to ON. High voltage should NOT go ON.

K. HIGH VOLTAGE PROTECT "A"

Each interlock must be checked individually by opening and observing the following items:★

1. HV "A" breaker must trip OFF.
2. PA and power supply shorting relays must be de-energized.
3. INTERLOCK INDICATOR lamp must go OUT for each interlock opened corresponding to its proper position shown on INTERLOCK Switch.

The above items must also occur when the BANDSWITCH RELEASE and OUTPUT BANDSWITCH RELEASE push buttons are depressed.*

* RECORD ON TEST DATA SHEET

L. LOAD AND ANTENNA SWITCHING MATRIX

The GPT-200K has available at customers request, a 6 1/8" coaxial switching matrix. This is used for switching the output of the transmitter to a dummy load (TER-100K) or antenna. Control circuits are provided which will insure proper interlock control for either output condition. As previously mentioned, the 200K REMOTE INTERLOCK Switch was set in its ON position which completes the interlock line from the power supply "A" ANTENNA DRAWER interlock to the RELAY PANEL "A" interlock. This condition is for operation of the transmitter without the 6 1/8" coaxial switches. When the 200K REMOTE INTERLOCK switch is set OFF, the interlock line is then controlled by the switching matrix.

For LOAD operation, the 6 1/8" LOAD switch controls the output of the transmitter to the load. The interlock line goes from the ANTENNA DRAWER interlock, through the LOAD micro switch, through the external load connector, through the remote interlock relay contacts in the TER-100K, back through the external load connector and then to the RELAY PANEL "A" interlock. In the TER-100K, the remote interlock relay is controlled by the door interlocks and the fan air switches.

For ANTENNA operation, the 6 1/8" ANTENNA switch controls the output of the transmitter to the antenna. The interlock line goes from the ANTENNA DRAWER interlock, through the ANTENNA micro switch to the RELAY PANEL "A" interlock.

The following tests are required and should be performed after the interlock system has been completed.

1. Check proper termination of interconnecting cables to TER-100K, ANTENNA switch and LOAD switch. (Refer to Figure 4, Page 10.)
2. Set TER-100K AC-OFF switch to A.C.. A.C. power must go ON in TER-100K.
3. Set TER-100K REMOTE-OFF switch to REMOTE. A.C. power must go OFF in TER-100K.
4. Set 200K REMOTE INTERLOCK switch to OFF.
5. Set OUTPUT switch to LOAD and observe the following.*
   a. The 6 1/8" LOAD switch must close and the LOAD indicator must light.
   b. The 6 1/8" ANTENNA switch must open and the ANTENNA indicator must be OFF.
   c. The AC power must go ON in the TER-100K.
   d. The interlock line must be completed.
6. Remove each fan fuse in turn in the TER-100K. The interlock line must be opened in every case. Reinsert fuses after each test.
7. Open the right door on the TER-100K. The interlock line must be opened. Close the right door.
8. Open the left door on the TER-100K. The interlock line must be opened. Close the left door.
9. Set OUTPUT switch to ANTENNA and observe the following:*

   a. The 6 1/8" ANTENNA switch must close and the ANTENNA indicator must light.

* RECORD ON TEST DATA SHEET

b. The 6 1/8" LOAD switch must open and the LOAD indicator must be off.
c. The AC power must go OFF in the TER-100K.
d. The interlock line must be completed.

10. Set the OUTPUT switch to LOAD for further tests.

M. FUSE CHECKS

In performing the following fuse checks, it will be necessary to remove each fuse from its holder. The fuse holder should then be reinserted with the following results.

The circuit being fused must be de-activated and the indicator lamp within the fuse holder knob should light. After the tests are completed, reinsert fuse and knob:*

1. CONTROL PANEL

a. Removal of HVR BLOWER fuse will stop HVR blower and HVR BLOWER INDICATOR light must go ON.
b. Removal of each BREAKER MOTOR fuse must render motor inoperative.
c. Removal of LIGHTS fuse will cause meter lights to go OFF.
d. Removal of TOP FAN fuse will stop top fan and TOP FAN INDICATOR light must go ON.

2. HVR
Remove HV FILAMENT fuses one at a time. High Voltage Rectifier filaments must go OFF.

3. CROWBAR
Remove crowbar FILAMENT fuse.
a. POWER lamp must go OFF.
b. CROWBAR relay must de-energize.
c. FILAMENT TIME meter must be de-activated.

4. POWER SUPPLY "A"
Removal of HV REAR LIGHT fuse must make HV REAR LIGHT go OFF.

5. ANTENNA SWITCHING PANEL
a. Removal of FAN fuse will stop fan located behind ANTENNA SWITCHING PANEL and the FAN indicator light must go ON.
b. Removal of DC AMP AC fuse will remove power to the DC AMPLIFIER. POWER light must go OFF.
c. Removal of DC AMP B+ fuse will open B+ line. B+ light must go OFF.
d. Removal of fuse on antenna switching chassis should render the 6 1/8" coaxial switches inoperative.

6. BIAS SUPPLY
Removal of BIAS fuse will open bias line and the BIAS ON indicator must go OFF.

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a. In relay panel "A" the BIAS relay will de-energize and the BIAS lamp must go ON.
b. BIAS VOLTS meter must indicate 0 volts.

7. RELAY PANEL "A"

a. Removal of ELAPSE METER fuse must de-activate the FILAMENT TIME meter.
b. Removal of SHORTING RELAY fuse will de-activate the shorting relay and the bias relay in the bias supply.
c. Removal of PA LIGHTS fuse must make all PA lights go OFF, except the relay panel lights and the PLATE "A", "B" HV lights.
d. Removal of ALARM fuse must de-activate alarm.
e. Removal of TIME DELAY fuse must de-activate time delay timer.

8. BLOWER DELAY

a. Removal of RELAY "A" fuses must de-activate the "A" relay.
b. Removal of CONTACTOR fuse must de-activate blower contactor.
c. Removal of TIME DELAY fuse must de-activate time delay timer.

9. RELAY PANEL "B"

a. Removal of FANS fuse will de-activate all fans in the PA and the PA FANS INDICATOR must go ON.
b. Removal of INTERLOCK fuse must remove voltage from INTERLOCK INDICATOR and interlock system.

N. RETUNE CIRCUIT

The purpose of the retune circuit is to protect the final tubes from overdissipation. The RETUNE relay will trip with a plate current of 3 amps when the plate RF drops to a value of 2 KVRF.

There is a fixed bias of 3 VDC on the RETUNE DC AMP. which will cause the relay tube to draw approximately 12 ma. This is enough current to make the RETUNE relay trip. The RETUNE relay overload coil is connected in series with the RETUNE DC AMP plate, through the normally open contacts of the two TUBE PROTECT relays; which are in parallel with each other. The RETUNE relay will therefore be controlled by either "A" or "B" final tubes.

The TUBE PROTECT relays are set to operate at 3 amps DC final plate current.

The PA plate RF is rectified in the metering circuit for the PLATE RF meter. A sampling of this voltage is fed to the RETUNE DC AMP grid. This DC voltage is high enough to cancel out the fixed bias of 3V and the RETUNE relay tube is held at cut-off. When the plate RF drops to 2 KVRF, the fixed bias voltage takes over; the RETUNE relay tube conducts and the RETUNE relay will trip.

Perform the following tests to adjust the RETUNE circuit.

1. Open RETUNE overload coil line by lifting wire at terminal 36 on relay panel "A". (Refer to CK-630, Final Amplifier Schematic Diagram).
2. Place a milliameter in series with terminal 36 and the "opened" wire. Set milliameter to its 100 ma scale.
3. Operate TUBE PROTECT relay manually in relay panel "A" and adjust the RETUNE OVERLOAD SET until the RETUNE relay trips. Current should be 10-15 ma.*
4. Release TUBE PROTECT relay in relay panel "A" and manually operate TUBE PROTECT relay in relay panel "B". Current should be 10-15 ma.
5. Release TUBE PROTECT relay. There should be no current drawn.
6. Remove milliameter and reconnect wire to terminal 36.
7. Reset RETUNE relay.

O. SWR CIRCUIT

The SWR control circuit consists of a SWR relay, DC amplifier and a front adjustable meter relay. The meter relay operates in the following manner. The meter movement (black pointer) has a contact point which will connect with a corresponding contact point on the red pointer. The red pointer is fully adjustable over the entire meter relay range. It is therefore possible, using a scale calibrated in SWR, to control an external circuit for SWR protection.

The SWR Relay is connected in series with the SWR DC AMPLIFIER plate. The SWR DC AMPLIFIER is normally at cut-off. When the set SWR figure is surpassed, the meter relay will complete a circuit which will place a 3 volt bias on the SWR AMP grid.

* RECORD ON TEST DATA SHEET

The SWR DC AMPLIFIER then starts to conduct and the SWR relay will trip.

Perform the following tests to adjust the SWR circuit.

1. Open SWR overload coil line by removing wire at terminal 44 on relay panel "A". (Refer to CK-630, Final Amplifier Schematic Diagram).
2. Place a milliameter in series with terminal 44 and the "opened" wire.
3. Adjust the SWR OVERLOAD SET for a value of 1.5 ma on the milliameter. Set milliameter to its 100 ma scale.
4. Remove DC AMPLIFIER chassis from Antenna Switching Panel.
5. Place a jumper from the junction of R6203 (47K 2W) resistor and CR6202 (Zener) to the cathode (pin 8) of the SWR DC AMPLIFIER. The SWR relay must trip.* (Refer to CK-631, Power Supply "A" Schematic Diagram).
6. Remove jumper, disconnect the milliameter and reconnect wire to terminal 44.
7. Reset SWR relay and reinsert the DC AMPLIFIER in the ANTENNA SWITCHING PANEL.
8. Set red pointer on SWR meter to 2.5.

P. HEAT OVERLOAD

1. Place a jumper across the front thermostat terminals. The HEAT OVERLOAD relay must trip. Remove jumper and manually reset HEAT OVERLOAD relay.*
2. Place a jumper across the rear thermostat terminals. The HEAT OVERLOAD relay must trip. Remove jumper and manually reset HEAT OVERLOAD relay.*

Q. OUTPUT CONTROL

The OUTPUT control pot varies a DC Voltage derived in the DC AMPLIFIER chassis. This controlled voltage is known as the "drive bias" and goes to the SBE or CHG ALDC input jack.

1. Turn OUTPUT control pot. fully CCW.
2. Remove the BNC plug from the ALDC jack of either the SBE or CHG.
3. Place meter (50 VDC scale) across the center conductor and ground of the BNC plug (minus terminal of meter to center conductor).

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There should be -20 VDC ± 20% present.

4. Turn OUTPUT control CW. Voltage should vary toward 0 VDC.
5. Turn OUTPUT control fully CCW, remove meter and reconnect BNC plug to ALDC jack.

R. 40K HIGH VOLTAGE

With the 200K mode switch set at OPERATE, set the 40K HV breaker to ON. HV should NOT go ON.

1. Turn the 200K mode switch to TUNE. The 40K HV should go On.
2. Turn the 200K mode switch to EMERGENCY. The 40K HV should stay ON.
3. Turn the 200K mode switch to OPERATE.

S. 200K HIGH VOLTAGE "A"

Allow the transmitter to warm up for 30-45 minutes before proceeding further. Set the 40K INTERLOCK switch to ON (up) and then set the HV "A" breaker to ON.

Observe the following:

CAUTION: From this point on, care must be taken by operator; make sure HV capacitors are shorted with external shorting stick before entering unit.

1. The PLATE VOLTS meter should indicate a rising voltage to 8 KV. (If PLATE VOLTS meter does not indicate, set HV "A" breaker OFF.)
2. There should be a delay of 5-7 seconds after which the second contactor must operate.
3. PLATE VOLTS meter should now indicate 20 KVDC (± 10%).*
4. The following HV lights should be ON.
   a. Power supply HV TOP light
   b. HVR HV lamps
   c. PLATE "A" ON lamp
   d. XMTR lamp in TER-100K
5. PLATE TIME timer must start operating.
6. PLATE CURRENT "A" meter must indicate the quiescent plate current which is controlled by the BIAS ADJ pot.
7. The 40K HV must go ON.
8. The 40K INTERLOCK relay will operate and the 40K INTERLOCK lamp will go OFF.
9. Turn the mode switch to TUNE, EMERGENCY and then back to OPERATE. The HV should stay On and the 3 1/8" coaxial switches should not change their positions.

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10. Set the ALARM switch to ON (up). The alarm should not sound. Set the ALARM switch to OFF (down).
11. Remove the HV LIGHTS fuse. The HV top light and PLATE A ON indicators in the 200K must go OFF. The XMTR indicator in the TER-100K must also go OFF. Reinsert the HV LIGHTS fuse.
12. Manually trip the following relays. (All HV must go OFF. Push RESET "A" after each check).

    a. PLATE OVERLOAD
    b. GRID OVERLOAD
    c. RETUNE
    d. SWR
    e. In relay panel "B", trip the HEAT OVERLOAD and manually reset this relay.

13. Set the 40K INTERLOCK switch to OFF (down) and turn the 40K HV breaker to OFF. All HV must go OFF.
14. Set the 40K INTERLOCK switch to On (up). The 200K HV must go ON.
15. Adjust the plate current to 3 amps. Set the TUBE PROTECT ADJ so that the TUBE PROTECT relay operates causing the RETUNE relay to trip. Reduce the plate current to 2 amps, the TUBE PROTECT relay must release.*
16. Set HV OFF, turn off section "A" and proceed to check section "B".

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VI. PROCEDURE FOR SECTION "B"

The following procedure is provided for tests up to and including the turning ON of HIGH VOLTAGE in SECTION "B". The tests would include POWER SUPPLY "B", BIAS SUPPLY "B", RELAY PANEL "B", FINAL TUBE "B" and any common circuitry required of the PA section. All references to switches and controls pertain to the sections and units mentioned above.

The following tests will be considered complete as they are found in SECTION "A" tests and need not be repeated for the SECTION "B" tests.

1. Main Blower Breaker Operation
2. 200K "Mode" Switch
3. Interlocks
4. Load And Antenna Switching Matrix
5. Retune Circuit
6. SWR Circuit
7. Heat Overload
8. Output Control
9. 40K High Voltage

Turn main power to ON and check the following:

A. PRIMARY POWER BREAKER OPERATION

1. MOTORIZED PRIMARY MAIN breaker must go ON or OFF with PRIMARY POWER breaker operation to ON or OFF.
2. Meter lights should go ON.
3. Top fan and HVR Blower should operate. Rotation of fan should be CCW as viewed from bladed end. Rotation of blower should be CW as viewed from bladed end.
4. The following lights must be ON in the relay panel:
   a. BIAS
   b. FINAL FILAMENT
5. Unlatch the plate overload, grid overload and heat overload relays; their respective lights should go ON.
6. Push the RESET "B" push button. The above latch relays should reset and their respective lights should go OFF. The MOTORIZED PRIMARY MAIN breaker should also reset by pushing the RESET "B" push button.

B. BLOWER DELAY "B"

Set MAIN BLOWER breaker to ON and check the following:

1. Main Blower and PA fans should operate.
2. Set PRIMARY POWER breaker to OFF. Main blower and PA fans should stay ON and blower TIME DELAY should start working. When the blower TIME DELAY reaches zero, the main blower and PA fans should go OFF with the TIME DELAY timer being de-activated.*
3. Set PRIMARY POWER breaker to ON.

C. PA FILAMENT BREAKER OPERATION

Set PA FIL breaker to ON and check the following:

1. FILAMENT PRIMARY meter should indicate filament transformer primary voltage.
2. HVR should go ON.
3. CROWBAR should go On. Adjust RESERVOIR voltage to value stamped on thyratron tube base. If stamping on thyratron tube base is obscured or missing, set the RESERVOIR voltage to the lower limit shown on the RESERVOIR meter marked RESERVOIR SETTING (3 VAC). Set TRIGGER ADJ to its mid setting.
4. BIAS SUPPLY should go ON.
5. CROWBAR and FINAL FILAMENT relays should operate and the FINAL FILAMENT lamp will go OFF.
6. TIME DELAY timer should start operating.
7. FILAMENT TIME meter should start operating.
8. Final tube ML-8317 should be ON. A glow from the filament may be observed through window on Final Amplifier door.

D. FILAMENT PROTECT "B"

1. Set MAIN BLOWER breaker to OFF.

NOTE: PA FIL BREAKER MUST TRIP*
CAUTION: IF PA FIL BREAKER DOES NOT TRIP SET MAIN POWER BREAKER TO OFF IMMEDIATELY ANY DELAY IN DOING SO MAY RESULT IN DAMAGE TO ML-8317

2. Set MAIN BLOWER and PA FIL breakers to ON.
3. Manually defeat the rear air switch on main blower. PA FIL breaker must trip.*
4. Set PA FIL breaker to ON.

E. PRIMARY ADJUST "B"

PRIMARY ADJUST switch sets up AC inputs to HIGH VOLTAGE RECTIFIER, CROWBAR, BIAS SUPPLY, FINAL FILAMENT relay and filament transformer. Switching PRIMARY ADJUST should cause voltage to go up or down.

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FILAMENT PRIMARY meter monitors this voltage and is always set at 230 VAC. The PRIMARY ADJUST knob will always indicate approximately the value of the line voltage.*

1. Set PRIMARY ADJUST switch midway between two positions and note if HIGH VOLTAGE RECTIFIER, CROWBAR, BIAS SUPPLY AND FINAL FILAMENT relay lose AC power.

F. TIME DELAY "B"

The TIME DELAY timer in the relay panel should be at zero (0) minutes. Removal of bias supply AC fuse should de-energize this timer.

1. Reinsert the AC fuse in the bias supply.
2. Slide out bias supply. The TIME DELAY timer should de-energize.
3. Slide the bias supply back in the compartment and lock.
4. With the TIME DELAY at zero (0) minutes, the power supply shorting relay must operate and the HV Rear red lamp on the rear of the power supply should light.
5. The HV REAR red lamp must be controlled by the rear door micro switch. When the rear door is closed, the red lamp must go OFF.
6. In the bias supply, the bias relay should operate and the BIAS ON lamp should light.
7. In the relay panel, the BIAS relay should operate and the BIAS lamp should go OFF.
8. BIAS VOLTS meter will indicate 350 to 550 VDC. Set BIAS ADJUST pot in the bias supply to 450 VDC.*

   CAUTION:

   Never touch any exposed parts of Transmitter under above conditions. When shorting relay is energized, DC voltage from the bias supply is on B- line.

G. INTERLOCK READY "B"

1. Set 40K INTERLOCK switch to ON (up). INTERLOCK READY relay should operate. Set 40K INTERLOCK switch to OFF (down). INTERLOCK READY relay should de-energize.
2. Set HV "B" breaker to ON. High voltage should NOT go ON.

H. HIGH VOLTAGE PROTECT "B"

Open any interlock and observe the following items:*

1. HV "B" breaker must trip OFF.

* RECORD ON TEST DATA SHEET

2. PA and power supply shorting relays must be de-energized.

I. FUSE CHECKS

In performing the following fuse checks, it will be necessary to remove each fuse from its holder. The fuse holder should then be re-inserted with the following results.

The circuit being fused must be de-activated and the indicator lamp within the fuse holder knob should light. After the tests are completed, reinsert fuse and knob.*

1. CONTROL PANEL

a. Removal of HVR BLOWER fuse will stop HVR blower and HVR BLOWER INDICATOR light must go ON.
b. Removal of each BREAKER MOTOR fuse must render motor inoperative.
c. Removal of LIGHTS fuse will cause meter lights to go OFF.
d. Removal of TOP FAN fuse will stop top fan and TOP FAN INDICATOR light must go ON.

2. HVR

Remove HV FILAMENT fuses one at a time. High voltage rectifier filaments must go OFF.

3. CROWBAR

Remove crowbar FILAMENT fuse.

a. POWER lamp must go OFF.
b. CROWBAR relay must de-energize.
c. FILAMENT TIME meter must be de-activated.

4. POWER SUPPLY

Removal of HV REAR LIGHT fuse must make HV REAR LIGHT go OFF.

5. BIAS SUPPLY

Removal of BIAS fuse will open bias line and the BIAS ON indicator must go OFF.

a. In relay panel "B", the BIAS relay will de-energize and the BIAS lamp must go ON.
b. BIAS VOLTS meter must indicate 0 volts.

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6. RELAY PANEL "B"

a. Removal of ELAPSE METER fuse must de-activate the FILAMENT TIME meter.
b. Removal of SHORTING RELAY fuse will de-activate the shorting relay and the bias relay in the bias supply.
c. Removal of TIME DELAY fuse must de-activate time delay timer.

7. BLOWER DELAY
Removal of RELAY "B" fuses must de-activate the "B" relay.

J. 200K HIGH VOLTAGE "B"

Allow the transmitter to warm up for 30-45 minutes before proceeding further.

Set the 40K INTERLOCK switch to ON (up) and then set the HV "B" breaker to ON. Observe the following:

CAUTION: From this point on, care must be taken by operator; make sure HV capacitors are shorted with external shorting stick before entering unit.

1. The PLATE VOLTS meter should indicate a rising voltage to 8 KV. (IF PLATE VOLTS meter does not indicate, set HV "B" breaker OFF.)
2. There should be a delay of 8-10 seconds after which the second contactor must operate.
3. PLATE VOLTS meter should now indicate 20 KVDC (± 10%).*
4. The following HV lights should be ON.
   a. Power supply HV TOP light.
   b. HVR HV lamps.
   c. PLATE "B" ON lamp.
5. PLATE TIME timer must start operating.
6. PLATE CURRENT "B" meter must indicate the quiescent plate current which is controlled by the BIAS ADJ pot.
7. The 40K HV must go ON.
8. Turn the mode switch to TUNE, EMERGENCY and then back to OPERATE. The HV should stay ON and the 3 1/8" coaxial switches should not change their positions.
9. Set the ALARM switch to ON (up). The alarm should not sound. Set the ALARM switch to OFF. (down).
10. Remove the HV LIGHTS fuse. The HV top light and PLATE B ON lamps must go OFF. Reinsert the HV LIGHTS fuse.

* RECORD ON TEST DATA SHEET

11. Manually trip the following relays. (All HV must go OFF. Push RESET "B" after each check.)

    a. PLATE OVERLOAD
    b. GRID OVERLOAD
    c. HEAT OVERLOAD

12. Set the 40K INTERLOCK switch to OFF (down) and turn the 40K HV breaker to OFF. All HV must go OFF.
13. Set the 40K INTERLOCK switch to ON (up). The 200K HV must go ON.
14. Adjust the plate current to 3 amps. Set the TUBE PROTECT ADJ so that the TUBE PROTECT RELAY operates causing the RETUNE relay to trip. Reduce the plate current to 2 amps. The TUBE PROTECT relay must relaese.*
15. Set HV "B" breaker to OFF and reset the RETUNE relay.
16. Turn section "A" back ON and proceed to check the transmitter with "A" and "B" power ON together.

*RECORD ON TEST DATA SHEET

VII PROCEDURE FOR SECTION "A" AND "B"

A. HIGH VOLTAGE PROTECT "A" AND "B"

Set 40K INTERLOCK switch to OFF (down). Set HV "A" and HV "B" high voltage breakers to ON. The high voltage on "A" and "B" should NOT go ON. Open any interlock and observe the following items: *

1. HV "A" breaker must trip OFF.
2. HV "B" breaker must trip OFF.
3. PA shorting relay must de-energize.
4. Power supply "A" shorting relay must de-energize.
5. Power supply "B" shorting relay must de-energize.
6. Re-activate the opened interlock.

B. 200K HIGH VOLTAGE "A" AND "B"

Set 40K INTERLOCK switch to ON (up). Set HV "A" and HV "B" high voltage breakers to ON. The high voltage on "A" and "B" should go ON.

1. Manually trip the PLATE OVERLOAD relay in relay panel "A". High voltage "A" and "B" must go OFF.
2. Reset high voltage by pressing RESET "A" push button.
3. Manually trip the PLATE OVERLOAD relay in relay panel "B". High voltage "A" and "B" must both go OFF.
4. Reset high voltage by pressing RESET "B" push button. Set HV "A" and HV "B" breakers to OFF.

C. PARASITIC CHECK

1. Set bandswitch and output bandswitch to 22 - 28 mc. band.
2. Set PA TUNE capacitors to 000 (minimum capacitance).
3. Set OUTPUT LOAD capacitors to 000 (minimum capacitance).
4. Set LOAD capacitors to 000 (minimum capacitance).
5. With no drive (OUTPUT control fully CCW), turn on high voltage "A" and "B". Quiescent plate current should be set at 1 amp for each final.
6. Slowly rotate PA TUNE control from minimum capacitance (000) to maximum capacitance. There must be NO indication on PLATE RF meter.*
7. Slowly rotate LOAD control from minimum capacitance (000) to maximum capacitance. There must be NO indication on PLATE RF meter.*
8. Slowly rotate PA TUNE control from maximum capacitance to minimum capacitance (000). There must be NO indication on PLATE RF meter.*
9. TURN high voltage OFF on both supplies.

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D. UNBALANCE RF TEST

Before applying RF to the 200K, the following procedure must be performed.

1. Check arrows on directional coupler for proper direction (Refer to Fig. 3, Page 9).
2. Connect transmitter to 50 ohm unbalanced load (TER-100K). Connect AC power to load.
3. Set REMOTE switch in TER-100K to ON.
4. Set OUTPUT switch to LOAD. AC power must go ON in TER-100K.
5. Make sure ALL shields are properly fitted and secure.
6. Set all controls as per tuning chart for 2 mcs.

NOTE: Figures may vary from transmitter to transmitter due to lead length, minimum capacitance setting and various other settings. The chart serves as only a tuning aid for the technician as to prevent the technician from hunting for resonance points in the band.

7. Turn 200K mode switch to TUNE. Set 40K and 10K high voltage breakers to ON.
8. Check 10K and 40K tuning for a proper dip. The 200K OUTPUT pot must control the output of the 10K and 40K.
9. Turn 200K mode switch to OPERATE with the OUTPUT control set fully CCW.
10. Set HV "A" and HV "B" high voltage breakers to ON. There should be high voltage ON in both power supplies as well as in the 40K and 10K.
11. Set the quiescent plate current of each "final" to 1 amp.
12. Slowly advance OUTPUT control CW until 1.5 AMPS is indicated on PLATE CURRENT "A" and PLATE CURRENT "B" meters.
13. DRIVE meter should indicate the drive volts.
14. Slowly rotate the PA TUNE control until a dip occurs.
15. Advance 200K OUTPUT control CW observing the PLATE RF and LOAD RF meters. Adjust LOAD and OUTPUT LOAD bank of capacitors for proper loading.

EXAMPLE: To determine if the 200K transmitter is properly loaded, refer to the tuning chart and observe what the PLATE RF and LOAD RF voltages are for a given frequency at 100KW average power output.

Set up a ratio between plate RF and load RF. Tune the 200K transmitter for the above ratio. It will be noted that the ratios will change with the frequency, affecting a corresponding loading change.

For normal operation the grid current should not exceed 500 ma. at 100KW average power output. If the grid current goes above 500 ma. for a lesser amount of power output than 100KW, the transmitter can be considered as being unloaded. To load the transmitter decrease the loading capacitance and retune the plate.

The plate current should not exceed 7 amps at 100KW average power output. If the transmitter is overloaded, the plate current will be greater than 7 amps for a lesser amount of power output than 100KW. To unload the transmitter increase the loading capacitance and retune the plate.

16. Observe the 40K SWR meter. If the SWR figure starts to increase during the tuning of the 200K, adjust the SWR INPUT control for a minimum reading on this meter. Any adjustment of the SWR INPUT control would mean that the 40K and 200K would have to be retuned. Repeat the above procedure for minimum SWR.
17. Observe KW OUTPUT meter for an indication of output R.F. For 100KW average output using a single tone test, the KW OUTPUT meter must indicate 120KW. For 100KW average output using a two tone test, the KW OUTPUT meter must indicate 100KW.
18. With an output of 50KW, set the SWR-CAL switch to CAL. The KW OUTPUT meter must drop to 0 and the SWR meter should indicate. Adjust the SWR meter pointer to the CAL mark on the meter scale by use of the SWR-CAL control. Release the SWR-CAL switch.
19. Increase the output of the 200K transmitter until 100KW is reached.
20. Record all necessary data.
21. Continue tuning the transmitter for all the required frequencies as per tuning chart.

E. DISTORTION CHECK

Distortion must be checked at all of the required frequencies on the test and alignment sheet. The following monitored points are as indicated by the MCP-2 and APP-3.

1. SBE - SBE OUTPUT
2. EXCITER - CHG OUTPUT
3. IPA - 40K OUTPUT
4. PA - 200K OUTPUT

With the use of a spectrum analyzer, check the distortion products which must be within the required specifications.

F. DISTORTION SPECIFICATIONS

UNBALANCED OUTPUT TWO (2) TONE TEST

1. FULL POWER 35db. Below either tone of the two tone test.
2. HALF POWER 40db. Below either tone of the two tone test.

BALANCED OUTPUT TWO (2) TONE TEST

1. FULL POWER 35 db. below either tone of the two tone test.
2. HALF POWER 40 db. below either tone of the two tone test.

G. OVERLOADS

1. PLATE OVERLOAD

a. Tune transmitter to full output at 8 mc.
b. Overload transmitter output by decreasing LOAD capacitance. (The transmitter may also be overloaded by bringing the PA TUNE out of its dip).
c. Adjust PLATE OVERLOAD ADJ control in relay panel "A" to trip PLATE OVERLOAD relay at 7.5 amps for the "A" final.* Reset the PLATE OVERLOAD relay.
d. Adjust PLATE OVERLOAD ADJ control in relay panel "B" to trip PLATE OVERLOAD relay at 7.5 amps for the "B" final.* Reset the PLATE OVERLOAD relay.

2. GRID OVERLOAD

a. Tune transmitter to full output at 8 mc.
b. Unload transmitter by increasing LOAD capacitance. The grid current should increase.
c. Adjust GRID OVERLOAD ADJ control in relay panel "A" to trip GRID OVERLOAD relay at 1 amp for the "A" final.* Reset the GRID OVERLOAD relay.
d. Adjust GRID OVERLOAD ADJ control in relay panel "B" to trip GRID OVERLOAD relay at 1 amp for the "B" final.* Reset the GRID OVERLOAD relay.

3. RETUNE OVERLOAD

Tune transmitter at 8 mc. Adjust drive for 3 KVRF. Turn retune overload adj. until transmitter goes off air. (Retune relay trips). Bring control back slightly. Recheck Retune by detuning plate and drawing 3 amps DC with 2 KVRF. Retune relay should trip.*

4. BIAS RELAY ADJ. "A" And "B"

a. Set the BIAS VOLTS to a minimum value by adjustment of the BIAS ADJUST pot in the Bias Supply.
b. Adjust the BIAS RELAY ADJ pot in the Relay Panel until the BIAS relay operates.
c. Reset the BIAS VOLTS to 450 VDC.*

* RECORD ON TEST DATA SHEET

H. BALANCED RF TEST

Before applying RF to the 200K the following procedure must be performed.

1. Check arrows on direction coupler for proper direction. (Refer to Fig. 3, Page 9).
2. Connect transmitter for 600 ohm balanced output shown in Fig. 3, Page 9.
3. Connect two (2) 0-20 AMP R.F. meters in series with balance output lines.
4. Set OUTPUT switch to LOAD. A.C. power must go ON in TER-100K.
5. Make sure all shields are properly fitted and secure.
6. Set ALL controls as per tuning chart for 5 mc.
7. Turn 200K mode switch to TUNE. Set 40K and 10K high voltage breakers to ON.
8. Check 10K and 40K tuning for a proper dip.
9. Turn 200K mode switch to OPERATE with the OUTPUT control set fully CCW.
10. Set HV "A" and HV "B" high voltage breakers to ON.
11. Set the quiescent plate current of each "final" to 1 amp.
12. Slowly advance OUTPUT control CW until 1.5 AMPS is indicated on PLATE CURRENT "A" and PLATE CURRENT "B" meters.
13. Slowly rotate the PA TUNE control until a dip occurs.
14. Proceed to load the 200K transmitter as per step 15 sheet 44 of this specification.
15. Increase the output of the 200K transmitter to 25 KW.
16. Adjust ANTENNA MATCHING control on 200K transmitter for a minimum indication on the SWR meter.
17. Retune the plates by adjusting the PA TUNE control. It may be necessary to repeat steps 15 thru 17 until a low SWR figure is obtained.
18. Observe the two (2) RF AMP meters and adjust the BALANCE control until both meters indicate the same current (balanced condition). Zero the BALANCE OUTPUT meter by adjustment of the BALANCE ADJ pot mounted directly behind the plug button located on the Antenna Tuning Panel. Due to the tremendous RF field around the balance output lines, the RF AMP meters become very inaccurate at the higher frequencies. Therefore after the initial balance adjustments have been made, the RF AMP meters should be removed from the circuit. The balance adjustments will now be metered by the BALANCE OUTPUT meter and the BALANCE control will be set accordingly.
    CAUTION: ALL POWER MUST BE TURNED OFF BEFORE REMOVING METERS.
19. Observe the 40K SWR meter. If the SWR figure starts to increase during the tuning of the 200K, adjust the SWR INPUT control for a minimum reading on this meter. Any adjustment of the SWR INPUT control would mean that the 40K and 200K would have to be retuned. Repeat the above procedure for minimum SWR.
20. Increase the output of the 200K transmitter until 100KW is reached.
21. Record all necessary data.
22. Continue tuning the 200K transmitter for all the required frequencies as per tuning chart.

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Proceed to check the 200K EMERGENCY output circuit. Only one frequency check is required.

I. EMERGENCY OPERATION

1. Connect the 200K transmitter for emergency operation as per Fig. 10, Page 16.
2. Make sure ALL shields are properly fitted and secure.
3. Set 40K and 10K controls as per tuning chart for 8 mcs.
4. Turn 200K OUTPUT control fully CW.
5. Turn output control on SBE or CHG fully CCW.
6. Turn 200K mode switch to EMERGENCY. Set 40K and 10K high voltage breakers to on.
7. Proceed to tune 10K and 40K for a proper dip. The output will now be controlled by either the SBE or the CHG.
8. After proper operation, record results on test data sheet.*

* RECORD ON TEST DATA SHEET

J. CROWBAR OVERLOAD TEST

CAUTION: The following procedure must be performed with the utmost care. Be sure the HV capacitors have been shorted out with the shorting stick before any connections are made. There must be NO AC POWER on any section of the 200K transmitter.

1. Connect the test apparatus as shown in Fig. 11 Page 17 to power supply "A".
2. Connect a 1000 ohm 1/2 watt resistor between the test apparatus and ground.
3. Connect the test apparatus line cord to a 115 VAC 60 cycle power source.
4. The shorting relay section of the test apparatus should operate and the red lamp on the control box will go ON.
5. Turn AC power ON in the 200K transmitter, allow sufficient warm up time, then turn HIGH VOLTAGE ON.
6. Press RED button on test apparatus. The following items must occur.*
    a. CROWBAR tube must FLASH.
    b. 1000 ohm 1/2 WATT resistor should shatter.
    c. MOTORIZED PRIMARY MAIN breaker must trip.
    d. GRID OVERLOAD relay must trip.
    e. High voltage must go OFF.
7. Press RESET "A" push button. The GRID OVERLOAD relay and MOTORIZED PRIMARY MAIN breaker must reset and the high voltage will go ON.
8. Set the high voltage OFF.
9. Turn AC power OFF. Short the HV capacitors out with the shorting stick and remove the test apparatus.
10. Insert a new 1000 ohm 1/2 WATT resistor in the test apparatus and repeat the above test for the "B" section.

* RECORD ON TEST DATA SHEET

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APPROVED		

TEST DATA SHEET

III MECHANICAL INSPECTION

PAGE	SECTION		ACCEPT
20	A,4.	Power Supply "A" ----------	
20	B,5.	Power Supply "B" ----------	
20	C,7.	Power Amplifier Section ----------	
21	D,5.	Final Tube Section ----------	
21	E,5.	Buffer Section ----------	

IV PRELIMINARY ELECTRICAL INSPECTION

PAGE	SECTION		
22	A,9.	Power Supply "A" ----------	
23	B,8.	Power Supply "B" ----------	
23	C,7.	Power Amplifier Section ----------	
24	D,4.	Final Tube Section ----------	
24	E,5.	Buffer Section ----------	

V PROCEDURE FOR SECTION "A"

PAGE	SECTION		
26	B,1.	Main Blower Operation ----------	
26	B,5.	Alarm ----------	
26	C,1.	Blower Delay "A" ----------	
27	E,1,3.	Filament Protect "A" (Blower Breaker)--	
27	F.	Filament Primary 230 VAC; Primary Adjust Knob Set At ----------	VAC
27	G.	200K "Mode" Switch (Tune-Operate-Emergency) ----------	
28	H,6.	200K Interlock System ----------	
29	I,8.	Bias Volts "A" ----------Adjusted To	VDC
29	K.	High Voltage Protect "A" ----------	
30	L,5,9.	6 1/8" Coaxial Switching Matrix --------	
31	M.	Fuses "A" Section ----------	
33	N,3.	Retune Overload Set --------Adjusted To	MA.
34	O,5.	SWR Overload ----------	
34	P,1,2.	Heat Overload ----------	
34	Q,3.	Output Control (Drive Bias) ----------	VDC
35	S,3.	Plate Volts "A" ----------	KVDC
36	S,15.	Tube Protect "A" ----------	

VI PROCEDURE FOR SECTION "B"

PAGE	SECTION		
38	B,2.	Blower Delay "B" ----------	
38	D,1,3.	Filament Protect "B" (Blower Breaker) --	

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PAGE	SECTION		ACCEPT
38	E.	Filament Primary 230 VAC; Primary Adjust Knob Set At ----------	___VAC
39	F,8.	Bias Volts "B" ---------- Adjusted To--	___VDC
39	H.	High Voltage Protect "B" ----------	_____
40	I.	Fuses "B" Section ----------	_____
41	J,3.	Plate Volts "B" ----------	___KVDC
42	J, 14.	Tube Protect "B" ----------	_____

VII PROCEDURE FOR SECTION "A" AND "B"

PAGE	SECTION		ACCEPT
43	A.	High Voltage Protect "A" And "B" --------	_____
43	C,6,7,8.	Parasitic Check ----------	_____
46	G,1,c.	Plate Overload "A" -------- Adjusted to -	___AMPS
46	G,1,d.	Plate Overload "B" -------- Adjusted to -	___AMPS
46	G,2,c.	Grid Overload "A" --------- Adjusted to -	___AMP
46	G,2,d.	Grid Overload "B" --------- Adjusted to -	___AMP
46	G,3.	Retune Overload ---------- Adjusted to -	___KVRF
46	G,4,c.	Bias Relay Adjust "A" and "B" ----------	_____
48	I,8.	Emergency Operation ----------	_____
49	J,6.	Crowbar Overload Test PS "A" ----------	_____
		PS "B" ----------	_____

TESTER _____ INSPECTOR _____

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REVISION SHEET

THE TECHNICAL MATERIEL CORP.
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LIST NO.

DATE	REV.	SHEET	EMN #	DESCRIPTION	APP.
1/19/65		1 of	51	O=ORIGINAL RELEASE FOR PRODUCTION.	