Procedure 5.2 - Troubleshooting the Lift System (SCR & PWM Units)

Lift System Description:
The lift system on these units consists of an AC line voltage driven lift motor (120 Vac or 240 Vac), a hall effect rotation sensor and three position location switches. The lift system orients itself by locating the zero sense switch when the treadmill is powered up. When the zero sense switch is activated the system recognizes that physical position as 0% incline. If the zero sense switch is activated when the treadmill is powered up, the system proceeds directly into the normal program mode. If the zero sense switch is not activated when the treadmill is powered up, the system performs a self calibration procedure. The purpose of the self calibration procedure is to locate the zero sense switch (0% incline). The user will be prompted to press any key to commence the lift calibration. The treadmill will go up 4%, because the lowest the treadmill could have been at power up is -3%. If the treadmill does not locate the zero sense switch by going up 4%, it will stop and then go down until it activates the zero sense switch. The system will then proceed to the normal program mode. Once the 0% lift position has been located, the system tracks any subsequent lift operations by counting motor revolutions. A hall effect sensor is mounted on a bracket that is next to a hub that is attached to the lift motor shaft. As the lift motors operates, a magnet mounted in the hub, passes the hall effect sensor once per motor revolution. The hall effect sensor send one pulse to the lift control system per revolution. The system knows how far the lift travels per revolution and by counting revolutions (hall effect sensor pulses), knows the current lift position. The other two position switches (upper and lower limit) do not come into play during normal operation. If either switch is activated it means that the lift has moved beyond itís normal range of motion. When either limit switch is activated, power is removed from the lift motor. Removing power from the lift motor, protects the lift system from physical damage.

Note:
All resistance measurements must be performed with power removed from the treadmill. Performing resistance measurements with voltage applied may damage your ohmmeter.

Procedure

1. If the lift motor operates but creates a lift error (error 40, 41 or 43) go to step 8. If the lift motor will not move continue with step 2.

2. Put the treadmill in a condition in which the lift motor is ready to be operated (for example, quick start into the manual program). Using an AC voltmeter, monitor the voltage across the lift capacitor and press one of the incline keys. Approximately 1.4 times the AC input voltage should appear on the lift capacitor when an incline key is pressed. Approximately 170 Vac on a 120 Vac unit or approximately 340 Vac on a 240 Vac unit. The actual lift capacitor voltage will vary with the AC input voltage. If AC line voltage or 1.4 times line voltage is on the lift capacitor go to step 6. If no AC voltage is on the lift capacitor, continue with step 3.

3. Set the treadmill circuit breaker in the ìoffî position. Remove the 2 amp lift fuse (F2) from the lower PCA. Using an ohmmeter, measure the fuse resistance. The fuse should measure approximately 1W or less. If the fuse is open (ï) or significantly higher than 1W, replace the fuse. If the fuse was bad, perform the test in step 4 before applying power to the lift. If the fuse was good continue with step 5.

4. Using an ohmmeter, measure the resistance across the lift capacitor terminals. The Lower PCA resistance should be extremely high (megohms), the capacitor resistance should be extremely high (megohms) and the lift motor winding should read approximately 34W (120 Vac units) or 122W (240 Vac units). Therefore, if the measurement is significantly lower than 34W or 122W, disconnect both red leads from the lift capacitor. Measure the resistance between the black leads on the lift capacitor and red lead to the lower PCA. If it measures significantly low, replace the lower PCA. Measure the resistance between the black leads on the lift capacitor and red lead to the lift motor. If it measures significantly low, replace the lift motor. Measure the resistance between the black leads on the lift capacitor and other terminal of the lift capacitor. If it measures significantly low, replace the lift capacitor.

5. At this point the lift fuse is good, but there is no AC voltage on the lift capacitor when the lift is actuated. There are three potential causes for this condition. They are lower PCA, ribbon cable or upper PCA. There are no good means of troubleshooting these components other than substituting known good components. Replace only one component at a time. If the component that you replaced does not correct the problem, replace the original component. Try substituting the lower PCA first, the ribbon cable second and the upper PCA third. If you have performed all of the above procedures and have been unable to correct the problem, call Precor Customer Support.

6. Using an ohmmeter, measure the resistance across the lift capacitor terminals. The lower PCA resistance should be extremely high (megohms), the capacitor resistance should be extremely high (megohms) and the lift motor winding should read approximately 34W or 122W. If it measures significantly high or open (ï), replace the lift motor.

7. If the resistance measurement in step 6 was approximately 34W (120 VAC units) or 122W (240 VAC units), replace the lift capacitor. If you have performed all of the above procedures and have been unable to correct the problem, call Precor Customer Support.

8. Typically, when the lift is able to physically move but causes a lift error, the problem is in the lift position identification system (rotation sensor and zero sense switch).

9. Connect a DC voltmeter between the white wire (term. 2 of J3) and the red wire (term. 4 of J3) on the lower PCA. Set the treadmill circuit breaker in the ìonî position and slowly rotate the hub at the bottom of the lift motor by hand. The DC voltmeter should read approximately 0 Vdc when the magnet in the hub is not near the hall effect sensor and approximately 5 VDC when the magnet is near the hall effect sensor. If the voltage switches between 0 and 5 Vdc as the magnet passes the hall effect sensor continue with step 11.

10. Measure the voltage between the red wire (term. 4 of J3) and the black wire (term 1 of J3). The voltage should read a constant 5 Vdc. If the voltage is 0 or significantly lower than 5 Vdc, disconnect the rotation sensor connector from the lower PCA. Measure the voltage between the red wire (term. 4 of J3) and the black wire (term 1 of J3) on the lower PCA. If the voltage is still 0 Vdc or significantly low, replace the lower PCA. If the voltage is now correct, replace the hall effect sensor.

Note:
If possible set the lift in a position that does not operate the zero sense switch. The zero sense switch may be operated by hand to perform the tests in step 11.

11. At this point the hall effect sensor is functioning normally, but lift errors occur. With a DC voltmeter measure the voltage across the zero sense (center) switch. It should measure approximately 0 Vdc when the switch is not operated and approximately 5 Vdc when the switch is operated. If the operated voltage is 0 Vdc or significantly low, remove both blue wires from the zero sense switch. Measure the voltage between the two blue wires. If the voltage is now correct replace the zero sense switch. If the voltage is still O Vdc or significantly low, replace the lower PCA.

12. At this point the hall effect sensor and the zero sense switch are functioning normally, but lift errors occur. There are three potential causes for this condition. They are lower PCA, ribbon cable or upper PCA. There are no good means of troubleshooting these components other than substituting known good components. Replace only one component at a time. If the component that you replaced does not correct the problem, replace the original component. Try substituting the lower PCA first, the ribbon cable second and the upper PCA third. If you have performed all of the above procedures and have been unable to correct the problem, call Precor Customer Support.