

# **PROGRESSIVE DYNAMICS**

## **SERVICE MANUAL**

**710778**

**Rev. A**

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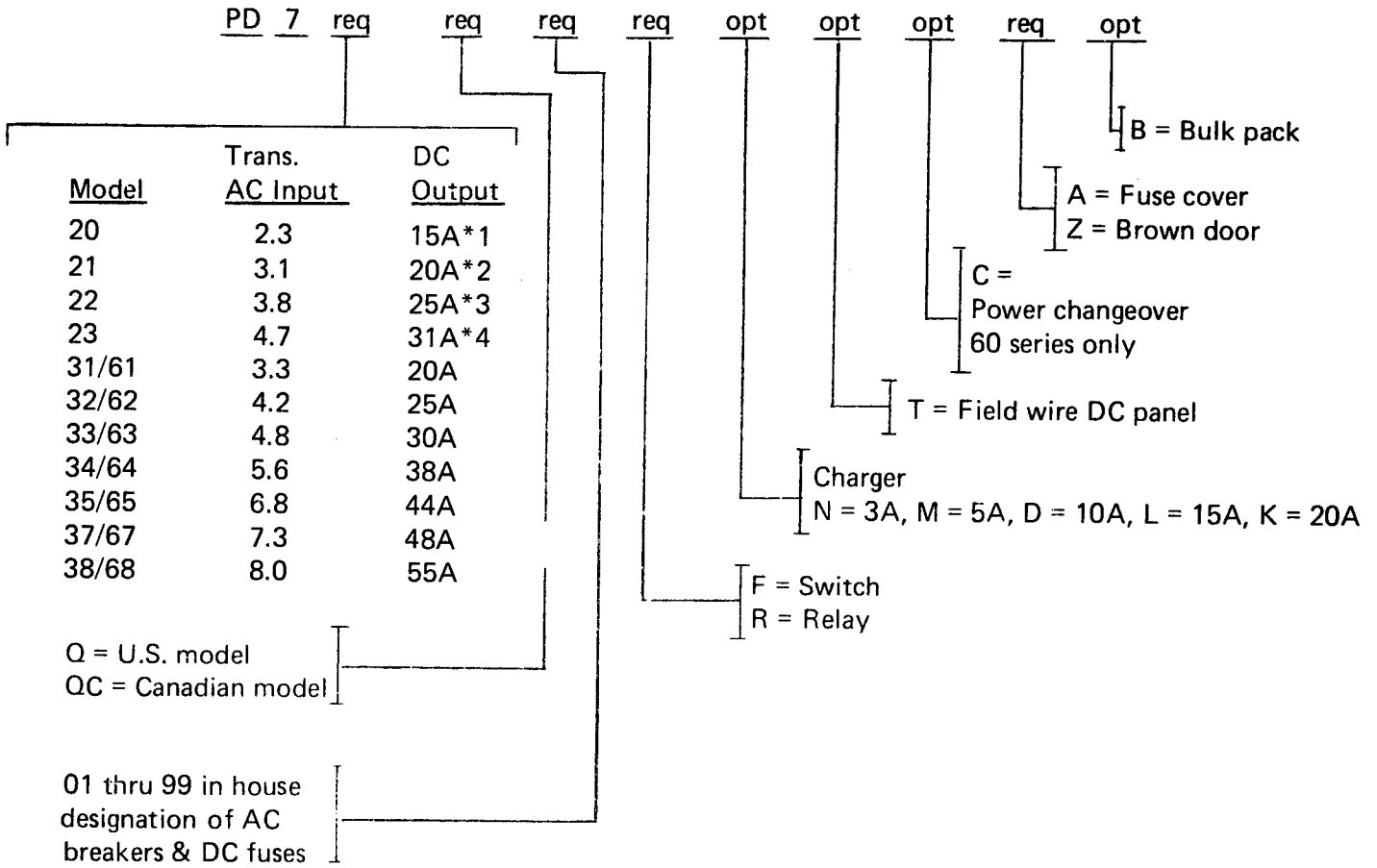
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**TROUBLE SHOOTING THE ELECTRICAL CONTROL  
CENTER POWER CONVERTER**

Models PD 720Q-723Q, PD731Q-738Q,  
PD731-733, PD743-746, PD753-756,  
PD761Q-768Q, PD773-776, PD7220  
7231, 7338, 7348, 7648, 7655

PD720 THRU PD768 MODEL NUMBER MAKE-UP

OPTIONS NOT AVAILABLE ON ALL MODELS



\*1 \*2 - Canadian model not available

\*3 - "C" model 3.2 amps input, 21 amps output. "CQ" not available.

\*4 - "C" model 4.0 amps input, 26 amps output. "CQ" not available.

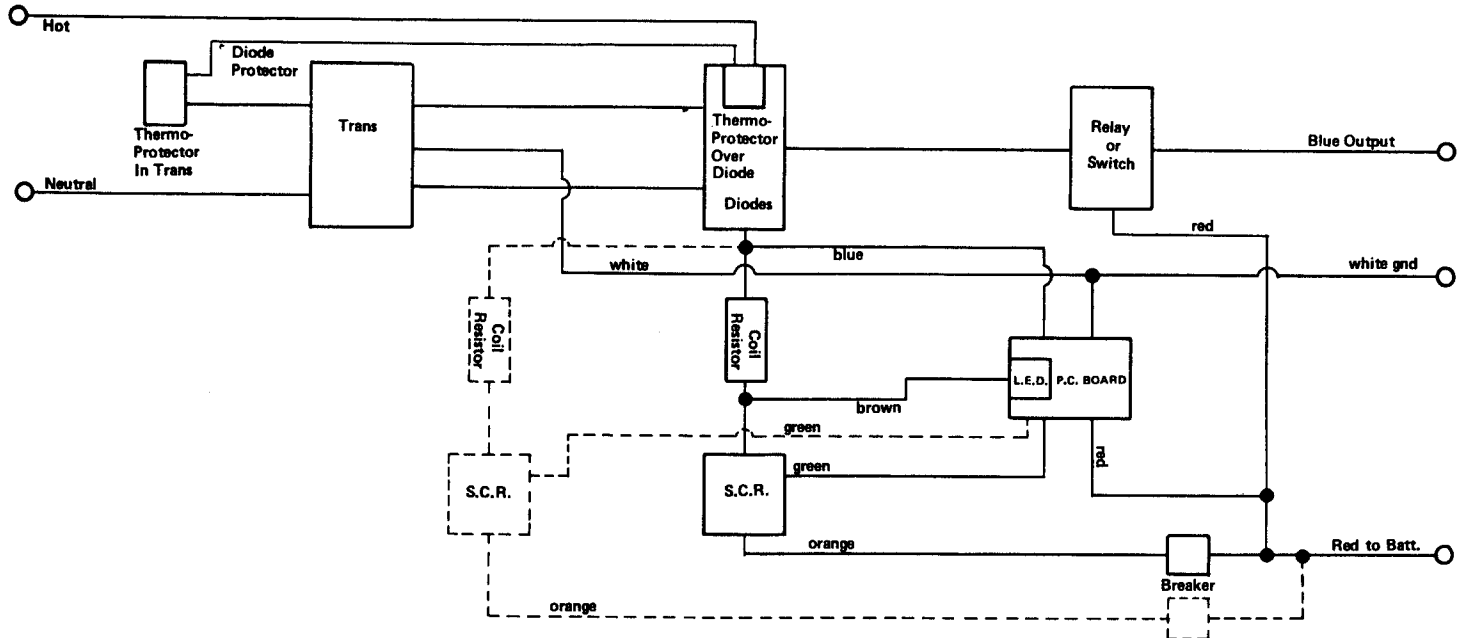
## PROGRESSIVE DYNAMICS STANDARD MODEL POWER CONVERTERS

- PD7220 20 Amp Power Converter, UL & CSA approved, with a 3 Amp battery charger, dual 20/15 AC circuit breaker installed, with the 15 Amp connected to the Converter circuit, a DC fuse board, with three (3) standard output circuits, and one (1) isolated circuit, automatic battery to converter relay, single pack
- PD7231 31 Amp Power Converter, UL & CSA approved, with a 5 Amp battery charger, dual 20/15 Amp AC circuit breaker installed, with the 15 Amp connected to the Converter circuit, a DC fuse board, with three (3) standard output circuits, and one (1) isolated circuit, automatic battery to converter relay, single pack
- PD7338 38 Amp Power Converter, UL & CSA approved, with a 10 Amp battery charger, one (1) dual 20/15 Amp AC circuit breaker installed, with the 15 Amp connected to the converter circuit, a DC fuse board, with seven (7) standard output circuits, and three (3) isolated circuits, automatic battery to converter relay, a brown door, bulk pack
- PD7348 48 Amp Power Converter, UL & CSA approved, with a 15 Amp battery charger, one (1) dual 20/15 Amp AC circuit breaker installed, with the 15 Amp connected to the converter circuit, a DC fuse board, with seven (7) standard output battery to converter relay, brown door, bulk pack
- PD7648 48 Amp Power Converter, UL & CSA approved, with a 15 Amp battery charger, one (1) dual 20/15 Amp AC circuit breaker installed, with the 15 Amp connected to the converter circuit, a DC fuse board, with seven (7) standard output circuits, and three (3) isolated circuits, automatic battery to converter relay, automatic generator to shore power transfer relay, bulk pack
- PD7655 55 Amp Power Converter, UL & CSA approved, with a 15 Amp battery charger, one (1) dual 20/15 Amp AC circuit breaker installed, with the 15 Amp connected to the converter circuit, a DC fuse board, with seven (7) standard output circuits, and three (3) isolated circuits, automated battery to converter relay, automatic generator to shore power transfer relay, bulk pack

## TROUBLE SHOOTING THE ELECTRICAL CONTROL CENTER

The electrical control center consists of three basic modules:

1. **Transformer module:** Contains the transformer that reduces the 115 VAC to 12 VAC and the rectifiers that change the 12 VAC to 12 VDC.
2. **12 Volt distribution panel:** Contains the 12 VDC replaceable fuses, the power switch (automatic relay or manual switch) and the optional battery charger PC board.
3. **115 VAC distribution panel:** Contains the 30 amp main input breaker and the individual branch circuit breakers for all the branch circuits.



**How the converter works:**

Referring to the above diagram with the converter power switch in the transformer position, and 115 VAC available, the converter will supply the 12 VDC to operate the R.V. lights, fans, motors, etc.

When the power switch is in the battery position, the battery supplies the 12 Volt power to the lights, etc.

On units with the option "R", the automatic relay switches to the transformer position as soon as the 115 VAC power is connected to the R.V. and then switches to the battery when the 115 VAC power is removed.

On units with option "F", you must depress the manual switch to the transformer or battery position.

The optional battery charger is a solid state device which senses the condition of the battery and controls the charger output to the battery bringing it up to a fully charged condition. The control then senses when the battery is charged and drops the charge rate down to a safe trickle charge to maintain the battery. The following charge rates correspond to the option letters: N-3 Amp, M-5 Amp, D-10 Amp, L-15 Amp and K-20 Amp.

**WARNING -----WARNING -----WARNING**

**Disconnect all 115 VAC power to the recreational vehicle and remove the positive terminal from the battery before removing any of the components of the converter. If this procedure is not followed, damage may result to the PC boards.**

The following color codes are used on the output circuits of all P.D. power converters:

**Blue:** There may be from 1 to 8 blue wire output circuits. These are 12 Volt positive load circuits.

**Caution:** At no time should a blue load circuit be connected to the battery.

Red: There may be from 1 to 4 red wires. These are the 12 Volt positive leads for the battery charging circuit or the battery feed wires. All wires should be connected together as one and connected to the battery positive terminal.

White: These are the common negative (ground) circuits including the battery circuit. All ground wires should be connected together and grounded to the frame of the R.V.

### CHARGE SENTINEL LIGHT (L.E.D.)

A visual indication of the amount of current that is charging your battery from the power converter. However, this is only an indication of a charge to the battery. If any problems occur with the charge sentinel light, you should put an ammeter between the converter and battery to see if the charger is working correctly.

### LIGHT (L.E.D.) INDICATES

1. Continuous bright light: Battery is being charged. This will change to a flashing light as explained in number 3.
2. Continuous bright light on all the time: Battery is being over charged. Loss of water in the battery is an indication of this condition.
3. Flashing light: Battery has reached approximately 90% of full charge. It will continue to flash several times a second as long as the battery is over 90% of full charge under normal conditions.
4. No light:
  - A. Battery is fully charged. This condition happens to a few units, but is a normal condition.
  - B. No charge going to the battery.  
Warning: The charge sentinel will not work when there is no battery in the R.V. or when the converter is not plugged into 115 VAC power.
  - C. L.E.D. (Light Emitting Diode) is defective. Replace L.E.D. or replace the P.C. board.
5. Light stays on after converter or 115 VAC power is unplugged. P. C. board is defective.. Have it repaired or replaced.

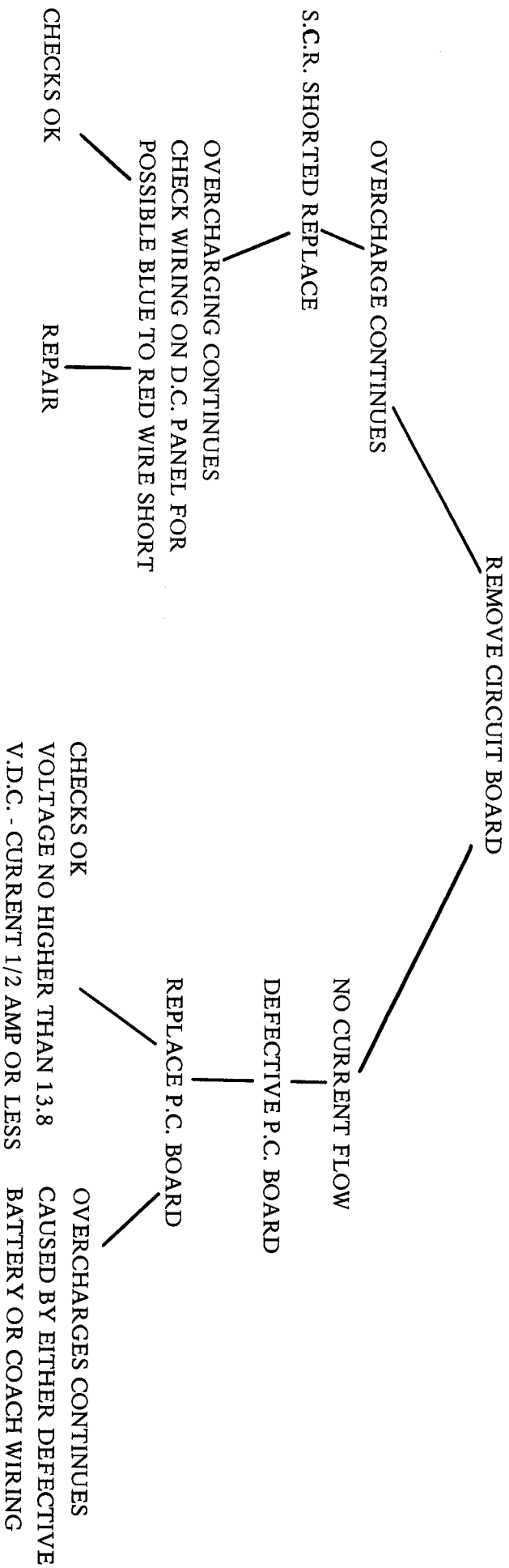
## TROUBLE SHOOTING CHARTS



PROBLEM: CONVERTER OVERCHARGES THE BATTERIES

INITIAL TEST

PLACE AMPMETER IN SERIES WITH BATTERY POSITIVE CURRENT MEASURES 1 AMP OR HIGHER AND VOLTAGE ACROSS BATTERY TERMINALS IS 13.8 V.D.C. OR HIGHER, RED L.E.D. CHARGE SENTINEL MAY STAY ON ALL THE TIME.



PROBLEM: CONVERTER POWERS LIGHTS, FANS, MOTORS BUT BATTERY DOES NOT SUPPLY POWER.

INITIAL TEST

CHECK FOR BATTERY VOLTAGE PRESENT AT CONVERTER D. C. PANEL.

NO VOLTAGE PRESENT

TROUBLESHOOT CONNECTIONS TO THE BATTERY

YES VOLTAGE PRESENT

CHECK FOR BATTERY VOLTAGE AT FUSE HOLDERS

YES VOLTAGE PRESENT  
CHECK FOR BLOWN FUSES OR DEFECTIVE WIRING

NO VOLTAGE PRESENT  
CHECK FOR DEFECTIVE RELAY OR SWITCH ON D. D. PANEL

PROBLEM: CONVERTER POWERS LIGHTS, FANS, MOTORS BUT BATTERY DOES NOT SUPPLY POWER.

INITIAL TEST

CHECK FOR BATTERY VOLTAGE PRESENT AT CONVERTER D. C. PANEL.

NO VOLTAGE PRESENT

TROUBLESHOOT CONNECTIONS TO THE BATTERY

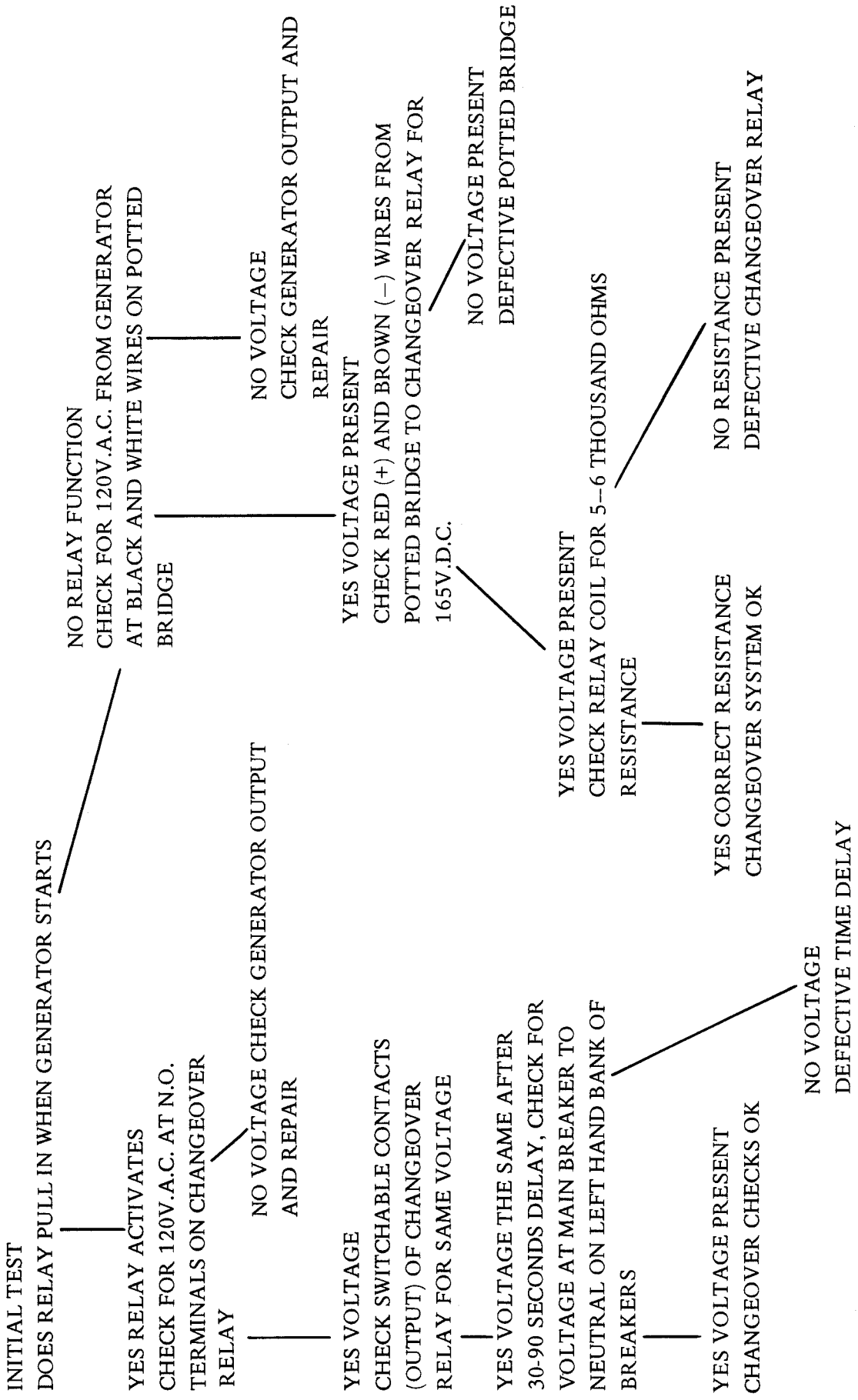
YES VOLTAGE PRESENT

CHECK FOR BATTERY VOLTAGE AT FUSE HOLDERS

YES VOLTAGE PRESENT  
CHECK FOR BLOWN FUSES OR DEFECTIVE WIRING

NO VOLTAGE PRESENT  
CHECK FOR DEFECTIVE RELAY OR SWITCH ON D. D. PANEL

PROBLEM: GENERATOR CHANGEOVER SYSTEM NOT WORKING



PROBLEM: CONVERTER DOES NOT CHARGE BATTERY BUT DOES SUPPLY POWER TO LIGHTS, FANS, MOTOR.

INITIAL TEST

WITH BATTERY VOLTAGE BELOW 12.5 VOLTS AND AMPMETER IN SERIES: CHECK FOR CHARGE CURRENT FLOWING TO THE BATTERIES.

NO CHARGE PRESENT  
REPLACE CIRCUIT BOARD

NO CHARGE PRESENT  
JUMPER AUTO BREAKER

YES CHARGE PRESENT  
DEFECTIVE P. C. BOARD

YES CHARGE PRESENT  
CIRCUIT BOARD I.E.D. CIRCUIT  
DEFECTIVE OR BROWN WIRE FROM  
S.C.R. HEAT SINK TO P.C. BOARD  
DEFECTIVE.

YES CHARGE PRESENT  
DEFECTIVE AUTO BREAKER

NO CHARGE PRESENT  
PLACE 1K OHM 1/2 WATT RESISTOR  
BETWEEN THE BLUE AND GREEN  
WIRES ON THE CIRCUIT BOARD  
HARNNESS.

NO CHARGE PRESENT  
YES CHARGE PRESENT  
REPLACE P. C. BOARD

S.C.R. DEFECTIVE

OR

LIMIT RESISTOR

# PROGRESSIVE DYNAMICS, INC. SERVICE DEPARTMENT

507 INDUSTRIAL ROAD, MARSHALL, MI 49068

TPN (269) 781-4241 FAX (269) 781-7802

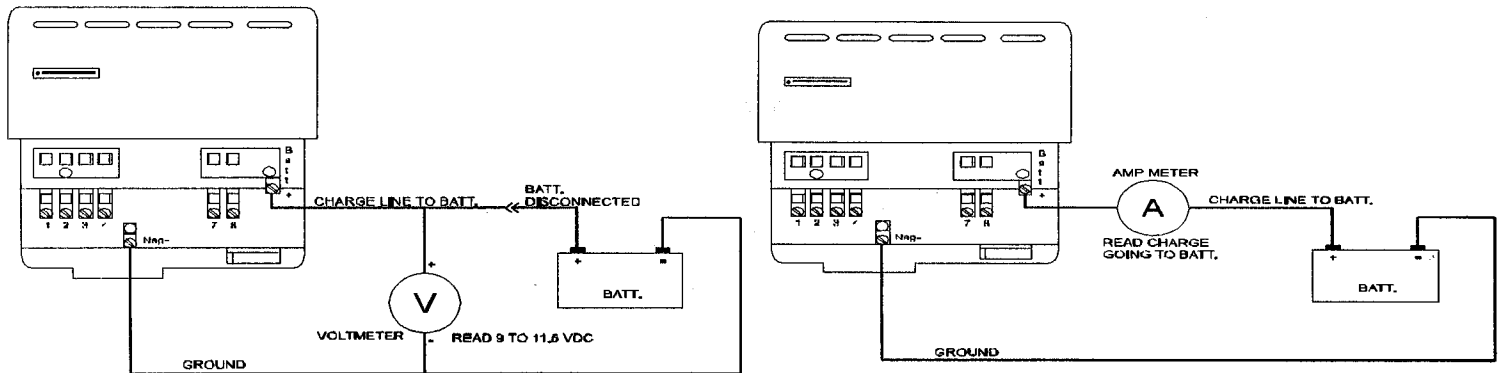
## BATTERY CHARGING TROUBLESHOOTER FOR PD7200-PD7700 CONVERTERS

**You will need** a multi meter (PDI converters can charge up to 20 amps) and a 1,000 ohm 1/2 watt resistor (from Radio Shack, etc.)

Discharge the battery to between 11.5 and 12.5 volts DC. The converter now sees the need to charge the remaining 10% at a rate of 1/2 Amp.

Verify the DC voltages at both fuse panel's left side (transformer output), then the right side (battery output). If you do not have both dc voltages, call us for options.

Turn on one light & read dc current (w/o AC power.) If you read a "+" current flow, reverse the leads. You want a "-" reading here, so that when you reapply AC power the meter reads current going to the battery.



**No Charging** Check continuity on the autobreaker. Unplug charger board & check the continuity of the limiting resistor between blue & brown wires on charger board's wire harness (open=bad).

Look for cracked solder joints, burnt components & blown solder traces on charger board. There is no field test available at this time for the charger board.

Check the SCR's amperage flow by jumpering a 1,000 ohm 1/2 watt resistor between the blue & green wires on the charger board wiring harness. Normal rate is 1/2 Amp when the battery is at a 90% charge level.

**Over Charging** Look for cracked solder joints, burnt components & blown solder traces on charger board. There is no field test available at this time. Check for blue to red wiring shorts in dc panel.

Check SCR's amperage flow by jumpering a 1,000 ohm 1/2 watt resistor between the blue & green wire on the charger board wiring harness. Normal rate is 1/2 amp. If overcharging, you will see 1+ Amps.

Wire color has faded and can be tough to decipher. Locate the red wire and match up the rest.

### 4 Prong Board

\_\_\_ RED  
\_\_\_ GREEN  
\_\_\_ BLUE  
\_\_\_ WHITE

### 5 Prong Board

\_\_\_ RED  
\_\_\_ BROWN  
\_\_\_ GREEN  
\_\_\_ BLUE  
\_\_\_ WHITE

### 6 Prong Board

\_\_\_ WHITE  
\_\_\_ RED  
\_\_\_ BLANK NO WIRE  
\_\_\_ GREEN  
\_\_\_ BROWN  
\_\_\_ BLUE

Call PDI for any charger board repairs (\$22.00 plus freight), unit repair or part replacements.

**Please call us Monday - Friday 8AM - 5PM EDST if you have questions!!!**

PROBLEM: INTERFERENCE IN RADIO OR T.V. WHILE OPERATING ON 12 V.D.C.

HUM OR BUZZ IN AUDIO, LINES ROLLING UP THROUGH PICTURE ON T.V. MAY BLOW FUSE

POPPING OR CLICKING NOISE THAT IS IN TIME WITH THE BLINKING OF CHARGE SENTINEL L.E.D.

STEP 1 Make sure 12V power line is connected to battery charger output and battery is hooked up.

Check number on back of P.C. board  
Check page No. 12 to verify that R.F. board is in place.

STEP 2 Install L-C Filter as close to power input of appliance as possible. PD-734 Electronic Electronic Filter is available. See page 27.

Check to make sure charge line is not run very close to appliance

STEP 3 Noise is being induced into the audio by unfiltered D.C. wires either too close to speaker or appliance itself. Wiring must be physically moved to control interference.

PROBLEM: INTERFERENCE IN RADIO OR T.V. WHEN VENT OR FURNACE FAN IS RUNNING

This noise is radiated from the motor running

A .5 MFD feed through capacitor with the case grounded should be installed in series with the power line to the motor.  
As close to the motor as possible.

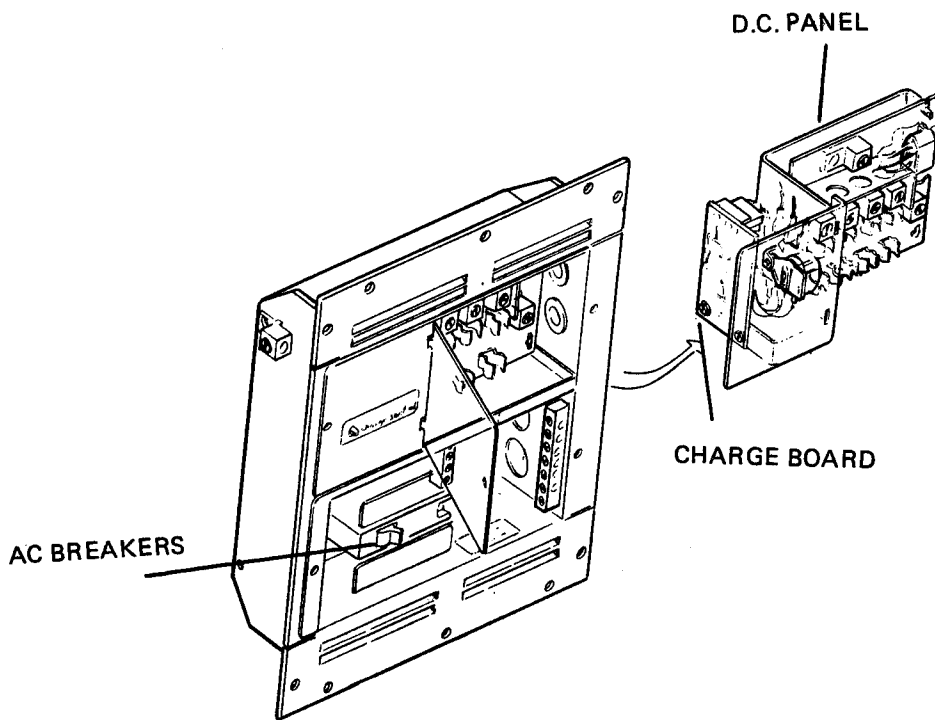
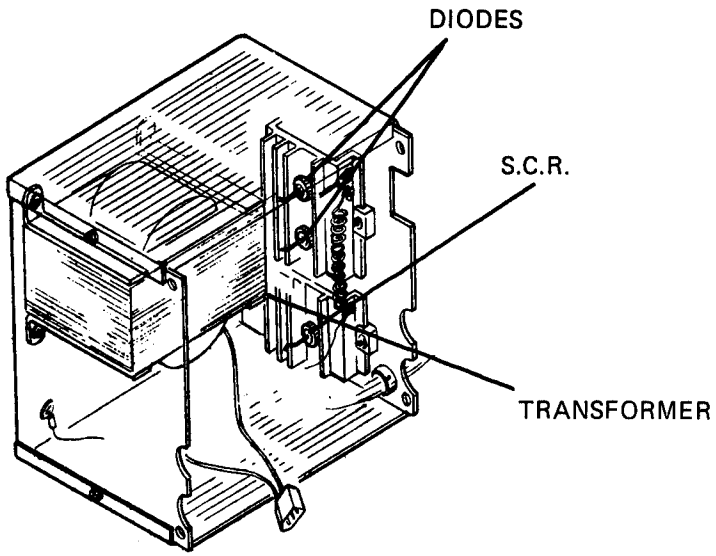
## PROCEDURE FOR REPLACEMENT OF CHARGER CIRCUIT BOARD

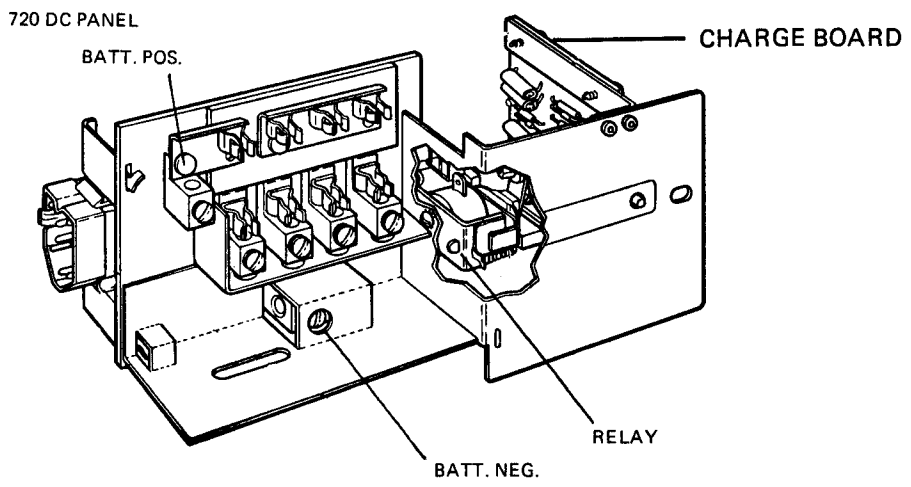
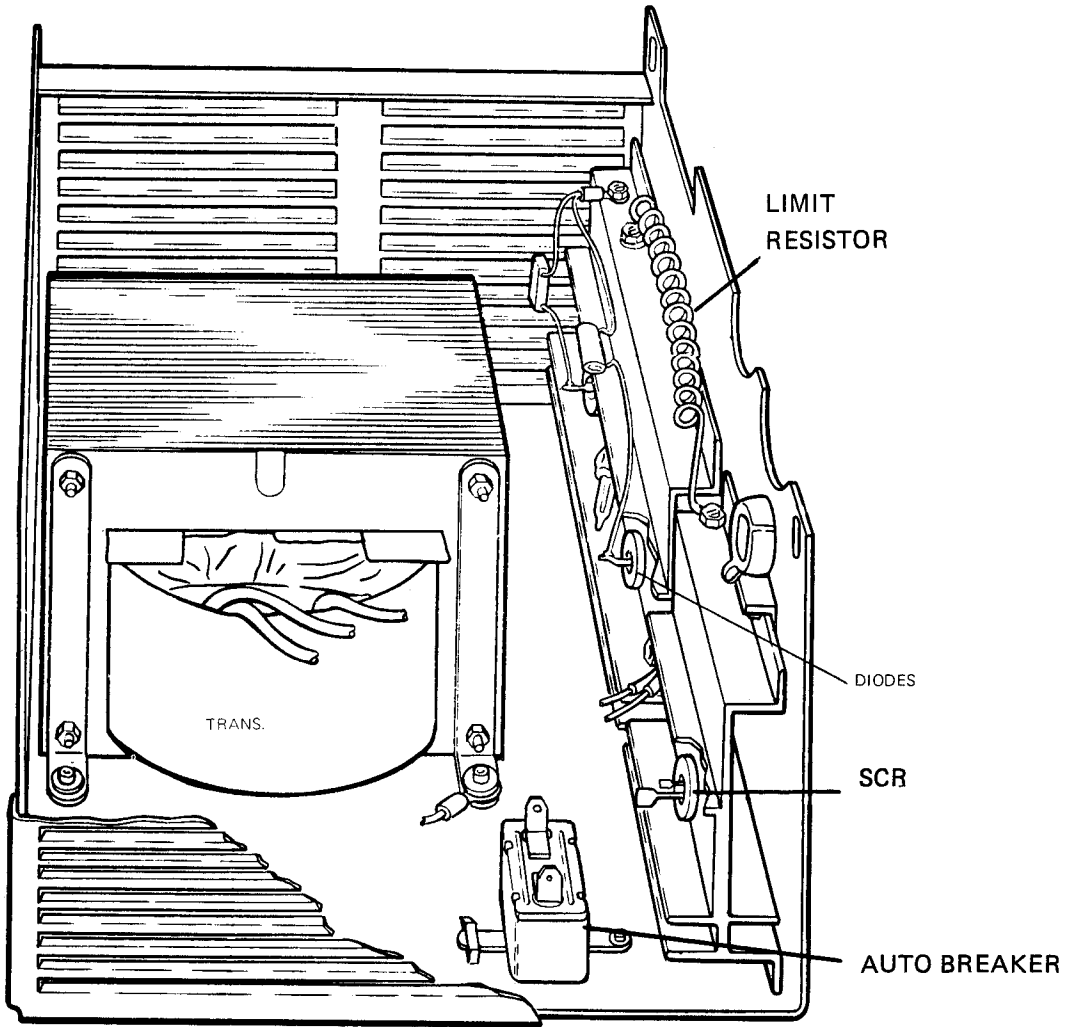
1. Disconnect battery charge line from terminal on the right hand of the DC distribution panel and cap with appropriate size wire nut.
2. Disconnect AC power from input of converter.
3. Remove the (2) screws holding the DC panel to the panel board and tip forward.
4. Remove (2) 1/4 inch screws holding the printed circuit board to the bracket and unplug from wiring harness.
5. Install new printed circuit board and reverse procedure to reinstall.

### PC BOARD IDENTIFICATION

Number on Board	Board Assembly Number	Description
102508 ) 103544 )	802896	4 Pin Board W/O LED Indicator
103544	803704	4 Pin W/Brown Wire and LED Indicator
103544	803704	5 Pin W/LED Indicator
104143	804397	5 Pin RF Board W/LED Indicator
104230	804510	6 Pin W/O LED Indicator 3 Amp Only
*103849	804044	6 Pin W/LED Indicator
104307	804775	6 Pin RF Board W/LED Indicator
106836	804775	
107335	PD-683	6 Pin Step-Charger Board
*Replaced by 804775		

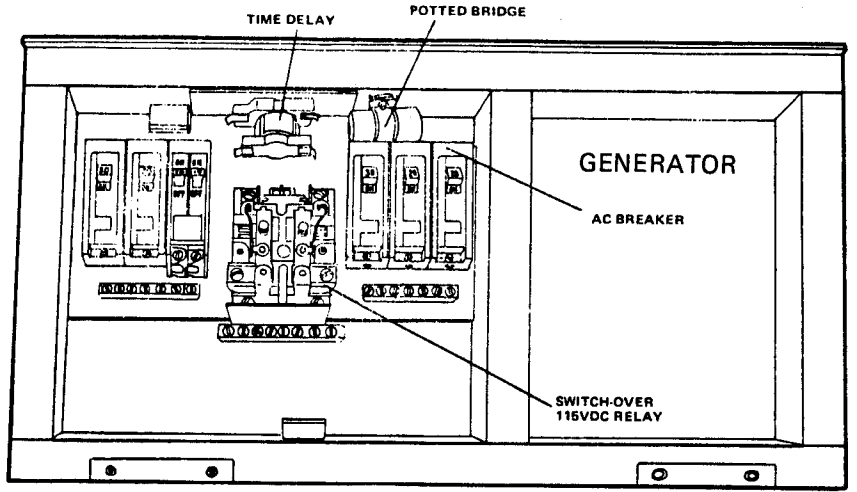




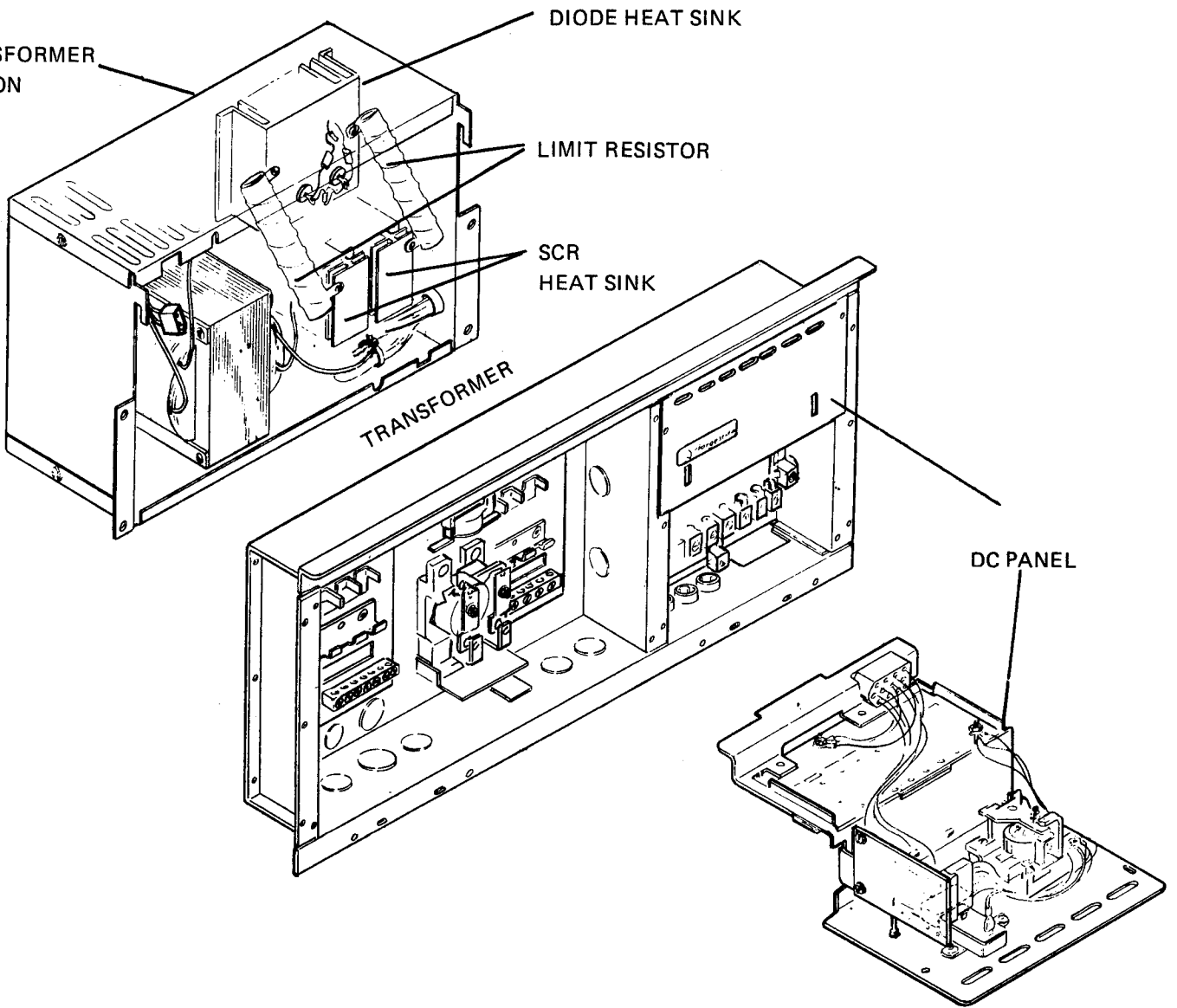


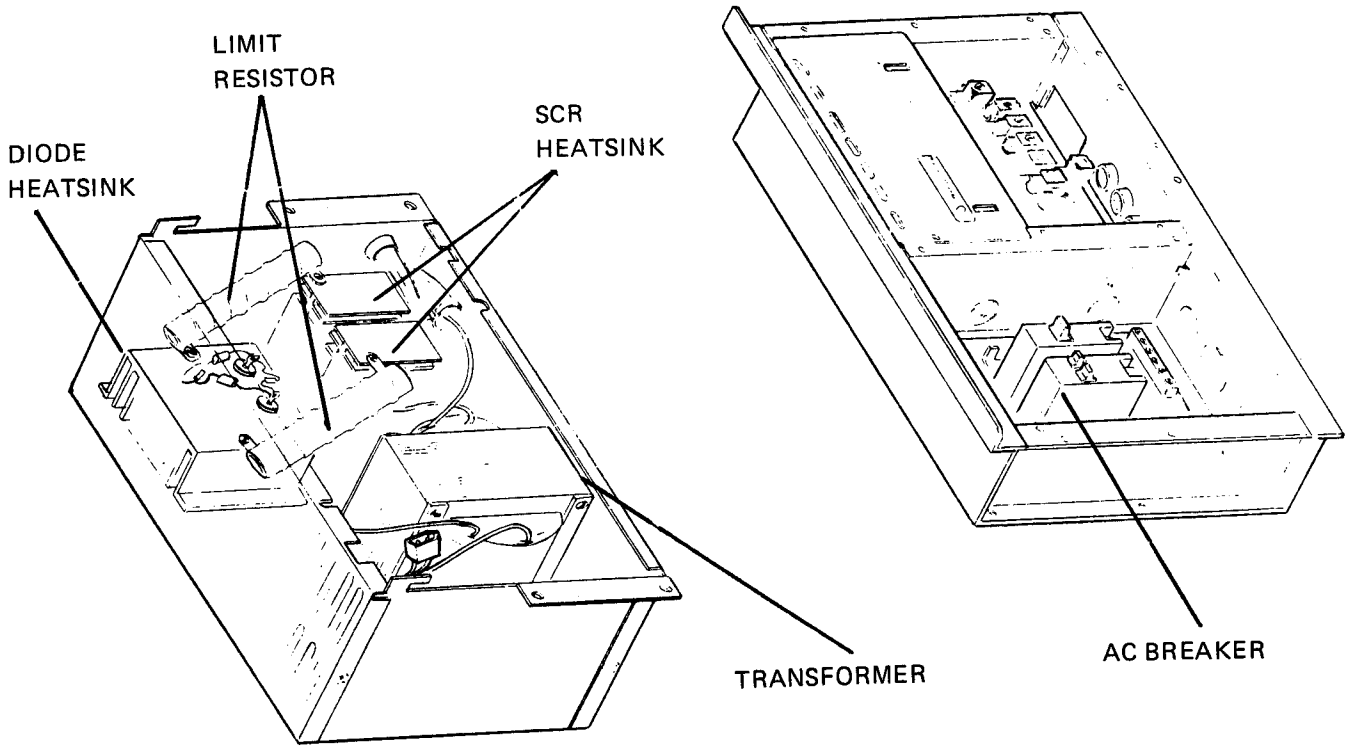
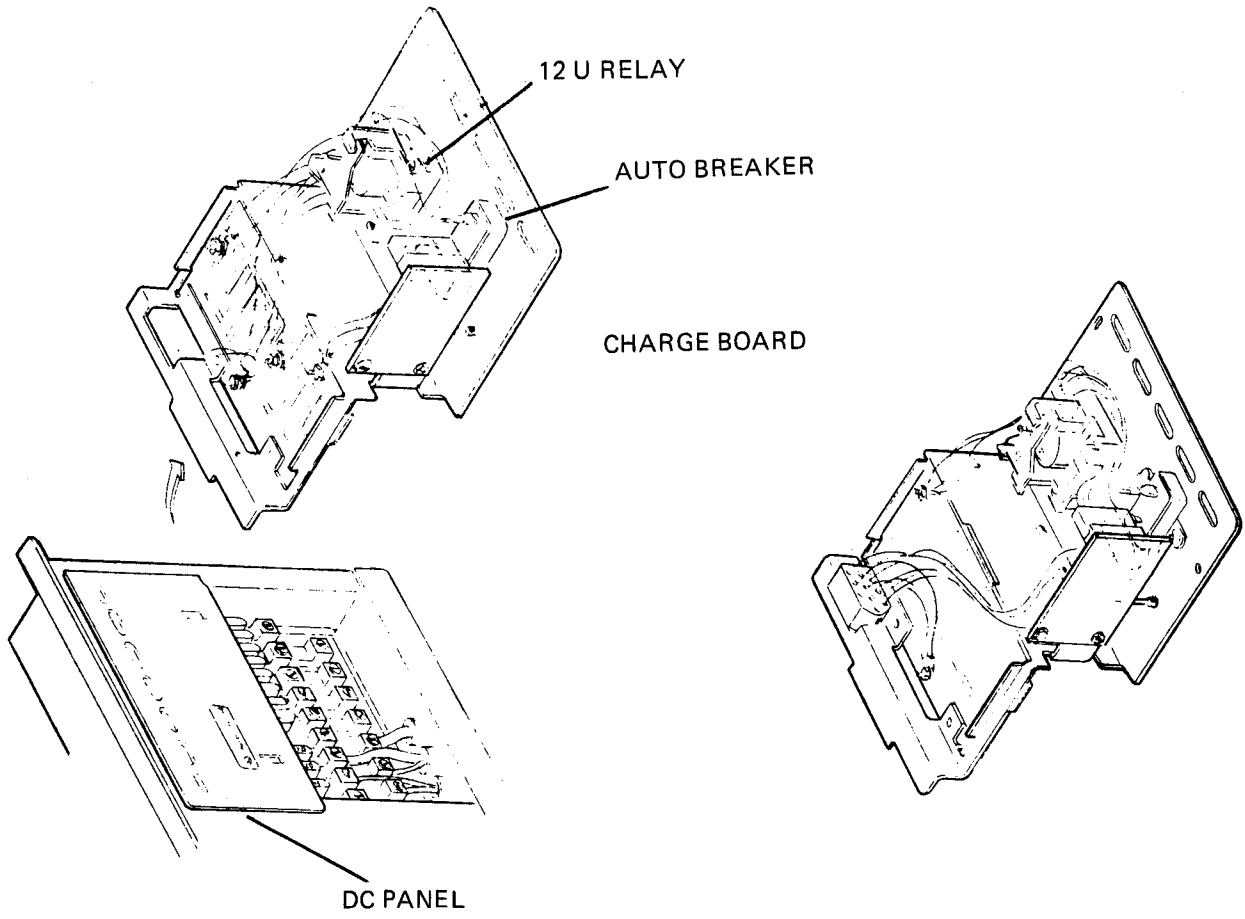
PD-760-776

SHORE POWER  
AC BREAKER

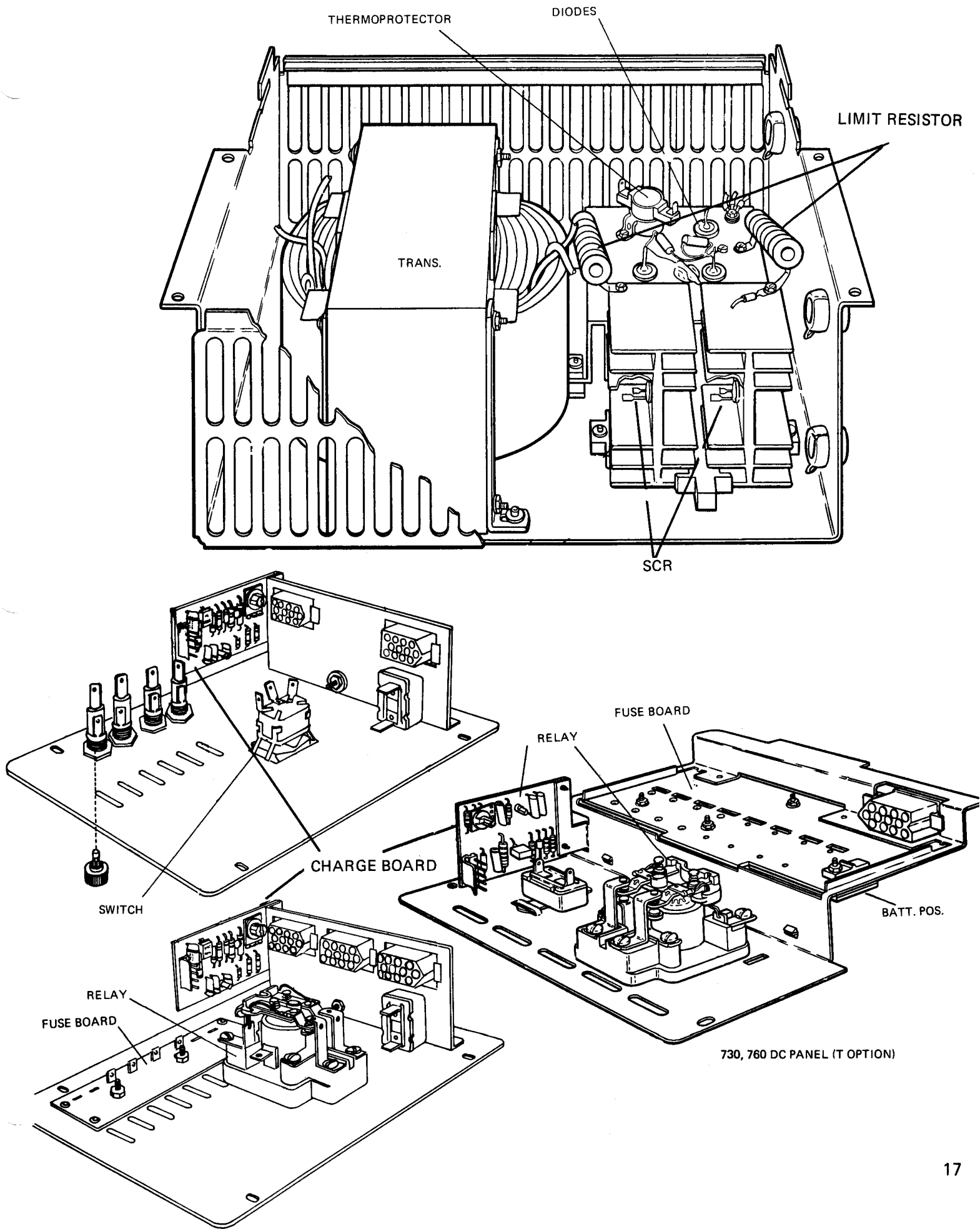


TRANSFORMER  
SECTION

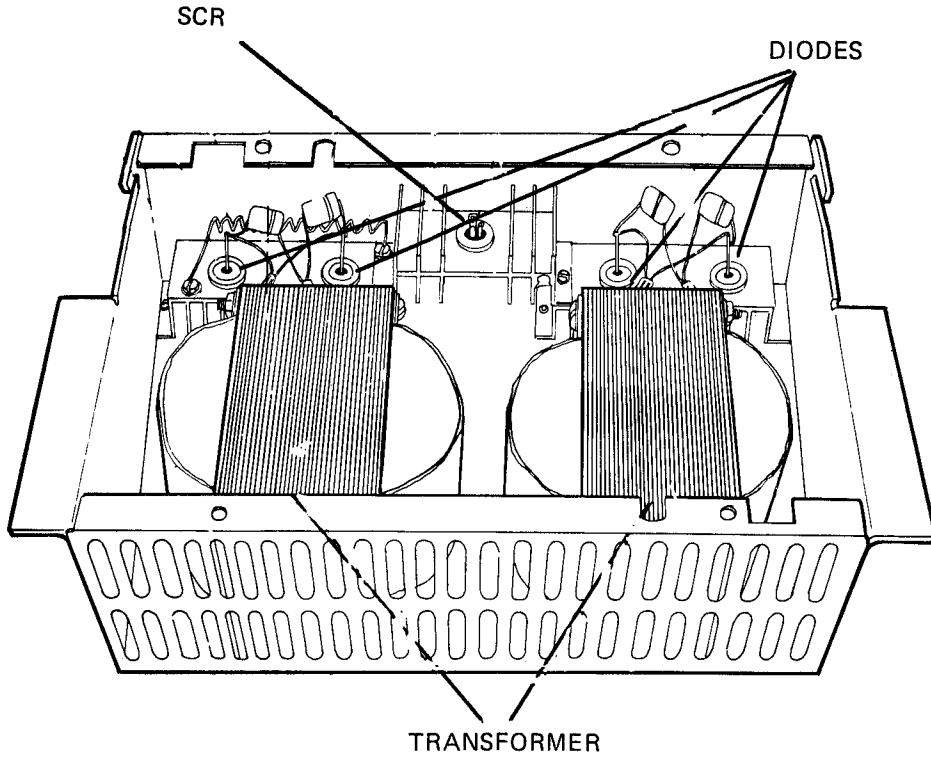




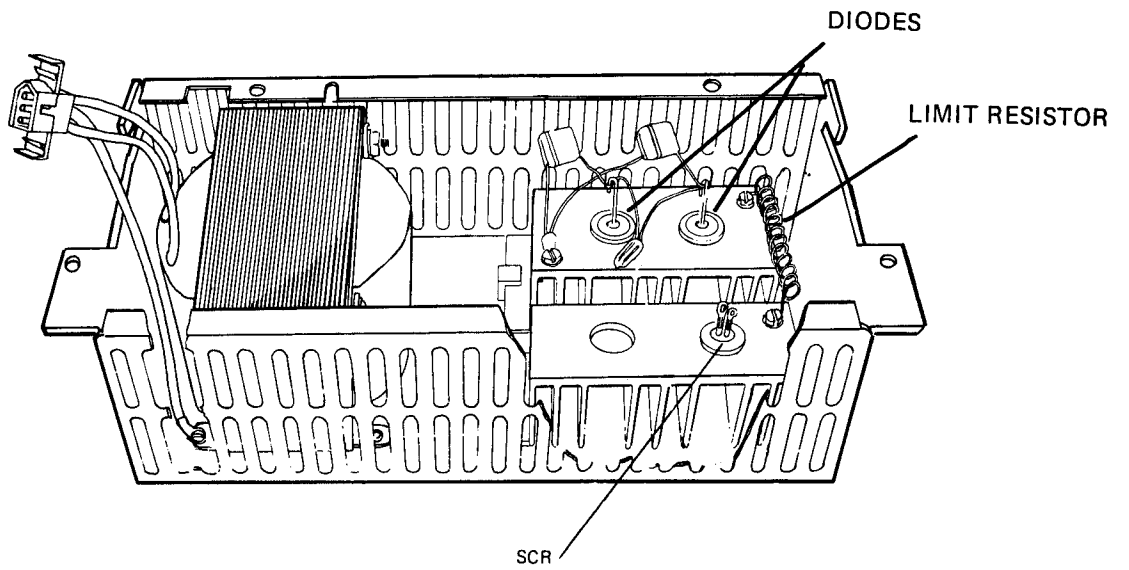
PD-734-738 TRANSFORMER MODULE

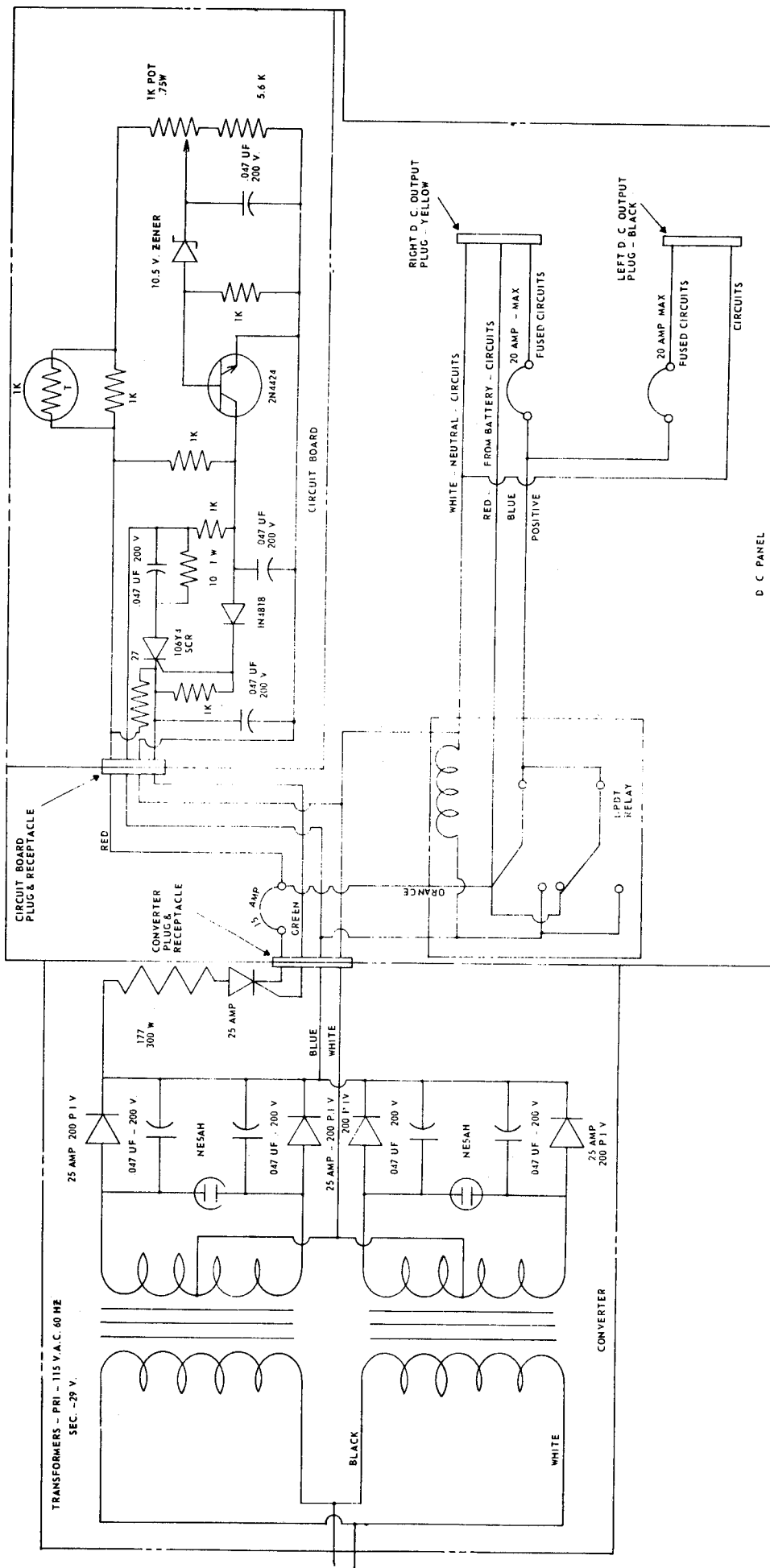


MODELS PD 743-776



731, 732, 733, 763 TRANSFORMER MODULE



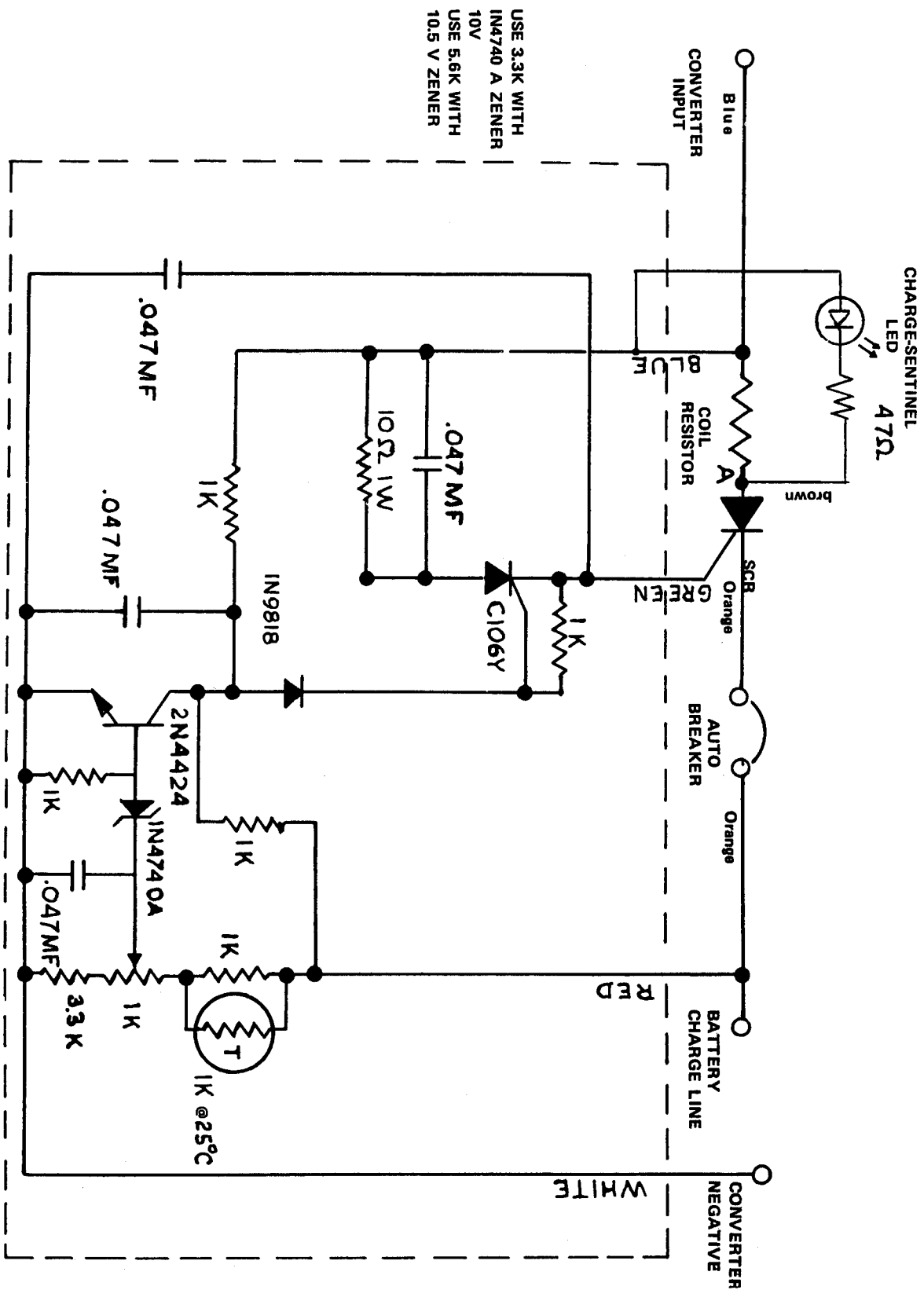


DRAWING NO. 700287

D.C. PANEL

NOTE:  
UNLESS OTHERWISE SPECIFIED ALL RESISTORS 1/2W  
ALL VOLTAGE SPECIFICATIONS ON COMPONENTS ARE  
MINIMUM - HIGHER RATINGS MAY BE USED

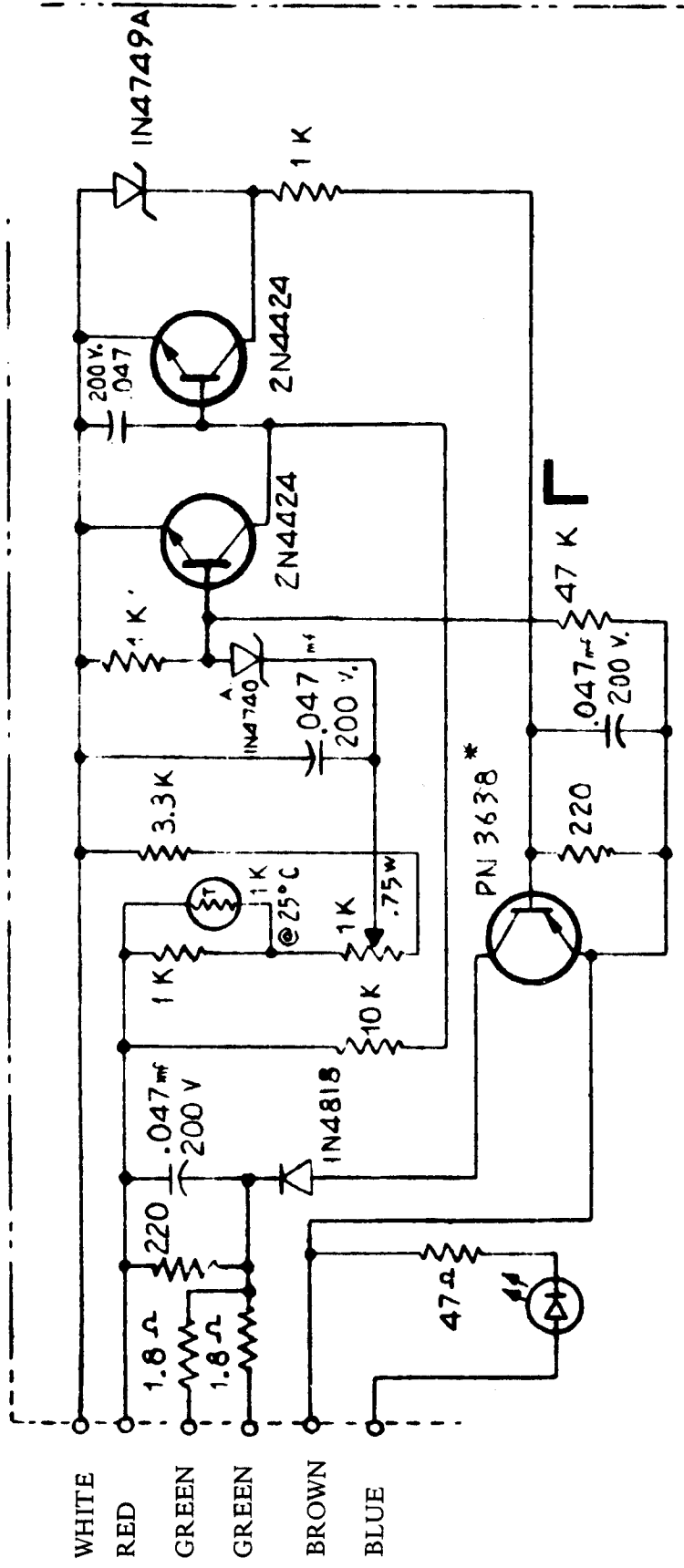
BATTERY CHARGER BOARD W/ CHARGE SENTINEL



NOTES:

- 1. Unless otherwise specified -
- 2. All voltage specs. on components are minimum -
- 3. Capacitors 200 V Extended



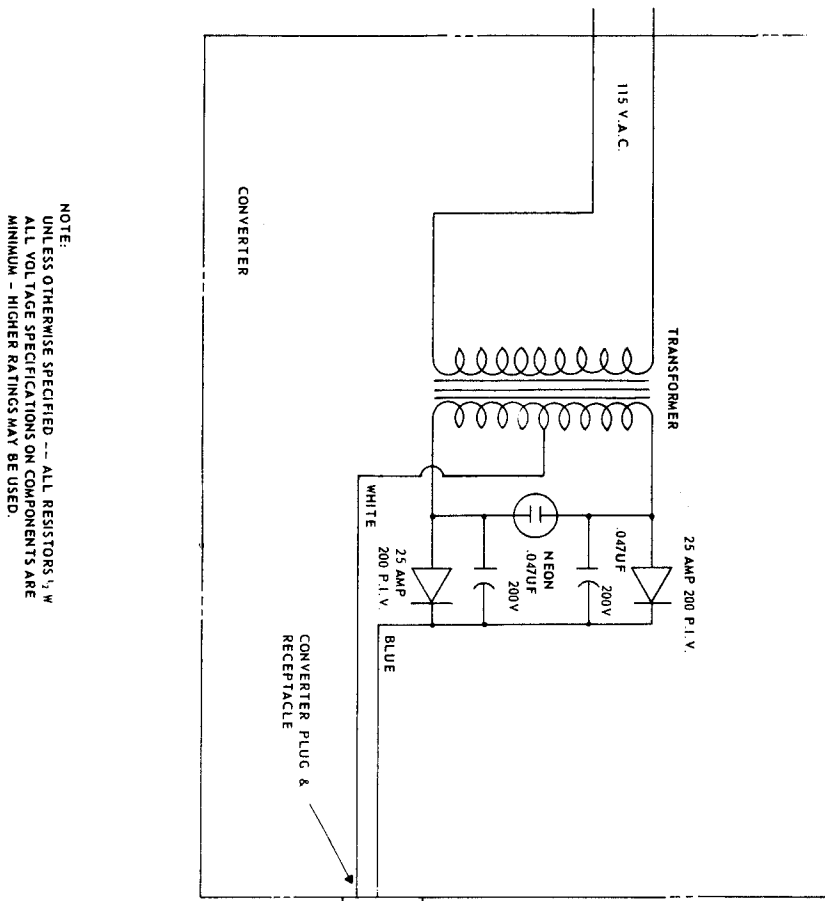


NOTE:  
All fixed resistors 1/2 W.

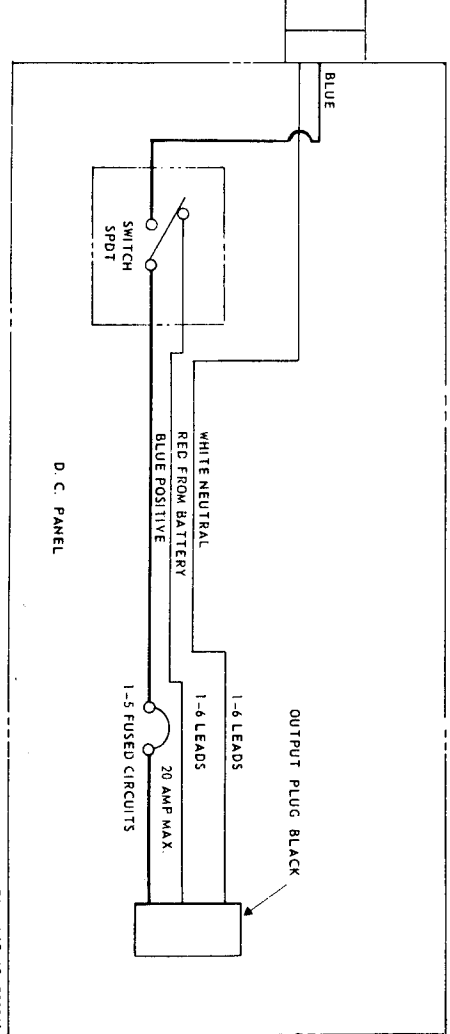
104307 CIRCUIT BD.  
106836

To test for a drain on the BATT. connect AMP meter between the converter CHARGE LINE and the BATT. POSITIVE TERMINAL. With the converter disconnected from SHORE POWER, read the amount of discharge on the AMP meter. The converter has a NORMAL DRAIN of approx. 0 to 20 ma. If you read HIGHER than 20 ma. start removing the wiring or fuses from the output of the converter. Also make sure there is nothing connected to the BATT. If removing the wiring or fuses does not correct the problem, then the PC Board or the SCR might be defective and have to be replaced.

Model PD 731-733

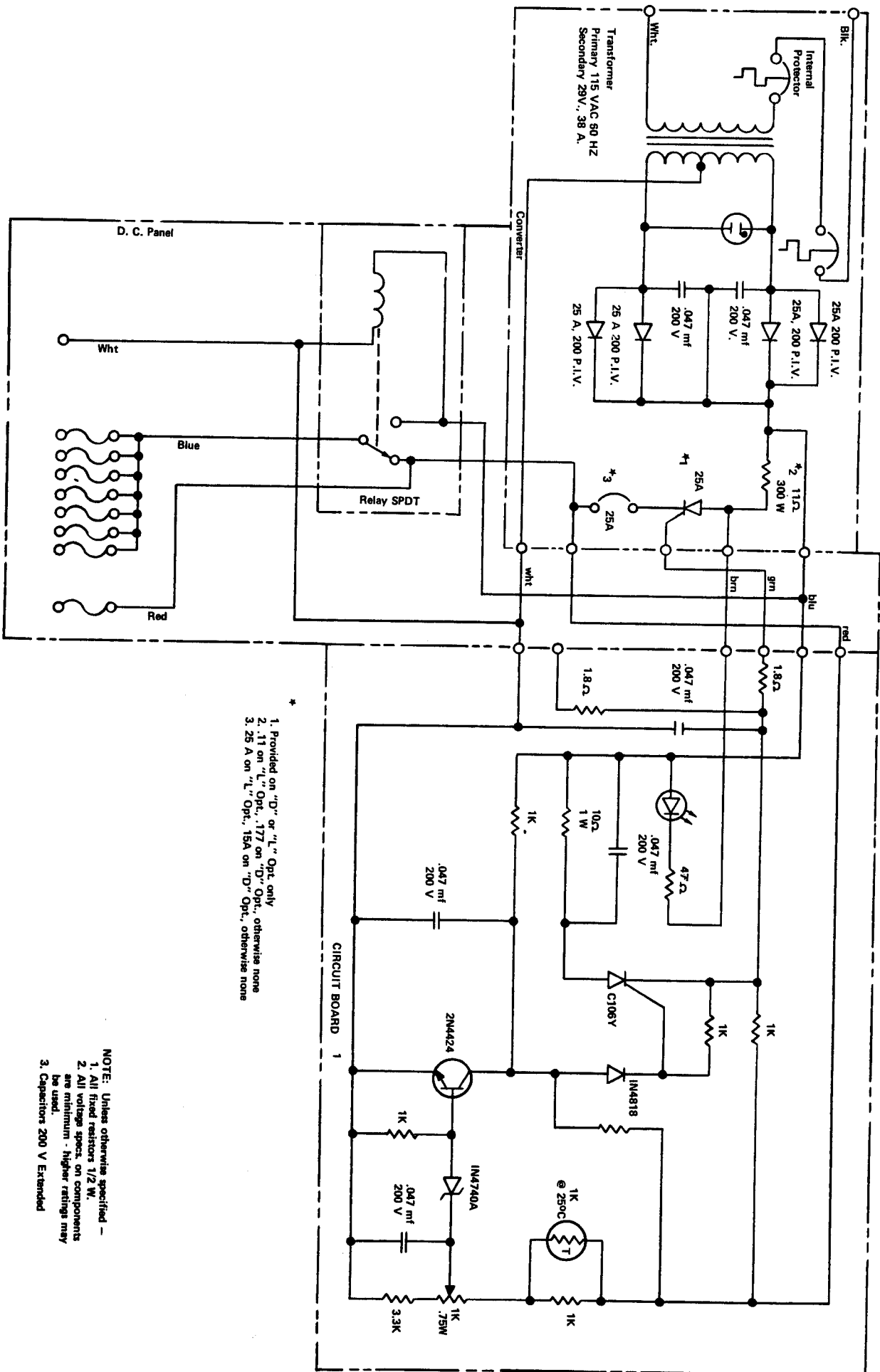


NOTE:  
 UNLESS OTHERWISE SPECIFIED -- ALL RESISTORS 1/2 W  
 ALL VOLTAGE SPECIFICATIONS ON COMPONENTS ARE  
 MINIMUM - HIGHER RATINGS MAY BE USED.



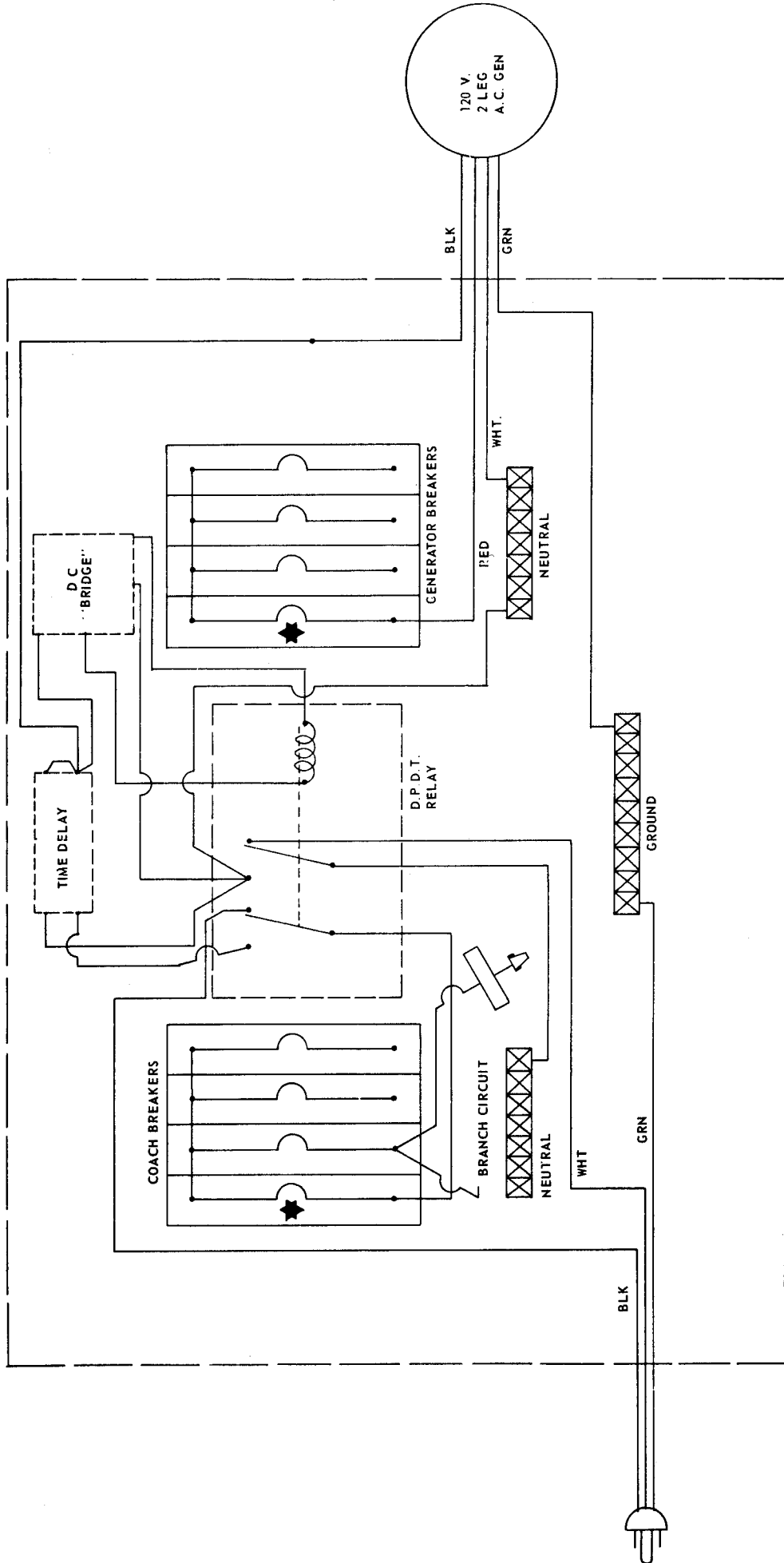
DRAWING NO. 700361

TYPICAL Q MODEL SCHEMATIC



1. Provided on "D" or "L" Opt. only
2. .11 on "L" Opt., .177 on "D" Opt., otherwise none
3. 25 A on "L" Opt., 15A on "D" Opt., otherwise none

NOTE: Unless otherwise specified —  
 1. All fixed resistors 1/2 W.  
 2. All voltage specs. on components are minimum - higher ratings may be used.  
 3. Capacitors 200 V Extended



DRAWING NO. 700357

P.D. PANELBOARD



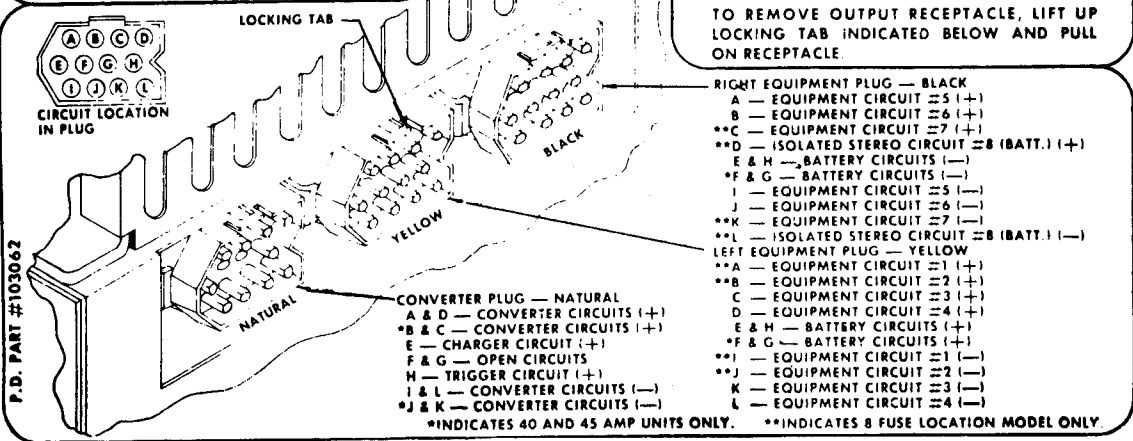
MAIN BREAKER REQ'D ONLY WITH 3 OR MORE BRANCH BREAKERS

## ELECTRICAL SYSTEMS CONTROL CENTER OUTPUT PLUG SEQUENCING — OUTPUT PIN IDENTIFICATION

USE OUTPUT RECEPTACLE  
MANUFACTURED BY: MOLEX PRODUCTS CO.  
DOWNERS GROVE, ILL.  
PART NUMBER: 03-12-1121 60515

OBSERVE PLUG COLOR CODING WHEN CONNECTING RECEPTACLES. SERIOUS DAMAGE COULD RESULT IF MISCONNECTED. DISCONNECT ALL RECEPTACLES BEFORE SERVICING D.C. SECTIONS OF CONTROL CENTER.

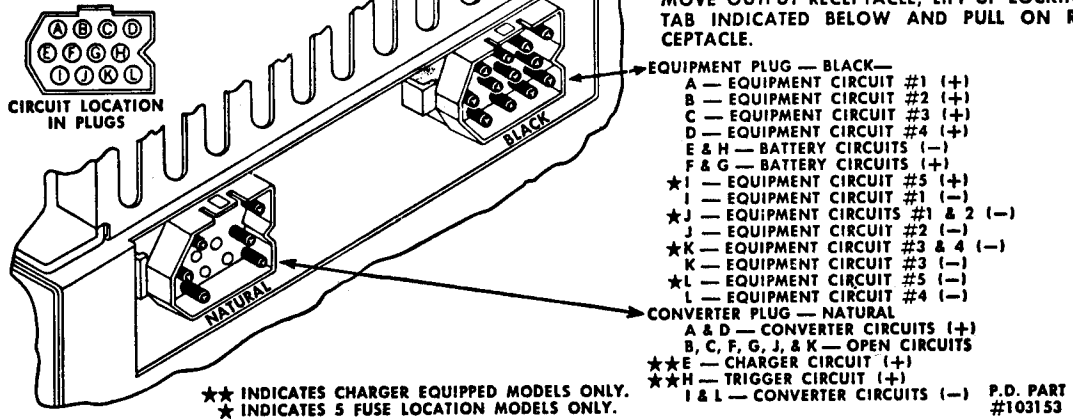
TO REMOVE OUTPUT RECEPTACLE, LIFT UP LOCKING TAB INDICATED BELOW AND PULL ON RECEPTACLE



## ELECTRICAL SYSTEMS CONTROL CENTER OUTPUT PLUG SEQUENCING — OUTPUT PIN IDENTIFICATION

USE OUTPUT RECEPTACLE MANUFACTURED  
BY: MOLEX PRODUCTS CO.,  
DOWNERS GROVE, ILL. 60515  
PART NUMBER: 03-12-1121

OBSERVE PLUG COLOR CODING WHEN CONNECTING RECEPTACLES. SERIOUS DAMAGE COULD RESULT IF MISCONNECTED. DISCONNECT ALL RECEPTACLES BEFORE SERVICING D.C. SECTIONS OF CONTROL CENTER. TO REMOVE OUTPUT RECEPTACLE, LIFT UP LOCKING TAB INDICATED BELOW AND PULL ON RECEPTACLE.



## ORDERING INFORMATION

Send check or money order payable to:

Progressive Dynamics, Inc.  
507 Industrial Road  
Marshall, MI 49068  
Attn: Parts Department

or

Call 269-781-4241 for Phone Orders.

There is a minimum billing of \$25.00 on C.O.D. orders