C544 Elliptical Fitness Crosstrainer

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

Right, Left, Front, and Back Conventions

In this manual, right, left, front, and back are from the perspective of a user standing on the EFX 544, facing the display enclosure.

Warning and Caution Statements and General Safety Guidelines

Warning statements indicate a particularly dangerous activity. Warning statements you will find in this manual include:

- To remove power from the EFX 544, the power cord must be disconnected from the wall outlet. Always ensure that the EFX 544 is unplugged from the wall outlet when you inspect or adjust the EFX 544, or when you isolate, remove, or replace an EFX 544 component.

- Removing the covers exposes high voltage components and potentially dangerous machinery. Exercise extreme caution when you perform maintenance procedures with the hood removed.

- During service operations you will be very close to moving machinery and high voltage components. When you perform maintenance procedures with the covers removed, remove jewelry (especially from ears and neck), tie up long hair, remove neck ties, and do not wear loose clothing.

- When the EFX 544 is operating, the capacitor will hold a lethal amount of charge. Do not touch the capacitor as serious injury or death might result.

- When the EFX 544 is turned off and the power cord is removed from the wall outlet, the capacitor will hold voltage for 30–60 seconds. Allow the capacitor to discharge for a period of one minute before you touch or work near the capacitor. Do not attempt to discharge the capacitor by any other means.

- Exercise caution when touching any wire or electrical component during EFX 544 operation.

- Exercise extreme caution when working with the flywheels and/or the stairarms. Because of the mass of the flywheels, serious injury may result if fingers are pinched between the flywheel spokes and the stairarms.

- The flywheel is very heavy. Be prepared for the weight of the flywheel when it comes off of the pulley shaft.

Caution statements are intended to prevent damage to the EFX 544 as a result of the current activity. Caution statements included in this manual are listed below:

- Notice the orientation notch on the PROM (U3). These components must be positioned with the same notch orientation.

- When it is necessary to lift the EFX 544, ensure that the EFX 544 has adequate support. Do not lift the EFX 544 by the front cross-member.

Safety guidelines you should know and follow include:

- Read the owner's manual and follow all operating instructions.
- Operate the EFX 544 on a solid, level surface. Locate the rear of the EFX 544 at least four feet from walls or furniture. Keep the area behind the EFX 544 clear.
- Visually check the EFX 544 before beginning service or maintenance operations. If it is not completely assembled or is damaged in any way, exercise extreme caution while operating and checking the EFX 544.
- When operating the EFX 544, do not wear loose clothing. Do not wear shoes with heels or leather soles. Check the soles of your shoes and remove any embedded stones. Tie long hair back.
- Do not rock the unit. Do not stand or climb on the handlebars, display enclosure, or cover.
- Do not set anything on the handlebars, display enclosure, or cover. Never place liquids on any part of the EFX 544.
- To prevent electrical shock, keep all electrical components, such as the power cord and circuit breaker away from water and other liquids.
- Do not use accessory attachments that are not recommended by the manufacturer-such attachments might cause injuries.

General Information

For the latest exploded view, part number and part pricing information, visit the Precor dealer website at "www.precor.com/Dealer".

Procedure 3.1 - Software Access Codes

Over the years the codes used to access the various software diagnostics features have changed. Currently we are using a “standardized” set of access codes. These codes will be used on all current and future software. In using the standardized access codes the keys are numbered left to right with key #1 on the far left and key #7 on the far right. If the standard access codes do not function on the unit being tested refer to the appropriate old access codes listed below. The standard access codes use all sequential key presses, the old access codes use simultaneous key presses.

Standard Access Codes

Diagnostics	Keys RESET,5,1,7,6,5,7,6,1
Odometer	Keys RESET,6,5
Club Settings	Keys RESET,5,6,5,1,5,6,5

Old Access Codes

Diagnostics	Keys Ramp ▲, Resistance ▼, Resistance ▲
Odometer	Keys Ramp ▲, Resistance ▲
Club Settings	Keys Resistance ▲, Quick Start/Change

Procedure 3.2 - Accessing the Diagnostic Software

The EFX 544 diagnostic software cycles through the following tests:

- Performing LED Diagnostics
- Checking the Lift Calibration Number
- Determining Software Version
- Heart Rate Diagnostic
- Performing the Keypad Test

Procedure

1. Plug the power cord into the wall outlet, then turn on the EFX 544 with the circuit breaker.

2. Press the **RAMP ▲, RESISTANCE ▼** and **RESISTANCE ▲** keys, simultaneously or keys **RESET,5,1,7,6,5,7,6,1,** sequentially**.**

3. Watch the upper display as the LED test progresses. The test is programmed to display the following LED illumination sequence:

   a Every LED on the left display window illuminates simultaneously.

   b Diagonal lines of illuminated LED's 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 LED's illuminate simultaneously and then extinguish.

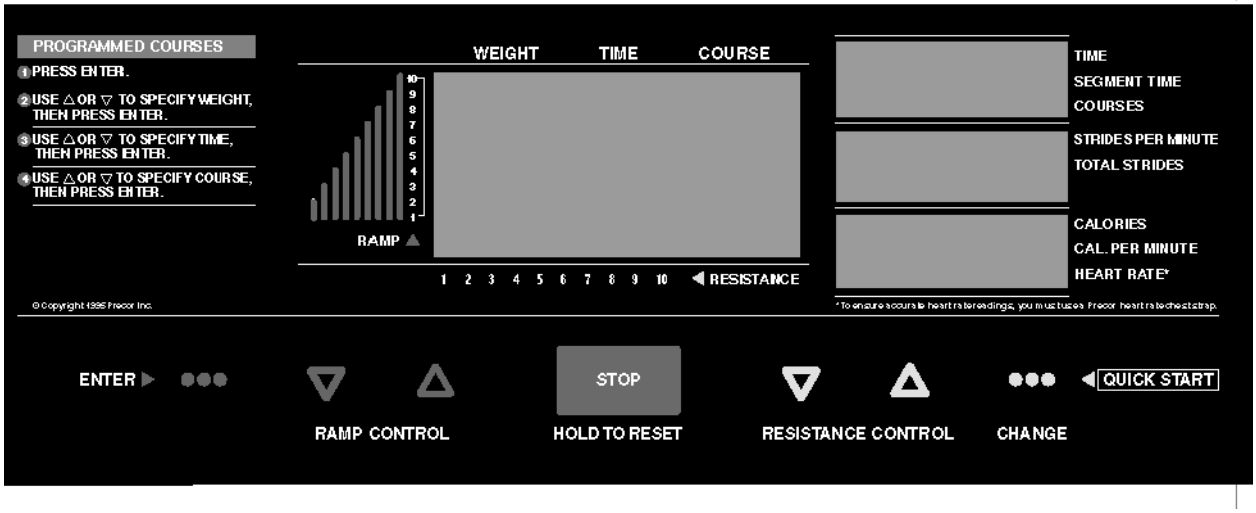
   e Each function LED illuminates separately and then extinguishes.

4. With **LIFT** displayed in the right display window, watch the right display window (shown in Diagram 3-1). Press the **RAMP ▲ a**nd **RAMP ▼** keys. Verify that the lift calibration number increments and decrements as the **RAMP** keys are pressed.

5. If you do not observe the LED illumination sequences described in Step 3**...**

THEN...	**OTHERWISE...**
Replace the upper PCA as described in Procedure 8.2.	The LED passed successfully; continue with the next step.

Diagram 3.1 - C544 Display



6. Press **ENTER**, then release.

7. Note the software 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.

8. Press **ENTER**, then release.

9. With **HArt** displayed in the right display window, a heart rate will be displayed when a chest strap or test transmitter is used.

10. Press **ENTER** until seven dots illuminate in the left display window.

11. Press each key listed below. Verify that each single dot expands to four dots as the appropriate key is pressed.

ENTER	Expands the far left dot.
RAMP DOWN	Expands the second dot from the left.
RAMP UP	Expands the third dot from the left.
STOP/RESET	Expands the center dot.
RESISTANCE DOWN	Expands the third dot from the right.
RESISTANCE UP	Expands the second dot from the right.
QUICK START	Expands the far right dot.

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

THEN...	**OTHERWISE...**
The keypad test passed successfully; continue with the next step.	Replace the upper PCA as described in Procedure 8.2.

13. End the keypad test by pressing the **RAMP** ▼ and **RESISTANCE** ▲ keys, simultaneously.

Procedure 3.3 - Displaying the Odometer

Procedure

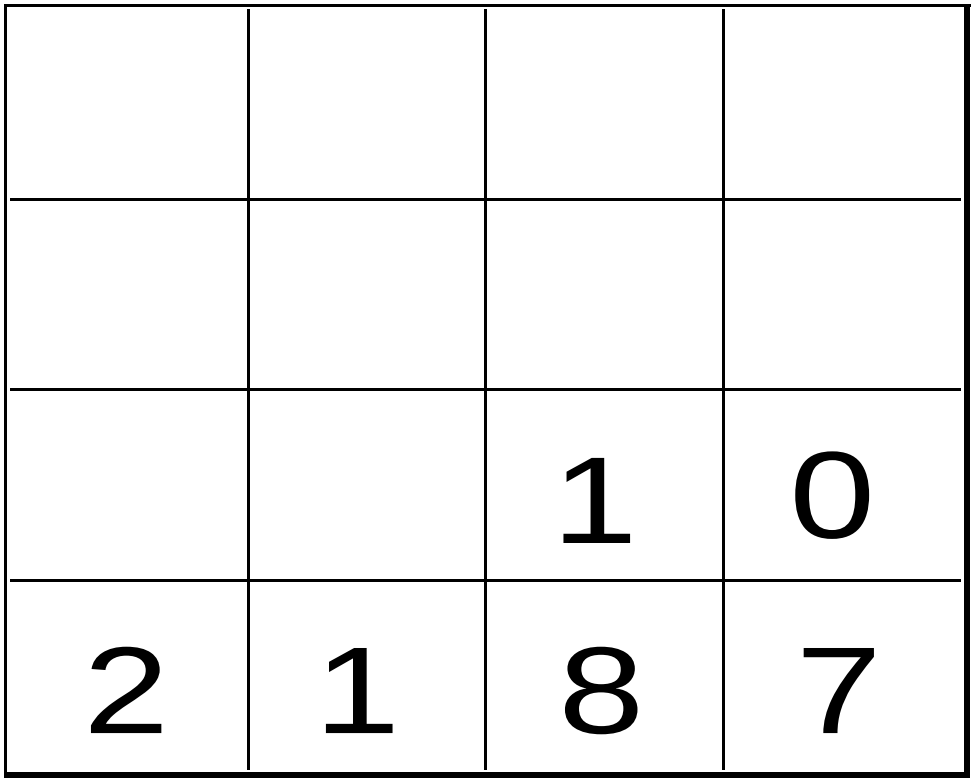
1. Plug the power cord into the wall outlet, then turn on the EFX 544 with the circuit breaker.

2. With the **PRECOR EFX 544** banner scrolling, press the **RAMP ▲** and **RESISTANCE ▲** keys, simultaneously or keys **RESET,6,5**, sequentially. The message **EFX 544 ODOMETER** will scroll across the left display window.

3. Press **ENTER**, then release.

Note:
The right display window displays the total strides on the EFX 544 (see Diagram 3.2). The number displayed is 102,187. To convert strides to miles, divide the total number of strides by 2241. To convert strides to kilometers, divide the total number of strides by 1392.5.

Diagram 3-2. - Odometer Reading



Procedure 3.4 - Club Settings

Selecting United States standard units causes information to be displayed in miles. Information is displayed in kilometers if metric units are selected. After you select a measurement standard, the software accumulates and records workout information in the units of the measurement standard selected.

Procedure

1. Plug the power cord into the wall outlet, then turn on the EFX 544 with the circuit breaker.

2. With the **PRECOR EFX 544** banner scrolling, press the **RESISTANCE ▲** and **QUICK START** keys simultaneously or keys **RESET,5,6,5,1,5,6,5,** sequentially. Either **U. S. Standard** or **Metric** will scroll across the display.

3. If you wish to change the measurement standard...

THEN...	**OTHERWISE...**
Use the ▲ or ▼ keys to toggle to an alternate measurement standard; then continue with the next step.	Continue with the next step.

4. Press **ENTER**, then release.

5. Either **120 VOLTS** or **240 VOLTS** will scroll across the display. Press either of the ▲ or ▼ keys to toggle between the 120 0r 240 volt setting.

Note:
The 120 Volt/240 Volt setting does not change the input operating voltage of the EFX 544. It changes the resistance levels to match the input operating voltage. Therefore, this setting must match the input voltage of the EFX 544. If the setting does not match the input voltage, the resistance levels will be incorrect.

6. The maximum workout time is displayed on the left display window.

7. If you wish to change the maximum workout time...

THEN...	**OTHERWISE...**
Use the ▲ or ▼ keys to select the new maximum workout time; then continue with the next step.	Press **ENTER** to continue with the next step.

8. Either **SMART RATE ACTIVATED** or **NO SMART RATE** will scroll across the display. Use the ▲ or ▼ keys to activate or deactivate smart rate, as required. Press **ENTER** to exit.

Procedure 3.5 - 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:
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.

- 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 Four - Checking EFX 544 Operation

This section provides you with a quick method of checking EFX 544 operation. Check the operation of the EFX 544 at the end of most maintenance procedures.

Procedure

1. Plug the power cord into the wall outlet, then turn on the EFX 544 with the circuit breaker.

2. When the **PRESS ENTER FOR PROGRAMS** prompt appears, press **QUICK START**.

3. If the ramp is not currently at the mid-point, the ramp will automatically move to the mid-point.

4. Select Resistance Level 1 and press **ENTER**.

5. Operate the EFX 544 for 4–5 minutes. As you operate the EFX 544, concentrate on the operating sounds made by the unit. Be on the alert for unusual rubbing, hitting, grinding, or squeaking noises.

6. If the EFX 544 makes unusual noises or the electronic display does not change appropriately, trouble shoot per section 6.

7. Press the **RESISTANCE ▲** key until you reach Resistance Level 5. Operate the EFX 544 for another 2–3 minutes.

8. If the EFX 544 resistance does not change or the operation of the EFX 544 feels inconsistent compared with Resistance Level 1, troubleshoot per section 6.

9. Press the **RESISTANCE ▲** key until you reach Resistance Level 10. Operate the EFX 544 for another 2–3 minutes.

10. If the resistance of the EFX 544 does not change or the EFX 544 operation feels inconsistent with Resistance Levels 1 and 5, troubleshoot per section 6.

11. Check the LED's mounted on the upper PCA and the function keys displayed on the electronic console by performing Procedure 3.2.

12. Press the **RAMP ▲** key while viewing the electronic console. Confirm that the foot pads incline and the ramp display increments to ten as the **RAMP ▲** key is pressed.

13. Press the **RAMP ▼** key while viewing the electronic console. Confirm that the foot pads return to a level position and the ramp display decrements to zero as the **RAMP ▼** key is pressed.

14. Turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

Procedure 5.1 - Inspecting and Adjusting the Gap Between the Disk and Magnet Assembly

Note:
This procedure is applicable only to units manufactured prior to March 20, 1997

Procedure

1. Turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

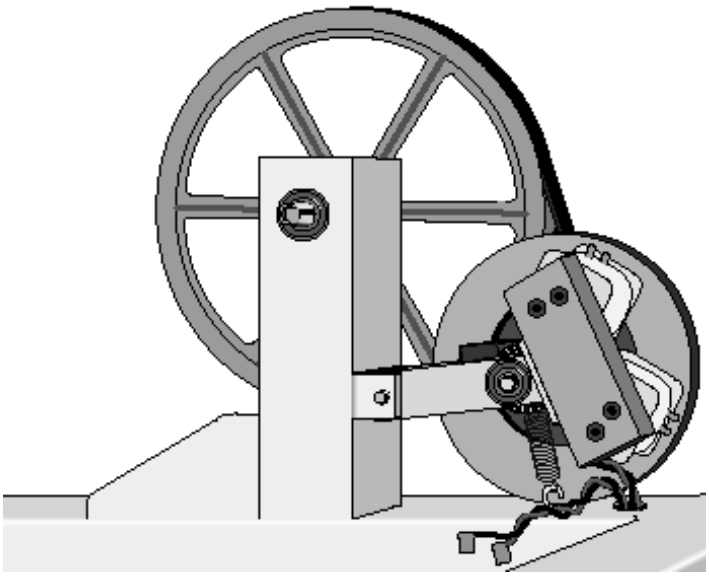
2. Remove the rear cover as described in Procedure 7.1.

3. Place a. 062" (1/16”) feeler gauge between the disk and the magnets (see Diagram 5.1).

4. If the feeler gauge does not fit snugly**...**

THEN...	**OTHERWISE...**
Continue with the next step.	Skip to Step 9.

Diagram 5.1 - The Magnets and Disk



5. Loosen the two screws that secure the magnet assembly to the magnet pivot assembly.

IMPORTANT
Do not loosen the screws too much. Although you must be able to move the magnet assembly along the adjustment slots, the assembly must stay in place after it is moved.

6. Place a .062" (1/16”) feeler gauge between the disk and the magnets.

7. Slide the magnet assembly along its adjustment slots until the feeler gauge fits snugly between the disk and the magnets.

8. Using the 6 mm allen wrench, tighten the screws that secure the magnet assembly to the magnet pivot assembly.

9. Re-install the rear cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 5.2 - Measuring the Resistance of a Magnet

Caution
Remove power from the EFX 544 before you measure magnet resistance.

Procedure

1. Turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

1. Remove the rear cover as described in Procedure 7.1.

2. Set the ohmmeter to a range that will conveniently read 125 Ω.

3. Remove the wires from the terminals on the top magnet. Measure the resistance between the two terminals.

Note:
The resistance of the magnets will be higher than optimum (90 - 110 Ω) when they are warm.

4. If the resistance measures significantly less than 90 Ω or significantly more than 110 Ω**...**

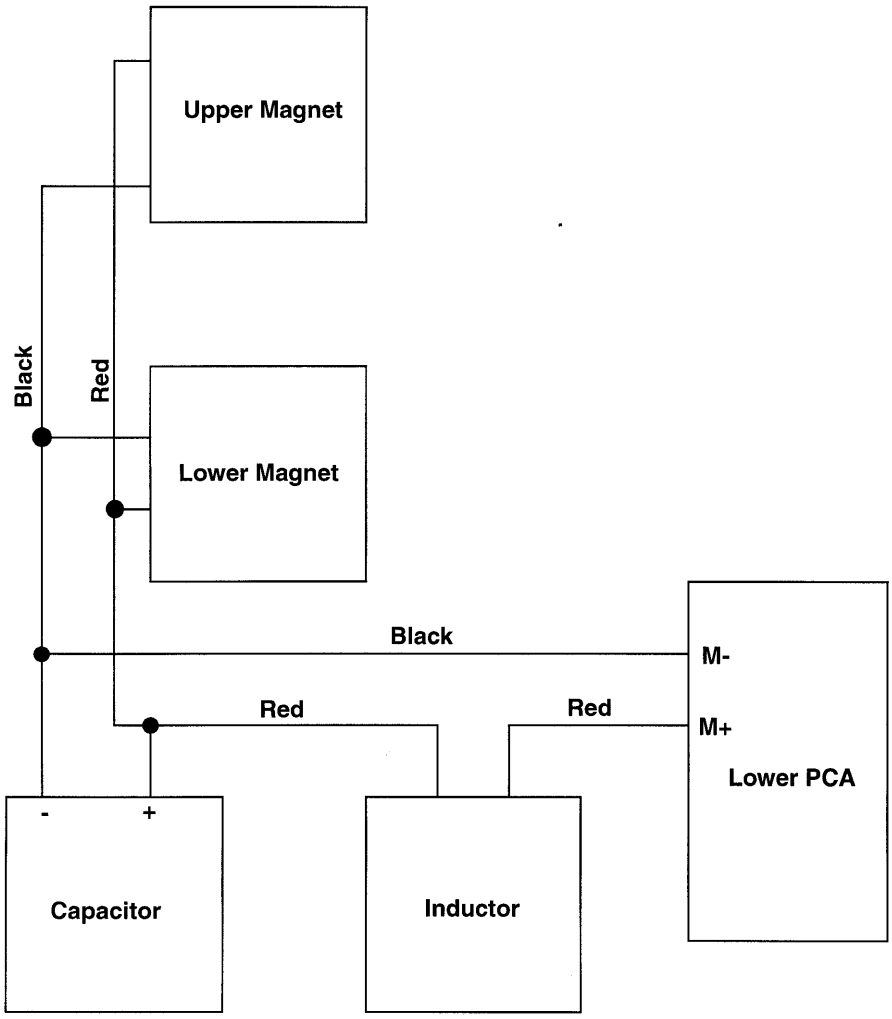
THEN...	**OTHERWISE...**
Replace the magnet as described in Procedure 7.19.	Connect the wires to the magnet, then continue with the next step.

Note:
The EFX 544 magnet cable assembly is shown in Diagram 5-2.

5. Repeat Steps 4 and 5 for the remaining magnets.

6. Re-install the rear cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Diagram 5.2 - Magnet Wiring



Procedure 5.3 - Calibrating the Lift Motor

Note:
The lift motor must be removed for calibration.

Removing the Lift Motor Assembly

1. Set the ramp (lift) at level 1, turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

2. Remove the front and rear covers as described in Procedure 7.1.

Note:
Refer to the wiring diagram shown in Diagram 8.1. Mark all wires before disconnecting, to insure quick, accurate replacement!

3. Lift the stair arms from the ramp assembly and rotate them towards the back of the EFX 544.

4. Rotate the ramps to the back of the unit. Rest the ramps on the flywheels.

5. Remove the outboard snap rings from each end of the lower lift shaft. Remove the plastic wear tubes. Hold one end of the lower lift shaft with a wrench. Loosen the other end with a second wrench. Using the wrenches, unthread both ends of the lower lift shaft from the threaded stud. Set aside the lower lift shaft and the stud.

Note:
Units built before September 3, 1996, may have a one-piece lower lift shaft.

6. Cut the cable ties that secure the ribbon cable to the lift motor and EFX 544 wiring cables.

7. Disconnect the lift motor cable assembly from the lower PCA.

8. Remove the wires from the lift motor capacitor.

9. Remove the screw that secures the lift motor ground wire to the EFX 544 frame.

10. Remove the two screws securing the top of the electronics bracket to the EFX 544 frame.

11. While an assistant supports the lift motor, remove the nut from upper lift motor mounting bolt. Remove the upper lift motor mounting bolt and the two plastic spacers (read the Note below).

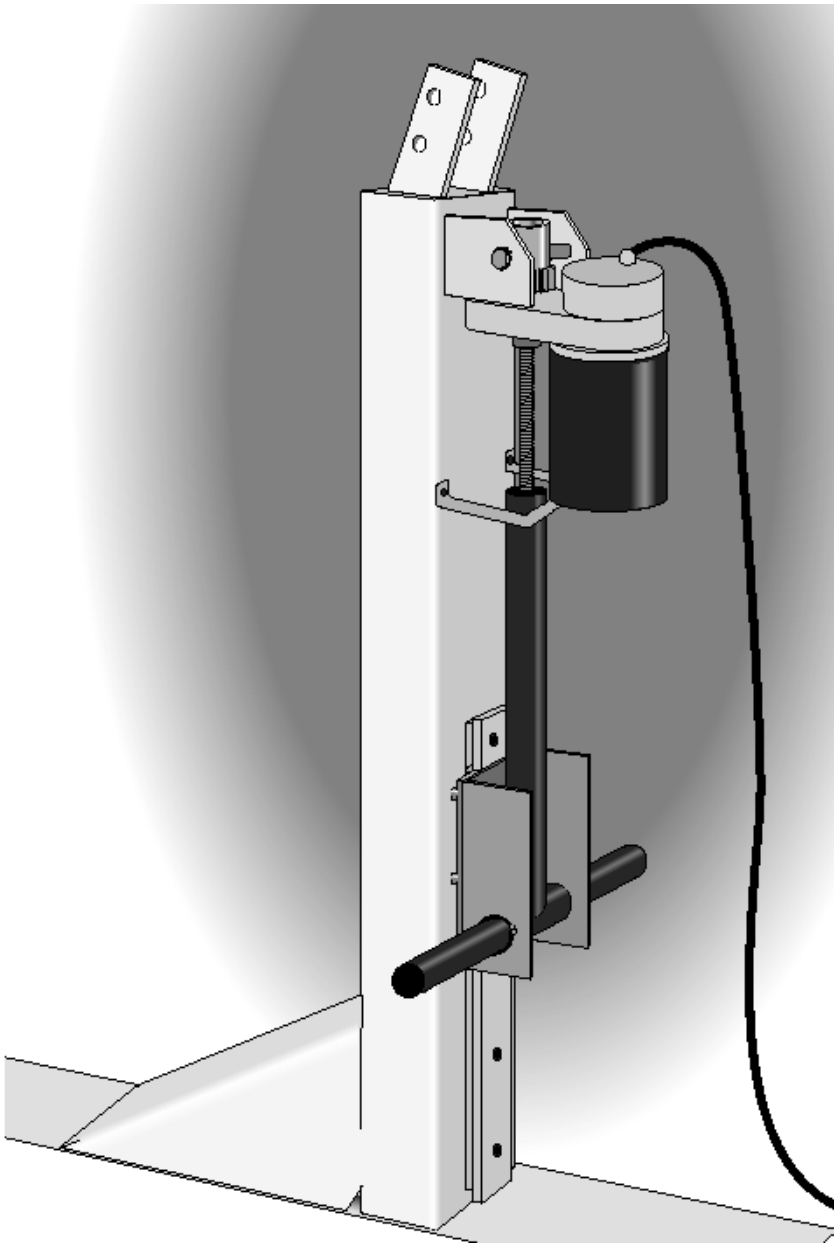
Note:
Units built after July 9, 1996, have two plastic spacers inserted onto the upper lift shaft.

12. Lift the lift motor assembly up and away from the EFX 544 (see Diagram 5.3).

Calibrating the Lift Motor Assembly

13. Position the lift motor assembly on the floor, close to the EFX 544 frame.

Diagram 5.3 - Lift Motor Assembly



14. Refer to Diagram 8.1. Re-connect the lift motor cables to the lower PCA and lift capacitor. Connect the lift motor ground wire.

15. Plug the power cord into the power entry module, then plug the power cord into the wall outlet. Turn on the circuit breaker.

16. Access the EFX 544 diagnostic program by pressing **Ramp ▲**, **Resistance ▼** and **Resistance ▲** simultaneously or keys 4,5,1,7,6,5,7,6,1.

17. When the LED test is complete and the EFX 544 is in lift calibration mode, operate the **Ramp ▲** or **Ramp ▼** keys until 12 is shown on the display.

18. Exit the diagnostic program.

19. With the Precor banner scrolling, turn off the EFX 544 with the circuit breaker. Unplug the power cord from the wall outlet.

20. Without allowing the lead screw to turn, thread the lift tube clockwise until it reaches the top of the lead screw. Again without allowing the lead screw to turn, thread the lift tube counterclockwise three and a half turns.

21. Disconnect the lift motor cable from the lower PCA, and lift capacitor.

22. Remove the screw that secures the lift motor ground wire to the EFX 544 frame.

Replacing the Lift Motor Assembly

23. Remount the upper end of the lift motor with the nut and bolt removed in step 11.

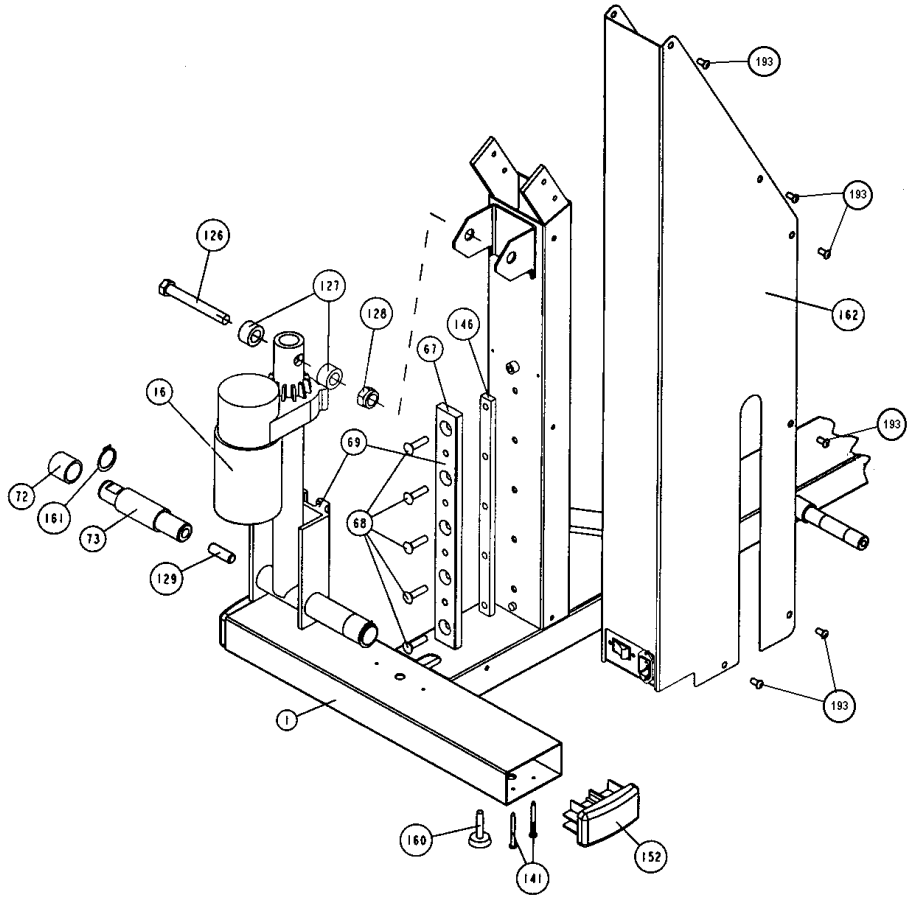
24. Position the lift motor assembly against the lift guide. Align the bore in the lift tube with the bore in the lift bracket.

25. Remove the lower lift shaft from the threaded stud. Clean off the old loctite. Put a small amount of blue loctite on the threaded stud. Thread one end of the lower lift shaft onto the stud, then insert the shaft with the stud through the lift guide clamp.

26. Thread the remaining lower lift shaft onto the stud. Hand tighten the lower lift shaft and then use the two wrenches to tighten it an additional 1/4 turn.

27. Slide both wear tubes onto the lower lift shaft and replace the snap rings on each end of the lower lift shaft (see Diagram 5.4).

Diagram 5.4 - Exploded View of the Lift System



28. Insert the upper lift shaft through the EFX 544 frame and upper lift motor assembly. Replace the plastic spacers (if you have a unit built after June 19, 1996) and the snap ring on the end of the upper lift shaft.

29. Position the lower electronics bracket against the EFX 544 frame. Replace the two screws that secure the top of the bracket to the frame.

30. Refer to Diagram 7-3. Re-connect the lift motor cables to the lower PCA and lift capacitor. Connect the lift motor ground wire.

31. Replace the screw that secures the lift motor and EFX 544 ground wires to the frame.

32. Using a large cable tie, secure the ribbon cable, lift motor cable and lift motor capacitor wires to the lift motor. Loop the lift motor cable over the lift motor until the lift motor cable lies flat against the motor casing.

33. Rotate the ramps and then the stair arms to the front of the EFX 544. Position the stair arms on the ramp.

34. Re-install both covers.

Procedure 6.1 - Troubleshooting the Ribbon Cable

1. With the lift set at level 1, turn off the EFX 544 with the circuit breaker.

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

2. Remove the front cover.

3. Attach the wrist strap to your arm, then connect the ground lead of the wrist strap to the EFX 544 frame.

4. Disconnect the ribbon cable from the lower PCA.

5. Remove the screws that secure the upper display module assembly to the upper frame member.

CAUTION
When you perform the next step, tape the ribbon cable to the EFX 544 to prevent it from falling into the upper frame member.

6. Disconnect the ribbon cable from the upper PCA. Set aside the upper display module.

7. Connect the spare ribbon cable between the upper PCA and the lower PCA.

8. Check the operation of the EFX 544 as described in Section Four.

9. If the EFX 544 operates correctly with the spare ribbon cable**...**

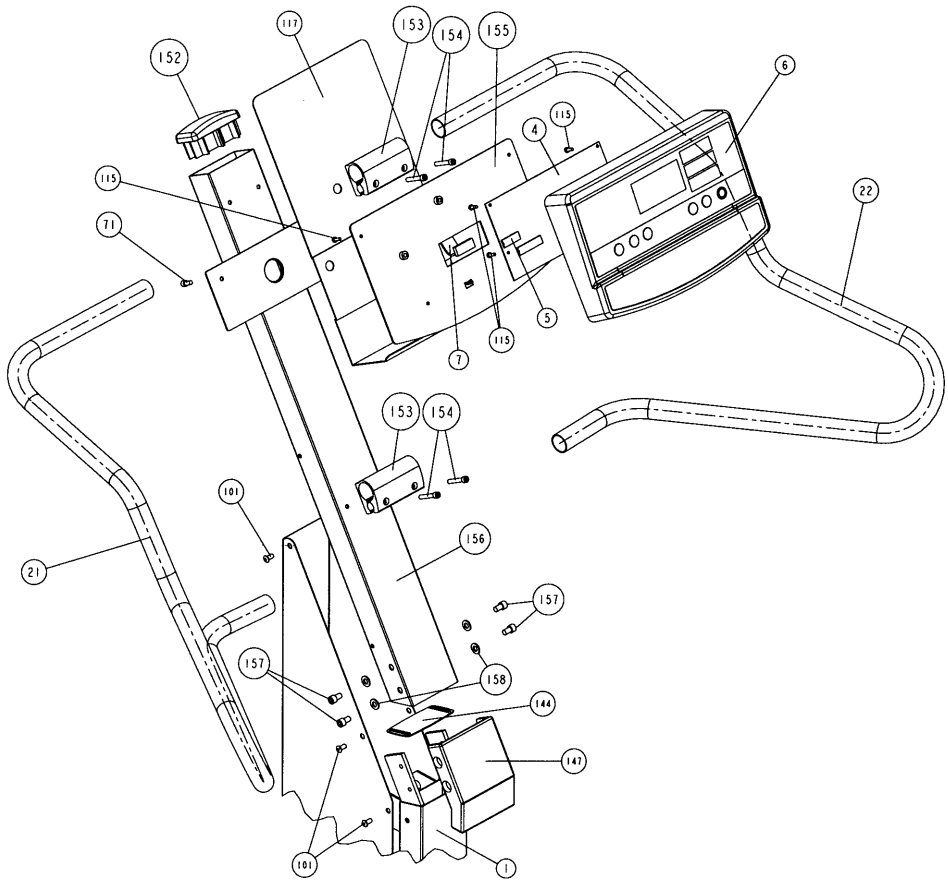
THEN...	**OTHERWISE...**
Install a new ribbon cable on the EFX 544 as described in Procedure 7.5.	Continue with the next step.

10. Turn off the EFX 544 with the circuit breaker.

11. Disconnect the spare ribbon cable from the upper and lower PCA’s.

12. Connect the original ribbon cable to the upper and lower PCA’s.

Diagram 6.1 - Upper Column Assembly



13. Position the upper display module on the upper frame member (see Diagram 6.1). Install the screws that secure the display module to the frame member.

14. Remove the ground lead of the wrist strap from the EFX 544 frame, then remove the wrist strap from your arm.

15. Re-install the front cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

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

Procedure

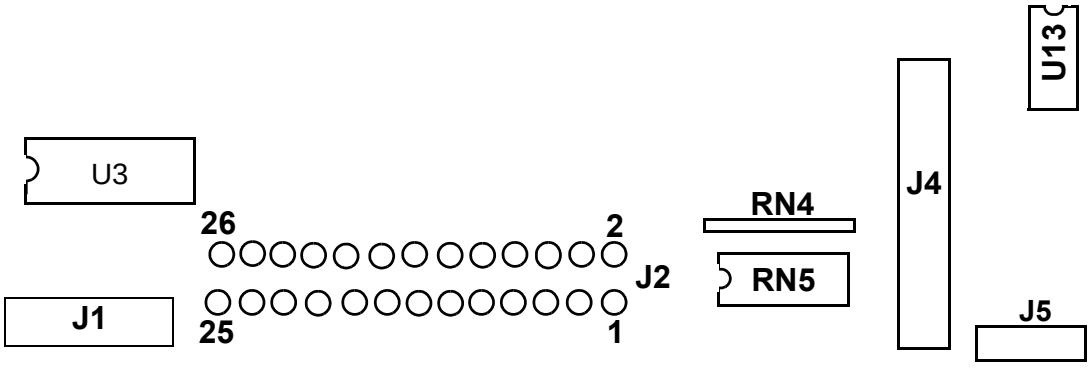
1. Set the circuit breaker in the “off” position.

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 6.2 - 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 6.1 (no keys pressed) and Table 6.2 (with the appropriate key pressed)...

Table 6.1 - Voltage Test Points (Function Keys Not Pressed)

Place the positive lead of the voltmeter on...	The voltmeter should read...
Pin 3 of J3	5 Vdc ± 500 mVdc
Pin 4 of J3	5 Vdc ± 500 mVdc
Pin 5 of J3	5 Vdc ± 500 mVdc
Pin 7 of J3	5 Vdc ± 500 mVdc
Pin 8 of J3	5 Vdc ± 500 mVdc
Pin 9 of J3	5 Vdc ± 500 mVdc
Pin 10 of J3	5 Vdc ± 500 mVdc

Table 6.2 - Voltage Test Points (Function Keys Pressed)

Place the positive voltmeter lead on...	At the display enclosure, press...	The voltmeter should read between...
Pin 3 of J3	ENTER	0 Vdc and 500 mVdc
Pin 4 of J3	RAMP DOWN	0 Vdc and 500 mVdc
Pin 5 of J3	RAMP UP	0 Vdc and 500 mVdc
Pin 7 of J3	STOP	0 Vdc and 500 mVdc
Pin 8 of J3	RESISTANCE DOWN	0 Vdc and 500 mVdc
Pin 9 of J3	RESISTANCE 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 6.1 and 6.2 and one or more keys do not function, replace the upper PCA.

8. If the voltage readings in Table 6.1 are incorrect, disconnect the keypad cable from the key pad connector and repeat the voltage measuremnts in 6.1. 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 6.1 are correct and one or more voltage readings in Table 6.2 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 6.3 - Troubleshooting the Speed Sensor

Circuit Description
The speed sensor is an infrared photoeye that straddles a target. The target is either a plastic disc with alternate clear and opaque sections or a plastic “fan” type device. The target rotates as the unit is operated and the infrared beam is interrupted when an opaque section or “fan blade” passes between the sensor legs. The output from the speed sensor is a 5 Vdc square wave, the frequency of which indicates the operating speed. When a square wave output is not being generated by the speed sensor the system assumes the unit is not in use and removes resistance from the eddy current magnet system after 6 seconds of idle time.

Procedure

1. Remove front and rear covers. Plug the unit into a wall outlet and set the circuit breaker in the “on” position. Set the unit in the manual program and operate the unit. If a stride rate is not displayed, the speed sensor is not operative. We shall use the presence of a stride rate to determine when the speed sensor is functioning normally.

2. Using a DC voltmeter, measure the voltage between terminal 1 (red wire) and terminal 2 (black wire) on the speed sensor connector. The measurement should be approximately 5 Vdc. If the voltage is correct skip to step 4. If the voltage is missing or significantly low, disconnect the speed sensor connector from the speed sensor and repeat the measurement on the connector. If the voltage is now correct, replace the speed sensor. If the voltage is still missing or significantly low, continue with step 3.

3. Repeat the measurement in step 2 at terminals 1 and 2 of P4 on the lower PCA. If the voltage is missing or significantly low, replace the lower PCA. If the voltage is now correct, replace the speed sensor cable assembly.

4. Using a DC voltmeter, measure the voltage between terminal 1 (red wire) and terminal 5 (white wire) on the speed sensor connector. Slowly rotate the flywheel as you monitor the voltage. The measurement should switch between approximately 0.5 Vdc and approximately 4.25 Vdc. If the voltage is correct, skip to step 5. If the voltage does not switch (the voltage is constantly low or high as the flywheel is slowly rotated), replace the speed sensor. If the voltage does not exceed 3.8 Vdc, adjust potentiometer R24 on the lower PCA and repeat the measurement. If the voltage is now correct, but the stride rate is still not displayed when the unit is operated, skip to step 5. If the voltage is still significantly low, replace the lower PCA.

5. Repeat the measurement in step 4 at terminals 1 and 5 of P4 on the lower PCA. If the voltage is missing or significantly low, replace the speed sensor cable assembly.

6. If you have performed all of the above tests and the stride rate is not displayed when the unit is operated, 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.

Procedure 6.4 - Troubleshooting the Lift System (electrical)

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 C544 circuit breaker in the “off” position. Using an ohmmeter, measure between terminal 4 (brown wire) and terminal 6 (orange wire) of the P2 connector on the lower PCA. The measurement should be approximately 10 KΩ. If the measurement is open (∞) 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 KΩ. If the measurement is open (∞) 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 C544 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 1Ω or less. If the fuse is good, re-insert the fuse and skip to step 9. If the fuse is open (∞)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 14.5Ω, 14.5Ω and 29Ω, respectively. If any of the measurements are significantly low, replace the lift motor.

9. Re-insert the P2 connector in the lower PCA. Set the C544 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 **RAMP ▲** 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 **RAMP ▼** 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 6.5 - Troubleshooting the Lift System (mechanical)

Potential Symptoms

This procedure will cover two separate areas, a mechanically “frozen” lift system and a noisy lift symptom. A mechanically “frozen” lift system is a lift system in which the lift motor is powered but the lift does not move. Noise issues, will be segregated into two areas. Noises occurring as the lift motor operates and noises from the front of the unit that occur as the stairarms are operated

1. If the lift system is mechanically “frozen” continue with step 2. If lift system is noisy skip to step 10.

2. Set the circuit breaker in the “off” position and remove the front cover. Remove the lower lift shaft. Set the circuit breaker in the “on’ position. If the lift motor operates normally with the lower lift shaft removed continue with step 3. If the lift motor does not operate normally with the lower lift removed, go to Procedure 6.4.

3. Set the circuit breaker in the “off” position and unplug the unit from the wall outlet. Grasp the lift bracket (aluminum bracket) and slide it up or down on the lift guide (plastic bar). If the lift guide is very difficult to move, skip to step 4. Using a clean dry cloth, wipe the surface of the lift guide clean. Slide the lift bracket out of your way so that you can wipe the entire surface of the bracket. Apply a fresh coat of teflon anti-seize (paste) lubricant. Skip to step 8.

4. Remove the bolts securing the lift guide to the frame. You may need to force the lift bracket out of way to access some of the lift guide bolts. If, after the lift guide and lift bracket have been removed, the lift bracket does not move freely on the lift guide, replace it with part number 50548-101. This is a matched set and will provide optimum performance.

5. If the steel bar that is between the lift guide and the frame is welded onto the frame skip to step 7. If the steel bar that is between the lift guide and the frame is not welded onto the frame, continue with step 6.

6. Apply a fresh coat of teflon anti-seize lubricant to the lift guide. Apply a small amount of blue loctite to the five lift guide mounting bolts. Set the lift bracket/lift guide on the steel bar and remount all three onto the frame. Torque the mounting bolts to 100 in/lbs. Allow the loctite to fully set (per label instructions) before the unit is used. If the lift tube has not been rotated and the lift motor drive screw is well lubricated, remount the lift motor per Procedure 5.3 steps 23 to 33. Otherwise, this procedure is complete.

7. Apply a fresh coat of teflon anti-seize lubricant to the lift guide. Apply blue loctite to the lift guide mounting bolts and mount the lift bracket/lift guide onto the frame. If the lift guide mounting bolts were hypothetically numbered from 1 to 5, with bolt 1 on top and bolt 5 on the bottom, tighten the bolts in the following order; 3,2,4,1,5. As the lift guide mounting bolts are tightened the lift bracket may start to bind on the lift guide. Tighten the bolts as tight as possible without causing the lift bracket to bind on the lift guide. It will be necessary to check lift bracket movement after each bolt is tightened. If the lift bracket starts to bind, back out the bolt just enough to allow the lift guide to move freely. Allow the loctite to fully set (per label instructions) before the unit is used. If the lift tube has not been rotated and the lift motor drive screw is well lubricated, remount the lift motor per Procedure 5.3 steps 23 to 33. Otherwise, this procedure is complete.

8. If the lift motor drive screw requires lubrication, thread the lift tube (T shaped tube) off of the lift motor drive screw. Wipe the lift motor drive screw clean with a dry cloth. Apply a fresh coat of bearing grease to the lift motor drive screw. Recalibrate the lift per Procedure 5.3.

9. If the C544 is noisy when the stairarms are operated, skip to step 12. If the C544 is noisy when the lift motor is operated continue with step 10.

10. If the noise is coming from the lift motor, lubricate the drive screw as in step 8. If the motor is noisy after the drive screw has been lubricated, replace the lift motor per Procedure 5.3 steps 23 to 33.

11. If the noise is coming from the lift guide/lift bracket area the correct procedure will depend on the type of lift guide, lift bracket and lower lift shaft that is on the unit.

12. If the unit contains a 3 piece lift bracket, replace the lift guide and lift bracket with part number 50548-101. If the unit contains a one piece lower lift shaft, replace it with part number 50533-104. Skip to step 5.

13. If the unit contains a aluminum lift bracket and the fit between the lift bracket and lift guide is too loose, replace the lift guide and lift bracket with part number 50548-101. Skip to step 5.

Procedure 6.6 - Troubleshooting the Eddy Current System (electrical)

Note:
If the control circuit does not see an output from the speed sensor for 6 second, it removes power from the eddy current system. Therefore, when it is necessary to check the resistance or take voltage measurements in the eddy current system it will be necessary to slowly turn the flywheels to ensure that the power time out has not occurred.

1. There are three typical symptoms concerning the eddy current system. No resistance (pedaling resistance), no resistance after six seconds and incorrect resistance. If the problem is no resistance, continue with step 2. If the problem is no resistance after six seconds test the speed sensor per Procedure 6.3. If the problem is incorrect resistance skip to step 7.

2. Set the circuit breaker in the “on” position, enter the manual program and set the resistance at level 5. Using a DC voltmeter, check the voltage across one of the magnets. The voltage should measure approximately 24.5 Vdc (approximately 31 Vdc on software versions V2.03 or less). If the voltage is missing or significantly low, skip to step 4. If the voltage is correct, continue with step 3.

3. Set the circuit breaker in the “off“ position. Check the magnet wiring per Diagram 5.2. If any of the magnet wiring is reversed or incorrect the resistance will be affected. If you have performed all of the above tests and there is still no resistance, call Precor Technical Support.

4. Using an ohmmeter, measure between the M- and M+ terminals of the lower PCA. The measurement should be approximately 45Ω. If the measurement is open (∞), check the connections at both magnets, the filter capacitor, the inductor and the lower PCA.

5. If all of the wiring connections are good and there is still no resistance, 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 there is still no resistance, call Precor Technical Support.

7. If the resistance is greater than normal, the cause could be mechanical rather than electrical. Set the circuit breaker in the “off“ position. Rotate the flywheels, they should turn freely and easily. If the stairarms are removed from the flywheels and the flywheels are rotated rapidly and then released, the flywheels should continue to spin for several seconds. If the flywheels do no turn freely, continue with Procedure 6.7.

8. If the C544 was manufactured prior to March 20, 1997, a magnet and eddy current disc with an adjustable gap was used. If appropriate, check the magnet gap per Procedure 5.1.

9. Set the circuit breaker in the “on“ position, enter the manual program and set the resistance at level 5. Using a DC voltmeter, check the voltage across one of the magnets. The voltage should measure approximately 24.5 Vdc (approximately 31 Vdc on software versions V2.03 or less).

10. If the voltage is significantly high check the 120/240 volt setting in Procedure 3.4. If the 120/240 volt setting is incorrect the voltages measured in step 9 will be incorrect.

11. If the voltage is still significantly high or low, 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 resistances still incorrect, call Precor Technical Support.

Procedure 6.7 - Troubleshooting the Eddy Current System (mechanical)

Note:
Over a period of time and usage, the lubrication of the main flywheel oilite bushings and the stairarm oliite bushings will loose effectiveness. This will cause the flywheels and/or stairarms to turn harder, thus increasing the force required to operate the unit.

1. Set the circuit breaker in the “off” position, unplug the line cord from the wall outlet and remove the rear cover.

2. Remove both stairarms per Procedure 7.21, steps 1 to 6. Remove the left hand flywheel per Procedure 7.14 steps 1 to 8. Rotate the right hand flywheel and “walk” the drive belt off of the pulley. Slide the right hand flywheel and pulley/axle assembly out of the frame as a unit.

3. Using a clean dry cloth, wipe all residue off of the stairarm pins, mounted in the flywheel rim, and the pulley axle. Using a clean dry cloth, wipe the inner surfaces of the oilite bushings in both stairarms and the oilite bushings in the rear frame column. Use a Scotch Brite pad or similar abrasive to lightly buff the inner surface of the stairarm and rear frame column oilite bushings to remove any potential “glazing”.

4. Coat the inner surface of the stairarm and rear frame column oilite bushings with Anderol 465 synthetic oil. If Anderol 465 is not available, mineral oil may be used. However, longer lasting results will be achieved by using Anderol 465.

5. Replace the flywheels per Procedure 7.14 steps 10 to 15. Replace the stairarms per Procedure 7.21, steps 7 to 13.

6. Replace the rear cover.

Procedure 7.1 - Replacing the Covers

Replacing the Front Cover

1. Turn on the EFX 544 with the circuit breaker, then press **QUICKSTART** on the display panel.

2. Press **Ramp ▼** until the lift is set at level 1.

3. Turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

4. Remove the fasteners that secure the front cover to the EFX 544 frame.

5. Lift the cover until it clears the lower electronics bracket, then set it aside.

6. When maintenance operations are complete, slide the cover over the lower electronics bracket. Position the cover at its mounting position, take care not to snag any wiring as you slide the cover into place.

7. Thread the fasteners through the front cover and EFX 544 frame, but do not tighten. Pull the cover towards the front of the unit. Secure the fasteners.

Replacing the Rear Cover

1. Turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

2. Remove the fasteners that secure the rear cover to the EFX 544 frame.

3. Raise the cover until it is clear of the flywheels, then set it aside.

4. When maintenance operations are complete, place the cover over the flywheels. Position the cover at its mounting position.

5. Replace the fasteners that secure the rear cover to the EFX 544 frame.

Procedure 7.2 - Replacing the Display Enclosure or Upper PCA

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

Removing the Display Enclosure

1. Turn off the EFX 544 with the circuit breaker.

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

2. Remove the screws that secure the upper display module assembly to the upper frame member.

CAUTION
When you perform the next step, tape the ribbon cable to the EFX 544 to prevent it from falling into the upper frame member.

3. Attach the wrist strap to your arm, then connect the ground lead of the wrist strap to the EFX 544 frame.

4. Disconnect the ribbon cable from the upper PCA.

5. Remove the screws that secure the display enclosure to the display plate.

6. If you are going to re-install the display enclosure without replacing the upper PCA **. . .**

THEN . . .	**OTHERWISE . . .**
Skip to Step 19.	Continue with the next step.

Removing and Replacing the Upper PCA

7. Carefully disconnect the keypad ribbon cable from the upper PCA.

8. Remove the screws that secure the upper PCA to the display enclosure. Set aside the defective upper PCA for eventual shipment to Precor Customer Service.

9. Position the upper PCA at its mounting location on the display enclosure (see Diagram 7-1). Install the screws that secure the upper PCA to the display enclosure.

10. Line up the blank place on the end of the keypad ribbon cable with the blank pin position on the keypad connector. Place a full twist in the end of the keypad ribbon cable, then carefully connect it to the upper PCA.

11. Remove the ground lead of the wrist strap from the EFX 544 frame, then remove the wrist strap from your arm.

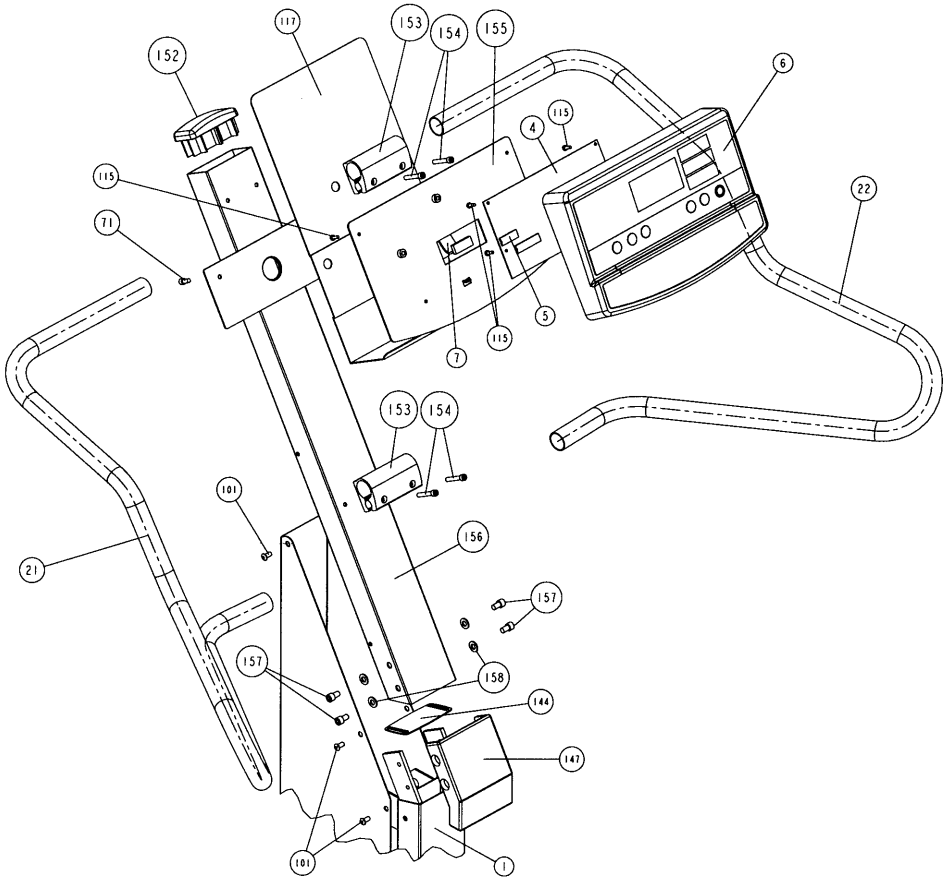
12. Connect the ribbon cable to the upper PCA.

13. Position the upper display module on the upper frame member. Install the screws that secure the display module to the upper frame member.

14. Position the display plate on the display enclosure. Install the screws that secure the display enclosure to the display plate.

15. Check the operation of the EFX 544 as described in Section Four.

Diagram 7.1 - Upper Frame Assembly



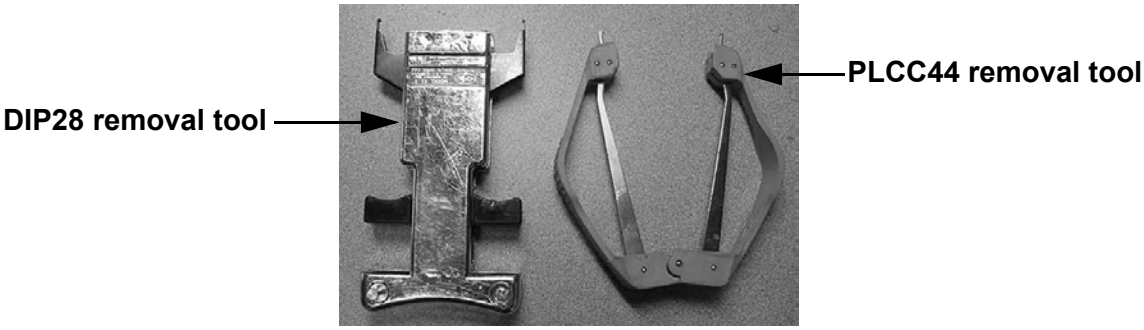
Procedure 7.3 - Replacing the PROM

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

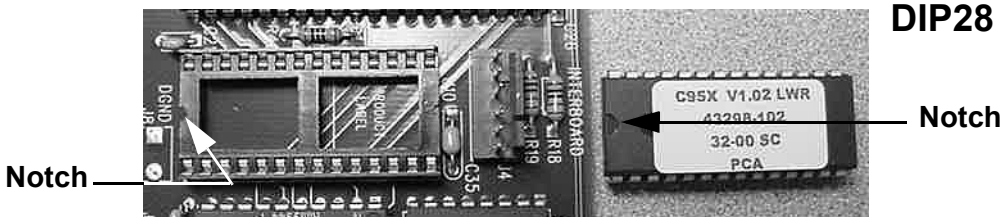
1. The PROM and the associated printed circuit assembly (PCA) are static sensitive. Anti-static devices must be used and all anti-static precautions must be followed during this procedure.

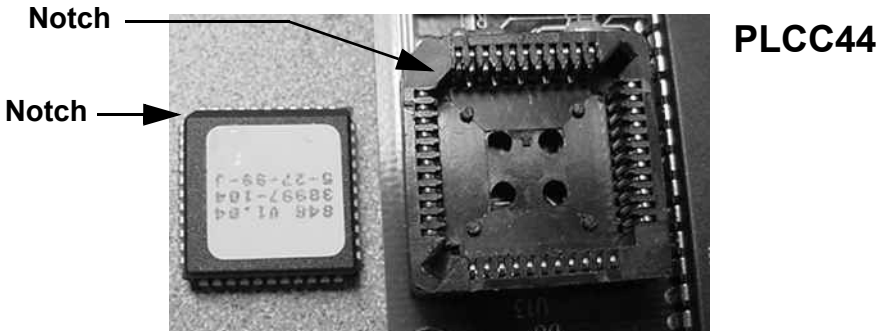
2. Remove the printed circuit assembly per its associated procedure.

3. Currently we are using two styles of IC software packages. they are a 28 pin dual in line package (DIP28) and a forty-four pin square package (PLCC44). Each of these packages should be removed with a proper IC removal tool (see the illustrations below)



4. The IC's may inserted into their socket by hand by carefully aligning the notch on the IC with the notch on the IC socket and carefully pressing the IC into its socket. See the illustrations below for the alignment notches. Care must be taken that the IC legs on a DIP28 are all aligned in the socket to prevent the legs from bending when inserted. The PLCC44 IC must be carefully aligned squarely in its socket or it will not insert. Do not force the IC into its, socket. If it does not insert easily, remove the it and re-align it in its socket.





Procedure 7.4 - Replacing the Lower PCA

Removing the Lower PCA

1. With the lift set at 1, turn off the EFX 544 with the circuit breaker.

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

2. Remove the front cover as described in Procedure 7.1.

3. Attach the wrist strap to your arm, then connect the ground lead of the wrist strap to the EFX 544 frame.

Note:
Refer to the wiring diagram shown in Diagram 7.3. Always mark all wires before disconnecting, to insure quick accurate replacement!

4. Disconnect the cables from the lower PCA.

CAUTION
While performing the next step, hold the lower PCA to prevent it from making contact with the capacitor clamps.

5. Remove the nuts that secure the lower PCA to the lower electronics bracket.

6. Set aside the lower PCA for eventual shipment to Precor.

Replacing the Lower PCA

7. Remove the P1 connector from the lower PCA that has been removed from the EFX 544 and install it on the replacement lower PCA.

8. Insert the lower PCA screws into the T-shaped channel on the PCA heat sink.

9. Hold the lower PCA against the lower electronics bracket. Install the nuts that secure the lower PCA to the bracket.

10. Connect the cables you disconnected in Step 6.

11. Remove the ground lead of the wrist strap from the EFX 544 frame, then remove the wrist strap from your arm.

12. Re-install the front cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 7.5 - Replacing the Ribbon Cable

Removing the Ribbon Cable

1. With the lift set at level 1, turn off the EFX 544 with the circuit breaker.

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

2. Remove the front cover as described in Procedure 7.1.

3. Cut the cable tie that secures the ribbon cable to the lift motor.

4. Attach the wrist strap to your arm, then connect the ground lead of the wrist strap to the EFX 544 frame.

5. Disconnect the ribbon cable from the lower PCA.

6. Remove the screws that secure the upper display module assembly to the upper frame member.

CAUTION
When you perform the next step, tape the ribbon cable to the EFX 544 to prevent it from falling into the upper frame member.

7. Disconnect the ribbon cable from the upper PCA. Set aside the upper display module until you are ready to install the new ribbon cable.

Replacing the Ribbon Cable

8. Tape the end of the new ribbon cable to the end of the old ribbon cable. Pull the old ribbon cable through the slot in the lower end of the upper frame member until the ribbon cable is in position. Tape the end of the new ribbon cable to the upper frame member.

9. Connect the ribbon cable to the upper PCA.

10. Position the upper display module on the upper frame member. Install the screws that secure the display module to the frame member.

11. Connect the new ribbon cable to the lower PCA.

12. Remove the ground lead of the wrist strap from the EFX 544 frame, then remove the wrist strap from your arm.

13. With a large cable tie, secure the ribbon cable to the lift motor.

14. Re-install the front cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 7.6 - Replacing the Power Entry Module

Removing the Power Entry Module

1. With the lift set at level 1, turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

2. Remove the front cover as described in Procedure 7.1.

3. Remove the wires from the back of the power entry module.

4. Note the orientation of the power entry module. The new module must be positioned with the same orientation. Remove the screws that secure the power entry module to the EFX 544 frame.

Replacing the Power Entry Module

5. Position the new power entry module at its entry position. Make sure that the module is oriented correctly. Install the screws that secure the power entry module to the EFX 544 frame.

6. Replace the loose wire connected to the circuit breaker to the lower terminal of the power entry module. Replace the loose wire connected to the lower PCA to the upper terminal of the power entry module. Replace the loose ground wire on the ground stud to the middle terminal.

7. Re-install the front cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 7.7 - Replacing the Circuit Breaker

Removing the Circuit Breaker

1. With the lift set at level 1, turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

2. Remove the front cover as described in Procedure 7.1.

3. Remove the wires from the circuit breaker.

4. Remove the screws that secure the circuit breaker to the EFX 544.

Replacing the Circuit Breaker

5. Make sure that the new circuit breaker is set to OFF. Position the breaker so that the label is facing up, then install the screws that mount the circuit breaker to the EFX 544.

6. Reconnect the loose wire connected to the power entry module to the line terminal of the circuit breaker. Reconnect the loose wire connected to the lower PCA to the load terminal.

7. Re-install the front cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 7.8 - Replacing the Inductor

Removing the Inductor

1. With the lift set at level 1, turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

2. Remove the front cover as described in Procedure 7.1.

3. Remove the inductor leads from the inductor.

4. Remove the screws that secure the inductor to the lower electronics bracket.

Replacing the Inductor

5. Hold the new inductor below its mounting position. Connect the inductor leads to the inductor.

6. Position the new inductor at its mounting position. Install the screws that secure the inductor to the lower electronics bracket.

7. Re-install the front cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 7.9 - Replacing the Filter Capacitor

Removing the Capacitor

1. With the lift set at level 1, turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

2. Remove the front cover as described in Procedure 7.1.

3. Slide the plastic cap back from the capacitor terminals. Remove the screws that secure the wires to the terminals of the capacitor. Remove the wires from the terminals.

4. Loosen the screw and locknut on the capacitor clamp. Remove the capacitor from the clamp.

5. If you are removing and replacing the capacitor clamp **. . .**

THEN . . .	**OTHERWISE . . .**
Continue with the next step.	Skip to Step 8.

Removing the Capacitor Clamp

6. Remove the screws that secure the capacitor clamp to the lower electronics bracket.

7. Position the new capacitor clamp so that it is flush with the lower electronics bracket. Replace the the screws that secure the clamp to the bracket.

Replacing the Capacitor

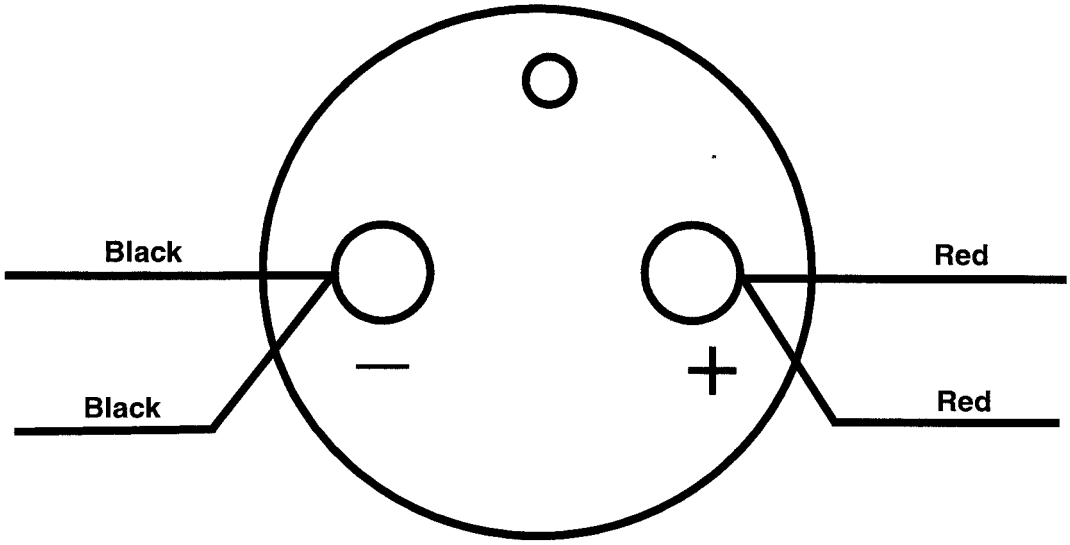
Take care not to nick the capacitor case. If the bare metal of the capacitor comes in contact with the capacitor clamp, equipment failure could result.

8. Position the new capacitor in its mounting position. Tighten the screw and locknut on the capacitor clamp.

9. Make sure the wires taken off the capacitor are routed through the capacitor cap. Connect the loose black wires to the negative terminal of the capacitor. (see Diagram 7.5). Connect the loose red wires to the positive terminal of the capacitor. Replace the screws that secure the wires to the capacitor terminals. Slide the plastic cap over the capacitor terminals.

10. Re-install the front cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Diagram 7.3 - Capacitor Wiring



Procedure 7.10 - Replacing the Lift Motor Assembly

Removing the Lift Motor Assembly

1. With the lift set at 1, turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

2. Remove the front and rear covers as described in Procedure 7.1.

3. Lift the stair arms from the ramp assembly and rotate them towards the back of the EFX 544.

4. Rotate the ramps to the back of the unit. Rest the ramps on the flywheels.

5. Remove the outboard snap rings from each end of the lower lift shaft. Remove the lower axle wear tubes. Hold one end of the lower lift shaft with a wrench. Loosen the other end with a second wrench. Using the wrenches, unthread both ends of the lower lift shaft from the threaded stud. Set aside the lower lift shaft and the stud.

Note:
Units built before September 3, 1996, will have a one-piece lower lift shaft.

6. Cut the cable ties that secure the ribbon cable to the lift motor and EFX 544 wiring cables.

7. Disconnect the lift motor cable assembly from the lower PCA.

8. Remove the wires from the lift motor capacitor.

9. Remove the screw that secures the lift motor ground wire to the EFX 544 frame.

10. Remove the two screws that secure the top of the lower electronics bracket to the EFX 544 frame.

11. While an assistant supports the lift motor, remove the snap ring from one end of the upper lift shaft. Remove the upper lift shaft and the two plastic spacers (read the Note below) from the EFX 544 frame.

Note:
Units built after July 9, 1996, have two plastic spacers inserted into the upper lift shaft.

12. Lift the lift motor assembly up and away from the EFX 544 (see Diagram 7.6).

13. Calibrate the lift motor per Procedure 5.3, steps 13 to 22.

Replacing the Lift Motor Assembly

14. Inspect the upper and lower lift shafts. If they are worn, install new shafts on the EFX 544.

15. Position the lift motor assembly against the lift guide. Align the bore in the lift tube with the bore in the lift bracket.

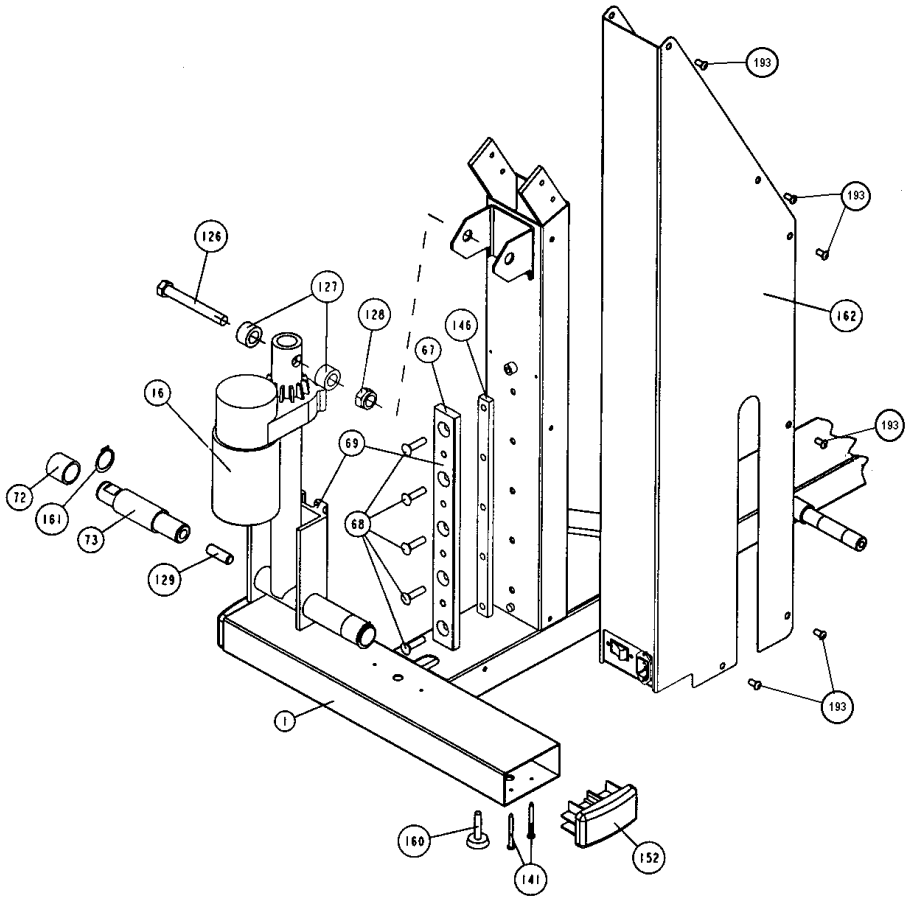
16. Remove the lower lift shaft from the threaded stud. Clean off the old loc-tite. Put a small amount of blue loc-tite on the threaded stud. Thread one end of the lower lift shaft onto the stud, then insert the shaft with the stud through the lift guide clamp.

17. Thread the remaining lower lift shaft onto the stud. Hand tighten and then use wrenches to tighten the lift shaft an additional 1/4 turn.

CAUTION
If you do warp the lift guide clamp, the fit between the lift guide clamp and the lift guide will be loose. This situation results in noise when the unit is used.

18. Replace the snap rings on each end of the lower lift shaft (see Diagram 7-4).

Diagram 7.4 - EFX 544 Lift System



19. Insert the upper lift shaft through the EFX 544 frame and upper lift motor assembly. Replace the plastic spacers (if you have a unit built after June 19, 1996) and the snap ring on the end of the upper lift shaft.

20. Position the lower electronics bracket against the EFX 544 frame. Replace the two screws that secure the top of the bracket to the frame.

21. Refer back to Diagram 7.3. Re-connect the lift motor cables to the lower PCA and lift capacitor. Connect the lift motor ground wire.

22. Replace the screw that secures the lift motor and EFX 544 ground wires to the frame.

23. Using a large cable tie, secure the ribbon cable, lift motor cable and lift motor capacitor wires to the lift motor. Loop the lift motor cable over the lift motor until the lift motor cable lies flat against the motor casing.

24. Rotate the ramps and then the stair arms to the front of the EFX 544. Position the stair arms on the ramp.

25. Re-install both covers as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 7.11 - Replacing the Lift Guide

IMPORTANT
Units built before January 23, 1996, have a T-shaped lift guide. If you must replace an older style lift guide, order a lift guide replacement kit from Precor (kit part number:50530-103).

Removing the Lift Guide

1. With the lift set at level 1, turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

2. Remove the front and rear covers.

3. Lift the stair arms from the ramp assembly and rotate them towards the back of the EFX 544.

4. Rotate the ramps to the back of the unit. Rest the ramps on the flywheels.

5. Remove the lift motor assembly as described in Procedure 7.10, steps 5 to 12. After removing the lift motor, do not rotate the lift tube. If the tube is rotated, you must recalibrate the lift motor per Procedure 5.3, steps 13 to 22.

6. Remove the screws that secure the lift guide to the EFX 544 frame.

7. Replace the lift guide per Procedure 6.5 steps 5, 6 and 7.

8. Replace the lift motor per Procedure 7.10, steps 15 to 23.

9. Rotate the ramps and stairarms forward.

10. Replace both covers.

Procedure 7.12 - Replacing the Lift Motor Capacitor

1. With the lift set at level 1, turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

2. Remove the front cover as described in Procedure 7.1.

Note:
Refer to the wiring diagram shown in Diagram 7.3. Mark all wires before disconnecting, to insure quick, accurate replacement!

3. Remove the wires from the terminals of the capacitor.

4. Loosen the screw and locknut on the capacitor clamp. Remove the capacitor from the clamp.

5. If you are removing and replacing the capacitor clamp **. . .**

THEN . . .	**OTHERWISE . . .**
Continue with the next step.	Skip to Step 8.

Removing the Capacitor Clamp

6. Remove the screws that secure the capacitor clamp to the lower electronics bracket.

7. Position the capacitor clamp at its mounting location. Replace the screws that secure the clamp to the lower electronics bracket.

Replacing the Capacitor

CAUTION
Take care not to nick the capacitor case. If the bare metal of the capacitor comes in contact with the capacitor clamp, equipment failure could result.

8. Position the new capacitor in its mounting position. Tighten the screw and locknut on the capacitor clamp.

9. Connect a loose lift motor wire to each terminal of the lift motor capacitor.

10. Re-install the front cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 7.13 - Replacing the Lift Axle Wear Tube

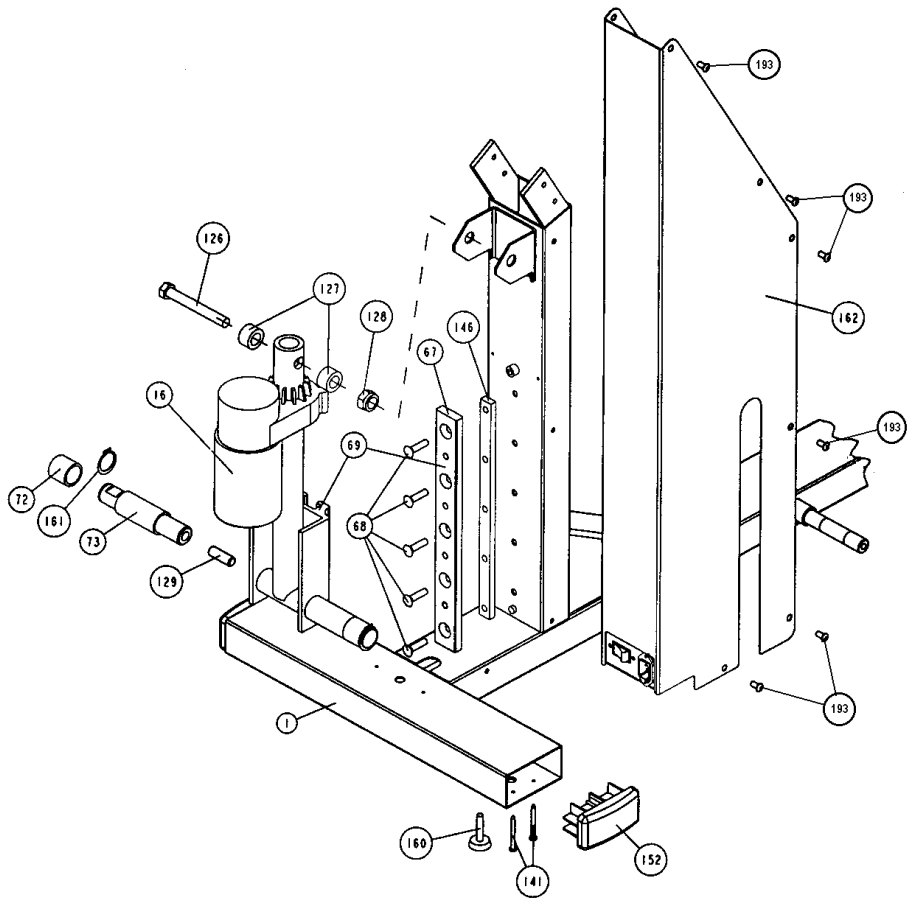
Removing the Lift Axle Wear Tube

1. Turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

2. Remove the outboard snap ring from one end of the lower lift shaft. Remove the lower axle wear tube (see Diagram 7.5).

Diagram 7.5 - EFX 544 Lift System



3. If you removed the lift axle wear tube because you are installing a new lower lift shaft (as described in Procedure 7.10), visually inspect the lift axle wear tube. If the wear tube is worn or defective **. . .**

THEN . . .	**OTHERWISE . . .**
Replace a new lift axle wear tube on the EFX 544 when you perform the next step.	Replace the original lift axle wear tube on the EFX 544 when you perform the next step.

Replacing the Lift Axle Wear Tube

4. Place the lift axle wear tube on the end of the lower lift shaft. Replace the snap ring on the lower lift shaft.

Procedure 7.14 - Replacing a Flywheel

Removing a Flywheel

1. Turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

2. Remove the rear cover as described in Procedure 7.1.

3. Remove the stair arm assembly from the flywheel that is to be removed as described in Procedure 7.21.

4. Place a 2 x 4 piece of lumber or a long-handled tool through the flywheel spoke and against the back of the rear frame upright.

Note:
When you perform the next step, use a long-handled wrench.

WARNING
Be careful not to catch your fingers in the flywheel when you perform the following steps.

5. Remove the bolt and washer that secure the flywheel to the flywheel pulley shaft.

6. Using a rubber mallet (or a block of wood and a hammer), tap the rim of the flywheel away from the flywheel pulley. Rotate the flywheel 90 degrees, and tap the rim of the flywheel again.

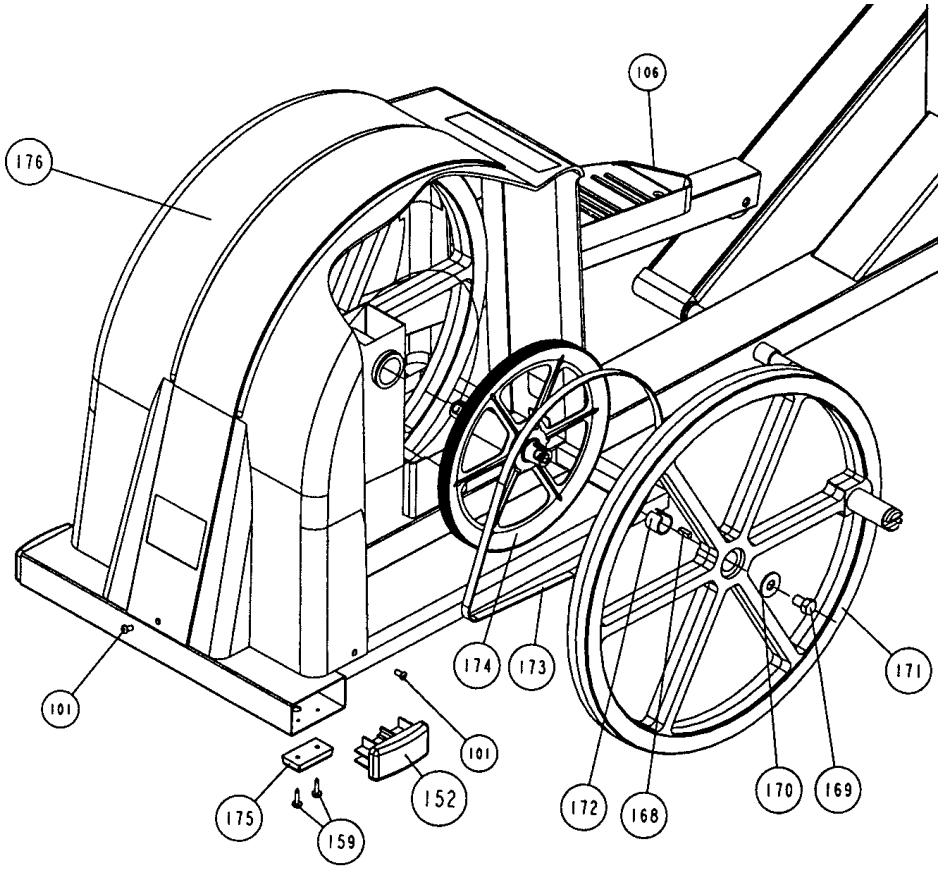
WARNING
The flywheel is very heavy. Be prepared for the weight of the flywheel when it comes off of the pulley shaft.

7. Keep tapping and rotating until the flywheel comes off of the pulley shaft (see Diagram 7.6).

8. Set aside the flywheel and the square key.

9. Check the flywheel belt for wear or damage. If the belt must be replaced, install a new belt on the EFX 544 as described in Procedure 7.15.

Diagram 7.6 - EFX 544 Flywheel



Replacing a Flywheel

10. Remove the tapered bushing from the flywheel hub. Inspect the bushing for wear or damage. If the bushing must be replaced, put a new bushing in the flywheel hub.

Note:
The thin edge of the tapered bushing must go toward the inside of the hub. If the bushing is not placed correctly in the flywheel hub, the flywheel will not fit onto the flywheel pulley shaft.

11. Position the square key on the pulley shaft. Line up the slot on the flywheel with the square key. Push the flywheel onto the pulley shaft. Position two carpenter clamps, 180 degrees apart, on the flywheels. Tighten the clamps evenly, drawing the flywheel fully onto the shaft.

Note
The outer edge of the bushing must be flush with the outer edge of the flywheel hub.

12. Place the edge of a deep-well socket against the edge of the bushing. Using a rubber mallet, tap the bushing until it is is flush with the flywheel hub.

13. Clean the old loc-tite off of the bolt removed in Step 5. Place a few drops of blue loc-tite onto the bolt shaft.

14. Place a 2 x 4 piece of lumber or a long-handled tool through the flywheel spoke and against the front of the rear frame upright.

15. Install the bolt and washer that secure the flywheel onto the EFX 544. Torque the bolt to 100 foot-pounds. Remove the carpenter clamps.

CAUTION
If loc tite is not used and the bolts are not correctly torqued, the bolts may work loose during normal operation.

16. Replace the stair arm assembly as described in Procedure 7.21.

17. Re-install the rear cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 7.15 - Replacing the Flywheel Belt

Removing the Flywheel Belt

1. Turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

2. Remove the rear cover as described in Procedure 7.1.

3. Remove the right stair arm assembly as described in Procedure 7.21.

4. Remove the right flywheel as described in Procedure 7.14.

5. Walk the belt off of the flywheel pulley.

Note:
The eddy current disk will fall to the frame when the belt is removed from the disk pulley.

Replacing the Flywheel Belt

6. Position one end of the belt on the disk pulley. Place the other end of the belt inboard of the flywheel pulley. Hold the belt against the disk pulley as you walk the belt onto the larger flywheel pulley.

7. Center the flywheel belt on the disk and flywheel pulley grooves.

8. Replace the right flywheel as described in Procedure 7.14.

9. Replace the right stair arm assembly as described in Procedure 7.21.

10. Re-install the rear cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 7.16 - Replacing the Tension Spring

Removing the Tension Spring

1. Turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

2. Remove the rear cover as described in Procedure 7.1.

3. Walk the flywheel belt off of the eddy current disk.

4. Remove the spring from the magnet pivot assembly and the EFX 544 frame.

Replacing the Tension Spring

Caution
Be careful not to pinch the speed sensor or magnet wiring when performing the next steps.

5. Place the new spring onto the EFX 544 frame and the magnet pivot assembly.

6. Replace the flywheel belt as described in Procedure 7.15.

7. Re-install the rear cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 7.17 - Replacing the Speed Sensor Assembly

IMPORTANT
On units built after August 21, 1996, the speed sensor cable is connected to the speed sensor via a connector.

Removing the Speed Sensor Assembly

8. With the lift set at level 1, turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

9. Remove the front and rear covers as described in Procedure 7.1.

10. Remove the screw(s) that secures the speed sensor assembly to the rear frame upright.

11. If the unit you are servicing was built before August 22, 1996 **. . .**

THEN . . .	**OTHERWISE . . .**
Continue with the next step.	Disconnect the speed sensor cable from the speed sensor. Skip to Step 7.

IMPORTANT
Do not remove the old speed sensor cable from when you perform the next step.

12. Cut the speed sensor cable off of the defective speed sensor. Remove the speed sensor cable from the lower PCA.

13. Tape the connector on the new speed sensor assembly to the old speed sensor. Pull the old speed sensor assembly through the slot in the horizontal frame member until the new sensor assembly is in position. Separate the old and new speed sensor cables.

Replacing the Speed Sensor Assembly

14. Position the speed sensor so that the sensor "legs" evenly straddle the edge of the speed label.

15. Replace the screw(s) that secures the speed sensor to the rear frame upright.

CAUTION
Rotate the eddy current disk assembly shaft. Check to be sure that the speed label does not rub against the speed sensor.

16. If the unit you are servicing was built before August 22, 1996 **. . .**

THEN . . .	**OTHERWISE . . .**
Connect the speed sensor cable to the lower PCA. Continue with the next step.	Connect the speed sensor cable to the speed sensor. Continue with the next step.

17. Re-install the front and rear covers as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 7.18 - Replacing the Magnet Cable Assembly

Removing the Magnet Cable Assembly

1. With the lift set at level 1, turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

2. Remove the front and rear covers as described in Procedure 7.1.

3. Remove the magnet cable assembly from the magnets.

4. Slide the plastic cap back from the filter capacitor terminals. Remove the screws that secure the wires to the terminals of the capacitor. Slide the magnet cables out of the plastic cap.

5. Tape the connector on the new magnet cable assembly to the old magnet cable. Pull the old magnet cable assembly through the slot in the horizontal frame member until the new magnet cable is in position. Separate the old and new magnet cables.

Replacing the Magnet Cable Assembly

6. Push the magnet cable assembly onto the magnet terminals (see Diagram 5.2).

7. Push the magnet cables through the plastic capacitor cap.

8. Connect the loose black wires to the negative terminal of the capacitor. Connect the loose red wires to the positive terminal of the capacitor. Replace the screws that secure the wires to the capacitor terminals. Slide the plastic cap over the capacitor terminals.

9. Re-install the front and rear covers as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 7.19 - Replacing the Magnet Pivot Assembly

IMPORTANT
Use this procedure when you must install a new magnet assembly, eddy current disk, target label and magnet pivot assembly.

Removing the Magnet Pivot Assembly

1. Turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

2. Remove the rear cover as described in Procedure 7.1.

3. Remove the flywheel belt as described in Procedure 7.15.

4. Remove the screw(s) that secure(s) the speed sensor assembly to the magnet pivot assembly.

5. Disconnect the magnet cables from the magnet assembly.

6. Remove the snap ring from one end of the magnet weldment pivot pin.

7. Use the rubber mallet to tap the magnet weldment pivot pin out of the magnet weldment.

8. Remove the tension spring from the magnet weldment (see Diagram 7.12).

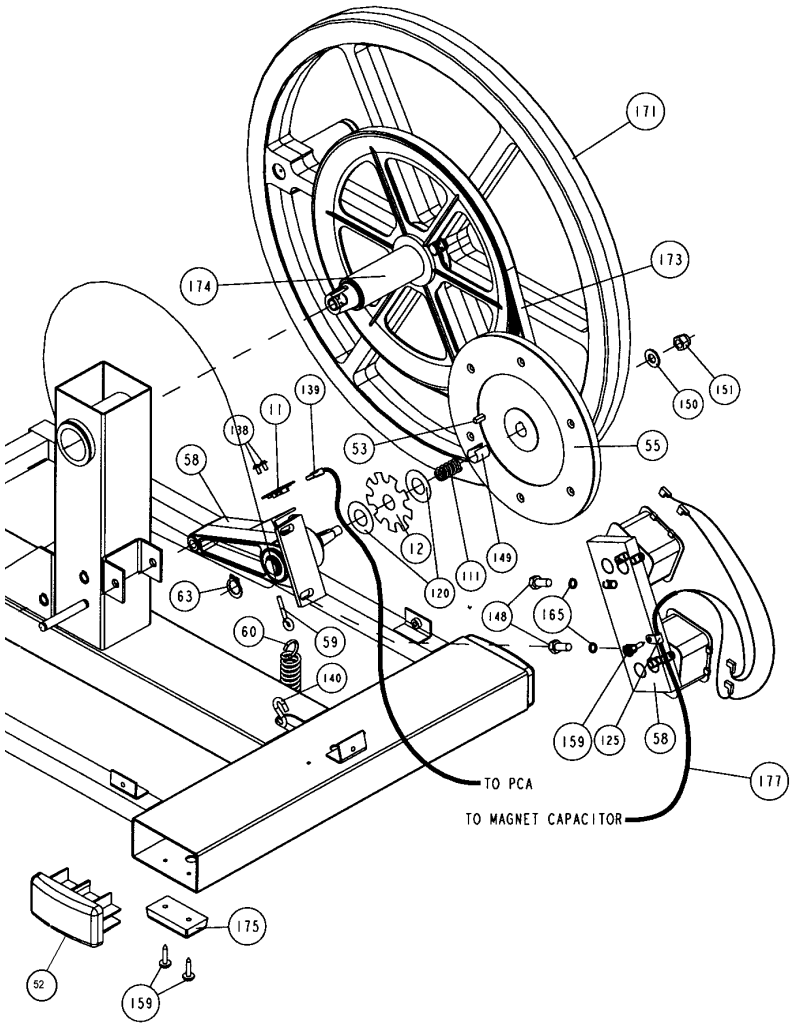
Replacing the Magnet Pivot Assembly

9. Place the tension spring onto the EFX 544 frame and the new magnet pivot assembly.

10. Position the magnet pivot assembly against the EFX 544 frame. Push the magnet weldment pivot pin into the magnet weldment. If necessary, use a rubber mallet to push the pivot pin into the magnet weldment.

11. Replace the snap ring into the end of the pivot pin.

Diagram 7.7 - Magnet Pivot Assembly



12. Position the speed sensor so that the sensor "legs" evenly straddle the edge of the speed label.

13. Replace the screw(s) that secure(s) the speed sensor to the magnet pivot assembly.

CAUTION
Rotate the eddy current disk assembly shaft. Check to be sure that the speed label does not rub against the speed sensor.

14. Connect the magnet cables to the magnet assembly.

15. Replace the flywheel belt as described in Procedure 7.15.

16. Re-install the rear cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 7.20 - Replacing the Stair Arm Wheel

Removing the Old Wheel

1. Turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

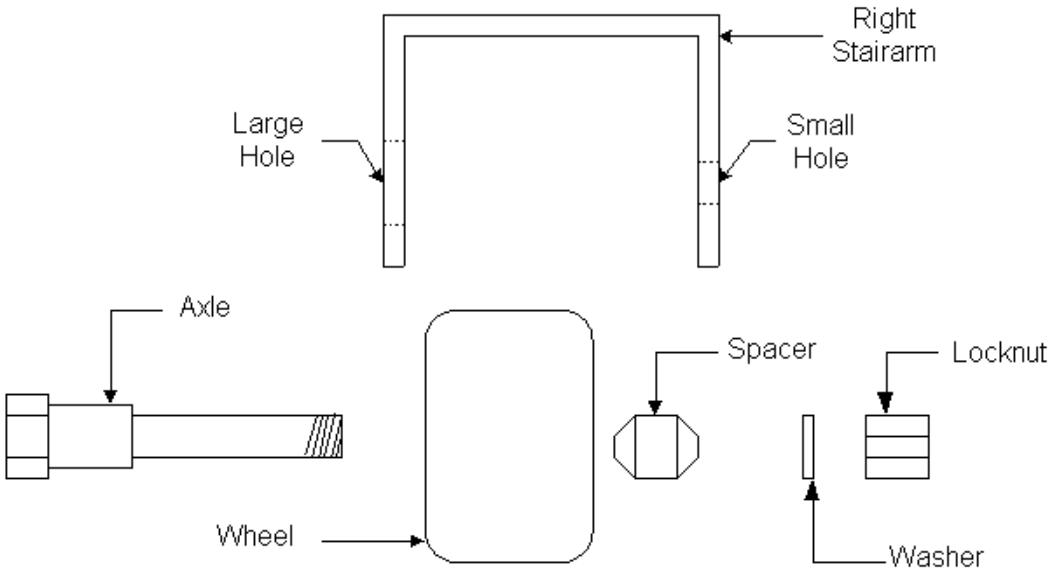
2. Remove the rear cover as described in Procedure 7.1.

3. Lift the stair arms from the ramp assembly and rotate them towards the back of the EFX 544.

4. Use wrenches to remove the wheels from the stair arm assembly.

5. Replace with the new wheel assembly (Precor part number: 50532-108). Install the tapered aluminum spacer (shown in Diagram 7.8) to prevent noise during operation.

Diagram 7.8 - Stairarm Wheel



6. The wheel assembly consists of a wheel, axle, spacer, washer and locknut.

7. Securely tighten the locknut.

8. Rotate the stair arms towards the front of the EFX 544. Position the stair arms on the rail assembly.

9. Re-install the rear cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 7.21 - Replacing the Stair Arm Assembly

Removing the Stair Arm Assembly

1. Turn off the EFX 544 with the circuit breaker, then unplug the power cord from the wall outlet.

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

2. Remove the rear cover as described in Procedure 7.1.

3. Lift the stair arms from the ramp assembly and rotate them towards the back of the EFX 544.

4. If the unit you are servicing was built before January 16, 1996**. . .**

THEN . . .	**OTHERWISE . . .**
Continue with the next step.	Skip to Step 11.

5. Place a 2 x 4 piece of lumber or a long-handled tool through the flywheel spoke and against the back of the rear frame upright.

Note:
When you perform the next step, use a long-handled wrench.

CAUTION
Be careful not to catch your fingers between the stair arm and the flywheel when you perform the following step.

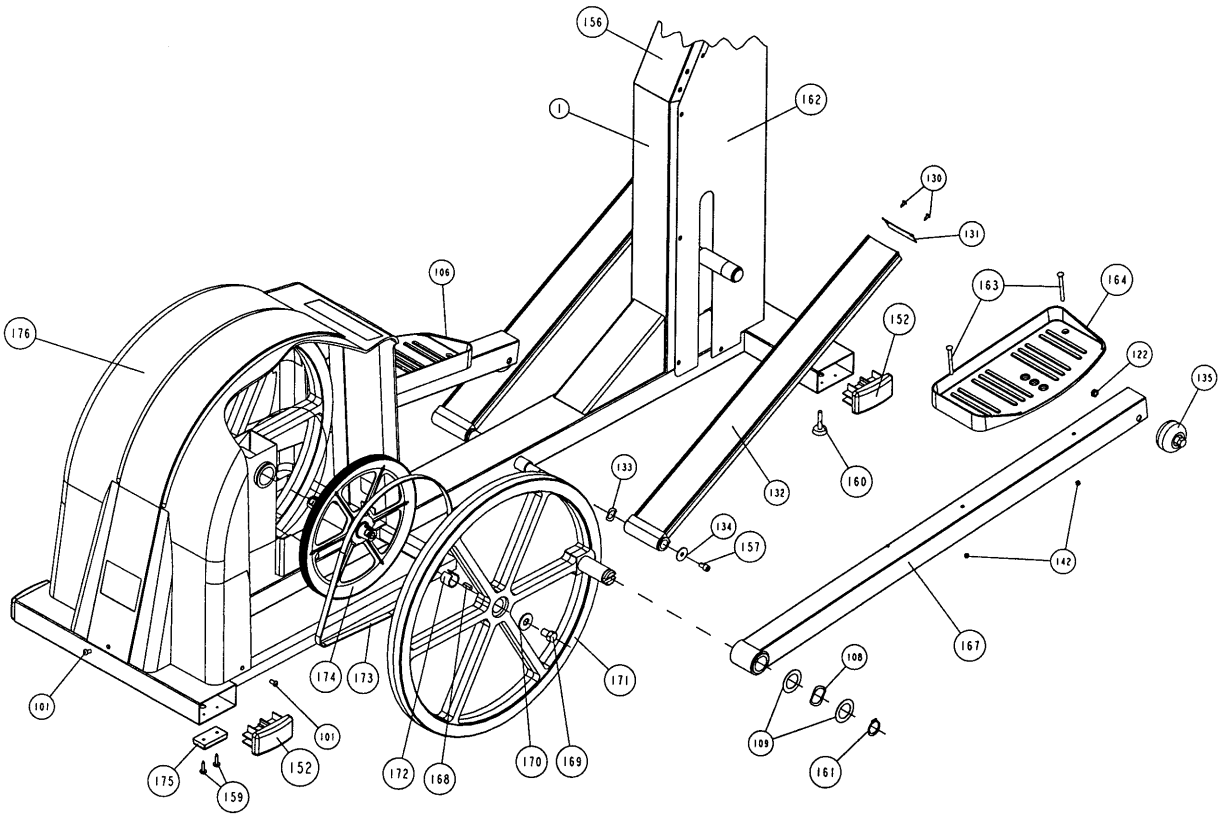
6. Using a 1-1/2 inch wrench or ratchet, remove the bolt and washer that secure the stair arm assembly to the flywheel (see Diagram 7.9).

Replacing the Stair Arm Assembly

7. Place a 2 x 4 piece of lumber or a long-handled tool through the flywheel spoke and against the front of the rear frame upright.

8. Clean the old loc-tite off of the bolt removed in Step 6. Place a few drops of blue loc-tite onto the bolt shaft.

Diagram 7.9 - Stairarm Assembly



9. Install the stair arm assembly on the flywheel and secure with the bolt and washer. Torque the bolt to 100 foot-pounds.

10. Rotate the stair arms towards the front of the EFX 544. Position the stair arms on the ramp assembly. Skip to Step 13.

11. Remove the snap ring, washers and wave washer. Slide the stair arm assembly away from the 544 frame.

CAUTION
Be careful not to catch your fingers between the stair arm and the flywheel when you perform the following step.

12. Slide the stair arm assembly onto the 544 frame. Replace the wave washer, washers and snap ring.

13. Re-install the rear cover as described in Procedure 7.1, then check the operation of the EFX 544 as described in Section Four.

Procedure 7.22 - Replacing a Handlebar

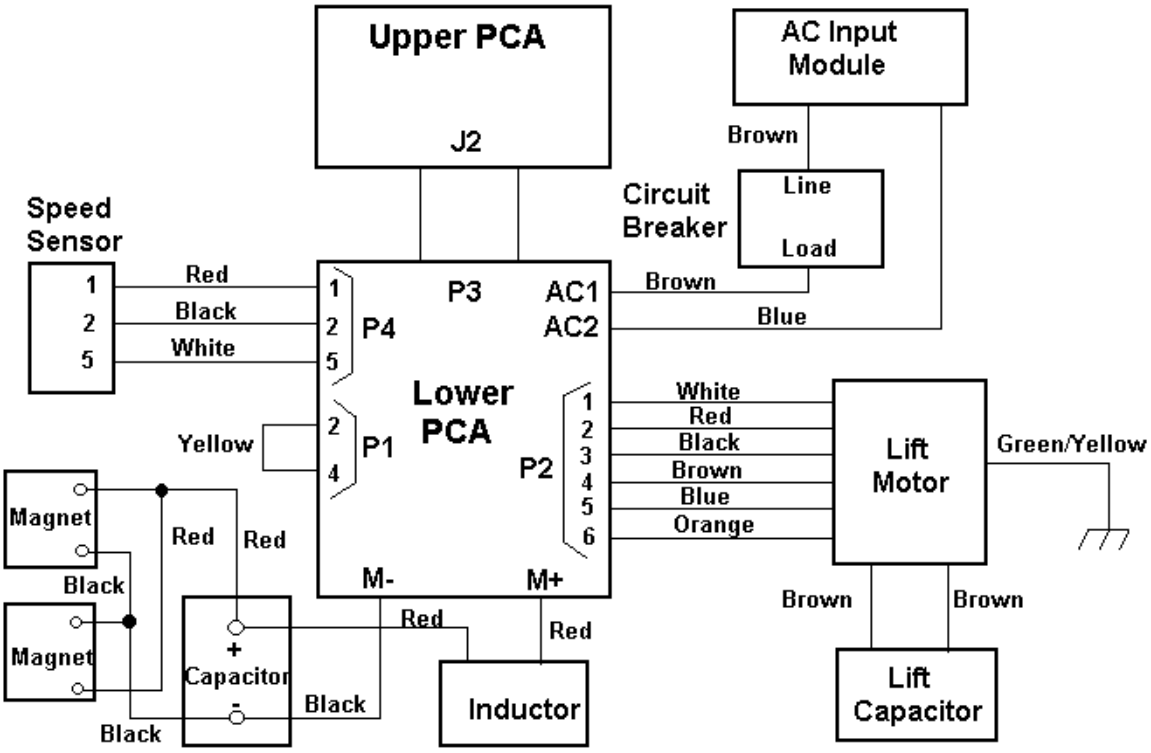
Removing a Handlebar

1. Loosen the four screws that hold the handlebars in the upper and lower handlebar clamps.
2. Grasp and pull the ends of the handlebar away from the handlebar clamps.

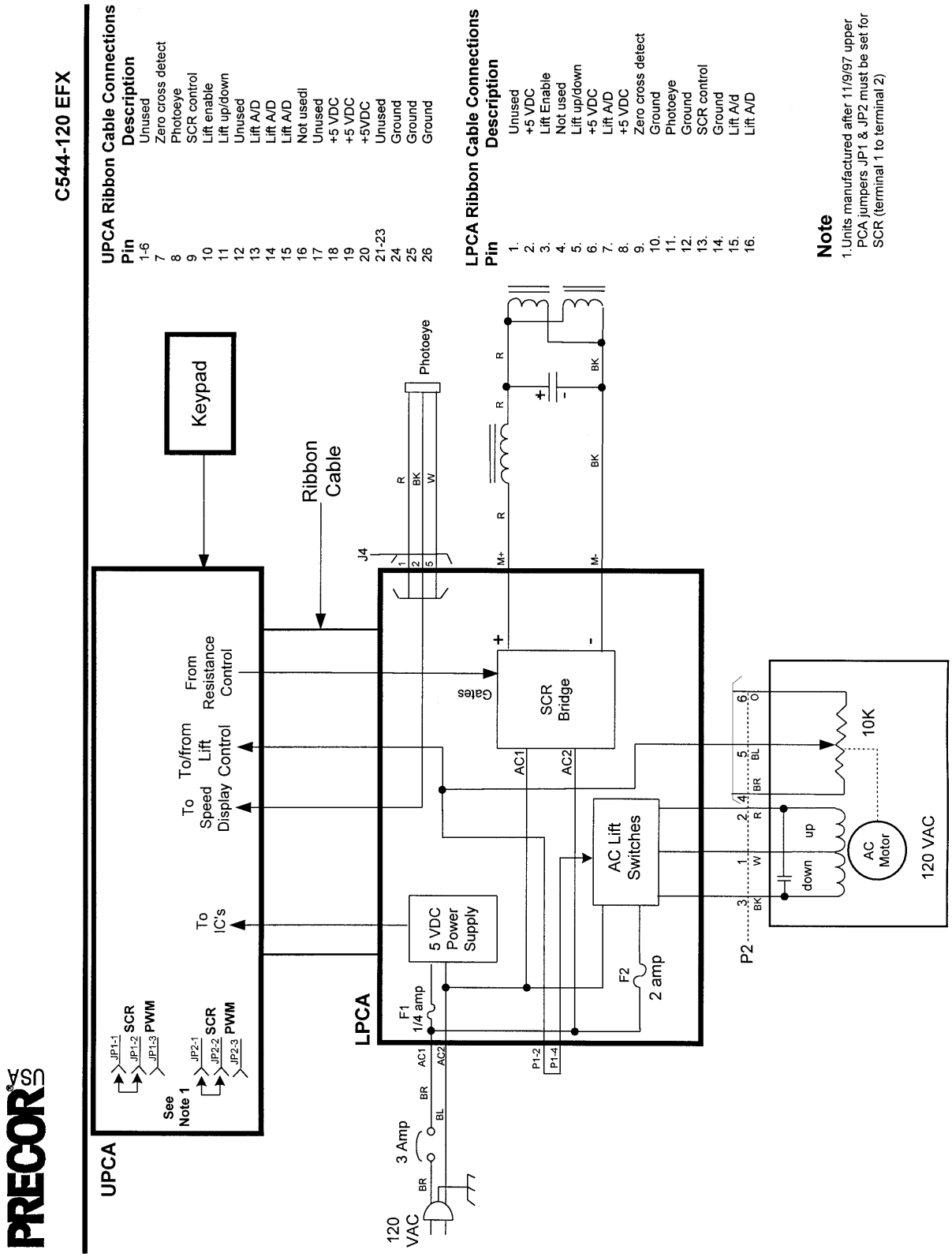
Replacing a Handlebar

3. Position the handlebar in the handlebar clamp. The edge of the foam grip must be flush with the edge of the clamp.
4. Tighten the screws that secure the handlebar in the handlebar clamps.

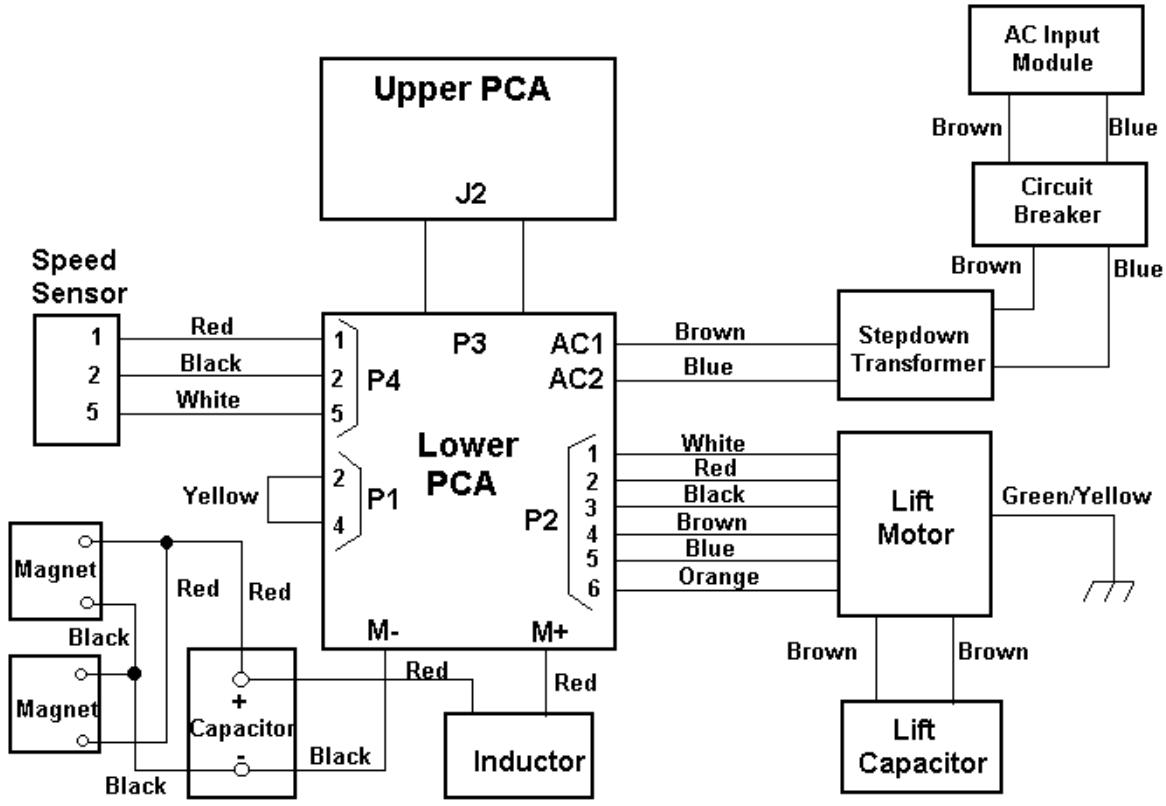
Wiring Diagram 8.1 - C544 120 Vac



Block Diagram 8.2 - C544 120 Vac



Wiring Diagram 8.3 - C544 240 Vac



Block Diagram 8.4 - C544 240 Vac