Procedure 6.1 - Troubleshooting the Lower and Upper Interconnect Cables

Anti-static kits can be ordered from Precor (part number 20024-101).

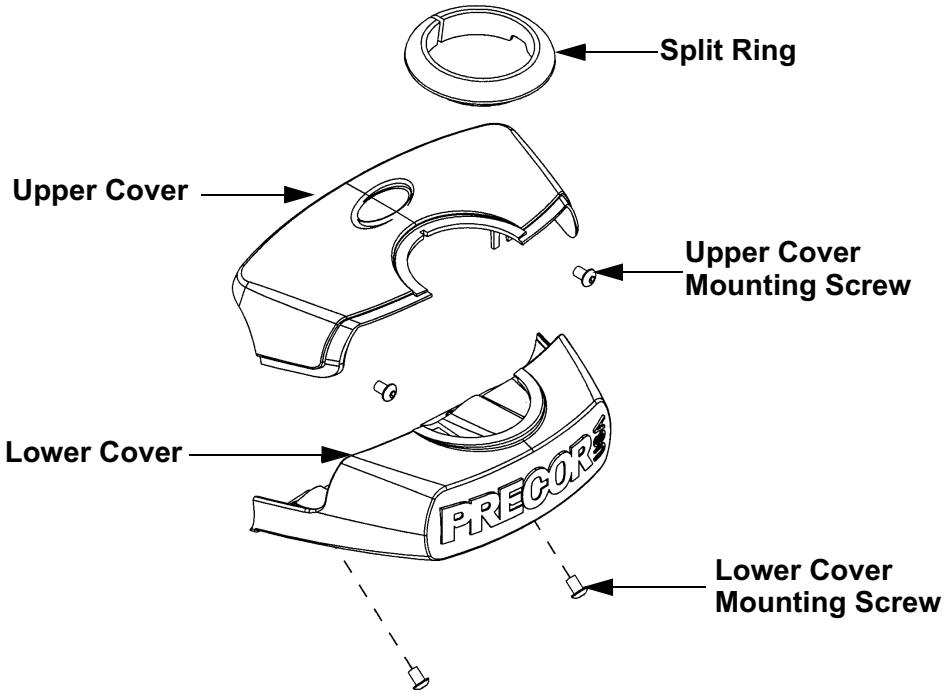
Troubleshooting the Upper Interconnect Cable

WARNING
Before continuing with this procedure, review the Warning and Caution statements listed in Section One, Things You Should Know.

9. Attach the anti-static wrist strap to your arm, then connect the ground lead of the wrist strap to the units frame.

10. Remove two screws that fasten the upper mid-point cover. Remove two screws that fasten the lower mid-point cover. Remove both halves of the cover and the split ring. See Diagram 6.1

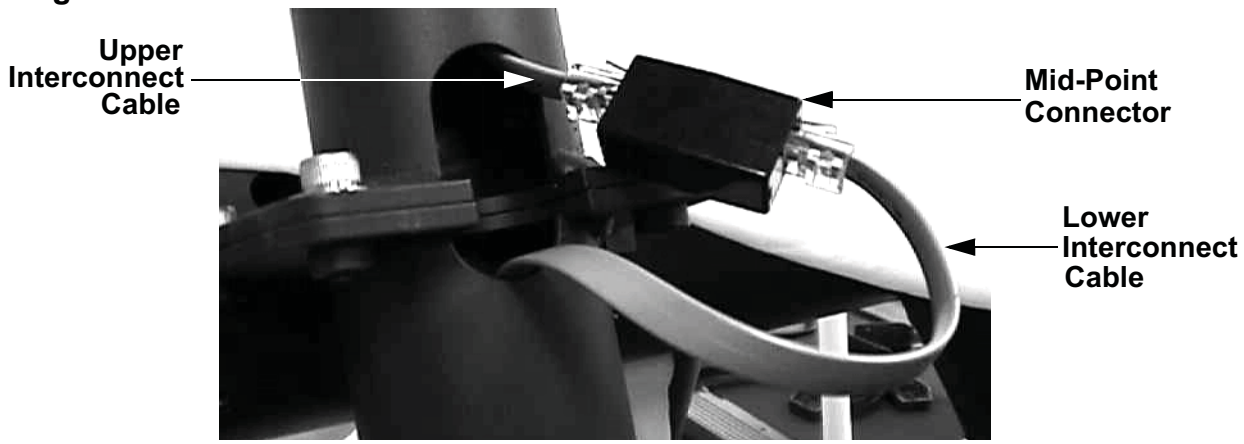
Diagram 6.1 - Mid-Point Cover



11. Remove the four screws from the rear of the upper display housing. Remove the display housing front panel from the display housing. Disconnect the upper interconnect cable from the upper PCA.

12. Disconnect the upper interconnect cable from the mid-point connector. See Diagram 6.2

Diagram 6.2 - Mid-Point Connector



13. External of the upper column, connect a replacement upper interconnect cable to the mid-point connector and the upper PCA.

14. Check operation as described in Section 4. If the unit works properly, replace the upper interconnect cable as described in Procedure 7.4.

15. If the symptoms are unchanged, remove the external upper interconnect cable. Reconnect the internal upper interconnect cable to the mid-point connector and the upper PCA. Set the display housing front panel in it's mounting position and fasten it with the four mounting screws removed in step 4. Trouble shoot the lower interconnect cable starting with step 9.

Troubleshooting the Lower Interconnect Cable

16. Disconnect the lower interconnect cable from the mid-point connector and the lower PCA.

17. External of the frame, connect a replacement lower interconnect cable to the mid-point connector and the lower PCA.

18. Check operation as described in Section 4. If the unit works properly, replace the lower interconnect cable as described in Procedure 7.4.

19. If the symptoms are unchanged, remove the external lower interconnect cable. Reconnect the internal lower interconnect cable to the mid-point connector and the lower PCA. Remove the upper and lower interconnect cables from the mid-point connector. Connect a replacement mid-point connector between the two interconnect cables and retest the unit per Procedure 4.

20. Replace the lower PCA shield, rear cover (Procedure 7.1) and the main column cover. If the unit still does function correctly, contact Precor Technical Support.

Procedure 6.2 - Troubleshooting the Keypad and Upper PCA

If the function keys on the electronic console are unresponsive, the problem may be either the upper PCA or keypad. The keys on this unit are touch sensitive keys. It is necessary to use the keypad diagnostics to troubleshoot the key functions.

WARNING
Before continuing with this procedure, review the Warning and Caution statements listed in Section One.

1. Attach the anti-static wrist strap to your arm, then connect the ground lead of the wrist strap to the units frame.

2. If the EFX powers up and functions normally until a particular key(s) is pressed, skip to step 12.

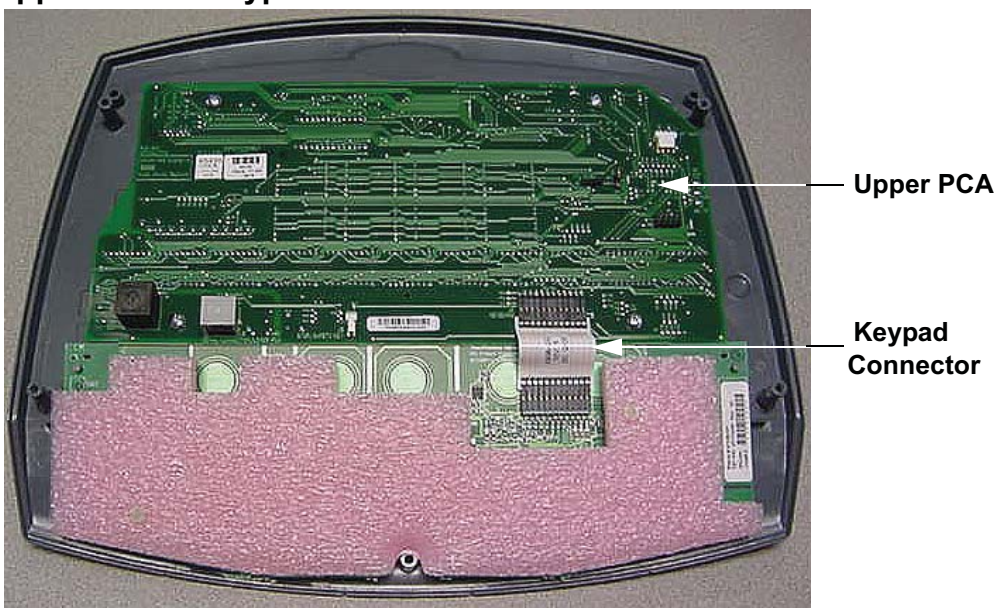
3. If a “key depressed” message is immediately displayed when the EFX is powered up, continue with the next step.

4. This condition may be caused by either the keypad or upper PCA.

5. Remove the four screws that fastens the display housing front panel to the display housing backing plate. These screws are located on the rear of the display housing backing plate.

6. Lift the display housing front panel off of the display housing backing plate. Remove the keypad connector from the upper PCA. See Diagram 6.3.

Diagram 6.3 - Upper PCA & Keypad



7. If a “key depressed” message is immediately displayed when the EFX is powered up, replace the upper PCA.

8. If a “key depressed” message is not displayed when the EFX is powered up, replace the display housing front panel. The display housing front panel is equipped with the keypad.

9. If you have performed all of the procedures above and have been unable to correct the problem, call Precor customer service.

10. Access the diagnostics program per procedure 3.2. If the key(s) necessary to access the diagnostic program is not functioning, skip to step 14.

11. Test the keypad per Procedure 3.2, step 4.

12. If all of the keys test good, the problem may be user error or a key function that is normally disabled during a particular user program.

13. If one or more keys do not function correctly, either the keypad (display housing) or upper PCA could be defective. Replace the display and repeat step 12. If the display housing did not correct the problem, re-install the original display housing and replace the upper PCA.

14. If you have performed all of the procedures above and have been unable to correct the problem, call Precor customer service.

Procedure 6.3 - Upper Display does not Illuminate

1. Because this is self powered unit, the display will not illuminate until it is used or the optional external power supply is equipped. If the optional external power supply is equipped, the display should be constantly illuminated. If the optional external power supply is not equipped, the unit must be used at a stride rate of 20 strides per minute or higher for the display to illuminate.

2. If the optional external power supply is not equipped, skip to step 5.

3. Disconnect the optional external power supply from the EFX and measure between the inner and outer sleeves of the power supply's output jack with a DC voltmeter. You should measure approximately 18 VDC.

4. If the voltage measured in step 3 was significantly low, replace the optional external power supply. If the voltage measured in step 3 was 0 Vdc, disconnect external power supply from its AC outlet and measure the voltage at the AC outlet. If the AC outlet voltage is normal replace the optional external power supply. If the AC outlet voltage is significantly low or 0 Vdc, the AC system must be inspected by an electrician.

5. Troubleshoot the generator per Procedure 6.4.

6. If the generator was found to be good, the problem will be in either the lower PCA, upper PCA or the upper to lower PCA interconnect cables.

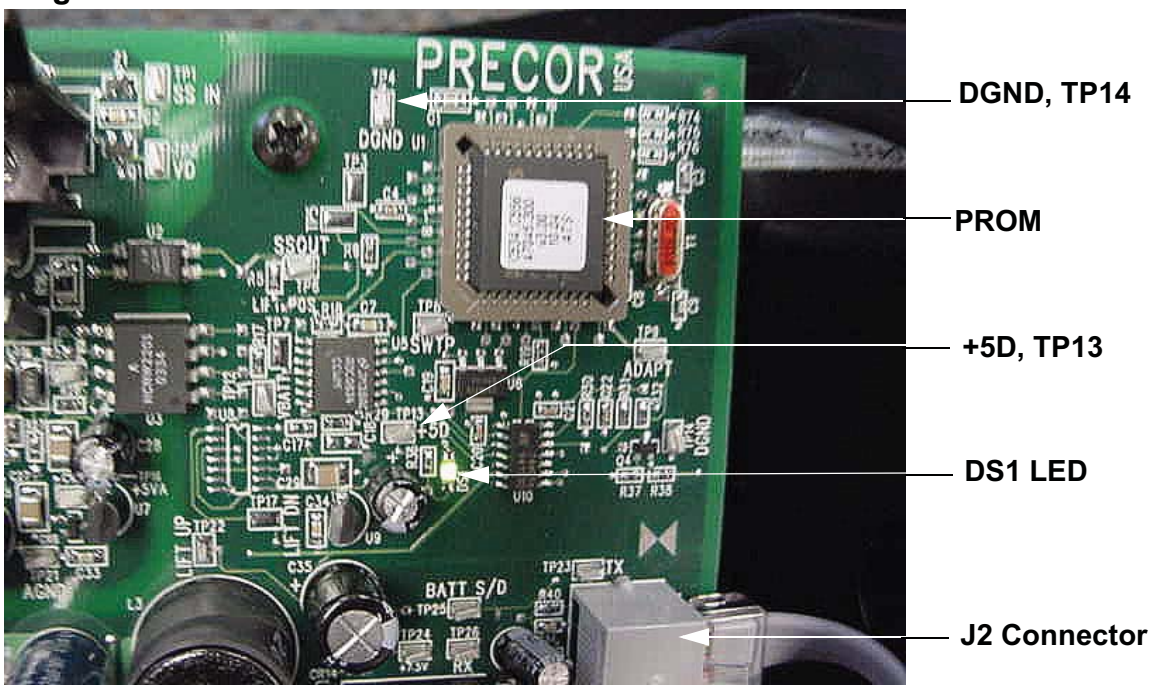
Warning
Because this is a self powered unit, it will either be necessary to either equip the unit with the optional external power supply or have an assistant pedal on the unit while voltage measurements are being taken. Because of the danger of working on the unit while it is in motion using the optional external power supply is strongly recommended.

7. Remove the rear cover and disconnect the interconnect cable from the J2 connector of the lower PCA.

8. The following voltage reading must be taken while the unit is in motion. Extreme care must be taken to keep meter leads, hands, etc. clear of all moving parts. Using a DC voltmeter, measure the voltage between TP13 (+5D) and TP4 (DGND). Refer to Diagram 6.4. The voltage measured should be approximately 5 Vdc. If the voltage is significantly low, replace the lower PCA. Additionally, the DS1 LED should illuminate.

9. Reconnect the interconnect cable to the J2 connector of the lower PCA and repeat the voltage measurement in step 8. The voltage measured should be approximately 5 Vdc. If the voltage is significantly low, the problem is in the upper PCA or the upper to lower PCA interconnect cables.

Diagram 6.4 - Partial View of Lower PCA



10. Troubleshoot the upper to lower PCA interconnect cables per Procedure 6.1.

11. If the upper to lower interconnect cables are found to be good, replace the upper PCA.

12. If you have performed all of the above tests and are unable to resolve the problem, contact Precor customer support.

Procedure 6.4 - Troubleshooting the Generator

The generator performs three functions in the EFX. First, by controlling the amount of electrical load applied to the generator, the user's pedalling resistance is controlled. Second, the generator is used to charge the EFX's internal battery. Lastly, one of the generators six phase output windings is monitored to determine when the unit is in use and when it is idle. This system also determines the stride rate by determining the operating speed (output frequency) of the monitored generator winding.

Warning
Because this is a self powered unit, it will either be necessary to either equip the unit with the optional external power supply or have an assistant pedal on the unit while voltage measurements are being taken. Because of the danger of working on the unit while it is in motion using the optional external power supply is strongly recommended.

1. Perform the generator resistance test per Procedure 5.1. If any of the resistance measurements are significantly high or significantly low, replace the generator.

2. The following voltage reading must be taken while the unit is in motion. Extreme care must be taken to keep meter leads, hands, etc. clear of all moving parts. Using an AC voltmeter, measure the voltage between 1 & 3, 2 & 3, 5 & 7 and 6 & 7 on J1 of the lower PCA. All AC voltage readings will vary depending on the unit's stride rate at the time the measurement is taken. At a stride rate of 100 strides per minute, all three voltage readings will be approximately 100 VAC -110 VAC.

3. If any of the six readings in step 2 are significantly low, replace the generator.

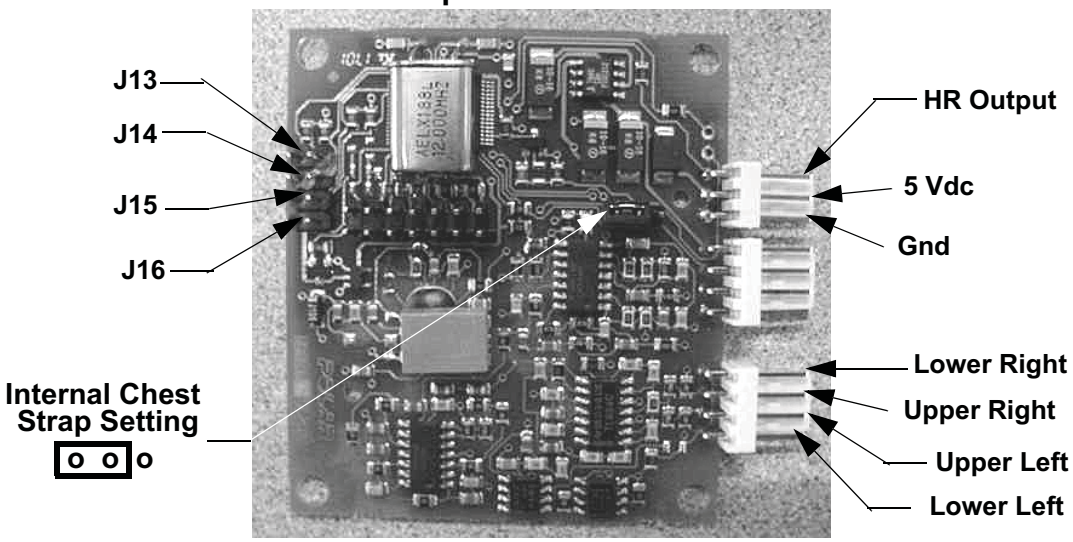
4. If you have performed all of the above tests and are unable to resolve the problem, contact Precor customer support.

Procedure 6.5 - Troubleshooting Hand Held Heart Rate

Circuit Description
The hand held heart rate system is actually a dual system, that is, it can accept a heart rate signal from either the hand held heart rate contacts on the unit's handlebar or from a Polar heart rate chest strap transmitter. Refer to Diagram 6.5 and verify that no jumpers are equipped on J13, J14, J15 or J16. Also, verify that there is a jumper equipped on the internal chest strap setting. The internal chest strap setting is the two left hand pins on the three pin connector as shown below in Diagram 6.5. These settings allow the heart rate system to operate on the internal chest strap receiver with the chest strap heart rate priority. That is, if both a chest strap and hand heart rate signal is being received, the system will accept the chest strap signal and ignore the hand held signal. If a chest strap signal is not being received, the system will accept the hand held signal.

Note:
There are four typical failure modes for the hand held/chest strap heart rate system. They are: 1 - hand held is normal - no chest strap reading; 2 - no hand held reading - chest strap normal; 3 - no hand held or chest strap reading; 4 - constant or intermittent readings when neither hand held or chest strap are in use.

Diagram 6.5 - Hand held/chest strap heart rate PCA



Normal hand held reading - No chest strap reading

1. Access the diagnostic program (Procedure 3.2). Advance to the heart rate display portion of the diagnostic program. Verify that a chest strap signal is not being accepted with either a Polar heart rate test transmitter or a known good chest strap transmitter. If this reading is good, skip to step 3.

2. Using a Polar heart rate test receiver, verify the operation of the chest strap transmitter furnished with the unit. If the Polar heart rate test receiver does not receive a signal, replace the chest strap transmitter.

3. Remove the display housing.

4. Verify the internal chest strap setting is set as shown in Diagram 6.5. Verify that a ferrite bead is installed on the heart rate PCA to upper PCA cable.

5. If the above procedures did not correct the problem, replace the heart rate PCA.

No hand held reading - Normal chest strap reading

6. Access the diagnostic program (Procedure 3.2). Advance to the heart rate display portion of the diagnostic program. Verify that a hand held signal is not being accepted by firmly grasping both the right and left hand held contacts on the handlebars. Cover as much of the contact surface area with your hands as possible (without moving your hands), you should receive a heart rate reading within ten seconds.

7. Temporarily, install a spare jumper on J14 of the heart rate PCA (hand held priority).

8. Repeat the procedure in step 6.

9. If the hand held signal is now being accept, something in the near vicinity is radiating RF (radio frequency) energy that is being received by the chest strap portion of the heart rate PCA. Disabling the chest strap signal proves that it is radiated energy that is causing the problem.

10. If a hand held signal still not being accepted, skip to step 13.

11. The source of the radiated energy must be determined and relocated so that it no longer affects the heart rate PCA. Televisions, cell phones, Cardio-theatre receivers, etc. are possible sources of radiated energy.

12. Remove the temporary jumper from J14 of the heart rate PCA. Re-locate all potential sources of radiation. Pedal the C546i to power it on and repeat the procedure in step 6.

13. Access the diagnostic program (Procedure 3.2). Advance to the heart rate display portion of the diagnostic program. Verify that a hand held signal is not being accepted by firmly grasping both the right and left hand held contacts with the opposite hands, right hand on the left handlebar contacts and left hand on the right handlebar contacts. Cover as much of the contact surface area with your hands as possible, you should receive a heart rate reading within ten seconds. If a hand held signal is still not being accepted, skip to step 15.

14. If a hand held signal was accepted in step 13, the hand held contact wiring is reversed. The end of the wire harness that connects to the hand held contacts in the handlebar is segregated into two groups. One group has blue shrink wrap around it and the other group has black shrink wrap around it. The “blue” group must go to the right hand contacts and the “black” group must go to the left hand contacts. In both groups the black wire must go to the lower contact and the red wire must go to the upper contact. If necessary, rewire the hand held contacts as described above and test as described in step 6.

15. Refer to Diagram 6.5 for the following measurements. With an ohmmeter measure between the “lower right contact” pin on the J1 connector and the lower right hand held heart rate contact on the handlebar. The reading should be 1 Ω or less. Measure between the “upper right contact” pin on the J1 connector and the upper right hand held heart rate contact on the handlebar. The reading should be 1 Ω or less. Measure between the “upper left contact” pin on the J1 connector and the upper left hand held heart rate contact on the handlebar. The reading should be 1 Ω or less. Measure between the “lower left contact” pin on the J1 connector and the lower left hand held heart rate contact on the handlebar. The reading should be 1 Ω or less. If any of the above readings are greater than 1 Ω, replace the heart rate PCA to handlebar wire harness.

No hand held reading - No chest strap reading

16. Access the diagnostic program (Procedure 3.2). Advance to the heart rate display portion of the diagnostic program. Verify that neither a chest strap signal or a hand held signal is being accepted with either a heart rate test transmitter or a chest strap transmitter.

17. Check the plug/connector connections on both the heart rate PCA (J4), and upper PCA (J1).

18. If neither a chest strap signal or a hand held signal is being accepted, measure between the “ground” and “5 Vdc” pins on J4 for 5 Vdc. If 5 Vdc is present, replace the heart rate PCA.

19. If 5 Vdc is not present, remove the connector from J4 of the heart rate PCA. Measure between the “ground” and “5 Vdc” pins of the connector (just removed from the heart rate PCA) for 5 Vdc. If 5 Vdc is present, replace the heart rate PCA. If the 5 Vdc is not present, measure between the corresponding pins of J1 on the upper PCA (red and black wires). If 5 Vdc is not present replace the upper PCA. If 5 Vdc is present, replace the upper PCA to heart rate PCA cable.

Constant or intermittent readings when neither the hand held or chest strap is in use

20. Verify that a ferrite core is clamped around the heart rate PCA to upper PCA cable.

21. Constant or intermittent heart rate readings when neither heart rate system is in use is caused by something in the near vicinity radiating RF energy that is being received by the chest strap portion of the heart rate PCA.

22. Temporarily, install a spare jumper on J14 of the heart rate PCA (hand held priority). Pedal the C546i to power it on and repeat the procedure in step 6.

23. If the hand held signal is now being accept, something in the near vicinity is radiating RF energy that is being received by the chest strap portion of the heart rate PCA. Disabling the chest strap signal proves that it is radiated energy that is causing the problem.

24. The source of the radiated energy must be determined and relocated so that it no longer affects the heart rate PCA. Televisions, cell phones, Cardio-theatre receivers, etc. are possible sources of radiated energy.

25. Remove the spare jumper from J14 of the heart rate PCA. Re-locate all potential sources of radiation. Repeat the procedure in step 6.

Procedure 6.6 - Troubleshooting the Llft Motor

The lift motor is a 12 Vdc motor with an internally driven 1 KΩ potentiometer used to track ramp position. Because the lift motor is a DC motor, lift motor direction is controlled by the polarity of the DC voltage applied to the lift motor. When a positive voltage is applied to the lift motor, the lift motor will move upward. When a negative voltage is applied to the lift motor, the lift motor will move downward. As the lift motor moves the 1 KΩ potentiometer is rotated via an internal gear drive system. The potentiometer's changing resistance is fed to the lift control system and converted to and A/D (analog to digital) reading that is used in the diagnostics system to indicate ramp position.
The ramp operating system has a battery monitoring system. If the battery voltage falls below 11 Vdc when ramp movement is initiated or the battery voltage falls below 10 Vdc after ramp movement has been initiated, ramp movement will be stopped and the message "**NO RAMP LOW VOLTAGE"** will be displayed. Ramp motion will not be enabled until such time as the battery voltage exceeds the above limits. The battery voltage must be raised to correct this condition either by battery charging or battery replacement. This is strictly a battery problem and not a lift system or lift motor problem.

1. If an Error 40 (no lift movement) is being displayed continue with step 2. If an Error 42 is being displayed (lift out of range) skip to step 12.

2. If the lift moves briefly and then displays an Error 40, skip to step 12. If the lift does not move prior to displaying the Error 40 continue with step 3.

3. Remove the rear cover. Remove the F1 fuse (6.3 amps) from the lower PCA. See Diagram 6.4. Check the fuses resistance using an ohmmeter. The fuse should read 1 Ω or less. If the reading is significantly high, replace the fuse. If the fuse is good or replacing the fuse does not correct the problem, continue with step 4.

4. Enter the diagnostic program per Procedure 3.2. Using the diagnostic program allows you to test the lift system without continuously pedalling the unit. Connect a DC volt meter to the J3 connector on the lower PCA as follows: voltmeter common lead to terminal 3 (black wire) and voltmeter "hot" lead to terminal 2 (red wire). Using the **CROSSRAMP** ▼,▲ keys operate the lift. The voltmeter should read +12 Vdc when the lift is instructed to move upward and -12 Vdc when the lift is instructed to move downward.

5. If when the **CROSSRAMP** keys are pressed, the display does not indicate that the lift should be moving, troubleshoot the upper PCA and keypad per Procedure 6.2.

6. If the voltage measurements in step 4 are correct continue with step 7. If the either voltage measurement in step 4 is significantly low, replace the lower PCA.

7. Verify that all of the wires in the intermediate lift cable (the cable inserted in to J3 of the lower PCA) are securely inserted into the connector housing and providing a good electrical connection.

8. Remove both front covers. Enter the diagnostic program, if necessary, per Procedure 3.2. Using the diagnostic program allows to test the lift system without continuously pedalling the unit. Connect a DC volt meter to the lift motor cable as follows: voltmeter common lead to terminal 2 (brown wire) and voltmeter “hot” lead to terminal 3 (red wire). Using the **CROSSRAMP ▼,▲** keys operate the lift. The voltmeter should read +12 Vdc when the lift is instructed to move upward and -12 Vdc when the lift is instructed to move downward.

9. If the voltage measurements in step 8 are correct replace the lift motor. If the either voltage measurement in step 4 is significantly low, continue with step 10.

10. Verify that all of the wires in the intermediate lift cable (the cable inserted in to J3 of the lower PCA) are securely inserted into the connector housing and providing a good electrical connection.

11. If you have performed all of the above tests and are unable to resolve the problem, contact Precor customer support

12. Enter the diagnostic program per Procedure 3.2 and advance to the **Lift Test**. If the A/D reading is either 0 or 255, skip to step 15.

13. Using the **CROSSRAMP ▼,▲** keys operate the lift. If the A/D reading tracks the lift movement smoothly without skips, calibrate the lift motor per Procedure 5.3 and re-test lift functions in a normal operating mode.

14. If the A/D reading was erratic and did not smoothly follow lift motion, visually check the connections between the lift intermediate cable and the J3 connector on the lower PCA and between the lift intermediate cable lift motor cable.

15. Exit the diagnostics program, and leave the unit idle long enough for it to “shut off”. Disconnect the red battery lead from terminal M6 of the lower PCA. Remove the lift intermediate cable from the J3 connector of the lower PCA. Using an ohmmeter, test between terminal 4 (green wire) and terminal 6 (brown wire) of the lift intermediate cable. The ohmmeter should read approximately 1000Ω.

16. Test between terminal 4 (green wire) and terminal 5 (black wire) of the lift intermediate cable and between terminal 5 (black wire) and terminal 6 (brown wire) of the lift intermediate cable. These two readings should total approximately 1000Ω.

17. If the readings in steps 15 and 16 are correct, skip to step 19. If either reading is significantly high or low, continue with step 18.

18. Disconnect the lift intermediate cable from the lift motor cable. Using an ohmmeter read each of the six wires in the lift intermediate cable from end to end. Each of the wires in the lift intermediate cable should read less than 1Ω. If any of the readings are significantly high, replace the lift intermediate cable. If all of the readings are correct, continue with step 19.

19. Replace the lift motor. Calibrate the lift motor per Procedure 5.3.