TABLE OF CONTENTS

Trouble Shooting the Electrical Control Center Power Converter
Models PD 720Q through 723Q, PD731Q through 738Q, PD731 through 733, PD743 through 746, PD753 through 756, PD761Q through 768Q, PD773 through 776, PD7220, 7231, 7338, 7348, 7648, 7655

Model Number Explanation

System Description

Trouble Shooting Charts

Charger PC Board Information

Pictorial Breakdown

Schematic Diagrams

Output Plug Identification

Ordering Information

Price Sheet

Page 1

Page 1

Pages 3 & 4

Pages 5 - 11

Page 12

Pages 13 - 18

Pages 19 - 24

Page 25

Page 26

Page 27
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
<table>
<thead>
<tr>
<th>Model</th>
<th>Trans.</th>
<th>DC Input</th>
<th>DC Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>2.3</td>
<td>15A*1</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>3.1</td>
<td>20A*2</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>3.8</td>
<td>25A*3</td>
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</tr>
<tr>
<td>23</td>
<td>4.7</td>
<td>31A*4</td>
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</tr>
<tr>
<td>31/61</td>
<td>3.3</td>
<td>20A</td>
<td></td>
</tr>
<tr>
<td>32/62</td>
<td>4.2</td>
<td>25A</td>
<td></td>
</tr>
<tr>
<td>33/63</td>
<td>4.8</td>
<td>30A</td>
<td></td>
</tr>
<tr>
<td>34/64</td>
<td>5.6</td>
<td>38A</td>
<td></td>
</tr>
<tr>
<td>35/65</td>
<td>6.8</td>
<td>44A</td>
<td></td>
</tr>
<tr>
<td>37/67</td>
<td>7.3</td>
<td>48A</td>
<td></td>
</tr>
<tr>
<td>38/68</td>
<td>8.0</td>
<td>55A</td>
<td></td>
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</tbody>
</table>

*1 - Canadian model not available
*2 - "C" model 3.2 amps input, 21 amps output
*3 - "C" model 4.0 amps input, 26 amps output

01 thru 99 in house designation of AC breakers & DC fuses

Q = U.S. model
GC = Canadian model

B = Bulk pack
A = Fuse cover
Z = Brown door
C = Power changeover
T = Field Wire DC panel
F = Switch
R = Relay
N = 3A, M = 5A, D = 10A, L = 15A, K = 20A

"CQ" not available.
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

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

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

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

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

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
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-5 Amp, M-5 Amp, D-10 Amp, L-15 Amp and K-20 Amp.

---

**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

Check for:
- Battery Terminal Voltages
- Higher than 13.8V DC
- D.C. Current less than 1/2 amp or less

Possible Cause:
- Battery Charging Inversely

Remedy:
- Check Wiring On D.C. Panel
- Replace
- S.C.R. Shorted Replace
- Crossing Continues
- Overcharging Continues
- Check DC Panel For Possible Blue Wire Short
- Replace P.C. Board
- No Current Flow
- Remove Circuit Board
- Battery Continues
- Battery Charging Inversely

Note:
- Across Battery Terminals Is 13.8V DC Or Higher, Red LED Charger Sentinel May Stay On All Time
- Place Ammeter In Series With Battery Positive Current Measures 1 Amp Or Higher And Voltage

Initial Test:
- Converter Overcharges The Batteries
PROBLEM: CONVERTER POWERS LIGHTS, FANS, MOTORS BUT BATTERY DOES NOT SUPPLY POWER.

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

<table>
<thead>
<tr>
<th>NO VOLTAGE PRESENT</th>
<th>YES VOLTAGE PRESENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>TROUBLESHOOT CONNECTIONS TO THE BATTERY</td>
<td>CHECK FOR BATTERY VOLTAGE AT FUSE HOLDERS</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>NO VOLTAGE PRESENT</th>
<th>YES VOLTAGE PRESENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>TROUBLESHOOT CONNECTIONS TO THE BATTERY</td>
<td>CHECK FOR BATTERY VOLTAGE AT FUSE HOLDERS</td>
</tr>
</tbody>
</table>

YES VOLTAGE PRESENT
CHECK FOR BLOWN FUSES OR DEFECTIVE WIRING

NO VOLTAGE PRESENT
CHECK FOR DEFECTIVE RELAY OR SWITCH ON D. C. PANEL
PROBLEM: GENERATOR CHANGEOVER SYSTEM NOT WORKING

INITIAL TEST
DOES RELAY PULL IN WHEN GENERATOR STARTS

YES RELAY ACTIVATES
CHECK FOR 120V.A.C. AT N.O. TERMINALS ON CHANGEOVER RELAY

NO RELAY FUNCTION
CHECK FOR 120V.A.C. FROM GENERATOR AT BLACK AND WHITE WIRES ON POTTED BRIDGE

YES VOLTAGE
CHECK SWITCHABLE CONTACTS (OUTPUT) OF CHANGEOVER RELAY FOR SAME VOLTAGE

NO VOLTAGE CHECK GENERATOR OUTPUT AND REPAIR

YES VOLTAGE PRESENT
CHECK RED (+) AND BROWN (−) WIRES FROM POTTED BRIDGE TO CHANGEOVER RELAY FOR 165V.D.C.

YES VOLTAGE THE SAME AFTER 30-90 SECONDS DELAY, CHECK FOR VOLTAGE AT MAIN BREAKER TO NEUTRAL ON LEFT HAND BANK OF BREAKERS

NO VOLTAGE PRESENT DEFECTIVE POTTED BRIDGE

YES VOLTAGE PRESENT
CHANGEOVER CHECKS OK

YES VOLTAGE PRESENT
CHECK RELAY COIL FOR 5–6 THOUSAND OHMS RESISTANCE

NO VOLTAGE CHECK GENERATOR OUTPUT AND REPAIR

NO VOLTAGE DEFECTIVE TIME DELAY

YES CORRECT RESISTANCE CHANGEOVER SYSTEM OK

NO RESISTANCE PRESENT DEFECTIVE CHANGEOVER RELAY
Problem: Converter does not charge battery but does supply power to lights, fans, motor.

Initial Test:
- Connect battery voltmeter below 12.5 volts and ammeter in series: check for charge current flowing.

- Circuit Board: Replace if defective.
- SCR, Heat Sink to PCB Board: Check for defective SCR board. If defective, replace.
- SCR Board: Check for defective SCR board. If defective, replace.
- Battery: Check battery for defective. If defective, replace.
- Harness: Wire on the circuit board between the blue and green pin 1/2 watt resistor. If not present, replace.
- SCR: If defective, replace.
- SCR Board: If defective, replace.
- SCR Board: If defective, replace.
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 resister 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 resister 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.

<table>
<thead>
<tr>
<th>4 Prong Board</th>
<th>5 Prong Board</th>
<th>6 Prong Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED</td>
<td>RED</td>
<td>WHITE</td>
</tr>
<tr>
<td>GREEN</td>
<td>BROWN</td>
<td>RED</td>
</tr>
<tr>
<td>BLUE</td>
<td>GREEN</td>
<td>BLANK NO WIRE</td>
</tr>
<tr>
<td>WHITE</td>
<td>BLUE</td>
<td>GREEN</td>
</tr>
<tr>
<td></td>
<td>WHITE</td>
<td>BROWN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BLUE</td>
</tr>
</tbody>
</table>

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

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

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.

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.

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

Check number on back of P.C. board
Check page No. 12 to verify that R.F. board is in place.
Check to make sure charge line is not run very close to appliance

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

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

NOTE:
All fixed resistors 1/2 W.
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