

## 9.23 Treadmill

**Warning:** This service manual is for use by Precor trained service providers only. If you are not a Precor Trained Servicer, you must not attempt to service any Precor Product; Call your dealer for service.

This document contains information required to perform the majority of troubleshooting, and replacement procedures required to repair and maintain this product.

This document contains general product information, software diagnostic procedures (when available), preventative maintenance procedures, inspection and adjustment procedures, troubleshooting procedures, replacement procedures and electrical block and wiring diagrams.

To move directly to a procedure, click the appropriate procedure in the bookmark section to the left of this page. You may “drag” the separator bar between this page and the bookmark section to change the size of the page being viewed.

# Section One - Things you Should Know

## About This Appendix

**Section One, Things You Should Know.** This section includes technical specifications and a procedure matrix. Read this section, as well as the 9.23 Treadmill Owner's Manual, before you perform the maintenance procedures in this manual.

**Section Two, Software Features.** Precor's 9.23 Treadmill is programmed with several diagnostic and setup features. This section contains the procedures you need to access the diagnostic features on this treadmill.

**Section Three, Checking Treadmill Operation.** This section provides you with a quick way of checking treadmill operation. Check treadmill operation at the end of a maintenance procedure and when it is necessary to ensure that the treadmill is operating properly.

**Section Four, Inspection and Adjustment Procedures.** Perform inspection procedures when a trouble symptom points to a particular problem and after removing and replacing major components. Many maintenance problems can be fixed by adjusting various treadmill components. This section also provides you with the step-by-step procedures required to make these adjustments.

**Section Five, Troubleshooting Procedures.** The diagnostic and troubleshooting procedures contained in this section should be performed when it is necessary to isolate a problem to a particular component.

**Section Six, Replacement Procedures.** When a treadmill component must be replaced, go to this section and follow the step-by-step procedures required to remove and replace the component.

**Section Seven, Wiring and Block Diagrams.** This section includes wiring and block diagrams 9.23 Treadmill.

## General Information

For the latest exploded view, part number and part pricing information, visit the Precor dealer website at "[www.precor.com/Dealer](http://www.precor.com/Dealer)."

## Technical Specifications

### Physical Specifications

Length:	67 inches (170 cm)
Width:	Handrails 28.5 inches (71 cm) Base 25 inches (63.5 cm)
Height:	44 inches (111.6 cm)
Running surface:	51 inches by 17 inches (129.5 cm by 43 cm)
Motor:	1.7 hp continuous duty
Speed:	0.5 to 10 mph (0.8 to 12.5 kph) 10 mph is equivalent to a 6 minute mile
Incline:	0 to 10% grade
Power:	50/60Hz 120v AC
Weight:	193 lbs (87 kg)
Shipping weight:	233 lbs (105 kg)

### Electronic Specifications

4 user memory

### Programs:

Manual  
 2 Interval  
 (1 minute rest: 1 minute work)  
 (1 minute rest: 2 minute work)  
 5 Preprogrammed courses)  
 2 Custom courses  
 Weight Loss  
 Fitness Test  
 Heart Rate

### Display Readouts:

Time  
 Distance (miles or kilometers)  
 Speed (mph or kph)  
 Incline  
 Calories  
 Heart rate  
 Fitness score

## Procedure 2.1 - Accessing the Diagnostic Program

The 9.23 Treadmill's diagnostic program cycles through the following modes:

**Lift Mode.** Allows you to verify that the lift calibration number increments and decrements as the **INCLINE** keys are pressed.

**Power Bits Mode.** Allows you to view the power bits value displayed on the display console.

**Safety Key Mode.** Allows you to verify that the message on the right display window cycles from **SAFE ON** to **SAFE OFF** when the safety key is removed from the upper display module.

**Heart Rate Mode.** Allows you to verify heart rate monitor operation.

**Circuit Breaker Mode.** Allows you to verify that the circuit breaker trips when **STOP** is pressed.

### Procedure

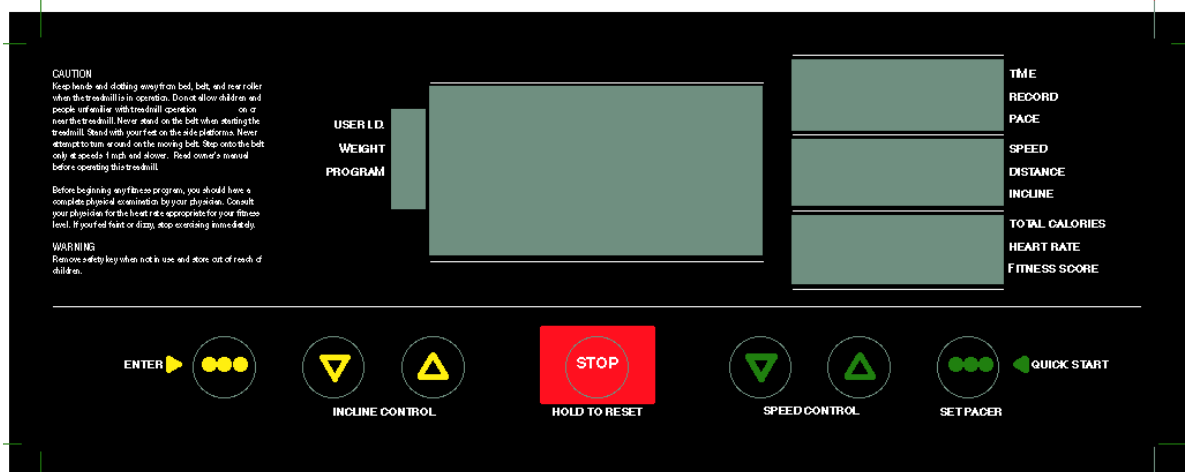
1. Plug the power cord into the wall outlet, then turn on the treadmill with the circuit breaker.
2. With the **PRECOR M9.23** banner scrolling, press and hold **ENTER**. The software version number is displayed in the right display windows. Continue to press **ENTER** until **LIFT** is displayed in the right display window.
3. Press the **INCLINE** keys while you watch the right display window (see Diagram 2.1). The lift calibration number increments as the **INCLINE ▲** key is pressed and decrements as the **INCLINE ▼** key is pressed.
4. Press **ENTER**, then release. The power bits and running belt speed are displayed in the right display window.

### Note:

Ignore the number displayed in the lowest right display window.

5. Press the **SPEED** keys while you watch the right display window. The power bits number increments as the **SPEED ▲** key is pressed and decrements as the **SPEED ▼** key is pressed.
6. Press **ENTER** until **SAFE ON** is displayed in the right display window

Diagram 2.1 - 9.23 Display



- Remove the safety key from the upper display module while you watch the right display window. Return the safety key to the upper display module. If **SAFE OFF** is displayed when the safety key is removed and **SAFE ON** is displayed when the safety key is replaced...

**THEN...**

Diagnostic software Safe On mode checks correctly; continue with the next step.

**OTHERWISE...**

Remove and replace the heart rate receiver assembly as described in Procedure 5.4 of the Residential Treadmill Service Manual.

- Using conductive spray (Pecor part number 37364-101), put on the heart rate chest strap assembly. Press **ENTER** until **HARt** is displayed in the right display window.
- If the **HEART RATE** indicator blinks in time with your heart beat and the heart rate information displayed is correct...

**THEN...**

Skip to Step 11.

**OTHERWISE...**

Continue with the next step.

- Re-adjust the fit of the chest strap. If the **HEART RATE** indicator still does not blink as described in Step 9, replace the battery in the chest strap assembly. If the **HEART RATE** indicator still does not blink as described in Step 9, refer to Procedure 5.2 in this appendix.

**Note:**

**BLO** mode checks the coil across the terminals of pole 2 on the circuit breaker.

- Press **ENTER** until **BLO** is displayed in the right display window and the messages "**PRESS STOP TO TURN BREAKER OFF**" and "**PRESS ENTER TO QUIT**" are displayed on the upper display module. If you need to check the lower PCA's ability to trip the circuit

breaker...

**THEN...**

If you wish to test the circuit breaker trip test, continue with the next step.

**OTHERWISE...**

Press ENTER to return to the User ID.

12. Press and hold the **STOP** key, the circuit breaker will trip.



## Procedure 2.2 - Resetting System Information

This procedure completely resets the all user statistics. All previously-saved user information will be either reset to zero or changed to default values. All odometers will be reset to zero.

### Procedure

1. Plug the power cord into the wall outlet, then turn on the treadmill with the circuit breaker.
2. With the **PRECOR M9.23** banner scrolling, press the **INCLINE ▲**, **INCLINE ▼**, **SPEED ▲**, and **SPEED ▼** keys simultaneously and hold them for approximately five seconds (or until zeros are displayed in the right display windows). Release the keys.
3. Watch the electronic display. The right middle display window:
  - a. Resets to all zeros, then increments to 119
  - b. Jumps to 1000, then increments to 1119
  - c. Jumps to 2000, then increments to 2119
  - d. Jumps to 3000, then increments to 3119
4. When the procedure is complete the **User ID** prompt will be displayed.



## Procedure 2.3 - Resetting User Information

This procedure resets accumulated user information and odometer readings for an individual User ID. All previously-saved user information for a selected User ID will be either reset to zero or changed to default values. The odometer reading for the selected User ID will be reset to zero.

### Procedure

1. Plug the power cord into the wall outlet, then turn on the treadmill with the circuit breaker
2. With the **PRECOR M9.23** banner scrolling, press any key.
3. At the **User ID** prompt, select one of four User IDs using the **SPEED ▲** (or **INCLINE ▲**) and **SPEED ▼** (or **INCLINE ▼**) keys.
4. Press the **ENTER** and **RESET** keys simultaneously and hold them for approximately two seconds (or until the right middle display window displays one of the numbers displayed in the second column of Table 2.1).
5. Watch the right middle display window. This software feature is programmed to display the information provided in Table 2.1

### Note:

The number displayed in the right middle display window is determined by the User ID you selected in Step 3 (see Table 2.1).

**Table 2.1. Individual User Reset Values in the Right Display Window**

If you select User ID...	The value shown is...	The value shown increments to...	The value then clears to...
1	0000	119	0.000
2	1000	1119	0.000
3	2000	2119	0.000
4	3000	3119	0.000

6. If you do not observe the values listed in Table 2.1...

#### THEN...

Replace the upper PCA as described in Procedure 5.2 of the Residential Treadmill Service Manual.

#### OTHERWISE...

This procedure is complete.

## Procedure 2.4 - Performing Keypad and LED Diagnostics

### Procedure

1. Plug the power cord into the wall outlet, then turn on the treadmill with the circuit breaker.
2. With the **PRECOR M9.23** banner scrolling, press **ENTER**, **RESET**, and **SPEED ▲** simultaneously until seven dots illuminate in the left display window.
3. Press each key listed below. Verify that each single dot expands to four dots as the appropriate key is pressed.

<b>ENTER</b>	Expands the far left dot.
<b>INCLINE ▼</b>	Expands the second dot from the left.
<b>INCLINE ▲</b>	Expands the third dot from the left.
<b>STOP</b>	Expands the center dot.
<b>SPEED ▼</b>	Expands the third dot from the right.
<b>SPEED ▲</b>	Expands the second dot from the right.
<b>QUICK START/SET PACER</b>	Expands the far right dot.

4. If the left display window column illuminates appropriately as each key is pressed...

<b>THEN...</b>	<b>OTHERWISE...</b>
The keypad test passed successfully; continue with the next step.	Troubleshoot the keypad and upper PCA per Procedure 5.1

5. End the keypad test by pressing the **INCLINE ▼** and **SPEED ▲** keys simultaneously.

### Note:

Pressing the **INCLINE ▼** and **SPEED ▲** keys simultaneously initiates the following LED test.

6. Watch the electronic display as the LED test progresses. This test is programmed to display the following LED illumination sequence.
  - a. Every LED on the left display window illuminates simultaneously. The lower row of the display window cycles from red to yellow to green.
  - b. Diagonal lines of illuminated LEDs sweep across the left display window.
  - c. The right display windows illuminate, then decrement from 8.8.8.8 to 0.0.0.0.
  - d. The function LEDs illuminate simultaneously and then extinguish.
  - e. Each function LED illuminates separately and then extinguishes.

**Note:**

The message **DIAGNOSTICS COMPLETE—PRESS ANY KEY TO CONTINUE** displays when the LED test is complete.

7. If you do not observe the LED illumination sequences described in Step 6...

**THEN...**

Replace the upper PCA as described in Procedure 5.2 of the Residential Treadmill Service Manual.

**OTHERWISE...**

The LED passed successfully; continue with the next step.

## Procedure 2.5 - Displaying the Treadmill Odometer

This procedure displays total distance (in miles or kilometers).

### Procedure

1. Plug the power cord into the wall outlet, then turn on the treadmill with the circuit breaker.
2. With the **PRECOR M9.23** banner scrolling, press the **ENTER**, **SPEED ▼** and **SPEED ▲** keys simultaneously and hold them until the message **TREADMILL ODOMETER** scrolls across the left display window.

### Note:

The right display window displays total miles or kilometers on the treadmill (see Diagram 2.2). The top display window shows the most significant bits of the number; the lower display window shows the least significant bits of the number. The number displayed is 102,187,23 (in miles or kilometers).

**Diagram 2.2. Odometer Reading**

0	0	0	1
0	2	1	8
7	7	2	3

## Procedure 2.6 - Selecting U.S. Standard or Metric Units

Selecting United States standard units causes information to be displayed in miles and pounds. Information is displayed in kilometers and kilograms if metric units are selected.

### Procedure

1. Plug the power cord into the wall outlet, then turn on the treadmill with the circuit breaker.
2. Choose one:

#### IF...

You wish to verify the measurement standard the treadmill is currently using before you change the standard

You wish to change the measurement standard the treadmill is using

#### THEN...

Continue with the next step

Skip to Step 5

### Checking the Measurement Standard

3. Press **ENTER** until the **WEIGHT** indicator light appears.
4. Watch the number displayed in the left display window while you press the **SPEED ▲** key five or six times.

#### Note:

If the treadmill is using United States standard units, the numbers in the left display window are repeatable multiples of 5 (such as 160, 165, 170, 175, etc.). Otherwise, the treadmill is using metric units.

### Changing the Measurement Standard

5. Press and hold **STOP** to get back to the **PRECOR M9.23** banner.

#### Note:

Releasing the **ENTER** key before the **SPEED ▲** key when you perform the next step may cause the selected measurement standard to change to the alternate measurement standard.

6. Press the **ENTER** and **SPEED ▲** keys simultaneously and hold them for three seconds.

**Note:**

The left display window displays either U. S. Standard Units or Metric Units.

7. Use the **SPEED** keys to select the alternate measurement standard.
8. Press **ENTER** to return to the **User ID** prompt.

## Procedure 2.7 - Accessing and Clearing the Error Buffer

### Procedure

1. Check the treadmill operation as described in Section Three of this appendix.
2. With the **PRECOR M9.23** banner scrolling, press the **ENTER**, **SPEED ▼** and **SPEED ▲** keys simultaneously and hold them for five seconds or until the message **TTL TIME** (Total Time) is displayed in the left display window.
3. Press **ENTER**. The error buffer is displayed and scrolls across the left display window (see Diagram 2.3). Choose one:

#### IF...

**ERR Buff 1** is displayed in the right display window

The message **NO ERROR** is displayed in the right display window

#### THEN...

The latest error message scrolls across the left display window; continue with the next step.

There are no error messages in the error buffer.

4. Use the **SPEED ▼** (or **INCLINE ▼**) and **SPEED ▲** (or **INCLINE ▲**) keys to cycle to the next position in the error buffer.

Press the **QUICK START/SET PACER** and **STOP** keys simultaneously to clear the error buffer.

Err:	No
22	Err
1	2

## Procedure 2.8 - Determining Software Version Numbers

Software version numbers are invaluable for tracking and identifying problems and staying aware of changes to the operation and features of the product.

### Procedure

1. Plug the power cord into the wall outlet, then turn on the treadmill with the circuit breaker.
2. With the **PRECOR M9.23** banner scrolling, press the **ENTER** key.
3. Note the version number displayed in the right middle display window.

### Note:

If you cannot determine the software version number in this manner, look at the PROM (U3) mounted on the upper PCA. A label on U3 indicates the software version number. The part number of the PROM indicates the version number.



## Procedure 2.9 - Documenting Software Problems

When a problem is found with either the software or upper or lower PCA's, record the information listed below. If you isolated the problem to either the PROM, upper PCA, or lower PCA, include the information you recorded with the malfunctioning PROM or PCA when you ship it to Precor.

### When a problem occurs, record the following information:

- Model and serial number
- Software version number

#### **Note:**

Determine the version number of the PROM mounted on the upper PCA by pressing the **ENTER** key when the **PRECOR M9.23** banner is scrolling (or by looking at the label on the PROM).

- User and program number running when the problem occurred
- A description of:
  - a. What happened or failed to happen.
  - b. The action taken by the user just before the problem occurred.
  - c. Problem-related information (such as how far into the program the problem occurred, the work level being used when the problem occurred, etc.).
- The frequency of occurrence.

## Section Three - Checking Treadmill Operation

This procedure provides you with a quick method of checking treadmill operation. Check treadmill operation at the end of a maintenance procedure and when it is necessary to ensure that the treadmill is operating properly.

### Procedure

1. Plug the power cord into the wall outlet, then turn on the treadmill with the circuit breaker.
2. Place the treadmill in Manual Mode. Adjust the speed of the running belt to 2–3 mph. Operate the treadmill for at least 5 minutes.
  - a. Concentrate on the feel of the running belt and the sound of the drive motor and rollers. Be on the alert for unusual noises, smells, or vibrations.
  - b. Measure and log the AC input current under loaded and unloaded conditions.
  - c. Observing the LEDs on the electronic console. Make sure that each LED lights as the information corresponding to that LED is displayed on the electronic console.
3. Press the **STOP** key. When the treadmill comes to a stop, view the electronic console as the treadmill scans time, speed, distance and percent.
4. Press the **INCLINE ▲** key while viewing the electronic console. Confirm that the running bed inclines and the incline display increments to ten percent as the **INCLINE ▲** key is pressed.
5. Press the **INCLINE ▼** key while viewing the electronic console. Confirm that the running bed returns to a level position and the incline display decrements to zero percent as the **INCLINE ▼** key is pressed.
6. Press **ENTER** to return to the User ID.
7. Turn off the treadmill with the circuit breaker, then unplug the treadmill from the wall outlet.

## Procedure 4.1 - Calibrating the Lift

1. Turn off the treadmill with the circuit breaker, then unplug the treadmill from the wall outlet.
2. Remove the hood.
3. Place the treadmill on its right side. Remove the hitch pin from the clevis pin that holds the base of the lift jack to the lift tube. Remove the clevis pin.
4. Pull the lift jack 2–3 inches out of the column. Rotate the lift jack about 90 degrees.
5. Plug the power cord into the wall outlet, then turn on the treadmill with the circuit breaker.
6. Press and hold the **ENTER** key until the software version number is displayed. Continue to hold **ENTER** until **LIFT** is displayed.
7. Press the **INCLINE ▲** or **INCLINE ▼** keys to set the lift calibration number to 20.
8. Press **ENTER** until the power bits number is displayed in the right display window.
9. Press **ENTER** until **SAFE ON** is displayed in the right display window.
10. Press **ENTER** until **HARt** is displayed in the right display window.
11. Press **ENTER** until **BLO** is displayed in the right display window
12. Press **ENTER** to return to the User ID. Press and hold **STOP** to get back to the **PRECOR M9.23** banner.
13. Turn off the treadmill with the circuit breaker, then unplug the treadmill from the wall outlet.

### CAUTION

When you perform the next step, finger tighten the lift tube onto the drive screw. Do not force the lift tube onto the drive screw.

14. Insert clevis pin, then thread the lift tube onto the lift motor drive screw as far as it will go.
15. Turn the lift tube counterclockwise two and one-half turns. Remove the clevis pin.
16. Rotate the lift jack, then slide it into the lift column and onto the lift tube.

### CAUTION:

When you perform the next step, do not turn the lift tube more than ninety degrees.

17. Line up the holes in the lift tube with the holes in the lift jack.

18. Push the clevis pin through the holes, then push the hitch pin through the clevis pin. Return the treadmill to an upright position.
19. Plug the power cord into the wall outlet, then turn on the treadmill with the circuit breaker.
20. Check the calibration of the lift system by performing the following steps:
  - a. Press the **INCLINE ▲** key until the electronic console displays ten percent incline;
  - b. Use the **INCLINE ▼** key to return the treadmill to zero percent incline.
21. Using the ruler, measure the distance between the floor and the top of the front and back ends of the side rail. The distance between the floor and the top of the front end of the side rail should be equal.
22. Re-install the hood as described in Procedure 5.1 of the Residential Treadmill Service Manual.

## Procedure 5.1 - 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. This troubleshooting procedure gives you the information you need to determine which of these components is malfunctioning.

### Procedure

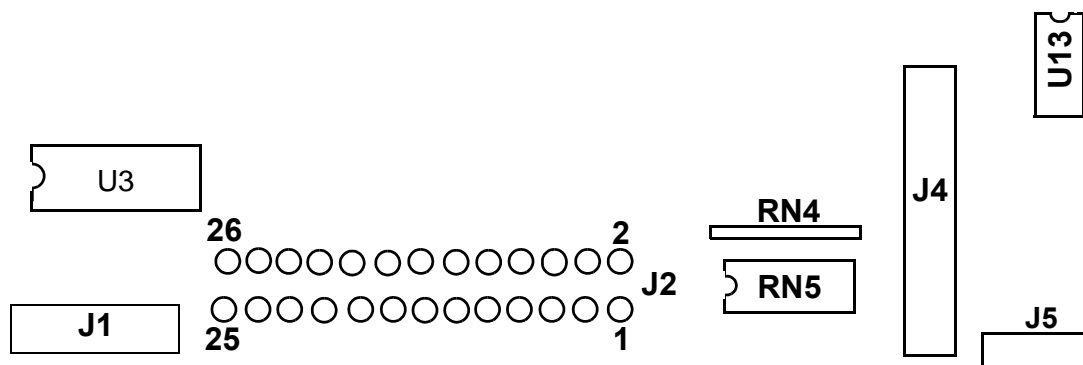
1. Set the circuit breaker in the “off” position.

### WARNING

Before continuing with this procedure, review the Warning and Caution statements listed in Section One of the Residential Treadmill Service Manual.

2. Remove the screws that secure the upper display assembly to the upper handrail. Carefully, pull some excess interconnect cable out from the targa upright. Rotate the display housing, so that the rear of the upper PCA is facing upward, and set the display housing on the upper handrail.
3. Attach the wrist strap to your arm, then connect the ground lead of the wrist strap to the treadmill frame. Set the voltmeter to a range that will conveniently read +6 Vdc.

### Diagram 5.1 - Upper PCA Component Layout



4. Set the voltmeter to a range that will conveniently read +6 Vdc.
5. Set the circuit breaker in the “on” position.
6. Use a DVM, set for DC volts, and read between pin 6 of J3 and the each of the pins in Table 5.1 (no keys pressed) and Table 5.2 (with the appropriate key pressed)...

**Table 5.1 - Voltage Test Points (Function Keys Not Pressed)**

<b>Place the positive lead of the voltmeter on...</b>	<b>The voltmeter should read...</b>
Pin 3 of J3	5 Vdc $\pm$ 500 mVdc
Pin 4 of J3	5 Vdc $\pm$ 500 mVdc
Pin 5 of J3	5 Vdc $\pm$ 500 mVdc
Pin 7 of J3	5 Vdc $\pm$ 500 mVdc
Pin 8 of J3	5 Vdc $\pm$ 500 mVdc
Pin 9 of J3	5 Vdc $\pm$ 500 mVdc
Pin 10 of J3	5 Vdc $\pm$ 500 mVdc

**Table 5.2 - Voltage Test Points (Function Keys Pressed)**

<b>Place the positive voltmeter lead on...</b>	<b>At the display enclosure, press...</b>	<b>The voltmeter should read between...</b>
Pin 3 of J3	ENTER	0 Vdc and 500 mVdc
Pin 4 of J3	INCLINE DOWN	0 Vdc and 500 mVdc
Pin 5 of J3	INCLINE UP	0 Vdc and 500 mVdc
Pin 7 of J3	STOP	0 Vdc and 500 mVdc
Pin 8 of J3	SPEED DOWN	0 Vdc and 500 mVdc
Pin 9 of J3	SPEED UP	0 Vdc and 500 mVdc
Pin 10 of J3	QUICK START	0 Vdc and 500 mVdc

7. If the voltage readings match those listed in Tables 5.1 and 5.2 and one or more keys do not function, replace the upper PCA.
8. If the voltage readings in Table 5.1 are incorrect, disconnect the keypad cable from the keypad connector and repeat the voltage measurements in 5.1. If the voltage readings are now correct, replace the display housing (keypad). If the voltage readings are still incorrect, replace the upper PCA.
9. If the voltage readings in Table 5.1 are correct and one or more voltage readings in Table 5.2 are incorrect, replace the display housing (keypad).
10. Set the circuit breaker in the "off" position.
11. If necessary, carefully re-connect the keypad cable to the keypad connector.
12. Remove the ground lead of the wrist strap from the treadmill frame, then remove the wrist strap from your arm.
13. Position the display enclosure on the display plate. Install the screws that secure the display enclosure to the display plate.
14. Check the operation of the treadmill as described in Section Three of this appendix.

## Procedure 5.2 - Troubleshooting the Heart Rate System

If the **HEART RATE** indicator does not blink with your hear beat when you perform Procedure 2.1, the problem may be either the heart rate receiver assembly or the chest strap assembly. This troubleshooting procedure gives you the information you need to determine which of these components is malfunctioning.

### Procedure

1. If you are referring to this procedure because the **HEART RATE** indicator did not blink properly when you performed Procedure 2.1...

#### **THEN...**

Skip to Step 6.

#### **OTHERWISE...**

Continue with the next step.

2. Plug the power cord into the wall outlet, then turn on the treadmill with the ON/OFF switch.
3. Using conductive spray (Precor part number 37364-101), put on the heart rate chest strap assembly. Press **ENTER** until **HArt** is displayed in the right display window.
4. If the **HEART RATE** indicator blinks in time with your heart beat and the heart rate information displayed is correct...

#### **THEN...**

The Heart Rate system is operating correctly. There is no need to continue with this procedure.

#### **OTHERWISE...**

Continue with the next step.

5. Re-adjust the fit of the chest strap. If the **HEART RATE** indicator still does not blink as described in Step 4, replace the battery in the chest strap assembly. If the **HEART RATE** indicator still does not blink as described in Step 4...

#### **THEN...**

Continue with the next step.

#### **OTHERWISE...**

The Smart Rate system is operating correctly. There is no need to continue with this procedure.

6. Hold the Smart Rate Test Generator (Precor part number 20045-101) close to the display housing. If the **HEART RATE** indicator on the electronic console blinks with the LED on the Heart Rate Test Generator...

**THEN...**

The chest strap assembly is bad. Wear a new chest strap assembly when you use the Smart Rate System.

**OTHERWISE...**

The heart rate receiver assembly is bad. Replace the heart rate receiver as described in Procedure 5.4 of the Residential Treadmill Service Manual.

7. Press **ENTER** to return to the User ID.



## Procedure 5.3 - Troubleshooting the Lift system

### System Description

The lift system is powered by a 120 Vac lift motor that uses two independent motor windings, one operates the motor in an upward direction and one operates the motor in a downward direction. The motor contains a 10 K $\Omega$  potentiometer, driven by the motor, that indicates lift position. AC power to operate the lift motor is provided by a pair of triacs (relays on older units). One triac provides power to the “up” winding of the lift motor and the other triac provides power to the “down” winding of the lift motor. The triacs are controlled either manually or by software control from the upper PCA.

1. If the lift motor will not move skip to step 7. If the lift motor moves and an error occurs continue with step 2.
2. Access the diagnostics program per Procedure 3.2 and proceed to the lift calibration portion of the diagnostics program. If the lift calibration number is 0 or 255 skip to step 3. Operate the lift, if the lift calibration number does not increment as the lift moves, skip to step 3. If the calibration number increments as the lift moves, recalibrate the lift per Procedure 5.3. If recalibration does not correct the problem, continue with step 3.
3. Set the treadmill circuit breaker in the “off” position. Using an ohmmeter, measure between terminal 4 (white wire) and terminal 6 (orange wire) of the P2 connector on the lower PCA. The measurement should be approximately 10 K $\Omega$ . If the measurement is open ( $\infty$ ) or significantly high or low, replace the lift motor.
4. Using an ohmmeter, measure between terminals 4 and 5 of P2 and measure between 5 and 6 of P2 on the lower PCA. The two measurements should total approximately 10 K $\Omega$ . If the measurement is open ( $\infty$ ) or significantly high or low, replace the lift motor.
5. If you have performed all of the above tests and an error still occurs when the lift motor operates, there are three parts that could cause the problem. There are not any good tests to check these parts other than substituting a known good part. They are lower PCA, ribbon cable and upper PCA. Replace only one part at a time. If the new part does not correct the problem replace the original part.
6. If you have performed all of the above tests and the lift system is still not functioning, call Precor Technical Support.
7. Set the treadmill circuit breaker in the “off” position. Remove the F2 (2 amp slow blow) fuse from the lower PCA. Measure the fuse with an ohmmeter. The measurement should be 1 $\Omega$  or less. If the fuse is good, re-insert the fuse and skip to step 9. If the fuse is open ( $\infty$ ) or significantly high, replace the fuse. Before operating the lift motor it is necessary to perform a continuity test on the lift motor.

8. Remove the P2 connector from the lower board. Using an ohmmeter, measure between terminals 1 and 3 of P2, between terminals 1 and 2 of P2 and between terminals 2 and 3 of P2. The measurements should be approximately  $14.5\Omega$ ,  $14.5\Omega$  and  $29\Omega$ , respectively. If any of the measurements are significantly low or high, replace the lift motor.
9. Re-insert the P2 connector in the lower PCA. Set the treadmill circuit breaker in the “on” position. Using an AC voltmeter, monitor the voltage between terminals 1 and 2 (red and white wires) of the P2 connector. Enter the manual program and press the **INCLINE ▲** key. The measurement should be approximately 120 Vac (line voltage). If the voltage is present and the lift motor moves normally, skip to step 10. The voltage will only be present until such time as an error occurs. If line voltage is not present skip to step 11. If line voltage is measured but the motor does not move, replace the lift motor.
10. Monitor terminals 1 and 3 (white and black wires) of P2. Enter the manual program and press the **INCLINE ▼** key. The measurement should be approximately 120 Vac (line voltage). If the voltage is present and the lift motor moves normally skip to step 12. The voltage will only be present until such time as an error occurs. If line voltage is measured but the motor does not move, replace the lift motor.
11. If line voltage is not present in both steps 9 and 10, there are three parts that could cause the problem. There are not any good tests to check these parts other than substituting a known good part. They are lower PCA, ribbon cable and upper PCA. Replace only one part at a time. If the new part does not correct the problem replace the original part.
12. If you have performed all of the above tests and the lift system is still not functioning, call Precor Technical Support.

## Procedure 5.4 - Troubleshooting the External A.C. Power Source

It is extremely important that any Precor treadmill be connected to and operated on a dedicated 20 amp A.C. circuit. A 20 amp dedicated circuit is defined as: a circuit fed by a 20 amp circuit breaker that feeds a single load. A treadmill operating from a non-dedicated circuit or a circuit breaker of less than 20 amps capacity will not have the necessary power available to operate normally under higher load conditions. The lack of available power can cause any number of symptoms ranging from numerous intermittent (seemingly inexplicable) error conditions, poor speed control, or tripping the house circuit breaker.

If any of the above symptoms exist the external A.C. circuit must be checked and confirmed to be a 20 amp dedicated circuit **before** troubleshooting the treadmill.

In addition the A.C. voltage must be checked. Nominal A.C. operating voltage on 120 Vac circuits is 105 Vac to 120 Vac. Nominal A.C. operating voltage on 240 Vac circuits is 208 Vac to 240 Vac.

For operator safety considerations and to minimize electrostatic discharge conditions the A.C. frame ground continuity must also be verified to be a low resistance connection to the A.C. distribution ground bar.

### Important

If the A.C. circuit feeding a treadmill is found to be a non-dedicated circuit or a circuit equipped with a circuit breaker with a capacity of less than 20 amps, the A.C. circuit must be corrected to be a 20 amp dedicated circuit **before** any reliable troubleshooting can be performed on the treadmill. More importantly, a non-dedicated circuit may constitute a safety hazard to the treadmill operator.

### 120 Vac Systems

120 Vac distribution systems utilize a single pole circuit breaker (hot lead) and a neutral lead connected to a common neutral (ground) bar. The A.C. safety ground (green wire) is connected to a separate ground bar in the distribution system.

The most common problems found are (1) the circuit is fed by a circuit breaker of less than 20 amp capacity, (2) the circuit breaker correctly feeds a single A.C. outlet but the neutral is common between several A.C. outlets and (3) both the hot and neutral leads feed several A.C. outlets. The appropriate correction action or actions (see below) must be followed if any of the above conditions exist. **Corrective actions should only be undertaken by a licensed electrician.**

#### 1. The circuit breaker feeding the treadmill is not a 20 amp circuit breaker.

If the circuit breaker is greater than 20 amps, the circuit breaker should be replaced with a 20 amp circuit breaker. If the circuit breaker is less than 20 amps the circuit breaker must be replaced with a 20 amp circuit breaker and the wiring from the A.C. distribution must be capable of safely handling 20 amps. If the A.C. wiring is under sized, it must be replaced with wire capable of safely handling 20 amps. Please, refer to local electrical codes when determining the appropriate wire size for a 20 amp circuit.

**2. The circuit breaker correctly feeds a single A.C. outlet but the neutral is common between several A.C. outlets.**

The common neutral lead must be removed from treadmill's A.C. outlet and a new neutral lead from the treadmill's A.C. outlet to the A.C. neutral distribution bar must be added.

**3. Both the hot and neutral leads feed several A.C. outlets.**

Both the common neutral and hot leads must be removed from treadmill's A.C. outlet and a new neutral lead and hot lead from the treadmill's A.C. outlet to the A.C. neutral distribution bar and circuit breaker must be added.

## **240 Vac Systems**

240 Vac distribution systems utilize a double pole circuit breaker (two hot leads) The A.C. safety ground (green wire) is connected to a ground bar in the distribution system.

The most common problems found are (1) the circuit is fed by a circuit breaker of less than 20 amp capacity and (2) both the hot leads feed several A.C. outlets. The appropriate correction action or actions (see below) must be followed if any of the above conditions exist. **Corrective actions should only be undertaken by a licensed electrician.**

**1. The circuit breaker feeding the treadmill is not a 20 amp circuit breaker.**

If the circuit breaker is greater than 20 amps, the circuit breaker should be replaced with a 20 amp circuit breaker. If the circuit breaker is less than 20 amps the circuit breaker must be replaced with a 20 amp circuit breaker and the wiring from the A.C. distribution must be capable of safely handling 20 amps. If the A.C. wiring is under sized, it must be replaced with wire capable of safely handling 20 amps. Please, refer to local electrical codes when determining the appropriate wire size for a 20 amp circuit.

**2. Both the hot leads feed several A.C. outlets.**

Both hot leads must be removed from treadmill's A.C. outlet and two new hot leads from the treadmill's A.C. outlet to the circuit breaker must be added.

A licensed electrician may use the followings hints to determine if an A.C. service is dedicated.

1. If, on a 120 Vac system, the A.C. distribution panel contains more circuit breakers than neutral leads, the system has shared neutral leads and is not dedicated.
2. If an A.C. outlet (120 or 240 Vac) has multiple hot and/or neutral leads, it is not a dedicated.

If either of the above conditions exist, the system is not dedicated. However, absence of the above conditions does not necessarily mean that the system is dedicated. If any doubt exists about A.C. systems dedication, point to point tracing of the A.C. wiring may be the only way to prove system dedication.

## Procedure 6.1 - Replacing the Lift Jack and Lift Column

### CAUTION

Do not rotate the lift tube while you perform this procedure.

### WARNING

Always turn off the circuit breaker and unplug the treadmill before you raise the treadmill hood.

### Removing the Lift Jack

1. Raise and secure the hood to the handlebars with a bungie cord.

#### Note:

Place a drop cloth under the treadmill to protect the flooring and to ensure that the treadmill handrail is not scratched or damaged.

2. Remove the hitch pin from the clevis pin that holds the base of the lift jack to the lift tube.
3. Remove the clevis pin, then pull the lift jack out of the column.
4. Choose one:

<b>If...</b>	<b>Then...</b>	<b>Otherwise...</b>
You are replacing the lift column step	Continue with the next	Skip to Step 13

### Removing and Replacing the Lift Column

5. Remove the screws that secure the upper display module assembly to the upper handrail clamp.
6. Disconnect the ribbon cable from the upper PCA. Set aside the upper display module until you are ready to install the ribbon cable. Place the treadmill on its right side.
7. Remove the ribbon cable as described in Procedure 5.6 of the Residential Treadmill Service Manual.
8. Remove the screws and washers that secure the upper handrail clamp to the lift column.
9. Remove the flanged nuts that secure the lift column to the treadmill frame. Slide the lift column through the base of the treadmill frame.

#### Note:

If necessary, use the rubber mallet to loosen the lift jack from its mounting position.

## Replacing the Lift Column

10. Position the new column at its mounting location.
11. Install the flanged nuts that secure the lift column to the treadmill frame.
12. Install the screws and washers that secure the upper handrail clamp to the lift column.

## Replacing the Lift Jack

13. With the treadmill on its right side, insert the lift jack into the lift column.

### Note:

If necessary, use the rubber mallet to gently position the lift jack cross tube at its mounting location.

14. Line up the holes in the lift jack base with the holes in the lift tube.

### Caution

You may need to rotate the lift tube slightly to align the holes in the tube with the holes in the lift jack. Rotating the tube more than 90 degrees will affect the calibration of the lift assembly.

15. Push the clevis pin through the holes, then push the hitch pin through the clevis pin. Return the treadmill to an upright position.
16. Replace the ribbon cable in the lift column trim as described in Procedure 5.6 of the Residential Treadmill Service Manual.
17. Replace the screws that secure the upper display module assembly to the upper handrail clamp.
18. If the lift tube was rotated during the performance of this procedure...

### THEN...

Calibrate the lift assembly as described in Procedure 4.1

### OTHERWISE...

Continue with the next step.

19. Check the operation of the treadmill as described in Section Three of this appendix, then replace the hood.

## Procedure 6.2 - Replacing the Lift Motor Assembly

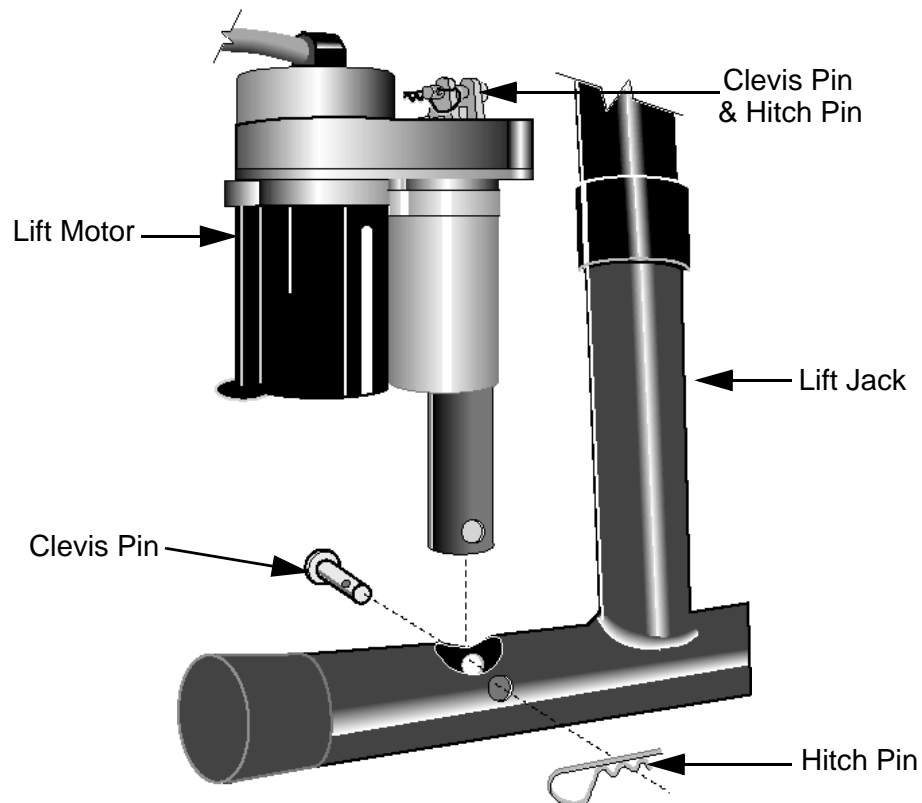
### WARNING

Always turn off the circuit breaker and unplug the treadmill before you raise the treadmill hood.

### Removing the Lift Motor

1. Raise and secure the hood to the handlebars with a bungi cord.
2. Disconnect the lift motor wiring assembly from the lower PCA.
3. Remove the ground wire from the lift motor ground stud on the treadmill frame.
4. Remove the hitch pin from the clevis pin that holds the base of the lift jack to the lift motor tube (see Diagram 6.1).
5. Remove the hitch pin from the clevis pin that holds the top of the lift motor to the treadmill frame. Remove the clevis pin from the top of the lift motor. Place the treadmill on its right side.

### Diagram 6.1 - Lift Motor



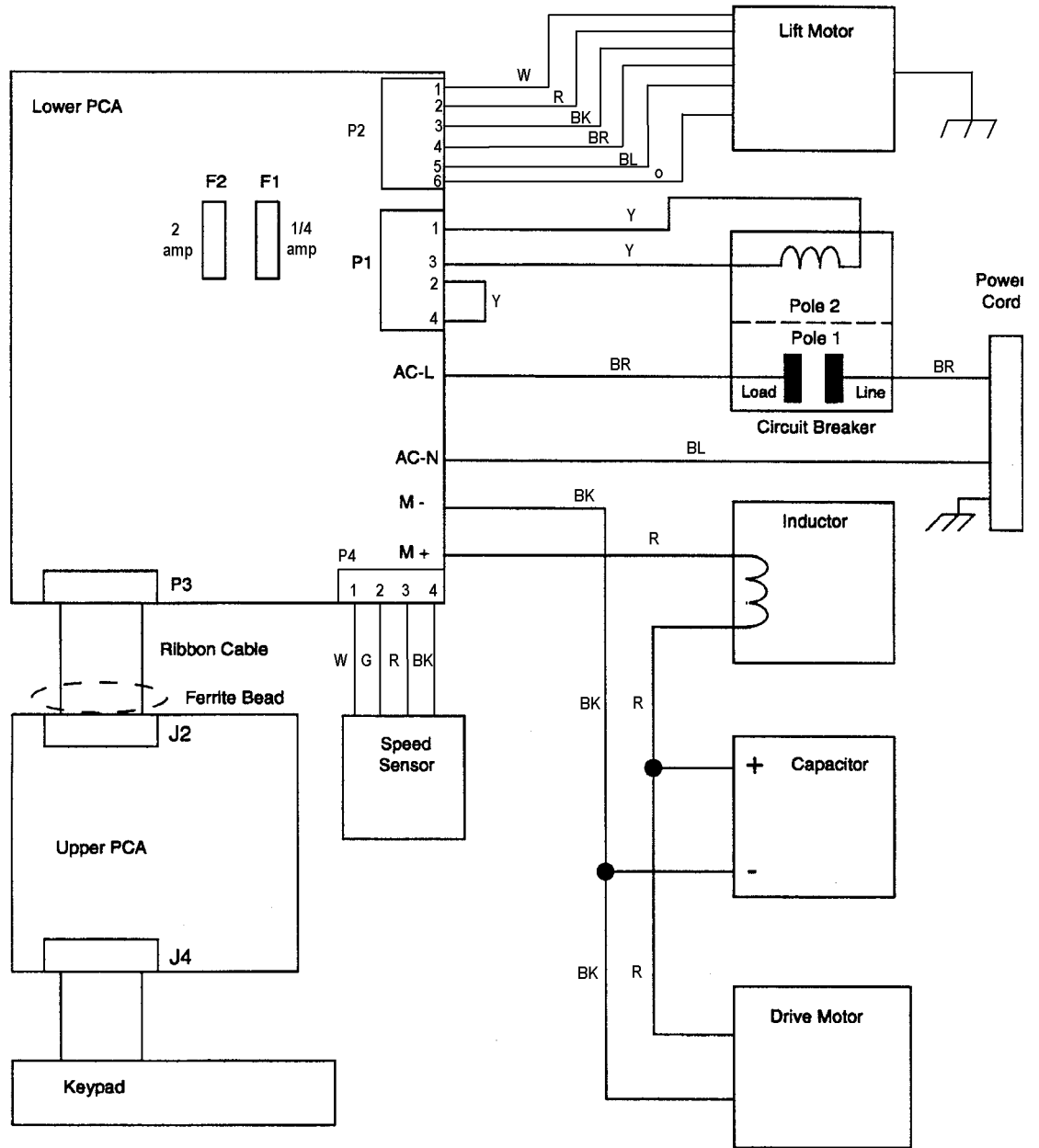
6. Remove the clevis pin, then pull the lift jack out of the column. Set aside the defective lift motor. Return the treadmill to an upright position.

### **Replacing the Lift Motor**

7. Line up the mounting holes at the top of the lift motor with the lift motor mounting holes on the treadmill frame.
8. While an assistant holds the lift motor in place, position the clevis pin through the top of the lift motor and the treadmill frame. Push the hitch pin through the clevis pin.
9. Place the treadmill on its right side. Position the lift jack in the column, then line up the holes in the lift guide base with the holes in the lift motor tube.
10. Calibrate the lift assembly as described in section four of this appendix.
11. Push the clevis pin through the holes, then push the hitch pin through the clevis pin. Return the treadmill to an upright position.
12. Secure the ground wire to the lift motor ground stud.
13. Connect the lift motor wiring assembly to the lower PCA.
14. Check the operation of the treadmill as described in Section Three of this appendix, then replace the hood as described in Procedure 5.1 of the Residential Treadmill Service Manual.



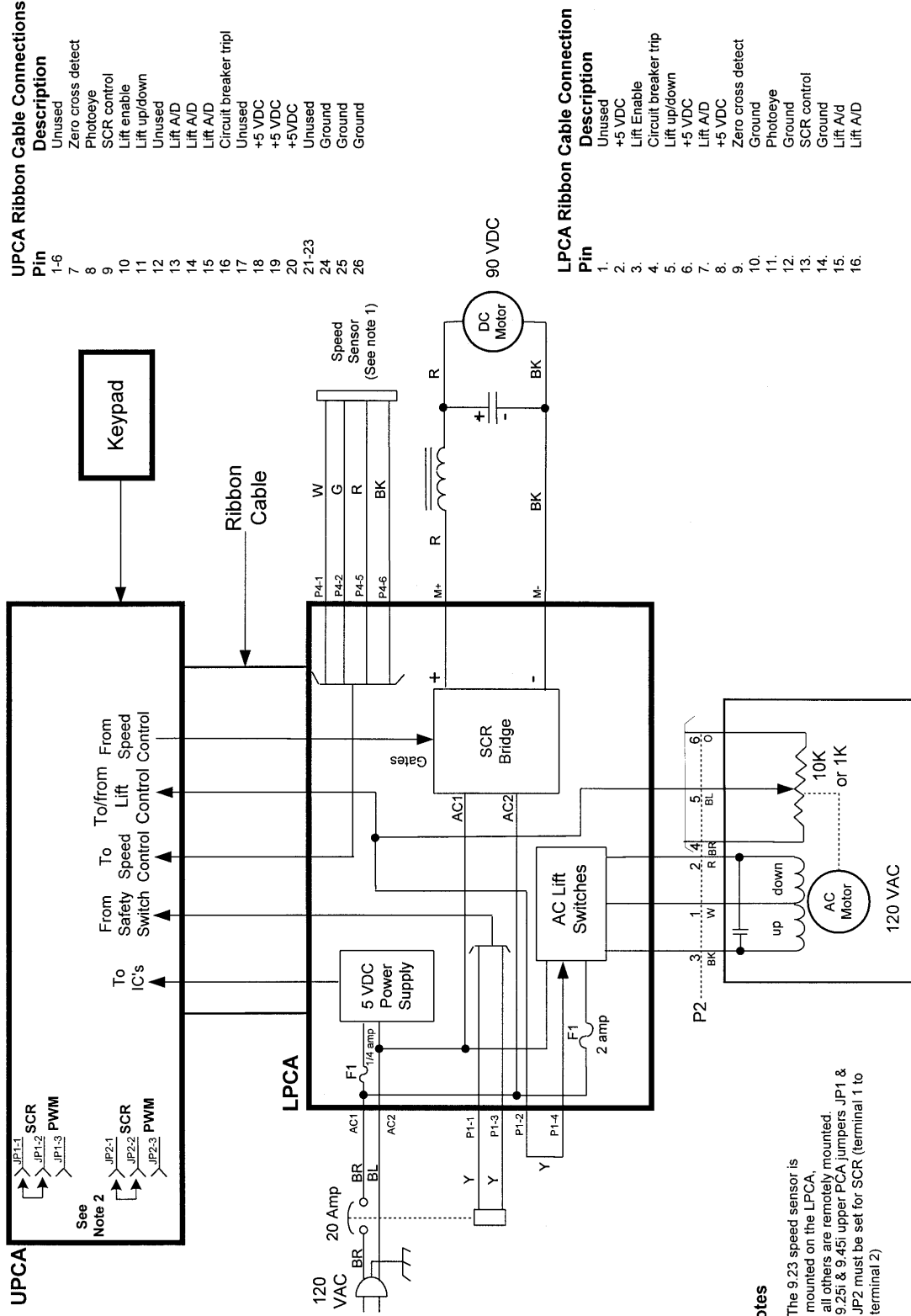
# Wiring Diagram 7.1 - 9.23



# Block Diagram 7.2 - 9.23



9.45 (manufactured after 4/30/96)  
 9.23, 9.25, 9.25i, 9.45i Treadmill



**UPCA Ribbon Cable Connections**

Pin	Description
1-6	Unused
7	Zero cross detect
8	Photoeye
9	SCR control
10	Lift enable
11	Lift up/down
12	Unused
13	Lift A/D
14	Lift A/D
15	Lift A/D
16	Circuit breaker tripl
17	Unused
18	+5 VDC
19	+5 VDC
20	+5VDC
21-23	Unused
24	Ground
25	Ground
26	Ground

**LPCA Ribbon Cable Connection**

Pin	Description
1.	Unused
2.	+5 VDC
3.	Lift Enable
4.	Circuit breaker trip
5.	Lift up/down
6.	+5 VDC
7.	Lift A/D
8.	+5 VDC
9.	Zero cross detect
10.	Ground
11.	Photoeye
12.	Ground
13.	SCR control
14.	Ground
15.	Lift A/d
16.	Lift A/D

- Notes**
1. The 9.23 speed sensor is mounted on the LPCA, all others are remotely mounted.
  2. 9.25i & 9.45i upper PCA jumpers JP1 & JP2 must be set for SCR (terminal 1 to terminal 2)