CLM 835

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

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

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

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

Section One - Things you Should Know

Right, Left, Front, and Back Conventions

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

General System Information

The generator performs three functions in the CLM. First, by controlling the amount of electrical current applied from the generator to a load circuit, the user's pedaling resistance is controlled. Second, the generator is used to charge the CLM's internal battery. Lastly, one of the generators three phase output windings is monitored to determine when the unit is in use and when it is idle. This system also determines the step rate by determining the operating speed (output frequency) of the monitored generator winding. There is also a magnetic brake that applies resistance to horizontal motion and a sensor that measures horizontal motion (stride length).

Warning and Caution Statements and General Safety Guidelines

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

- Because this is a self powered unit, it will either be necessary to either equip the unit with the optional external power supply or have an assistant pedal on the unit while voltage measurements are being taken. Because of the danger of working on the unit while it is in motion using the optional external power supply is strongly recommended.
- When the unit is used, stairarms are in motion, the generator will operate and produce potentially hazardous voltages even when the battery is disconnected.
- To remove power from the CLM, the optional external power supply (when equipped) must be disconnected from the wall outlet and the red (positive) wire must be disconnected from the battery. Always ensure that the CLM external power supply is unplugged from the wall outlet and the red (positive) wire is removed from the battery when you inspect or adjust the CLM, or when you isolate, remove, or replace an CLM component.
- Removing the covers exposes high voltage components and potentially dangerous machinery. Exercise extreme caution when you perform maintenance procedures with the cover(s) removed.
- During service operations you will be very close to moving machinery and voltage bearing components. When you perform maintenance procedures with the covers removed, remove jewelry (especially from ears and neck), tie up long hair, remove neck ties, and do not wear loose clothing.
- Exercise caution when touching any wire or electrical component during CLM operation.

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

Safety guidelines you should know and follow include:

- Read the owner's manual and follow all operating instructions.
- Operate the CLM on a solid, level surface with the unit properly leveled. The CLM is properly leveled when all five "feet" are in contact with the floor. Visually check the CLM 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 CLM.
- When operating the CLM, do not wear loose clothing. Do not wear shoes with heels or leather soles. Check the soles of your shoes and remove any embedded stones. Tie long hair back.
- Do not rock the unit. Do not stand or climb on the handlebars, display enclosure, or cover.
- Do not set anything on the handlebars, display enclosure, or cover. Never place liquids on any part of the CLM, while performing service.
- To prevent electrical shock, keep all electrical components away from water and other liquids.
- Do not use accessory attachments that are not recommended by the manufacturer-such attachments might cause injuries.
- CLM's equipped with Cardio Theater PVS units will have external power supply and coaxial cable routed through the bottom of the unit to the top of the display console. Cord management must be maintained.

General Information

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

Tools Required

Multimeter
Anti-static kit
4" - 6" gear puller
Precor part number 20030-108 belt gauge
US and metric end wrench set
US and metric socket wrench set
Torque wrench, 200 in./lbs.
Torque wrench, 200 ft./lbs
Allen wrench set
Screwdriver set

Section Two – Future Content

Section Three – Future Content

Section Four – Future Content

Section Five – P30 Console - CLM

Procedure 5.1 – P30 - Accessing the Diagnostic Software

The P30 Console diagnostic software consists of the following modes:

- Display Test
- Keyboard Test
- Heart Rate Test
- Machine Test
  - Brake Test
  - RPM Test
  - Battery Test
  - Stride Position Test

Procedure:

1. The AMT 885 and 835 uses the standard access codes to provide access to the various software features. Use the **PAUSE** key and the numeric keypad to enter the access code. The standard access codes use all sequential key presses. The allowable delay between key presses is short. If too much time is taken between key presses the access procedure will be aborted. If the access is aborted, it will be necessary to start over from the beginning.

Diagram 5.1 .1 – P30 Console - AMT

2. Using the **PAUSE** key and the numeric keypad, press keys **PAUSE,5,1,7,6,5,7,6,1,** sequentially.

3. **Hardware Validation** will scroll across the display followed by **DISPLAY TEST**.

4. Press the **OK** key, the upper most group of LED's will illuminate on the display. Check the display to ensure that all LED segments are illuminated.

5. Press the **OK** key four more times to display the remaining LED groups. Check each display group to ensure that all LED segments are illuminated.

6. Press the **CLEAR** key then the ▼ key, **KEYBOARD TEST** will scroll across the display.

7. Press the OK key, a representation of all of the keys on the console will be displayed. Pressing a key on the console will cause the illuminated representation of that key to turn off. Press all of the keys on the console to ensure that all of the keys are functioning.

8. Press and hold the **CLEAR** key for **5 seconds** then the ▼ key, **HEART RATE** will be displayed.

9. Press the OK key then grasp both of the heart rate grips on the handlebar, after a couple of seconds the heart rate will be displayed in the heart rate and smart rate displays.

10. Use chest strap transmitter or a test transmitter to test the wireless heart rate function, after a couple of seconds the heart rate will be displayed in the heart rate and smart rate displays.

11. Press the **BACK** key then the ▼ key, **MACHINE TEST** will scroll across the display.

12. You may now proceed to either the brake test or the RMP test. Press the ▼ key once to access the brake test or twice to access the RPM test. Press the OK key.

13. **BRAKE** test. Press the OK key, the console will display the power bits (PWRB). Changing the resistance ▲,▼ keys will change the power bit settings.

14. Press the **CLEAR** key then the ▼ key, **RPM** will scroll across the display.

15. **RPM** test. Press the OK key, the console will display the Pulse. The pulse is showing a count of zero crossings from the generator. RPM shows a software averaged version of pulse.

16. Press the **CLEAR** key then the ▼ key, **BATTERY** will scroll across the display.

17. **BATTERY** test. Press the OK key, the console will display the battery test. Battery test will display battery voltage.

18. Press the **CLEAR** key then the ▼ key, **STRIDE POSITION TEST** will scroll across the display.

19. Press the OK key, the low, high and actual stride positions will be displayed. The low display shows the lowest position reading achieved during the test. The high display shows the highest position reading achieved during the test. The actual display changes with the current stride position. Stride on the AMT to the maximum horizontal movement in both directions. At maximum stride length the low stride display should read 0 and the high stride display should read 40.

20. Press the **CLEAR** key to exit the belt battery test.

21. Press the **PAUSE** key to exit the hardware validation test.

Procedure 5.2 – P30 – Displaying Information

The information display will access the following data;

- Odometer
- Hour Meter
- U-Boot Software
- U-Base Software
- Lower Software
- Metrics Board Software
- Stride Dial Software
- Serial Number
- Usage log
- Error Log

Procedure

1. Plug the power cord into the wall outlet, and then turn on the treadmill with the circuit breaker. (Treadmill Only)
2. With the **PRECOR** banner scrolling, press the keys **PAUSE,6,5,** sequentially.
3. **DIAGS-INFORMATION DISPLAY** will scroll across the display.
4. Use the ▲,▼ keys to move to the desired display shown in the list above.
5. **ODOMETER** display. Press the OK key.
6. The odometer will be displayed as **1234567 MILES** or **1234567 KM** depending on club parameter settings (See Procedure 2.3). The odometer is also used to provide the "distance stamp" for the error code log
7. **Note:** The odometer data is stored in non-volatile memory on the upper PCA. If the upper PCA is replaced the odometer data will be lost.
8. Press the **CLEAR** key to exit the odometer display.
9. **HOUR METER** display. Press the **OK** key.
10. The operating time of the unit will be displayed as **12345 HOURS**. The operating time is defined as total amount of time that the unit has operated in program modes with the drive motor running. The hour meter is also used to provide the "time stamp" for the error code log.
11. Press the **CLEAR** key to exit the hour meter display.
12. **U-BOOT SW** display. This display the installed version of upper boot software. The boot software is used to upload new software into the upper display PCA.
13. Press the OK key. The software part number will be displayed as **XXXXX-XXX.**
14. Press the **CLEAR** key to exit the U-Boot SW display.
15. **U-BASE SW** display. This display the installed version of upper PCA software.

16. Press the **OK** key. The software part number will be displayed as **XXXXX-XXX.**
17. Press the **CLEAR** key to exit the U-Base SW display.
18. **LOWER SW** display. This display the installed version of lower PCA software.
19. Press the **OK** key. The software part number will be displayed as **XXXXX-XXX.**
20. Press the **CLEAR** key to exit the lower SW display.
21. METRICS BOARD SW display. This display the installed version of lower PCA software.
22. Press the OK key. The software part number will be displayed as XXXXX-XXX.
23. Press the CLEAR key to exit the lower SW display.
24. STRIDE DIAL SW display. This display the installed version of lower PCA software.
25. Press the OK key. The software part number will be displayed as XXXXX-XXX.
26. Press the CLEAR key to exit the lower SW display.
27. **SER. NUMBER** display. Press the **OK** key.
28. The serial number will be displayed. The serial number may be incorrect or not displayed if the upper PCA has been replaced.
29. Press the **CLEAR** key to exit the serial number display.
30. **USAGE LOG** display. Press the **OK** key.
31. Use the ▲,▼ keys to move through the list of programs. A message will scroll describing the program, the number of times and the number of minutes the program was used.
32. Press the **BACK** key to exit the usage log display.
33. **ERROR LOG** display. Press the **OK** key, the quantity of errors in the log will be displayed.
34. Press the **OK** key, the most recent error will be displayed first.
35. Use the ▲,▼ keys to move through the list of errors. The error messages will list the error name, the odometer reading when the error occurred, the hour meter when the error occurred and the drive motor current reading when the error occurred.
36. If you wish to clear the error log, press and hold the **QUICK START** key. The message **HOLD TO CLEAR ERRORS** will be displayed. The error log will be cleared when the message NO ERRORS is displayed.
37. Press the **CLEAR** key to exit the information display.
38. Please note that the **ERROR LOG** may also be accessed at any time by pressing and holding the CLEAR key for four seconds. If the error log does not contain any errors, the message **STUCK KEY** will be displayed.

Procedure 5.3 – P30 – Setting Club Parameters

This procedure allows you to change the following club settings:

- Select Language
- Select Units
- Set Max Workout Time
- Set Max Pause Time
- Set Cool Down Time

Procedure

1. With the banner scrolling, press keys **PAUSE,5,6,5,1,5,6,5**, sequentially.
2. Use the ▲,▼ keys to move to the desired display shown in the list above.
3. **DIAGS-SET CLUB PARAMETERS** will scroll across the display.
4. **SELECT LANGUAGE** display. Press the **OK** key.
5. Use the ▲,▼ keys to toggle between the available languages.
6. Press the **OK** key to select desired language.
7. Press the **BACK** key to exit the select language display.
8. **SELECT UNITS** display. Press the **OK** key.
9. Use the ▲,▼ keys to toggle between **U.S** (miles per hour) and **METRIC** (kilometers per hour).
10. Press the BACK key to exit the set units display.
11. **SET MAX WORKOUT TIME** display. Press the **OK** key.
12. Use the ▲,▼ keys to select the maximum time a user can remain in a program.
13. Press the **BACK** key to exit the set max. workout time display.
14. **SET MAX PAUSE TIME** display. Press the **OK** key.
15. Use the ▲,▼ keys to select the maximum time a program will remain in the pause mode.
16. Press the **BACK** key to exit the set max. pause time display.
17. **SET COOL DOWN TIME** display. Press the **OK** key.
18. Use the ▲,▼ keys to select the cool down time.
19. Press the **BACK** key to exit the set cool down time display.
20. Pres the **BACK** key to exit without saving changes.

Procedure 5.4 – P30 – Documenting Software Problems

When a problem is found with the software in the upper or lower PCA, record the information listed below.

When a problem occurs, record the following information:

- Model and serial number
- Software version number
- Program number running when the problem occurred

A description of:

- What happened or failed to happen.
- The action taken by the user just before the problem occurred.
- Problem-related information (such as how far into the program the problem occurred, the work level being used when the problem occurred, error code displayed, etc.).
- The frequency of occurrence.

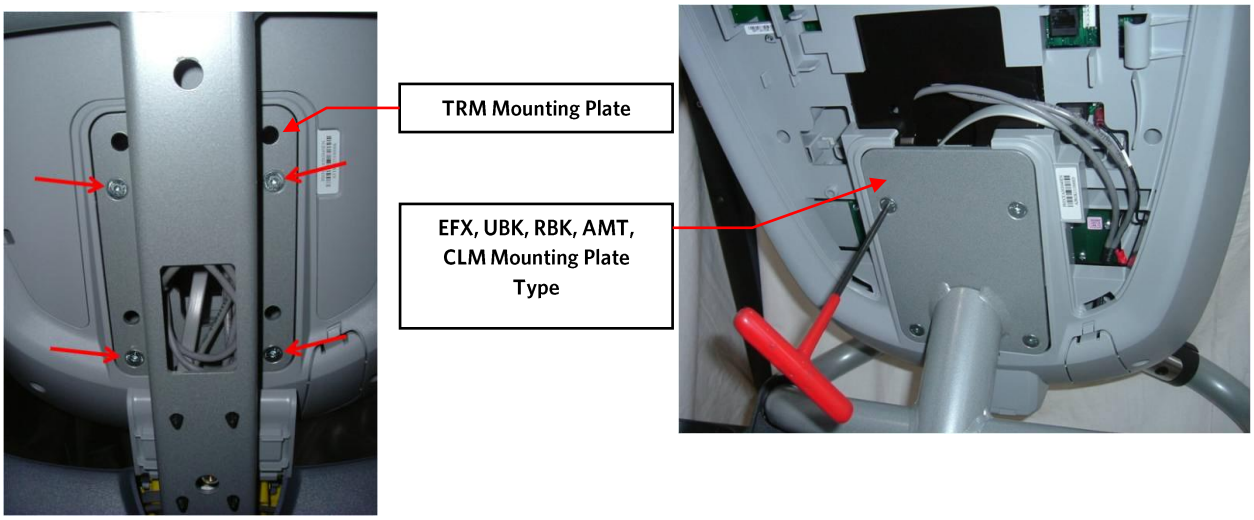
Procedure 5.5 – P30 – Replacing Upper PCA

1. Set the treadmill circuit breaker in the "off" position and unplug the treadmill's line cord from the AC outlet. **(TRM only)**
2. The PCA's in the console are static sensitive. They can be damaged if proper static prevention equipment is not used. Attach an anti-static wrist strap to your arm, and then connect the ground lead of the wrist strap to the treadmill's frame ground.
3. Remove the two screws that fasten the dash transition cover and remove the cover. **See Diagram 5.5.1**

Diagram 5.5.1 – Dash Transition Cover – (TRM only)

4. Remove the four screws that fasten the console to the dash mounting plate. **See Diagram 5.5.2.**

5. Diagram 5.5.2 – Dash Mounting Plate

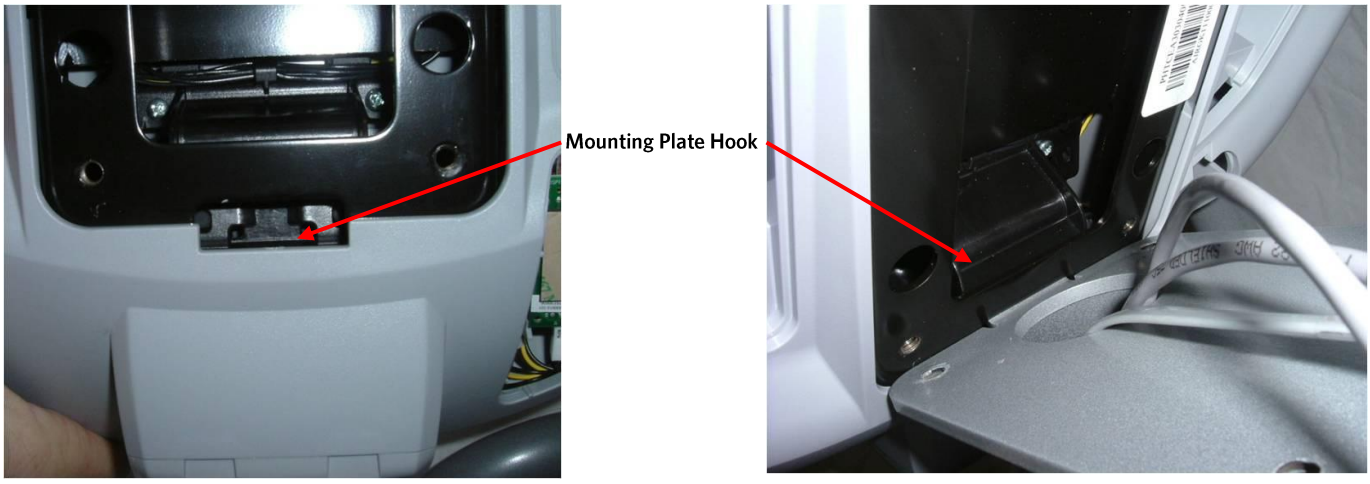


6. Remove the two screws that fasten the access panel to the console. **See Diagram 5.5.3**

Diagram 5.5.3 – Console Access Panel

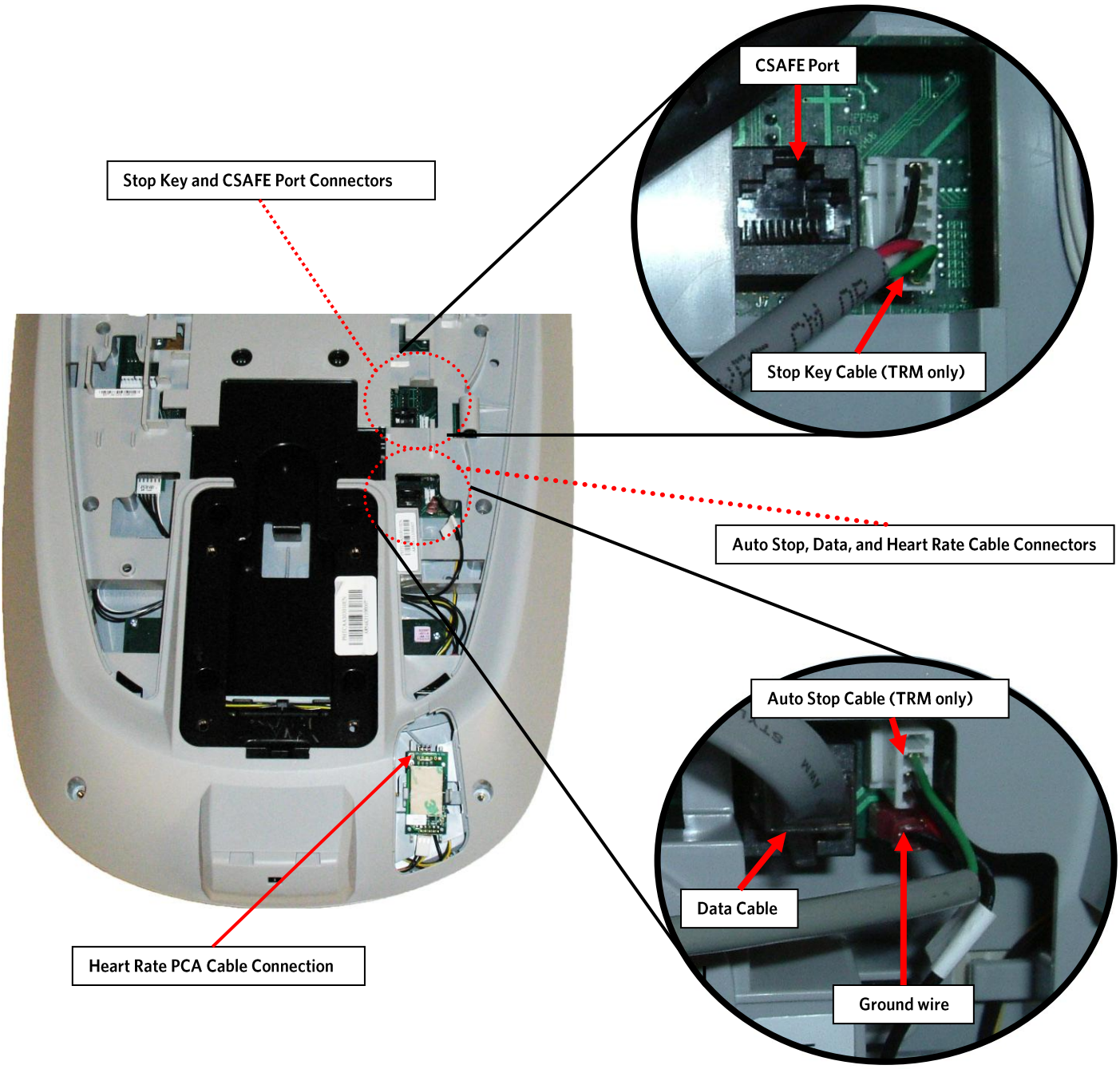
7. Remove the back access Panel:
   a. Treadmills: Lift the console off the maintenance hook and then position the console so that the back panel is accessible and remove the back cover.
   b. AMT's, EFX's, CLM's, UBK's, and RBK's: Tilt the console forward on the maintenance access hook on the dash weldment and remove the back. **See Diagram 5.5.4.**

Diagram 5.5.4 – Maintenance Access Hook



8. Remove the Heart Rate PCA. **See Procedure 5.7, Removing Heart Rate PCA.**
9. Disconnect the Heart Rate Cable from the Heart Rate PCA.
10. Disconnect the Data cable, Auto Stop cable (Treadmill only), Stop Key cable(Treadmill only), Ground wire and the CSAFE cable (if in use) from the Upper PCA. **See Diagram 5.5.5.** Remove the console from the maintenance access hook and place it on a flat work surface.

Diagram 5.5.5 – P30 Cable Connectors

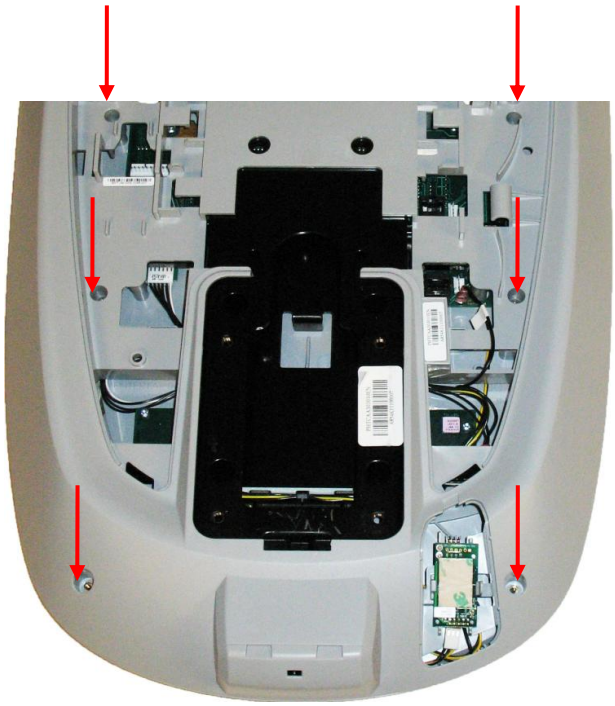


11. Remove the two screws that fasten the back cover to the option cap and remove the cover. **See Diagram 5.5.6**

Diagram 5.5.6 – Option Cap Back Cover

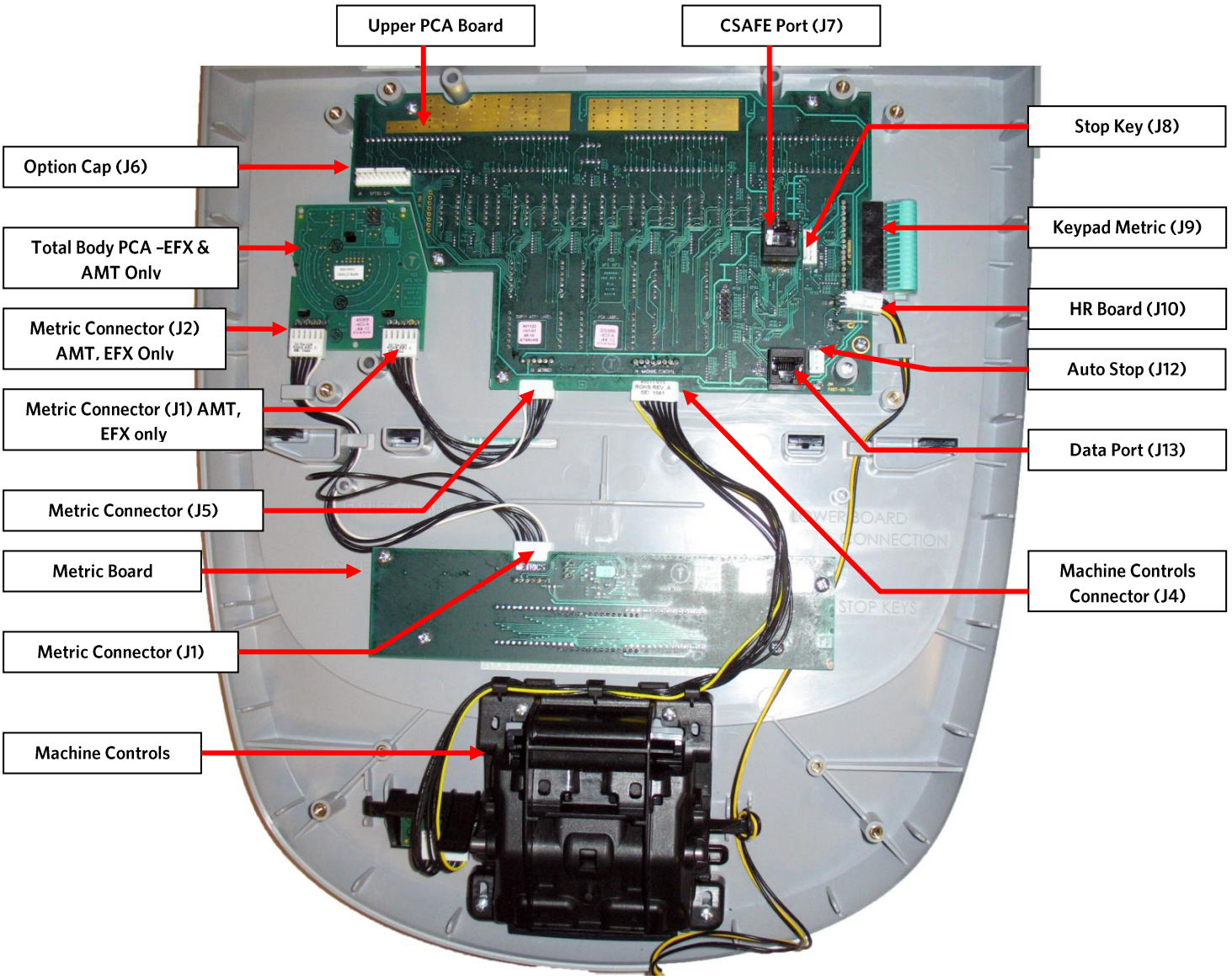
12. Remove the 6 screws that fasten the rear cover from the console and remove. **See Diagram 5.5.7.**

Diagram 5.5.7 – Rear Console Cover



13. Disconnect the Metric cable (J5), Machine Controls cable (J4), Option Cap cable (J6, if applicable), Keypad Metric cable (J9) and HR cable (J10) from the Upper PCA board. **See Diagram 5.5.8.**
14. Remove the five screws that fasten the Upper PCA board to the console and remove the Upper PCA.

Diagram 5.5.8 – P30 Electronic Components



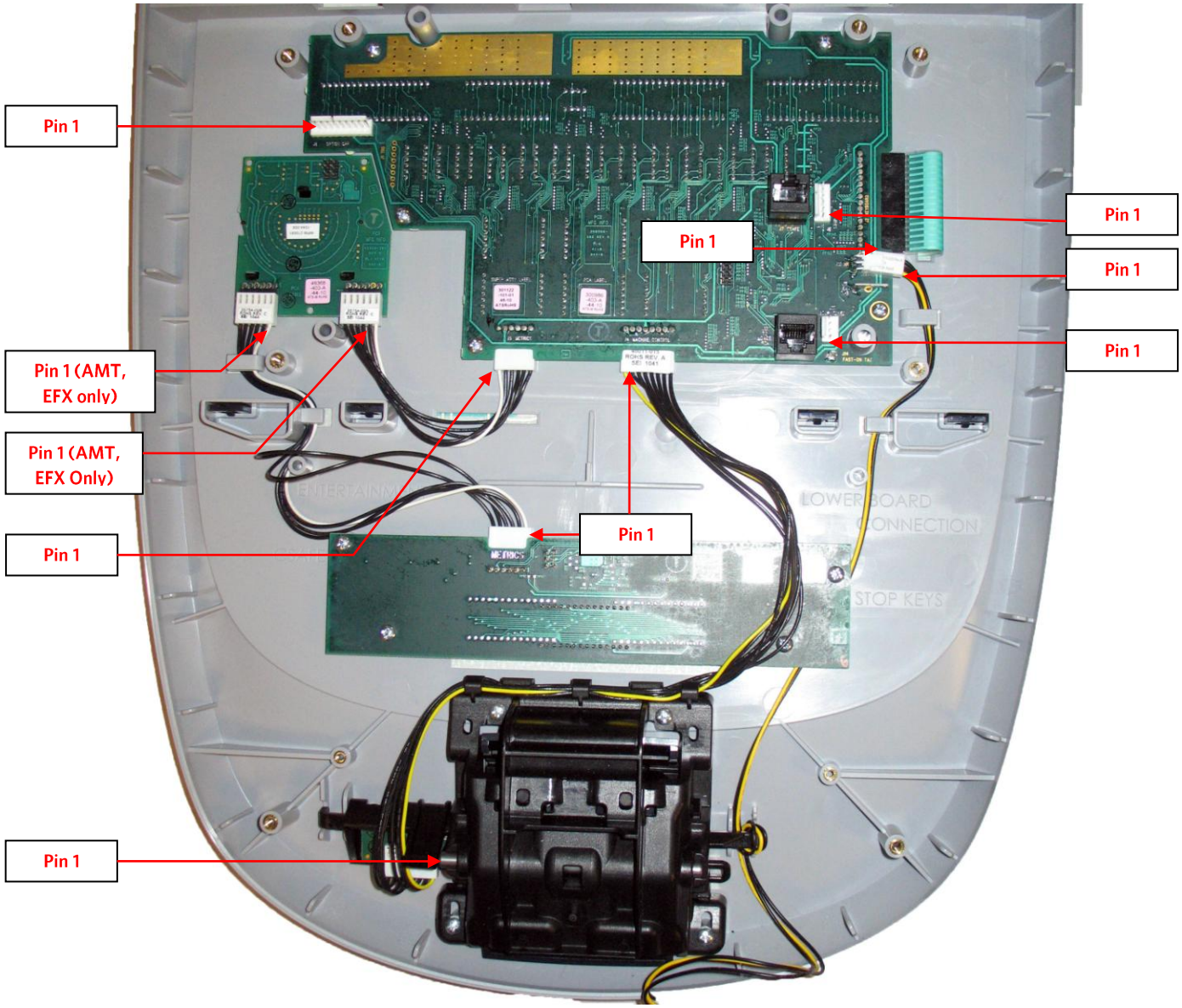
15. Install the replacement upper PCA into the console using the five screws removed in step 14. Torque to 10 inch pounds.

    Note: Do not use an electric screw driver or over tighten the screws. Over tightening may damage the console. This type of damage is not covered under warranty.

16. The white wire in the Metrics cable and the yellow wire in the Machine Controls and HR cables indicate pin 1. Align the white wire in the Metrics cable and yellow wires in the Machine Controls and HR cables with the pin 1 markings on the upper PCA. **See Diagram 5.5.9**

    Note: If pin 1 is not marked on the Upper PCA refer to **Diagram 5.5.9**.

Diagram 5.5.9 – P30 PCA – Pin 1 Reference



17. Reconnect the Metric cable (J5), Metric cable (J1), Metric cable (J2), Machine Controls cable (J4), Option Cap cable (J6, if applicable), Keypad Metric cable and HR cable (J10) from the Upper PCA board. **See Diagram 5.5.8** cables to the Upper PCA.
18. Replace the P30 Rear Cover removed step 12 and secure the cover with the screws 6 screws. Torque to 10 inch pounds.

    Note: Do not use an electric screw driver or over tighten the screws. Over tightening may damage the console. This type of damage is not covered under warranty.
19. Replace the P30 Option Cap back cover removed step 11 and secure the cover with the screws 2 screws. Torque to 10 inch pounds.

    Note: Do not use an electric screw driver or over tighten the screws. Over tightening may damage the console. This type of damage is not covered under warranty.
20. Place the P30 console on the maintenance access hook.
21. Reconnect the Data cable, Auto Stop cable (Treadmill only), Stop Key cable (Treadmill only), Ground wire and the CSAFE cable (if in use) to the Upper PCA. **See Diagram 5.5.5.**
22. Reconnect the Heart Rate Cable to the Heart Rate PCA.
23. Replace the Heart Rate PCA. **See Procedure 5.7, Removing Heart Rate PCA**
24. Replace the access cover with the hardware removed in step 6.
25. Tilt the console back against the mounting plated. While tilting the console back feed the excess cable into weldment tube making sure that the cables will not become pinched.
26. Fasten the console to the dash mounting plate with the four screws removed in step 4. **See Diagram 5.5.2.**
27. Fasten the dash transition cover using the two screws removed in step 3. **See Diagram 5.5.1**
28. Check treadmill operation per Section Seven.

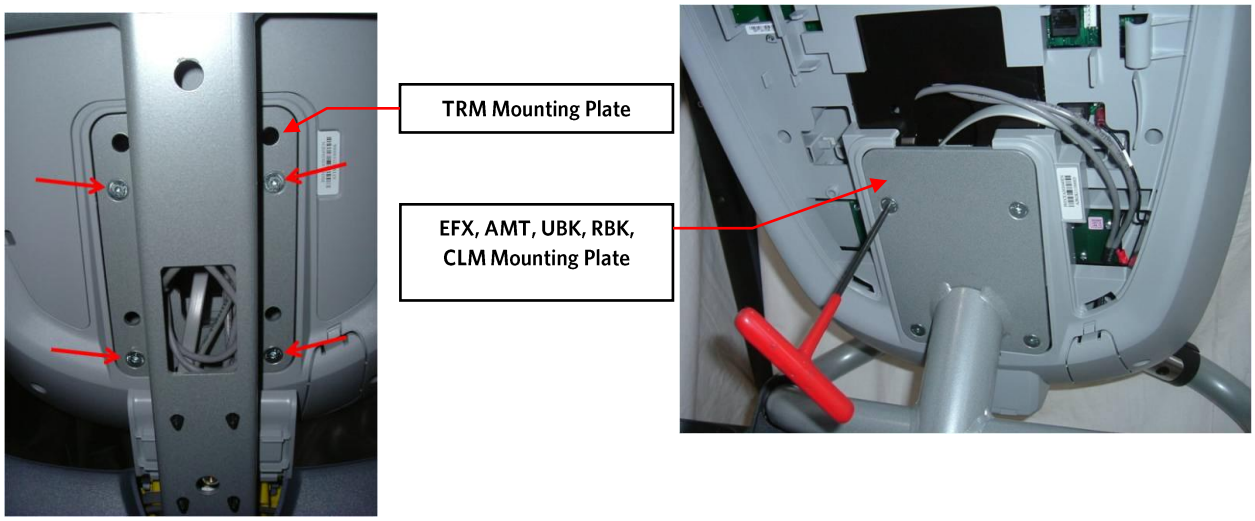
Procedure 5.6 – P30 – Replacing Metric PCA

1. Set the treadmill circuit breaker in the "off" position and unplug the treadmill's line cord from the AC outlet. **(TRM only).**
2. The PCA's in the console are static sensitive. They can be damaged if proper static prevention equipment is not used. Attach an anti-static wrist strap to your arm, and then connect the ground lead of the wrist strap to the treadmill's frame ground.
3. Remove the two screws that fasten the dash transition cover and remove the cover. **(TRM Only) See Diagram 5.6.1**

Diagram 5.6.1 – Dash Transition Cover – (TRM only)

4. Remove the four screws that fasten the console to the dash mounting plate. **See Diagram 5.6.2.**

Diagram 5.6.2 Dash Mounting Plate

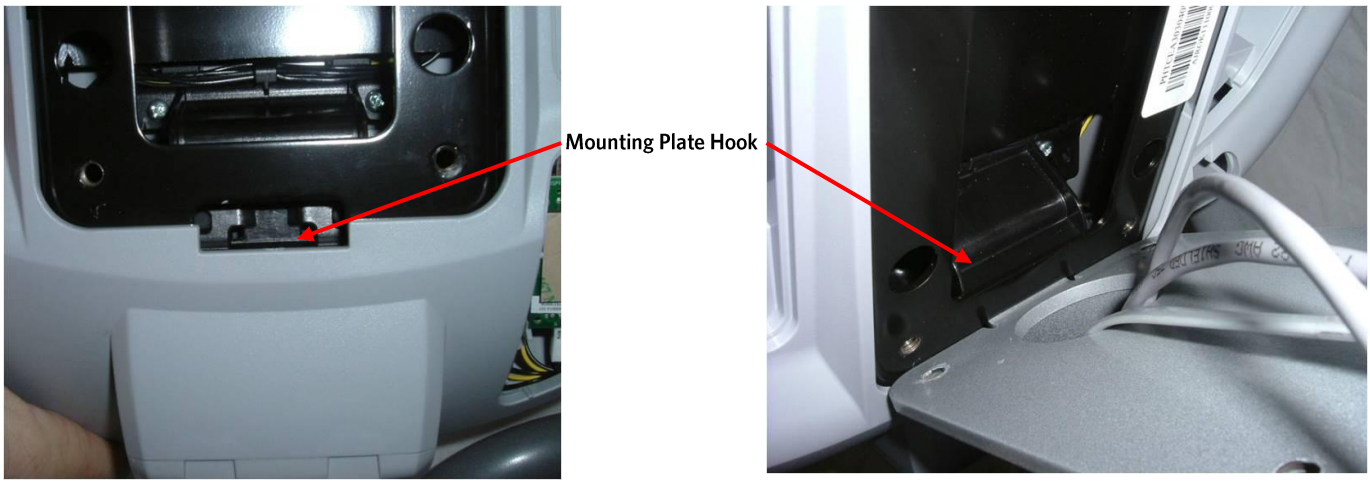


5. Remove the two screws that fasten the access panel to the console. **See Diagram 5.6.3**

Diagram 5.6.3 – Console Access Panel

6. Remove the back access panel:
    a. Treadmills: Lift the console off the maintenance hook and then position the console so that the back panel is accessible and remove the back cover.
    b. AMT's, EFX's, CLM's, UBK's, and RBK's: Tilt the console forward on the maintenance access hook on the dash weldment and remove the back. **See Diagram 5.6.4.**

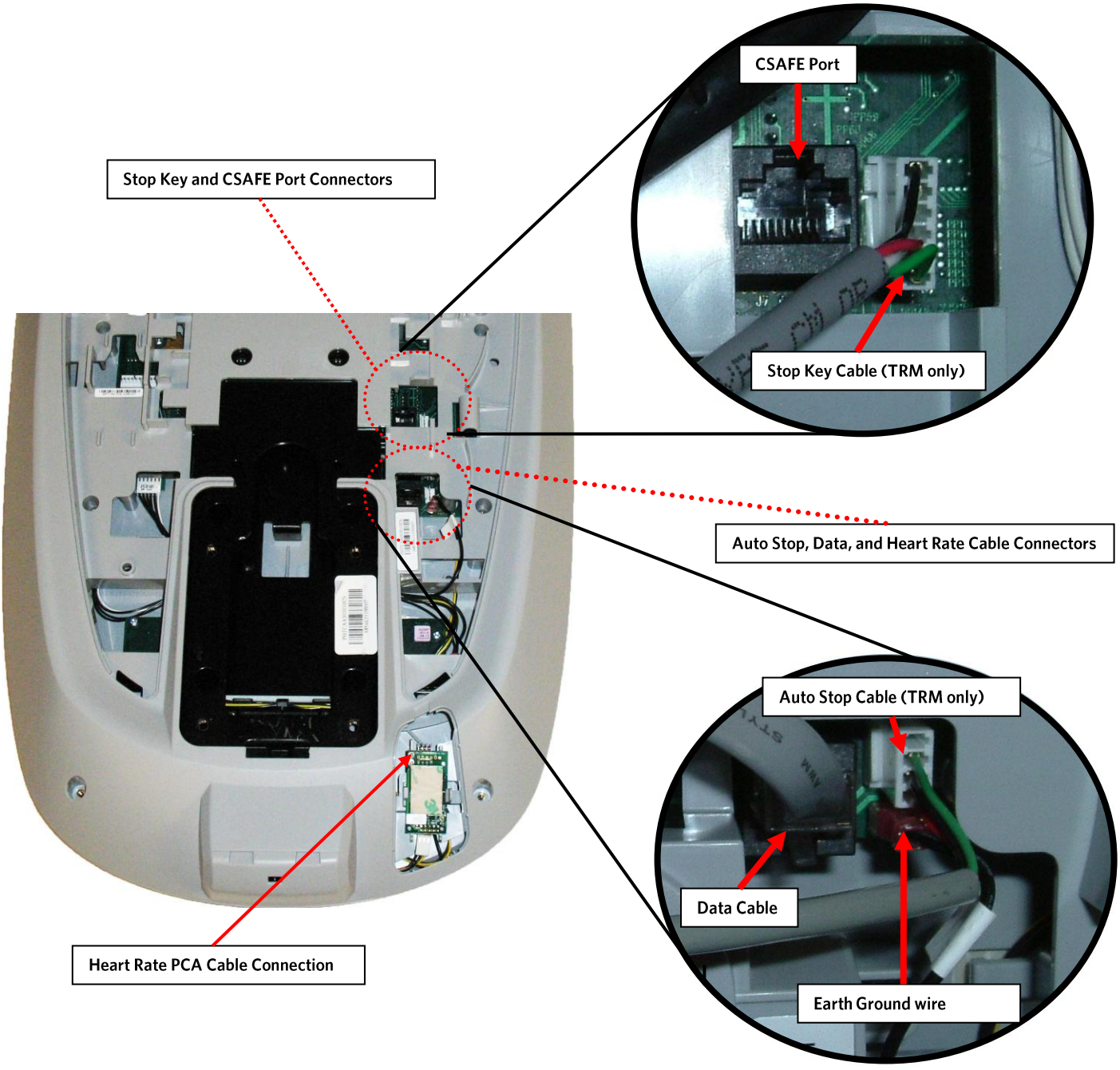
Diagram 5.6.4 – Maintenance Access Hook



7. Remove the Heart Rate PCA. **See Procedure 5.7, Removing Heart Rate PCA.**
8. Disconnect the Heart Rate Cable from the Heart Rate PCA.

9. Disconnect the Data cable, Auto Stop cable (Treadmill only), Stop Key cable (Treadmill only), Heart Rate ground wire and the CSAFE cable (if in use) from the Upper PCA. **See Diagram 5.6.5.** Remove the console from the maintenance access hook and place it on a flat work surface.

Diagram 5.6.5 – P30 Cable Connectors

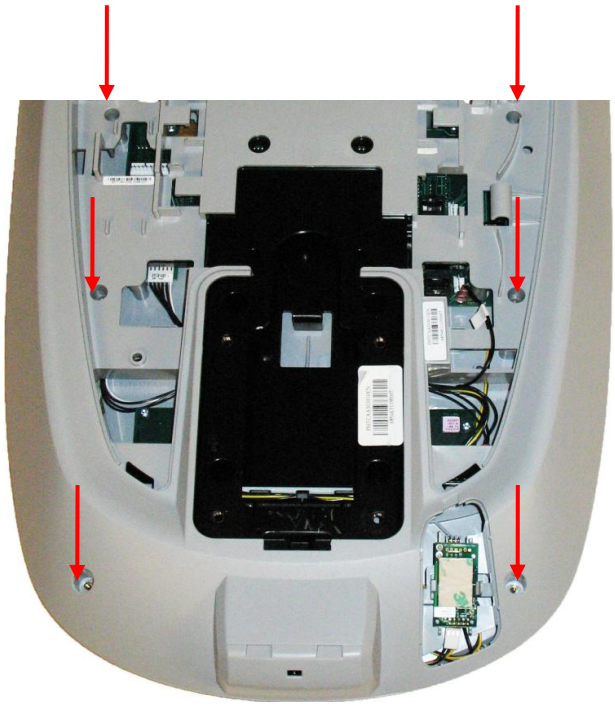


10. Remove the two screws that fasten the back cover to the option cap and remove the cover. **See Diagram 5.6.6**

Diagram 5.6.6 – Option Cap Back Cover

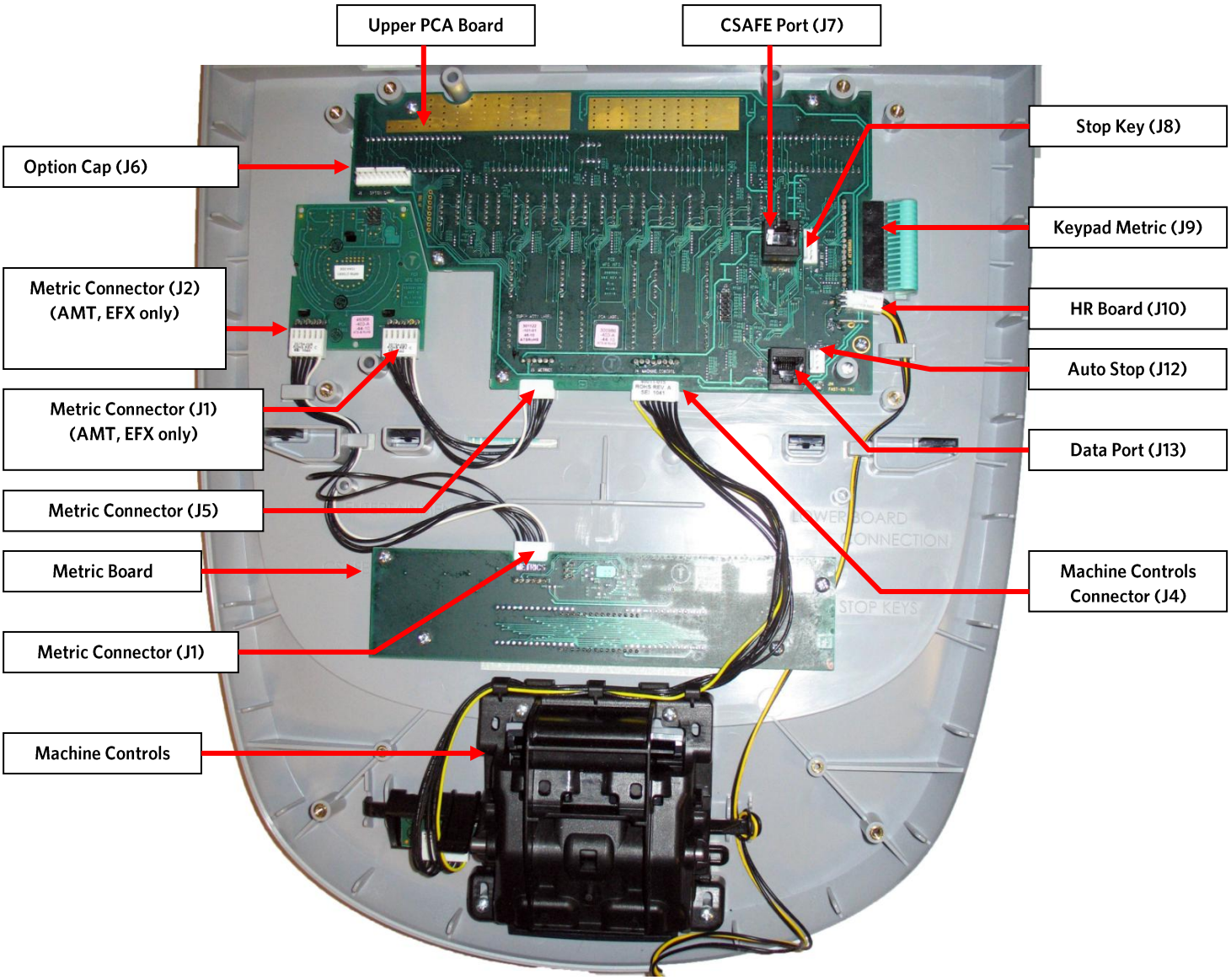
11. Remove the 6 screws that fasten the rear cover from the console and remove. **See Diagram 5.6.7.**

Diagram 5.6.7 – Rear Console Cover



12. Disconnect the Metric cable (J1) from the Metric PCA board. **See Diagram 5.6.8.**
13. **Remove the four screws that fasten the Metric PCA board to the console and remove the Metric PCA and the four spacers.**

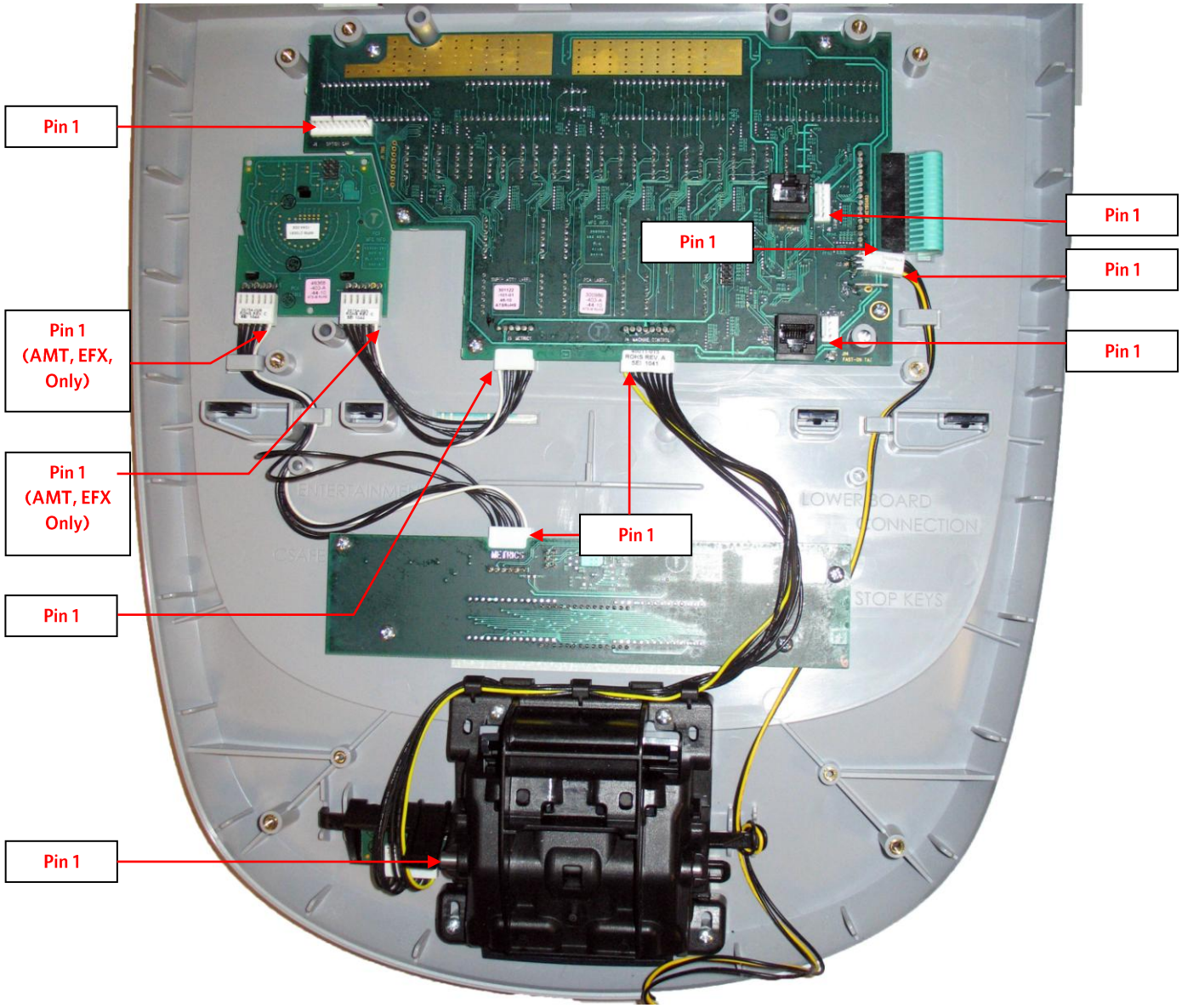
Diagram 5.6.8 – P30 Upper PCA & Metric Board



14. Replace the four spacers removed in step 13 onto the console mounting studs. The spacers must be used to insure the Metrics LED's are flush with the display window. If spacers are not used the Metrics LED's will apply excessive pressure on the Metrics board and may cause damage to the Metrics board.
15. Install the replacement Metric PCA into the console using the four screws removed in step 13.
16. The white wire in the Metrics cables indicate pin 1. Align the white wire in the Metrics cables with the pin 1 markings on the Metics PCA. **See Diagram 5.6.9**

    Note: If pin 1 is not marked on the Upper PCA refer to **Diagram 5.6.9**.

Diagram 5.6.9 – P30 PCA – Pin 1 Reference



17. Connect the Metrics cable to the Metric PCA.
18. Replace the P30 Rear Cover removed step 11 and secure the cover with the screws 6 screws. Torque to 10 inch pounds.

    Note: Do not use an electric screw driver or over tighten the screws. Over tightening may damage the console. This type of damage is not covered under warranty.
19. Replace the P30 Option Cap back cover removed step 12 and secure the cover with the screws 2 screws. Torque to 10 inch pounds.

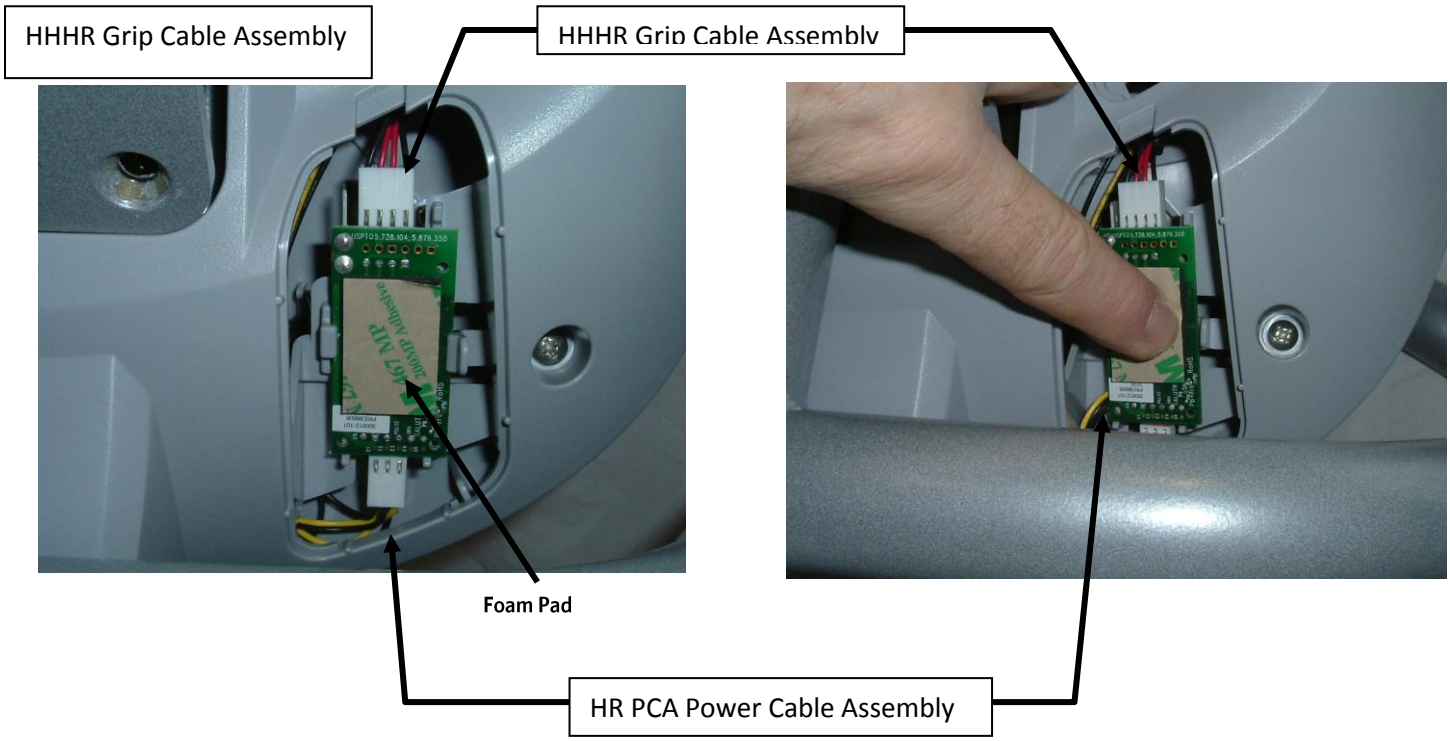
    Note: Do not use an electric screw driver or over tighten the screws. Over tightening may damage the console. This type of damage is not covered under warranty.
20. Place the P30 console on the maintenance access hook.
21. Reconnect the Data cable, Auto Stop cable (Treadmill only), Stop Key cable (Treadmill only), Heart Rate ground wire and the CSAFE cable (if in use) from the Upper PCA. **See Diagram 5.6.5.**
22. Reconnect the Heart Rate Cable to the Heart Rate PCA.
23. Replace the the Heart Rate PCA. **See Procedure 5.7, Removing Heart Rate PCA**
24. Replace the access cover with the hardware removed in step 6.
25. Tilt the console back against the mounting plated. While tilting the console back feed the excess cable into weldment tube making sure that the cables will not become pinched.
26. Fasten the console to the dash mounting plate with the four screws removed in step 4. **See Diagram 5.6.2.**
27. Fasten the dash transition cover using the two screws removed in step 3. **See Diagram 5.6.1**
28. Check treadmill operation per Section Seven.

Procedure 5.7 – P30 – Replacing Heart Rate PCA

1. Set the treadmill circuit breaker in the "off" position and unplug the treadmill's line cord from the AC outlet.
2. The PCA's in the console are static sensitive. They can be damaged if proper static prevention equipment is not used. Attach an anti-static wrist strap to your arm, and then connect the ground lead of the wrist strap to the treadmill's frame ground.
3. Remove the HR PCA access panel on the back of the console. **See Diagram 5.7.1**
4. The HR PCA snaps into its mounting. Press its tabs downward and remove the HR PCA from its mounting.
5. Disconnect the HR cable and handlebar cable from the HR PCA. **See Diagram 5.7.2.**
6. Connect the HHHR Grip cable assembly to the upper connector on the HR PCA and the HR PCA Power cable to the lower connector on the replacement HR PCA. **See Diagram 5.7.2**.
7. Orient the replacement HR PCA so that the side with the protective foam pad is facing out and snap the HR PCA into its mounting.
8. Replace the HR PCA access panel removed in step 3.
9. Check treadmill operation per Section 7

Diagram 5.7.1

Diagram 5.7.2



Procedure 5.8 – Future Content

Procedure 5.9 – P30 – Flash Programming the Upper PCA

This unit utilizes an upper PCA software system that is capable of on site upper PCA software uploading (re-programming). The software upload may be accomplished with the use of a PDA (palm device) or a laptop computer.

If a palm device is to be used it must use OS software version 3.2 or higher. Currently, we have only tested devices manufactured by Palm, but other manufacturer's palm devices may also function correctly.

If a palm device is to be used, the appropriate software must be available in the palm device. A PDA containing the appropriate software may be ordered from Precor or it may be downloaded to the PDA from your desktop or laptop computer via the "hot sync" function. With the PDA inserted in the hot sync cradle, download to "Precor IFP" (in field programmer) directory.

If a laptop computer is to be used, the computer's DB9 serial port will be used for the upload.

Upload Procedure

1. The P30 must be "powered down" before the upload procedure can be initiated. Ensure that the P30 has not be used for a sufficient time to allow the lower PCA to completely discharge. The light emitting diode on the lower PCA will go out when the power supply is discharged.
2. If the CSAFE port is in use, temporarily disconnect the RJ-45 cable from the CSAFE port. If the CSAFE port is not in use, temporarily remove the plastic plug from the CSAFE port.
3. Connect the PDA or computer interface cable to the CSAFE port.
4. Select the software file to be uploaded on the palm device or computer.
5. Start pedaling the P30 or power up using the external power supply. When the P30 "powers up" the upload will commence. You must continue to pedal until the upload is complete, approximately 2 minutes.
6. Stop pedaling or disconnect the external power supply when the upload is complete, and allow the lower PCA to completely discharge. The light emitting diode on the lower PCA will go out when the power supply is discharged.
7. Start pedaling the P30, after it has been allowed to power down, the P30 will now be operating on the newly uploaded software.
8. Thoroughly, check the P30's function per Section Seven.

Procedure 5.10- Future Content

Troubleshooting 5.11 – P30 – Troubleshooting the Keypad and the Upper PCA

Procedure

Note: The white or yellow wire on the cables shown in **Diagram 5.5.9** denotes pin 1. When these cables are inserted into their connectors, the white or yellow wire must align with the pin 1 designation on the PCA. If pin 1 is not marked on the PCA refer to **Diagram 5.5.9**.

1. Set the treadmill's on/off switch in the "off" position (Treadmill only). Access the upper electronics and machine controls per Procedure 5.5, steps 1 through 12. Place the console on the maintenance mounting hook and reconnect all cables.
2. If the message STUCK KEY is displayed when the unit is turned on for treadmill's or pedaling on the RBK, UBK, AMT, and EFX, skip to step 23.
3. If a key does not function, skip to step 18.
4. If the display does not illuminate, continue with step 5.

Diagram 5.11.1 - Console, Upper PCA, JTAG (J9) Connector

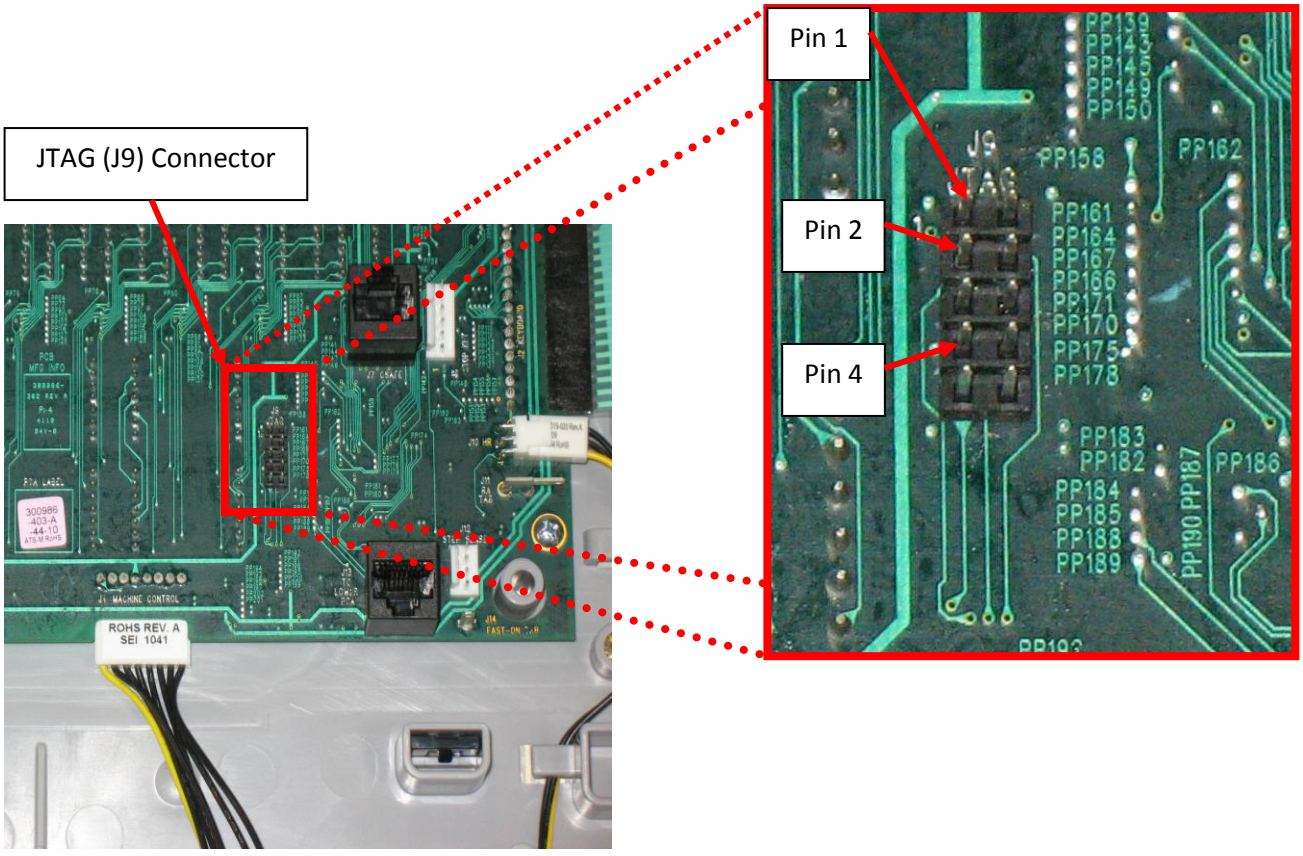
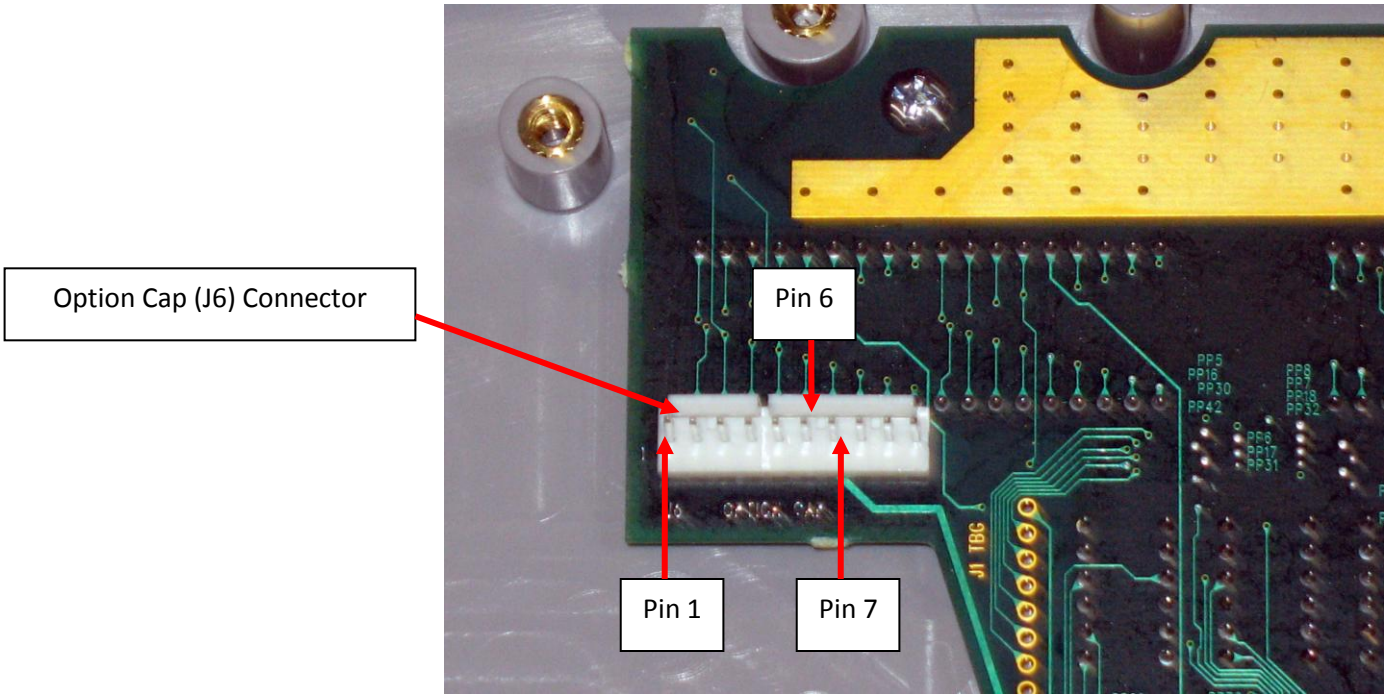


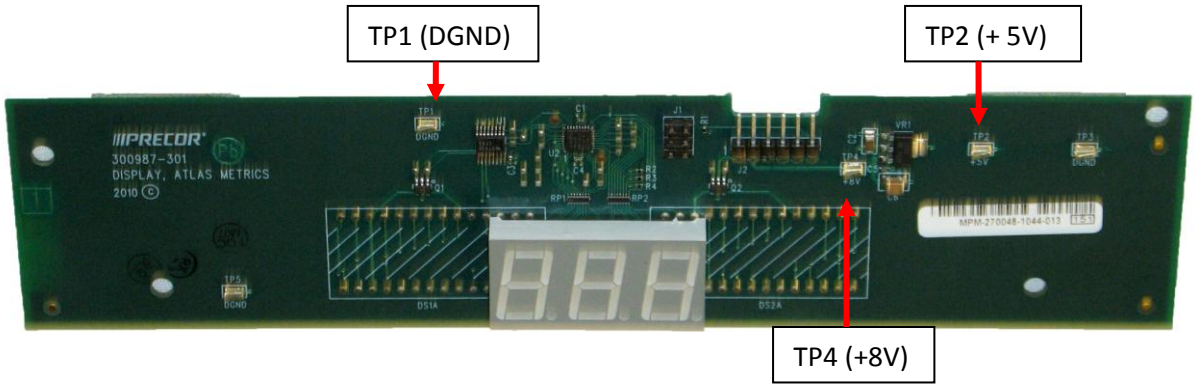
Diagram 5.11.2 - Console, Upper PCA , Option Cap (J6) Connector



5. If the upper PCA is not illuminating, skip to step 12.
6. If the metrics PCA is not illuminating, continue with step 7.
7. Remove the four screws that fasten the metrics PCA to the display face and rotate it so that the front of the PCA is visible. For treadmill's set the on/off switch in the "on" position for AMT's, EFX's, UBK's, RBK's and CLM's start pedaling.

   Note: There are four spacers between the Metric board and the mounting studs. These must be saved and reinstall with the Metric board. If they are not used the Metric board or display face may become damaged.
8. With a DC voltmeter, measure between TP4 (+8V) and TP1 (DGND) for 8 Vdc and between TP2 (+5V) and TP1 (DGND) for 5Vdc. See Diagram 5.11.3

Diagram 5.11.3 - Metrics PCA, Front View



9. If 5 Vdc is not present on TP2 and 8 Vdc is present on TP4, replace the metrics PCA.
10. If 8 Vdc is not present on TP4 and the upper PCA is illuminating normally, replace the cable between the upper PCA and the metrics PCA.
11. If you have performed steps 7 - 10 and the metrics PCA still does not illuminate, contact Precor customer support for assistance.
12. For treadmill's set the on/off switch in the "on" position, for AMT's, EFX's, UBK's, RBK's and CLM's start pedaling.
13. With a DC voltmeter, measure between pins 2 and 4 of J9 (JTAG Connector) for 5 Vdc and between pins 6 and 7 of J6 (Option Cap) for 8 Vdc.
14. If 5 Vdc is not present on J9 and 8 Vdc is present on J6, replace the upper PCA.
15. If 8 Vdc is not present on J6, temporarily replace the upper PCA to power control module (treadmill's) or Lower PCA (AMT's, EFX's, UBK's, RBK's and CLM's), cable with a known good cable.
16. If the upper PCA illuminates normally, replace the upper PCA to power control module cable permanently. If the upper PCA still does not illuminate, replace the power control module (treadmills) or Lower PCA (AMT's, EFX's, UBK's, RBK's and CLM's).
17. If you have performed steps 12 - 16 and the upper PCA still does not illuminate, contact Precor customer support for assistance.
18. For treadmill's set the on/off switch in the "on" position for AMT's, EFX's, UBK's, RBK's and CLM's start pedaling.
19. If none of the keys on the display are functioning, check the stop switch cable connection to the upper PCA. (Treadmill Only).If the stop switch is not connected or the stop switch is not functioning, none of the display keys will operate. This feature insures that the treadmill has a functioning stop switch when it is in use (Treadmill Only).
20. If a particular key is not functioning, perform the keyboard test in **Procedure 5.2.** If the test verifies that the key is not functioning, replace the console face or the machine controls.
21. If the console face or the machine controls has been replaced and the same key or control is still not functioning, replace the upper PCA.
22. If you have performed steps 18 - 22 and the same key is still not functioning, contact Precor customer support for assistance.
23. Remove the keypad cable from the upper PCA. **See Diagram 5.5.8.**
24. For treadmill's set the on/off switch in the "on" position for AMT's, EFX's, UBK's, RBK's and CLM's start pedaling.
25. If the STUCK KEY message is no longer displayed, replace the console face.
26. Set the treadmill's on/off switch in the "off" position (Treadmills Only).

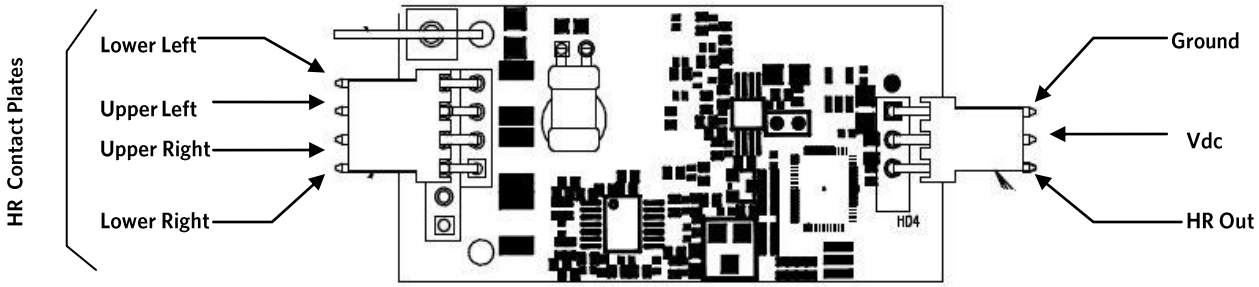
27. Remove the Machine Control cable from the upper PCA.
28. For treadmill's set the on/off switch in the "on" position for AMT's, EFX's, UBK's, RBK's and CLM's start pedaling.
29. If the STUCK KEY message is no longer displayed, replace the machine Controls assembly.
30. If the STUCK KEY is still being displayed with the keyboard cable disconnected, replace the upper PCA.
31. If you have performed steps 23 - 30 and the STUCK KEY message is still being displayed, contact Precor customer support for assistance.

Troubleshooting 5.12 – P30 – Troubleshooting Handheld Heart Rate

Circuit Description
The hand held heart rate system is actually a dual system, that is, it can accept a heart rate signal from either the hand held heart rate contacts on the unit's handlebar or from a Polar heart rate chest strap transmitter. The PCA is configured for hand held priority. That is, if both a chest strap and hand heart rate signal are being received, the system will accept the hand held signal and ignore the chest strap signal. If a hand held signal is not being received, the system will accept the chest strap signal.

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

Diagram 5.12.1 - Hand held/chest strap heart rate PCA



Normal hand held reading - No chest strap reading

1. Access the diagnostic program (Procedure 5.1). Advance to the heart rate display portion of the diagnostic program. Verify that a chest strap signal is not being accepted with either a Polar heart rate test transmitter or a known good chest strap transmitter. If this reading is good, skip to step 3.
2. Using a known good Polar heart rate chest strap, verify that the heart rate operates with the known good chest strap. If the known good Polar chest strap does correct the problem, replace the original chest strap transmitter.
3. If the above procedures did not correct the problem, replace the heart rate PCA.

No hand held reading - Normal chest strap reading

4. Access the diagnostic program (Procedure 5.1). Advance to the heart rate display portion of the diagnostic program. Verify that a hand held signal is not being accepted by firmly grasping both the right and left hand held contacts on the handlebars. Cover as much of the top and bottom contact surface area with your hands as possible (without moving your hands), you should receive a heart rate reading within ten seconds.
5. If the hand held signal is now being accepted, something in the near vicinity is radiating RF (radio frequency) energy that is being received by the chest strap portion of the heart rate PCA.
6. If a hand held signal still not being accepted, skip to step 8.
7. Replace the heart rate PCA with a 300812-101 (or higher) heart rate PCA. 300812-101 and higher versions of heart rate PCA are less susceptible to radiated RF energy.
8. Access the diagnostic program (Procedure 5.1). Advance to the heart rate display portion of the diagnostic program. Verify that a hand held signal is not being accepted by firmly grasping both the right and left hand held contacts with the opposite hands, right hand on the left handlebar contacts and left hand on the right handlebar contacts. Cover as much of the top an bottom contact surface area with your hands as possible, you should receive a heart rate reading within ten seconds. If a hand held signal is still not being accepted, skip to step 10.
9. If a hand held signal was accepted in step 8, the hand held contact wiring is reversed. The harness that connects to the hand held contacts in the handlebar is segregated into two groups. One group has blue shrink wrap around it and the other group has black shrink wrap around it. The “blue” group must go to the right hand contacts and the “black” group must go to the left hand contacts. If necessary, rewire the hand held contacts as described above and test as described in step 4.
10. If the wiring is correct, refer to Diagram 5.12.1 for the following measurements. With an ohmmeter measure between the “lower right contact” pin on the J1 connector and the lower right hand held heart rate contact on the handlebar. The reading should be 1 Ω or less. Measure between the “upper right contact” pin on the J1 connector and the upper right hand held heart rate contact on the handlebar. The reading should be 1 Ω or less. Measure between the “upper left contact” pin on the J1 connector and the upper left hand held heart rate contact on the handlebar. The reading should be 1 Ω or less. Measure between the “lower left contact” pin on the J1 connector and the lower left hand held heart rate contact on the handlebar. The reading should be 1 Ω or less. If any of the above readings are greater than 1 Ω, replace the heart rate PCA to handlebar wire harness.

No hand held reading - No chest strap reading

11. Access the diagnostic program (Procedure 5.1). Advance to the heart rate display portion of the diagnostic program. Verify that neither a chest strap signal or a hand held signal is being accepted with either a heart rate test transmitter or a chest strap transmitter.
12. Check the plug/connector connections on both the heart rate PCA (J4), and upper PCA (J1).
13. If neither a chest strap signal or a hand held signal is being accepted, measure between the "ground" and "5 Vdc" pins on J4 for 5 Vdc. If 5 Vdc is present, replace the heart rate PCA.
14. If 5 Vdc is not present, remove the connector from J4 of the heart rate PCA. Measure between the "ground" and "5 Vdc" pins of the connector (just removed from the heart rate PCA) for 5 Vdc. If 5 Vdc is present, replace the heart rate PCA. If the 5 Vdc is not present, measure between the corresponding pins of J1 on the upper PCA (red and black wires). If 5 Vdc is not present replace the upper PCA. If 5 Vdc is present, replace the upper PCA to heart rate PCA cable.
15. Constant or intermittent readings when neither the hand held or chest strap is in use.
16. Verify that a ferrite core is clamped around the heart rate PCA to upper PCA cable. Constant or intermittent heart rate readings when neither heart rate system is in use is caused by something in the near vicinity radiating RF energy that is being received by the chest strap portion of the heart rate PCA. Replace the heart rate PCA with a 300812-101 (or higher) heart rate PCA. 300812-101 and higher versions of heart rate PCA are less susceptible to radiated RF energy.

Troubleshooting 5.13 - Upper Display does not Illuminate

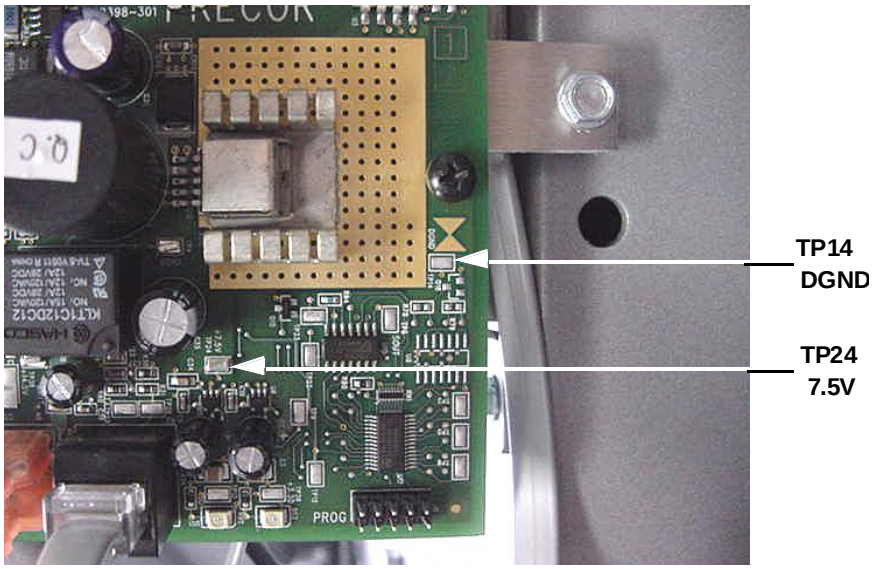
1. Because this is self powered unit, the display will not illuminate until it is used or the optional external power supply is equipped. If the optional external power supply is equipped, the display should be constantly illuminated.
2. If the optional external power supply is not equipped, skip to step 5.
3. Disconnect the optional external power supply from the AMT and measure between the inner and outer sleeves of the power supply's output jack with a DC voltmeter. You should measure approximately 18 VDC.
4. If the voltage measured in step 3 was significantly low, replace the optional external power supply. If the voltage measured in step 3 was 0 Vdc, disconnect external power supply from its AC outlet and measure the voltage at the AC outlet. If the AC outlet voltage is normal replace the optional external power supply. If the AC outlet voltage is significantly low or 0 Vdc, the AC system must be inspected by an electrician.
5. Troubleshoot the generator per Procedure 9.2.
6. If the generator was found to be good, the problem will be in either the lower PCA, upper PCA or the upper to lower PCA interconnect cable.

Warning

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

7. Remove the right side cover and disconnect the interconnect cable from the lower PCA.
8. The following voltage reading must be taken while the unit is in motion. Extreme care must be taken to keep meter wires, hands, etc. clear of all moving parts. Using a DC voltmeter, measure the voltage between TP24 (7.5V) and TP14 (DGND). Refer to Diagram 5.14.1. The voltage measured should be approximately 7.5 Vdc. If the voltage is significantly low, replace the lower PCA. Additionally, the DS1 and DS2 LED's should illuminate.
9. Reconnect the interconnect cable to the lower PCA and repeat the voltage measurement in step 8. The voltage measured should be approximately 7.5 Vdc. If the voltage is significantly low, the problem is in the upper PCA or the upper to lower PCA interconnect cables.

Diagram 5.13.1 - Partial View of Lower PCA



10. Troubleshoot the upper to lower PCA interconnect cables per Procedure 9.1.
11. If the upper to lower interconnect cable is found to be good, replace the upper PCA.
12. If you have performed all of the above tests and are unable to resolve the problem, contact Precor customer support.

Section Six – Future Content

Section Seven – Checking CLM Operation

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

Procedure

1. Start "stepping" on the climber. When the **Precor** banner prompt appears, press QUICK START.
2. Operate the climber 4–5 minutes. As you operate the climber:
   a. Concentrate on the resistance of the climber and the sound of the stair arm belts and return springs as you pedal. Be on the alert for unusual rubbing, hitting, grinding, or squeaking noises
   b. Press the Change keys. Verify that various information displays are functioning.
   c. Make sure that the stair arm belts do not rub on the cover.
3. If you feel no resistance as you step, if the climber makes unusual noises, or the electronic display does not change appropriately...

Then...	**Otherwise...**
Refer to Section XX	Continue with the next step.

4. Press the STEP RATE s key until you reach Step Rate 60 (60 steps per minute). Operate the climber for another 2–3 minutes.
5. If the climber resistance does not change or the climber operation feels inconsistent compared with Work Level 1...

Then...	**Otherwise...**
Refer to Section XX	Continue with the next step.

6. Press the STEP RATE s key until you reach Step Rate 90. Operate the climber for another 2–3 minutes.
7. If the climber resistance does not change or the climber operation feels inconsistent compared with Step Rates 30 and 60...

Then...	**Otherwise...**
Refer to Section XX.	Continue with the next step.

8. Check the LED's mounted on the upper PCA and the function keys displayed on the electronic console by performing Procedure 5.1.

Section Eight - Inspection and Adjustment Procedures

Procedure 8.1 - Preventive Maintenance

Section Three - Preventive Maintenance

Preventive maintenance measures are either scheduled (performed on a regular basis by the owner) or unscheduled (performed when you make a service call). Maintenance performed by the owner is limited to cleaning and visually inspecting the climber and making the adjustments specified in the C760 Series Owner's Manual. 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 CLM and their 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.

At the End of Each Day

- Wipe down the stair arms and frame with a damp cloth.

Every Week

- Wipe the surface of the electronic console with a barely-damp sponge or soft cloth. Dry with a clean towel.
- Vacuum underneath the climber, following these steps:
    1. Turn off the climber with the circuit breaker, then unplug the power cord from the wall outlet.
    2. Place the climber 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 climber to an upright position.

On-Site Preventive Maintenance (Service Technician)

Perform the following preventive maintenance tasks each time you are called to service a CLM:

- Examine the belts, sheaves and bearings for wear, cracks, or other signs of deterioration and replace if necessary.
- Visually inspect the power cable harness. Replace the power cable harness if it is torn or damaged.
- Check the LED's mounted on the upper PCA and the function keys displayed on the electronic console by performing Procedure 5.1.

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

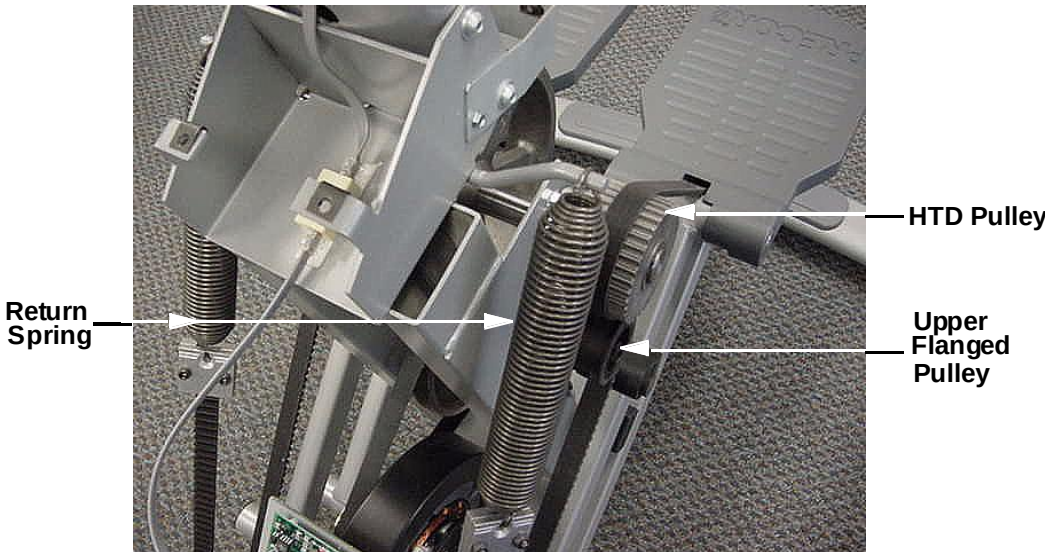
- Inspect the stairarm and drive belts. If the belts show signs of wear or damage, remove and replace the belts as described in either Procedure 10.4 or Procedure 10.9.

Procedure 8.2 - Inspecting and Adjusting Belt Tension

Remove the left and right hand cover sections per Procedure 10.1.

1. Grasp the stairarm return spring and carefully remove it from its mounting peg. See Diagram 8.2.1.

Diagram 8.2.1 - Stairarm Return Spring

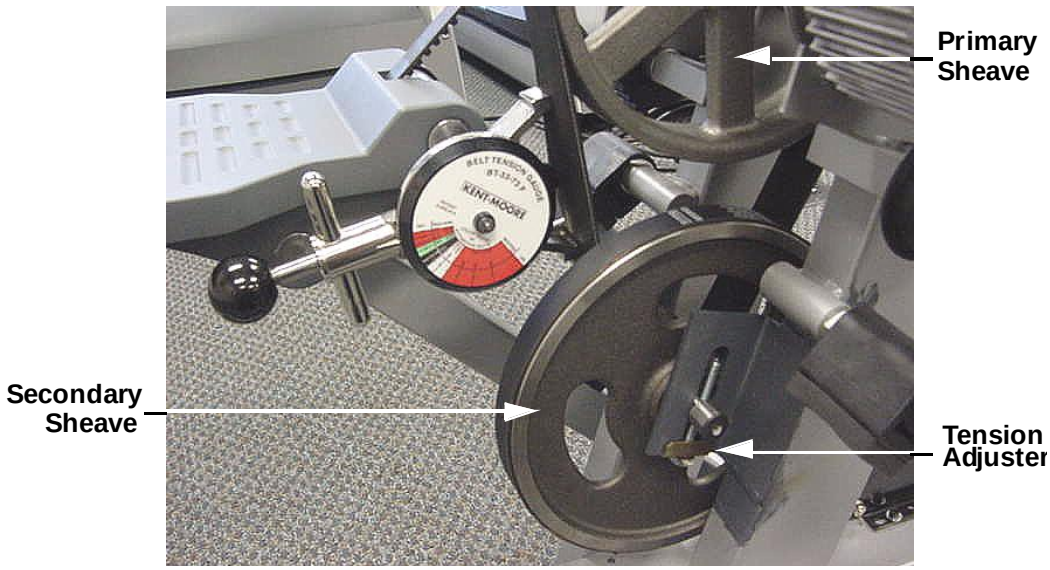


2. Support the stairarm and remove the stairarm belt from both flanged pulleys and the HTD pulley.
3. Lower the stairarm and inspect the stairarm belts for cracks, worn areas and missing teeth.
4. If required, replace the belt per Procedure 10.4.
5. Wrap the stairarm belt over the HTD pulley, behind and under the upper flanged pulley. Wrap the belt under an around the lower flanged pulley. Then lift the stairarm and hook the return spring on its mounting peg. Check the belt to ensure there are no twists in the belt. If there are remove the return spring from its mounting peg and rotate the return spring to remove any twist. Hook the return spring on its mounting peg.
6. Replace the left hand and right hand cover sections per Procedure 10.1.

Procedure 8.3 - Checking Drive Belt Tension

1. Remove the left hand, right hand and rear cover sections per Procedure 10.1
2. Place the belt tension gauge on the primary (wide) drive belt as shown in Diagram 8.3.1. The gauge should read approximately 100 pounds.

Diagram 8.3.1 - Check Primary Drive Belt Tension



3. If necessary, adjust the primary drive belt tension using the two tension adjusters (one on each side of the secondary sheave) until the tension gauge reads approximately 100 pounds. There are locking tabs on the tension adjusters that must be straightened in order to turn the adjuster bolts. See Diagram 10.7.1. Bend the tabs back into the locking position when the belt tension adjustments are complete.
4. Changing the tension of the primary drive belt will affect the generator belt tension. If the tension was primary drive belt tension was changed in step 3, continue with step 5.
5. Place the belt tension gauge on the generator (narrow) belt as shown in Diagram 8.3.2. The belt gauge should read approximately 80 pounds.
6. Loosen but do not remove the four generator mounting bolts. Using the slots in the frame and a flat metal bar as a lever, move the generator forward or backward as required to set the belt tension at 80 pounds and torque the four generator mounting bolts to 40 inch pounds.
7. Replace the left hand, right hand and rear cover sections per Procedure 10.1.

Section Nine - CLM Troubleshooting Procedures

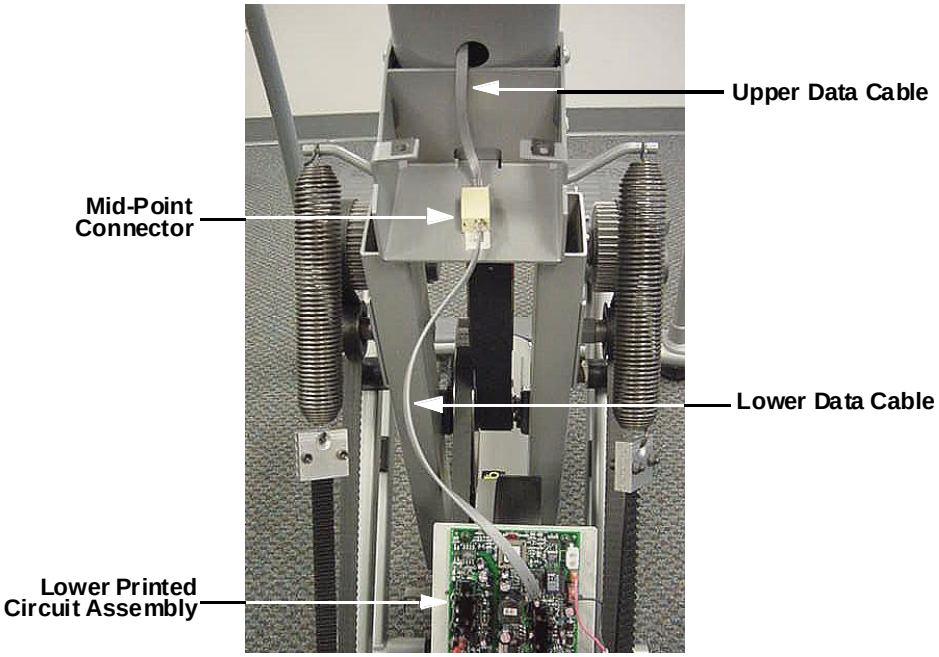
Troubleshooting 9.1 - Troubleshooting the Lower and Upper Data Cables and Mid-Point Connector

1. Access the Upper PCA per Procedure 5.5
2. Remove the left hand and right hand cover sections per Procedure 10.1.
3. Disconnect the upper data cable from the mid-point connector. See Diagram 6.2.
4. Connect a known good data cable from the upper printed circuit assembly to the mid-point connector.
5. If the CLM now functions correctly, replace the upper data cable. If the CLM still functions incorrectly, replace the original upper data cable and continue with step 6.

Troubleshooting the Lower Data Cable

6. Connect a known good data cable from the lower printed circuit assembly to the mid-point connector. See Diagram 9.1.1.
7. If the CLM now functions correctly, replace the lower data cable. If the CLM still functions incorrectly, replace the original lower data cable and continue with step 8.

Diagram 9.1.1 - Upper and Lower Data Cables, Mid-Point



Troubleshooting the Mid-Point Connector

8. Remove the upper and lower data cables from the mid-point connector.
9. Connect the upper and lower data cables to a known good mid-point connector.
10. If the CLM now functions correctly, replace the mid-point connector. If the CLM still functions incorrectly, replace the original mid-point connector. The problem may be caused by another component such as the upper printed circuit assembly or the lower printed circuit assembly. Troubleshoot those components per the appropriate troubleshooting procedure.
11. If all of the above tests have been performed and the CLM is still not functioning correctly, call Precor technical support.

Troubleshooting 9.2 - No Resistance

Note:
The term resistance in this case refers to the physical opposition to the downward movement of the stairarm. That is, the greater the resistance, the slower fall rate and the lesser the resistance the faster the fall rate.

1. Remove the left hand, right hand and front cover sections per Procedure 10.1.
2. Remove both of the wires from the "LOAD CONNECTIONS" on the lower printed circuit assembly. Measure between the two wires with an ohmmeter for approximately 13W. If the measurement is open or significantly high, replace the generator. If the measurement is correct, replace both wires and continue with step 3. The wires may be connected to the load connection terminals in any order.
3. The following A.C. voltage readings will be measured on the 3 PHASE GEN IN terminals. While the CLM is in use, perform the same A.C. voltage reading between the red and black, red and white and black and white wires. All three voltage readings should be approximately 90 Vac at 60 steps per minute. See Diagram 5.14.1.
4. If the voltage measurements are present, replace the lower printed circuit assembly.
5. If the voltage measurements are absent, disconnect the three generator leads from the 3 PHASE GEN IN terminals and repeat the measurements in step 3 directly to the generator wires.
6. If the voltage measurements are still absent, replace the generator. If the voltage measurements are now present, replace the lower printed circuit assembly.
7. If all of the above test has been performed and the CLM is still not functioning correctly, call Precor technical support.

Section Ten - Replacement Procedures

Procedure 10.1 - Replacing the Covers

1. There are four cover sections, left hand, right hand, front and rear.

Left Hand Cover Section Removal

2. Remove the three screws that fasten the left hand cover section to the front cover section.
3. The left hand cover has four tabs that snap into the front cover section. Carefully remove the left hand cover.

Right Hand Cover Section Removal

4. Remove the three screws that fasten the right hand cover section to the front cover section.
5. The right hand cover has four tabs that snap into the front cover section. Carefully remove the left hand cover.

Rear Cover Section Removal

6. Lowering one of the stairarms makes rear cover removal easier.
7. The rear cover section is fastened with four screws, two on top and two on the bottom.
8. Remove the four cover screws and carefully remove the rear cover.

Front Cover Section Removal

9. The left and right hand cover sections must be removed before the front cover section can be removed.
10. The front cover section is fastened with four screws, two on top and two on the bottom. The lower front cover mounts utilize spacers.
11. Remove the four front cover mounting screws and associated spacers. Remove the front cover section.

Rear Cover Section Replacement

12. Lowering one of the stairarms makes rear cover replacement easier.
13. Set the rear cover in its mounting position and fasten it with the four screws removed in step 8.

Front Cover Section Replacement

14. The front section must be replaced before either the left hand or right hand cover sections can be replaced.
15. Set the front cover section in its mounting position.
16. Fasten the front cover section with the screws and spacers removed in step 11.

Left Hand Cover Section Replacement

17. Set the left hand cover section in its mounting position and carefully snap its four tabs into the front cover section.
18. Fasten the left hand cover section with the screws removed in step 2.

Right Hand Cover Section Replacement

19. Set the right hand cover section in its mounting position and carefully snap its four tabs into the front cover section.
20. Fasten the right hand cover section with the screws removed in step 4.

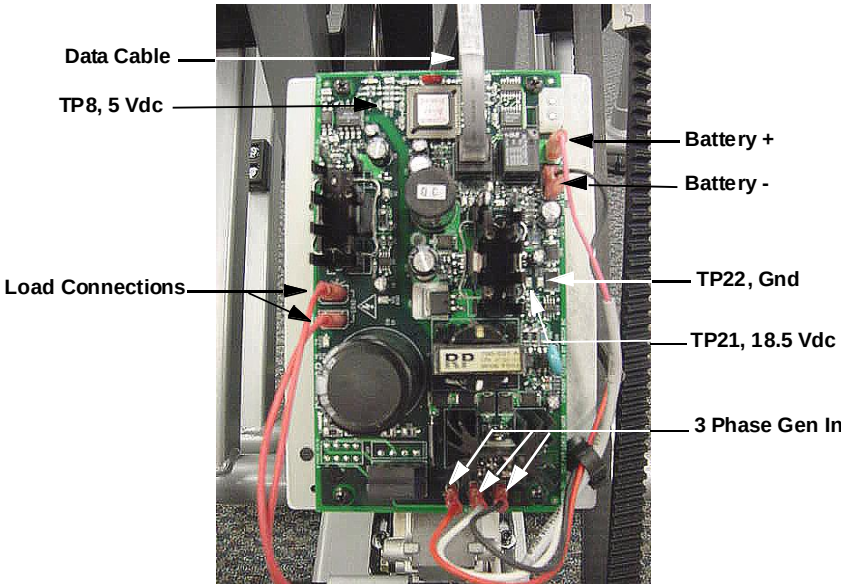
Procedure 10.2 – Future Content

Procedure 10.3 - Replacing the Lower PCA

Follow anti-static handling procedures and wear an anti-static device (such as a wrist strap) when you perform this procedure.

1. Remove the left hand and right hand cover sections per Procedure 10.1.
2. Remove all of the wiring connections from the lower printed circuit assembly. See Diagram 10.3.1.
3. Remove the four screws that fasten the lower printed circuit assembly to its mounting bracket.

Diagram 10.3.1 - Lower Printed Circuit Assembly Mounting

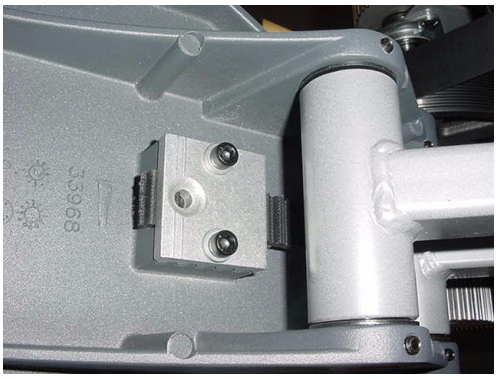


4. Set the replacement lower printed circuit assembly in its mounting position and fasten it with the four screws removed instep 3.
5. Connect the red lead from the battery to the BATTERY + terminal. Connect the black lead from the battery to BATTERY - terminal.
6. Connect the two red wires from the generator to the LOAD terminals. These wires may be connected in any order.
7. Connect the red, black and white wires from the generator to the 3 PHASE GEN IN terminals. These wires may be connected in any order.
8. Connect the data cable to its connector on the lower printed circuit assembly.
9. Replace the left hand and right hand covers per Procedure 10.1.

Procedure 10.4 - Replacing a Stairarm Belt

1. Remove the left hand or right hand cover, as required, per Procedure 10.1.
2. Grasp the stairarm return spring and carefully remove it from its mounting peg. See Diagram 8.2.1.
3. Support the stairarm and remove the stairarm belt from both flanged pulleys and the HTD pulley.
4. Remove the bolts that fasten the clamp on the bottom of the stairarm foot plate. Remove the belt from the stairarm foot plate. See Diagram 10.4.1.

Diagram 10.4.1 - Stairarm Belt Clamps

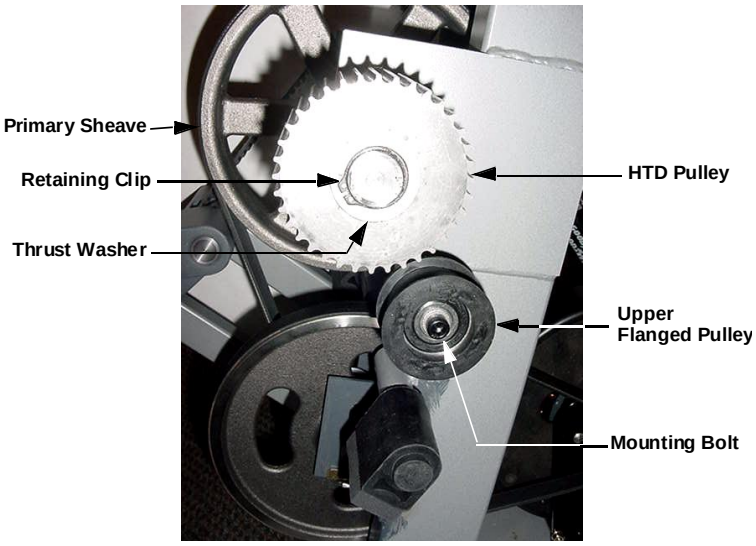


5. Remove the return spring from the other belt clamp. Remove the bolts the fasten the belt clamp to the belt and remove the belt from the clamp.
6. If the replacement belt is a loop, cut it between any set of teeth.
7. Refer to diagram 10.5.1, feed the belt into the stairarm foot plate through the slot in the front edge of the stairarm foot plate. Replace the clamp and fasten the belt in the clamp with the bolts removed in step 3.
8. Place the other belt clamp on the other end of the belt and fasten the belt clamp on the belt with the bolts removed in step 4. Hook the return spring into the belt clamp.
9. Refer to diagram 10.5.1, wrap the stairarm belt over the top of HTD pulley, behind and under the upper flanged pulley. Refer to diagram 10.6.1, wrap the belt under and around the lower flanged pulley. Then lift the stairarm and hook the return spring on its mounting peg. Check the belt to ensure there are no twists in the belt. If there are remove the return spring from its mounting peg and rotate the return spring to remove any twist. Hook the return spring on its mounting peg.
10. Replace the left hand and/or right hand cover sections per Procedure 10.1

Procedure 10.5 - Replacing a HTD (Toothed) Pulley

1. Remove the left hand or right hand cover, as required, per Procedure 10.1.
2. Grasp the stairarm return spring and carefully remove it from its mounting peg. See Diagram 8.2.1.
3. Support the stairarm and remove the stairarm belt from both flanged pulleys and the HTD pulley. Lower the stairarm to its lowest position.
4. Rotate the HTD pulley. Note that it free wheels when rotated toward the front of the climber and engages the primary sheave when rotated toward the rear of the climber. The replacement pulley must be mounted so it rotates in the same manner. See Diagram 10.5.1.

Diagram 10.5.1 - HTD Pulley

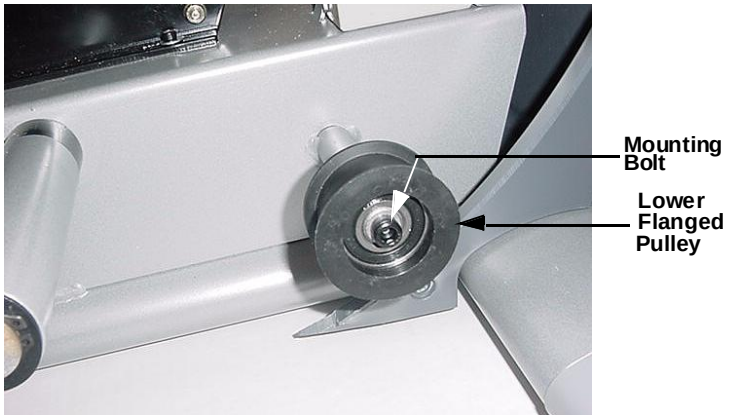


5. Remove the retaining clip from the HTD pulley. Remove the thrust washer from the shaft. Slide the HTD pulley off of the shaft. Verify that there are three thrust washers, one wave washer and another thrust washer remaining on the shaft.
6. Slide the replacement HTD pulley onto the shaft. Verify that it rotates as described in step 4. Slide the thrust washer onto the shaft. Fasten the HTD pulley with the retaining clip removed in step 5.
7. Wrap the stairarm belt over the HTD pulley, behind and under the upper flanged pulley. Wrap the belt under an around the lower flanged pulley. Then lift the stairarm and hook the return spring on its mounting peg. Check the belt to ensure there are no twists in the belt. If there are remove the return spring from its mounting peg and rotate the return spring to remove any twist. Hook the return spring on its mounting peg.
8. Replace the left hand and right hand cover sections per Procedure 10.1.

Procedure 10.6 - Replacing a Flanged Pulley

1. There are four flanged pulleys, two on either side. Remove the left hand or right hand cover, as required, per Procedure 10.1.
2. Grasp the stairarm return spring and carefully remove it from its mounting peg. See Diagram 8.2.1.
3. Support the stairarm and remove the stairarm belt from both flanged pulleys and the HTD pulley. Lower the stairarm to its lowest position.
4. Remove the flanged pulley mounting bolt. Remove the flanged pulley. See Diagrams 10.5.1 and 10.6.1.

Diagram 10.6.1 - Lower Flanged Pulley

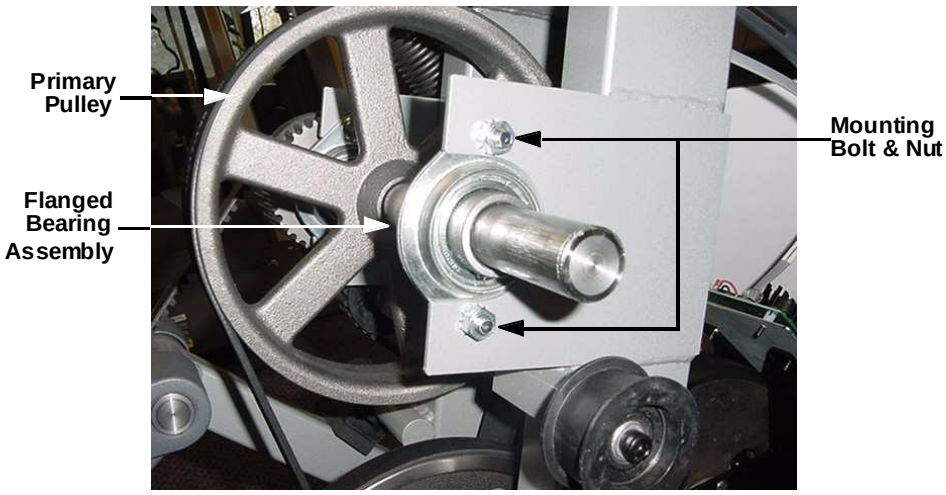


5. Set the replacement flanged pulley at its mounting position and fasten it with the bolt removed in step 4. Torque the mounting bolt to 120 inch pounds.
6. Wrap the stairarm belt over the HTD pulley, behind and under the upper flanged pulley. Wrap the belt under an around the lower flanged pulley. Then lift the stairarm and hook the return spring on its mounting peg. Check the belt to ensure there are no twists in the belt. If there are remove the return spring from its mounting peg and rotate the return spring to remove any twist. Hook the return spring on its mounting peg.
7. Replace the left hand and right hand cover sections per Procedure 10.1.

Procedure 10.7 - Replacing the Primary Sheave

1. Remove the left hand cover, right hand cover and rear cover per Procedure 10.1.
2. Grasp one of the stairarm return springs and carefully remove it from its mounting peg. See Diagram 8.2.1.
3. Support the stairarm and remove the stairarm belt from both flanged pulleys and the HTD pulley. Lower the stairarm to its lowest position.
4. Repeat steps 2 and 3 with the remaining stairarm belt.
5. Remove the retaining clip from one of the HTD pulleys. Remove the thrust washer from the shaft. Slide the HTD pulley off of the shaft. Remove the remaining three thrust washers, wave washer and another thrust washer from the shaft.
6. Remove the remaining HTD pulley as described in step 5.
7. Remove tension from the primary belt with the secondary sheave tension adjusters. See Diagram 10.8.1.
8. Remove the four bolts and nuts (two each side) that fasten the flange bearing assemblies to the frame. See Diagram 10.7.1.

Diagram 10.7.1 - Primary Sheave Mounting



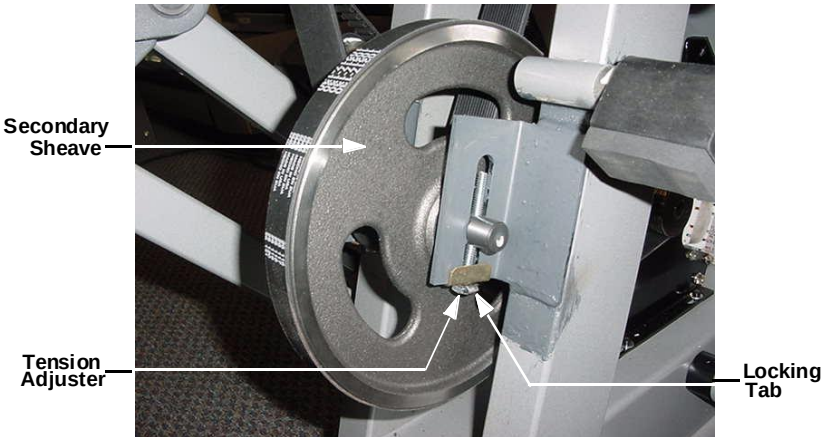
9. Set the replacement primary sheave inside the primary belt then set the primary sheave in its mounting position. Insert the four mounting bolts, removed in step 8 through the flanged bearing assembly and the frame. Hand start the four mounting nuts on the mounting bolts. Torque the mounting nuts to 120 inch pounds.
10. Slide a thrust washer onto one of the primary sheave shafts, then a wave washer and then three more thrust washers.
11. Slide one of the HTD pulleys onto the shaft. Verify that it rotates as described in step 4 of Procedure 10.5.1. Slide another thrust washer onto the shaft. Fasten the HTD pulley with the retaining clip removed in step 5.
12. Replace the remaining HTD pulley as described in steps 11 and 12.
13. Tension both the primary and generator belts as described in Procedure 8.3.

14. Wrap one of the stairarm belts over the HTD pulley, behind and under the upper flanged pulley. Wrap the belt under and around the lower front flanged pulley. Then lift the stairarm and hook the return spring on its mounting peg. Check the belt to ensure there are no twists in the belt. If there are remove the return spring from its mounting peg and rotate the return spring to remove any twist. Hook the return spring on its mounting peg.
15. Replace the remaining stairarm belt as described in step 15.
16. Replace the left hand cover, right hand cover and rear cover sections per Procedure 10.1.

Procedure 10.8 - Replacing the Secondary Sheave

1. Remove the left hand cover, right hand cover and rear cover per Procedure 7.1.
2. Using a pair of pliers, straighten the locking tabs on both secondary sheave adjusters. Remove both of the secondary sheave tension adjusters. See Diagram 10.8.1.

Diagram 10.8.1 - Secondary Sheave Mounting



3. Remove the primary belt from the primary sheave's hub and allow it to lie on the primary sheave's shaft. This will allow clearance for the removal of the secondary sheave.
4. Remove the secondary sheave from both the primary and generator belts.
5. Place the primary belt and generator belt around the replacement secondary sheave. Set the secondary sheave in it mounting position. Tension both the primary belt and generator belt per Procedure 8.3.
6. Bend both tension adjuster locking tabs to prevent the tension adjuster bolts from turning.
7. Replace the left hand cover, right hand cover and rear cover per procedure 10.1.

Procedure 10.9 - Replacing the Primary Drive Belt

1. Remove the primary sheave per Procedure 10.7, steps 1-9.
2. Remove the secondary sheave per Procedure 10.8, steps 2-4.
3. Set the primary sheave inside the replacement primary belt then set the primary sheave in its mounting position. Insert the four mounting bolts, removed in step 8 of procedure 10.7, through the flanged bearing assembly and the frame. Hand start the four mounting nuts on the mounting bolts. Torque the mounting nuts to 120 inch pounds.
4. Slide a thrust washer onto one of the primary sheave shafts, then a wave washer and then three more thrust washers.
5. Slide one of the HTD pulleys onto the shaft. Verify that it rotates as described in step 4 of Procedure 10.5. Slide another thrust washer onto the shaft. Fasten the HTD pulley with the retaining clip removed in step 5.
6. Replace the remaining HTD pulley as described in steps 11 and 12.
7. Place the replacement primary belt along with the generator belt around the replacement sheave. Set the secondary sheave in it mounting position. Hand start both secondary sheave tension adjusters.
8. Tension both the primary belt and generator belt per Procedure 8.3.
9. Replace the left hand, right hand and rear covers per Procedure 10.1.

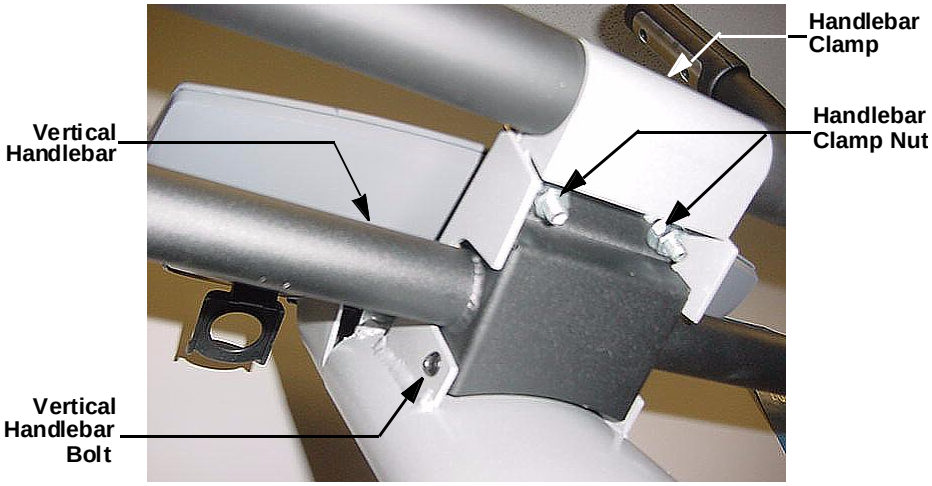
Procedure 10.10 - Replacing the Generator Belt

1. Remove the secondary sheave per Procedure 10.8, steps 1-4. Remove the generator belt.
2. Set the replacement generator belt on the secondary sheave along with the primary belt.
3. Set the secondary sheave in it mounting position. Hand start both secondary sheave tension adjusters.
4. Place the generator belt around the generator pulley.
5. Tension both the primary belt and generator belt per Procedure 8.3.
6. Replace the left hand, right hand and rear covers per Procedure 10.1.

Procedure 10.11 - Replacing a Vertical Handlebar Assembly

1. Remove the two (one each side) vertical handlebar mounting bolts. See Diagram 10.11.1.

Diagram 10.11.1 - Vertical Handlebar Mounting



2. While supporting the vertical handlebar, remove both handlebar clamp nuts. Carefully, lower the vertical handlebar and then rotate it and set it on the left and right handlebars as shown in Diagram 10.11.2.

Diagram 10.11.2 - Vertical Handlebar Removal

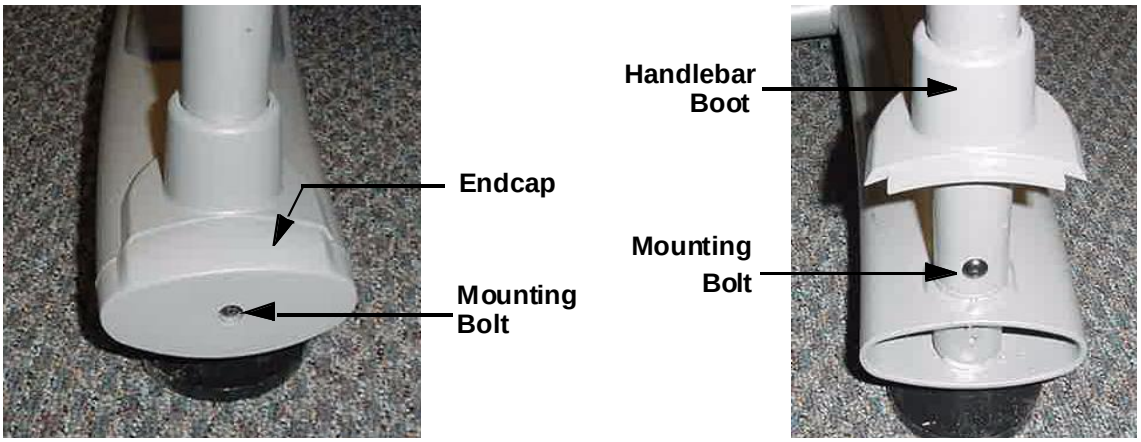
3. Disconnect the hand held heart rate (HHHR) connectors. Remove the vertical handlebar assembly.
4. Set the replacement vertical handlebar assembly on the left and right handlebars as shown in Diagram 10.11.2. Connect the hand held heart rate (HHHR) connectors.

5. While rotating the vertical handlebar assembly into its mounting position, feed the hand held heart rate cable into the access hole in the upright column.
6. Hand start but do not tighten the two handlebar clamp bolts removed in step 2. Hand start but do not tighten the two vertical handlebar bolts removed in step 1.
7. Verify that both the left and right hand handlebars are fully inserted in the handlebar clamp. Securely tighten both handlebar clamp nuts. Then tighten both vertical handlebar bolts.

Procedure 10.12 - Replacing the Right or Left Handlebar

1. Loosen but do not remove the two handlebar clamp nuts. See Diagram 10.11.1.
2. Remove the bolt retaining the frame end cap. Remove the frame endcap and slide the handlebar boot up to expose the handlebar mounting bolt, See Diagram 10.12.1

Diagram 10.12.1 - Lower Handlebar Mounting

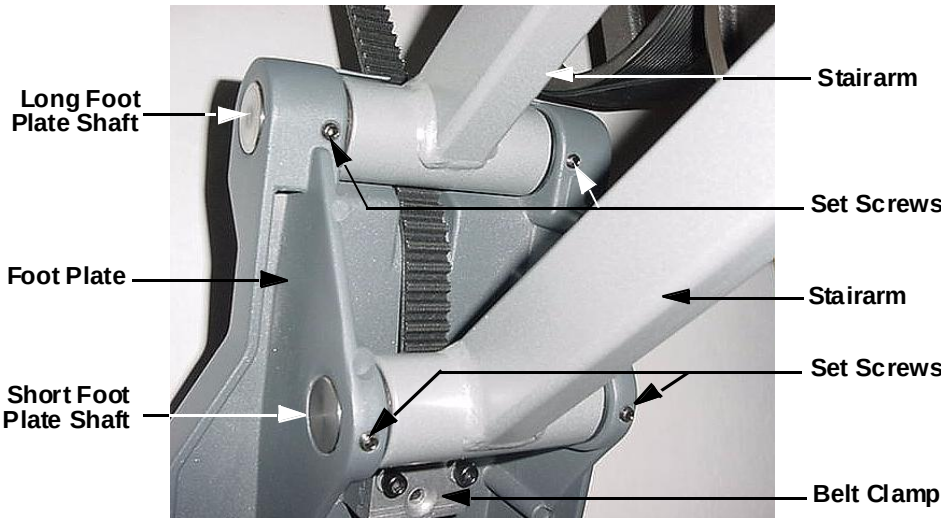


3. Remove the handlebar mounting bolt.
4. Slide the upper end of the handlebar out the handlebar clamp and lift the handlebar from its lower rear mount.
5. Remove the handlebar boot from the handlebar and install it on the replacement handlebar.
6. Set the replacement handlebar on its lower rear mount and slide the upper end of the handlebar into the handlebar clamp.
7. Verify that both the left and right handlebar is fully inserted in the handlebar clamp and tighten both handlebar clamp nuts.
8. Fasten the lower rear handlebar with the bolt removed in step 3.
9. Slide the handlebar boot down into position and replace the end cap with the bolt removed in step 2.

Procedure 10.13 - Replacing a Stairarm Foot Plate

1. Remove the left hand or right hand cover, as required, per Procedure 10.1.
2. Grasp the stairarm return spring and carefully remove it from its mounting peg. See Diagram 8.2.1.
3. Support the stairarm and remove the stairarm belt from both flanged pulleys and the HTD pulley. Lower the stairarm to its lowest position.
4. Remove the four set screws that retain the foot plate shafts. See Diagram 10.13.1.

Diagram 10.13.1 - Stairarm Foot Plate Mounting

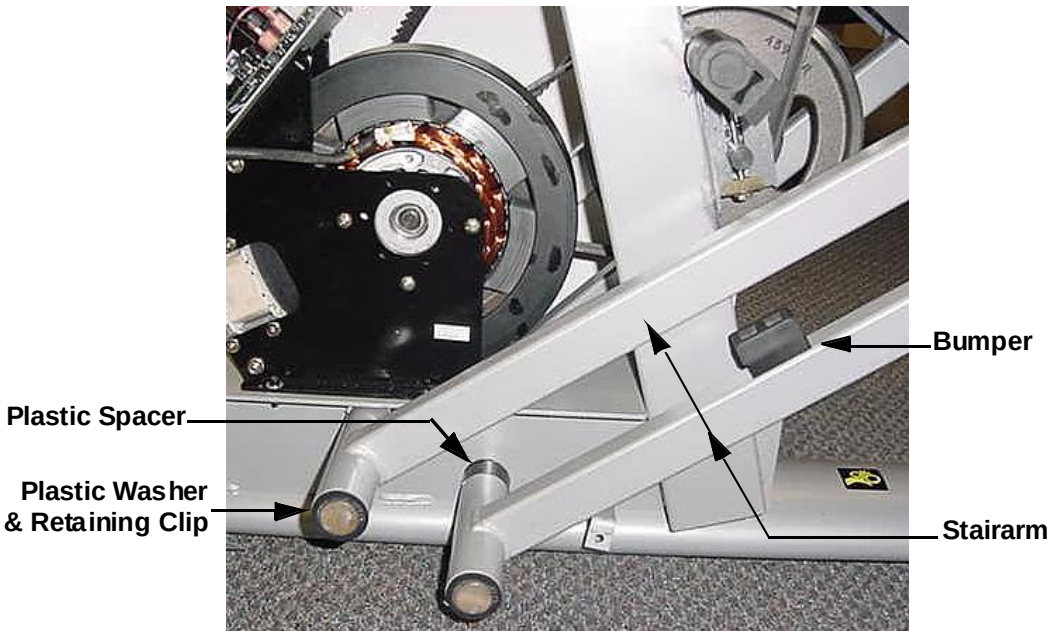


5. While supporting the foot plate, remove both foot plate shafts and remove the foot plate.
6. Remove the bolts that retain the belt clamp and remove the belt from the foot plate.
7. Set the replacement foot plate in its mounting position and replace both the long and short foot plate shaft as shown in Diagram 10.13.1.
8. Verify that the ends of the foot plate shafts are flush with the edge of the foot plates. Apply blue loctite to the set screws, removed in step 2, and secure the foot plate shafts with the set screws.
9. Feed the belt into the stairarm foot plate through the slot in the front edge of the stairarm foot plate. Replace the clamp and fasten the belt in the clamp with the bolts removed in step 4.
10. Wrap the stairarm belt over the HTD pulley, behind and under the upper flanged pulley. Wrap the belt under an around the lower flanged pulley. Then lift the stairarm and hook the return spring on its mounting peg. Check the belt to ensure there are no twists in the belt. If there are remove the return spring from its mounting peg and rotate the return spring to remove any twist. Hook the return spring on its mounting peg.
11. Replace the left hand and/or right hand cover sections per Procedure 10.1

Procedure 10.14 - Replacing a Stairarm

1. Remove the stairarm foot plate per Procedure 10.13, steps 1-3.
2. Remove the retaining clip and the black plastic washer from the stairarm being replaced. See Diagram 10.14.1.

Diagram 10.14.1 - Stairarms

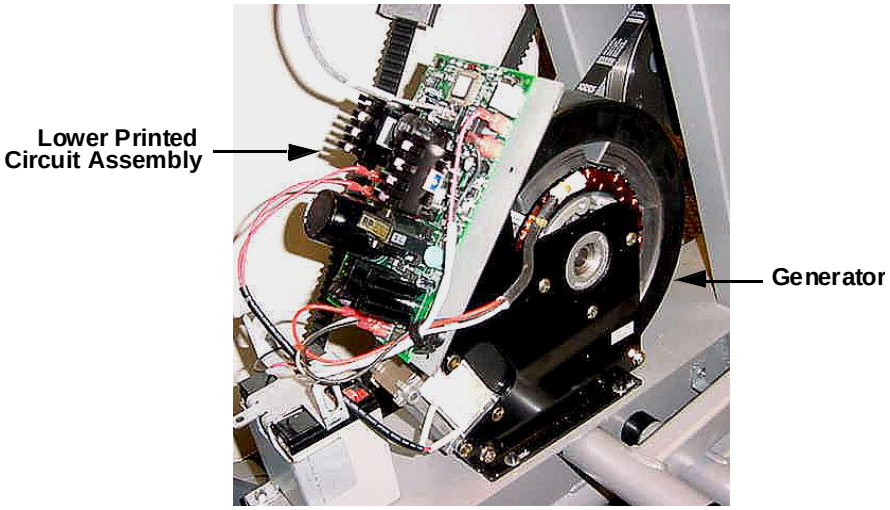


3. Remove the stairarm. If the lower stairarm is being replaced, remove the bumper from the stairarm and mount it on the replacement stairarm.
4. The upper and lower stairarm are the same part. Therefore, the upper stairarm will also have bumper mounting holes. If the upper stairarm is being replaced, orient the stairarm so that the bumper mounting holes are facing downward.
5. Verify that the black plastic spacer is on the stairarm mounting shaft and slide the replacement stairarm onto the stairarm mounting shaft.
6. Fasten the stairarm with the black plastic washer and retaining clip removed in step 2.
7. Replace the foot plate and belt per Procedure 10.13, steps 5-9.

Procedure 10.15 - Replacing a Generator

1. Remove the left hand cover per Procedure 10.1.
2. Attach the wrist strap to your arm, then connect the ground lead of the wrist strap to the climber frame.
3. Disconnect all of the wiring from the lower printed circuit assembly See Diagram 10.15.1.

Diagram 10.15.1 - Generator Mounting



4. Remove the four screws that retain the lower printed circuit assembly. Remove the lower printed circuit assembly and set it on a static safe surface.
5. Remove the four screws that fasten the lower printed circuit assembly mounting plate to the generator. See Diagram 10.15.2

Diagram 10.15.2 - Lower Printed Circuit Assembly Mounting Plate

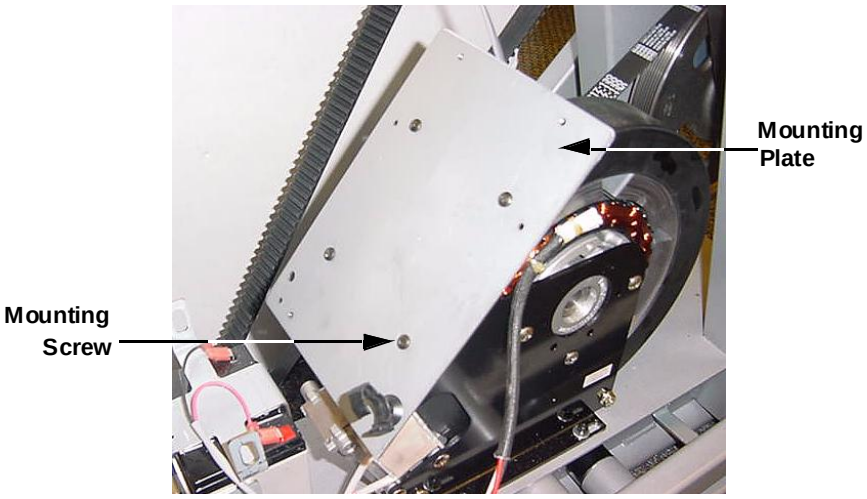
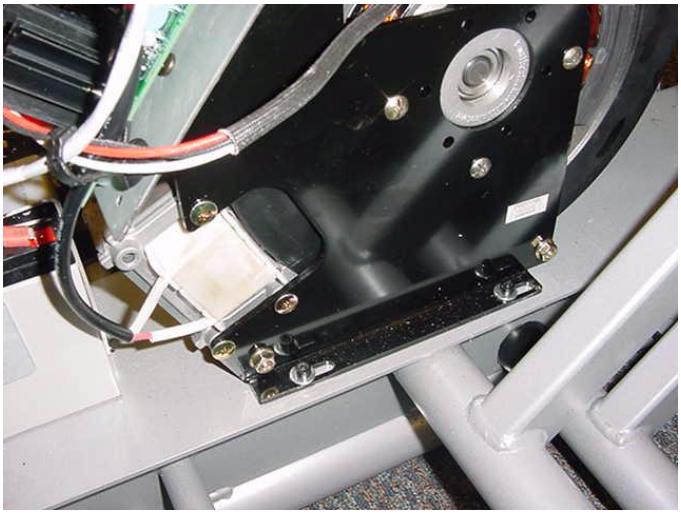


Diagram 10.15.3 - Generator Mounting

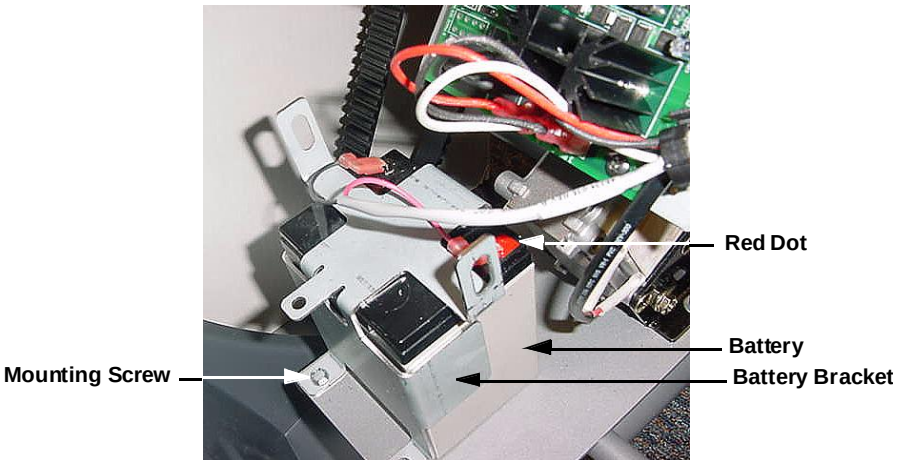


6. Remove the generator belt from the generator then remove the generator from the climber.
7. Set the replacement generator at its mounting position. Hand start, but do not tighten the four generator mounting bolts removed in step 6. Set the generator belt on the generator's pulley.
8. Place the belt tension gauge on the generator belt.
9. Using the slots in the frame and a flat metal bar as a lever, move the generator until the belt tension is 80 pounds and torque the four generator mounting bolts to 40 inch pounds.
10. Set the lower printed circuit assembly mounting plate at its mounting position on the generator and fasten it with the screws removed in step 5.
11. Set the lower printed circuit assembly in its mounting position on its mounting plate and fasten it with the screws removed in step 4.
12. Connect the red lead from the battery to the BAtTERY + terminal. Connect the black lead from the battery to BATTERY - terminal. See Diagram 10.3.1.
13. Connect the two red wires from the generator to the LOAD terminals. These wires may be connected in any order.
14. Connect the red, black and white wires from the generator to the 3 PHASE GEN IN terminals. These wires may be connected in any order.
15. Connect the data cable to its connector on the lower printed circuit assembly.
16. Replace the left hand cover per Procedure 10.1.
17. Check the CLM per Section Seven.

Procedure 10.16 - Replacing a Battery

1. Remove the left hand cover per Procedure 10.1.
2. Remove the red and black wires from the battery. See Diagram 10.16.1.

Diagram 10.16.1 - Battery Mounting

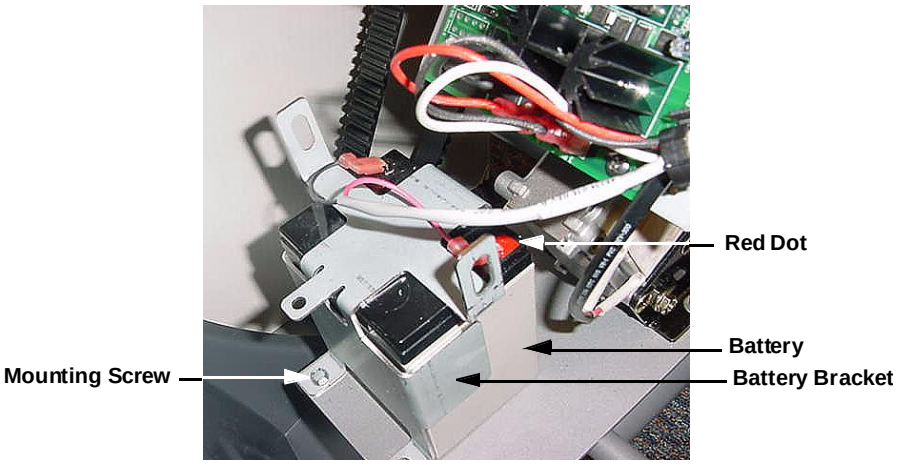


3. Remove both of the battery bracket mounting screws. Carefully, remove the battery bracket from the battery. Care must be taken to avoid touching the battery terminals with the battery bracket.
4. Remove the battery from the climber.
5. Set the replacement battery in its mounting position with the red dot oriented as shown in Diagram 10.16.1.
6. Set the battery bracket in its mounting position taking care to avoid touching the battery terminals with the battery bracket. Fasten the battery bracket to the frame with the screws removed in step 3.
7. Connect the red wire removed in step 2 to the battery terminal with the red dot. Connect the black lead to the remaining terminal of the battery.
8. Replace the left hand cover per Procedure 10.1.
9. Test the CLM per Section Seven.

Procedure 10.17 - Replacing a Display Column

1. Remove the left hand cover per Procedure 10.1.
2. Remove the red and black wires from the battery. See Diagram 10.16.1.

Diagram 10.16.1 - Battery Mounting



3. Remove both of the battery bracket mounting screws. Carefully, remove the battery bracket from the battery. Care must be taken to avoid touching the battery terminals with the battery bracket.
4. Remove the battery from the climber.
5. Set the replacement battery in its mounting position with the red dot oriented as shown in Diagram 10.16.1.
6. Set the battery bracket in its mounting position taking care to avoid touching the battery terminals with the battery bracket. Fasten the battery bracket to the frame with the screws removed in step 3.
7. Connect the red wire removed in step 2 to the battery terminal with the red dot. Connect the black lead to the remaining terminal of the battery.
8. Replace the left hand cover per Procedure 10.1.
9. Test the CLM per Section Seven.

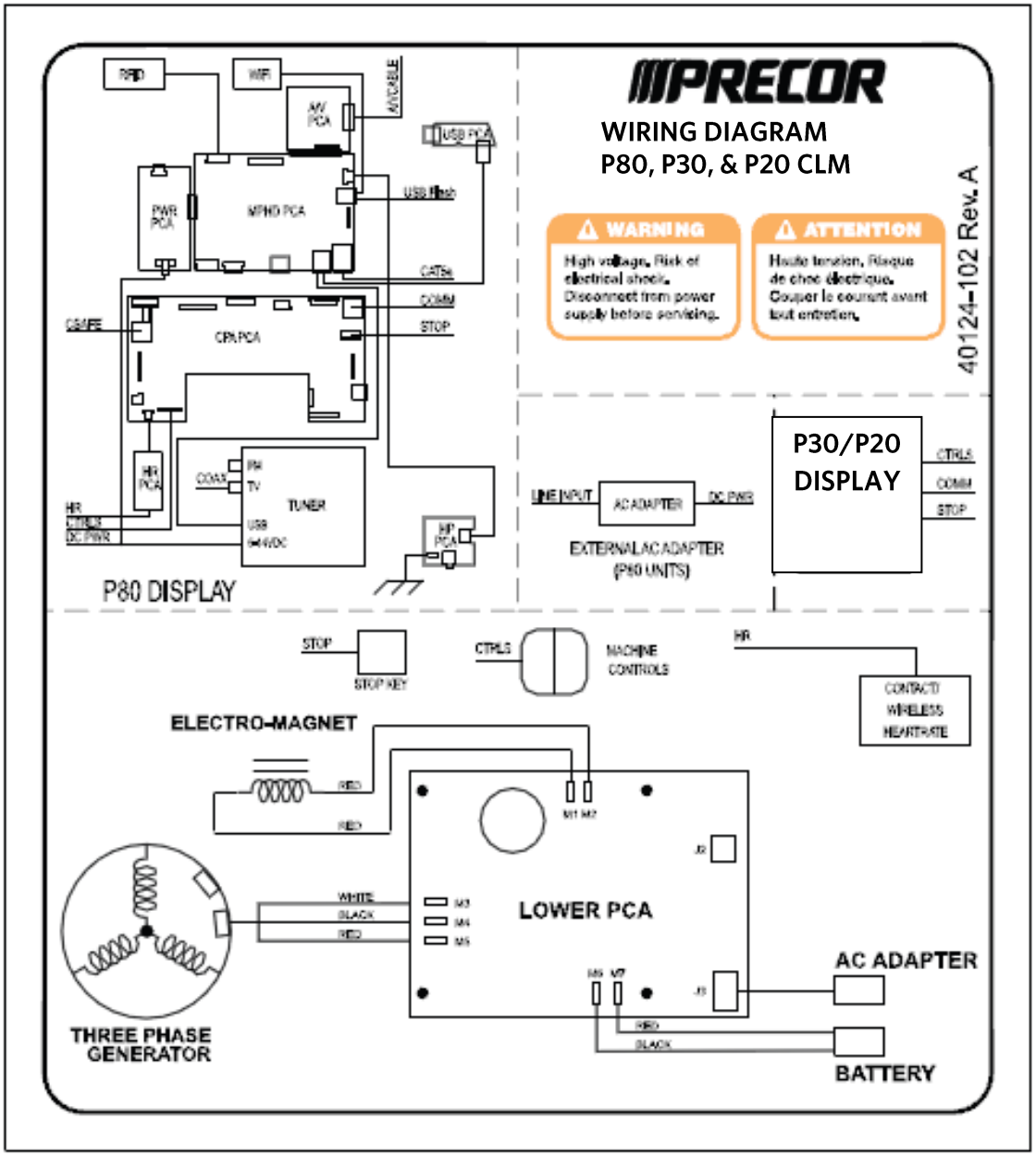
Section Eleven – Future Content

Section Twelve – Future Content

Section Thirteen – Future Content

Section Fourteen – Wiring Diagram

Wiring Diagram 14.1 – CLM



Block Diagram 14.2 – CLM 835