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Section One — Things You Should Know

Treadmill Appendices

The information contained in Sections One through Six, with little exception, pertains to all commercial treadmills. Treadmill-specific information is contained in separate treadmill appendices.

About The Smart Rate System

The Smart Rate system consists of a receiver, a transmitter, software, LED's, and labels. A Smart Rate Generator is provided to troubleshoot the Smart Rate System.

The Smart Rate receiver is the heart rate receiver assembly mounted in the display housing. The transmitter is the chest strap assembly worn by the user. The Smart Rate software is built into the PROM. The LED's consist of green, red and yellow LED's mounted on the upper PCA that, when illuminated, are displayed on the electronic console. The labels are mounted on the display housing.

Exploded View Diagram References

To locate and identify commercial treadmill components, use the parts list and exploded view diagrams provided in the appendix for the treadmill you are servicing.

Right, Left, Front and Back Conventions

In this manual, right, left, front, and back are from the perspective of a user standing on the treadmill, facing the electronic console.

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 treadmill, the power cord must be disconnected from the wall outlet. Always ensure that the treadmill is unplugged from the wall outlet when you inspect or adjust the treadmill, or when you isolate, remove, or replace a treadmill component.

- Removing the hood 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 hood removed, remove jewelry (especially from ears and neck), tie up long hair, remove neck ties, and do not wear loose clothing.

- When the treadmill 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 treadmill 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.

- Remove the brush leads from the drive motor terminals before you touch or remove the drive motor brushes.

- Do not plug in the power cord and do not turn on the treadmill when the motor brushes are removed from the drive motor.

- After you replace a motor brush, make sure the brush is seated securely and makes full contact with the commutator before you plug in the power cord and turn on the treadmill

.

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

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

- If you use tension gauges on a pre-tensioned running belt that has not been allowed to rest for 24 hours, the belt will be over tensioned.

Note
The term pre-tensioned running belt refers to a belt that has been previously installed and tensioned.

- When adjusting running belt tracking and alignment, do not turn the running belt adjustment screws more than 1/4 turn at a time. The treadmill can be damaged if the screws are over-tightened.

- If the running belt moves rapidly to one side as it starts to move, press **STOP** immediately.

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

- Keep the running bed parallel to the treadmill frame when you slide it out of the running belt. If the bed is tilted as it slides across the running belt, the bed studs may score the running bed.

- When removing and replacing the flywheel, do not use a hammer to force the flywheel off or onto the drive motor or you will damage the motor bearings.

- Be alert when replacing the drive motor brushes. If a brush is mounted backwards in the brush guide, the bottom surface of the brush will not make full contact with the motor and the motor will not operate correctly.

- When it is necessary to lift the treadmill, ensure that the treadmill has adequate support. Do not lift the treadmill 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 treadmill on a solid, level surface. Locate the rear of the treadmill at least four feet from walls or furniture. Keep the area behind the treadmill clear.
- Visually check the treadmill 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 treadmill.
- When operating the treadmill, 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.
- Use care when getting on or off the treadmill. Use the handrails whenever possible. Do not get on or off the treadmill when the running belt is moving.
- Before starting the running belt, straddle the belt by placing your feet firmly on the sides of the treadmill. You should also step off the belt and onto the sides of the treadmill after turning off the running belt.
- Do not rock the unit. Do not stand or climb on the handrails, electronic console, or hood.
- Do not set anything on the handrails, electronic console, or hood. Never place liquids on any part of the treadmill.
- To prevent electrical shock, keep all electrical components, such as the drive motor, 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.
- Turn off the treadmill when adjusting or working near the take-up roller. Do not make any adjustments to the running belt when someone is standing on the machine.
- Keep all loose items away from the treadmill running surface. A treadmill running belt will not stop immediately if an object becomes caught in the belt or rollers.

General Information

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

Required Tools and Equipment

The following list is a summary of the tools and equipment required by the procedures in this manual.

phillips screwdrivers
anti-static wrist strap
flat-head screwdrivers
digital multimeter
two running belt tension gauges
allen wrench set
drive belt tension gauge
open-end wrenches of assorted sizes
clamp-on AC ammeter
1/2" drive ratchet and sockets of assorted sizes
blue loc-tite
chip puller
cable ties
dowel, 3/16"
needle nose pliers
damp cloth
rubber mallet
drop cloth
ruler
snap ring pliers
torque wrench
wire cutters

Note
Running belt tension gauges (part number 20007-101) and drive belt tension gauges (part number 20030-108) can be ordered from Precor

Section Two — Preventive Maintenance

Preventive maintenance measures are either scheduled or unscheduled. Scheduled preventive maintenance activities are included here so that you are aware of preventive measures performed on a regular basis.

Regular Preventive Maintenance (Owner)

Cleanliness of the treadmill and its operating environment will keep maintenance problems and service calls to a minimum. Precor recommends that you perform the following preventive maintenance schedule.

After Each Use

- Turn off and unplug the treadmill.
- Wipe down the running belt and bed frame. Use a damp cloth to clean underneath the running belt.
- Inspect the running belt and bed for wear.
- Check and adjust the tracking and alignment of the running belt as described in the Owner's Manual for the treadmill you are servicing.

Every Week

- Vacuum underneath the treadmill, following these steps:

1. Turn off the treadmill with the circuit breaker, then unplug the treadmill from the wall outlet
2. Place the treadmill on its side.

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

3. Vacuum the rug or damp mop the floor.
4. Make sure that the floor is dry before returning the treadmill to an upright position.

Every Month

- Clean the treadmill’s frame and running belt using mild soap and water or a general household cleaner. Use a soft nylon scrub brush to clean the running belt.

- Wipe the surface of the electronic console with a damp sponge or soft cloth. Dry with a clean towel.

CAUTION

Keep water away from electronic components to prevent shock.

- Visually inspect the running belt and bed. If the belt is worn or damaged, replace it as described in Procedures 5.11 or 5.12.

On-Site Preventive Maintenance (Service Technician)

When you are called to service a treadmill, perform these preventive maintenance activities:

- Check the LEDs mounted on the upper PCA (refer to the appendix for the treadmill you are servicing).
- Visually inspect the running belt and bed. If the belt is worn or damaged, replace it as described in Procedures 5.11 or 5.12.
- Check the drive motor brushes as described in Procedure 3.5.
- Where applicable, measure the target gap as described in Procedure 3.4.
- Inspect the power cord. If the power cord is damaged, install a new power cord as described in Procedure 5.8.
- Check and adjust the tension, tracking, and alignment of the running belt as described in Procedure 3.1.
- Visually examine all wires and check connectors and wire connections. Secure connections and replace wiring as necessary.
- Clean the drive motor and area underneath the hood, following these steps:

WARNING

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

1. Remove the hood as described in Procedure 5.1.
2. Vacuum and clean the drive motor and area underneath the hood.
3. Wipe down the speed sensor with a clean dry cloth.
4. Replace the hood as described in Procedure 5.1.

Regular Preventive Maintenance (Owner)

Cleanliness of the C960 Treadmill and its operating environment will keep maintenance problems and service calls to a minimum. For this reason, Precor recommends that the following preventive maintenance schedule be followed.

After Each Use

- Turn off the treadmill with the circuit breaker, then unplug the power cord from the wall outlet.

WARNING

To remove power from the treadmill, the power cord must be disconnected from the wall outlet.

- Visually inspect the running belt and bed. If either the belt or the bed is worn or damaged, contact your authorized Precor dealer.
- Wipe down the running belt and bed frame. Use a damp cloth to clean underneath the running belt.
- Inspect the power cord. If the power cord is damaged, contact your authorized Precor dealer.
- Make sure the power cord is not underneath the treadmill.
- Check and adjust the tension, tracking, and alignment of the running belt as described in Procedure 6.1

Every Week

Vacuum underneath the treadmill, following these steps:

1. Turn off the treadmill with the circuit breaker, then unplug the power cord from the wall outlet.
2. Place the treadmill on one side (either side will do).
3. Vacuum the rug or "damp mop" the floor.
4. Make sure that the floor is dry before returning the treadmill to an upright position.

Every Month

- Clean the treadmill’s frame and running belt using mild soap and water or a general household cleaner. Use a soft nylon scrub brush to clean the running belt.
- Wipe the surface of the electronic console with a barely-damp sponge or soft cloth. Dry with a clean towel.

- Inspect the running belt and bed for wear.

On-Site Preventive Maintenance (Service Technician)

When you are called to service a C960 series treadmill, perform these preventive maintenance activities:

- Check the LEDs mounted on the upper PCA, the lift limit switches, and the function keys displayed on the electronic console by performing Procedure 3.1.

- Visually inspect the running belt and bed. If the belt is worn or damaged, replace it as described in Procedure 8.12.

Note
If you replace the running belt, replace the bed also if both sides have been used. Otherwise, turn the bed over before you install the running belt on the treadmill.

- Check the drive motor brushes as described in Procedure 6.5.

- Measure the air gap between the speed sensor and the flywheel as described in Procedure 6.3.

- Check and adjust the tension, tracking, and alignment of the running belt as described in Procedure 6.1.

- Visually examine all wires and check connectors and wire connections. Secure connections and replace wiring as necessary.

Section Three — Inspection and Adjustment Procedures

Procedure 3.1 — Inspecting and Adjusting Running Belt Tension, Tracking, and Alignment

Procedure

1. Choose one:

IF . . .	THEN . . .
You need to inspect running belt tension	Continue with the next step.
You are tensioning a new running belt (or a running belt that has been loosened for at least 24 hours)	Read the Caution statement at the top of Page 3-4; then continue with Step 5.
You need to adjust running belt tension	Skip to Step 12.

Inspecting Running Belt Tension

2. Check the operation of the treadmill by referring to the appropriate appendix.

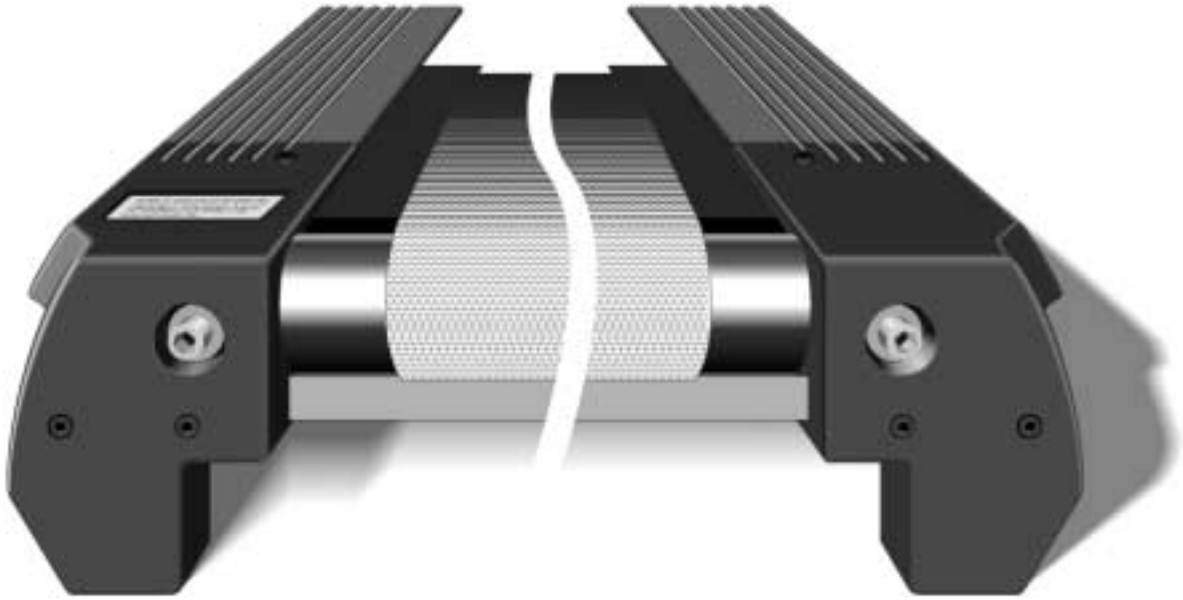
3. Choose one:

IF . . .	THEN . . .
Running belt tension does not feel right (the treadmill slips or you hear a slapping sound when you walk on the treadmill)	Read the Warning statement below; then continue with the next step.
The tension of the running belt feels right	Skip to Step 19 and inspect running belt tracking.

WARNING
Make sure the circuit breaker is set to OFF and the treadmill is unplugged from the wall outlet before you continue this procedure
.

4. Alternately turn the tension and tracking bolts counterclockwise to loosen the running belt.

Note
The tension and tracking bolts are located at the back of the treadmill (see below).



Adjusting Running Belt Tension (New or Untensioned Running Belts)

CAUTION
If you use tension gauges to tension a previously tensioned belt that has not been allowed to rest for 24 hours, you will overtension the belt. Perform Steps 12 through 18 for previously tensioned running belts. Perform Steps 5 through 9 for new running belts and for previously tensioned running belts that have been loosened for at least 24 hours.

Note
Before you perform Step 5, make sure that the drive and take-up rollers are parallel to the edge of the running bed. When you position the tension gauges on the belt, do not place the them across the belt seams.

5. Position a belt tension gauge on each side of the running belt (see Diagram 3-2). On each tension gauge, position the movable clip as close as possible to the fixed clip.

Note
Before continuing, make sure that the tension gauges display zero percent. If necessary, rotate the gauge dials until they display zero percent.

6. Turn the tension and tracking bolts clockwise until the tension gauges read 0.15 percent.

7. Alternately turn the tension and tracking bolts clockwise until the tension gauges read 0.4 Percent.

8. Remove the tension gauges from the running belt.

9. If belt tension increased to the percentage levels referenced in Step 7 . . .

THEN . . .	**OTHERWISE . . .**
Belt tension is correct; skip to Step 19 and inspect belt tracking.	Continue with the next step.

10. Remove the tension bolt from the take-up roller. Check the tension bolt as described in Troubleshooting Flow Chart 18.

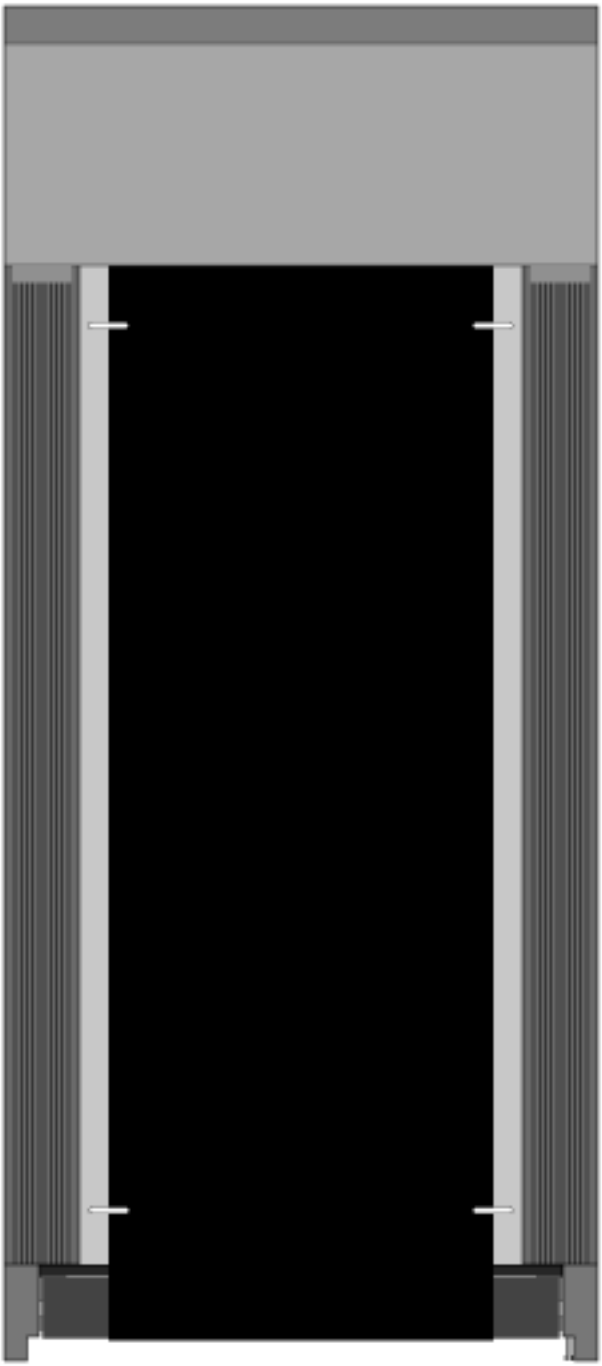
11. Choose one:

IF . . .	**THEN . . .**
The tension bolt checks good	Replace the running belt, then return to Step 5.
The tension bolt **does not** check good	Thread a new tension bolt into the take-up roller. Turn the tension and tracking bolts counterclockwise to loosen the belt; then return to Step 5.

Adjusting the Tension of Previously Installed Running Belts

Perform Steps 12 through 16 when you must loosen or remove a running belt that you will later re-install and tension.

12. Place four marks on the running belt and bed. Each mark must be visible on both the running belt and bed (see below).



13. Alternately turn the tension and tracking bolts counterclockwise to loosen the running belt. When you are ready to re-tension the running belt, perform the following steps.

14. Turn the tension and tracking bolts clockwise one turn.

15. Alternately turn the tension and tracking bolts clockwise until the marks placed on the running belt align with the marks on the running bed. Continue with the next step when the marks on the running belt and bed are aligned or if you are not able to align the marks by turning the tension and tracking bolts.

16. If the marks on the running belt and bed lined up when you performed the previous step . . .

THEN . . .	**OTHERWISE . . .**
Belt tension equals the tension of the belt in Step 12; inspect running belt tracking (skip to Step 19).	Continue with the next step.

17. Remove the tension bolt from the take-up roller. Check the tension bolt as described in Troubleshooting Flow Chart 18.

IMPORTANT
The running belt will begin to loose its tension about 20 minutes after you remove the tension bolt. If you do not replace the tension bolt within 20 minutes of removing it, you must return to Step 4 and re-tension the running belt.

18. Choose one:

IF . . .	**THEN . . .**
The tension bolt checks good	Replace the running belt*;* then return to Step 5.
The tension bolt **does not** check good (and **more than** 20 minutes have passed since you removed the bolt from the take-up roller)	Thread a new tension bolt into the take-up roller; then return to Step 4.
The tension bolt **does not** check good (and **less than** 20 minutes have passed since you removed the bolt from the take-up roller)	Thread a new tension bolt into the take-up roller; then return to Step 13.

Inspecting Running Belt Tracking

CAUTION
If the running belt moves rapidly to one side when you perform the next step, press STOP immediately.

19. Turn on the treadmill. With the running belt moving at 6–8 miles per hour, have an assistant operate the treadmill. Stand behind the treadmill and watch the running belt as it moves. As you watch the running belt, make sure that

    a. The running belt runs without moving from one side to the other.

    b. The running belt is centered between the trim strips.

20. Incline the treadmill, then repeat the previous step. Decline the treadmill, then repeat the previous step. Turn off and unplug the treadmill.

21. If the running belt is tracking correctly . . .

THEN . . .	**OTHERWISE . . .**
Inspect running belt alignment (skip to Step 30.	Continue with the next step.

Adjusting Running Belt Tracking

CAUTION
Do not turn the tracking bolt more than 1/4 turn at a time. Overtightening the tracking bolt may damage the treadmill.

22. Choose one:

IF . . .	**THEN . . .**
The running belt tracks to the left	Turn the tracking bolt 1/4 turn **clockwise;** then skip to Step 24.
The running belt tracks to the right	Turn the tracking bolt 1/4 turn **counterclockwise;** then skip to Step 24.
The running belt tracks correctly	Continue with the next step.

23. If you loosened or removed the drive roller or roller mounting hardware before starting this procedure . . .

THEN . . .	OTHERWISE . . .
Inspect running belt alignment (skip to Step 30.	It is not necessary to inspect belt alignment; this procedure is complete.

24. Repeat Steps 19–22. Continue with the next step when the running belt is tracking correctly or if you are not able to adjust belt tracking by turning the tracking bolt.

25. If the running belt tracks correctly . . .

THEN . . .	OTHERWISE . . .
Return to Step 23	Continue with the next step.

26. Remove the tracking bolt from the take-up roller. Check the tracking bolt as described in Troubleshooting Flow Chart 18.

IMPORTANT
The running belt will begin to loose its tension about 20 minutes after you remove the tracking bolt. If you do not replace the tracking bolt within 20 minutes of removing it, you must return to Step 4 and re-tension the running belt.

27. Choose one:

IF . . .	THEN . . .
The tracking bolt checks good	Replace the running belt*;* then return to Step 5.
The tracking bolt **does not** check good (and **more than** 20 minutes have passed since you removed the bolt from the take-up roller)	Thread a new tracking bolt into the take-up roller; then return to Step 4.
The tracking bolt **does not** check good (and **less than** 20 minutes have passed since you removed the bolt from the take-up roller)	Thread a new tracking bolt into the take-up roller; then return to Step 13.

Inspecting Running Belt Alignment

CAUTION
If the running belt moves rapidly to one side when you perform the next step, press STOP immediately.

28. Turn on the treadmill. Increase the running belt speed to 2–3 miles per hour, then move behind the treadmill and watch the running belt. Turn off and unplug the treadmill.

29. f the running belt is skewed to the left or right . . .

THEN . . .	OTHERWISE . . .
Read the text preceding Step 30; then continue with the next step.	The running belt is aligned correctly; this procedure is complete.

Adjusting Running Belt Alignment

To align the running belt with the trim strips, adjust the alignment bolt on the right end of the drive roller shaft. Check the roller and roller mounting hardware before you continue with this procedure. The bolt in the left end of the drive roller shaft must be turned completely clockwise and tightened securely.

30. Choose one:

IF . . .	THEN . . .
The running belt tracks to the left	Turn the tracking bolt 1/4 turn **clockwise;** then continue with the next step.
The running belt tracks to the right	Turn the tracking bolt 1/4 turn **counterclockwise;** then continue with the next step.

31. Repeat Steps 28 through 30 until the running belt is parallel with the trim strips.

IMPORTANT
Inspect running belt tension (refer back to Step 1) and running belt tracking (refer back to Step 19) after you adjust running belt alignment.

Procedure 3.2 — Inspecting and Adjusting Drive Belt Tension on J Belts

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

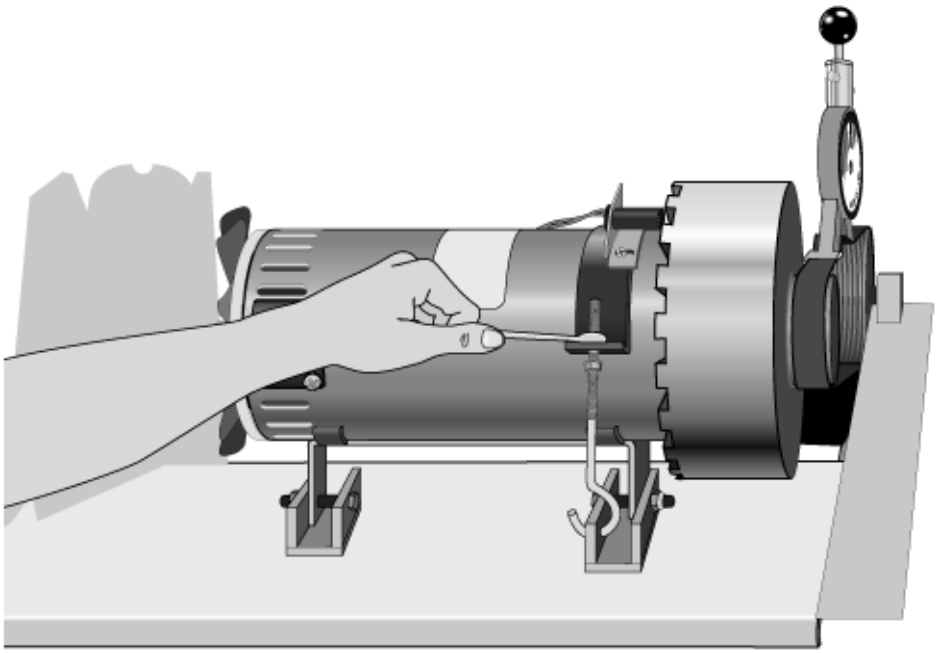
Removing the Drive Belt and Drive Roller

1. Remove the hood as described in Procedure 5.1.

2. Place the drive belt tension gauge on the drive belt (see Diagram 3-4). If the belt tension gauge reads 70–90 inch-pounds **. . .**

THEN . . .	**OTHERWISE . . .**
The drive belt is tensioned correctly. Remove the belt tension gauge from the drive belt; then skip to Step 10.	Adjust drive belt tension as described in the following steps.

3. Remove the belt tension gauge from the drive belt.



4. Use your hand to slowly push the running belt toward the back of the treadmill. Inspect the drive belt for wear, cracks or other damage. Examine the drive belt treads. If the drive belt is in good condition **. . .**

THEN . . .	**OTHERWISE . . .**
Continue with the next step.	Install a new drive belt on the treadmill as described in Procedure 5.16.

5. Loosen the drive belt.

6. Place the drive belt tension gauge on the drive belt.

7. Tighten the drive belt until the belt tension gauge reads 70–90 inch-pounds. Align the motor with the treadmill frame. Inspect the drive pulley alignment as described in Procedure 3.3.

8. Tighten the mounting hardware that was loosened in Step 5.

9. Remove the belt tension gauge from the drive belt.

10. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Procedure 3.3 — Inspecting and Adjusting Drive Belt Tension on Cog Drive Belts

If the drive belt tension is too tight, the treadmill will make a squealing noise when in use.

Inspecting Drive Belt Tension

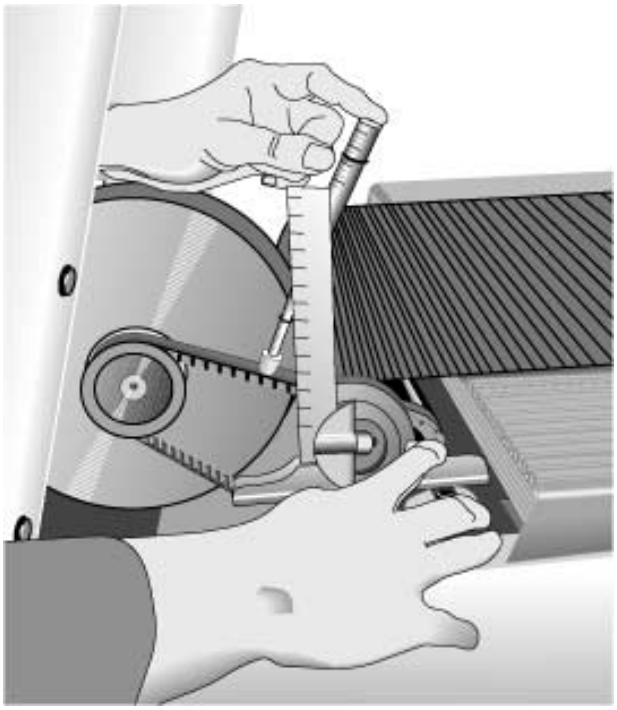
1. Remove the hood as described in Procedure 5.1.

WARNING
Before performing maintenance operations with the hood removed, review the Warning and Caution statements listed in Section One of the CommercialTreadmill Manual.

2. With the pressure gauge positioned as shown in Diagram 3-5, apply four pounds of pressure to the drive belt.

3. If the pressure gauge deflects 1/8" when four pounds of pressure are applied to the belt . .

THEN . . .	**OTHERWISE . . .**
Drive belt tension is adjusted correctly; skip to Step 18.	Drive belt tension must be adjusted; continue with the next step.



Adjusting Drive Belt Tension

4. Place the scribe against the edge of the drive motor pedestal. Score a line on the drive motor mounting plate that runs the length of the motor pedestal.

Note
The position of the drive motor pedestal is adjusted at the factory. When you replace the drive motor, position the edge of the motor pedestal parallel to the line scored on the drive motor mounting plate.

5. For SCR treadmills, remove the inductor as described in Procedure 5.13.

6. Loosen the bolts that secure the drive motor pedestal to the motor mounting plate.

7. Choose one:

If . . .	Then . . .	Otherwise . . .
The pressure gauge deflected more than 1/8"	**Increase** drive belt tension by performing Steps 8 through 11	**Decrease** drive belt tension by performing Steps 12 through 15

Increasing Drive Belt Tension

8. Carefully push the drive motor away from the drive roller.

9. With the pressure gauge positioned as shown in Diagram 3-5, apply four pounds of pressure to the drive belt.

10. Choose one:

If . . .	Then . . .	Otherwise . . .
The pressure gauge deflects more than 1/8"step (indicating that drive belt tension is still too loose)	Continue with the next	Skip to Step 16

11. Choose one:

If . . .	Then . . .	Otherwise . . .
The drive motor is pushed to the back end of the motor adjustment slots and drive belt tension is still loose.	Replace the drive belt as described in Procedure 5.16, then return to Step 2	Further increase drive belt tension by returning to Step 8

Decreasing Drive Belt Tension

12. Carefully push the drive motor toward the drive roller.

13. With the pressure gauge positioned as shown in Diagram 3-5, apply four pounds of pressure to the drive belt.

14. Choose one:

If . . .	Then . . .	Otherwise . . .
The pressure gauge deflects less than 1/8" (indicating that drive belt tension is still too tight)	Continue with the next step	Skip to Step 16

15. Choose one:

If . . .	Then . . .	Otherwise . . .
The drive motor is pushed to the front end of the motor adjustment slots and drive belt tension is still too tight	Replace the belt as described in Procedure 5.16, then return to Step 2	Further decrease drive belt tension by returning to Step 12

16. Tighten the bolts that mount the pedestal to the drive motor mounting plate.

17. For SCR treadmills, replace the inductor as described in Procedure 5.13.

18. Check the operation of the treadmill as described in Section Three in the Appendix of the Treadmill you are servicing.

Note
The drive belt will track along either the right or left edge of the pulley grooves. It will not center itself between the pulley flanges.

19. Replace the hood as described in Procedure 5.1.

Procedure 3.4 — Inspecting and Adjusting Drive Belt Pulley Alignment

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

Inspecting Drive Belt Pulley Alignment

1. Remove the hood as described in Procedure 5.1.

2. Make sure that the motor mounting screws are secure.

3. Place the ruler against the drive roller and motor pulleys (see Diagram 3-6).

4. Hold one end of the ruler flush against the drive roller pulley and the other end suspended over the motor shaft. Allow the ruler to fall. Choose one:

IF . . .	**THEN . . .**
The ruler is flush with the outside edge of the motor pulley	The pulleys are aligned correctly; skip to Step 14.
The ruler hits the motor pulley	Slide the motor pulley closer to the motor case as described in the following steps.
There is a gap between the ruler and the outside edge of the motor pulley	Slide the motor pulley away from the motor case as described in the following steps.

Adjusting Drive Belt Pulley Alignment

5. Loosen the drive belt.

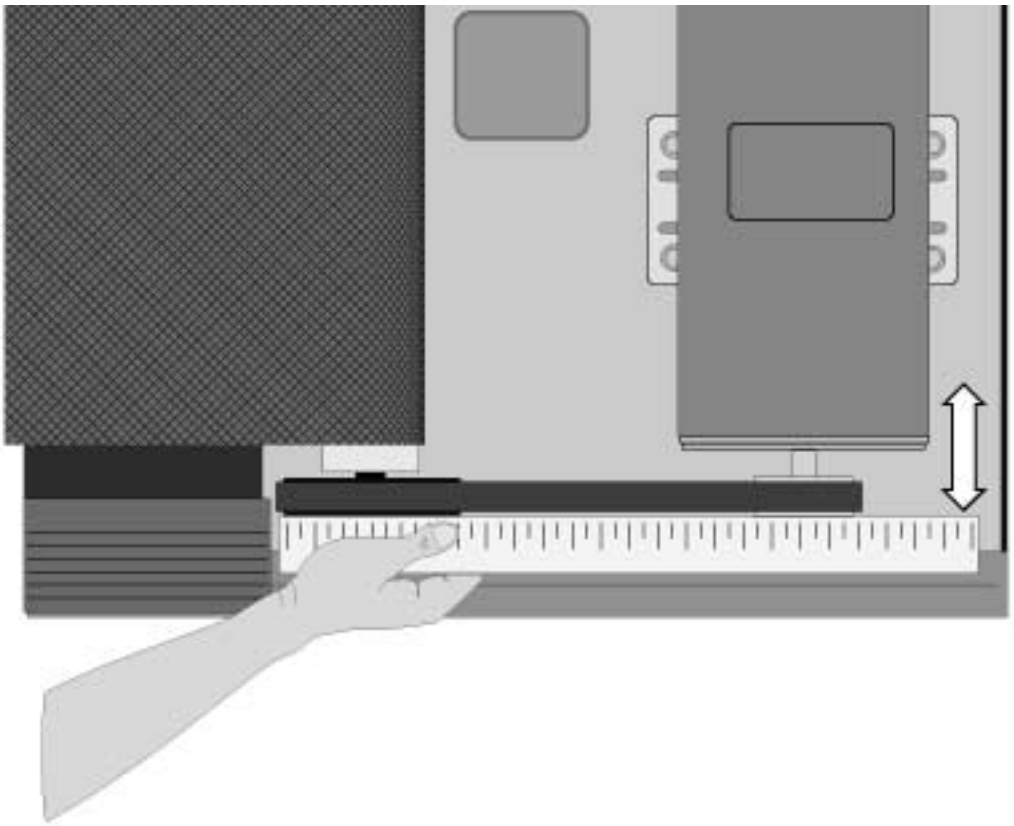
Note
Commercial treadmill motors are installed two different ways:

Mounted on a motor-fixed motor pan. Adjust the tension of the drive belt by moving the motor pedestal.

Mounted with a hook bolt and motor pivot bracket. Adjust the tension of the drive belt by turning the lock nut on the hook bolt.

6. Remove the drive belt from the drive motor pulley.

7. Remove the set screws from the drive motor pulley.



8. Hold the ruler against the drive roller pulley. Slide the motor pulley in or out until the outside edge of the motor pulley is flush with the ruler.

9. Replace the set screw on the square key. Using the torque wrench, torque to 150 in-lbs. Thread the remaining set screw into the remaining set screw position. Torque to 150 in-lbs.

10. Place the loose end of the drive belt on the drive motor pulley. Manually push the running belt toward the back of the treadmill while you position the drive belt on the center of the motor pulley. Tighten the drive belt slightly.

11. Place the drive belt tension gauge on the drive belt.

12. Tighten the drive belt to the correct tension as described in either Procedure 3.2 or 3.3. Align the motor with the treadmill frame.

13. Tighten the mounting hardware that was loosened in Step 5. Remove the belt tension gauge from the drive belt.

14. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Procedure 3.5 — Inspecting and Adjusting the Speed Sensor Gap

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

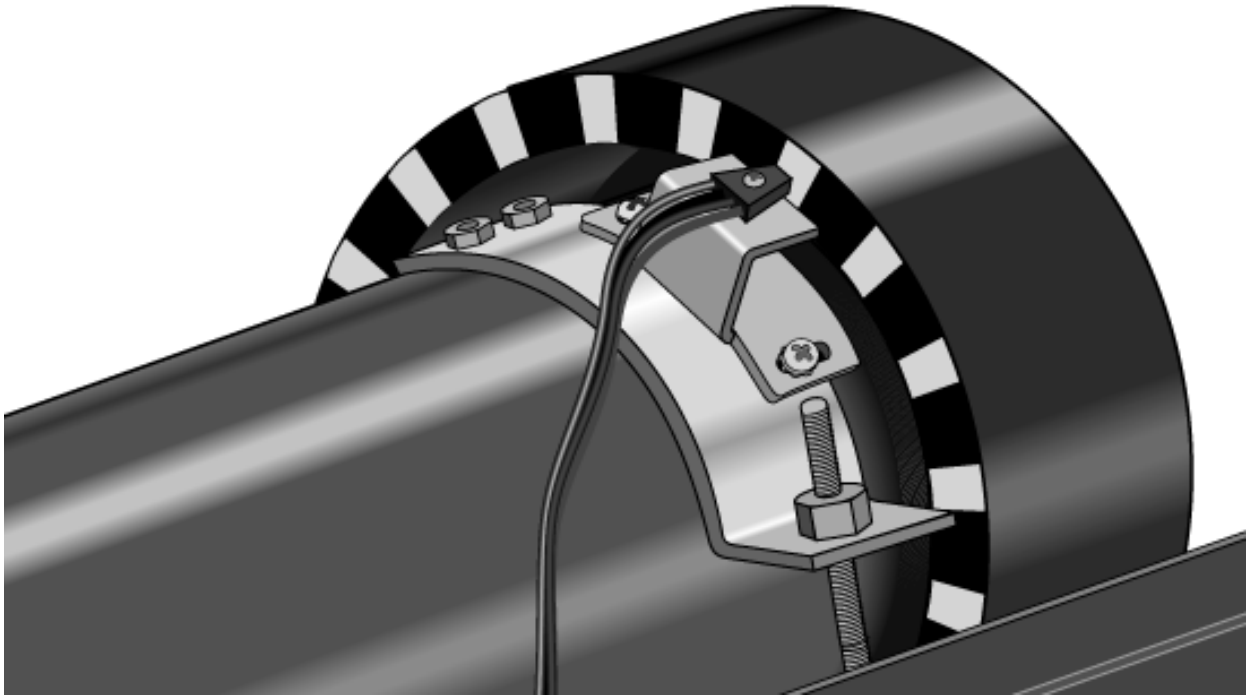
Procedure

1. 1.Remove the hood as described in Procedure 5.1.

2. Choose one . . .

IF . . .	THEN . . .
You are servicing a treadmill with a photo-eye unit	Continue with the next step.
You are servicing a treadmill with a hall effect sensor	Skip to Step 8.

3. Insert a 3/16" dowel between the target disk and the photo eye. If you are servicing a C942 Treadmill, the photo eye is mounted on the motor casing (see Diagram 3-7).



4. If the dowel fits snugly between the target and sensor . . .

THEN . . .	**OTHERWISE . . .**
The width of the target gap is correct; skip to Step 13.	Adjust the target gap as described in the following steps.

5. Loosen the screws and lock nuts that secure the lower PCA or optical sensor assembly to the treadmill frame.

6. Position the lower electronics assembly or optical sensor assembly until the dowel fits snugly between the target and electronics assembly.

7. Remove the dowel from the target gap. Tighten the screws and lock nuts that secure the lower PCA or optical sensor assembly to the treadmill frame. **Skip to Step 13.**

8. Place a feeler gauge blade between the hall effect sensor and the flywheel.

9. If the gap between the hall effect sensor and the flywheel is between 0.045" and 0.060" . . .

THEN . . .	**OTHERWISE . . .**
The width of the target gap is correct; skip to Step 13.	Continue with the next step.

10. Loosen the sensor mounting bracket.

11. Adjust the position of the sensor mounting bracket until the gap measures 0.045".

12. Secure the sensor mounting bracket to the motor case.

13. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Procedure 3.6 — Inspecting the Drive Motor Brushes

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

Procedure

1. Remove the hood as described in Procedure 5.1.

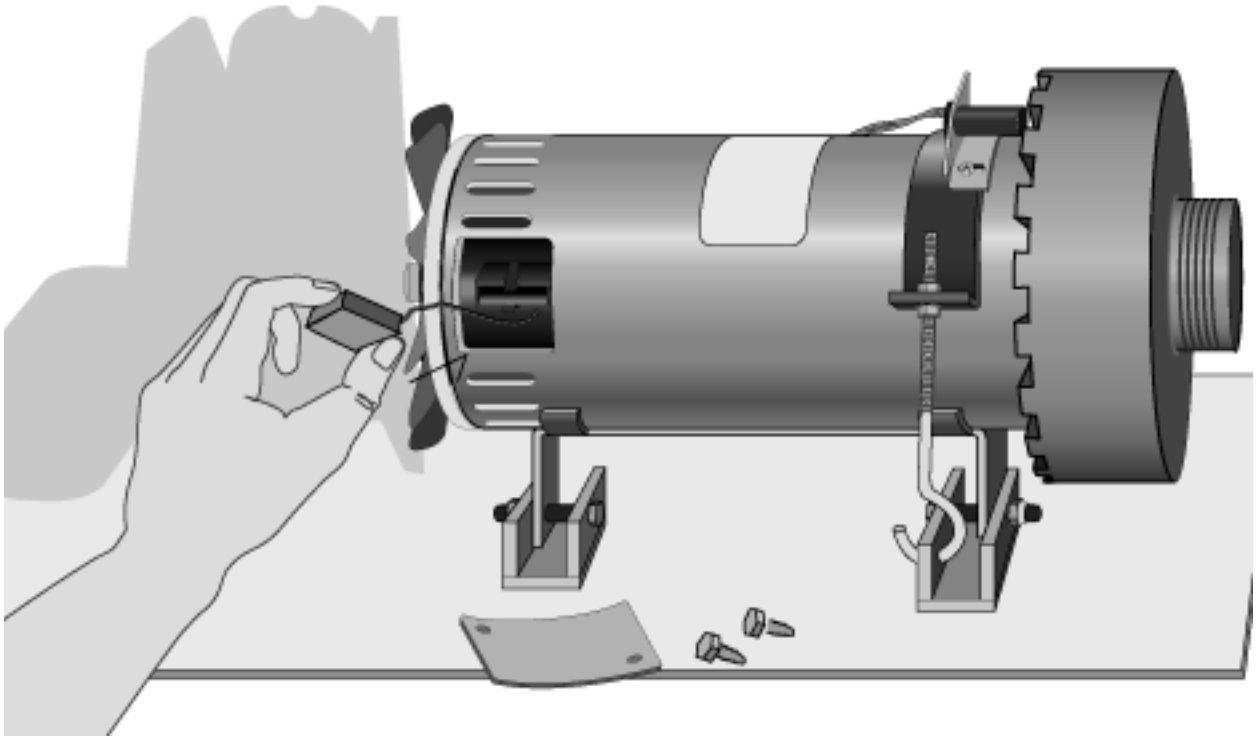
2. If required, remove the flywheel as described in Procedure 5.20.

3. Remove the front brush cover plate from the drive motor case. Expose the brush assembly.

WARNING
Remove the brush leads from the drive motor terminals before you touch or remove the drive motor brushes (see Diagram 3-8).

4. Pull the brush tension spring away from the motor brush. Remove the motor brush from the brush channel, then release the tension spring.

5. Measure the amount of brush wear.



6. If the brush is worn evenly, free of gouges, and is at least 11/16" long . . .

THEN . . .	**OTHERWISE . . .**
Re-install the brush as described in the following steps.	Install a new brush as described in Procedure 5.19.

7. Pull the brush tension spring away from the brush channel and insert the used brush in the channel. Make sure that the bottom surface of the brush makes full contact with the drive motor. Replace the brush tension spring.

CAUTION
If the brush does not make full contact with the drive motor, the motor will not operate correctly.

8. Place the paper shielding over the brush assembly. Secure the brush cover plate to the drive motor case.

9. Repeat Steps 3 through 8 for the back brush and brush cover plate.

WARNING
Make sure the brushes are fully seated before you plug in the treadmill and turn on the circuit breaker.

10. If required, replace the flywheel as described in Procedure 5.20.

11. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Section Four — Troubleshooting

Note
The troubleshooting procedures in this manual are generic and may be applied to all Precor commercial treadmills. Please refer to the appropriate service manual addendum for Precor model specific troubleshooting procedures.

Procedure 4.1 — The Upper Display does not Illuminate

Warning
Hazardous voltages will be tested in the following procedure. Exercise extreme caution when performing these procedures. Do not connect or disconnect any wiring, connectors or other components with power applied to the treadmill.

1. Disconnect the treadmill line cord from the AC wall outlet. Using an AC voltmeter, verify that the proper AC voltage is present at the wall outlet. Nominal 120 Vac may vary between approximately 105 Vac and 135 Vac. Nominal 240 Vac may vary between approximately 195 Vac and 245 Vac. If the AC voltage is missing or incorrect, check the AC service or consult an electrician.

2. Set the treadmill's circuit breaker in the "off" position. Plug the treadmill's AC line cord into the AC wall outlet. Using an AC voltmeter, check between the black and white (or blue and brown) wires for the appropriate AC voltage (as tested in step 1). If the AC voltage is missing or incorrect, replace the line cord.

3. Set the treadmill's circuit breaker in the "on" position. Using an AC voltmeter, check between the AC input terminals of the lower PCA. The AC voltage should read as in step 1. If the AC voltage is missing or incorrect, replace the circuit breaker or the wiring between the circuit breaker an lower PCA as appropriate.

4. Remove the fuse(s) from the lower PCA. Using an ohmmeter, check both fuses for continuity. They should read 1Ω or less. If either fuse is open or reads significantly higher than 1Ω replace the fuse. If the upper display still does not illuminate continue with the next step.

5. Refer to the appropriate block diagram for the treadmill, and note the ribbon cable connections for "+5V" and "ground". Set treadmill circuit breaker in the "off" position. Remove the upper PCA from the display housing. With the ribbon cable still connected set the upper PCA on an insulated surface. Set treadmill circuit breaker in the "on" position. Using a DC voltmeter, measure the voltage between the "+5v" and "ground" connections on the ribbon cable connector on the upper PCA. The voltage read approximately 5 Vdc ± 0.5 Vdc. If the voltage is correct, replace the upper PCA. If the voltage is missing or incorrect, continue with the next step.

6. Set the treadmill's circuit breaker in the "off" position. Remove the ribbon cable from the upper PCA. Set the treadmill's circuit breaker in the "on" position. Check the 5 Vdc voltage (as in step 5) on the ribbon cable connector. If the voltage is correct replace the upper PCA. If the voltage is missing or incorrect, continue with step 7.

7. Set the treadmill's circuit breaker in the "off" position. Remove the ribbon cable from the lower PCA. Set the treadmill's circuit breaker in the "on" position. Check the 5 Vdc voltage (as in step 5) on the lower PCA ribbon cable connector. If the voltage is correct replace the ribbon cable. If the voltage is missing or incorrect, replace the lower PCA.

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

Procedure 4.2 — The Treadmill or AC Supply Circuit Breaker Trips Immediately Upon Turn On.

1. Remove the treadmill's line cord from the wall outlet. Remove the fuse(s) from the lower PCA. Set the treadmill's circuit breaker in the "off" position. Using an ohmmeter, measure between two of the three terminals on the line cord plug. Test all three possible combinations of line cord plug terminals in this manner. All of the measurements should read 1 million ohms or greater. If any of the readings are significantly lower than 1 million ohms, replace the line cord. Otherwise, continue with the next step.

2. Set the treadmill's circuit breaker in the "on" position. Repeat the measurements in step 1. If all of the readings are 1 million ohms or greater, continue with step 6. If any of the readings are significantly lower than 1 million ohms, continue with step 3 or 4 as appropriate.

3. If treadmill has an external SCR (an SCR that is not mounted on the lower PCA), remove the leads from the AC terminals of the SCR. Repeat the measurements in step 1. If all of the readings are 1 million ohms or greater, replace the SCR.

4. If the treadmill does not have an external SCR, remove the AC leads from the lower PCA. If all of the readings are 1 million ohms or greater, replace the lower PCA.

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

6. Remove the yellow wires from the treadmill circuit breaker. Removing these wires disables the software controlled circuit breaker trip function. Measure the fuses as in step 4 of procedure 6.1 and replace the fuse(s) in the lower PCA.

Warning
Do not allow anyone to stand on the treadmill running surface while the yellow leads are removed from the circuit breaker.

7. Plug the treadmill's line cord into the wall outlet. Set the treadmill's circuit breaker in the "on" position. If the treadmill's circuit breaker does not trip continue with step 8. If the treadmill circuit breaker trips, remove the upper PCA. Check that a prom is correctly oriented and installed in the upper PCA. Press all "socketed" IC chips firmly into their sockets. Replace the upper PCA. Set the treadmill's circuit breaker in the "on" position. If the treadmill's circuit breaker trips, replace the circuit breaker.

8. Replace the yellow leads on the circuit breaker.

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

Procedure 4.3 — The Treadmill Circuit Breaker Trips While the Treadmill is Being used

Warning
Hazardous voltages will be tested in the following procedure. Exercise extreme caution when performing these procedures. Do not connect or disconnect any wiring, connectors or other components with power applied to the treadmill.

Note:
Load related tests will be performed in the following procedure. It is highly recommended that you perform the load tests on a SCR an PWM treadmill that are in excellent condition. By performing these tests you will establish a “benchmark” against which to measure treadmill performance and condition. The readings that you obtain will be pertain for your weight and walking/running style at a specified speed. For example an SCR treadmill running unloaded at 3 MPH and at maximum speed will draw approximately 3-5 amps of input current. A 150 pound person using the treadmill at 3 MPH will draw approximately 8 -10 amps. On PWM treadmills, unloaded and loaded tests (at 3 MPH) can be performed using the power bit reading as the benchmark instead of input current. You now have 3 benchmarks; unloaded at 3 MPH, unloaded at maximum speed and loaded at 3 MPH.

1. If you are troubleshooting a PWM treadmill go to step 9.

2. Clamp an AC clamp-on ammeter around one of the AC line cord wires other than the green wire. Measure the AC current with no load. If the AC current is significantly higher the unloaded benchmarks go to step 5, otherwise continue with the next step.

3. With the AC clamp-on ammeter still attached as in step 1, measure the AC input under load at 3 MPH. If the current is significantly higher than the benchmark current, check the condition of the running bed and running belt. If necessary replace the running bed and/or running belt as appropriate.

Note:
Most commercial running beds are reversible. If the bottom side of a reversible running bed is unused the deck must be reversed instead of being replaced.

4. If the loaded AC input current is still higher than the benchmark current, continue with the next step.

5. Set the treadmill’s circuit breaker in the “off” position. Using a DC voltmeter measure the DC voltage on the motor filter capacitor. The voltage should read less than 1 Vdc. If the voltage is greater than 1 Vdc, discharge the capacitor using a 100Ω 10W resistor.

6. Remove the screw from the negative terminal of the capacitor. Remove all of the leads from the negative terminal of the capacitor and connect them together (off of the capacitor) with a nut and bolt of the appropriate size. Insulate the exposed metal terminals and the nut and bolt. High voltage will be present so they must not come in contact with any portion of the treadmill. Set the treadmill's circuit breaker in the "on" position. Repeat the unloaded AC input current measurement as in step 1. If the current is now in the benchmark range, replace the capacitor.

7. Set the treadmill's circuit breaker in the "off" position. Reconnect the wires on the negative terminal of the capacitor.

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

9. Access the treadmills diagnmostic program and go to the power bit display. Operate the treadmill at the unloaded "benchmark" speeds. If the power bit reading is significantly higher than the unloaded benchmarks go to step 11, otherwise continue with the next step.

10. Record the power bit reading under load at 3 MPH. If the power bit reading is significantly higher than the benchmark reading, check the condition of the running bed and running belt. If necessary replace the running bed and/or running belt as appropriate.

Note:
Most commercial running beds are reversible. If the bottom side of a reversible running bed is unused the deck must be reversed instead of being replaced.

11. Replace the lower PCA and repeat the tests in steps 9 and 10.

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

Procedure 4.4 — The AC Supply Circuit Breaker Trips While the Treadmill is Being Used

Note:
A treadmill operating normally but under heavy load conditions may draw AC input currents approaching 20 amps. Therefore, the treadmill must be connected to a 20 amp dedicated circuit. That is, the circuit feeding the treadmill must be rated for 20 amps and be connected to a 20 amp circuit breaker. Also, the treadmill must be the only equipment connected to the circuit.

1. Check the tripped circuit breaker to verify that a 20 amp breaker is installed.

2. Determine if any other equipment is fed from the circuit breaker. You can see which pieces of equipment will and will not work when the breaker is switched on and off.

3. If the breaker is not a 20 amp breaker and/or the circuit is not dedicated, the AC service must be rewired (by a qualified electrician) as a 20 amp dedicated circuit.

4. If the treadmill is connected to a 20 amp dedicated circuit, connect a clamp-on AC ammeter to one of the AC line cord wires other than the green wire. Measure the AC input current under the conditions which cause the circuit breaker to trip. If the circuit breaker is tripping at currents of less than 20 amps, the AC supply breaker must be replaced by a qualified electrician.

5. If the AC supply breaker is tripping at approximately 20 amps (depending on breaker reaction times, current could exceed 20 amps before the breaker trips), continue with Procedure 5.15.

Procedure 4.5 — The Treadmill Drive Motor will not Start

Warning
Hazardous voltages will be tested in the following procedure. Exercise extreme caution when performing these procedures. Do not connect or disconnect any wiring, connectors or other components with power applied to the treadmill.

1. With the treadmill in normal operating condition and the manual program selected, connect a DC voltmeter between the M- and M+ terminals of the lower PCA. Press the “speed up” key to start the drive motor. If voltage appears continue with step 4, otherwise continue with step 2.

Note:
On PWM units the voltage between the M- and M+ terminals will only appear momentarily. When the error is logged on the display the voltage, if there was a voltage, will be removed.

2. Since voltage did not appear, the electronics did not function normally. There are three components that could cause this condition. The lower PCA, interconnect cable or upper PCA. It will be necessary to substitute know good components to determine which component is defective. Substitute only one component at a time. If the known good component does not fix the problem, replace the original component before substituting another component. Substitute the three components in the order listed above.

Warning
PWM lower boards use a jumper to set the board for operation in 120 Vac units. Be sure that the lower board you use as a substitute is correctly set up. If you install a lower PCA in a 240 Vac treadmill with the 120 Vac jumper equipped, you will destroy the lower PCA.

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

4. Since voltage appeared, the electronics are functioning. Therefore the problem is toward the motor.

Warning
If you are troubleshooting a SCR treadmill the motor filter capacitor may be charged to a high voltage. Before proceeding, discharge the motor filter capacitor with a 100Ω, 10W resistor.

5. Set the treadmill’s circuit breaker in the “off” position. Disconnect the motor wires from the lower PCA (PWM units) or motor filter capacitor (SCR units). Using an ohmmeter, measure between the motor wires. The reading should be approximately 1Ω-3Ω. If the reading is open (∞) or significantly high, remove both motor brushes. The brushes must be long enough to allow the brush springs to firmly hold the motor brushes against the motor commutator. If necessary replace the motor brushes.

6. If the brushes are good, measure the resistance between one of the motor wires and its corresponding connection on the motor brush holder. It should read approximately 0Ω. If the reading is open (∞)or significantly high, repair or replace the motor wire. Check the other motor lead in the same manner.

7. If the motor brushes are good and both motor wires are good, but the reading (step 5) between the two motor leads is high or open (∞), replace the motor.

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

Procedure 4.6 — The Treadmill Drive Motor Starts Momentarily, then Stop

Note:
Typically if the drive motor starts (when the speed up command is given) and then stops, it is because speed sensor signal is not being received by the upper PCA control circuit. The upper PCA depends on not only receiving a signal from the speed sensor but receiving the correct speed sensor signal. The speed sensor signal is a real time indication of how fast the drive motor is running. If the speed sensor signal is missing or incorrect, the safety features in the upper PCA control system will stop the drive motor and display an error condition.

1. Check the motor brushes as in step 5 of procedure 6.5. If you have ensured that the motor brushes are good, continue with step 2.

2. If the treadmill you are troubleshooting uses a photoeye speed sensor go to step 3, if it uses a hall effect sensor continue with step 3.

3. The spacing between the hall effect sensor and the flywheel lobes should be approximately.050 inch. Some hall effect mounting brackets allow for two mounting positions. Ensure that the mounting position that maximum overlap between the hall effect sensor and flywheel lobe is used. If the above requirements are correct and the problem persists, continue with step 5.

4. The spacing between the photoeye and the flywheel target is approximately 3/16 inch. The photoeye and the flywheel target must be clean. The photoeye and flywheel target must be free of gouges or scratches. If the above requirements are correct and the problem persists, continue with step 5.

5. If the treadmill you are testing has an external speed sensor (the speed sensor is not mounted on the lower PCA), go to step 8.

6. There are three components that could cause this condition. The lower PCA, interconnect cable or upper PCA. It will be necessary to substitute know good components to determine which component is defective. Substitute only one component at a time. If the known good component does not fix the problem, replace the original component before substituting another component. Substitute the three components in the order listed above.

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

8. Perform steps 8 & 9 with the treadmill “on” and the banner scrolling (or at the initial start up point). Using a DC voltmeter, measure between the red and black leads of the speed sensor connector on the lower PCA. The reading should approximately be 5 Vdc ± 0.5 Vdc. If the voltage is missing or significantly low, remove the speed senor connector from the lower PCA. Perform the same measurement on the lower PCA connector, with the speed sensor disconnected from the lower PCA. If the voltage reads 5 Vdc ± 0.5 Vdc, replace the speed sensor. If the voltage is missing or is significantly low, replace the lower PCA.

9. If the voltage is step 8 was correct, measure the voltage between red and white leads of the speed sensor connector on the lower PCA. By hand, slowly rotate the drive motor flywheel. The reading should toggle between 5 Vdc ± 0.5 Vdc and 0.5 Vdc ± 0.5 Vdc. If the voltage does not toggle, replace the speed sensor.

10. If the voltage in step 9 was correct, continue with step 6.

Procedure 4.7 — The Treadmill Lacks Normal Power

Warning
Hazardous voltages will be tested in the following procedure. Exercise extreme caution when performing these procedures. Do not connect or disconnect any wiring, connectors or other components with power applied to the treadmill.

1. On 120Vac PWM treadmills, be sure that the jumper is installed between the “J1” and “AC2” terminals of the lower PCA.

Warning
The jumper in step is installed on 120 Vac units only. If the jumper is mistakenly installed on 240 Vac units the lower PCA will be damaged.

2. Set the treadmill’s circuit breaker in the “off” position. Disconnect the motor leads from the lower PCA (PWM units) or motor filter capacitor (SCR units). Using an ohmmeter, measure between the motor leads. The reading should be approximately1Ω-3Ω. If the reading is open (∞) or significantly high, remove both motor brushes. The brushes must be long enough to allow the brush springs to firmly hold the motor brushes against the motor commutator. If necessary, replace the motor brushes.

3. If the brushes are good, continue with procedure 6.3.

4. If you have completed all of the tests in procedure 6.3, replace the drive motor.

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

Procedure 4.8 — Software Access Codes

Over the years the codes used to access the various software diagnostics features have changed several times. Currently we are using a “standardized” set of access codes. These codes will be used on all current and future software. When feasible the standardized access codes may be added to older software if it is being updated for other reasons. 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 treadmill being tested refer to the appropriate old access codes listed below. The standard access codes use all sequential key presses, no simultaneous key presses are used.

The access codes below will be grouped by treadmill model and in some cases by software version within that model. See the appropriate treadmill addendum for specific procedures, such as lift calibration.

STANDARD ACCESS CODES

Diagnostics	Press keys 4,5,1,7,6,5,7,6,1
Odometer	Press keys 4,6,5
Measurements Units	Press keys 4,5,6,7
Club Settings	Press keys 4,5,6,5,1,5,6,5

9.5

Diagnostics	When “weight” is displayed, press the “enter weight” key and “incline down” key, simultaneously.
Odometer	Enter the manual program, press the hidden key between the “stop” key and the “incline up” key.
Measurement Units	Access diagnostics as above, when in the calibration mode press the stop key. Use the scan key to select 9.5-1 for MPH or 9.5-2 for KPH.

9.5SP

Diagnostics	Press the “enter key, then the “reset” key and the “speed down” and “incline down” keys together.
Odometer	Press the hidden key below the “stop” key
Measurement Units	Access the odometer as above and follow the prompts to set the configuration.

C940

Diagnostics	Press the “speed up, “speed down” and “enter” keys, simultaneously
Odometer	Press the “speed down” and “enter” keys, simultaneously
Measurement Units	Press the “speed up” and “change” keys, simultaneously

C942

Diagnostics	Press the “stop”, “speed up”, “speed down” and “quick start” keys, simultaneously
Odometer	With the weight displayed, press the “stop”, “speed down” and “speed up” keys, sequentially.
Measurement Units	With the weight displayed, press the “speed up” and “quick start” keys, simultaneously

C944

Diagnostics	Press the “speed up”, “speed down” and “incline up” keys, simultaneously
Odometer	Press the “speed up” and “incline up” keys, simultaneously
Measurement Units	Press the “speed up” and “change” keys, simultaneously

C960, C962, C964

Diagnostics	Press the “speed up”, “speed down” and “incline up” keys, simultaneously
Odometer (ver. 2.00 or less)	Access diagnostics as shown above
Odometer (ver.2.03 or greater)	Press the “speed up” and “incline up” keys, simultaneously
Measurement Units	Press all three “change” keys, simultaneously
Motor size (SCR, ver. 2.7 or greater)	Press the “speed up”, “speed down”, “incline up” and “incline down” keys, simultaneously

Procedure 4.9 — Software Error Codes

Over the years the codes used to designate problem conditions have changed several times. Currently we are using a “standardized” set of error codes. These codes will be used on all current and future software. When feasible the standardized error codes may be added to older software if it is being updated for other reasons.

STANDARD ERROR CODES

Error 00	Checksum error
Error 01	Memory error
Error 02	Ram test 1 error
Error 03	EEPROM test error
Error 04	Ram test 2 error
Error 05	Key depressed at power up
Error 10	Line frequency out of acceptable range
Error 20	Too many maximum power requests in 1 second
Error 21	Too many consecutive maximum power requests
Error 22	No motor pulses at start-up
Error 23	Motor pulses missing after start-up
Error 24	Reduce speed requested, speed not reducing
Error 25	Motor pulses over acceptable limit
Error 26	Motor pulse width incorrect
Error 40	No lift motion detected
Error 41	Lift has not responded in an acceptable time
Error 42	Lift position value out of range
Error 43	Zero switch not detected

9.5, 9.5SP

Error 1, error 6 or program error	Checksum error
Error 2 or line freq. error	Line frequency out of acceptable range
Error 3, control error or pace error 1	Motor pulses missing
Error 4, speed control error or pace error 2	Speed is too slow
Error 5 or lift control error	No lift motion detected
Error 7 or pace error 3	Too much variation in speed

C944, C960, C962, C964

Pace error 2	Speed out of acceptable range
Pace error 3	No motor pulses at start-up
Pace error 4	Motor pulses missing after start-up
Pace error 5	Reduce speed requested, speed not reducing
Pace error 6	Motor pulses over acceptable limit
Pace error 7	Pulse width incorrect
Lift error	No lift motion detected
Program error	Checksum error
Memory error	Ram test error
Line frequency error	Line frequency out of acceptable range

Procedure 4.10 — Troubleshooting the Ribbon Cable

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

Procedure

1. Remove the hood.

2. Disconnect the ribbon cable from the lower PCA.

3. Remove the screws that secure the upper display module assembly to the upper handrail clamp.

4. Disconnect the ribbon cable from the upper PCA.

5. Connect the spare ribbon cable between the upper and lower Pecs.

6. Check the operation of the treadmill by referring to the appropriate appendix.

7. If the treadmill operates correctly with the spare ribbon cable**..**

THEN...	**OTHERWISE...**
Install a new ribbon cable as described in Procedure 5.6.	Continue with the next step.

8. Turn off the treadmill with the circuit breaker, then unplug the treadmill from the wall outlet.

9. Disconnect the spare ribbon cable from the upper and lower Pecs.

10. Connect the original ribbon cable to the lower and upper Pecs.

11. Position the upper display module on the upper handrail clamp. Install the screws that secure the display module to the handrail clamp.

12. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood.

Procedure 4.11 — Troubleshooting the Smart Rate System

If the **HEART RATE** indicator does not blink in time with your hear beat when you perform Procedure 2.1 in the appendix of the treadmill you are servicing, 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 in the appendix of the treadmill you are servicing **. .**

THEN . . .	**OTHERWISE . . .**
Skip to Step 6.	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. Access the Heart Rate diagnostic mode as described in the Software Features Section of the appendix for the treadmill you are servicing.

4. If the **HEART RATE** indicator blinks in time with your heart beat and the heart rate information displayed is correct **. . .**

THEN . . .	**OTHERWISE . . .**
The Smart Rate system is operating correctly. There is no need to continue with this procedure.	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 . . .	**OTHERWISE . . .**
Continue with the next step.	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 in time with the LED on the Smart Rate Test Generator **. . .**

THEN . . .	OTHERWISE . . .
The chest strap assembly is bad. Wear a new chest strap assembly when you use the Smart Rate System.	The heart rate receiver assembly is bad. Replace the heart rate receiver as described in Procedure 5.4 of the Commercial Treadmill Service Manual.

Procedure 4.10 — Troubleshooting the Roller and Motor Bearings

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

Procedure

1. Remove the hood as described in Procedure 5.1.

2. Check the set screws that secure the flywheel to the drive motor shaft. If the flywheel set screws are loose **. . .**

THEN . . .	**OTHERWISE . . .**
Install new set screws in the flywheel as described in Procedure 5.20.	Continue with the next step.

3. Examine the surfaces of the take-up and drive rollers. Remove encrusted wax with a plastic scraper.

4. Inspect drive belt tension as described in either Procedure 3.2 or 3.3.

Note
The motor revolves three times faster than the rollers. Watch the motor and rollers turn as you perform the next step.

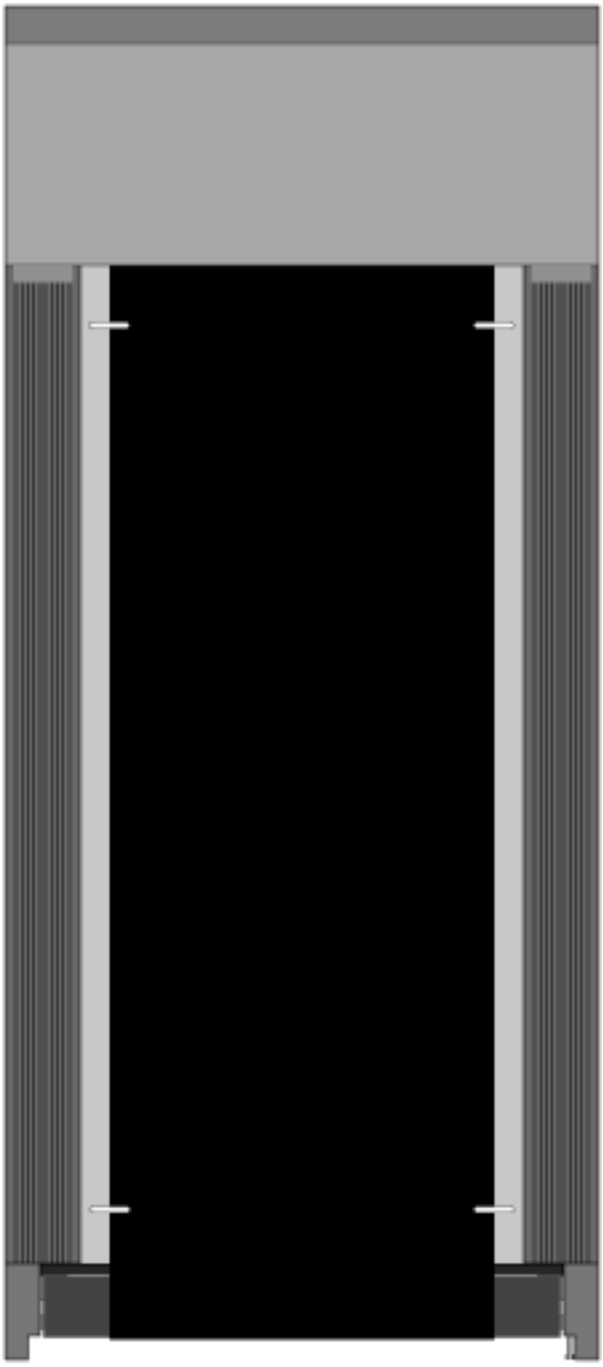
5. Turn on the treadmill. Adjust the speed of the running belt to 1–2 MPH. Compare the noise made by the rollers to the sound coming from the motor. If you can determine that the knocking noise is coming from the motor or either of the rollers, replace the malfunctioning component as described in the appropriate procedures included in Section Five. Turn off and unplug the treadmill.

6. Place four marks on the running belt and bed. Each mark must be visible on both the running belt and bed (see Diagram 4-1).

7. Remove the tension and tracking bolts. Remove the take-up roller from the roller mounts, then place the roller on the running bed.

8. Look underneath the running belt. Pay special attention to the front and back edges of the running bed. Make sure the running bed is free of debris and loose objects.

9. Turn on the treadmill. Adjust the speed to 2–3 MPH. Walk slowly around the treadmill and listen to the operating sounds made by the treadmill. Turn off and unplug the treadmill.



10. If the treadmill no longer knocks during operation **. . .**

THEN . . .	**OTHERWISE . . .**
Install a new take-up roller as described in Procedure 5.17.	Continue with the next step.

11. Listen to the operating sounds made by the treadmill as described in Step 9.

12. If the treadmill no longer knocks during operation **. . .**

THEN . . .	**OTHERWISE . . .**
This procedure is complete; skip to Step 15.	Re-install the original take-up roller in the treadmill. Install a new drive roller and tension the drive belt as described in Procedure 5.16.

13. Listen to the operating sounds made by the treadmill as described in Step 9.

14. If the treadmill no longer knocks during operation **. . .**

THEN . . .	**OTHERWISE . . .**
This procedure is complete; continue next step.	Re-install the original drive roller in the with the treadmill, then tension the drive belt. Install a new motor as described in Procedure 5.18.

15. Go to Step 14 of Procedure 3.1 to align the marks on the running belt with the marks on the running bed.

16. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Procedure 4.13 — 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 handing 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 handing 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.

Section Five — Replacement Procedures

Precor Commercial Treadmills are built one of two ways: with inductors, capacitors and silicon controlled rectifiers (SCRs) to control the drive motor or with PWM-type control circuitry built into the lower PCA. Unless otherwise specified, the procedures in this appendix apply to all of Precor's Commercial Treadmills.

Procedure 5.1 — Removing or Replacing the Hood

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

Removing and Replacing the Hood

1. Remove the screws that secure the hood to the treadmill frame.
2. Remove the hood from the treadmill frame.
3. When maintenance operations are complete, position the hood against the treadmill frame.
4. Replace the screws that secure the hood to the treadmill frame.

Procedure 5.2 — Replacing the Upper Display Enclosure or Upper PCA

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

1. Remove the screws that secure the display enclosure to the treadmill frame.

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

3. Remove the screws that secure the upper display module to the treadmill.

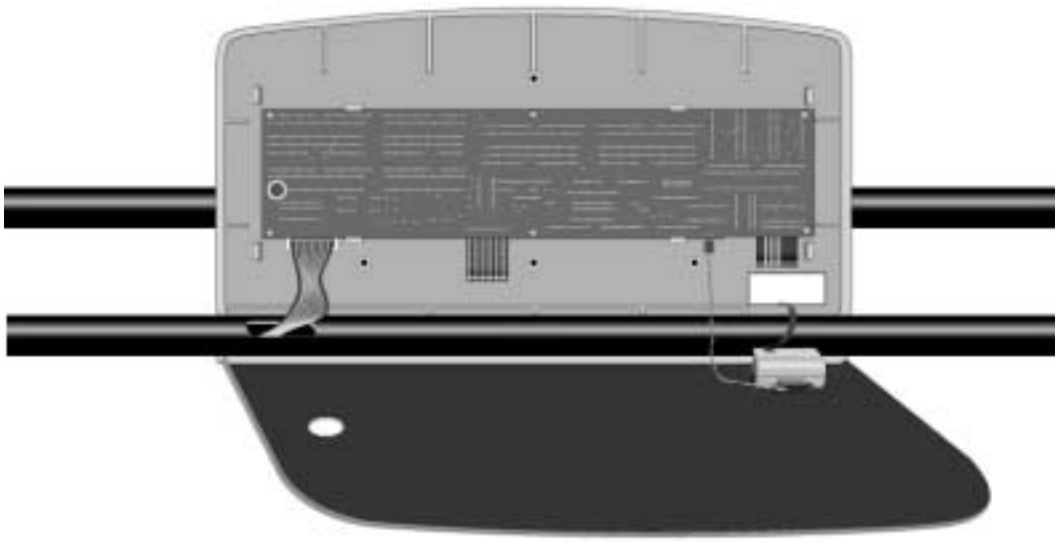
4. Disconnect the ribbon cable from the upper PCA. If you are going to re-install the display enclosure (without replacing the upper PCA or display label and keypad) set aside the display enclosure until maintenance operations are complete. Then, skip to Step 14.

5. If the treadmill you are servicing has a heart rate receiver assembly, disconnect the heart rate cable from the upper PCA.

6. If necessary, disconnect the safety switch wire assembly from the upper PCA.

7. Carefully disconnect the keypad from the upper PCA.

8. Remove the fasteners or release the upper PCA from its mounting tabs (see Diagram 5-1). Remove the upper PCA from the display housing.



9. If you are replacing the upper PCA, remove the PROM as described in Procedure 5.3. Set aside the defective upper PCA for eventual shipment to Precor Customer Service. Install the PROM in the new upper PCA.

10. Carefully connect the keypad to the upper PCA.

11. Position the upper PCA at its mounting location on the display enclosure. If the treadmill you are servicing has mounting tabs, push the upper PCA onto the tabs. Press down the upper PCA until the edge of the board is held by the tabs. Otherwise, install the screws that secure the upper PCA to the display enclosure.

12. If the treadmill you are servicing has a heart rate receiver assembly cable, connect it to the upper PCA.

13. If necessary, connect the safety switch wire assembly to the upper PCA.

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

15. Connect the ribbon cable to the upper PCA.

16. Position the upper display module on the treadmill. Install the screws that secure the display module to the treadmill frame.

17. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing.

Procedure 5.3 — Replacing the PROM, Processor or LED Chips

1. Due to several critical circumstances involving the handling and installation of prom, processor or LED chips, they are no longer available individually.

2. Generally, the failure of prom, processor or LED chips is very rare. Should it be necessary to upgrade software, the upper PCA must be replaced. The upper PCA is furnished with software (prom) installed.

3. Refer to Procedure 5.2 for upper PCA replacement.

Procedure 5.4 — Replacing the Heart Rate Receiver Assembly

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

Removing the Heart Rate Receiver Assembly

1. Remove the screws that secure the display enclosure to the treadmill frame.

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

3. Remove the screws that secure the display enclosure to the treadmill.

4. Disconnect the ribbon cable from the upper PCA.

5. Disconnect the heart rate cable from the upper PCA.

6. Remove the screws that secure the heart rate receiver assembly to the display enclosure.

Replacing the Heart Rate Receiver Assembly

7. Position the heart rate receiver assembly at its mounting position on the display enclosure. Install the screws that secure the heart rate receiver assembly to the display enclosure.

8. Connect the heart rate receiver assembly cable to the upper PCA.

9. Connect the ribbon cable to the upper PCA.

10. Remove the ground lead of the anti-static wrist strap from the treadmill frame, then remove the wrist strap from your arm.

11. Position the display enclosure on the treadmill. Install the screws that secure the display enclosure to the treadmill.

12. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing.

Procedure 5.5 — Replacing the Lower PCA

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

Removing the Lower PCA

1. Remove the hood as described in Procedure 5.1.

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

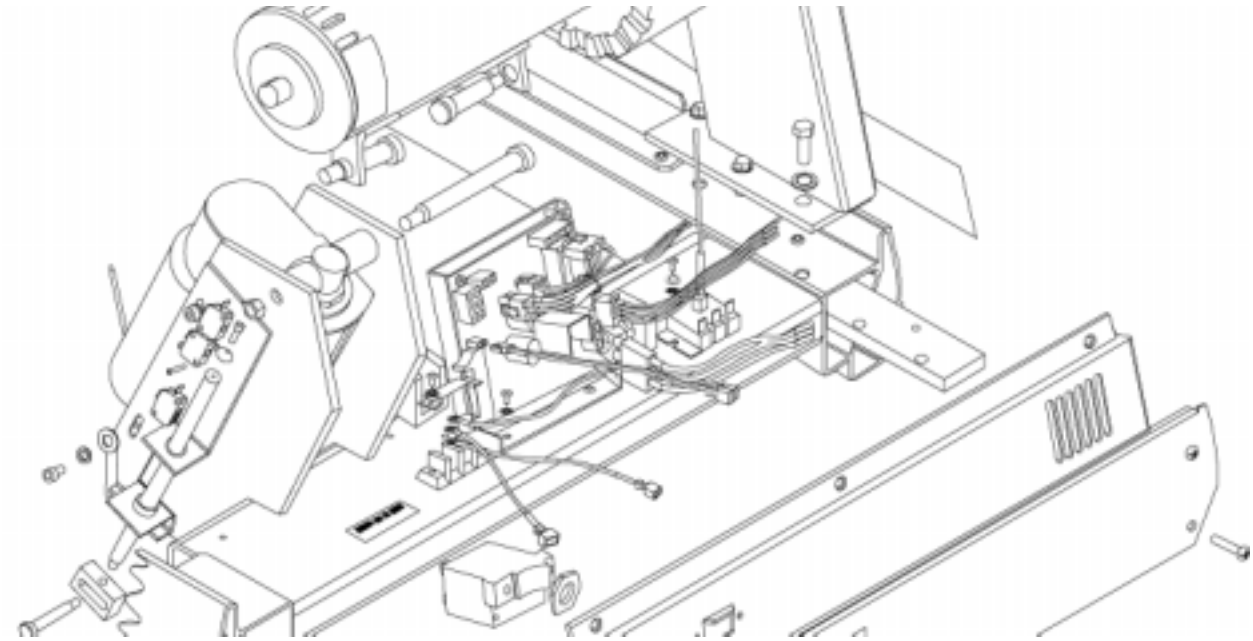
3. Disconnect the ribbon cable from the lower PCA.

4. When applicable, disconnect the lift motor cable from the lower PCA.

5. Disconnect the circuit breaker wiring assembly from the lower PCA.

6. Disconnect the remaining wires connected to the lower PCA (see the wiring diagram in the appendix of the treadmill you are servicing).

7. Remove the mounting hardware that secures the lower PCA to the treadmill (see below). Set aside the old lower PCA for eventual shipment to Precor.



Replacing the Lower PCA

8. Position the new lower PCA at its mounting position. Install the mounting hardware that secures the lower PCA to the treadmill frame.

9. Tighten the screws and locknuts that secure the lower PCA to the treadmill.

10. Connect the ribbon cable to the lower PCA.

11. If necessary, connect the lift motor cable to the lower PCA.

12. Connect the circuit breaker wiring assembly to the lower PCA.

13. Connect the wires you disconnected in Step 6.

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

15. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Procedure 5.6 — Replacing the Ribbon Cable

Before performing this procedure, ensure that the ribbon cable is defective by connecting a spare ribbon cable to the upper PCA and lower PCA as described in Procedure 4.1.

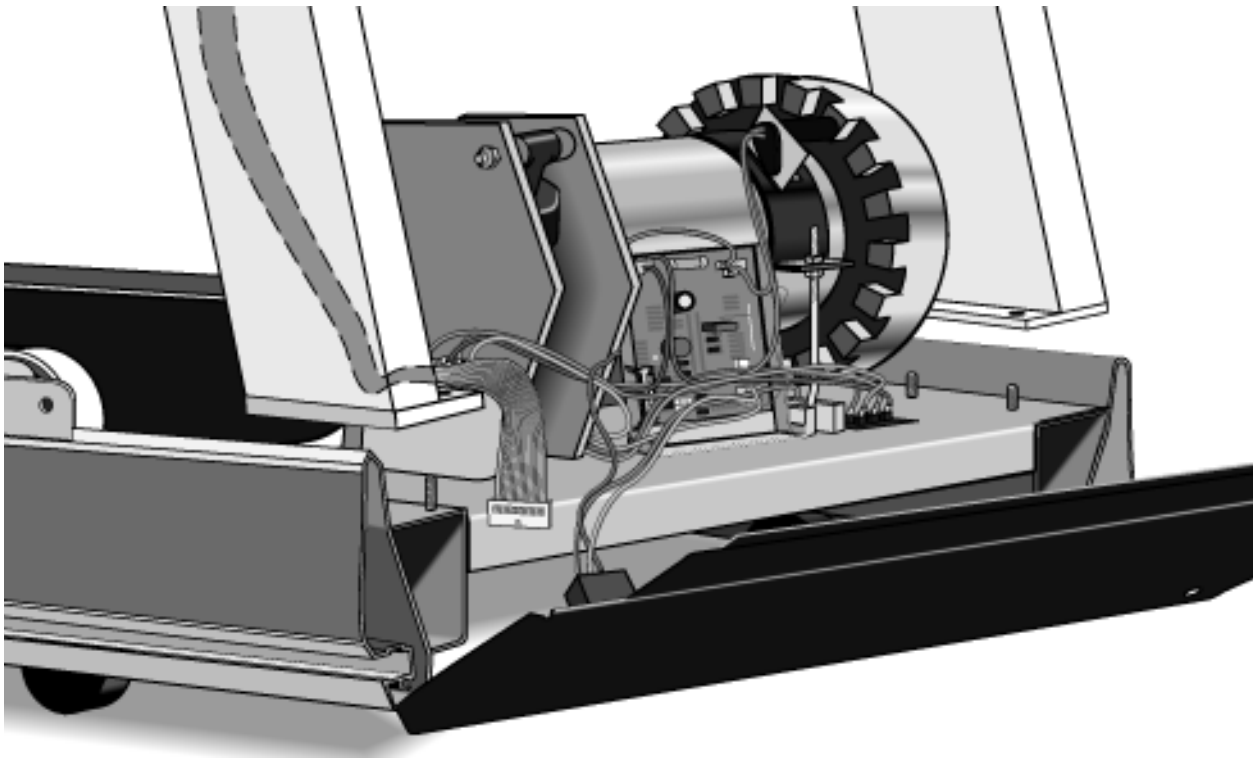
WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

Removing the Ribbon Cable

1. Remove the hood as described in Procedure 5.1.

2. Disconnect the ribbon cable from the lower PCA (see illustration below).

3. If necessary, remove the handrails as described in the appendix for the treadmill you are servicing.



4. Remove the connectors that secure the lower part of the targa uprights to the targa supports.

5. Push the lower ribbon cable connector into the targa upright.

6. Lift the targa uprights from the targa supports.

7. Remove the three screws that secure the upper display housing to the display housing mounting plate.

8. Place your right hand on the two right upper display housing mounting tabs. Place your left hand on the left tabs.

9. Push the right tabs towards the right targa upright and the left tabs towards the left targa upright as you lift the display housing from the mounting plate. Support the display housing while you perform the next step.

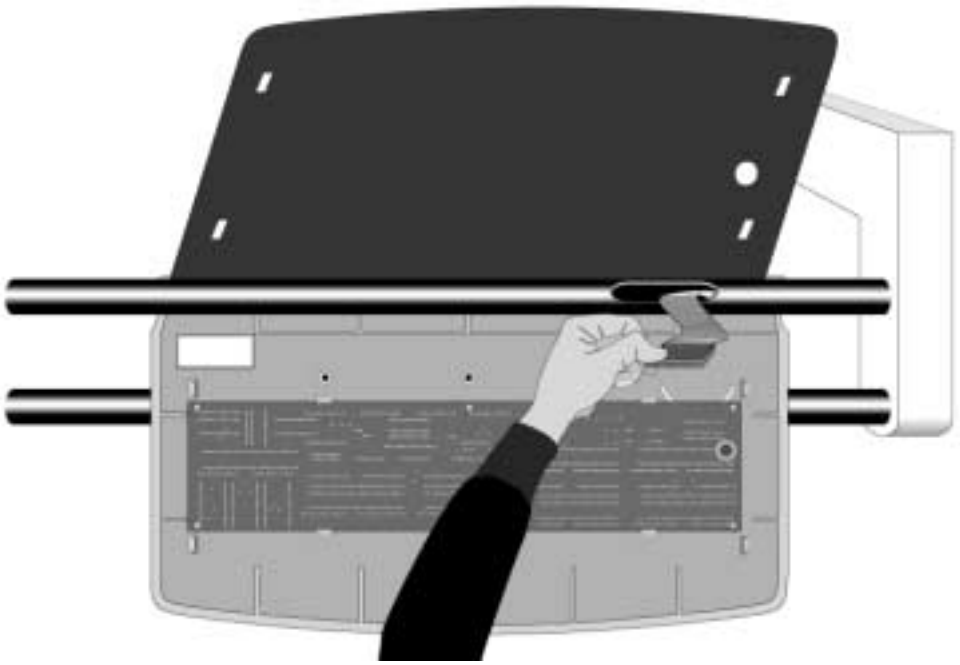
10. Disconnect the ribbon cable from the upper PCA (see Diagram 5-4).

11. Push the upper ribbon cable connector through the front handrail and into the targa upright. Carefully set aside the display housing.

12. If you removed a handrail from the treadmill, remove the bolts and end covers that secure the targa upright to the front handrail.

13. Remove the right targa upright from the front handrail assembly.

14. Remove the ribbon cable from the right targa upright.



Replacing the Ribbon Cable

15. Position the right targa upright on the right end of the front handrail assembly.

Note
It is easier to replace the ribbon cable by routing it from the front handrail to the lower end of the right targa upright.

16. Loosely twist one end of the ribbon cable, then push it through the opening in the right end of the front handrail.

17. Continue pushing the ribbon cable through the front handrail and right targa upright (see Diagram 5-5).

18. Using a long piece of wire, pull the ribbon cable through the targa upright.

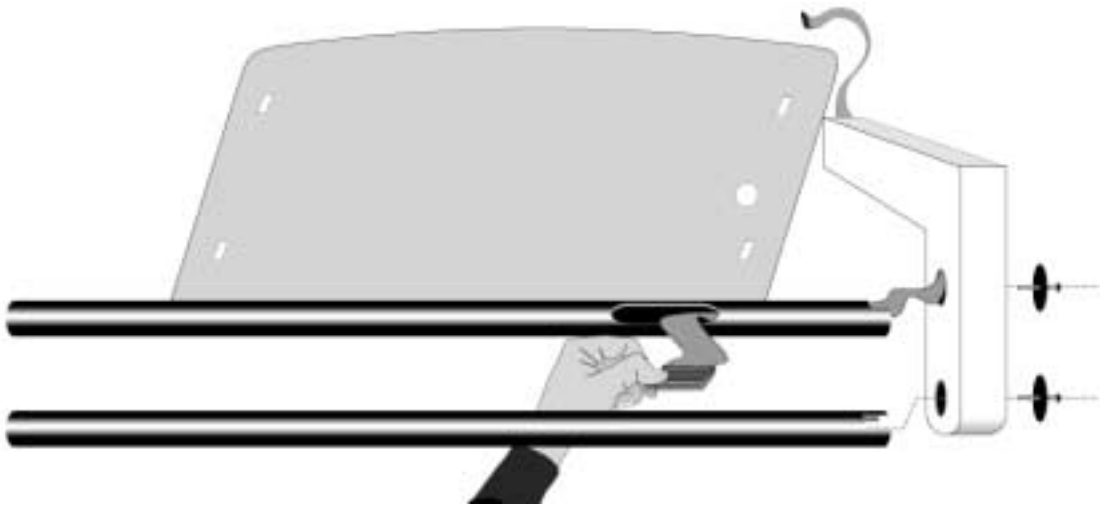
19. If you removed a handrail from the treadmill, replace the bolts and end covers that secure the targa upright to the front handrail.

20. Position the display housing on the handrails.

21. Support the display housing in an upright position while you connect the ribbon cable to the upper PCA.

22. Line up the tabs on the display housing with the holes on the display housing mounting plate.

23. Gently press the display housing onto the mounting plate until the tabs are pushed into the holes.



24. Replace the screws that secure the upper display housing to the display housing mounting plate.

25. Place the targa uprights over the targa supports.

26. Replace the socket head bolts that secure the targa uprights to the targa supports.

27. If necessary, remove the handrails as described in the appendix for the treadmill you are servicing.

28. Connect the ribbon cable to the lower PCA.

29. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Procedure 5.7 — Replacing the Circuit Breaker

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

Removing the Circuit Breaker

1. Remove the hood as described in Procedure 5.1.

2. Refer to the wiring diagram in the appropriate treadmill appendix. (For Non-PWM C960 Series Treadmills, see Diagram 5-6). Mark each wire connected to the breaker with the wire color and terminal designation of the component connected to it.

3. Disconnect the wires from pole 1 and pole 2 of the circuit breaker terminals.

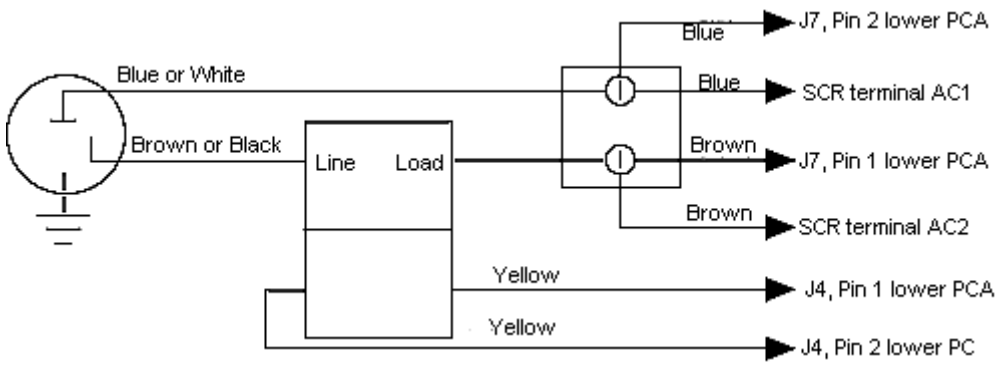
4. Loosen the two screws that secure the circuit breaker to the treadmill. Remove the switch from its mounting position.

Replacing the Circuit Breaker

5. Make sure that the new circuit breaker is set toOFF. Position the new circuit breaker on the treadmill. Install the screws that mount the circuit breaker to the treadmill.

6. Refer to the marks on the tape attached to the wires disconnected from the original circuit breaker. Connect the loose wires to the circuit breaker. Check the circuit breaker connections with the connections shown on the wiring diagram in the appendix of the treadmill you are servicing. A typical 120 VAC circuit breaker wiring diagram is shown below.

7. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.



Procedure 5.8 — Replacing the Power Cord

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

1. Remove the hood as described in Procedur e5.1.

2. Refer to the wiring diagram in the appropriate treadmill appendix. Mark each wire connected to the power cord with the wire color and terminal designation of the component it is connected to.

3. Remove the screw that secures the power cord ground wire to the treadmill frame.

Note
The power cord is routed through a strain relief mounted in the dress plate. The strain relief must be loosened before the power cord can be removed from the treadmill.

4. Measure the distance between the strain relief and the power cord terminals removed in the previous steps.

5. Use open-end wrenches to loosen the inner strain relief nut. Pull the power cord and the strain relief away from the treadmill.

Note
When you mount the new power cord, the distance between the strain relief and the power cord terminals must be equal to the distance measured inStep 4.

Replacing the Power Cord

6. Pull the new power cord through the strain relief until the distance between the strain relief and the power cord terminals is equal to the distance measured in Step 4. Route the new power cord through the dress plate, then through the strain relief nut.

7. Use open-end wrenches to secure the power cord.

8. Refer to the marks on the tape attached to the wires disconnected from the original power cord. Connect the loose wires to the power cord. Check the power cord connections with the connections shown on the wiring diagram in the appendix of the treadmill you are servicing.

9. Replace the screw that secures the ground wire to the treadmill frame.

10. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Procedure 5.9 — Replacing the Speed Sensor

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

Removing the Speed Sensor

1. Remove the hood as described in Procedure 5.1.
2. Disconnect the speed sensor wire assembly from the lower PCA.
3. Remove the screw that secures the speed sensor to the sensor mounting bracket.
4. Remove the speed sensor from the mounting bracket.

Replacing the Speed Sensor

5. Position the speed sensor in the sensor mounting bracket.
6. Replace the screw that secures the speed sensor to the sensor mounting bracket.
7. Connect the speed sensor wire assembly to the lower PCA.
8. Inspect and adjust the gap between the speed sensor and flywheel as described in Procedure 3.5.
9. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Procedure 5.10 — Replacing the Transformer

Removing the Transformer

1. Remove the hood as described in Procedure 5.1.

2. Refer to the wiring diagram in the appropriate treadmill appendix. Mark each wire connected to the transformer with the wire color and terminal designation of the component it is connected to.

3. Disconnect the wires from the transformer terminals.

4. Remove the screws that secure the transformer to the treadmill frame.

5. Remove the transformer from the treadmill frame.

Replacing the Transformer

6. Position the transformer at its mounting location. Tighten the screws that secure the transformer to the treadmill frame.

7. Refer to the marks on the tape attached to the wires disconnected from the original power cord. Connect the loose wires to the transformer. Check the transformer connections with the connections shown on the wiring diagram in the appendix of the treadmill you are servicing.

8. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Procedure 5.11 — Replacing the SCR (Non-PWM Units Only)

Removing the SCR

1. Remove the hood as described in Procedure 5.1.

2. Refer to the wiring diagram in the appropriate treadmill appendix. (For Non-PWM C960 Series Treadmills, see Diagram 5-7). Mark each wire connected to the transformer with the wire color and terminal designation of the component it is connected to.

3. Disconnect the wires from the SCR terminals.

4. Remove the screws that secure the SCR to the treadmill frame.

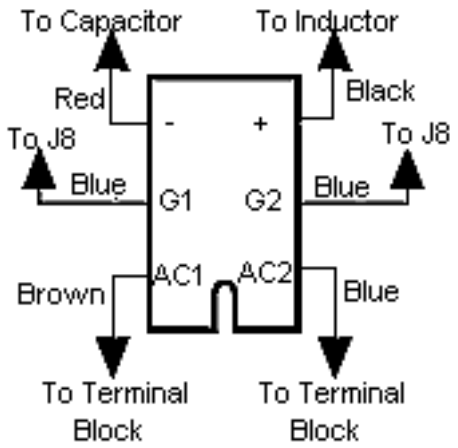
Replacing the SCR

5. Coat the mounting surface of the SCR with a thin coat of thermal compound. Position the SCR at its mounting location.

6. Position the screws that secure the SCR to the treadmill frame. Using the torque wrench, torque each screw to 10 in-lbs.

7. Connect the wires disconnected in Step 2 to the SCR.

8. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.



Procedure 5.12 — Replacing the Terminal Block (SCR Units Only)

Refer to the wiring diagram in the appendix of the treadmill you are servicing.

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

Removing the Terminal Block

1. Remove the hood as described in Procedure 5.1.

2. Remove the screws that secure the protective cover and terminal block to the treadmill.

3. Remove the stud that secures the blue and white wires to the terminal block.

Note
The white wire referred to in the previous step will be blue if the treadmill you are servicing conforms to the European wire color code.

4. Remove the stud that secures the brown wires to the terminal block.

Replacing the Terminal Block

You can connect the wires to either terminal stud. However, you cannot mix brown and blue wires on any one stud.

5. Connect the blue wires and the white wire (blue wire if the treadmill you are servicing conforms to the European wire color code) to the terminal block.

6. Connect the brown wires to the terminal block.

7. Position the protective cover over the terminal block, then position the terminal block at its mounting location.

8. Mount the terminal block and protective cover to the treadmill frame with the two screws removed in Step 2.

9. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Procedure 5.13 — Replacing the Inductor (SCR Units Only)

Refer to the wiring diagram in the appendix of the treadmill you are servicing.

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

1. Remove the hood as described in Procedure 5.1.

2. Slide the protective cap back from the terminals of the capacitor. Remove the screw that secures the red wires to the positive terminal of the capacitor. Remove the red wires from the terminal. Pull the inductor lead out of the plastic cap.

3. Remove the inductor lead from terminal M+ on the lower PCA.

4. Remove the fasteners that secure the inductor to the treadmill. Set aside the old inductor.

5. Position the new inductor at its mounting position.

6. Replace the fasteners that secure the inductor to the treadmill.

7. Connect the inductor lead to terminal M+ on the lower PCA.

8. Push the remaining red inductor lead with the ring connector through the plastic cap. Connect the inductor lead and the red drive motor lead to the positive terminal of the capacitor.

9. Replace the screw that secures the red wires to the positive terminal of the capacitor. Slide the protective cap over the terminals of the capacitor.

10. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Procedure 5.14 — Replacing the Drive Motor Capacitor or Capacitor Clamp (SCR Units Only')

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

Removing the Capacitor

1. Remove the hood as described in Procedure 5.1.

2. Loosen the screw and locknut on the capacitor clamp. Set aside the capacitor.

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

THEN . . .	**OTHERWISE . . .**
Continue with the next step.	Skip to Step 7.

Removing the Capacitor Clamp

4. Remove the screws that secure the capacitor clamp to the treadmill. Set aside the capacitor clamp.

5. Position the new capacitor clamp at its mounting location. Replace the the screws that secure the clamp to the treadmill.

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.

6. Slide the plastic cap back from the capacitor terminals. Remove the screws that secure the red and black wires to the terminals of the capacitor. Remove the wires from the terminals.

7. Position the new capacitor in the capacitor clamp. Tighten the screw and locknut on the capacitor clamp.

8. Feed the black and red leads through the plastic cap.

9. Connect the loose black wires to the negative terminal of the capacitor. Connect the red wires to the positive terminal of the capacitor. Replace the screw that secures the wires to the capacitor terminals. Slide the plastic cap over the capacitor terminals.

10. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Procedure 5.15 — Replacing the Running Belt and Bed

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

1. If the treadmill you are servicing is equipped with handrails **. . .**

THEN . . .	**OTHERWISE . . .**
Perform Steps 2 and 3.	Skip to Step 4.

2. Remove the hardware that secures the left lower handrail clamp to the treadmill frame. Set aside the handrail clamp.

3. Remove the screws that secure the left handrail in the upper handrail clamp. Set the handrail aside.

Removing the Running Bed

4. Remove the screws that secure the end caps to the treadmill frame.

5. Remove the screws that secure the finger guard to the treadmill frame.

6. Remove the screws that secure the trim strips to the treadmill running bed. Slide the trim strips from the running bed.

7. If you are going to install a new running belt on the treadmill, continue with the next step. Otherwise, place four marks on the running belt and bed. Each mark must be visible on both the running belt and bed (see Diagram 5-8).

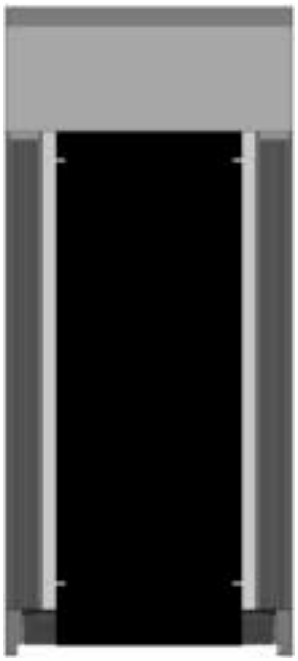
8. Loosen the running belt by turning the tension and tracking bolts counterclockwise.

CAUTION
When you perform the next step, keep the running bed parallel to the treadmill frame. If the bed is tilted as it slides through the belt, the bed studs may score the belt.

9. Straddle the treadmill and lift the running bed from the treadmill frame. Slide the running bed out of the running belt.

Removing and Replacing the Running Belt

10. If you are going to install a new running belt on the treadmill continue with the next step. Otherwise skip to Step 19.



11. Remove the take-up roller (as described in Procedure 5.17) and the drive roller (as described in Procedure 5.16). Remove the running belt from the treadmill.

12. Position the new running belt on the treadmill. Push the take-up roller through the running belt, then place the ends of the roller shaft in the take-up roller clamps.

13. Push the drive roller through the running belt, then place the drive belt on the drive roller pulley. Place the ends of the roller shaft in the drive roller clamps.

Removing and Replacing the Flange Bearings, Bed Springs or Bed Studs

A cross-section view of several typical running bed mounting schemes are shown on pages 5-39 and 5-40.

14. If the bed springs ar worn, cracked or broken and the bed studs must be replaced **. . .**

THEN . . .	**OTHERWISE . . .**
Continue with the next step.	Skip to Step 17.

Note
Replace the bed springs as a set, even if they are not all damaged.

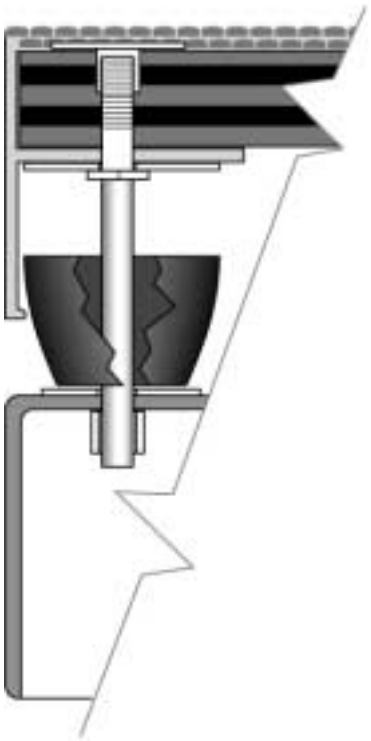
15. Remove the bed springs from the bed studs, then remove the bed studs from the frame rail.

16. Using your fingers, thread the new bed studs into the frame rail. Tighten the bed studs with a ratchet and socket, then skip to Step 18.

17. If the bed springs are worn, cracked, or broken and the bed studs do not need to be replaced . . .

THEN . . .	**OTHERWISE . . .**
Remove the old bed springs from the bed studs; then continue with the next step.	Skip to Step 19.

18. Push the new bed springs onto the bed studs.



Replacing the Running Bed

19. Choose one:

IF . . .	THEN . . .
The running bed is neither worn nor damaged	Skip to Step 23.
Only one side of the running bed is worn or damaged	Turn the original running bed over, then re-install it on the treadmill as described starting in Step 23.
Both sides of the running bed are worn or damaged	Install a new running bed on the treadmill (skip to Step 21).
The flange bearings are not elongated, worn or damaged	Skip to Step 23.
A flange bearing is elongated, worn or broken	Replace all six of the flange bearings as described in the following steps.

20. Pry the retainer rings off of the flange bearings and force the flange bearings out of the running bed. Discard the retainer rings and flange bearings.

21. Place the running bed on a flat surface. Push the new flange bearings into the bearing mounting holes in the running bed.

22. Position a new retainer ring over a flange bearing. Make sure that the retainer ring fingers point up. Use a deep socket or short section of pipe to push the retainer ring onto the flange bearing. Repeat this step for the remaining retainer rings.

23. Slide the running bed through the belt, then line up the flange bearings in the running bed with the bed studs in the side rail. Lower the bed onto the bed studs.

Note
New running beds do not have holes drilled for the screws that secure the trim strips. When you perform the next step, screw the screws into the bed.

24. Slide the right and left trim strips onto the running bed. Line up the trim strips with the back edge of the running bed.

25. Replace the screws that secure the trim strips to the treadmill running bed.

26. Position the finger guard underneath the running belt. Replace the screws that secure the finger guard to the treadmill frame.

27. Position the end caps on the treadmill frame. Replace the screws that secure the end caps to the treadmill frame.

28. If the treadmill you are servicing is equipped with handrails **. . .**

THEN . . .	**OTHERWISE . . .**
Perform Steps 29 through 32.	Skip to Step 33.

29. Position the upper end of the left handrail in the upper handrail clamp. Install the screws that secure the left handrail in the clamp.

30. Slide the nut plate along the side rail until it is aligned with the handrail mounting bolt hole.

31. Position the lower handrail clamp onto the nut plate. Place the lower end of the left handrail into the clamp. Align the screw holes in the clamp with the holes in the handrail. You may need to push the lower handrail clamp down along its track to securely seat the end of the tube into the clamp.

32. Align the screw holes on the lower handrail clamp, handrail, and nut plate. Push the lower handrail clamp screw through the washer, then thread the screw through the screw holes.

CAUTION
Do not overtighten the screw or damage may occur to the clamp.

33. Align the drive roller and drive motor pulleys as described in Procedure 3.4.

34. Adjust the tension of the drive belt as described in either Procedure 3.2 or 3.3.

35. If you just installed a new running belt on the treadmill **. . .**

THEN . . .	**OTHERWISE . . .**
Check and adjust the tension, tracking, and alignment of the running belt as described in Procedure 3.1.	Go to Step 14 of Procedure 3.1 to align the marks on the running belt with the marks on the running bed.

36. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Procedure 5.16 — Replacing the Drive Belt or Drive Roller

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

Removing the Drive Belt and Drive Roller

1. Remove the hood as described in Procedure 5.1.

2. Place four marks on the running belt and bed (refer back to Diagram 5-1).

3. Loosen the drive belt. Lift the drive belt from the drive motor pulley.

4. Remove the bolts threaded through both ends of the drive roller shaft.

5. Push the drive roller toward the back of the treadmill. Lift the drive roller and slide it from the running belt.

6. If you removed the drive roller because of a suspected bearing problem **. . .**

THEN . . .	**OTHERWISE . . .**
Set aside the drive roller until you have isolated the malfunctioning bearing; for more information, refer to Procedure 4.3.	Continue with the next step.

Replacing the Drive Belt and Drive Roller

7. If you removed the drive belt because you are installing a new running belt on the treadmill**. . .**

THEN . . .	**OTHERWISE . . .**
Visually inspect the drive belt for wear, cracks or other damage; then continue with the next step.	Skip to Step 9 and install a new drive belt on the treadmill.

8. If the visual inspection indicates no wear or damage, re-install the original drive belt. Otherwise, install a new drive belt on the treadmill.

9. Push the drive roller through the running belt. Place the drive belt on the drive roller pulley, then place the drive roller in the roller mounts. Thread the bolts removed in Step 4 through the ends of the drive roller shaft.

10. Push the left end of the roller shaft as far as possible toward the front of the treadmill. Turn the bolt in the left end of the drive roller clockwise until the left end of the roller is tight against the front of the roller mount.

11. Turn the bolt in the right end of the drive roller shaft clockwise until the marks placed on the running belt align with the marks on the running bed.

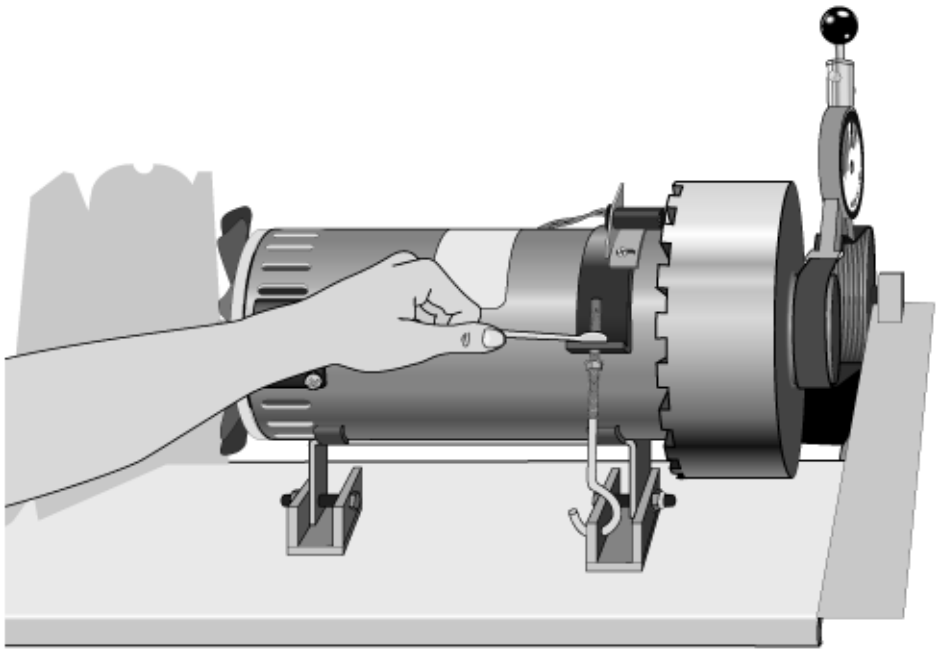
12. Place the loose end of the drive belt on the drive motor pulley. Manually push the running belt toward the back of the treadmill while you position the drive belt on the center of the motor pulley.

13. Place the drive belt tension gauge on the drive belt (see Diagram 5-3).

Note
Commercial treadmill motors are installed two ways:

Mounted on a motor-fixed motor pan.
Adjust the tension of the drive belt by moving the motor pedestal.

Mounted with a hook bolt and motor pivot bracket.
Adjust the tension of the drive belt by turning the lock nut on the hook bolt (see illustration below).



14. Tighten the drive belt until the belt tension gauge reads 70–90 inch-pounds. Align the motor with the treadmill frame.

15. Tighten the mounting hardware that was loosened in Step 3.

16. Remove the belt tension gauge from the drive belt. Align the drive roller and drive motor pulleys as described in Procedure 3.4.

17. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Procedure 5.17 — Replacing the Take–Up Roller

Removing the Take-Up Roller

1. Remove the screws that secure the end caps to the treadmill frame.

2. Remove the screws that secure the finger guard to the treadmill frame (see illustration below).

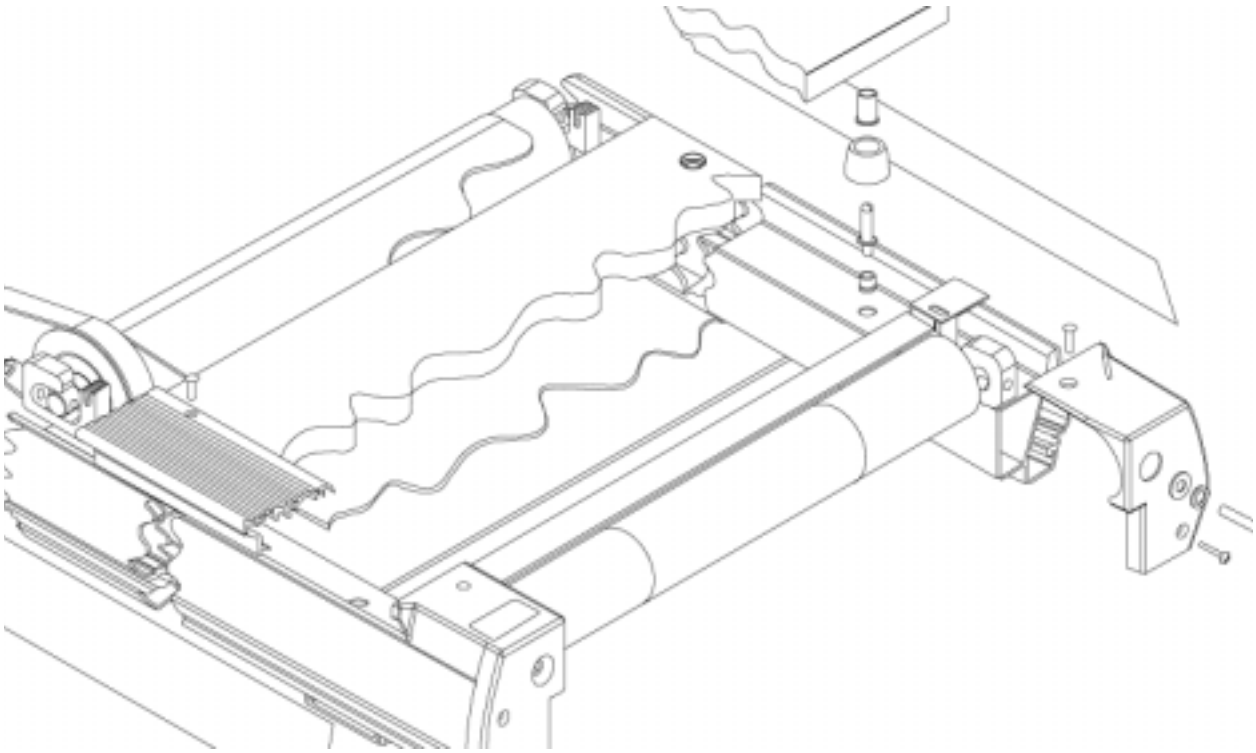
3. Place four marks on the running belt and bed (refer back to Diagram 5-8).

4. Remove the tension and tracking bolts from the take-up roller.

5. Push the take-up roller toward the drive roller, then lift the take-up roller and slide it from the running belt.

6. If you removed the take-up roller because of a suspected bearing problem **. . .**

THEN . . .	**OTHERWISE . . .**
Set aside the take-up roller until you have isolated the malfunctioning bearing; for more information, refer to Procedure 4.3.	Continue with the next step.



Replacing the Take-Up Roller

7. Push the take-up roller through the running belt, then place the take-up roller in the roller mounts.

8. Thread the bolts removed in Step 4 through the ends of the take-up roller shaft.

9. Position the finger guard underneath the running belt. Replace the screws that secure the finger guard to the treadmill frame.

10. Position the end caps on the treadmill frame. Replace the screws that secure the end caps to the treadmill frame.

11. Go to Step 14 of Procedure 3.1, to align the marks on the running belt with the marks on the running bed.

12. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing.

Procedure 5.18 — Replacing the Drive Motor

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

Removing the Drive Motor

1. Remove the hood as described in Procedure 5.1.

2. Loosen the drive belt. Remove the drive belt from the motor pulley.

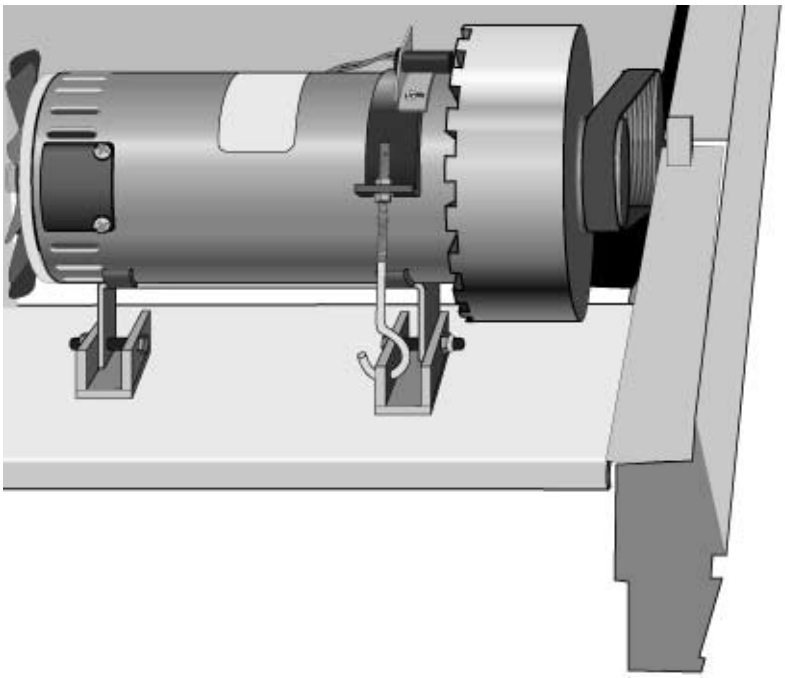
3. Remove the fan from the motor.

4. Disconnect the drive motor leads.

5. If the treadmill you are servicing does not have a pivot-mounted motor, score a line on the motor chassis that runs the length of the drive motor pedestal.

6. Remove the mounting hardware that secures the motor to the treadmill (see the illustration below).

7. Kneel in front of the treadmill, facing the drive motor. Grasp the drive motor firmly and lift it from its mounting position.



Removing and Replacing the Flywheel and Motor Pulley

8. Remove the flywheel and motor pulley from the old motor. Mount the flywheel and motor pulley on the new motor as described in Procedure 5.20.

9. Visually inspect the drive belt for wear, cracks, or other damage. If the visual inspection indicates no wear or damage **. . .**

THEN . . .	**OTHERWISE . . .**
Re-install the original drive belt on the treadmill.	Install a new drive belt as described in Procedure 5.16.

Replacing the Drive Motor

10. With the drive belt between the motor case and the motor pulley, position the drive motor pedestal parallel to the line scored on the motor chassis (unless the treadmill you are servicing has a pivot-mounted motor).

11. Place the loose end of the drive belt on the drive motor pulley. Manually push the running belt toward the back of the treadmill while you position the drive belt on the center of the motor pulley.

12. Install the mounting hardware that secures the drive motor to the treadmill frame.

13. Connect the red and black drive motor leads.

14. Replace the cable ties.

15. Check and adjust the pulley alignment as described in Procedure 3.4.

16. Adjust the tension of the drive belt as described in either Procedure 3.2 or 3.3.

17. Line up the fan with the flat area on the new drive motor shaft, then push the fan onto the shaft.

18. Inspect and adjust the gap between the speed sensor and the flywheel as described in Procedure 3.5.

19. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

Procedure 5.19 — Replacing the Drive Motor Brushes

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

1. Remove the hood as described in Procedure 5.1.

2. If required, remove the flywheel.

3. Remove the fasteners that secure the front brush cover plate to the motor case.

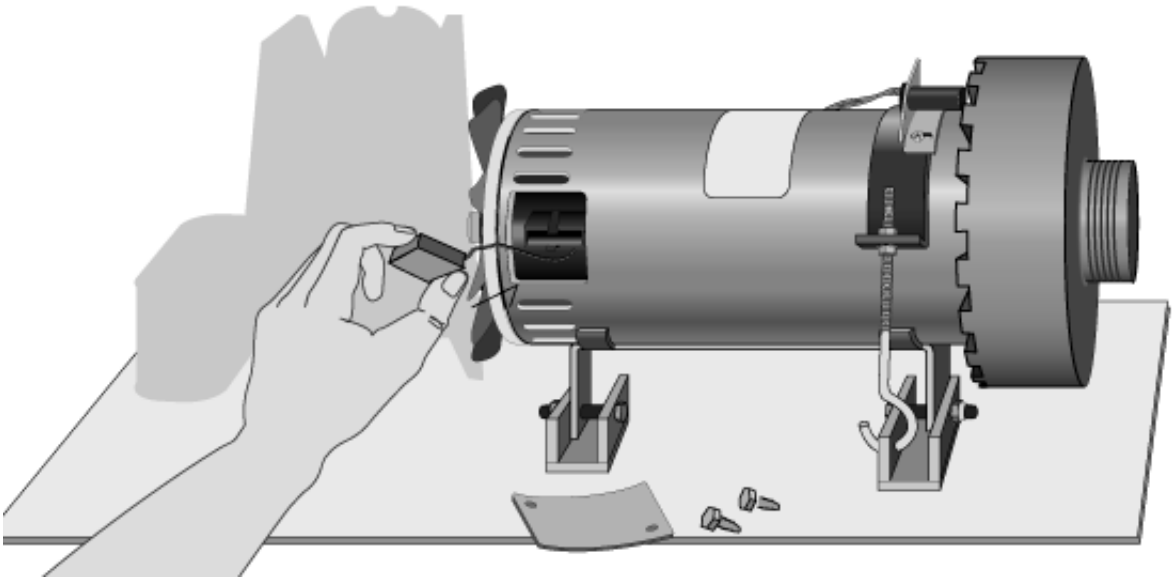
4. Move the paper shielding to the side to expose the brush assembly. Release the brush tension spring.

WARNING
Remove the brush leads from the drive motor terminals before you touch or remove the drive motor brushes.

5. Release the tension spring, then remove the motor brush from the brush channel (see Diagram 5-14).

6. Insert the new brush in the brush guide. The bottom surface of the brush must make full contact with the motor. Replace the brush tension spring.

Caution
If the bottom surface of the brush does not make full contact with the motor, the motor will not operate correctly.



7. Push the brush lead onto the motor power terminal and place the paper shielding over the brush assembly.

8. Position the brush cover plate over the motor case. Replace the fasteners that secure the plate to the motor case.

9. Repeat Steps 3 through 8 for the back brush.

10. If required, re-install the flywheel as described in Procedure 5.20.

WARNING
Make sure the brushes are fully seated before you plug in the treadmill and turn on the circuit breaker.

11. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.

12. Break in the brushes by running the treadmill for at least an hour at 4–6 MPH before applying a heavy load.

Procedure 5.20 — Replacing the Flywheel and Motor Pulley Assembly

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

1. Remove the hood as described in Procedure 5.1.

2. Remove the drive belt as described in Procedure 5.16.

3. Remove the drive motor as described in Procedure 5.18.

4. Remove the set screws from the flywheel. Slide the flywheel pulley off of the drive motor shaft. If the flywheel does not slide off the shaft easily, it might be necessary to use a wheel puller. Set the square key aside.

Caution
Using a hammer to force the flywheel off of or onto the drive motor will damage the drive motor bearings.

5. Inspect the square key and the drive motor shaft (if the old drive motor is to be remounted on the treadmill) or the flywheel bore (if the original flywheel assembly is to be mounted on the treadmill).

6. If you find burrs or abrasions on the square key, drive motor shaft, or flywheel bore, file them smooth before mounting the flywheel and drive motor.

7. Line up the slot on the drive motor shaft with the slot on the flywheel. Slide the flywheel bore over the drive motor shaft.

8. Place the square key into the slot. Push the slot key into the motor pulley/drive motor assembly until it is flush with the assembly.

9. Align the drive roller and drive motor pulleys as described in Procedure 3.4.

10. Replace the set screw on the key with a new set screw. Torque to 150 in-lbs.

Note
Locate the flywheel key by positioning the drive motor key at 12 o’clock.

11. Thread a new set screw into the remaining set screw position.Torque to 150 in-lbs.

12. Continue with Step 9 of Procedure 5.18.

Procedure 5.21 — Replacing the Line Filter

WARNING
Always turn off the circuit breaker and unplug the treadmill before you begin maintenance operations.

Removing the Line Filter

1. Remove the hood as described in Procedure 5.1.

2. Refer to the wiring diagram in the appropriate treadmill appendix. Mark each wire connected to the line filter with the wire color and terminal designation of the component connected to it.

3. Disconnect the wires from the line filter.

4. Loosen the screws that secure the line filter to the treadmill. Remove the filter from its mounting position.

Replacing the Line Filter

5. Position the new line filter on the treadmill. Install the screws that mount the line filter to the treadmill.

6. Refer to the marks on the tape attached to the wires disconnected from the original line filter. Connect the loose wires to the line filter. Check the line filter connections with the connections shown on the wiring diagram in the appendix of the treadmill you are servicing.

7. Check the operation of the treadmill as described in Section Three in the appendix of the treadmill you are servicing, then replace the hood as described in Procedure 5.1.