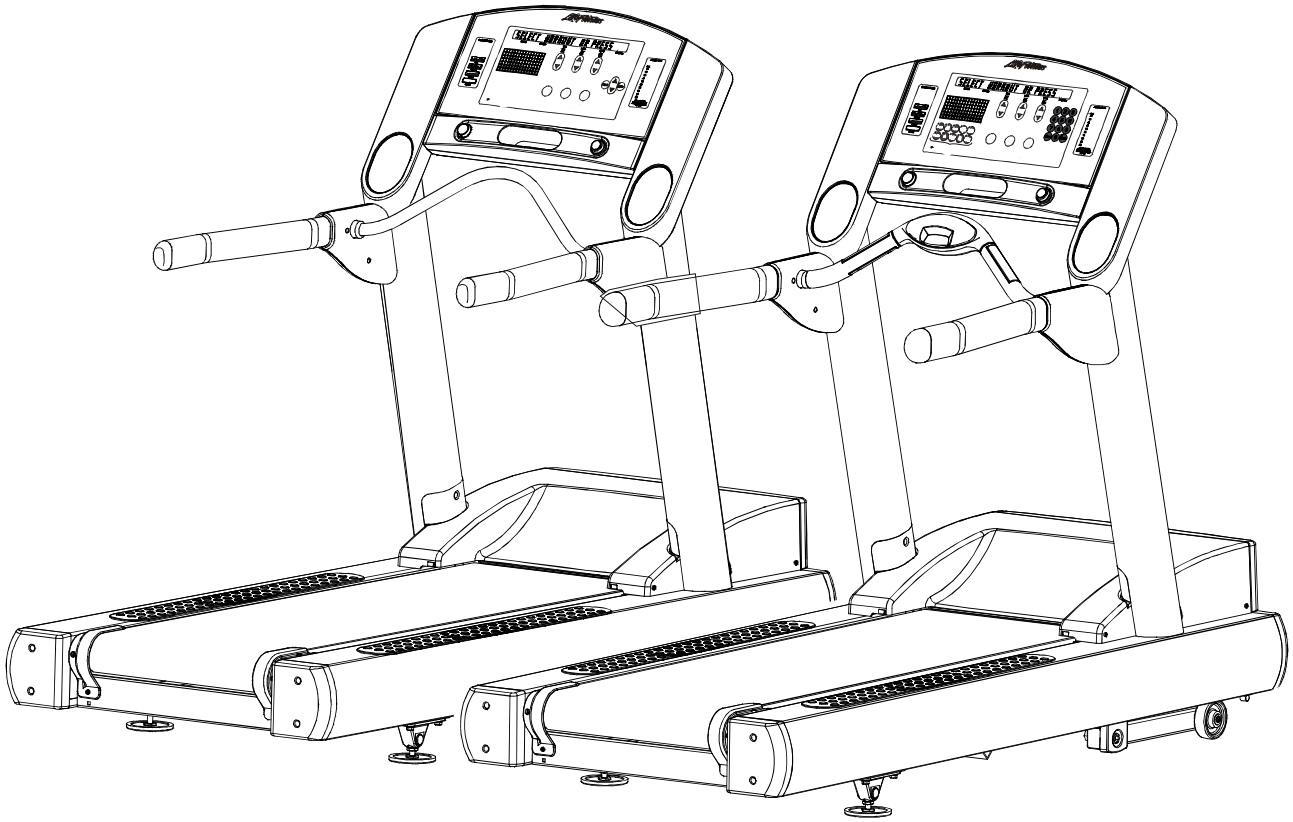
LifeFitness

# Models T9i & T9e Treadmills



## Customer Support Services

## *SERVICE MANUAL*

# GENERAL CONTENTS



## SECTIONAL CONTENTS

# Introduction

This service manual provides safe and efficient step-by-step test and service procedures for T9i and T9e Treadmills. The “i” designation represents interactive (LED) type consoles and the “e” designation represents liquid crystal display (LCD) consoles. Illustrations in this service manual reflect service view(s) to compliment the procedures. Some views or details may not be illustrated for clarity purposes.

Throughout this manual, all messages viewed in the Display Console will be displayed in UPPERCASE letters. Also, any Keys depressed on the Console will also appear in UPPERCASE letters in the Display Console.

If a service problem occurs, it is recommended that you first refer to “Troubleshooting” in Section 1 or “Diagnostics” in Section 2 and 3. Refer to “How To…” in Section 4 for actual service procedures. Refer to “Electronics” in Section 5 for Block Diagrams and Connector locations. Refer to “Miscellaneous” in Section 6 for ID Tag Location, Maintenance, and other general information pertinent to the product.

Life Fitness Customer Support Services (CSS) can be contacted Monday - Friday 8:00 AM - 5:00 PM Central Standard Time. To response to your needs expeditiously, please provide Life Fitness Customer Support Services with the following information:

- Serial Number
- Model Number
- Part Name and Number
- Problem or Symptom (if applicable)

LIFE FITNESS – CUSTOMER SUPPORT SERVICES
10601 Belmont Avenue, Franklin Park, IL 60131 (USA)
Telephone: 847.451.0036 Toll-free: 800.351.3737
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# *Life Fitness Models T9i and T9e Treadmills*
# Theory of Operation

This treadmill is an electromechanical fitness device that operates on alternating current. It's controlled through the electronics in the display console along with various other circuit boards.

The main components of the treadmill are:

- Frame
- Striding Belt and Deck
- Display Console
- Main Motor
- Motor Controller
- Lift Motor (Incline)
- Electronics

Initially, AC power is routed through a line filter to various individual boards. This AC power is then converted to the DC power, which is necessary to operate the wax/lift board, motor controller, and various other electrical and mechanical components. The operator controls all electromechanical devices through the display console and with a touch of a finger make settings and adjustments to speed, incline, and custom workout programs.

The frame is critical not only to support the user weight, but also to provide a stable base for the moving components and positioning of the electromechanical devices. The striding belt and deck are designed to endure constant mechanical stress loads. The main motor has a pulley on the end of its shaft, which is connected by a Poly-V drive belt to the front roller pulley. The striding belt tension is adjustable by means of adjusting bolts, which are located at the ends of the rear roller. When turned, these bolts tension and center the belt. The striding belt is pre-lubricated, which helps minimize wear. The deck is flexible, which provides lower impact to the runner. Under the deck are LifeSprings®, which absorb impact while providing greater support and stability to the runner.

The display console is the control center of the treadmill, where all operations are set and controlled for specific programming and diagnostic functions. Selections and settings are easily accomplished through various touch keys. The console allows the operator to choose operational settings, specific workout routine, or input of information such as weight, age, desired display language, etc.

The treadmill is by far one of the most popular pieces of all cardiovascular exercise equipment. With proper routine preventative maintenance and care, it will provide a lifetime of healthy cardiovascular exercise.

# Service Tools

Unless otherwise specified, only basic hand tools are required to perform service procedures. These standard tools can consist of:

- Philips and Straight-Blade Screw Drivers
- TORX® Bit Set
- Pliers
- Rubber Mallet
- Snap Ring Pliers (internal and external)
- Removable Thread Locking Compound
- Standard and Metric Size Socket Set (3/8" or 1/2" drive)
- Standard and Metric Size Combination, open-end, or Box Wrenches

**NOTE: Some specialized tools may be required to safely complete service procedures. Attempts to use improper tools could result in damage to equipment or personal injury.**

# Glossary of Terms

| TERM | DEFINITION |
|---|---|
| Anti-Slip Pads | Rubber strips located on the surface of each side of the frame used to avoid slipping while mounting or dismounting treadmill. |
| Anti-Static Tinsel | Copper tinsel-like material that discharges static electricity from the striding belt during operation. |
| Bucket | Term used to describe a software memory area. |
| Connectors | Devices used to join wiring together and make an electrical connection. |
| Deck | Special fibrous particleboard that is used for the running surface. |
| Display Console Board | Electronic board used for making direct input settings and monitoring output messages, which are displayed in the digital readout display. |
| EEPROM | Electrically erasable programmable read only memory. |
| Electromechanical | Relating to a mechanical device or system that is actuated or controlled by electricity. |
| Ergo Bar | Ergo is short for ergonomic. This refers to the crossbar that contains the LifePulse® sensors. |
| Front Roller | Motor driven roller that moves the striding belt. |
| Home Switch | Switch used to sense zero incline position of machine. |
| Jumper | Electrical connector used to short-circuit between two electrical points. |
| KPH | Kilometers per hour. |
| LCD | Liquid crystal display. |
| LED | Light emitting diode. |
| Leveler | Adjustable supports under the rear of the treadmill, which are used to level and stabilize the unit. |
| LifePulse® | Measures heart rate using hand sensors. |
| LifeSpring® | Rubber loops used for deck suspension. |
| Lift Motor | Motor that raises and lowers the unit for incline and decline operations. |
| Main Drive Belt | Used to transmit power from the striding belt motor to the striding belt. |
| Main Wire Harness | Harness that provides common interconnects between circuit boards. |
| Motor Controller | Regulates the speed of the striding belt. |
| MPH | Miles per hour. |
| Overlay Bezel | A clear plastic covering over the display console, that is "language specific". |
| PCB | Printed circuit board. |
| Polar® Receiver | Radio Frequency device manufactured by the Polar Corporation that receives signals from a chest strap transmitter in order to monitor a heart rate. |
| Power Module | Receives main electrical source from the wall outlet to distribute voltage throughout the various electromechanical systems. |

## Glossary of Terms - Continued

| TERM | DEFINITION |
|---|---|
| PWM | Pulse width modulation. |
| Rear Roller | A free-spinning adjustable roller used to tension and center the striding belt. |
| Rear Roller Guards | Protective guards located on each end of the rear roller. |
| RPM | Revolutions per minute. |
| Static Current | Steady current flow. |
| Stop Switch | A switch used to terminate a workout routine. |
| Striding Belt | Belt used to walk or run on. |
| Telemetry Receiver | A device that reads a heart rate signal from a chest strap transmitter. |
| Wax/Lift Board | A circuit board located under the motor shroud, which is used to communicate input/output signals from the console, wax motor, lift motor and striding belt motor.<br>**NOTE – Waxing feature not applicable on T9i and T9e models.** |
| Wire Ties | Plastic straps used to secure wiring. |

*Chapter 1*

# SECTION 1
# TROUBLESHOOTING

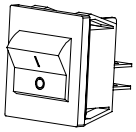
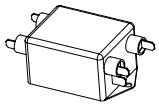
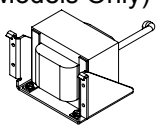
## Contents - Continued

# No Power to Treadmill – AC Power Distribution Testing

**SPECIAL SERVICE TOOLS REQUIRED: MULTIMETER**

To diagnose a No Power condition the motor cover must be removed. Use the following troubleshooting steps to take the proper corrective action.

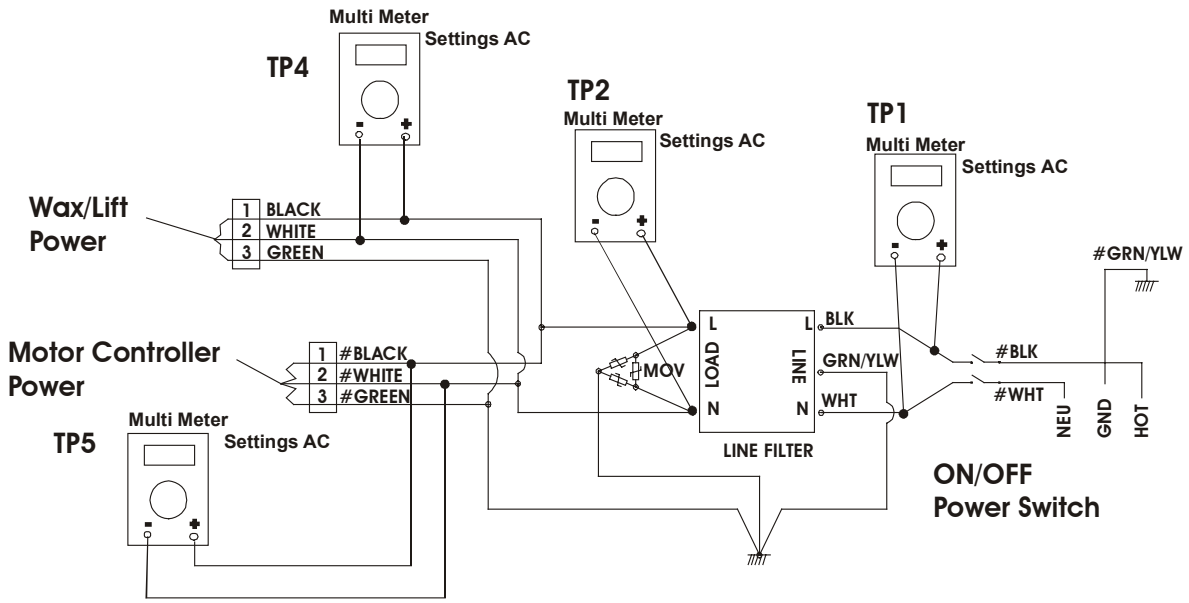
**NOTE – Line voltage is 120$V_{AC}$ unless otherwise specified.**

| STEP | INSPECT | ACTION | RESULTS |
|---|---|---|---|
| 1 | Line Voltage | Unplug unit from wall outlet and measure outlet for line voltage. | If line voltage is present, plug the line cord into the wall outlet. |
| | | | If no voltage is present, check house fuse or circuit breaker. Replace or reset as necessary. |
| 2 | Power Switch  | Turn the Power Switch ON and check for line voltage at TP1. | If no line voltage is present, then replace Power Switch and Line Cord. |
| 3 | Line Filter  | Turn the Power Switch ON and check for line voltage at TP2. | If no line voltage is present then replace the line filter. |
| 4 | Power Transformer (International Models Only)  | Turn the Power Switch ON and check for line voltage (240$V_{AC}$) at TP3. | If no line voltage (240$V_{AC}$) is present, then check wiring from line filter to power transformer. Repair or replace as necessary. |
| | | Turn the Power Switch ON and check for line voltage (120$V_{AC}$) between Pin1 and Pin8 on the Power Transformer. | If no line voltage (120$V_{AC}$) is present then replace transformer. |
| 5 | Wax/Lift Board Power Feed and Outputs | Turn the Power Switch ON and check for line voltage at TP4. | If no line voltage is present then check wiring between wax/lift board and power transformer (international) or line filter (domestic). Service as necessary. |
| | | Turn the Power Switch OFF and remove line cord from wall outlet. Remove the wax/lift board and check fuses 1, 2, and 3. | Check continuity of FUSE1, FUSE2, and FUSE3.<br>**NOTE: If any fuses are open, the wax/lift board must be replaced.** |
| 6 | Motor Controller Power Feed | Turn the Power Switch ON and check for line voltage at TP5. | If no line voltage is present, then check the wiring between the motor controller and power transformer (international) or line filter (domestic). Repair or replace as necessary. |

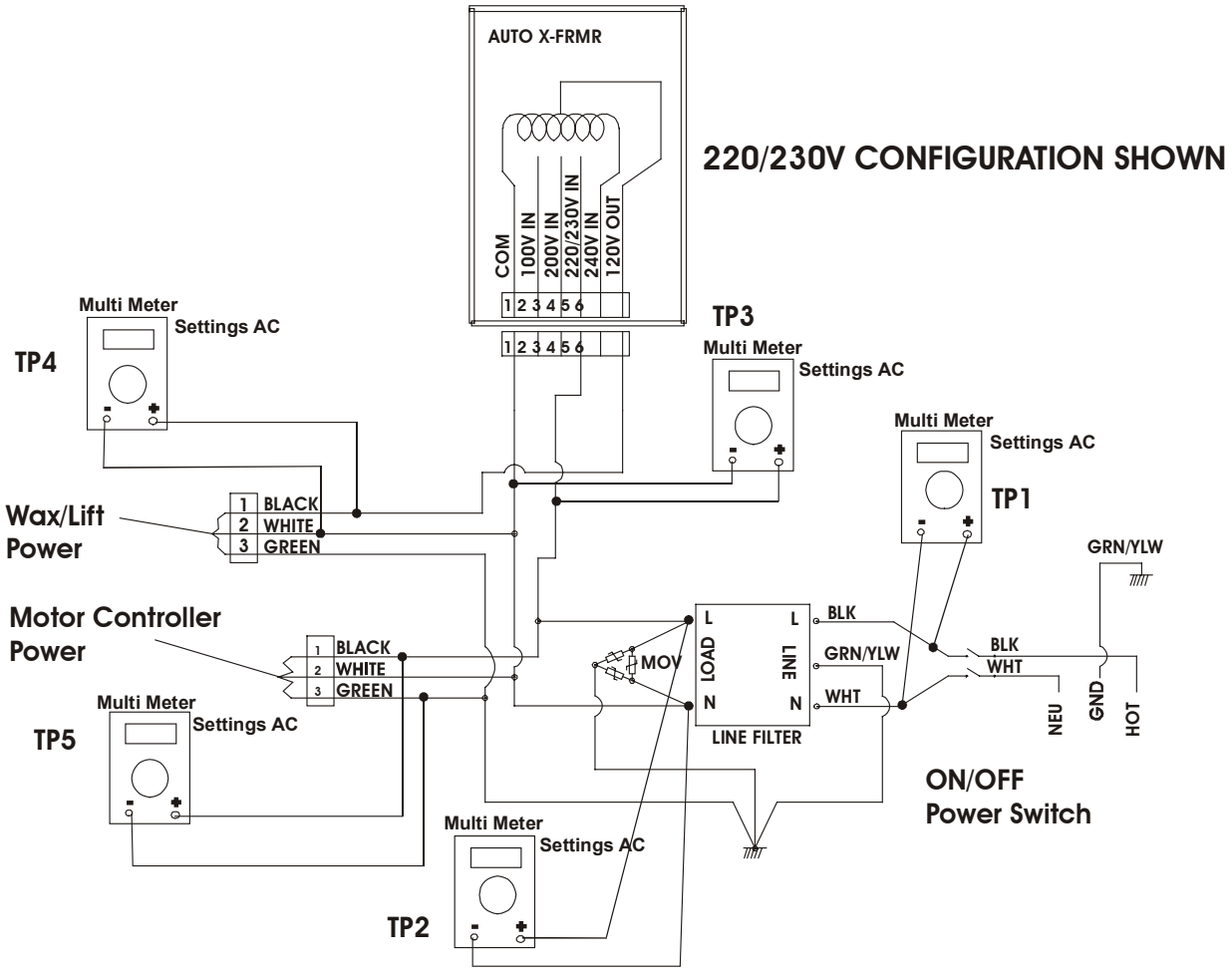
# No Power to Treadmill - AC Power Distribution Testing - Continued

**SPECIAL SERVICE TOOLS REQUIRED: MULTIMETER**

## 120V DOMESTIC




## 100V, 200-240V INTERNATIONAL



# No Power to Console

**SPECIAL SERVICE TOOLS REQUIRED: MULTIMETER**

Use the following procedure to troubleshoot a No Power condition at the treadmill console.

1. Turn Power Switch OFF.
2. Remove the console to gain access to the main wiring harness (P1).
3. Turn Power Switch ON.
4. Attach the black (negative) lead of the meter to Pin1 (yellow) or Pin2 (orange) to obtain a ground reference.
5. Attach the red (positive) lead of the meter and probe the corresponding harness wire (see below) to verify proper voltage is present.

**T9i**

| EXPECTED VOLTAGE | WIRE COLOR | POSSIBLE CAUSE | SOLUTION |
|---|---|---|---|
| $+8V_{DC}$ | Pin3 | Short circuit on console board. | If voltage is present and console is not lit, replace the console board. If no voltage is present, check the wax/lift board FUSE6 for continuity. If fuse is open, wax/lift board must be replaced. If the fuse is good, then check wiring from wax/lift board to console. |
| $+8V_{DC}$ | Pin4 | Short circuit on console board. | If voltage is present and console is not lit, replace console board. If no voltage is present, check wax/lift board FUSE5 for continuity. If fuse is open, wax/lift board must be replaced. If fuse is good, then check wiring from wax/lift board to console. |

**T9e**

| EXPECTED VOLTAGE | WIRE COLOR | POSSIBLE CAUSE | SOLUTION |
|---|---|---|---|
| INFORMATION NOT AVAILABLE AT TIME OF PRINTING | | | |

**SPECIAL SERVICE TOOLS REQUIRED: MULTIMETER**

| SYMPTOM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| Display Does Not Illuminate | Insufficient power source. | Make certain unit is connected to a $120V_{AC}$@15A power source. |
| | Faulty connection at display board. | Check all electrical connections for proper attachment. |
| | Faulty connection at wax/lift board. | Check all electrical connections for proper attachment. |
| | Damaged main harness wire. | Check main harness continuity as described in "No Power to Console". Repair or replace harness as necessary. |
| | Problem with EEPROM on wax/lift board. | Check that the EEPROM in the wax/lift board is seated properly. If necessary, replace the wax/lift board. |
| Striding Belt Slipping | Striding belt tension incorrect. | Check striding belt tension. Adjust if necessary. See "How to... Tension the Striding Belt" in Section 2. |
| Maximum Speed is Reduced | Striding belt/deck worn. | Perform belt and deck test. Replace belt if necessary. |
| | Insufficient power source. | Make certain unit is connected to a $120V_{AC}$@15A power source. |
| | Main motor binding. | Check main motor shaft for binding or roughness.<br>Replace main motor if necessary. |
| | Front or rear roller binding. | Check rollers for binding or roughness. Replace roller(s) as necessary. |
| Knocking Noise | Faulty front or rear roller bearings. | Check rollers for binding or roughness. Replace roller(s) as necessary. |
| Knocking Noise from Deck Area | LifeSprings® not positioned correctly and/or loose mounting hardware. | Reposition or tighten LifeSpring® hardware. |
| Rubbing Sound from Underneath | Foreign objects underneath machine. | Inspect and remove any debris or objects that may cause interference. |
| | Anti-static tinsel positioning incorrect. | Reposition tinsel for light contact on striding belt. |

# Troubleshooting Guide - Continued

**SPECIAL SERVICE TOOLS REQUIRED: MULTIMETER**

| SYMPTOM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| Squeaking Noise While Belt Moves | Main motor belt may be worn or damaged. | Inspect main motor belt. Replace belt as necessary. |
| | Motor pulley to roller pulley alignment. | Check alignment. Align as necessary. |
| Groaning Noise During Incline | Faulty lift motor. | Replace the lift motor. |
| | Obstruction in lift mechanism. | Inspect mechanism for interference. |
| Groaning Noise on Footfall | Excessive friction between deck and striding belt. | Perform belt and deck test. (See Section 2) Replace belt if necessary. |
| Display Keys Not Responding | Faulty ribbon cable connection. | Perform keypad test. Verify that the two ribbon connections are attached properly to the display board. Reseat ribbon cable connections and verify operation. |
| | Worn or marred overlay assembly. | Replace overlay assembly. |
| Unit Pauses or Randomly Resets | Intermittent power source. | Make certain unit is connected to a $120V_{AC}$@15A. power source. |
| | Damaged ground terminal on line cord. | Replace line cord. |
| | Line cord improperly seated in electrical outlet. | Inspect power connection at electrical outlet and at machine for proper contact. |
| | Emergency stop magnet not properly positioned or disengaged. | Engage the emergency stop magnet. |
| | Loose connections at display console. | Secure all connections at display console board. |
| | Stop switch is false triggering. | Replace stop switch. |
| | Damaged main wiring harness. | Replace the main wiring harness. |
| | Anti-static brush not making contact with drive belt. | Check contact of anti-static brush and adjust if necessary. |

## Troubleshooting Guide - Continued

**SPECIAL SERVICE TOOLS REQUIRED: MULTIMETER**

| SYMPTOM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| Striding Belt Traveling Beyond Tracking Limits | Striding belt needs to be tensioned or tracking needs adjustment. | Tension striding belt. Adjust striding belt tracking. |
| | Worn striding belt. | Perform belt and deck test. (Section 2) Replace belt if necessary. |
| | Unit is not level. | Refer to the operation manual for leveling procedure. |
| Striding Belt Not Centered | Striding belt requires adjustment. | Tension striding belt. Adjust striding belt tracking. |
| Lift Motor Will Incline Only | Wax/lift board not receiving proper incline positioning information. | Check connections to wax/lift board. Check operation of "home" switch. |
| Lift Motor Inoperative | FUSE1 is open. | Inspect wax/lift board for damaged/burned components. Replace board as necessary. |
| | | Inspect wiring between wax/lift board, motor controller, and lift motor switch. Replace as necessary. |
| | FUSE2 or FUSE3 is open. | Disconnect lift motor and make resistance checks.<br>Verify approximately 30 ohms from the black to red wire.<br>Verify approximately 15 ohms from the white to red wire.<br>Verify approximately 15 ohms from the white to black wire.<br>Replace lift motor if necessary. |

## Troubleshooting Guide - Continued

**SPECIAL SERVICE TOOLS REQUIRED: MULTIMETER**

| SYMPTOM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| LifePulse® System Does Not Respond or Displays Incorrect Reading | Dirty LifePulse® sensors. | Wipe sensors with a clean soft cloth. Verify proper operation with the LifePulse® test. |
| | Pace over 4.5 mph (7.5kph) while attempting to read heart rate. | Slow pace to less than 4.5 mph (7.5kph). |
| | User may have an unusual heart condition/signal. | Have several different people grasp sensors to detect any unusual variance. |
| | Loose connections at display console or ergo bar. | Secure connections at display console and ergo bar. |
| | Faulty LifePulse® sensors. | Replace LifePulse® sensors. |
| | Faulty display console board. | Replace display console board. |
| Console Displays Reading with No Heart Rate Signal Present | Wiring harness pinched at handlebar or handrail. | Repair or replace wiring harness if necessary. |
| No Chest Strap Detected | Chest strap sensors not making good contact with body. | Tighten chest strap and moisten sensors to make better contact with skin. |
| | Exceeding usable monitoring range. | Move within 3 feet (1 meter) of receiver. |
| | Faulty connection at receiver. | Check connection on receiver. Replace receiver if necessary. |
| | Faulty chest strap. | Replace chest strap. |
| | Faulty receiver. | Verify $+5V_{DC}$ at connector P6 on Pin1 with respect to ground. If voltage is present, then replace the receiver, if not, replace display console board. |
| | Telemetry turned OFF. | Enter MANAGER CONFIG and turn telemetry feature ON. |
| | Faulty connection at telemetry cable or receiver. | Check cable jack and receiver connection. |

## Troubleshooting Guide - Continued

**SPECIAL SERVICE TOOLS REQUIRED: MULTIMETER**

| SYMPTOM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| Abnormally High LifePulse® Readings | Electromagnetic interference from electronic devices such as cellular telephones, televisions, or computers in close proximity. | Increase the distance between interfering source and treadmill. |
| | Electromagnetic interference from another telemetry device. | Increase the distance between the interfering source and treadmill. |
| IMMOBILIZED | "Immobilized" safety feature is activated. | T9i: Press and hold SPEED DOWN key and press PAUSE key to toggle ON/OFF.<br><br>T9e: Press SPEED DOWN key briefly and then PAUSE key to toggle ON/OFF. |
| MOTOR CONTROLLER COMM BAD: CHECK HARNESS BETWEEN LIFT & CONTROLLER -P9/P3 | Faulty wiring harness. | Reset connections at wax/lift board connector P9 and motor controller board connector P3. |
| MOTOR CONTROLLER COMM BAD: CHECK POWER TO MOTOR CONTROLLER. | Faulty motor controller. | Verify line voltage at P1 on the motor controller. If voltage exists, replace motor controller. |
| WAX/LIFT BOARD COMM BAD: CHECK POWER ON LIFT | Faulty wax/lift board. | Verify if the LED7 (green) and LED8 (red) are lit on the wax/lift board. If not lit then replace wax/lift board. |
| BOTH LIFT & CONTROLLER COMM BAD: CHECK HARNESS BETWEEN CONSOLE & LIFT-P1/P1 | Intermittent wire harness connections. | Reseat connection at wax/lift board connector P1 and display console board connector P1. |
| SYSTEM CONFIGURED TWO WIRED | Motor controller jumper not properly configured. | Reseat jumper at JW1 on both pins. |

## Troubleshooting Guide - Continued

**SPECIAL SERVICE TOOLS REQUIRED: MULTIMETER**

| SYMPTOM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| INCLINE INOPERATIVE – CONTINUE IF DESIRED | Wax/lift board not receiving proper incline positioning information. | Refer to the diagnostics section for INCLINE AUTOMATIC to verify proper operation. |
| | | Check connections to wax/lift board. |
| | | Inspect wiring for damage. Repair or replace as necessary. |
| | Lift motor adjustment incorrect. | Adjust lift motor. |
| | Faulty lift motor. | Cycle motor using INCLINE MANUAL and verify $120V_{AC}$ at P7 on wax/lift board. Replace lift motor if voltage is incorrect. |
| SCI ERROR | Faulty wire harness connection. | Reseat all connections on display console and wax/lift board. |
| DYNAMIC CURRENT TRIP | Excessively worn striding belt or deck. | Perform belt and deck test. (Section 2) Replace belt if necessary. |
| | Insufficient power source. | Make certain unit is connected to a power source capable of $120V_{AC}$@15A. |
| CHECKSUM ERROR XXXX | Faulty display console. | Replace display console. |
| NOTIFY MAINTENANCE MOTOR CONTROLLER COMM BAD ERROR | Faulty motor controller. | Replace motor controller |
| | | Perform belt and deck test (Section 2) to ensure that excessive belt friction did not contribute to motor controller failure. Replace belt if necessary. |
| NOTIFY MAINTENANCE INCLINE TIMEOUT ERROR | Faulty lift motor. | Cycle motor using INCLINE MANUAL and verify $120V_{AC}$ is present on P7 of wax/lift board. Replace lift motor if necessary. |
| | Faulty "home" switch or associated wiring. | Cycle motor using INCLINE MANUAL to verify proper operation. |
| | | Verify wiring for continuity. Repair or replace wiring as necessary. |

## Troubleshooting Guide - Continued

**SPECIAL SERVICE TOOLS REQUIRED: MULTIMETER**

| SYMPTOM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| NOTIFY MAINTENANCE HOME SWITCH ERROR | Faulty connection to "home" switch. | Verify continuity and proper connection of "home" switch wiring. |
| | Faulty "home" switch. | Check "home" switch operation with ohmmeter. Replace as necessary. |
| UNABLE TO OBTAIN TARGET SPEED | Insufficient power source. | Make certain unit is connected to a $120V_{AC}$@15A power source. |
| | Striding belt or deck may have excessive wear. | Perform belt and deck test. (Section 2) Replace belt if necessary. |
| | Faulty motor controller. | Replace motor controller. |
| NOTIFY MAINTENANCE SPEED SENSOR ERROR<br>**NOTE - This error will only appear after a workout but allow the unit to function.** | Faulty speed sensor or associated wire harness. | Enter SPEED MANUAL mode and note RPM reading. For erroneous or zero reading:<br>Check continuity of sensor wiring harness. Repair or replace wire harness as necessary.<br>If wire harness continuity checks replace speed sensor. |
| EXTERNAL ROM FAILURE | Faulty console board. | Replace console board. |
| INCLINE TIMEOUT ERROR | Faulty "home" switch or associated wiring. | Cycle motor using INCLINE MANUAL to verify proper operation. |
| | | Verify wiring for continuity. Repair or replace wiring as necessary. |
| HOME SWITCH ERROR | Faulty "home" switch. | Check "home" switch operation with ohmmeter. Replace as necessary. |
| NO AC POWER ERROR | No AC power on wax/lift board. | Check connection at P5. |
| SPEED SENSOR ERROR | Faulty optical sensor or associated wiring. | Enter SPEED MANUAL mode and note RPM reading. For erroneous or zero reading:<br>Check continuity of sensor wiring harness. Repair or replace wire harness as necessary.<br>If wire harness continuity checks, replace speed sensor. |

# Troubleshooting Guide - Continued

**SPECIAL SERVICE TOOLS REQUIRED: MULTIMETER**

| SYMPTOM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| STATIC CURRENT TRIP | Faulty main motor. | Replace main motor. |
| MAX TEMPERATURE TRIP | Worn belt and deck. | Perform belt and deck test. (Section 2) Replace belt if necessary. |
| MAXIMUM VOLTAGE TRIP | Striding belt was forced, causing "generator" action to main motor. | Do not force striding belt in any direction. |
| FAULT LINE 1 ERROR | Faulty main motor. | Replace main motor. |
| No Audio | Faulty headphones. | Replace headphones. |
| | Faulty headphone jack assembly. | Replace headphone jack assembly. |
| | Faulty cable to headphone jack assembly. | Replace headphone jack assembly. |
| | Faulty single board computer. | Replace single board computer. |
| | Faulty interface board. | Replace interface board. |
| | Air/cable setting may be incorrect. | Follow setup procedures in operation manual. |
| Screen Does Not Respond to Touch | Faulty touch screen. | Replace LCD touch screen. |
| | Faulty single board computer. | Replace single board computer. |
| Screen Does Not Turn On and No Audio | No DC power. | Check wax/lift board for +12$V_{DC}$ and +5$V_{DC}$. Replace board if necessary. |
| | | Check wax/lift wire harnesses and connectors. |
| No Beeps Heard at Power-Up. After 15-20 Seconds Console Shows “SYSTEM COMM INIT TIME-OUT” | Interface board did not power-up. | Check interface board power cable. |
| | | Check power and cable coming from wax/lift board. |
| Only One Beep Heard at Power-Up. Second Beep After 15-20 Seconds | Interface board was unable to establish communications with all of the treadmill modules. Console shows error message of module that didn’t respond. | Perform a system communication test. |
| One Beep Heard at Power-Up Followed by One Burp Audio | Interface board checksum error detected. Console shows “SYSTEM COMM INIT TIME-OUT” error message. | Update interface board with the latest software. |

## Troubleshooting Guide - Continued

**SPECIAL SERVICE TOOLS REQUIRED: MULTIMETER**

| SYMPTOM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| One Beep Heard at Power-Up Followed by 3 Beeps. No Other Beeps and Screen Stays Black | Console board did not power-up. Interface board has successfully powered up and all treadmill modules are responding properly. | Check console board power cable. |
| One Beep Heard at Power-Up Followed by 3 Beeps. After 15-20 Seconds Beep Heard, Screen Lit | System is running but display cable isn't connected properly or is faulty. | Check display cable. |
| One Beep Heard at Power-Up Followed by 3 Beeps After 15-20 Seconds Beep Heard, Screen Black | Faulty backlight power inverter. | Check for disconnected or faulty inverter cables. |
| | | Replace backlight inverter. |
| One Beep at Power-Up | Interface board has power and is up and running. | None needed. |
| One Beep and Then One Burp at Power-Up | Interface board has power and has detected a checksum error. Unit will not work. | Replace interface board. |
| One Beep Followed by 3 Beeps in a Row at Power-Up | Interface board is running and has successfully communicated with all of the treadmill modules. | None needed. |
| Channels Won't Change | Faulty Keypad. | Perform keypad test. Replace keypad if defective. |
| | Faulty interface board. | Replace interface board. |
| Audio Level Won't Change | Faulty Keypad. | Perform keypad test. Replace keypad if defective. |
| | Faulty interface board. | Replace interface board. |
| Unable to Receive Any Channels Using Cable | Air/cable setting may be incorrect. | Follow setup procedures in operation manual. |
| | Faulty coaxial cable. | Replace coaxial cable. |
| | Coaxial Cable may be unplugged. | Reconnect cable. |
| Snow-Like Appearance On Screen | Air/cable setting may not be correct. | Follow setup procedures in operation manual. |
| | Faulty coaxial cable. | Replace coaxial cable. |

## Troubleshooting Guide - Continued

**SPECIAL SERVICE TOOLS REQUIRED: MULTIMETER**

| SYMPTOM | PROBABLE CAUSE | CORRECTIVE ACTION |
|---|---|---|
| Screen is Blank | Faulty LCD backlight. | Replace LCD touch screen. |
| | Faulty backlight power inverter. | Replace backlight inverter. |
| | LCD Screen failure. | Replace LCD touch screen. |
| | Faulty single board computer. | Replace single board computer. |
| Screen is Dark | Faulty LCD backlight. | Replace LCD touch screen. |
| | Faulty backlight power inverter. | Replace backlight inverter. |
| Wrong Keys Activate When Touch Screen is Touched | Touch screen not calibrated. | Calibrate touch screen |
| | Faulty touch screen. | Replace LCD touch screen. |
| No Keys Activate When Touch Screen is Touched | Faulty touch screen. | Replace LCD touch screen. |
| | Faulty single board computer. | Replace single board computer. |
| Display Does Not Light Up But Beeps | Faulty backlight power inverter. | Replace backlight inverter. |
| | Faulty touch screen. | Replace LCD touch screen. |

## Notes

*Chapter 2*

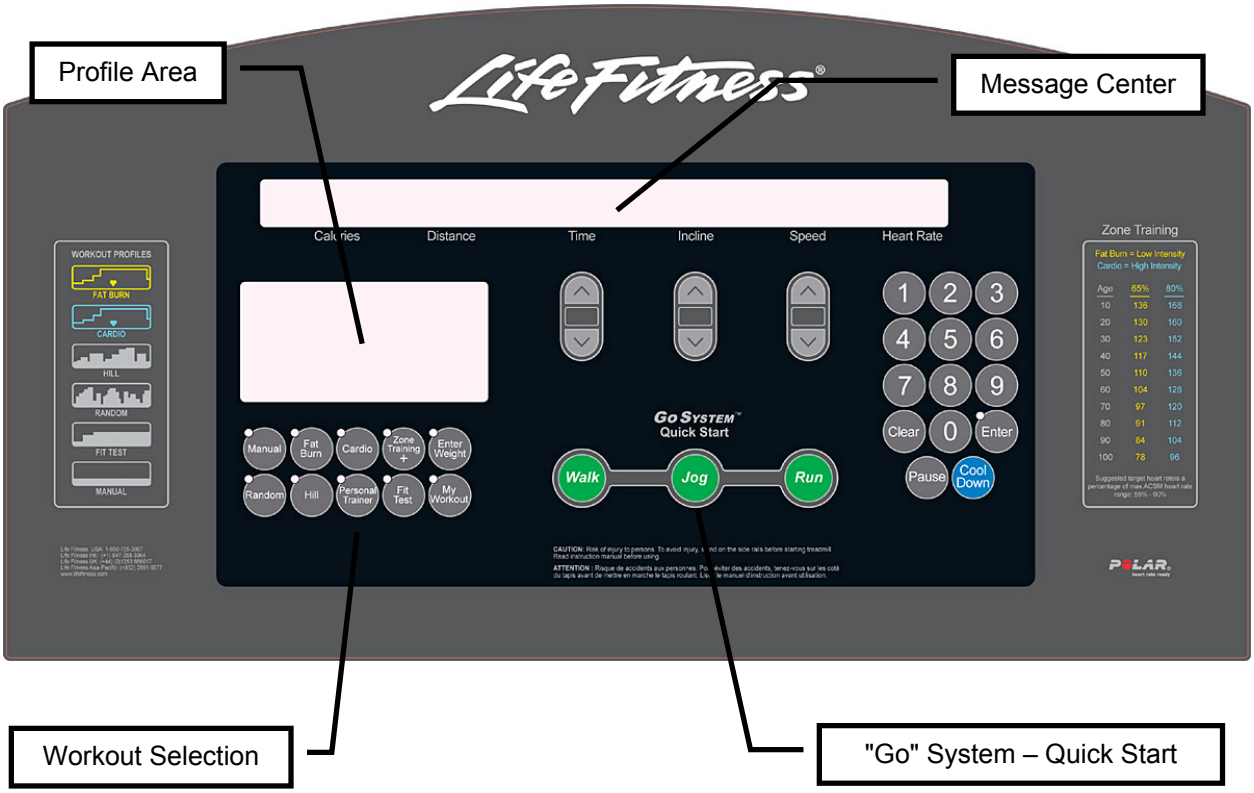
# SECTION 2

# DIAGNOSTICS
# T9i LED System

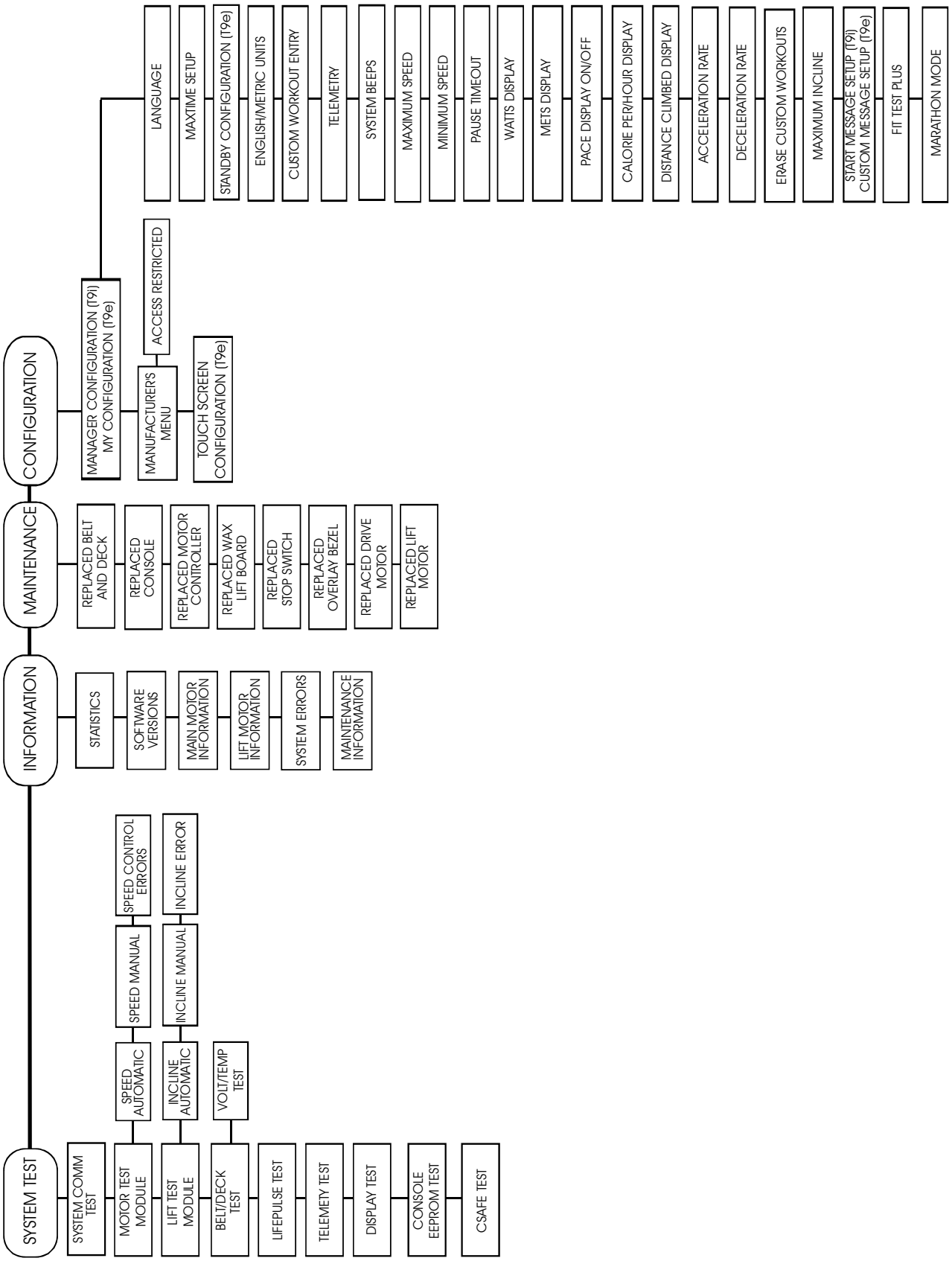
## NOTES

## (LED Console)

Use the following to aid you in control and message locations:

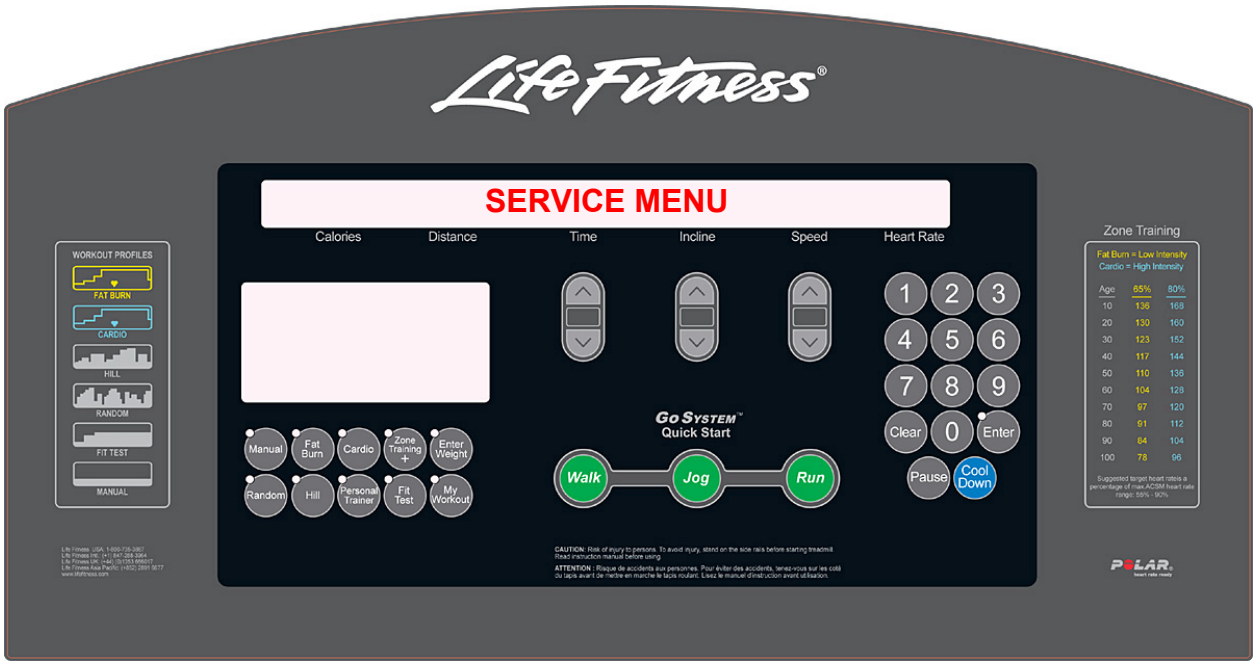


# Diagnostic Map



# Entering Diagnostic Mode

Diagnostic mode is used extensively by service personnel as an information gathering and repair tool. It also has the capability of adjusting various system settings.




Diagnostic mode can be entered by one of three methods:

Hold down the PAUSE key and press the STOP Button.
Hold down the PAUSE key and press CLEAR key twice.
Hold down the PAUSE key while power is being applied.

It should take approximately 3-4 seconds to enter the diagnostic mode and view this message:
SERVICE MENU

Followed by:
USE ARROW KEY TO SCROLL THROUGH LIST

Use any of the ARROW keys to scroll through the four main diagnostic categories.
SYSTEM TEST

CONFIGURATION

MAINTENANCE

INFORMATION

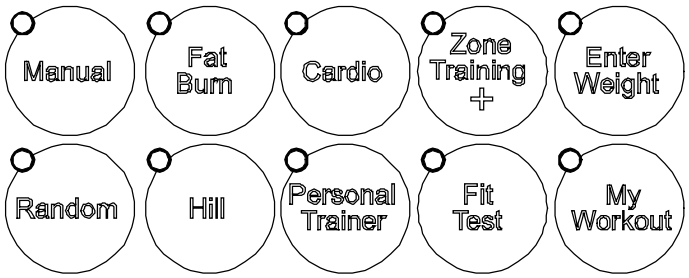
Press the ENTER key to select a diagnostic category.

► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# Diagnostic Quick- Keys

Diagnostic selections can also be made by pressing a combination of program keys. The following is the list of diagnostic tests and their program key combination. All blank fields in the chart are considered “OFF” for that program key.

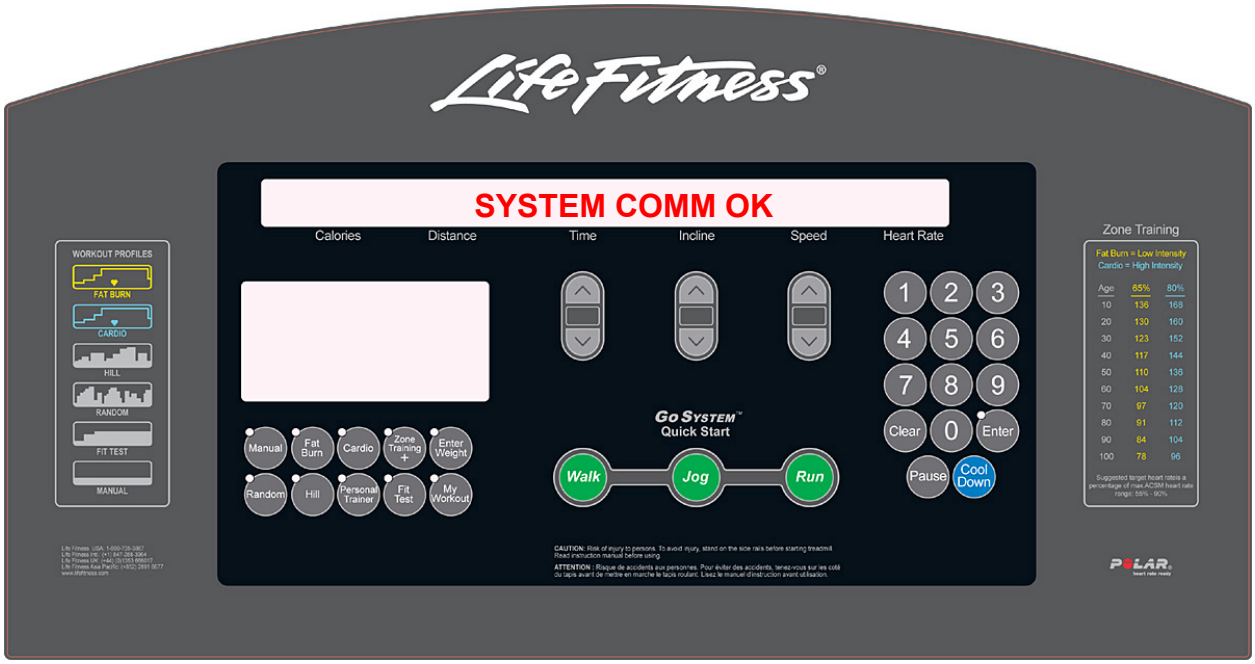
**NOTE –Diagnostic mode has to be entered to take advantage of these program key combinations.**




| PROGRAM KEYS→ DIAGNOSTIC TESTS ↓ | MANUAL | FAT BURN | CARDIO | RANDOM | HILL | PERSONAL TRAINER | FIT TEST | ZONE TRAINING | MY WORKOUT | ENTER WEIGHT |
|---|---|---|---|---|---|---|---|---|---|---|
| **SYSTEM TESTS** | | | | | | | | | | |
| BELT/DECK TEST | | | | | | ON | | | | |
| LIFEPULSE® TEST | | ON | | | | | | | | |
| TELEMETRY TEST | | | ON | | | | | | | |
| DISPLAY TEST | ON | ON | ON | ON | ON | ON | ON | ON | ON | ON |
| COMM TEST | | | | ON | | | ON | | | |
| CONSOLE EEPROM TEST | | ON | | | | | ON | | | |
| CSAFE TEST | | | ON | | | ON | | | | |
| SPEED AUTO | | | | ON | | | | | | |
| SPEED MANUAL | ON | | | ON | | | | | | |
| SPEED ERROR | | | | ON | | ON | | | | |
| INCLINE AUTO | | | | | ON | | | | | |
| INCLINE MANUAL | ON | | | | ON | | | | | |
| INCLINE ERRORS | | | | | ON | ON | | | | |
| **INFORMATION** | | | | | | | | | | |
| STATISTICS | | ON | ON | | | | | | | |
| SOFTWARE VERSION | | ON | | ON | | | | | | |
| MAINTENANCE INFO | ON | | ON | | | | | | | |
| MAIN MOTOR INFO | | | ON | ON | | | | | | |
| INCLINE MOTOR INFO | | | ON | | ON | | | | | |
| SYSTEM ERROR INFO | ON | ON | | | | | | | | |
| **MAINTENANCE** | | | | | | | | | | |
| MAINTENANCE MENU | ON | | | | | | | | | |

# System Test - System Communication Test

This test automatically checks the ability of all electronic boards to communicate with each other.




The system communications test starts automatically. If a module does not respond in an allotted time, an error message will be displayed.

If the motor controller module does not communicate, the message is:
MOTOR CONTROLLER COMM BAD

If the harness is disconnected the message is:
CHECK HARNESS BETWEEN LIFT AND CONTROLLER – P9/P3

If the motor controller has no power, the message is:
CHECK POWER TO THE MOTOR CONTROLLER

If the wax/lift board module does not communicate, the message is:
CHECK POWER TO WAX/LIFT BOARD

If the motor controller module and the wax/lift board module do not communicate, the message is:
BOTH LIFT AND CONTROLLER COMM BAD

If the wax/lift and motor controller have no power, the message is:
CHECK POWER ON LIFT AND CONTROLLER

## System Test - System Communication Test – Continued

If a portion the main harness from the console to the wax/lift board is faulty, the message is:

CHECK HARNESS BETWEEN CONSOLE AND LIFT – P1/P1

If both the motor controller module and the wax/lift board module are communicating but the console is unable to perform a loop-back test, the message is:

SYSTEM CONFIGURED TWO WIRE

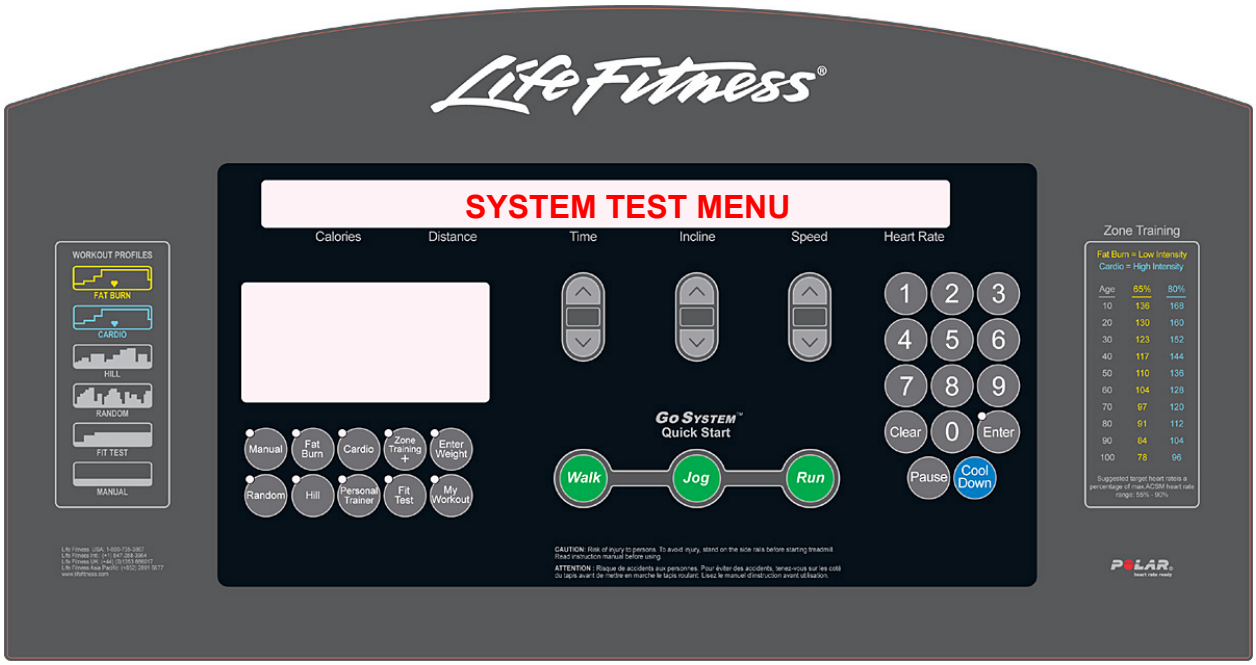
If all system communications are functioning normally the message, SYSTEM COMM OK will be displayed briefly. The system will then automatically advance to the SYSTEM TEST MENU.

Use any of the ARROW keys to scroll through the available tests in the SYSTEM TEST MENU.
Press the ENTER key to access any of the individual tests.

- ► Press the CLEAR key to return to the SERVICE MENU screen.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# System Test Menu

This menu allows hardware/software testing of critical treadmill components.




Use any of the ARROW keys to scroll through the available system tests:

SYSTEM TEST

MOTOR TEST MODULE

CSAFE TEST

CONSOLE EEPROM

DISPLAY TEST

TELEMETRY TEST

LIFEPULSE TEST

BELT/DECK TEST

LIFT TEST MODULE

► Press the ENTER key to access any of the individual tests.
► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# System Test – Speed Automatic

This test allows evaluation of the ability of the main motor and motor controller to maintain a target speed (MPH).

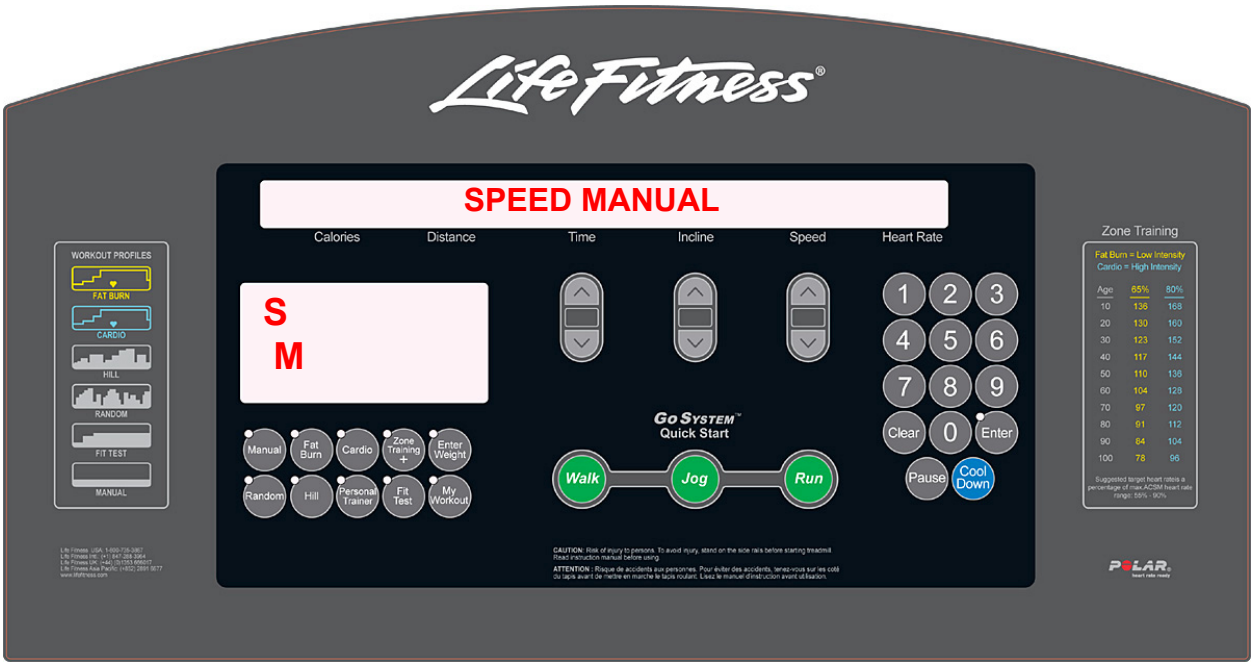

During this test, the letters SA (Speed Automatic) will appear in the profile window. A TARGET speed is then selected via the speed ARROW keys. The TARGET and ACTUAL speed (as calculated by the optical speed sensor) are displayed in the message center.

The incline system can be adjusted during this test. The display will show the incline status briefly when any incline keys have been pressed, and then revert to speed information.

- ► Press the CLEAR key to exit the SPEED AUTOMATIC test and return to the SYSTEM TEST MENU.
- ► Press the ENTER key to advance to the SPEED MANUAL test.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# System Test – Speed Manual

This test allows evaluation of the ability of the main motor and motor controller to maintain a target speed (RPM).



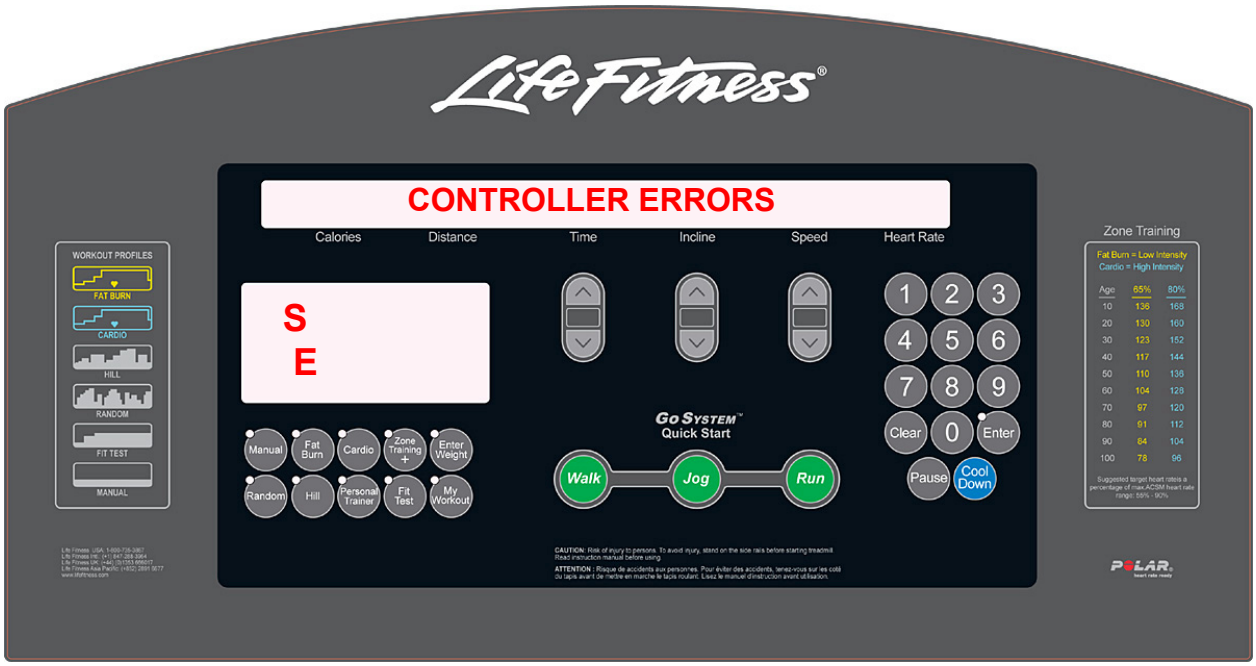

During this test, the letters SM (Speed Manual) will be displayed in the profile window. A TARGET motor RPM is selected via the speed ARROW keys. The TARGET and ACTUAL motor RPM (calculated by the speed feedback sensor) is displayed in the message center.

The incline system can be adjusted during this test. The display will show the incline status briefly when either incline key have been pressed, and then reverts to motor RPM information.

- ► Press the CLEAR key to exit the SPEED MANUAL test and return to the SPEED AUTOMATIC test.
- ► Press the ENTER key to advance to the CONTROLLER ERRORS test.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# System Test – Controller Errors

This test allows viewing of existing motor controller error conditions.




During this test, the letters SE (Speed Errors) will be displayed in the profile window.

The following is a list of possible motor controller error conditions:

STATIC CURRENT TRIP

MAX TEMPERATURE TRIP

MAXIMUM VOLTAGE TRIP

DYNAMIC CURRENT TRIP

FAULT LINE 1 ERROR

SCI ERROR

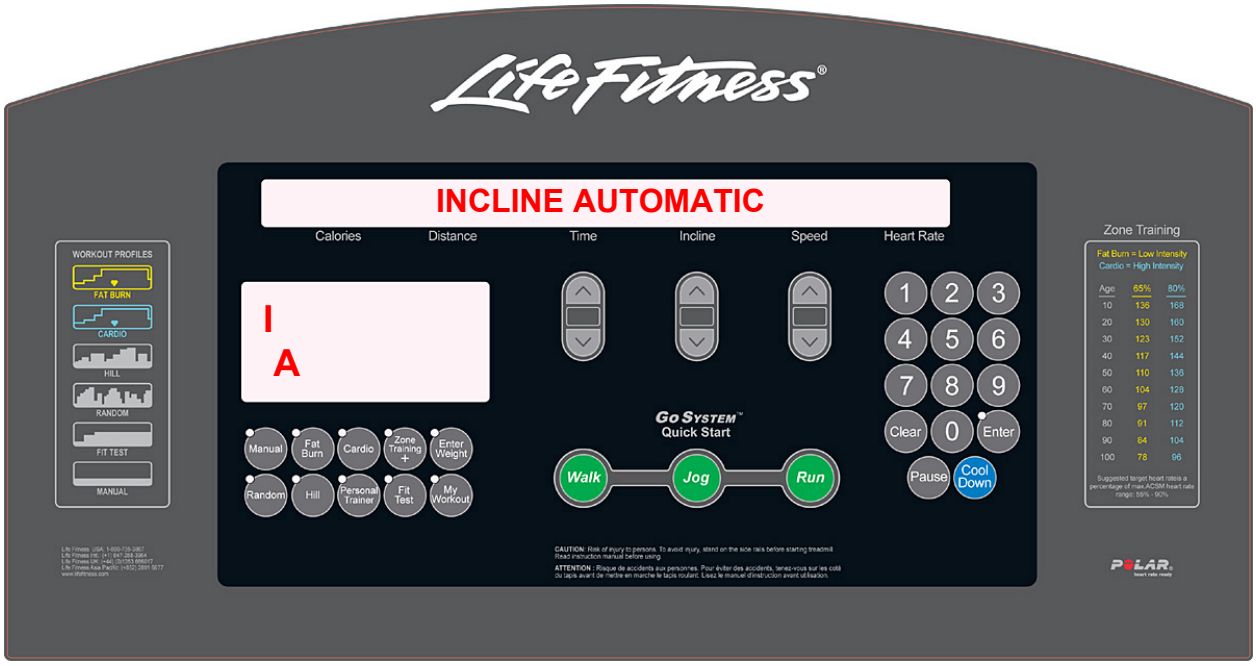
SPEED SENSOR ERROR

Should an error be displayed, refer to the troubleshooting section for corrective action.

► Press the CLEAR key to exit the CONTROLLER ERRORS test and return to the SPEED MANUAL test.
► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# System Test – Incline Automatic

This test allows evaluation of the lift motors ability to automatically move the deck to a target angle. It also provides information regarding "home" switch status.




During this test, the letters IA (Incline Automatic) appear in the profile window. A TARGET incline angle is selected via the incline ARROW keys. Both the TARGET and ACTUAL incline are shown in the message center along with a COUNT that defines the movement request in software terms.

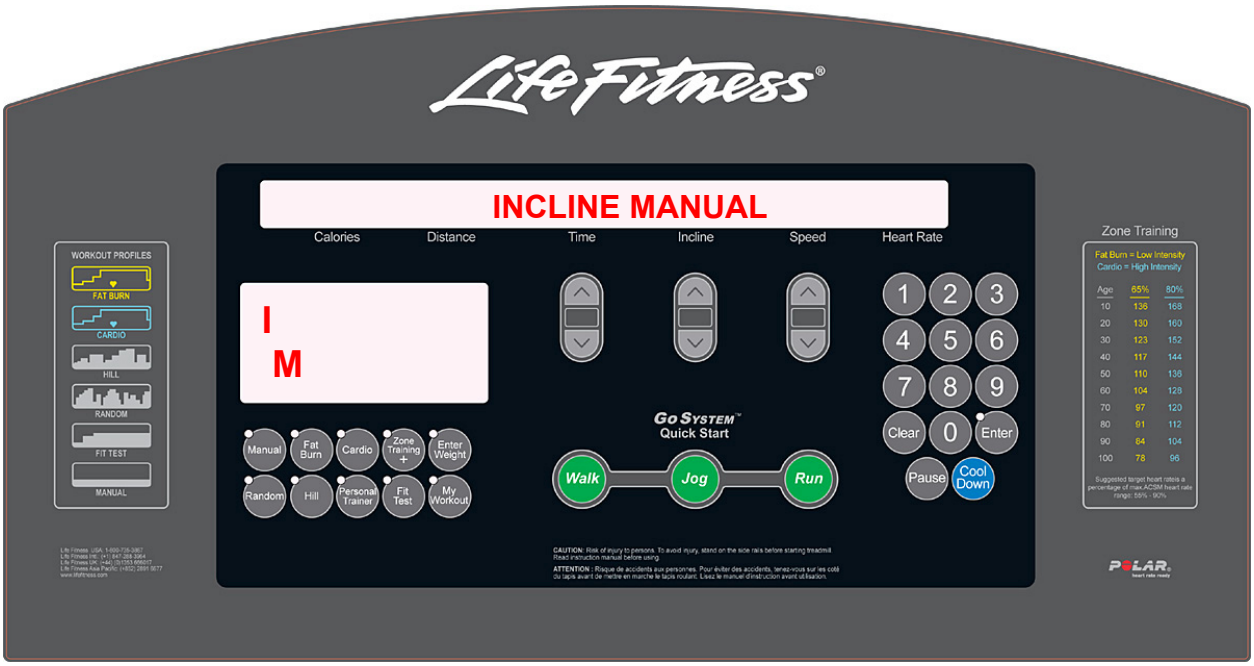
The status of the "home" switch will be displayed in the profile window. A "0" displayed indicates there is no deck incline and the "home" switch in the closed position. As the unit is inclined, the "0" displayed should disappear to indicate that the "home" switch is no longer closed.

The belt speed can be also be adjusted during this test. The display will show speed information briefly while the speed keys are being pressed, and then revert to the incline information.

- ► Press the CLEAR key to exit the INCLINE AUTOMATIC test and return to the SYSTEM TEST Menu.
- ► Press the ENTER key to advance to the INCLINE MANUAL test.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# System Test – Incline Manual

This test allows evaluation of the lift motors ability to manually move the deck to a target angle. It also provides information regarding "home" switch status.




During this test, the letters IM (INCLINE MANUAL) appear in the profile window. This test allows operation of the lift motor via the incline ARROW keys. The COUNT (defines the movement request in software terms) and ACTUAL incline are displayed in the message center.
**NOTE – The lift motor will only continue to operate while the incline ARROW keys are being pressed.**

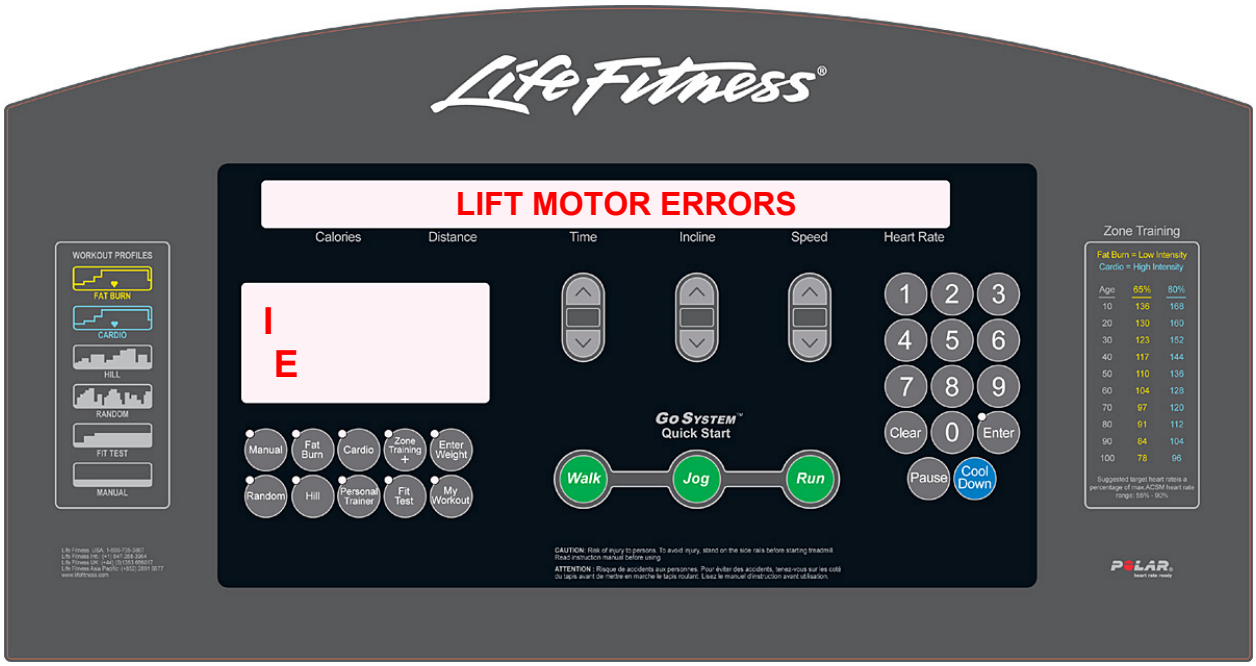
The status of the "home" switch will be displayed in the profile window. A "0" displayed indicates there is no deck incline and the "home" switch in the closed position. As the deck is inclined, the "0" displayed should disappear to indicate that the "home" switch is no longer closed.

The belt speed can also be adjusted during this test. The display will show speed information briefly while the speed keys are being pressed, and then revert to the incline information.

- ► Press the CLEAR key to exit the INCLINE MANUAL test and return to the INCLINE AUTOMATIC test.
- ► Press the ENTER key to advance to the INCLINE ERRORS test.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# System Test – Lift Motor Errors

This test allows viewing lift motor errors that have occurred.




During this test, the letters IE (Incline Errors) will be displayed in the profile window.

The following is a list of the possible lift motor errors:

INCLINE TIMEOUT ERROR

HOME SWITCH ERROR

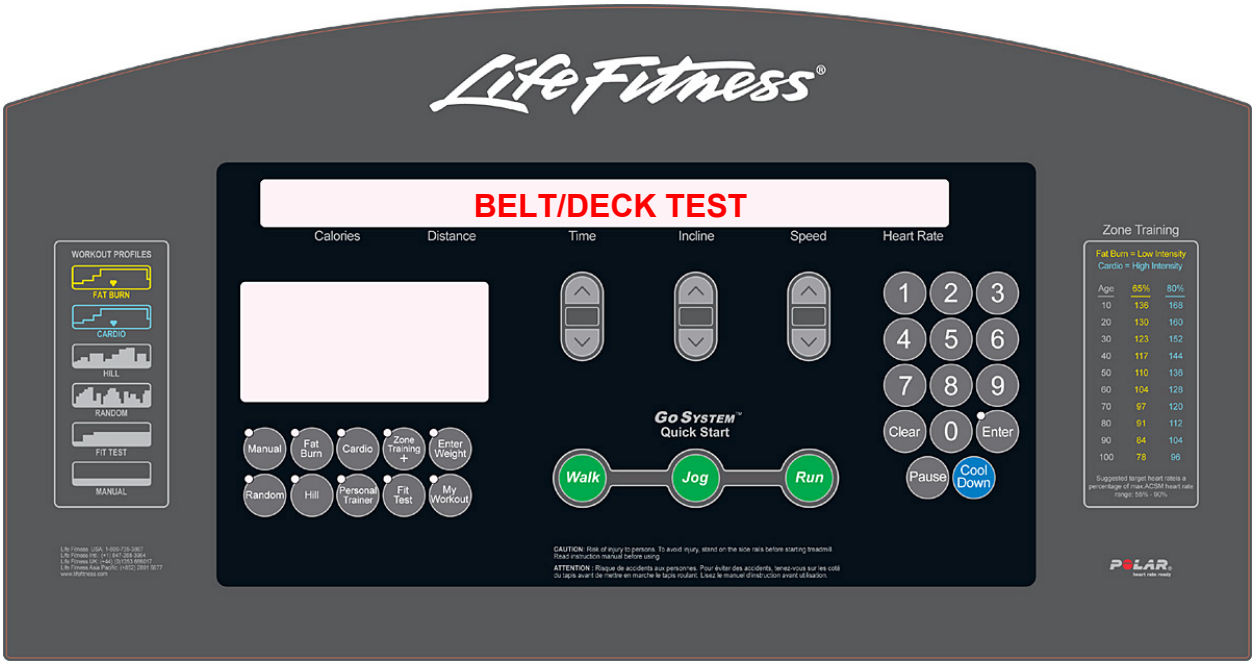
NO AC POWER ERROR

Should an error be displayed, refer to the troubleshooting section for corrective action.

- ► Press the CLEAR key to exit the LIF MOTOR ERRORS test and return to the INCLINE MANUAL test.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# System Test – Belt/Deck Test

This test allows evaluation of the belt and deck condition by monitoring main motor power consumption and motor controller heat sink temperature.




After the test begins, the following two messages will immediately scroll through the message center:

RELATIVE POWER METER

RECOMMEND SPEED ABOVE 3.5 MPH

Immediately followed by the message:

PERCENT XXX WATT XXX

| | |
|---|---|
| PERCENT (0-100) | Percentage used of available power. |
| WATT (410-1400) | Wattage supplied by the motor controller for powering main motor. |
| XXX | Indicates integer values. |

Pressing the COOL DOWN key will display additional information:

VOLTAGE XXX TEMP XX C

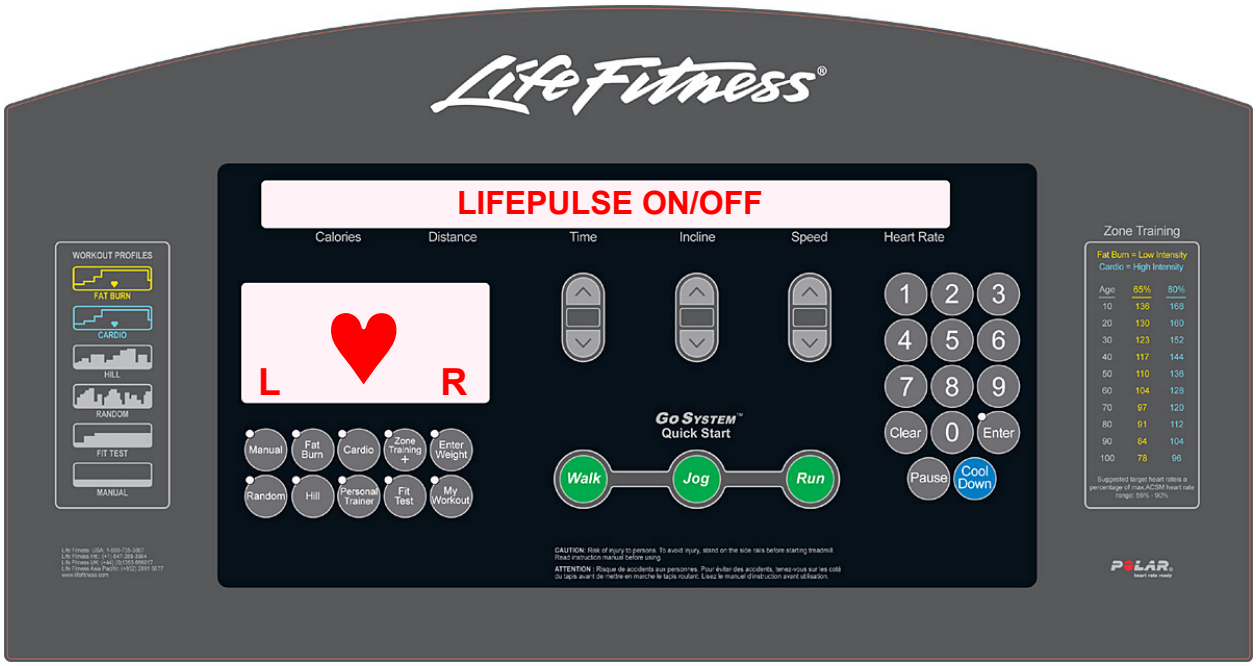
| | |
|---|---|
| VOLTAGE (0-500) | Bus voltage of the motor controller. (This is not the input line voltage) |
| TEMP (0-150) | Temperature of the motor controller heat sink. (Degrees Celsius) |
| XXX | Indicates integer values. |

Both the speed and incline systems can be adjusted during this test. The display will show this information briefly when any incline or speed keys have been pressed, and then revert to belt/deck information.

**Belt and Deck Evaluation Procedure: Walk on treadmill for one minute at 3.5 mph. Increase speed to 7 mph and note power consumption (watt) reading after one minute. Power consumption in excess of 1100 watts indicates excessive belt to deck wear. Replace belt and deck (deck may be inverted once) as needed.**

- ► Pressing the PAUSE key will suspend updating the display. Pressing PAUSE again will resume display update.
- ► Press the CLEAR key to exit the BELT/DECK TEST and return to the SYSTEM TEST menu.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

This test allows evaluation of the LifePulse® system.




A heart shape will then appear in the profile window indicating that LifePulse® is ready to acquire a signal.

The system will now sense when either hand is in proper contact with the LifePulse® sensors by displaying an "L" or "R" next to the heart in the profile window.

Once the LifePulse® system acknowledges that both hands are in place on the sensors and providing the proper signals, a timer will start. This timer running is an indication that the LifePulse® system is now performing the necessary initial calculations to provide a continuous accurate heart rate value. Once heart rate data is displayed, the counter will stop.

| | |
|---|---|
| ON/OFF | Status of LifePulse® feature.<br>**NOTE - This test will not function if the LifePulse® feature has been disabled.** |
| GAIN (0-99) | Value displayed is proportional to the amount of signal that is being provided by the LifePulse® sensors. The higher the gain values the lower the signal that is being evaluated by the LifePulse® system. |
| CONfidence (0-9) | Value displayed that indicates a confidence level for heart rate values displayed. Higher confidence readings indicate that LifePulse® is providing accurate readings while low confidence readings most often indicate poor contact with hand sensors. |

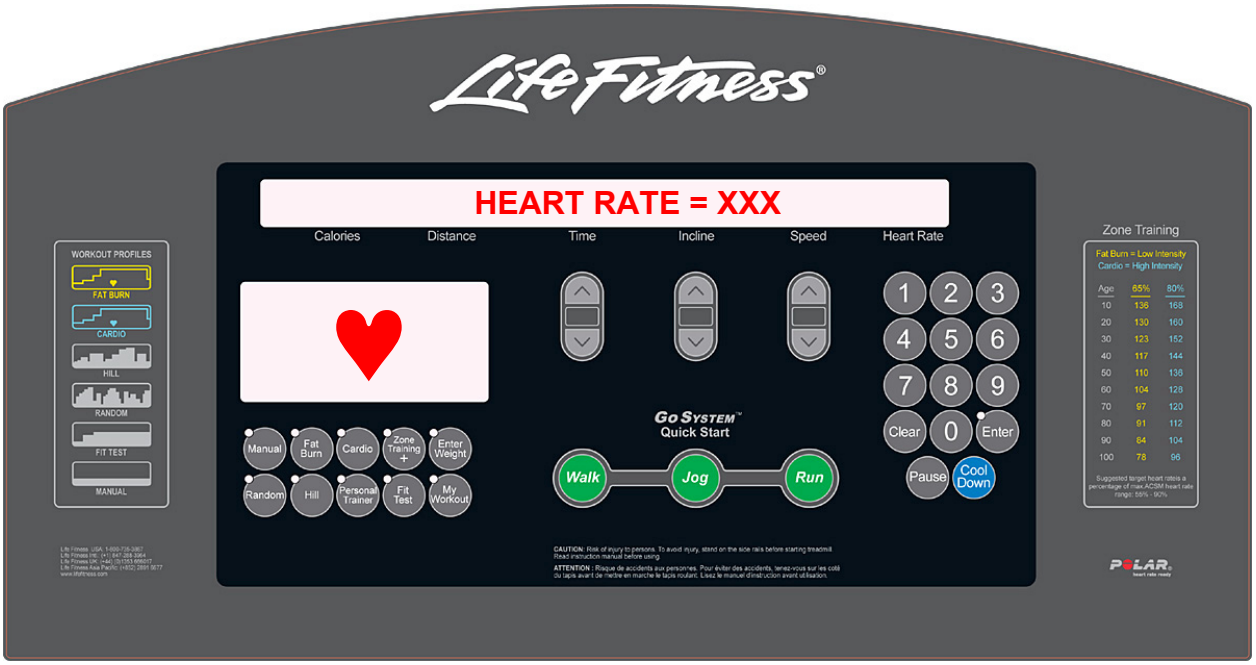
Both the speed and incline systems can be adjusted during this test. The display will show this information briefly when any incline or speed keys have been pressed, and then revert to LifePulse® information.

► Press the CLEAR key to exit the LIFEPULSE® TEST and return to the SYSTEM TEST Menu.
► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# System Test – Telemetry Test

**SPECIAL SERVICE TOOLS REQUIRED: POLAR® CHEST STRAP OR PULSE SIMULATOR**

This test allows evaluation of the heart rate telemetry feature.




The ENTER LED will flash (at heart beat rate) when the telemetry feature is on and the receiver is getting a signal from the Polar® transmitter. The heart rate value being transmitted by the Polar® strap will be displayed in the message center.

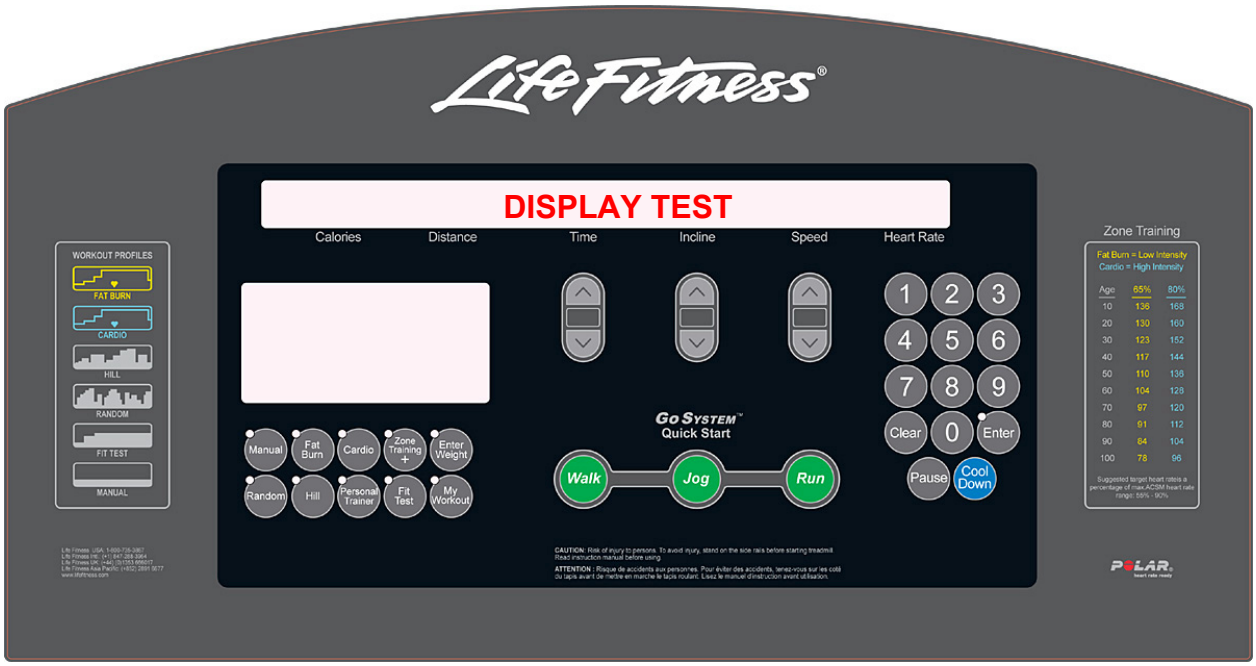
**NOTE – This test requires a Polar® compatible chest strap or pulse simulator.**

| | |
|---|---|
| ON/OFF | Status of telemetry feature.<br>**NOTE - This test will not function if the telemetry feature has been disabled.** |
| XXX | Indicates integer value. |

► Press the CLEAR key to exit the Heart Rate TELEMETRY test and return to the SYSTEM TEST MENU.
► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# System Test – Console Display Test

This test allows evaluation of all LEDs and keypad buttons on the display console.




The display test begins by lighting all LEDs in the display console simultaneously.

Pressing the following keys will result in a beeping sound and a corresponding character displayed in the message center, with the exception of the ENTER and CLEAR keys:

| KEY | DISPLAYED CHARACTER | | KEY | DISPLAYED CHARACTER |
|---|---|---|---|---|
| 0 | 0 | | PERSONAL TRAINER | K |
| 1 | 1 | | FIT TEST | L |
| 2 | 2 | | TIME UP | N |
| 3 | 3 | | INCLINE UP | P |
| 4 | 4 | | SPEED UP | Q |
| 5 | 5 | | TIME DOWN | R |
| 6 | 6 | | INCLINE DOWN | T |
| 7 | 7 | | SPEED DOWN | U |
| 8 | 8 | | WALK | V |
| 9 | 9 | | JOG | W |
| PAUSE | A | | RUN | X |
| COOL DOWN | B | | STOP | Y |
| MANUAL | C | | DOWN | Z |
| FAT BURN | D | | UP | S |
| CARDIO | E | | ZONE TRAINING + | F |
| RANDOM | H | | MY WORKOUT | M |
| HILL | J | | ENTER WEIGHT | G |

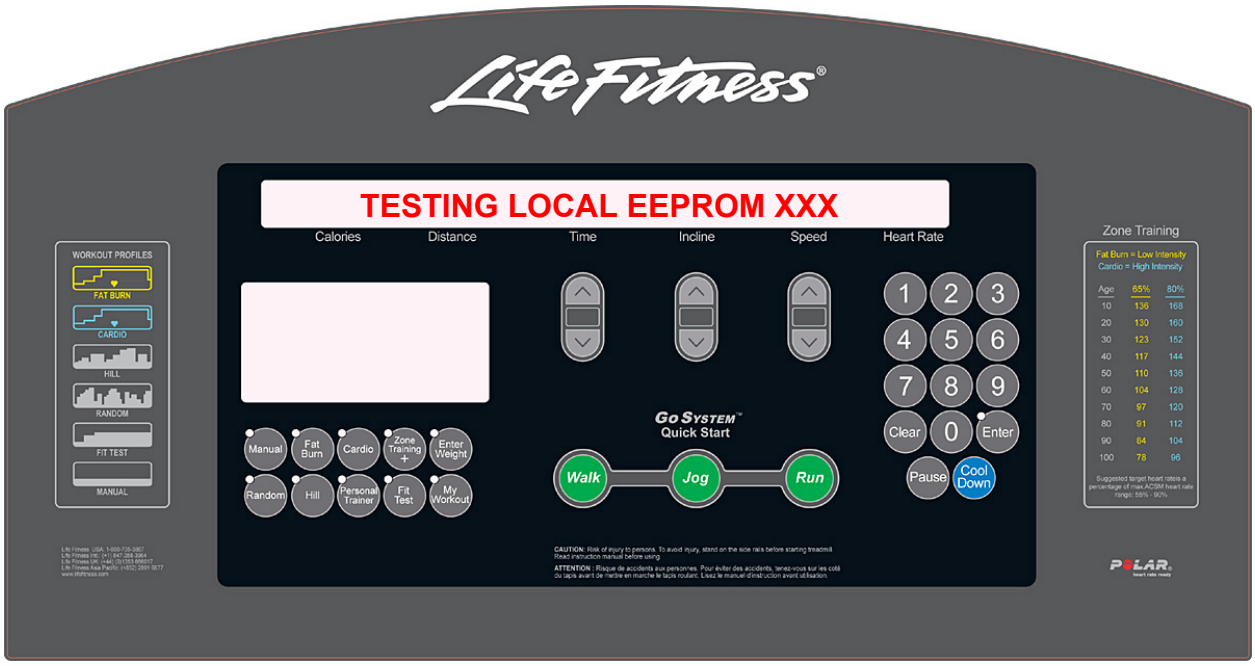
Removing the Emergency Stop switch during this test will result in the message:
REPLACE EMERGENCY STOP SWITCH

If ENTER is pressed at this time, the console will light each individual LED segment in a pattern that appears to "walk" across the display.

- ► Pressing the PAUSE key will suspend updating the display. Pressing PAUSE again will resume display update.
- ► Press the CLEAR key to exit the DISPLAY TEST and return to the SYSTEM TEST MENU.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# System Test – Console EEPROM Test

This test allows evaluation of the console "flash" memory integrated circuit.




This test will attempt to write electronic data to memory locations within the console EEPROM. It will then read this information back to verify its integrity.

This test runs automatically after the ENTER key is pressed.

The current memory location being tested is displayed.

The following is a list of possible information that can be displayed:

TESTING LOCAL EEPROM

EEPROM BAD AT XX

EEPROM TESTED GOOD

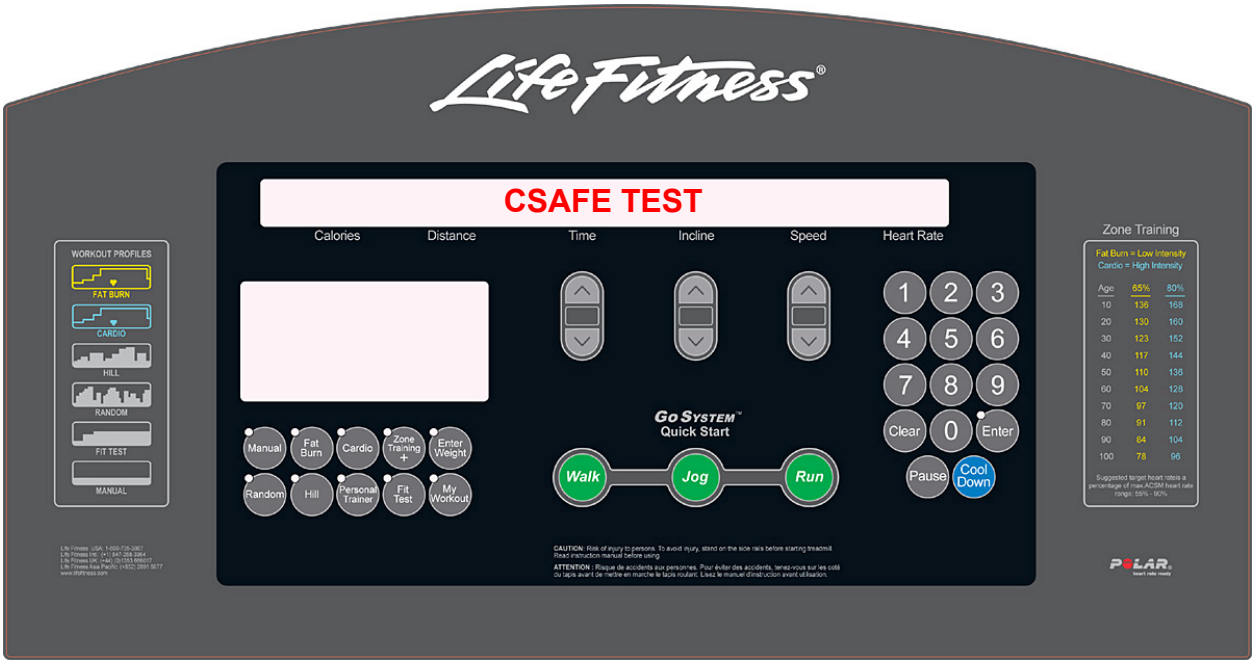
If a problem is detected, the failed memory location will be displayed and the console should be replaced. See "How To... Remove the Console Assembly."

► Press the CLEAR key to exit the CONSOLE EEPROM test and return to the SYSTEM TEST MENU.
► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# System Test – CSAFE Test

**SPECIAL TOOLS REQUIRED: "LOOP-BACK TEST CABLE**

This test allows evaluation of the CSAFE network interface hardware. This port is used exclusively for loading software updates.




Pressing the ENTER key displays the following messages:

RESETTING NETWORK

NOT CONNECTED

Plug in the special loop-back cable onto the CSAFE console connector

The following displayed messages indicate that data was successfully transferred:

SENDING

RECEIVING

READY MODE

The following messages will be displayed if the data transfer failed:

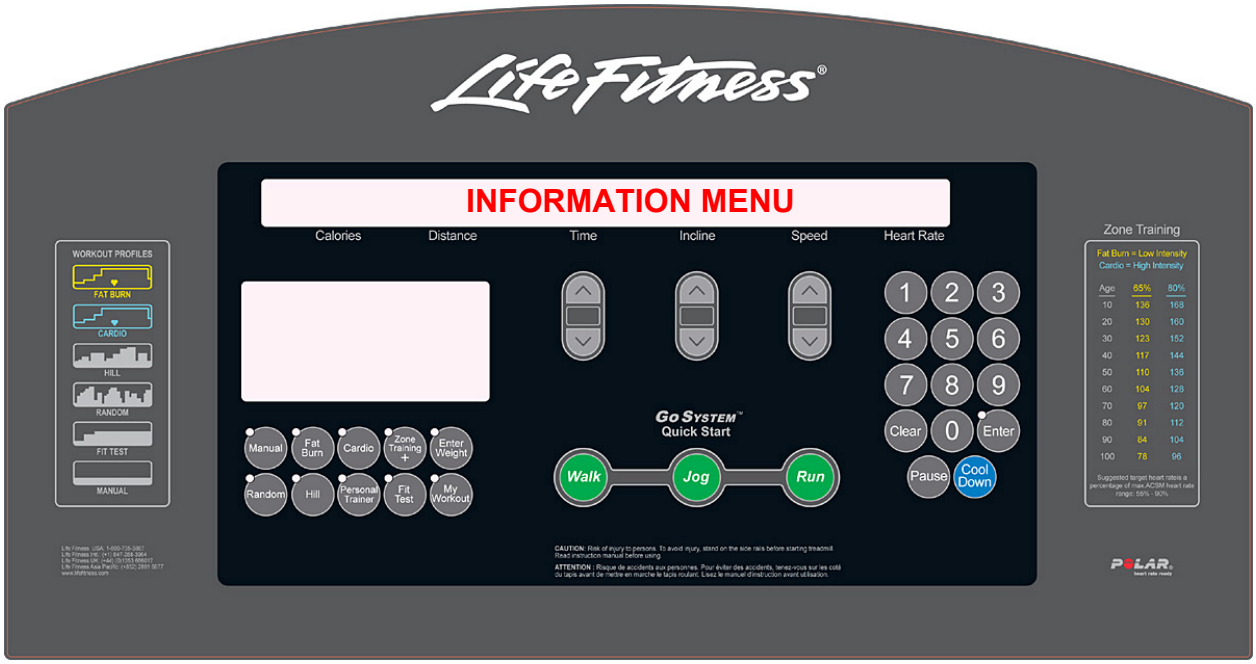
SENDING

NOT CONNECTED

► Press the CLEAR key to exit the CSAFE TEST and return to the SYSTEM TEST MENU.
► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# Information Menu

This menu provides historical data on critical system items.




Using any of the ARROW keys will allow scrolling through the system INFORMATION items.

SYSTEM STATISTICS

MAINTENANCE INFO

SYSTEM ERRORS

LIFT MOTOR INFO

MAIN MOTOR INFO

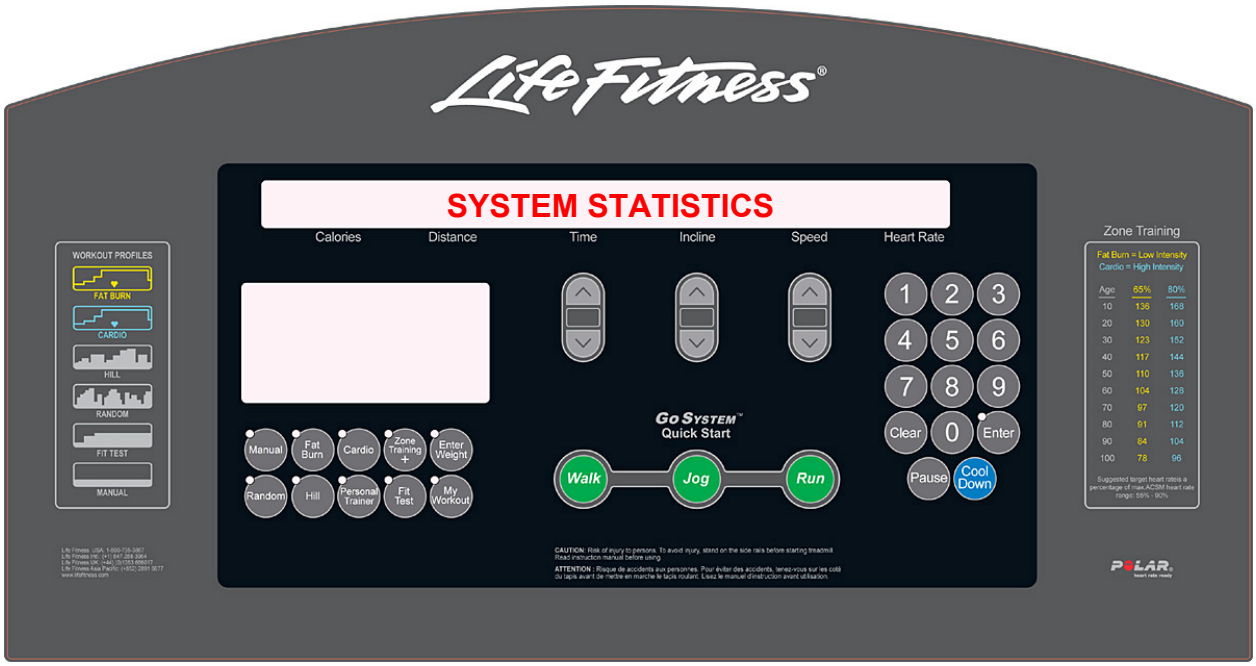
SOFTWARE VERSION

Press the ENTER key to enter the desired category.

- ► Press the CLEAR key to exit the INFORMATION MENU and return to the SERVICE MENU.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# Information – System Statistics

This screen will allow viewing of information concerning machine usage.




The following statistical information will scroll automatically or can be manually advanced by using any of the ARROW keys.

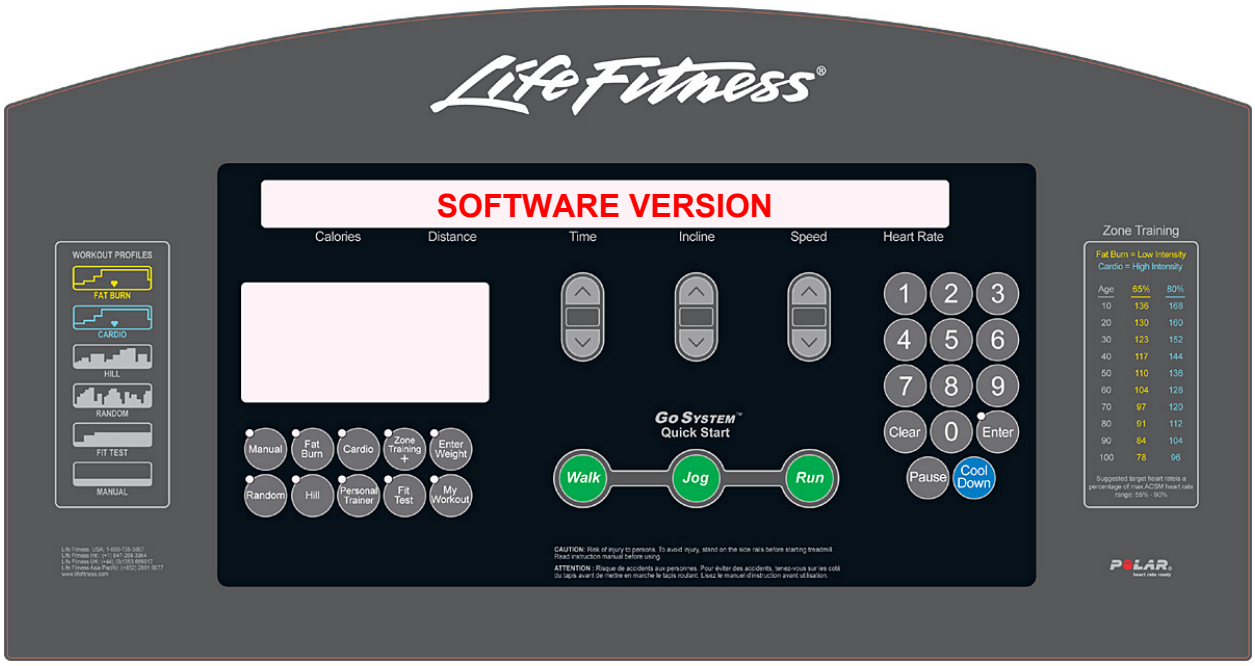
| | |
|---|---|
| TOTAL HOURS | CARDIO PROGRAM SELECTIONS |
| TOTAL MILES | FIT TEST PROGRAM SELECTIONS |
| BELT HOURS | QUICK START PROGRAM SELECTIONS |
| BELT MILES | MY WORKOUTS |
| LIFT MINUTES | CUSTOM 1-6 PROGRAM SELECTIONS |
| HILL PROGRAM SELECTIONS | MISCELLANEOUS CUSTOM PROGRAM SELECTIONS |
| RANDOM PROGRAM SELECTIONS | SPORT TRAINING PROGRAM SELECTIONS |
| MANUAL PROGRAM SELECTIONS | SPEED INTERNAL PROGRAM SELECTIONS |
| FAT BURN PROGRAM SELECTIONS | ZONE TRAINING AND PROGRAM SELECTIONS |

**NOTE – Console replacement will reset all statistical information.**

- ► Pressing the PAUSE key will suspend updating the display. Pressing PAUSE again will resume display update.
- ► Press the CLEAR key to exit the SYSTEM STATISTICS and return to the INFORMATION MENU.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# Information – Software Version

This screen provides software version information for various printed circuit boards used in the system.




The following information will scroll automatically or can be manually advanced by using any of the ARROW keys.

CONSOLE VERSION

MOTOR VERSION

WAX/LIFT BOARD VERSION

LIFEPULSE VERSION

CSAFE VERSION

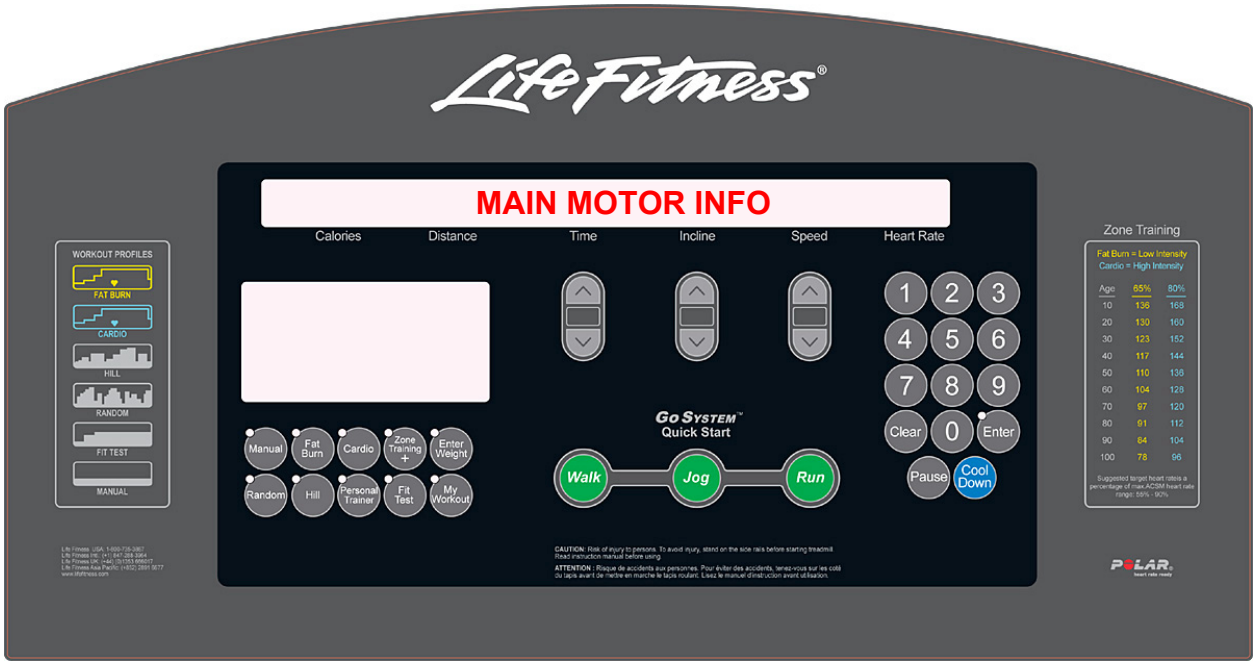
BOOT VERSION

Pressing WALK, JOG or RUN at this time will display the unit serial number.

> **NOTE – The motor controller serial number can be displayed by pressing ENTER while the MOTOR VERSION is being displayed.**

- ► Pressing the PAUSE key will suspend updating the display. Pressing PAUSE again will resume display update.
- ► Press the CLEAR key to exit the SOFTWARE VERSION and return to the INFORMATION MENU.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

This screen provides historic data on various motor and motor controller parameters.




The following information will scroll automatically or can be manually advanced by using any of the ARROW keys.

MOTOR MINUTES

POWER RESETS

HARDWARE TRIPS

STATIC TRIPS

TEMPERATURE TRIPS

VOLTAGE TRIPS

DYNAMIC TRIPS

MAX STATIC AMPS

MAX TEMPERATURE

MAX VOLTAGE

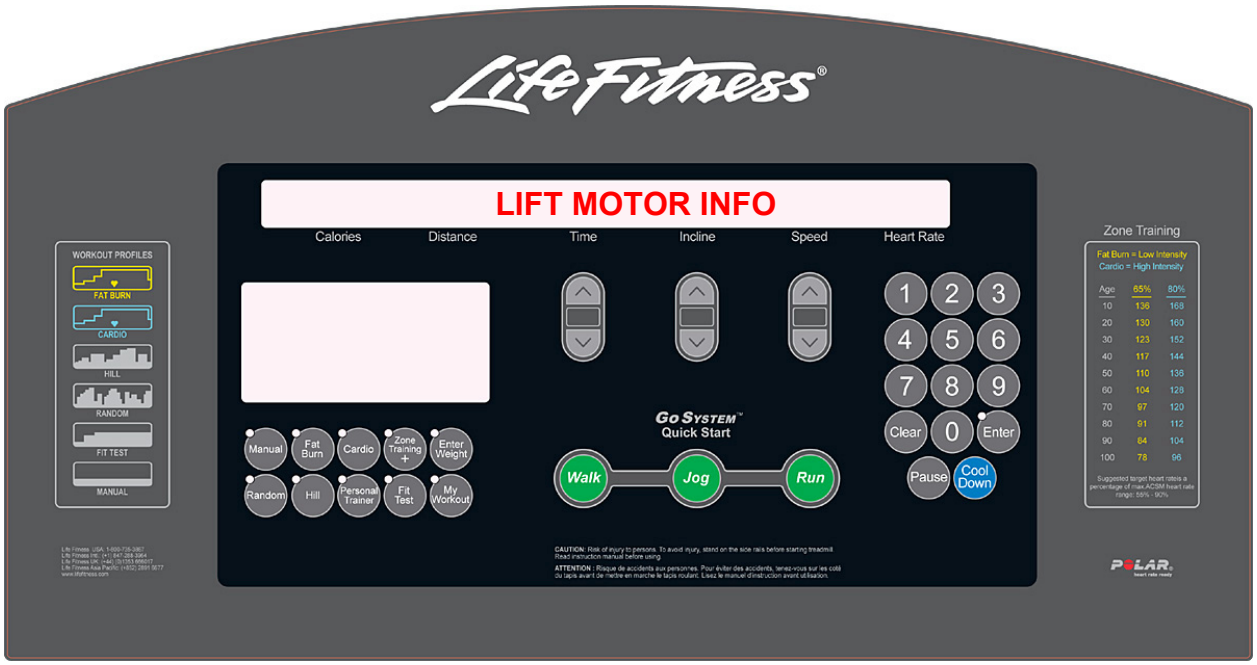
MAXIMUM DYNAMIC AMP

SPEED SENSOR ERRORS

- ► Pressing the PAUSE key will suspend updating the display. Pressing PAUSE again will resume display update.
- ► Press the CLEAR key to exit the MAIN MOTOR INFO and return to system INFORMATION.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# Information – Lift Motor Information

This screen allows viewing historical data on lift motor usage.




The following information will scroll automatically or can be manually advanced by using any of the ARROW keys.

UNIT CONFIGURATION – NON-NEGATIVE

CURRENT LIFT ON TIME IN MINUTES

BUCKET (Table Below)

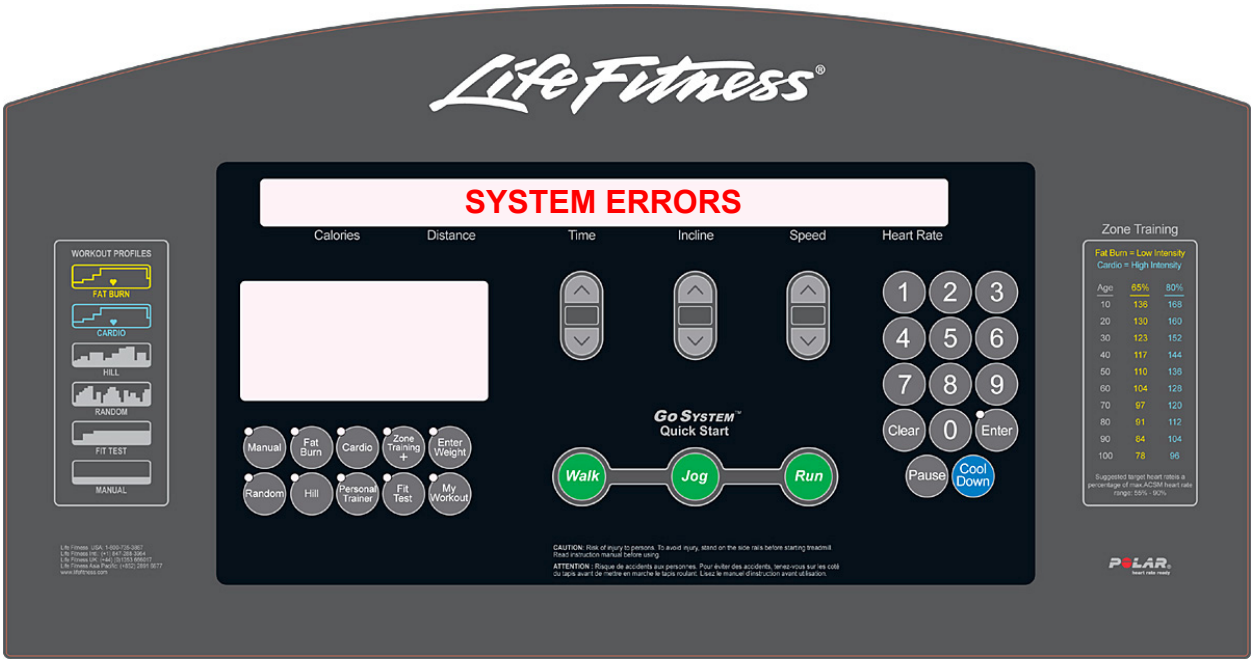
| BUCKET - INCLINE AT PERCENTAGE OF RANGE | | | | |
|---|---|---|---|---|
| BUCKET 0 | NOT USED | | BUCKET 10 | 7.0 TO 6.1 PERCENT |
| BUCKET 1 | NOT USED | | BUCKET 11 | 8.0 TO 7.1 PERCENT |
| BUCKET 2 | NOT USED | | BUCKET 12 | 9.0 TO 8.1 PERCENT |
| BUCKET 3 | 0.0 PERCENT | | BUCKET 13 | 10.0 TO 9.1 PERCENT |
| BUCKET 4 | 1.0 TO 0.1 PERCENT | | BUCKET 14 | 11.0 TO 10.1 PERCENT |
| BUCKET 5 | 2.0 TO 1.1 PERCENT | | BUCKET 15 | 12.0 TO 11.1 PERCENT |
| BUCKET 6 | 3.0 TO 2.1 PERCENT | | BUCKET 16 | 13.0 TO 12.1 PERCENT |
| BUCKET 7 | 4.0 TO 3.1 PERCENT | | BUCKET 17 | 14.0 TO 13.1 PERCENT |
| BUCKET 8 | 5.0 TO 4.1 PERCENT | | BUCKET 18 | 15.0 TO 14.1 PERCENT |
| BUCKET 9 | 6.0 TO 5.1 PERCENT | | | |

**NOTE – Console replacement will reset all historical information.**

- ► Pressing the PAUSE key will suspend updating the display. Pressing PAUSE again will resume display update.
- ► Press the CLEAR key to exit the LIFT MOTOR INFO and return to system INFORMATION.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# Information – System Errors

This screen will allow the viewing the last 25 logged system errors.




Any error information will be displayed from most recent to oldest.

Individual system errors will be scrolled automatically or can be manually scrolled using any of the ARROW keys.

If system errors exist, each error will be displayed with an error number and brief error title.

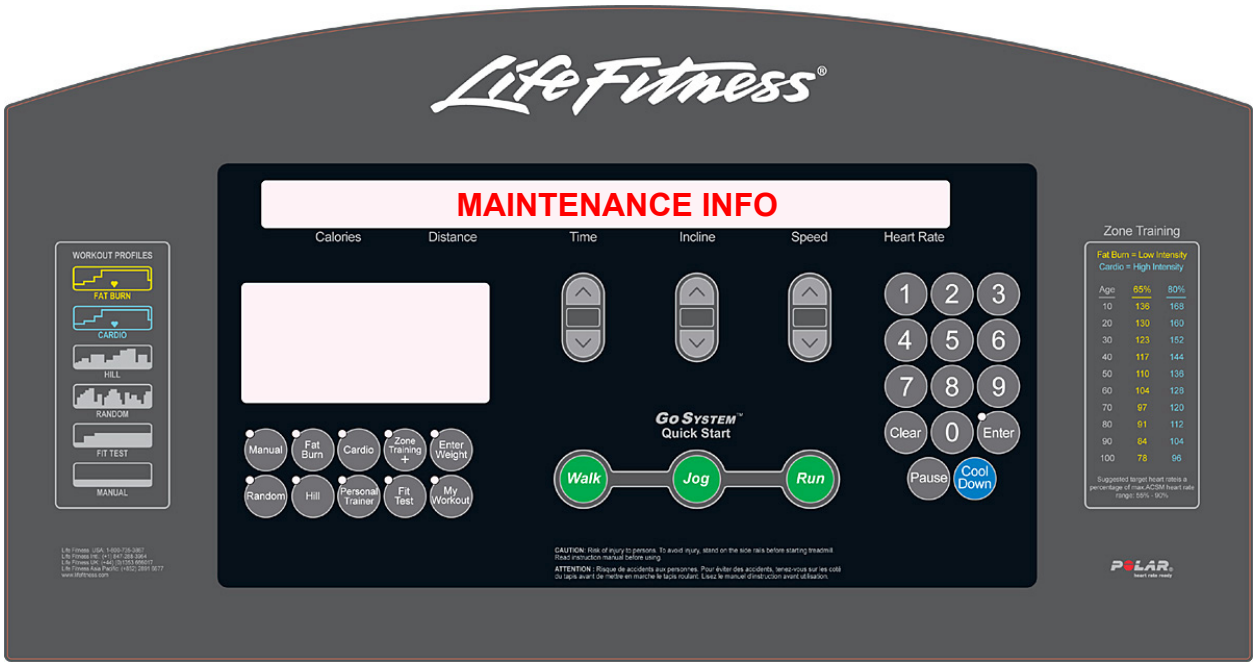
This format allows the user to scroll through all logged system errors without seeing any specific error details.

Pressing the ENTER key while an error is being displayed will allow viewing of specific error details. These details will also scroll automatically or can be manually scrolled using any of the ARROW keys. Pressing the CLEAR key will return to viewing error titles.

**NOTE – Console replacement will reset all system error information.**

- ► Pressing the PAUSE key will suspend updating the display. Pressing PAUSE again will resume display update.
- ► Press the CLEAR key to exit the SYSTEM ERRORS and return to INFORMATION MENU.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

This screen will allow viewing the last 12 logged repairs.




Repair information will be displayed from most recent to oldest.

Any individual logged repairs will be scrolled automatically or can be manually scrolled using any of the ARROW keys.

Each repair will be displayed with a procedure number and repair title.

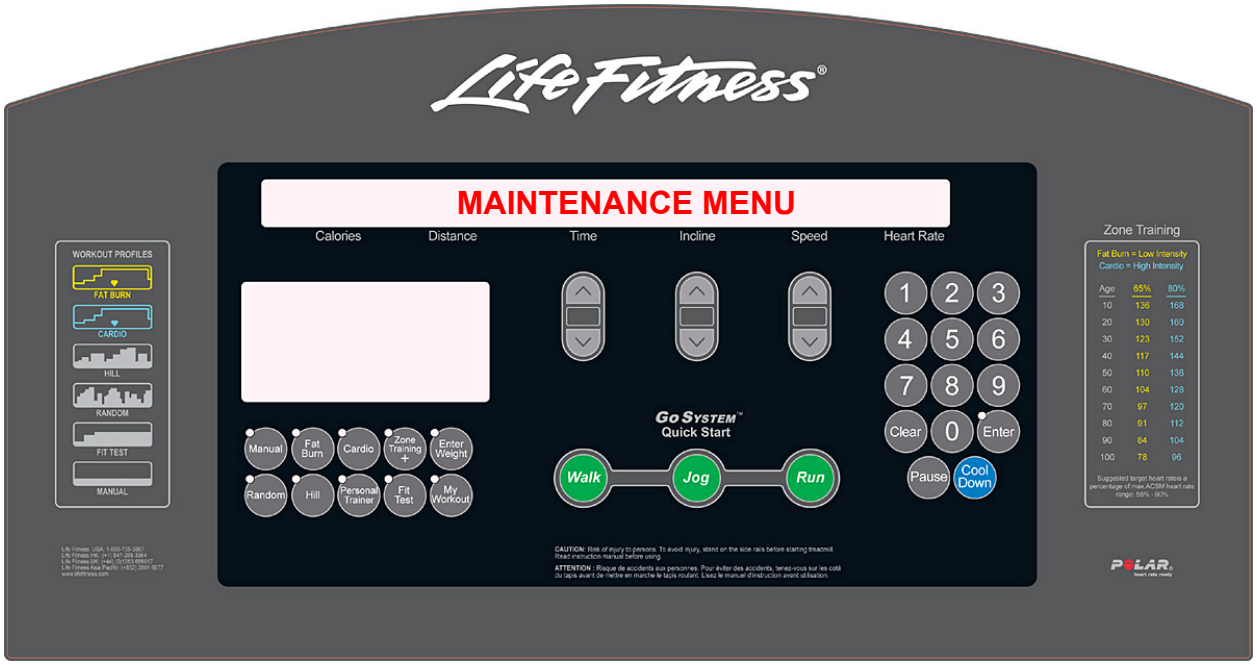
This format allows viewing all logged repairs without seeing specific details.

Pressing the ENTER key while a logged repair is being displayed will allow viewing of specific repair details. These details will also scroll automatically or can be manually scrolled using any of the ARROW keys. Pressing the CLEAR key will return to viewing logged repairs.

- ► Pressing the PAUSE key will suspend updating the display. Pressing PAUSE again will resume display update.
- ► Press the CLEAR key to exit MAINTENANCE INFO and return to the INFORMATION MENU.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# Maintenance Menu

This menu provides logging capabilities for specific maintenance procedures. This information will be stored in the console and is available for viewing by entering the MAINTENANCE INFO test.




Use any of the ARROW keys to allow you to scroll through the available maintenance procedures to be logged:

REPLACING BELT/DECK

REPLACING CONSOLE

REPLACING MOTOR CONTROLLER

REPLACING WAX LIFT BOARD

REPLACING STOP SWITCH

REPLACING OVERLAY

REPLACING MAIN MOTOR

REPLACING LIFT MOTOR

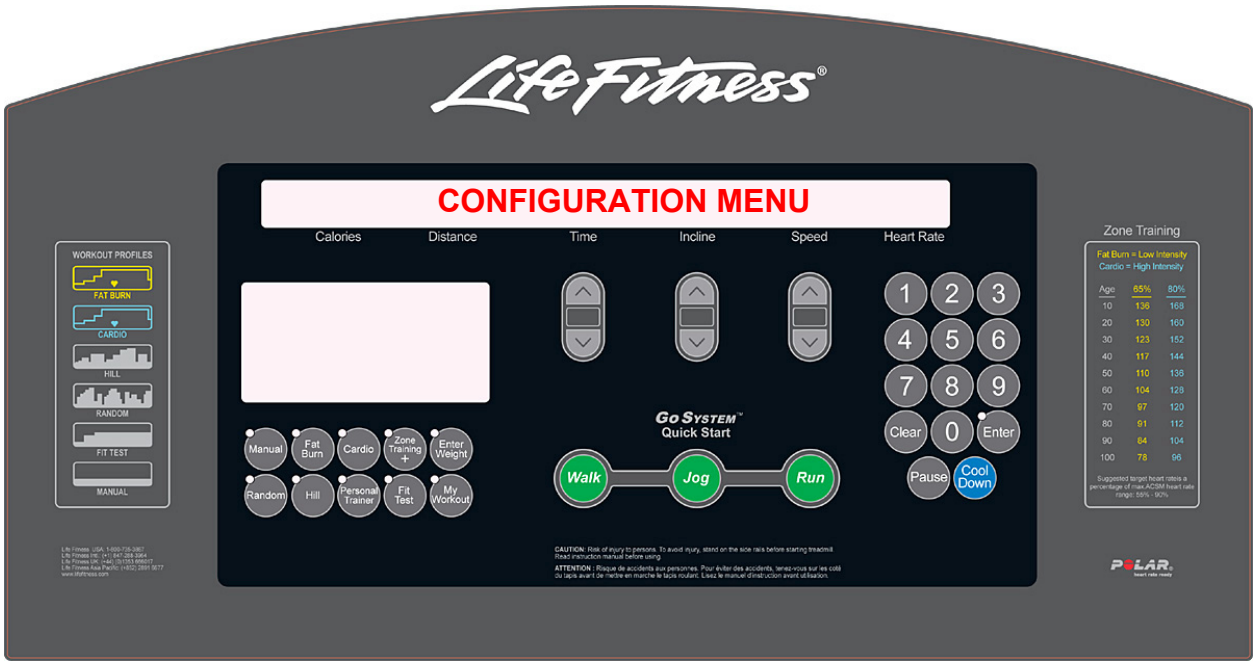
Press the ENTER key to select logging of a completed repair procedure.

After ENTER is pressed, the system will gather all pertinent information concerning the specific procedure that was completed. The message REPAIR LOGGED will be displayed when this information has successfully been stored to the console.

- ► Press the CLEAR key to exit the MAINTENANCE MENU and return to the SERVICE MENU.
- ► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

# Configuration Menu

This menu provides a method of adjusting system settings.




Use any of the ARROW keys to select either of the system configuration screens.

MANAGER CONFIG

MANUFACTURER CONFIG

Press the ENTER key to select the desired screen.

► Press the CLEAR key to exit the CONFIGURATION MENU and return to the SERVICE MENU.
► Press the CLEAR key multiple times until the message SYSTEM INITIALIZING is displayed to exit diagnostic mode.

This menu allows adjustment of various operational and personal settings.


The available settings will scroll automatically or can be manually scrolled using the time ARROW keys.

Using either the speed or incline ARROWs, a specific setting can be changed when it's displayed in the message center.

| SETTING | FACTORY DEFAULT | DESCRIPTION |
|---|---|---|
| LANGUAGE | ENGLISH | Sets language used for display console. |
| MARATHON MODE ON/OFF | OFF | When marathon mode is enabled, it allows the default 99 minutes to be extended to an unlimited workout time. |
| ENGLISH/METRIC UNITS | ENGLISH | Sets the measurement system used for "unit" type settings. |
| CUSTOM WORKOUT ENTRY | No Workout Settings | Allows six different workouts to be defined in terms of intervals, duration, incline, target heart rate percentage, and speed. |
| TELEMETRY ON/OFF | ON | Allows use of Polar® compatible heart rate chest strap monitor. |
| MAXIMUM SPEED (0.5-12) | 12 MPH | Sets fastest belt speed the treadmill will operate. |
| MINIMUM SPEED (0.5-12) | 0.5 MPH | Sets slowest belt speed the treadmill will operate. |
| PAUSE TIMEOUT | 5 Minutes | Sets maximum pause time allowed during a workout before unit resets. |

## Configuration – Manager's Configuration -Continued

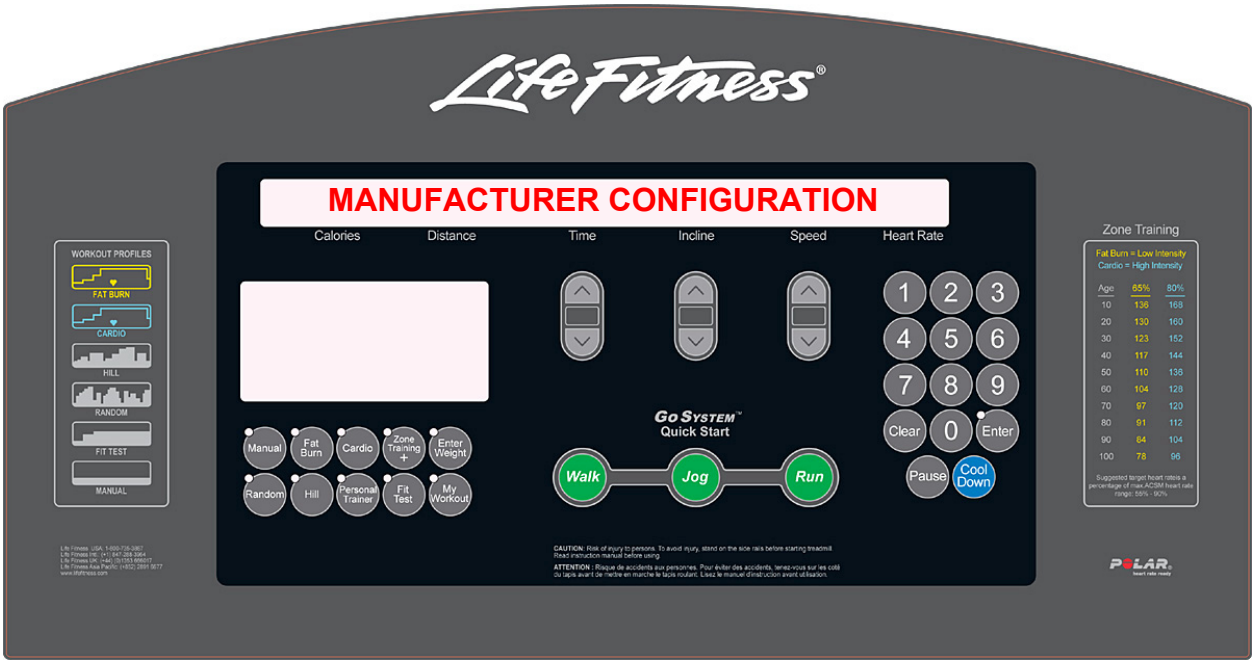
| SETTING | FACTORY DEFAULT | DESCRIPTION |
|---|---|---|
| WATT DISPLAY ON/OFF | OFF (Domestic)<br>ON (International) | Displays wattage equivalent of energy expended during workout. |
| METS DISPLAY ON/OFF | OFF | Displays METS equivalent of energy expended during workout. |
| PACE DISPLAY | ON | Displays minutes per mile. |
| CALORIE PER HOUR DISPLAY ON/OFF | ON (Domestic)<br>OFF (International) | Displays calories/hour expended during workout. |
| DISTANCE CLIMBED DISPLAY ON/OFF | OFF | Displays total distance climbed based on incline and speed. |
| ACCELERATION RATE | 3 | Sets rate (1=slowest to 5=fastest) at which the treadmill accelerates to the selected speed. |
| DECELARATION RATE | 3 | Sets rate (1=slowest to 5=fastest) at which the treadmill decelerates to the selected speed. |
| ERASE CUSTOM WORKOUTS | Not Applicable | Allows erasure of custom workouts. |
| MAXIMUM INCLINE (0-15%) | 15.0 | Sets maximum incline angle. |
| START MESSAGE SETUP | No Message | Sets a custom message to scroll across display at start.<br>See Using the “Start Message Startup” in the operation manual. |
| FIT TEST PLUS ON/OFF | ON | Allows access to special fitness tests including Army PFT, Navy PRT, Marines PFT, Gerkin protocol, and PEB. See operation manual for details. |
| SYSTEM BEEPS | ON | Enables or disables beeping when a key is pressed. (Beep is always enabled in diagnostic mode) |

**NOTE - Pressing the CLEAR key saves all setting preferences.**

**NOTE – Console replacement will reset operational and personal settings to default vales.**

- ► Pressing the PAUSE key will suspend updating the display. Pressing PAUSE again will resume display update.
- ► Press the CLEAR key to exit MANAGER CONFIG and return to the CONFIGURATION MENU.

This screen allows adjustment of various system settings and is for factory authorized service personnel only.




Unless you have performed the proper keystroke sequence to use this feature, the message will appear: ACCESS RESTRICTED

- ► Press the CLEAR key to return to the CONFIGURATION MENU.
- ► Press the CLEAR key multiple times until the message SY
- ► STEM INITIALIZING is displayed to exit diagnostic mode

**NOTES**

# SECTION 3

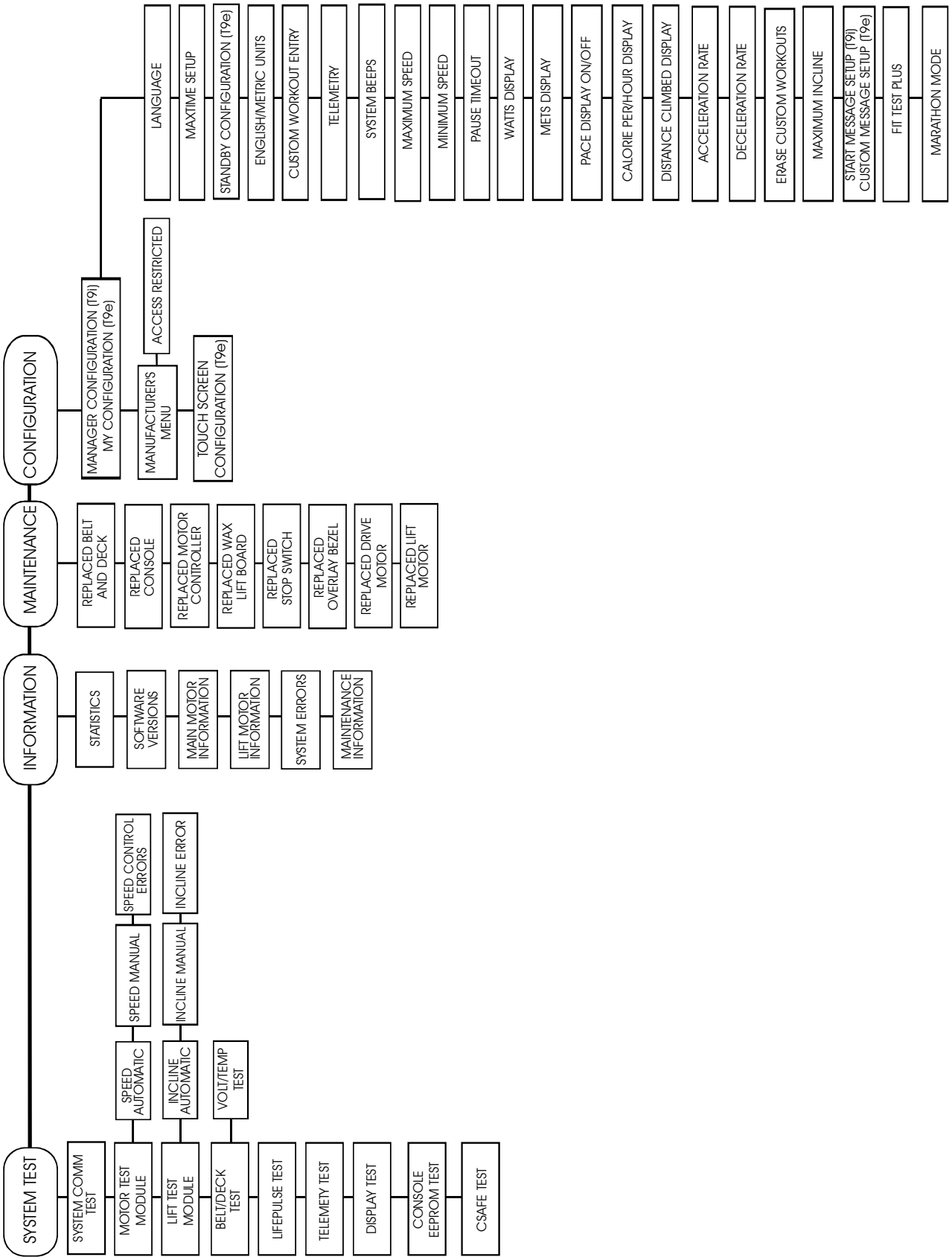
# DIAGNOSTICS
# T9e LCD System

## NOTES

## (LCD Console)

Use the following to aid you in control and message locations.

# Diagnostic Map



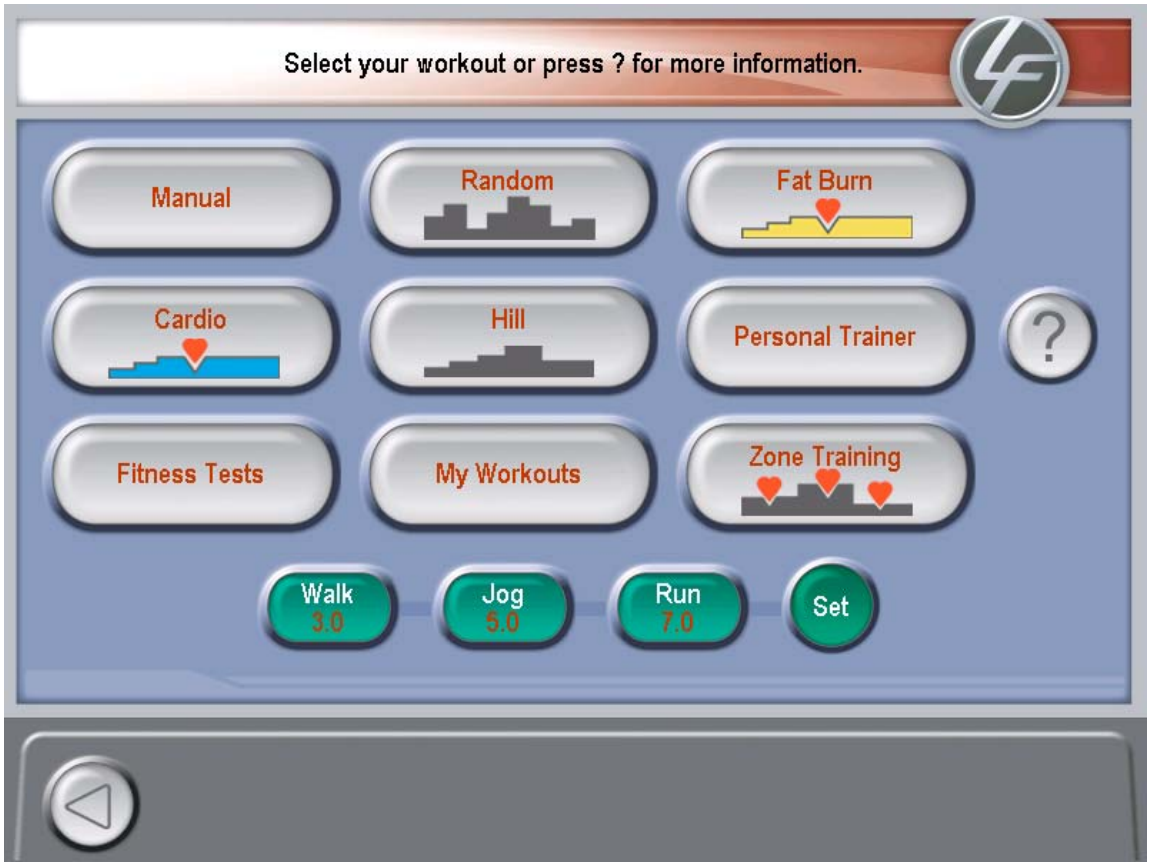
# Welcome Screen

The welcome screen appears after power-up or if the treadmill has been in an idle mode for a specified time.


Touching the screen in the designated area will change to the WORKOUT SELECTION menu.

# Entering Diagnostic Mode - Workout Selection

This screen allows a specific workout to be selected.

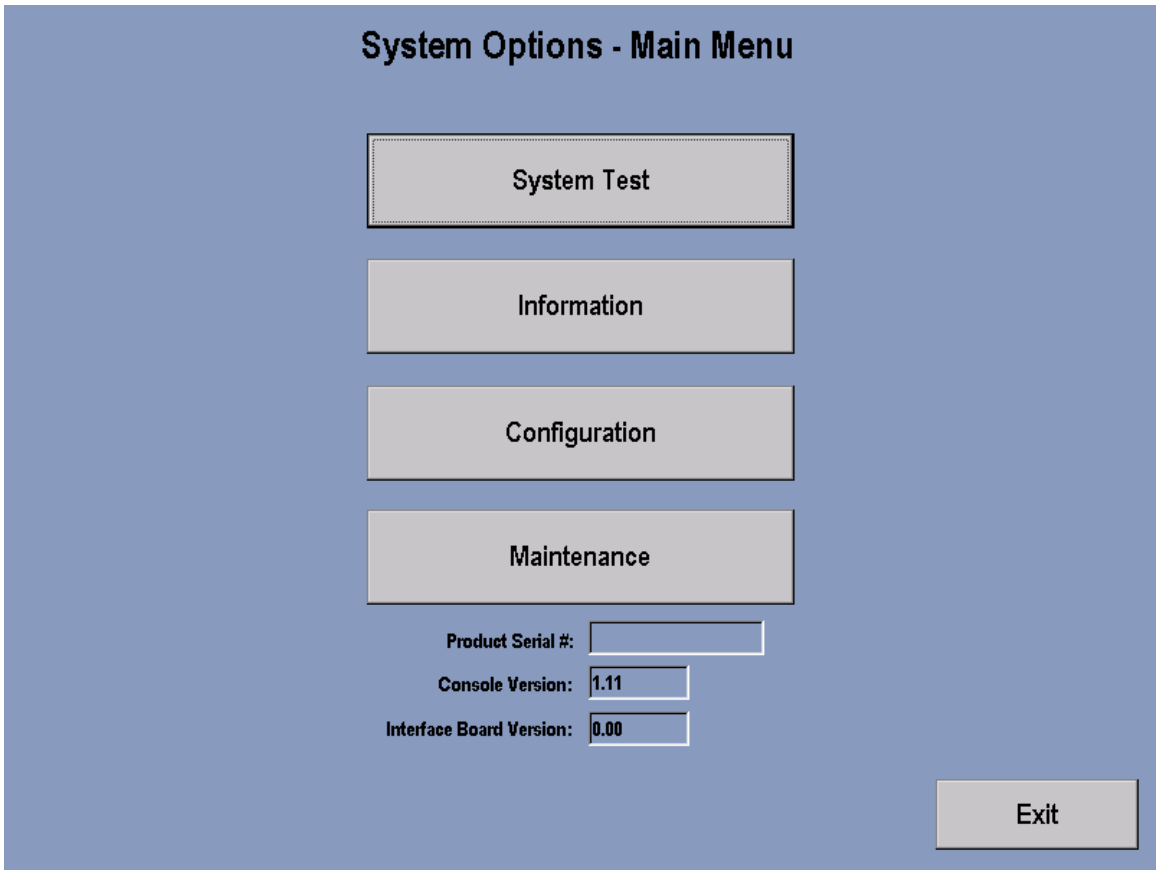



Diagnostics is entered by holding the COOL DOWN key and tapping the LF (Life Fitness) logo in the upper right corner twice.

► Press the  key to move back to the welcome screen.

# Diagnostics & System Options – Main Menu

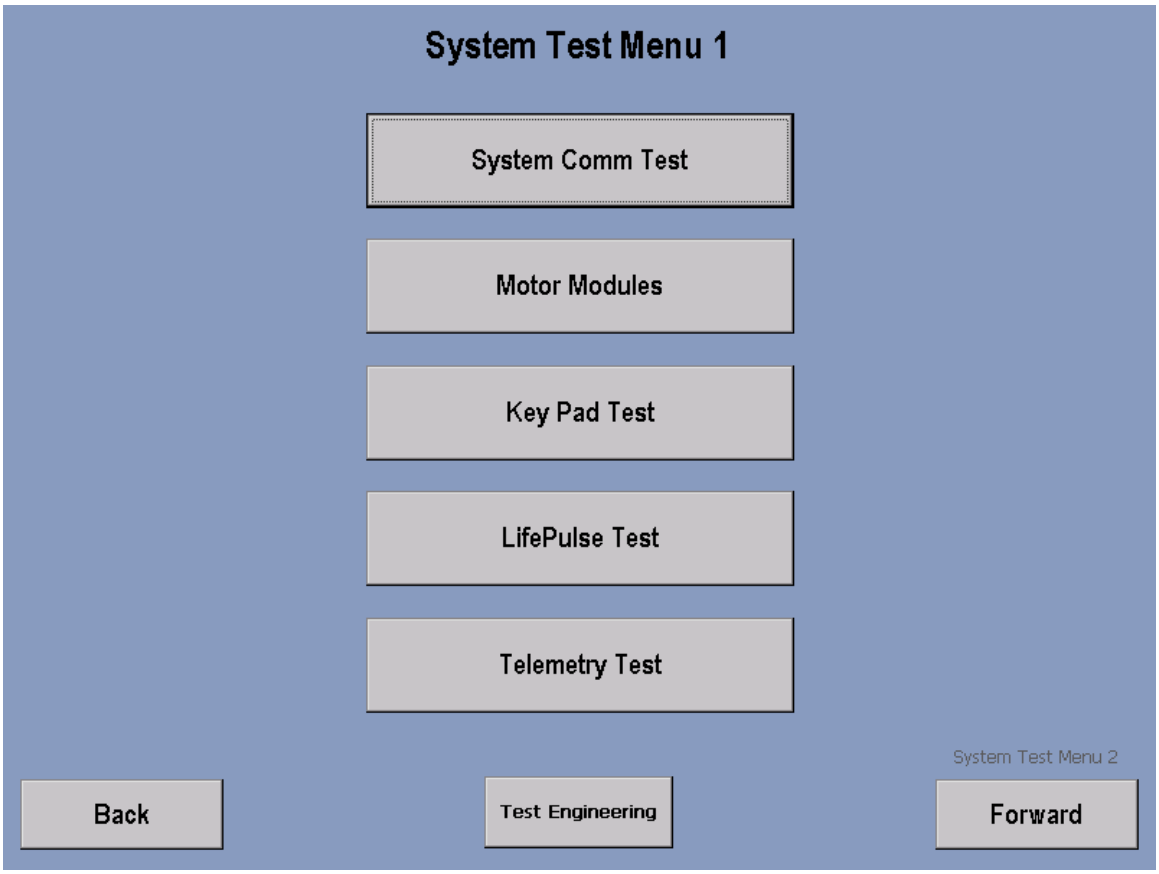
This screen allows entry into the main categories of diagnostics and system options.




► Press the EXIT key to exit diagnostic mode.

# System Test Menu 1

This menu allows entry into the tests provided through the first system test screen.

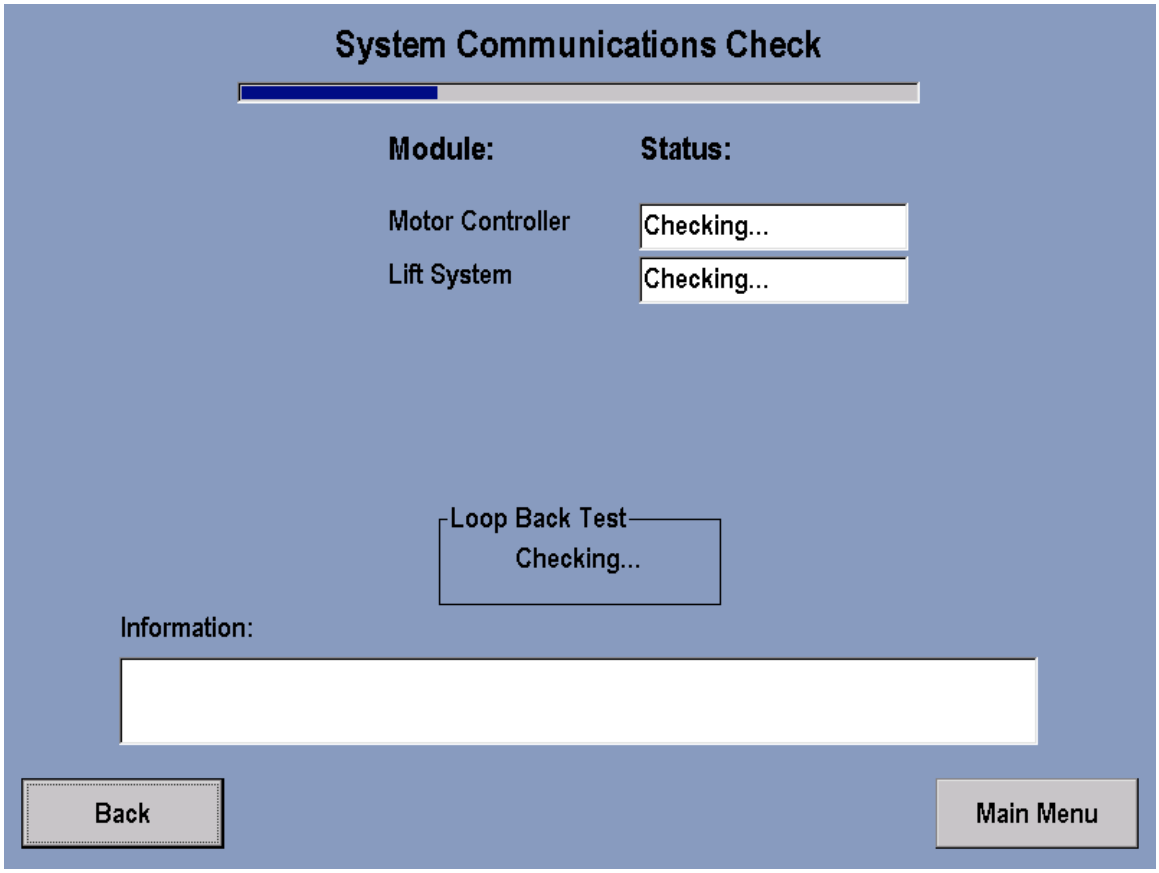



| | |
|---|---|
| SYSTEM COMM TEST | This test checks the ability of all electronic boards to communicate with each other. |
| MOTOR MODULES | This test allows evaluation of the main motor, lift motor, and "home" switch operation. |
| KEY PAD TEST | This test evaluates the condition of all console switches that are not part of the LCD touch screen. |
| LIFEPULSE TEST | This test evaluates the LifePulse® system. |
| TELEMETRY TEST | This test evaluates the heart rate telemetry system. |
| TEST ENGINEERING | For Life Fitness test engineering functions only. |

- ► Return to the previous screen by pressing the BACK key.
- ► Press the FORWARD key to move to the SYSTEM TEST MENU 2 screen.

# System Test Menu 1 – System Communication Test

This test checks the ability of all electronic boards to communicate with each other.



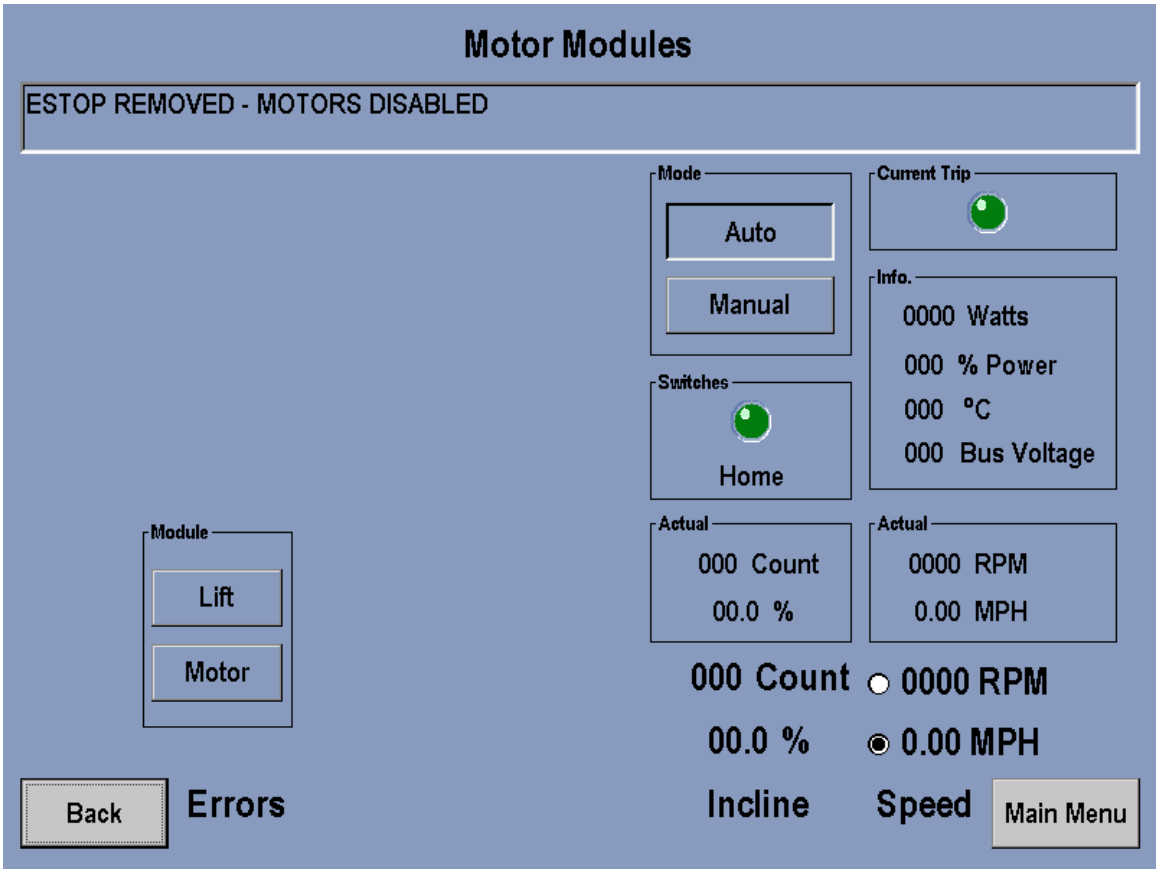

The test starts automatically. An error message will be displayed in the INFORMATION screen if a module does not respond in an allotted time.

The message SYSTEM COMM OK will be displayed in the INFORMATION screen if no fault is detected.

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# System Test Menu 1 – Motor Modules

This test allows evaluation of the main motor, lift motor, and "home" switch operation.




| | |
|---|---|
| Error message area | Displays any current errors when a module (LIFT or main MOTOR) is selected. |
| MODULE | Selection of LIFT motor or main MOTOR. |
| MODE | Selects automatic or manual modes for lift and main motor activation. |
| SWITCHES | Displays a lit condition when "home" switch has been activated. |
| ACTUAL (COUNT and %) | Displays software equivalent count of lift motor position and incline angle. |
| INCLINE | The incline can be adjusted by pressing the incline ARROWs. |
| CURRENT TRIP | Displays a lit condition when motor current exceeds a predetermined trip value. |
| INFO | Displays real-time information regarding wattage consumption, % power available, motor controller heat sink temperature, and voltage available to main motor. |
| ACTUAL (RPM & MPH) | Displays main motor rpm and belt speed in mph. |
| SPEED | The speed can be adjusted by pressing the speed ARROWs. |

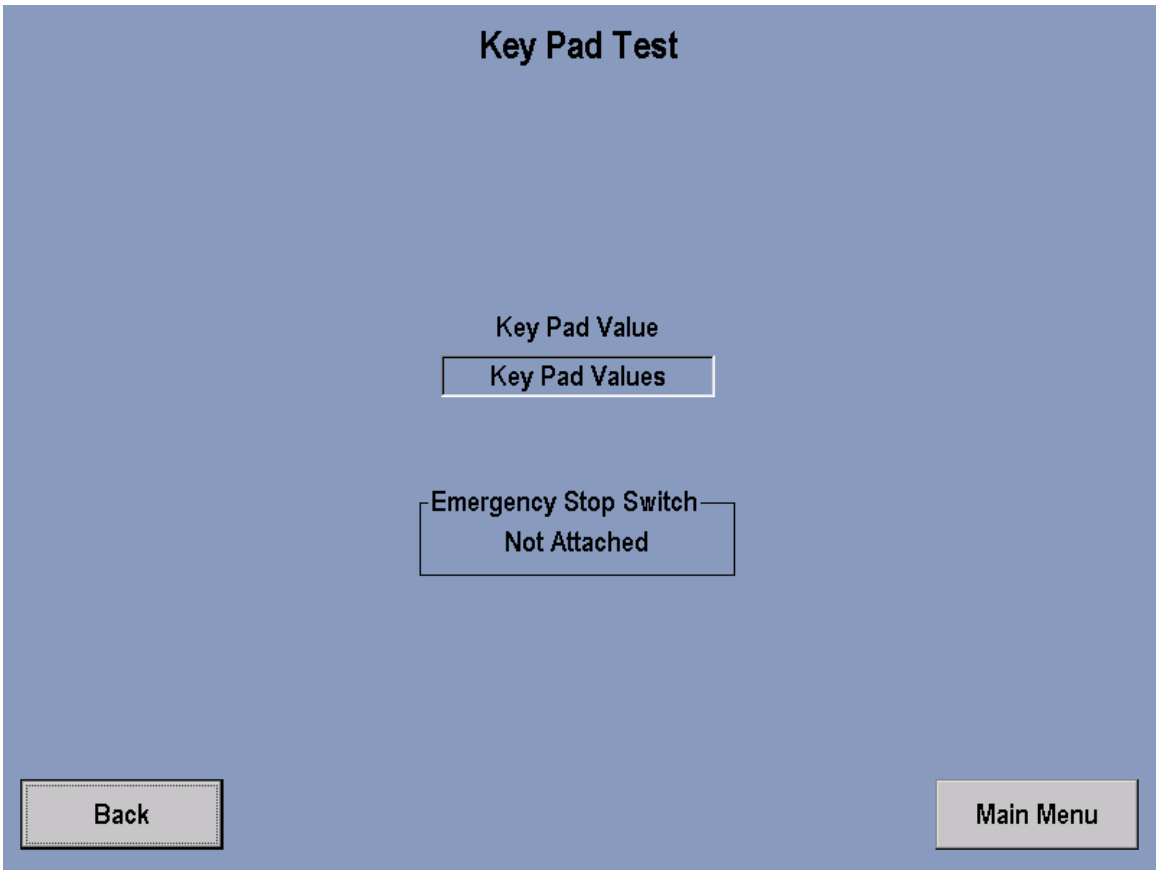
**Lift Motor "home" Switch Evaluation Procedure - Operate lift motor and ensure mechanism moves smoothly between 0 and 15% incline. Make certain HOME indicator is lit when incline value is zero.**

**Belt and Deck Evaluation Procedure - Walk on treadmill for one minute at 3.5 mph. Increase speed to 7 mph and note power consumption (watt) reading after one minute. Power consumption in excess of 1100 watts indicates excessive belt to deck wear. Replace belt and deck (deck may be inverted once) as needed.**

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# System Test Menu 1 – Key Pad Test

This test evaluates the condition of all console switches that are not part of the LCD touch screen.

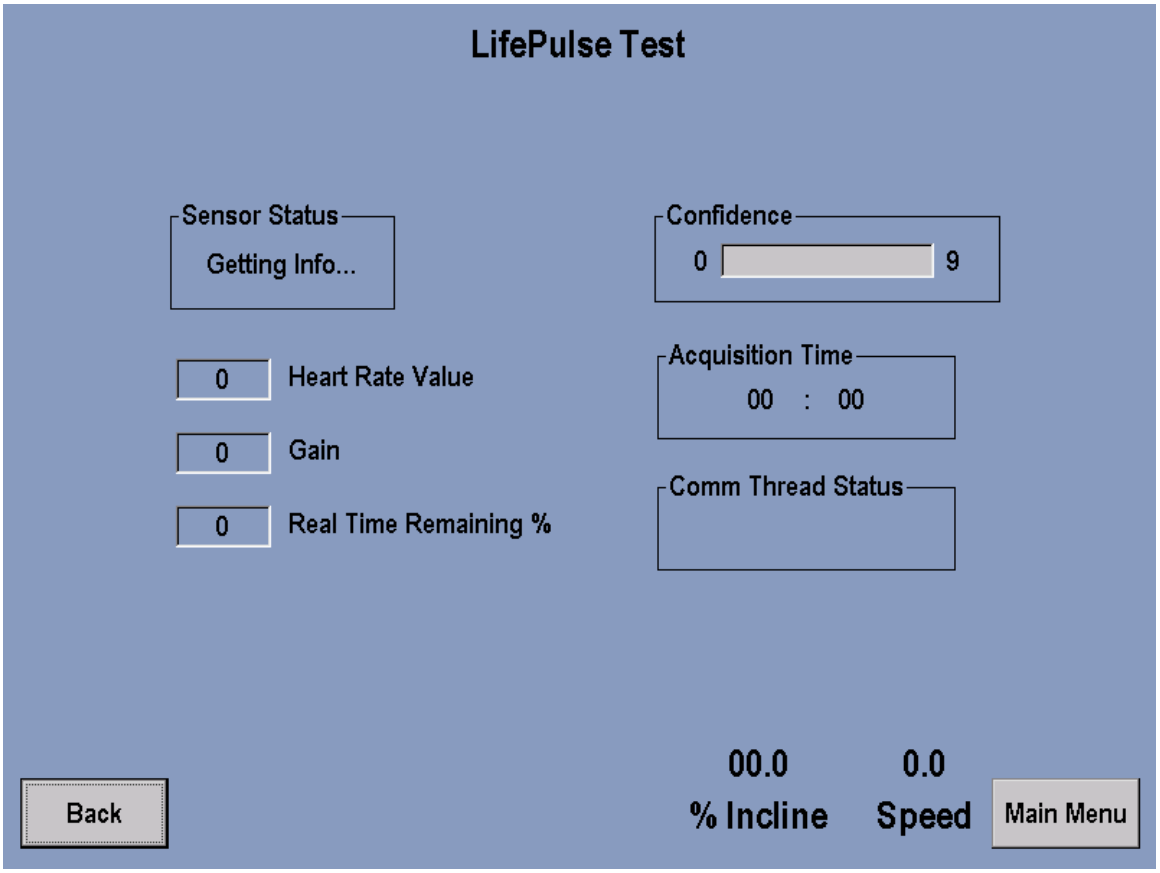



| | |
|---|---|
| KEY PAD VALUES | Displays the corresponding text equivalent for any key outside the touch screen that is pushed. |
| EMERGENCY STOP SWITCH | Displays the status of the positioning of the emergency stop switch magnet. |

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# System Test Menu 1 – LifePulse® Test

This test evaluates the LifePulse® system.



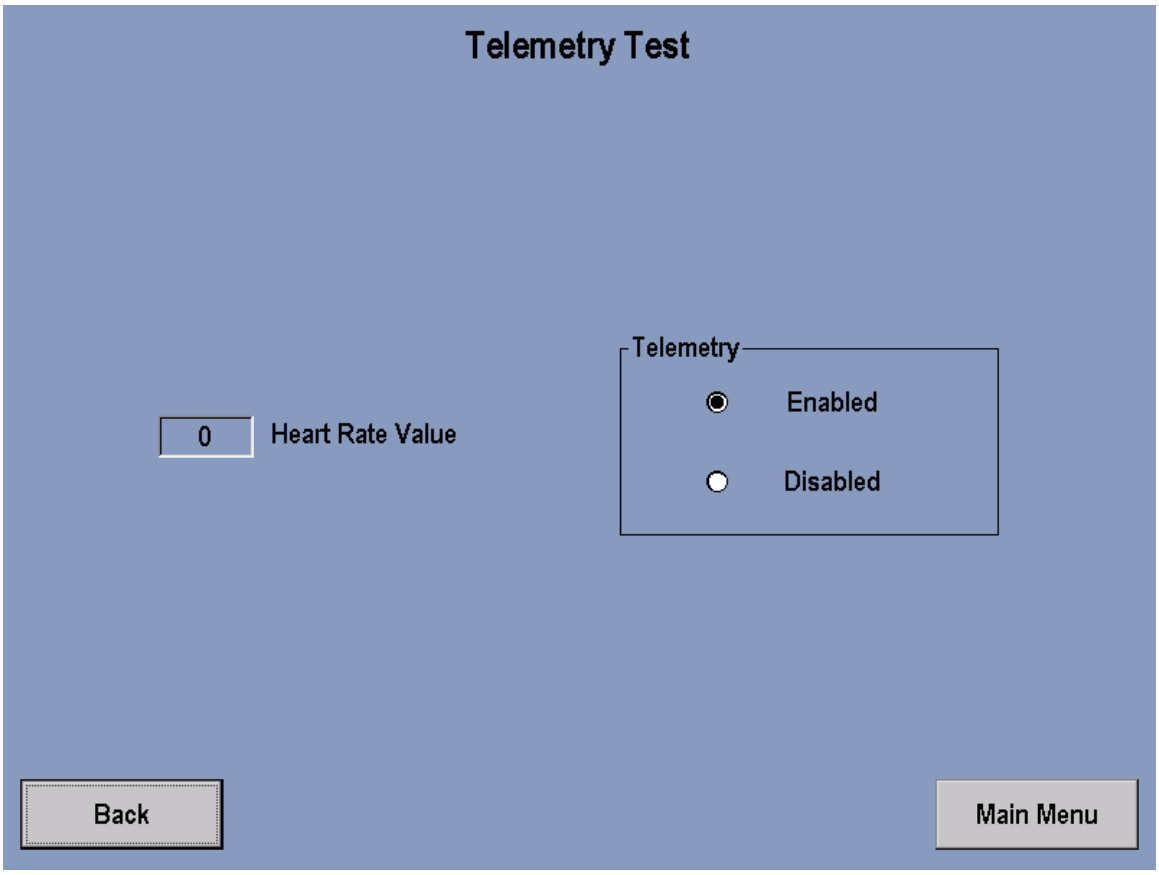

| | |
|---|---|
| SENSOR STATUS | A LEFT ON and RIGHT ON message should be displayed when hands are placed on the corresponding LifePulse® sensors. |
| HEART RATE VALUE | Displays current heart rate value calculated by LifePulse®. |
| GAIN (0-99) | The value displayed is proportional to the amount of signal that is being provided by the LifePulse® sensors. The higher the gain values the lower the signal that is being evaluated by the LifePulse® system. |
| CONFIDENCE (0-9) | A value that indicates a confidence level for heart rate values displayed. Higher confidence readings indicate that LifePulse® is providing accurate readings while low confidence readings most often indicate poor contact with hand sensors. |
| ACQUISITION TIME | Count starts when both left and right hands are in proper contact with LifePulse® sensors. This timer running is an indication that the LifePulse® system is now performing the necessary initial calculations to provide a continuous accurate heart rate value. The timer will stop when the system has calculated and displayed a heart rate value. |
| REAL TIME REMAINING % | For engineering purposes only. |
| COMM THREAD STATUS | For engineering purposes only. |

Both the speed and incline systems can be adjusted during this test by pressing the corresponding ARROW keys.

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# System Test Menu 1 – Telemetry Test

This test evaluates the heart rate telemetry system.

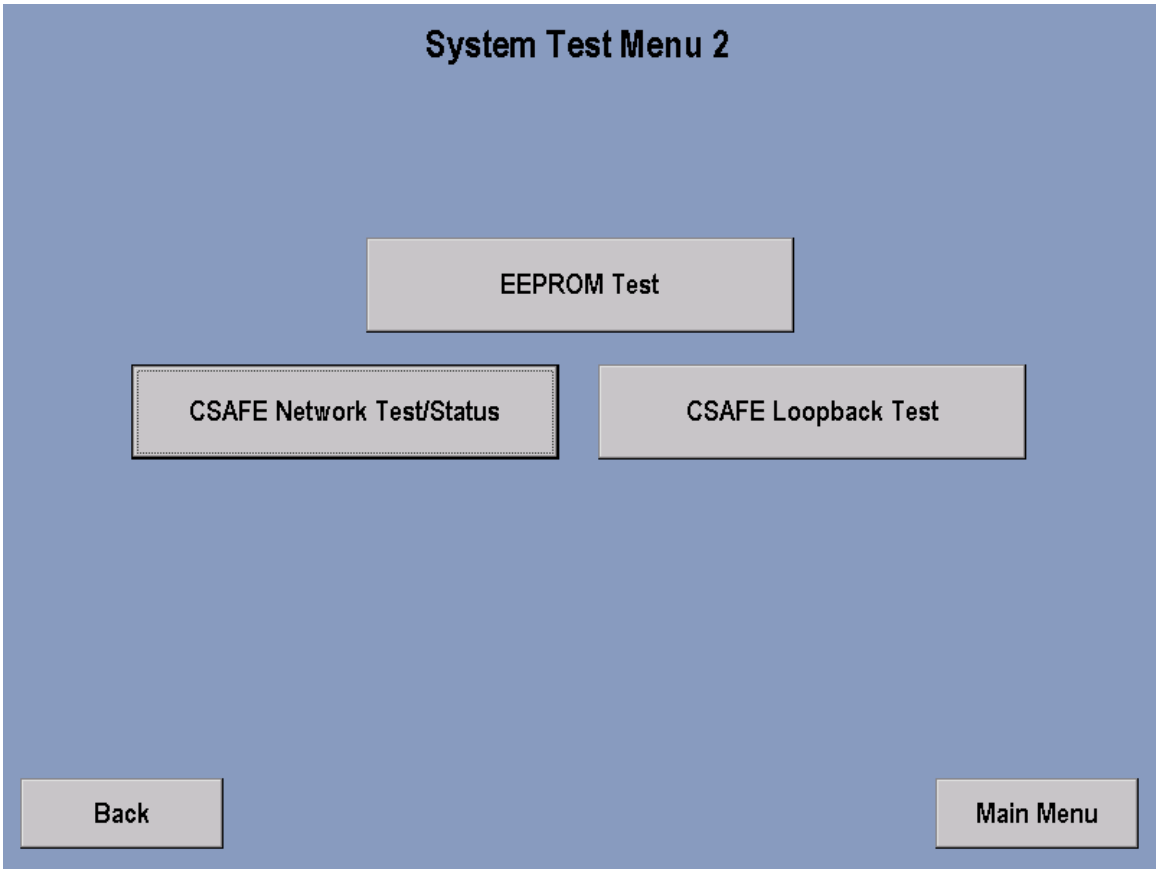



| | |
|---|---|
| HEART RATE VALUE | Displays heart rate value if telemetry is enabled and the receiver is getting a signal from the Polar® transmitter. |
| TELEMETRY | Allows enabling or disabling telemetry by touching the desired selection. |

► Return to the previous screen by pressing the BACK key.
► Press the MAIN MENU key to return to the MAIN MENU screen.

# System Test Menu 2

This menu allows evaluation of console board "flash" memory and CSAFE interface port.

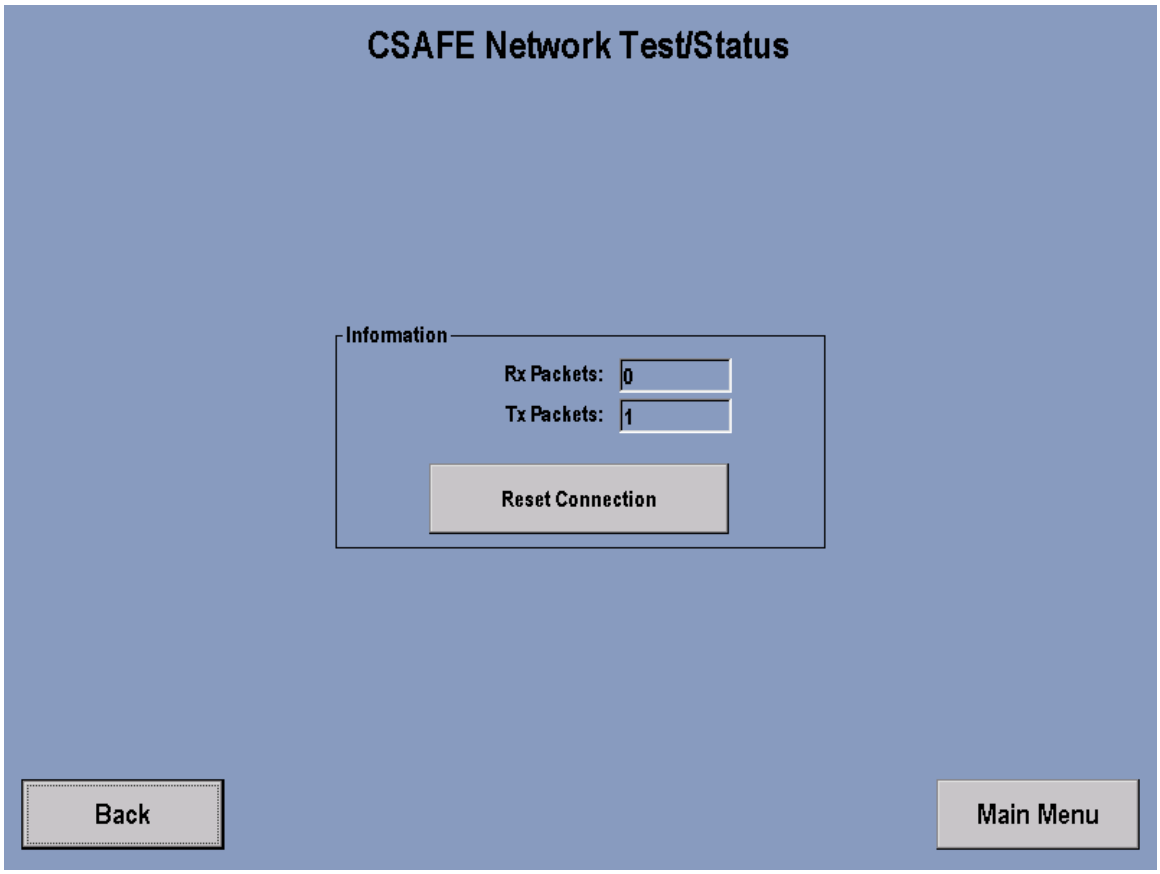



| | |
|---|---|
| EEPROM TEST | This test will attempt to write electronic data to memory locations within the console EEPROMs. This information will be read back to verify its integrity. |
| CSAFE NETWORK TEST/STATUS | Displays information regarding packet transfer on network and is for engineering purposes only. |
| CSAFE LOOPBACK TEST | Allows evaluation of the CSAFE network interface hardware. |

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# System Test Menu 2 - CSAFE Network Test/Status

This screen allows evaluation of the CSAFE network interface hardware and is for engineering purposes only.

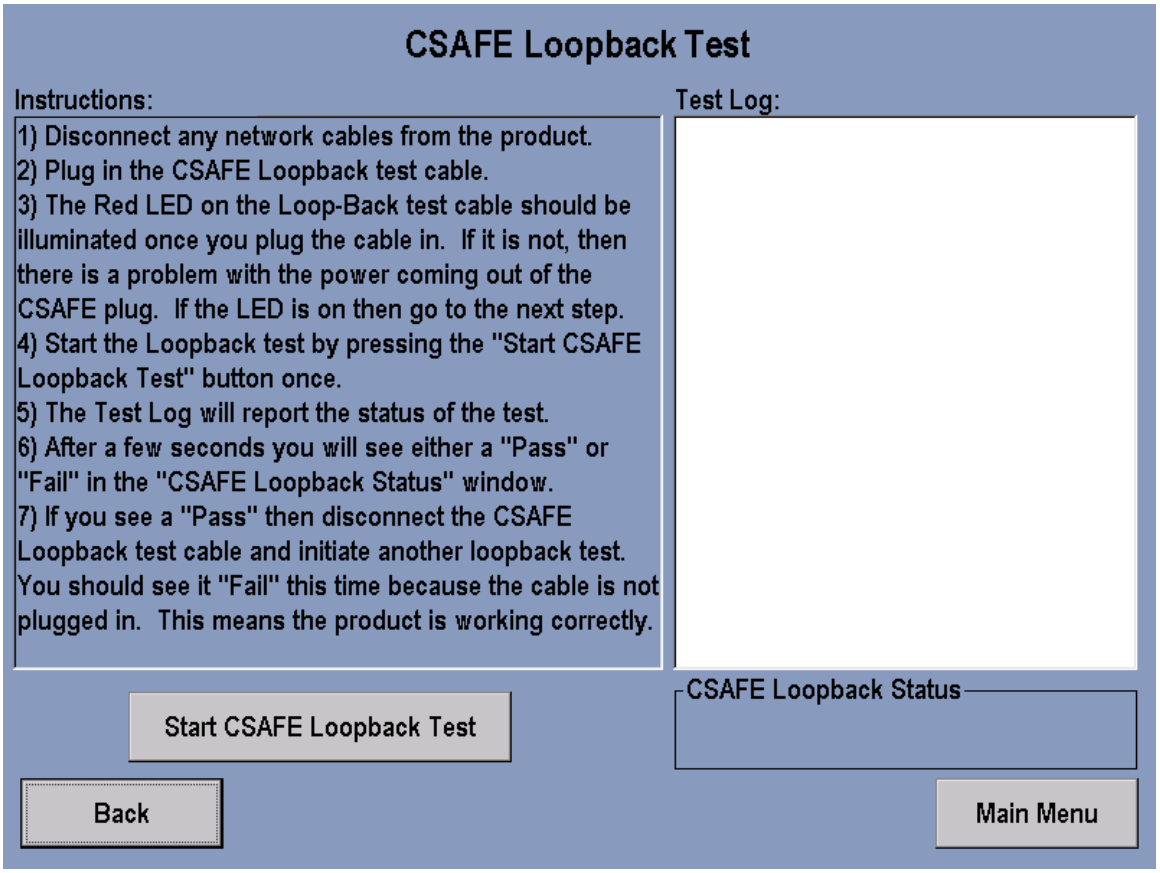



- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# System Test Menu 2 - CSAFE Loopback Test

**SPECIAL SERVICE TOOLS REQUIRED: LOOPBACK CABLE**

This test allows evaluation of the CSAFE network interface hardware. This port is exclusively used for loading software updates.



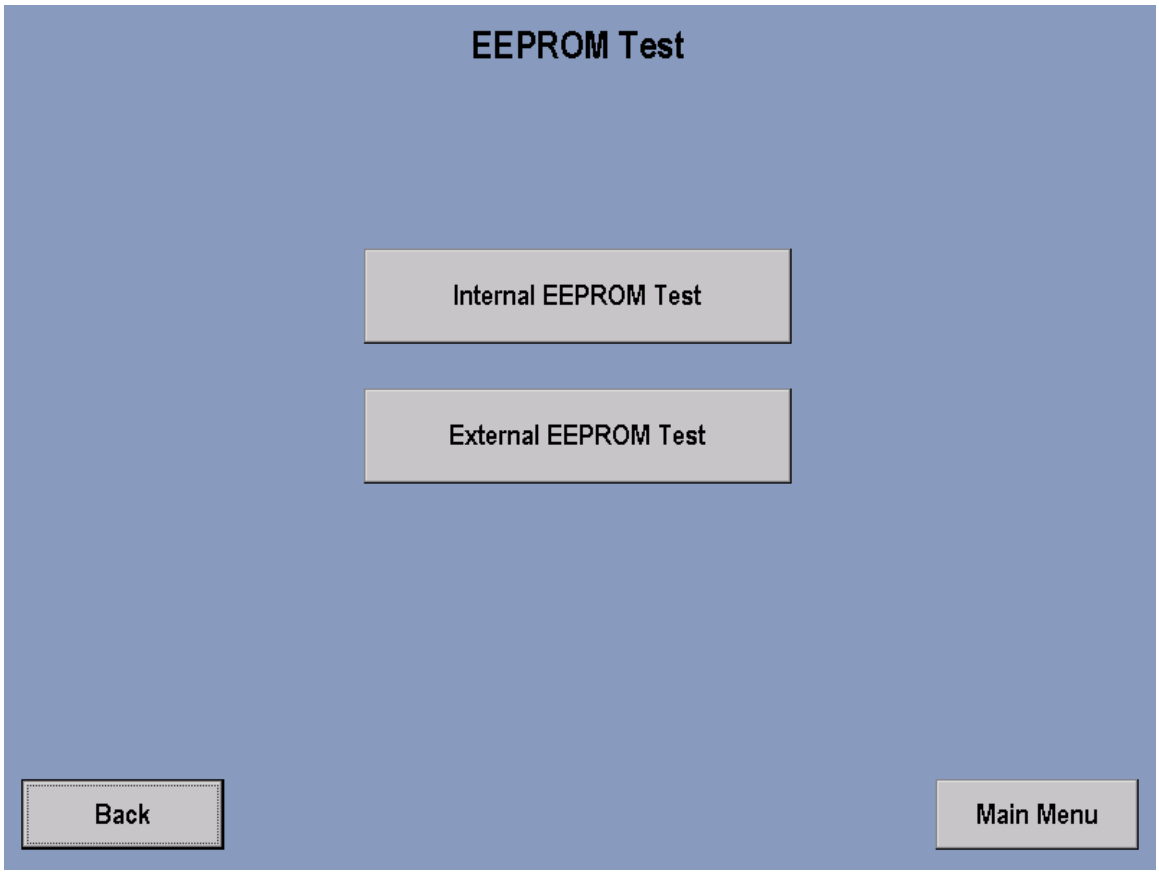

Follow the directions on the screen to perform the testing.

| | |
|---|---|
| START CSAFE LOOPBACK TEST | Starts testing routine once loop-back cable is in place. |
| CSAFE LOOPBACK STATUS | Displays results of completed test. |

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# System Test Menu 2 – EEPROM Test

This test allows evaluation of the single-board computer and interface board "flash" memory.

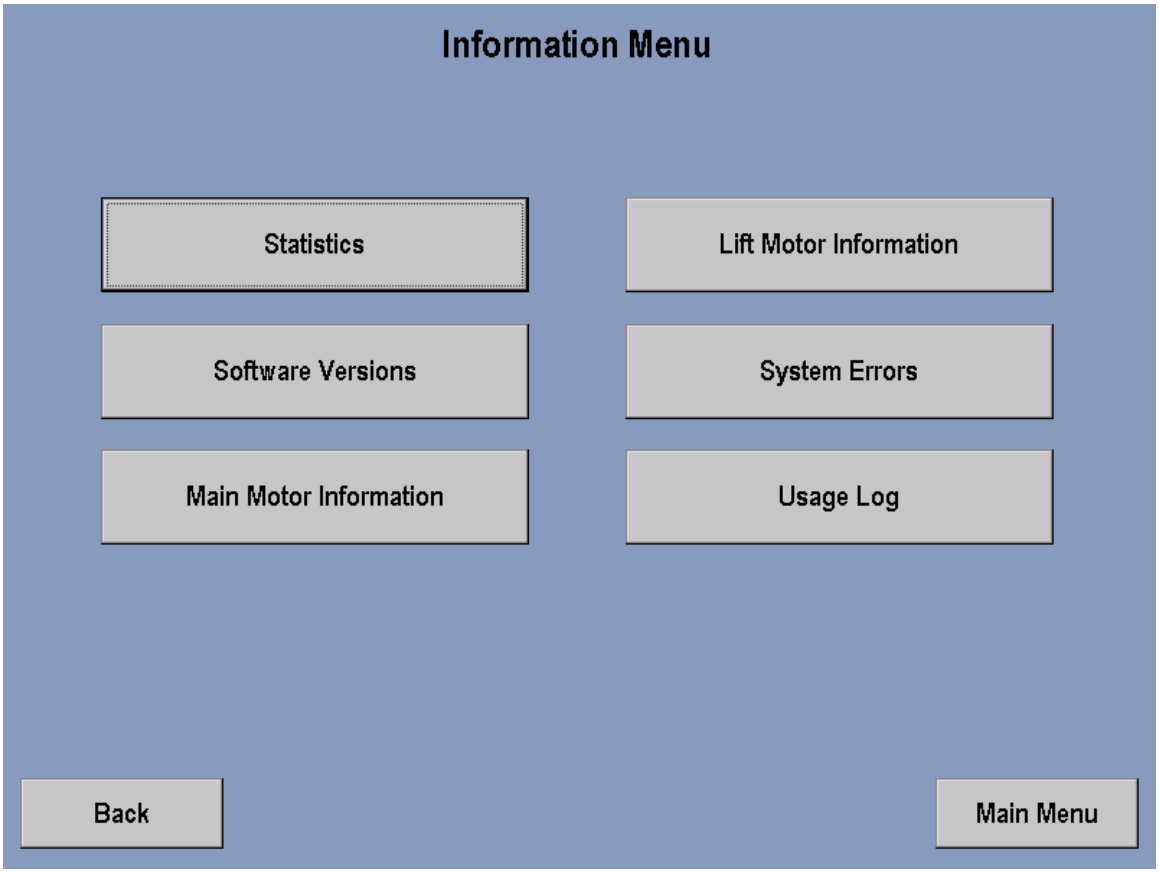



| | |
|---|---|
| INTERNAL EEPROM TEST | Checks memory locations of EEPROM on single-board computer. |
| EXTERNAL EEPROM TEST | Checks memory locations of EEPROM on interface-board. |

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# Information – Information Menu

This menu provides historical data on critical system items.



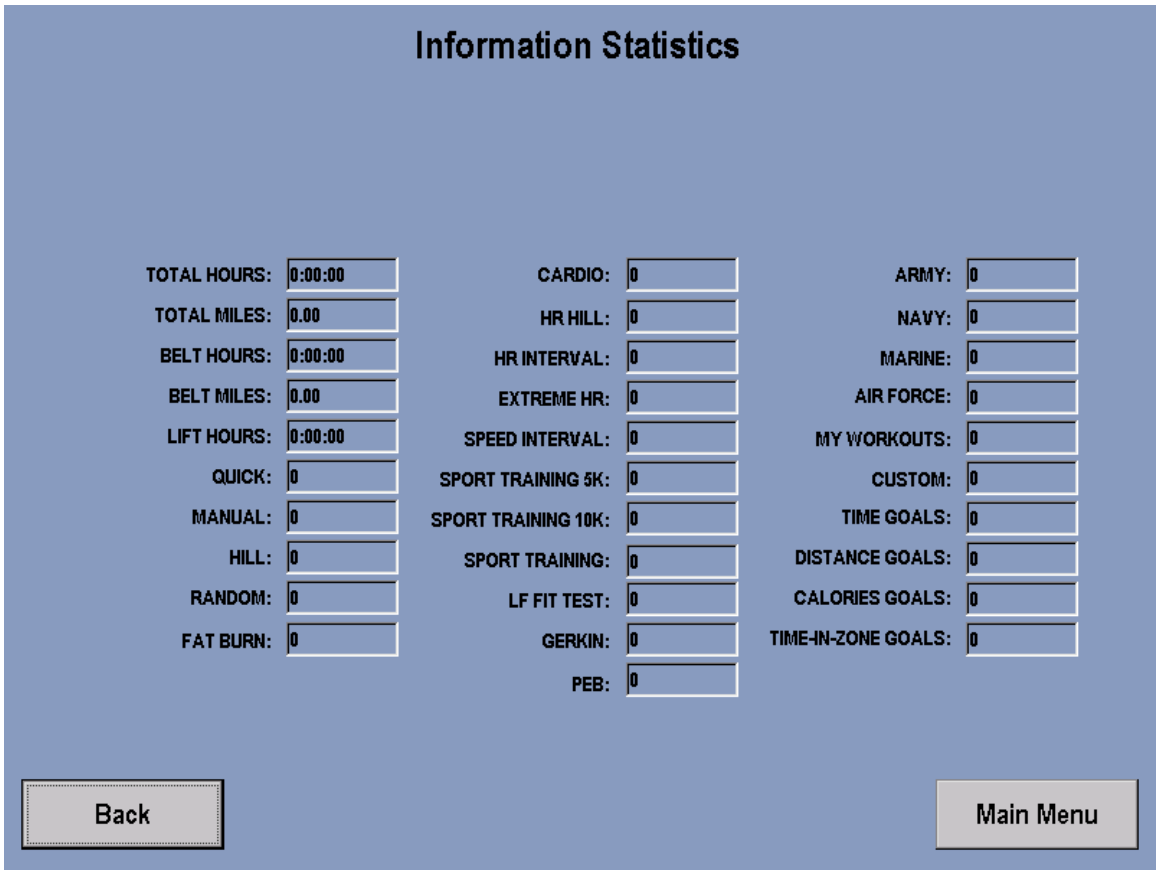

Press the appropriate button to see information on that topic.

| | |
|---|---|
| STATISTICS | Allows viewing of information concerning machine usage. |
| SOFTWARE VERSIONS | Provides software version information for various printed circuit boards used in the system. |
| MAIN MOTOR INFORMATION | Allows viewing historical data regarding the main motor and motor controller. |
| LIFT MOTOR INFORMATION | Allows viewing of historic information on lift motor usage. |
| SYSTEM ERRORS | Allows viewing of any historical system errors. |
| USAGE LOG | Allows viewing of historical information on machine usage by logging user weight and striding belt speed. |

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# Information – Information Statistics

This screen allows viewing of information concerning machine usage.

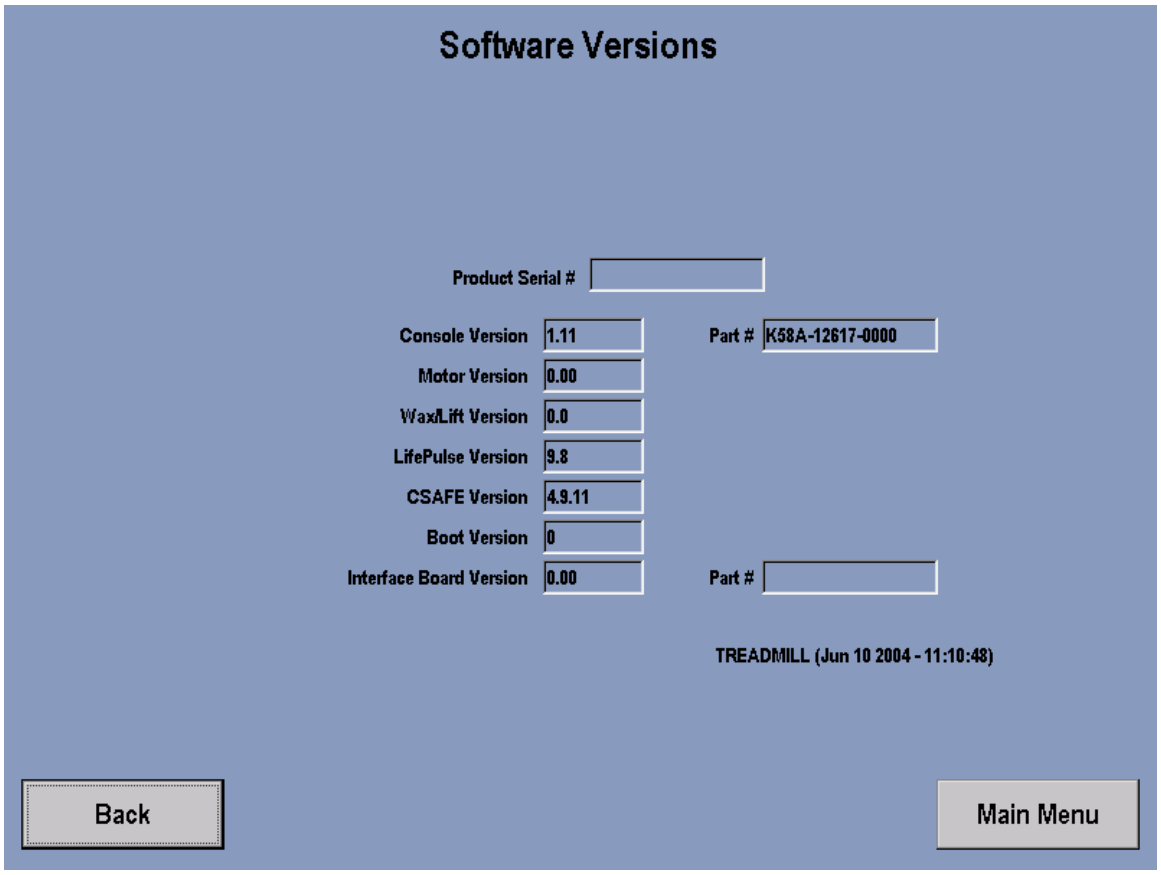



**NOTE - Information shown for reference only.**

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# Information - Software Version

This screen provides software version information for various printed circuit boards used in the system.



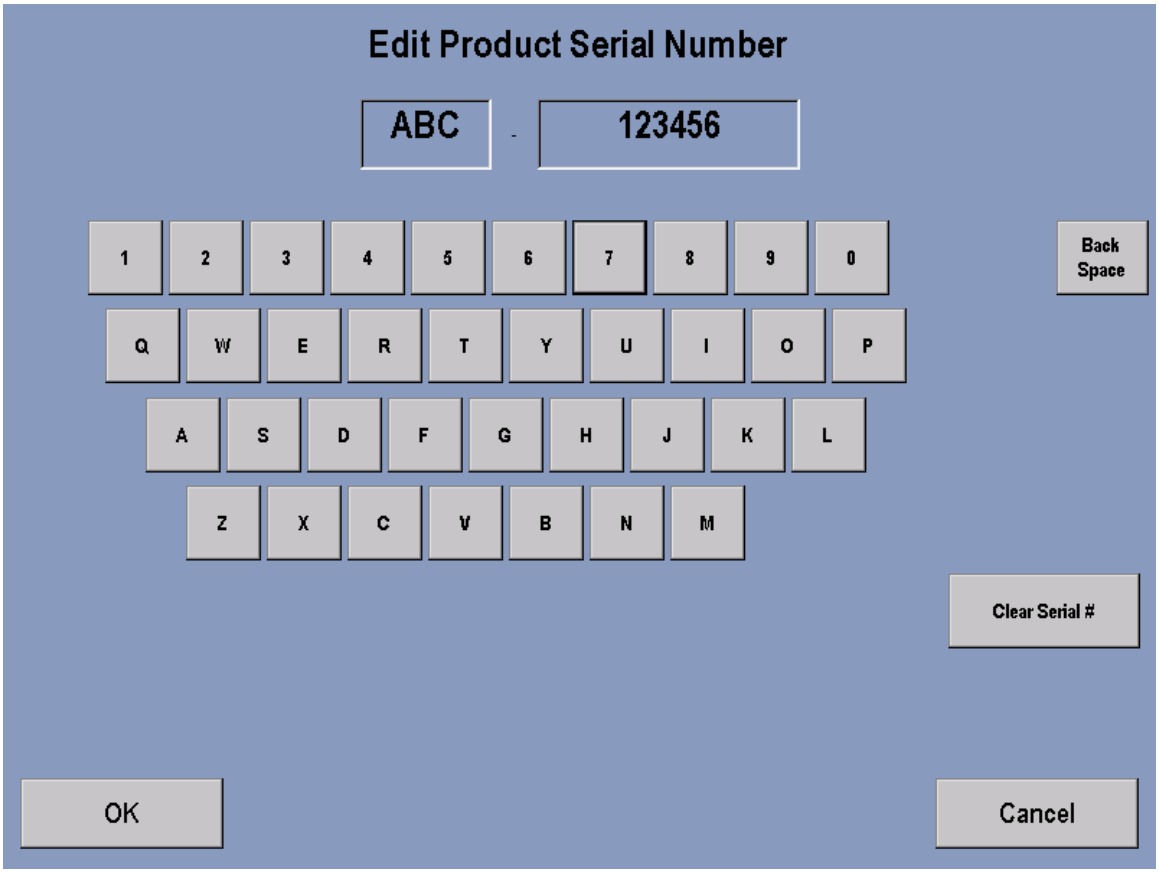

**NOTE - Information shown for reference only.**

The product serial number is stored in electronic memory in both the console and motor controller. When either of these two assemblies is replaced, the system will automatically interrogate the remaining board to extract the proper product serial number. In the event that both the console and motor controller are replaced simultaneously or if the product serial number memory becomes corrupt, it will be necessary to input the product serial number manually.

The corresponding Life Fitness part number is displayed next to the software version if applicable.

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

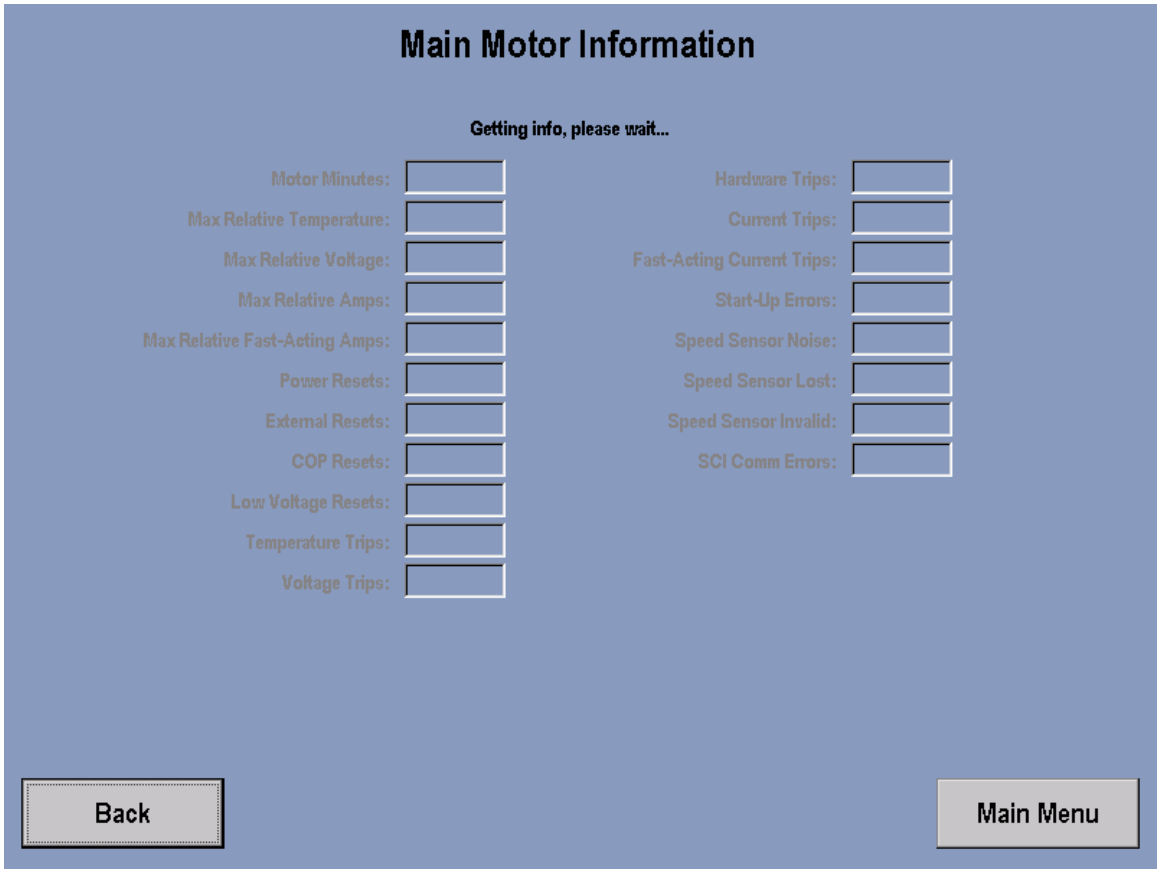
This screen is only used for manual inputting of the product serial number.




Use the information on the product serial number tag to enter correct number back into console and motor controller memory locations.

- ► Return to the previous screen by pressing the CANCEL key.
- ► Press OK to accept any serial number changes and return to the previous screen.

This screen allows viewing historical data regarding the main motor and motor controller.




**NOTE – It may take several seconds before data is displayed.**

| | |
|---|---|
| MOTOR MINUTES | Total number of minutes main motor has been running. |
| MAX RELATIVE TEMPERATURE | Maximum temperature. |
| MAX RELATIVE VOLTAGE | Maximum bus voltage. |
| MAX RELATIVE AMPS | Maximum bus current. |
| MAX RELATIVE FAST-ACTING AMPS | Maximum short-term/fast-acting current. |
| POWER RESETS | Motor controller microprocessor resets due to power-ups. |
| EXTERNAL RESETS | Motor controller microprocessor resets due to external resets. |
| COP RESETS | Motor controller microprocessor resets due to COP timeouts. |
| LOW VOLTAGE RESETS | Motor controller microprocessor resets due to low voltage. |
| TEMPERATURE TRIPS | Motor controller shut downs due to excessive temperature detection. |
| VOLTAGE TRIPS | Motor controller shut downs due to excessive bus voltage. |

## Information - Main Motor Information - Continued

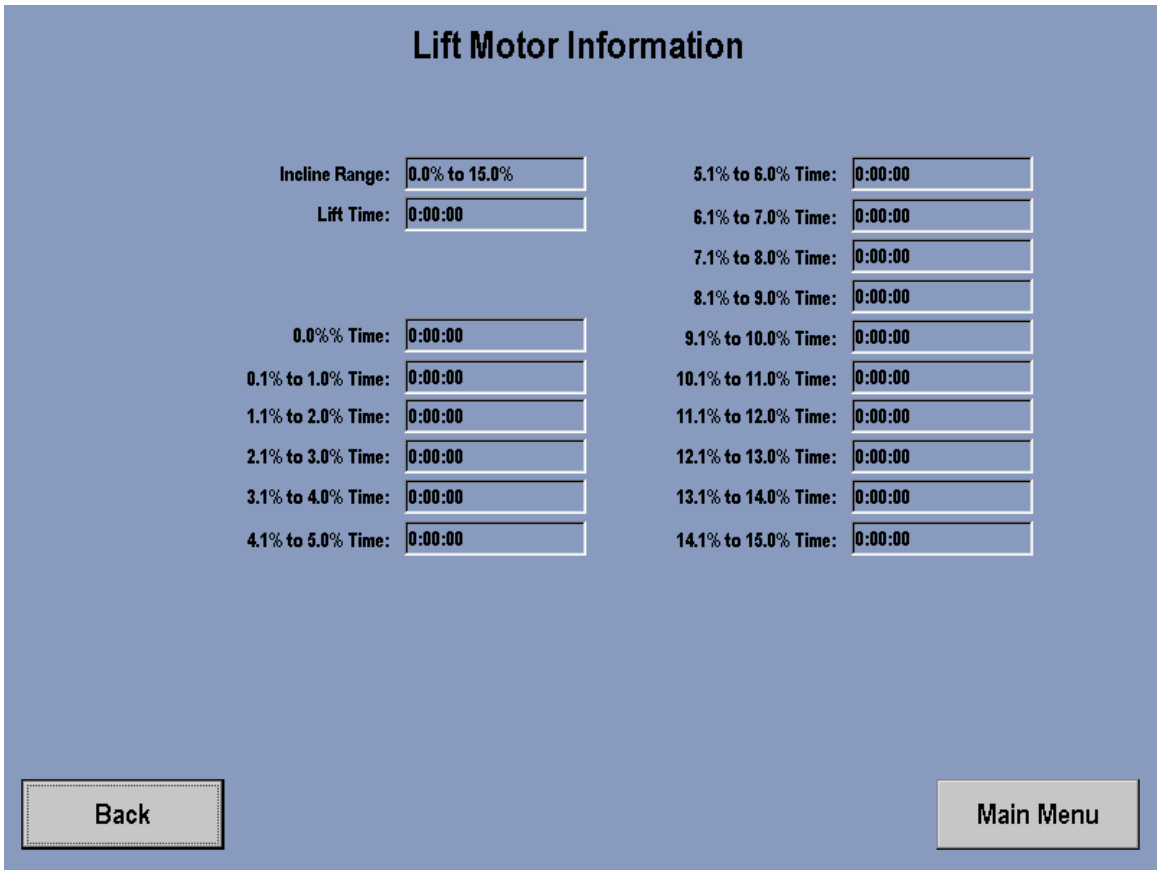
| | |
|---|---|
| HARDWARE TRIPS | Motor controller shut downs due to excessive bus currents detected by hardware. |
| CURRENT TRIPS | Motor controller shut downs due to excessive bus currents detected by software. |
| FAST-ACTING CURRENT TRIPS | Motor controller shut downs due to short-term/fast-acting excessive bus currents detected by software. |
| START-UP ERRORS | Speed sensor counts not detected at beginning of workouts. |
| SPEED SENSOR NOISE | Noise detected in speed sensor system. |
| SPEED SENSOR LOST | Speed sensor counts not detected during workouts. |
| SPEED SENSOR INVALID | Number of unrealistic speed sensor readings. |
| SCI ERRORS | Internal communication bus errors. |

**NOTE – Console replacement will reset all main motor information.**

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# Information - Lift Motor Information

This screen allows viewing of historic information on lift motor usage.



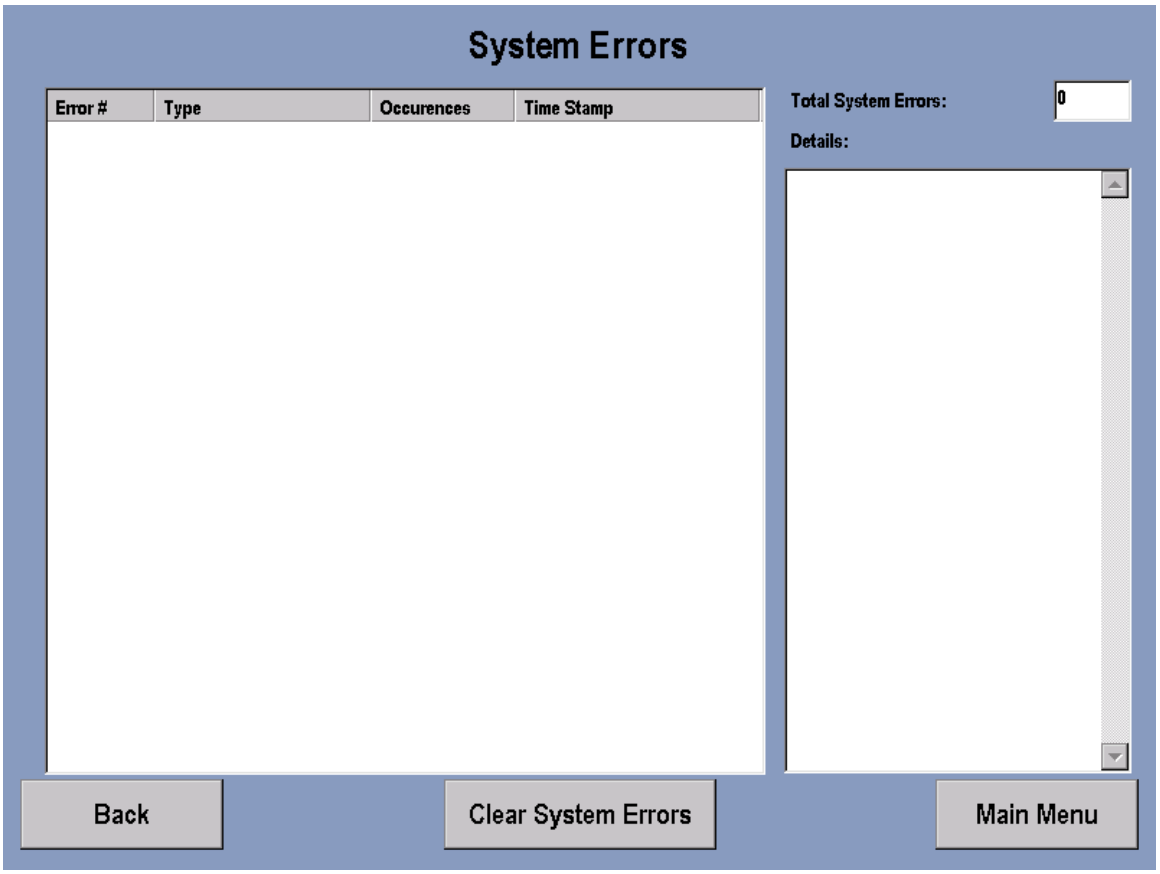

**NOTE - Information shown for reference only.**

**NOTE – Console replacement will reset all lift motor information.**

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# Information - System Errors

This screen allows viewing of any historical system errors.




Any errors will be displayed from most recent to oldest.
The display format will include the error number, error type, occurrences, and time stamp.

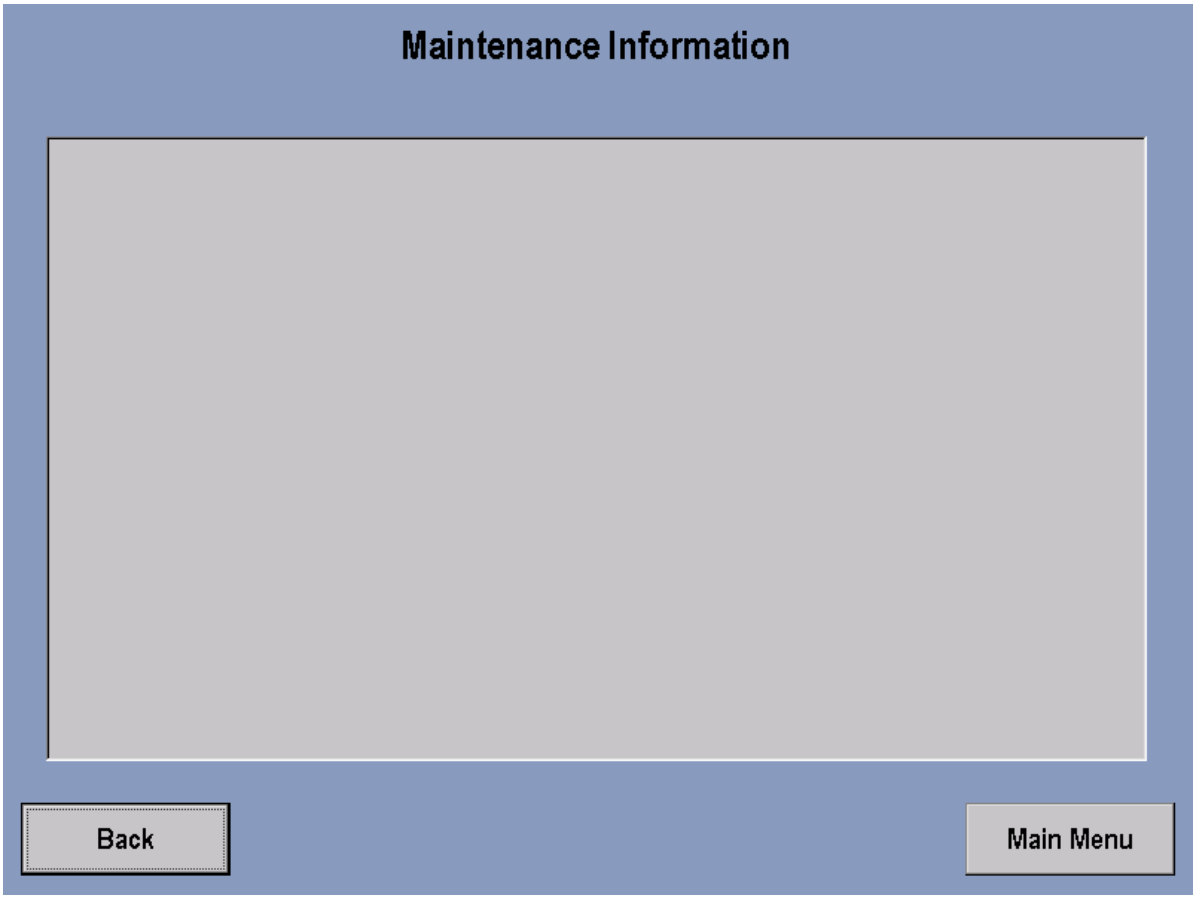
| | |
|---|---|
| ERROR # | Error number designation. Multiple errors of the same type will be displayed on one line with multiple occurrences. |
| TYPE | Error type designation. |
| OCCURANCES | Displays how many times the error has occurred in successive power-ups. |
| TIME STAMP | Displays information on what power-up cycle the error occurred. It also contains information regarding the exact moment in that cycle the error occurred. |
| TOTAL SYTEM ERRORS | Total count of occurrences of all errors. |
| DETAILS | Specific technical details such as "memory dumps" or internal software messages that could aid in error resolution. |

Pressing CLEAR SYSTEM ERRORS will delete all errors from the log.

**NOTE – Console replacement will reset all system error information.**

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

This screen will allow viewing the last 12 logged repairs.




Repair information will be displayed from most recent to oldest.

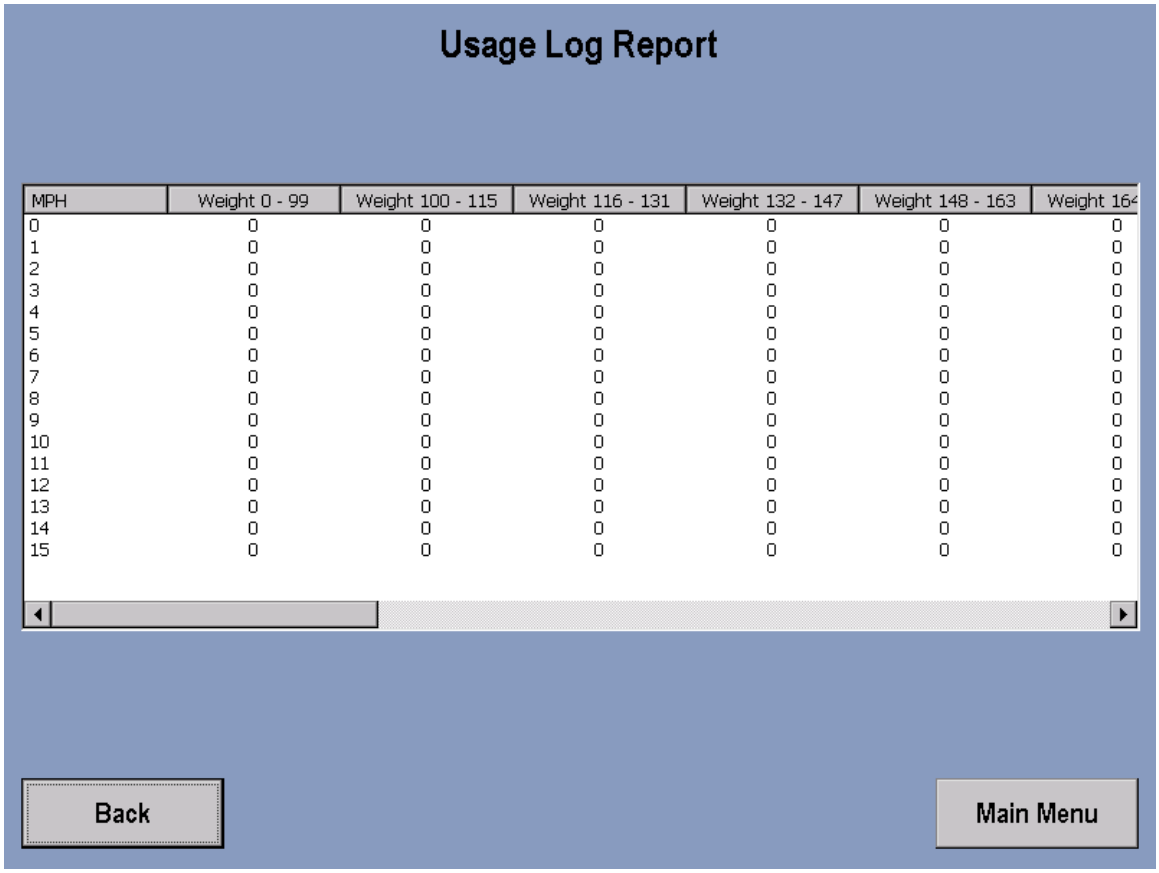
Repair operations that are displayed here were logged using the MAINTENANCE screen.

**NOTE – Console replacement will reset all maintenance information.**

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# Information - Usage Log Report

This screen allows viewing of historical information on machine usage by logging user weight and striding belt speed.



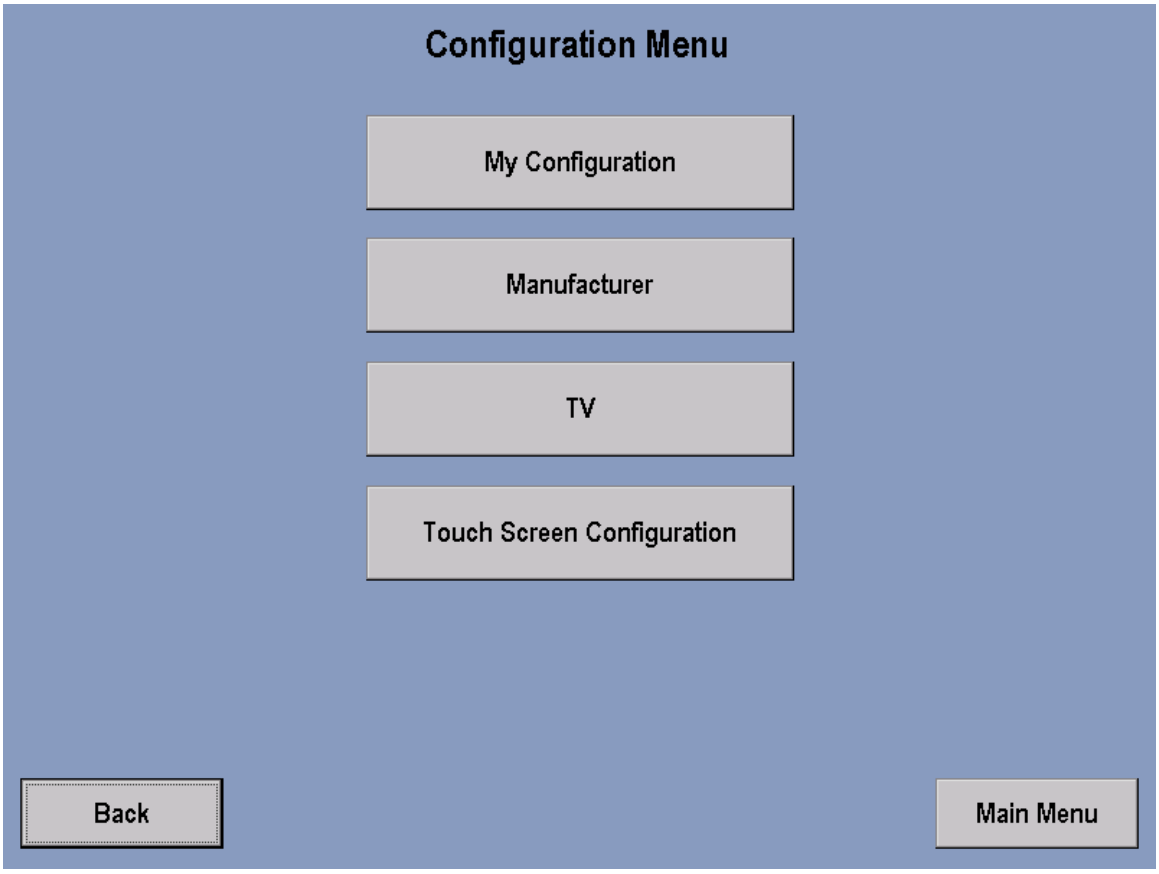

**NOTE - Information shown for reference only.**

**NOTE – Console replacement will reset all usage information.**

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# Configuration - Configuration Menu

This menu allows access to four separate configuration categories.

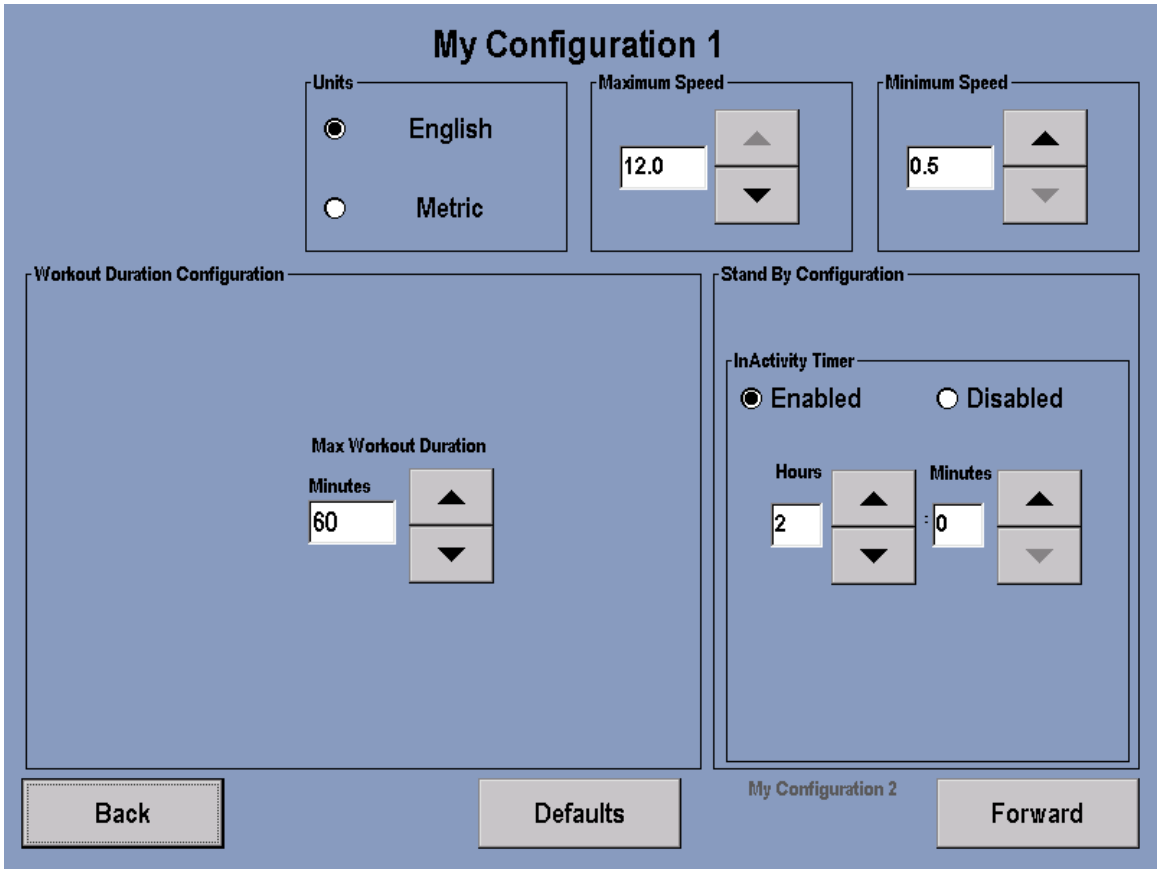



| | |
|---|---|
| MY CONFIGURATION | Two separate screens that allow personalizing settings and parameters. |
| MANUFACTURER | Allows adjustment of various system settings and is for factory authorized service personnel only. |
| TV | Allows adjustment of entertainment system parameters. |
| TOUCH SCREEN CONFIGURATION | Allows calibration of the touch screen. |

► Return to the previous screen by pressing the BACK key.
► Press the MAIN MENU key to return to the MAIN MENU screen.

# Configuration – My Configuration 1&2

This screen allows personalizing settings and parameters.

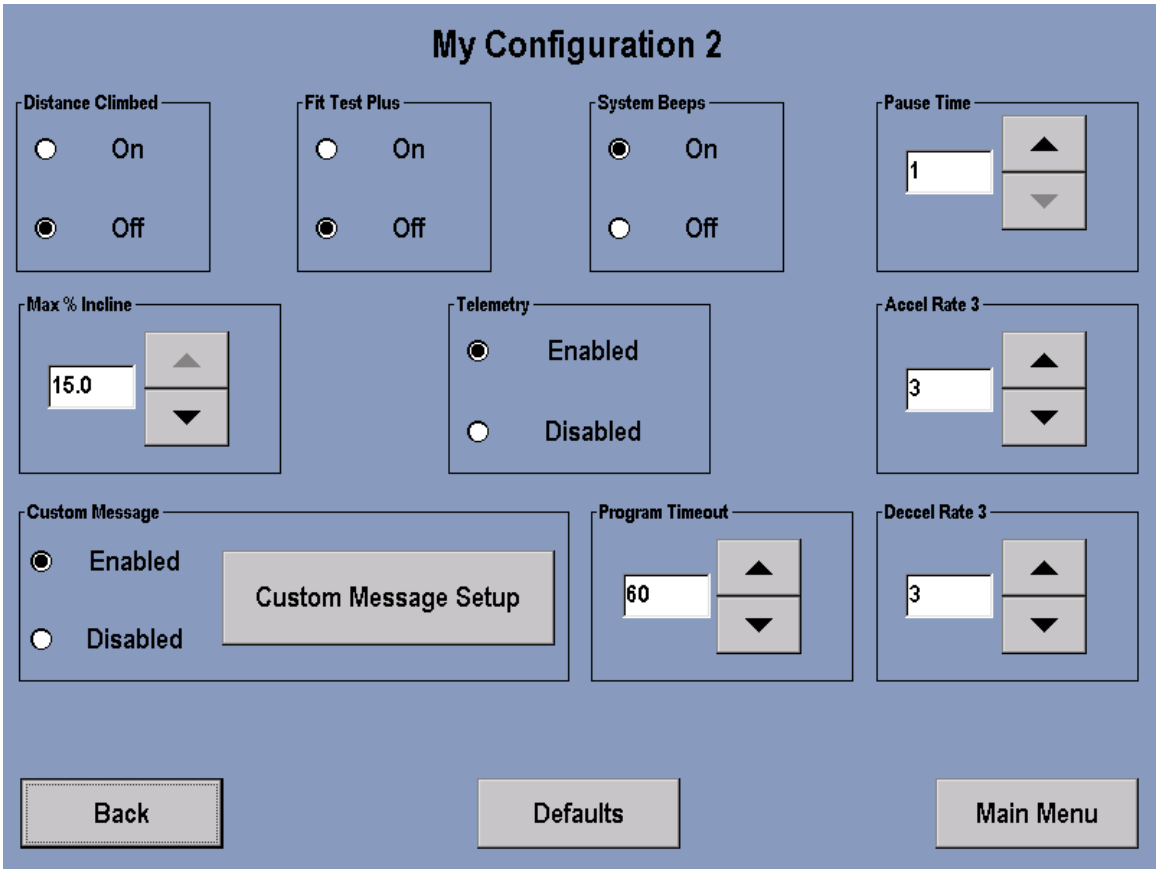



| | |
|---|---|
| UNITS | English or metric units displayed. |
| WORKOUT DURATION CONFIGURATION | Maximum single workout duration in minutes. |
| MAXIMUM SPEED (0.5-12) | Maximum speed in mph. |
| MINIMUM SPEED (0.5-12) | Minimum speed in mph. |
| STANDBY CONFIGURATION | When enabled will allow entering a low power consumption mode after a predetermined time. |

- ► Press the DEFAULT key to return all settings to factory defaults.
- ► Return to the previous screen by pressing the BACK key.
- ► Press FORWARD to advance to MY CONFIGURATION 2 menu.

## Configuration – My Configuration 1&2 - Continued

This screen allows personalizing settings and parameters.



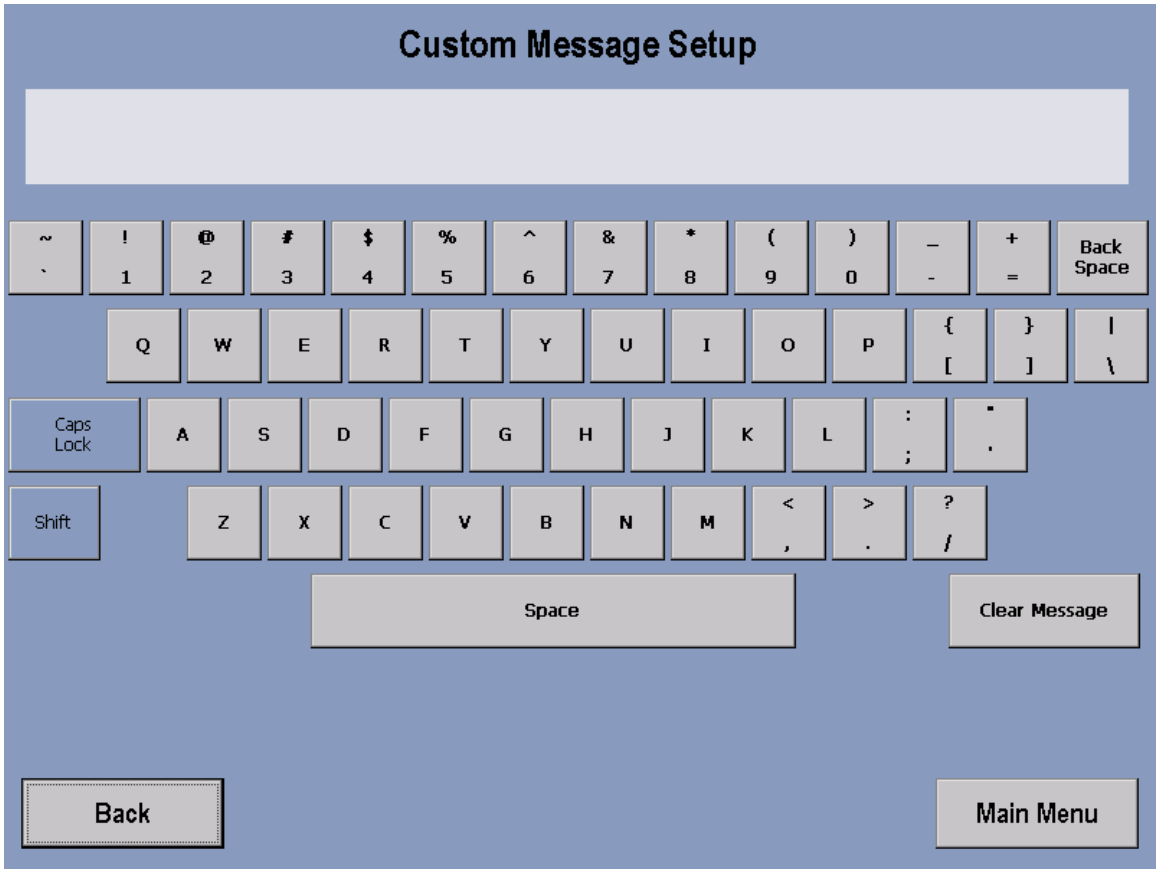

| | |
|---|---|
| Distance Climbed | Allows viewing of total distance climbed (based on incline angle and speed) during workout. |
| Max % Incline (0-15%) | Sets maximum incline angle. |
| Custom Message | A custom message will be shown at startup if this has been enabled and a custom message has been previously entered. |
| Fit Test Plus | Allows access to special fitness tests including Army PFT, Navy PRT, Marines PFT, Gerkin protocol, and PEB. Refer to operation manual for details. |
| Telemetry | Enables or disables telemetry feature. |
| System Beeps | Enables or disables beeping when a key is pressed. (Beep is always enabled in diagnostic mode) |
| Program Timeout | Sets the idle time that the system will wait at any input screen before resetting. |
| Pause Time | Sets maximum pause time allowed during a workout before unit resets. |
| Accel Rate 3 (1-5) | Sets rate (1=slowest to 5=fastest) at which the treadmill accelerates to the selected speed. |
| Deccel Rate 3 (1-5) | Sets rate (1=slowest to 5=fastest) at which the treadmill decelerates to the selected speed. |

**NOTE – Console replacement will reset all personal settings and parameters to default values.**

- ► Press the DEFAULT key to return all settings to factory defaults.
- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# Configuration - Custom Message Setup - Continued

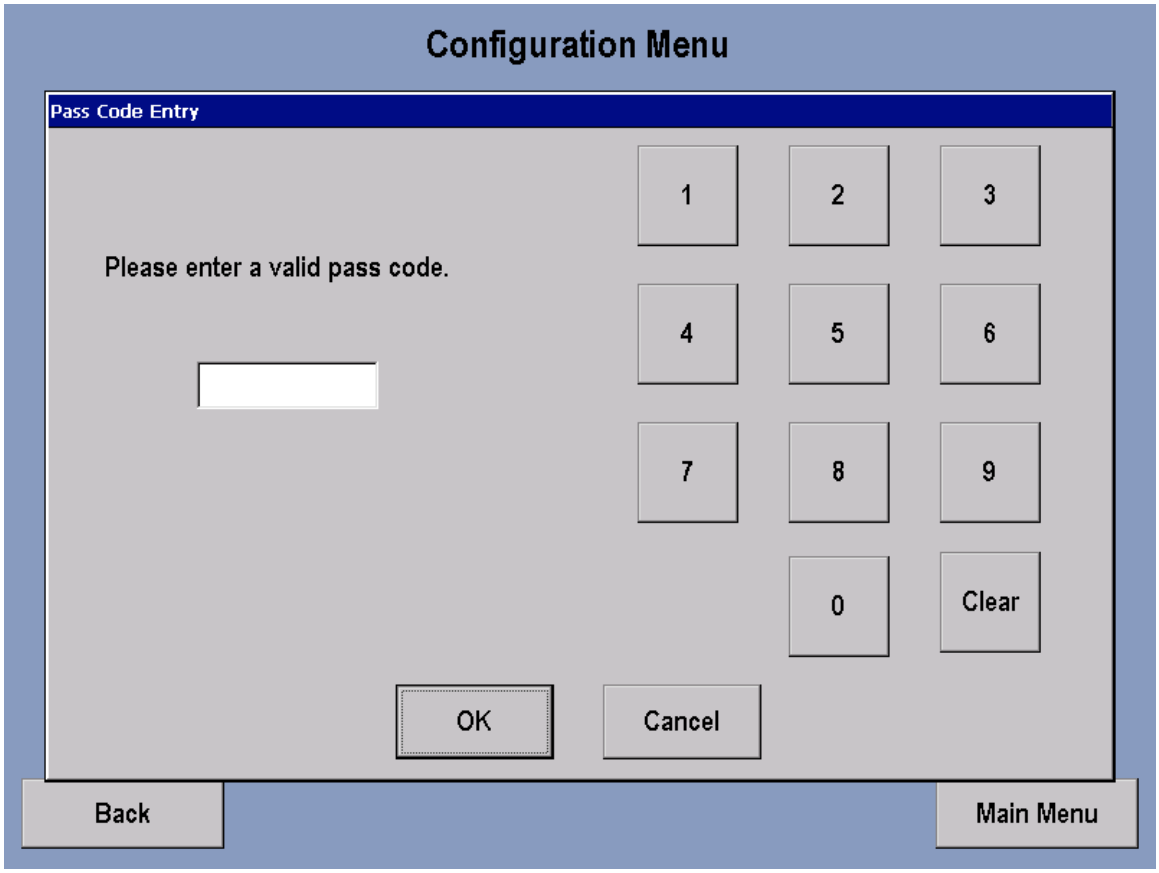
This screen allows setting a custom message that scrolls across the welcome screen.




| | |
|---|---|
| Creating/Changing Message | Enter a custom message just as you would on a computer keyboard. Use the CLEAR MESSAGE key erase the message and start again if desired. During message input, the message will scroll across the area above the keys. When finished press MAIN MENU to save and activate message. |
| Erasing an Existing Message | Press the CLEAR MESSAGE key followed by MAIN MENU. |

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

This screen allows adjustment of various system settings and is for factory authorized service personnel only.

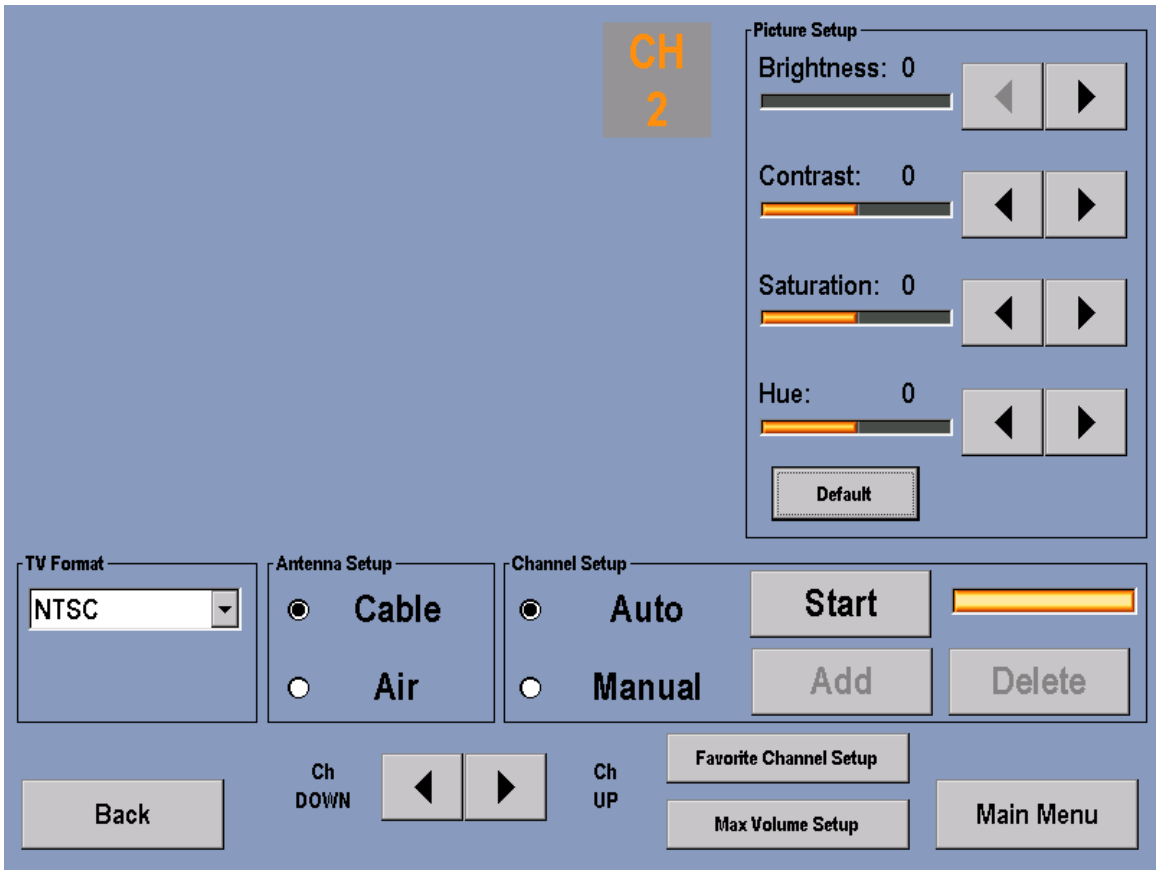



Enter the proper pass code and press OK to allow modifications to system parameters.

► Return to the previous screen by pressing the CANCEL key.

# Configuration - Television Controls

This screen allows adjustment of entertainment system parameters.



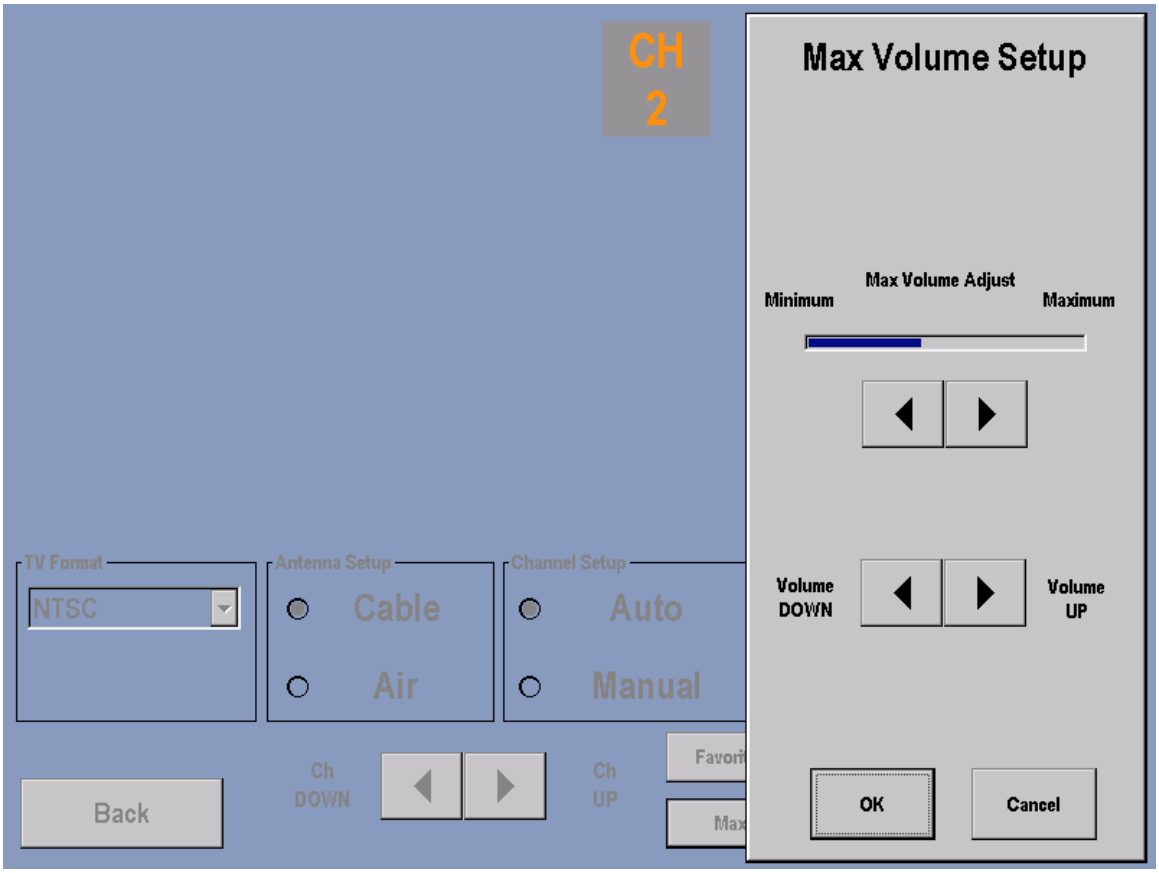
## Configuration - Television Controls - Continued

| | |
|---|---|
| TV FORMAT | NTSC is the television broadcast standard for the United States. Other choices are available for foreign countries. |
| ANTENNA SETUP | CABLE – Select for cable type broadcasts. |
| | AIR – Select for antenna type broadcasts. |
| CHANNEL SETUP | AUTO – An automatic broadcast channel scan will begin when START is pressed. An indicator shows the scanning progress. All captured channels will be available for selection. |
| | MANUAL – Using CH UP and CH DOWN, broadcast channels can be ADDed or DELETEd manually. |
| PICTURE SETUP | BRIGHTNESS – White to black ratio. (Default = 180) |
| | CONTRAST – The difference in brightness between the light and dark areas of the picture.(Default = 71) |
| | SATURATION – Color intensity. (Default = 64) |
| | HUE – Sometimes referred to as tint. This controls the red to green level. (Default = 0) DEFAULT – Adjusts all controls for picture setup to factory default settings. |
| FAVORITE CHANNEL SETUP | Allows a five character custom abbreviation and direct access to be assigned to any of nine favorite TV stations. |
| MAX VOLUME SETUP | Adjustment of the maximum attainable volume possible for audio headphones. |
| CH UP | Manually advances to the next higher frequency broadcast station that is available for selection. |
| CH DOWN | Manually advances to the next lower frequency broadcast station that is available for selection. |

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

# Configuration - Max Volume Setup

This screen allows adjustment of the maximum attainable volume possible for audio headphones.




**NOTE - Headphones must be used for this adjustment.**

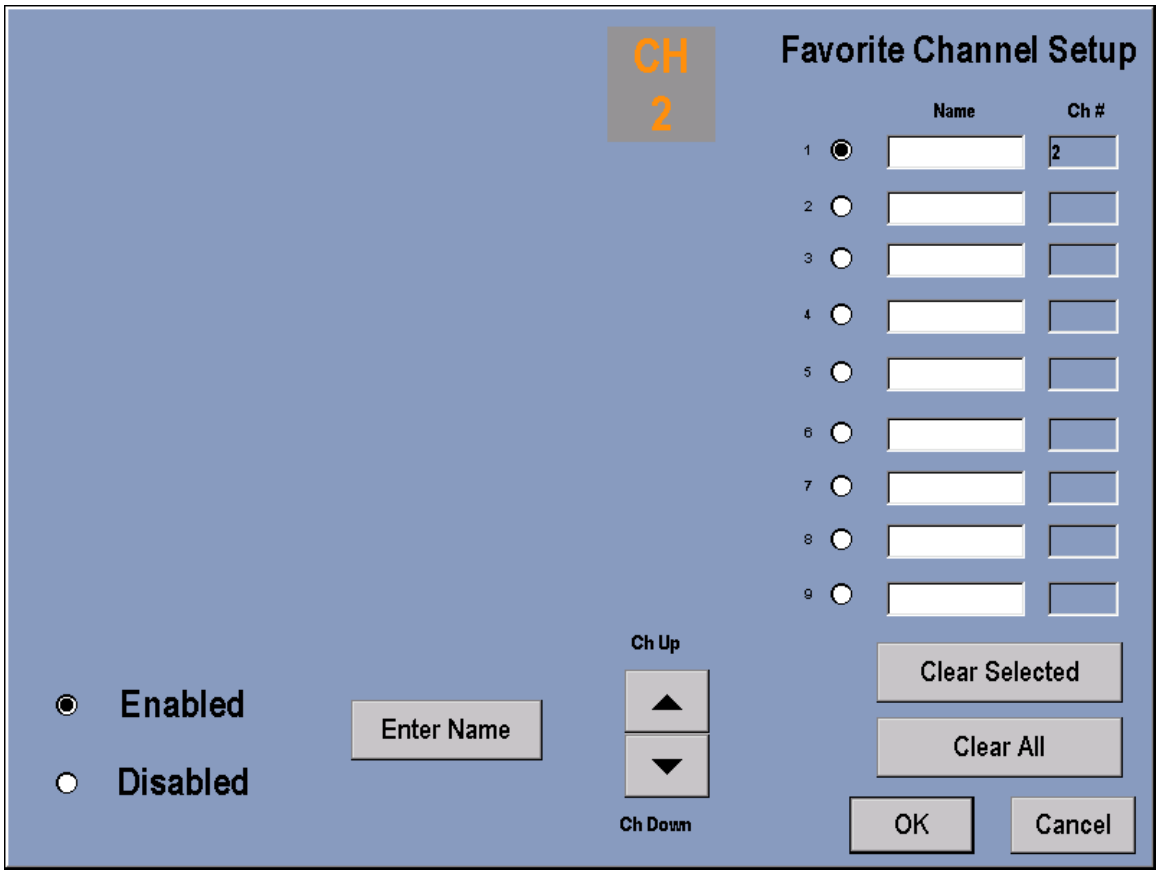
Use the ARROW keys to adjust the level of the maximum attainable volume and actual volume settings for the headphones.

**NOTE – At the end of every workout the actual volume setting reverts to a default level. This has no effect on the maximum volume setting.**

- ► Press OK to accept adjustments to volume levels
- ► Press CANCEL to abort any adjustments in volume levels.

# Configuration – Favorite Channel Setup

This screen allows a five character custom abbreviation and direct access to be assigned to any of nine favorite TV stations.

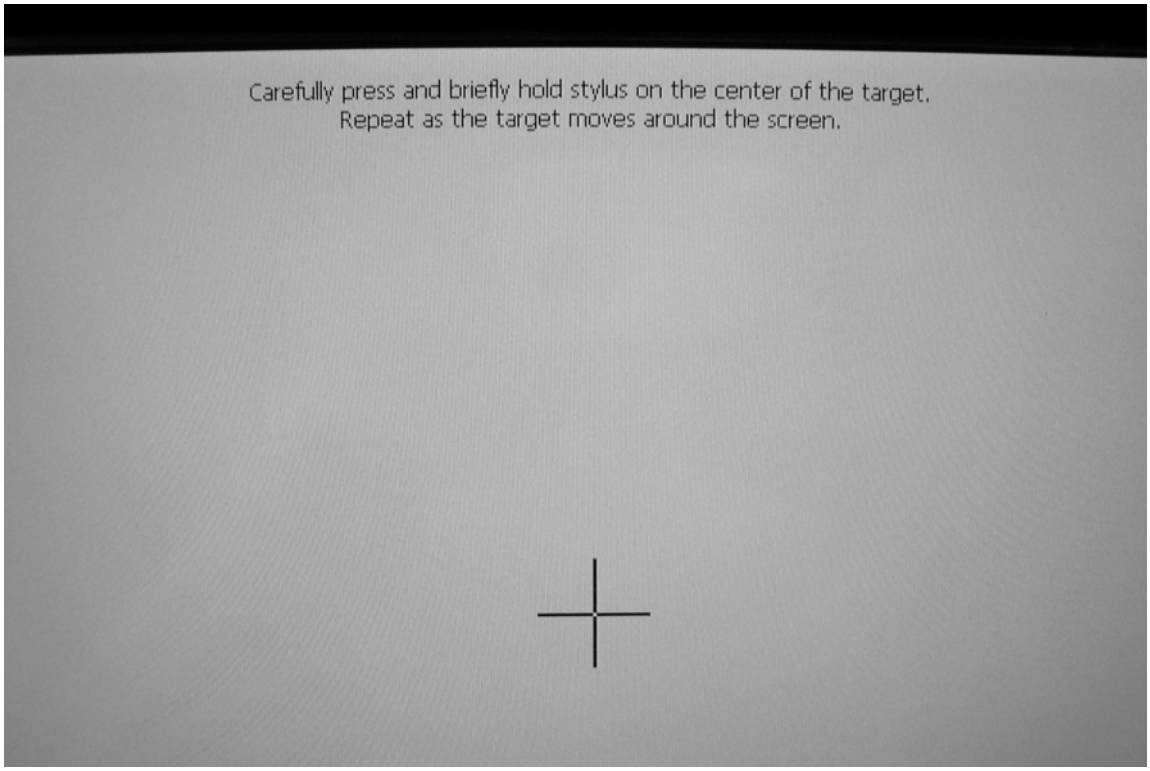



| | |
|---|---|
| ENABLED/DISABLED | Status of favorite channel feature. |
| ENTER NAME | Allows entry of custom abbreviation for a single channel. |
| CLEAR SELECTED | Allows deletion of a custom abbreviation for a single channel. |
| CLEAR ALL | Clears all custom abbreviations for TV stations. |
| NAME | Displays custom abbreviation assigned to a single channel. |
| CH # | Displays channel number associated with custom abbreviation. |

- ► Press OK to accept adjust to favorite channels
- ► Press CLEAR ALL to delete all favorite channel information.

# Configuration – Touch Screen Calibration

This screen allows the LCD display to be calibrated to acknowledge the point where the screen is being touched.

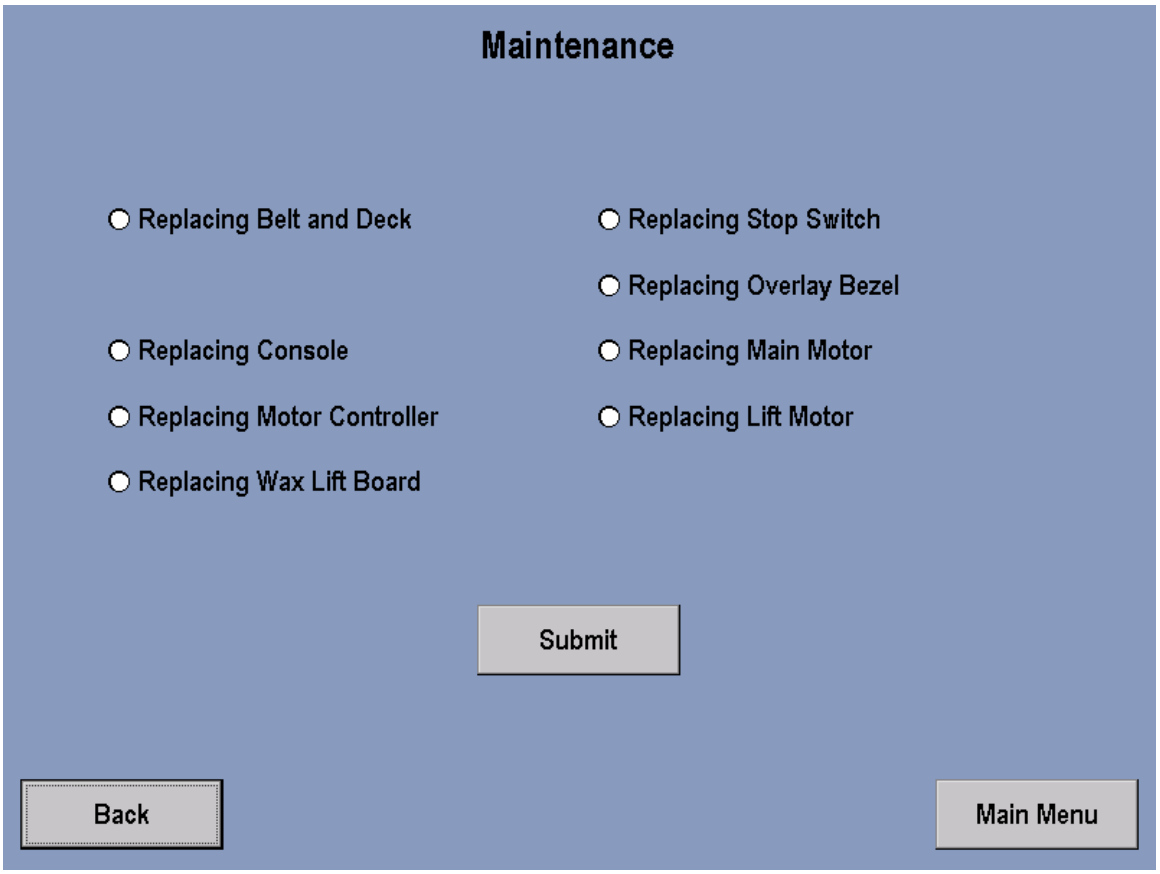



Follow the directions on the screen. This will require touching the screen in several locations.
**NOTE – Once the calibration process starts, it should not be interrupted.**

**IMPORTANT - After calibration has been completed, you will have 30 seconds to touch the screen and save new calibration settings. Failure to touch screen within that time limit will not save new calibration settings.**

# Maintenance - Maintenance

This screen provides logging capabilities for specific maintenance procedures. This information will be stored in the console and is available for viewing by entering MAINTENANCE INFORMATION.




Choose one of the available maintenance procedures to be logged by touching the appropriate selection.

Press the SUBMIT key to select logging of a completed repair procedure.

- ► Return to the previous screen by pressing the BACK key.
- ► Press the MAIN MENU key to return to the MAIN MENU screen.

*Chapter 4*

# SECTION 4

# HOW TO…
# SERVICE AND REPAIR GUIDE

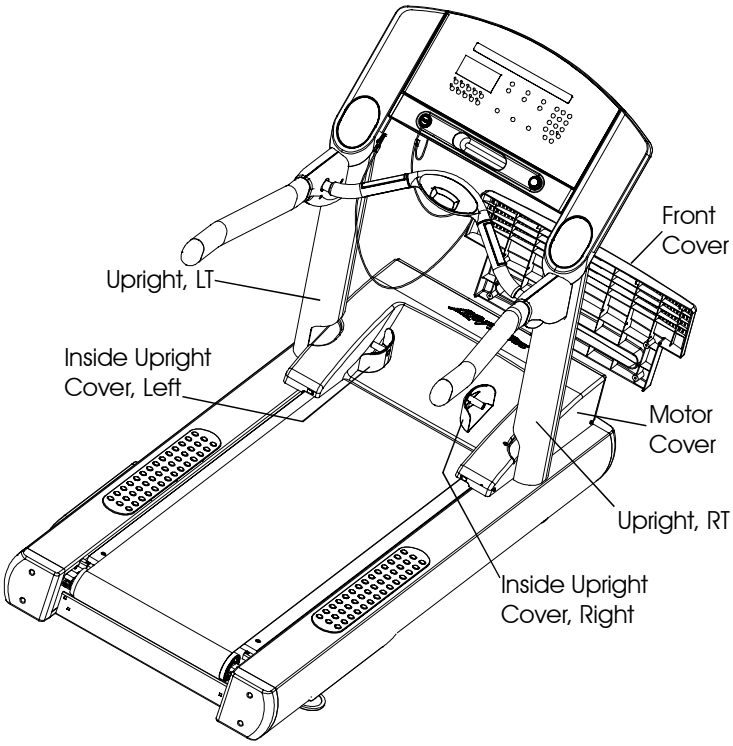
**How To Replace:**

## NOTES

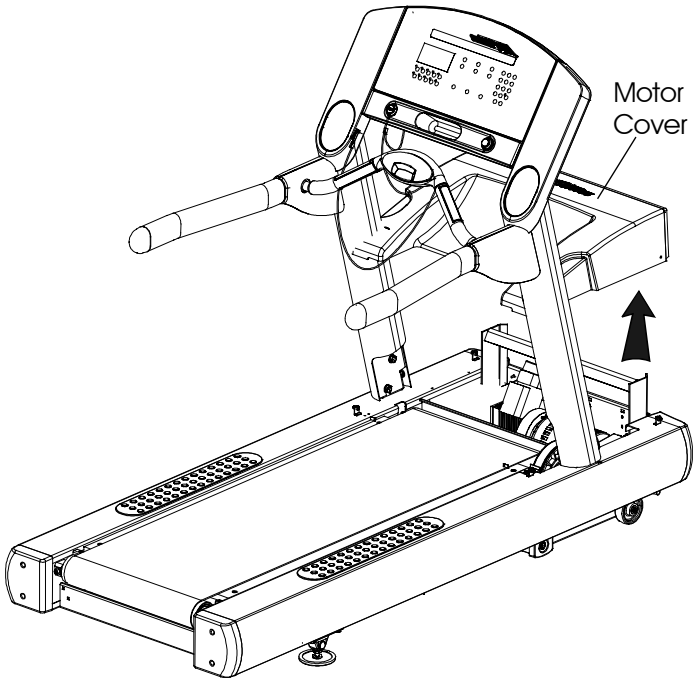
# How To...Replace the Upright Covers, Motor Cover, and Front Cover

**Special Service Tools Required: None**

1. Turn the unit power OFF at ON/OFF Switch, and then unplug line cord at wall outlet.
2. Remove the two screws releasing left and right inside upright covers.
3. Remove the front cover with the four attaching screws.




4. Remove the four motor cover screws and lift off the cover from between the support uprights.
5. Install the covers in reverse order.



# How To...Replace the Main Motor Belt

**Special Service Tools Required: None**

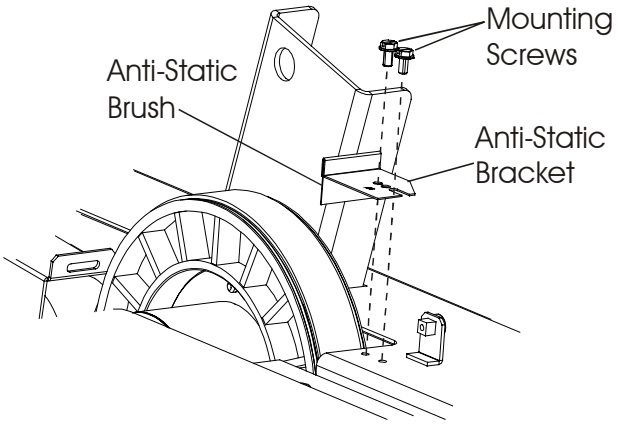
1. Turn unit power OFF at ON/OFF Switch, and then unplug the line cord at the wall outlet.

2. Remove the inside upright covers, front cover, and motor cover. See “How To…” in this section.

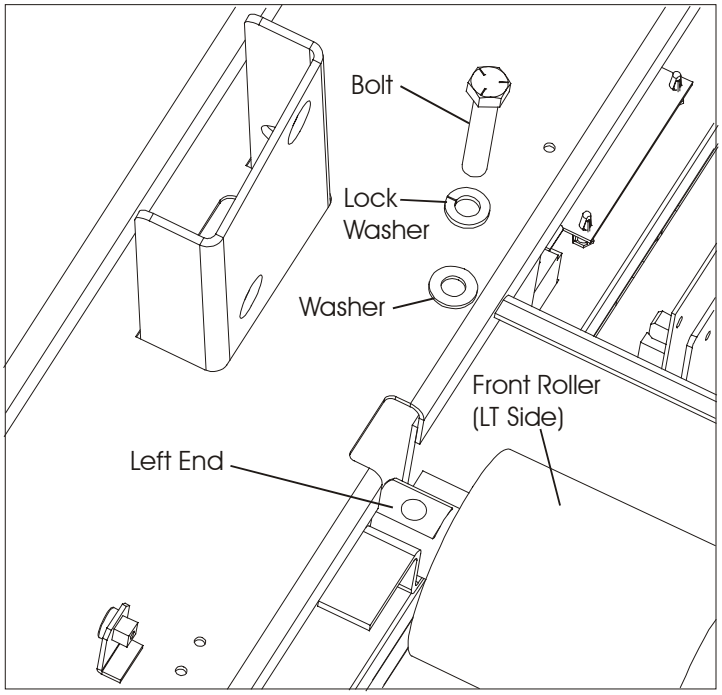
3. Loosen the rear roller adjusting screws enough to slacken the striding belt and allow side-to-side movement of the front roller.

NOTE: Count the number of rotations when loosening the roller adjusting screws. This will provide a starting point for belt re-tensioning.

4. Remove the anti-static brush bracket prior to roller removal by removing the two mounting screws.




5. Remove the single bolt and associated hardware on the left side of the front roller shaft.




Left Side of the Unit Frame

# How To...Replace the Main Motor Belt - Continued

**Special Service Tools Required: None**

6. Scribe a mark or measure the position of motor bracket with respect to frame.


NOTE: Scribing or measuring is done so that the motor can be returned to the original position for proper belt tensioning.

7. Loosen the four motor nuts on studs securing the motor bracket.

NOTE: If the hardware is removed, note the position and polarity of the white shouldered washer under each nut.

8. Relieve the tension on the main motor belt by rotating the tensioning bolt counterclockwise.

9. Move the left side of the front roller shaft into the left side of the frame so that the pulley shaft clears the access hole in the right side.

10. Remove the drive belt from the front roller and motor pulley.

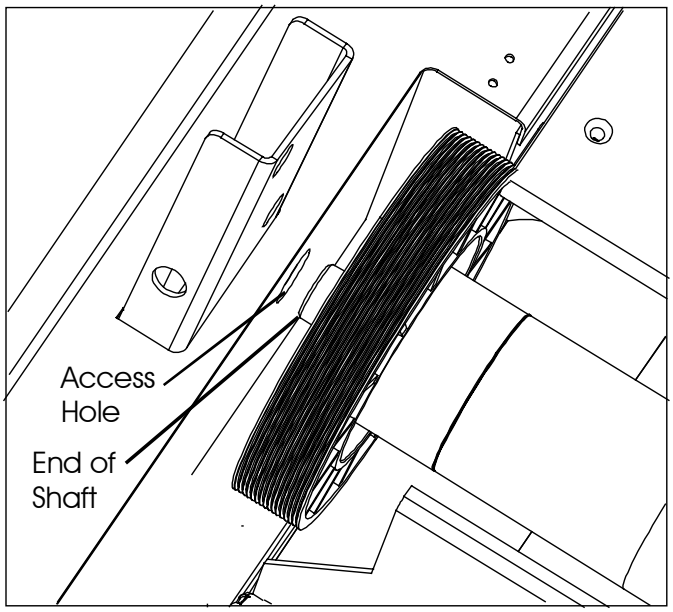
11. Install main motor belt in reverse order.

IMPORTANT: Make certain that the motor drive belt is positioned so that the belt is flush with the left side of the roller pulley.

12. Use the tensioning bolt to return the motor bracket to the scribe mark or measurement.

13. Tighten nuts on motor bracket to secure motor.

IMPORTANT: Make certain that main motor pulley and roller pulley are parallel and that the white shouldered washers under the nuts are properly seated in the bracket slots before tightening.




Right End of Front Roller as Viewed From Front of Unit

14. Tension the striding belt. See “How To…” in this section.

15. Re-install covers.

# How To...Replace the Striding Belt and Deck

**Special Service Tools Required: None**

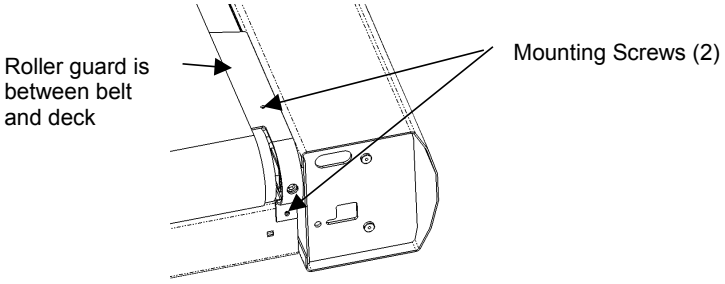
NOTE: When replacing a deck, the striding belt must also be replaced.

1. Turn unit power OFF at ON/OFF Switch, and then unplug line cord at wall outlet.

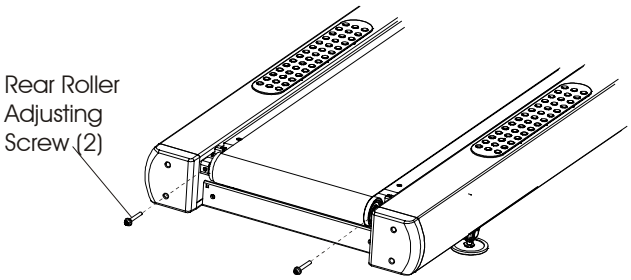
2. Remove the front cover. See “How To…” in this section.

3. Remove the rear roller guards.

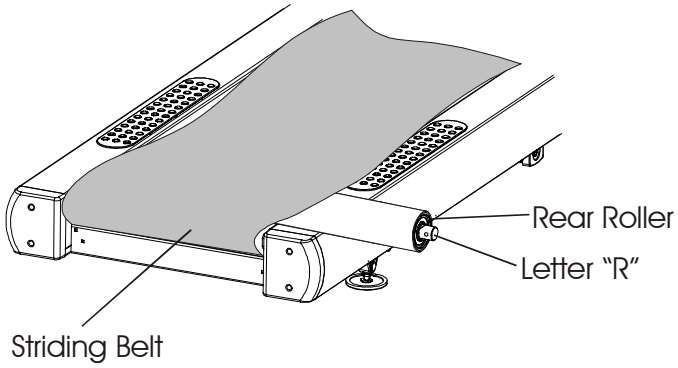
NOTE: End cap shown removed for clarity only.




4. Remove the rear roller adjusting screws (counterclockwise). Count the number of rotations when removing the roller adjusting screws to provide a starting point for belt re-tensioning.



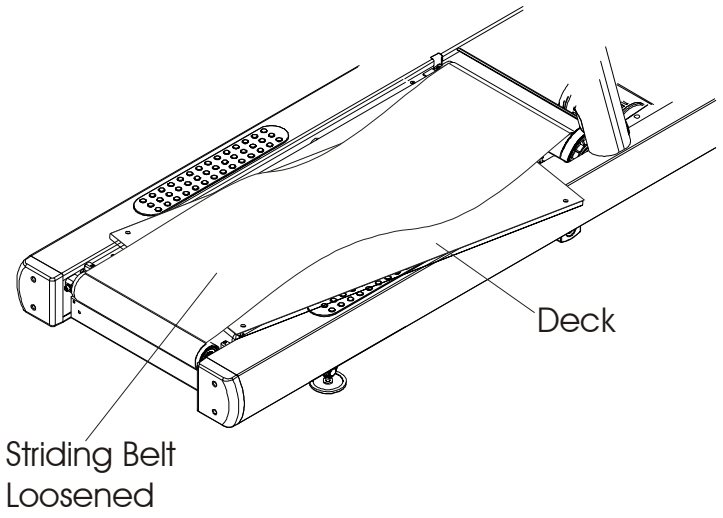

5. Remove the rear roller from under the striding belt just enough to mark the end of the shaft so that it can be re-installed in the same position in order to maintain a similar bearing wear pattern. Using a felt-tip marker, mark the letter “R” on the right end of the shaft.



## How To...Replace the Striding Belt and Deck - Continued

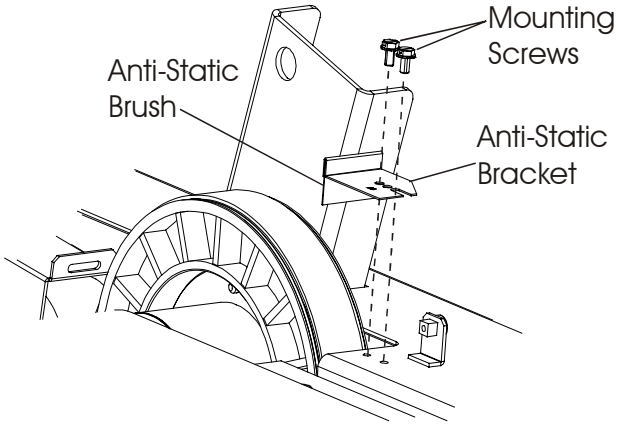
**Special Service Tools Required: None**

6. Remove the deck from underneath the striding belt by removing the four screws, one in each corner of the deck.




7. Remove the anti-static brush bracket prior to roller removal by extracting two retaining screws.

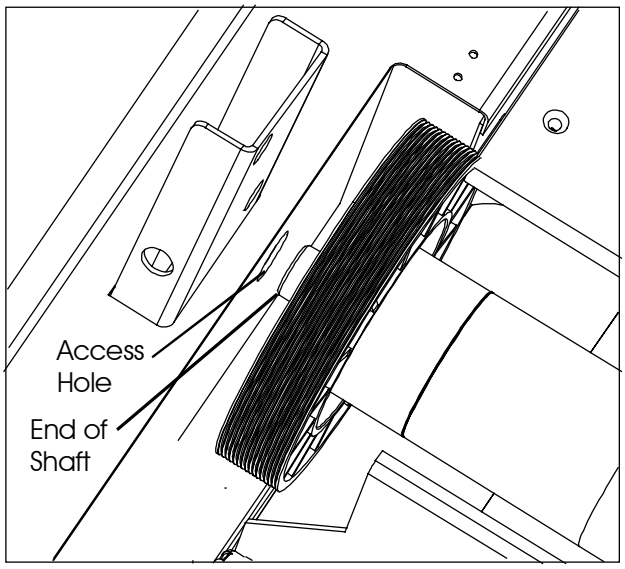
8. Remove main motor drive belt. See "How to... " in this section.



## How To...Replace the Striding Belt and Deck - Continued

**Special Service Tools Required: None**

9. Remove the motor drive belt from the front roller pulley.

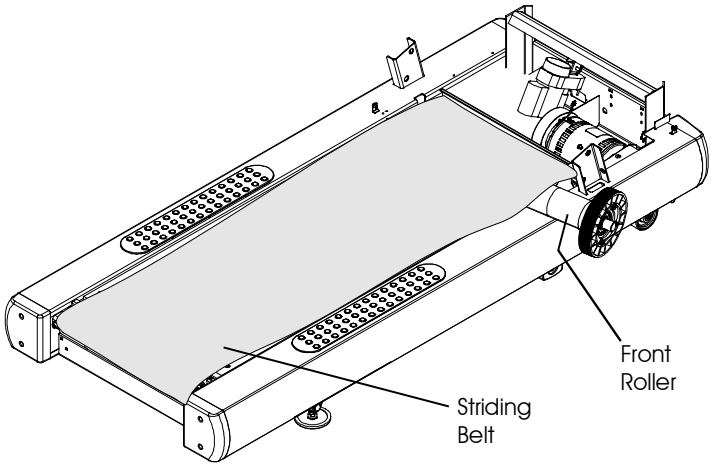



Right End of Front Roller as Viewed From Front of Unit

10. Remove the front roller from under the striding belt.

NOTE: The console and uprights are not shown for clarity purposes.

11. With rollers removed, proceed to remove the striding belt.



# How To...Replace the Striding Belt and Deck - Continued

**Special Service Tools Required: None**

**INSTALLATION**

1. Position the striding belt on the unit.

NOTE: Make certain that the arrow on the inside of the belt points towards the direction of belt rotation.

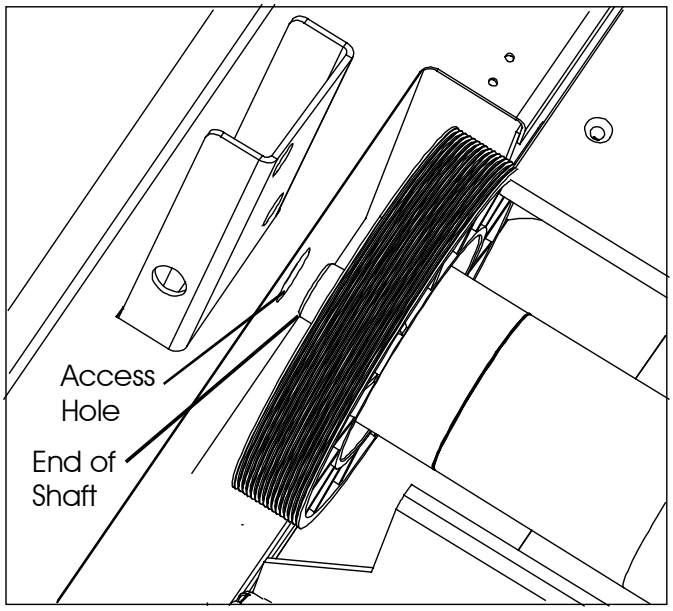
2. Reconnect the anti-static tinsel.

NOTE: If belt is being replaced then the tinsel should be replaced at the same time.

3. Position the front roller out from under the striding belt and install motor drive belt on the front roller pulley.

4. Place the right side of front roller shaft in the access hole and secure the left side shaft with the mounting bolt and washers.

5. Install the main motor drive belt on the pulley.



Right End of Front Roller as Viewed From Front of Unit

IMPORTANT: Make sure that the motor drive belt is positioned so that the belt is flush with the left side of the front roller pulley.

6. Adjust the main motor drive belt to proper tension. See "How To…" in this section.

7. Install the deck and secure with the four mounting screws.

NOTE: The deck should be flipped, if used.

8. Position the rear roller under the striding belt.

NOTE: Make sure that the letter “R”, which was earlier marked at the end of the rear roller shaft, is positioned on the right side of the machine.

9. Install the rear roller adjusting screws loosely.

10. Adjust the striding belt tension. See "How To…" in this section.

11. Adjust the striding belt tracking. See "How To…" in this section.

12. Reinstall the rear roller guards. Tighten screws 22-37 in lbs.

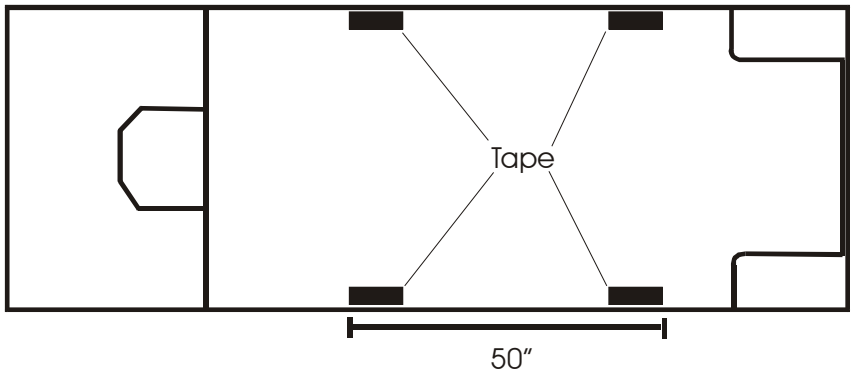
13. Reinstall the inside upright covers, motor cover, and front cover.

NOTE: Reference MAINTENANCE in diagnostics section to log this event.

# How To... Tension New Striding Belt

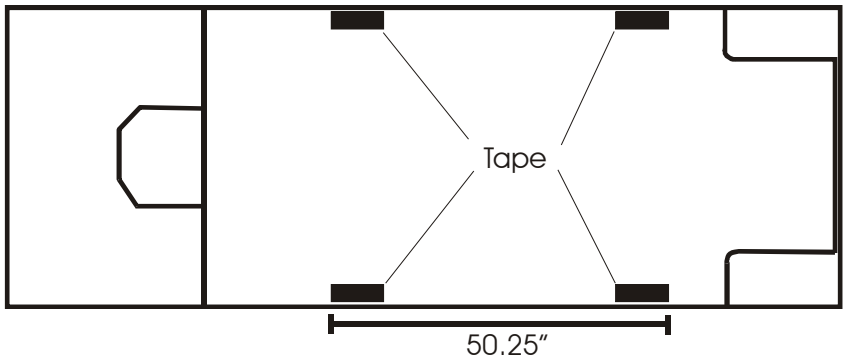
**Special Tools Required: None**

1. Center the loose striding belt on front and rear rollers.
2. Place two pieces of masking tape 50” apart on the right and left side edges of the striding belt as shown.




3. Tighten tensioning bolts until the distance between tapes (both sides) is increased to 50.25”. At this point, the belt is properly tensioned.
4. Adjust the striding belt tracking. See How To... Adjust the Striding Belt Tracking.

NOTE: Refer to MAINTENANCE in diagnostics section to log this event.



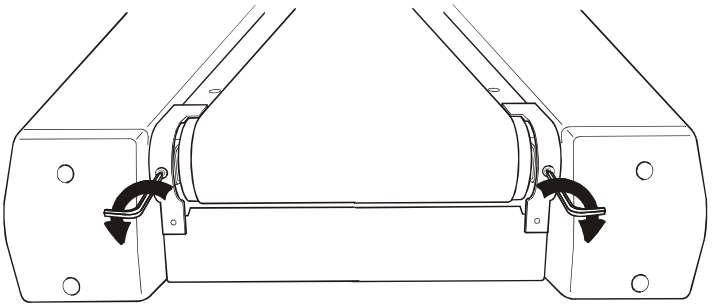
# How To... Tension Existing Striding Belt

**Special Service Tools Required: None**

1. Locate the belt tensioning bolt on each side of the rear roller. The tensioning bolts are accessible through the holes provided in the rear roller guards.

2. Return the tensioning bolts to their approximate original position using the count of the number of rotations required for removing them.

NOTE: If this rotational count is unavailable, hand-tighten tensioning bolts plus an additional two turns before continuing tensioning process.



3. Enter SPEED MANUAL and run unit for at 5.0 mph (8.0 km/h) for five minutes.

NOTE: Do not walk or run on the treadmill at during this time.

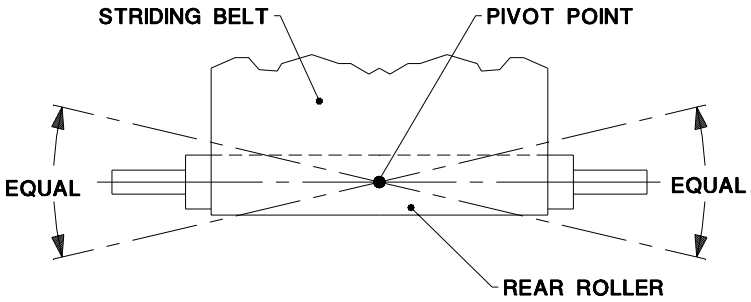
4. Set the striding belt speed to 2 mph (3.2 km/h). Begin walking on the treadmill. Tightly grasp the handrails and make a deliberate attempt to slow the striding belt. If belt slippage is detected, proceed to step 5, otherwise proceed to step 6.

NOTE: When verifying striding belt tension using this method, an error can be generated with the message "CANNOT OBTAIN SPEED ERROR". This message should be ignored for this procedure.

5. Stop belt and increase belt tension on each side by 1/4-turn. Return to step 3.

NOTE: Make tension adjustments in 1/4 turn increments.

6. With the belt running, note its tracking on the deck surface. If the belt is offset to the right, turn the right tensioning bolt 1/8 turn counterclockwise and the left tensioning bolt clockwise an equal amount. If the belt is offset to the left, turn the left tensioning bolt 1/8 turn clockwise and the right tensioning bolt counter-clockwise the same amount. Repeat adjustment as necessary. Allow the unit to operate for several minutes after each adjustment to see that the belt remains centered on the deck surface.

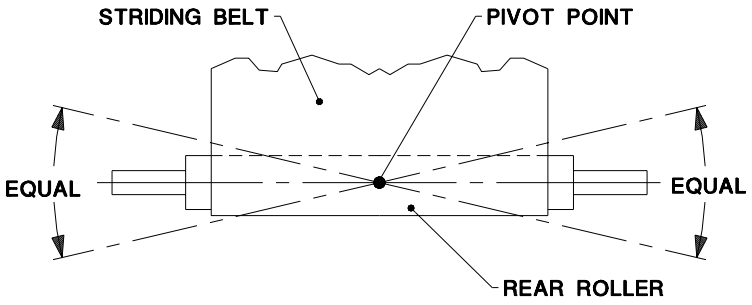



NOTE: Make tracking adjustments in 1/8 turn increments.

# How To... Adjust the Striding Belt Tracking

**Special Service Tools Required: None**

IMPORTANT - It is critical that the treadmill be level prior to any tracking adjustments. An unstable or leaning unit can cause the striding belt to drift to one side. Refer to “How To…Remove the Leveler Assembly”.



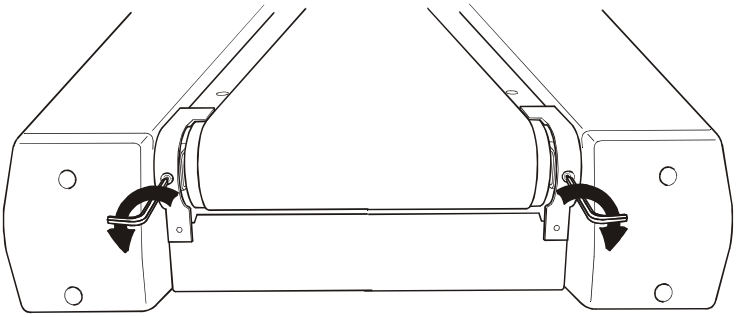

1. Turn unit power ON and use the SPEED AUTOMATIC mode to set the belt speed to 2.5 mph.

2. Check the belt tracking at 2.5 mph speed. If the belt is offset to the right, turn the right tensioning bolt clockwise and the left tensioning bolt counterclockwise the same amount to bring the belt back to a center position. If the belt is offset to the left, turn the left tensioning bolt clockwise and the right tension bolt counterclockwise the same amount to bring the belt back to a center position.

NOTE: Adjust tensioning bolts in 1/8 turn increments.

3. If the striding belt has moved to the right, turn the right tension bolt 1/8 turn clockwise and the left tension bolt 1/8 turn counter-clockwise to start moving the striding belt back to the center of the rear roller.

4. If the striding belt has moved to the left, turn the left tension bolt 1/8 turn clockwise and the right tension bolt 1/8 turn counterclockwise to start moving the striding belt back to the center of the rear roller.



5. Repeat this adjustment until the striding belt appears centered. Allow the unit to operate for several minutes to see that the belt remains in the centered position.

NOTE: During the adjustment do not exceed one full turn of the adjusting screws in either direction to avoid significant changes in belt tension.

# How To...Replace the Main Motor

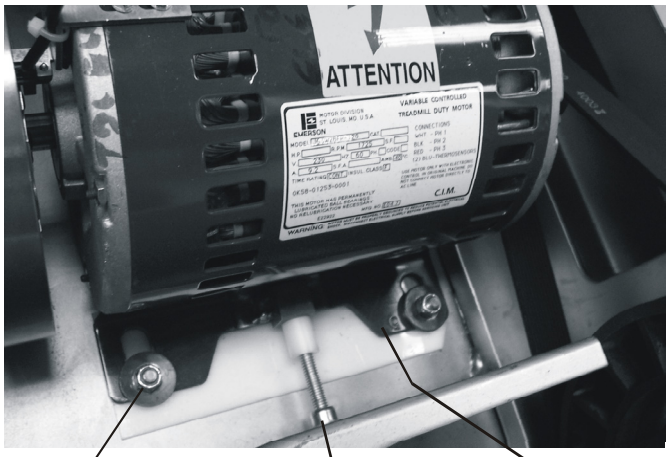
**Special Service Tools Required: None**

1. Turn the unit power OFF at the ON/OFF Switch, and then unplug line cord at wall outlet.

2. Remove the inside upright covers, front cover, and motor cover. See “How To…” in this section.

3. Disconnect the two connectors from the motor, which lead to the motor controller and the optical speed sensor.

4. Scribe a mark, or measure the position of motor bracket with respect to frame for proper relocation.

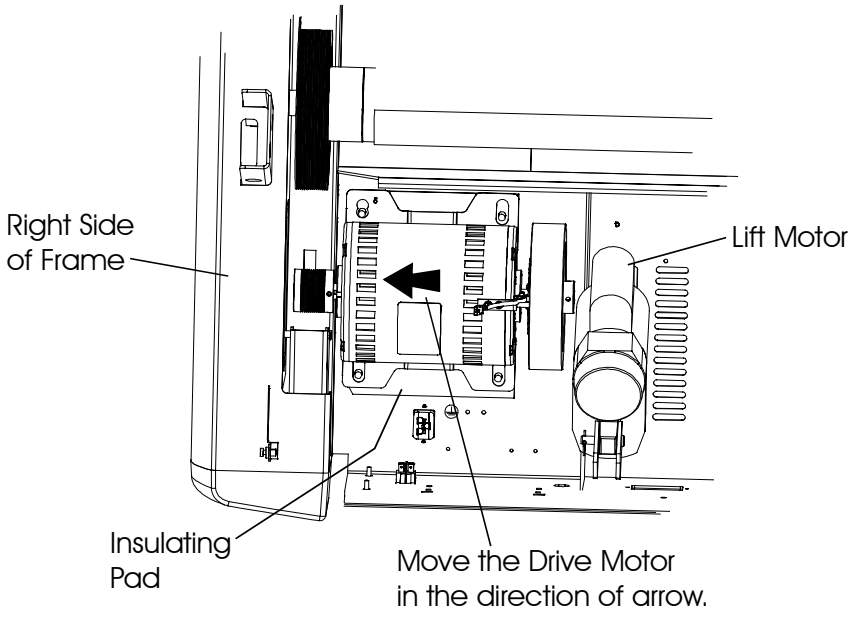



5. Loosen the four motor mounting nuts at the motor bracket, and then loosen the motor belt at the tensioning bolt (counterclockwise). With the belt slackened, remove the belt off the Poly-V Pulley. With the belt off, remove the motor mounting nuts, flat washers, and insulating washers from the motor-mounting studs.

NOTE: The motor weighs approximately 50 pounds and is in close proximity to other components. Care should be taken when removing the motor to avoid injury or damaging adjacent components.

6. Lift the motor slightly off its studs and towards the left side of the frame to allow for added clearance between the pulley and lift motor. Now tilt the pulley end up and lift the motor out at a slight angle.

NOTE: The Illustration shown is for clarity purposes only.



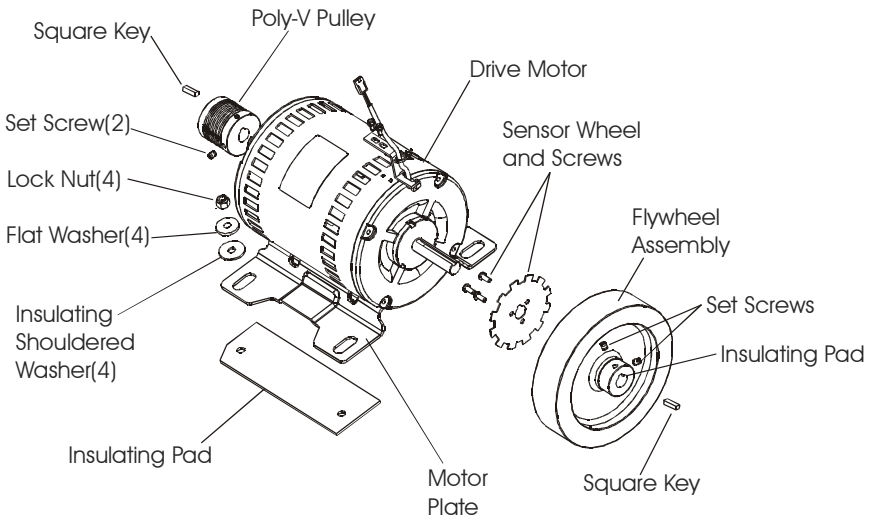
# How To...Replace the Main Motor - Continued

**Special Service Tools Required: None**

7. Place the motor on a work bench, and remove the flywheel/sensor wheel and OPTO sensor.

8. Remove the two setscrews securing the Poly-V Pulley to the motor shaft, and remove it.

9. Replace the motor.




Install new motor in reverse order of removal except as follows:

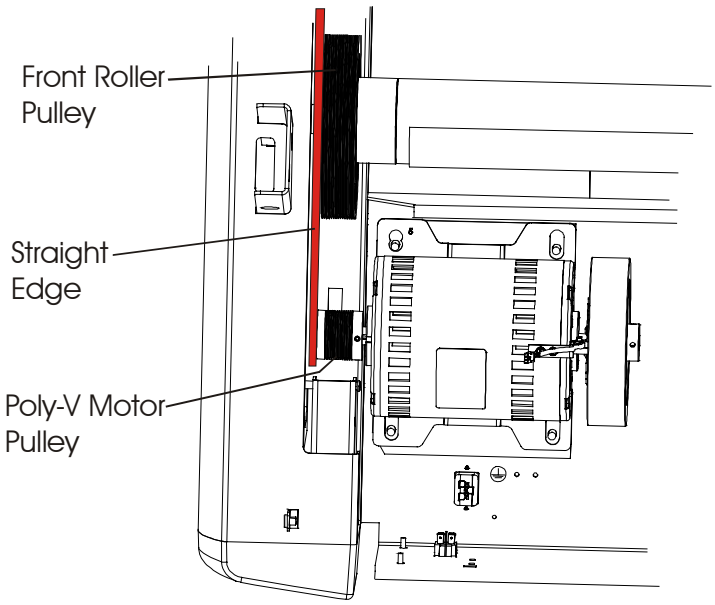
10. Install the flywheel/sensor wheel and OPTO sensor back on the motor bracket.

11. Adjust OPTO sensor so that the sensor wheel is centered in the optical sensor gap. Once this adjustment is complete, secure the flywheel to motor shaft. Apply a small amount of Loctite® 242 or equivalent on the setscrew treads. Install the first setscrew over the key and then second setscrew last.

12. Reinstall insulating pad and main motor onto retaining studs making certain that the white washers are seated against the slots properly before securing with retaining nuts. Do not fully tighten nuts at this time.

13. Secure all connections to motor controller.

14. Install the motor drive belt and Poly-V pulley loosely on the motor shaft. Check the alignment of the Poly-V pulley to the front roller pulley using a straight edge. Adjust by sliding the Poly-V pulley (on the motor shaft) until the Poly-V pulley and front roller are in alignment with each other. Apply a small amount of Loctite® 242 or equivalent on the setscrews treads. Install the first setscrew over the key and the second setscrew last.




15. Re-tension the main motor belt using the tensioning belt. See "How To" in this section.

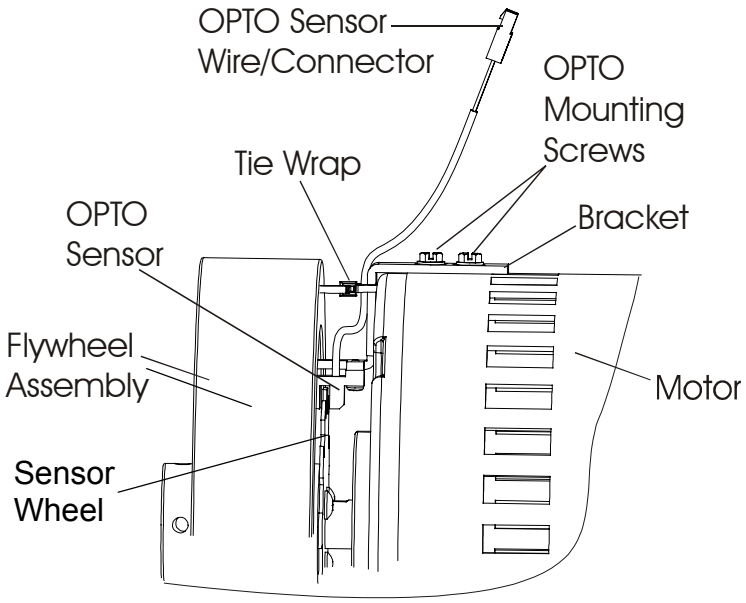
16. Tighten the motor mounting nuts after tensioning the belt, and then reinstall the motor cover, front cover, and inside upright covers.

NOTE: Refer to MAINTENANCE in diagnostics section to log this event.

# How To...Replace the Main Motor Optical (OPTO) Sensor

**Special Service Tools Required: None**

1. Turn unit power OFF at ON/OFF Switch, and then unplug line cord at the wall outlet.
2. Remove the inside upright covers, front cover, and motor cover. See “How To…” in this section.
3. Cut the tie wrap from around the mounting bracket.
4. Remove two mounting screws securing the bracket to the top of the motor.
5. Lift optical sensor from between the flywheel assembly and the motor.
6. Install new optical sensor in reverse order, making certain that the sensor wheel is centered in the OPTO Sensor.



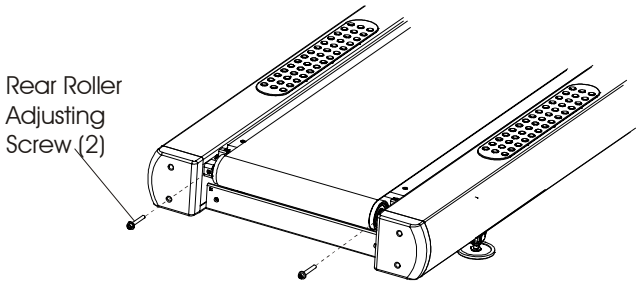
# How To...Replace the Front Roller

**Special Service Tools Required: None**

1. Turn the unit power OFF at the ON/OFF Switch, and then unplug line cord at the wall outlet.

2. Remove the inside upright covers, front cover, and motor cover. See “How To…” in this section.

3. Loosen the rear roller adjusting screws to slacken the striding belt enough to allow side-to-side movement of the front roller. Count the number of rotations when loosening the roller adjusting screws to provide a starting point for belt re-tensioning.

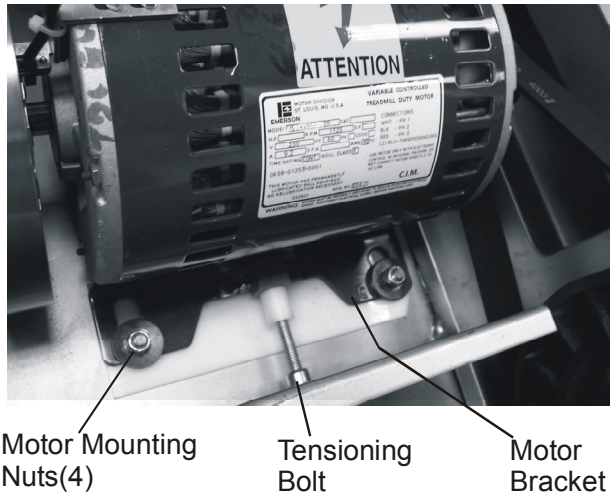



NOTE: Rear Roller Adjusting Screws removed for clarity only.

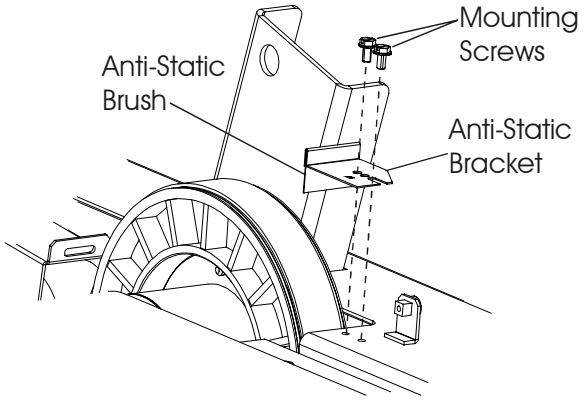
4. Scribe position of motor bracket with respect to frame for proper belt re-tensioning.

5. Loosen the four motor nuts on the studs securing the motor bracket.

6. Relieve motor belt tension by loosening the tensioning bolt counterclockwise.




7. Remove the anti-static brush bracket prior to roller removal by extracting two retaining screws.

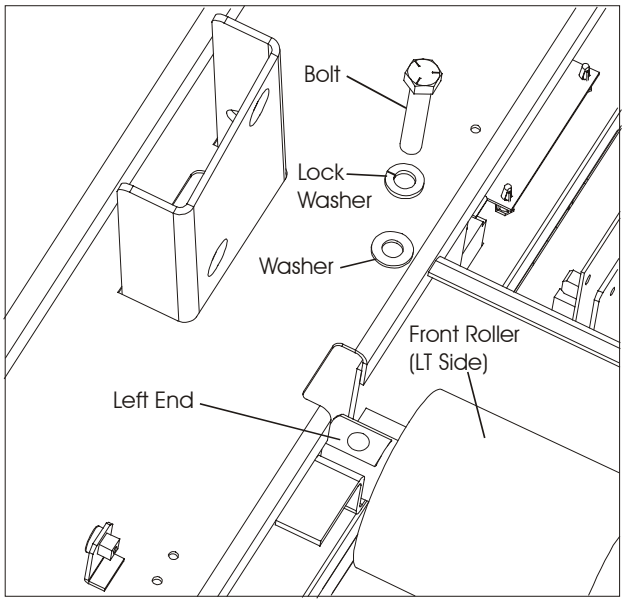


# How To...Replace the Front Roller - Continued

**Special Service Tools Required: None**

8. Remove the single bolt and associated hardware on the left side of the front roller shaft.

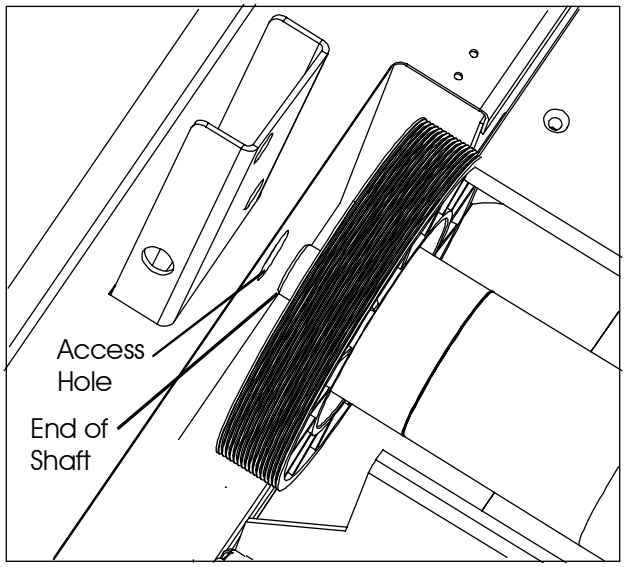
NOTE: Illustration shows striding belt removed for clarity purposes only.




Left Side of the Unit Frame

9. Move the left side of the front roller shaft into the left side of the frame so that the pulley shaft end clears the access hole in the right side.

10. Remove the drive belt from the front roller pulley and motor pulley.

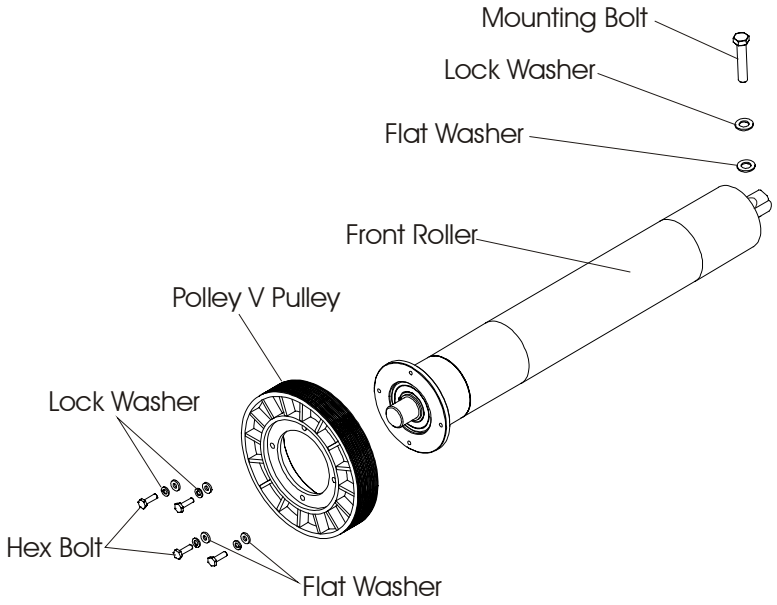



Right End of Front Roller as Viewed From Front of Unit

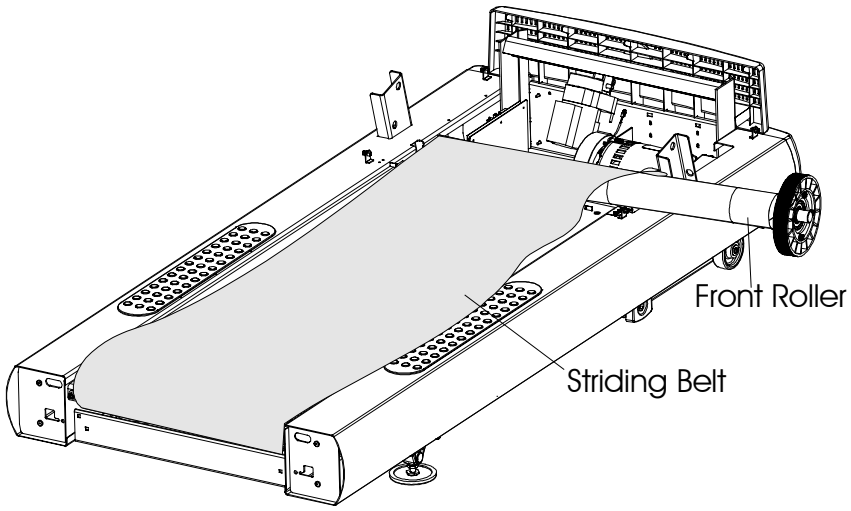
# How To...Replace the Front Roller - Continued

**Special Service Tools Required: None**

11. Remove the front roller from under the striding belt on the right side.




12. Install new front roller in reverse order of removal.
13. Make sure to position the motor drive belt so that it is flush with left side of pulley.
14. Adjust motor drive belt tension. See "How To…" in this section.
15. Adjust striding belt tension. See "How To…" in this section
16. Adjust striding belt tracking. See "How To…" in this section.

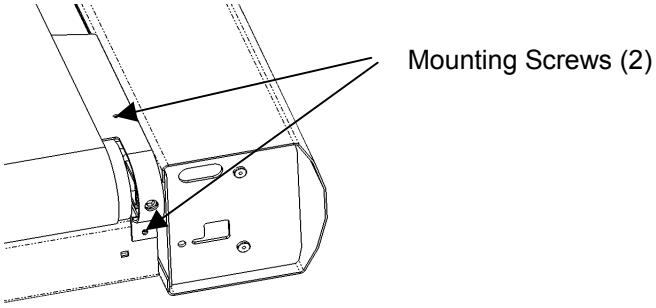


# How To...Replace the Rear Roller

**Special Service Tools Required: None**

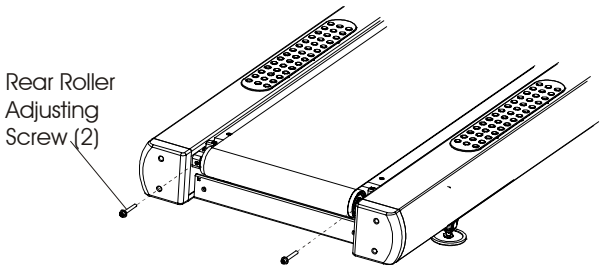
1. Turn unit power OFF at ON/OFF Switch, and then unplug line cord at the wall outlet.
2. Remove roller guards by removing two mounting screws.

NOTE: End cap shown removed for clarity only.

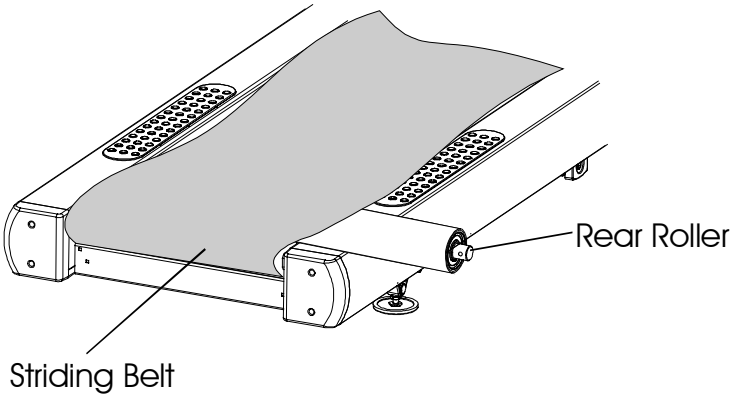



3. Remove the rear roller adjusting screws.

NOTE: Count the number of rotations when removing the roller adjusting screws. This will provide a starting point for belt re-tensioning.



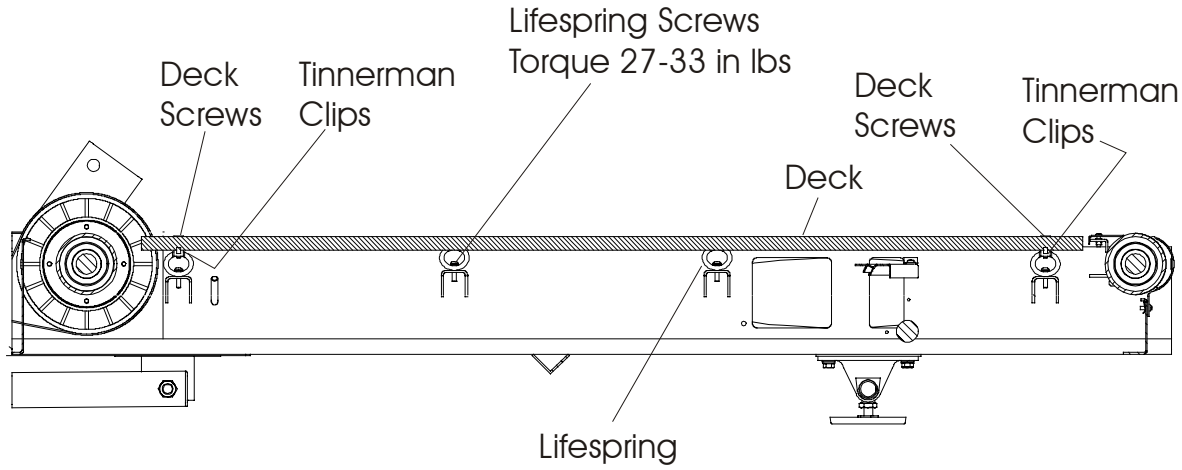

4. Remove the rear roller from under striding belt.
5. Install new rear roller.
6. Install and tighten rear roller guards 22-37 in lbs.
7. Tension the striding belt. See “How To…” in this section.
8. Adjust striding belt tracking if necessary.



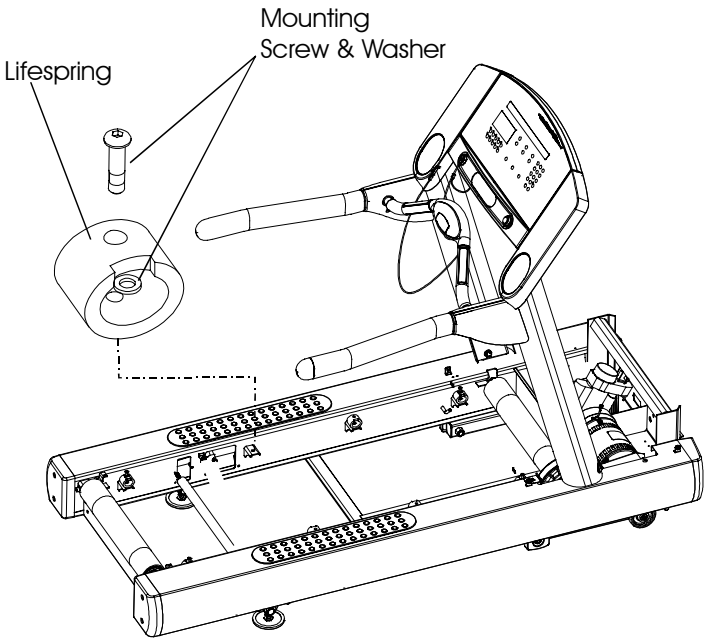
# How To...Replace the Tinnerman Clips or LifeSpring® Absorbers

**Special Service Tools Required: None**

1. Turn the unit power OFF at ON/OFF Switch and unplug line cord at wall outlet.
2. Remove the inside upright covers, front cover, and motor cover. See "How To…" in this section.
3. Loosen the rear roller tensioning bolts so that the striding belt is loose enough for deck removal. Count the number of rotations when loosening the roller adjusting screws to provide a starting point for belt re-tensioning.



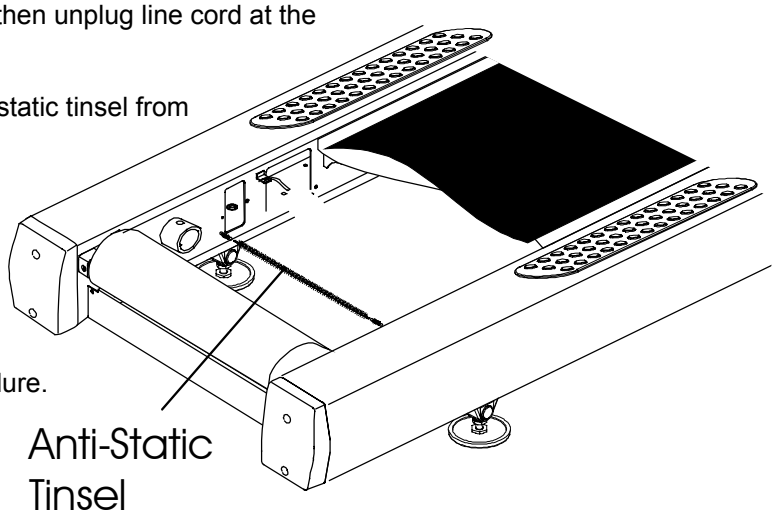

4. Remove the four deck screws, one at each corner.
5. Remove the deck out from under striding belt.
6. Remove the Tinnerman clips.
7. Remove LifeSpring® screws and LifeSprings® from frame.
8. Install LifeSprings® with notch in the LifeSpring® facing towards the inside of the frame, and then torque screws to 27-33 in lbs.
9. Reinstall Tinnerman clips on the LifeSprings® at each corner of the unit.
10. Reinstall deck.
11. Re-tension striding belt. Refer to “How To" in this section.
12. Reinstall motor cover, front cover, and the inside upright covers.



# How To...Replace the Anti-Static Tinsel

**Special Service Tools Required: None**

1. Turn unit power OFF at ON/OFF Switch, and then unplug line cord at the wall outlet.
2. Reach under the machine and unclip the anti-static tinsel from right side of frame.
3. Remove the single screw securing the tinsel on the left side of the frame.
4. Install anti-static tinsel in reverse order. Make certain that tinsel is oriented for a light contact on bottom belt surface. Excessive contact may lead to premature tinsel string failure.

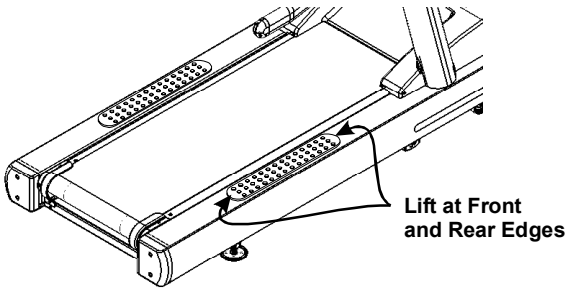


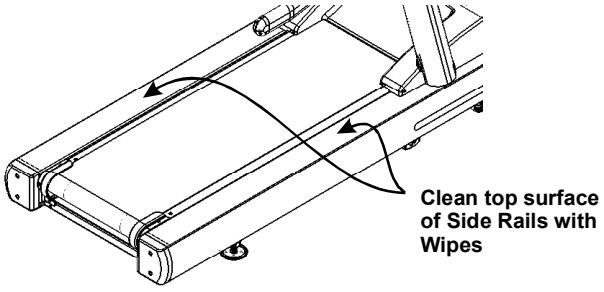
# How To...Replace the Anti-Slip Pads

**Special Service Tools Required: None**

**REMOVAL**

1. Remove anti-slip pads by carefully lifting the front and rear edges. Use caution not to scratch paint during this operation.



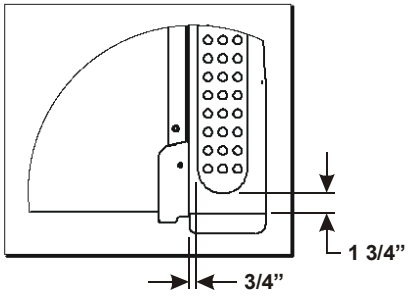

2. After removing anti-slip pads, remove any remaining residue with a non-metallic scraper.

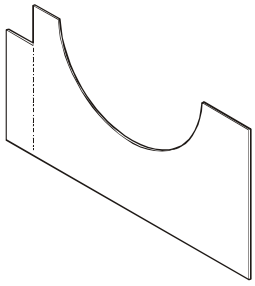
3. Clean entire top surface of side rails with the cleaning wipes provided with the replacements.

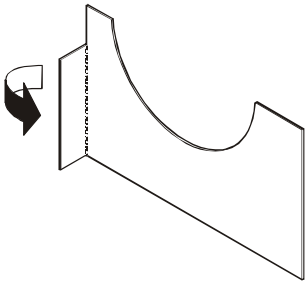
4. The final location of the replacement anti-slip pads is 3/4" from the inside face and 1 3/4" from the rear edge of the frame. The included templates will be used to aid in positioning.

5. Fold both templates along scored lines as shown.

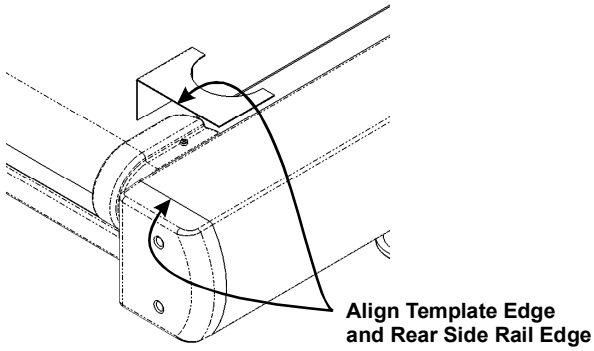
NOTE: Templates are folded in opposite directions to accommodate both left and right sides.





6. Position templates at rear of side rail as shown (removal of roller guard may be required) and tape in proper position.

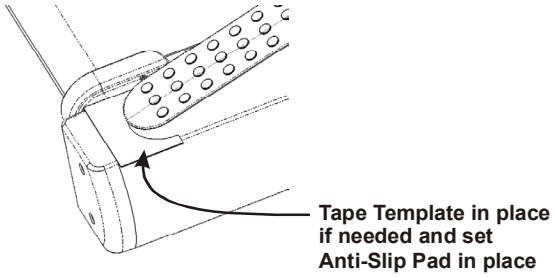


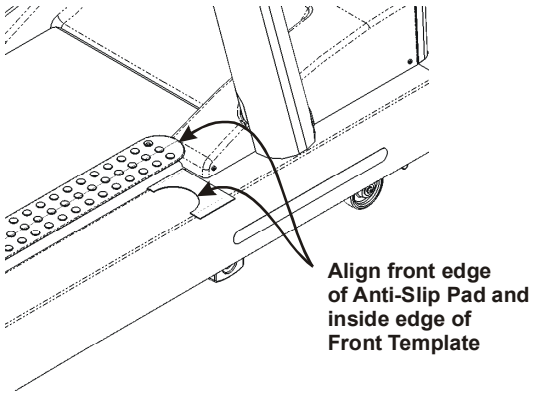
# How To...Replace the Anti-Slip Pads- Continued

**Special Service Tools Required: None**

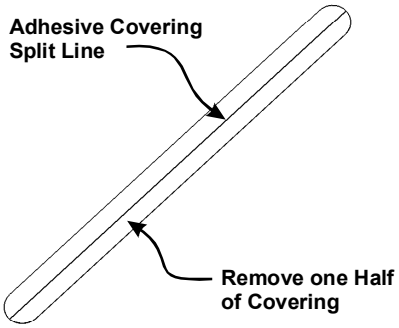
**INSTALLATION**

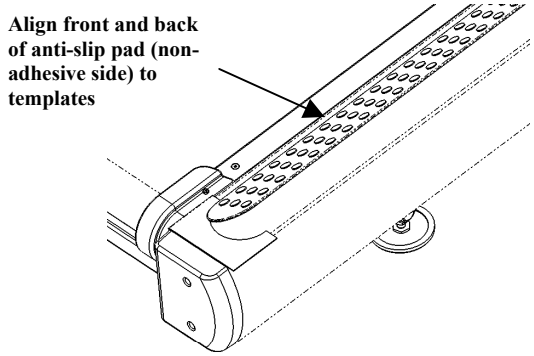
1. Position anti-slip pad as shown with adhesive covering still in place. Position front template and tape in place.




2. Remove one-half of the adhesive covering from pad.




3. Carefully register the pad edge with the adhesive covering into the template. Once this has been accomplished, allow the adhesive side of the pad to contact the mating surface. Firmly press the adhesive exposed half down in a smoothing motion to force out any trapped air.

4. Remove remaining half of the adhesive backing and finish the smoothing process in a similar manner.

5. Remove both templates.

6. Repeat operation for opposite side.

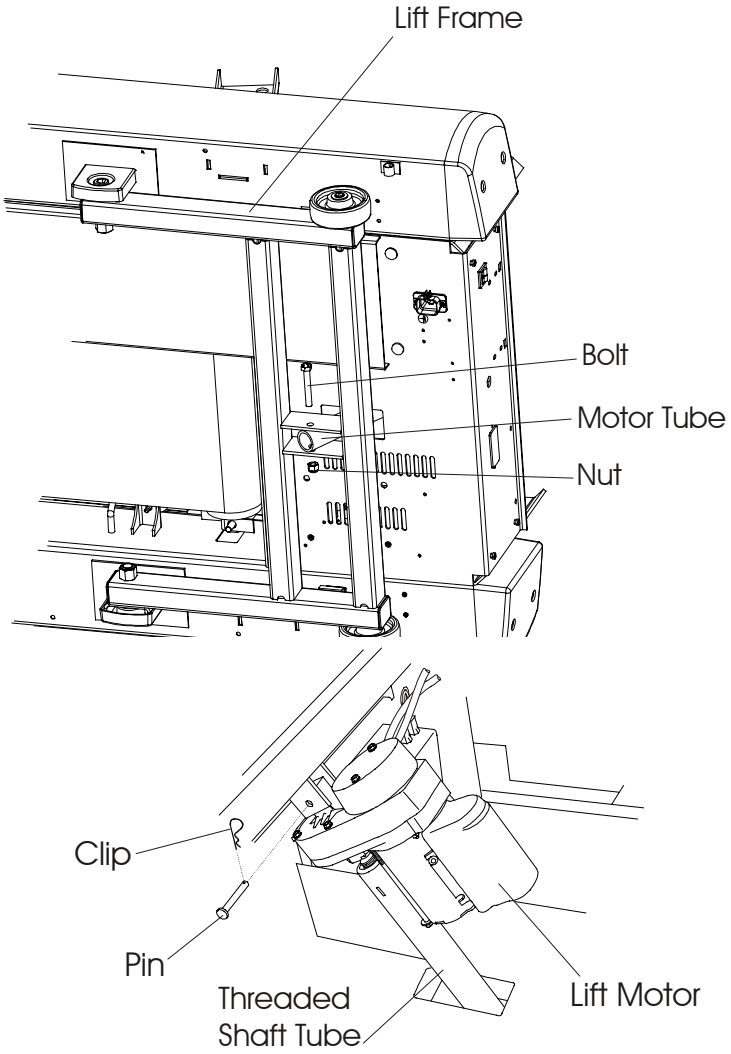
NOTE: Pad adhesive can take up to 24 hours to fully cure.

# How To...Replace the Lift Motor

**Special Service Tools Required: None**

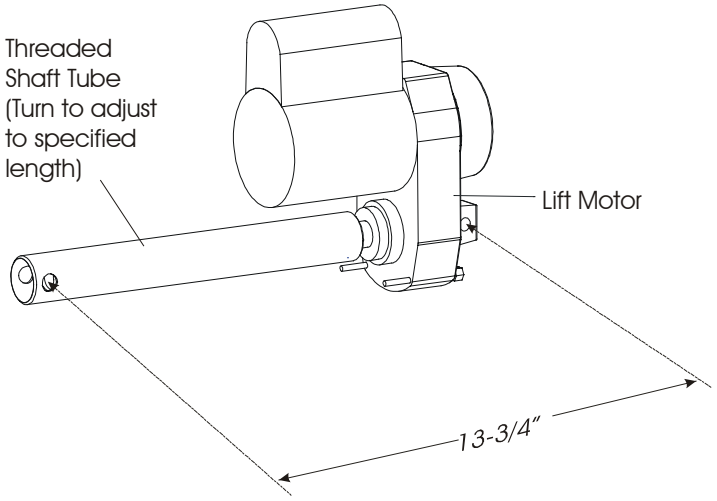
IMPORTANT: If a new lift motor is being installed, do not attempt to turn or adjust the threaded shaft tube prior to installation.

1. Turn unit power OFF at ON/OFF Switch, and then unplug line cord at the wall outlet.
2. Remove the inside upright covers, front cover, and motor cover. See “How To…” in this section.
3. Cut off three cable ties securing the cables to the cross member.
4. Disconnect the 4-Pin connector from the wax/lift board.
5. Disconnect the lift motor ground wire.
6. Tip the treadmill over on its left side as shown.
7. Remove nut and bolt from end of the motor tube and lift frame.
8. Remove the clip and pin securing the motor to the cross member, and lift out the motor.




9. Install new lift motor in reverse order of removal.
10. To ensure that the “home” incline switch will activate at the proper time, adjust the length of threaded shaft tube to 13 3/4" as shown.
11. Install in reverse order.

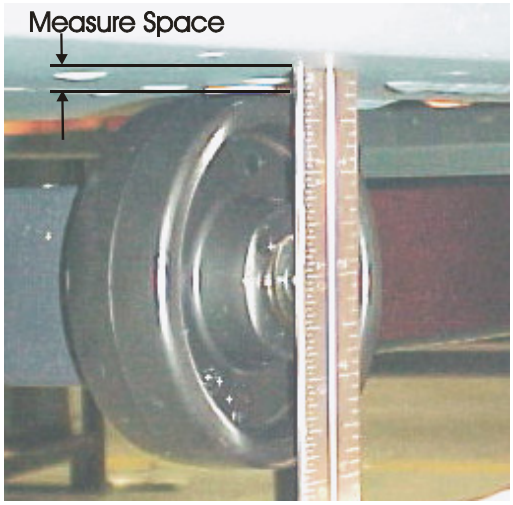
NOTE: Refer to MAINTENANCE in diagnostics section to log this event.



# How To... Adjust the Lift Actuator

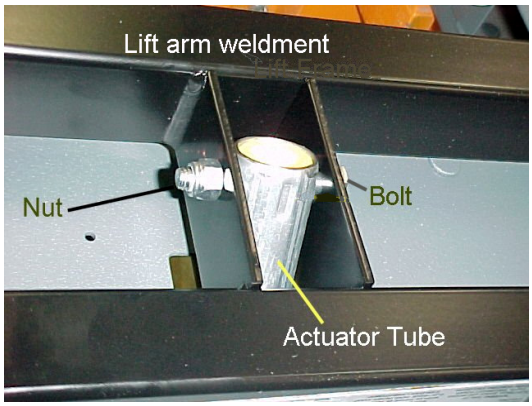
**Special Service Tools Required: None**

Verify that the "home" switch is functioning and adjusted correctly. A “0” should appear in the lower right corner of the profile window when activated (T9i) or HOME should be lit (T9e) when the incline has been moved to zero. In addition, the wax/Lift LED4 and LED5 will be lit when home switch is activated. if not, then proceed with adjustment.



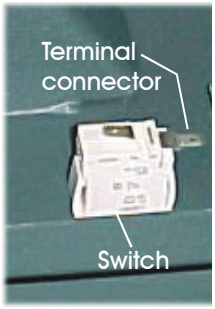

1. Drive the lift system down until the actuators internal limit switch stops the lift motor.
2. Turn unit power off at switch and unplug line cord at wall outlet.
3. Measure and record the distance between the top of the lift wheels and bottom of the unit frame.
4. Turn the treadmill over on its side.
5. Remove the 3/8" nut and bolt from lift arm to frame attachment.
6. Turn the actuator tube clockwise (towards the motor) in half-turn increments to approximately equal the space measured in step 3. One-half turn of the actuator tube shortens the operating length by 1/16”. Make sure the bolt holes align.

   Example - If the space between the top of the wheel and the bottom of the frame is 3/16”, turn the actuator tube 1-1/2 turns clockwise (in towards the motor). If the space is 5/32”, turn the actuator tube 1 turn clockwise.




IMPORTANT: Be careful not to turn the actuator screw while turning the actuator tube.

7. Install the actuator tube back into the lift arm frame attachment and secure with nut and bolt.




NOTE: Verify orientation of "home" switch so that terminal connector is facing towards front of machine.

8. Turn the treadmill over and restore power.
9. Test the lift operation in a user program.

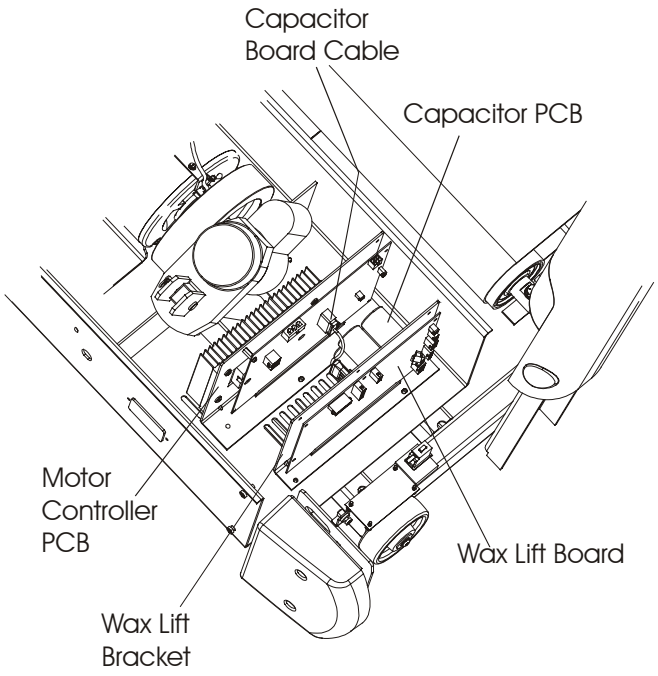
NOTE: If necessary, level the unit and adjust striding belt tracking.

# How To...Replace the Motor Controller Assembly

**Special Service Tools Required: None**

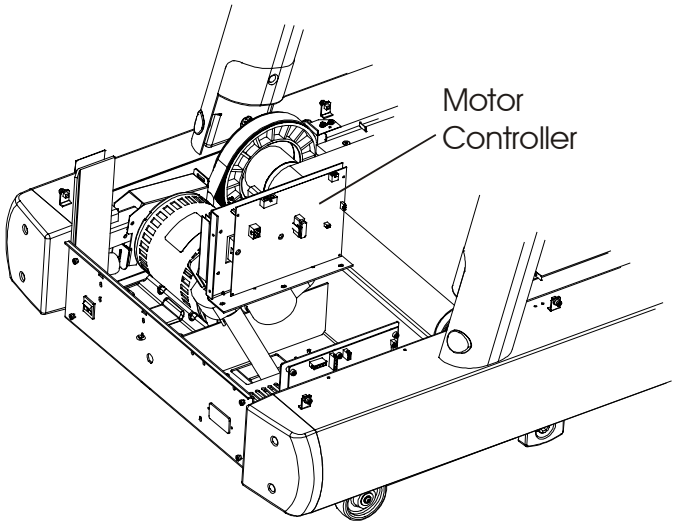
**WARNING! BEFORE BEGINNING THE FOLLOWING STEPS, ALL LEDS ON THE MOTOR CONTROLLER BOARD MUST BE OFF TO AVOID ELECTRICAL SHOCK.**

1. Turn unit power OFF at ON/OFF Switch, and then unplug line cord at the wall outlet.
2. Remove the inside upright covers, front cover, and motor cover. See “How To…” in this section.
3. Disconnect the capacitor board cable from capacitor board.




4. Remove two screws in the front and three screws at the bottom of the unit, and then lift out the motor controller assembly.
5. Install new motor controller assembly in reverse order.

NOTE: Refer to MAINTENANCE in diagnostics section to log this event.



# How To...Replace the Wax/Lift or Capacitor Board

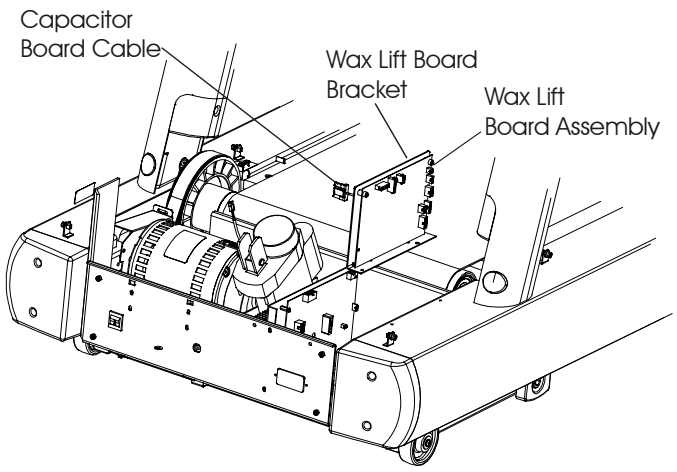
**Special Service Tools Required: None**

**WARNING! - BEFORE BEGINNING THE FOLLOWING STEPS, ALL LEDS ON THE MOTOR CONTROLLER BOARD MUST BE OFF TO AVOID ELECTRICAL SHOCK.**

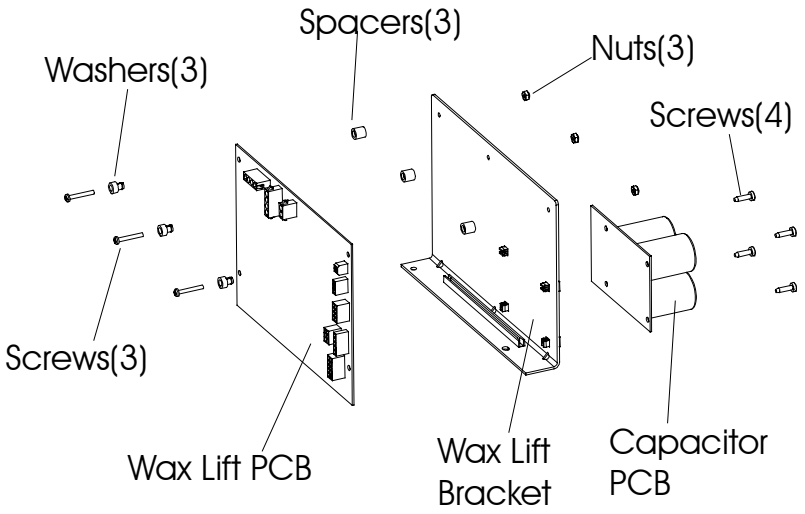
1. Turn unit power OFF at ON/OFF Switch, and then unplug line cord at the wall outlet.
2. Remove inside upright covers, front cover, and motor cover. See “How To…” in this section.
3. Disconnect capacitor board cable from capacitor board.
4. Remove two screws at the bottom.
5. Remove the wax/lift and capacitor board.

NOTE: If capacitor board is damaged or exhibits a burned odor, then replace it along with the motor controller board.

6. Install new Wax/Lift or Capacitor Board in reverse order of removal. Use the exploded image to aid in assembly.



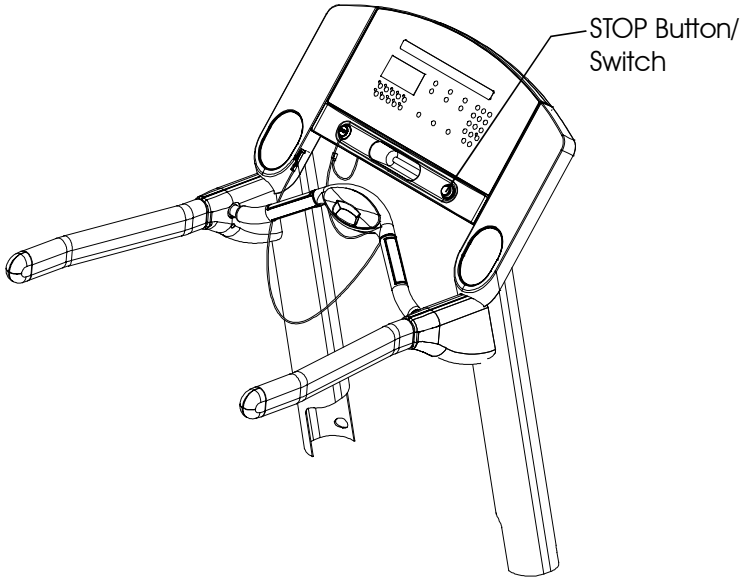

DETAILS OF WAXLIFT/CAPACITOR BOARD



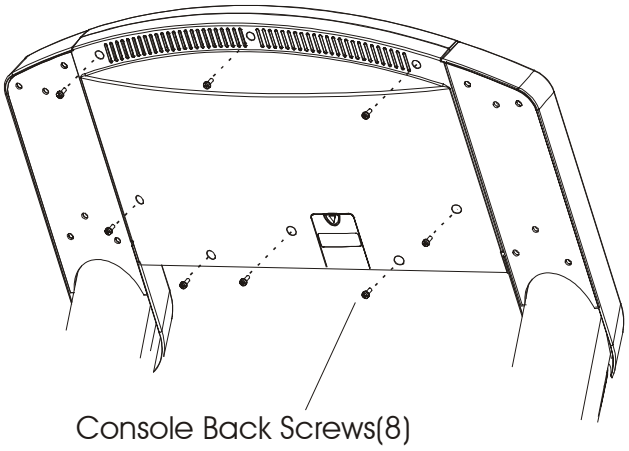
# How To...Replace the Stop Button/Switch

**Special Service Tools Required: None**

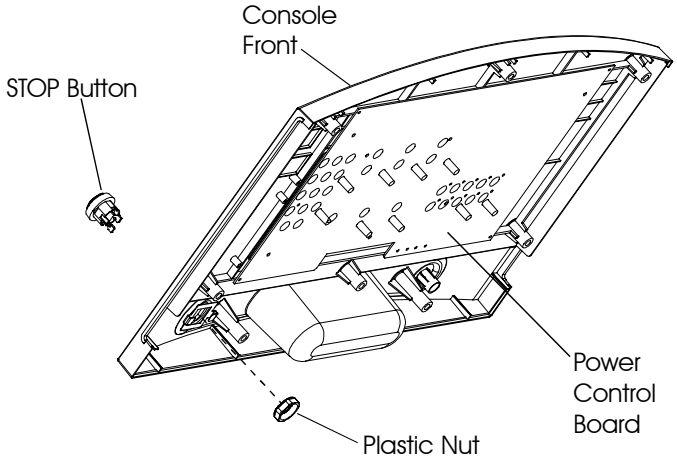
1. Turn unit power OFF at ON/OFF Switch, and then unplug line cord at the wall outlet.




2. Remove eight screws from the back of the console.




3. Lift console front enough to disconnect all wiring in preparation for removal.
4. Remove front of console.
5. Remove plastic nut securing the stop button switch assembly at the back of the console front.
6. Remove the stop button assembly.



## How To...Replace the Stop Button/Switch - Continued

**Special Service Tools Required: None**

7. Install the new Stop Button/Switch in reverse order.

NOTE: The stop switch assembly consists of a stop (micro type) switch and separate actuator body. The micro switch can be replaced separately.

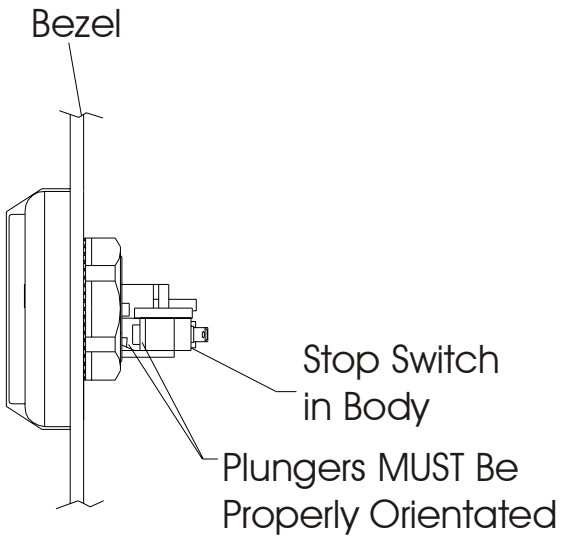
8. Insert the stop switch into the switch body making certain to orient the two components so that the switch plunger makes contact upon assembly. At this time, verify that the plungers are making proper contact by pressing the stop button.

9. Insert the stop switch assembly through opening in the front of bezel assembly and orient switch body so the text “STOP” is aligned with the face of bezel.

10. Install plastic nut on to threaded portion of switch body with the flat side towards bezel.

11. Hand-tighten the plastic nut.

NOTE: Do not over-tightening the plastic nut, which can cause damage to the switch body or bezel.




**Assembled View**

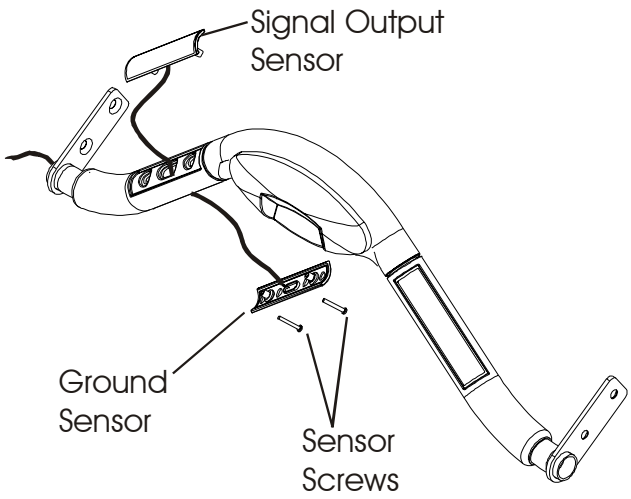
12. Reconnect the wiring using caution not to bend or break the connecting tabs.

NOTE: Refer to MAINTENANCE in diagnostics section to log this event.

# How To...Replace the LifePulse® Sensors

**Special Service Tools Required: None**

1. Turn the unit power OFF at ON/OFF Switch, and then unplug line cord at the wall outlet.
2. Remove two screws securing both sides of the LifePulse® sensor.
3. Disconnect the black or green wire from the ground sensor.
4. Disconnect the red or white wire from the signal output sensor.
5. Remove the sensor assembly.
6. Install LifePulse® sensor assembly in reverse order and tighten screws to 5-7 in/lbs.

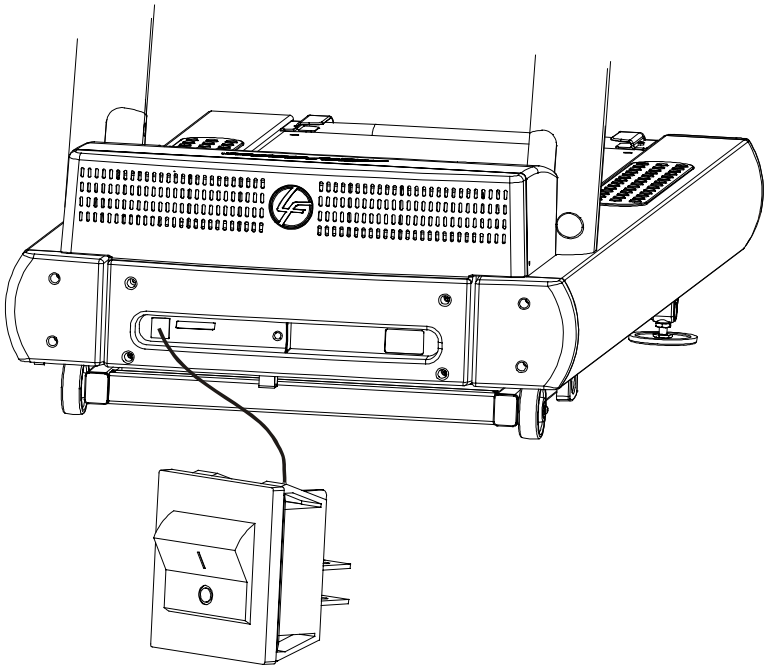



7. Repeat the above steps for the remaining LifePulse® sensor as required.

# How To...Replace the ON/OFF Power Switch

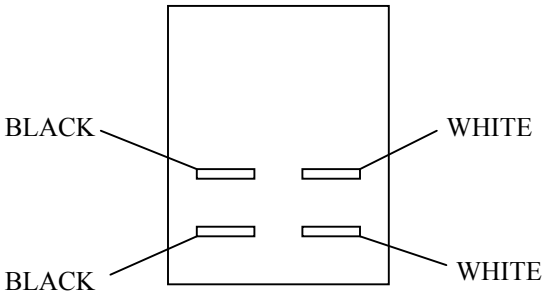
**Special Service Tools Required: None**

1. Turn the unit power OFF at ON/OFF Power Switch, and then unplug line cord at the wall outlet.
2. Remove the motor cover. See “How To…” in this section.
3. Tag and identify the wiring on switch before disconnecting.
4. Squeeze the tabs on the sides of the switch and remove through front of unit.
5. Install new switch in reverse order. Use the diagram below to aid in re-wiring.




**ON/OFF Power Switch**

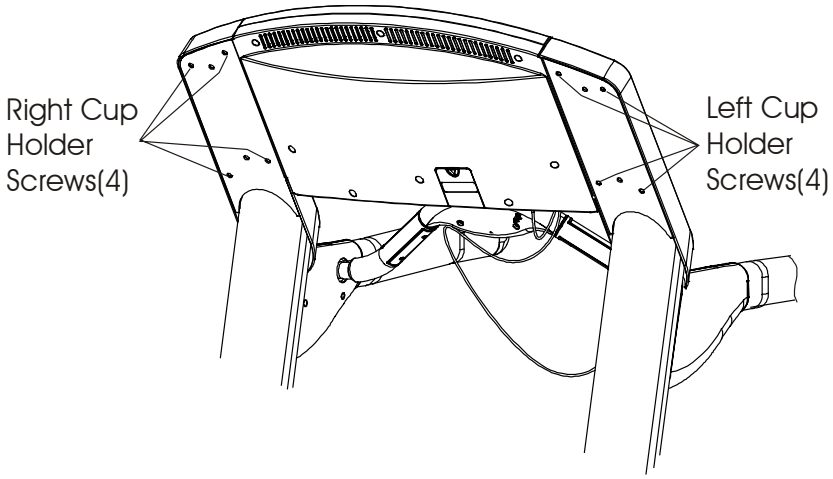
Terminal Connections (Rear View)



# How To...Replace the Accessory Cup Holders

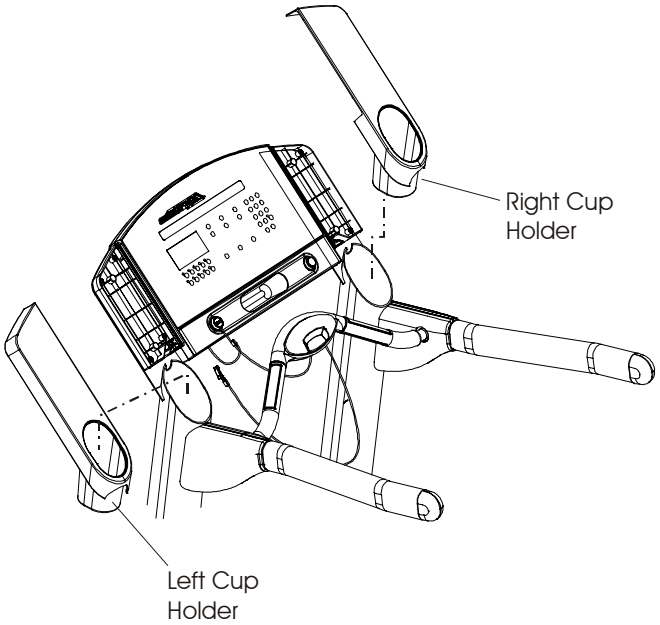
**Special Service Tools Required: None**

1. Remove four corner screws from the back of each cup holder.




2. Lift cup holders out of the uprights being careful not damage any cabling underneath.

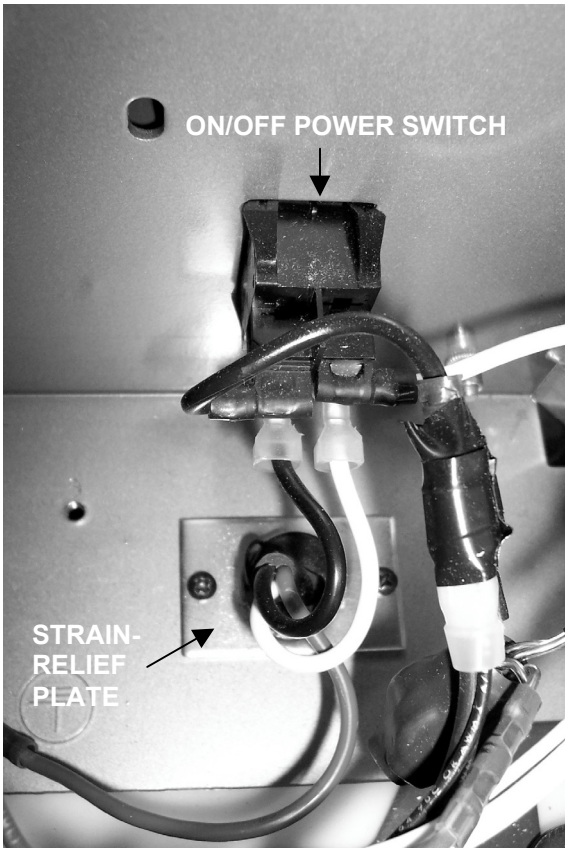
3. Install cup holders in reverse order.



# How To...Replace the Line Cord

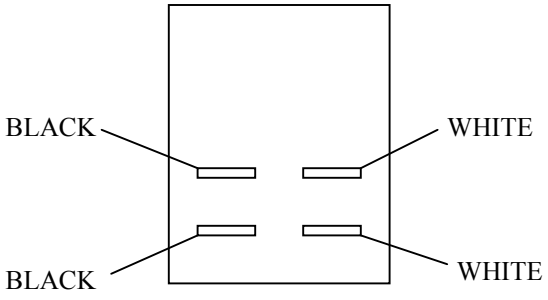
**Special Service Tools Required: None**

**CAUTION! TO AVOID A POTENTIAL SHOCK HAZARD, THE LINE CORD MUST BE REMOVED FROM THE WALL OUTLET BEFORE PERFORMING THIS PROCEDURE!**




1. Turn the unit power OFF at ON/OFF Switch, and then unplug line cord at the wall outlet.
2. Remove motor cover. See "How To… Remove " in this section.
3. Unplug white and black wires at ON/OFF Power Switch.
4. Remove the single screw securing the green power cord ground wire from the frame.
5. Remove both screws securing the line cord strain-relief mounting plate.
6. Remove the line cord and strain-relief plate as one unit.
7. Squeeze the plastic strain-relief to remove from plate.
8. Reverse procedure for installation. Use the wiring diagram below to aid in reassembly.

Terminal Connections (Rear View)



# How To...Replace the Power Transformer or Line Filter

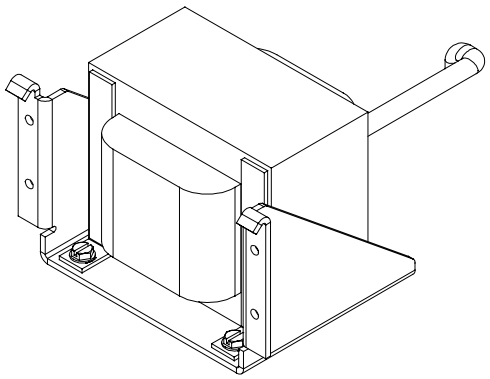
**Special Service Tools Required: None**

1. Turn the unit power off at ON/OFF Switch, and then unplug line cord at the wall outlet.
2. Remove inside upright covers, front cover, and motor cover. See “How To” in this section.

NOTE: If the unit is equipped with a power transformer, it must be removed first to access the line filter.

**If Unit is Equipped with a Power Transformer: (International Only)**

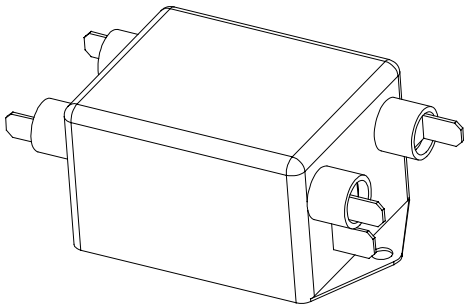
3. Tag and identify all wires on power transformer.
4. Remove power transformer.
5. Tag and identify all wires on line filter.
6. Remove line filter.
7. Reverse procedure for installation using tags to aid in reattaching wiring.



Transformer

**If Unit Has No Power Transformer:**

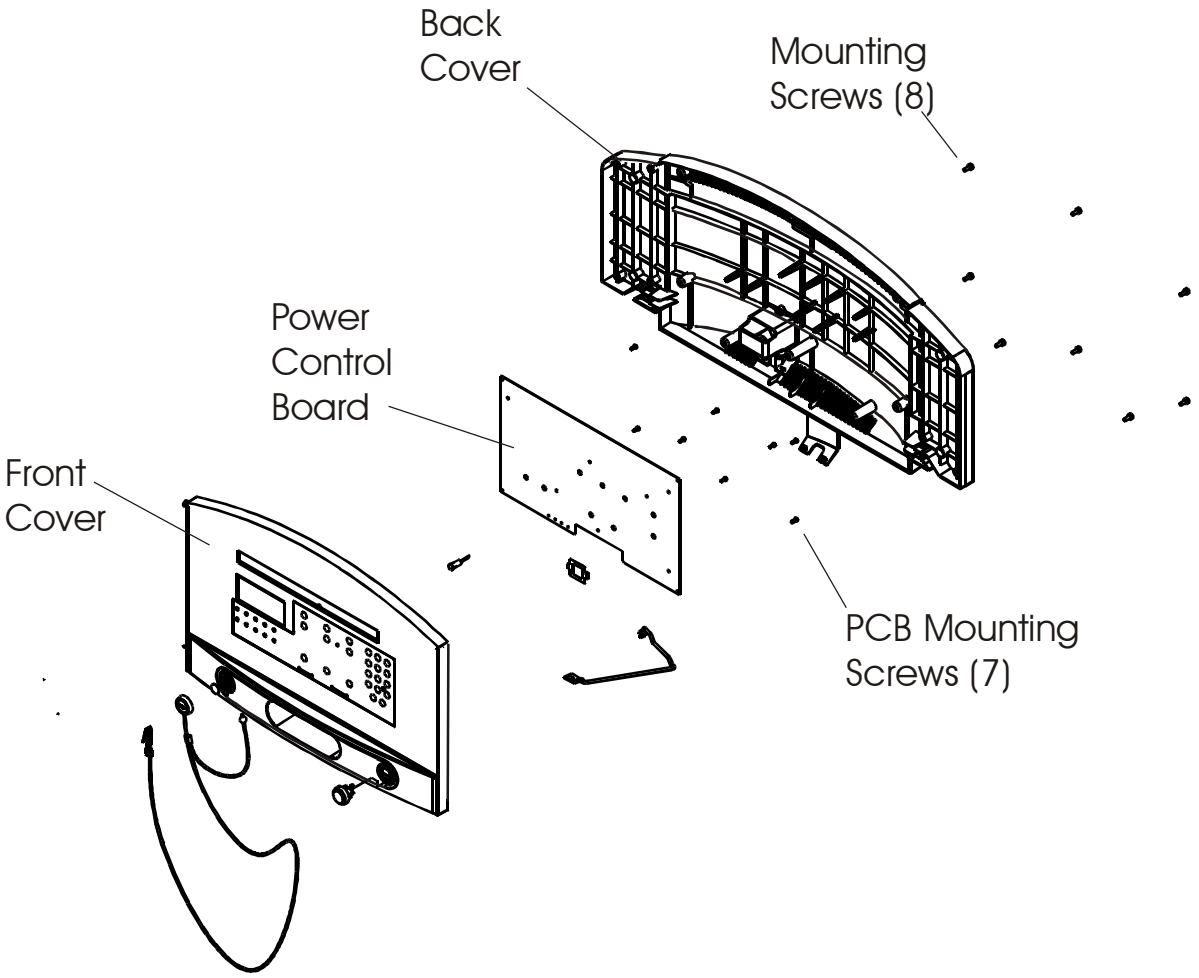
8. Tag and identify all wires on line filter.
9. Remove two attaching screws and line filter.
10. Reverse procedure for installation using tags to aid in reattaching wiring.



Line Filter

# How To...Replace the Display Board

**Special Service Tools Required: None**




1. Turn the unit power off at ON/OFF Switch, and then unplug line cord at the wall outlet.
2. Remove eight screws from back cover of console.
3. Lift front cover and disconnect all connectors from display board.
4. Remove display board with eight retaining screws.

NOTE: Display board should be returned to Life Fitness for all repairs.

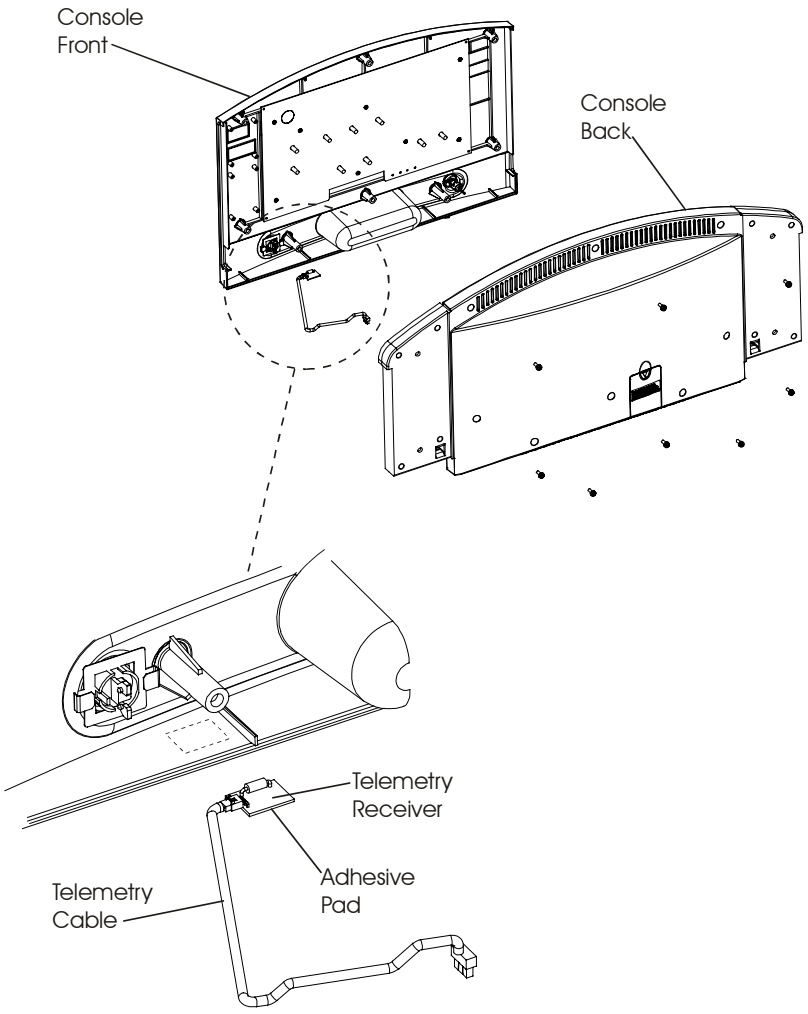
5. Install display board in reverse order making certain to secure all connections.
6. Secure mounting screws, but DO NOT Over-Tighten.

NOTE: Refer to MAINTENANCE in diagnostics section to log this event.

# How To...Replace the Telemetry Receiver and Cable

**Special Service Tools Required: None**

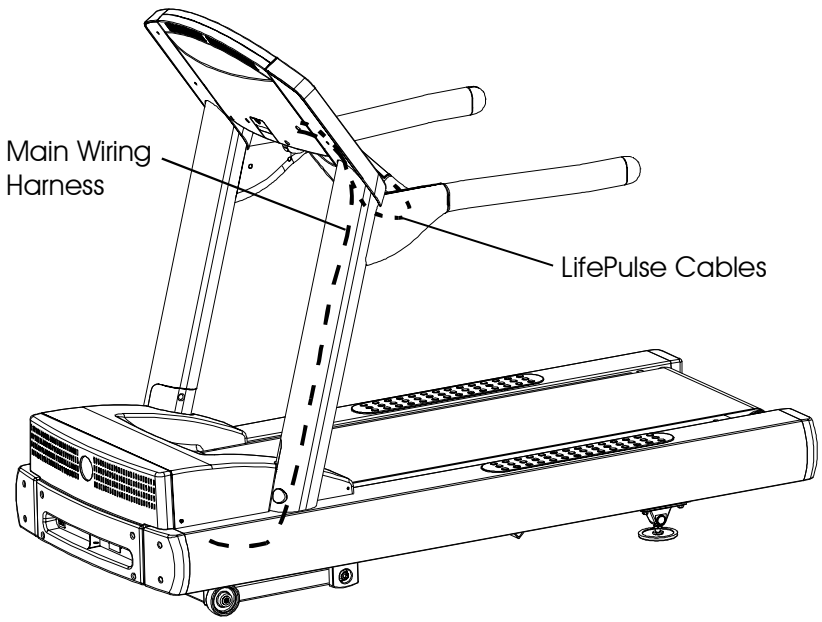
1. Turn the unit power OFF at the ON/OFF Switch, and then unplug the line cord at wall outlet.
2. Remove eight screws from the console back.
3. Lift the console front off and disconnect telemetry receiver connector.
4. Remove the telemetry receiver and cable held in place with an adhesive pad in the inside left corner of the console front.
5. Install telemetry receiver in reverse order using a new adhesive pad.



# How To...Replace the Main Wiring Harness

**Special Service Tools Required: None**

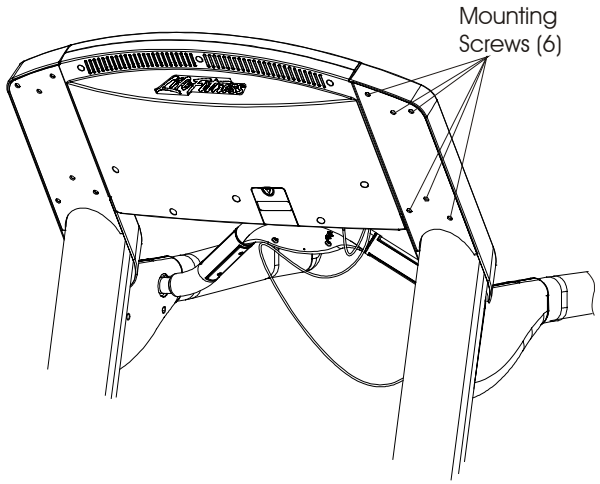
1. Turn unit power OFF at ON/OFF Switch and unplug line cord at wall outlet.
2. Remove inside upright covers, front cover, and motor cover. See “How To…” in this section.
3. Remove the console. See “How To...” in this section.
4. Remove the main wiring harness after disconnecting at the motor controller board.
5. Install harness in reverse order using caution not to pinch wiring.



# How To...Replace the Console Assembly

**Special Service Tools Required: None**

1. Turn the unit power off at th eON/OFF Switch, and then unplug line cord at wall outlet.
2. Remove six mounting screws from the back of each cup holder.
3. Lift the cup holders up from the uprights using caution not to damage LifePulse® wiring.
4. Remove eight screws from back of console and lift console front while disconnecting electrical connectors from the console board.
5. Install console assembly in reverse order using caution not to pinch wiring.




NOTE: If console is being replaced, then eight screws must be removed from the new assembly prior to installation.

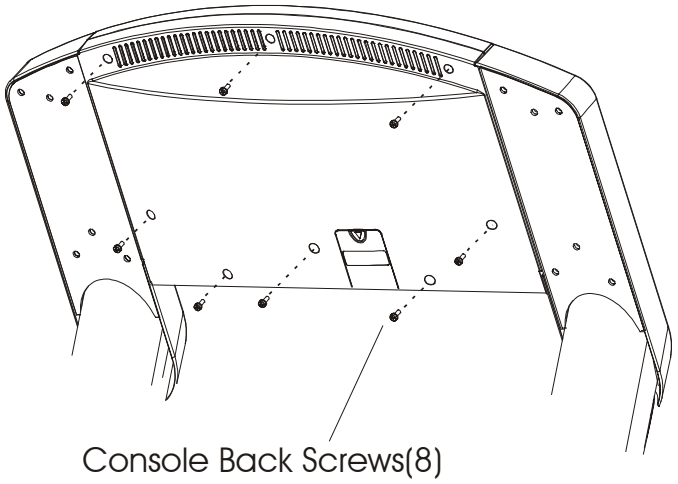
NOTE: Refer to MAINTENANCE in diagnostics section to log this event.

# How To...Replace the Overlay Bezel

**Special Service Tools Required: None**

1. Turn the unit power OFF at the ON/OFF Switch, and then unplug line cord at the wall outlet.

2. Remove the eight screws from console back.




3. Lift the front of the console just enough to disconnect the electrical connectors from the console board.

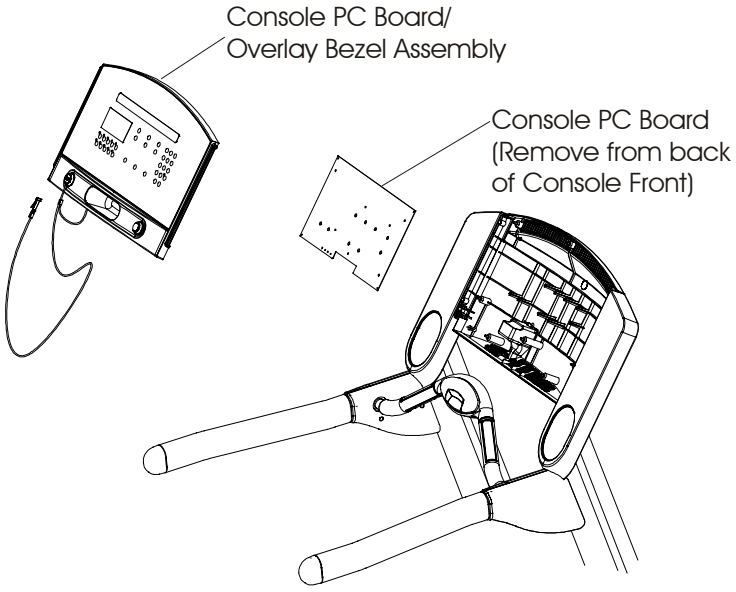
4. Remove the screws securing the console board to console front.

5. Disconnect the ribbon cables from the console board.

6. Remove the console board.

7. Install overlay bezel assembly in reverse order making sure that all connectors and ribbon cables are securely fastened to the console board.

NOTE: Refer to MAINTENANCE in diagnostics section to log this event.

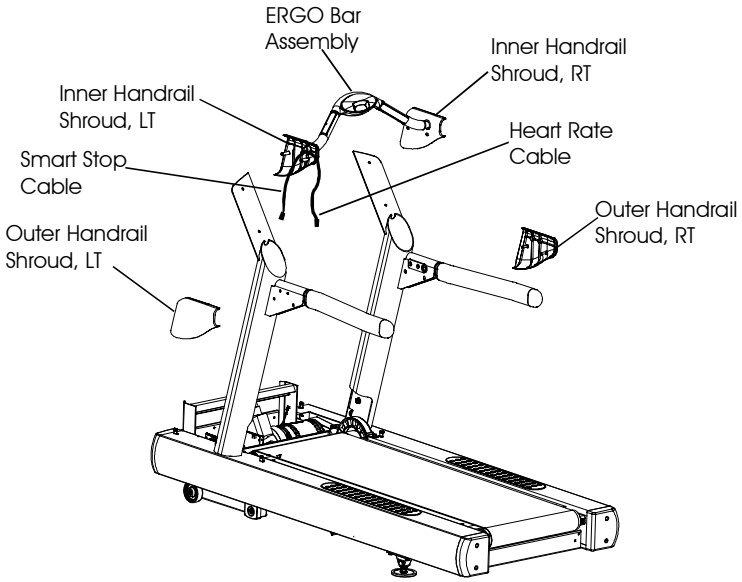


# How To...Replace the Handrail, Ergo Bar, and Uprights

**Special Service Tools Required: None**

**HANDRAIL**

1. Turn the unit power OFF at the ON/OFF Switch, and then unplug line cord at the wall outlet.
2. Remove both screws and move both inner handrail shrouds towards the center of the ergo bar.
3. Remove both outer handrail shrouds.
4. Remove both bolts that retain handrail.
5. Remove the handrail.
6. Install new handrail in reverse order.




**ERGO BAR**

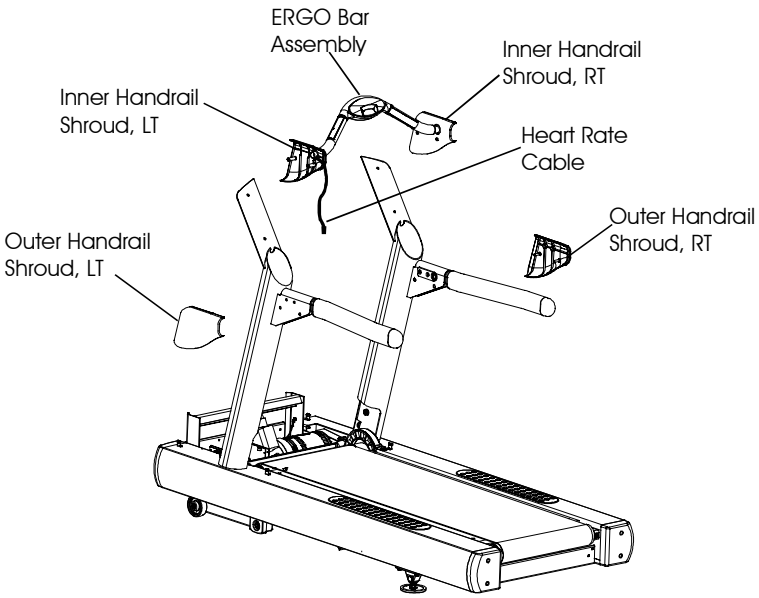
1. Turn the unit power OFF at the ON/OFF Switch, and then unplug line cord at the wall outlet.
2. Remove the screws securing both inner handrail shrouds, and then move both inner handrail shrouds towards the center of the ergo bar.
3. Remove the mounting bolts securing the ergo bar to the handrails.
4. Spread the uprights just enough to remove the ergo bar and LifePulse® sensor wiring.
5. Reverse procedure for installation. When installing the ergo bar, make sure not to pinch the wiring.

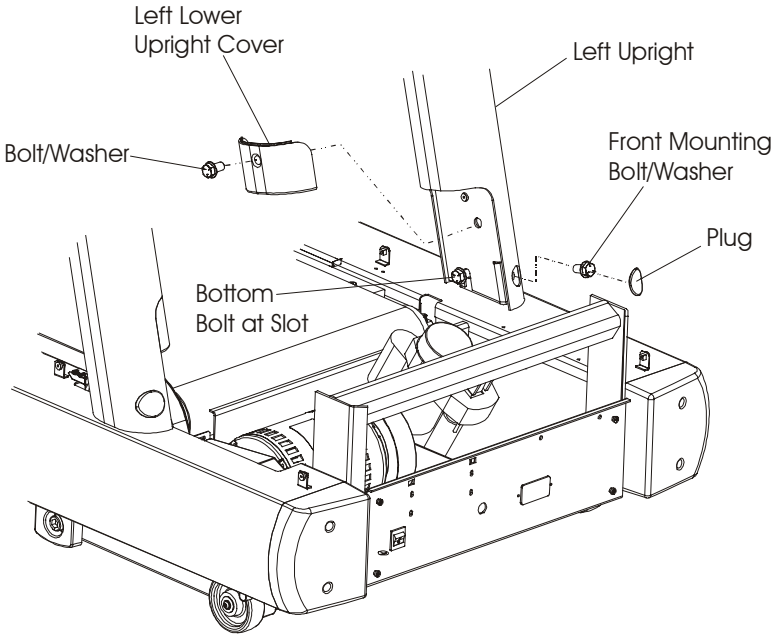
# How To...Replace the Handrail, Ergo Bar, and Uprights - Continued

**Special Service Tools Required: None**

**UPRIGHTS**

1. Turn the unit power off at the ON/OFF Switch, and then unplug line cord at the wall outlet.
2. Remove the console assembly. See “How To…" in this section.
3. Remove screws securing the inner handrail shrouds, and then move both inner handrail shrouds towards the center of the ergo bar.
4. Remove mounting bolts securing the ergo bar to the handrails.
5. Spread uprights just enough to remove the ergo bar and LifePulse® sensor wiring.
6. Remove inside upright covers, front cover, and motor cover. See “How To… Remove the Upright Covers, Motor Cover, and Front Cover”.
7. Remove the plug at the front of each upright.
8. Remove the mounting bolt under each plug.
9. Remove the inside mounting bolts at the base of each upright.
10. Lift the uprights out of frame supports.
11. Install the uprights in reverse order leaving upright mounting bolts loose.
12. Tighten upright mounting bolts after all other hardware has been installed and secured.



# How To...Replace the Leveler Assembly

**Special Service Tools Required: None**

**WARNING! MAKE CERTAIN THAT TREADMILL IS PROPERLY SUPPORTED BEFORE REPLACING AND INSTALLING NEW LEVELER ASSEMBLY.**

1. Turn the unit power OFF at the ON/OFF Switch, and then unplug the line cord at the wall outlet.

2. Lift treadmill up just enough to allow removal of leveler assembly, and then support with suitable blocks.

3. Remove the four leveler mounting bolts and hardware.

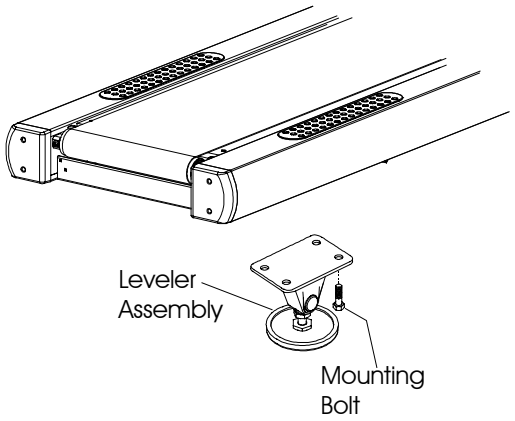
4. Install new leveler assembly in reverse order of removal.

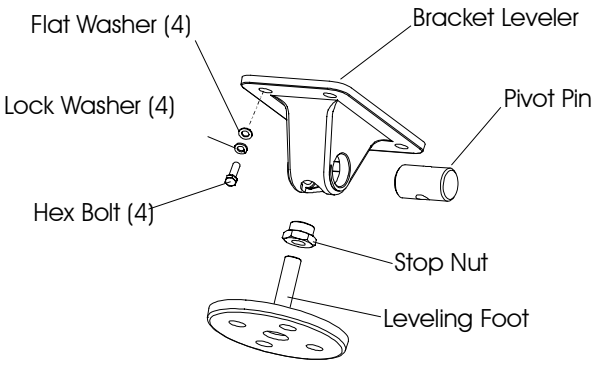
NOTE: Mounting holes in the leveler bracket are of a non-symmetrical pattern, and therefore can only fit the holes in the bottom of the frame one way.

5. Level the unit by turning the leveler foot until the leveler firmly contacts the floor.

6. When unit is level, tighten the stop nut. Make certain the stop nut is properly seated against the pivot pin.

NOTE: It's important that unit is leveled before using. An unleveled machine can cause the striding belt to drift to one side.

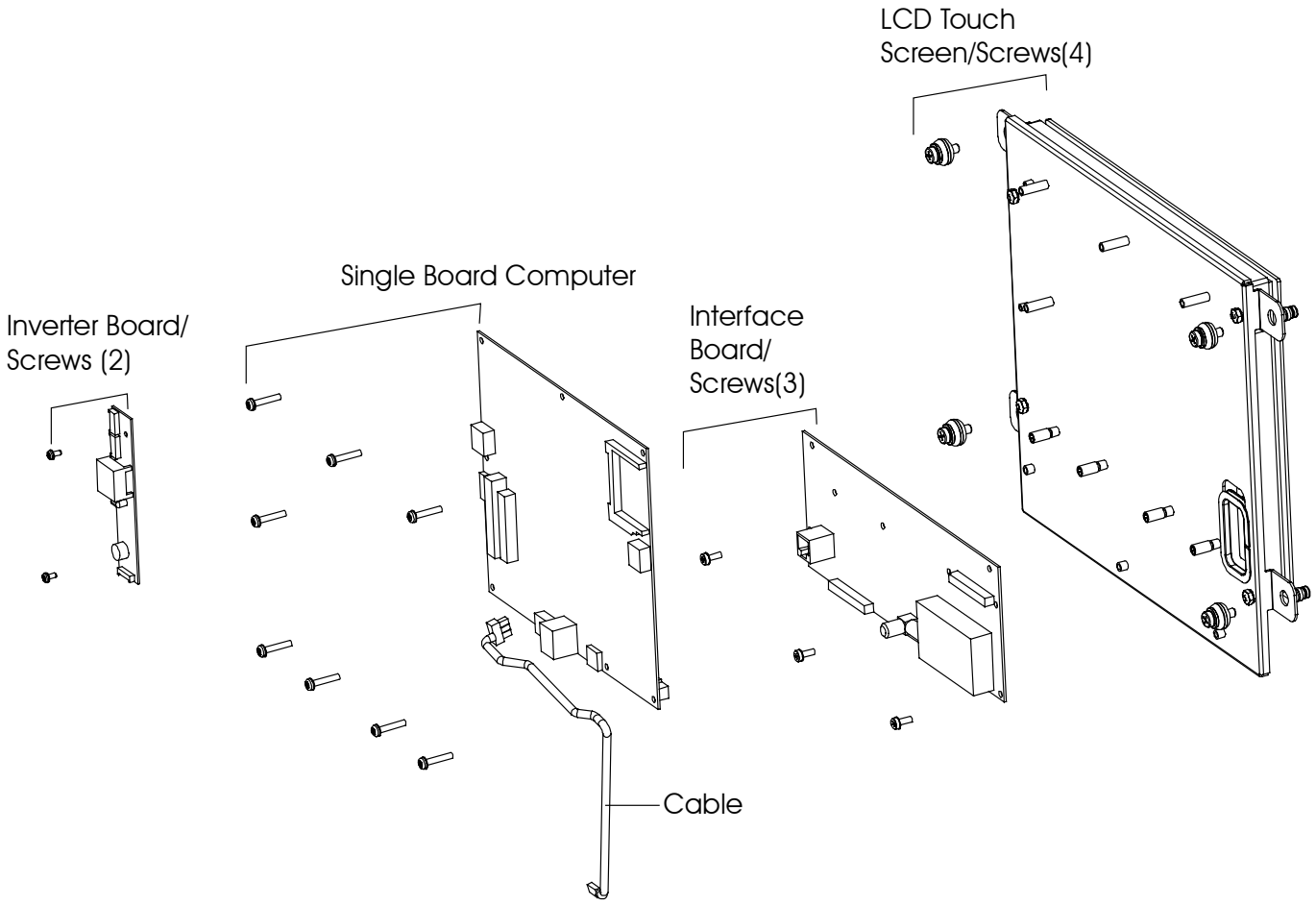


# LCD Integrated Console Service Review (T9e)

**Special Service Tools Required: None**

NOTE: The following pages provide service procedures for servicing the LCD integrated console. Use the exploded view below to help identify parts and component locations during servicing.

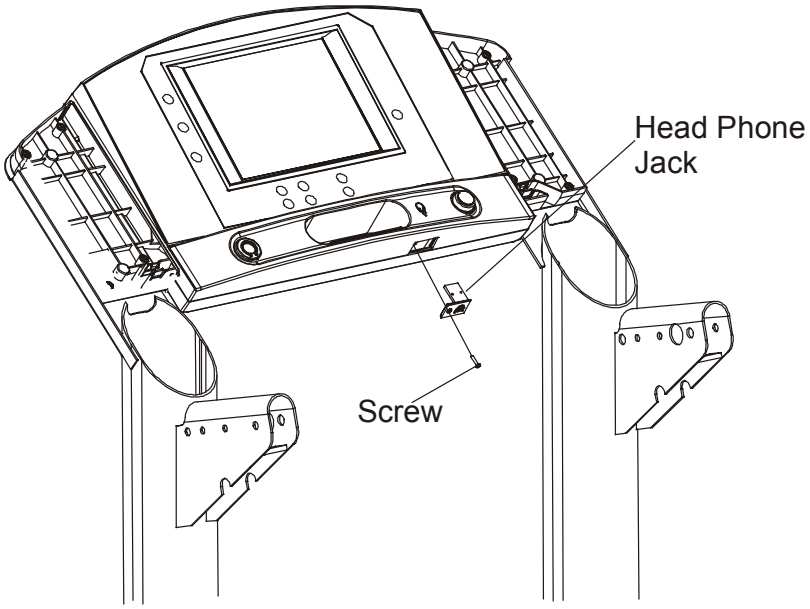


# How To...Replace the Headphone Jack (T9e)

**Special Service Tools Required: None**

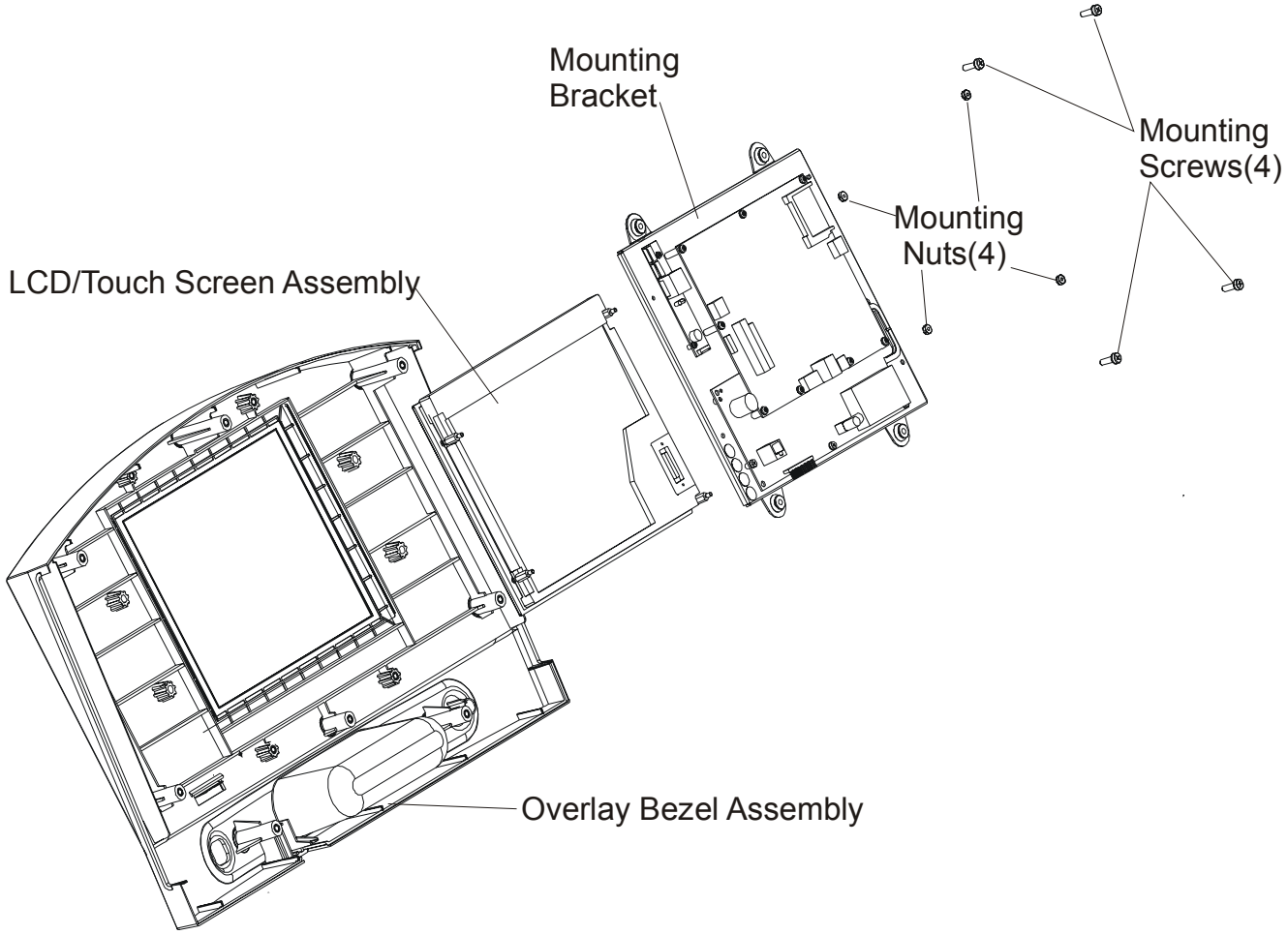
NOTE: Some components are not shown for clarity purposes, and are not required to be removed to access the headphone jack assembly.

1. At the bottom of the console, remove the screw securing the headphone jack assembly.
2. Remove the headphone jack assembly.
3. Unplug the attached cable.
4. Install new headphone jack assembly reverse order.



# How To...Replace the Touch-Screen Assembly (T9e)

**Special Service Tools Required: None**

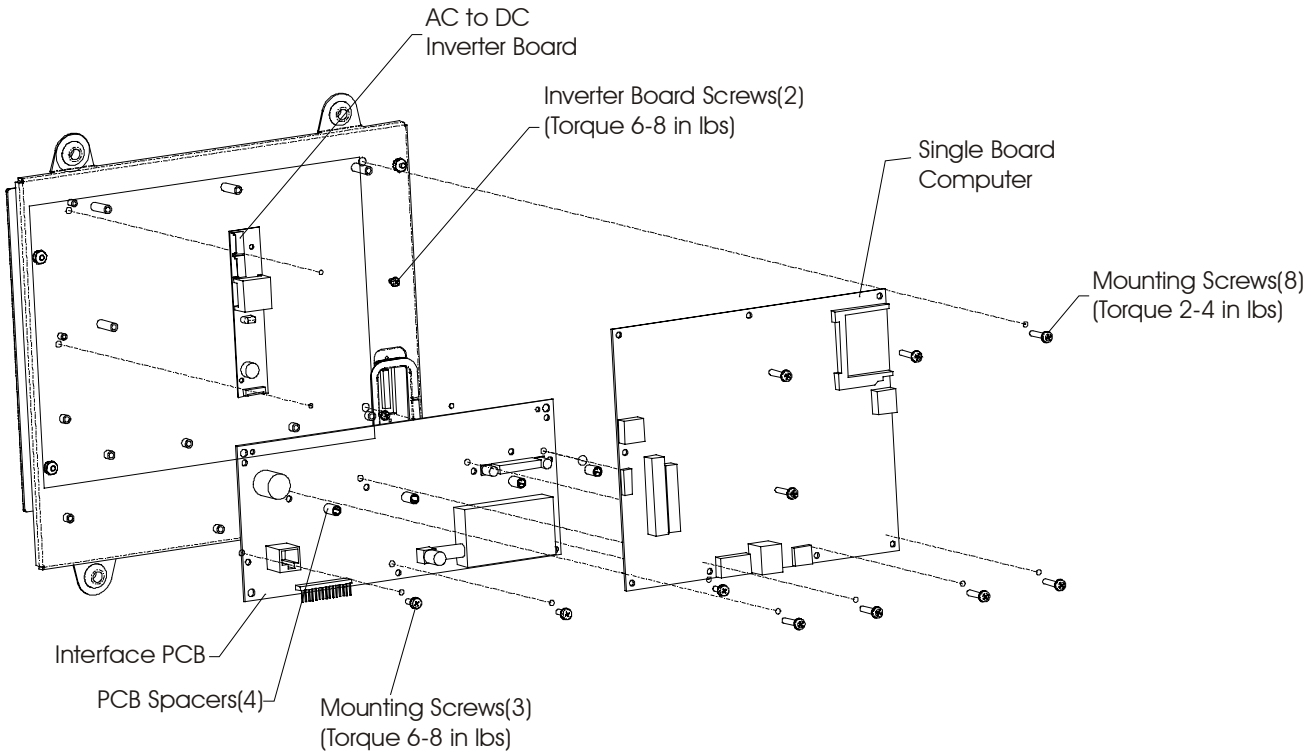



1. Remove eight mounting screws from the back cover of the console.
2. Lift the front half of the console far enough to disconnect electrical connections.
3. Remove the front of console assembly.
4. Remove four mounting screws and bushings that secure the LCD touch-screen assembly to the overlay bezel assembly.
5. Remove four mounting nuts securing LCD touch-screen assembly to metal bracket.
6. Remove LCD touch-screen assembly from console.
7. Install new touch-screen in reverse order.

# How To...Replace the Power Inverter, Single Computer, & Interface Boards (T9e)

**Special Service Tools Required: None**

NOTE: The following steps cover replacement of all boards attached to the back of the LCD touch screen assembly. Use the illustrations on this page to aid in board replacement.




1. Disconnect the 5-Pin touch-screen communication ribbon cable and the 4-Pin LCD communication cable.

2. Remove the mounting screws securing the single board computer.

NOTE: The single board computer remains engaged into a 24-Pin receptacle, which is located between two connector pins on the interface board.

3. Carefully wiggle the single board computer out of the interface board receptacle and connector pins.

4. Remove interface board with three attaching screws

5. Disconnect the pink/white wires from the two backlight connectors, and the four yellow wires from the power inverter board.

6. Remove power inverter board with two attaching screws.

7. Install boards in reverse order.

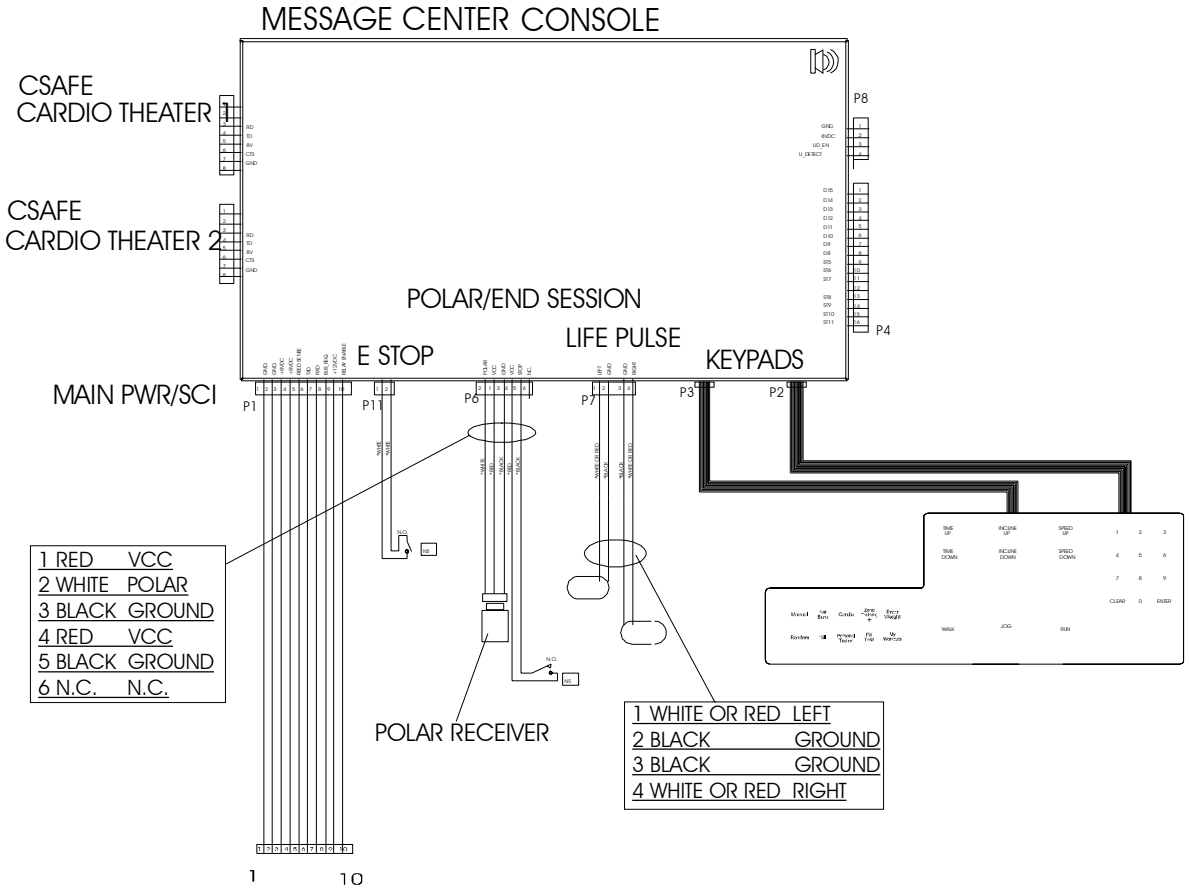
*Chapter 5*

# SECTION 5

# ELECTRONIC OVERVIEW AND BLOCK DIAGRAMS

## NOTES

# Electronic Overview - Display Console Board Block Diagram (T9i)

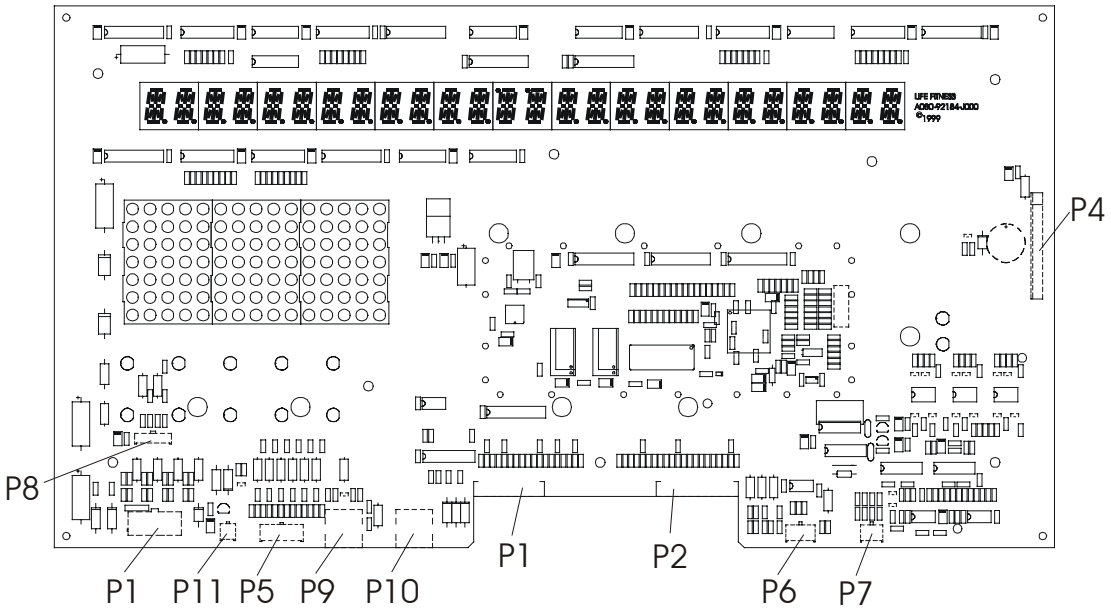


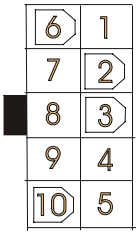

| WIRE # | COLOR | DESCRIPTION |
|---|---|---|
| 1 | YELLOW | GROUND |
| 2 | ORANGE | GROUND |
| 3 | BROWN | +8 VOLTS DC |
| 4 | RED | +8 VOLTS DC |
| 5 | BLUE | REED SENSE |
| 6 | PURPLE | TXD |
| 7 | GREEN | RXD |
| 8 | GRAY | BUS_REQ |
| 9 | WHITE | +12 VOLTS DC |
| 10 | BLACK | RELAY ENABLE |

# Electronic Overview - Display Console Board (T9i)

## Functional Description

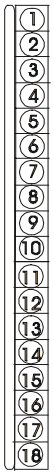
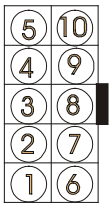
The display Console printed circuit board is an intelligent display and keypad interface. It works in conjunction with the wax/lift board and motor controller. The console board reads the keypad input for user commands, refreshes the status LEDs, data display, profile display matrix. The LifePulse® circuitry reads analog voltages from the user hands and converts it into digital signal for LifePulse® heart rate. The console contains two RJ45 type (CSAFE) connectors to provide +8 volts at 0.4 Amps DC and CSAFE network interface.



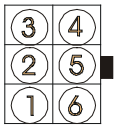
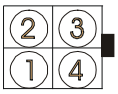
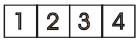
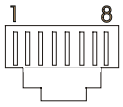
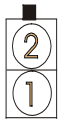

| CONNECTOR | LOCATION | PIN | FUNCTIONAL DESCRIPTION |
|---|---|---|---|
| P1 is a 10Pin connector, which connects to wax/lift board. |  | 1 | GND |
| | | 2 | GND |
| | | 3 | +8$V_{DC}$ (LEDs) |
| | | 4 | +8$V_{DC}$ (LEDs) |
| | | 5 | Reed Sense (RELAY1) |
| | | 6 | TXD (transmit data) |
| | | 7 | RXD (data received) |
| | | 8 | Bus_Req (bus request) |
| | | 9 | +12$V_{DC}$ (emergency stop switch) |
| | | 10 | Relay Enable |

# Electronic Overview - Display Console Board (T9i) - Continued

| CONNECTOR | LOCATION | PIN | FUNCTIONAL DESCRIPTION |
|---|---|---|---|
| P2 is a 12Pin ribbon connector connects to the display console overlay. |  | 1 | Ground (ESD) |
| | | 2 | Switch (strobe 0) |
| | | 3 | Switch (return 0) |
| | | 4 | Switch (strobe 1) |
| | | 5 | Switch (return 1) |
| | | 6 | Switch (strobe 2) |
| | | 7 | Switch (return 2) |
| | | 8 | Switch (strobe 3) |
| | | 9 | Switch (return 3) |
| | | 10 | Switch (strobe 4) |
| | | 11 | Switch (return 4) |
| | | 12 | GND (ESD) |
| | | | |
| P3 is a 10Pin ribbon connector which connects to the display console overlay |  | 1 | GND (ESD) |
| | | 2 | Switch (return 6) |
| | | 3 | Switch (strobe 2) |
| | | 4 | Switch (return 3) |
| | | 5 | Switch (strobe 1) |
| | | 6 | Switch (strobe 4) |
| | | 7 | Switch (return 5) |
| | | 8 | Switch (return 1) |
| | | 9 | Switch (return 7) |
| | | 10 | Ground (ESD) |

| CONNECTOR | LOCATION | PIN | FUNCTIONAL DESCRIPTION |
|---|---|---|---|
| P4 is an 18Pin connector which connects to the remote console |  | 1 | D15 ( DP Segment Data) |
| | | 2 | D14 ( G Segment Data) |
| | | 3 | D13 ( F Segment Data) |
| | | 4 | D12 ( E Segment Data) |
| | | 5 | D11 ( D Segment Data) |
| | | 6 | D10 ( C Segment Data) |
| | | 7 | D9 ( B Segment Data) |
| | | 8 | D8 ( A Segment Data) |
| | | 9 | ST5 (Digit Strobe 5) |
| | | 10 | ST6 (Digit Strobe 6) |
| | | 11 | ST7 (Digit Strobe 7) |
| | | 12 | Key |
| | | 13 | ST8 (Digit Strobe 8) |
| | | 14 | ST9 (Digit Strobe 9) |
| | | 15 | ST10 (Digit Strobe 10) |
| | | 16 | ST11 (Digit Strobe 11) |
| | | 17 | +8$V_{DC}$ (not used) |
| | | 18 | Ground (not used) |
| | | | |
| P5 is a 10Pin connector, which connects to the serial peripheral interface serial communications port |  | 1 | MISO (master-in slave-out) |
| | | 2 | MOSI (master-out slave-in) |
| | | 3 | SCK (serial clock) |
| | | 4 | N/U (not used) |
| | | 5 | GND (ground) |
| | | 6 | PCS1 (peripheral chip select 1) |
| | | 7 | PCS2 (peripheral chip select 2) |
| | | 8 | PCS3 (peripheral chip select 3) |
| | | 9 | Output (open collector) |
| | | 10 | +8$V_{DC}$ |

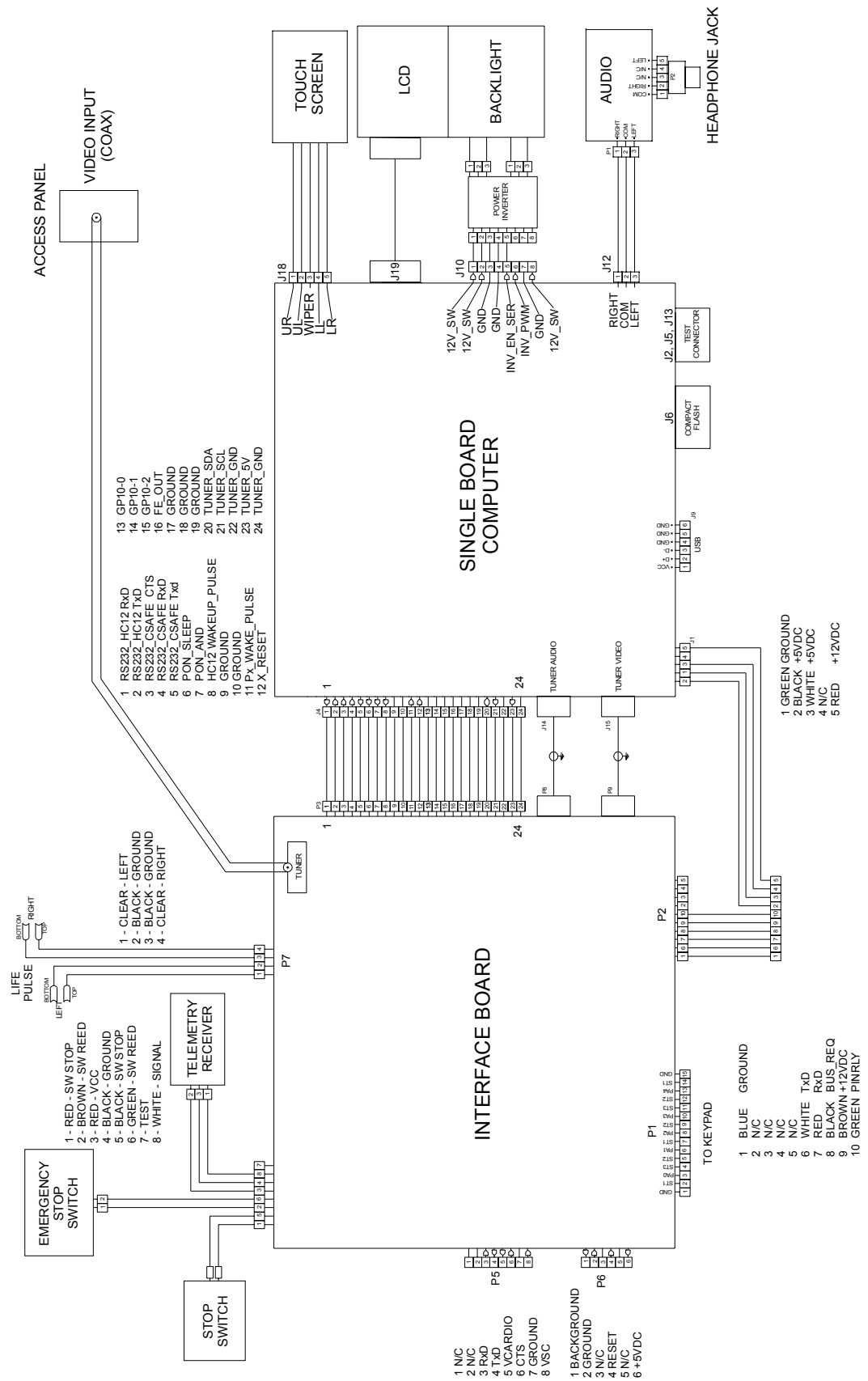
## Electronic Overview - Display Console Board (T9i) - Continued

| CONNECTOR | LOCATION | PIN | FUNCTIONAL DESCRIPTION |
|---|---|---|---|
| P6 is a 6pin connector which connects to the Polar® receiver |  | 1 | $+5V_{DC}$ |
| | | 2 | Telemetry signal |
| | | 3 | GND (ground) |
| | | 4 | Stop Switch (+) |
| | | 5 | Stop Switch (-) |
| | | 6 | N/U (not used) |
| P7 is a 4pin connector which connects to the LifePulse® electrodes |  | 1 | Left (+) |
| | | 2 | Left (-) |
| | | 3 | Right (-) |
| | | 4 | Right (+) |
| | | | |
| P8 is a 4Pin connector which is not used on T9I or T9e |  | 1 | N/C (no connection) |
| | | 2 | N/C (no connection) |
| | | 3 | N/C (no connection) |
| | | 4 | N/C (no connection) |
| | | | |
| P9 and P10 are 8Pin connectors which connect to the CSAFE interface |  | 1 | N/U - not used |
| | | 2 | N/U - not used |
| | | 3 | Receive Data |
| | | 4 | Transmit Data |
| | | 5 | $+8V_{DC}$ |
| | | 6 | CTS |
| | | 7 | GND (ground) |
| | | 8 | N/U - not used |
| | | | |
| P11 is a 2Pin connector which connects to the emergency stop switch |  | 1 | Switch (-) |
| | | 2 | Switch ($+12V_{DC}$) |

## Electronic Overview - Display Console Board (T9i) - Continued

| CONNECTOR | LOCATION | PIN | FUNCTIONAL DESCRIPTION |
|---|---|---|---|
| P14 is a 10Pin connector which connects to the background debug mode signals |  | 1 | /DS |
| | | 2 | /BERR |
| | | 3 | Ground |
| | | 4 | /BKPT/DSCLK |
| | | 5 | GND (ground) |
| | | 6 | SUSPEND/QUOT |
| | | 7 | /RESET |
| | | 8 | IPIPE1/DS1 |
| | | 9 | $+5V_{DC}$ |
| | | 10 | IPIPE0/DS0 |

# Electronic Overview - Display Console Block Diagram (T9e)



## FUNCTIONAL DESCRIPTION

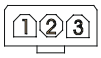
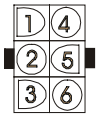
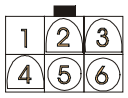
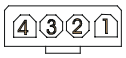
The motor controller circuit board is a single-phase AC input PWM variable frequency three-phase AC output motor controller. Specifically the controller input is configured as a full wave bridge for $230V_{AC}$ input, and as a voltage doubler for $120V_{AC}$ input. The resultant DC bus voltage is processed through a microprocessor controlled six switch DC to AC inverter. The output is three-phase power with pulse width modulation of both voltage and frequency.

**NOTE:** The motor controller design utilizes a 'hot' supply. This means the entire board will be at elevated potentials relative to earth ground any time the circuit is active. All measurements should be conducted with isolated equipment. Additionally there is considerable energy stored within the circuitry for up to 90 seconds after power is removed from the circuit. Personnel working with this equipment should be trained and adequate precautions should be used whenever working with this equipment.

## Electronic Overview – Motor Controller Board - Continued

| DESCRIPTION | LOCATION | | FUNCTION |
|---|---|---|---|
| Service LED | LED1 | | +5$V_{DC}$ (indicator) |
| | LED2 | | +14$V_{DC}$ (indicator) |
| | LED3 | | Service LED |
| | | | |
| Test Point (TP) | TP1 | | +14$V_{DC}$ (supplies relay power) |
| | TP2 | | +5$V_{DC}$ (system voltage) |
| | TP3 | | GND (ground) |
| | TP4 | | EPROM default |
| | TP5 | | Voltage (motor setting) |
| | | | |
| Jumper (JW) | JW1 | IN | Serial interface (Error message “System Configured Two Wire” appears If removed.) |
| | JW6 | OUT | Clears continuous error messages and displays EPPROM data |
| | JW7 | IN | Determines the wave form applied to the motor |

# Electronic Overview – Motor Controller Board - Continued

| CONNECTOR | LOCATION | PIN | FUNCTIONAL DESCRIPTION |
|---|---|---|---|
| P1 is a 3Pin connector, which connects to the AC inputs |  | 1 | $120V_{AC}/230V_{AC}$ input line |
| | | 2 | $120V_{AC}$ neutral/$230V_{AC}$ return |
| | | 3 | GND (earth) |
| | | | |
| P2 is a 6Pin connector, which connects to the main motor |  | 1 | Earth ground connection. |
| | | 2 | Motor phase W |
| | | 3 | Motor phase V |
| | | 4 | Motor phase U |
| | | 5 | Power connection (motor thermal cutout) |
| | | 6 | Power connection (motor thermal cutout) |
| | | | |
| P3 is a 6Pin connector, which connects to the Control Inputs |  | 1 | $+8V_{DC}$ (supplied by wax/lift board) |
| | | 2 | GND (console circuit ground) |
| | | 3 | Emergency stop switch |
| | | 4 | Bus request |
| | | 5 | Data receive |
| | | 6 | Data transmit |
| | | | |
| P4 is a 4Pin connector, which connects to the Power Factor Controller or Capacitor Board |  | 1 | Volt positive (PFC in) |
| | | 2 | Motor controller ground |
| | | 3 | Voltage doubler neutral (no connection for $230V_{AC}$ or PFC) |
| | | 4 | Voltage positive (PFC out) |
| | | | |
| P5 is a 3Pin connector, which connects to the RPM Input |  | 1 | Motor controller ground |
| | | 2 | $+5V_{DC}$ (VCC) |
| | | 3 | Speed sense input |

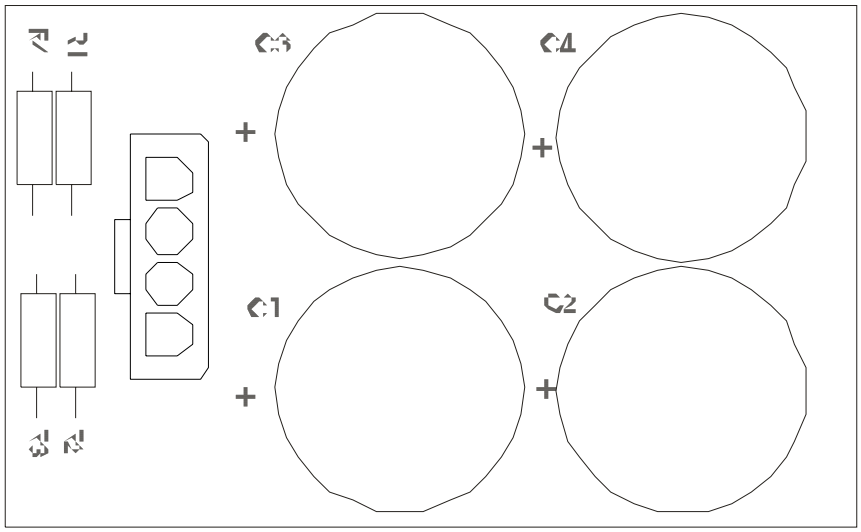
## Electronic Overview – Motor Controller Board - Continued

| CONNECTOR | LOCATION | PIN | FUNCTIONAL DESCRIPTION |
|---|---|---|---|
| P6 is a 10Pin connector, which connects to the diagnostic header inputs.<br><br>**NOTE - Pins 1 and 6 are located closest to P5 on the printed circuit board.** |  | 1 | Serial output |
| | | 2 | Serial input |
| | | 3 | Secure input to 68HC08 processor |
| | | 4 | Ground (Motor Controller circuit) |
| | | 5 | Bi-directional serial line |
| | | 6 | PTC4 input |
| | | 7 | Programming voltage input |
| | | 8 | DC voltage (+VD) |
| | | 9 | $+5V_{DC}$ (VCC) |
| | | 10 | $+5V_{DC}$ (VCC) |

# Electronic Overview – Capacitor Board

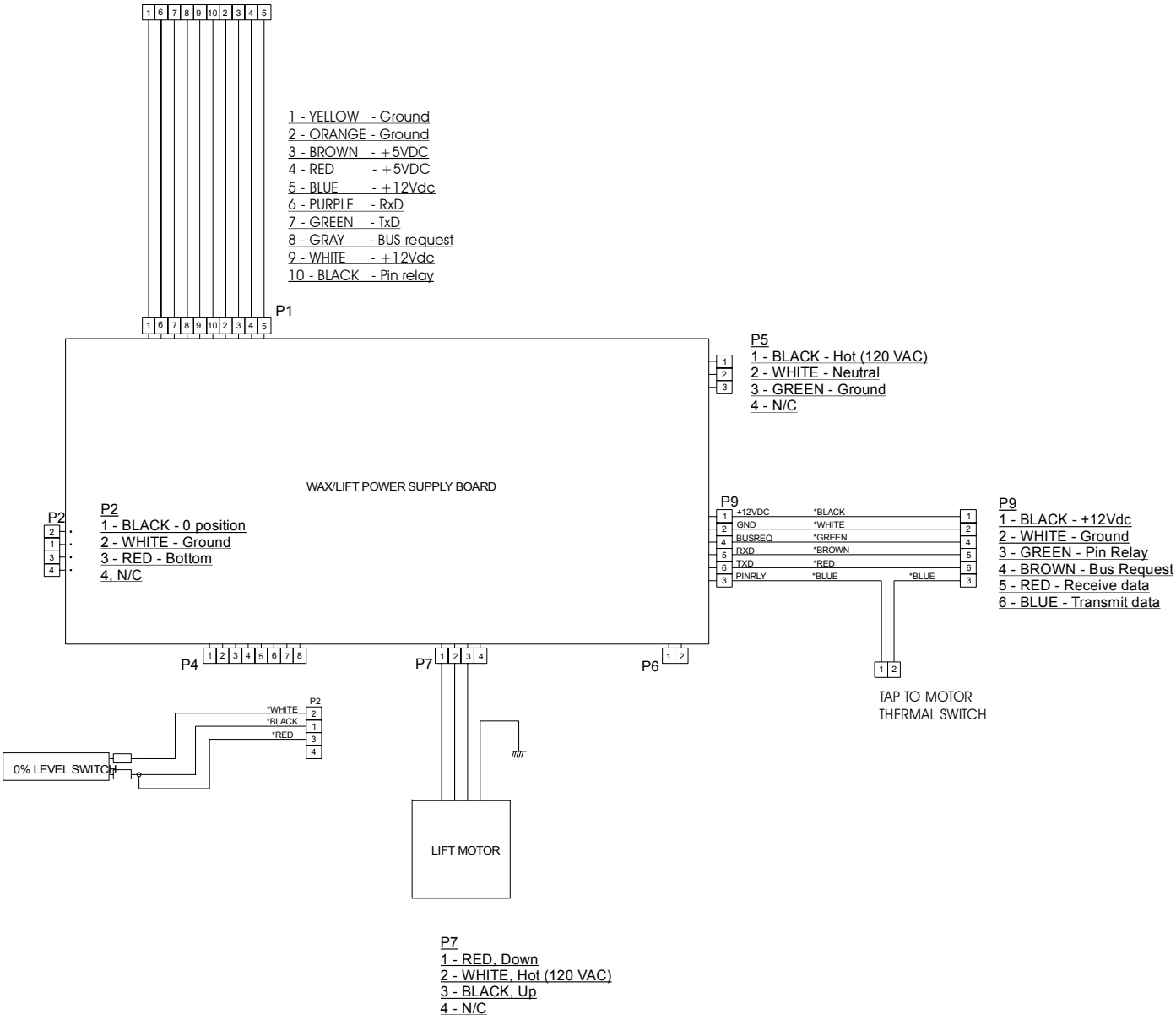
## Functional Description

The capacitor board provides the bus capacitance for a motor control board. A mid-point tap of the bank of capacitors is provided for a voltage doubler configuration. Connection between output of AC input bridge rectifier and DC buss is made through the capacitor board. A capacitor discharge path (bleeder) is also provided on this board.

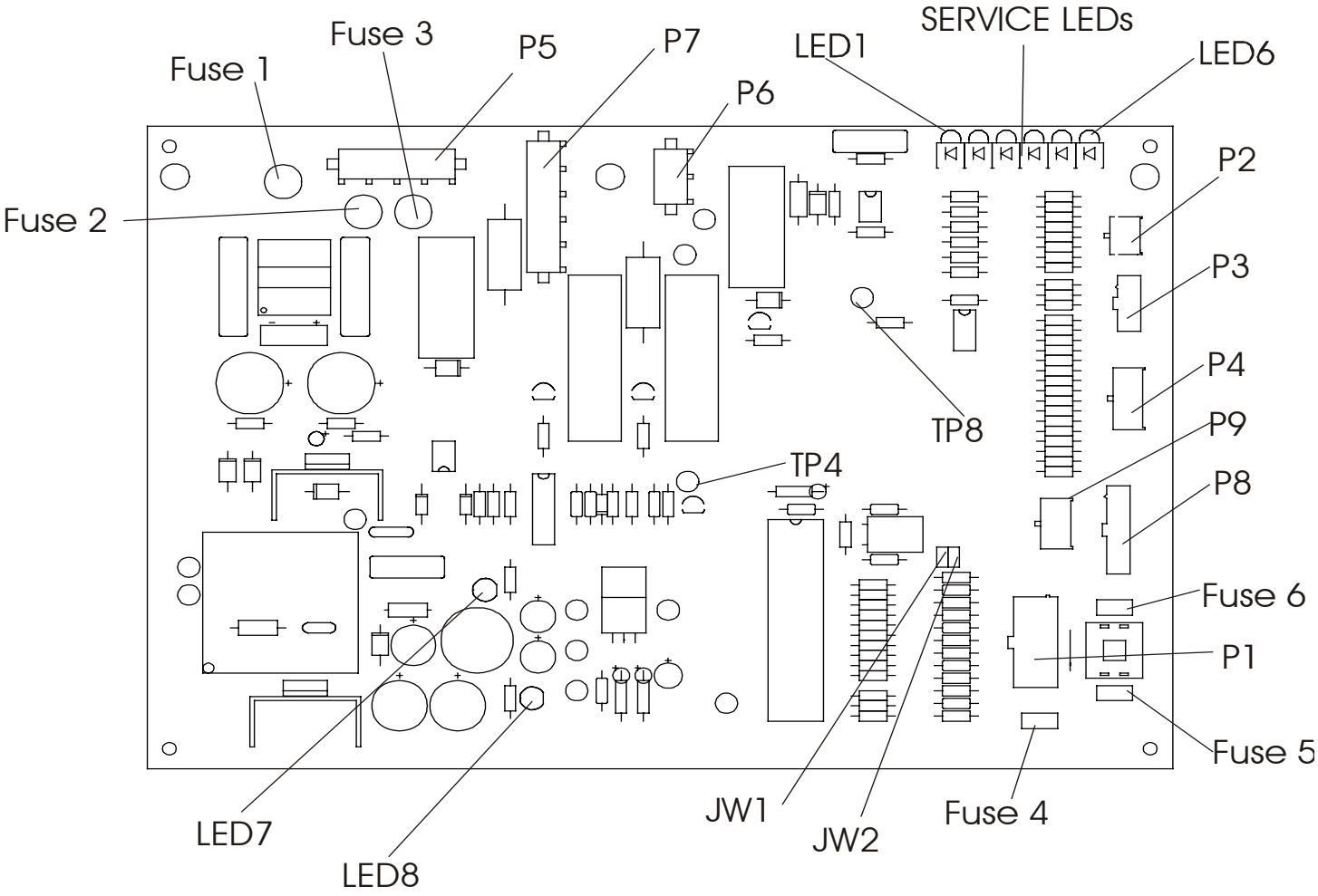



| CONNECTOR | LOCATION | PIN | FUNCTIONAL DESCRIPTION |
|---|---|---|---|
| P1 is a 4Pin connector that connects to motor controller |  | 1 | Input AC rectifier output |
| | | 2 | DC buss return |
| | | 3 | DC buss mid-point tap |
| | | 4 | DC buss |

# Electronic Overview – Wax/Lift Board Block Diagram



### LEDs, Relays, Test Points, and Jumpers




### Functional Description

The wax/lift/power supply board acts as a junction and interfaces with the following components:

Display Console

Home Switch

Lift Motor

Power Supply

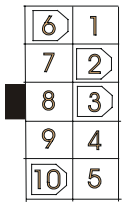
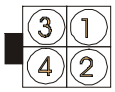
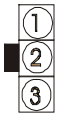
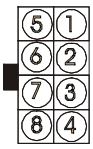
## Electronic Overview – Wax/Lift Board (T9i) - Continued

| DESCRIPTION | LOCATION | FUNCTION |
|---|---|---|
| Service LEDs | LED1 | Flashes when the control processor and the main processor are running. (console board) |
| | LED2 | ON when lift motor is going up |
| | LED3 | ON when lift motor is going down |
| | LED4 | ON when 0% switch is closed |
| | LED5 | ON when bottom limit switch is engaged |
| | LED6 | Flashes when Control UP is running |
| | LED7 | Green indicates that +12V output is ON |
| | LED8 | Red indicates that +8V output is ON |
| | | |
| Fuse | FUSE1 | 2Amp $120V_{AC}$ (supply for low voltage power supply) |
| | FUSE2 | 4Amp $120V_{AC}$ (supply power for lift motor) |
| | FUSE3 | 4Amp $120V_{AC}$ (supply power for lift motor) |
| | FUSE4 | 0.5Amp $+12V_{DC}$ (supply to console emergency stop switch) |
| | FUSE5 | 1Amp $+8V_{DC}$ (supply power to console electronics and CSAFE (RJ45 type connector) |
| | FUSE6 | 1Amp $+8V_{DC}$ (supply to console CPU) |
| | | |
| Relay Switch | RELAY1 and RELAY2 | Lift motor drive |
| | RELAY3 | N/C (no connection) |
| | RELAY4 ($+12V_{DC}$ coil): | RELAY4 supplies AC input to the wax/lift Circuit |

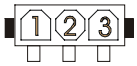
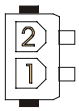
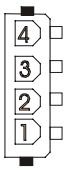
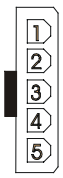
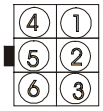
## Electronic Overview – Wax/Lift Board (T9i) - Continued

| DESCRIPTION | LOCATION | FUNCTION |
|---|---|---|
| Test Point (TP) | TP1 | GND (ground) |
| | TP2 | +8$V_{DC}$ |
| | TP3 | +12$V_{DC}$ |
| | TP4 | +5$V_{DC}$ |
| | TP5 | Line voltage (neutral) |
| | TP6 | Line voltage (hot) |
| | TP7 | +5$V_{DC}$ (voltage regulator) |
| | TP8 | Line frequency test |
| | TP9 | N/C (no connection) |
| | TP10 | GND (ground) |
| | TP11 | Rectifier output (POS) |
| | TP12 | Rectifier output (NEG) |
| | | |
| Jumper (JW) | JW1 | One wire system |
| | JW2 | Two wire system |

## Electronic Overview – Wax/Lift Board (T9i) - Continued

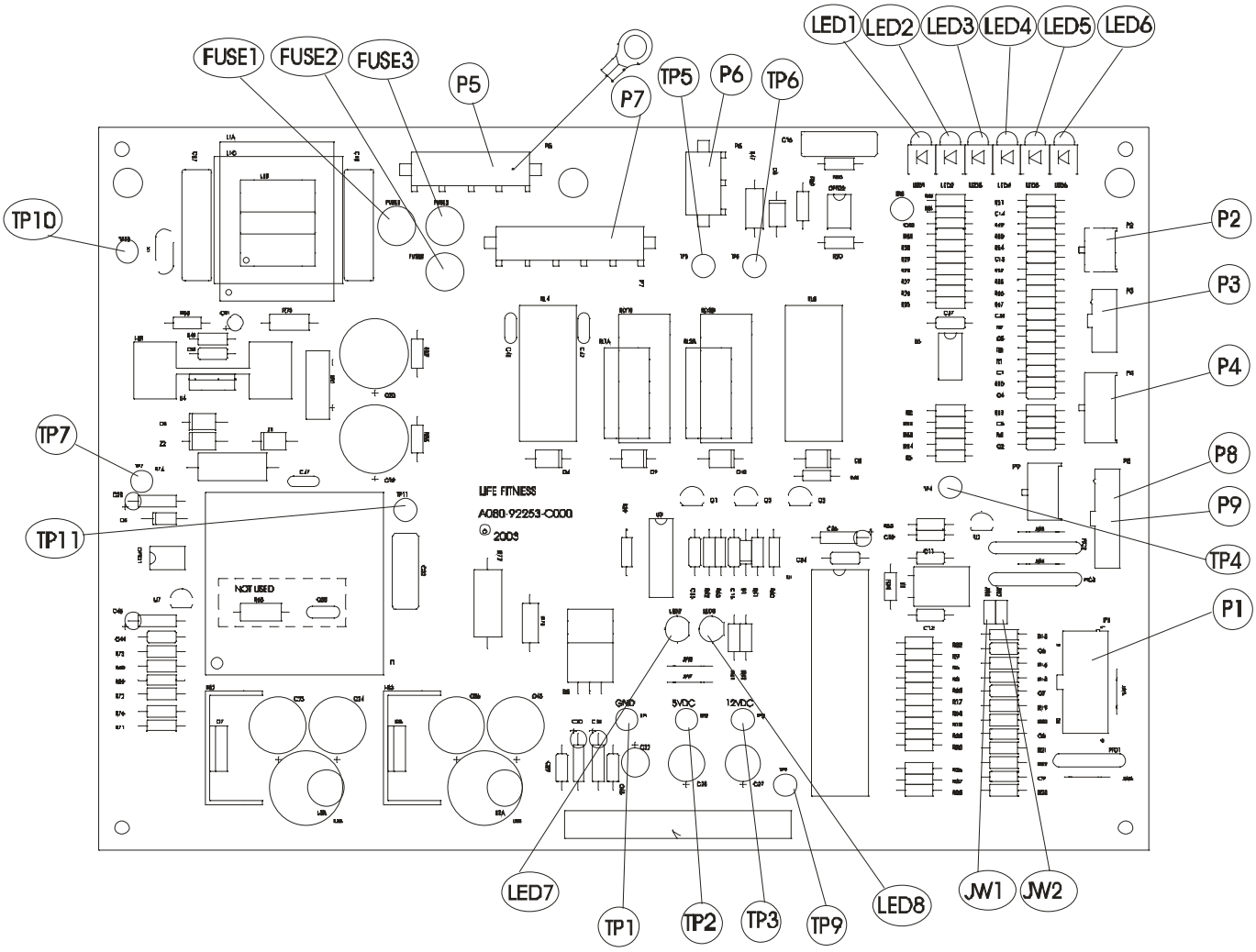
| CONNECTOR | LOCATION | PIN | FUNCTIONAL DESCRIPTION |
|---|---|---|---|
| P1 is a 10Pin connector, which connects to the Console |  | 1 | GND (ground) |
| | | 2 | GND (ground) |
| | | 3 | +8$V_{DC}$ |
| | | 4 | +8$V_{DC}$ |
| | | 5 | N/C (no connection) |
| | | 6 | RXD |
| | | 7 | TXD |
| | | 8 | BUS request |
| | | 9 | +12$V_{DC}$ |
| | | 10 | Pin relay |
| | | | |
| P2 is a 4Pin connector which connects to the Lift Motor |  | 1 | Zero Incline Position Indication |
| | | 2 | GND (ground) |
| | | 3 | Bottom |
| | | 4 | GND (ground) |
| | | | |
| P3 is a 3Pin connector which is not used on T9I or T9e |  | 1 | N/C (no connection) |
| | | 2 | N/C (no connection) |
| | | 3 | N/C (no connection) |
| | | | |
| P4 is a 8Pin connector which is not used on T9I or T9e |  | 1 | N/C (no connection) |
| | | 2 | N/C (no connection) |
| | | 3 | N/C (no connection) |
| | | 4 | N/C (no connection) |
| | | 5 | N/C (no connection) |
| | | 6 | N/C (no connection) |
| | | 7 | N/C (no connection) |
| | | 8 | N/C (no connection) |

## Electronic Overview – Wax/Lift board (T9i) - Continued

| CONNECTOR | LOCATION | PIN | FUNCTIONAL DESCRIPTION |
|---|---|---|---|
| P5 is a 3Pin connector, which connects to the AC Input |  | 1 | $120V_{AC}$ (Hot) |
| | | 2 | Neutral |
| | | 3 | GND (ground) |
| | | | |
| P6 is a 2Pin connector, which is not used on T9I or T9e |  | 1 | N/C (no connection) |
| | | 2 | N/C (no connection) |
| | | | |
| P7 is a 4Pin connector, which connects to the Lift Motor |  | 1 | Down |
| | | 2 | $120V_{AC}$ (Hot) |
| | | 3 | Up |
| | | 4 | GND (ground) |
| | | | |
| P8 is a 5Pin connector, which is not used on T9I or T9e |  | 1 | N/C (no connection) |
| | | 2 | N/C (no connection) |
| | | 3 | N/C (no connection) |
| | | 4 | N/C (no connection) |
| | | 5 | N/C (no connection) |
| | | | |
| P9 is a 6Pin connector, which connects to the Motor Controller Board |  | 1 | $+8V_{DC}$ |
| | | 2 | GND (ground) |
| | | 3 | Pin Relay |
| | | 4 | Bus Request |
| | | 5 | Receive data |
| | | 6 | Transmit data |

# Electronic Overview –Wax/Lift Board (T9e)

## LEDs, Relays, Test Points, and Jumpers




## Functional Description

The Wax/Lift/Power Supply Board acts as a junction and interfaces with the following components:

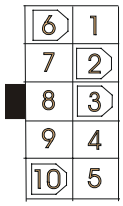
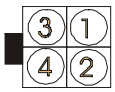
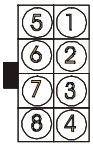
Display Console

Home Switch

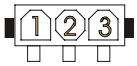
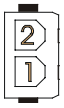
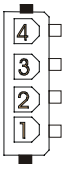
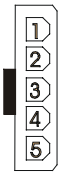
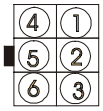
Lift Motor

Power Supply

| DESCRIPTION | LOCATION | FUNCTION |
|---|---|---|
| Service LEDs | LED1 | Flashes when the control processor and main processor are running. |
| | LED2 | On when lift motor is inclining |
| | LED3 | On when lift motor is declining |
| | LED4 | On when "home" switch is closed |
| | LED5 | On when bottom limit switch is engaged |
| | LED6 | Flashes when control processor is running |
| | LED7 | Indicates that +12$V_{DC}$ output is active (green) |
| | LED8 | Indicates that +8$V_{DC}$ output is active (red) |
| Fuses | FUSE 1 | 2 Amp 120$V_{AC}$ supply for low voltage power supply |
| | FUSE 2 | 4 Amp 120$V_{AC}$ supply power for lift motor |
| | FUSE 3 | 4 Amp 120$V_{AC}$ supply power for lift motor |
| Relay Switch | RELAY1 and 2 | Lift motor drive |
| | RELAY3 (+12$V_{DC}$ coil) | N/C (no connection) |
| | RELAY4 (+12$V_{DC}$ coil) | Relay 4 supplies ac input to the wax/lift circuit |
| Test Point (TP) | TP1 | GND (ground) |
| | TP2 | +5$V_{DC}$ |
| | TP3 | +12$V_{DC}$ |
| | TP4 | +5$V_{DC}$ |
| | TP5 | Line voltage (neutral) |
| | TP6 | Line voltage (hot wire) |
| | TP7 | +5$V_{DC}$ (voltage regulator) |
| | TP8 | Line frequency test |
| | TP9 | N/C (no connection) |
| | TP10 | Ground (GND) |
| | TP11 | Rectifier output (POS) |
| | TP12 | Rectifier output (NEG) |
| Jumper (JW) | JW1 | One wire system |
| | JW2 | |

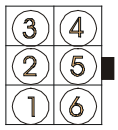
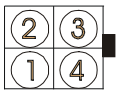
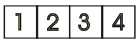
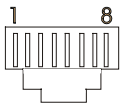
| CONNECTOR | LOCATION | PIN | FUNCTIONAL DESCRIPTION |
|---|---|---|---|
| P1 is a 10pin connector which connects to the console |  | 1 | GND (ground) |
| | | 2 | GND (ground) |
| | | 3 | $+5V_{DC}$ |
| | | 4 | $+5V_{DC}$ |
| | | 5 | $+12V_{DC}$ |
| | | 6 | RXD |
| | | 7 | TXD |
| | | 8 | BUS request |
| | | 9 | $+12V_{DC}$ |
| | | 10 | Pin relay |
| | | | |
| P2 is a 4pin connector which connects to the lift motor |  | 1 | Zero incline position indicator |
| | | 2 | GND (ground) |
| | | 3 | Bottom |
| | | 4 | GND (ground) |
| | | | |
| P3 is a 3Pin connector which is not used on T9I or T9e |  | 1 | N/C (no connection) |
| | | 2 | N/C (no connection) |
| | | 3 | N/C (no connection) |
| | | | |
| P4 is a 8Pin connector which is not used on T9I or T9e |  | 1 | N/C (no connection) |
| | | 2 | N/C (no connection) |
| | | 3 | N/C (no connection) |
| | | 4 | N/C (no connection) |
| | | 5 | N/C (no connection) |
| | | 6 | N/C (no connection) |
| | | 7 | N/C (no connection) |
| | | 8 | N/C (no connection) |

## Electronic Overview - LCD Wax/Lift Board (T9e) - Continued

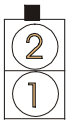
| CONNECTOR | LOCATION | PIN | FUNCTIONAL DESCRIPTION |
|---|---|---|---|
| P5 is a 3pin connector which connects to the AC input |  | 1 | $120V_{AC}$ (Hot) |
| | | 2 | Neutral |
| | | 3 | GND (ground) |
| | | 4 | GND (ground) |
| | | | |
| P6 is a 2Pin connector which is not used on T9i or T9e |  | 1 | N/C (no connection) |
| | | 2 | N/C (no connection) |
| | | | |
| P7 is a 4Pin connector, which connects to the Lift Motor |  | 1 | Down |
| | | 2 | $120V_{AC}$ (Hot) |
| | | 3 | Up |
| | | 4 | GND (ground) |
| | | | |
| P8 is a 5Pin connector which is not used on T9i or T9e |  | 1 | N/C (no connection) |
| | | 2 | N/C (no connection) |
| | | 3 | N/C (no connection) |
| | | 4 | N/C (no connection) |
| | | 5 | N/C (no connection) |
| | | | |
| P9 is a 6pin connector which connects to the motor control board |  | 1 | $+12V_{DC}$ |
| | | 2 | GND (ground) |
| | | 3 | Pin Relay |
| | | 4 | Bus Request |
| | | 5 | Receive data |
| | | 6 | Transmit data |

| CONNECTOR | LOCATION | PIN | FUNCTIONAL DESCRIPTION |
|---|---|---|---|
| P3 is an 24Pin connector which connects the interface board to single board computer | | 1 | RS232_HC12 RxD |
| | | 2 | RS232_HC12 TxD |
| | | 3 | RS232_CSAFE CTS |
| | | 4 | RS232_CSAFE RxD |
| | | 5 | RS232_CSAFE Txd |
| | | 6 | PON_SLEEP |
| | | 7 | PON_AND |
| | | 8 | HC12 WAKEUP_PULSE |
| | | 9 | GROUND |
| | | 10 | GROUND |
| | | 11 | Px_WAKE_PULSE |
| | | 12 | X_RESET |
| | | 13 | GP10-0 |
| | | 14 | GP10-1 |
| | | 15 | GP10-2 |
| | | 16 | FE_OUT |
| | | 17 | GROUND |
| | | 18 | GROUND |
| | | 19 | GROUND |
| | | 20 | TUNER_SDA |
| | | 21 | TUNER_SCL |
| | | 22 | TUNER_GND |
| | | 23 | TUNER_+5V |
| | | 24 | TUNER_GND |
| | | | |
| P8 (video) connects the interface board to the single board computer. | | 1 | VID_OUT |
| | | 2 | GND |

## Electronic Overview - Interface Board (T9e) - Continued

| CONNECTOR | LOCATION | PIN | FUNCTIONAL DESCRIPTION |
|---|---|---|---|
| P9 ($2^{nd}$ IF) connects the interface board to the single board computer | | 1 | $2^{nd}$_IF |
| | | 2 | GND |
| | | | |
| P7 is a 6pin connector which connects to the Polar® receiver |  | 1 | +5$V_{DC}$ (VCC) |
| | | 2 | N/C (no connection) |
| | | 3 | +5$V_{DC}$ (VCC) |
| | | 4 | GND (ground) |
| | | 5 | ESTOP |
| | | 6 | N/U (not used) |
| | | 7 | Test Mode |
| | | 8 | Telemetry Signal |
| | | | |
| P4 is a 4Pin connector, which connects to the LifePulse® sensors |  | 1 | Ground (Right Grip) |
| | | 2 | Ground (Left Grip) |
| | | 3 | Positive (Left Grip) |
| | | 4 | Positive (Right Grip) |
| | | | |
| P10 is a 4Pin connector which is not used on T9I or T9e |  | 4 | N/C (no connection) |
| | | 3 | N/C (no connection) |
| | | 2 | N/C (no connection) |
| | | 1 | N/C (no connection) |
| | | | |
| P5 is a 8Pin connector which connects to the CSAFE interface |  | 1 | N/C (no connection) |
| | | 2 | N/C (no connection) |
| | | 3 | Receive Data |
| | | 4 | Transmit Data |
| | | 5 | +8$V_{DC}$ |
| | | 6 | CTS (clear to send) |
| | | 7 | GND (ground) |
| | | 8 | N/C (no connection) |

## Electronic Overview - Interface Board (T9e) - Continued

| CONNECTOR | LOCATION | PIN | FUNCTIONAL DESCRIPTION |
|---|---|---|---|
| P11 is a 2Pin connector which connects to the emergency stop switch |  | 1 | Switch (-) |
| | | 2 | Switch (+12$V_{DC}$) |
| | | | |
| P6 is a 10Pin connector which connects to background debug mode signals |  | 1 | N/C (no connection) |
| | | 2 | N/C (no connection) |
| | | 3 | N/C (no connection) |
| | | 4 | N/C (no connection) |
| | | 5 | N/C (no connection) |
| | | 6 | N/C (no connection) |
| | | 7 | N/C (no connection) |
| | | 8 | N/C (no connection) |
| | | 9 | N/C (no connection) |
| | | 10 | N/C (no connection) |

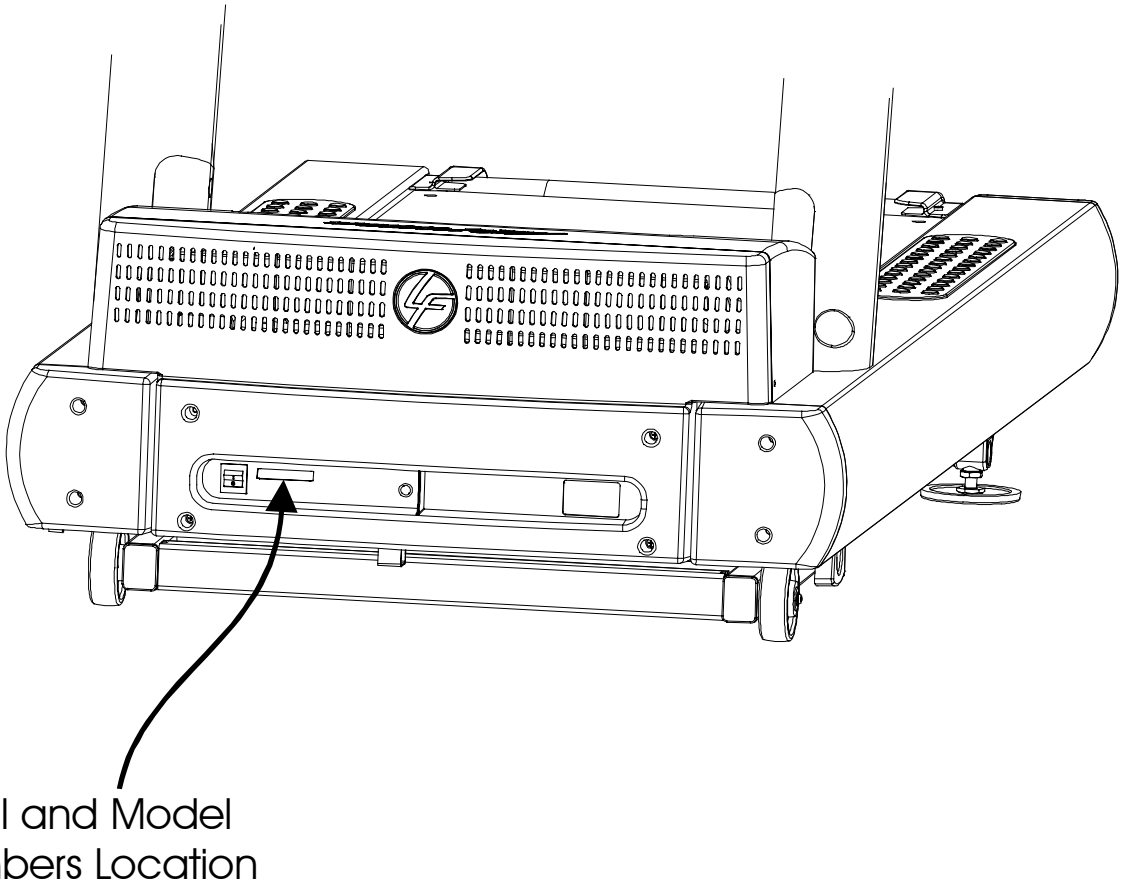
**NOTES**

*Chapter 6*

# SECTION 6
# MISCELLANEOUS

## NOTES

## Model and Serial Number Location



# Preventative Maintenance Schedule

| ITEM | WEEKLY | MONTHLY | QUARTERLY | BI-ANNUAL | ANNUAL |
|---|---|---|---|---|---|
| **DISPLAY CONSOLE ASSEMBLY** | | | | | |
| Hardware | | | | Inspect | |
| Overlay | Clean | | | Inspect | |
| Accessory Cups | | | | | Inspect |
| Stop Switch | Clean | | | Inspect | |
| Emergency Switch/Key | Clean | | | Inspect | |
| **HANDLEBAR ASSEMBLY (ERGO-BAR)** | | | | | |
| Hardware | | | | Inspect | |
| Handlebar | | | | Inspect | |
| Side Hand Rails | | | | Inspect | |
| LifePulse® Sensors | Clean/Inspect | | | | |
| **FRAME ASSEMBLY** | | | | | |
| Hardware | | | | Inspect | |
| Motor Cover | Clean | | | | |
| Motor Electronic Compartment | | Vacuum | | Inspect | |
| Drive Belt | | | | Inspect | |
| Leg Levelers | | Inspect/Adjust | | | |
| Front Roller | | | | Inspect | |
| Rear Roller | | | | Inspect | |



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