



# Service Manual TR 4000

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Part Order # 800-3263



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# Section 1:

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## Introduction

Welcome to the world of **STAR TRAC**. In your hands is the **STAR TRAC TR 4000 Service Manual**. This manual is designed to be easy to use, providing detailed instructions on how to service and maintain the **TR 4000**.

We highly recommend that you read all the applicable sections of the service manual prior to serving the treadmill. The information on the following pages will enable you to begin easily, quickly, and safely.

### Contents

1.1 How to use the Service Manual

1.2 Precautions

1.3 Product Support Assistance

1.4 Tools and Test Equipment

1.5 Treadmill Overview.



# How to use the manual

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- This Service Manual has been written to assist and instruct the repair technician on key components for quick and efficient diagnosis of service problems.
- To assist in finding the applicable sections in the Service Manual. Each Section has a table of contents to help locate specific symptoms and topics. Titles and major headings are located at the top of every page.
- This manual is to be used strictly as a Maintenance manual for service and repair, not as an owner's manual.
- An illustrated Parts List is located at the back of this manual for identifying parts with part numbers.
- Troubleshooting tables and Error Code Flowcharts are included for certain sections to help diagnose the system problem and find the root cause.

# Precautions

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- 1.** Always make sure that the treadmill is turned off and unplugged before starting any work, unless otherwise noted, or when necessary for voltage testing.
  
- 2.** Read each section through for NOTES before starting any work.
  
- 3.** To pull apart electrical connectors, pull on the connector itself, not the wires
  
- 4.** When replacing fuses, be sure the new fuses is the correct amperage rating. Do Not exceed the fuse amp rating. If necessary use a fuse of lower rating until the proper fuse may be attained.
  
- 5.** When checking continuity at the wire connector, insert the test probe carefully to prevent the terminals from bending.



# Product Support Assistance

## PRODUCT SUPPORT DEPARTMENT

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

## Technical Assistance

- When purchasing a part or requesting technical assistance, please contact our Product Support Department : **CALL TOLL-FREE: 1-800-535-4634 or 800-503-1221 US and CANADA or 714-669-1660**
- When placing the call, please have the following information available:
  1. **STAR TRAC** model.
  2. **STAR TRAC** serial number
  3. Problem statement/ symptom.

## After Hours Voicemail Direct

- **CALL TOLL-FREE: 1-800-486-4736**
- When placing the call, please have the following information available:
  1. **STAR TRAC** model.
  2. **STAR TRAC** serial number
  3. Problem statement/ symptom.
  4. Return phone number and contact name.

## Fax Requests

- Domestic and International: **FAx 714-669-0739**
- When placing the fax, please supply the following information:
  1. **STAR TRAC** model.
  2. **STAR TRAC** serial number
  3. Problem statement/ symptom.
  4. Return phone fax number and contact name.
  5. Purchase order or reference number.
  6. Part description and quantity.
  7. Ship to/bill to.

## Product Support Documentation Access

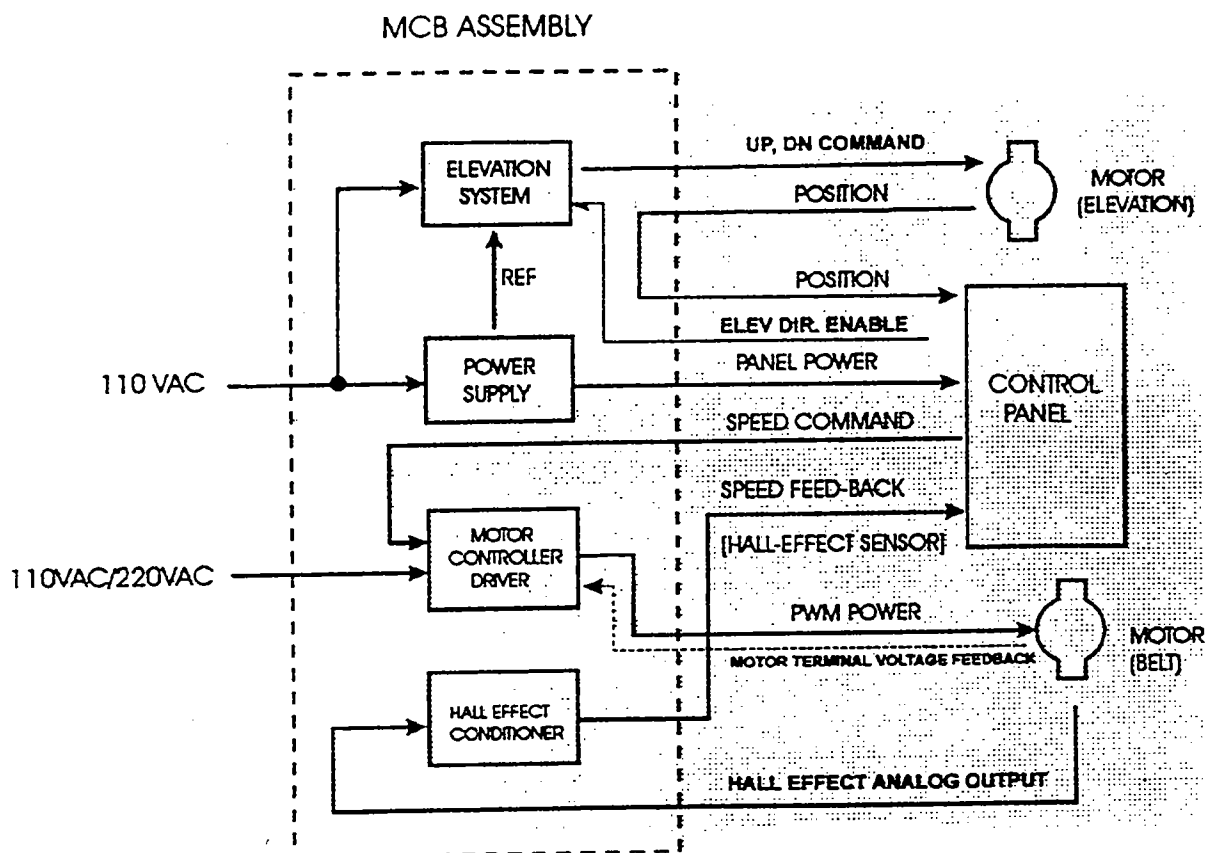
- Web page <http://www.startrac.com/support/>
- Docufacts **CALL TOLL FREE 1-800-429-3228 ext. 640 US and Canada or 714-253-3878** for a list Product Support Procedures and Bulletins.

# Tools and equipment



Equipment	Function
Philips Head Screwdriver	Shroud Speed Control Board Assembly Power Control Board Assembly Motor Control Board Assembly Side Bed Cover and End Caps Transformer
Small Slotted Screwdriver	EPROM RPM Sensor Potentiometer Motor Control Potentiometers
Bungie Cord	Suspend Motor Shroud on Display Rail
5/32" Allen Head Wrench	Handrail assembly
1/8" Allen Head Wrench	Display Assembly
1/4" Allen Head Wrench	Running Belt Head Roller Tail Roller
1/2" Wrench or Nut Driver	Drive Motor
9/16" - 3/4" Combo Wrench	Elevation Motor Leveling Feet
Multi-meter	Voltage Checks Continuity Checks

# Treadmill Overview



- DC POWER SUPPLY**  
 The MCB provides power to the display assembly. Establishes a reference voltage and potentiometer position from the elevation motor
- RUNNING BELT MOTOR DRIVE CONTROL**  
 Takes Alternating Current and converts it to Pulse Width Modulation (PWM) to power the Drive Motor.  
 Motor voltage feedback and control-speed-commands determine the level of PWM power delivered to the motor.  
 Motor Control circuits include fault sensing and safety functions.
- TACHOMETER SIGNAL CONDITIONING**  
 The signal from the RPM sensor is fed to signal conditioning circuits on the MCB, where the signal is converted to a digital output that is utilized by the Display Assembly to indicate belt speed.
- ELEVATION MOTOR CONTROL**  
 The elevation circuit on the MCB receives elevation direction and enable information from the Display Assembly, using these signals to provide control to the Elevation Motor. Elevation position information, in turn, is fed to the Display Assembly to indicate percent of incline.



## **Section 2:**

# **Preventive Maintenance Schedules**

Performing regular preventive maintenance on all Star Trac treadmills is strongly recommended. Without preventive maintenance, normal wear and tear may cause cumulative effects, such as misalignment and early replacement of parts. This may result in downtime. For this reason, we highly recommend following the manufacturer's maintenance schedules.

### **Contents:**

2.1 Preventative Maintenance Chart

2.2 Waxing Procedure

# Preventive Maintenance Chart

Maintenance	Clean	Inspect	Lubricate	Replace
<b>Daily</b>	Using a liquid non-abrasive cleaner, wipe down the following: display board handrails, shroud, heart rate grips. <b>Note:</b> Do not spray directly onto the display board or heart grips.	Inspect for wear and tear on exterior parts regularly, especially under the running belt. Inspect the line-cord plug and cord for possible damage or loose connection.		
<b>Weekly</b>	Elevate the treadmill and vacuum under the unit. <b>Note:</b> Unplug the unit when vacuuming.	Verify running belt alignment and tension. Inspect the area under the treadmill for obstructions.		
<b>Monthly</b>	Lift the motor shroud and vacuum around the motor and electronics. Clean and lubricate the elevation screws. <b>Note:</b> This must be done with the unit unplugged and turned off.	Inspect the display and handrail screws for loosening. Inspect the display panel keys for wear.	Using a silicone spray lubricate the elevation screws, while the unit is elevated. <b>Note:</b> This must be done with the unit unplugged and turned off.	
<b>Quarterly</b>			Wax the running belt and deck using Unisen powder wax.	

# Quarterly Waxing

## Time Required:

5 minutes

## Tools Required:

1 Wax Powder Bag (Unisen)

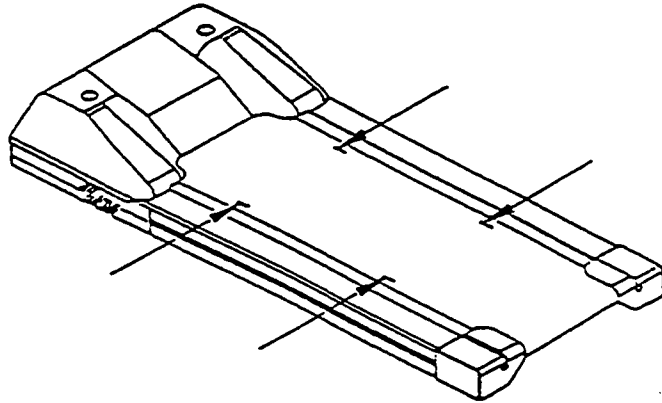
Teaspoon

1 Clean Towel

Paint Stick or Yard Stick

Diluted All-purpose Cleaner (409)

Bristle Brush



**Note:** Apply wax powder while belt and deck are still warm (from 5 to 15 minutes of use) for optimum benefit. The following steps are done with the treadmill off.



## PROCEDURE

### STEP 1: Cleaning the deck and belt:

- Using the stick or ruler, slide a towel under the middle of the running belt from one side of the frame to the other.
- Hold the edges of the towel, pull from head-roller down to the tailroller, then pull the belt down to wipe the remaining of the belt. **TIP:** Careful when removing the towel, it will be dirty. Fold the dirty towel and shake into trash.

### STEP 2: Re-waxing the deck and belt:

- Lift the left side (facing the display) of the belt, about 12 inches down from the motor shroud (see above figure). Hold the belt up such that the width of the belt is elevated from the deck.
- Gently place one level teaspoon of wax powder on the deck about two inches from the edge, and blow the wax steadily under the belt, so that the wax powder is spread evenly across the deck (see above figure). Gently place a second level teaspoon of wax 18 inches down the belt.
- Repeat the above step to the right side of the belt and deck.

### STEP 3: Walking the wax in:

- Start the treadmill at 1 mph and walk on all sections of the belt and deck for 1 minute to ensure the wax has been evenly distributed and worked-in properly.

### STEP 4: Clean-up:

- Remove any excess wax with diluted cleaner (409) and towel, or bristle brush. **TIP:** Blow away extra wax first from around the siderails and deck before wiping.



# Section 3:

## Diagnostics

The **STAR TRAC** 4000 Treadmill series contains diagnostic and customizing modes. In these modes you are able to check accumulated data about the past usage of the treadmill, test its motor and display controls, and investigate display code messages. For these reasons, your treadmill is equipped with a ;

- **Settings Mode**
- **Configure Mode**
- **Motor Test Mode**
- **Display Test Mode**
- **Heart Rate Test Mode**

### Contents:

3.2 Engaging Settings Mode

3.3 Engaging Configuration Mode

3.4 Description of parameters

3.5 Engaging Motor Test Mode

3.6 Calibration

3.7 Engaging Display Test Mode

3.8 Heart rate test

# Settings Mode

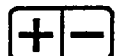
Settings Mode allows certain settings of your treadmill to be modified. To engage Settings Mode:

1. Press and hold the "0", "1" & "START" keys together. While holding the "0" & "START" keys down, release the "1" key.
2. The display will beep and display **SETTINGS** momentarily, then **UNITS** will be displayed.

Once the treadmill is in Settings Mode, you may use the following keys:



**INCLINE KEY:** Displays the next or previous parameter.



**SPEED KEYS:** Allows the variable to be changed within the parameter.



**ENTER KEY:** Saves the value if changed in the EPROM (software).



**KEY:** Exits Settings Mode and restarts the treadmill with a "warm start."



**KEYS:** Enters new parameter values. If **GRAPH** or **UNITS** parameters are displayed, key **5** starts **DISPLAY TEST** and key **8** starts **MOTOR TEST**.



**HEART:** Displays parameter's default value.

# Configure Mode

Configure Mode includes all of the items of Settings Mode, plus additional data that is automatically saved to properly troubleshoot in case of a problem. To engage Configure Mode:

1. Press and hold the "0", "2" & "START" keys together. While holding the "0" & "START" keys down, release the "2" key.
2. The display will beep and display **CONFIGURE** momentarily, then **UNITS** will be displayed.

Once the treadmill is in **CONFIGURE** Mode, you may use the following keys:



**INCLINE KEY:** Displays the next or previous parameter.



**SPEED KEYS:** Allows the variable to be changed within the parameter.



**ENTER KEY:** Saves the value if changed in the EPROM (software).



**KEY:** Exits **CONFIGURE** Mode and restarts the treadmill with a "warm start."



**KEYS:** Enters new parameter values. If **GRAPH** or **UNITS** parameters are displayed, key 5 starts **DISPLAY TEST** and key 8 starts **MOTOR TEST**.



**HEART:** Displays parameter's default value, except for **LSTDCK** and **LSTBLT**. In these two cases, the distance recorded is displayed.

# Description of parameters

**UNITS:**

Use this variable to select either English or Metric. Earlier versions offer 0 or 1,  
0 = English 1= Metric, defaults to English.

---

**MN SPD:**

This variable allows the minimum speed to be changed. Do not go less than 0.5 MPH, or 1.0 KPH.

---

**MX SPD:**

This variable allows the maximum speed to be changed. 110v (English) units maximum speed is 10MPH, 220v (Metric) units maximum speed is 20K.

---

**EL OPT:**

This variable disables the elevation incline, using ON or OFF. Earlier versions read EL REV, 0 = elevation disable.

---

**TIME:**

Maximum time allowed for a program, including warm up & cool down. Defaults to 99  
Depending on preference, normal is 30 min

---

**OP HRS:**

Number of hours treadmill has been in operation.

---

**DIST:**

Distance recorded either in Miles or Kilometers depending on what UNITS was saved under.

---

**WEIGHT:**

User's weight for calorie data. Defaults to 155 lbs.

---

**SER NO:**

Serial number of the unit. This information can also be located on the front bottom of the frame.

---

**ENGLISH LANG:**

This variable allows different languages to be selected: Dutch, French, German, Portuguese, Spanish, Swedish, and Italian.

**ENTRY:**

Use this variable to change the starting column for speed input in Units or Tenths.

ex: If saved in Units, command speed will be reached in MPH or in KPH.

ex: If saved in Tenths, command speed will only go to point of a mile or kilometer.

---

**HRT:**

Offers a choice of heart rate features:

CNT DN, manual heart rate count down.

POLAR, polar compatible (if software avail.)

CONTACT, contact heart rate (if software avail.)

BOTH, both contact and polar can be used (if software avail.)

---

**HR CON:**

Dynamic heart rate control On or Off.

Defaults to Off.

---

**10 REV:**

Measurement of running belt travel for 10 flywheel revolutions. This measurement is determined by the size of the drive motor pulley and headroller pulley diameter.

Headroller diameter will be constant for all 4000 series treadmills, motor pulley may differ.

Use the following:

10 REV= 27.5 for 1.6" dia. motor pulley 110v

10 REV= 29.1 for 1.7" dia. motor pulley 110v

10 REV= 30.7 for 1.8" dia. motor pulley 220v

10 REV= 35.8 for 2.1" dia. motor pulley 220v

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**CNT/RV:**

Variable represents notches on the flywheel, or windows on the RPM Disc. Magnetic (Cherry) sensors = 31, optical RPM sensors =125.

Defaults to 31.

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**MN PWM:**

Automatically re-set during calibration.

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**1/2 MAX**

Automatically reset during calibration.

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**MIX PWM:**

Automatically reseted during calibration.



# Description of parameters

## DATE:

Displays manufactures date.

The following variables records the occurrences the display code has appeared:

## NO STO: No stop key.

Number of occurrences. Needs to be cleared after correction has been made. Defaults to 0.

## KEY DN: Key stuck down at power up.

Number of occurrences. Needs to be cleared after correction has been made. Defaults to 0.

## NO RPM: RPM feedback loss.

Number of occurrences. Needs to be cleared after correction has been made. Defaults to 0.

## SP CNG: Sudden speed change.

Number of occurrences. Needs to be cleared after correction has been made. Defaults to 0.

## EL STL: Elevation stall.

Number of occurrences. Needs to be cleared after correction has been made. Defaults to 0.

**EL RNG:** Elevation beyond 0-15% range during reset. Number of occurrences. Needs to be cleared after correction has been made. Defaults to 0.

**EL LOST:** Elevation beyond 0-15% range after reset. Number of occurrences. Needs to be cleared after correction has been made. Defaults to 0.

**EL NOZ:** Elevation loss when seeking 0%. Number of occurrences. Needs to be cleared after correction has been made. Defaults to 0.

## ELZERO:

Variable represents 0% = 240

## ELMAX:

Variable represents 15% maximum= 57 110v.  
Variable represents 15% maximum= 80 220v.

The following variables store the condition when the last display code occurred:

**LSTERR:** Displays last display code by # .

18 = NO STO 21 = SP CNG 24 = EL LOS  
19 = KEY DN 22 = EL STL 25 = EL NOZ  
20 = NO RPM 23 = EL RNG

**LSTELV:** Displays the targeted elevation prior to the display code.

**LSTPOT:** Displays the last elevation feedback (count) prior to the display.

**LSTRES:** Displays 1=Unit was resetting 0% at start-up when display code appeared.  
Displays 2=Unit finished resetting 0% when display code appeared.

**LSTSSP:** Displays set speed prior to display code.

**LSTPWM:** Displays last PWM reading prior to display code.

**LSTMSP:** Displays actual measured speed prior to display code.

**LST TM:** Displays elapsed time in seconds since user started.

**LSTDCK:** Number of miles when deck was last serviced or belt rewaxed. After a 2000 mile or 3000 KM difference, "REWAX BELT" will scroll in the display until "LST DCK" miles are updated. ♥ key will automatically insert the miles.

**LSTBLT:** Number of miles when belt last replaced. ♥ key will automatically insert the miles.

**SHIFT:** This variable allows the matrix track or graphics display to toggle when TRACK is selected. When selecting TEXT will toggle between the upper and lower row of information, in alpha-numeric display.

# Motor Test Mode

Motor Test Mode allows the treadmill to calibrate incline and running belt speed, also burns in the motor, by way of the controls and displays of the treadmill. To engage Motor Test Mode:

**Caution: Do not stand on the running belt while performing these test.**

1. Press and hold the "0", "1" & "START" keys together (or the "0", "2"). While holding the "0" & "START" keys down, release the "1" (or 2) key.
2. The display will beep and display **SETTINGS** (or **CONFIGURE**) momentarily, then **UNITS** will be displayed.
3. Press and release the "8" key

4. Display will read: **XXX 3 .0** if treadmill is at 0% display will read: **240 3 .0**

**Alternative mode to enter Motor Test Mode:**

1. Turn the power switch on while pressing the "8" key simultaneously on the display.
2. Display will read: **XXX 3 .0** if treadmill is at 0% display will read: **240 3 .0**

Once the treadmill is in TEST Mode, you may use the following keys:



**INCLINE KEY:** Adjust voltage to incline motor, inclines the treadmill in increments of 1%.  
**Caution:** Do not elevate treadmill above 15% = 57 (110v units), 80 (220v units) or below 0% = 240 (110 & 220v units) mechanical damage may occur.



**SPEED KEYS:** Adjust the PWM duty cycle and motor speed up and down, respectively, in increments of 0.1 mph (UNITS=English) or 0.1km/hr (UNITS = Metric)



**ENTER KEY:** Starts burn-in mode. (continuous operation of running belt and incline using program 8 at maximum speed. Press STOP KEY to stop burn-in.



**KEY:** Exits MOTOR TEST Mode and restarts the treadmill.



**KEY:** Selects letter Z = 0% or M = 15% following elevation (incline) data numeral, to change to a new ELZERO or ELMAX setting.

**SHIFT KEY:** Saves the elevation (incline) data in the EPROM (software)



**HEART KEY:** Starts automatic calibration of MN PWM (minimum) 1/2 MX (half maximum) MX PWM (maximum) for minimum and maximum speed range. Calibration lasts less than 3 minutes; belt will be in motion during this test.

# Calibration

## Automatic Speed Calibration:

In this mode minimum and maximum speed is automatically calibrated.

**Caution:** Do not stand on the running belt while performing these test.

1. Press and hold the " 0 ", " 1 " & " START " keys together (or the "0" , "2" ). While holding the " 0 " & " START " keys down, release the " 1 " (or 2) key.
2. The display will beep and display **SETTINGS** (or **CONFIGURE**) momentarily, then **UNITS** will be displayed.
3. Press and release the "8" key
4. Display will read: **XXX 3 .0** if treadmill is at 0% display will read: **240 3 .0**
5. Press "HEART" key, display will read: **CALI** treadmill will go into an automatic will go into an automatic speed calibration for about 3 minutes. Press "STOP" key to exit Motor Test.

## Re-calibrating the 0% or 15%:

1. Press and hold the " 0 ", " 1 " & " START " keys together (or the "0" , "2" ). While holding the " 0 " & " START " keys down, release the " 1 " (or 2) key.
2. The display will beep and display **SETTINGS** (or **CONFIGURE**) momentarily, then **UNITS** will be displayed.
3. Press and release the "8" key
4. Display will read: **XXX 3 .0** XXX is a variable number depending on what % elevation the treadmill is at. Press elevation UP or DOWN key until **XXX 3 .0** reads : **240 3 .0**
5. Press the "0" key once, the letter **Z** will be displayed for 0% setting, pressing the "0" key a second time the letter **M** will be displayed for 15% setting.
6. Press the "Shift" key to save the above elevation.
7. Press "STOP" key to exit Motor Test.

# Display Test Mode

Display Test Mode allows you to test the light-emitting diodes (LEDs), 15-segment displays, and the watchdog timer of the Display Control Pane by way of its own controls and displays. It also allows EPROM version to be displayed. To enter Display Test Mode:

**Caution: Do not stand on the running belt while performing these test.**

1. Press and hold the " 0 ", " 1 " & " START " keys together (or the "0" , "2" ). While holding the " 0 " & " START " keys down, release the " 1 " (or 2) key.
2. The display will beep and display **SETTINGS** (or **CONFIGURE**) momentarily, then **UNITS** will be displayed.
3. Press and release the "5 key. Observe all the LEDs light up.
4. Pressing any key once will display the EPROM version.

**Alternative mode to enter Motor Test Mode:**

1. Turn the power switch on while pressing the "5" key simultaneously on the display. Observe all the LEDs light up.

Once the treadmill is in Display Test Mode, you may use the following keys:



**INCLINE KEYS:** Lights % grade LED's one at a time, also segments of 15-segment screen one at a time.

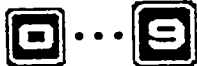
**SHIFT** KEY: Lights the six LEDs bordering the 15-segment display.



**HEART KEY:** Displays "HEART HEART" on the 15-segment display.



**ENTER KEY:** Displays "START START" on the 15-segment display.




**KEYS:** Lights corresponding LEDs in the Number/Program Select Keys, (except for key 9), alongside the Pre-Designed Program profiles.



**KEY:** Displays "WD TEST" on the 15-segment display. Activates the watchdog timer, resetting the processor and returning the program back to Start Mode.

# Heart Rate Test

Heart Rate Test Mode tests the heart rate calculation and display capability of the treadmill if it is equipped with contact rings or Polar wireless heart rate chest strap reception capability. To enter Heart Rate Test Mode:

- 1.** Press and hold the "0", "1" & "START" keys together (or the "0", "2"). While holding the "0" & "START" keys down, release the "1" (or 2) key.
- 2.** The display will beep and display **SETTINGS** (or **CONFIGURE**) momentarily, then **UNITS** will be displayed.
- 3.** Press and release the "5" key. Observe all the LEDs light up.
- 4.** Press the  key 3X's, display will read **SEEKING HR** across the display.
- 5.** Grasp the stainless steel contact rings or place the Polar wireless heart rate chest strap around your chest.
- 6.** In the far right display screen a blinking LED segment will flash then the average heart rate will be displayed.



# Section 4:

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# Troubleshooting

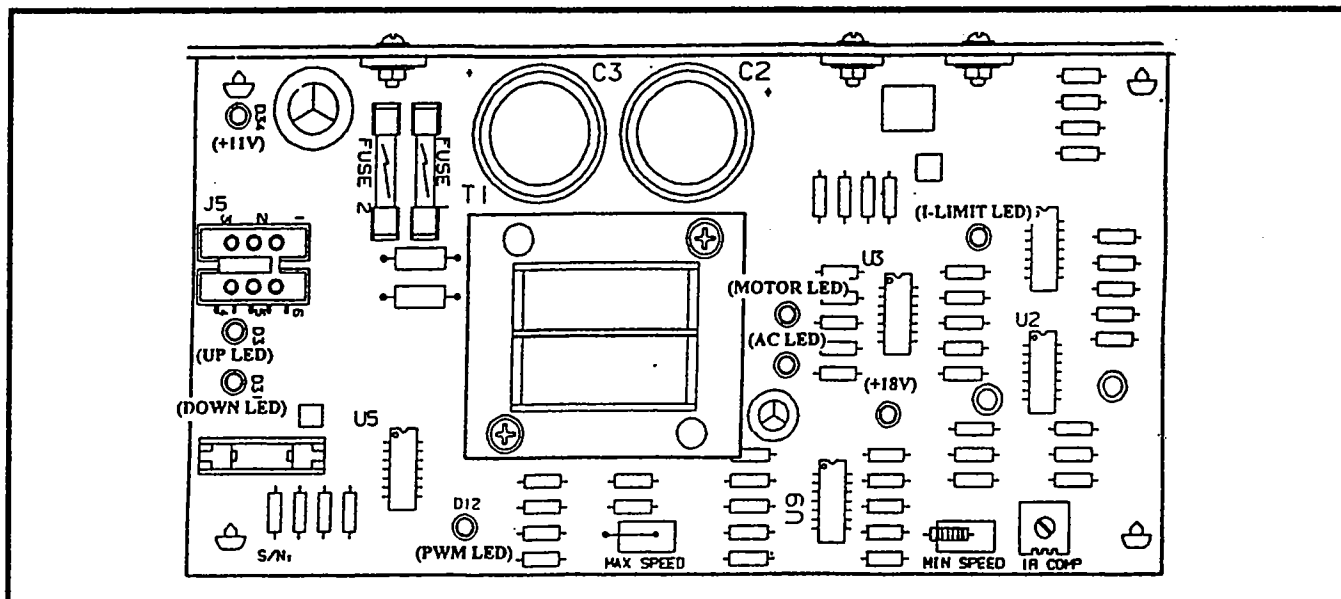
Should the **STAR TRAC** 4000 Treadmill experience a problem or a display code appear, the following procedures will help determine the precise reason for the problem. Included are flow charts breaking down each individual display code with problem statements and solutions.

## Contents

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| 4.7 Manual Calibration           | 4.28 Static Symptoms       |
| 4.8 No Display Power 110v        | 4.29 Vibration             |
| 4.9 No Display Power 220v        | 4.30 Display Codes Chart   |
| 4.10 Elevation Motor Symptoms    | 4.31 KEY DN Flowchart      |
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| 4.18 Drive Motor Symptoms        | 4.43 EL LOST Flowchart     |
| 4.19 Head / Tial Roller Symptoms | 4.44 EL RNG Flowchart      |
| 4.20 Drive Belt Symptoms         |                            |
| 4.21 Running Belt Symptoms       |                            |

# 110v MCB LED Layout

The Following LEDs will help diagnose if the MCB has failed or causing intermittent problems.



**\*\* CAUTION \*\***

Several of the following troubleshooting steps require dealing with live voltage. Have the treadmill turned off and unplugged when checking wire connections.

NOTE: The display console may still power up with the AC LED off.

**AC LED** - Indicates that AC power has been applied to the MCB. It does not give indication of voltage level, if this LED is not lit and the treadmill does not power up, verify the following:

1. The treadmill is plugged into a wall outlet.
2. The ON/OFF switch is turned to the "ON" position.
3. Verify with a VOLT METER that 110VAC is present at the outlet. Units with step-down transformers need 220VAC.
4. Verify 110v (+/- 10%) AC voltage at AC1 & AC2 wires.

**After the above have been verified and the AC LED is still "OFF", the MCB should be replaced.**

**+18v LED** - Indicates the presence of an acceptable level of voltage to operate the MCB. If this LED is off or dim, the AC voltage level is not acceptable to properly power the MCB, verify the following:

1. Verify with a VOLT METER that 110VAC is present on pins AC1 & AC2.

**After the above step has been verified and the + 18V LED is still "OFF", and the display does not power up, replace the MCB.**

**+11v LED** - Indicates there is +11 volts supplied to the display board. If this LED is not lit verify the following:

1. The display cable is damaged or pinched, disconnect the display cable and verify if the +11 LED lights up. If the LED lights up replace the display cable.

**After the above has been verified and the +11 LED is still "OFF", the MCB should be replaced.**



# 110v MCB LED Layout

NOTE: Engage Motor Test Mode and manually push on the running belt to verify RPM feedback.

**MOTOR LED** - Indicates the presence of acceptable voltage to the motor. If this LED is not lit one of the following conditions exists:

1. Verify AC voltage is being applied.
2. Verify that MTR1/MTR2 wires are connected to the MCB.

(This should be done with the treadmill unplugged and turned off)

**After the above have been verified and the MOTOR LED is still 'OFF', the MCB should be replaced.**

**PWM LED** - Indicates that there is a valid control command from the display to the MCB (this LED flashes only when the treadmill is operating) If this LED is not lit verify the following:

1. Verify if the display cable is connected.
2. Verify if the display cable is damaged or pinched.  
(see page 4.17 in this section for Display Cable symptoms)

**After the above have been verified and the PWM LED is still "OFF", the MCB should be replaced.**

NOTE: If the current limit is reached, the MCB will shut the treadmill down and the I-LIMIT LED will remain on until it resets.

**I-LIMIT LED** - Indicates that an excessive load is being placed on the motor. Amp readings of 26 or higher will cause the LED to light. If this LED is lit one of the following conditions exists:

1. Running belt is worn.
2. Belt and deck require lubrication.
3. Drive motor drawing over the 26 amp peak.

**After the above has been verified and the I-LIMIT LED is still "ON", the MCB should be replaced.**

**UP LED** - Indicates that the incline is being commanded up. If this LED is not lit and the elevation motor will not respond, verify the following:

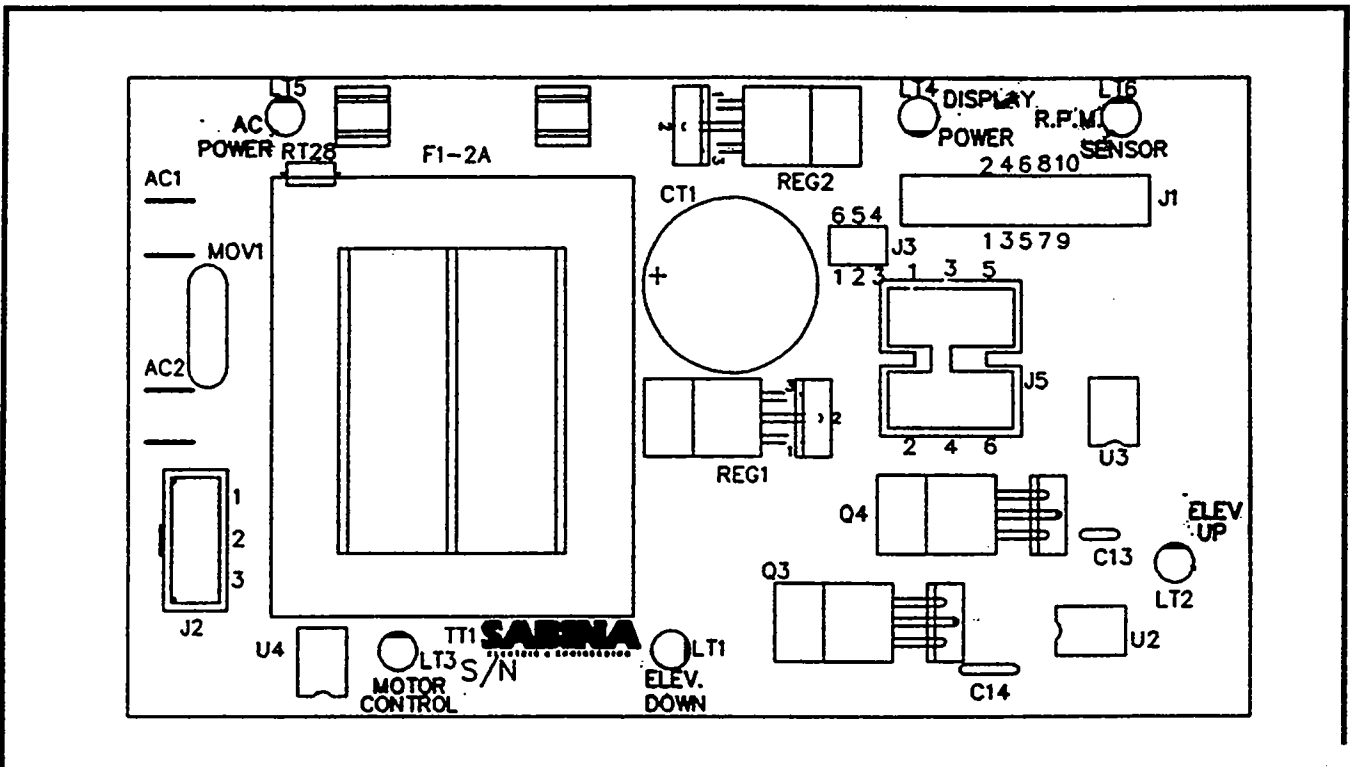
1. Display cable for possible pinch or tear (see page 4.17 in this section for Display Cable symptoms)
2. Replace MCB.

**DOWN LED** - Indicates that the incline is being commanded up. If this LED is not lit and the elevation motor will not respond, verify the following:

1. Display cable for possible pinch or tear (see page 4.17 in this section for Display Cable symptoms)
2. Replace MCB.

# 220v MCB LED Layout

The Following LEDs will help disgnose if the MCB has failed or causing intermittent problems.



**\*\* CAUTION \*\***

Several of the following troubleshooting steps require dealing with live voltage. Have the treadmill turned off and unplugged when checking wire connections.

NOTE: The display console may still power up with the AC PWR LED off.

**AC PWR** - Indicates that AC power has been applied to the MCB. It does not give indication of voltage level, if this LED is not lit and the treadmill does not power up, verify the following:

1. The treadmill is plugged into a wall outlet.
2. The ON/OFF switch is turned to the on position.
3. Verify with a VOLT METER that 110VAC is present at the outlet. Units with step-down transformers need 220VAC.
4. Verify 220v (+/- 10%) AC voltage at AC1 & AC2 wires.

After the above have been verified and the AC LED is still "OFF", the MCB should be replaced, if the treadmill is not operating.

**DISPLAY PWR**- Indicates there is +11 volts supplied to the display board. If this LED is not lit verify the following:

1. The display cable is damaged or pinched, disconnect the display cable and verify if the DISPLAY PWR LED lights up. If the LED lights up replace the cable.

After the above has been verified and the DISPLAY PWR LED is still "OFF", the MCB should be replaced.

# 220v MCB LED Layout

NOTE: Engage Motor Test Mode and manually push on the running belt to verify RPM feedback.

**RPM SENSOR** - Indicates input signal from the RPM Sensor to the MCB.  
If this LED is not flashing during operation, verify the following

1. RPM sensor disconnected from connector J3 at the MCB.
2. RPM sensor gap misaligned.
3. RPM sensor faulty

After the above have been verified and the RPM LED is still "OFF", the MCB should be replaced.

**MOTOR CONTROL** - Indicates that there is a valid control command from the display to the MCB. If this LED is not lit verify the following:

1. Verify if the display cable is connected.
2. Verify if the display cable is damaged or pinched.

After the above have been verified and the MOTOR CONTROL LED is still "OFF", the MCB should be replaced.

**UP LED** - Indicates that the incline is being commanded up. If this LED is not lit and the elevation motor will not respond, verify the following:

1. Display cable for possible pinch or tear ( see page 4.17 in this section for Display Cable symptoms).
2. Replace MCB.

**DOWN LED** - Indicates that the incline is being commanded down. If this LED is not lit and the elevation motor will not respond, verify the following:

1. Display cable for possible pinch or tear ( see page 4.17 in this section for Display Cable symptoms).
2. Replace MCB.

# Calibration Troubleshooting

The following steps help troubleshoot in case Auto-Calibration (in Test Mode) procedures fail to give the correct reading or response.

## Symptom:

### Auto-Calibration fluctuates.

- 1.** Verify line voltage for sufficient voltage supply.
  - If wall voltage is less than 10% than what is required, this will cause speed fluctuation.
- 2.** Verify unit is on a dedicated circuit breaker.
  - Treadmills sharing the same circuit line will cause intermittent problems and variation in speed.
- 3.** Verify the following parameters are set correctly in the Configuration/Engineering Mode:  
 (Configuration Mode details in section 2.2)
  - CNT/RV : 31 = Magnetic/Cherry RPM Sensors
  - CNT/RV : 125 = Optical RPM Sensors.
 NOTE: See Diagram #1 and 2, verify RPM sensor.
  - 10 REV: 27.5 for 1.6" dia. motor pulley (110v)
  - 10 REV: 29.1 for 1.7" dia. motor pulley (110v)
  - 10 REV: 30.7" for 1.8" dia. motor pulley (220v)
  - 10 REV: 35.8 for 2.1" dia. motor pulley (220v)
 NOTE: If not sure what your 10 REV settings should be, manually measure your drive motor pulley diameter. Above measurements are done in inches.

- 4.** Verify RPM Sensor alignment.
  - If an optical sensor is being used verify RPM Disc is not touching the inner walls of the sensor.
 NOTE: If disc has been rubbing and appears damaged, replace the RPM disc and sensor to Magnetic style RPM and assembly . See Diagram #2.
  - If a Magnetic Sensor (Hall Effect/Cherry) is being used, verify the gap is approximately 3 business cards (1 credit card).

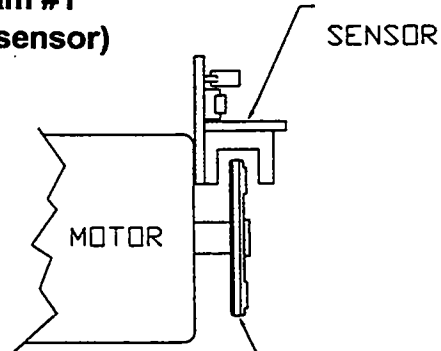
**REPLACE:** RPM Sensor if adjustment is sensitive.

- 5.** Adjust IR COMP potentiometer.
 

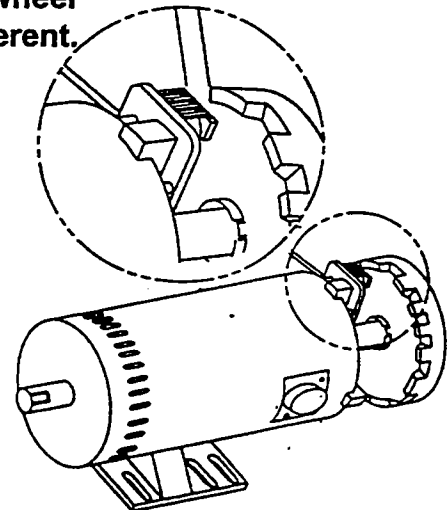
NOTE: See Diagram #3 110v adjustment.  
 See Diagram #4 220v adjustment.

**REPLACE:** MCB if symptom continues.

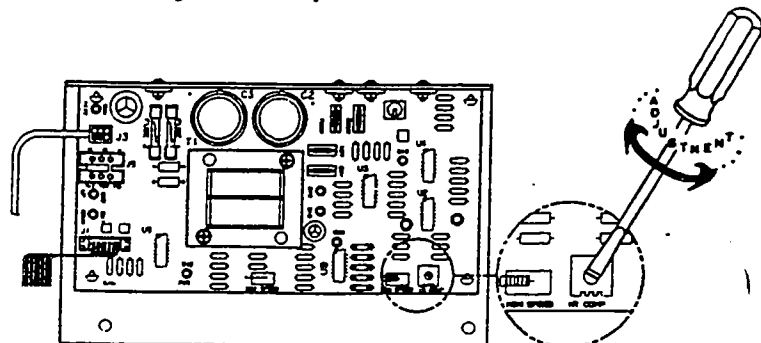
**Diagram #1**  
**(optical sensor)**



**Diagram #2**  
**(magnetic sensor)**  
 note: motor size, color, & flywheel may be different.



**Diagram #3**  
**(IR COMP adjustment)**



# Calibration Troubleshooting

## Symptom:

**Will not Calibrate to MAX speed.**

- 1.** Verify line voltage for sufficient voltage supply.
  - If wall voltage is less than 10% than what is required, this will cause speed fluctuation.
- 2.** Verify unit is on a dedicated circuit breaker.
  - Treadmills sharing the same circuit line will cause intermittent problems and variation in speed.
- 3.** Verify the following parameters are set correctly in the Configuration/Engineering Mode (Configuration Mode details in section 2.2)
  - MN SPD: 0.5 MPH or 1.0 Km/hr
  - MX SPD: 10.0 MPH (110v) or 20.0 Km/hr (220v)

NOTE: See Diagram #1 and 2, verify RPM sensor.

  - CNT/RV : 31 = Magnetic/Cherry RPM Sensors
  - CNT/RV : 125 = Optical RPM Sensors.

NOTE: See Diagram #3 and 4, verify RPM sensor.

  - 10 REV: 27.5" for 1.6" dia. motor pulley (110v)
  - 10 REV: 29.1" for 1.7" dia. motor pulley (110v)
  - 10 REV: 30.7" for 1.8" dia. motor pulley (220v)
  - 10 REV: 35.8" for 2.1" dia. motor pulley (220v)

NOTE: To reach 20.0 Km/hr(12MPH) on 220v units, motor pulley must be 2.1". If not sure what your 10 REV settings , manually measure the drive motor pulley diameter.

- 4.** Verify RPM Sensor alignment.
  - If an optical sensor is being used verify RPM Disc is not touching the inner walls of the sensor.

NOTE: If disc has been rubbing and appears damaged, replace the RPM disc and sensor to Magnetic style RPM. See Diagram #2.

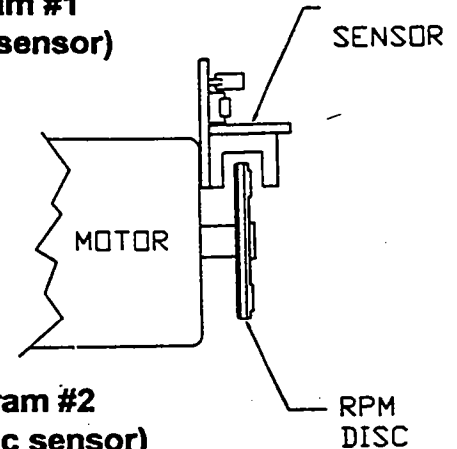
  - If a Magnetic Sensor (Hall Effect/Cherry) is being used, verify the gap is approximately 3 business cards (1 credit card). If adjustment is necessary loosen the flywheel to re-position.

**REPLACE:** RPM Sensor if RPM reading is sensitive.

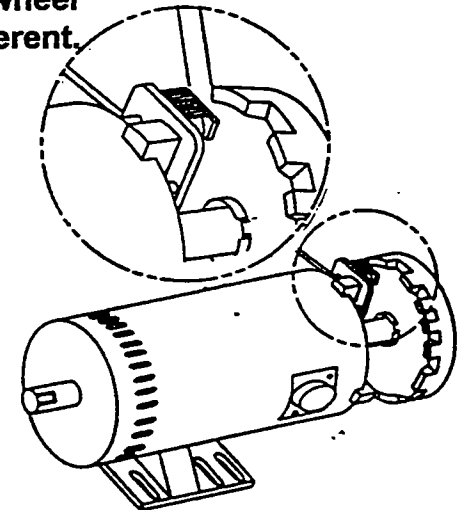
- 5.** Adjust the MAX SPEED potentiometer.
 

NOTE: See Diagram #3 (220v adjustment only).

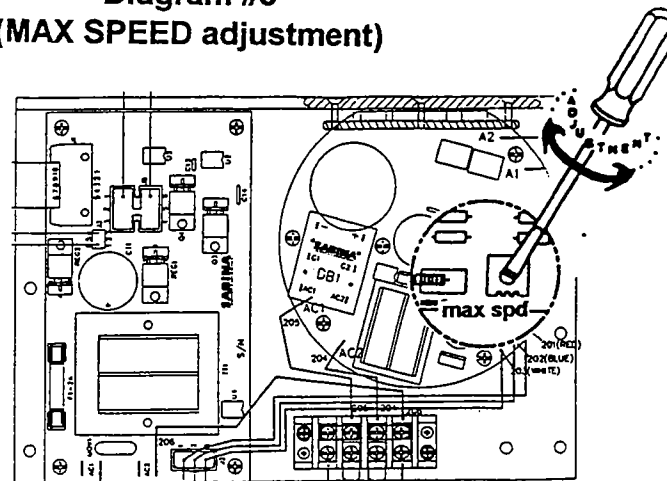
**Diagram #1  
(optical sensor)**



**Diagram #2  
(magnetic sensor)  
note: motor size,  
color, & flywheel  
may be different.**



**Diagram #3  
(MAX SPEED adjustment)**



The following procedure allows the treadmill to manually calibrate Minimum and Maximum speeds, only in the case Auto-Calibration is not functioning correctly.

## Symptom:

Will not calibrate to MN or MX speed, in the Auto-Calibration Mode.



### \*\*CAUTION\*\*

Do not stand on the running belt while performing these steps.

NOTE: Alternative mode to enter Motor

Test Mode; turn the power switch "ON" while pressing

the "8" key simultaneously on the display.

NOTE: The MN SPD should not exceed .5 MPH

or 1KPH. The 1/2 MX SPD should be exactly half of the desired MX SPD. The MX SPD must not exceed 10 MPH or 20 KPH (220 units).

NOTE: Speed Command 255 is the maximum the treadmill will reach.

1. Engage TEST MODE. Press and hold the "0", "1" & "START" keys together (or the "0", "2"). While holding the "0" & "START" keys down, release the "1" (or 2) key. The display will beep and display SETTINGS (or CONFIGURE) momentarily, then UNITS will be displayed.
2. Press and release the "8" key. Display will read: XXX 3 .0 XXX is a variable number depending on the elevation position the treadmill is at. 3 indicates Speed Command, 0 indicates RPM. If the treadmill is at 0% the display will read: 240 3 .0
3. Press the "+" key (speed) to the desired MN SPD, 1/2 MX, and MX SPD. Write down the corresponding Speed Command number displayed for each desired setting.
4. Press the "STOP" key. Engage Configuration/Settings Mode as described in STEP 1.
5. Using the "UP ELEVATION" key go to MN PWM parameter and enter the new MN SPD Speed Command number by using the "+" or "-" keys, then press the "START" (enter) key to save the new setting. Do this for the 1/2 MX and MX SPD.
6. Press the "STOP" key to exit.

## 110v UNIT



- 1.** Lift and suspend the motor shroud.
- 2.** Verify if LED AC is lit. AC LED indicates that AC power is being applied to the MCB, does not indicate voltage level. If this LED is lit go to step 3.  
If LED is not lit verify the following: (see diagram A)
  - The treadmill is plugged into the wall.
  - The ON/OFF Switch is turned to the "ON" position.
  - Verify wire connection AC1/AC2 on the MCB.
  - Verify the ON/OFF Switch Breaker wires are connected.
  - Verify 110v (+/- 10%) AC voltage at AC1/AC2. if the voltage is 0 or less than 90v, check wall voltage, verify unit is on a dedicated line.
  - If wall voltage is correct, verify linecord continuity. (see diagram B)

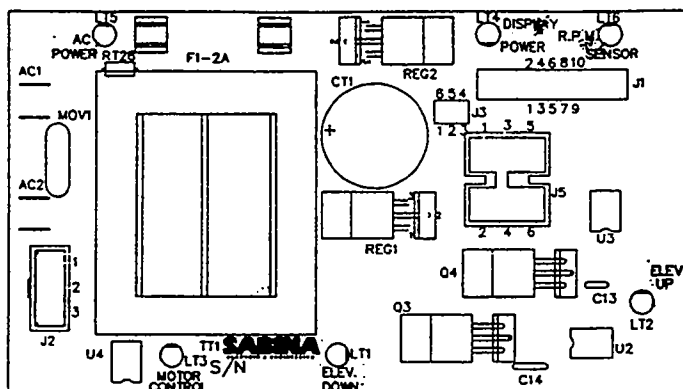
## 4.8

# No Display Power

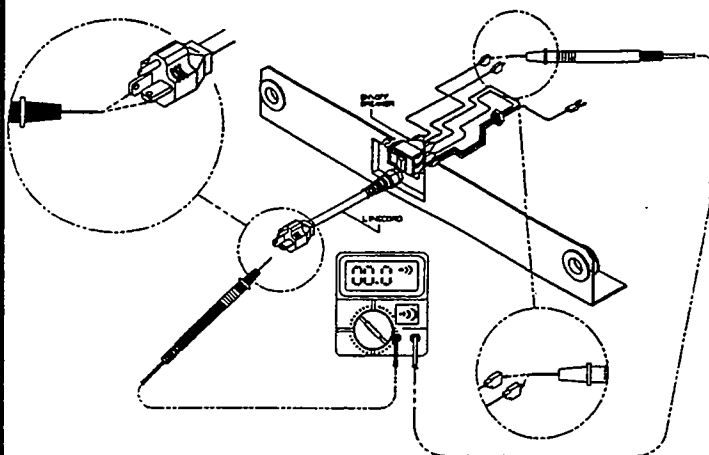
The following steps help troubleshoot in case the display board fails to power up, during or before regular operation.

## 220v UNIT

**Diagram A**



**Diagram B**



**\*\*CAUTION\*\***

The following steps are performed with treadmill "ON".

**1.** Lift and suspend the motor shroud.

**2.** Verify if LED AC is lit. AC LED indicates that AC power is being applied to the MCB, does not indicate voltage level. If this LED is lit go to step 3. If LED is not lit verify the following: (see diagram A)

- The treadmill is plugged into the wall.
- The ON/OFF Switch is turned to the "ON" position.
- Verify wire connection AC1/AC2 on the MCB.
- Verify the ON/OFF Switch Breaker wires are connected.
- Verify 220v (+/- 10%) AC voltage at AC1/AC2. if the voltage is 0 or less than 200v, check wall voltage, verify unit is on a dedicated line.
- If wall voltage is correct, verify linecord continuity. (see diagram B)

**REPLACE:** MCB if all the above check OK.

**3.** Verify if LED DISPLAY POWER is lit. This LED indicates 11v are being applied to power the display board. If the LED is lit go to step 4.

**REPLACE:** MCB if DISPLAY POWER LED is not lit.

**4.** Verify if LED MOTOR CONTROL is lit. This LED indicates there is a valid control command from the display to the MCB. Verify the following if LED is off:

- Verify display cable connection.
- Verify display cable for possible pinch or tear mark.

**REPLACE:** Display board if display cable checks OK.



# Elevation Motor



NOTE: Activation of the thermal protection breaker does not cause damage to the elevation actuator or other treadmill components.

The following procedure explains the elevation system Thermal Protection and limitations.

## Symptom:

Elevation system shuts-off when used consistently.

1. The Star Trac Model 4000 elevation system actuator is protected from overheating by a thermal protection circuit. In the event that the thermal protection breaker is activated, the treadmill's elevation system is temporarily disabled, and an "EL STL" display codes is displayed.
  - A simple resetting of the treadmill restores full operation once the elevation actuator has been allowed to cool for a few minutes.
2. The pre-defined workout programs 1 through 8 as well as other typical workout regimens include elevation changes that easily fall within the operating limits of the Model 4000's elevation system actuator. The following information serves as a guide for users that may wish to set a custom program that requires frequent and/or large changes in incline.
  - Incline changes greater than 5 percent should not be programmed for intervals less than 1 minute.
  - Full range incline changes (from 0 percent to 15 percent, or vice-versa) should not be programmed for intervals less than 3 minutes.

# Elevation Motor



**\*\* CAUTION \*\***

Do not stand on the running belt while performing these steps.

NOTE: Several of the following steps require dealing with "live" voltage. Have the treadmill turned off and unplugged when checking wire connections.

NOTE: The potentiometer values can be read in Motor Test Mode, 240 = 0%, 57 = 15% for 110v units or 80 = 15% for 220v units.

NOTE: The values in diagram A were taken from a properly functioning elevation system. You may expect slight variation from machine to machine. If the values are 0, check display cable for possible short see page 4.17 Display Cable Symptoms. If values are erratically different replace the Elevation Motor.

The following procedure verifies elevation motor potentiometer.

## Symptoms:

**Elevation motor hesitates during operation.**

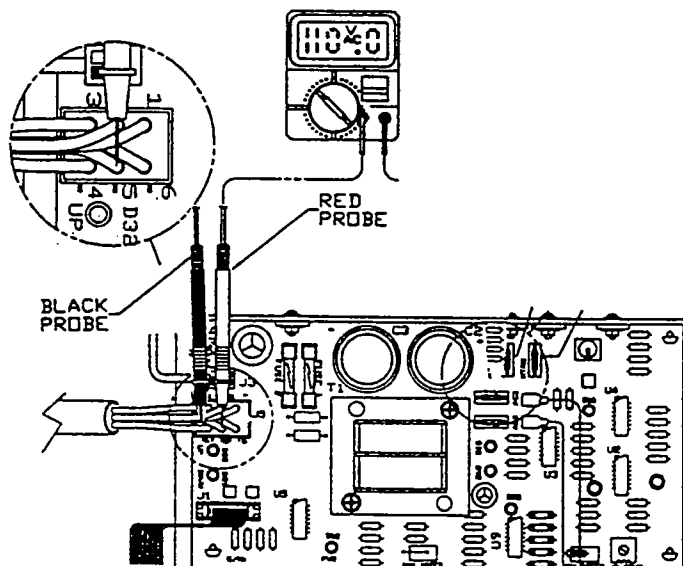
**No elevation count reading in Test Mode.**

1. The elevation motor potentiometer may have failed or register incorrect values causing the motor to hesitate while operating. The chart below (see diagram A) is a guide for the correct elevation readings on the TR 4000.
  - Using a Volt Meter verify the following values from the elevation motor at certain elevation grades (see the chart for elevation grades). The voltage readings may vary by +/- .05 volts. The ohms may vary by +/- .01 k ohms. See diagram B for meter reference.

**Diagram A.**

% Grade	Incline number in Motor Test Mode	DC Voltage across Blue and Orange wire on the Elev. motor connector	Ohm reading between the Blue and Orange (elev. motor unplugged)	DC Voltage on Pin 4 of the display electronics
0	240	4.68	9.76k	4.8
1	228	4.44	9.33 k	4.58
2	216	4.21	8.86 k	4.37
3	204	3.98	8.41 k	4.12
4	192	3.75	7.92 k	3.88
5	180	3.51	7.48 k	3.64
6	168	3.27	6.95 k	3.42
7	156	3.04	6.48 k	3.18
8	144	2.81	6.01 k	2.95
9	132	2.57	5.50 k	2.71
10	120	2.34	4.98 k	2.48
11	108	2.11	4.48 k	2.26
12	96	1.88	3.99 k	2.03
13	84	1.64	3.52 k	1.79
14	72	1.41	2.97 k	1.55
15	60	1.17	2.48 k	1.33

**Diagram B.**



# Elevation Troubleshooting



**\*\* CAUTION \*\***  
Do not stand on the running belt while performing these steps.

220v treadmill Incline Range Adjustment for Free-wheeling symptom.

## Symptom:

**Treadmill free-wheels at high elevation, causing the running belt to slowly accelerates beyond the selected speed.**

1. This symptom may be easily fixed by changing certain values in the Configure Mode. Engage Engineering/Configure Mode by holding down the "0", "1" and "Start" keys at the same time, and then release the "1" key only.
2. Press the elevation "↑" key until the display window reads "EL MAX 57". Change the "57" to "80" by pressing the "+" key.
3. Press the "START" key and the display window will show "UPDATING". This will save the "80" in the parameter.
4. Press the "STOP" key to exit the Engineering or Configure mode. Procedure completed.

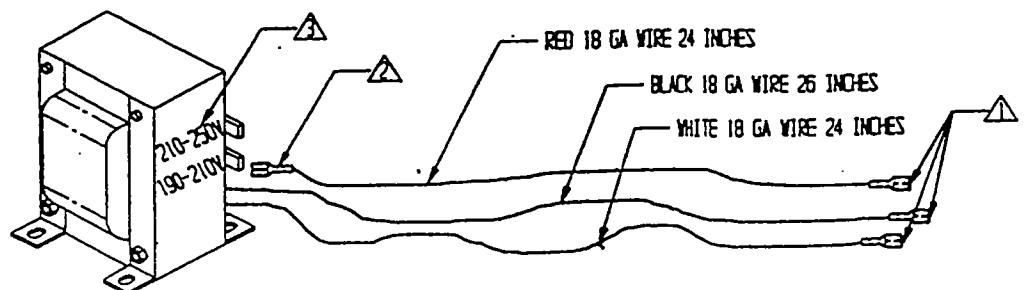
## Symptom:

**Elevation Motor overheats and blows the MCB fuse.**

NOTE: These ranges were chosen to optimize the output voltage to the elevation motor within an acceptable operating range, while still using the present manufacturing tolerances of the transformer manufacturer.

1. The elevation motor on the 4000 series treadmill uses 115 VAC. On 230 volt treadmills, there is an autotransformer which will lower the voltage to operate the elevation system.
2. Line voltage may vary from location to location. Some locations have line voltages as low as 195 VAC or as high as 250 VAC. The autotransformer has been manufactured with two taps to accommodate these variations in voltage. The two taps are:

- 190 to 210 VAC line voltage
- 210 to 250 VAC line voltage



**\*\*CAUTION\*\***

Do not stand on the running belt while performing these steps.

Before any troubleshooting is performed verify that the heart rate grips are being used and maintained properly.

**Symptom:****Intermittent or erratic heart rate reading.**

1. User failing to grip all four rings completely with both left and right hands.
2. An excessively tight grip on the rings can cause erratic readings. The probability of erratic readings can be therefore be lessened by:
  - reduced upper torso movement.
  - a proper grasp on the grips.
  - clean hands.
  - clean grips.
3. Excessive foreign matter (dirt) on the hands can biochemical generate electrical interference which will cause erratic readings.
4. Clean and wipe heart rate grips after each usage, for optimum use.

**Symptom:****Heart rate signals when none should be present (phantom readings).**

Phantom readings are defined as heart rate readings displayed without actually making contact with the Heart Rate Grips. This is caused by electrical interference from the Contact Heart Rate Board or other electrical systems that transmitt "electrical noise" such as;

- Vacuum Cleaner
- Steroe System
- Cardio Equipment (equipment should be spaced at least 3 ft apart ).

Repositioning the Contact Heart Rate Board and installing a new EPROM version or replacing the display assembly will element ghost readings. Affected serial numbers 401807 and higher.

- Unisen offers a complete display assembly or repositioning kit at a nominal price.

1. Remove the display panel to determine Contact Heart Rate Board positioning and EPROM version. See diagram below for reference.
2. If the Contact Heart Rate Board is being held in position by double-side tape a complete display assembly will be needed, if Velcro is used contact Unisen for repositioning kit.

# Heart Rate Troubleshooting

## Symptom:

### No Heart Rate reading.

1. Engage HEART RATE TEST. Turn the power switch "on" while pressing key "5" simultaneously on the display. All the display LEDs will light up when engaged.
  - Press the key once, EPROM version will be displayed. key twice, displays Heart/ Seeking HR.

NOTE: If EPROM version is less than 2.0, upgrade with 2.3 or higher (contact Unisen).

- Grip heart rate handles, The negative (-) symbol will begin to flash indicating heart rate system is being registered. Do not squeeze excessively to avoid excessive muscle contraction (false readings).

2. Verify Contact Heart Rate settings.

Engage SETTINGS MODE, Hold the "0", "1", and "START" keys together and release the "1" key only. Display will read SETTINGS momentarily, then UNITS will be displayed.

- Scroll through the parameters using the elevation "UP" key until display reads: HRT X (X is a variable number)
  - X=1 for EPROM version 1.2
  - X=2 for EPROM version 1.5 or higher.
 EPROM versions 2.5 and above offer:
  - CONTACT= contact heart rate.
  - BOTH = both contact and polar can be used (if software available).
- Press the "+" or "-" key to change, "START" key to save.

3. Verify Heart Rate receiver connection.

- Remove the display board, verify wire connections.

NOTE: See diagram #1. If connections are wrong or loose, reconnect and repeat step 1.

4. Verify Heart Rate grip cables.

NOTE: See diagram #2. If connections are wrong or loose, reconnect and repeat step 1.

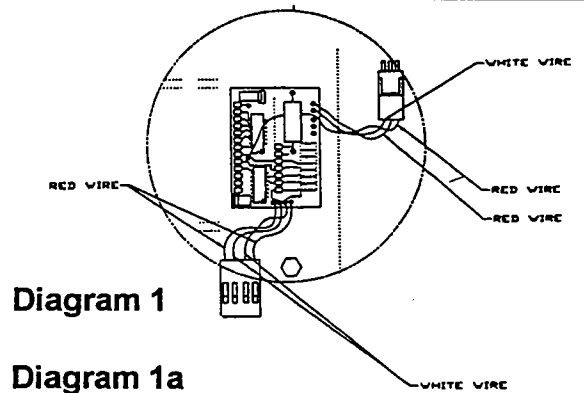


Diagram 1

Diagram 1a

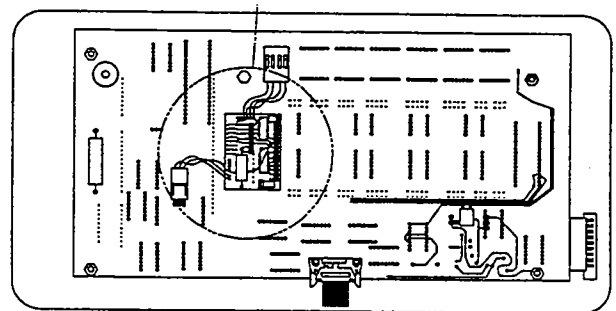


Diagram 2

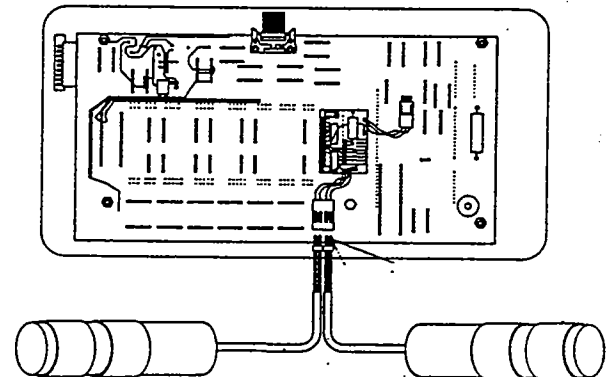


Diagram 3

# Heart Rate Troubleshooting

## 5. Connect Heart Rate Board straight to the display input.

- By-pass the Combiner Board, insert the heart rate wires straight to the display.

See Diagram #3 & 3a. After connection has been repeat step 1.

**REPLACE:** Combiner Board if Heart Rate registers. If no Heart Rate is registered go to step 6.

**NOTE:** Step 5 can only be performed if the software includes both Polar and Contact.

## 6. Check continuity/resistance between Heart Rate grip rings and input wires.

- Disconnect both heart rate grip inputs (red & black wires) from back of display.
- Using a Multi-meter check continuity between the heart rate rings and its corresponding output wires.
- Red wire = outside rings.
- Black wires = inside rings.

**NOTE:** See Diagram #4.

**REPLACE:** Heart Rate grip(s) if reading is greater than 1.0Ω

## 7. Check continuity/resistance of each hand rate grip.

- Using a Multi-meter check continuity between the two rings on the same grip.
- Black meter probe to inside ring and red meter probe to outside ring.

**NOTE:** See diagram #5.

**REPLACE:** Heart Rate grip(s) if reading is lower than 3 MΩ.

## 8. Check continuity/resistance between the two hand rate grips.

- Measure the resistance between the two outside rings.

**NOTE:** See diagram #6.

**REPLACE:** Heart Rate grip(s) if reading is less than 18.0Ω

Diagram 3a

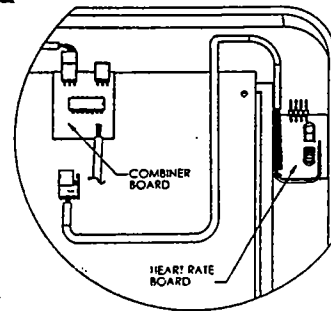


Diagram 4

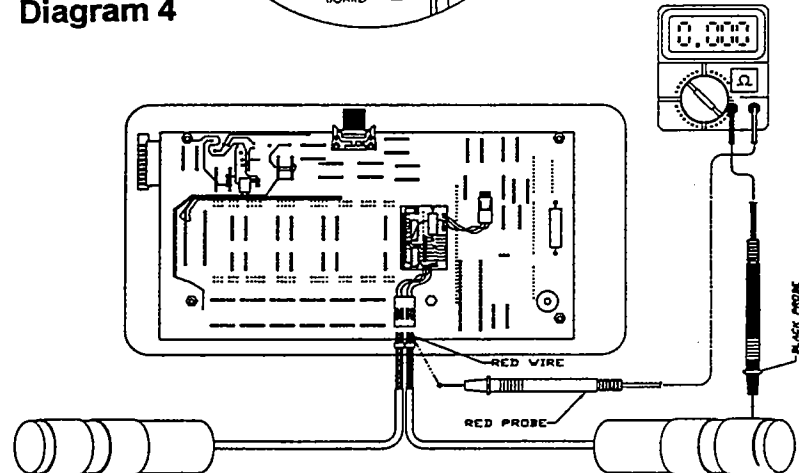


Diagram 5

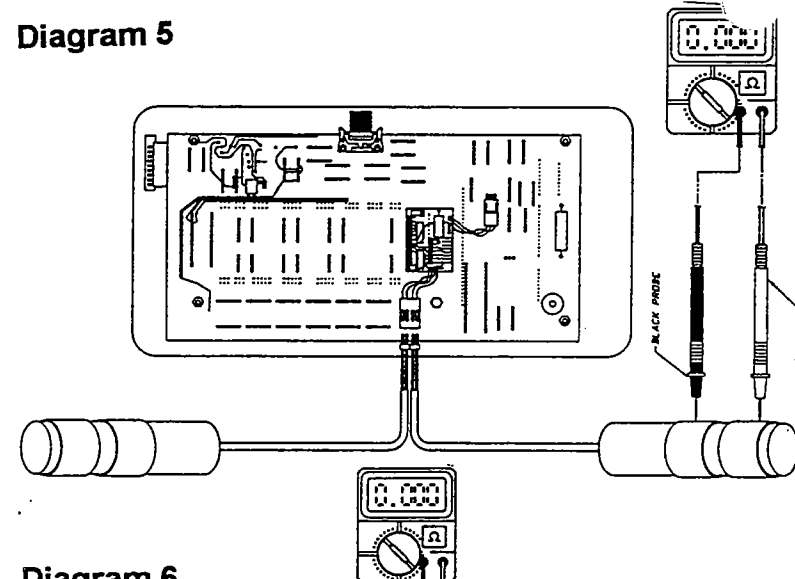
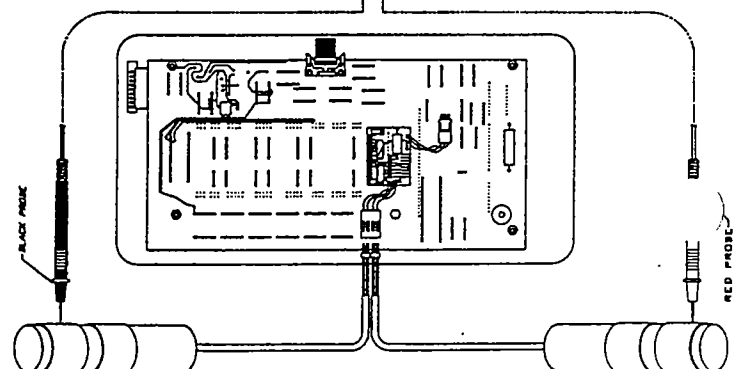


Diagram 6



# Polar Heart Troubleshooting



**\*\* CAUTION \*\***

Do not stand on the running belt while performing these steps.

**NOTE:** Secure the chest strap transmitter as high under the pectoral muscle (breast) as is comfortable and allow normal breathing.

**NOTE:** Wet the electrodes (the two grooved rectangular areas) thoroughly with water.

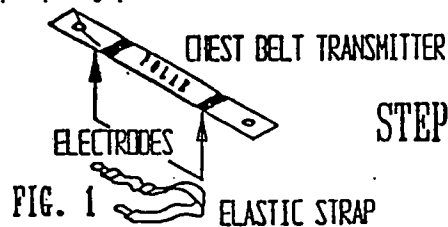
**NOTE:** Verify heart rate response without operating the running belt. Straddling the treadmill press the HEART key. If heart rate is not picked up engage Heart Rate Test, refer section 2.8

If the display is having difficulty picking up polar heart rate readings, verify proper usage.

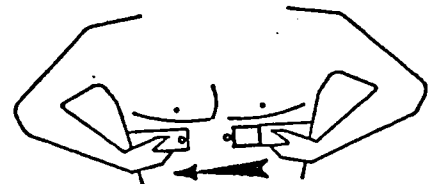
## Symptom:

### Intermittent or erratic polar heart reading.

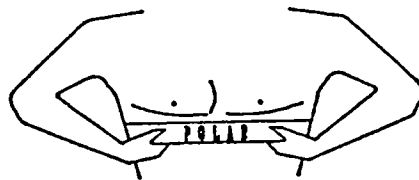
1. The maximum distance for polar heart rate to receive a signal is 3 feet.
2. Verify chest strap is correctly positioned. Chest strap electrodes must be properly positioned and wet. See below diagrams.



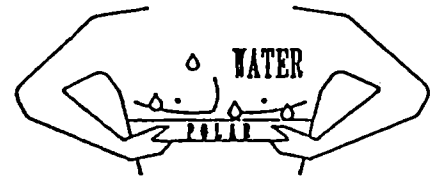
STEP 1



STEP 2



STEP 3



STEP 4

3. Connect Polar Board straight to the display input.

- By-pass the Combiner Board, insert the heart rate wires straight to the display. See Diagram 1 # 1a

**REPLACE:** Polar Board if Heart Rate registers. If no Heart Rate is registered go to .

Diagram 1

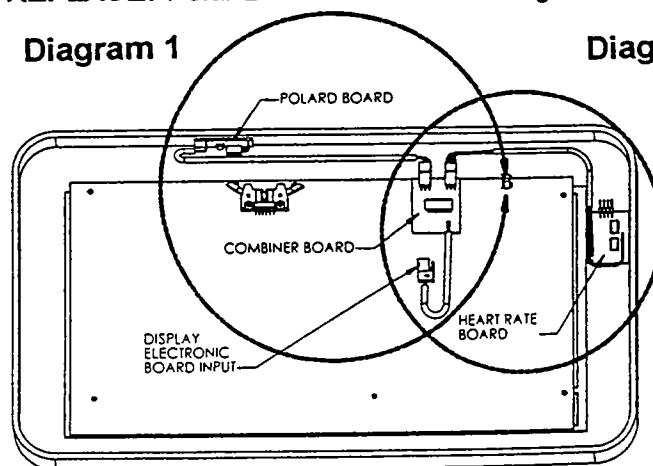
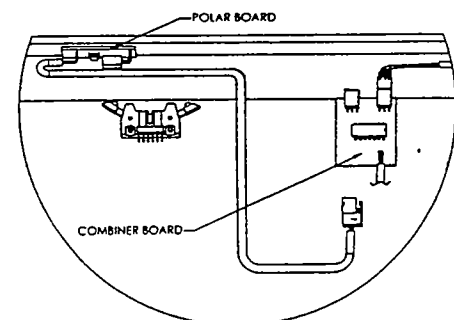


Diagram 1a



# Display Cable

The following symptoms indicates a faulty or pinched display cable.



**\*\*CAUTION\*\***

Do not stand on the running belt while performing these steps.

NOTE: Alternative mode to enter Motor Test Mode; turn the power switch "ON" while pressing the "8" key simultaneously on the display.

## Symptom:

### No display power related.

1. No display power, treadmill elevation bottoms out during start-up.
2. No display power, MCB LED +11 remains lit on 110v units. MCB LED Display remains lit on 220v units.

### Intermittent or no elevation.

1. In Test Mode only up direction works, MCB LED "UP" remains lit.
2. In Test Mode no elevation count (elevation motor pot), will elevate both directions reads EL LOST across display in regular operation mode.
3. In Test Mode no elevation response, reads EL STL across display in regular operation mode.
4. In Test Mode elevation count registers slow to actual elevation response.
5. Treadmill elevation without command in regular operation mode.
6. Elevation motor hesitates in between elevation percents, MCB LEDs "UP" & "Down" toggle back and forth.
7. Elevation intermittently responds, registers different elevation display codes in regular operation mode.

### Intermittent or no speed reading

1. In Test Mode belt movement, but no RPM reading. MCB LED RPM remains of on 220v units. registers NO RPM code across display in regular operation mode.
2. In Test Mode or regular operation mode, RPM reading intermittently flashes.
3. In Test Mode or regular operation mode, RPM speed fluctuates.
4. In Test Mode MCB LED PWM (110v units) or MOTOR CONTROL (220v units) remains off and no RPM reading is registered.



# Drive Motor

The following symptoms indicates a faulty drive motor.

## Symptom:



### \*\*CAUTION\*\*

Do not stand on the running belt while performing these steps.

NOTE: If the ON/OFF switch trips only with a load, running belt may be worn. See section 3.21

### Tripping the ON/OFF switch breaker.

1. Disconnect the drive motor belt.
2. Run the drive motor for ten minutes at a high speed (6 MPH/ 10 KPH). If the ON/OFF switch trips, verify if the MCB LED I-LIMIT lights up (110v units), this would indicate Drive Motor pulling higher amps than desired.

### Drive Motor making noise.

1. Disconnect the drive motor belt.
2. Isolate the noise. Bellow is a list of discriptions related to motor noise:
  - Knocking**; Noise described for bearing failure or motor magnet.
  - Grinding**; Noise describing bearings, motor brush wear.
  - Squeaking**; Motor brushes installed incorrectly, flywheel loose, motor bearings.
  - Howling**; Usually described when motor increases to higher speeds.

## Head / Tail Roller



You may need to replace the head or tail roller, if the following symptoms are observed.

### **Symptom:**

**Thumping, knocking noise as the running belt goes over the roller.**

Verify the following:

- Delron end caps are loosening.
- Bearings are grinding or knocking.
- Lagging (coating) is loose.
- Thumping sounds (may also indicate a possible wax buildup).

The running deck surface is coated with a special wax. During the break in period (first 20-30 hours of operation), some wax may form on the tail roller causing a loud thumping noise or in worse case cause mis-tracking. If the thumping noise continues, remove the wax buildup with the following procedure:

- 1.** Loosen or remove the tail roller by backing of the Allen screws, using a 1/4" Allen wrench.
- 2.** Remove the largest buildup of wax deposits from the tail roller. Use a plastic scraper, credit card or piece of wood, never scrape with a sharp metal object.

**Note:** Do not remove all the wax as it is required to lubricate both the running belt and deck.

# Drive Belt Troubleshooting

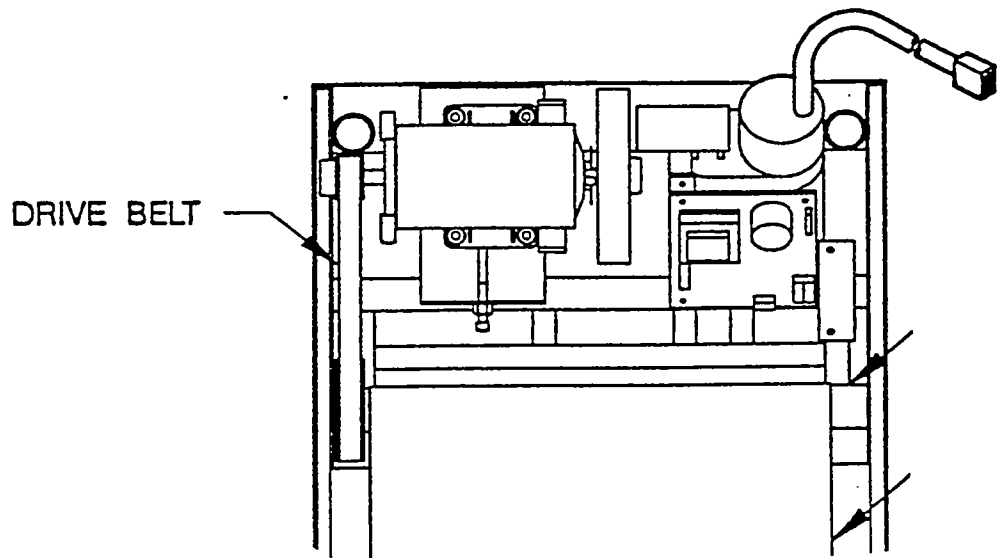


The drive belt tension may require tightening, if slipping problem occurs on the drive pulley.

## Symptom:

**Running belt slips when running or walking.**

- 1.** Loosen the four motor mount kep nuts and washer, using a 5/16" wrench.
- 2.** Adjust the drive belt tension by turning the motor mount adjustment (socket head cap) screw. See diagram below.
  - If too tight, turn the belt tension screw counter-clockwise.
  - If too loose, turn the belt tension screw clockwise.
- 3.** Simultaneously, tighten the belt tension lock nut, while holding the belt tension screw with a 5/16" wrench.
- 4.** Simultaneously, tighten the right rear motor mount nut, then tighten the remaining bolts.
- 5.** Verify if the belt is tensioned properly.



## Running Belt Troubleshooting

Note: For optimal performance during the lifetime of the treadmill,

running belt adjustments may become necessary. All adjustments are performed by adjusting the tail roller Allen screws with a 1/4" Allen wrench.

To prevent belt problems from occurring, verify the running belt is properly adjusted and working smoothly by performing the following steps:

1. Feel the underside center of the running belt, for glaze. Glaze is described as a smooth glass texture, the correct feeling should be a rough texture such as found on the undersides of the belt.

If glazed, replace the running belt. Contact your local retailer or act **STAR TRAC** Product Support Department at 800-501-1221 or through our web site at <http://www.startrac.com>.

2. Activate the treadmill. Stand at the back of the treadmill and visually inspect the running belt. The running belt should move smoothly, without drifting to far to the left or right. This will cause fraying or damage to the running belt. For proper tension and tracking, refer to **Running Belt Tension and Running Belt Tracking** in this section.

If you observe the following symptoms, running belt needs to be replaced

1. On/off switch tripping to the "off" position after treadmill is used for short period of time.
2. Running belt continues to slip after tightening . (Provided the drive belt has been checked for proper tension)
3. Edges of the running belt are frayed.
4. Running belt seam is coming apart.
5. Running belt beginning to fold in the middle.

# Running Belt Tracking

**Note:** The running belt may mis-track due to the style of the walker or runner.

**Note:** The running belt will track to the side less tensioned.

**Note:** To ensure proper tracking, the treadmill leveling feet must be adjusted to conform to the floor surface. For proper procedure see **Feet Leveling** in this section.

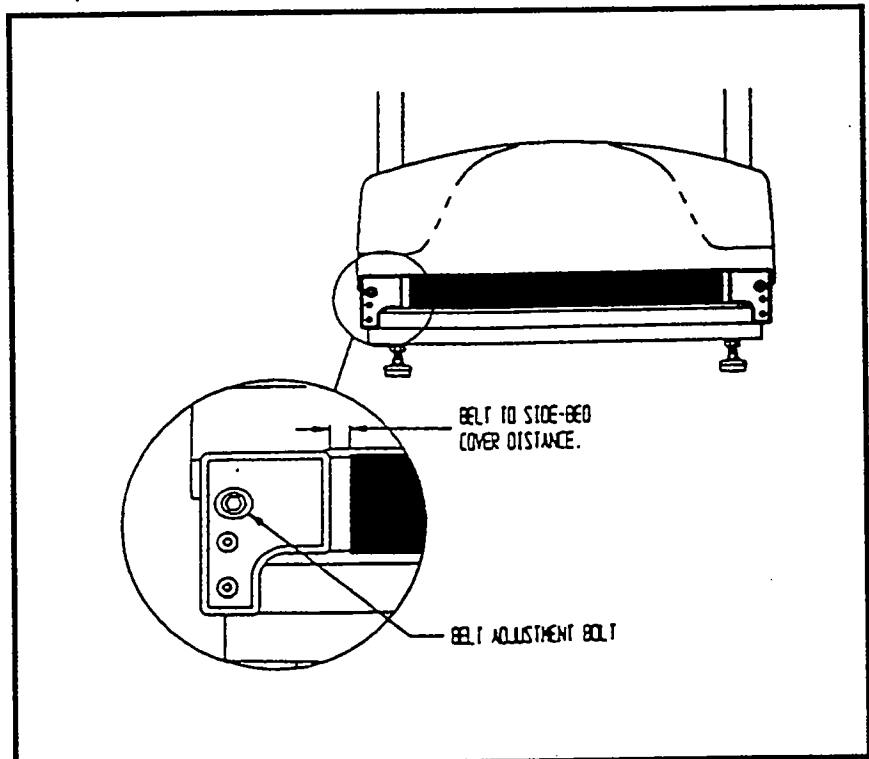
If the running belt is not centered on the tailroller and is either to far left or right, adjust tracking using the following steps::

1. Turn treadmill on. Increase speed to 3.0 mph (5.0 kph).
2. Adjust tracking by adjusting the tailroller Allen screws located at the back sides of the tail roller with a 1/4" Allen wrench in 1/4 turn increments.  
(See below diagram)

If the running belt is tracking to the left, adjust the running belt to track to the right. Tighten the left tailroller Allen screw by turning clockwise or loosen the right tail roller bolt by turning counter-clockwise.

If your running belt is tracking to the right, then adjust the running belt to track to the left. Tighten the right tail roller Allen screw by turning clockwise or loosen the left tail roller bolt by turning counter-clockwise.

3. After running belt appears to be tracking properly, increase speed to 10 mph (16 kph) and verify belt stays centered.
4. Verify correct running belt tension as outlined in the **Running Belt Tension** procedure in this section.



# Running Belt Tension

**Note:** Prior to making any adjustments to the running belt tension, verify the drive motor

belt is properly tensioned.

The running belt tension may need to be adjusted over time to keep the the belt from slipping with each jogging step or at high speeds. Use the following procedure for testing belt tension.

1. Accelerate the running belt to 3.0 mph (5.0 kph).
2. Stand on the side of the treadmill. Grasping the handrails firmly, place one foot on the running belt with a very sharp impact. The running belt should not come to a complete stop. The running belt should slip for a split second, then forcing your foot back.

If the running belt does not stop with impact, the running belt may be too tight and cause the belt and other components to premature fail. Loosening the tail roller Allen screws a 1/4 of a turn counter-clockwise and re-checking will be necessary.

If the running belt stops and noticeable slippage occurs, check the location of the slippage. It can be slipping due to the drive belt slipping over the drive motor pulley and head roller or from the running belt slipping over the rollers.

- If the slippage is caused from the drive belt slipping over the drive motor pulley, loosen the motor mount bolts located at the mount of the drive motor and tighten the adjustment bolt. For detail more details refer to **Drive Belt Tension** procedure in this section.
- If the slippage is caused by the running belt slipping over the rollers, tighten the running belt.

**Note:** If you do not tighten Allen screws in equal increments, you will mis-track the running belt. Verify correct belt tracking procedure.

3. Tighten the left and right tail roller Allen screws clockwise in equal 1/4 increments. Repeat Step Two until running belt is tensioned properly.

**The running belt has been tightened too much and may require loosening, if:**

**Note:** Do not over tighten the running belt. Over tightening will cause premature failure.

**Note:** If the running belt creaks in spite of being loosened, apply dry lubricant, such as TFE Teflon or powdered wax to the deck.

1. The edges of the running belt curls down or up, causing the middle of the belt to bubble up.
2. Running belt creaks as it goes over the rollers.
3. Treadmill trips the circuit breaker (on/off switch) after tensioning.

# Running Deck

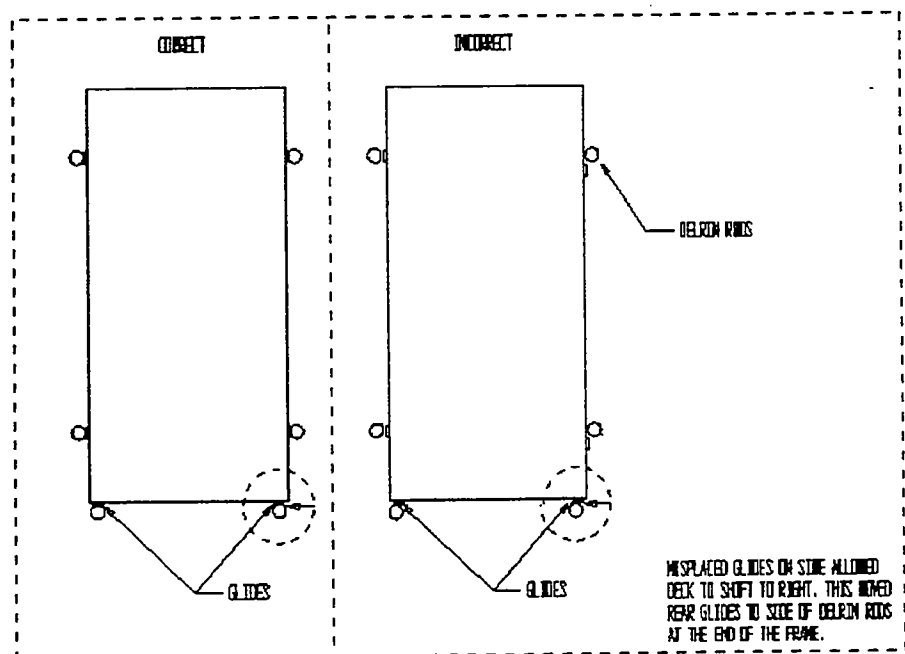


The following procedure will help determine and properly adjust the deck bumpers.

## Symptom:

**Running deck squeaks when running.**

1. When properly located, the side bumpers (two on each side) bear against the delrin rods in the frame rails, and the rear bumpers bear against the steel posts at the end of the frame rails (see figure below). If the bumpers are not located so that they bear against the rods as described, the running deck may shift to one side or the other during use, allowing the rear edge of the deck to rub against the steel post. This causes a high-pitched squeak as the user runs on the treadmill.
2. To determine if a deck has the bumpers properly located, look under the end cap/finger guards to see if the bumpers on the end of the deck bear against the steel posts. A problem definitely exists if the bumpers are to one side of the steel posts and the edge of the deck is bearing against the posts.
3. Remove the screws securing each of the four delrin rods and pull them out. Look through the hole in the frame to see if the running deck bumper is adjacent to the hole, such that it would bear against the delrin rod if it was reinstalled in the hole. If all bumpers are properly located, replaced the delrin rods and examine the treadmill further for the other causes of squeaks. If one or more bumpers is misaligned, follow the procedure given below.



# Running Deck



## Symptom:

**Running deck squeaks when running (continued).**

### Correcting the Problem:

- 1.** Position the deck with the rear bumpers properly aligned with the steel posts. With a pencil, make a mark the deck adjacent to each of the four delrin rods (as seen from the top of the siderails).
- 2.** Reaching under the running deck, shift the deck as far as possible to one side. On the side that now has the edge of the deck exposed from under the frame rail, pull the rear edge of the deck upward, until it is just above the frame rail. Use a screwdriver or putty knife to hold the deck above the frame. Using another screwdriver, raise and hold the front of the deck.
- 3.** Remove the bumper(s) that are not aligned with the pencil marks by carefully prying them away from the deck with a screwdriver, knife or putty knife.
- 4.** Position bumpers, removed in the previous step, so they are adjacent to the pencil mark(s), and drive them into the edge of the deck using a hammer.
- 5.** Once the bumpers on the side have been installed in the proper locations, remove the screwdrivers used to hold the deck above the frame.
- 6.** Repeat process on opposite side of the treadmill.
- 7.** After the bumpers have been properly installed on both sides of the running deck, position the deck properly, and verify that all bumpers are adjacent to the holes. Reinstall the delrin rods.
- 8.** Test treadmill thoroughly. The squeak should be gone.



# Isolating Noise



NOTE: Verify that the treadmill is leveled before isolating any specific component.

NOTE: Ensure all assembly screws are tight:

1. handrails.
2. display board.
3. motor shroud.

NOTE: When doing the stethoscope method, be careful of body placement. Ensure all loose items (hair, clothing, jewelry etc ) are secure and away from moving parts.

Sounds travel throughout the treadmill making it difficult to isolate the cause of a sound. The following procedure will help determine where a noise may be coming from.

## Isolate the noise.

1. If the noise seems to be coming from two different parts (drive motor or roller etc.), isolate the noise by disconnecting the drive belt. Then run the drive motor by itself. If the noise is still present, it is coming from the drive motor. If the noise goes away, manually push the running belt to see if the noise returns. If it does, then it is coming from the headroller.
2. Isolate the rollers. Adjust the tension on the tail roller screws until the running belt is loose. Spin each roller by itself to determine where the noise is coming from.

## The Stethoscope method.

1. Use a long screwdriver as a stethoscope. Put the handle of the screwdriver to your ear, then place the opposite end to the area where you are listening for. This will help locate where a specific noise is coming from.

## Symptoms:

### Rumbling.

- Wax build up on the rollers.
- Head / Tail Roller bearings.
- Adjustable feet / leveling.
- Floor condition; thick carpet or wood floors.
- Elevation screws dry.
- elevation motor stripped.

### Squeaking.

- Deck rubbing against the frame.
- Adjustable feet / leveling.
- Head roller and drive motor pulleys not aligned.
- Drive belt tensioning.
- Running belt tensioning.
- Drive motor brushes.

### Knocking.

- Drive motor bearings.
- Head / tail roller bearings.
- Running belt hitting the back or front of the frame.
- Missing or worn deck cushions.

### Grinding.

- Drive motor bearings.
- Head / tail roller bearings.
- Motor brushes worn.

# Leveling



NOTE: If a leveling foot does not make contact with the floor, or if it lifts upwards as weight is applied to one corner of the deck, this will cause the running belt to mis-track.

To ensure proper tracking of the running belt, treadmill leveling should be verified.

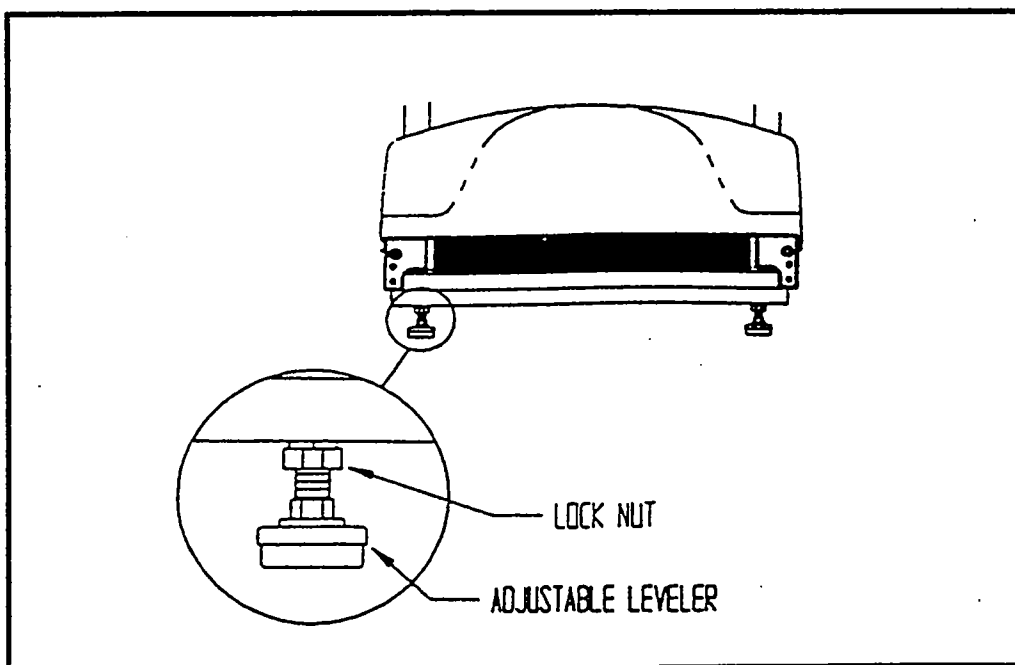
## Symptoms:

- Running belt travels to one side.
- Treadmill vibrates.

Leveling feet must be adjusted to conform to the floor surface. After the treadmill has been leveled, tracking of the belt must be tested and adjustments made as necessary. This two step procedure is particularly important for treadmills installed in a residences, where floors are commonly uneven. When a treadmill is installed on carpet, a repeat adjustment may be required after the carpet and padding have been compressed by the treadmill feet.

1. Place the treadmill in the exact location where it is to be used.
2. Check the leveling feet at each corner of the treadmill to ensure that they make contact with the floor surface. It may be helpful to have one person bear his/her weight at one corner of the running belt, then move to another corner, etc., while another person notes whether one or more corners lift from the floor as weight is applied.

- Using a 9/16-inch open end wrench, loosen the lock nut. (see diagram)
- Adjust leveler height by turning the leveler base. The wrench may be used on the lower nut for this purpose.
- Tighten the lock nut.



# Static Shock



**\*\* CAUTION \*\***  
When checking motor brushes, always turn the treadmill off and unplug.

The treadmill may cause a slight shock from the display panel or handrail, due to a faulty ground wire or a worn running belt and deck.

## Symptom:

**Slight shock from handrails or when using the display panel.**

- 1.** Check the line cord and plug prongs for signs of damage.
  - Verify no prongs are broken, loose or missing.
- 2.** Check the green groundwires attached to the frame for the following.
  - Motor
  - Linecord
- 3.** Check running belt condition.
  - Check for glazing. Replace the running belt if glazed.
  - Wax slick deck.
- 4.** Check drive motor conditions.
  - Verify motor brush wear.



A treadmill vibrates during use if the floor or leveling feet are uneven or when assembly bolts are loose.

## Symptom:

**Unit vibrates while running.**

**Note:** For complete leveling procedure, see the following

page for Leveling Procedure.

- 1.** Verify the treadmill is on an even, uncarpeted floor.
  - If no, move the treadmill to an even floor.
  - If floor is carpeted, place the treadmill on a rubber mat.
- 2.** Verify that the leveling feet are adjusted correctly.
- 3.** Verify the following bolt assemblies.
  - Handrails
  - Slikdeck
  - Display board
  - Motor mount
  - Flywheel
- 4.** Remove the drive belt and isolate the motor.
  - If the drive motor vibrates, check motor mount bolts.
  - Verify that the motor brushes aren't cracked.

**Note:** When checking motor brushes, the treadmill must be turned off and unplugged.

# Display Codes Chart

**\*\* CAUTION \*\***

Do not stand on the running belt, while performing these steps.

NOTE: Treadmill should be turned off and unplugged from the wall when looking under the motor shroud.

NOTE: Contact STAR TRAC Product Support Department at 1-800-501-1221 or through our web site at <http://www.startrac.com> Please have your serial number and display code available.

STAR TRAC recommends that you refer your questions about your STAR TRAC 4000 TREADMILL operation and suspected malfunctions to STAR TRAC's PRODUCT SUPPORT DEPARTMENT. However, you may wish to investigate display codes that appear on the display. You may do so by reviewing the below chart or follow the step-by-step flowcharts for the corresponding display code.

## Display Codes/Symptoms

### KEY DN

- This code generally occurs when a key other than "5" or "8" is held pressed while turning the treadmill ON using the on/off switch.
- It may also happen if a key becomes stuck.

### NO STO

- This code generally occurs when the Stop Switch is not connected tightly to the electronic board of the Display.
- It may also happen if the circuitry associated with the switch develops a fault.

### NO RPM / SP CNG

- These codes generally occur when the RPM (speed sensor) is disconnected, faulty, or misaligned.
- They may also happen if the RPM Sensor cable is damaged.
- Motor Control Board (MCB) is misadjusted, miscalibrated. or faulty.
- Pinched or faulty Display Cable.
- Drive Motor arcing or faulty.

### EL STL, EL RNG, EL LOST and EL NOZ

- These display codes generally occur when the elevation (incline) potentiometer is faulty or out of limits.
- Elevation motor disconnected or receiving low power.
- May also happen if the MCB is miscalibrated or faulty.
- Display Cable pinched or faulty.
- Elevation Belt damaged or binding.

# Code: KEY DN Flowchart

**Definition:** "KEY STUCK"

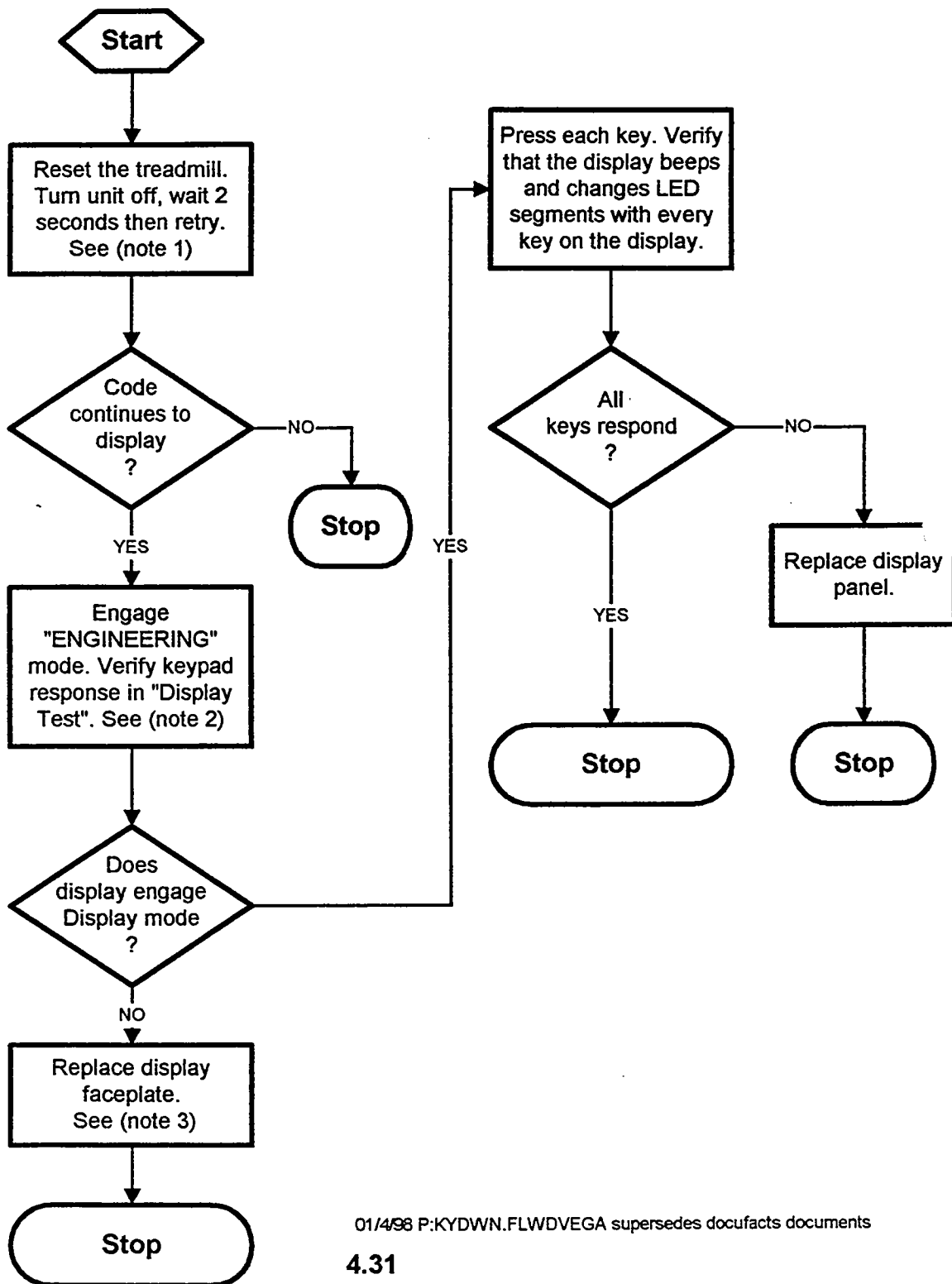
**Possible Cause:** Damaged or shorted key/keypad.

**Note 1:** This code may occur when a user tried entering "ENGINEERING" or "Test Mode" using the wrong key. Look for any indentations on any of the keys. The plus or fast key are used most often and may cause this error.

**Note 2:** Press and hold the "0", "1" & "START" keys down at the same time, then release the "1" key. The display will read: ENGINEERING. Press and release the 5 key. Or manually hold the 5 key and simultaneously turn the treadmill on by the on & off switch.

**Note 3:** If you are unable to enter the "ENGINEERING" or "Display Test", the panel may have a key that is permanently stuck. Replace the display panel. If any of the LED segments do not light up, there may be a failure in the electronics and you will need to replace the electronic board only.

**Note 4:** Verify that the PWM LED is flashing, while the treadmill is on. The PWM LED indicates a valid control command is being sent from the Display Board to the PWM Board. If the LED is not flashing, check connection and look for pinch or tear marks.



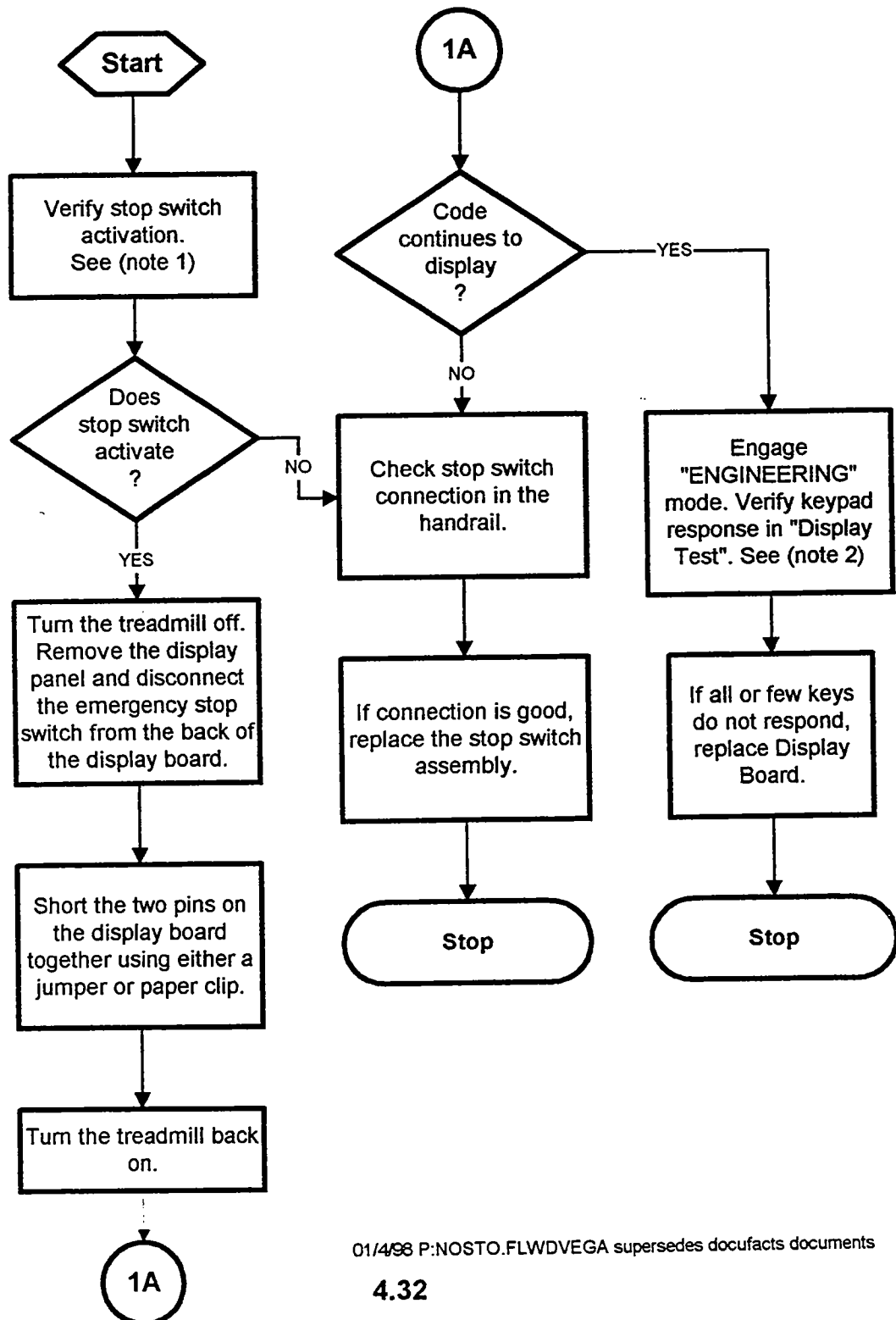
# Code: NO STO Flowchart

**Definition:** "NO STOP KEY"

**Possible Cause:** Disconnected or shorted stop switch.

**Note 1:** Try pushing the emergency stop switch on & off. If switch appears to stick, replace stop switch assembly.

**Note 2:** Press and hold the "0", "1" & "START" keys down at the same time, then release the "1" key. The display will read: ENGINEERING. Press and release the 5 key.



# Code: NO RPM Flowchart

**Definition: "RPM LOSS"**

**Possible Cause:** Damaged or misaligned RPM sensor.

Start

Engage "ENGINEERING" mode. Verify RPM feedback in "Test Mode". See (note 1)

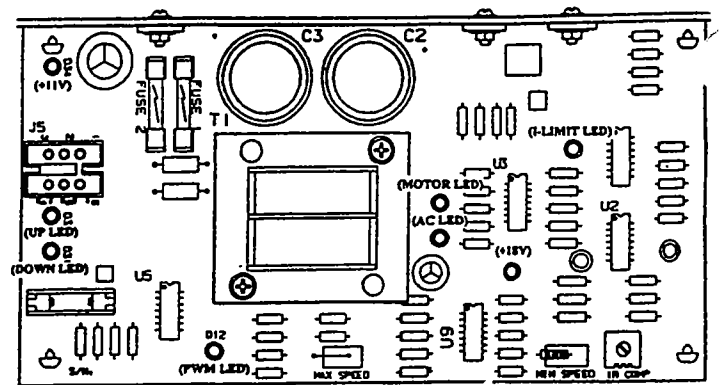
Display reads:  
XXX 3 .0  
(at 0%, XXX will read 240)  
Press the "+" and bring the middle number 3 up to 50.

Does the running belt move ?

Left motor shroud and verify PWM LED for 110v units or MOTOR CONTROL LED for 220v units response. See (note 2) & Diagram #1

PWM LED responds ?

1A





# Code: NO RPM Flowchart

**Note 5:** Verify that the RPM disc is not touching the inner walls of the RPM sensor. If rubbing loosens setscrews on the RPM disc and re-align. If a Hall Effect RPM is being used, verify the gap between the Hall Effect pick-up and flywheel is approximately 3 business cards. If not, adjust flywheel to re-position the gap.

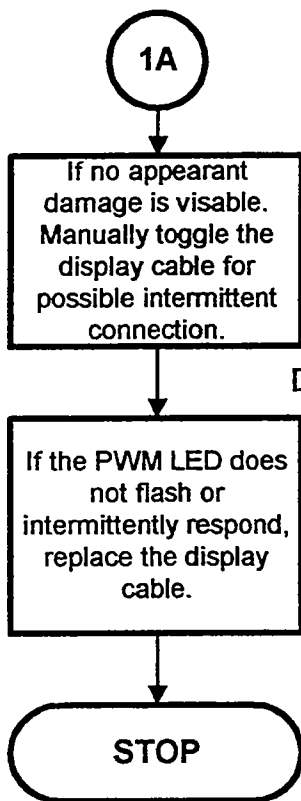


Diagram #2

2A

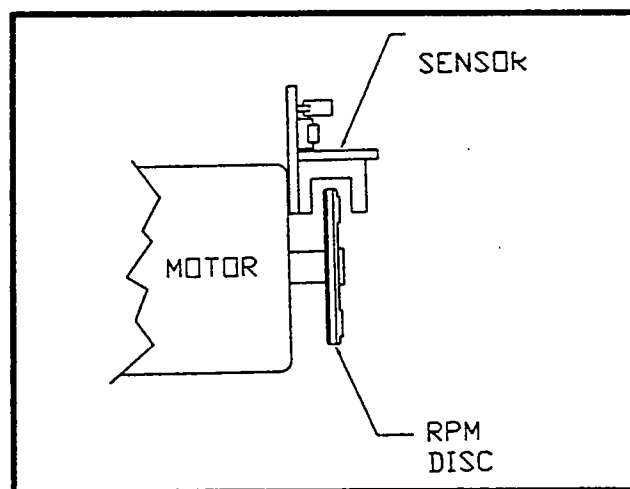
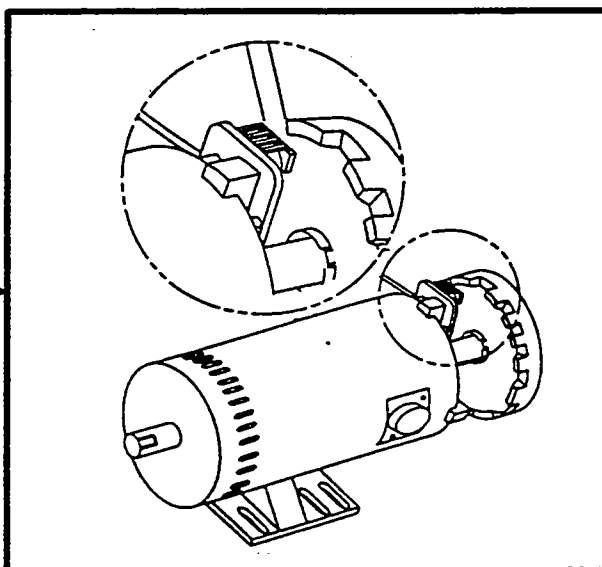
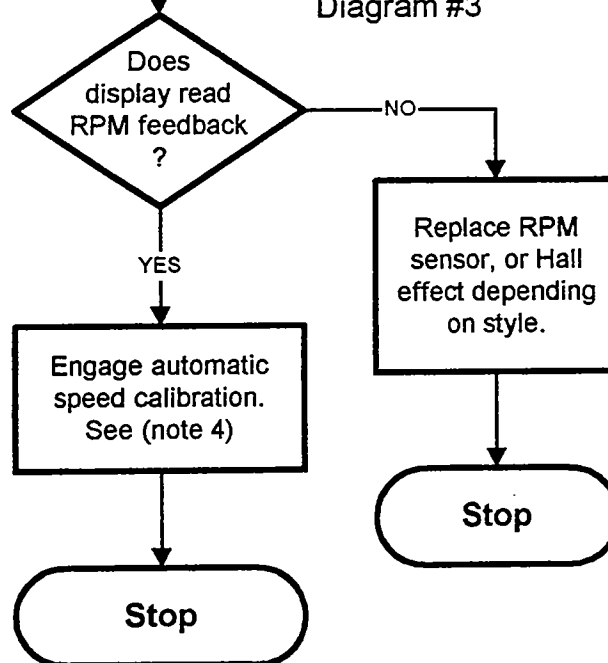
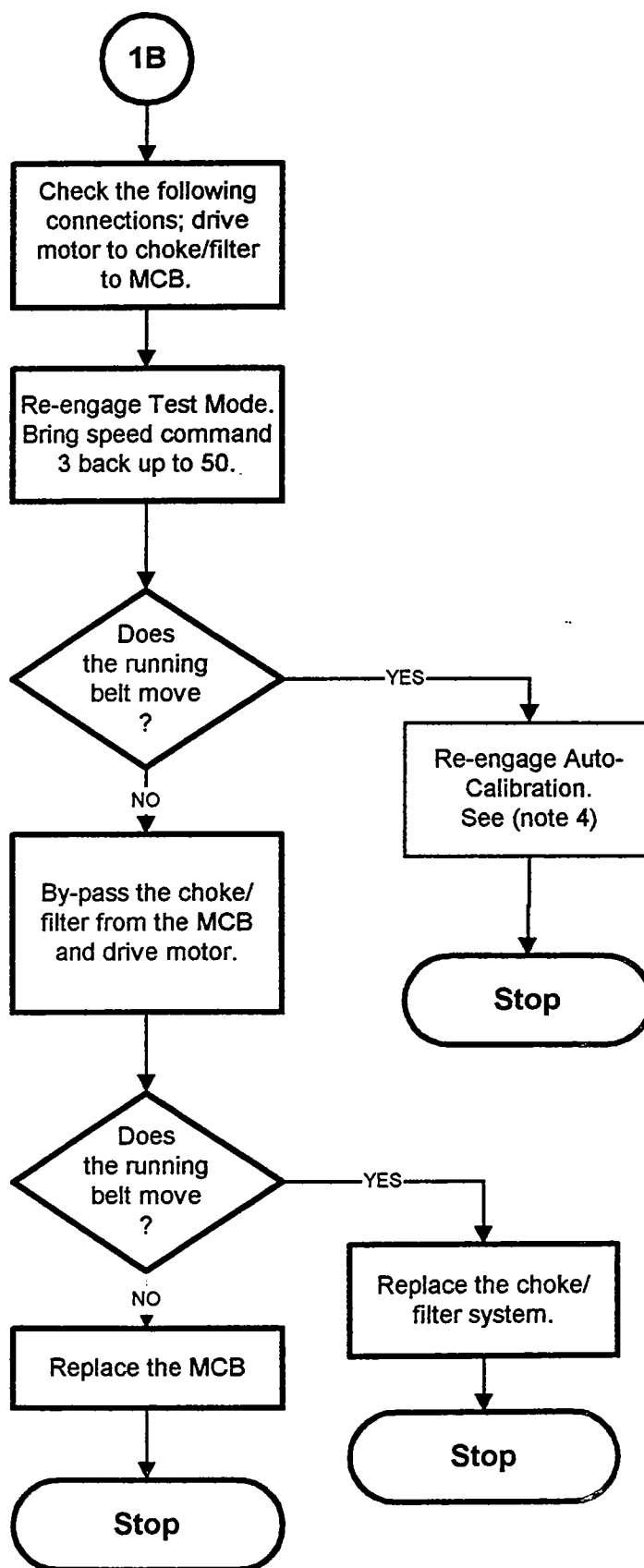


Diagram #3



# Code: NO RPM Flowchart



# Code: No RPM Flowchart

2B

**Note 6:** Before adjusting the RPM sensor, verify alignment as shown in Diagram #2. Adjust the potentiometer clockwise to increase.

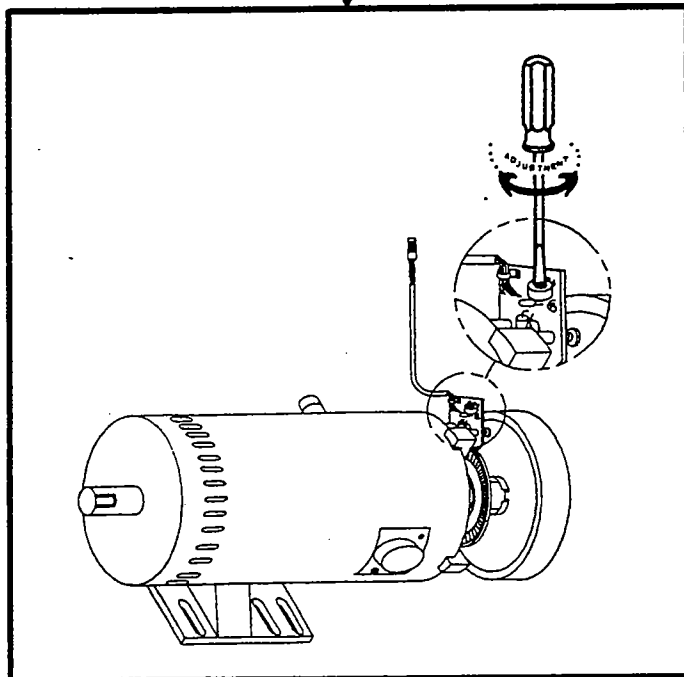


Diagram #4

Does display read RPM feedback ?

NO

YES

Engage automatic speed calibration.  
See (note 4).

Replace the RPM sensor or Hall Effect, depending on style.

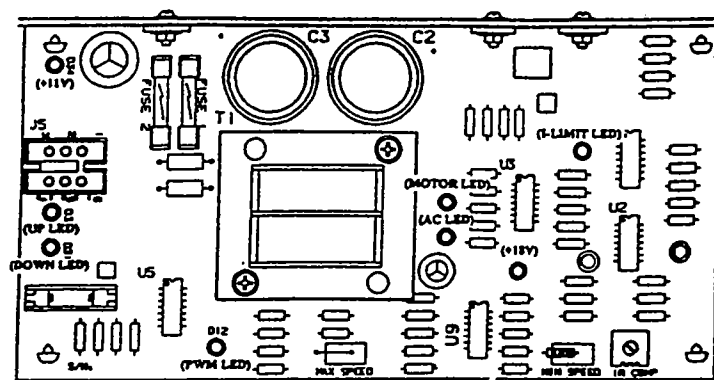
Stop

Stop

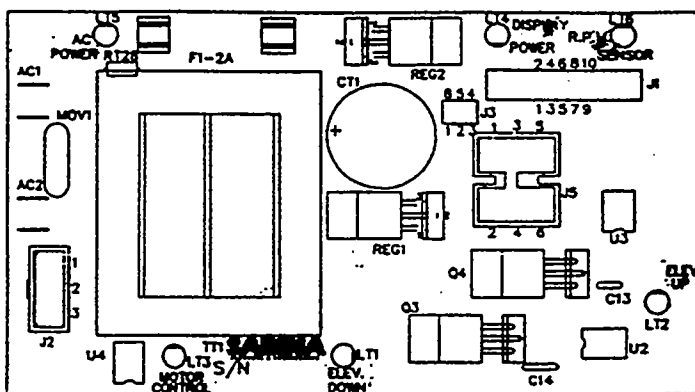
## Code: SP CNG Flowchart

**Definition: "SUDDEN SPEED CHANGE."**

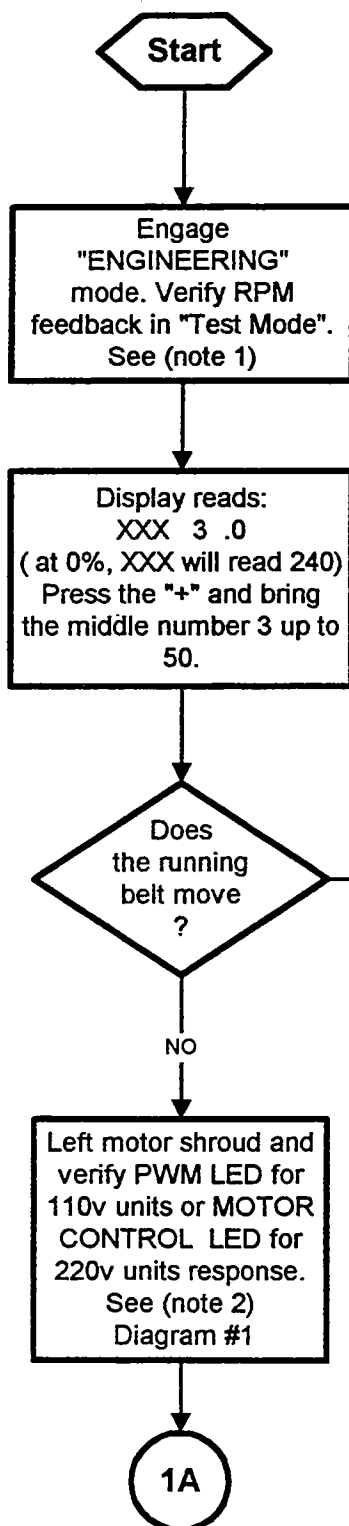
**Possible Cause:** RPM pick-up misaligned.



110V↑ 220V↓



### Diagram #1



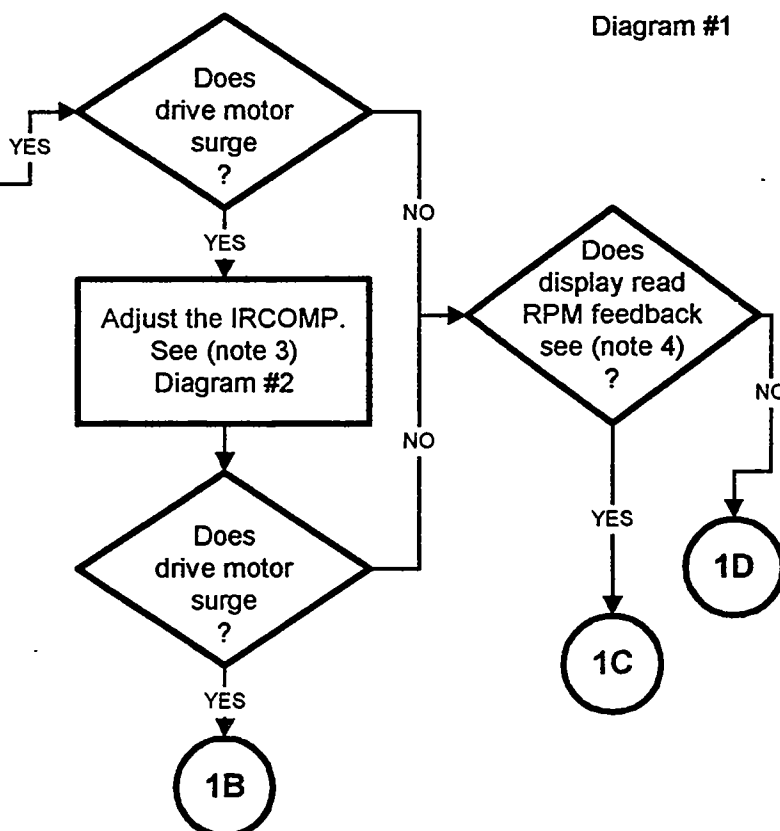
**Note 1:** Press and hold the "0", "1", & "START" keys down at the same time, then release the "1" key. The display will read: ENGINEERING, then press and release the "8" key.

Or, manually hold the "8" key and simultaneously turn the treadmill on by the on & off switch. Both methods will engage "Test Mode".

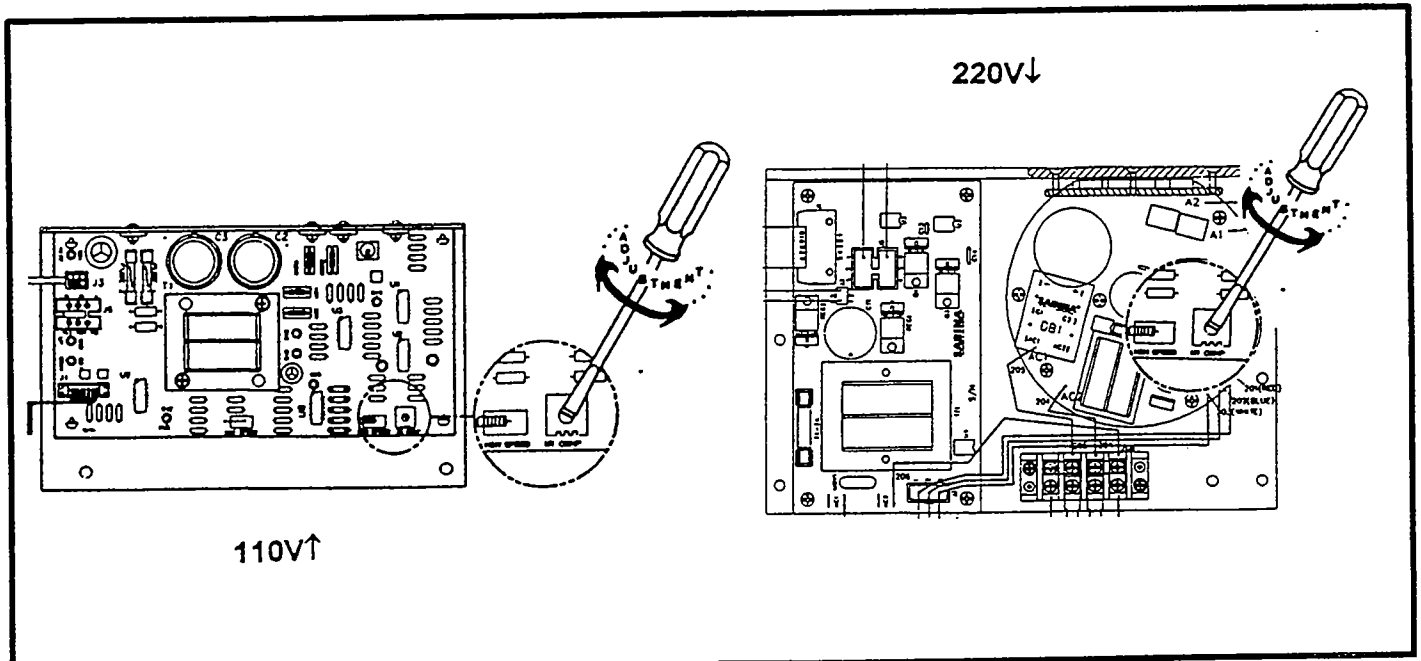
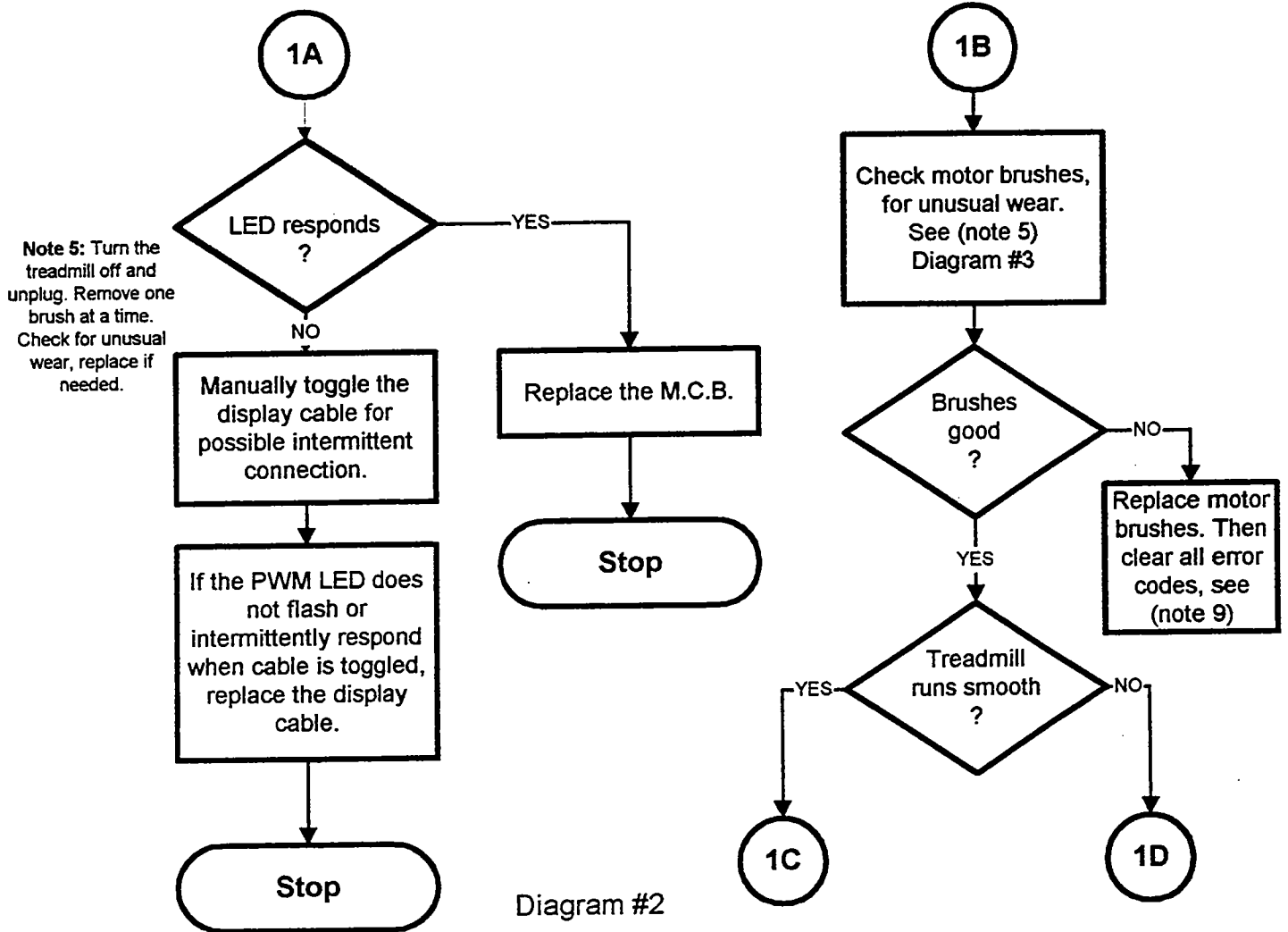
**Note 2:** Verify that the PWM LED is flashing, while the treadmill is on. The PWM LED indicates a valid control command is being sent from the Display Board to the M.C.B. If the LED is not flashing, check connection and look for pinch or tear marks.

**Note 3:** Adjust the potentiometer clockwise or counterclockwise.

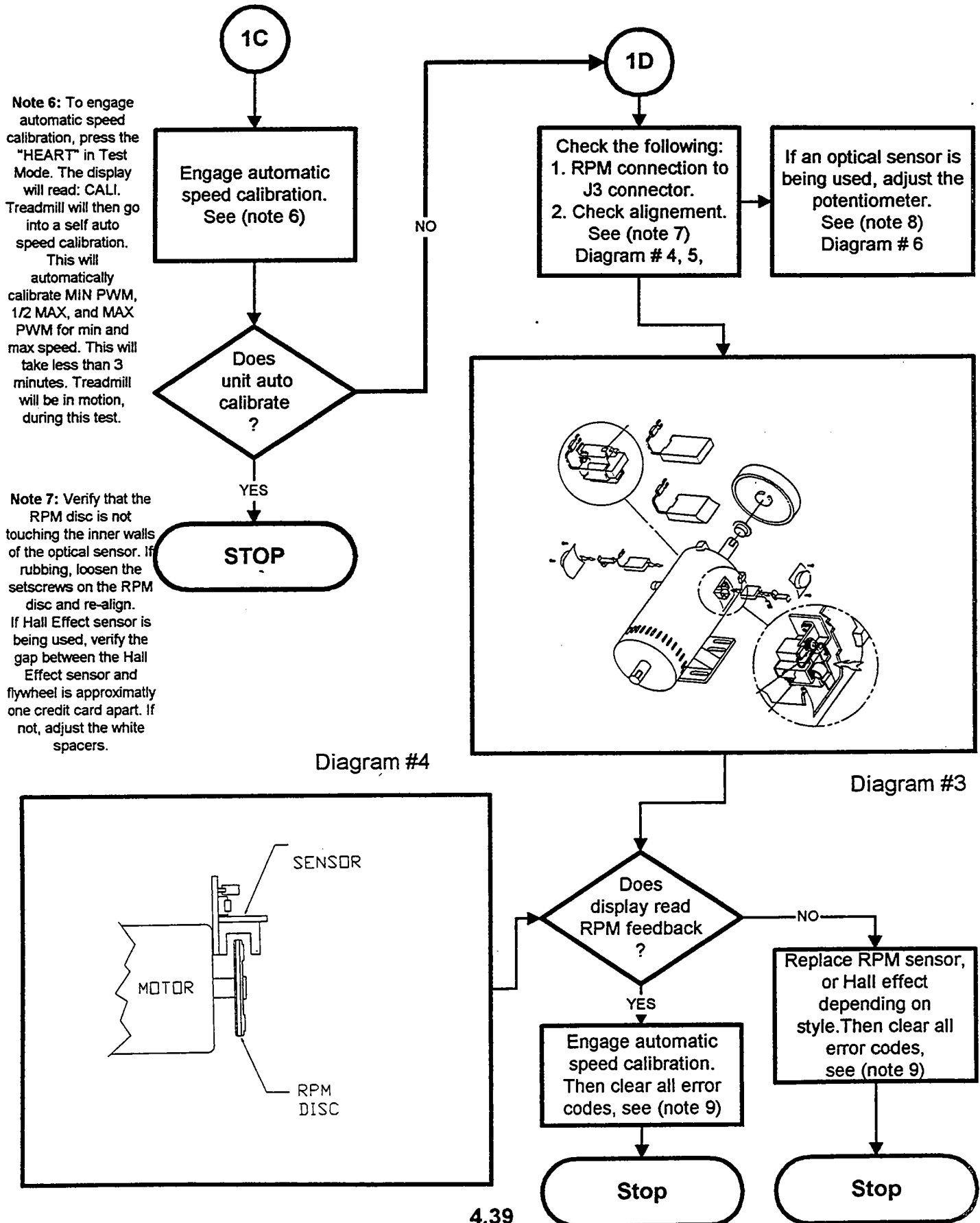
**Note 4:** Verify that RPM feedback is being displayed under speed as the running belt moves.



# Code: SP CNG Flowchart



# Code: SP CNG Flowchart



# Code: SP CNG Flowchart

**Note 8:** Before adjusting the RPM sensor, verify alignment physically, as shown in Diagram #4. Adjust the potentiometer clockwise to increase.

**Note 9:** Engage "Engineering Mode". Scroll up through the menu to the different error references by using the "UP" elevation key. Clear all error codes by pressing the "HEART" key.

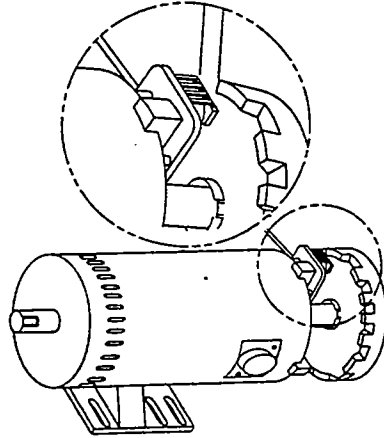


Diagram #5

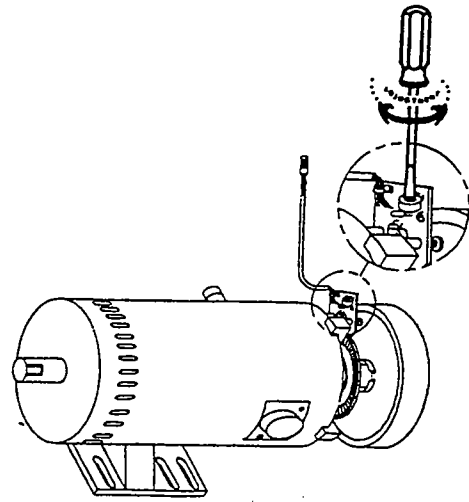
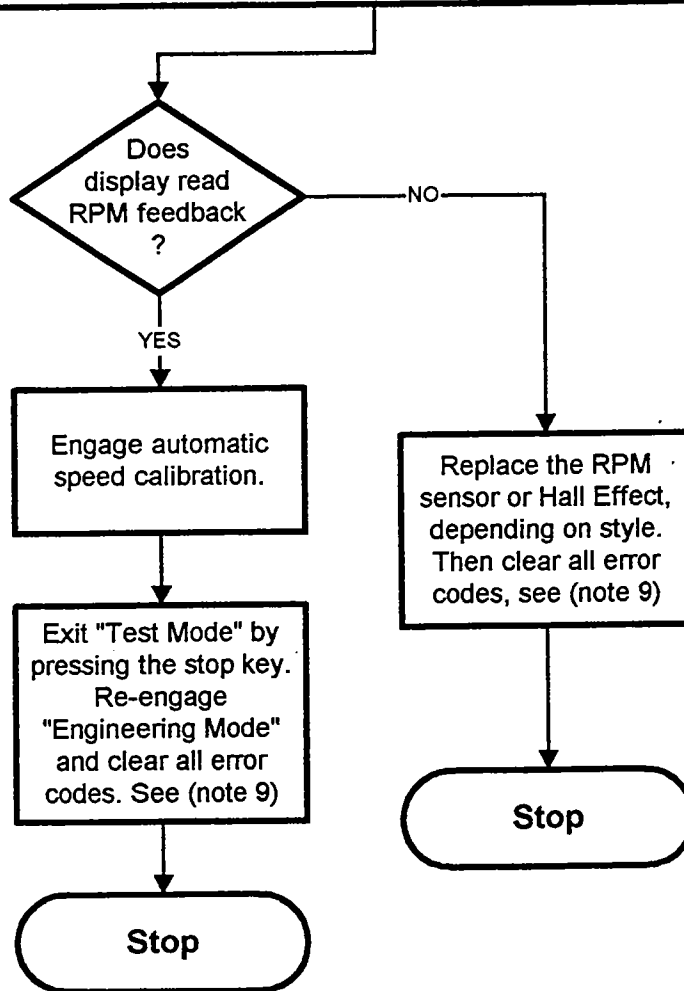


Diagram #6



# Code: EL STL Flowchart

**Definition:** "ELEVATION STALL BEYOND 0% or 15% RANGE"

**Possible Cause:** Out of range elevation count or elevation system malfunctioned.

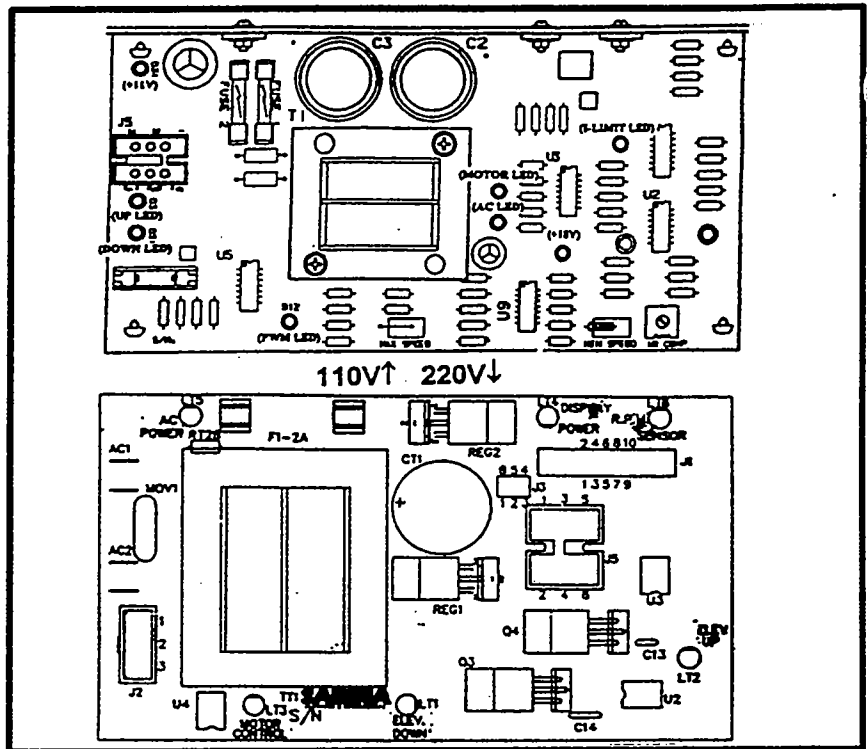
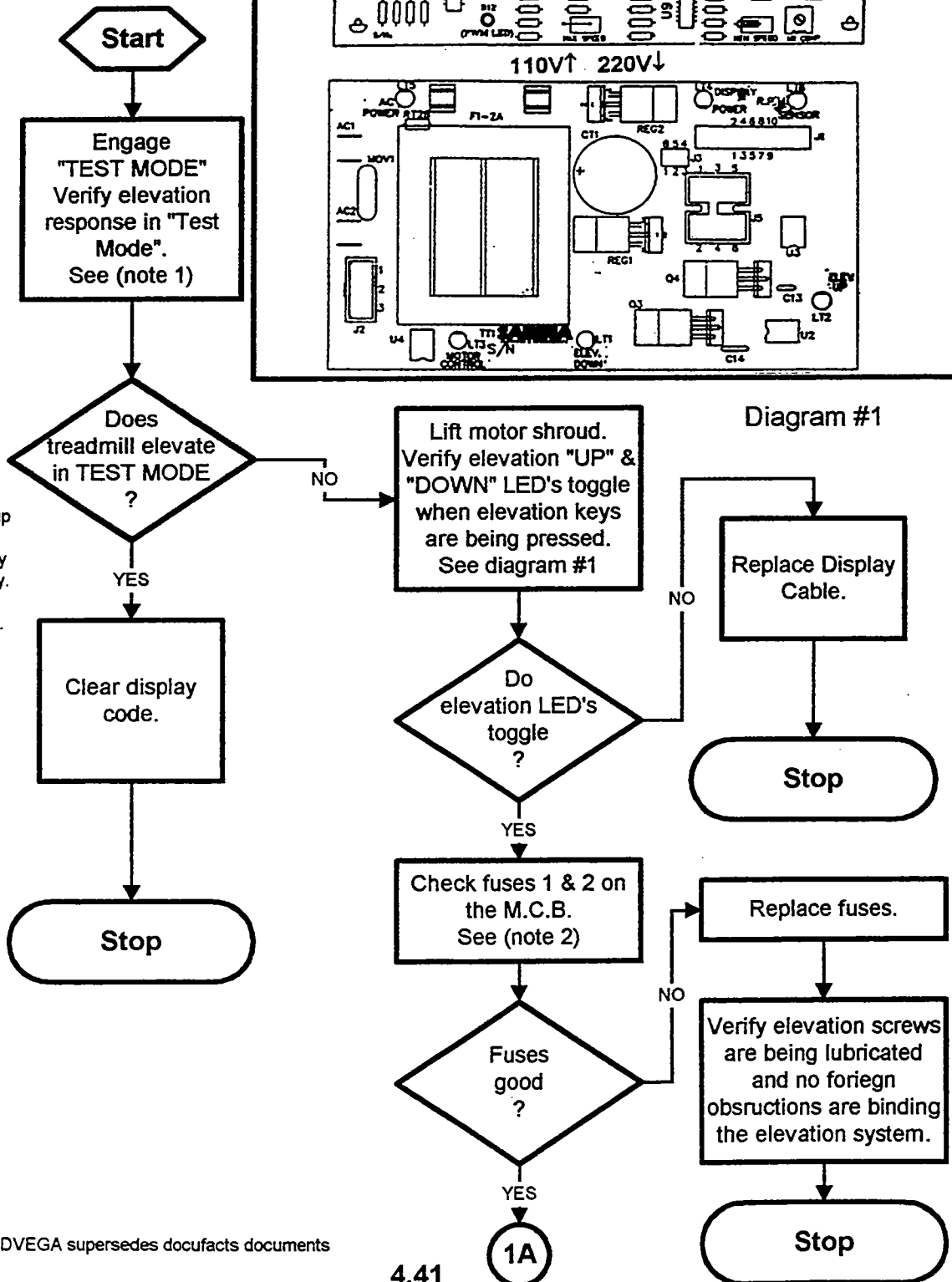


Diagram #1

**Note 1:** Press and hold the "0", "1" & "START" keys down at the same time, then release the "1" key. The display will read: ENGINEERING/SETTINGS MODE. Press and release the "8" key.  
Or manually hold the "8" key and simultaneously turn the treadmill on by the on & off switch. Both methods will engage "Test Mode".

**Note 2:** Engage "Engineering Mode" scroll up through the menu to the different error references by using the "UP" elevation key. Clear all error codes by pressing the "HEART" key.

**Note 3:** Visually check both fuses. Replace fuses, if burned or cracked. If a multi-meter is available, verify continuity.





# Code: EL STL Flowchart

**Note 4: Diagram #2**  
Place your (red) meter probe into the black wire of pin 4, located at connector J5. Then place your (black) meter probe to AC1 on the M.C.B.  
Voltage should read +/-110v. or +/-220v depending on model.

When pressing the elevation "DOWN" key, the voltage should drop down to 0v or 1v. This would indicate a good response from the M.C.B.

Do the same for pin 5 (red wire), as shown in Diagram #4. Then press the elevation "UP" key. Voltage should drop down to 0v or 1v.

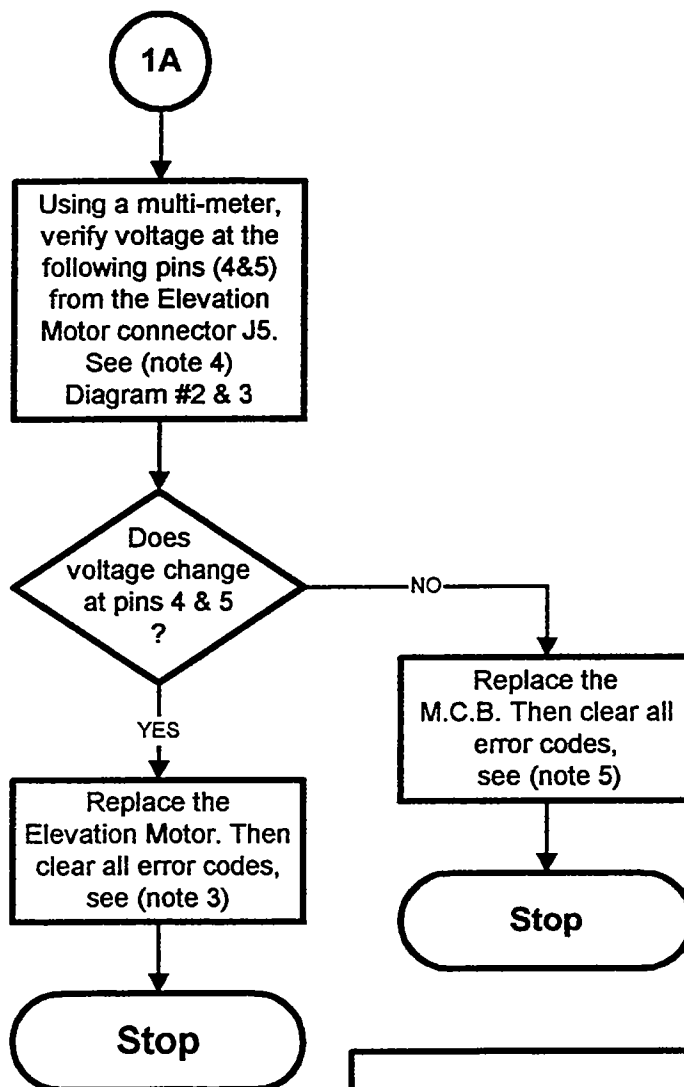
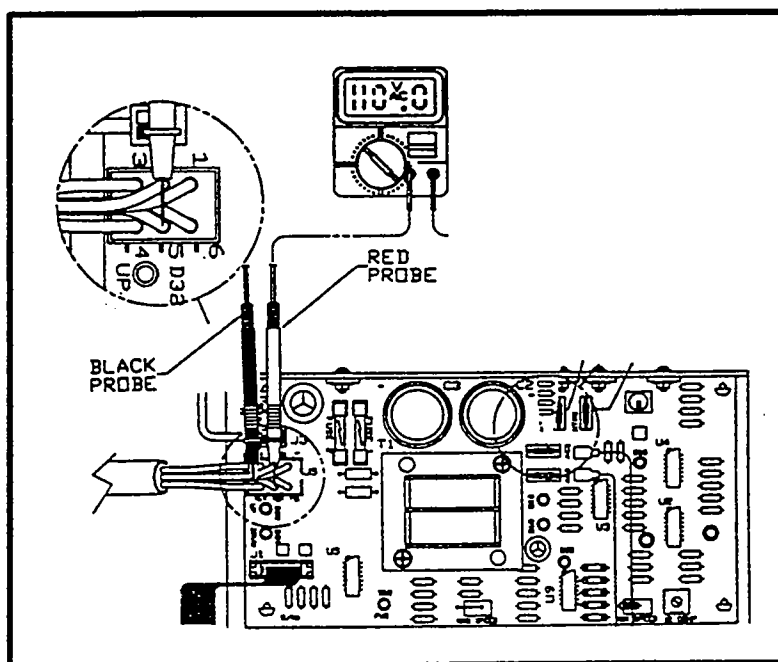


Diagram #2



# Code: EL LOST Flowchart

**Definition:** "ELEVATION LOST BEYOND 0% or 15% RANGE"

**Possible Cause:** Out of range elevation count or elevation system malfunctioned.

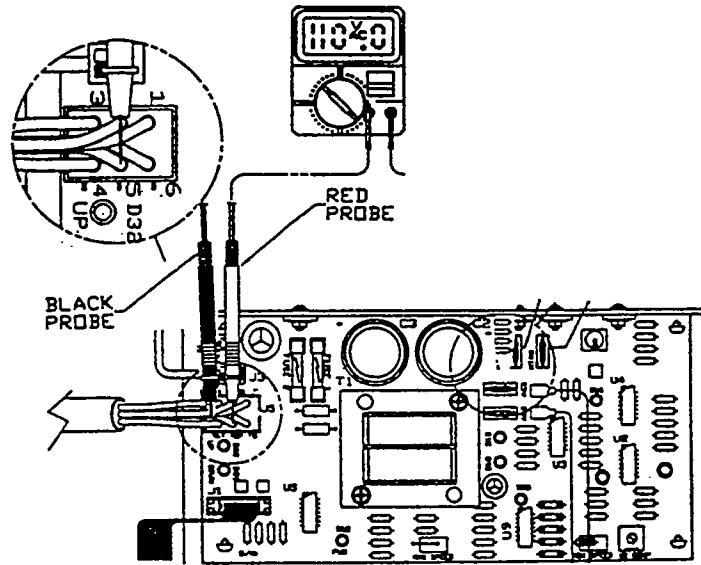


Diagram #1

Start

Engage  
"TEST MODE"  
Verify elevation  
response in  
"Test Mode".  
See (note 1)

**Note 1:** Press and hold the "0", "1" & "START" keys down at the same time, then release the "1" key. The display will read ENGINEERING/SETTINGS MODE. Press and release the "8" key.

Or manually hold the "8" key and simultaneously turn the treadmill on by the on & off switch. Both methods will engage "Test Mode".

Is  
incline within  
range  
See (note 2)  
?

NO

If incline reading is  
less than 20 verify  
elevation motor  
potentiometer  
readings.  
See (note 4)

If elevation motor  
readings register 0,  
check display cable for  
possible pinch or tear.  
Manually toggle the  
cable, if readings are  
now registered replace  
the display cable.

If no readings are  
registered by toggling  
the display cable  
replace the elevation  
motor.

Stop

Clear display  
code.  
See (note 3)

Stop

**Note 2:** When treadmill is at physical 0% the elevation range will read 240 across the display screen. Pressing the elevation "UP" key the elevation range number will decrease, 57 = 15% for 110v units, 80 = 15% for 220v units.

**Note 3:** Engage "Engineering Mode" scroll up through the menu to the different error references by using the "UP" elevation key. Clear all error codes by pressing the "HEART" key.

**Note 4:** The elevation motor potentiometer may have failed or register the incorrect elevation value causing the motor to hesitate while operating. Using a Volt Meter, see diagram #1, use the chart in diagram #2 to instruct you in verifying the correct elevation values.

% Grade	Incline number in Motor Test Mode	DC Voltage across Blue and Orange wire on the Elev. motor connector	Ohm reading between the Blue and Orange (elev. motor unplugged)	DC Voltage on Pin 4 of the display electronics
0	240	4.68	9.76k	4.8
1	228	4.44	9.33 k	4.58
2	216	4.21	8.86 k	4.37
3	204	3.98	8.41 k	4.12
4	192	3.75	7.92 k	3.88
5	180	3.51	7.48 k	3.64
6	168	3.27	6.95 k	3.42
7	156	3.04	6.48 k	3.18
8	144	2.81	6.01 k	2.95
9	132	2.57	5.50 k	2.71
10	120	2.34	4.98 k	2.48
11	108	2.11	4.48 k	2.26
12	96	1.88	3.99 k	2.03
13	84	1.64	3.52 k	1.79
14	72	1.41	2.97 k	1.55
15	60	1.17	2.48 k	1.33

Diagram #2

# Code: EL RNG Flowchart

**Definition:** "ELEVATION RANGE BEYOND 0% or 15% RANGE"

**Possible Cause:** Out of range elevation count or elevation system malfunctioned.

**Note 1:** Press and hold the "0", "1" & "START" keys down at the same time, then release the "1" key. The display will read: ENGINEERING/ SETTINGS MODE. Press and release the "8" key.

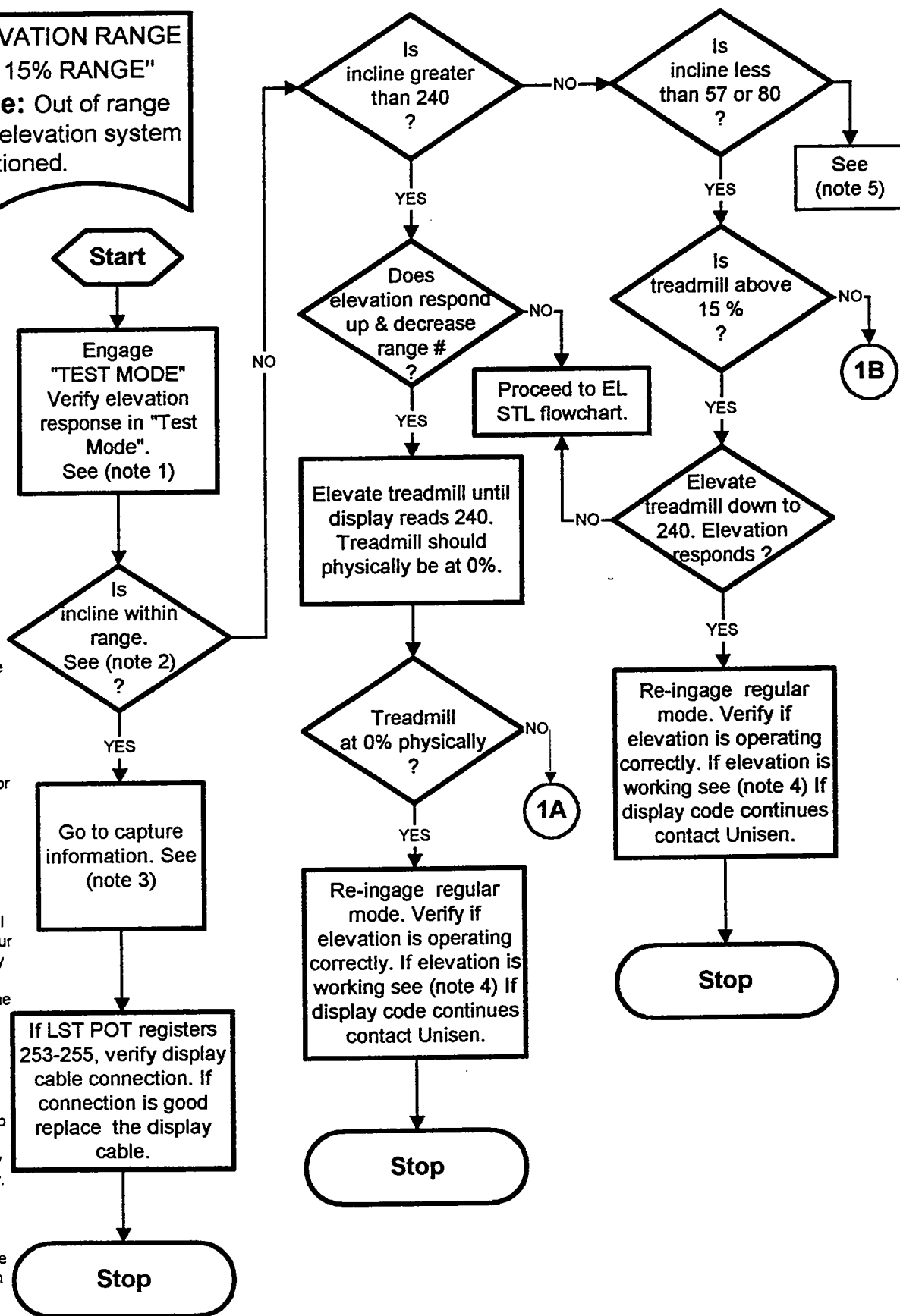
Or manually hold the "8" key and simultaneously turn the treadmill on by the on & off switch. Both methods will engage "Test Mode".

**Note 2:** In "TEST MODE" the number under "ELAPSED TIME" on the display, represents the elevation range. When physically at 0%, the range will register 240. When elevating the range will fluctuate from 240-80. Elevation range 80 represents 15% for 220v units. 57 represents 15% for 110v units. Do not elevate beyond the range.

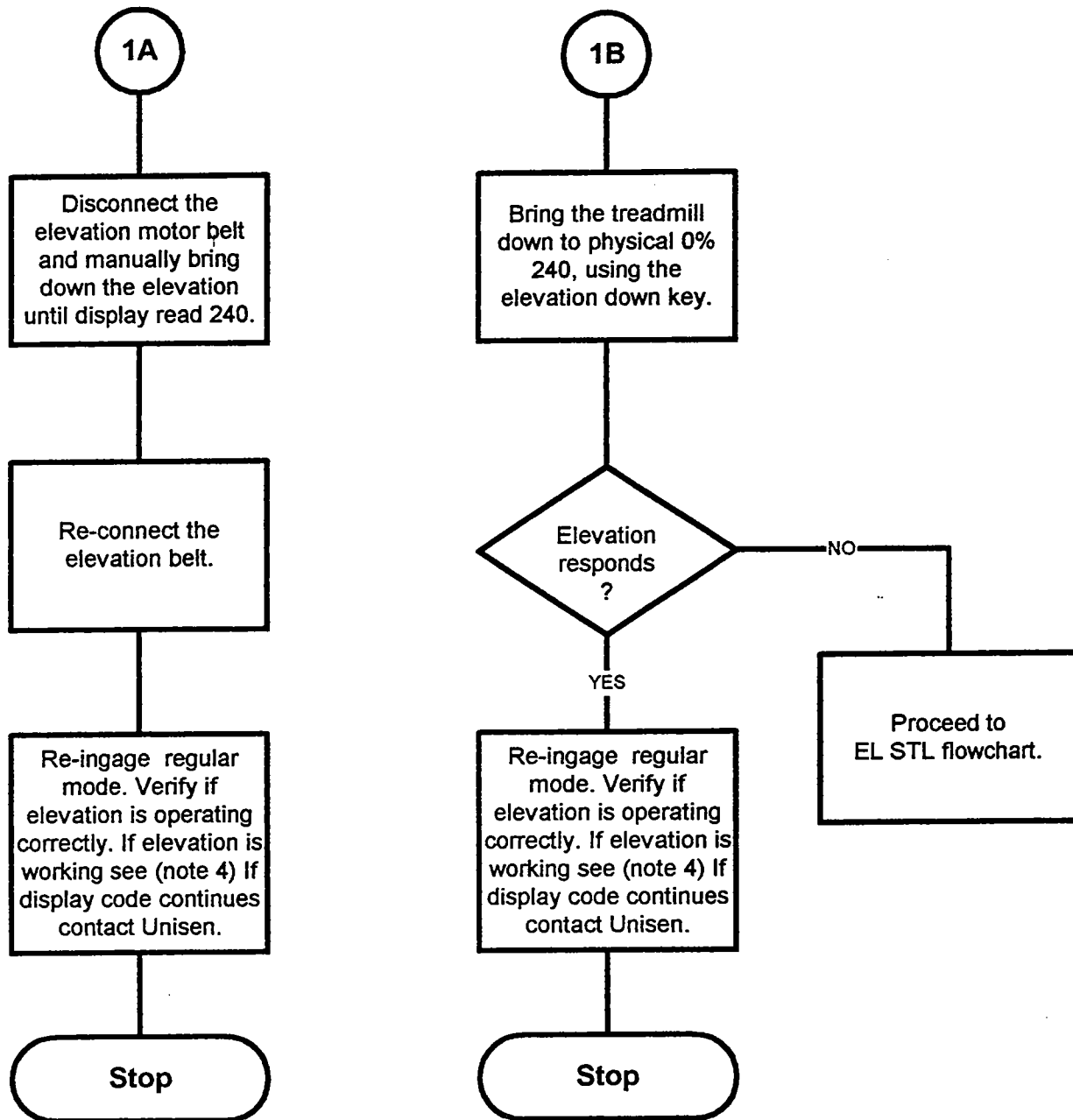
**Note 3:** Exit out of TEST MODE. Re-engage "Engineering Mode/ Configuration Mode" scroll through the menu using your elevation keys until display reads LST POT. The following variables store the condition when the last display code occurred.

**Note 4:** Engage "Engineering Mode" scroll up through the menu to the different error references by using the "UP" elevation key. Clear all error codes by pressing the "HEART" key.

**Note 5:** Thi would indicate that the elevation is within range and should be operating correctly, if not contact Unisen.



# Code: EL RNG Flowchart



# Section 5:

## Parts Replacement

Should the **STAR TRAC** 4000 Treadmill experience a problem requiring replacement of a specific part , the following procedures will help and instruct in the replacement of major parts.

### Contents:

5.2-6 Drive Motor Replacement

5.7-10 Elevation Motor Replacement

5.11-16 Display Cable Replacement

5.17-19 Side Bed Cover Replacement

5.20-22 Autotransformer Replacement

5.23-26 Heartrate Grip Replacement

# Drive Motor Replacement

## Notes:

### **!!CAUTION!!!**

*Always turn the power switch to the Off position. Unplug the treadmill power cord from the power outlet.*

## Tools:

- Running Belt Drive Motor
- Philips-head screwdriver
- Bungee cord, approx 24 inches
- Needlenose pliers
- 5/16-in. socket and torque socket wrench to measure 110 in./lb.
- 1/8-in. Allen torque wrench to measure 75 in./lb.
- Plastic hammer
- Punch
- Straightedge, 24 inch
- Belt Tension Gauge, to 150 lbs (optional)

## Procedure: Lift motor shroud

The drive motor is located below the plastic shroud at the front of the treadmill. To remove the shroud to access the motor, proceed as follows:

1. Remove philips-head screw at center of front edge of the shroud.
2. Lift-up the front of the shroud, lifting from both sides to separate the Velcro strips.
3. Lift the shroud up the vertical rails as far as it can go, then suspend it using a bungee cord looped over the gooseneck rail and hooked under the upper edge of the shroud.

The drive motor is now accessible for replacement.

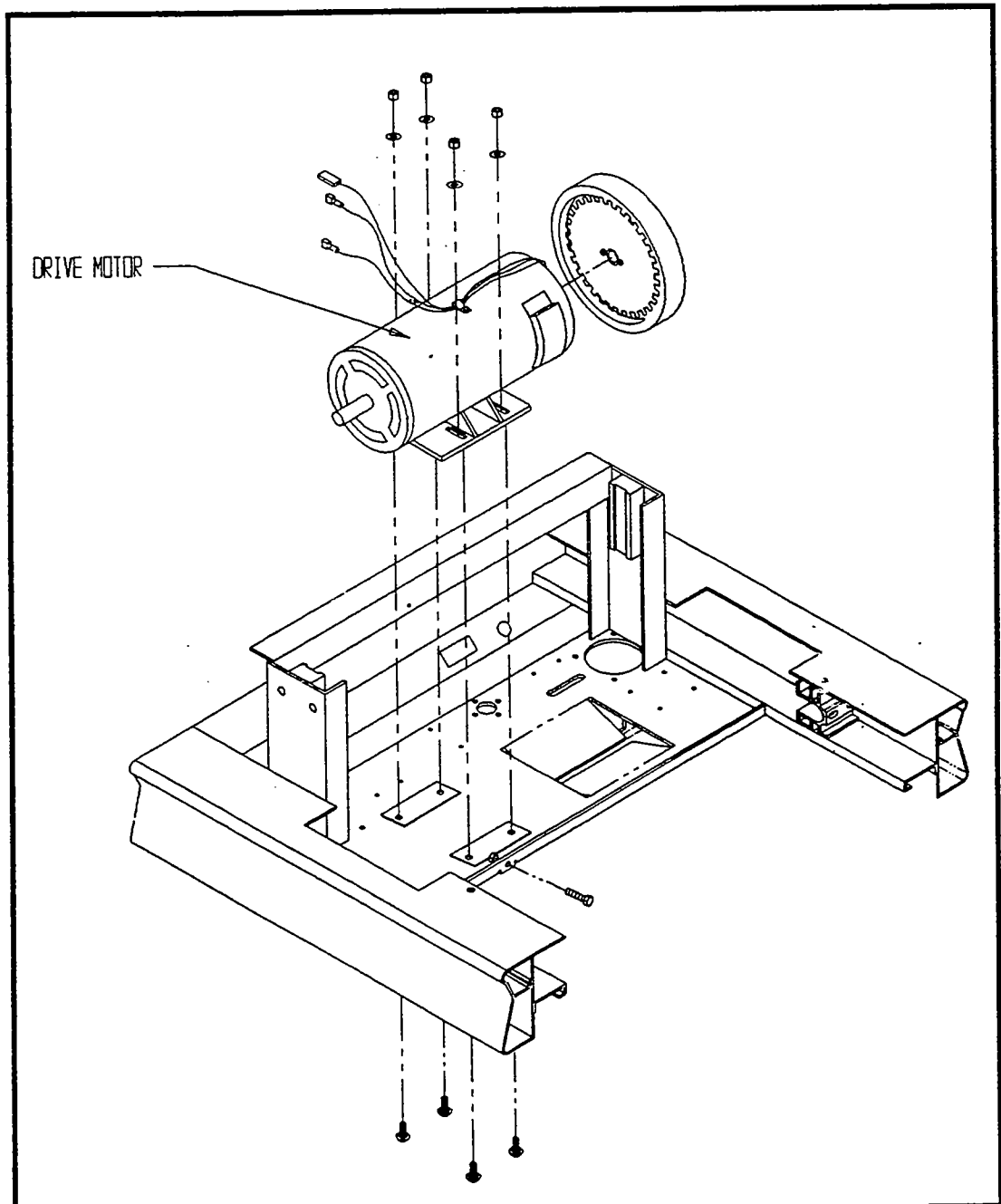
## Disconnect Motor Wiring

1. Follow the green ground wire from the motor to the grounding point in the frame (marked with the ground symbol), then remove the screw that holds the wire terminal to the frame.
2. Cut the two wire ties that hold together the remaining wiring from the motor.
3. Using needlenose pliers, pull apart the black plug-in connectors of the red and black wires. *Do not pull on the wires.*
4. Follow the gray sensor cable to the connector marked J3 on the left end of the circuit board, and pull the cable connector upwards to disconnect it from the board.

# Drive Motor Replacement

## Remove Motor

1. Loosen the 5/16-inch nut that locks the motor alignment screw, then unscrew the screw several turns.
2. Loosen the four 5/16-inch motor-mount nuts so that motor slides freely on the frame.  
**See Diagram A below.**



3. Using a 1/8-inch Allen wrench, loosen the two set screws in the motor pulley.
4. Slide the motor towards the rear of the treadmill to give slack to the motor drive belt.
5. Slip the drive belt off the motor pulley, then remove the pulley and locking key.
6. Remove the four motor-mount nuts, then lift the motor out of the treadmill and set it aside. Mark it as the removed motor to avoid confusion with the replacement motor.

This completes motor removal procedures.

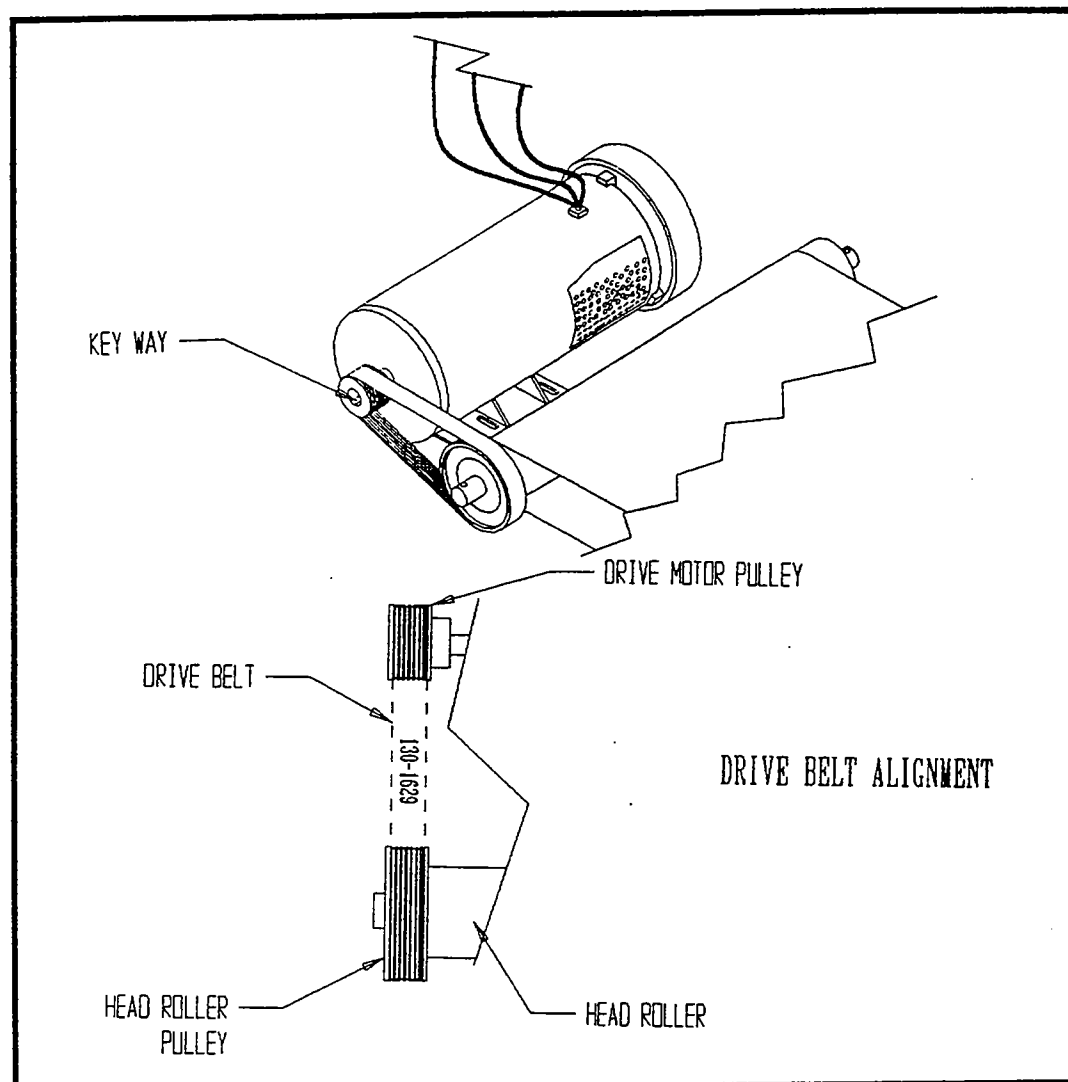
## Install Replacement Motor

1. Set motor mount onto the four captive screws in the frame.
2. Fit the motor pulley over the motor shaft so that either of the set screws is aligned with the shaft's keyway.
3. Using a plastic hammer and a punch, tap the locking key into the keyway so that its end protrudes about 1/16-inch past the inner face of the pulley.
4. Tighten the set screw that is over the keyway to hold the pulley in place, but do not torque tightly at this time.
5. Place a 5/16-inch flat washer onto each mounting screw, then loosely turn a 5/16-inch locknut onto each screw.
6. Place the drive belt over the motor pulley, aligned with pulley surfaces.
7. Using a hand on each end of the motor, press motor towards the front of the treadmill to tighten the belt.
8. Slightly tighten the four mounting nuts, just tight enough to hold the motor in place.
9. Check motor alignment relative to the running belt pulley. Hold the edge of a steel straightedge against the outer face of the running belt pulley. The straightedge should be flush against the outer face of the motor pulley. **See Diagram B.**
10. If the straightedge is not flush against the motor pulley, loosen motor-mount nuts, adjust motor position so that it becomes flush, then slightly retighten mounting nuts.



# Drive Motor Replacement

**Diagram B.**



## Check and Adjust Belt Tension

1. Place a tension gauge onto the center of the belt and check tension.

The gauge should indicate 110 inch-pounds.

2. If you have no tension gauge, press down on top of the belt, midway between pulleys, very hard with your thumb. The belt should deflect between  $\frac{3}{8}$  inch and  $\frac{1}{2}$  inch.
3. Screw the motor adjustment screw against the motor mount, moving the motor towards the front of the treadmill pulleys to equalize tension through the belt.
4. When the gauge indicates 110, or when deflection is as specified in preceding step 1, tighten the motor-mount nut nearest the adjustment screw.

# Drive Motor Replacement

5. Recheck pulley alignment and belt tension.
6. When alignment and tension are correct, tighten all four motor-mount nuts using a socket torque wrench set at 75 inch-pounds.
7. Lock the motor adjustment screw by tightening the locking nut against the frame.
8. Loosen the set screw at the motor pulley, then recheck alignment.
9. Slide the pulley on the shaft until alignment is restored.
10. Check to see that the pulley locking key still extends about 1/16-inch past the inner face of the pulley. Tighten the setscrew over the keyway first, then tighten the other setscrew. Use a 1/8-inch Allen torque wrench set for 50 inch-pounds.
11. Recheck both tension and alignment. Check alignment while rotating the belt and pulleys. Use a thickness gauge to measure any gap. If the gap between the outer face of the pulley at its edge, and the straightedge, exceeds 0.007 inches, repeat alignment procedures until that gap is reduced to less than 0.007 inches.

## Reconnect Motor Wiring

1. Connect the gray sensor cable to the connector marked **J3** on the left end of the circuit board.
2. Press together connectors for the red wires, and then for the black wires.
3. Using a philips-head screwdriver, secure the lug on the green wire to the ground point on the frame, using the screw removed previously.
4. Using small wire ties, neatly tie together the four wires.

## Replace Shroud

1. Release the shroud from the bungee cord that has held it to the handrail gooseneck, and carefully slide the shroud downwards so that it rests on the treadmill frame.
2. Match the screw hole in the lower front edge of the shroud with the mating hole in the frame, then insert and start the philips-head screw previously removed.
3. Press down on the sides and front of the shroud to engage the Velcro strips on the frame.
4. Tighten the screw to complete shroud-replacement procedures.



# Elevation Motor Replacement



## Notes:

### **!!CAUTION!!!**

*Always turn the power switch to the Off position. Unplug the treadmill power cord from the power outlet.*

## Tools:

Replacement elevation motor  
Philips-head screwdriver  
Pliers  
Tap nuts, 1/2-inch (2)  
Allen wrench, 9/64 in.  
Socket wrench with 17-mm socket  
Shop hammer  
Large screwdriver or steel chisel

## Procedure: Lift motor Shroud

1. Remove philips-head screw at the center of the front edge of the treadmill.
2. Lift-up the front of the shroud, lifting from both sides to separate the Velcro strips.
3. Lift the shroud up the vertical rails as far as it can go, then suspend it using a bungee cord over the gooseneck and hooked under the upper edge of the shroud.

## Tip the Treadmill on its side

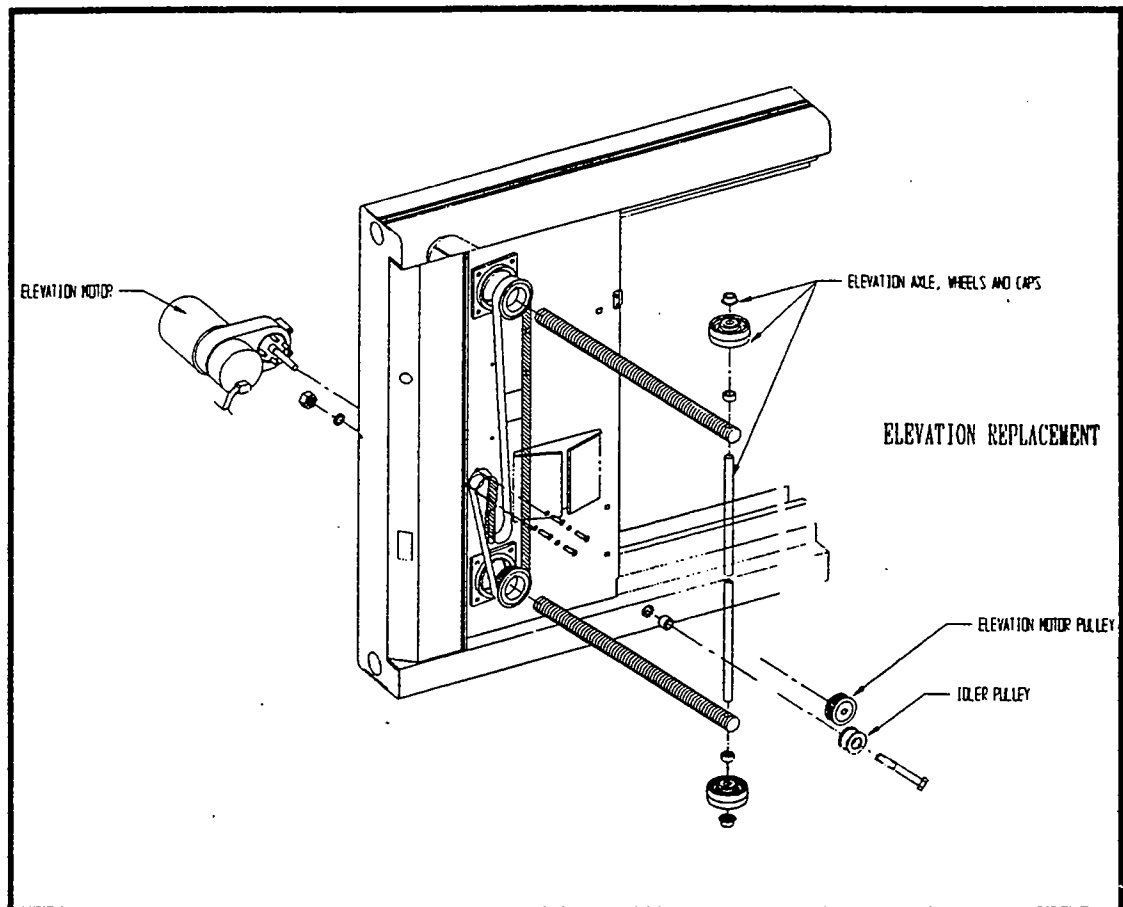
Lift either side of the treadmill and tip the treadmill on its side. This makes accessible both the elevation motor and the belt drive train below the motor plate.

## Remove the Elevation Motor

1. Using pliers, remove the end caps (tap nuts) from both ends of the wheel axle at the front end of the treadmill.
2. Remove the wheels and bushings from both ends of the axle, then remove the axle from the treadmill.
3. At the bottom of the motor plate, loosen the idler pulley mounting nut using a 17-mm socket wrench **See Diagram A.**

# Elevation Motor Replacement

Diagram A.



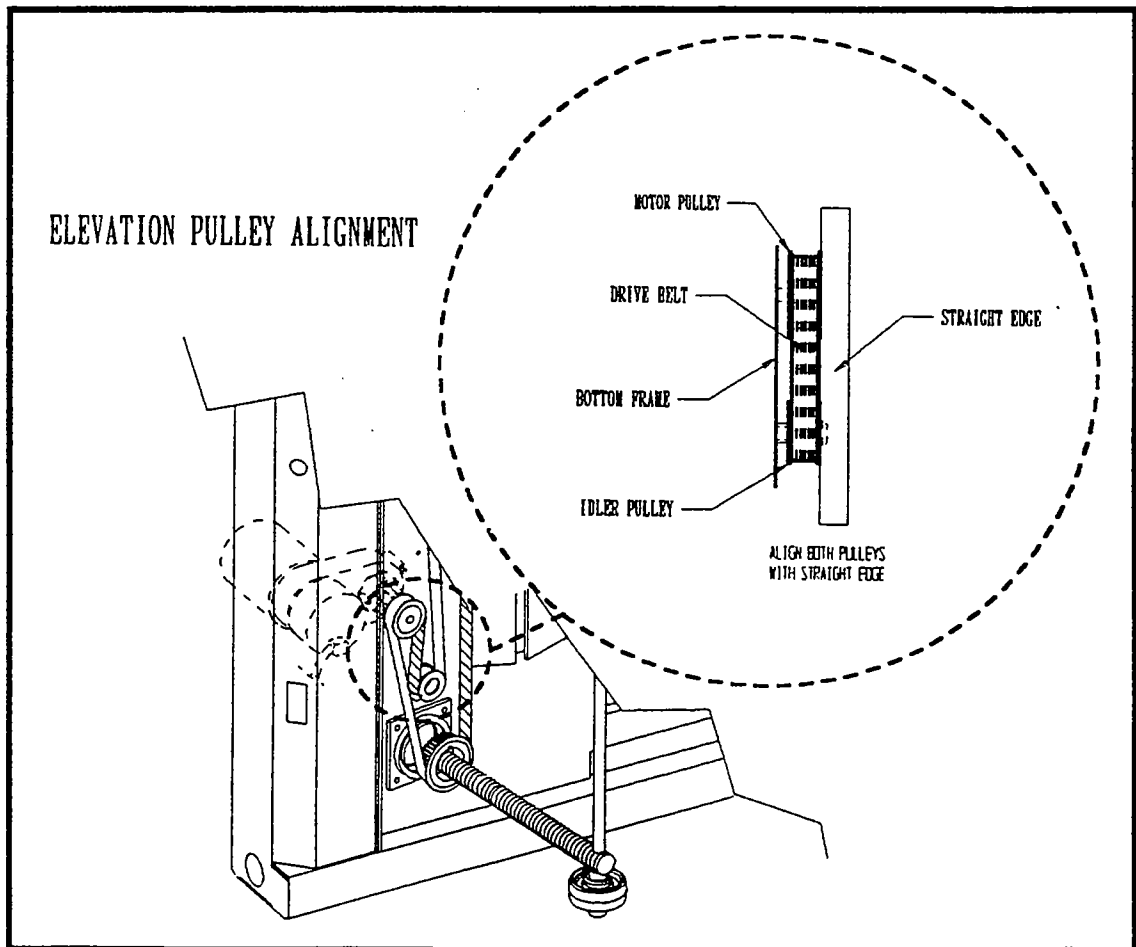
4. Slide the idler pulley in its slot to loosen the elevation drive belt, then remove the belt from the idler pulley.
5. Using an Allen wrench, loosen the screws around the drive pulley, then remove the pulley from the elevation motor shaft.
6. At the Motor Control Board, disconnect the elevator motor cable from connector J5.
7. At the upper surface of the motor plate, remove the four screws that hold the elevation motor to the motor plate. Use a 9/64-inch Allen wrench.
8. Remove the elevation motor from the treadmill.

# Elevation Motor Replacement

## Replace the Elevation Motor

1. Position the elevation motor in its mount. Be sure to hold the motor's electrical cable closely against the motor to prevent its being pinched between the motor and the treadmill frame.
2. Replace and tighten the four screws that hold the elevation motor to the motor plate. Use a 9/64-inch Allen wrench.
3. Connect the motor cable connector to connector J5 on the Motor Control Board.
4. At the bottom of the motor plate, replace the drive pulley on the motor shaft.
5. Check vertical alignment of the drive pulley, idler pulley, and right-hand elevation screw bearing. To do this, rest a straightedge on pulley and bearing faces, then position the drive pulley on the shaft until alignment is achieved See **Diagram B**.

**Diagram B.**



# Elevation Motor Replacement

6. Tighten Allen screws in the drive pulley, taking care to preserve the alignment achieved in the preceding step.
7. Place the drive belt over the idler pulley.
8. Slide the idler pulley tightly against the belt, then finger-tighten the mounting screw on the idler pulley shaft.
9. Manipulate the drive belt so that it is flush with the inside surface of all pulley flanges and the right-hand drive screw bearing.
10. Tighten the idler pulley mounting nut  $\frac{1}{4}$  to  $\frac{1}{2}$  turn.
11. Using a large screwdriver or steel chisel, and a hammer, tap the middle of the idler pulley shaft sharply to drive the pulley against the belt.
12. If you have a belt gauge, measure belt tension. Adjust tension until the gauge indicates 50 to 60 pounds, then tighten the idler pulley mounting nut.  
If you have no suitable belt gauge, pinch the sides of the belt together, using strong thumb and finger pressure, in the middle of the belt length. The sides of the belt should not quite touch.  
Readjust belt tension, if necessary loosening the idler pulley mounting nut, then repeating preceding steps 11 and 12 until correct belt tension is achieved.
13. Re-install the wheel axle, along with bushings, wheels, and *new* tap nuts.

## Set the Treadmill Upright

## Test Treadmill Operation

After you have completed replacement of the elevation motor, perform a complete system test.



# Display Cable Replacement

Perform the following procedures to replace a Display Panel. It is important that elevation be calibrated after installation of the new panel.

## Tools:

- Allen wrench, 1/16-in.
- Carpenter's level.

## Procedure: Determine software version.

1. Hold down the "0", "1" and "Start" keys at the same time, and then let go of the "1" only. "ENGINEERING" (or "SETTINGS", in versions 2.5 & later) will display on the alpha-numeric window. (If unsuccessful, press "STOP" twice, center your fingers, press keys sequentially and hold all 3 for 1/2 second or more, then move off "1" only. Repeat as necessary.)
2. Press "5" = All lights will go on. \*(May also use "5"+"Power On".)
3. Press any key = EPROM Version is displayed PWM VX.X.
4. Press "STOP" = To exit

## Record the data from the old display software

1. Enter the ENGINEERING mode described in A1, or "0", "2" and "Start", "CONFIGURE", in versions 2.5 & later.
2. Press the "elevation up" key to scroll through the many menu variables.
3. Record the following data, as available:  
UNITS \_\_\_\_\_ OP HRS \_\_\_\_\_ HRT \_\_\_\_\_ LST BLT \_\_\_\_\_  
MN SPD \_\_\_\_\_ DIST \_\_\_\_\_ 10 REV \_\_\_\_\_ DATE (MFG) \_\_\_\_\_  
MX SPD \_\_\_\_\_ WEIGHT \_\_\_\_\_ CNT/RV \_\_\_\_\_ SHIFT \_\_\_\_\_ TIME \_\_\_\_\_  
SER NO \_\_\_\_\_ LST DCK \_\_\_\_\_
4. Press "Stop" key to exit.

## Remove the Display Assembly

1. Using a 1/16-in. Allen wrench, remove the five screws from the rear of the Display Panel and carefully lay the panel down on the display rail.
2. Unplug the display cable from the Display Panel, then unplug the two handgrip cables from their connectors. **See Diagram A.**
3. Separate the Velcro strips on the handgrip cables from the Velcro strip on the back of the Display Panel, then remove the cables from the Display Panel.
4. Unplug the Stop switch cable from its connector on the Display Panel.
5. Remove the Display Panel from the treadmill.

# Display Cable Replacement

## Notes:

**!!CAUTION!!!**

*Always turn the power switch to the Off position. Unplug the treadmill power cord from the power outlet.*

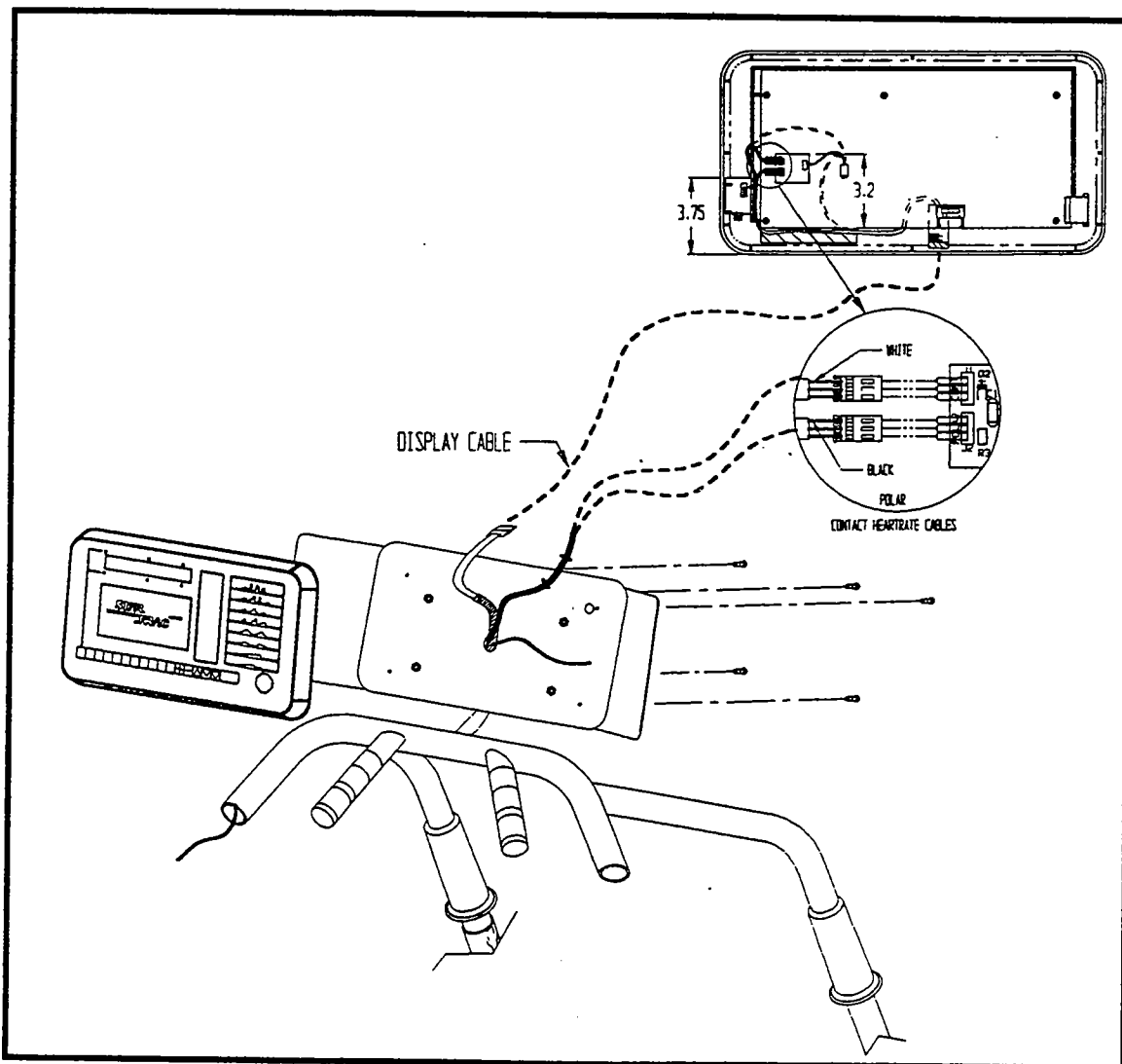
## Tools:

Handgrip Kit  
1/16-inch Allen wrench  
Light nylon cord  
Isopropyl alcohol

## Procedure: Remove the Display Panel

1. Using a 1/16-inch Allen wrench, remove the five screws from the rear of the display panel mount and carefully lay the panel down on the display rail.
2. Unplug the two handgrip cables from their connectors. See **Diagram A**.

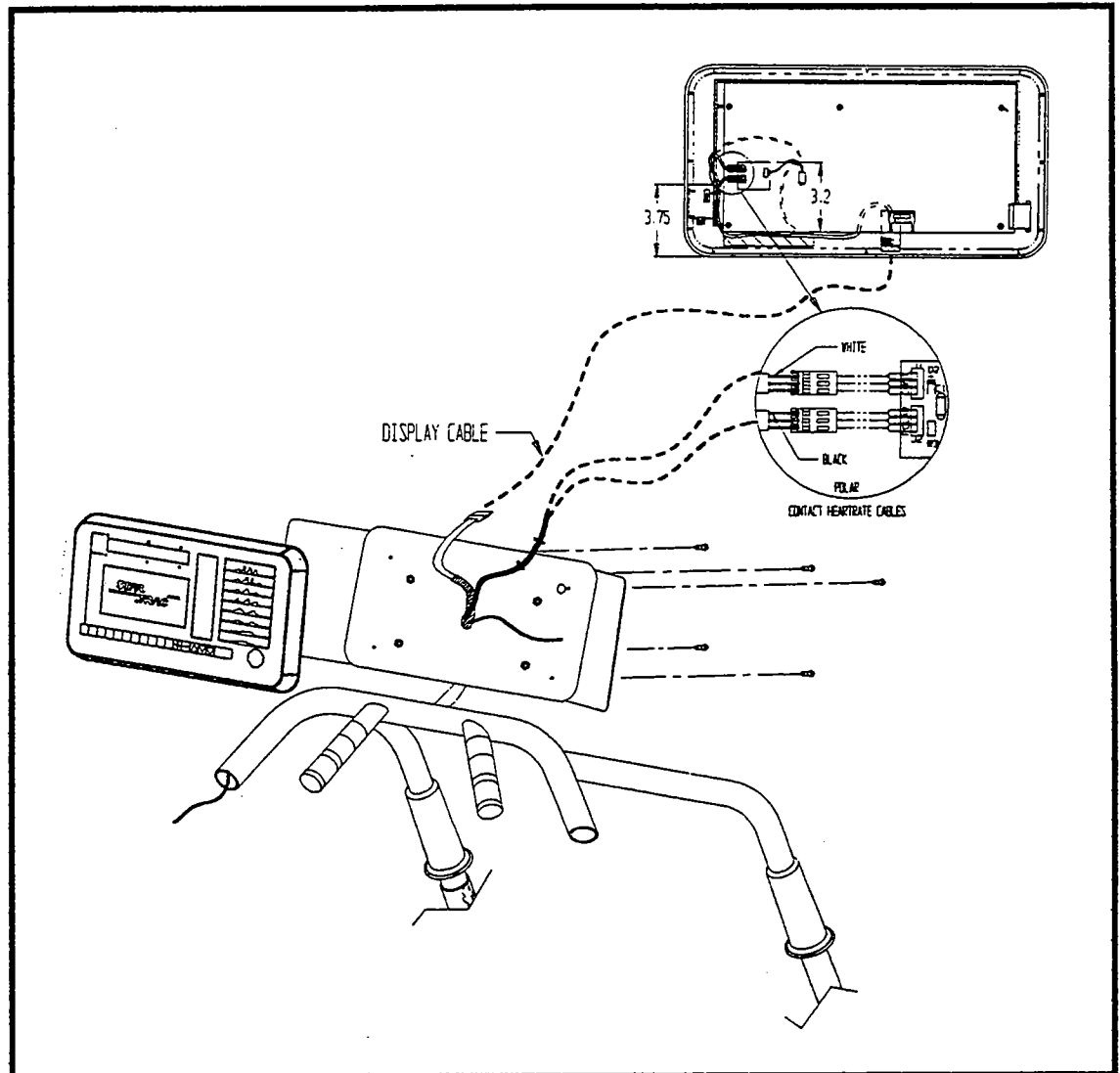
### Diagram A.





# Display Cable Replacement

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**TRAC**



## Replace the Display Panel

1. Lay the replacement Display Panel on the display rail.
2. Connect the Stop switch cable to its connector on the Display Panel.
3. Connect the handgrip cables to their connectors, being careful to match markings to retain the left/right relationships. Press the Velcro strips on the cable onto the Velcro strip on the back of the panel.
4. Connect the display cable to its connector on the Display Cable.
5. Position the back of the Display Panel against the panel mount and replace the five Allen-head screws removed in previous steps.

# Display Cable Replacement

## ENTER EPROM DATA

1. Turn on the "Power" switch.
2. Hold down the "0", "2" and "Start" keys at the same time, and then let go of the "2" only. "CONFIGURE" will display on the alpha-numeric window. (If unsuccessful, press "STOP" twice, center your fingers, press keys sequentially and hold all 3 for 1/2 second or more, then move off "2" only. Repeat as necessary.)

### Notes:

- The "Elevation Up/Down" keys will scroll through the menu.
- The "Speed Plus/Minus" keys will increase/decrease the variable.
- The "Start" key must be pressed to save a variable change.
- All menu variables have EPROM default values noted as follows in ( ).

### 3. VERIFY or ENTER recorded (see B) changes for the bolded variables.

The other variables are listed for reference, and may be changed as the customer prefers. Press "Start" after each variable change, to save it.

<b>UNITS</b>	(Eng) <b>English, Metric</b>
<b>MN SPD</b>	(0.5) <b>Minimum speed. Do not go less than 0.5 MPH, or 1.0 KPH.</b>
<b>MX SPD</b>	(10.0) <b>Maximum speed.</b>
<b>EL OPT</b>	(ON) <b>ON; OFF will disable the elevation incline.</b>
<b>TIME</b>	(99) <b>Some clubs prefer 30 minutes maximum.</b>
<b>OP HRS</b>	(0) <b>Operation hours recorded from old EPROM.</b>
<b>DIST</b>	(0) <b>Distance recorded from old EPROM.</b>
<b>WEIGHT</b>	(155) <b>Typical user's weight for calorie calculations.</b>
<b>SER NO</b>	(0) <b>Serial number from old EPROM, or check frame.</b>
<b>HRT</b>	(CNT) <b>CNT DN, POLAR, CONTCT (Contact), BOTH</b>
<b>10 REV</b>	(30.7) <b>Enter the recorded value, or measure the running belt travel for 10 flywheel revolutions and enter the measured value.</b>

Values will be near one of the following:

27.5".... (1.6" dia. pulley)	29.1".... (1.7" dia. pulley)
30.7".... (1.8" dia. pulley)	35.8".... (2.1" dia. pulley)

<b>CNT/RV</b>	(31) <b>Flywheel or plate notches, or disk windows:</b>
	Magnetic / Flywheel = 31      Optical Disk = 125.
<b>MN PWM</b>	(30) <b>This is automatically reset during calibration (see E).</b>
<b>1/2 MX</b>	(130) <b>This is automatically reset during calibration (see E).</b>
<b>MX PWM</b>	(230) <b>This is automatically reset during calibration (see E).</b>
<b>LST DCK</b>	(0) <b>Miles since the deck was last <u>serviced or replaced</u>. After a 2000 mile or 3000 KM difference, "REWAX BELT" will scroll in the START message until "LST DCK" miles are updated.</b>
<b>LST BLT</b>	(0) <b>Miles when the running belt was last replaced.</b>
<b>DATE</b>	(1/96) <b>Manufacture date from old EPROM, or check frame.</b>

# Display Cable Replacement

The following (•) variables indicate the number of times each error\* has occurred:

- NO STO (0) No Stop Key. Handrail stop switch was open on power-up.
- KEY DN (0) Key stuck down at power-up (except "5" or "8").
- NO RPM (0) RPM sensing feedback was lost while running.
- SP CNG (0) Speed changed suddenly.
- EL STL (0) Elevation stall -- no response to command.
- EL RNG (0) Elevation was beyond 0% to 15% range at Start.
- ELLOST (0) After 0% reset, elevation went beyond 0% to 15%.
- EL NOZ (0) During 0% reset, elevation went beyond 0% to 15%.

ELZERO (240) This represents 0% elevation.

ELMAX This represents maximum elevation. Do not use less than 57.

Note: 220V units require this setting to be 80.

These (••) variables store the conditions when the last error\* occurred:

- LSTERR (0) The display number describes the last error, ref:
  - 18= NO STOP KEY      21= SP CNG    24= ELLIST
  - 19= KEY DN            22= EL STL    25= EL NOZ
  - 20= NO RPM            23= EL RNG
- LSTELV (0) 0-15, or 255 Target elevation.
- LSTPOT (0) 0-255 Elevation feedback "elevation number".
- LSTRES (0) 1= Resetting (returning) to 0% at startup.  
 (0) 0= Finished resetting to 0%.
- LSTSSP (0) 0-200 Set speed (0 to 20.0).
- LSTPWM (0) 0-255 PWM number.
- LSTMSP (0) 0-200 Measured speed (0 to 20.0).
- LST TM (0) 0-6000 Elapsed time (seconds) since user started.

SHIFT (TRACK) Track: "SHIFT" toggles between matrix track or graphics display.  
 Text: "SHIFT" toggles between upper & lower row of information, in alpha-numeric display.

**\*4. Any Errors should be "zeroed" at each error variable, & at each last error condition:**

- Press "Heart" (returns display to default value).
- Press "Start" (to update).

**5. Press "Stop" to exit "Configure" Mode.**

# Display Cable Replacement

## RECALIBRATE THE TREADMILL

1. Enter a mode as described in A1 or D2.
2. Press "8" (may also use "8"+"Power On").
3. Press "Heart". (The Automatic Calibration will take less than 3 minutes, dwelling at minimum speed, 1/2 maximum speed, and maximum speed.)
4. Press "STOP" when the running belt has stopped.



# Side Bed Cover Replacement

## Notes:

**!!CAUTION!!!**

*Always turn the power switch to the Off position. Unplug the treadmill power cord from the power outlet.*

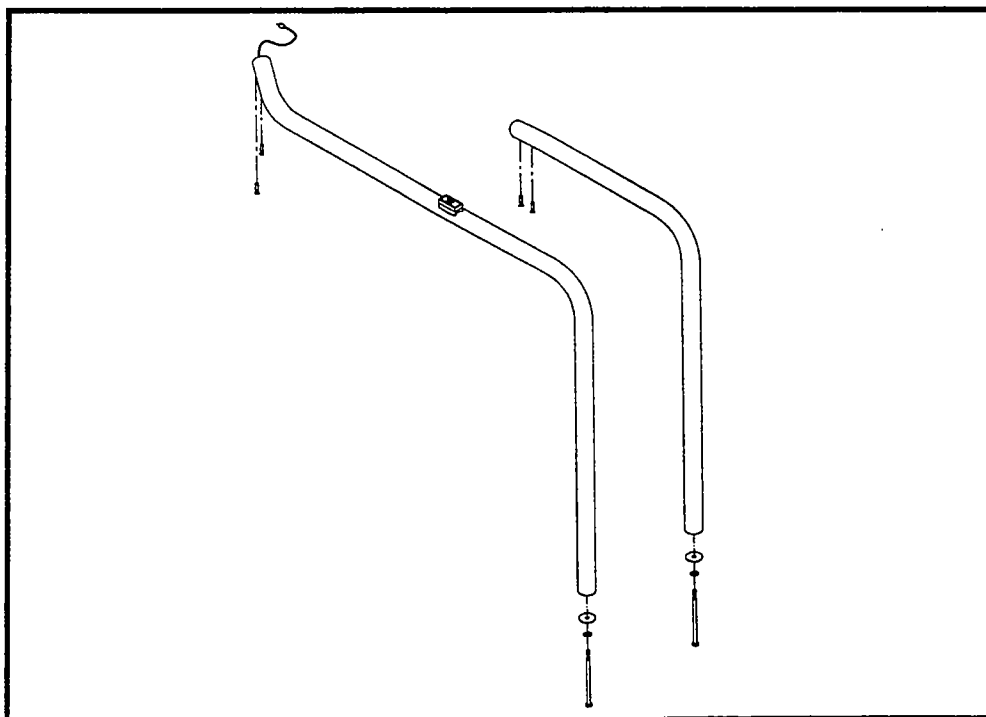
## Tools:

- Side Bed Cover
- Philip-head screwdriver
- Slot-head screwdriver
- 1/8-in. Allen wrench
- 5/8-in. socket and socket wrench with ratchet
- Plastic-head hammer
- Wooden block

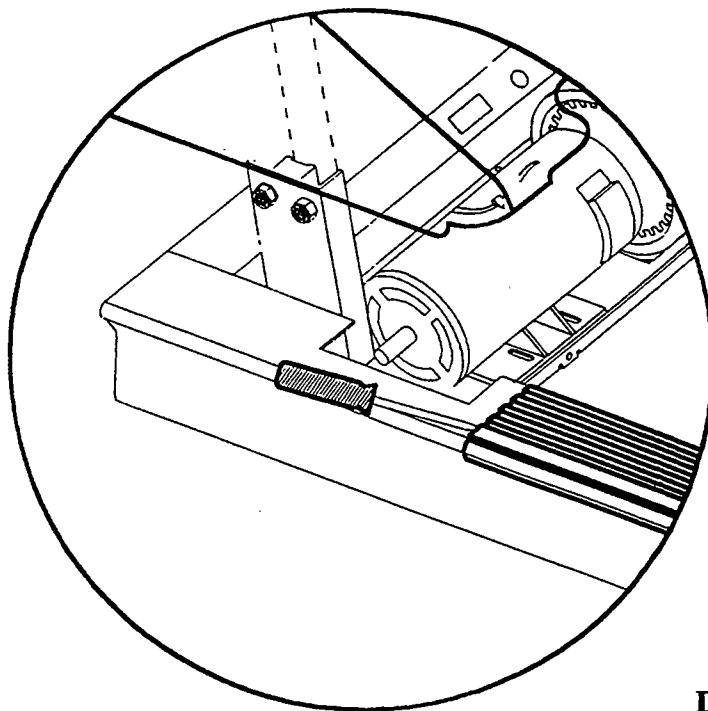
## Procedure: Removing the Side Bed Cover.

1. Remove the 5/8-in. hex-head screw at the bottom of the frame and in-line with the bottom end of the vertical section of the handrail. See **Diagram A**.
2. Lift the bottom of the vertical section of the handrail to clear the side bed cover and pull it to the side of the frame only far enough to clear the side bed cover.
3. Slip a screwdriver under the front end of the side bed cover, near the outside edge, and pry the edge upwards until the outer flange is clear of the frame. See **Diagram B**.

**Diagram A**



# Side Bed Cover Replacement



**Diagram B**

4. Starting at the raised corner of the flange, lift upwards and outwards to free its outer edge from the frame all along its length.
5. Lifting the outer edge of the cover, push the cover towards the center of the treadmill to clear the cover's inner flange from the frame and remove from the treadmill..

## Install Replacement Side Bed Cover

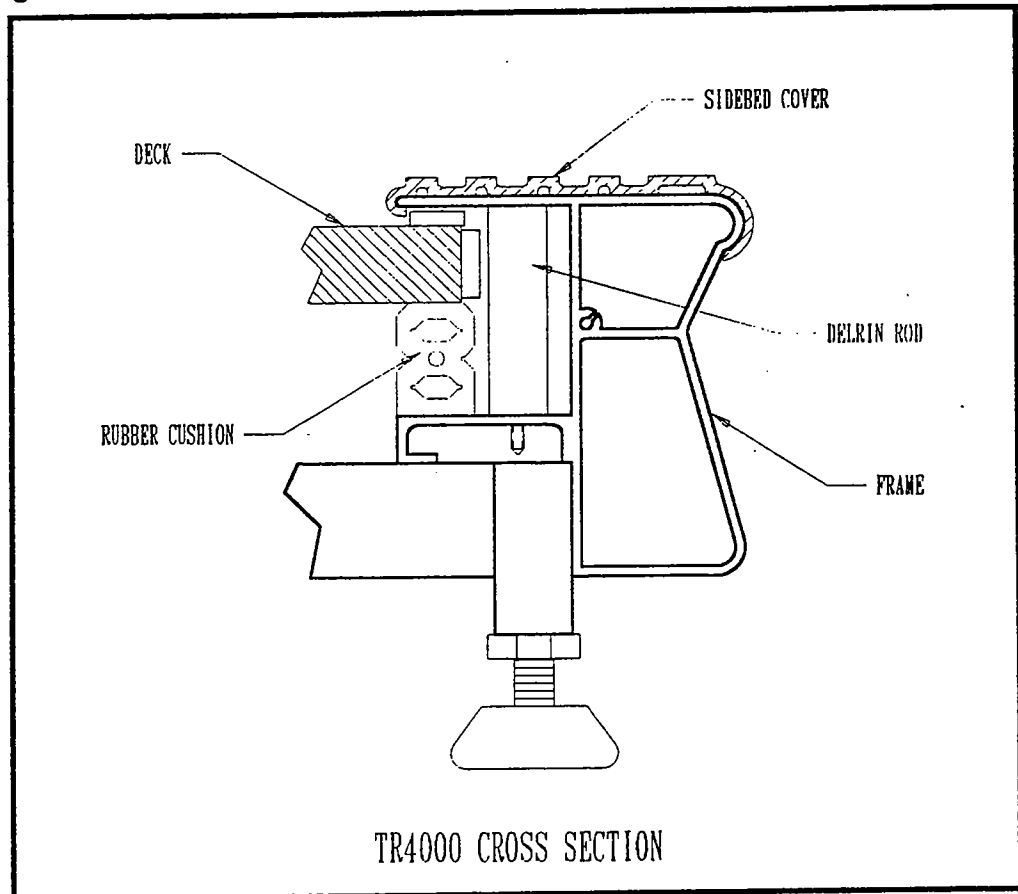
To replace the cover, proceed as follows:

1. To be sure that you have the correct cover (right or left), position it so that the wider flange is at the outside edge of the frame. The hole in the cover should be located nearer the front end of the treadmill.
2. Position the new cover so that the hole is nearest the front of the treadmill. If it is a left-hand cover, be sure to position the front end first, fitting the inner flange to clear the running belt pulley.
3. Move the cover parallel to the frame and hook the inner flange over the frame.

# Side Bed Cover Replacement

4. At the front end, pull the outer flange over the frame, then use your hand or a soft mallet to 'pop' the outer flange over the frame along its full length. The rear end of the cover should butt against the end cap. See **Diagram C**

**Diagram C**



5. If the rear end of the cover does not meet the end cap, set a short section of wooden board against the front end of the cover, then tap the board with a plastic hammer to slide the cover flush against the end cap.
6. Lift the vertical section of the handrail to clear the new side bed cover, then set it carefully into the hole in the side bed cover. Be careful not to scratch the side bed cover.
7. Screw the 5/8-inch hex-head screw through the bottom of the frame and into the bottom of the vertical section of the handrail, and tighten.

This completes side bed cover replacement procedures.

# Autotransformer Replacement

The autotransformer may be tapped to accommodate line voltages from 195V AC to 250V AC. Following are procedures for replacing a failed autotransformer.

## Tools:

- Replacement autotransformer
- Philips-head screwdriver
- Slot screwdriver

## Procedure: Lift the motor shroud

You must first remove the plastic shroud at the front of the treadmill. To remove the shroud to access the autotransformer, proceed as follows:

1. Remove philips-head screw at the center of the front edge of the treadmill.
2. Lift-up the front of the shroud, lifting from both sides to separate the Velcro strips.
3. Lift the shroud up the vertical rails as far as it can go, then suspend it using a bungee cord over the gooseneck and hooked under the upper edge of the shroud.

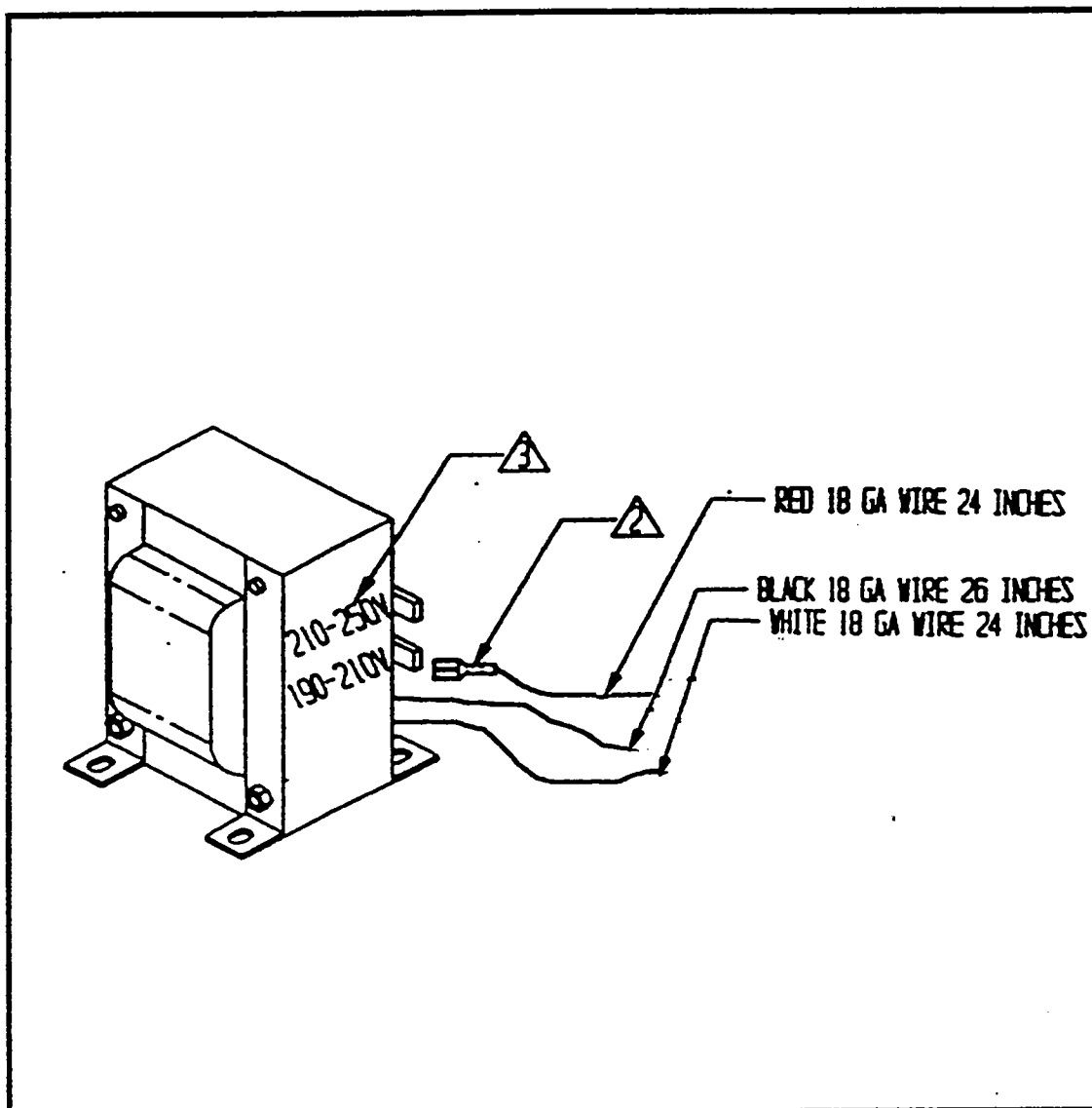
## Remove the Autotransformer

The autotransformer is located on the left-hand side of the motor plate.

1. Pull the connectors of the red and blue wires from the transformer lugs. See **Diagram A. for wire color layout.**
2. Pull the connector of the transformer's black wire from connector **AC1** at the left-rear corner of the Motor Control Board.
3. Using a slot screwdriver, disconnect the transformer's white wire from the **WHT** terminal on the barrier strip.
4. Disconnect the transformer's brown wire from terminal **AC1** on the barrier strip.
5. Using a philips-head screwdriver, remove the four screws that hold the autotransformer to the motor plate. Reach under the treadmill to hold and retrieve the related washers and nuts.



# Autotransformer Replacement



## Replace the Autotransformer

1. Position the replacement autotransformer over the four holes in the motor plate so that the connector lugs are towards the left-hand side of the treadmill.
2. Drop the four screws removed in preceding step 5 into the mounting holes of the autotransformer.
3. Reaching under the treadmill, install related washers and nuts, and tighten the mounting screws.
4. Reconnect the autotransformer's brown wire to terminal **AC 1** on the barrier strip.
5. Reconnect the autotransformer's white wire to the terminal marked **WHT** on the barrier strip.

# Autotransformer Replacement

Reconnect the autotransformer's black wire to terminal AC1 at the left-rear corner of the Motor Control Board.

Connect the blue wire to the lug on the autotransformer.

1. Connect the red wire to the same lug from which it was removed in the previous step.

If there is a question about the available line voltage, or if **EL STL** messages have been appearing on the display, check and following the recommendations in *Selecting the Voltage Tap* following.

## Replace the Shroud

1. Release the shroud from the bungee cord that has held it to the handrail gooseneck, and carefully slide the shroud downward so that it rests on the treadmill frame.
2. Match the screw hole in the lower front edge of the shroud with the mating hole in the frame, then insert and start the philips-head screw previously removed.
3. Press down on the sides and front of the shroud to engage the Velcro strips on the frame.
4. Tighten the screw to complete shroud-replacement procedures.

## Test Treadmill Operation

After you have completed replacement of the autotransformer, perform a complete system test.

## Selecting the Voltage Tap (if there have been EL STL messages)

The treadmill may be operated over a wide range of line voltages. Either of two voltage taps on the autotransformer may be selected to optimize the voltage at the elevation motor. If the treadmill has been generating **EL STL** messages on the display, the elevation motor has either been overheating and shutting-down, or it has been failing to respond to elevation commands.

Measure the line voltage when the facility's power line is under a typical high load.

- If line voltage is less than 210V AC, connect the red wire to the lower lug on the autotransformer.
- If the voltage is greater than 210V AC, connect the wire to the upper lug.



# Heart Grip Replacement

## Notes:

**!!CAUTION!!!**

Always turn the power switch to the Off position. Unplug the treadmill power cord from the power outlet.

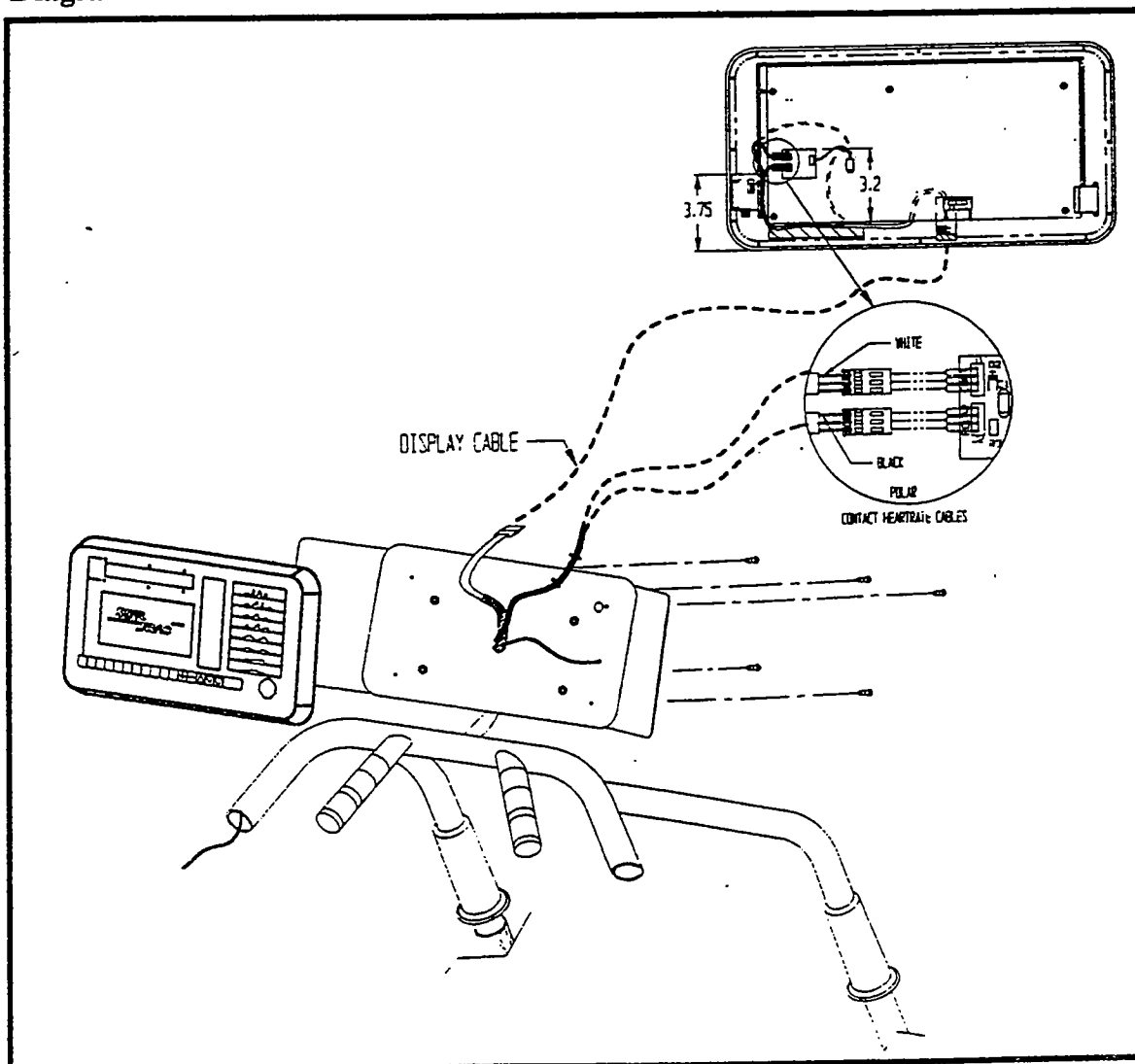
## Tools:

Handgrip Kit  
1/16-inch Allen wrench  
Light nylon cord  
Isopropyl alcohol

## Procedure: Remove the Display Panel

1. Using a 1/16-inch Allen wrench, remove the five screws from the rear of the display panel mount and carefully lay the panel down on the display rail.
2. Unplug the two handgrip cables from their connectors. See Diagram A.

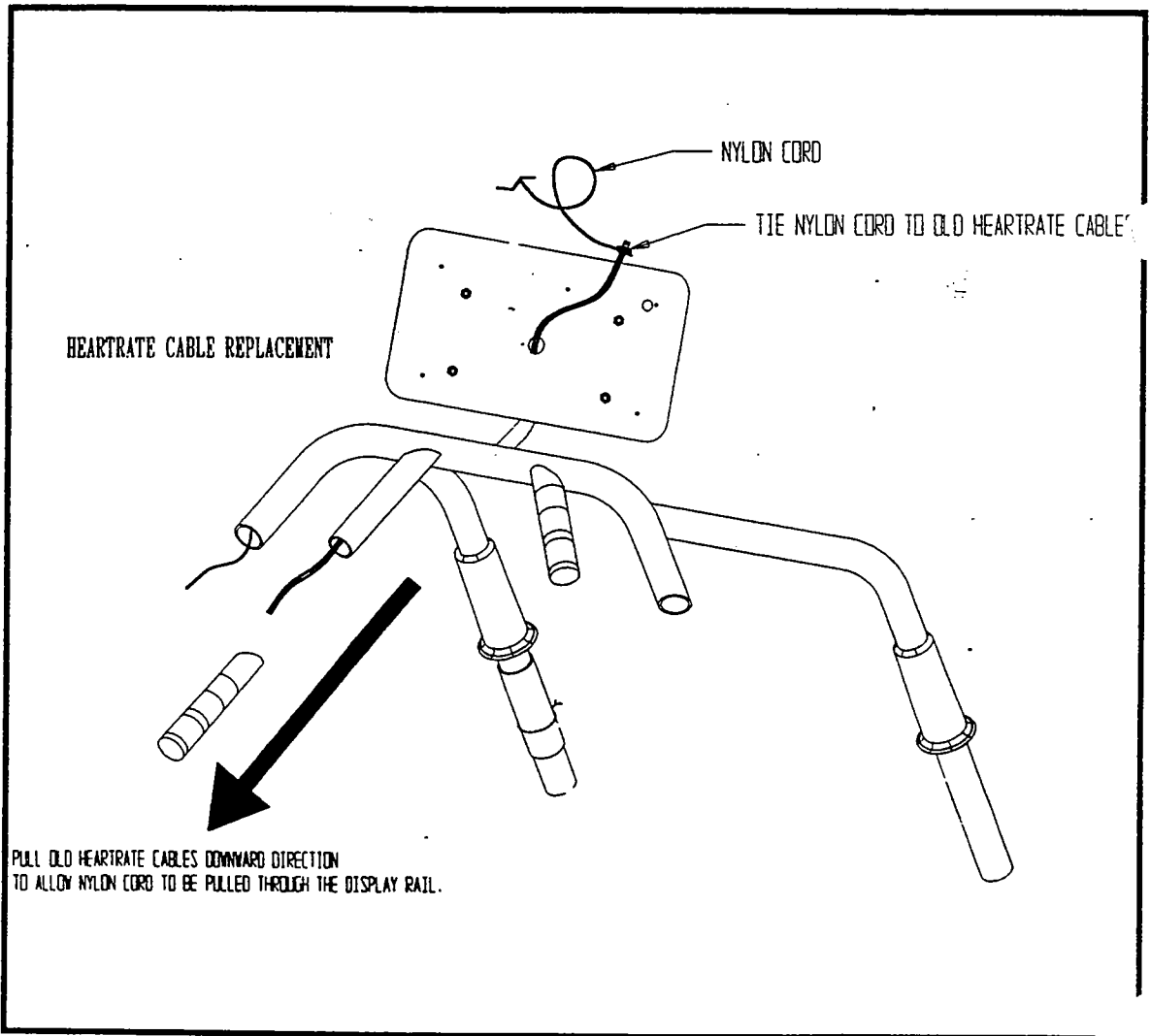
### Diagram A.



# Heart Grip Replacement

3. Lift the handgrip cables to separate the Velcro strips on the cables from the Velcro on the rear of the panel, then remove the two Velcro strips that hold the two cables together.
4. Cut and remove the cable ties from the handgrip cables.
5. Tie a 4-foot length of strong nylon cord to each cable, just below the connector **See Diagram B**. Secure the free end of each cord so that it will not be pulled into the gooseneck. The cord will be the means of pulling the new cables back through the gooseneck to the display panel.

**Diagram B.**



# Heart Grip Replacement

## Remove the Handgrips

1. Pull and twist the handgrips free of the rail tubing. If they will not slide off the tubing, use a knife or scissors to cut the rubber along its length, then slide the handgrips off the tubing.
2. Continue to pull each of the handgrip cables through the gooseneck and the display rail until they emerge with the nylon cord attached.
3. Remove the nylon cord from each cable, and discard the handgrips.

## Replace the Handgrips

1. Remove the new handgrips from their package. Mark the cable connector of the handgrip that is to be on the left-hand side.
2. Tie each nylon cord *securely* to the end of a handgrip cable, just below the connector.
3. For each handgrip cable, pull the related nylon cord out of the gooseneck, drawing the cable up through the gooseneck.
4. Before each handgrip is drawn to the rail tubing, lubricate the inside of the rubber surface with isopropyl alcohol, then promptly push and twist it onto the rail tubing until the rubber sleeve fits snugly against the tubing joint. Pull the remainder of the cable out of the gooseneck during this step.
5. Bring the cable ends together and apply a cable tie approximately 12 inches from the ends.
6. Wrap Velcro strips (furnished) around both cables approximately 2-1/2 to 3 inches from the cable ends.
7. Connect cable connectors to the mating connectors on the rear of the display panel.
8. Press Velcro strips on the cables down onto the Velcro strip on the rear of the display panel.

# Heart Grip Replacement

## Replace Display Panel

1. Position the display panel over the display panel mount, matching screw holes in the back of the panel with holes in the mount.
2. Using a 1/16-inch Allen wrench, replace and tighten each of the five screws removed in a previous step.

## Test Treadmill Operation

After you have completed replacement of the handgrips, perform a complete system test.

