

Section 1:

Introduction

Welcome to the world of **STAR TRAC**. In your hands is the **STAR TRAC TR 4500 Service Manual**. This manual is designed to be easy to use, providing detailed instructions on how to service and maintain the **TR 4500**.

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 | 1.4 Tools and Test Equipment |
| 1.2 Precautions | 1.5 Treadmill Overview. |
| 1.3 Product Support Assistance | |



How To Use This Manual

- 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

- 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.

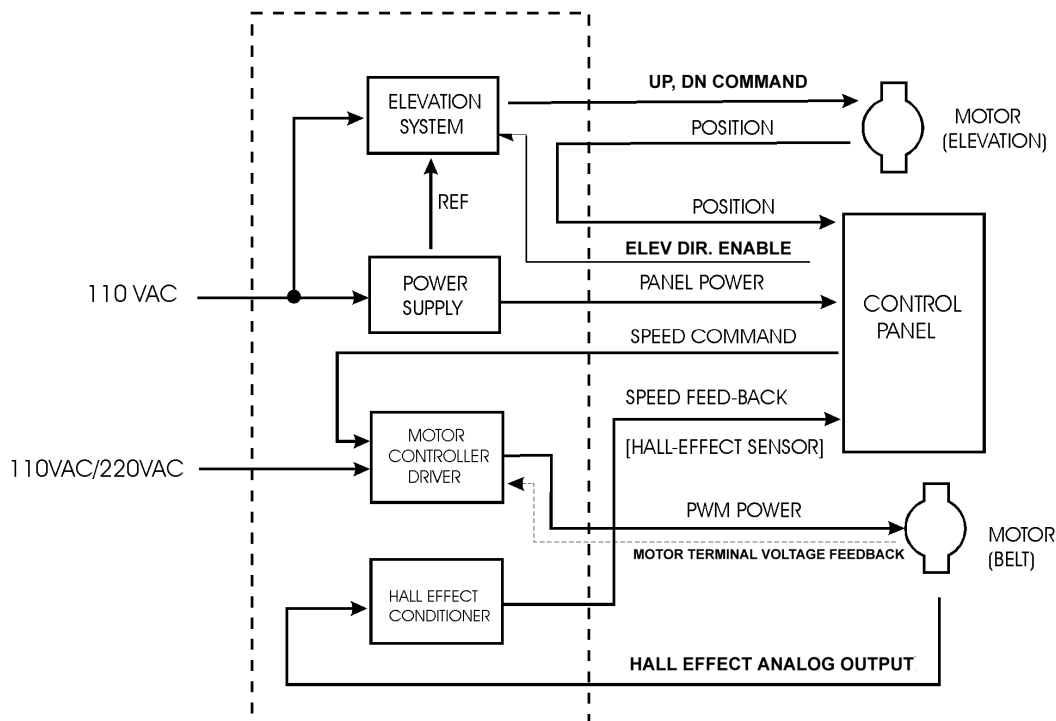
Tools and Equipment



Equipment	Function
Philips Head Screwdriver #2	Shroud Motor Control Board Assembly Side Bed Cover and End Caps Auto-Transformer
Small Slotted Screwdriver 3/32"	Motor Control Potentiometers (MAX SPD) & (IRCOMP)
Bungee Cord 28"	Suspend Motor Shroud on Display Rail
5/32" Hex Allen key	Handrail assembly
5/64" Hex Allen key	Display Board set screws
1/8" Hex Allen key	Display Assembly
1/4" Hex Allen key	Running Belt Head Roller Tail Roller
5/16" Wrench or Nut Driver	Drive Motor Bolts
9/64" Allen Wrench 17-mm Socket Wrench	Elevation Motor
Multi-meter	Voltage Checks Continuity / OHM Ω Checks

Treadmill Overview

MCB ASSEMBLY



- **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
Daily	Using a liquid non-abrasive cleaner, wipe down the following: display board handrails, shroud, heart rate grips. Note: 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.		
Weekly	Elevate the treadmill and vacuum under the unit. Note: Unplug the unit when vacuuming.	Verify running belt alignment and tension. Inspect the area under the treadmill for obstructions.		
Monthly	Lift the motor shroud and vacuum around the motor and electronics. Clean and lubricate the elevation screws. Note: 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. Note: This must be done with the unit unplugged and turned off.	
Quarterly			Wax the running belt and deck using Unisen powder wax.	

Quarterly Waxing



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.

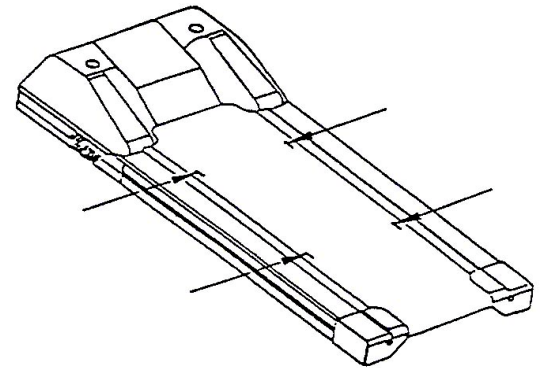
The treadmill is designed with an automatic prompt, which will display RE WAX across the display screen every 2,000 miles or 3,000 kilometers. The procedure below explains step-by-step how to apply wax and clear the RE WAX prompt.

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



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.

STEP 5: Clear RE WAX prompt:

- Engage Settings or Configure Modes. Press and hold the “0”, “1” or (2) & “START” keys down, release the “1” or (2) key only. Display will beep and display SETTINGS or CONFIGURE momentarily (depending if the 1 or 2 key was released), then UNITS will be displayed.
- Press the Incline Down Key (elevation) until LSTDCK is displayed. Press and release the HEART Key, this will automatically transfer the accumulated miles/kilometers into the LSTDCK, press the ENTER Key to save.

Note: Blow away extra wax first from around the siderails and deck before wiping.

Note: The RE WAX prompt may be cleared either in “Settings or Configure Mode”.

Section 3:

Diagnostics

The **STAR TRAC** 4500 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 ;

- **Manager Mode (customize)**
- **Maintenance Mode (diagnostics)**
- **Motor Test Mode (diagnostics)**
- **Display Test Mode (diagnostics)**
- **Heart Rate Test Mode (diagnostics)**

Contents:

3.1 Engaging Manager Mode

3.2 Engaging Maintenance Mode

3.3 Description of parameters

3.8 Engaging Motor Test Mode

3.9 Calibration

3.10 Engaging Display Test Mode
Heart rate test

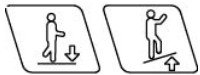
Manager Mode

After having used you **Star Trac 4500 treadmill** for several workouts, you may wish to specially customize your treadmill by changing some of its settings.

To engage Manager Mode:

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

Once the treadmill is in Manager 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).

Note: ENTER KEY must be pressed, for each value changed.



STOP KEY: Exits Manager Mode and restarts the treadmill with a “warm start.”



0 – 9 KEYS: Enters new parameter values. If **UNITS** parameter is displayed, key **5** starts DISPLAY TEST and key **8** starts MOTOR TEST.



HEART KEY: When pressed will automatically display manufactures default value.

Note: ENTER KEY must be pressed, to save the default values if changed.

Manager Mode

The following parameters may be changed using the previous keys:

Parameters	Lowest Value	Highest Value	Option 1	Option 2	Default Value	Meaning
UNITS	---	---	English	Metric	English	English= units of lbs., miles, hours, minutes Metric= units of kg., km, hours, minutes.
MN SPD	0.1	2.5	English=0.5	Metric=1.0	0.5	Minimum speed in MPH or KM/HR
MX SPD	5.0	20.0	English=10.0	Metric=20.0	10.0	Maximum speed in MPH or KM/HR
EL OPT	---	---	ON	OFF	ON	Turns the elevation system ON or OFF.
TIME	5	99			99	Maximum time in minutes allowed for program, including warm-up/cool-down.
OP HRS	0	0	---	---	6,553.5	Total operating hours
DIST	0	0	---	---	65,635	Total treadmill miles (Units=English) or kilometers (Units=Metric)
WEIGHT	0	399	---	---	155	Defaults (to user), typical weight in lbs/kg depending on what setting (UNITS= English or Metric)
SER NO	0	0	---	---	65,535	Treadmill serial number.
LANG	---	---	---	---	English	Language in English, Dutch, German, Portuguese, Spanish, Swedish, or Italian.
ENTRY	---	---	Units	Tenths	Units	This variable changes the starting speed in Units or Tenths

Maintenance Mode

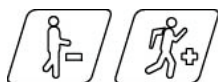
Maintenance Mode includes all of the items of Manager Mode, plus additional data that is automatically saved to properly troubleshoot in case of a problem. To engage Maintenance Mode:

1. Press and hold the “ 0 ”, “ 2 ” & “ START ” keys together. While holding the “ 0 ” & “ START ” keys down, release the “ 2 ” key only.
2. The display will beep and display MAINTENANCE momentarily, then UNITS will be displayed.

Once the treadmill is in Maintenance 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).

Note: ENTER KEY must be pressed, for each value changed.



STOP KEY: Exits Manager Mode and restarts the treadmill with a “warm start.”



0 – 9 KEYS: Enters new parameter values. If **UNITS** parameter is displayed, key **5** starts DISPLAY TEST and key **8** starts MOTOR TEST.



HEART KEY: When pressed will automatically display manufactures default value.

Note: ENTER KEY must be pressed, to save the default values if changed.

Maintenance Mode

The following parameters may be changed using the previous keys:

Parameters	Lowest Value	Highest Value	Option 1	Option 2	Default Value	Meaning
UNITS	---	---	English	Metric	English	English= units of lbs., miles, hours, minutes Metric= units of kg., km, hours, minutes.
MN SPD	0.1	2.5	English=0.5	Metric=1.0	0.5	Minimum speed in MPH or KM/HR
MX SPD	5.0	20.0	English=10.0	Metric=20.0	10.0	Maximum speed in MPH or KM/HR
EL OPT	---	---	ON	OFF	ON	Turns the elevation system ON or OFF.
TIME	5	99			99	Maximum time in minutes allowed for program, including warm-up/cool-down.
OP HRS	0	0	---	---	0	Total operating hours
DIST	0	0	---	---	0	Total treadmill miles (Units=English) or kilometers (Units=Metric)
WEIGHT	0	399	---	---	155	Defaults (to user), typical weight in lbs/kg depending on what setting (UNITS= English or Metric)
SER NO	0	0	---	---	0	Treadmill serial number.
LANG	---	---	---	---	English	Language in English, Dutch, German, Portuguese, Spanish, Swedish, or Italian.
ENTRY	---	---	Units	Tenths	Units	This variable changes the starting speed in Units or Tenths

Maintenance Mode

Parameters	Lowest Value	Highest Value	Option 1	Option 2	Default Value	Meaning
HRT CON	---	---	ON	OFF	OFF	OFF= Heart Control disable ON= Heart Control enabled
HRT	---	---	CNT DN POLAR CONTACT BOTH	CNT DN POLAR CONTACT BOTH	CNT DN	CNT DN= Manual countdown heart rate POLAR, CONTACT or BOTH (Polar & Contact)
10 REV	22.0	74.0	30.7 = For 110v units.	35.8 = For 220v units	29.1	Inches of running belt travel for 10 flywheel revolutions, measured in inches. 1.8" pulley:30.7 (110v) 2.1"pulley:35.8(220v)
CNT/REV	1	255	31 = Magnetic RPM Sensor	125 = Optical Sensor	31	Number of counts per RPM Sensor revolution.
MN PWM	2	50	---	---	30	Minimum PWM to obtain minimum speed, automatically done.
1/2 PWM	25	170	---	---	130	1/2 Maximum PWM to obtain 1/2 maximum speed, automatically done.
MX PWM	86	255	---	---	230	Maximum PWM to obtain maximum speed, automatically done.
DATE	1.00	12.99	---	---	1.96	Treadmill manufacturing date.
NO STO	0	255	---	---	0	Number of times the Stop Switch was down or disconnected on power-up since last reset.

Maintenance Mode

Parameters	Lowest Value	Highest Value	Option 1	Option 2	Default Value	Meaning
KEY DN	0	255	---	---	0	Number of times the Stop Switch was down or disconnected on power-up since last reset.
NO RPM	0	255	---	---	0	Number of times the display did not detect a RMP signal.
SP CNG	0	255	---	---	0	Number of times a sudden change in speed was detected
EL STL	0	255	---	---	0	Number of times an elevation stall was detected.
EL RNG	0	255	---	---	0	Number of counts per RPM Sensor revolution.
EL LOST	0	255	---	---	0	Number of times no elevation was detected.
ELZERO	0	255	---	---	240	Represents the incline number for 0%.
EL MAX	0	255	---	---	57	Represents the incline number for 15%.
LSTERR	0	25	---	---	0	Indicates what display code appeared last. 18 = NO STO 19 = KEYDN 20 = NO RPM 21 = SP CNG 22 = EL STL 23 = EL RNG 24 = EL LOST
LSTELV	0	255	---	---	0	Displays the target elevation prior to the display code.
LSTPOT	0	255	---	---	0	Displays the incline number prior to the display code.

Maintenance Mode

Parameters	Lowest Value	Highest Value	Option 1	Option 2	Default Value	Meaning
LSTRES	0	2	---	---	0	Displays 1 = Unit was resetting to 0%. 0 = Unit finished resetting to 0% prior to the display code.
LSTSSP	0	255	---	---	0	Displays the speed prior to the display code.
LSTPWM	0	255	---	---	0	Displays the PWM number prior to the display code.
LSTMSP	0	255	---	---	0	Display the actual measured speed prior to the display code.
LST TM	0	65355	---	---	0	Displays the elapsed time, in seconds, prior to the display code.
LSTDCK	0	65355	---	---	0	Number of miles when the deck was last waxed. After a 2000 mile (or 3000 KM) difference, "REWAX BELT" will scroll in the display until "LST DCK" miles are updated.
LSTBLT	0	65355	---	---	---	Number of miles when the last belt was replaced.

Motor Test Mode

Motor Test Mode allows the treadmill to calibrate both elevation and running belt speed. Verifies RPM Sensor feedback, Drive Motor and MCB response, and verifies Elevation Motor range (count). Also burns in the motor, by way of the controls and displays of the treadmill.

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

Engage 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 only. The display will beep and display **MANAGER (or MAINTENANCE)** momentarily, then UNITS will be displayed.
2. Press and release the “8” key. Display will read: **240 3 .0** if treadmill is at 0%.

Alternative mode to enter Motor Test Mode:

1. Turn the power switch on while pressing the “ 8 ” key simultaneously on the display.

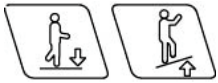
240	3	.0
------------	----------	-----------

A. Elevation Motor Range.

B. PWM Duty Cycle.

C. RPM Sensor Feedback

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%. When using the Incline Keys verify the elevation system is responding correctly by the following:

- As the treadmill elevates up and down verify the corresponding LEDs light up on the MCB.
- Verify that the Elevation Motor Range (see above A column) is changing in increments of 1% as the treadmill elevates up and down.

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).

When using the Speed Keys verify the speed control system is responding correctly by the the following:

- As the treadmill begins to increase speed, verify that the display registers RPM feedback (see above C column) in increments of 0.1 mph/km.



START 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.



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



HEART KEY: Starts automatic calibration of minimum, 1/2 maximum, & maximum speed.

Calibration

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

Automatic Speed Calibration:

In this mode minimum and maximum speed is automatically calibrated. Calibration lasts less than 3 minutes; belt will be in motion during this test.

Auto-calibration should be done every time MN, MX SPD & UNITS parameters have been changed in either SETTINGS or CONFIGURE Mode. Auto-calibration must be engaged when ever speed controlling components have been upgraded or replaced such as; MCB, Display Board, Drive Motor & RPM Sensor.

- 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. The display will beep and display **MANAGER (or MAINTENANCE)** momentarily, then UNITS will be displayed.
- 2.** Press and release the “8” key. Display will read: **XXX 3 .0** if treadmill is at 0% display will read: **240 3 .0**
- 3.** Press “HEART” key, display will read: **CAL** treadmill will go into an automatic speed calibration for less than 3 minutes. Press “STOP” key to exit Motor Test.

NOTE: If Auto-calibration fails to give the correct response refer to Section 4.

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 Panel by way of its own controls and displays. It also allows EPROM version to be displayed. To enter Display Test Mode:

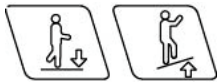
*****Caution*** : Do not stand on the running belt while performing these test.**

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 **MANAGER (or MAINTENANCE)** 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.



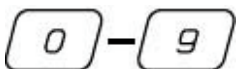
PROGRAM SELECT KEY: Lights the six LEDs bordering the 15-segment display.



HEART KEY: Displays “HEART HEART” on the 15-segment display.



START KEY: Displays “START START” on the 15-segment display.



0 – 9 KEYS: Lights corresponding LEDs in the Number/Program Select Keys, (except for key 9), alongside the Pre-Designed Program profiles.



STOP 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 **MANAGER (or MAINTENANCE)** 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 (treadmill must be equipped with both contact and Polar).
- 6.** In the far right display screen a blinking LED segment will flash then the average heart rate will be displayed.

NOTE: If the above Heart Rate Test fails to give the correct reading or response, refer to Section 4.

Section 4:

Troubleshooting

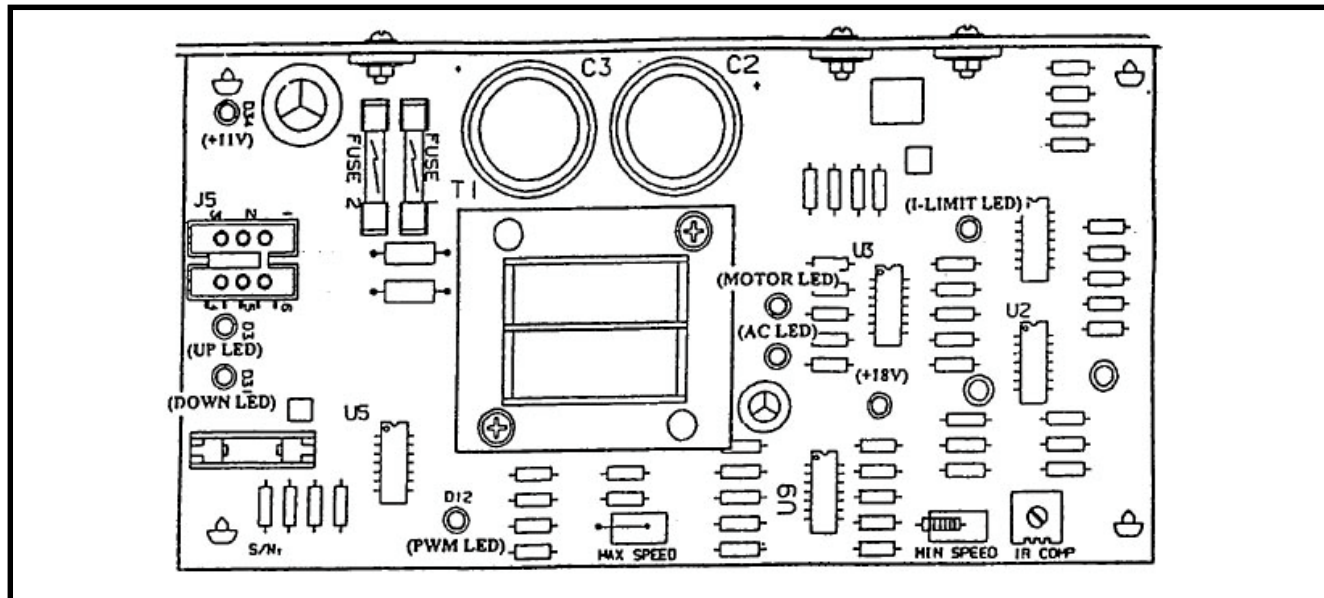
Should the **STAR TRAC** 4500 Treadmill experience a problem or a display code appear, the following procedures will help determine the precise reason for the problem. Included are flow charts breaking down each individual display code with problem statements and solutions.

Contents

4.1 110v MCB Layout	4.24 Running Deck Symptoms
4.3 220v MCB Layout	4.26 Isolating Noise
4.5 Calibration Symptoms	4.27 Leveling
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
4.12 Elevation Symptoms	4.32 NO STO Flowchart
4.13 Heart Rate Symptoms	4.33 No RPM Flowchart
4.16 Polar Symptoms	4.37 SP CNG Flowchart
4.17 Display Cable Symptoms	4.41 EL STL Flowchart
4.18 Drive Motor Symptoms	4.45 EL RNG Flowchart
4.19 Head / Tail Roller Symptoms	4.49 EL LOST Flowchart
4.20 Drive Belt Symptoms	4.53 EL NOZ Flowchart
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 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 LED lights up. If LED lights up replace the 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 excessiveload 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:

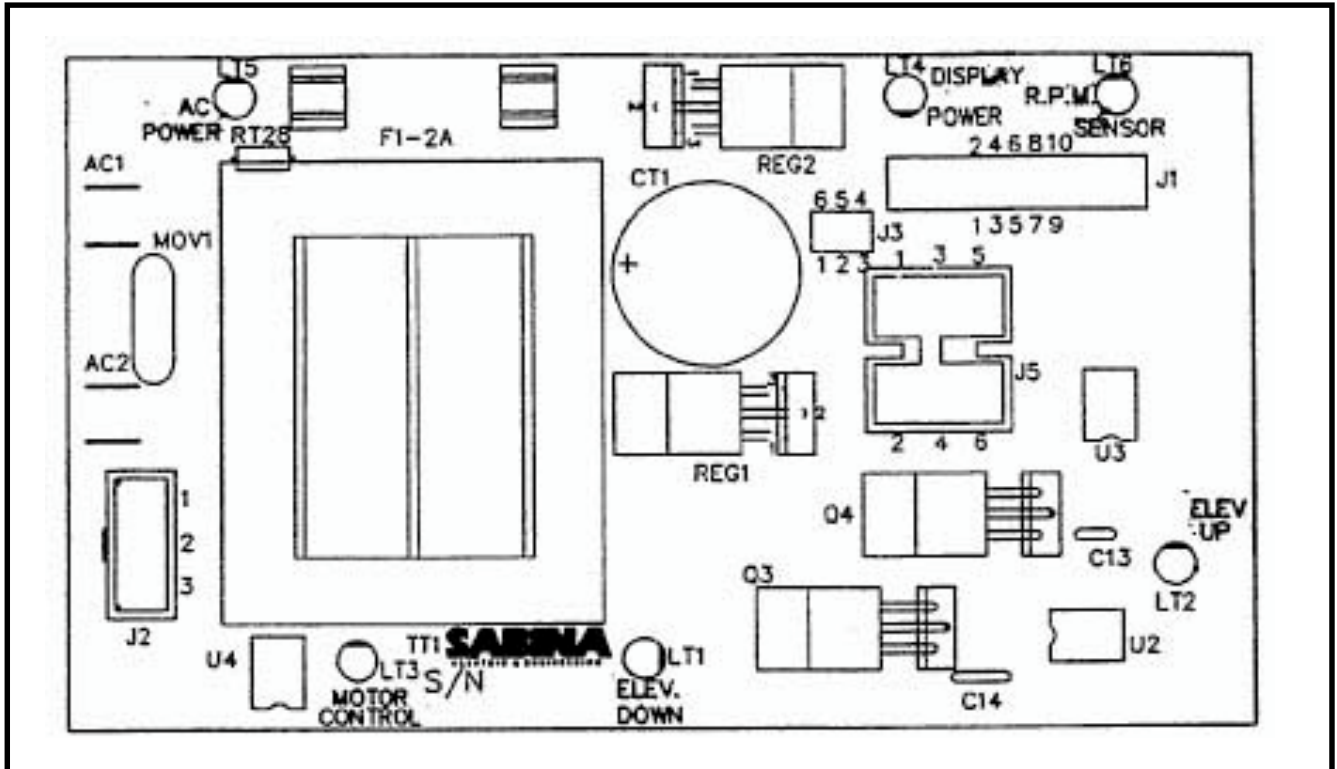
1. Display cable for possible pinch or tear (see page 4.17 in this section for Display Cable symptoms)
2. Replace MCB.

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 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 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.

Troubleshooting

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

Symptom:

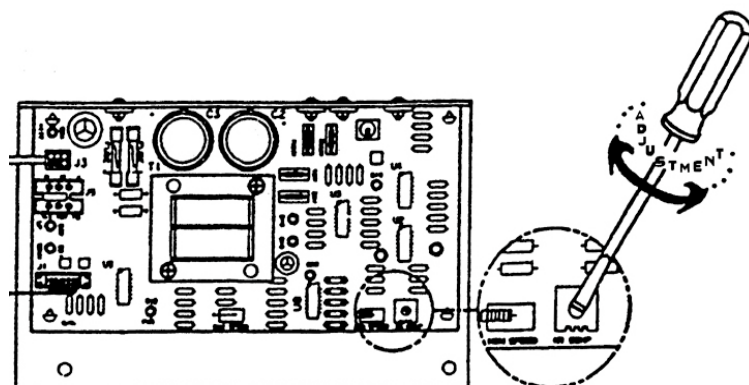
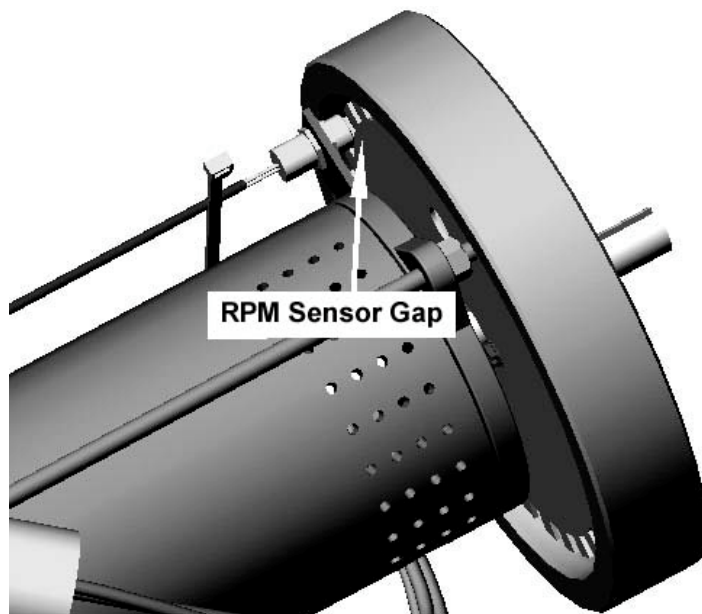
Auto-Calibration fluctuates.

- 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 Mode:
(Configuration Mode details in Section 3)
 - CNT/RV : 31 = Magnetic/Cherry RPM Sensors
 - 10 REV: 29.1" for 1.7" dia. motor pulley (110v)
 - 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.
 - Hall Effect/Cherry RPM Sensor is being used, verify the gap is no more than 1/8 inch.NOTE: See Diagram # 1.

- 5.** Adjust IR COMP potentiometer.
NOTE: See Diagram #2, adjustment.

REPLACE: MCB if symptom continues.



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 Mode.
(Configuration Mode details in Section 3)
 - MN SPD: 0.5 MPH or 1.0 KM/PH
 - MX SPD: 10.0 MPH (110v) or 20.0 KM/PH (220v)
 - CNT/RV : 31 = Magnetic/Cherry RPM Sensors
 - 10 REV: 29.1" for 1.7" dia. motor pulley (110v)
 - 10 REV: 35.8" for 2.1" dia. motor pulley (220v)

NOTE: To reach 20.0 KM/PH on 220v units, drive motor pulley must be 2.1". If not sure what your 10 REV settings should be, manually measure the drive motor pulley diameter.

4. Verify RPM Sensor alignment.
 - Hall Effect/Cherry RPM Sensor is being used, verify the gap is approximately 3 business cards or 1 credit card. If adjustment is necessary loosen the flywheel to re-position.

NOTE: See Diagram #1.

REPLACE: RPM Sensor if RPM reading is sensitive or feedback appears erratic.

5. Adjust the MAX SPEED potentiometer.
NOTE: See Diagram #2. (220v units only)

GO TO: Section 3.7 Manual Calibration if problem continues.

Diagram #1

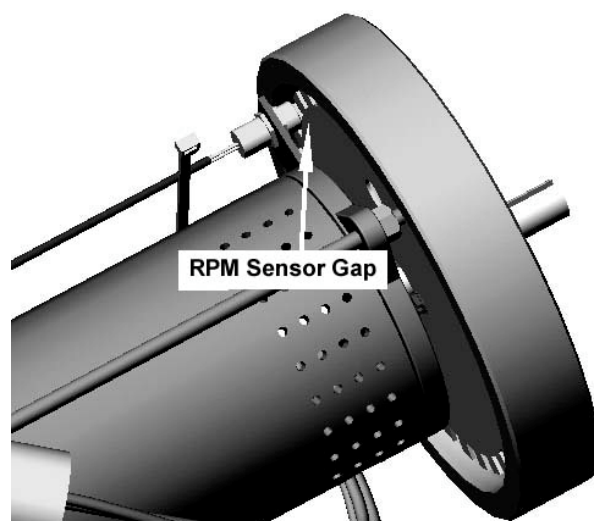
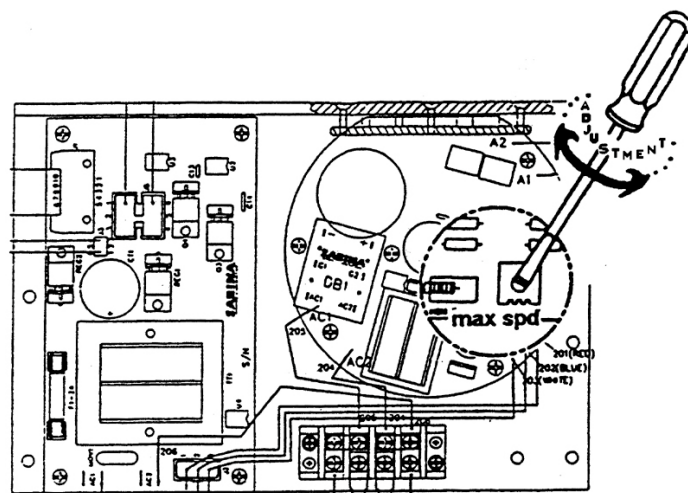


Diagram #2



Manual Calibration



****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.

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.

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.

No Display Power

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

110v UNIT

Diagram A

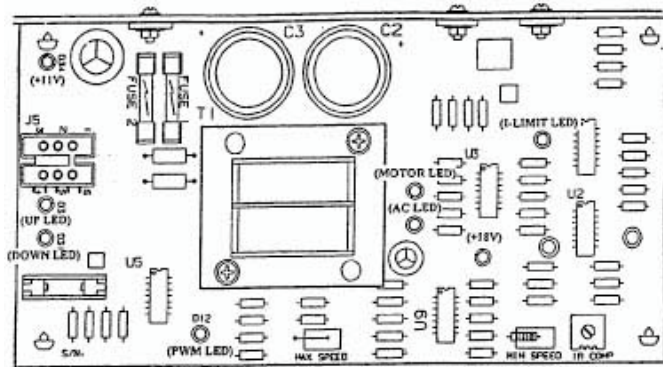
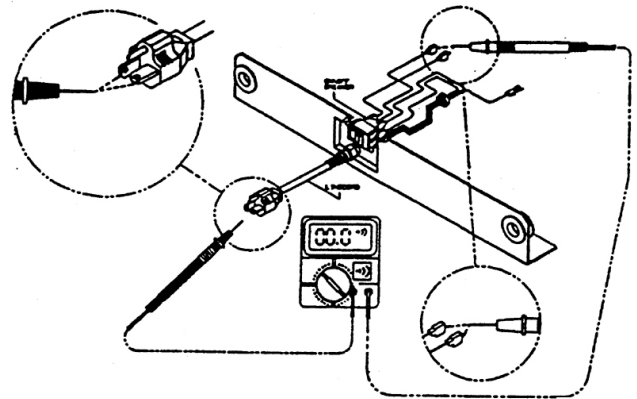


Diagram B



****CAUTION****

The following steps are performed with the 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 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)

REPLACE: MCB if all the above check OK.

- 3.** Verify if LED +18 is lit. LED +18 indicates the presence of an acceptable level of voltage for MCB operation.

REPLACE: MCB if +18 is not lit.

- 4.** Verify if LED + 11 is lit. LED +11 indicates 11v are being applied to power the display board. If the LED is lit go to step 5.

REPLACE: MCB if +11 is not lit.

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

REPLACE: Display board if display cable checks OK.

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

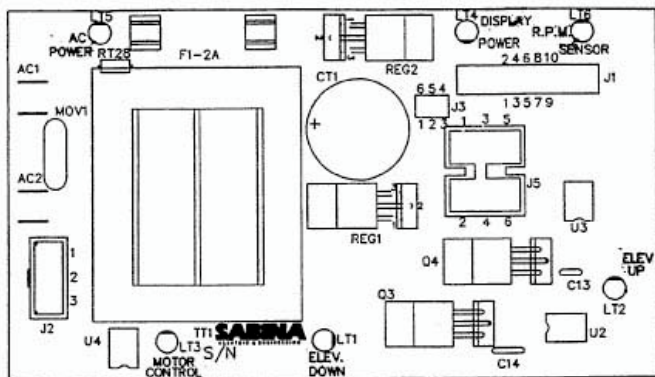
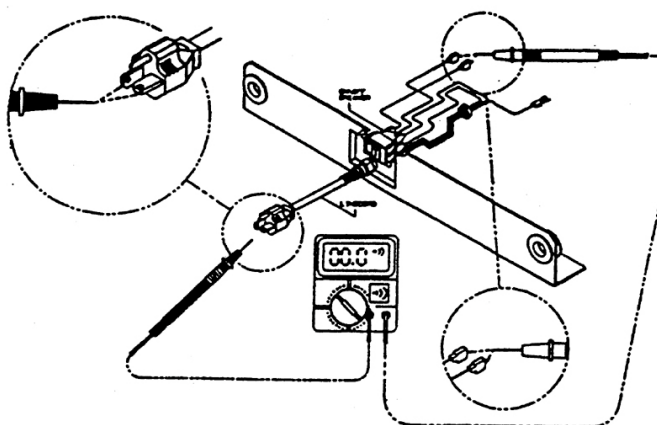


Diagram B



****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 4500 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 4500'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 response.

Symptoms:

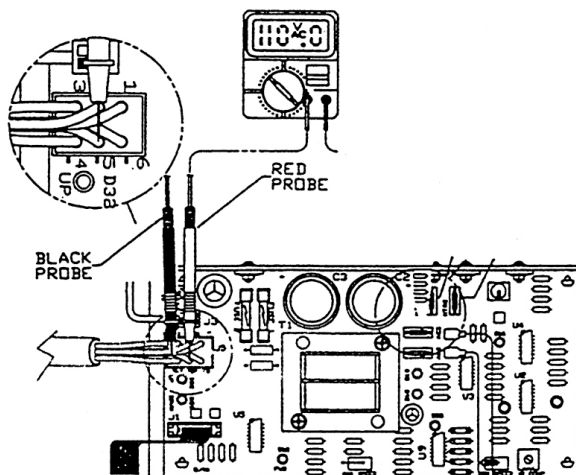
Elevation motor hesitates during operation.

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 4500.
 - 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



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 Manager/Maintenance 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 Manager or Maintenance Mode. Procedure completed.

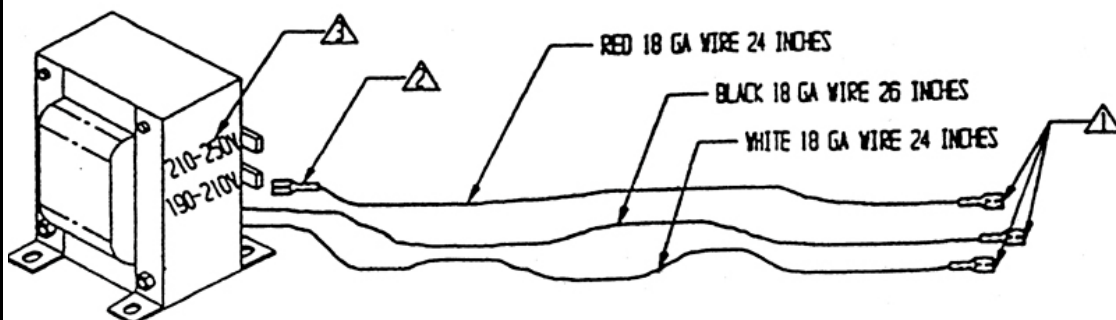
Symptom:

Elevation Motor overheats and blows the MCB fuse.

1. The elevation motor on the 4500 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

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.



Speed Troubleshooting



Note: This symptom may be easily fixed by verifying certain values in the Configure Mode.

Note: For each value changed the "ENTER" key must be pressed to be saved.

Symptom:

Treadmill appears/feels faster/slower than other **STAR TRAC** treadmills.

1. Engage Maintenance Mode by holding down the "0", "2" and "Start" keys at the same time, and then release the "1" key only. Display will read MAINTENANCE momentarily then display UNITS.
2. Using the elevation "↑" key to go through the parameteres, verify the following parameterts have the correct values.

	110V / 220V Units English	220v Units Metric
• UNITS	ENGLISH	METRIC
• MN SPD	0.5	1.0
• MX SPD	10.0	20.0
• ENTRY	UNITS/TENTHS	UNITS/TENTHS
• 10 REV	30.7	35.8
• CNT/REV	31	31

3. If any values have been changed or set back to default settings, re-engage Auto-Calibration and re-calibrate.

Speed Troubleshooting



Note: This symptom may be easily fixed by verifying certain values in the Configure Mode.

Note: For each value changed the "ENTER" key must be pressed to be saved.

Note: All 110v units are designed to reach a maximum speed of 10.0 MPH. 220v units set in metric will reach a maximum 20.0 KM/PH.

Note: Wall voltage is very critical when dealing with maximum speed. Voltages under 100v for 110v units will cause speed variation, voltages under 200v for 220v units will cause the same problem.

Note: Each unit must be on its own dedicated circuit, very main wall breaker.

Symptom:

Treadmill will not reach maximum speed.

1. Engage Maintenance Mode by holding down the "0", "2" and "Start" keys at the same time, and then release the "1" key only. Display will read MAINTENANCE momentarily then display UNITS.
2. Using the elevation "↑" key to go through the parameters, verify the following parameters have the correct values.

	110V / 220V Units English	220v Units Metric
• UNITS	ENGLISH	METRIC
• MN SPD	0.5	1.0
• MX SPD	10.0	20.0
• ENTRY	UNITS/TENTHS	UNITS/TENTHS
• 10 REV	30.7	35.8
• CNT/REV	31	31

3. If any values have been changed or set back to default settings, re-engage Auto-Calibration and re-calibrate.

IF the problem continues verify the following.

1. Wall voltage. (+/- 10%)
2. Dedicated Circuit Breaker.
3. Adjust MAX SPEED potentiometer (220v units). See Diagram below:

Speed Troubleshooting



**** CAUTION ****

Running belt will be moving at high speed during Step 1 & 3.

**** CAUTION ****

When checking motor brushes have the treadmill turned off and unplugged.

Note: Brushes should show a smooth pattern of wear, cracks or unusual wear will cause motor to jerk, replace if brushes if needed.

Symptom:

Treadmill jerks or hesitates during operation.

1. Verify the running belt / drive belt are not loose or slipping.
 - Accelerate the running belt to 3.0 (5.0 kph). Stand on the side of the treadmill, while grasping the handrails firmly, place one foot on the running belt with a very sharp impact. Running belt should not stop, instead slip for a split second forcing your foot back. Drive belt should never stop rotating over the headroller during this procedure.
 - If running belt or drive belt appears loose, see page 4.26 in this section.
2. Verify motor brushes are making contact and are seated correctly.
 - Remove the motor brush cover, check brushes are seated correctly by removing the brush clip and verify contact. See diagram A for removal instructions.
 - Cleaning the motor armature with a commutator stone is highly recommended to remove any possible carbon dust build up, causing the the brushes to skip over resulting in a brief motor hesitation.
3. Adjust the IRCOMP potentiometer, located on the MCB, see diagram B.
 - Bring the treadmill to its minimum speed.
 - Stand on the running belt, if the belt feels jerky / hesitates adjust the IRCOMP potentiometer until running belts feels smooth.

Symptom:

Treadmill hesitates during initial speed start-up.

1. Manually calibrate the minimum PWM as described in page 4.7 in this section.

Heart Rate Troubleshooting



**** 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 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 generate electrical interference which will cause erratic readings.
- 4.** Clean and wipe heart rate grips after each use, for optimum results.

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 HEART key once, EPROM version will be displayed. HEART key twice, displays Heart/ Seeking HR.
 - 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). If no reading is displayed go to **STEP 2**.

2. **Verify Contact Heart Rate settings.** Engage MANAGER MODE, Hold the "0", "1", and "START" keys together and release the "1" key only. Display will read MANAGER MODE momentarily, then UNITS will be displayed.
 - Scroll through the parameters using the elevation "UP" key until display reads: 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 Display removal.

NOTE: See diagram #2 Wire connection.

Connection is wrong or loose, reconnect and repeat step 1.

4. **Verify Heart Rate grip cables.**

NOTE: See diagram #3. If connections are wrong or loose, reconnect and repeat step 1.

Diagram 1

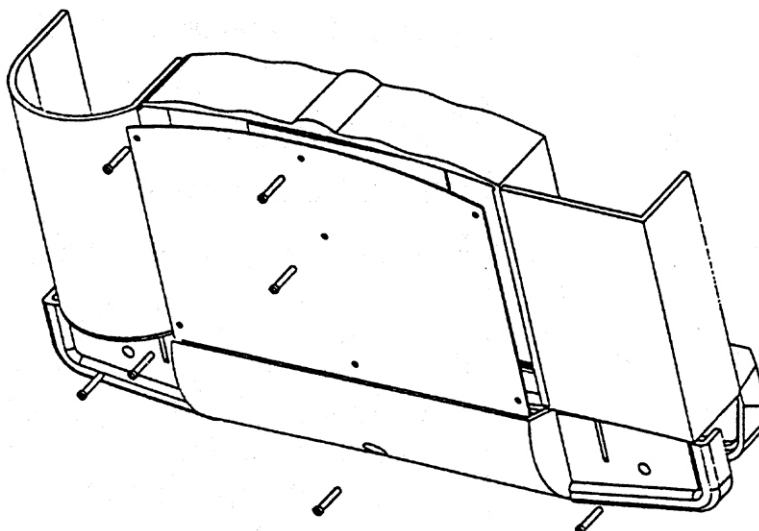


Diagram 2

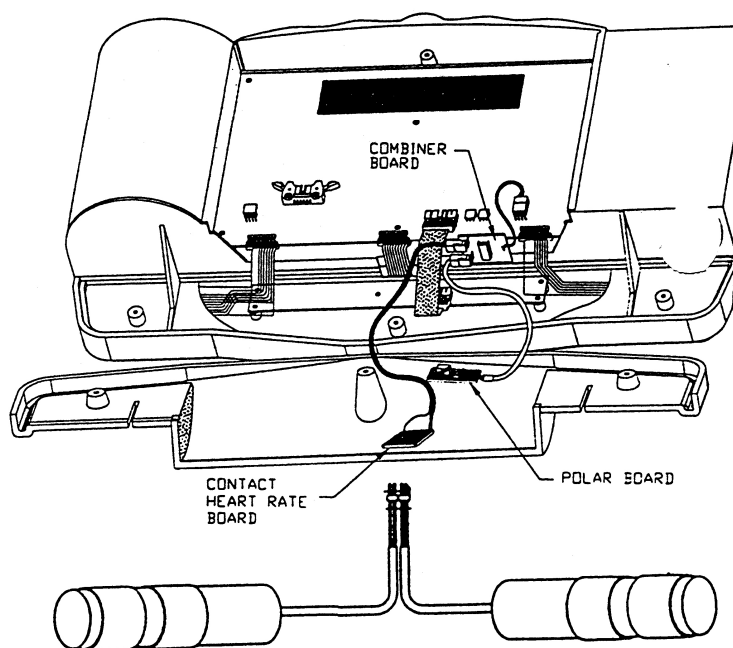


Diagram 3

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 $3\text{ M}\Omega$.

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 4

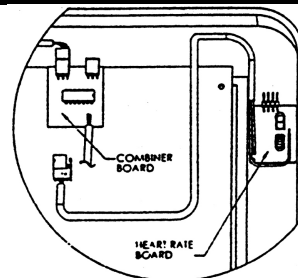


Diagram 5

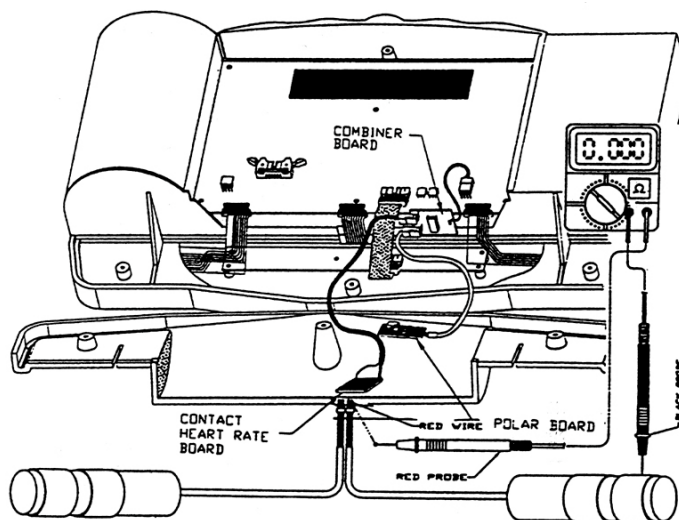


Diagram 6

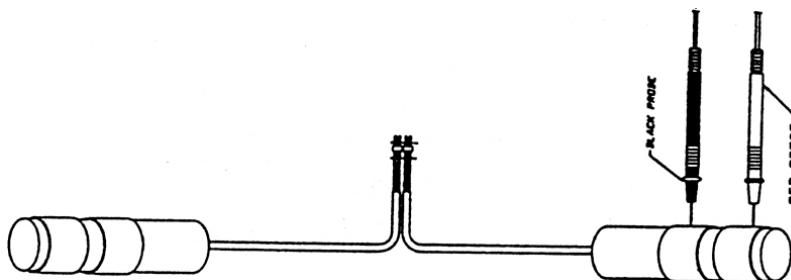
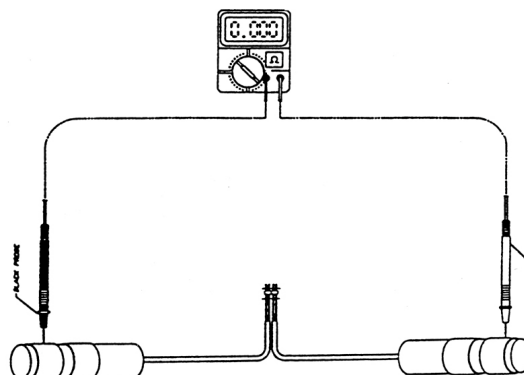


Diagram 7



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.

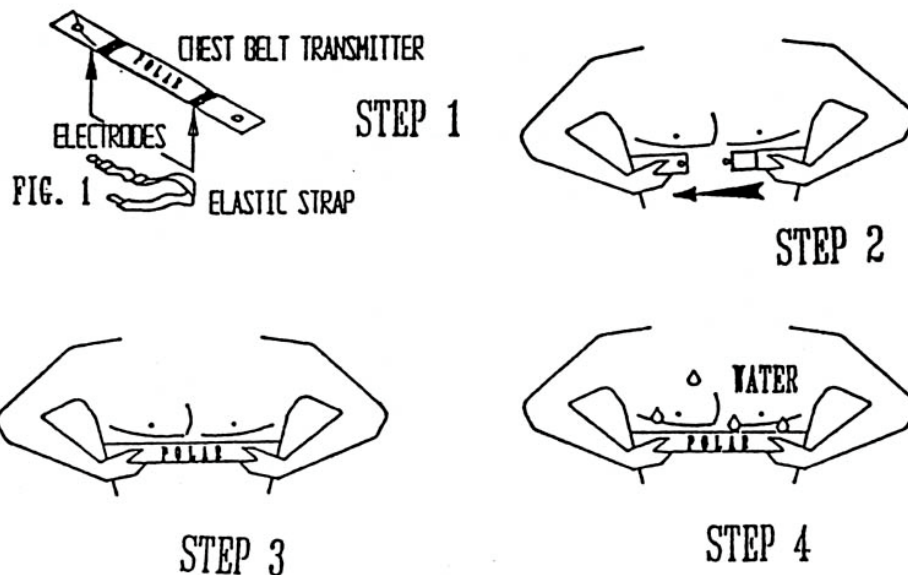
NOTE: Verify heart rate response without operating the running belt. Straddling the treadmill press the HEART key. If heart rate is not picked up engage Heart Rate Test, refer section 2.8

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

Symptom:

Intermittent or erratic polar heart reading.

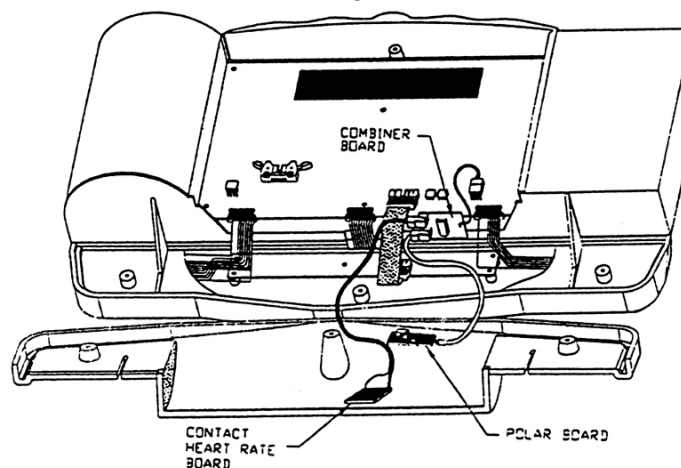
1. The maximum distance for polar heart rate to receive a signal is 3 feet.
2. Verify chest strap is correctly positioned. Chest strap electrodes must be properly positioned and wet. See below diagrams.



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 .



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.



****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.

Symptom:

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 build up).

The running deck surface is coated with a special wax. During breaking period (first 20 – 30 hours of operation), some wax may form on the tail roller causing a loud thumping noise. In worse cases, this may 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. Use a ¼" 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 scrap 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

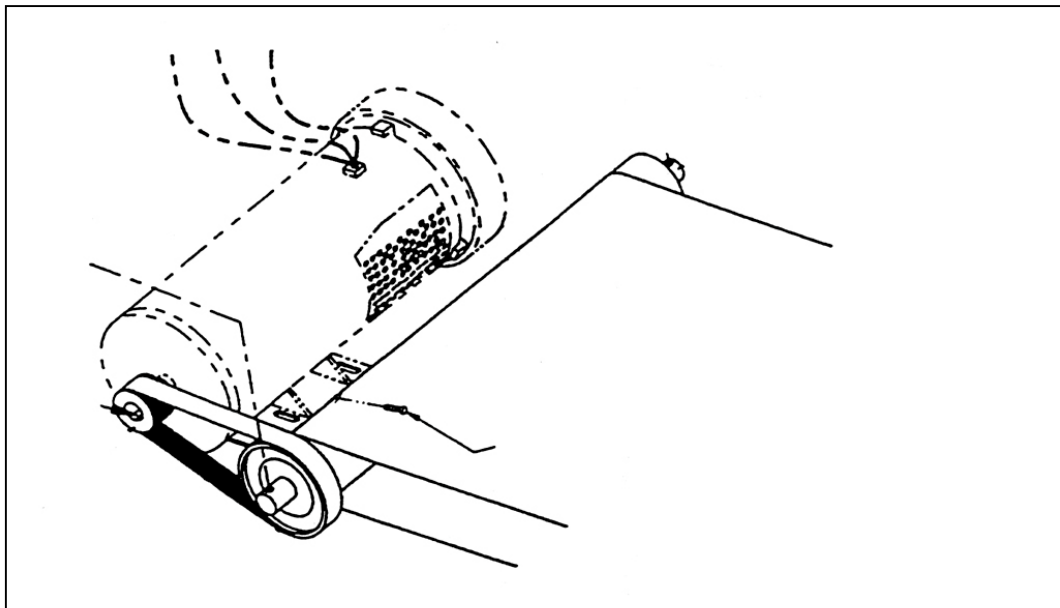


The drive belt tension may require tightening if a slipping problem occurs on the drive pulley.

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. Tension should be no more than 90 lbs.
 - 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.

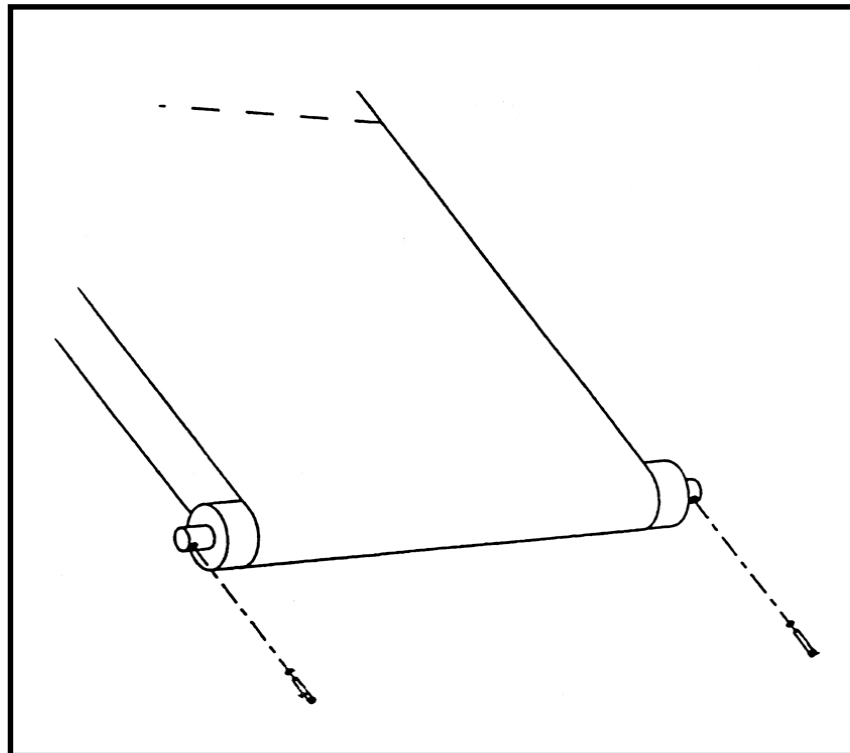
If the running belt is not centered on the tailroller and is either too far left or right, adjust tracking using the following steps::

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 to 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 powered 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. The rear bumpers bear against the steel posts at the end of the frame rails. If the bumpers are not located so they bear against the rods as described, the running deck may shift to one side or the other during use. This allows 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 guard 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 hold, such that it would bear against the delrin rod if it was reinstalled in the hole. If all bumpers are properly located, replace the delrin rods and examine the treadmill further for the other causes of squeaks. If one or more bumpers is misalign, 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 on the deck adjacent to each of the four delrin rods (as seen from the top of the side rails).
2. Reach 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, 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 the 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 have adjacent to the holes. Reinstall the delrin rods.
8. Test the treadmill thoroughly. The squeak should be gone.

Isolating Noise



NOTE: Verify that the treadmill is level 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 goes away, manually push the running belt to see if the noise returns. If it does, then it is coming from the rollers.
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. Using a long screwdriver as a stethoscope put the handle of the screwdriver to your ear. Place the opposite end of to the area where you are listening. This will help locate where a specific noise is coming from.

Symptoms:

Rumbling

- Wax buildup 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.**

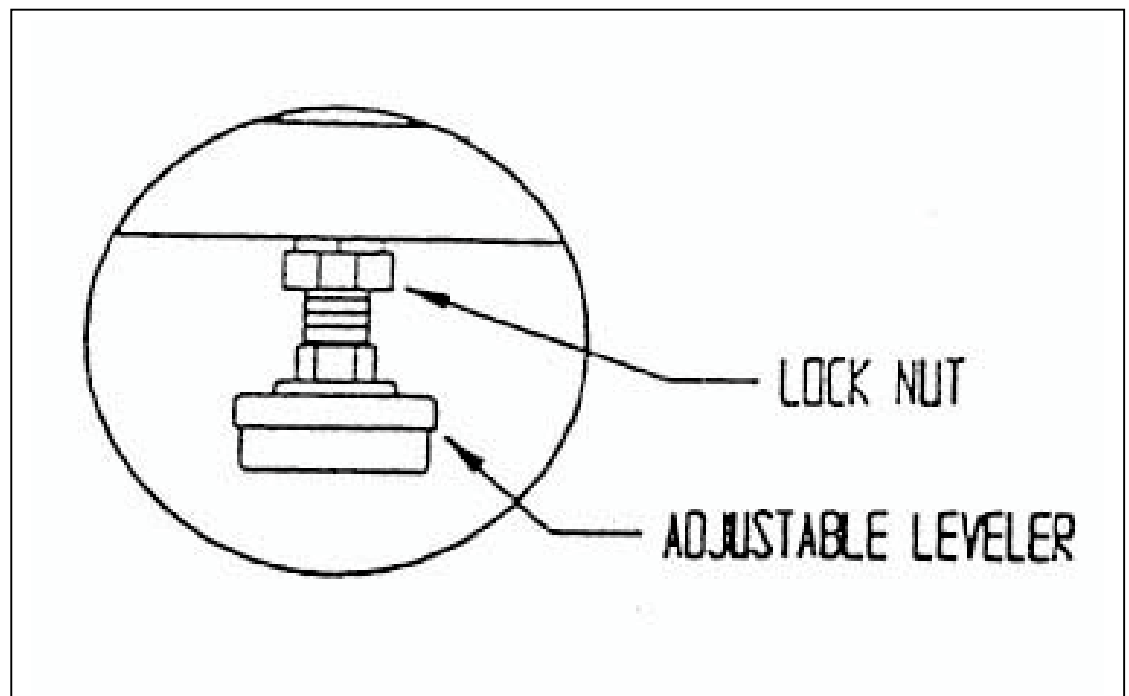
Leveling feet must be adjusted to conform to the floor surface. After the treadmill has been leveled, tracking of the belt must be tested and adjustments made as necessary. This two step procedure is particularly important for treadmill installed in a residence, where floors are commonly uneven. When 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 their 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.



Vibration



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

Symptom:

Unit vibrates while running.

- 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 assemblies.
 - Handrails
 - Slick deck
 - 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: For complete leveling procedure, see the following page.

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

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 handrails, 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 ground wires attached to the frame for the following:
 - Motor
 - Line cord
- 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.

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.

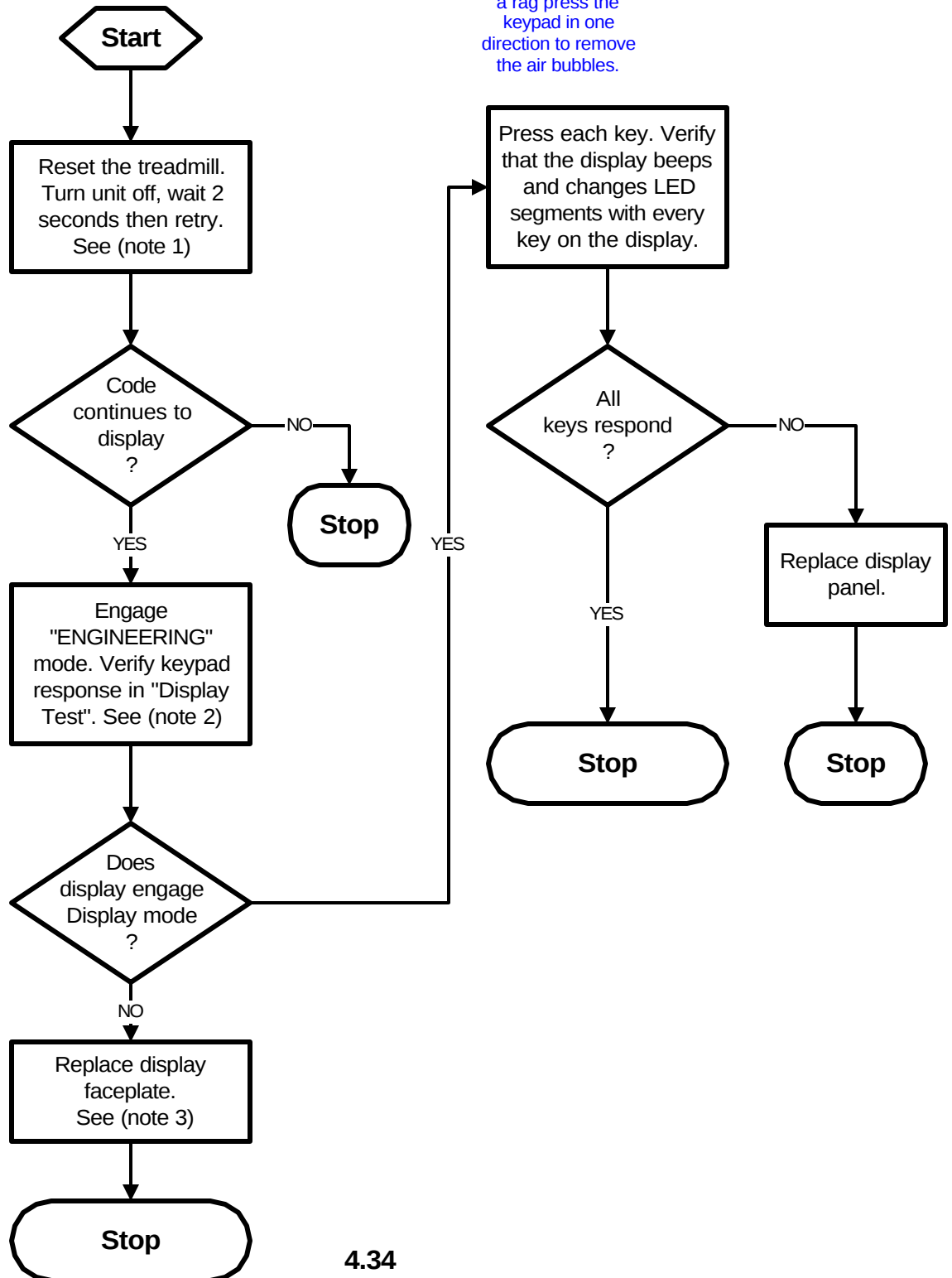
Note 1: This code may occur when a user tried entering "Test Mode" or "Display Test Mode" using the wrong key. Look for any indentations on any of the keys. The plus or fast key are used most often and may cause this error.

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

Note4 : Carefully peel off the affected keypad. Wipe the display surface with degreaser (Windex works well). Re-apply the keypad starting from one edge and using your fingers or a rag press the keypad in one direction to remove the air bubbles.



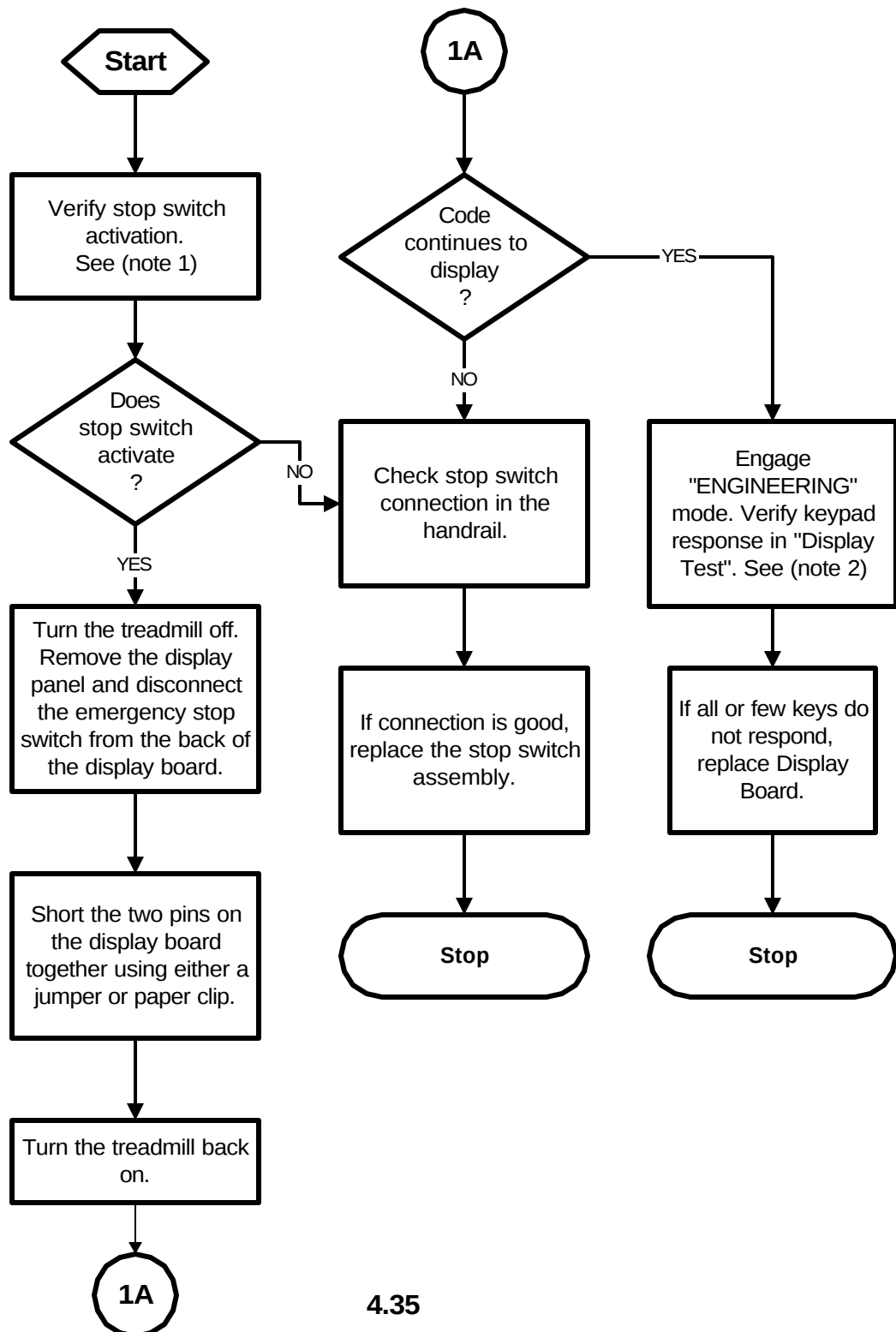
Code: NO STO Flowchart

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



Code: NO RPM Flowchart

Definition: "RPM LOSS"
Possible Cause: Damaged or misaligned RPM sensor.

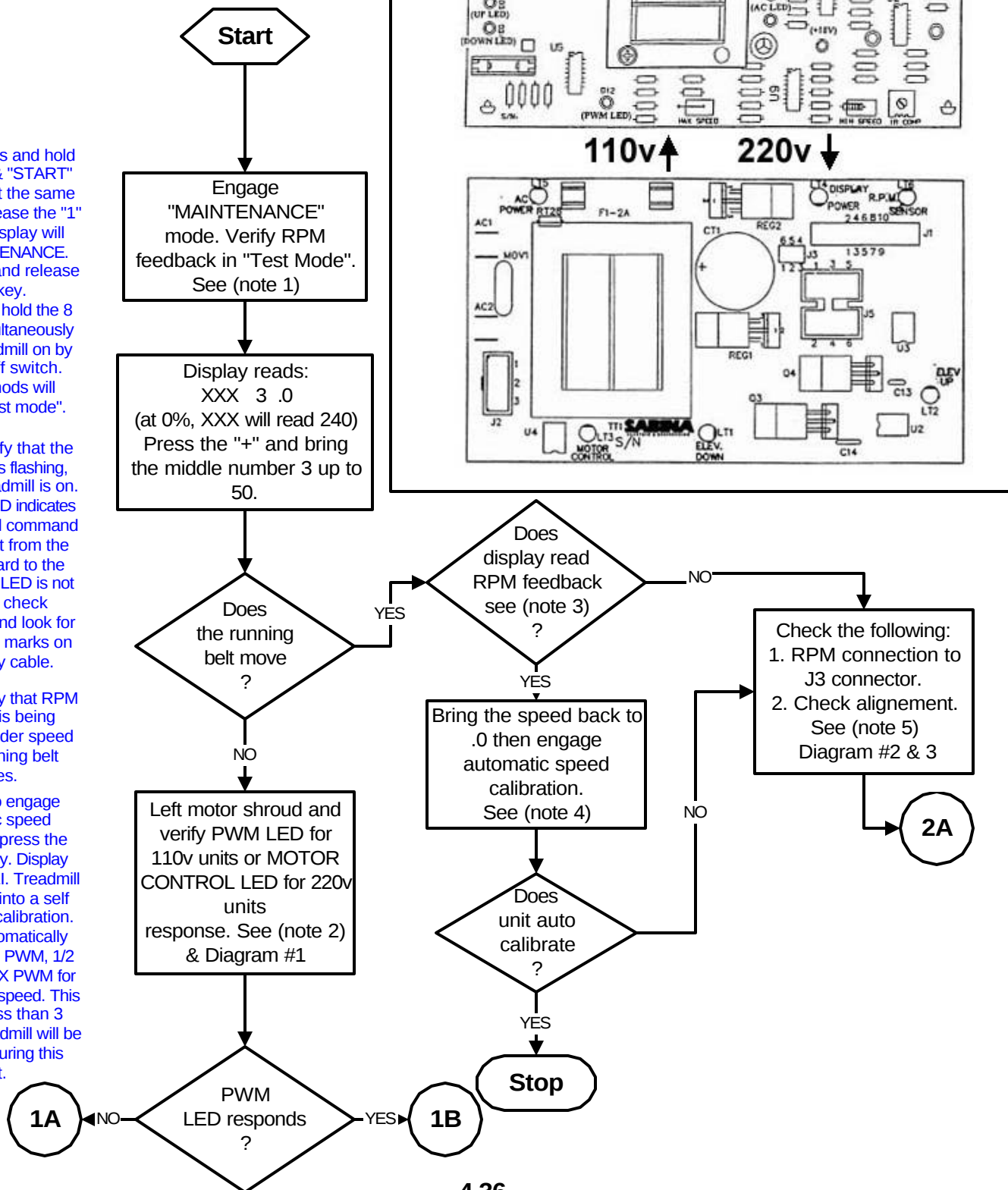
Note 1: Press and hold the "0", "1," & "START" keys down at the same time, then release the "1" key. The display will read: MAINTENANCE. Then press and release the 8 key.

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 on the display cable.

Note 3: Verify that RPM feedback is being displayed under speed as the running belt moves.

Note 4: To engage automatic speed calibration, press the "HEART" key. Display will read: CALI. Treadmill will then go into a self auto speed calibration. This will automatically calibrate MIN PWM, 1/2 max, and MAX PWM for min and max speed. This will take less than 3 minutes. Treadmill will be in motion, during this test.



Code: NO RPM Flowchart

Note 5: RPM Sensor gap between the Hall Effect pickup and the flywheel should be no more than 1/8 inch. If not, adjust the RPM sensor to correct gap.

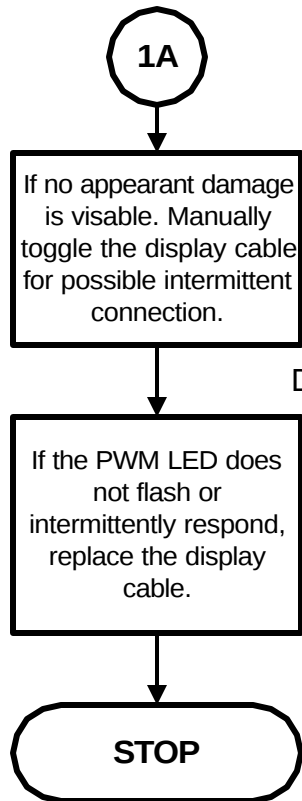
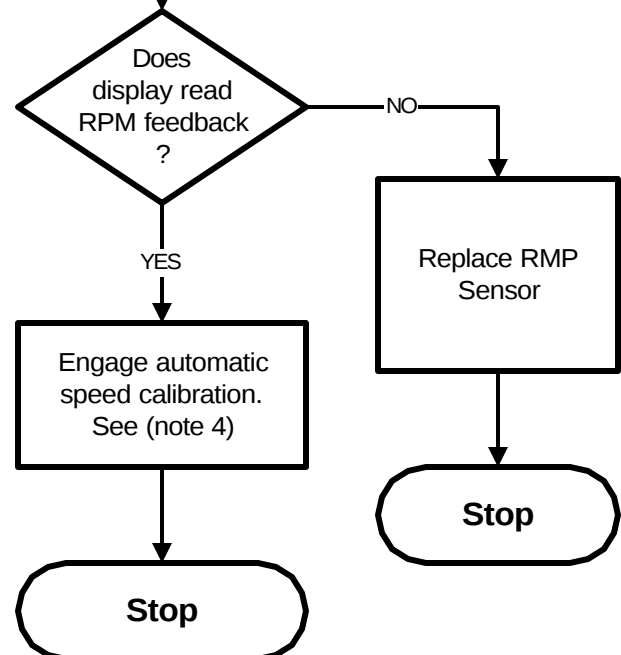
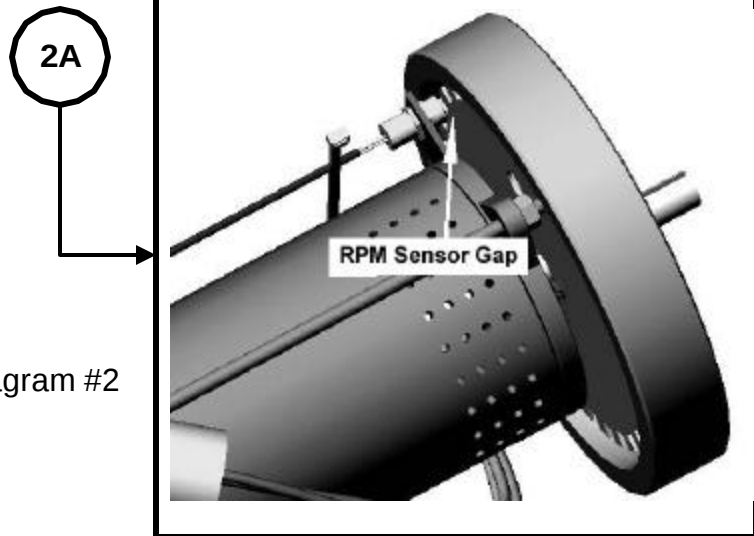
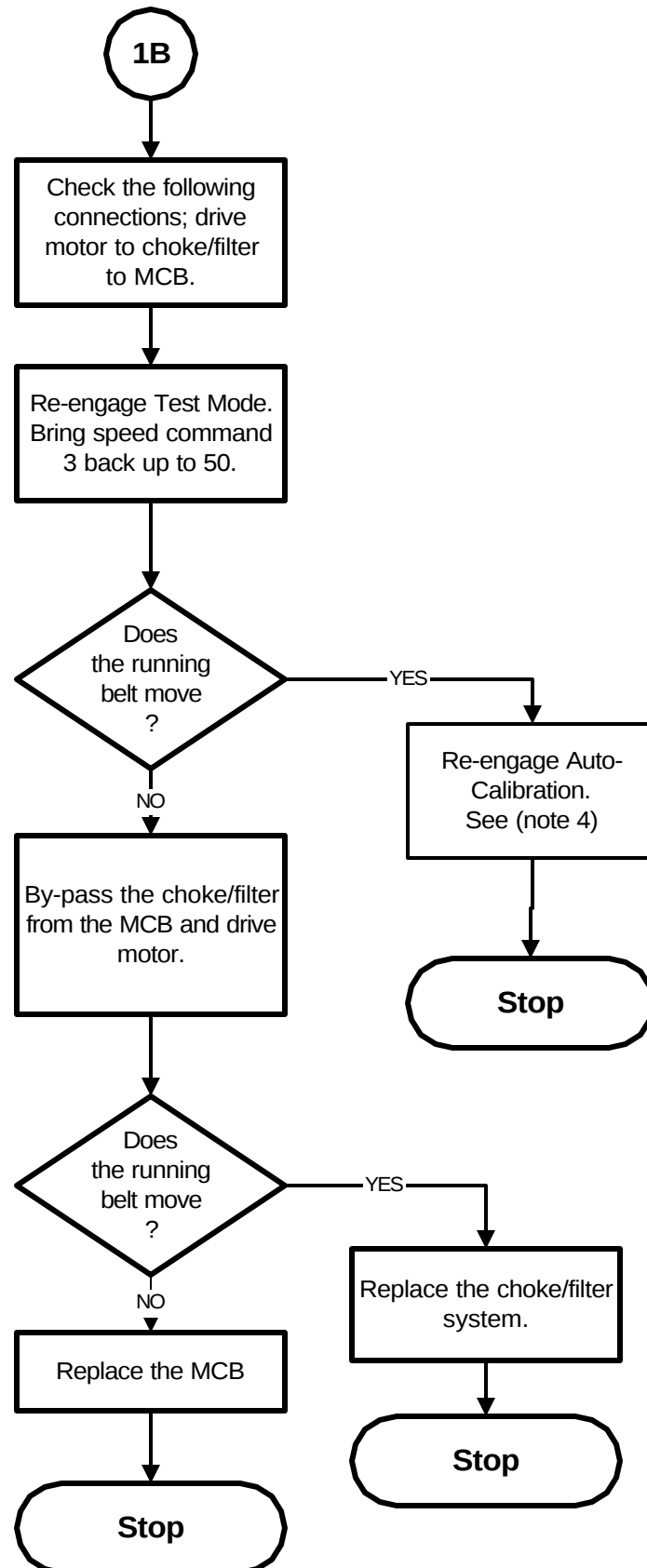


Diagram #2



Code: NO RPM Flowchart



Code: SP CNG Flowchart

Definition: "SUDDEN SPEED CHANGE."

Possible Cause: RPM pick-up misaligned.

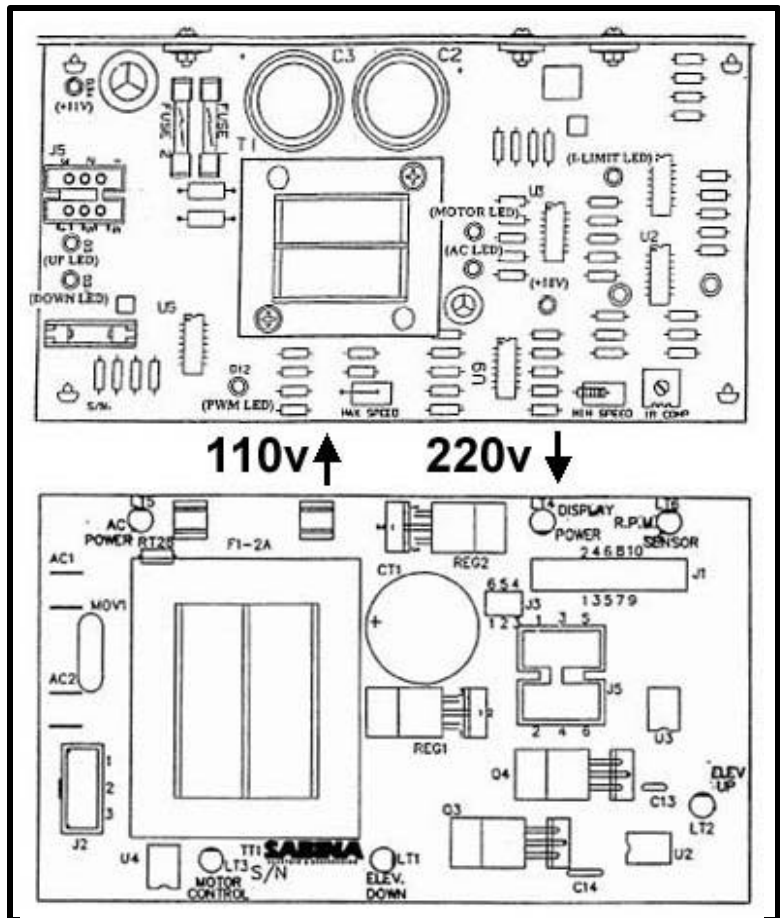


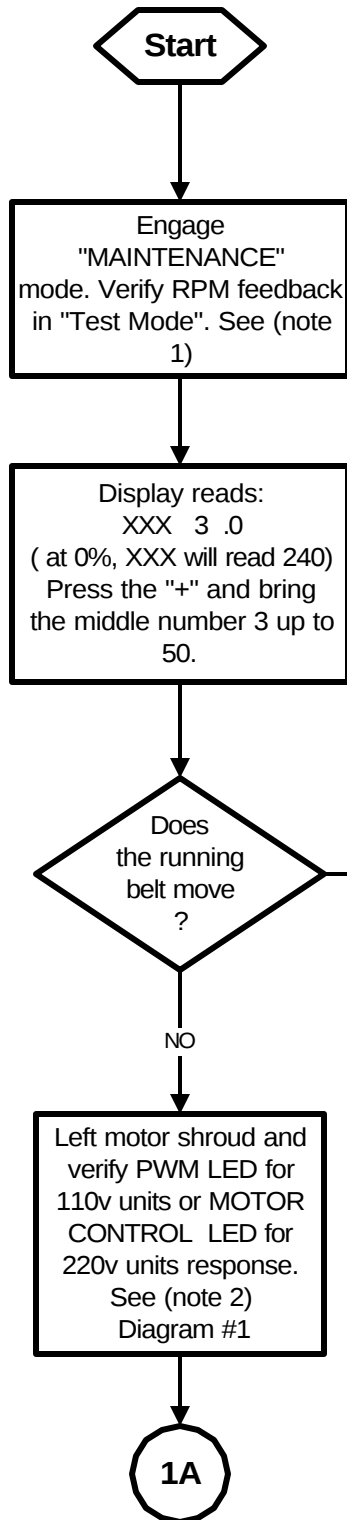
Diagram #1

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

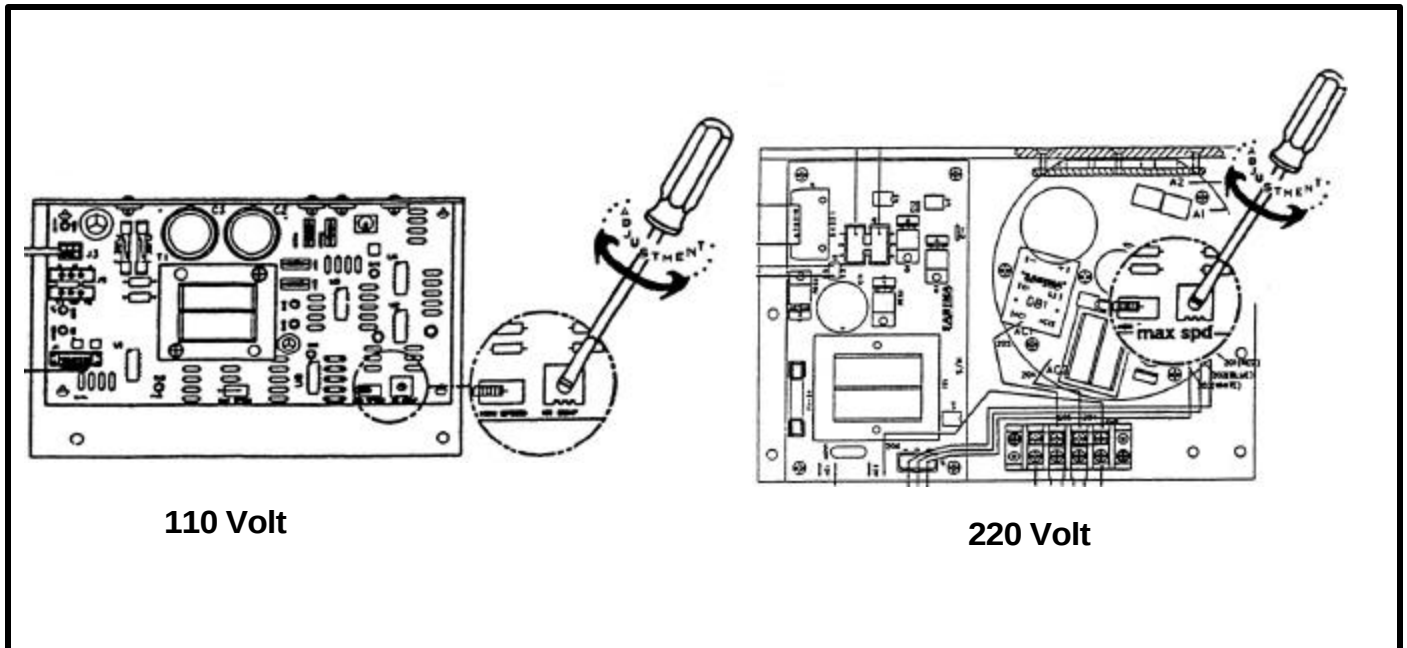
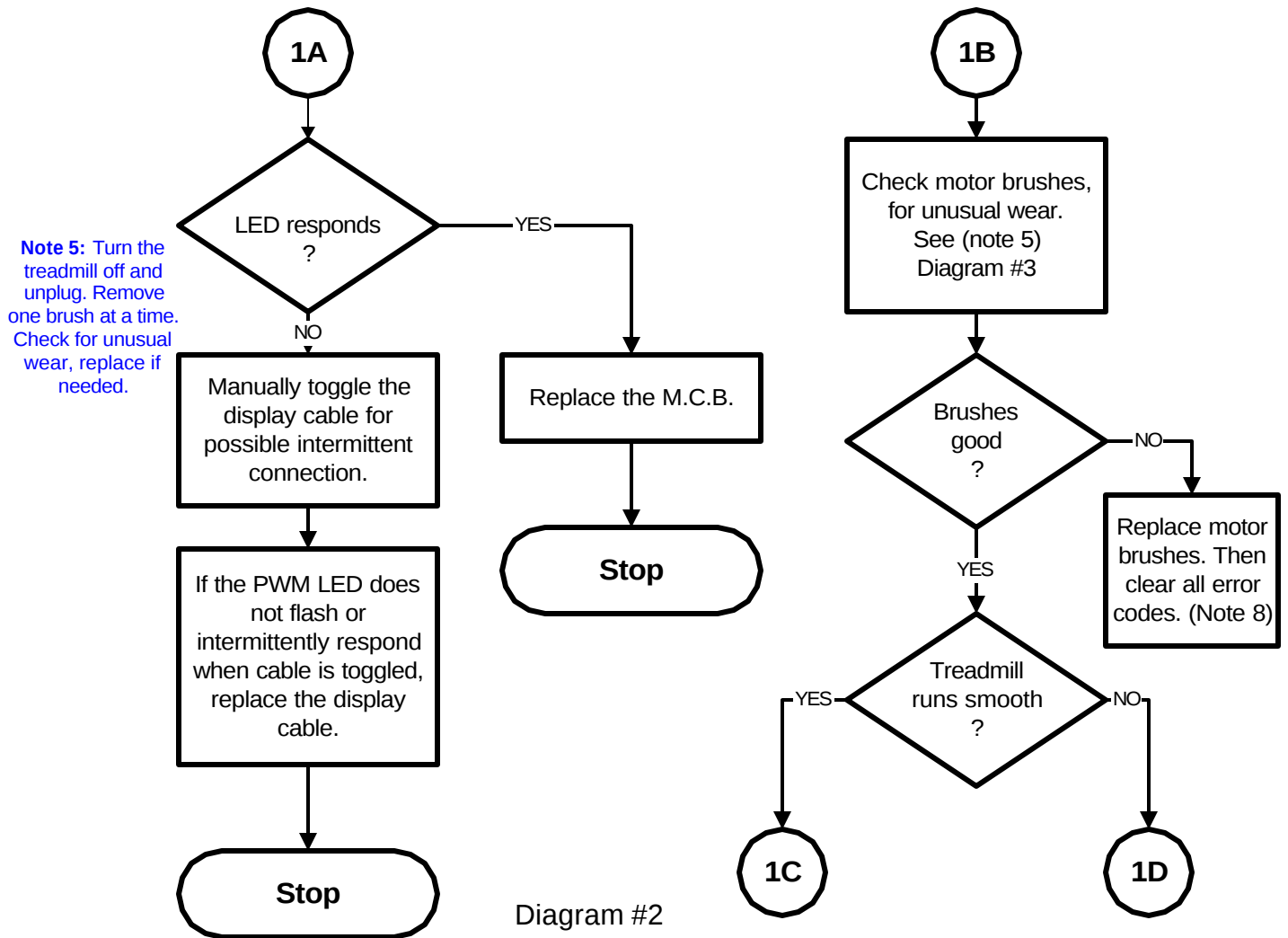
Note 2: Verify that the PWM LED is flashing, while the treadmill is on. The PWM LED indicates a valid control command is being sent from the Display Board to the M.C.B. If the LED is not flashing, check connection and look for pinch or tear marks.

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

Note 6: To engage automatic speed calibration, press the "HEART" in Test Mode. The display will read: CALI. Treadmill will then go into a self auto speed calibration. This will automatically calibrate MIN PWM, 1/2 MAX, and MAX PWM for min and max speed. This will take less than 3 minutes. Treadmill will be in motion, during this test.

Note 7: The RPM sensor gap between sensor and flywheel is no more than 1/8 inch wide. If not, adjust the sensor.

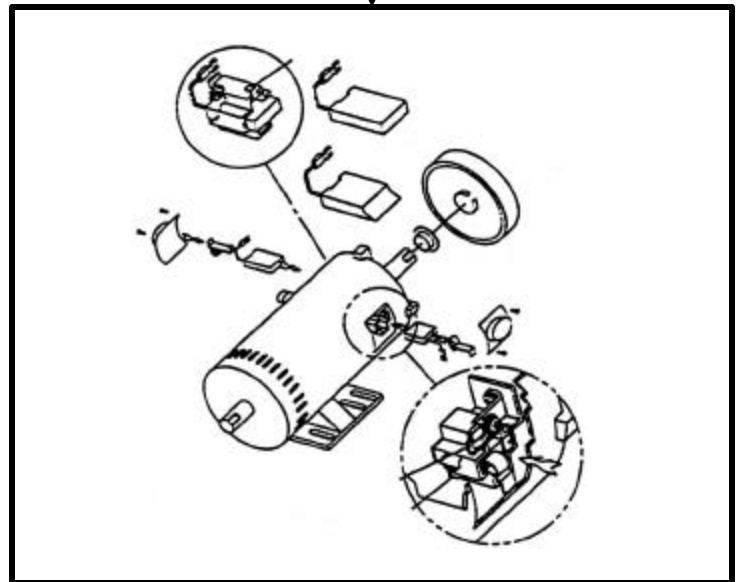
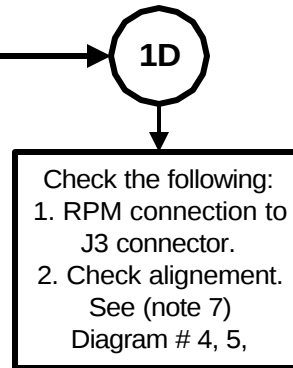
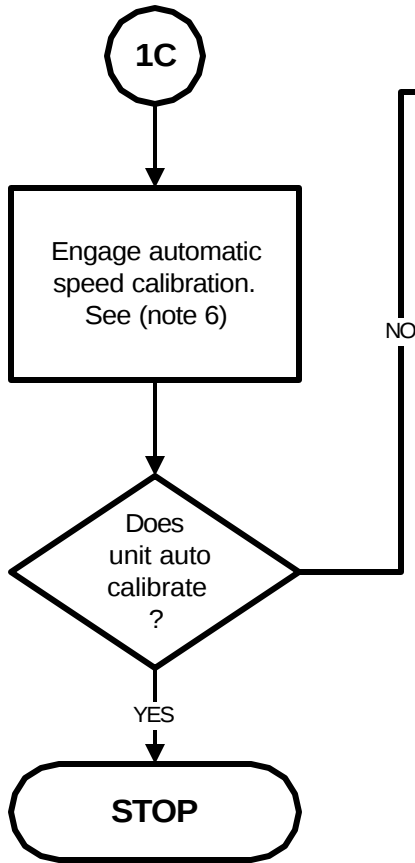
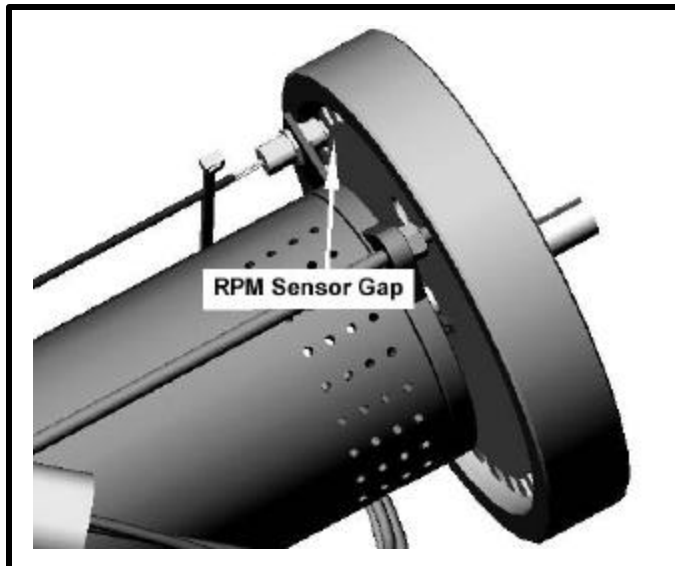
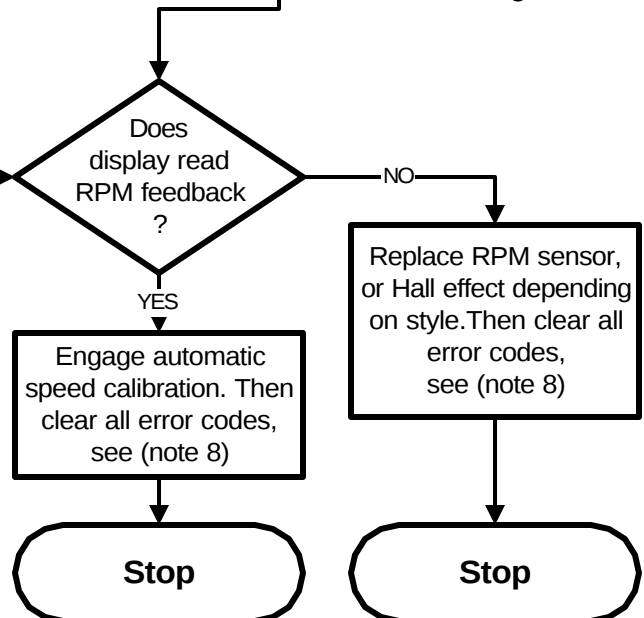


Diagram #4

Diagram #3



4.41



Code: SP CNG Flowchart

Note 8: Engage "Maintenance 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.

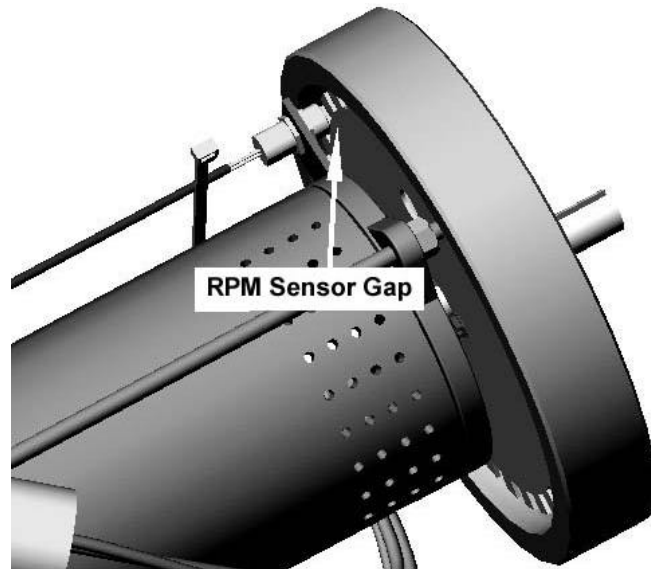
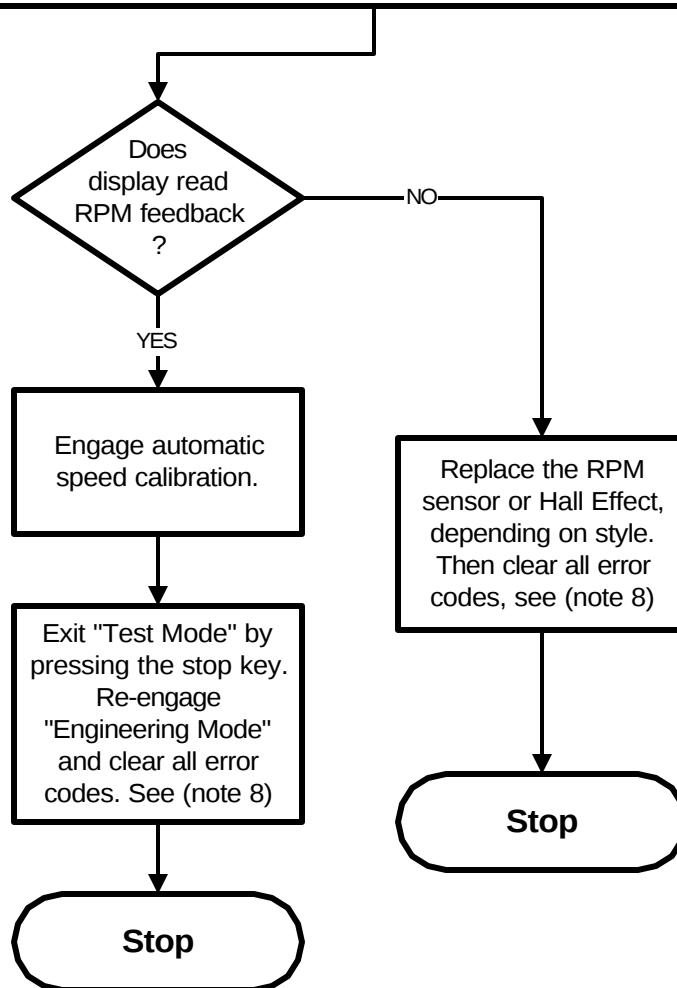


Diagram #5



Code: EL LOST Flowchart

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

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

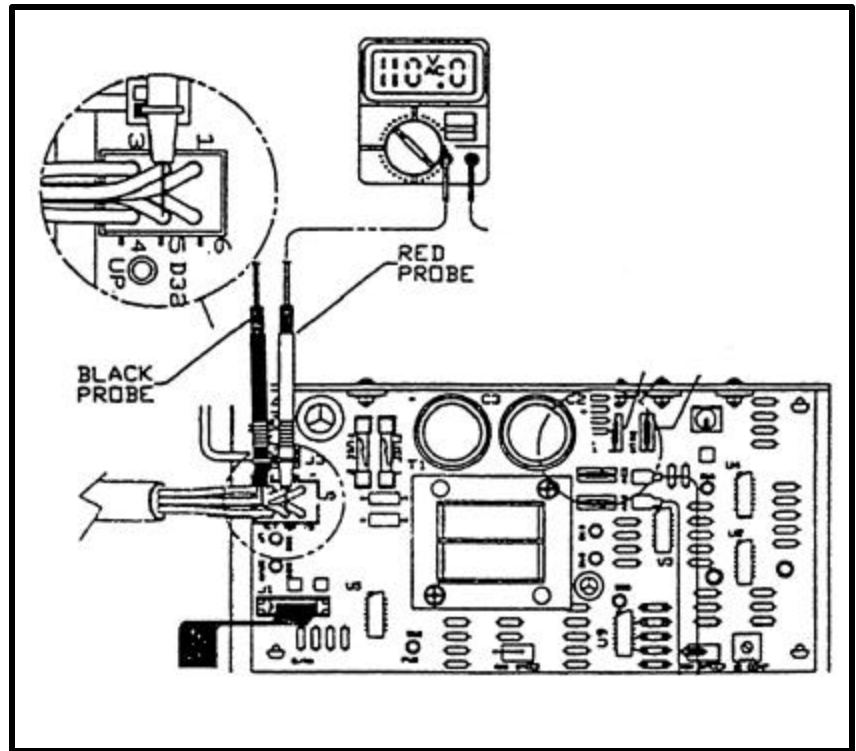


Diagram #1

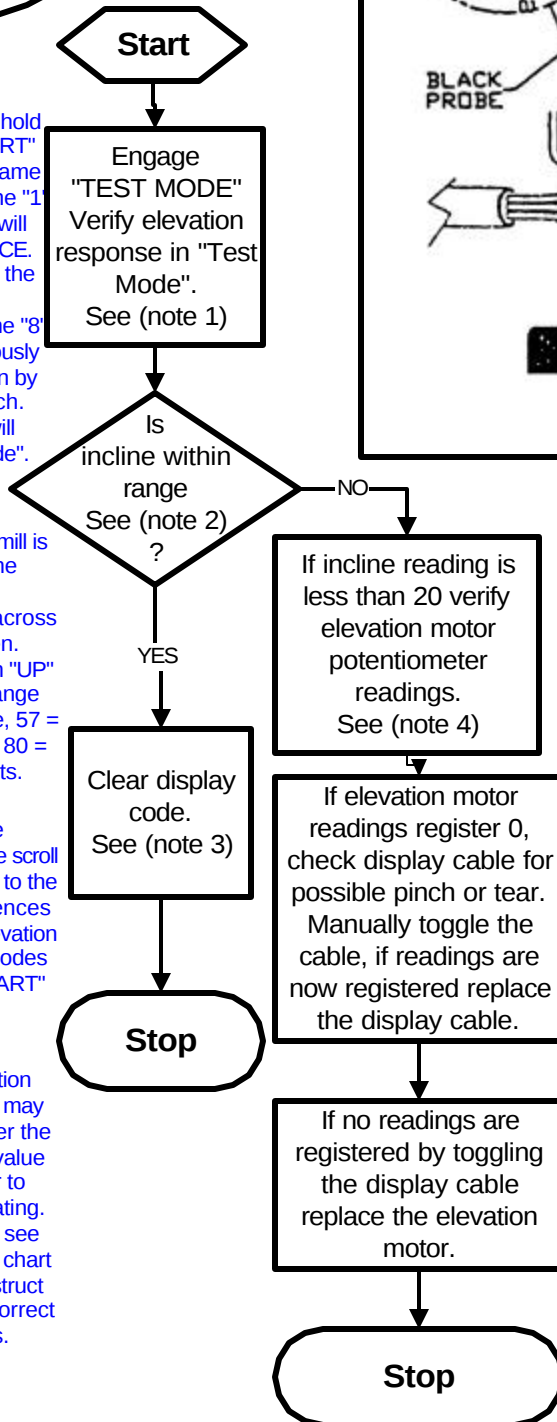
Note 1: Press and hold the "0", "2" & "START" keys down at the same time, then release the "1" key. The display will read: MAINTENANCE. Press and release the "8" key.

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: 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 MAINTENANCE 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", "2" & "START" keys down at the same time, then release the "1" key. The display will read: MAINTENANCE/. Press and release the "8" key.

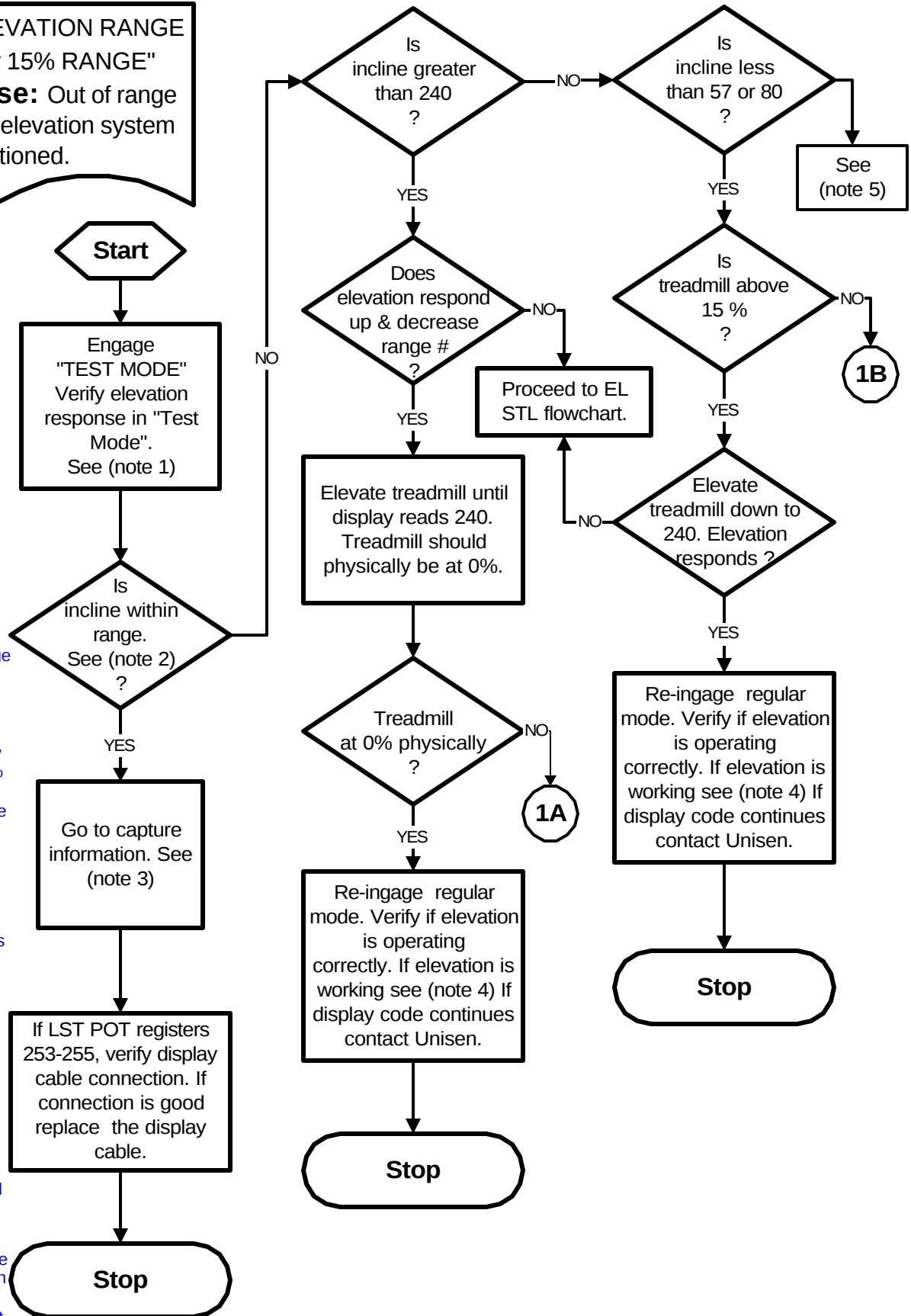
Or manually hold the "8" key and simultaneously turn the treadmill on by the on & off switch. Both methods will engage "Test Mode".

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.

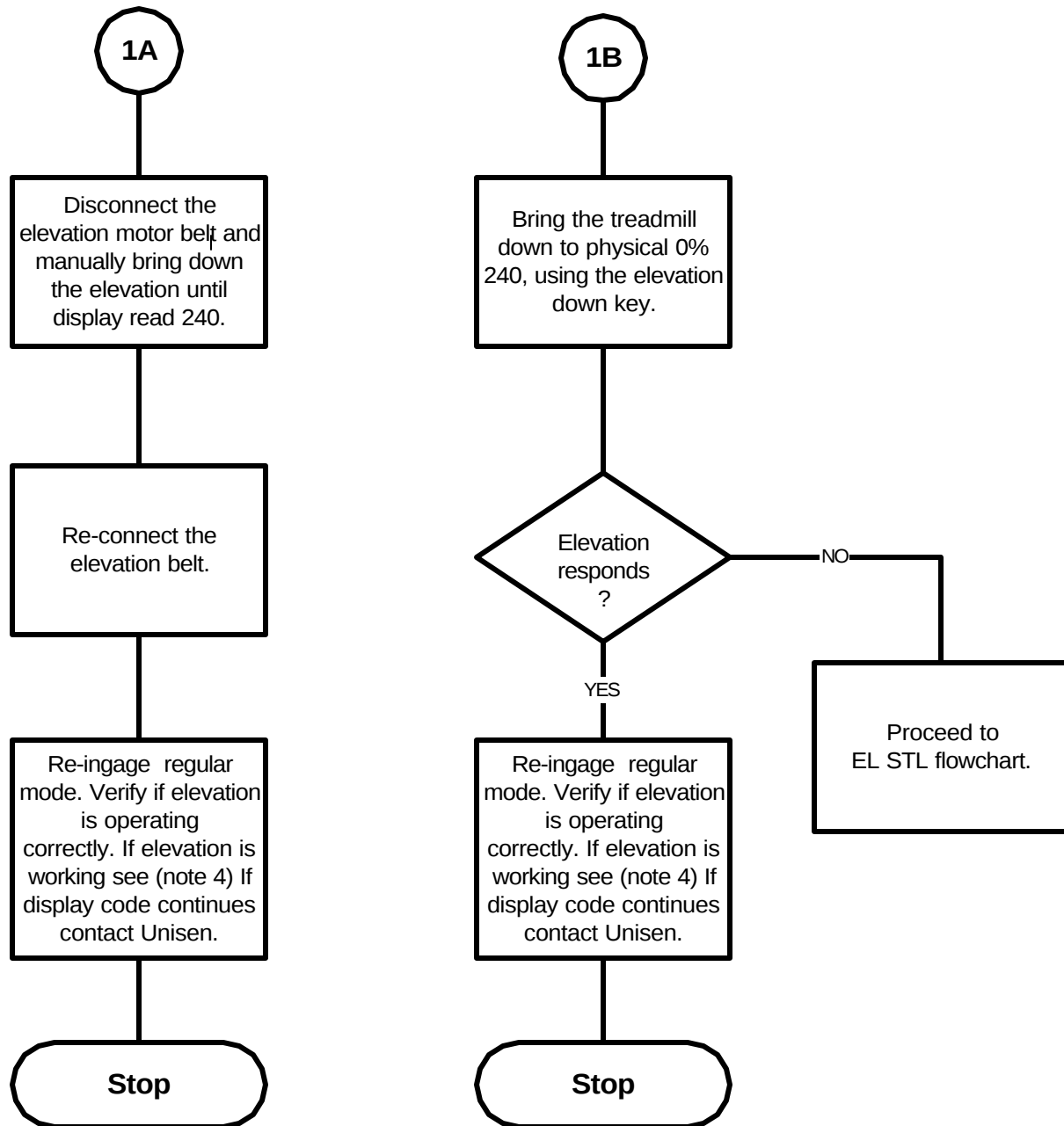
Note 3: Exit out of TEST MODE. Re-engage "MAINTENANCE Mode" scroll through the menu using your elevation keys until display reads LST POT. The following variables store the condition when the last display code occurred.

Note 4: Engage "MAINTENANCE 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: This would indicate that the elevation is within range and should be operating correctly, if not contact Unisen.



Code: EL RNG Flowchart

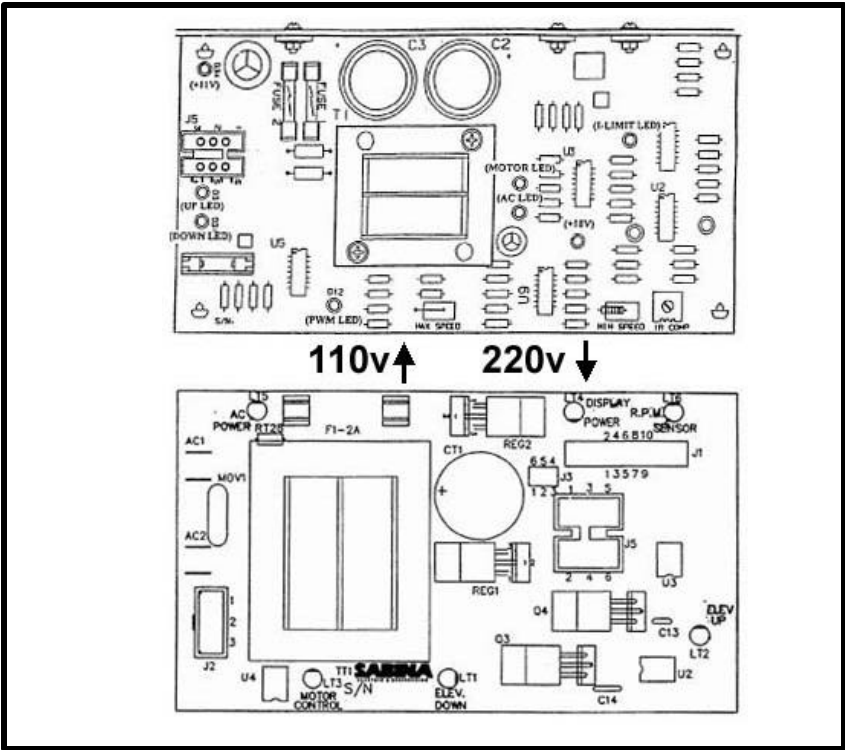
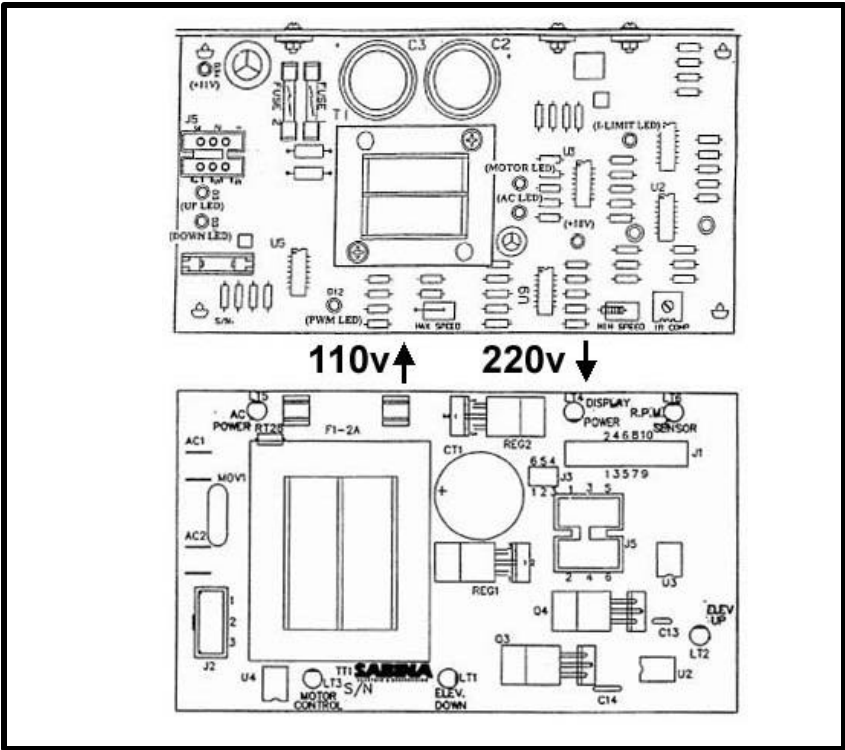
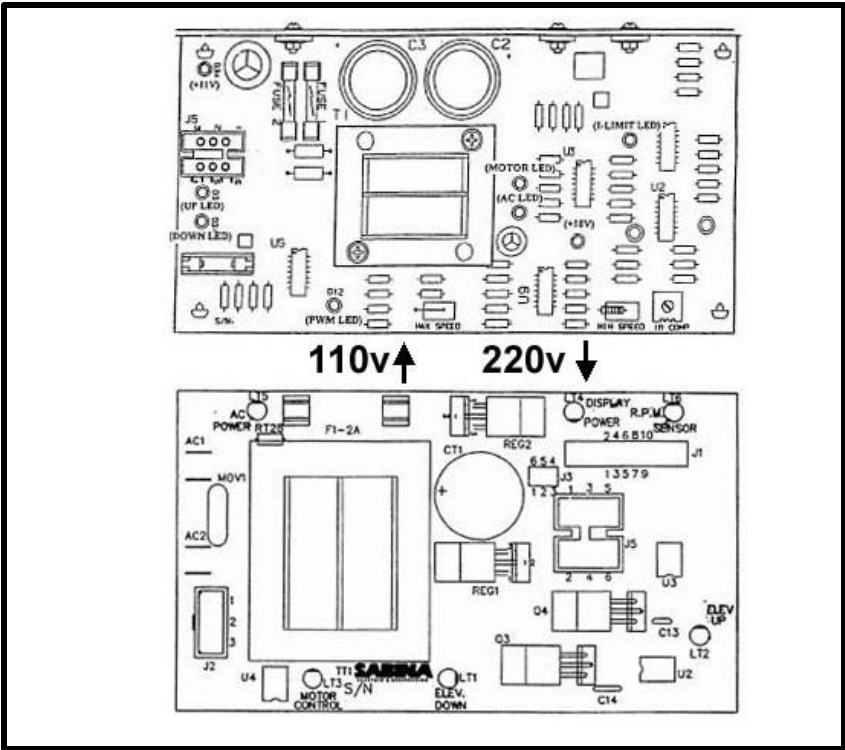


Code: EL STL Flowchart

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

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

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



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

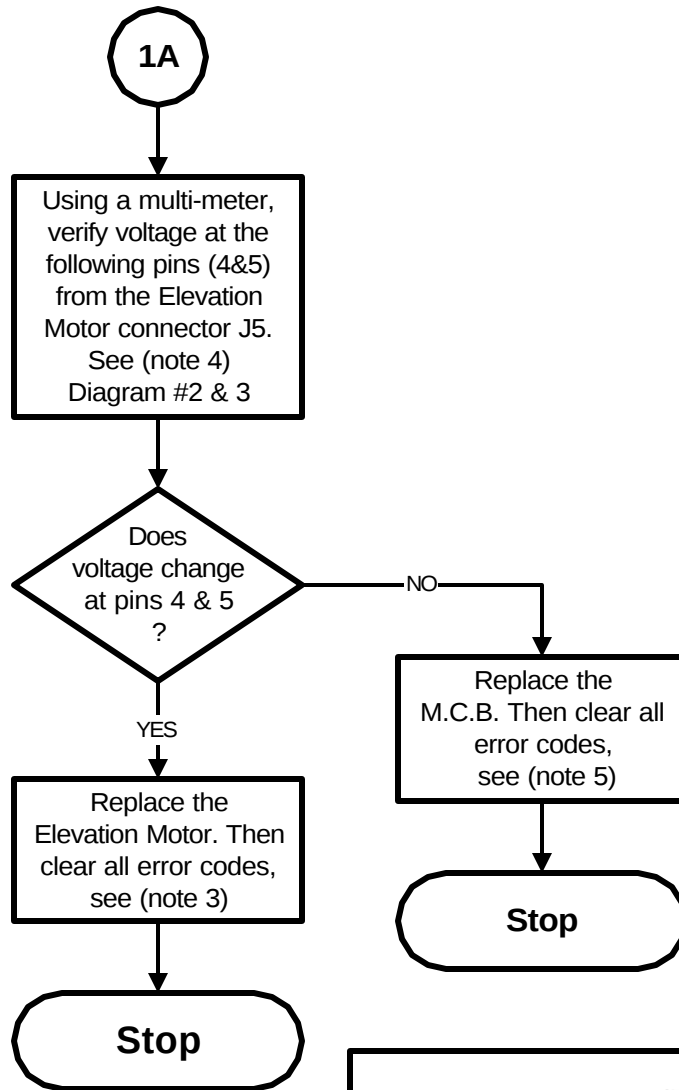
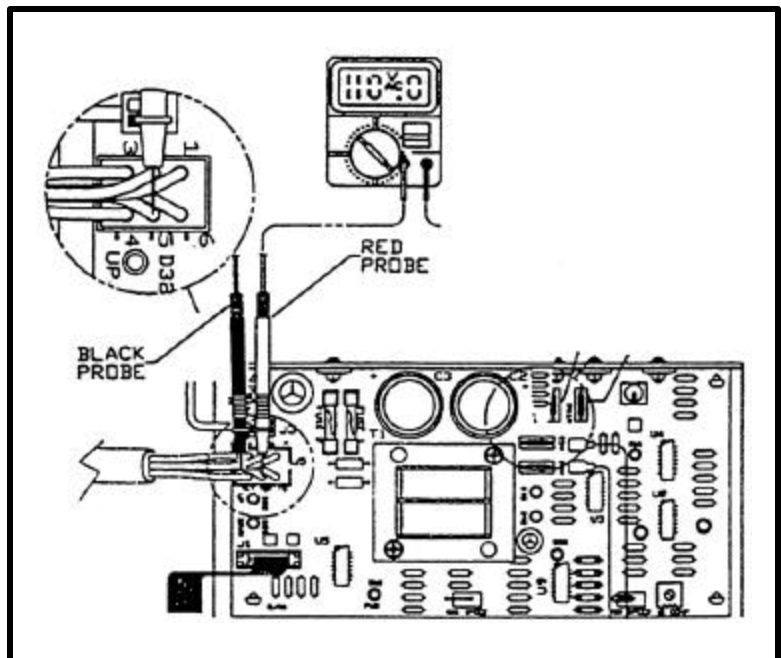


Diagram #2



Section 5:

Parts Replacement

Should the **STAR TRAC** 4500 Treadmill experience a problem requiring replacement of a specific part, the following procedures will help and instruct in the replacement of major parts.

Contents

5.1 – 5 Drive Motor Replacement

5.6 – 9 Elevation Motor Replacement

5.10 – 12 Side Bed Cover Replacement

5.13 – 15 Auto-transformer Replacement

5.16 – 19 Heart Rate Grip Replacement

Drive Motor Replacement



**** 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
- Needle nose 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
- Straight edge, 24 inch
- Belt Tension Gauge, to 90 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 at access the motor, proceed as follows:

1. Remove the Philips-head screw at the center of the 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 up under the upper edge of the shroud.

The drive motor is now accessible for replacement.

Disconnecting Motor Wiring

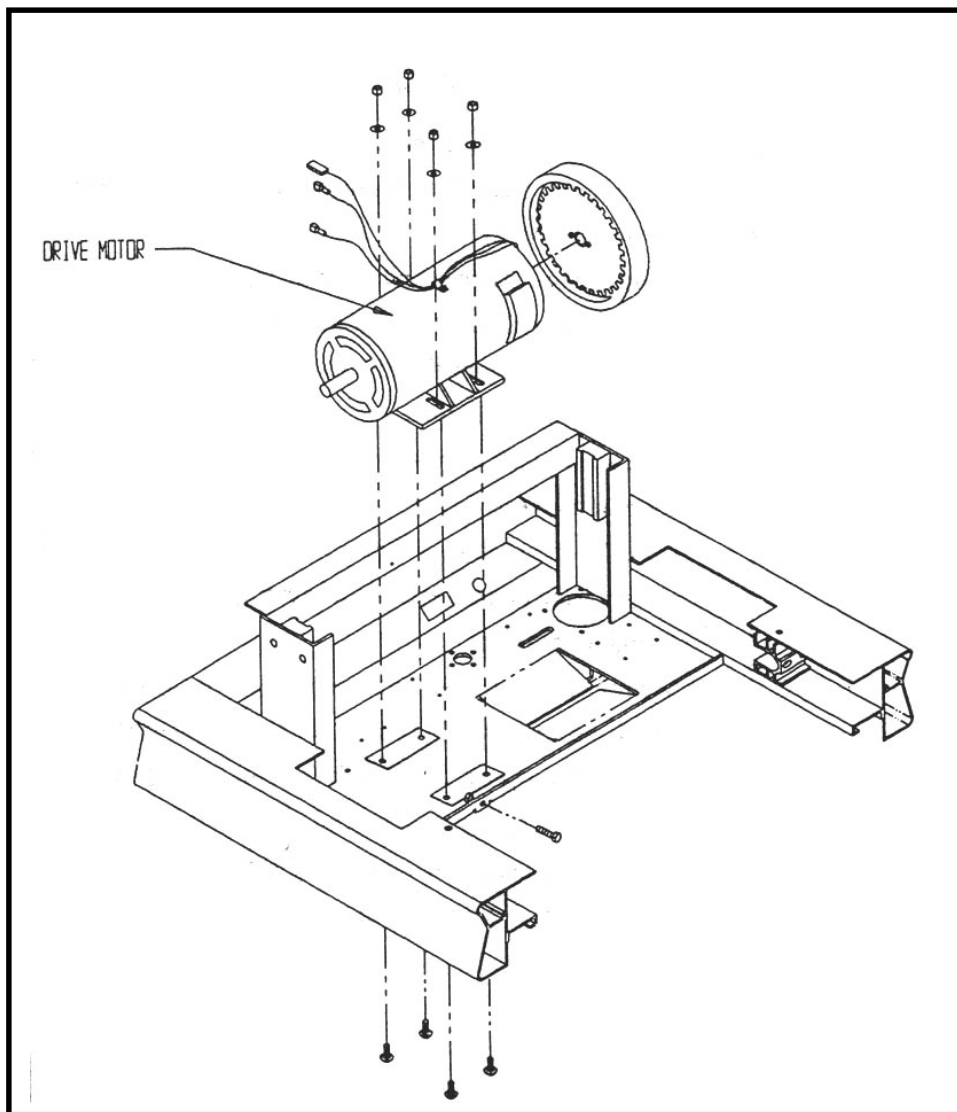
1. Follow the green ground wire from the motor to the grounding point in the frame (marked with the ground symbol), then remove the screw that hold the wire terminal to the frame.
2. Cut the two wire ties that hold together the remaining wiring from the motor.
3. Using needle nose pliers, pull apart the black plug-in connector of the red and black wires. *Do not pull on the wires.*
4. Follow the gray sensor cable to the connector marked J# 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 the motor slides freely on the frame.

See Diagram A below.



Drive Motor Replacement

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 I to give slack to the motor drive belt.
5. Slip the drive belt off the motor pulley, then remove the pulley and the locking key.
6. Remove the four motor mount nuts, then lift the motor out of the treadmill and set I aside. Mark it as the removed motor to avoid confusion with the replacement motor.

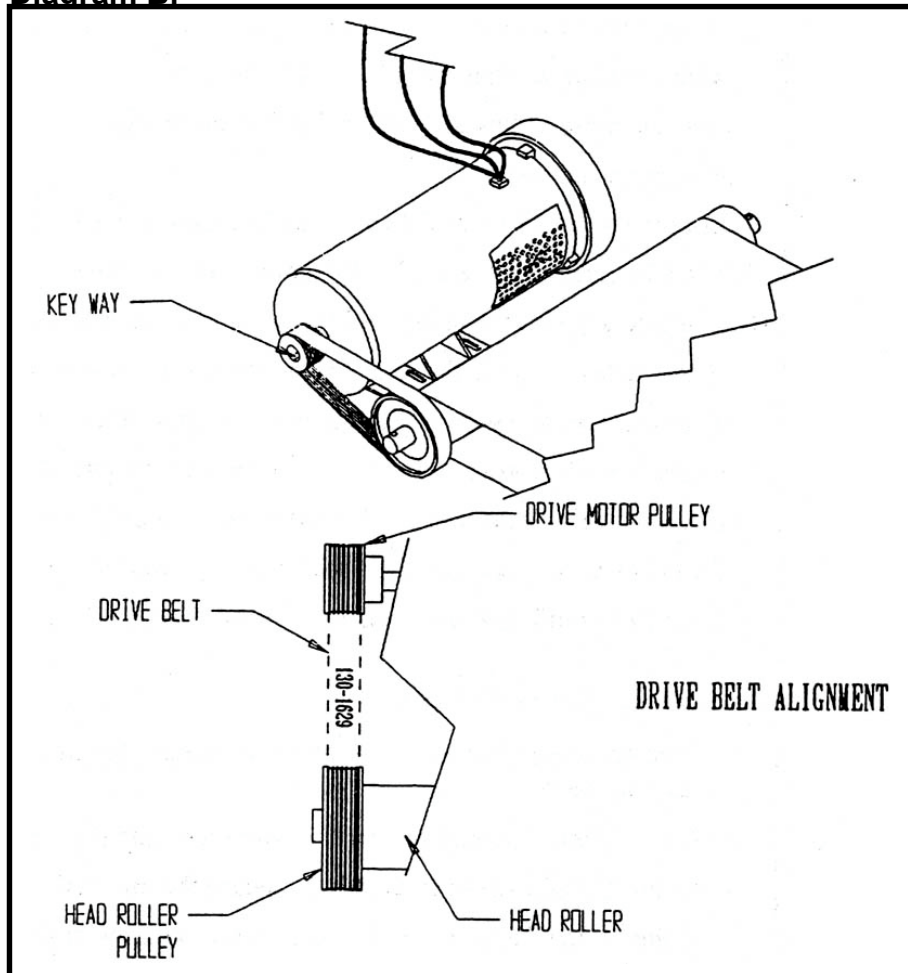
This completes motor removal procedures.

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 thither 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 it's end protrudes about 1/16-inch past the inner face of the pulley.
4. Tighten the set screws 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 mountain screw, then loosely turn a 5/16-inch lock nut 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, and 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 90 inch-pounds.
2. If you have not 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 90 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 set screw over the keyway first, then tighten the other set screw. 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 star the Philips-head screw previously removed.
3. Press down on the side and front of the shroud to engage the Velcro strips on the frame.

Tighten the screw to complete shroud-replacement .

Elevation Motor Replacement



**** 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

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

1. Remove the Philips-head screw at the center of the 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 up under the upper edge of the shroud.

Tip the Treadmill on its side

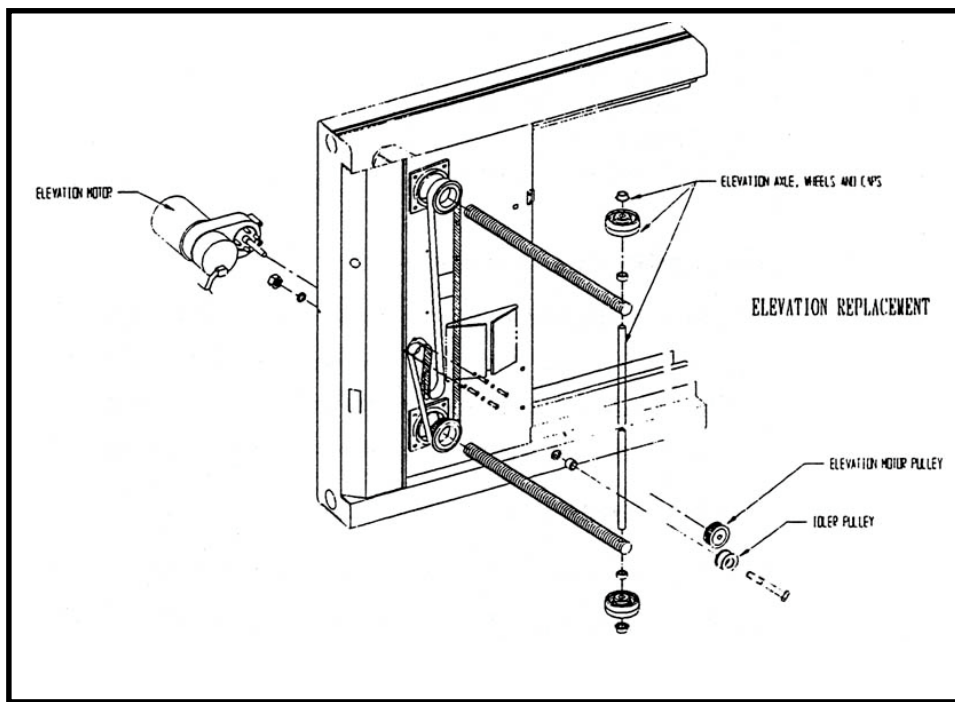
Lift either side of the treadmill and tip the treadmill on its side. This makes accessible both the elevation motor and the belt drive train below the motor plate.

Remove the Elevation Motor

1. Using pliers, remove the end cap (tap nuts) from both ends of the wheel axle at the front end of the treadmill.
2. Remove the wheels and the 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

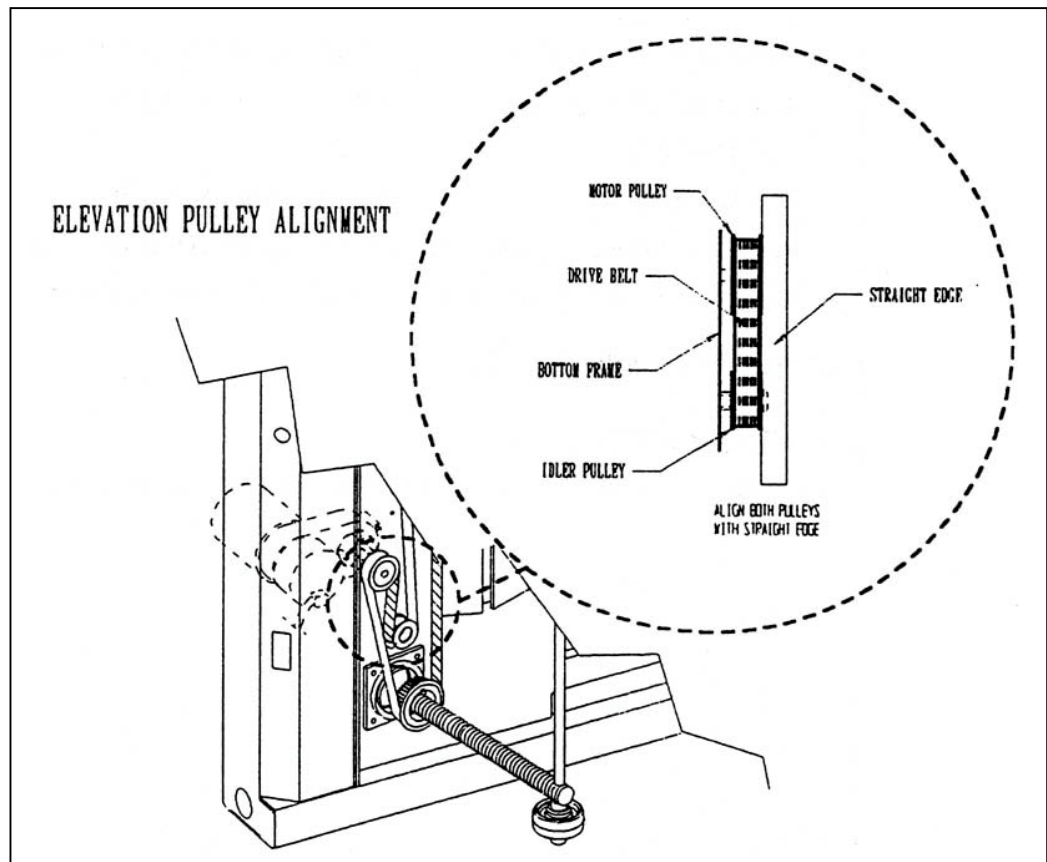


4. Slide the idler pulley in its slot to loosen the elevation drive belt, then remove the belt from the idler pulley.
5. Using an Allen wrench, loosen the screws around the drive pulley, then remove the pulley from the elevation motor shaft.
6. At the Motor Control Board, disconnect the elevation motor 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

Replacement 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 the 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 the pulley and the bearing faces, then position the drive pulley on the shaft until alignment is achieved. **See 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 mount nut. If you have not 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. Re-adjust belt tension if necessary loosening the idler pulley mounting nut, then repeating the preceding steps **11** and **12** until correct belt tension is achieved.
13. Re-install the wheel axle, align 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.

Side Bed Cover Replacement



**** CAUTION ****

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

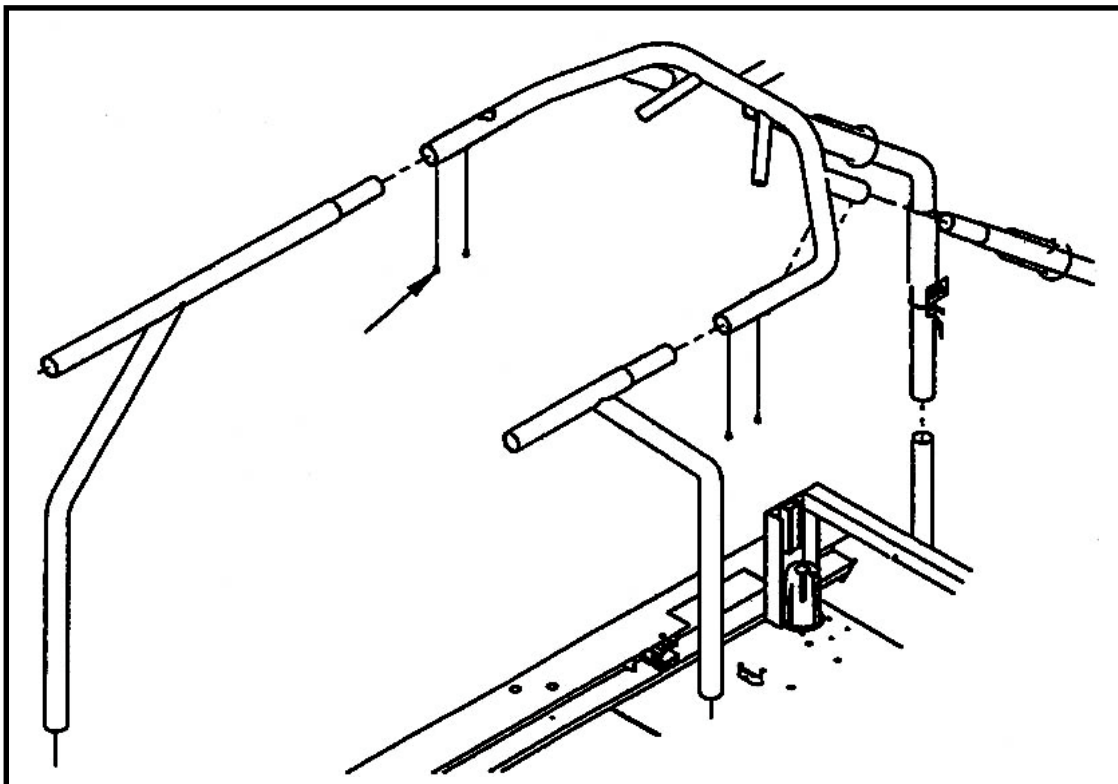
Tools:

- Side bed cover
- Philips-head screwdriver
- Slot-head screwdriver
- 1/8-in Allen wrench
- 5/8-in socket and socket wrench with ratchet
- Plastic-head hammer
- Wooden block

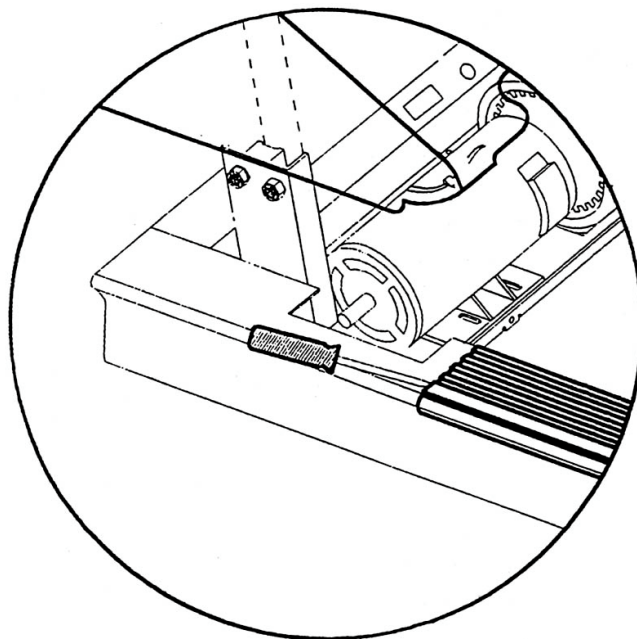
Procedure: Removing the Side Bed Cover.

1. Remove the 5/8-in. hex-head screw at the bottom of the frame and inline 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



4. Starting at the raised corner of the flange, lift upwards and outwards to free its outer edge from the frame 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.

Installing Replacement Side Bed Cover

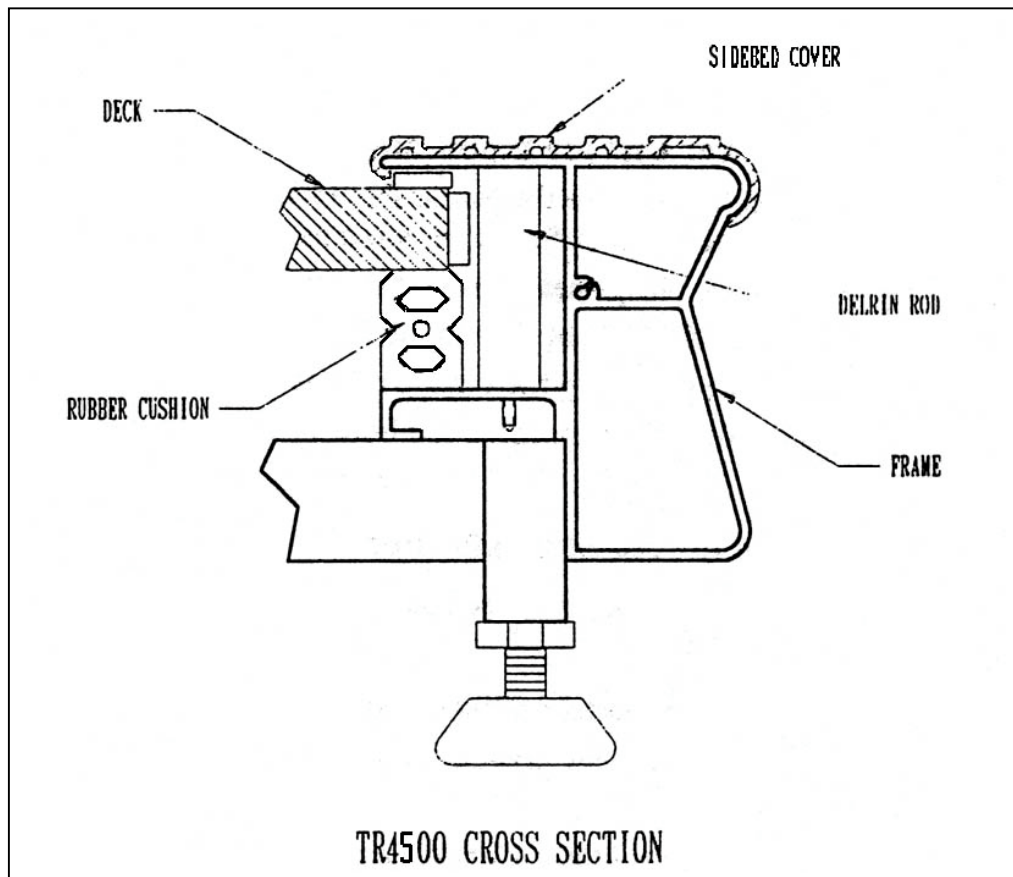
To replace the cover, proceed as follows:

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 195VAC to 250VAC. Following are procedures for replacing a failed autotransformer.

Tools:

- Replacement autotransformer
- Philips-head screwdriver
- Slot screwdriver

Procedure: Lift motor shroud

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

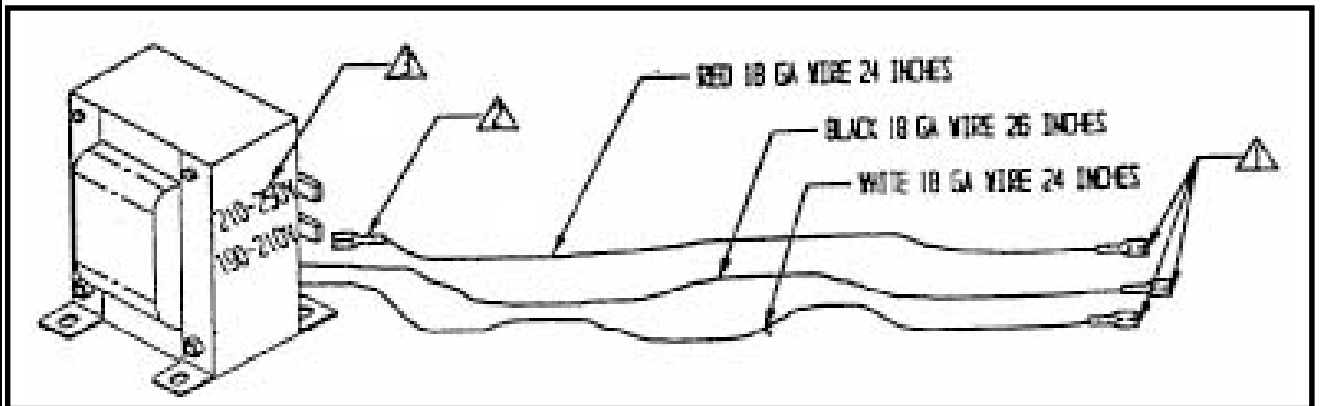
1. Remove the Philips-head screw at the center of the front edge of the shroud.
2. Lift up the front of the shroud, lifting from both sides to separate the Velcro strips.
3. Lift the shroud up the vertical rails as far as it can go, then suspend it using a bungee cord looped over the gooseneck rail and hooked up 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 the 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 the 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 AC1 on the barrier strip.
5. Reconnect the autotransformer's white wire to the terminal marked WHT on the barrier strip.

Autotransformer Replacment

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 follow the recommendations in *Selecting the Voltage Tap*.

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 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 the elevation commands.

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

- If line voltage is less than 220 VAC, connect the red wire to the lower lug on the autotransformer.
- If the voltage is greater than 210 VAC, connect the wire to the upper lug.

Heart Grip Replacement



**** CAUTION ****

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

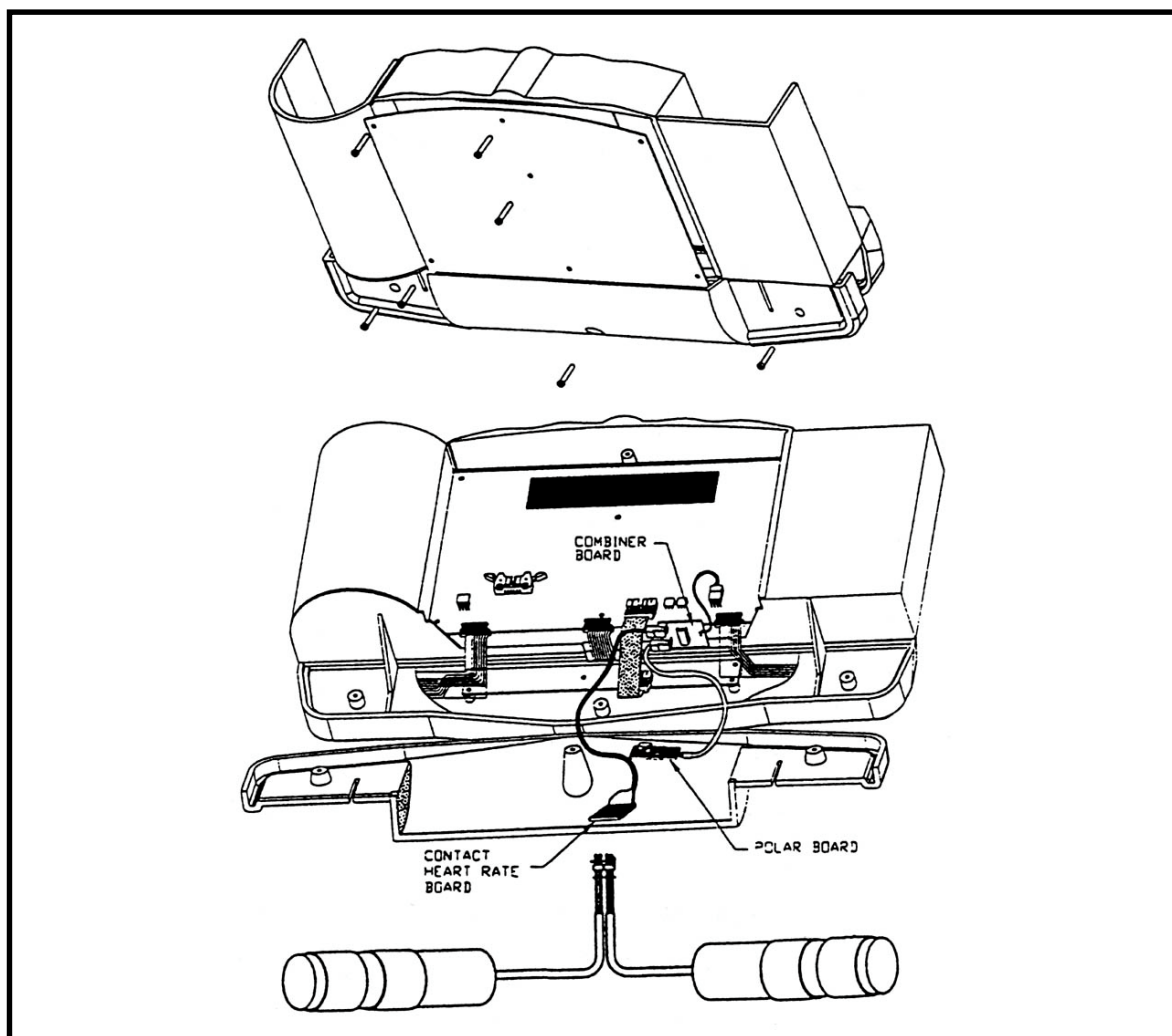
Tools:

- 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**.

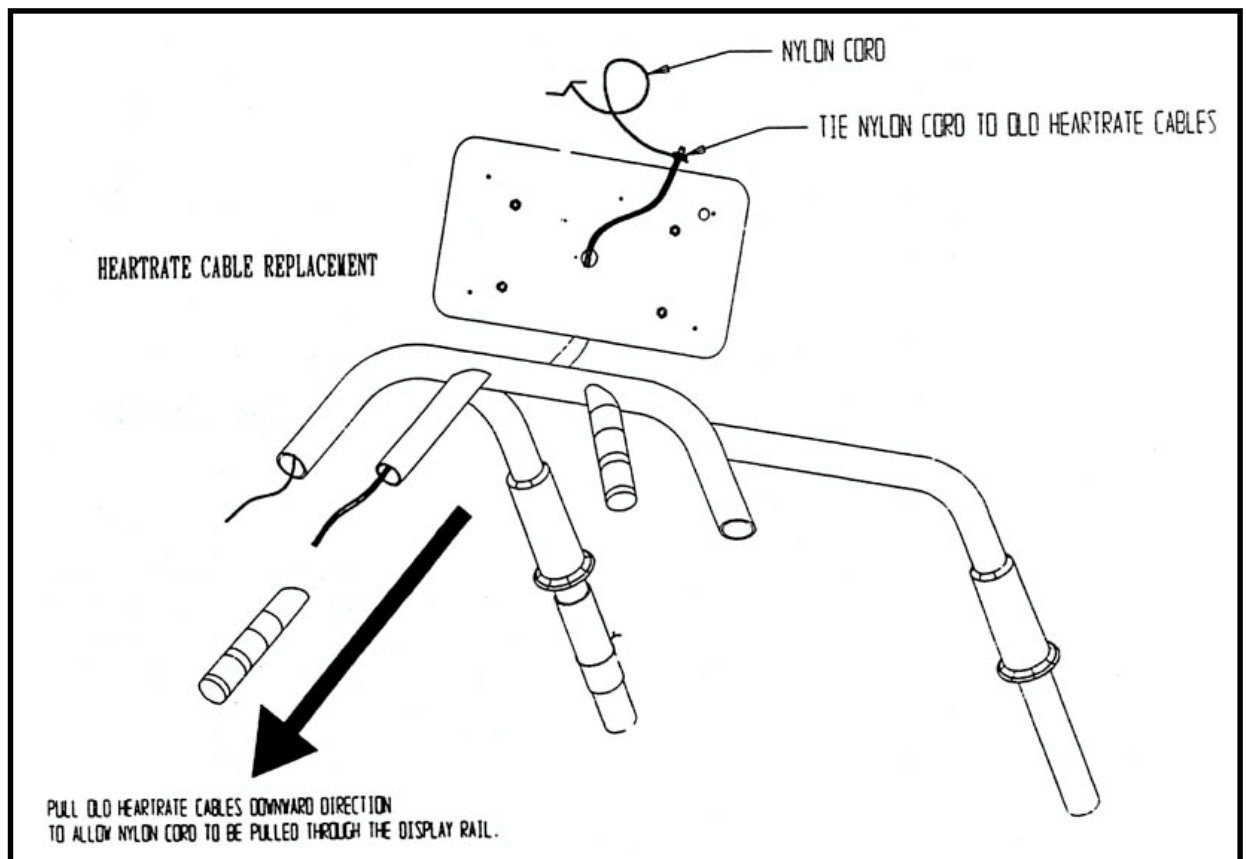
Diagram A



Heart Grip Replacement

3. Lift the handgrip cables to separate the Velcro strips on the cable 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 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, 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 the 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



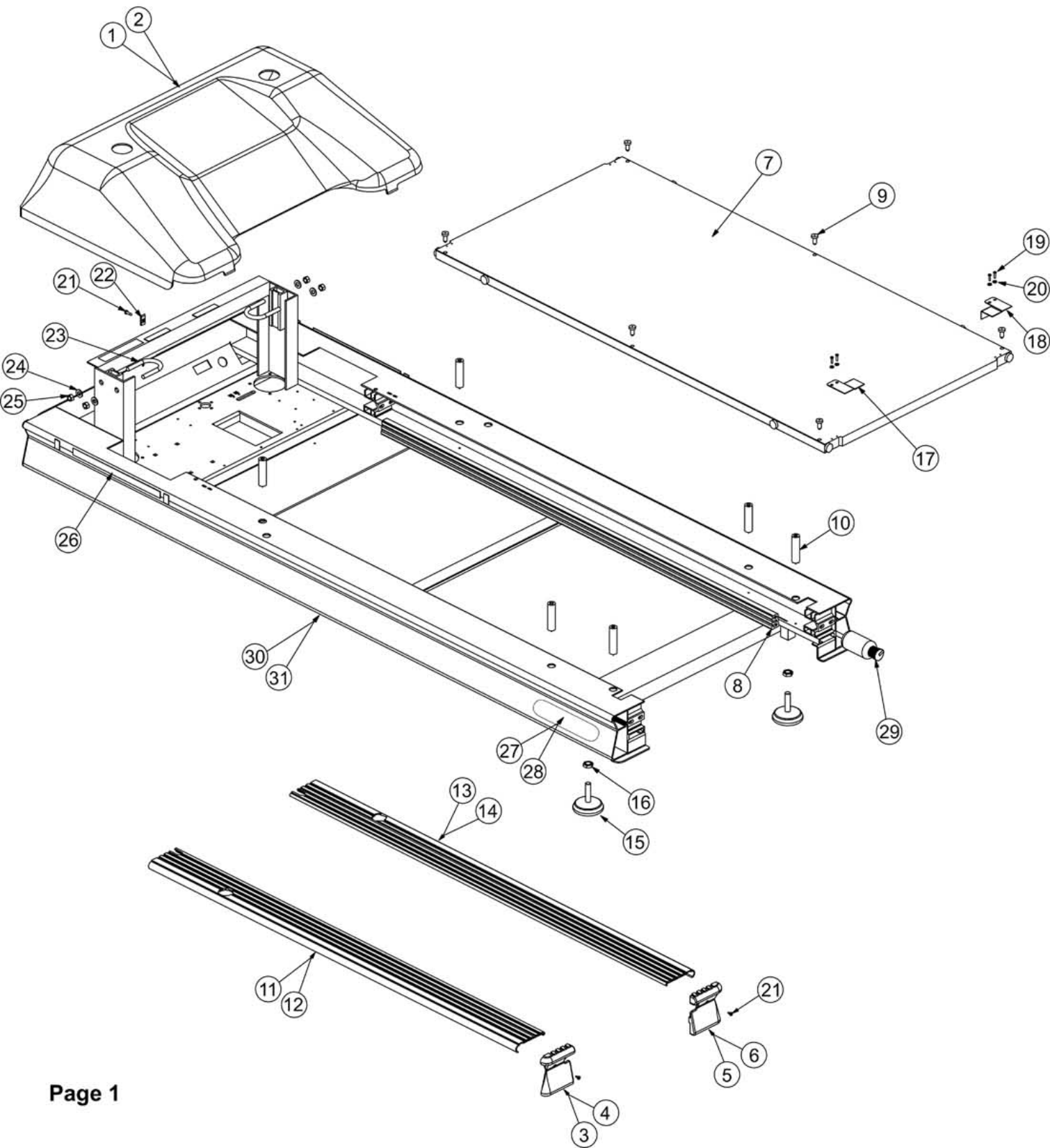
Replace Display Panel

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.

Deck & Frame Assy

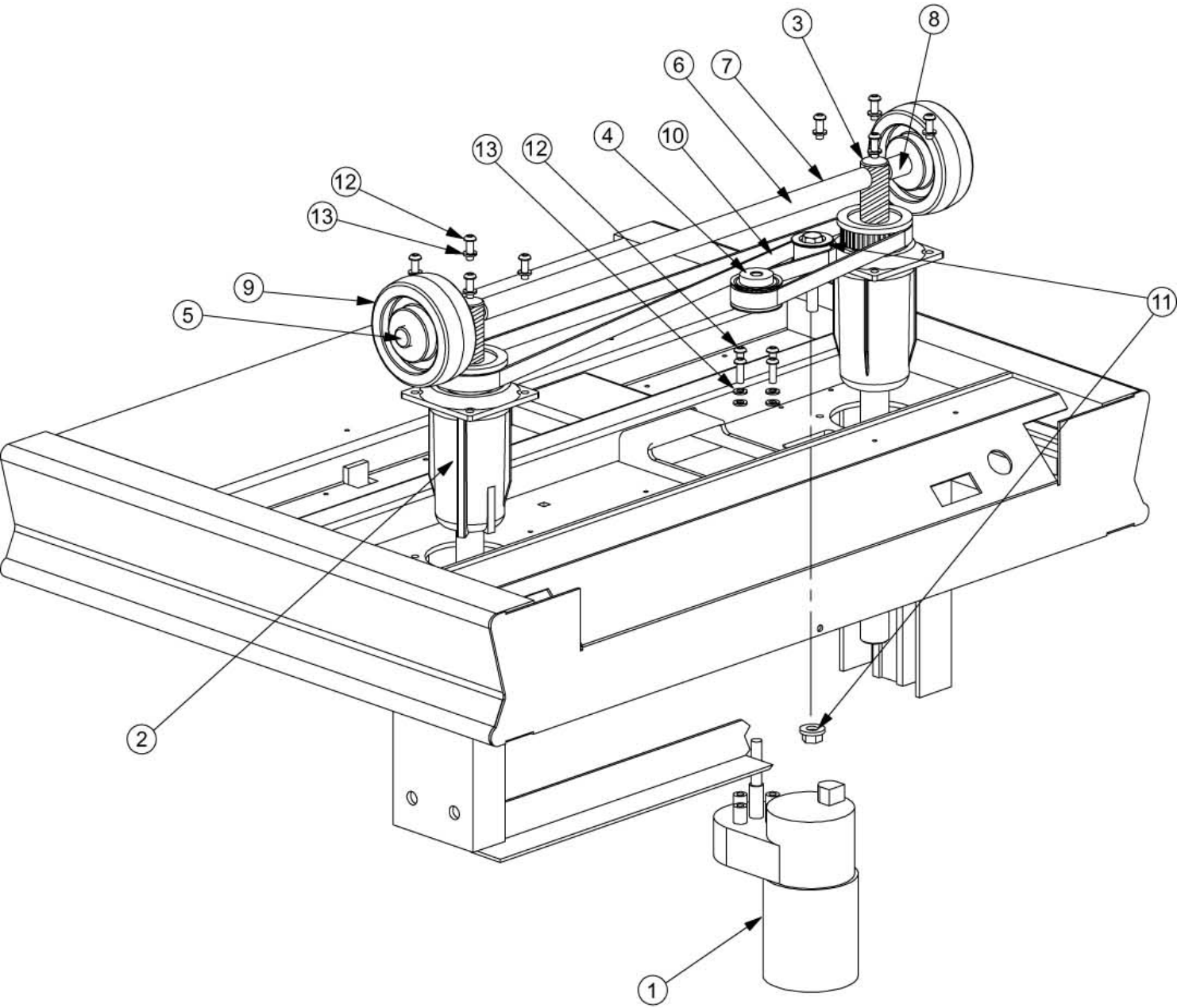




Deck & Frame Assy

Item No	Part Number	Description	Qty Per	Core
1	020-4497	Shroud, Motor, black, 45/39/4000Sm	1	N
2	020-4500	Shroud, motor, grey, 45/39/4000Sm	1	N
3	020-4452	End Cap, 45/39/4000, left, black	1	N
4	020-4480	End Cap, 45/39/4000, left, grey	1	N
5	020-4453	End Cap, 45/39/4000, right, black	1	N
6	020-4481	End Cap, 45/39/4000, right, grey	1	N
7	050-1630	Slikdeck, dbl-sided	1	N
8	010-3061	Deck Rubber Cushion (60" strip)	2	N
9	140-3108	Bumper Rubber, hollow stem, deck	6	N
10	715-3196	Delrin Deck Stop Rod, w/screw	6	N
11	020-4544	Side Bed Cover, left, black	1	N
12	020-4584	Side Bed Cover, left, grey	1	N
13	020-4543	Side Bed Cover, right, black	1	N
14	020-4583	Side Bed Cover, right, grey	1	N
15	140-3200	Adjustable Foot, 3" Base	2	N
16	110-1823	Nut, hex, 1/2-13 X 5/16	2	N
17	020-4454	Finger Guard Plate, 18/35/45/4000, left	1	N
18	020-4627	Finger Guard Plate, 18/35/45/4000, right	1	N
19	110-3066	Screw, 6 X 5/8	4	N
20	120-3002	Washer, #6	4	N
21	110-0475	Screw, 10-32 x 1/2"	3	N
22	110-1790	Tinnerman Clip, #10 nut	1	N
23	110-1000	U-Bolt, 3/8-16	2	N
24	120-0460	Washer, 3/8", flat	4	N
25	110-1830	Nut, hex, 3/8-16, nyloc	4	N
26	140-0492	Velcro Tape Loops <12" strips>	2'	N
27	050-1721	Label, Tr4500 Series	2	N
28	050-1716	Label, Tr3900 Series	2	N
29	140-3180	Bottle, Calwax	1	N
30	710-1031	Frame, welded/painted, black	1	N
31	710-1035	Frame, welded/painted, grey	1	N

Elevation Assy

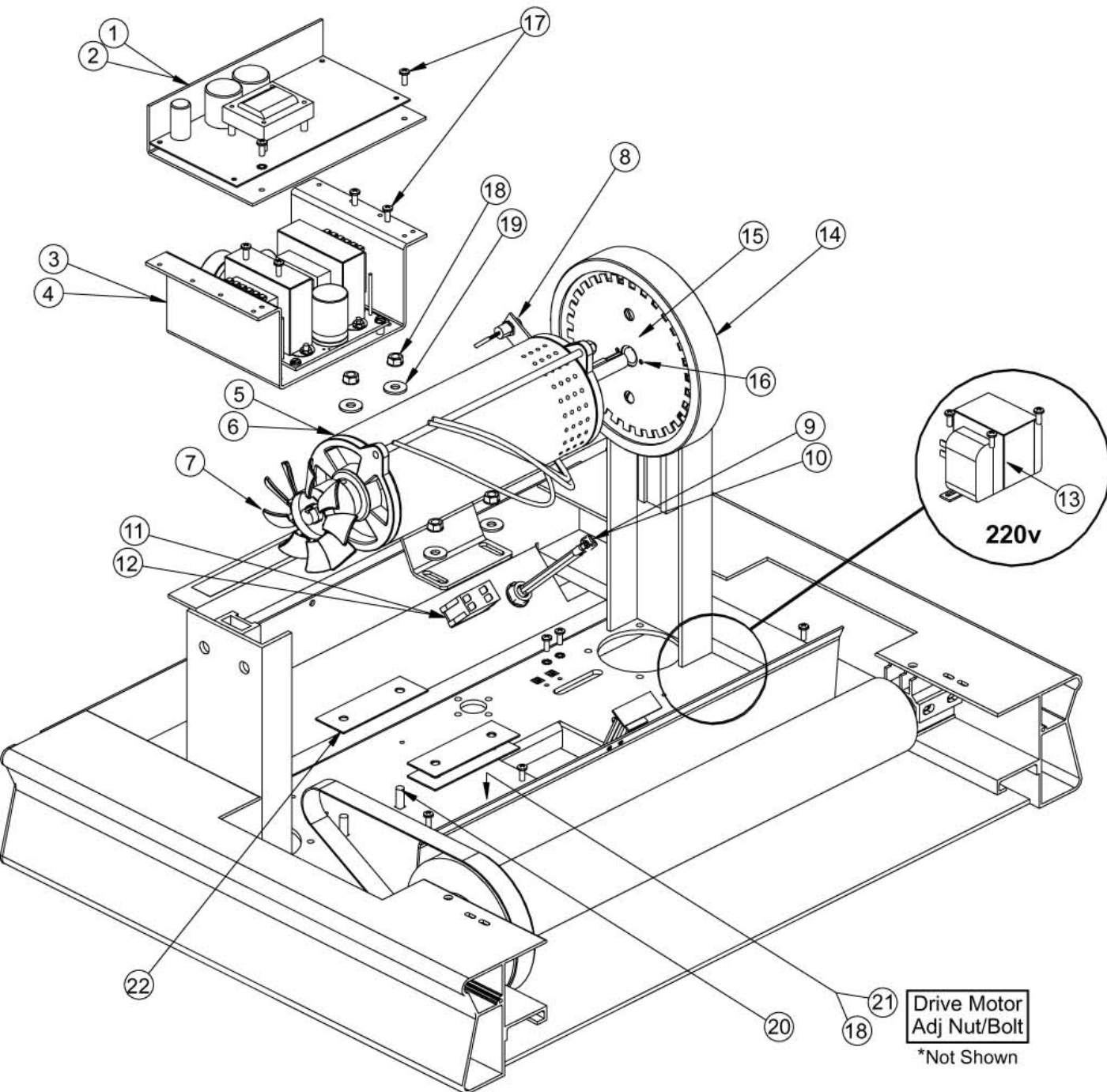




Elevation Assy

Item No	Part Number	Description	Qty Per	Core
1	260-0235	Motor, Elevation, 110vac	1	N
2	708-0151	Elevation Can	2	N
3	715-0110	Elevation Screw, drilled	2	N
4	130-0250	Pulley, Elevation, elev motor	1	N
5	110-1415	Axle Push Caps 1/2"	2	N
6	708-0645	Axle 1/2"	1	N
7	020-6266	Sleeve, Elevation Axle	1	N
8	020-6268	Spacer, Elevation (screw/wheel)	2	N
9	130-1280	Wheel, 3"x 1"x 1/2" bore	2	N
10	130-0050	Elevation Belt	1	N
11	800-0225	Elevation Idler Pulley, Assy	1	N
12	110-0477	Screw, 1/4-20 X 3/4" Shcs	12	N
13	120-0420	Washer, 1/4" lock	12	N

Motor & Electrical Assy

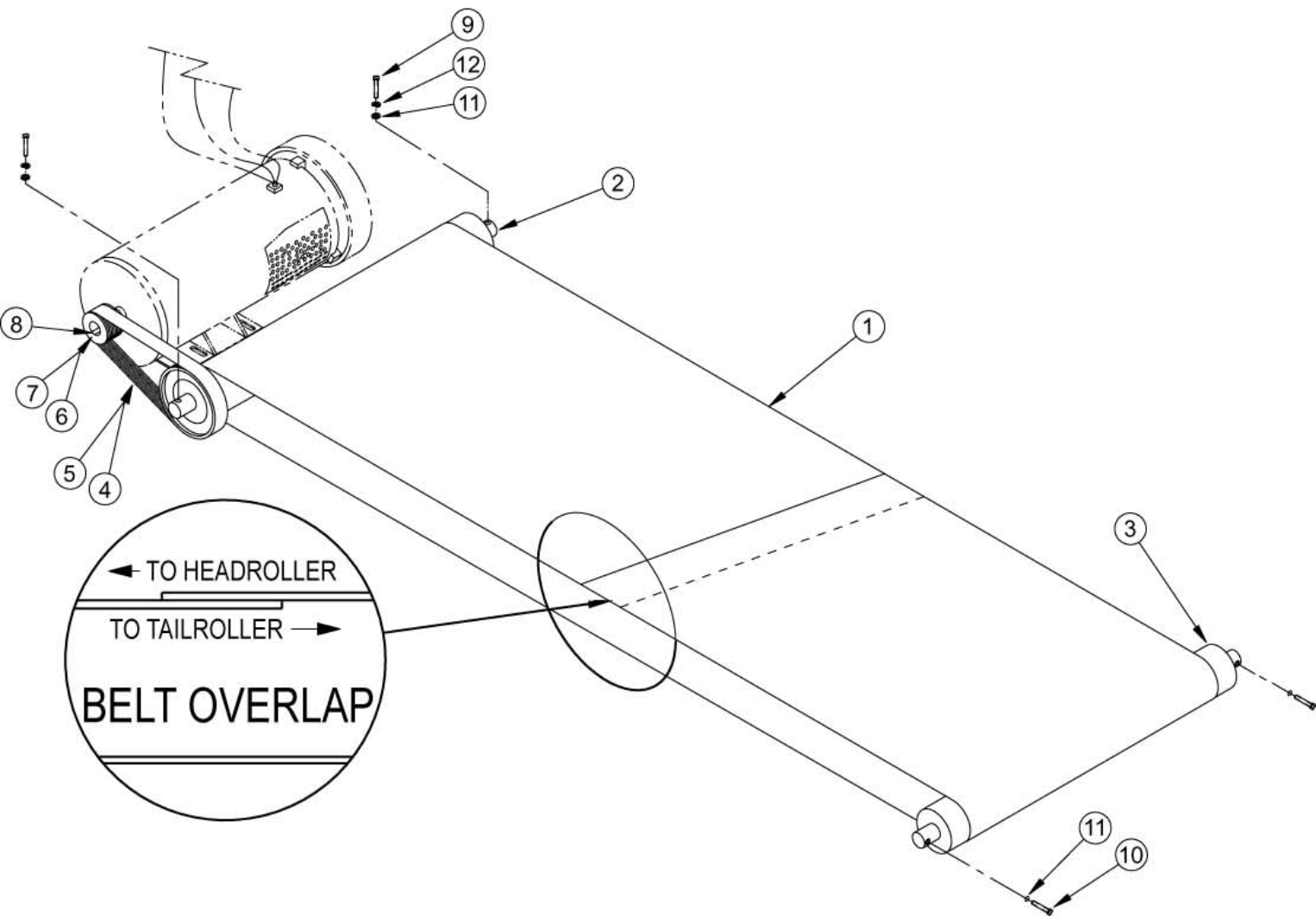




Motor & Electrical Assy

Item No	Part Number	Description	Qty Per	Core
1	800-3016	Mcb, 110v, 18/35/39/45/4000	1	Y
2	715-3132	Mcb, 220v, 18/35/39/45/4000	1	Y
3	800-3259	Filter Network, 110v	1	N
4	800-3258	Filter Network, 220v	1	N
5	260-0220	Motor, 110v, 2.5hp 3500rpm, mag	1	Y
6	260-0903	Motor, 220v, 2.5hp 3500rpm, mag	1	Y
7	140-3111	Fan, 4.5" X 5/8 bore, 9 blades	1	N
8	800-3260	Rpm Sensor, Cherry, (bracket/screws)	1	N
9	800-3245	Power Cord, 110v, (nema 5-20p)	1	N
10	800-3229	Power Cord, 220v, (nema 6-15p)	1	N
11	470-0190	Switch, On/off (breaker), 110v, 2-pole	1	N
12	470-0180	Switch, On/off (breaker), 220v, 4-pole	1	N
13	440-0095	Transformer, Elev Step Down, 220-110v	1	N
14	020-0681	Flywheel 8"	1	N
15	020-0493	Flywheel Rpm Disk, 31 Slots	1	N
16	110-0300	Screw, 8-32 x 3/8" Rhms	2	N
17	110-3026	Screw, 10-24 X 3/4" Phlcs	10	N
18	110-1870	Nut, 5/16-18	5	N
19	120-0480	Washer, 5/16, cut	4	N
20	110-1516	Bolt, 5/16-18 X 1", carriage	4	N
21	110-1510	Bolt, 5/16-18 x 1.75"	1	N
22	140-0020	Pad, Motor, 1/16"	2	N

Running Belt Assy

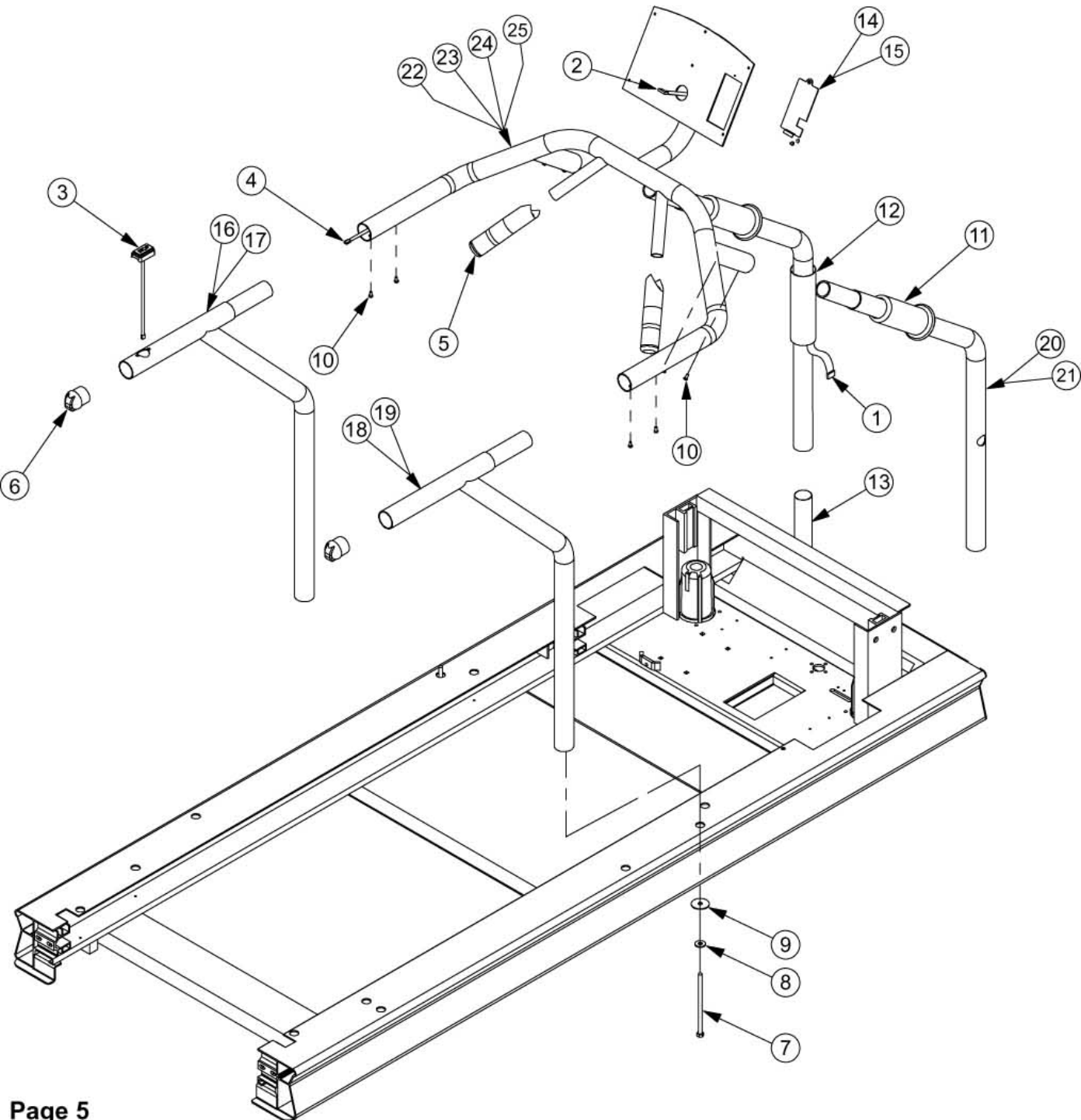




Running Belt Assy

Item No	Part Number	Description	Qty Per	Core
1	130-1630	Running Belt, (20"x128.5")	1	Y
2	708-0061	Head Roller	1	Y
3	708-0132	Tail Roller	1	Y
4	130-0121	Drive Belt, (280J10)	1	N
5	130-1629	Drive Belt, (285J10)	1	N
6	130-7009	Pulley, drive motor, (10J180) 1.8"dia	1	N
7	130-1628	Pulley, drive motor, (10J210) 2.1" dia	1	N
8	110-1442	Key, motor/pulley, 3/16 X 1.5"	1	N
9	110-3056	Screw, 5/16-18 X 2" Shcs, black	2	N
10	110-0651	Screw, 5/16-18 X 1 3/4" Shcs Thrd	2	N
11	120-0490	Washer, 5/16 x1/2"od, flat	4	N
12	120-0496	Washer, 5/16", lock	2	N

4500 Handrail Assy

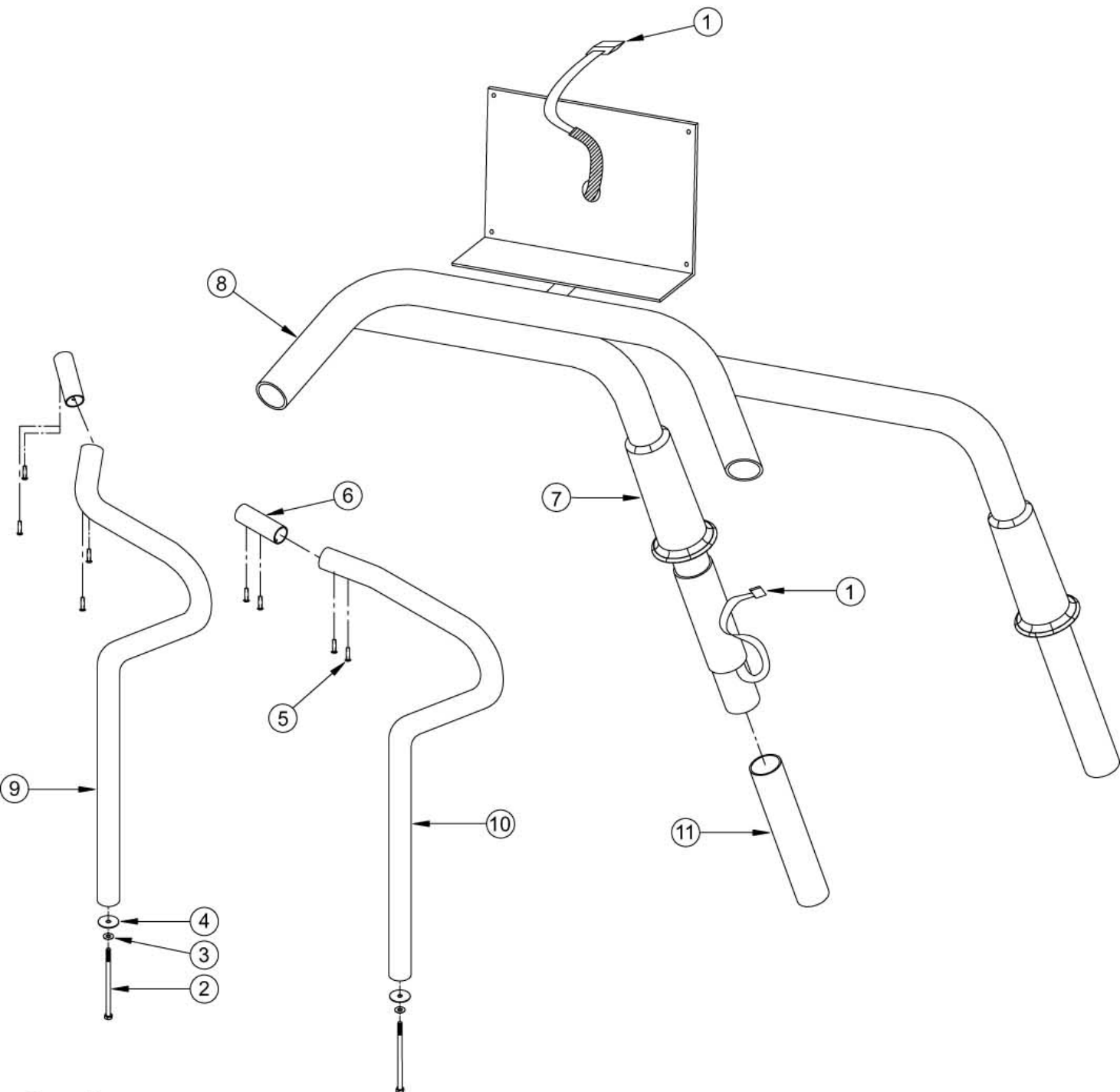




4500 Handrail Assy

Item No	Part Number	Description	Qty Per	Core
1	715-3301	Cable, Display, lower m/f, Tr4500	1	N
2	715-3302	Cable, Display, upper m/m, Tr4500	1	N
3	715-3328	Stop Switch, w/cable, 4500 (D04591 and up)	1	N
4	705-1663	Cable, Display to Stop Sw	1	N
5	711-1032	Hand Grip, Contact HR	2	N
6	020-4600	Cap, side rail (one color only)	2	N
7	110-0685	Screw, 5/16-18 X 6" hex	2	N
8	120-0480	Washer, 5/16, cut	2	N
9	120-0491	Washer, 5/16 x 1.5"od, flat	2	N
10	110-0506	Screw, 1/4-28 x 3/8" Bhss	8	N
11	140-3127	Gasket, base handrail, black	2	N
12	140-3133	Gasket, grey, base handrail	2	N
13	709-0550	Mylar Sleeve	1	N
14	020-4592	Plate, display back, black	1	N
15	020-4598	Plate, display back, grey	1	N
16	020-5037	Rail, side, left, w/stop sw hole, black	1	N
17	020-5038	Rail, side, left, w/stop sw hole, bgrey	1	N
18	020-4582	Handrail, side, right, black	1	N
19	020-4588	Handrail, side, right, grey	1	N
20	020-4581	Rail, front, black	2	N
21	020-4587	Rail, front, grey	2	N
22	020-4589	Handrail, top, cont Hr, black	1	N
23	020-4590	Handrail, top, cont Hr, grey	1	N
24	020-4580	Handrail, top, black (no HR)	1	N
25	020-4586	Handrail, top, grey	1	N

3900 Handrail Assy

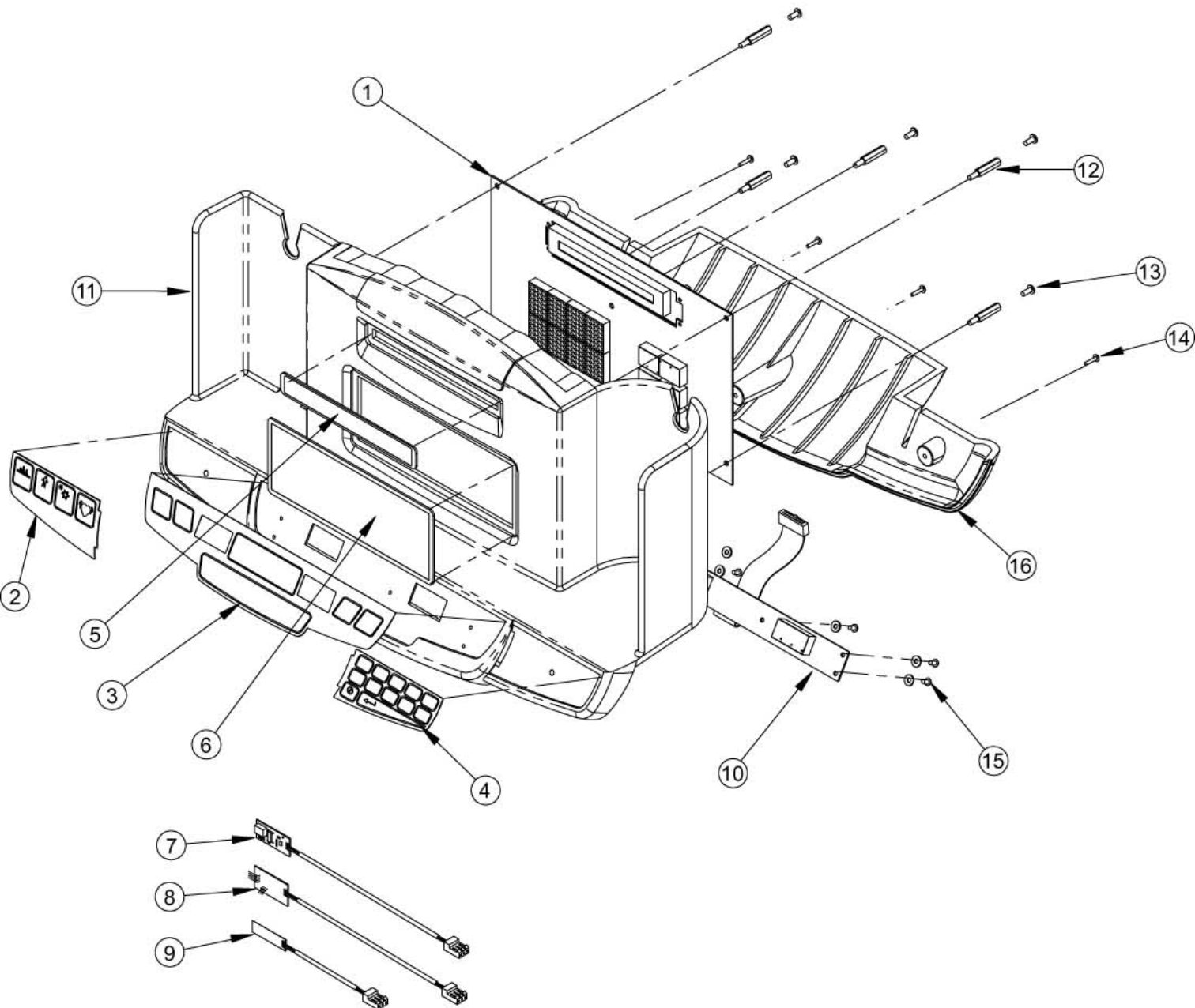




3900 Handrail Assy

Item No	Part Number	Description	Qty Per	Core
1	800-0126	Cable, Display, 39/4000/18/35/900-1	1	N
2	110-0685	Screw, 5/16-18 X 6" hex	2	N
3	120-0480	Washer, 5/16, cut	2	N
4	120-0491	Washer, 5/16 x 1.5"od, flat	2	N
5	110-0506	Screw, 1/4-28 x 3/8" Bhss	8	N
6	710-0521	Hand Rail Insert	2	N
7	140-3127	Gasket, base handrail, black	2	N
8	020-4555	Handrail, front	1	N
9	020-4535	Handrail, left, black	1	N
10	020-4540	Handrail, right, black	1	N
11	709-0550	Mylar Sleeve	1	N

4500 Display Assy

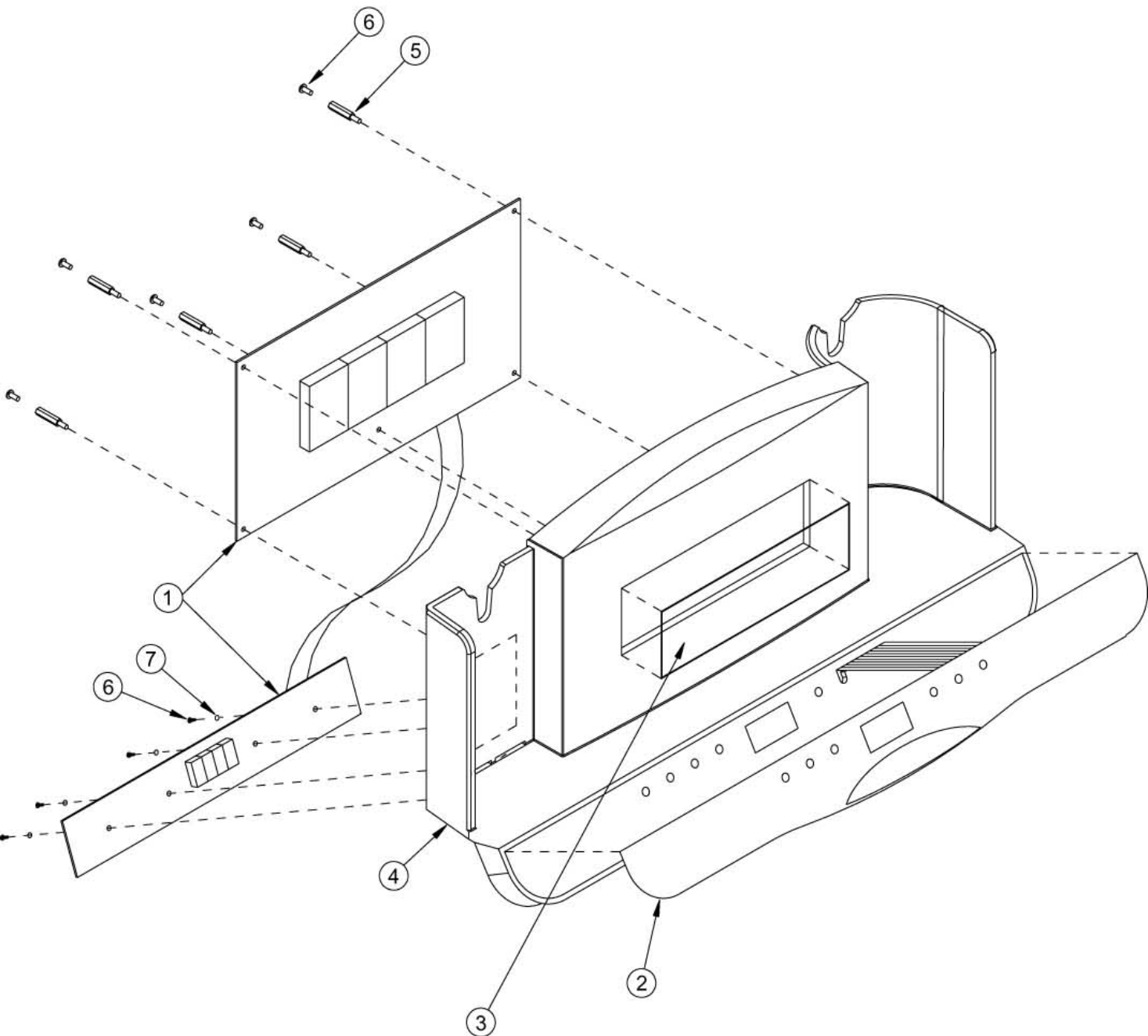




4500 Display Assy

Item No	Part Number	Description	Qty Per	Core
1	715-3279	Display Electronic, Pcb, Tr4500	1	Y
2	050-1722	Keypad Overlay, 4500/4200, left	1	N
3	050-1723	Keypad Overlay, 4500/4200, center	1	N
4	050-1724	Keypad Overlay, 4500/4200, right	1	N
5	020-4576	Lens, small, upper (1" x 6.5")	1	N
6	020-4577	Lens, large, lower (3" x 8")	1	N
7	140-2497	Contact Heartrate Board	1	N
8	715-3131	Contact/Polar Hr Combiner Board	1	N
9	711-1030	Polar Receiver	1	N
10	715-3280	Display Electronic, Pcb, 4500 (sm lower)	1	N
11	800-3360	Display Housing, w kpol/lenses, (no elec)	1	N
12	120-3012	Standoff, M/f 6-32 X 1.0" L	5	N
13	110-3086	Screw, 8-32 X 1/4, Bhcs	5	N
14	110-0250	Screw, 6-32 X 1/2" Rhms	3	N
15	110-0020	Screw, 4-40 x 1/4" Phil Pan	5	N
16	020-4579	Display Housing, lower cover	1	N
17				
18				
19				
91	715-3284	Display Assy Contact, No HR, black	1	Y
92	715-3288	Display Assy Complete, Polar only, black	1	Y
93	715-3289	Display Assy Complete, Contact only, black	1	Y
94	715-3290	Display Assy Complete, Contact/Polar, black	1	Y

3900 Display Assy





3900 Display Assy

Item No	Part Number	Description	Qty Per	Core
1	705-1635	Display Electronic, Pcb, 3900/3500	1	Y
2	050-1705	Keypad Overlay, 3900/3500	1	N
3	020-4496	Lens, (3" x 8")	1	N
4	020-4492	Display Housing	1	N
5	120-3004	Standoff, 6-32 X 3/8	5	N
6	110-0130	Screw, 6-32 X 1/4	9	N
7	120-3002	Washer, #6	4	N
8				
9				
91	705-1630	Display Assy Complete, Tr3500	1	Y