Section 1

Introduction

Welcome to the world of STAR TRAC. In your hands is the STAR TRAC *PRO* Service Manual. This manual is designed to be easy to use, providing detailed instructions on how to service and maintain the *PRO BIKE*

We highly recommend that you read the entire manual prior to performing any maintenance or repair procedure. The information on the following pages will enable you to begin easily, quickly and safely.

Contents

Part Order # 800-3437

How to Use the Manual

THIS IS NOT AN OWNER'S MANUAL. This Service Manual is intencied for use by qualified repair technicians as a guide to diagnose and correct service problems.

The Service Manual is divided into six sections. Each section is provided with it's own Table of Contents to assist in locating specific topics and procedures. Titles and major headings are located at the top of every page.

The Service Manual contains the following sections:

Section 1: Introduction - Provides a general overview of the Elliptical Edge, outlines safety precautions to be observed when performing maintenance or repair, and lists tools and materials required.

Section 2: Preventive Maintenance Schedules - Outlines periodic preventive maintenance checks and services; provides detailed procedures for specific maintenance tasks.

Section 3: Diagnostics - Describes how to access and use built-in diagnostic and customizing features and capabilities.

Section 4: Troubleshooting Provides information designed to help diagnose and correct equipment problems. Troubleshooting information is arranged in a Symptom Probable Cause and Suggested Remedy format.

Section 5: Parts Replacement - Provides step-by-step illustrated procedures to remove and install authorized infield replacement parts.

Section 6: Parts Breakdown - Contains an illustrated listing of all parts and assemblies contained in the PRO BIKE.

Precautions

The following general precautions apply whenever performing any maintenance or parts replacement procedure on the PRO BIKE:

1. Read each procedure COMPLETELY before starting any work. Give particular attention to all NOTES, CAUTIONS and/or WARNINGS.

2. If the optional external wall powered power pack is used with the unit, MAKE SURE the power pack is unplugged from the wall before starting any work.

3. When disconnecting cable connectors, ALWAYS pull on the connector itself, NEVER the wires.

PRODUCT SUPPORT DEPARTMENT

STAR TRAC Product Support Department sets the industry standard in Customer Service and Technical Assistance world wide. Providing superior product support and customer service is at the very heart of STAR TRAC's business philosophy. This commitment to service has been a major contributor to STAR TRAC's success and growth in the worldwide fitness equipment industry.

Technical Assistance

When purchasing a part or requesting technical assistance, please contact our Product Support DepartmentCALL TOLL-FREE: 1-800-535-4634 or 800-503-1221 US and CANADA or 714-669-1660. When placing a call, please have the following information available:

1. STAR TRAC model.
2. STAR TRAC serial number.
3. Problem statement/symptom.

After Hours Voicemail Direct

CALL TOLL-FREE: 1-800-486-4736

When placing a call, please have the following information available:

1. STAR TRAC model.
2. STAR TRAC serial number.
3. Problem statement/symptom.
4. Return phone number and contact name.

Fax Requests

Domestic and international: FAX 714-669-0739

When Placing the fax, please supply the following information:

1. STAR TRAC model.
2. STAR TRAC serial number.
3. Problem statement/symptom.
4. Return phone fax number and contact name.
5. Purchase order or reference number.
6. Part description and quantity.
7. Ship to/bill to.

Product Support Documentation Access

Web page http://www.startrac.com/supportl

Docufacts CALL TOLL FREE: 1-800-429-3228 ext. 640 US and Canada or 714-253-3878 for a list of Product Support Procedures and Bulletins.

Tools and Materials

The following tools and materials are required to perform adjustment and parts replacement procedures for the PRO BIKE:

TOOUMATERIAL	USED FOR
Flat head screwdriver	Crank Bearings
Phillips head screwdriver	Crank Bearings Heart rate grips Alternator Battery
1/8 Hex key	Crank Bearings
1 ¼ Open-end wrench	Crank Bearings
14 mm	Crank Bearings
12 mm	Alternator
10 mm	Alternator
1/16 Allen	Transfer case Display board Heart rate grips
9/16 Socket	Transfer Case
9/16-in, open-end wrench	Transfer Case
Needle-nose pliers	Crank Bearings
Mallet	Crank Bearings Transfer case
String/Scotch Tape	Heart rate cables

Section 2

Preventive Maintenance Schedules

Performing regular scheduled preventive maintenance is essential in keeping your ***PRO BIKE*** in top operating condition. Without preventive maintenance, normal wear and tear may cause cumulative effects, such as misalignment and early replacement of parts.

This section provides a list of factory-recommended preventive maintenance requirements, along with detailed procedures for performing each task.

Contents

Preventive Maintenance Chart

The Preventive Maintenance Chart lists the scheduled maintenance tasks for the *Pro Bike.* The chart lists the time interval when each procedure should be performed, and provides the general steps necessary to perform the task. In some cases, the chart references detailed maintenance procedures provided later in the section.

D =Daily W =Weekly M =Monthly (depending on the amount of use, Quarterly procedures may need to be performed more frequently).

INTERVAL			PROCEDURE
D	W	M	
►			Clean dust and dirt from the unit using a soft, clean cloth dampened with a non-abrasive liquid cleaner. Give particular attention to the display panel, handlebars, seat, pedals and heart rate grips (if used).
	►		Vacuum the floor under and around the unit MAKE SURE that the unit is at its maximum elevation when vacuuming (or move the unit to another location).
	►		Check the display panel, pedals, seat and shroud to ensure they are securely attached to the unit. Retighten the screws as needed.
		►	Tighten the handlebars by turning the four attaching screws.
		►	Tighten the pedals to their respective crank arms.

Diagnostics

The ***PRO BIKE*** contains several customizing and diagnostics features. The customizing feature allows you to tailor the unit operation to suit your particular needs. Diagnostics features let you view accumulated data related to machine usage, and check critical operating parameters as an aid in maintenance and troubleshooting.

These features include:

- **Diagnostic LEDs** - Provide and indication of the operating status of the Load Control Board (LCB) and the alternator.

  Display Maintenance Mode - Displays start-up and shut-down service messages as a result of self-test or when scheduled periodic maintenance is required.

  Display Settings Mode - Lets you modify certain operating and display settings for the unit.

  Service Settings Mode - Displays accumulated statistical data related to machine usage and troubleshooting.

  Service Messages - Display during machine use if certain electrical failures or out-of-tolerance conditions are detected.

  System Measurements Mode - Lets you monitor critical electrical parameters under both idle and in-usage to help diagnose.

Contents

Diagnostic LEOs

The Load Control Board (LCB) is equipped with three diagnostic LEOs. These LEOs provide indications of the operating status of the LCB and the alternator.

The LCB diagnostic LEOs function as follows:

LED	FUNCTION
02	This Led provides a steady series of flashes, at 20-per-second, indicating communication between the LCB and the display panel is functional. If this LED is off or flashes erratically, replacement of the LCB, the display panel or the communication cable may be required.
03	This LED provides a steady series of flashes, at one-per-second, indicating the LCB microprocessor is functional and the loop circuit is operating. If this LED is off or flashes erratically, replacement of the LCB may be required.
013	This LED is normally off. If alternator output voltage exceeds 19 volts, the LED lights steady on. This condition will also cause the - Needs Service" message to display (see Display Maintenance Mode for details).

NOTE: The diagnostic LEOs provide a general indication of certain equipment malfunctions. Refer to Systems Measurement Mode and in Section 4, Troubleshooting to aid in locating the most likely cause of the problem.

Display Maintenance Mode

The ***PRO BIKE*** displays start-up and shutdown service messages if an error is detected during use, or when periodic maintenance is due.

Start-up Service Messages

The unit performs a self-test at the beginning of every workout. The self-test is initiated as soon as operation of the unit begins, and continues throughout the duration of the workout. If a failure in an electronic circuit or component is detected, one of the following messages will display:

Key Down	One or more keys on the keypad(s) are stuck in the depressed (on) position; maintenance service is required. Call Star Trac Customer Support for assistance.
Needs Service	Self-test has detected an electronic component failure; maintenance service is required. Call Star Trac Customer Support for assistance. Specific service messages describing the equipment malfunction or failure can be accessed and viewed using the Service Settings feature. Additional troubleshooting information is provided in Section 4.

Shutdown Service Message

The ***PRO BIKE*** displays a " Needs Service" message when a periodic (preventive) maintenance procedure is due. This message displays for 2-3 seconds at the end of a workout session. Call Star Trac Customer Support for assistance. Preventive maintenance procedures are outlined in Section 2.

Display Setting Mode

The Display Settings Mode lets you view and modify several unit settings, which affect the way the machine operates during a workout Use the keypad to enter the Display Settings Mode, view the current settings and make any desired changes.

To enter the Display Settings Mode:

1. Press and hold the "Enter", "0" and "1" keys at the same time.
2. While continuing to hold the "ENTER "0" keys, release the "1" key. The unit will beep once, and the message "Display Settings" will show in the upper display screen.
3. Release the "Enter" and "0" keys.

Once the unit is in the Display Settings Mode, use the keypad to select and enter changes to unit settings:

KEY	FUNCTION
"Scroll" Key	Press the "Scroll" key to scroll through the display settings and select the setting you wish to view or change (for each setting, the current value is displayed in the upper information window). Pressing and holding the "Scroll" key will scroll continuously through the available settings. When a new value for the setting has been selected, press the "Scroll" key to save the new value and advance to the next setting.
Up Down Arrow Keys	Use the "Up-Down Arrow" keys to scroll through the available values for the setting and to select a new value.
	NOTE: To return display settings to their original values after changes have been made and saved, you must MANUALL Y re-enter the factory-default settings.
"Enter" Key	Press the "Enter" key to exit the Display Settings Mode and return to the standard operating mode.

Display Settings Mode

The following display settings may be changed using the keypad as previously described:

Setting	Default Value	Description
Minutes	60	Values shall be from 1-99. This shall be the maximum number of minutes for a program. NONE shall be used for no limit. If counter reaches limit of 99 minutes, it will roll over to 0.
Units	ENGL	Values shall be ENGL and METR. This shall determine whether units shall be displayed and received in English units (Pounds, Miles) or Metric (Kg, Km).
Weight	155	Values shall be 0-350 when UNITS is set to ENGL, and 0-160 when UNITS is set to METRIC. This number is provided as a default only; user will be prompted to enter their weight, which is used for calculating total calories burned.
HR	POL (polar)	Values shall be ON and OFF. This shall determine whether Heart Rate Sensing shall be Active.
DHRC	ON	Values shall be On and OFF. This shall determine whether the Heart Rate Control programs shall be accessible from the HEART KEY.
Watts	OFF	Values shall be ON and OFF. This shall determine whether or not a Watts value shall be displayed with other program statistics at the Info display during a workout.
Mets	OFF	Values shall be ON and OFF. This shall determine whether or not a Mets value shall be displayed with other program statistics at the text display during a workout.
Lang	ENGL	Values of ENGL, GER, SPAN, DUTC, FREN, ITAL, PORT, and SWED shall be available for language. settings. Prompts in the Info Window shall be translated to the selected language.

Service Settings

The *PRO BIKE* records and stores usage data which may be used as an aid in maintaining the unit and diagnosing malfunctions. The Service Settings Mode lets you view this usage data, as well as software version numbers and the serial number and date of manufacture for the unit.

To enter the Service Settings Mode:

1. Press and hold the "Enter", "0" and "2" keys at the same time.
2. While continuing to hold the "Enter" and "0" keys, release the "2" key. The unit will beep once, and the message "Service Settings" will show in the upper information display.
3. Release the "Enter" and "0" keys.

Once the unit is in the Service Settings Mode, use the keypad to view service settings, service messages, or system

Setting	Default Value	Description
Disp Ver	x.y	Values of x.y:x shall be 1-24 and y shall be 0-9. Current Display software version number shall be built into the software and shall not be modified from the keypad.
LCB Ver	X.y	Values of X.y:x shall be 1-24 and y shall be 0-9. Current LCB firmware version number is built into the LCB software and shall not be modified from the keypad.
Ser Number	000000	This shall be entered at manufacture time.
Mfg Date	00/00/00	This shall be entered at manufacture time.
Run Hrs	0	Values of 0 - 65535. Current number of whole hours of program time. Value entered from the keypad shall be up to a 4 digit number.
Run Dist	0	Values of 0-65535. Current number of whole miles of program distance. Value entered from the keypad shall be up to a 4 digit number.
Bat Hrs	0	Values of 0-65535. Current number of whole hours on the current battery. Value entered from the keypad shall be up to a 4 digit number.
Wall Hrs	0	Values of 0-65535. Current number of whole hours on wall power. Value entered from the keypad shall be up to a 4 digit number.
Key1	0	Values of 0-22. 10 number of key pressed previous to a NEEDS SERVICE or KEY DOWN condition. *
Key2	0	Values of 0-22. 10 number of key pressed previous Key1. *
Key3	0	Values of 0-22. 10 number of key pressed previous Key2. *
Key4	0	Values of 0-22. 10 number of key pressed previous Key3. *
Key5	0	Values of 0-22. 10 number of key pressed previous Key4. *
Model	xxxxxx	Values of "P-Vbike" AND "EE4600". When the model selection is changed from default, the Disp Ver will automatically update.

Service Messages

The ***PRO BIKE*** self-test function monitors critical electrical circuits while a workout is in progress. If a malfunction or failure in a monitored circuit occurs during a workout, the "Needs Service" message displays (as described in Display Maintenance Mode), and a specific service message is set. Service message can be accessed and viewed from the Service Settings Mode.

To view Service Messages:

While in the Service Settings Mode, press the "5" key. The first recorded service message will display in the upper information display.
Press the "Scroll" key to view additional service messages (if any have been set).

• Press the "Enter" key to exit Service Messages and return to the Service Settings Mode. The

following service messages may be set by the self-test function:

Message	Default Value	Description
No Comm	0	Values of 0-65535. Number of communication failures recorded for the system. Pressing CLEAR or "0" while viewing this value shall clear it to 0.
No Alt	0	Values of 0-65535. Number of alternator failures recorded for the system. Pressing CLEAR or "0" while viewing this value shall clear it to 0.
Fld Short	0	Values of 0-65535. Number of field short failures recorded for the system. Pressing CLEAR or "0" while viewing this value shall clear it to 0.
No Load	0	Values of 0-65535. Number of no load failures recorded for the system. Pressing CLEAR or "0" while viewing this value shall clear it to 0.
Low Batt	0	Values of 0-65535. Number of low battery failures recorded for the system. Pressing CLEAR or "0" while viewing this value shall clear it to 0.
Model Err	0	Value of 0-65535. Number of model mismatch errors recorded for the system. Pressing CLEAR or "0" while viewing this value shall clear it to 0.

System Measurements Mode

The System Measurements Mode lets you measure critical voltages in the battery/alternator circuits, under both idle and operating conditions.

To enter the System Measurements Mode:

- While in the Service Settings Mode, press the "8" key.
- Press the "Scroll" key to view the system measurements available.
- Press the "Enter" key to exit the System Measurements Mode and return to the Service Settings Mode.

MEASUREMENT	DESCRIPTION
Battery Voltage	Measures and displays battery output voltage while the unit is idle. Output voltage for a normal battery should range between 6.2-7.5 volts. ▪ Output voltage below 6.2 volts indicates a low battery charge or a damaged battery. ▪ Output voltage above 7.7 volts indicates a fault in the Load Control Board.
Alternator Voltage	Measures and displays alternator output voltage while the unit is in use. To check the alternator output voltage: ▪ Pedal the unit at a speed above 1.5 miles-per-hour. ▪ Alternator output voltage should range between 11 .5-13.5 volts. Voltages outside this range indicate a fault in the Load Control Board.
Wall Power	Measures and displays the voltage delivered to the unit from an optional external wall – between 11.0-1 8.0 voltage. The power pack should be replaced if the voltage is outside this range.
Load Voltage	Measures and displays the voltage generated across the workout loading resistor while the unit is in use. To measure the load voltage: ▪ Pedal the unit at a speed above 1.5 miles-per-hour. ▪ Load voltage should range between 1.0-10.0 volts. Voltages outside this range indicate a fault in the Load Control Board.

LED Test

LED test display are accessible by pressing "9" at the start of SERVICE SETTINGS.

The LED test display shall be all LEDs lit in the Profile Window, and "8" characters filling both the Info Window and the Feedback Window.

Section 4

Troubleshooting

The ***PRO BIKE*** incorporates built-in self-test and diagnostic features which assist in diagnosing electrical system problems.

Section 3: **Diagnostics** contains the procedures for using these self-test and diagnostic features.

This section contains troubleshooting information for mechanical problems which may occur as a result of normal usage of the ***PRO BIKE.*** Troubleshooting information is presented in chart form. The Troubleshooting Chart identifies symptoms of problems which may occur, lists the most probable cause(s) for the problem, and provides suggested remedies to return the unit to operating condition.

Contents

Troubleshooting Chart

SYMPTOM	PROBABLE CAUSE	SUGGESTED REMEDY
No power to display	1. Low or dead battery.	1. Enter System Measurement Mode, see Section 3 page 3.9 and check battery output.
		2. Using a volt meter manually check battery output voltage. Readings lower than 6.2 volts indicates a low battery.
	2. Disconnected or shorted Communication or Power cable.	1. Remove top shroud cover. Check LED's 02 and 03, verify they flash while pedaling, see Section 3 page 3.2 for details
	3. Faulty LCB.	1. Check all connections to the LCB. See No Power Flowchart in this section page 4.13
	4. Faulty display.	1. Remove the display and check Communication and Power cables connection. 2. Swap or replace display.
No Polar reading	1. Disconnected or faulty Polar cable.	1. Remove the display, check polar connector to the combiner/heart rate board.
		2. Connect the polar board straight into the display electronics, by-passing the combiner/heart rate board. If polar is working replace the combiner/heart rate board.
		3. No polar readings continue replace the polar board;
No Contact Heart Rate reading	1. Disconnected or faulty Heart Rate grips or board.	1. Remove the display, check heat rate grip connection to the grips and heart rate board.

Troubleshooting Chart

SYMPTOM	PROBABLE CAUSE	SUGGESTED REMEDY
No Contact Heart Rate (continue)		2. Remove the two screws which supports the heart rate grips and check connection. 3. Using a Multi-meter check continuity between the grips and the heart rate cables.
Ceasing, hard to pedal	1. Transfer case bearings are damaged.	1. Loosen or remove the Poly V belts. 2. Manually by hand rotate the transfer case pulley, feel for any loosening or mechanical grinding (bearings) as the pulley is rotated. If the pulley is hard to turn or completely loose replace the transfer case.
No resistance	1. Faulty Alternator	1. Check all connections from the LCB and alternator. 2. Enter System Measurement Mode, see section 3 page 3.9 and check Alternator Voltage. Output voltage range should be between 11.5 - 13.5. Voltage outside the this range indicates a faulty Alternator.
	2. Faulty LCB.	1. Enter System Measurement 2. Mode, see section 3 page 3.9 and check Load Voltage. Output voltage range should be between 1.0 - 10.0. Voltage outside the this range indicates a faulty LCB.

No Communication Flowchart

NOTE 1: *The LCa panel is secured with three Phillips head screws; two located under the flap from the rubber grommet, and the other located in front* of *the panel.*

NOTE 2: LED 02 *provides* a *steady series* of *flashes, at 20-per-second, indicating communication between the LCa and the display board. The LED remains flashing for* 20 *seconds after initial stride.*

NOTE 3: *You may temporarily use* a 6-*pin line telephone exten-sion cable in place* of *the communication cable to verify* if *the communication cable is defective.*

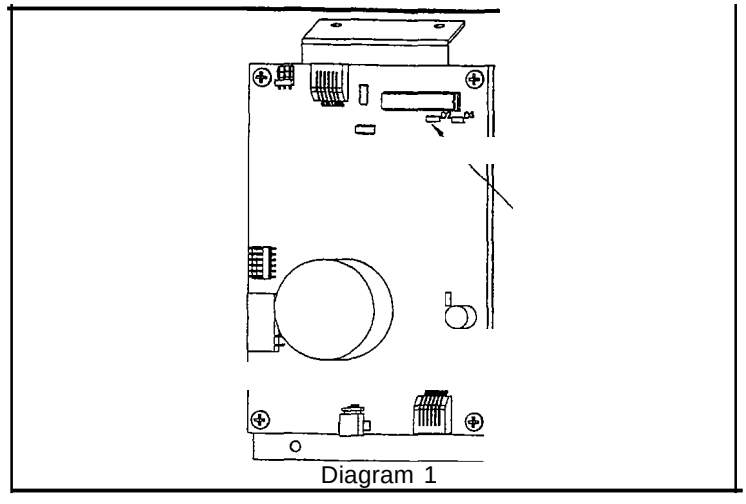


Diagram 1

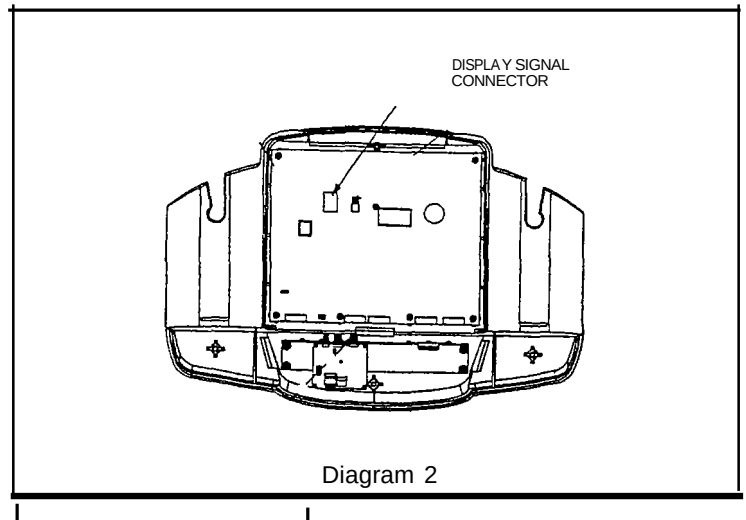


Diagram 2

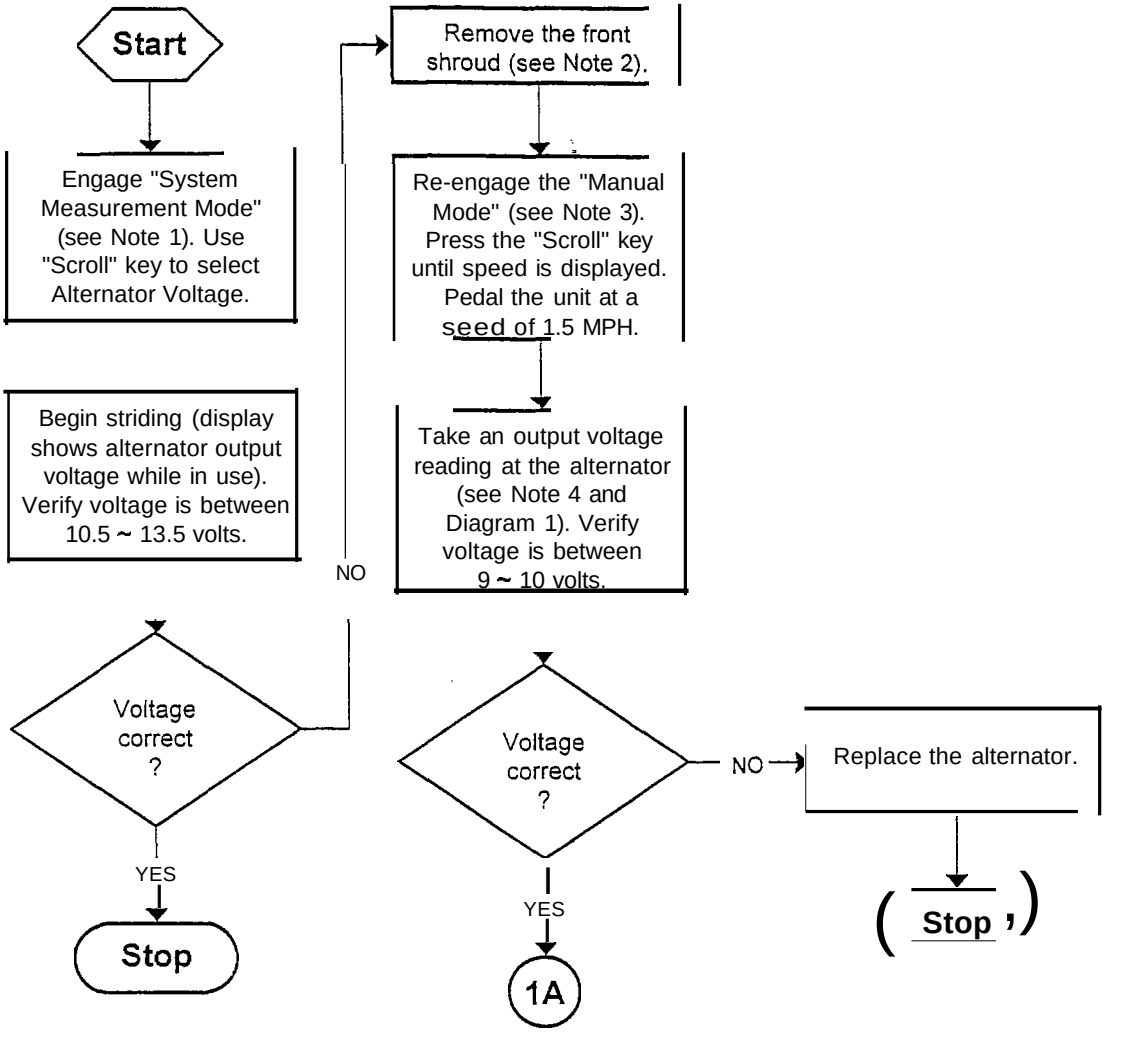
No Alternator Output Flowchart

NOTE 1: *Press and hold the "Enter", "0" and "2" keys at the same time. While holding the "Enter" and "0" keys, release the "2" key. The unit will beep once and the message "Service Settings" will display. Release the "Enter" and "0" keys; press the "8" key. The message "Measurements" will display.*

NOTE 2: *Remove eight Phillips head screws from the front shroud. Lift the front shroud off the unit.*

NOTE 3: *From the "System Measurements" mode, press the "Enter" key to return to the "Service Settings" mode. From the "Service Settings" mode, press the "Enter" key to return to the "Manual" mode.*

NOTE 4: *Place the red voltmeter probe on the alternator red wire connector labeled "B"; place the black volt-meter probe on the alternator black wire/nut labeled "E".*



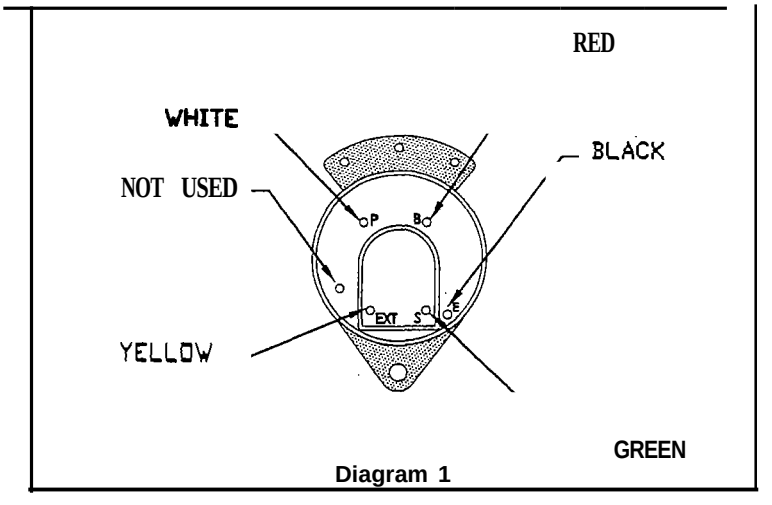
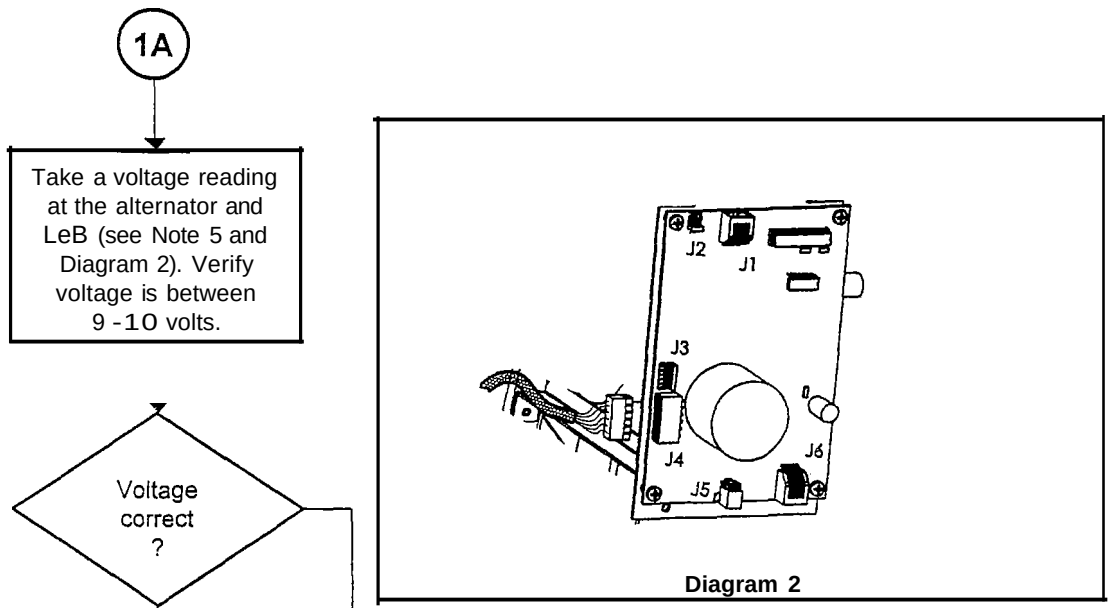


Diagram 1

No Alternator Output Flowchart

NOTE 5: Place the red voltmeter probe into the red wire at the Lea J4 connector; place the black voltmeter probe on the alternator black wire/nut labeled "E".

NOTE 6: Place the red voltmeter probe on the alternator yellow wire/ nut; place the black voltmeter probe on the alternator black wire/nut labeled "E".



No Alternator Output Flowchart

***NOTE** 7: Place the red voltmeter probe into the yellow wire at the Lea J4 connector; place the black voltmeter probe on the alternator black wire/nut labeled "E".*

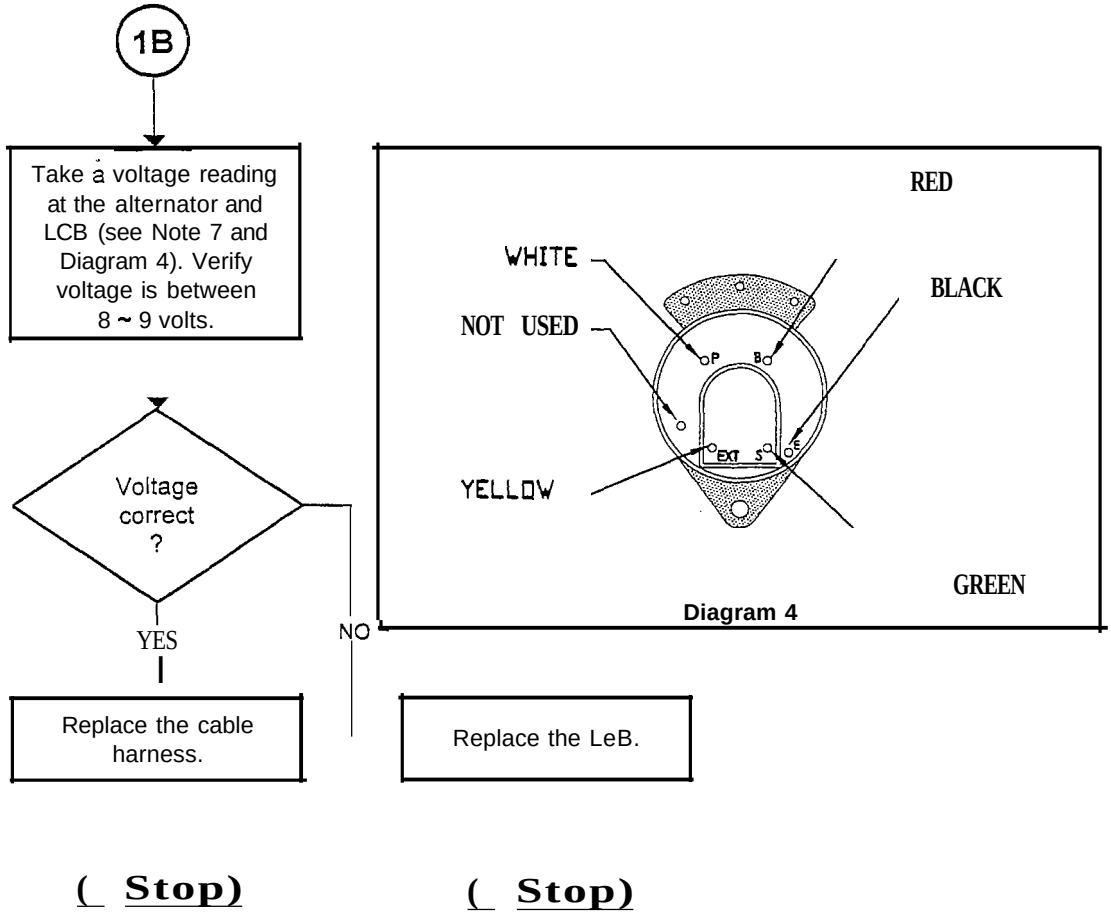


Diagram 4

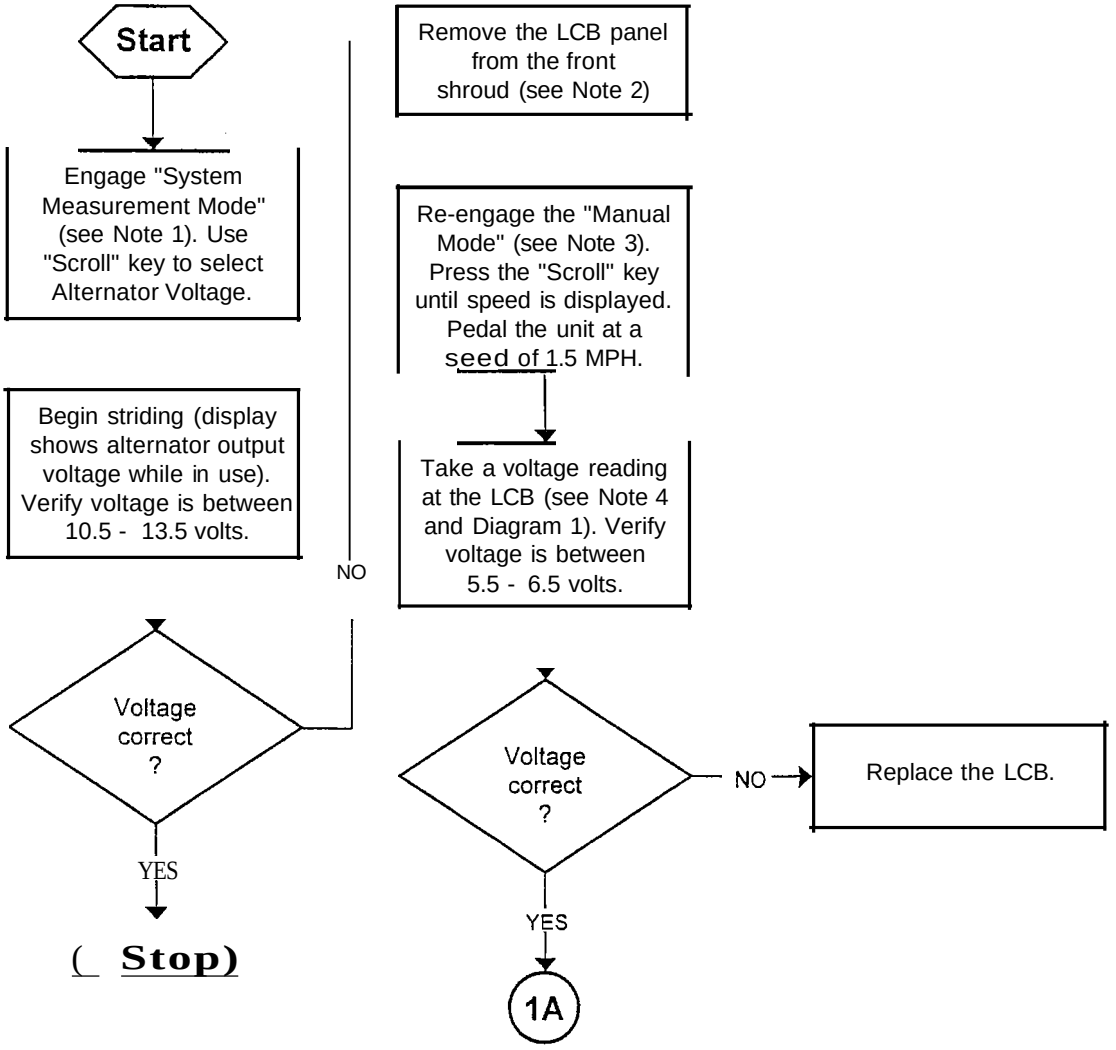
No Alternator Field Flowchart

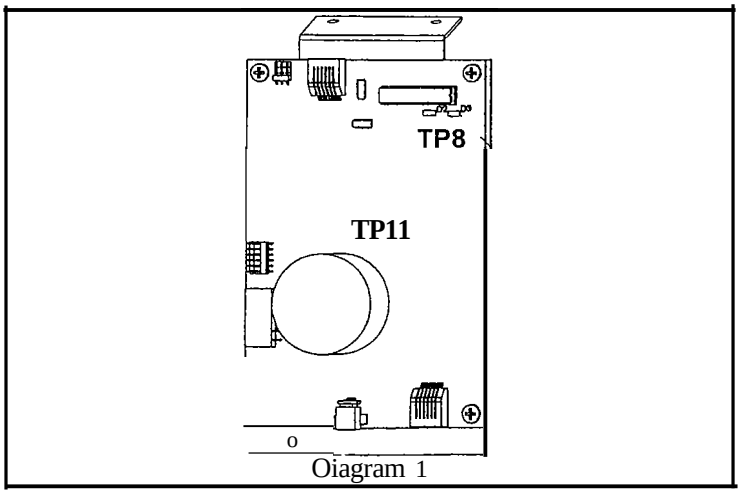
NOTE 1: Press and hold the "Enter", "0" and "2" keys at the same time. While holding the "Enter" and "0" keys, release the "2" key. The unit will beep once and the message "Service Settings" will display. Release the "Enter" and "0" keys; press the "8" key. The message "Measurements" will display.

NOTE 2: The LCa panel is secured with three Phillips head screws; two located under the flap from the rubber grommet, and the other located in front of the panel.

NOTE 3: From the "System Measurements" mode, press the "Enter" key to return to the "Service Settings" mode. From the "Service Settings" mode. press the "Enter" key to return to the "Manual" mode.

NOTE 4: Place the red voltmeter probe on LCa test point TP8 FIELDDRV; place the black voltmeter probe on LCa test point TP11 AGND.





Oiagram 1

No Alternator Field Flowchart

NOTE 5: Remove eight Phillips head screws from the front shroud. Lift the front shroud off the unit.

NOTE 6: Place the red voltmeter probe on the alternator yellow wire/nut; place the black voltmeter probe on the alternator black wire/nut labeled "E".

NOTE 7: Place the red voltmeter probe into the yellow wire at Lea connector J4; place the black voltmeter probe on the alternator black wire/nut labeled "E".

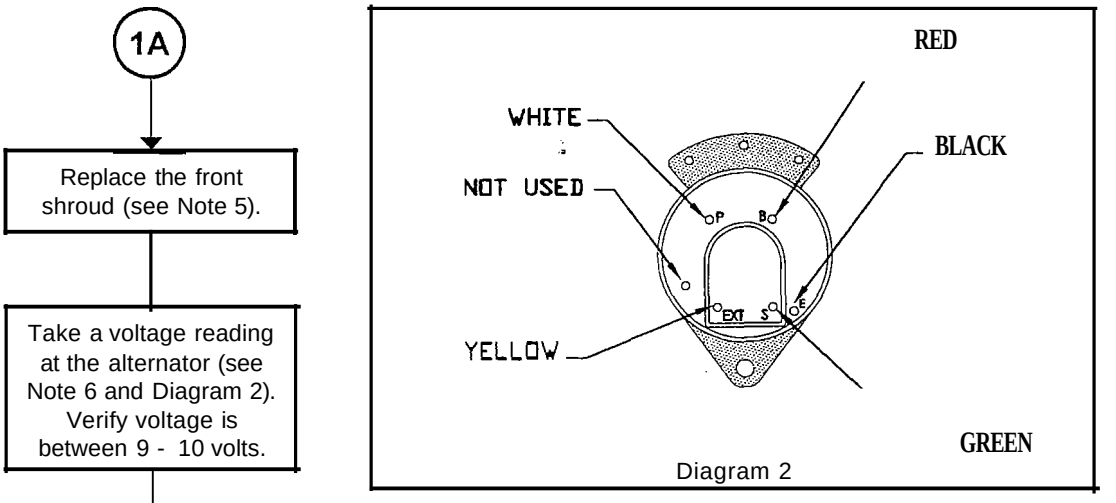


Diagram 2

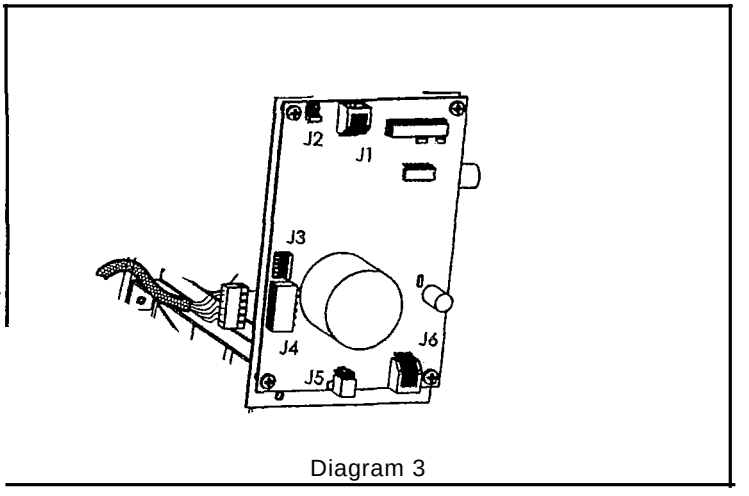


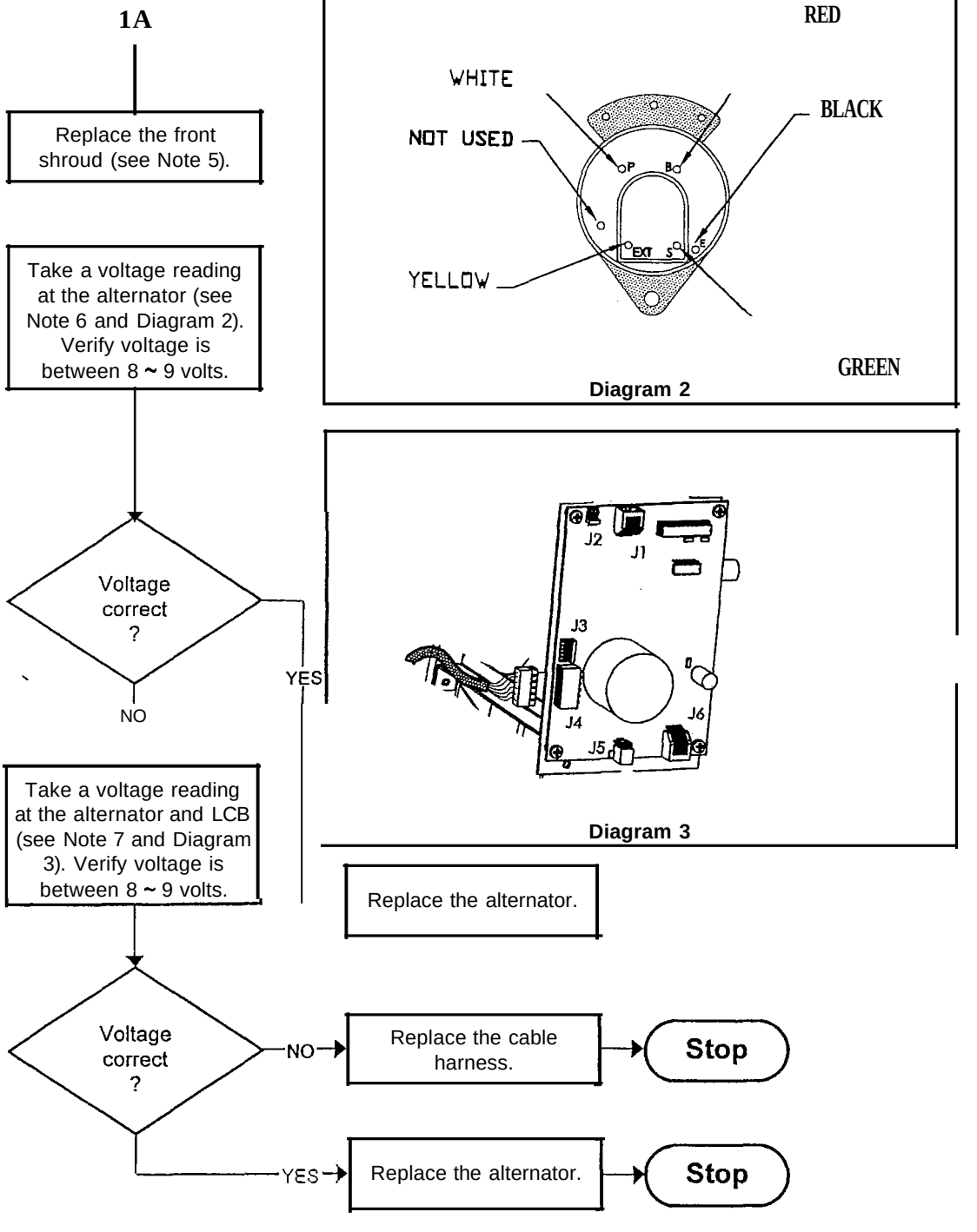
Diagram 3

No Load Flowchart

NOTE 5: *Remove eight Phillips head screws from the front shroud. Lift the front shroud off the unit.*

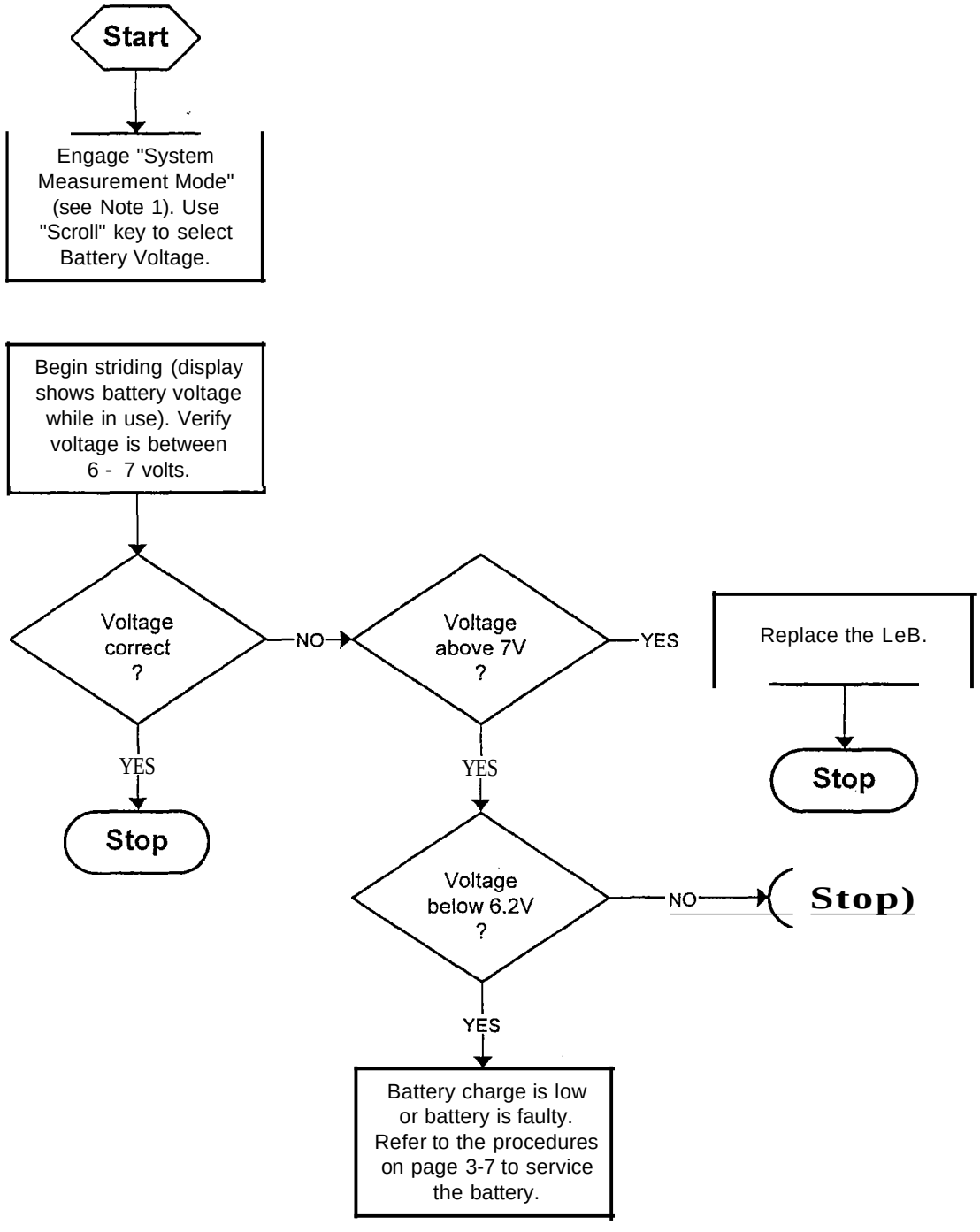
NOTE 6: *Place the red voltmeter probe on the alternator yellow wire/nut labeled EXC; place the black voltmeter probe on the alternator black wire/nut labeled "E".*

NOTE 7: *Place the red voltmeter probe into the yellow wire at LCa connector J4; place the black voltmeter probe on the alternator black wire/nut labeled "E".*



Low Battery Flowchart

NOTE 1: Press *and hold the "Enter", "0" and "2" keys at the* same *time. While holding the "Enter" and "0" keys, release the "2" key. The unit will beep once and the* message *"Service Settings" will display. Release the "Enter" and "0" keys; press the "8" key. The* message *"Measurements" will display.*



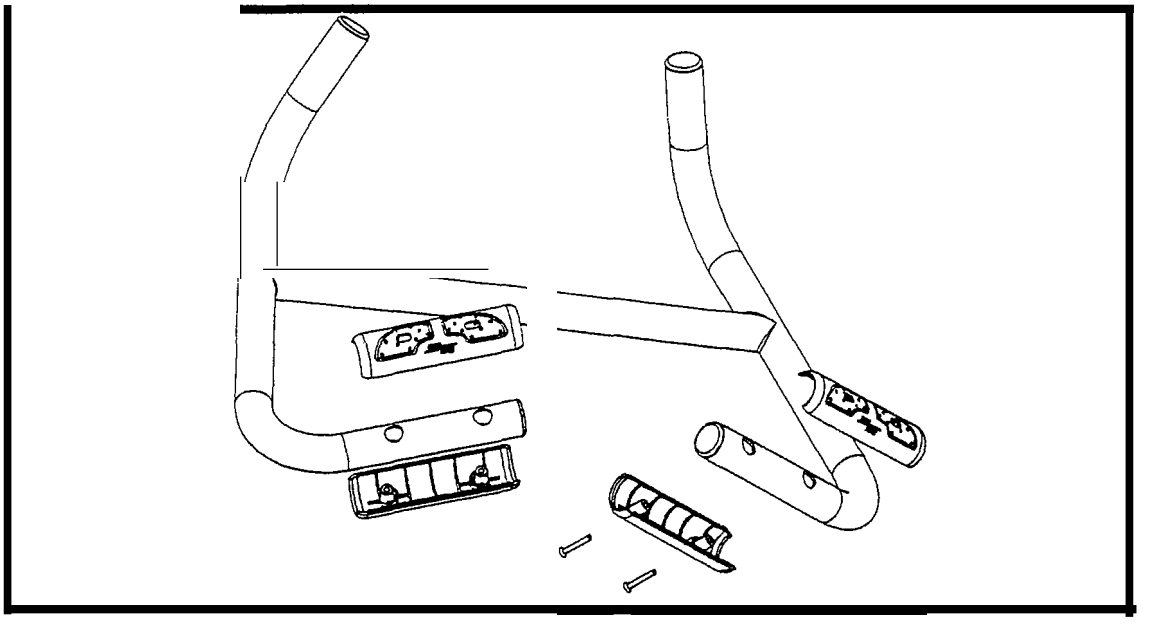
Heart Rate

Symptom:
Intermittent or no heart rate readings.

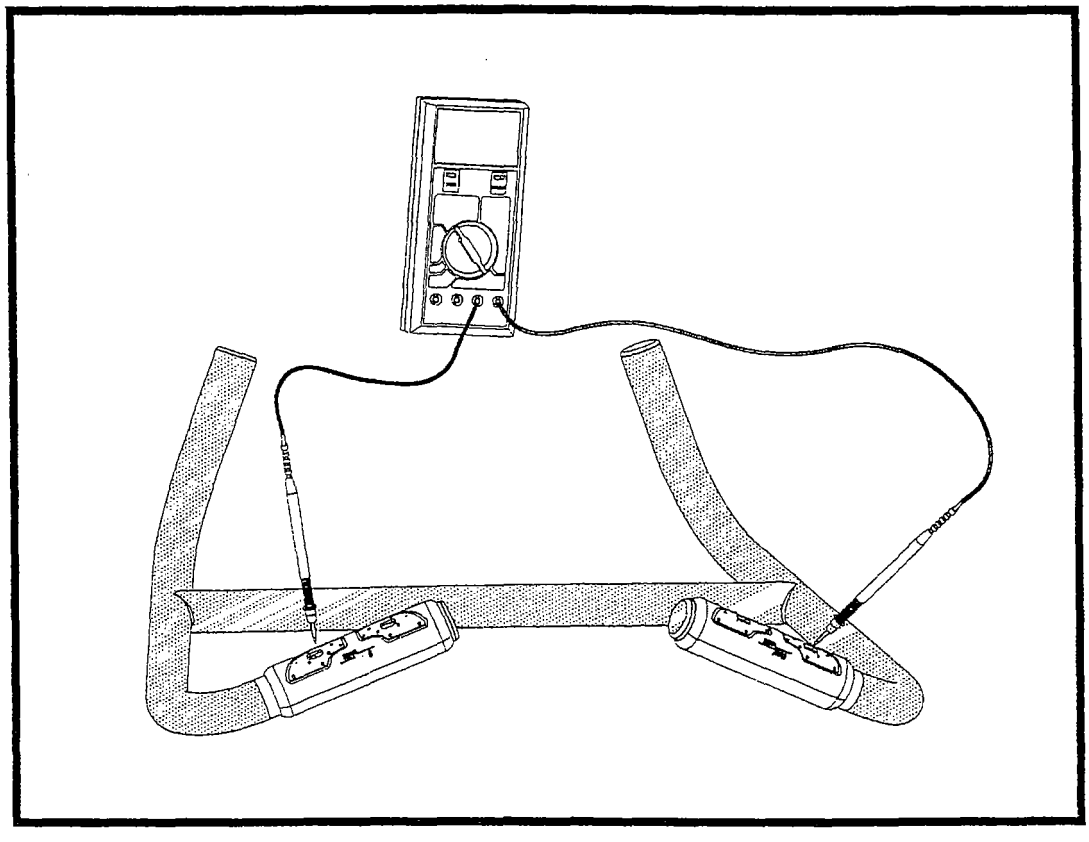
STEP 1: Confirm the user is using the grips correctly. Hands must be completely making contact with the heart rate plates.

STEP 2: An excessively tight grip on the heart rate grips can cause erratic readings. The probability of the erratic readings can be therefor be lessened by:
--- reduce upper torso movement.
--- a proper grasp on the grips.
--- clean hands.
--- clean grips.
Excessive foreign matter (dirt or hand lotions) on the hands can biochemical generate electrical interference which will cause erratic readings.

STEP 3: No heart rate is registered check connections and continuity between the grips.
--- Remove the display and verify that the heart rate cables are connected.
--- Remove the heart rate cover plates and check connection, see diagram 1.



--- Using a Multi- meter check the continuity between the heart rate grips, see diagram below.



--- Disconnect the heart rate cables. Using the Multi-meter check continuity between the heart rate grips and cables. Place the red meter on the red cable and using the black meter probe test each heart rate grip plate for continuity. One of the plates should register. Perform the same test with black heart rate cable.

Section 5:

Parts Replacements

Should the ***PRO BIKE*** experience a problem requiring replacement of a specific part, the following procedures will help and instruct in the replacement of major parts.

Contents

Tools:

- 1/8 Hex keys
- 1 1/4 Open-end wrench
- 14mm Open-end wrench
- Adjustable crescent wrench
- Punch
- Flat and Phillips head screwdriver
- Mallet
- Needle-nose pliers

Time Required: 20 Minutes

Procedure: Remove both pedals

1. Using a 14-mm open-end wrench, hold the opposite side of crank arm and loosen pedal. Note: The pedals loosen by turning to the right.

(See page 5.7 in this section Pedal Replacement for more details)

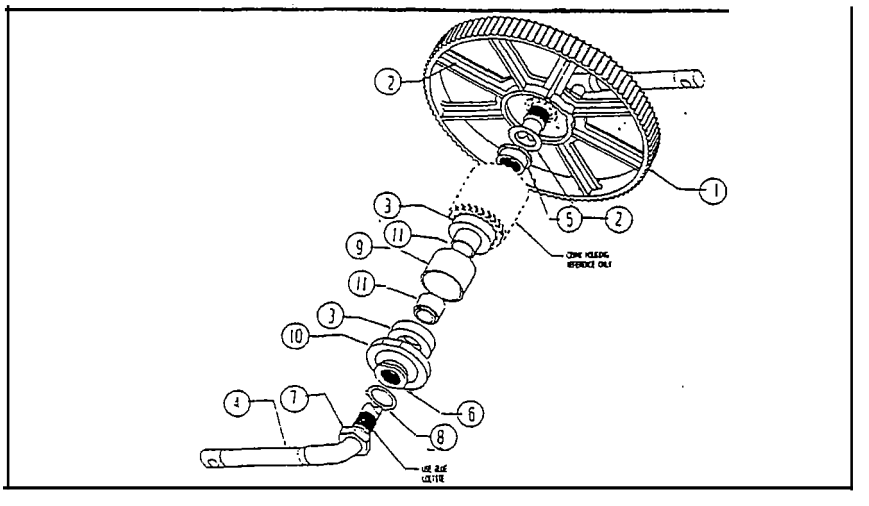
2. Repeat the same step for the opposite side.

Remove shroud

1. Using a 1/8 hex key, remove the shroud screws. (8 total)

2. Using a Phillips screwdriver remove the side shroud screws. (4 total)

3. Tum the crank arm toward the front of the bike. Left side first Gently slide the shroud towards the front of the bike until the shroud has been removed Do the same to the right side of the bike.



Crank Bearings Replacement

4. Bend the tabs up on locking retaining washer (See diagram for picture of part #8). Use a pair of needle nose pliers or a flat head screwdriver to bend both tabs up.

5. Slide the crank belt off the crank pulley. (#1).

6. Using a 1 ¼" open-end or an adjustable crescent wrench remove, the crank locking nut (#7) and slide the locking retaining washer completely off. Remember to loosen, tum to the right.

7. Using a 1 ¼" open-end or an adjustable crescent wrench, remove conical bearing nut (#6) completely.

8. Loosen the outer bearing Nut (#10) with a Channel lock wrench.

9. Remove the left side bearing from the bearing housing.

10. Remove the inner bearing spacer sleeve from the crank housing (#11).

11. Remove the outer bearing spacer sleeve from the crank housing (#11).

12. Remove the crank from the bearing housing. The bearing may come out with crank arm if not, use a flat head screw driver to pry the bearing out.

Install new spacers and bearings

13. Grease both sides of the bearing housing. Use black lithium grease and apply to both bearing cups.

14. Slide the bearing on the crank.

15. Slide the crank arm, starting from the right side through the bearing housing.

16. Insert the first bearing (#3) through the crank arm and crank housing.

17. Insert both inner and outer bearing spacer sleeves (#11) through crank arm in the crank housing.

18. Insert second bearing (#3) through the crank arm in the crank housing.

19. Apply a small drop of Loctite (RED) with a channel lock wrench to 15-20lbs.

20. Screw in the conical bearing nut (#6) first. Tighten first nut on crank only enough to align the bearing (no more then finger tight), then back the nut off 1/8 tum. Make sure the is no play from side to side. Remember to tighten, tum to the left.
21. Insert the locking retaining washer (#8). There is a flat tab on the inside hole, that tab will slide into the slot on the crank threads.
22. Apply a small drop Loctite (243) to threads on the crank arm.
23. Screw in the locking crank nut (#7) and tighten.
24. Using a 1 ¼ open end or adjustable crescent wrench tighten nut. Ensure the conical bearing nut does not tighten or loosen during this process.
25. After tightening the crank-locking nut, spin crank and ensure that the crank spins freely. The crank should spin a couple of times with finger pressure. If it does not spin freely, adjust locking nut in a counter-clock wise direction.
26. Grab the end of the crank and move the crank towards and away from the bike to check for play. If there is any play, tighten conical bearing nut, but be sure .not to over tighten.
27. Use a punch or a flat head screwdriver and mallet bend down retaining washer tabs one on first nut and one on second nut.
28. Slip the crank belt back on to the crank pulley.

Re-install shroud

1. Gently slide the shroud towards back of the bike until shroud is installed.
2. Using a 1/8 Hex key screw in the shroud screws. (8 total)
3. Using a Phillips screwdriver screw in the side shroud screws. (4 total)
4. Do the same to the right side of bike.

Re-install both pedals

ransfer Case Replacement

Tools:

- 1/16 Allen Wrench
- 9/16 Socket
- 9/16 Open End Wrench
- Rubber MalletJHarnmer
- Retaining Clip Tool or small flat head screwdriver and needlenose pliers

Time Required: 20 minutes

Procedure: Remove transfer case.

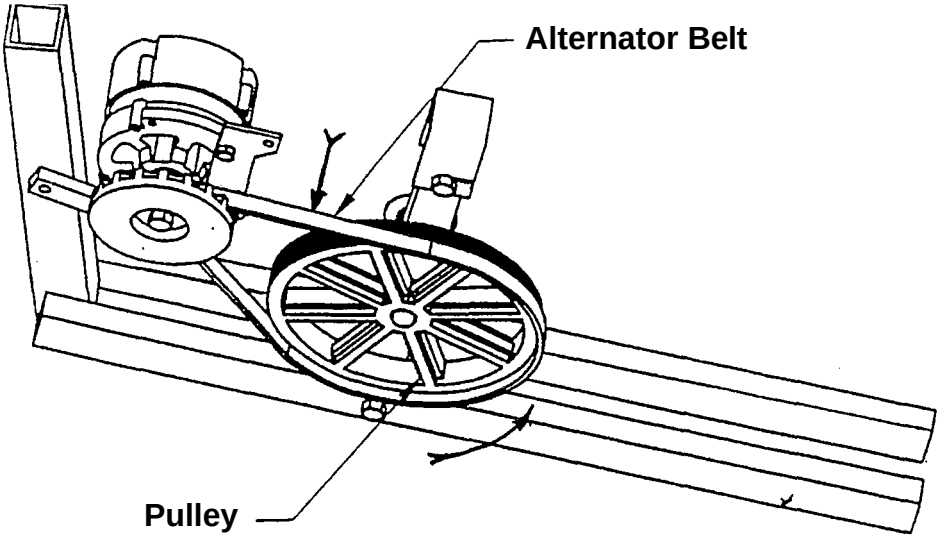
1. Remove screws from the bike shroud using the 1/16 allen wrench. Set the shroud and screws aside.

2. Remove the alternator belt by gently pushing it off of the 9/12" pulley. (See Diagram A)

3. Loosen the top nut on transfer case. (See Diagram B)

4. Remove the drive belt by slipping it off of the crank pulley and transfer case pulley. (See Diagram C)

5. Remove the 91/2" pulley by removing the c-ring retaining clip. Use the retaining clip tool or the small flat head screw driver and needlenose pliers.



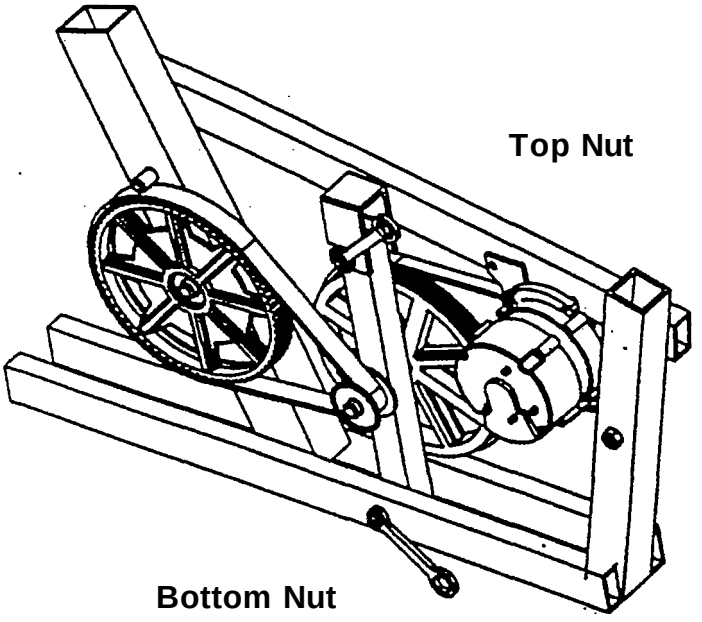


Diagram B

6. Loosen the bottom nut on the transfer case and remove both the top and bottom bolts, washers and nuts. (See Diagram B)

7. Remove the transfer case.

Transfer Case Replacement

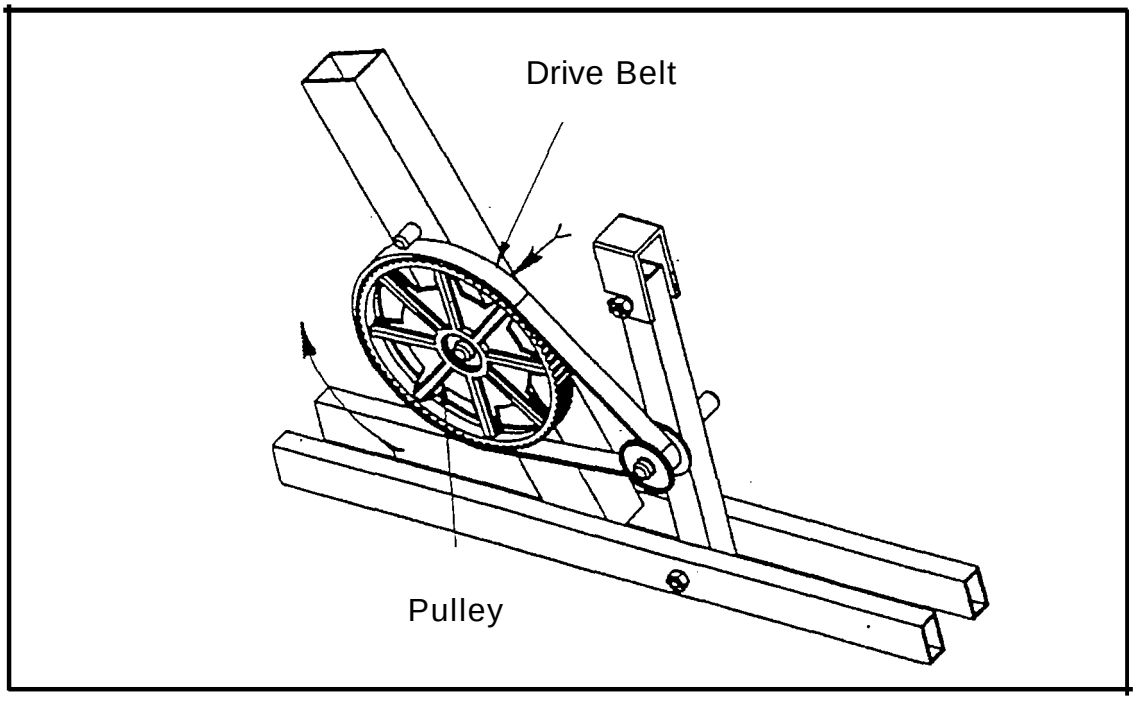


Diagram C

8. Place the new transfer case into place. The crank pulley shroud be facing towards the right side.

9. Replace the transfer case bolts. The long bolt goes on the bottom and the small bolt on the top. Slide the drive belt back on pulleys.

10. Tighten the bottom bolt on the transfer case first with the 9/16 open-end wrench.

11. Tighten the top bolt again until finger tight to allow for proper tensioning.

12. Using a rubber mallet or hammer tap the top end of the transfer case to tighten the drive belt. Proper tension should be 85 lbs +/- 5 lbs.

13. When proper tension is achieved tighten top bolt completely with the 91/6 open-end wrench.

14. Check the alignment of the belt to pulleys. Adjust the transfer case pulley by loosening the set screws on the transfer case pulley. When proper alignment is obtained re-tighten the set screws.

15. Replace the 91/2" pulley on the transfer case. Put the flush side of pulley against the transfer case. The recessed side out for the c-ring retainer dip.

16. Replace the retaining clip on the shaft to hold pUlley in place. Make sure the pulley moves when you tum the crank.

17. Walk the alternator belt back on the pulleys.

18. Replace shroud and screws using the 1/26 allen key.

Alternator Replacement

Tools:

- Phillips head screw driver
- 12mm socket
- 10mm socket
- 14mm socket
- ½" socket
- ¾" socket

Time Required: 1Hr.

Procedure: Remove Pedals

1. Place right foot on the right pedal and apply entire body weight.

2. simultaneously rotate opposite pedal mounting bolt in counter clockwise direction.

Remove shroud

1. Using the 1/8" hex wrench and the Phillips head screwdriver. Remove the 9 screws holding the shroud in place.

2. Be cautious of the pedal cranks as the shroud is removed.

Remove Alternator Belt

1. Move to the left side of the bike and note the Transfer Case Assembly.

2. Slowly rotate the large clutch pulley counter clockwise while simultaneously working the belt grooves to the outside of the pulley. (See Diagram A)

Remove the RPM Sensor

1. First, note the gapping between the rpm sensor and the rpm disc or "f)ywheel". The gap should-be no greater than 1/32"."
2. With the ½" socket, remove the nut located directly behind the rpm sensor mounting bracket.
3. Then remove the ½" bolt on the face of the rpm sensor bracket.
4. Let the rpm sensor remain attached to the wiring harness and set aside the ½" nut and bolt.
5. Refer to Figure A prior to removing wires.
6. Remove wires in clockwise sequence.
7. With the12mm socket remove the large red positive wire from Terminal B.
8. With the 10mm socket, remove the black ground wire from the post directly underneath Terminal B on the altemator casing.
9. With the 10mm socket, remove the narrow green field wire from Terminal S.
10. Using the 10mm socket, remove the black ground wire from Terminal EXC.

Remove the Alternator

1. Using the 14mm socket, loosen the nut on the tension bracket. Do not remove completely.
2. With the 7/8" socket, loosen and remove the large nut on the right side of the alternator. Be careful to note the presence of a washer and lock washer associated with this nut.
3. Remove the ½" bolt securing the alternator to the tension bracket. Note the presence of a washer at the bolt head and a spacer (on the Upright Bike only) between the bracket and the alternator.
4. Loosen and remove the ½" nut from the main alternator mount.
5. Remove the ½" bolt from the main alternator mount. Be careful to cradle the alternator with one hand as the last bolt is being removed to prevent it from falling and damaging the frame.

Alternator Replacement

Re-installation Procedure

1. Re-position Alternator on to support member.
2. Retrieve the 3/8" bolt, position washer and insert from the right side of unit
3. On the Upright bike only, be sure to include the thick spacer between the alternator and the support member.
4. Position the alternator and tension bracket together and insert the large ½" bolt from the left side of the unit to the right.
5. Again, note the presence of the spacer on the Upright Bike only.

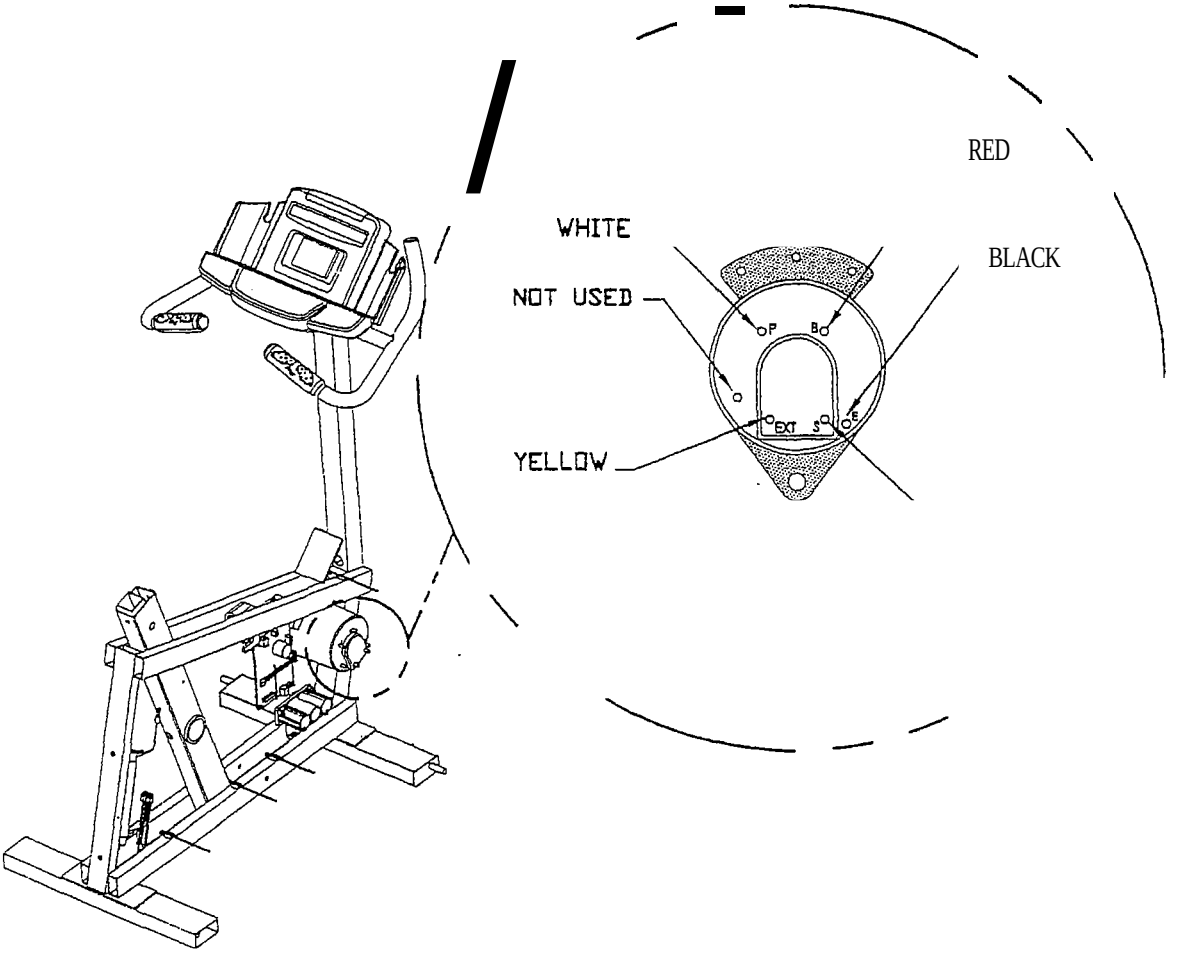
Attach RPM Sensor.

1. Using the other 3/8" bolt and nut, secure the RPM Sensor to the casing of the alternator.
2. Tighten the nut and bolt finger-tight and position the sensor lobe to *1/32"* distance away from the large sensor discJflywheel. *(1/32"* is about equal to the thickness of one business card.)
3. Tighten RPM sensor bolt.

Attach Alternator Belt.

1. Place the alternator belt around the alternator flywheel/pulley assembly.
2. Loop the other end around the 9.5" crank pulley.
3. While pressing the belt grooves and crank grooves together, slowly rotate the crank, allowing the alternator belt to seat on to the crank.
4. Make sure all grooves are aligned. Adjustment is easily made by pressing to the side of the belt and slowly rotating crank.
5. Adjust belt tension using the ½" socket. Tension is rated at 1001bs. The tension can be accurately approximated by tightening the forward facing tension bolt until there is no more than ½" inch of up and down play in the belt.
6. Tighten the large bolt and nut securing the alternator to the tension bracket with the 7/8" and ¾" sockets.

Re..wire the Alternator.



Replace Motor Shroud and Pedals.

1. Be cautious of the extended pedal cranks when replacing the shroud.

2. Using the 1/S" Allen Wrench and the Phillips Head screwdriver, fasten all shroud screws.

3. Using the 14mm open end wrench or Crescent Wrench, secure pedal shoulder bolts on to pedal cranks.

Battery Replacement

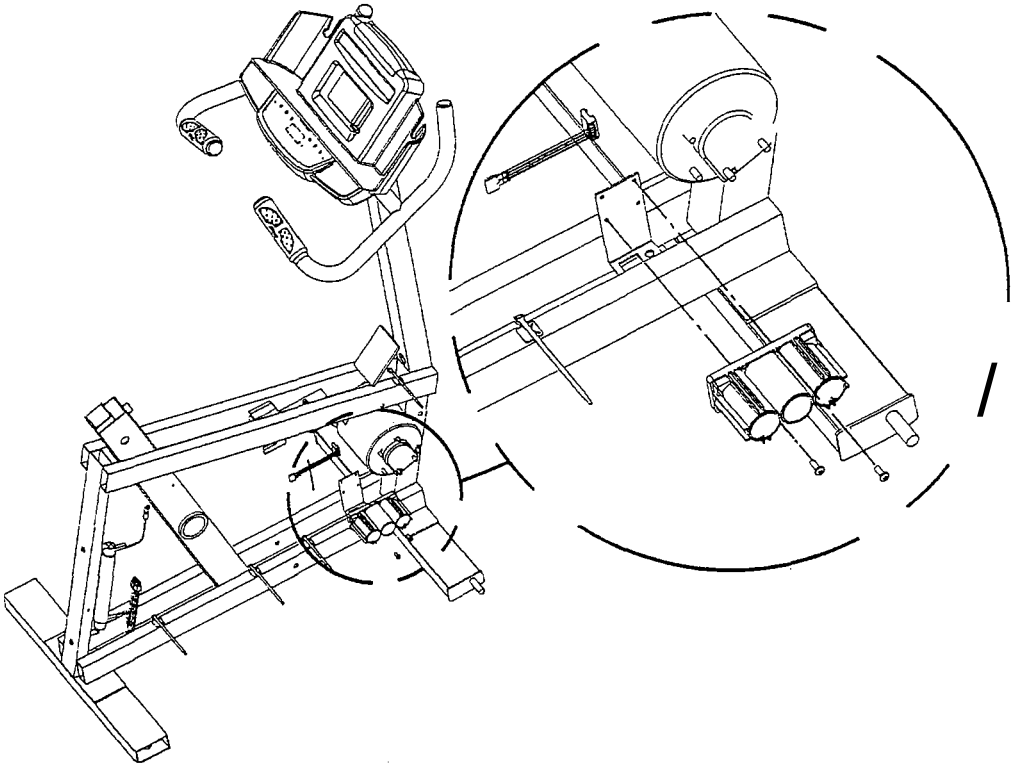
Tools

- Phillips head screwdriver

Time Required: 5 minutes

Procedure: Disconnect the battery

1. Disconnect the red (+) cable and the black (-) cable.



Remove screws

1. Using the Phillips head screw driver remove the two screws supporting the battery to the frame. (See diagram)

Install Battery

1. Using the Phillips head screwdriver re-install the two screws through the battery to the frame.

Display Replacement

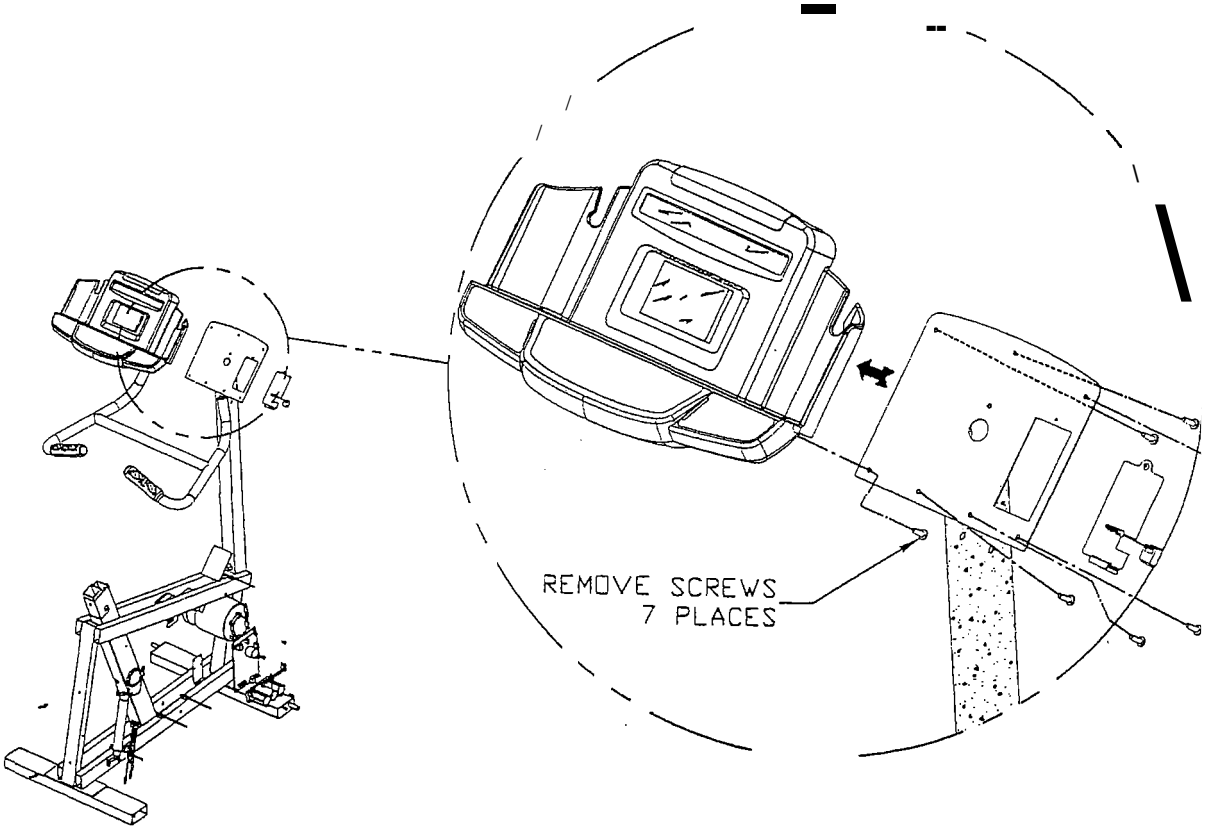
Tools

- 1/16-inch Allen Wrench

Procedure: Remove the display board

1. Using a 1/16-inch Allen Wrench, carefully remove the 7 screws from the rear of the display panel mount. It's important to use both hands so that the display board doesn't fall and damage any connections. (See diagram below.)

2. Carefully disconnect the heart rate cables, power cable and the Display signal cable from the back of the display and gently lay the panel down.

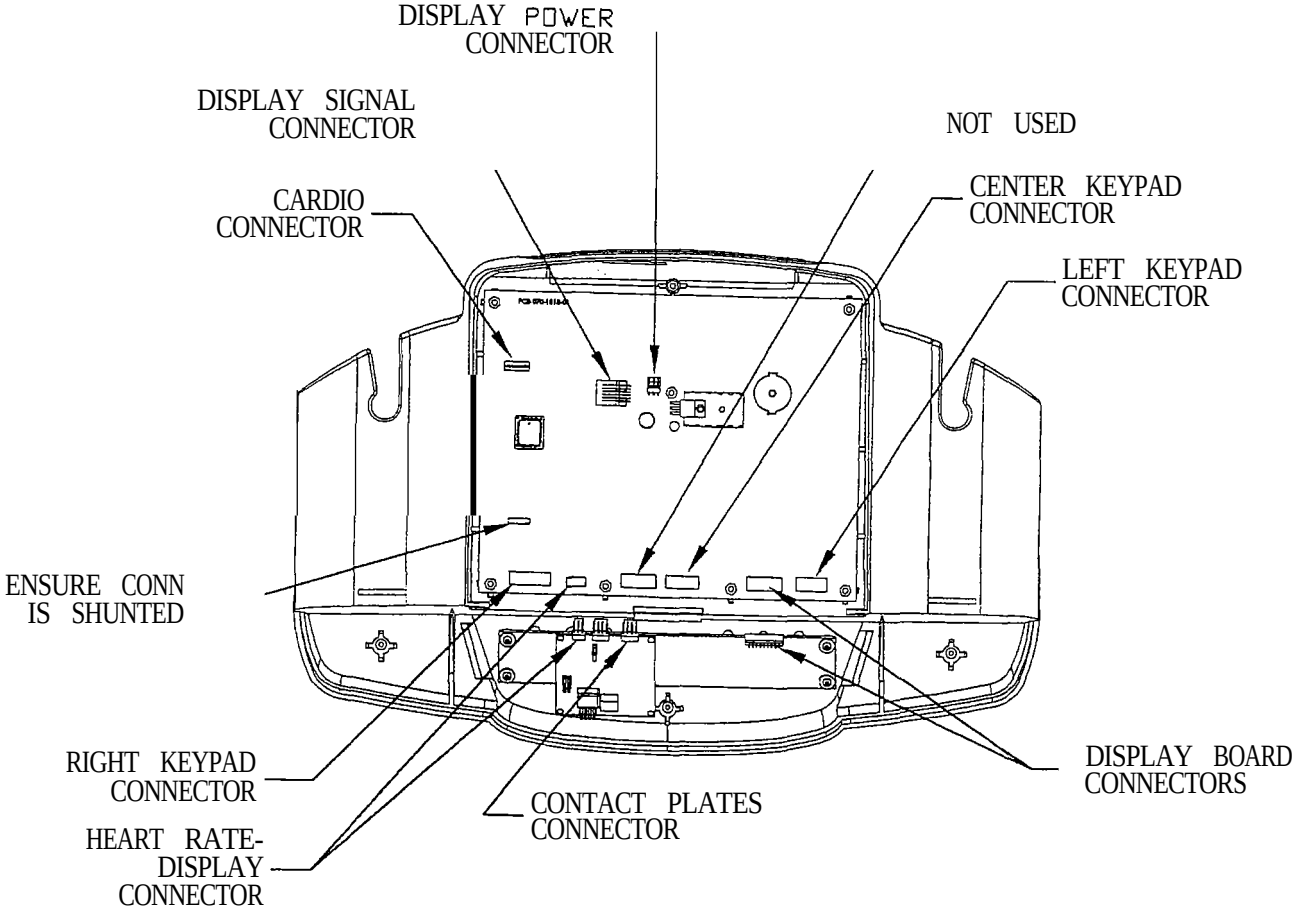


Display Replacement

Re-install Procedure

1. Using both han"ds to support the display board carefully re-connect the heart rate cables, power cable and display signal cable. (See diagram below for connection layout)

2. Carefully supporting the display board re-install the 7 Allen screws using the 1/16 -inch Allen Wrench.



PROM Replacement

Tools

- Small flat screwdriver
- PLCC Extractor
  (This spring-assisted chip extractor tool is especially designed for safe removal of PLCC IC's from 18 to 124 pins. This tool can be purchase at any electronic store or through Star Trac Product Support.)

Procedure: Remove the PROM

1. Locate the small back panel located on the back of the display mount supported by a single screw.

2. Using the flat screwdriver loosen, not remove the single screw. Gently slide the back plate to view the PROM socket.

3. Using the extractor carefully remove the PROM from the back of the display. It's critical that when using the extractor that you gently press to release the chip from its socket.

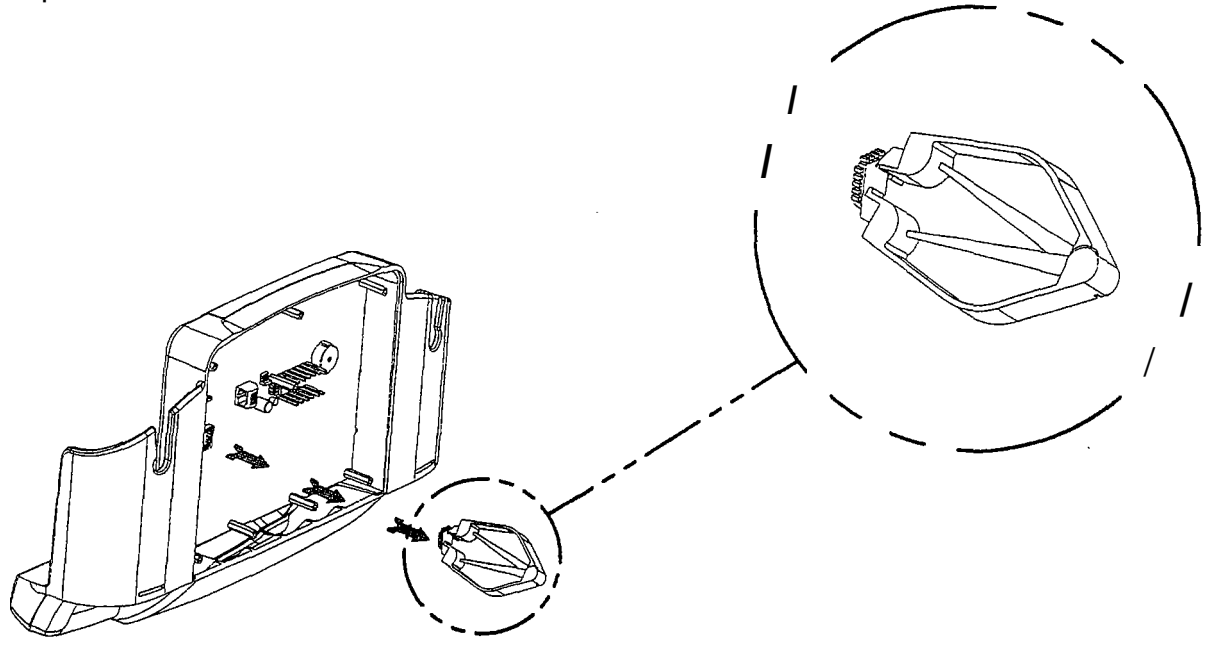
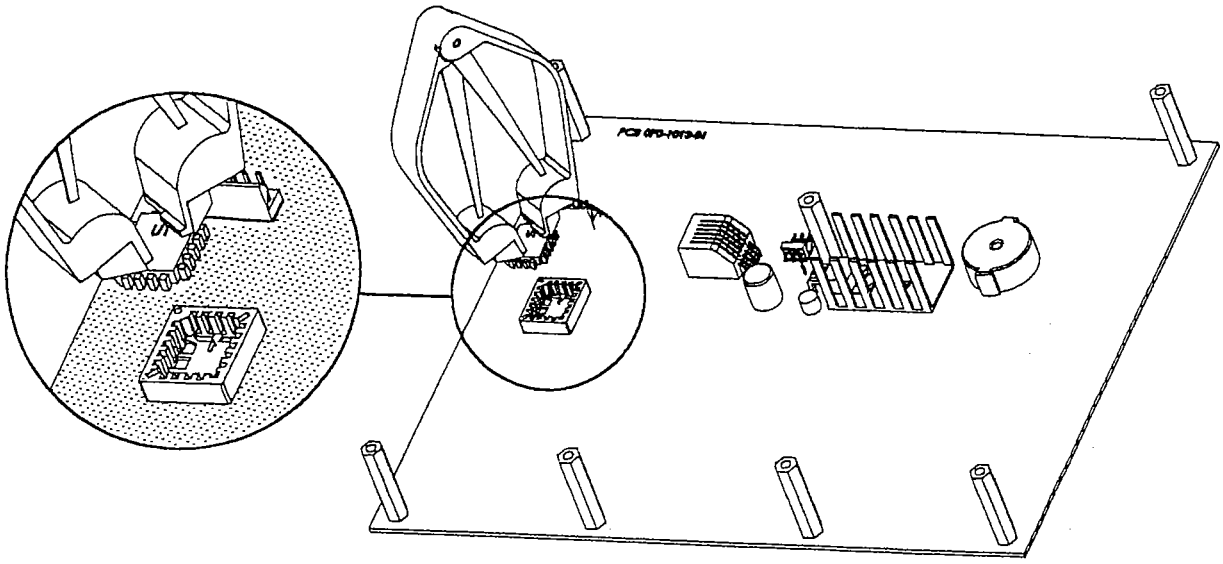


Diagram 1: Shows the display without the backing plate only as an example of the location of the chip.

PROM Replacement

Diagram 2: Shows the location and how to remove the chip.



Procedure: Re-install the PROM

1. The new PROM will have a sticker showing the software version. Carefully pull back the sticker to locate the directional indicator (circular groove located on the center top of the chip)

2. Using your index finger and thumb carefully position the new chip with the directional indicator lined-up with the arrow located on the printed circuit board (display electronic). Carefully using your thumb apply gentle pressure so that the chip is inserted into the chip socket on the printed circuit board.

3. Reposition the back panel. Using the flat screwdriver tighten down the single screw.

Heart Rate Grip Replacement

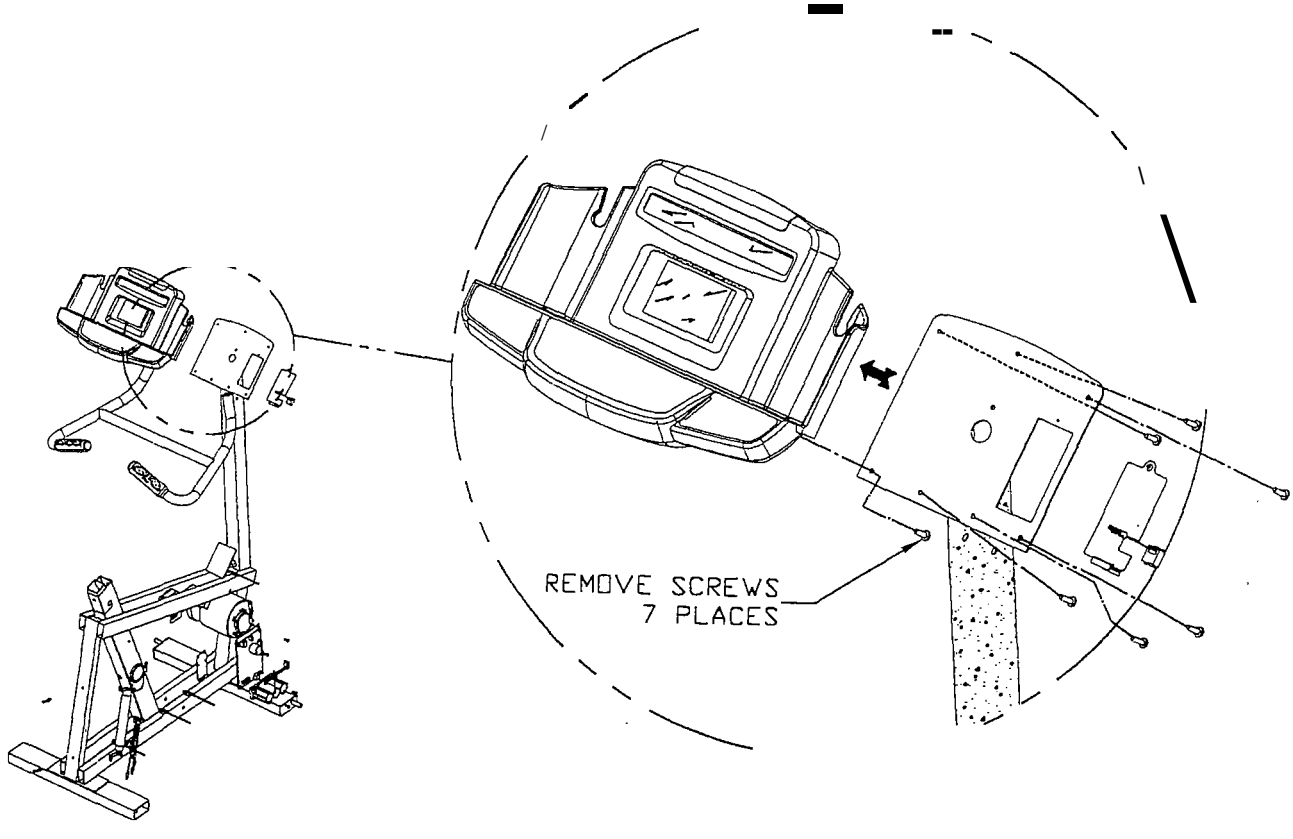
Tools

- 1/16-inch Allen Wrench
- Phillips Head Screwdriver
- String or Scotch Tape

Procedure: Remove the display board

1. Using a 1/16-inch Allen Wrench, carefully remove the 7 screws from the rear of the display panel mount. It's important to use both hands so that the display board doesn't fall and damage any connections. (See diagram below)

2. Carefully disconnect the heart rate cables, power cable and the Display signal cable from the back of the display and gently lay the display panel down.



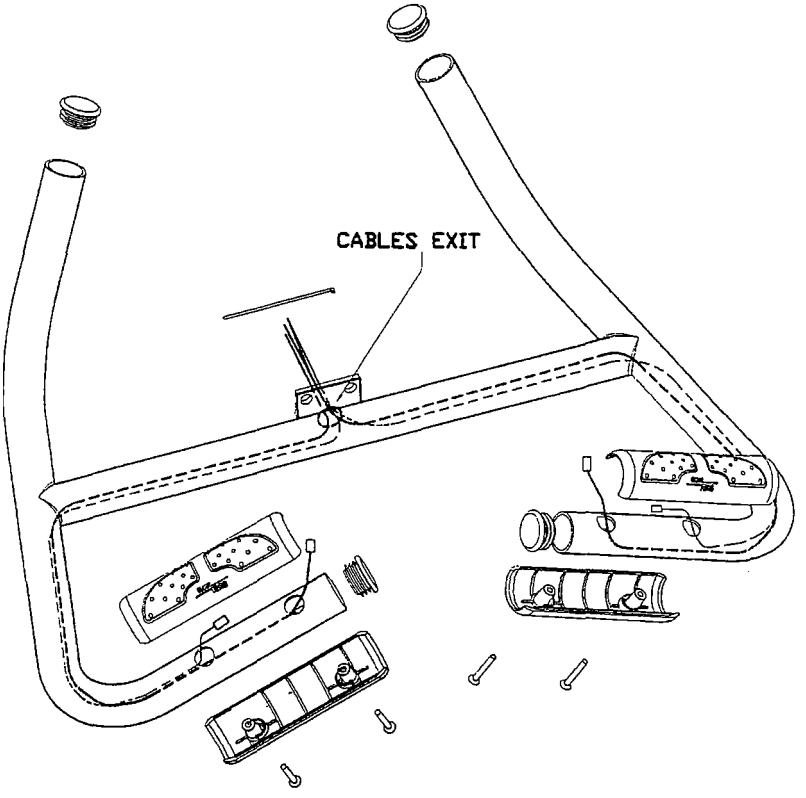
Heart Rate Grip Replacement

Procedure: Remove the heart rate grips

1. Using a Phillips head screwdriver, remove the 2 screws which support the heart rate plates to the handlebar. Do this for both the Left and Right heart rate grips.
   (See diagram below)

2. Carefully disconnect the heart rate cables from the back of the heart rate plates.

3. Remove the plastic end caps from the tips of the handlebar.
   (See diagram below)



RIGHT HAND

LEFT HAND

4. Attach the new cables with the old by using string or Scotch Tape and gently pull the old cable out from the back of the display post.

Heart Rate Grip Replacement

Procedure: Re-install the heart rate grips

1. Carefully pull the connector plugs through the front handlebar holes.

2. Re-connect the heart rate cables to the heart rate plates. Using the Phillips head screwdriver re-install the 2 screws, which attach the heart rate plates to the handlebar. Do this for both the Left and Right grips.

3. Using both hands to support the display board, carefully re-connect the heart rate cables, power cable and display signal cable.
   (See diagram below)

4. Carefully supporting the display board re-install the 7 Allen screws to the back of the display using the 1/16-inch Allen Wrench.