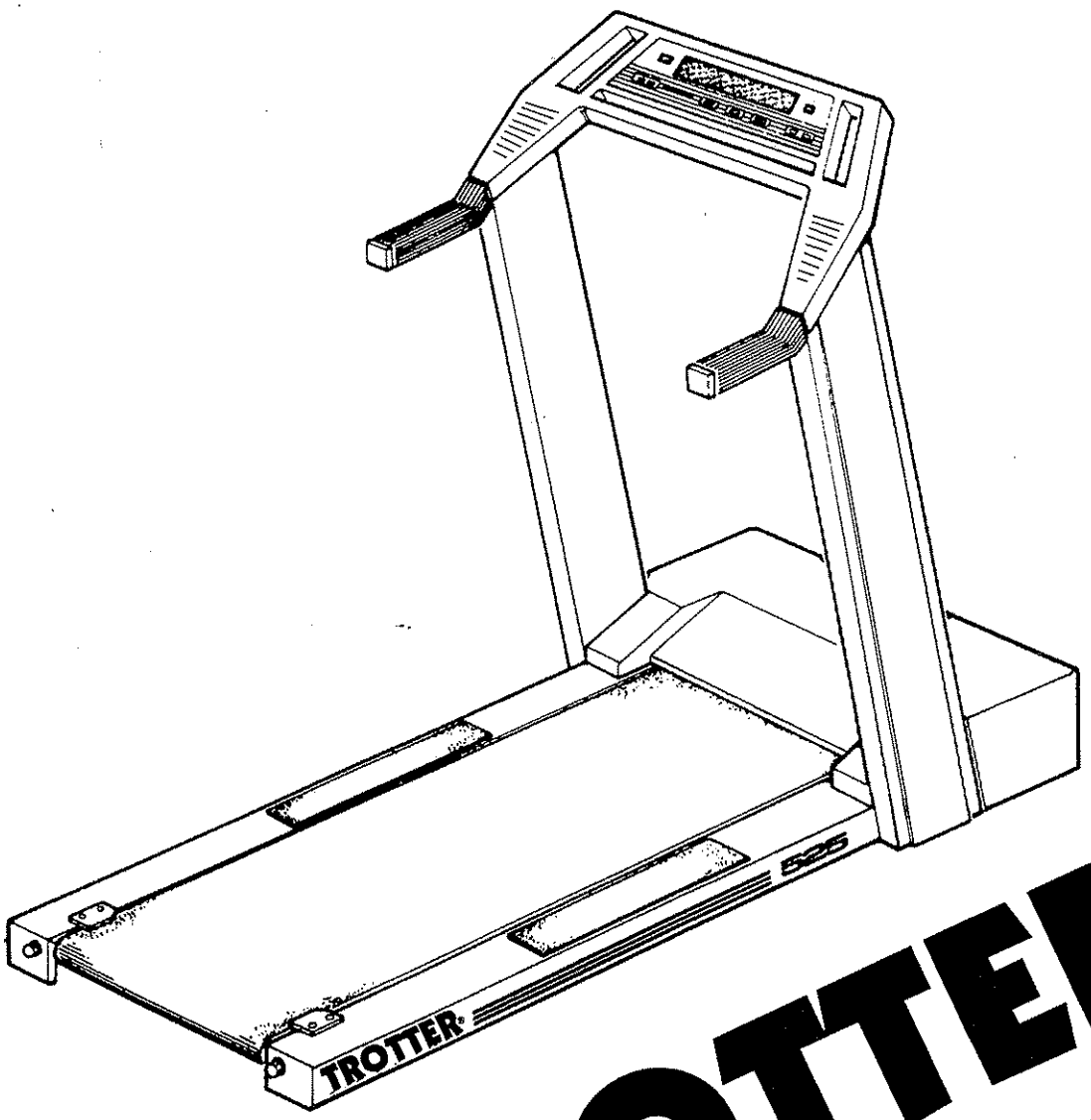


TROTTER® 525

Service Manual

TROTTER 525

Service Manual

Notice: This Document Contains Proprietary Information. This document contains proprietary information of TROTTER®. In consideration of the receipt of this document, the recipient agrees not to copy any of its contents, nor to disclose them to or allow them to be used by any person not currently a TROTTER employee or an employee of the recipient having a need to know, without the express written consent of TROTTER, and further agrees to surrender this document to TROTTER when the reason for its receipt has terminated.

TROTTER® Ten Trotter Drive, Medway, Massachusetts 02053 USA

Foreword

TROTTER is committed to a policy of providing the best possible service for our products and our customers. This service manual is intended for qualified and TROTTER certified service technicians who require detailed information on the operation, troubleshooting, and repair of the TROTTER Model 525.

This service manual is intended to be used in conjunction with, and as a supplement to, the personal training supplied by TROTTER. Departures and deviations from the procedures contained in this manual, except in conformity with official changes made to the manual by TROTTER, are made are at the technician's own risk.

Operators and technicians who require operating instructions and basic maintenance information should refer to the *TROTTER 525 Owner's Operating Manual.*

Through experience and necessity, technicians develop methods that simplify existing maintenance procedures. Since the most effective service manuals consist of these field-proven methods, we encourage you to forward any such procedures or comments to us at the following address:

TROTTER
Customer Service Dept.
Ten Trotter Drive
Medway, MA 02053 USA

Use of warning, caution, and note in this manual are described as follows:

WARNING - To warn the operator/technician of a potentially hazardous condition that may cause physical injury.

CAUTION -To caution the operator/technician of a condition that could cause damage to the equipment.

Note - To provide additional information.

TABLE OF CONTENTS

1

General Description

Introduction

The information contained in this chapter is used to provide TROTTER service personnel with a general introduction to the operating capabilities and specifications of the Model 525 treadmill. See Figure 1-1.

For detailed operating information, refer to the *Owner's Operating Manual.*

Equipment Overview

The Model 525 treadmill performs a variety of pre-programmed or user defined workout routines under microprocessor control.

The treadmill allows for either manual or programmed operations. These operations are discussed in the following paragraphs.

Manual mode

This mode of operation allows the user to manually alter the treadmill's running belt speed and its elevation or incline (% grade). These changes are made using the display console's control buttons.

While operating in manual mode, the microprocessor performs continuous self-testing and monitors system operations. If system monitoring or self-tests detect a problem, the user is alerted to the condition through a displayed error message. For error message definitions and troubleshooting methods refer to *Chapter 4, Corrective Maintenance.*

Program mode

This mode of operation places the treadmill's speed and elevation under microprocessor control. User selected pre-programmed workout routines contain speed and elevation settings which automatically execute at predetermined times. The treadmill also has the ability to store user defined workout routines.

In addition to executing workout routines, the microprocessor, as in the manual mode, also performs continuous self-testing and monitoring of system operations. If system monitoring or self-tests detect a problem, the user is alerted to the condition through a displayed error message. For error message definitions and troubleshooting methods refer to *Chapter 4, Corrective Maintenance.*

The microprocessor also alerts the user at appropriate mileage intervals of required Preventive Maintenance (PM) procedures. These alerts are in the form of displayed PM messages. For maintenance message definitions and procedures refer to *Chapter 3, Preventive Maintenance.*

Historical information regarding operation of the treadmill (e.g., hours and miles/kilometers of use to date) and workout routines (programs) created by the user are stored in Non-Volatile Random Access Memory (NVRAM).

Operational parameters for the model 525 are listed in the following table.

PARAMETER	DESCRIPTION
PROGRAMS	10 PRESET, PLUS 10 CUSTOM MADE (USER DEFINED)
LEVELS OF DIFFICULTY	UP TO 7 PER PROGRAM
MANUAL MODE	YES (USER DEFINED)
SPEED RANGE	1.0 TO 10 MPH (1.6 TO 16 KMH)
INCLINE RANGE	0 TO 12% GRADE

For a detailed operational and functional description of the Model 525 refer to *Chapter 2, Principles of Operation.*

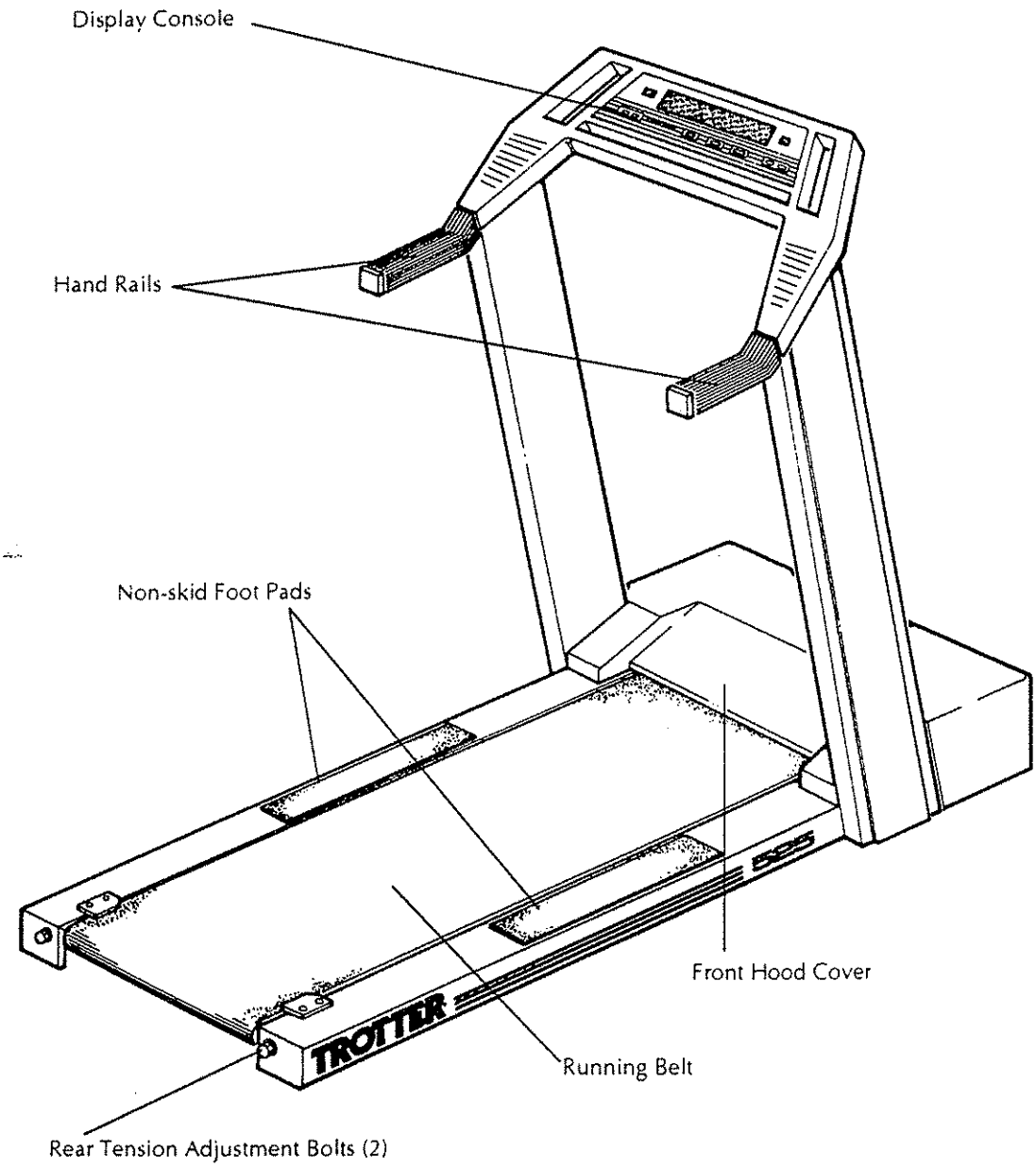


Figure 1-1: Model 525 Treadmill

Power Requirements

A steady and reliable supply of source AC power is critical to the operational performance of the treadmill. Due to the power (current) consumption of the equipment, the treadmill must be operated from a dedicated and separately grounded source AC line.

Power specifications for domestic and international 525 models are listed in the following tables.

	DOMESTIC	
VOLTAGE	FREQUENCY	CURRENT (AVAILABLE LINE)
115 VAC ±10%	60 Hz	20 AMP

	INTERNATIONAL	
VOLTAGE	FREQUENCY	CURRENT (AVAILABLE LINE)
230 VAC ±10%	50 Hz	15 AMP

CAUTION: Do not use a ground plug adapter to adapt the treadmill's three-prong power cord plug to a non-grounded electrical outlet.

Environmental Guidelines

To enhance the operational performance of the Model 525 treadmill, it is important that the following environmental guidelines be observed:

- Operate the treadmill in a well lit and ventilated area.
- Position the treadmill directly over (if possible) a major structural support if the treadmill is to be operated above the first floor.
- Install the treadmill in an area of low humidity. Areas in the vicinity of a steam room, sauna, or indoor pool provide an excessive amount of humidity/chlorine and could adversely affect the electronics, as well as other parts of the machine.

Note: To avoid possible damage to heavy, plush carpets and to ensure adequate air circulation, place a 3/4-inch (1.9 cm) thick wood or rigid plastic base under the treadmill.

Physical Specifications

Physical specifications for the model 525 are listed in the following table.

Description	Value
Overall length	69 in. (175 cm)
Overall width	30 in. (76 cm)
Running area length	52 in. (132 cm)
Running area width	18 in. (46 cm)
Equipment weight	240 lb (109 kg)
Weight range	40 to 300 lb (18 to 136 kg)
Deck material	Wax coated wood
Chassis construction	12 gauge uni-welded steel

2

Principles of Operation

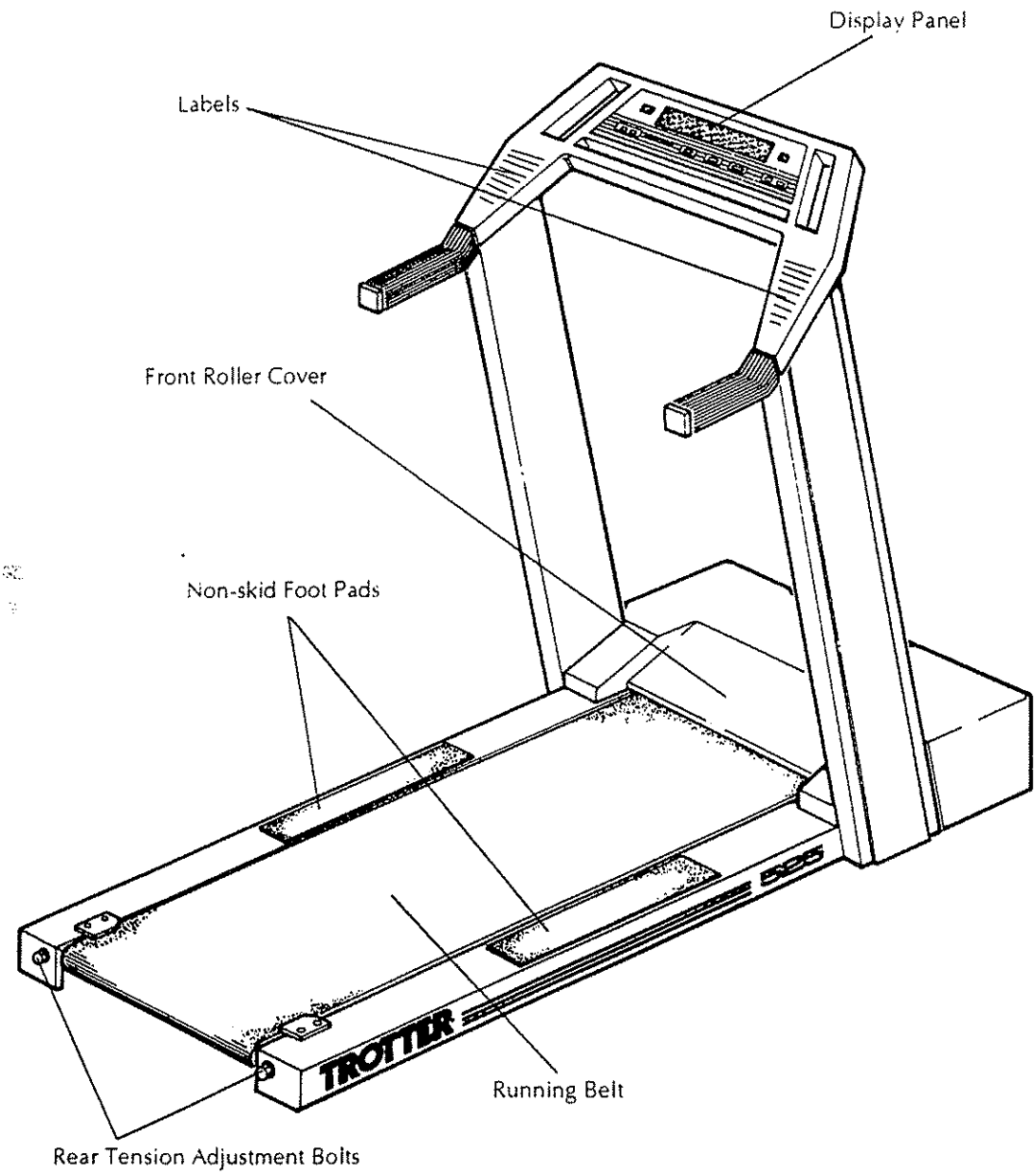


Figure 2-1: Model 525 Treadmill

Introduction

The information contained in this chapter is used to familiarize TROTTER service personnel with the technical operations of the Model 525 treadmill. See Figure 2-1.

Note: Model 525 information presented in this chapter is applicable to all 60 Hz/ 115 VAC and 50 Hz/230 VAC treadmills.

Normal Operation

To effectively troubleshoot and maintain the Model 525 treadmill requires a thorough knowledge of normal equipment operation. This knowledge will enable the technician to identify most malfunctioning components.

The following paragraphs describe normal operations of the Model 525 treadmill and how its individual components function together.

Upon power-up (placing the main power switch into the ON position), the system:

- performs a brief self-test ending in a momentary "beep."
- displays the AC power source frequency "**50HZ** or **60HZ**".
- displays the message, "**TEST DRIVE A TROTTER 525 PERSONAL TRAINER.**"
- displays the various pre-programmed workout routines available.

The displayed workout messages will continue to cycle until the user presses a control button. Once a control button has been pressed the system prompts with the message:

SELECT MODE : MANUAL ▲ PROGRAM ▼ MAN ▲ PRG ▼

Responding to this message by pressing either the ▲ or ▼ control button results in the system prompting with:

SET WEIGHT + OR –

The system will default to 160 lb. (72 kg). Pressing the + or – control button adjusts the displayed number to reflect the user's actual weight.

After adjusting the weight value, press the **ENTER/SCAN** control button.

If the **PROGRAM** mode was selected, the system prompts with the message:

SELECT PROGRAM, PR1, FITNESS TEST (PR1 PROFILE)

PRESS ENTER TO SELECT, + – TO CHANGE

The user may preview the programmed routines and select a choice by pressing the **ENTER** control button. After a selection is made, the system begins the start-up process. The start-up process for the PROGRAM mode consists of:

- the system performing a displayed countdown "**3...2...1...**" As each number is displayed it is accompanied by an audible "beep."
- power being applied to the main drive motor. Initially, the running belt speed is set to 1 MPH (1.6 KMH). The motor turns the belt and data from its speed sensor is monitored, confirming the 1 MPH (1.6 KMH) speed. Voltage to the motor is microprocessor controlled to maintain the set speed.

The microprocessor receives its instructions for belt speed and elevation control from the selected pre-programmed workout routine.

If the MANUAL mode was selected, the system, after a weight value has been entered, begins the start-up process. The start-up process for the MANUAL mode consists of:

- the system performing a displayed countdown "**3...2...1...**" As each number is displayed it is accompanied by an audible "beep."
- power being applied to the main drive motor. Initially, the running belt speed is set to 1 MPH (1.6 KMH). The motor turns the belt and data from its speed sensor is monitored, confirming the 1 MPH (1.6 KMH) speed. Voltage to the motor is adjusted to maintain the set speed.

After the system stabilizes, belt speed and elevation are controlled using the display console's control buttons.

When the user presses a button on the display console, to either increase or decrease speed, a circuit is activated, sending a signal to the microprocessor which:

- displays the "requested" speed on the dot matrix display.
- controls the timing, based on "requested" speed requirements, of applied gating current/voltage to the bridge rectifier. A change in gate timing results in increased (faster belt speed) or decreased (slower belt speed) DC voltage supplied to the main drive motor.
- confirms belt speed by monitoring the signal supplied by the speed sensor. This sensor signal is then converted into an "actual" speed.
- displays the "actual" speed in MPH on 7-segment LED blocks.

When the user presses a button on the display console, to either increase or decrease elevation (incline), a circuit is activated, sending a signal to the microprocessor which:

- displays the "requested" incline on the dot matrix display.
- activates a solid state TRIAC. This TRIAC relay allows AC voltage/current to flow to a mechanical relay.

- energizes the mechanical relay into the UP position (DOWN position is the relay's relaxed state). The position of the mechanical relay, based on "requested" incline requirements, determines to which set of internal elevation motor windings AC voltage/current will flow, and in which direction the elevation motor's leadscrew turns.

  Turning the leadscrew in one direction extends the elevation arms, which raises the treadmill's front. Turning the leadscrew in the opposite direction causes the elevation arms to retract, which lowers the treadmill's front.
- confirms treadmill incline by monitoring the data supplied by the elevation sensor (potentiometer). This data (DC voltage signal) is then converted into an "actual" incline.
- displays the "actual" incline in % grade on 7-segment LED blocks.

All equipment operations may be halted by pressing the **STOP** control button.

Block Diagram

A block diagram of the Model 525 is shown in Figure 2-2. This block diagram illustrates the connectivity of the various components of the treadmill.

Each of the blocks included in the diagram is discussed in the following paragraphs.

Note: Detailed schematics of the circuits contained in the block diagram may be found in Chapter 6, Technical Specifications.

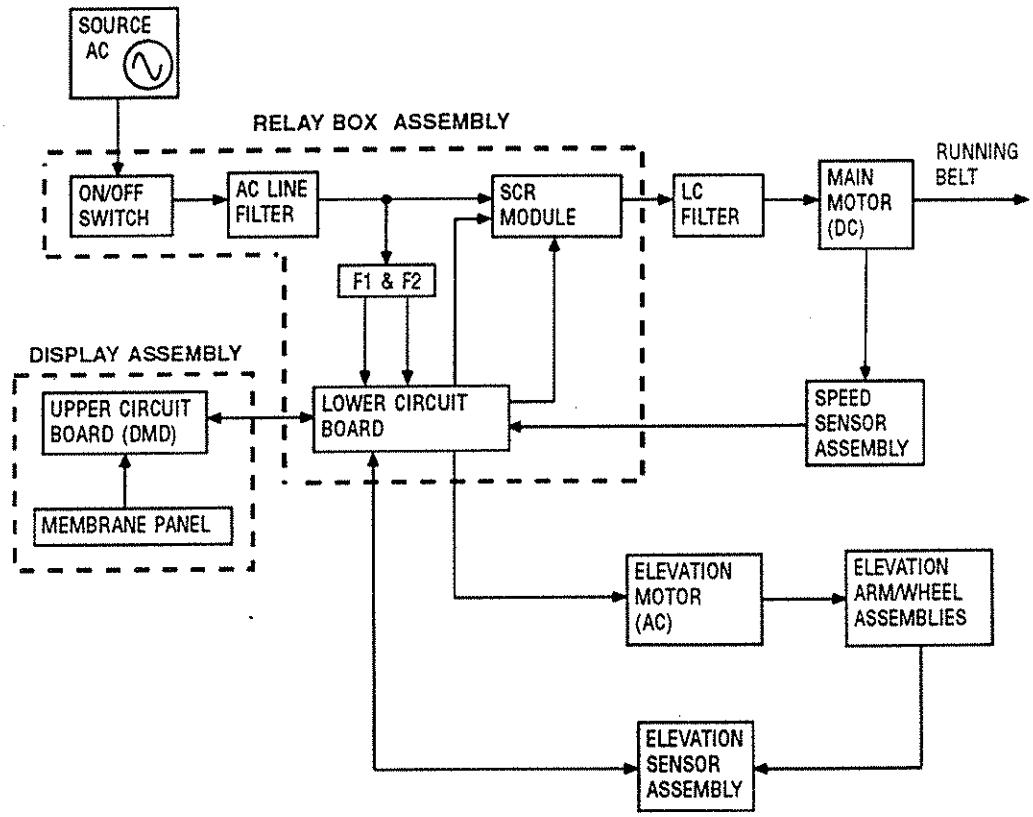


Figure 2-2: Model 525 Block Diagram

AC Main ON/OFF Switch

The single-throw double-pole main AC line switch is located on the relay box and is used to control the application of source AC power. See Figure 2-3.

Placing the switch into the ON position allows source AC to flow to the AC line filter.

AC Line Filter

The AC line filter is located inside of the relay box and is used to condition (filter) unwanted electrical noise. See Figure 2-3.

After filtering, the AC signal is distributed to the AC-to-DC rectifier (neutral side only) and fuses F1 and F2.

The two fuses protect the 3A and 25A, 60 Hz (1.6A and 16A, 50 Hz) AC signals which are distributed to the lower circuit board.

SCR Module (AC-to-DC Rectifier)

The SCR module contains an AC-to-DC bridge rectifier. This rectifier converts AC voltages (supplied by the lower circuit board and the AC line filter) into a regulated DC voltage which is then supplied to the main drive motor.

The SCR module is located inside of the relay box. See Figure 2-3.

The rectifier operates by forcing Alternating Current (AC) flowing in a circuit to flow in only one direction, commonly called Direct Current (DC).

This DC voltage causes the main drive motor's shaft to turn which is translated into belt movement. Voltage (DC) strength and therefore motor/belt speed are related to the amount of AC signal conducted (passed) by the rectifier. The more AC signal conducted, the greater will be motor/belt speed. The rectifier circuit uses four diodes arranged in a bridge configuration. See Figure 2-4.

Two of the diodes are Silicon Controlled Rectifiers (SCR). The purpose of these two diodes (SCR1 and SCR2) is to govern main motor speed by controlling the amount of AC signal conducted by the rectifier.

Two conditions must be present for an SCR diode to conduct. It must first receive sufficient gating current (microprocessor controlled) for its gate to become "enabled" or turned on. The diode must then become forward biased (AC signal controlled). After these two conditions are met the diode will conduct the remainder of the AC signal (positive or negative halfwave) being applied.

Once enabled, the SCR will continue to conduct current (one direction only) until it experiences reverse biasing (applied AC signal changes polarity).

To understand the operation of the SCR controlled bridge rectifier, refer to the following step-by-step discussion.

Note: The electron theory of current flow (positive to negative) is used during this rectifier discussion.

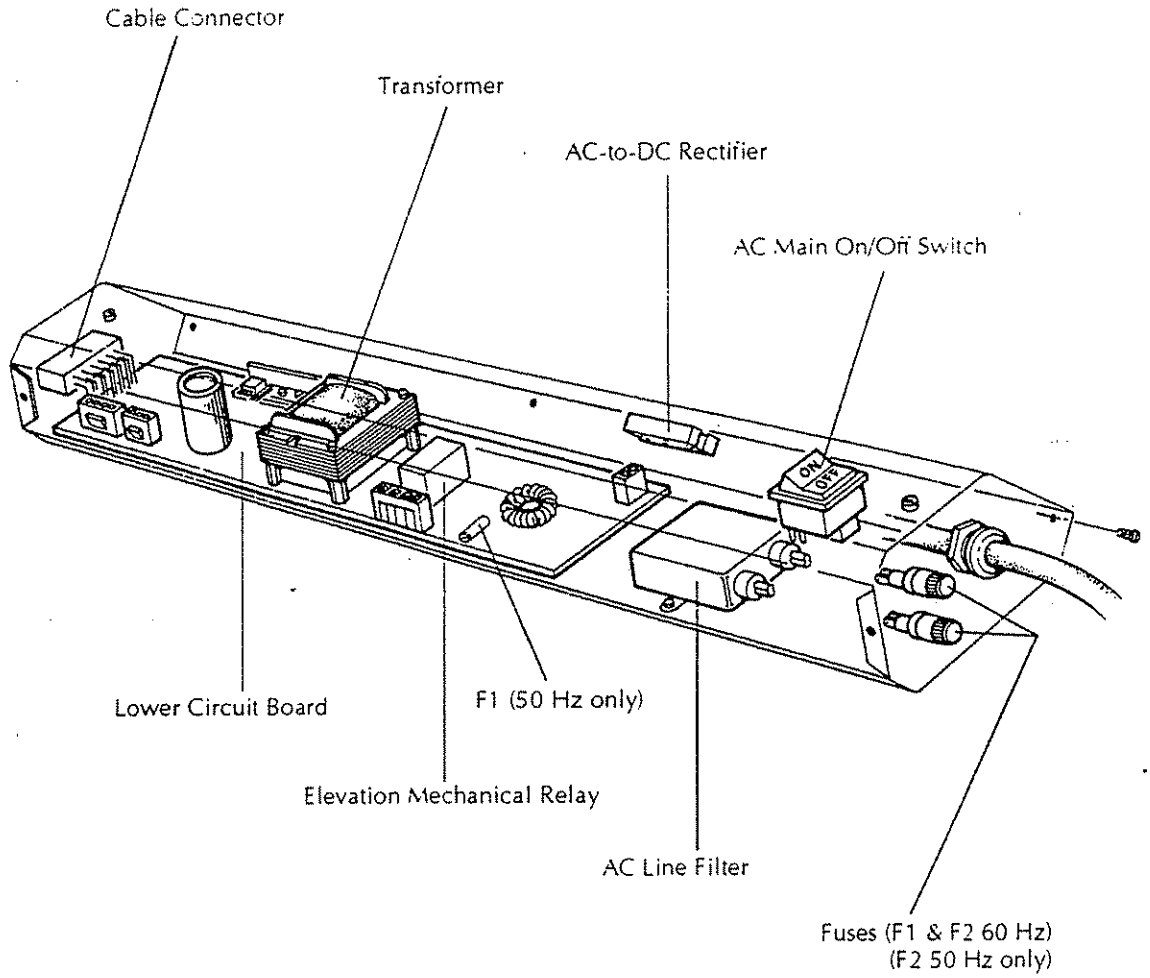


Figure 2-3: Relay Box Overview

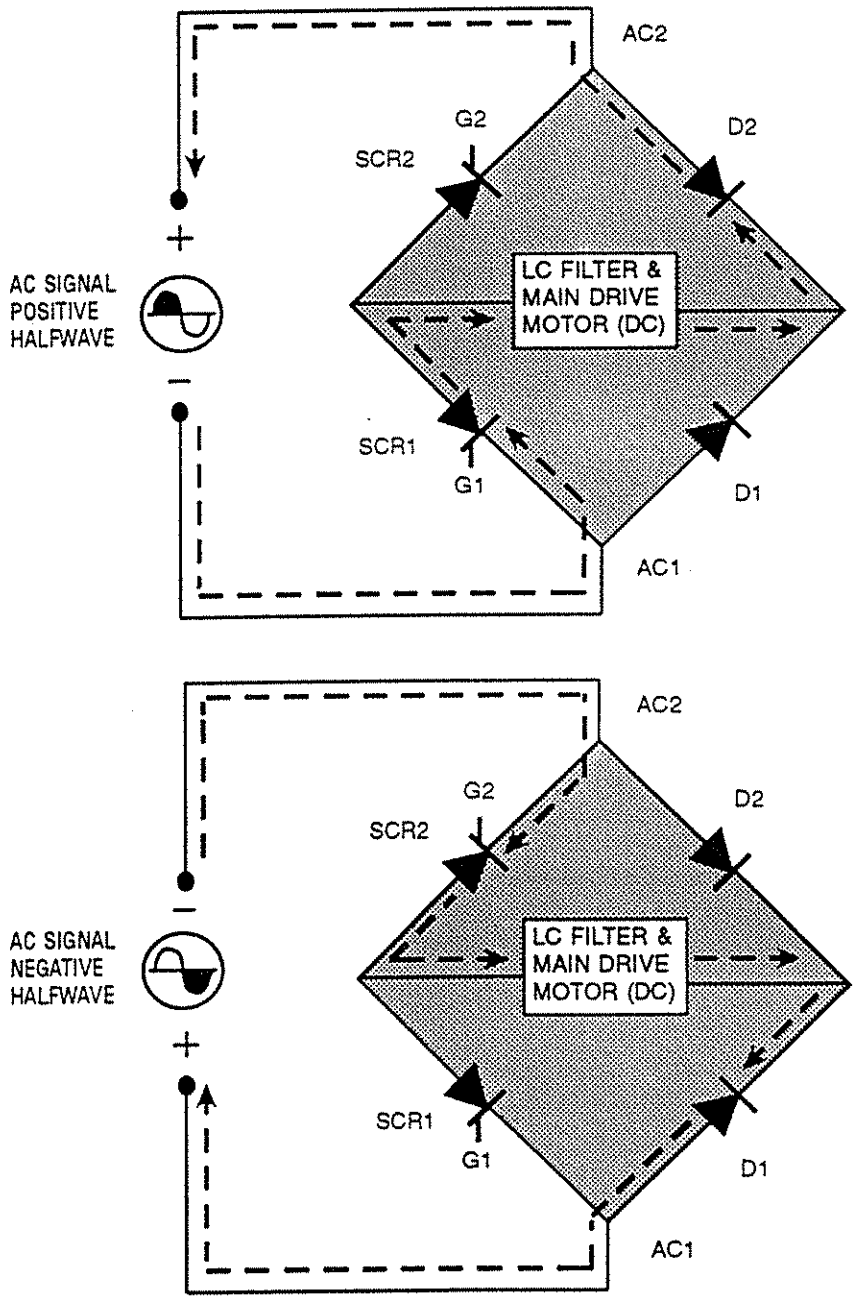


Figure 2-4: SCR Bridge Rectifier Operation

Processing the AC signal's positive halfwave.

a. The AC signal is applied (positive halfwave). Forward biasing is present on diodes SCR1 and D2. See figure 2-4.
b. The microprocessor determines when to apply gating current to G1 to achieve the desired DC voltage strength. See Figure 2-5.
c. Gating current is applied (microprocessor controlled) to G1, enabling SCR1. See Figure 2-4.
d. Diodes SCR1 and D2 conduct the remainder of the positive halfwave. The path of current flow (one direction) is through SCR1, LC filter, main motor (DC), and D2. See Figure 2-4.
e. The AC signal reverses polarity. This causes diodes SCR1 and D2 to become reverse biased and the microprocessor to remove gating current from G1 (disabling SCR1). Current conduction ceases. See Figure 2-5.

Processing the AC signal's negative halfwave.

a. The AC signal is applied (negative halfwave). Forward biasing is present on diodes SCR2 and D1. See Figure 2-4.
b. The microprocessor determines when to apply gating current to G2 to achieve the desired DC voltage strength. See Figure 2-5.
c. Gating current is applied (microprocessor controlled) to G2, enabling SCR2. See Figure 2-4.
d. Diodes SCR2 and D1 conduct the remainder of the negative halfwave. The path of current flow (one direction) is through SCR2, LC filter, main motor (DC), and D1. See Figure 2-4.
e. The AC signal reverses polarity. This causes diodes SCR2 and D1 to become reverse biased and the microprocessor to remove gating current from G2 (disabling SCR2). Current conduction ceases. See Figure 2-5.

The process is repeated as the AC signal begins a new positive halfwave.

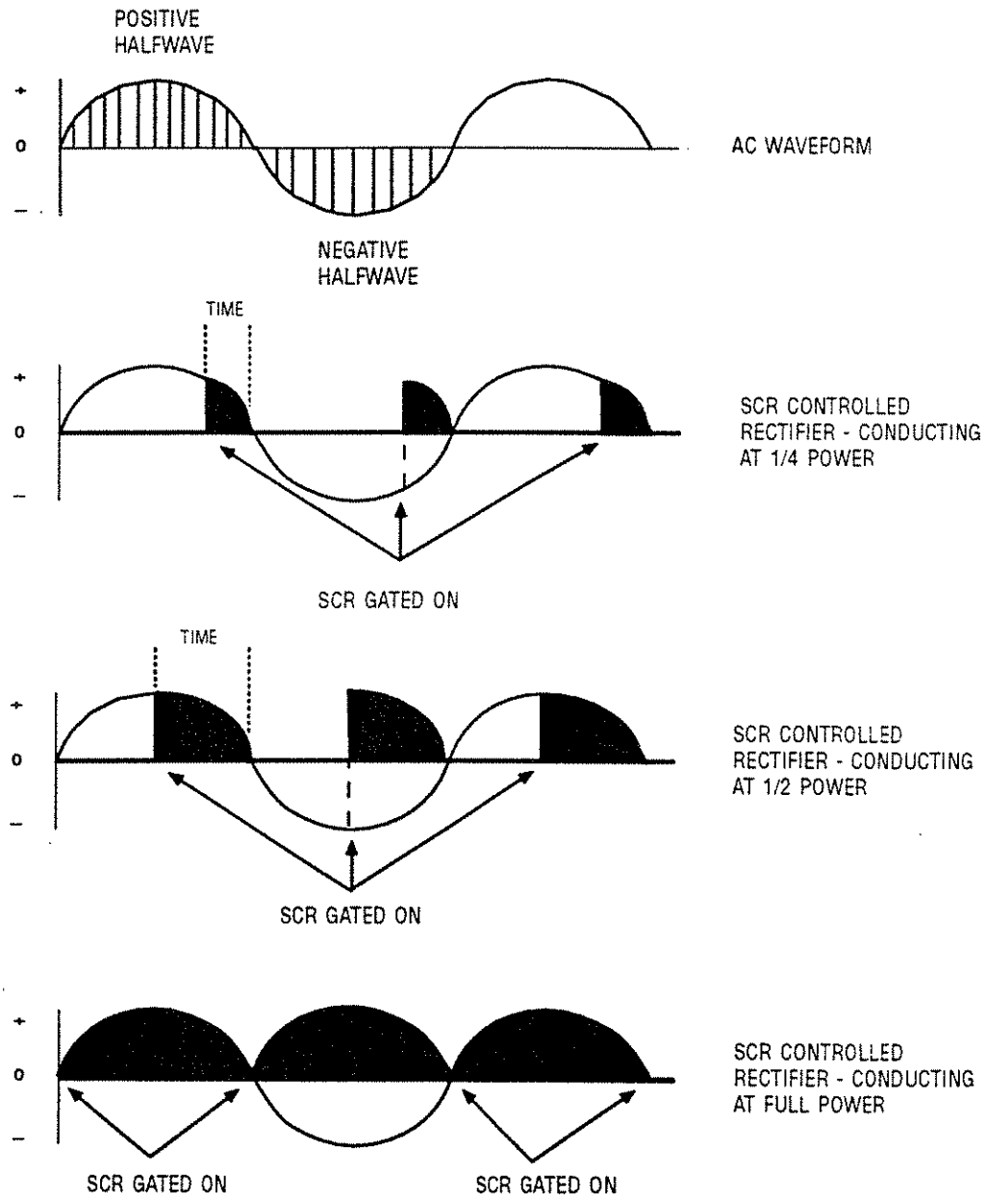


Figure 2-5: SCR Controlled Waveforms

LC Filter (Inductor/Capacitor)

The LC filter is located on the treadmill frame, near the main drive motor, and is used to condition the rectified DC produced by the AC-to-DC bridge rectifier.

Pulsating DC created by the bridge rectifier cannot be used by the main DC motor in its initial form.

The pulsating or ripple component of the DC signal must first be removed through filtering if the main motor is to run quietly and smoothly. This filtering is performed by an Inductor (L), also called a choke, placed in series and a Capacitor (C) arranged in parallel to the main drive motor (DC). See Figures 2-6 and 2-7.

The inductor opposes changes in current and the capacitor opposes changes in voltage; together they effectively remove the ripple contained in the pulsating DC signal.

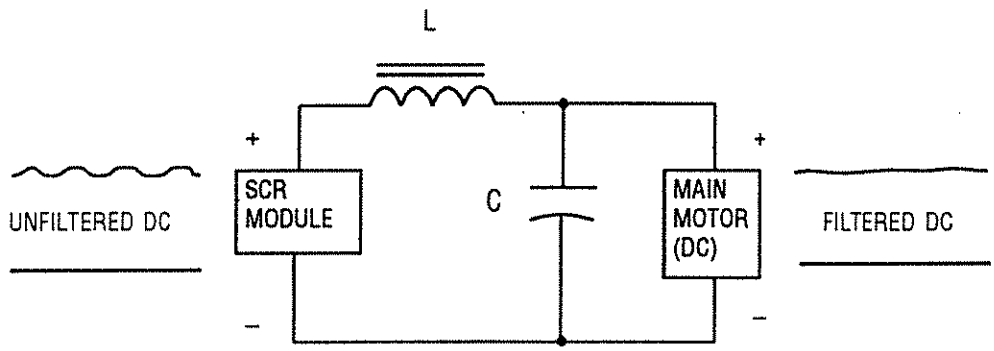


Figure 2-6: LC Filter Operation

Lower Circuit Board

The lower circuit board, housed in the relay box, contains many individual circuits devoted to power and control signal processing and distribution. These circuits operate through input requests made on the display console or under program control. See Figure 2-3.

Notes:
1. Detailed schematics of the circuits contained on the lower circuit board may be found in Chapter 6, Technical Specifications.

2. The failure of any circuit contained on the lower circuit board requires the replacement of the entire board.

The various circuits contained on the lower circuit board are discussed in the following paragraphs.

Speed pick-up amplifier
This circuit accepts and amplifies the output of the main DC motor speed sensor. The amplified signal (containing a constant voltage but varying frequency) is used by the microprocessor to adjust main drive motor (DC) speed.

Motor current sense
This circuit generates a voltage signal matching the amount of current drawn by the main DC motor. The microprocessor uses this signal to determine if an abnormal excessive current draw condition exists.

Elevation control system
This system consists of an elevation sensor circuit and an elevation control circuit. Refer to the *Elevation Assembly* discussion (later in this chapter) for an operational description of the control system.

Power supply (DC)
This circuit provides regulated voltages of +5.5 VDC and +12 VDC to the lower and upper circuit boards. The main components of the DC power supply consists of a:

- transformer (reduces an applied 115/230 VAC to 10 VAC and 20 VAC)
- diode network (rectifies the transformer outputs to +12 VDC)
- voltage regulator (converts +12 VDC to an output of +5.5 VDC)

SCR drive
This circuit provides voltage/current drive to gates G1 and G2 contained in the SCR rectifier module. The SCR drive circuit's activating signal originates at the microprocessor.

Main Drive Motor (DC)

The main drive motor is located beneath the front hood cover and is used to drive (turn) the running belt at a constant rate as determined by the user or while under program control. See Figure 2-7.

This 2.0 Horse Power (HP) drive motor receives power (VDC) from the AC-to-DC rectifier (SCR bridge) through the LC filter circuits. The DC motor allows variable speed control which ensures more precise control over belt speed.

Motion is transferred from the motor to the running belt using a pulley and a Poly "V" belt mounted at one end of the motor's drive shaft. Mounted at the other end of the drive shaft is a flywheel which is used to create inertia to overcome any momentary slowdown which might be experienced whenever a runner's foot strikes the running belt.

The DC motor is monitored to ensure that constant main drive motor (DC) speed is being maintained. Monitoring is performed by a speed sensor.

Speed Sensor Assembly

The speed sensor is located on the main drive motor (DC) and is used to detect motor/belt speed. The sensor consists of two main components; an electromagnetic sensor and a toothed gear. See Figure 2-7.

The electromagnetic sensor consists of a coil and a magnet housed in a split aluminum block which is mounted on the main drive motor's outer casing. The toothed gear is attached to the main drive motor's pulley shaft.

Belt speed is determined by the RPM of the drive motor's shaft. As the motor shaft and gear teeth rotate, they cut the magnetic flux field of the electromagnetic sensor creating a small current at a specific frequency. This current/frequency is induced into the sensor coil contained in the aluminum block and is passed to the speed pick-up amplifier found on the lower circuit board.

The output of the amplifier circuit is monitored by the microprocessor which uses the signal to compare the "requested" speed to the "actual" speed of the drive motor. If a difference exists between these two speeds, the microprocessor adjusts the SCR phase (gating time) to either increase or decrease the DC voltage supplied to the main motor, thus equalizing the "requested" and "actual" speeds. This monitoring procedure is performed every 1/120th second for 60 Hz models or every 1/100th second for 50 Hz models.

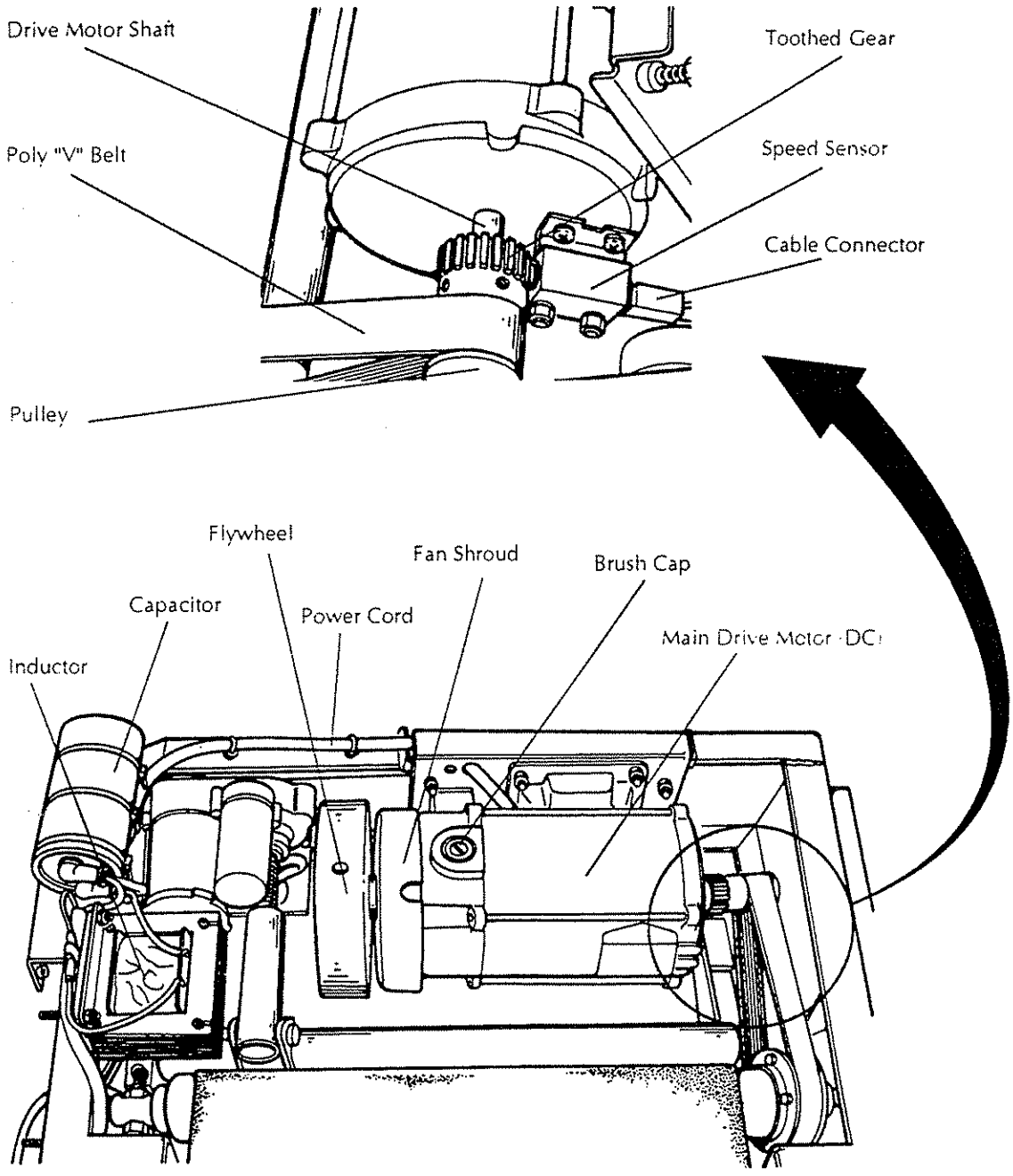


Figure 2-7: Main Drive Motor (DC) & Speed Sensor Assembly

Display Console

The display console is located within the display assembly and is used to provide a means, through various control buttons and Light Emitting Diodes (LED), of inputting user commands and obtaining the equipment's operational status. See Figure 2-1.

The two sub-assemblies contained in the display console are discussed in the following paragraphs.

Membrane panel

This panel contains the control buttons used to direct such operations as belt speed, elevation (incline), memory I/O, and the STOP function. See Figure 2-8.

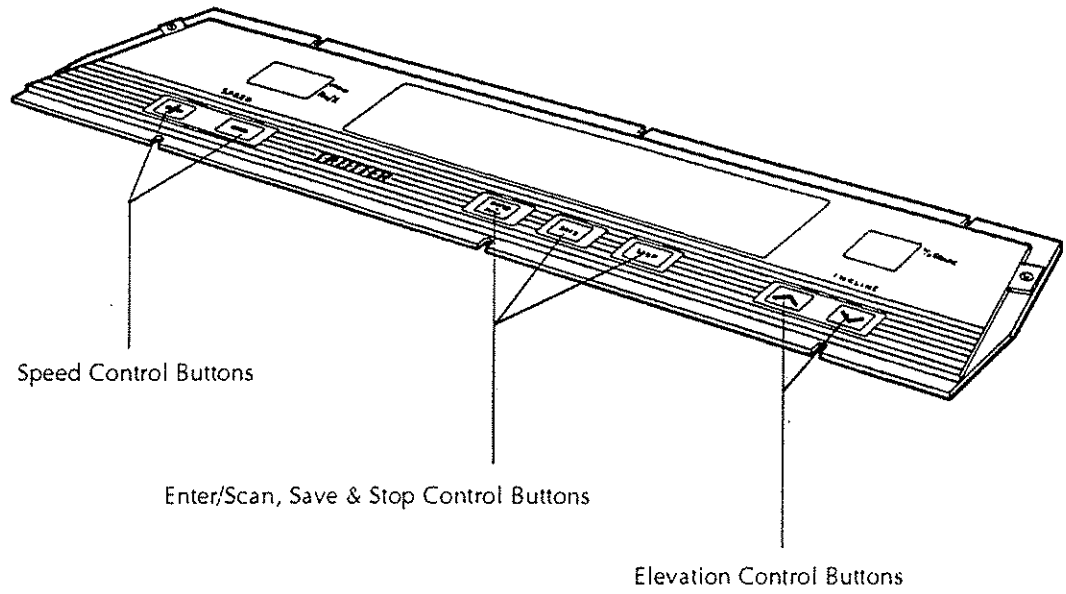


Figure 2-8: Membrane Panel

Upper circuit board (DMD)
This board, commonly called the Dot Matrix Display (DMD), contains many individual circuits devoted to display and control signal processing. These circuits operate under program control or through input requests made on the membrane panel. See Figure 2-9.

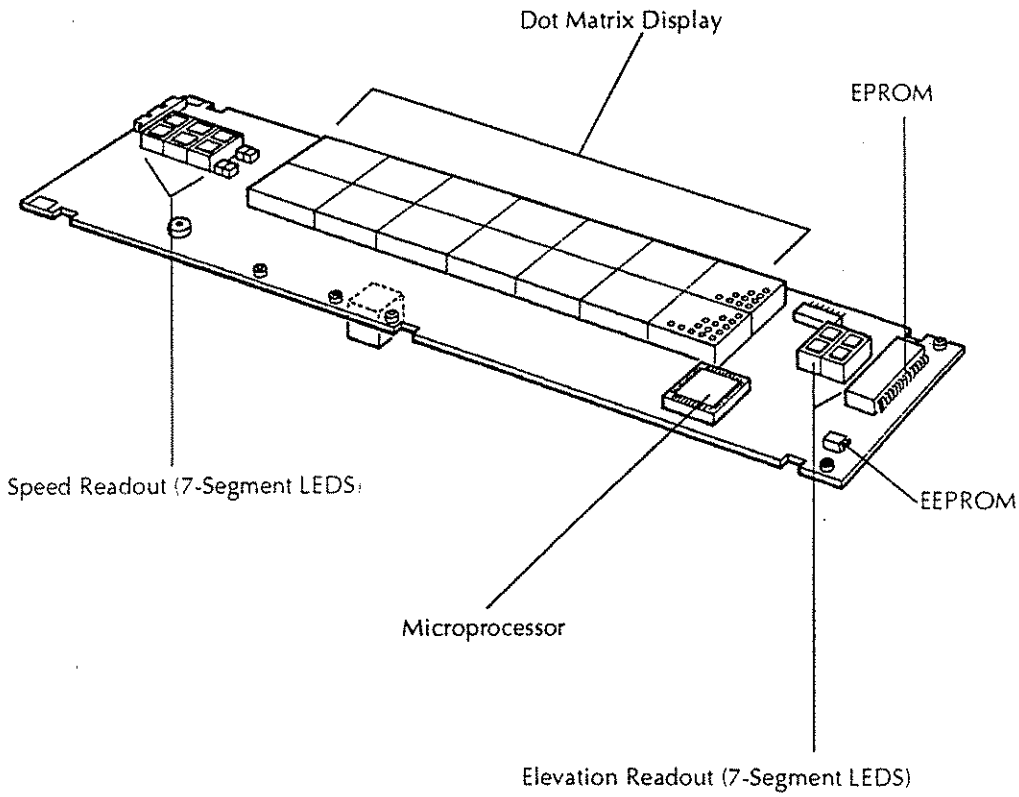


Figure 2-9: Upper Circuit Board (DMD)

The DMD board contains:

- an "actual" speed readout, composed of three 7-segment LED blocks.
- an "actual" elevation or incline readout (displayed in % grade), composed of two 7-segment LED blocks.
- a diode matrix display, composed of 14 LED blocks. Each block contains 35 separate LED segments, for a total matrix display of 10 rows and 49 columns. Each LED segment contains both a red and a green diode and may display red, green, or amber (combination of red and green) depending on the applied voltages.
- an Electronically Programmable Read Only Memory (EPROM) chip. The EPROM is used to store pre-programmed exercise routines, operating system, user interface, and various error, maintenance, and diagnostic test messages.
- an Electronically Erasable Programmable Read Only Memory (EEPROM) storage chip. The EEPROM acts as a storage area for custom programs, accumulated miles, accumulated hours, error log, number of starts, and elevation calibration information.
- a microprocessor chip. The microprocessor is considered to be the "brains" of the Model 525. It executes the display console input commands and programmed instructions (stored in on-board memory) which govern equipment operations. By monitoring sensor feedback (firmware and hardware) it is able to evaluate equipment status and to take appropriate action if specific parameters are not maintained. Microprocessor functions include:
  - regulating belt speed and treadmill incline (% grade)
  - performing memory I/O operations
  - execution of pre-programmed exercise routines
  - displaying workout results
  - generation of error messages
  - generation of maintenance messages
  - execution of pre-programmed diagnostic tests

Elevation Assembly

The elevation assembly is located beneath the front of the running deck and is used to raise or lower the front of the treadmill frame to simulate a grade in the road. See Figure 2-10.

The elevation assembly consists primarily of:

- two elevation arms
- a leadscrew and cylinder
- an elevation motor (AC)
- an elevation sensor assembly

The elevation assembly components are discussed in the following paragraphs.

Elevation arms

Spanning the width of the treadmill's front frame is the elevation arm assembly. Attached to each end of this assembly is an elevator arm and a plastic wheel. See Figure 2-10.

The arm assembly is designed to rotate, resulting in the two elevation arms pivoting either upward or downward. As the elevation arms pivot, their corresponding wheels contact and ride on the floor either extending (raising the front of the treadmill) or retracting (lowering the front of the treadmill).

Leadscrew and cylinder

The elevation arm assembly is rotated by the push and pull action of the leadscrew and cylinder assembly. See Figure 2-10.

Elevation motor (AC)

The function of the elevation motor is to drive (turn) the leadscrew into or out of its cylinder. See Figure 2-10. Two sets of internal windings enable the motor to rotate its shaft. Each set of windings controls a rotational direction. The motor's shaft (leadscrew) rotates in one direction when current is applied to the first set of windings, and in the other direction when current is applied to the second set of windings.

To avoid damage to the various elevation components, limit switches (upper and lower) are installed inside the elevation motor. These switches open, stopping the motor, whenever elevation exceeds the 0% lower and 12% upper limits.

When the treadmill is between 0% and 12% elevation limits these switches are closed, allowing current to flow to the motor, so that the treadmill can be raised or lowered as commanded.

If the treadmill attempts to exceed the 0% and 12% elevation limits, these switches open, stopping current flow to the motor.

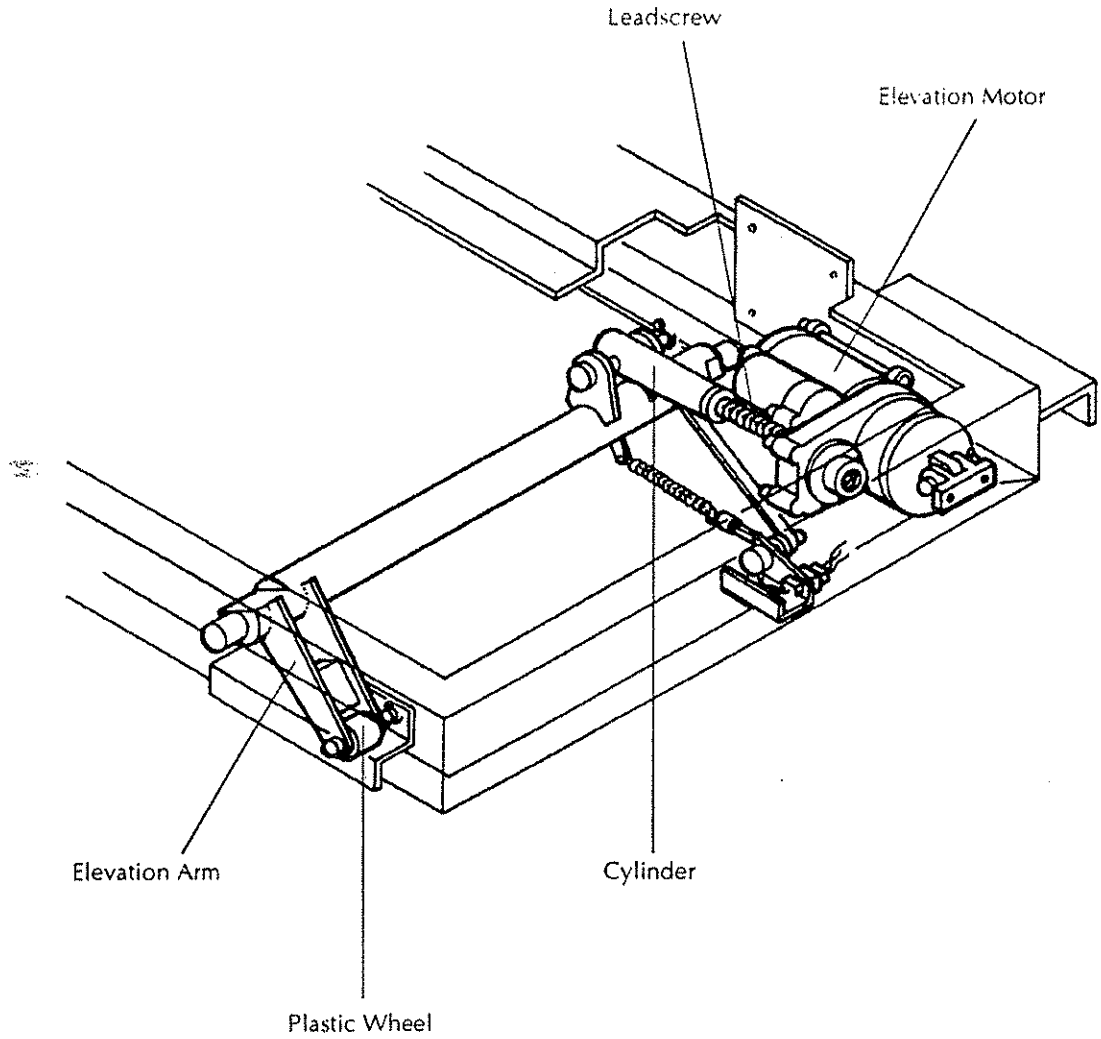


Figure 2-10: Elevation Assembly

Elevation sensor assembly

The elevation sensor assembly consists primarily of a 1K ohm potentiometer, mounted on the treadmill frame. See Figure 2-11.

Attached to the shaft of the potentiometer is a gear pulley. A toothed belt rides along the gear pulley and is attached to the elevation assembly. As the elevation assembly is raised and lowered the action of the moving belt turns the potentiometer's shaft resulting in a changing sensor signal.

The elevation sensor signal is returned to the lower circuit board where it is monitored by the microprocessor which uses the signal to compare the "requested" grade to the "actual" grade. If a difference exists between these two elevations, the microprocessor causes the elevation motor to operate, thus equalizing the "requested" and "actual" elevations.

Elevation or incline, measured in % grade, is determined by the return signal (voltage) from the potentiometer. At 0% grade the output from the elevation sensor is at a fixed reference voltage. Any change in this reference voltage, as that created by raising the treadmill, will cause the microprocessor to interpret it as a change in elevation (% grade).

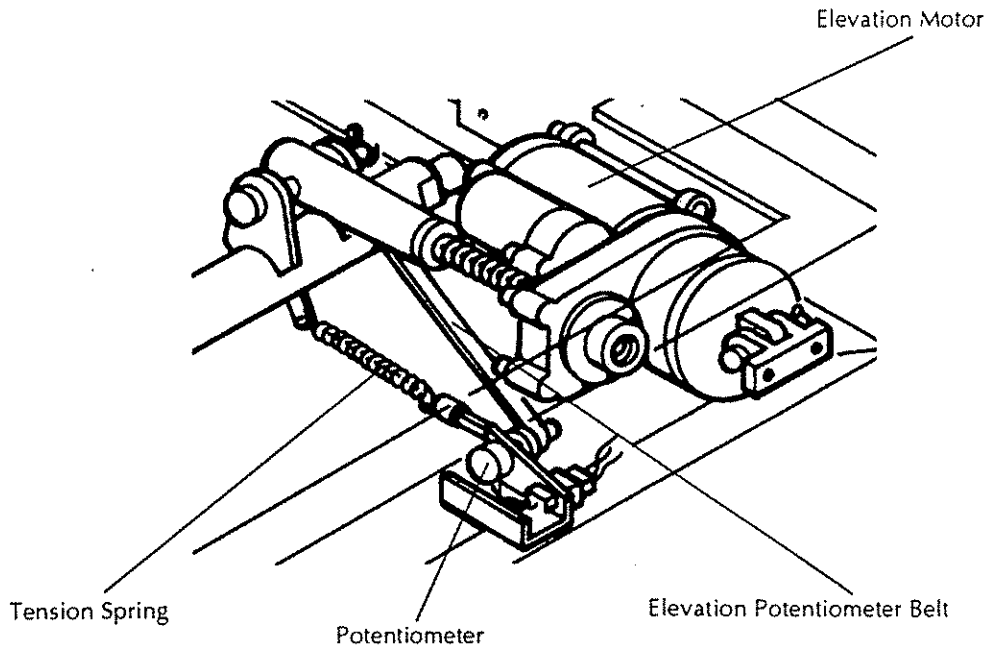


Figure 2-11: Elevation Sensor Assembly

Elevation control circuit

The elevation control circuit is located on the lower circuit board and is used to apply AC voltage/current to the elevation motor. This circuit consists of a solid state TRIAC (relay), a mechanical relay, and control/distribution signals from the microprocessor and lower circuit board.

To understand the operation of the elevation control circuit, refer to Figure 2-12 and the following step-by-step discussion.

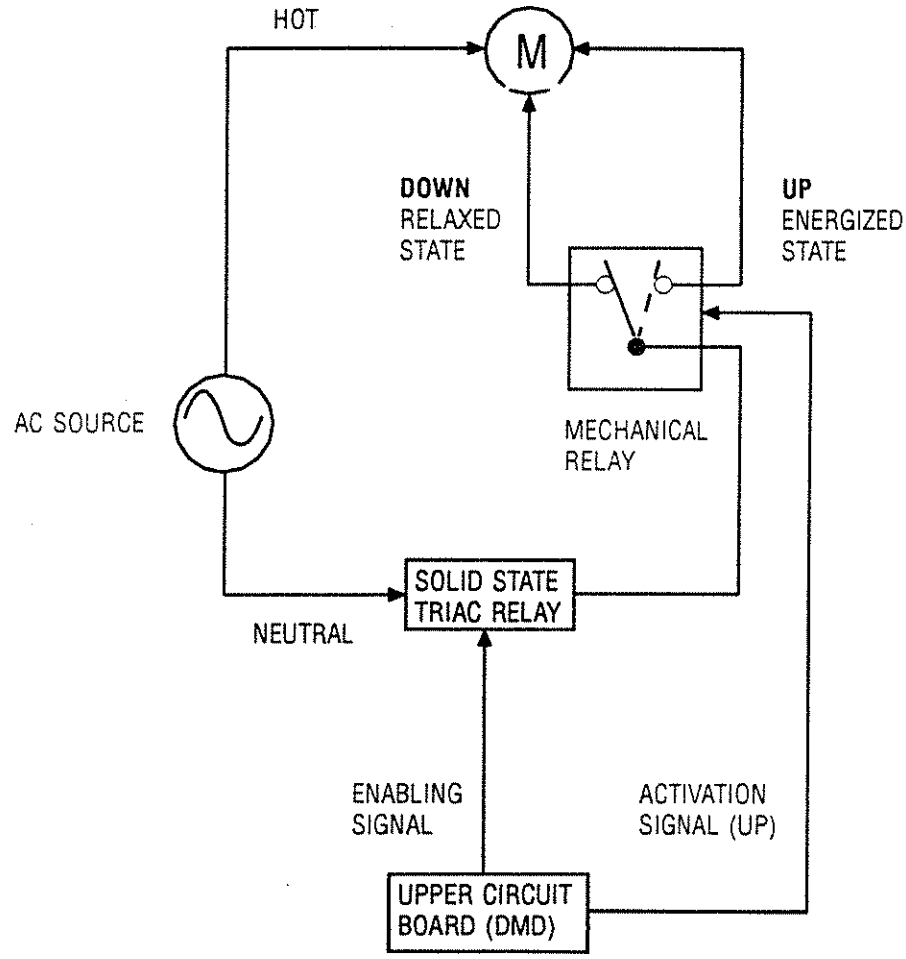


Figure 2-12: Elevation Block Diagram

Raising the treadmill

a. A request to raise the treadmill is made to the microprocessor. This request could be made by pre-programmed instructions or by depressing the ▲ control button on the display console. Requested % grade (elevation) is shown on the dot matrix display.
b. The microprocessor directs, through the relay box, the activation of the mechanical relay (a clicking sound can be heard) to the UP position. The relay is now in position to direct AC voltage/current to the elevation motor windings that cause the leadscrew to turn in the UP direction.
c. The microprocessor directs, through the relay box, the enabling of the TRIAC solid state relay. This relay passes AC voltage/current to the mechanical relay.
d. The mechanical relay passes the AC voltage/current to the elevation motor.
e. The elevation motor is activated; turning the leadscrew into the cylinder and extending the elevation assembly arms, which raises the treadmill.
f. The elevation sensor reports to the microprocessor the "actual" elevation of the treadmill.
g. The microprocessor compares "actual" elevation with "requested" elevation. Once the two values are equal the TRIAC relay is disabled and current stops flowing to the mechanical relay and to the elevation motor; the mechanical relay goes into its relaxed position.
h. The microprocessor causes the "actual" % grade (elevation) to appear on the 7-segment LEDs.

Lowering the treadmill

a. A request to lower the treadmill is made to the microprocessor. This request could be made by pre-programmed instructions or by depressing the ▼ control button on the display console. Requested % grade (elevation) is shown on the dot matrix display.
b. The mechanical relay remains in its relaxed DOWN position (no clicking sound will be heard in this position). The relay is now in position to direct AC voltage/current to the elevation motor windings that cause the leadscrew to turn in the DOWN direction.
c. The microprocessor directs, through the relay box, the enabling of the TRIAC solid state relay. This relay passes AC voltage/current to the mechanical relay.
d. The mechanical relay passes the AC voltage/current to the elevation motor.
e. The elevation motor is activated; rotating the leadscrew out of the cylinder and retracting the elevation assembly arms to retract, which lowers the treadmill.
f. The elevation sensor reports to the microprocessor the "actual" elevation of the treadmill.
g. The microprocessor compares "actual" elevation with "requested" elevation. Once the two values are equal the TRIAC relay is disabled and current stops flowing to the mechanical relay and to the elevation motor; the mechanical relay remains in its relaxed position.
h. The microprocessor causes the "actual" % grade (elevation) to appear on the 7-segment LEDs.

3

Preventive Maintenance

Introduction

The information contained in this chapter is used to provide TROTTER service personnel with the information necessary to perform Preventive Maintenance (PM) on the Model 525 treadmill.

A successful Preventive Maintenance (PM) program allows the treadmill to operate at peak efficiency and by performing minor adjustments and cleaning, major problems can be avoided.

Notes:

1. If a maintenance situation arises which is beyond the scope of this chapter, refer to Chapter 4, Corrective Maintenance.

2. For a detailed operational and functional description of the Model 525 components, refer to Chapter 2, Principles of Operation.

Positioning the Treadmill

The treadmill must occasionally be placed in a position where preventive maintenance can be performed more easily. Although the treadmill is very heavy, it can be rolled into position using its elevation wheels.

To reposition the treadmill, complete the following:

1. Start the treadmill using the normal power-up procedure.
2. Raise the elevation of the treadmill approximately 5% using the ▲ control button. This action will place the weight of the treadmill onto its elevation wheels.
3. Place the main AC switch into the OFF position. This action will prevent the microprocessor from automatically returning the elevation to 0% if power had been removed using the STOP control button.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEP 4.

4. Lift the rear of the treadmill. With the weight resting on its elevation wheels, roll the treadmill to its new work area.

Note: The microprocessor will automatically return the treadmill's elevation to 0% after power is applied.

This completes the procedure to reposition the treadmill.

Maintenance Messages

The Model 525 microprocessor monitors system usage and, based on the amount of accumulated miles, will notify the user of required PM through displayed messages.

Note: Preventive maintenance messages are never displayed during a workout routine. If a target mileage is reached during a workout, the system will defer displaying the message until the treadmill's next start-up.

These maintenance messages and the mileage required to "trigger" their display are listed in the following table.

THIS MESSAGE...	IS DISPLAYED EVERY...
M1: LUBRICATE RUNNING BELT	250 MILES (402 KM)
M2: CLEAN TREADMILL	500 MILES (805 KM)
M3: CHECK MOTOR BRUSHES	2,000 MILES (3219 KM)
M4: CHECK DECK WEAR	2,500 MILES (4023 KM)
M5: LUBRICATE ELEVATION	5,000 MILES (8047 KM)

Once generated, a PM message will scroll across the display console (right to left) every three seconds for a total of five minutes, or until a control button on the console is pressed. After it is cleared from the display console, the message will not be displayed again until the next target mileage (for that particular message) is reached.

To service a condition involving a preventive maintenance message, refer to its description and complete all instructions provided.

M1: LUBRICATE RUNNING BELT

This PM message is generated every 250 miles (402 km) and indicates that the treadmill's running belt and deck require lubricating.

Proper lubrication will lessen the effects of friction and help the running belt slide freely across the running deck. Lubrication also lowers the treadmill's current draw and reduces wear on the running belt, deck, and the entire main drive motor (DC) assembly.

To lubricate the running belt and deck surfaces, complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.

Notes:

1. The treadmill's running belt and deck surfaces may be lubricated with the treadmill placed in either a horizontal or a vertical position.

2. If the treadmill must be moved to another work area, refer to the Positioning the Treadmill *section (earlier in this chapter).*

2. Will the treadmill be lubricated in the horizontal position? Yes/No

   If the answer is Yes, continue with Step 3.

   If the answer is No, continue with Step 8.

3. Grasp each edge of the running belt. Manually rotate the belt until its seam runs across the rear roller. This seam will be used as a reference point to ensure that the entire belt has been lubricated. See Figure 3-1.

CAUTION: Use of lubricants not approved by TROTTER will void the treadmill warranty. Lubricants other than those specified by TROTTER may create excessive friction and heat which could prematurely wear the running belt and deck.

4. Lift up the left edge of the running belt. Insert the nozzle of the spray lubricant (part no. CH-00987) as far towards the center of the belt as possible and spray for four to six seconds along the entire length of the exposed underside (side in contact with the wooden running deck) of the belt. See Figure 3-1.
5. Lubricate the right side of the running belt by repeating Step 4.
6. Grasp each edge of the running belt. Manually rotate the belt until its seam runs across the front roller. This will expose the remaining portion of the belt to be lubricated. See Figure 3-1.
7. Lubricate the remaining portion of the belt by repeating Steps 4 and 5. Continue with Step 13.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEPS 8 AND 12.

8. Lift the rear of the treadmill and stand it on its front end. The display console (panel) should be resting on the floor in this position. See Figure 3-2.

CAUTION: Use of lubricants not approved by TROTTER will void the treadmill warranty. Lubricants other than those specified by TROTTER may create excessive friction and heat which could prematurely wear the running belt and deck.

9. Lift up the left edge of the running belt. Insert the nozzle of the spray lubricant (part no. CH-00987) as far towards the center of the belt as possible and spray for four to six seconds along the entire length of the exposed underside (side in contact with the wooden running deck) of the belt. See Figure 3-2.

   Lubricate the right side of the running belt in the same manner.
10. Grasp each edge of the running belt. Manually rotate the belt until an unlubricated area of the belt appears. Lubricate this section by repeating Step 9.
11. Lubricate the remaining portion of the belt by repeating Steps 9 and 10.
12. Lower the rear of the treadmill and place it into its normal operating position.
13. Plug the treadmill's power cord into the AC source outlet.
14. Start the treadmill using the normal power-up procedure.
15. With the treadmill operating at a slow speed, walk on the entire surface of the running belt. Move from side to side and then up and down the length of the belt to ensure that the lubricant is spread over the entire deck and belt surfaces.

This completes the procedure for servicing PM message M1.

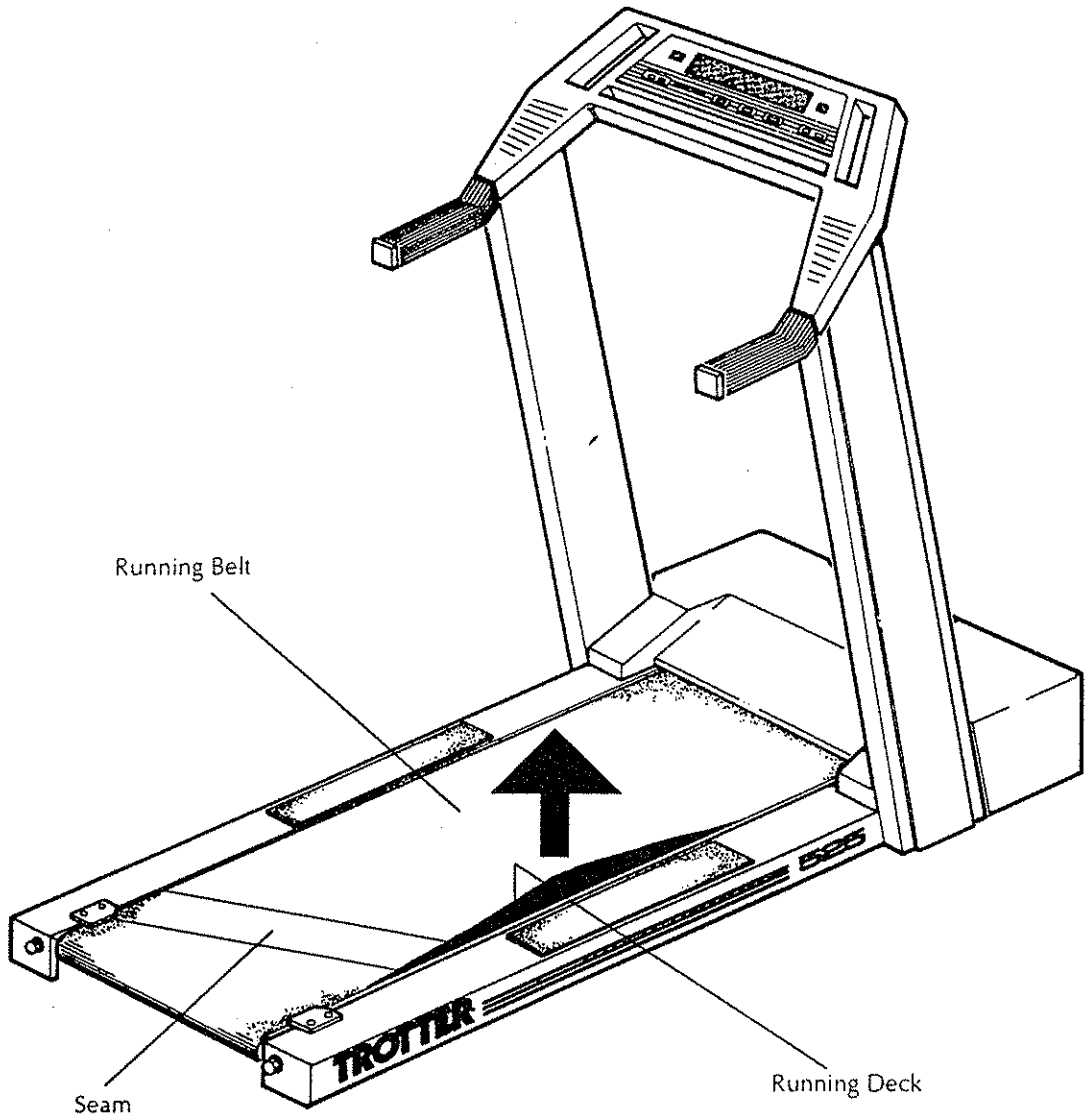
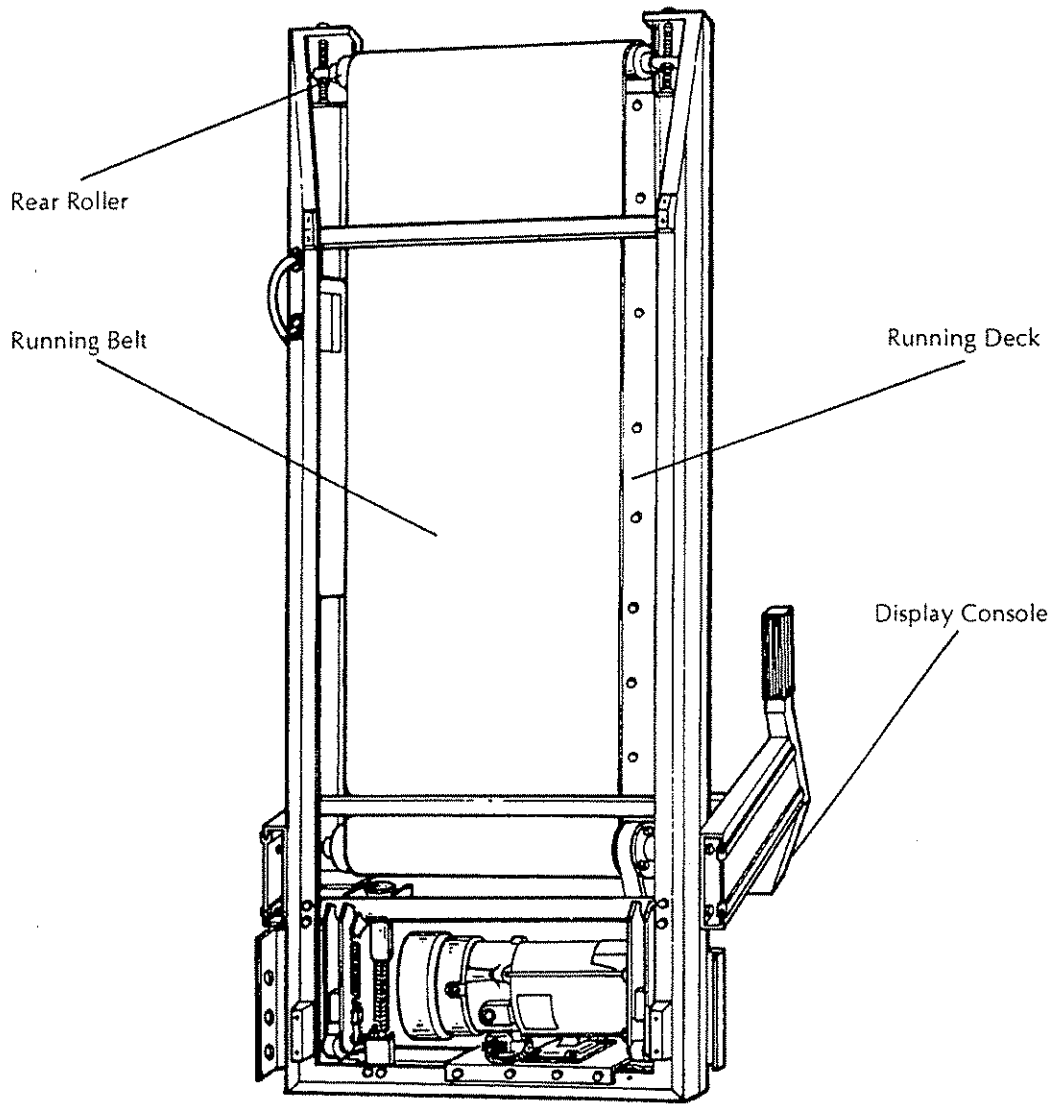


Figure 3-1: Lubricating the Running Belt/Deck (Horizontal)



(Shown in an Upend Position)

Figure 3-2: Lubricating the Running Belt/Deck (Vertical)

M2: CLEAN TREADMILL

This PM message is generated every 500 miles (805 km) and indicates that the treadmill requires a general cleaning.

Proper cleaning improves air circulation and cooling which reduces wear on the main drive and elevation motors by eliminating excessive heat.

Note: The M2 message is displayed every 500 miles; however, if the equipment is operated in a dusty environment it should be cleaned at least monthly, regardless of mileage.

To clean the treadmill, complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.

Note: If the treadmill must be moved to another work area, refer to the Positioning the Treadmill *section (earlier in this chapter).*

2. Wipe all exterior areas of the treadmill using a damp cloth.
3. Remove the front hood cover. Refer to Figure 3-3 and complete the following:
   a. Remove the cover's four Button-head screws.
   b. Lift the cover off the front roller and main motor assembly. Set the cover aside.
4. Vacuum the interior and surrounding areas of the front roller and main motor assemblies.

Note: It may be necessary to use a cloth to clean/wipe areas that cannot be reached using the vacuum.

5. Install the front hood cover. Refer to Figure 3-3 and complete the following:
   a. Place the front hood cover into its operating position.
   b. Secure the cover using the four Button-head screws.

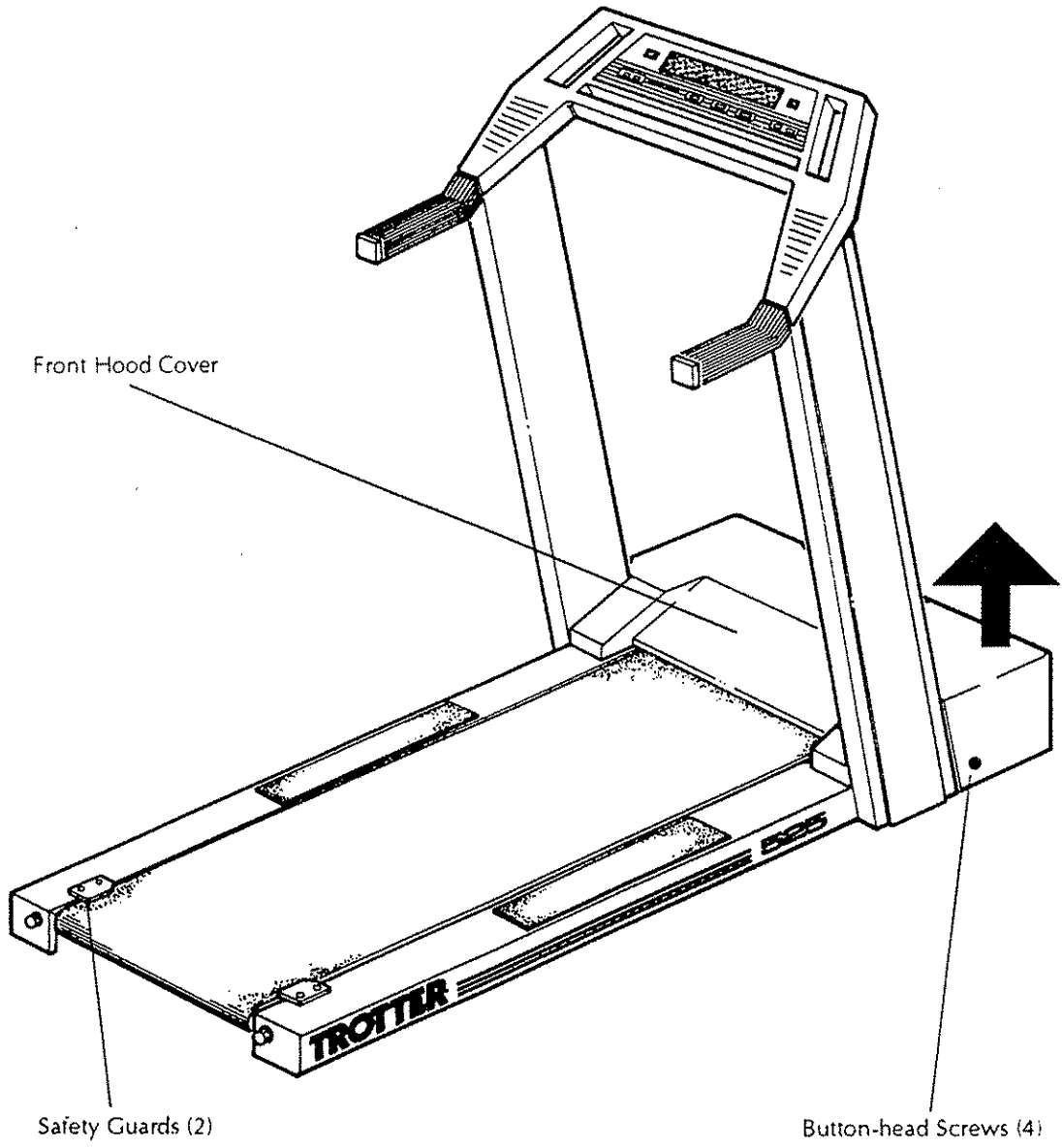


Figure 3-3: Removing/Replacing the Front Hood Cover

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEPS 6 AND 8.

6. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 3-4.
7. Vacuum the interior and surrounding areas of the rear roller and elevation assemblies. See Figure 3-4.

Note: It may be necessary to use a cloth to clean/wipe areas that cannot be reached using the vacuum.

8. Lower the rear of the treadmill and place it into its normal operating position.
9. Plug the treadmill's power cord into the AC source outlet.

This completes the procedure for servicing PM message M2.

M3: CHECK MOTOR BRUSHES

This PM message is generated every 2,000 miles (3219 km) and indicates that the treadmill's brushes require checking for signs of wear.

Worn brushes, brush holders, or brush caps may cause excessive current to flow; resulting in the failure of the main drive (DC) motor and/or related components.

To check the main drive motor (DC) brushes and brush caps for signs of wear, complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.

Note: If the treadmill must be moved to another work area, refer to the Positioning the Treadmill *section (earlier in this chapter).*

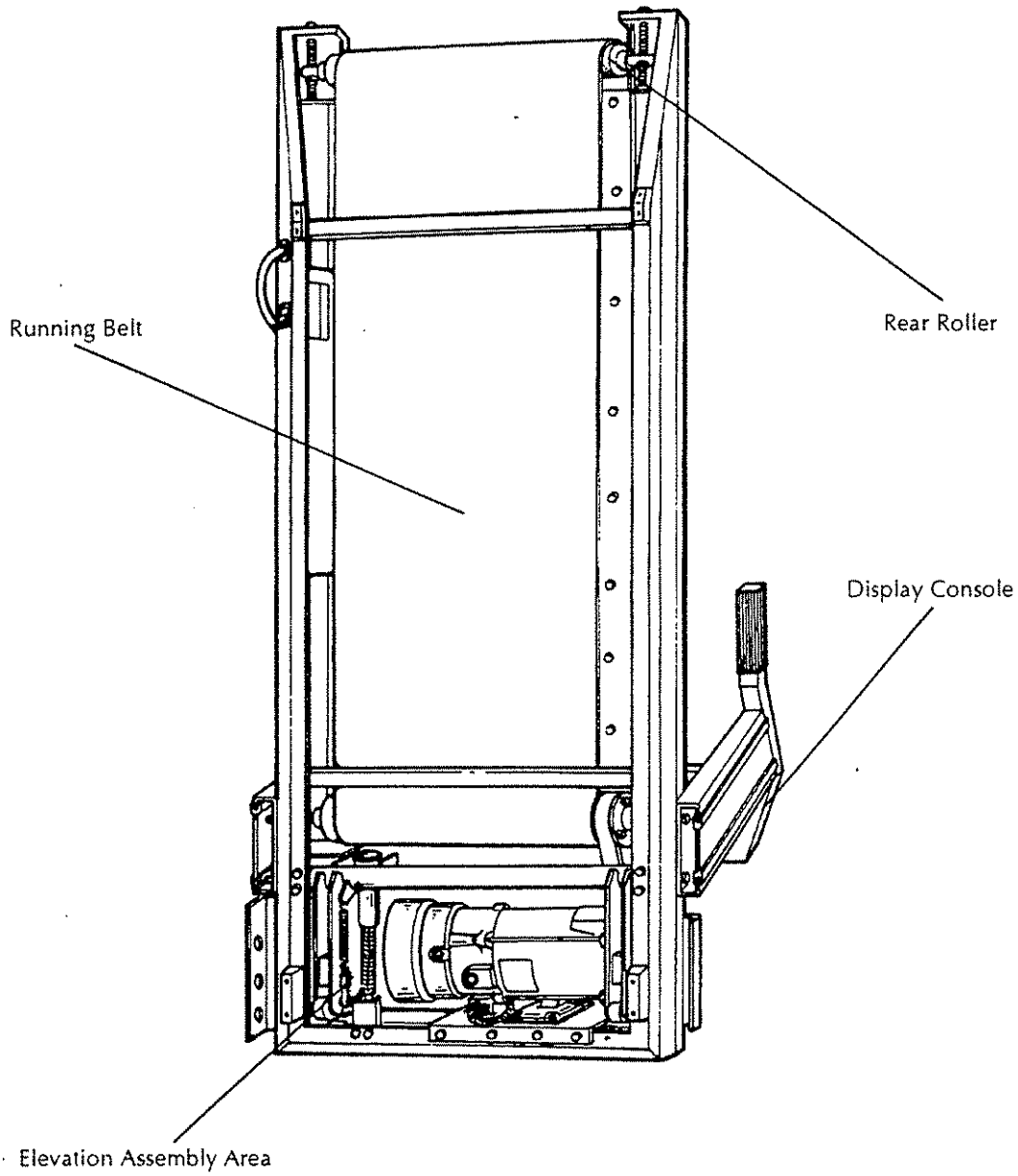


Figure 3-4: Treadmill Shown in the Upend Position

2. Remove the front hood cover. Refer to Figure 3-3 and complete the following:
   a. Remove the cover's four Button-head screws.
   b. Lift the cover off the front roller and main motor assembly. Set the cover aside.
3. Discharge the filter capacitor. Refer to Figure 3-5 and complete the following:

WARNING: THE LC FILTER CAPACITOR, ONCE CHARGED, CONTAINS A POTENTIALLY HARMFUL AMOUNT OF STORED VOLTAGE/CURRENT. USE EXTREME CAUTION WHEN DISCHARGING THIS FILTER COMPONENT. NEVER TOUCH BOTH EXPOSED TERMINALS WITH YOUR FINGERS

   a. *Carefully* pull back each of the capacitor terminal's rubber "boots."
   b. Grip the insulated handle of a screwdriver. Using the screwdriver's metal shaft, momentarily touch the capacitor's two terminals. Do not touch the screwdriver's metal shaft while performing this Step.
   c. Slide each rubber "boot" back over its respective terminal.

Note: The main motor's brush caps are made of plastic and can be easily damaged. Use the TROTTER brush cap removal tool when removing and installing brush caps during Steps 4 and 11.

4. Unscrew and remove, using the brush cap removal tool, the main motor's top brush cap. See Figure 3-6.
5. *Carefully* pull out the brush from the main motor brush holder. See Figure 3-6.
6. Examine the brush cap, spring, contact disc, and the brush for signs of wear such as arcing, pitting, or burning. Replace any item which shows signs of excessive wear and/or is cracked or broken.

Notes:
1. The motor brush must be replaced if it has worn to less than 1/2-inch (1.27 cm) in length.
2. Install the original brush (if applicable) into the holder in its original position. Reversing the brush could cause a "ticking" sound during operation until it has evenly worn.

7. Slide the motor brush (new or original) into the motor brush holder. Make sure that the brush wire doesn't become entangled in the spring. See Figure 3-6.

8. Install the brush cap. Refer to Figure 3-6 and complete the following:
    a. Place the brush cap on top of the brush contact disc. Gently press down and screw the cap into the brush holder, making sure that it is not over-tightened.
    b. Back off (unscrew) the brush cap 1/4-turn. This action will align the spring coil which may have become trapped under the cap.
    c. Fully tighten the brush cap, making sure that it is not over-tightened.
9. Install the front hood cover. Refer to Figure 3-3 and complete the following:
    a. Place the front hood cover into its operating position.
    b. Secure the cover using the four Button-head screws.
    c. Continue with Step 10.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEPS 10 AND 12.

10. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 3-4.
11. Using the brush cap removal tool, unscrew and remove the main motor's bottom brush cap. See Figure 3-6.
12. Remove and examine the main motor's bottom brush cap. Repeat Steps 5 through 8. Place the treadmill into its operating position.
13. Plug the treadmill's power cord into the AC source outlet.

This completes the procedure for servicing PM message M3.

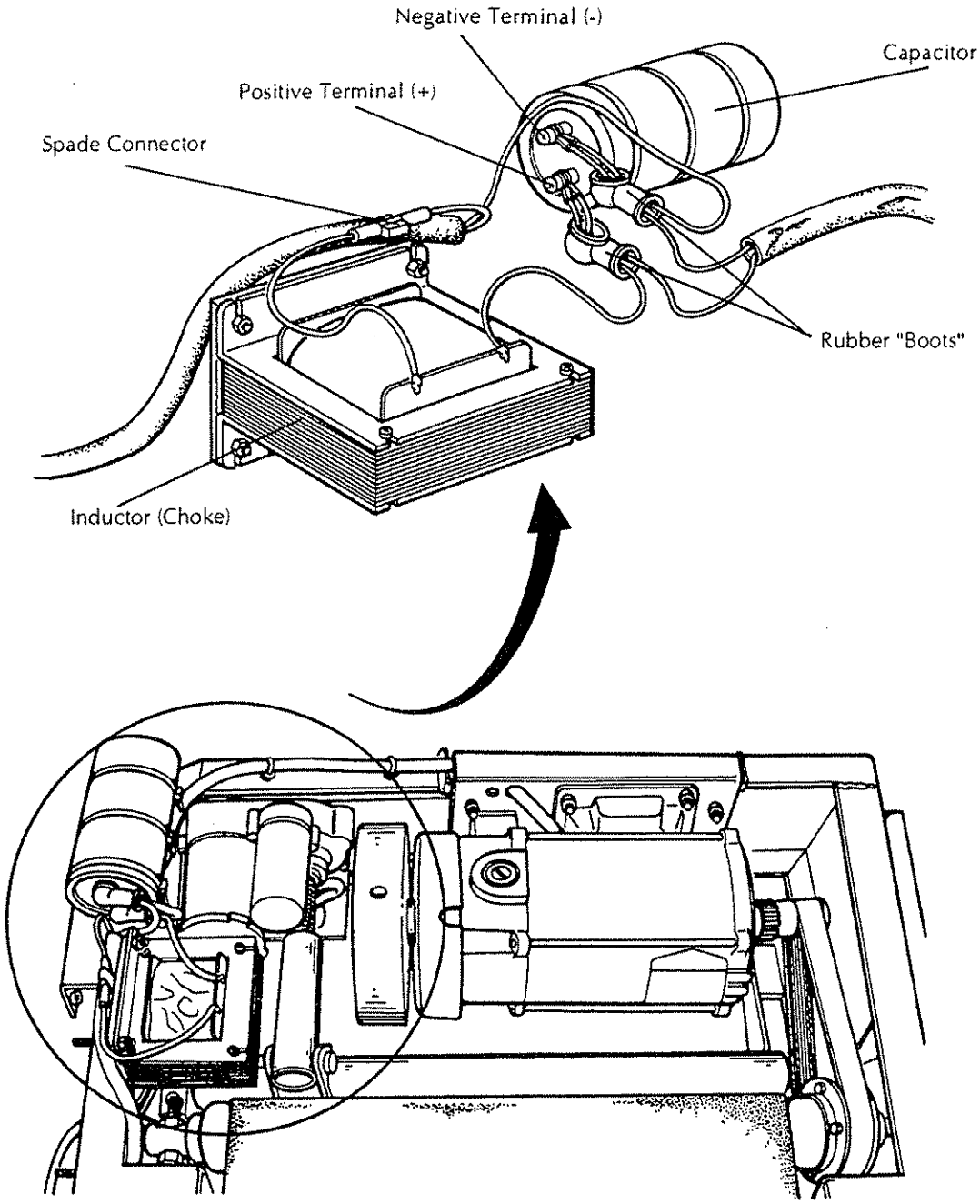


Figure 3-5: Discharging the Filter Capacitor

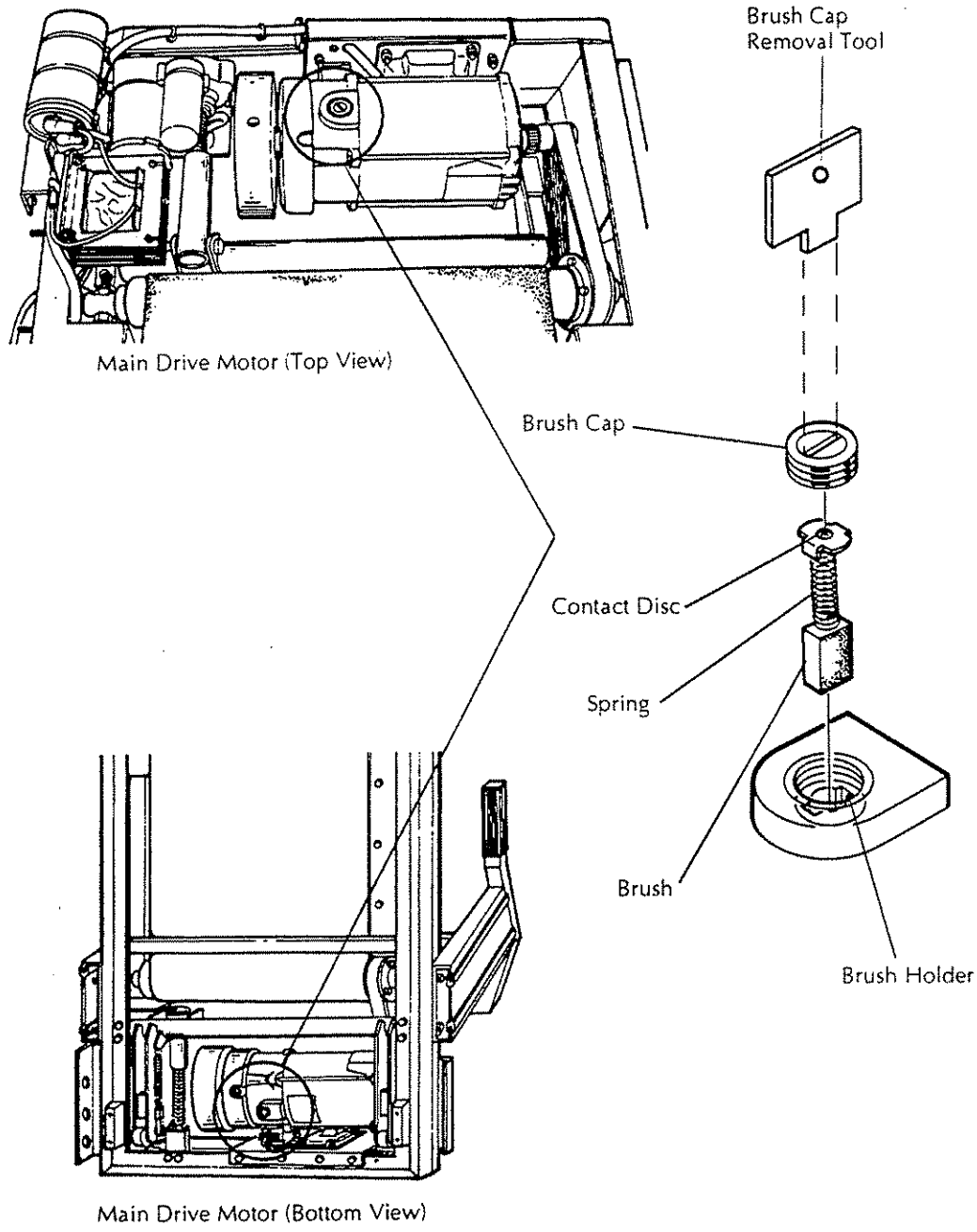


Figure 3-6: Checking the Main Motor Brush Assembly

M4: CHECK DECK WEAR

This PM message is generated every 2,500 miles (4023 km) and indicates that the treadmill's running deck should be checked for signs of wear and possible refinishing.

The wooden running deck, although designed to withstand the rigors of daily use, will still wear. Signs of abnormal deck wear, such as excessive furrowing, scraping, cracking, fissures, or burnt/insufficient wax may indicate the need for deck replacement or refinishing.

To access the running deck and check it for signs of wear, complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.

Note: If the treadmill must be moved to another work area, refer to the Positioning the Treadmill *section (earlier in this chapter).*

2. Remove the two safety guards. Refer to Figure 3-3 and remove the four Phillips-head screws securing the two safety guards to the chassis frame. Set the guards aside.
3. Remove the front hood cover. Refer to Figure 3-3 and complete the following:
   a. Remove the cover's four Button-head screws.
   b. Lift the cover off the front roller and main motor assembly. Set the cover aside.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEPS 4 AND 6C.

4. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 3-4.
5. Remove the rear roller assembly. Refer to Figure 3-7 and complete the following:
   a. Support the rear roller with one hand. With the other hand loosen and remove the two rear tension adjustment nuts and bolts.
   b. *Carefully* remove the rear roller by sliding it through the running belt.

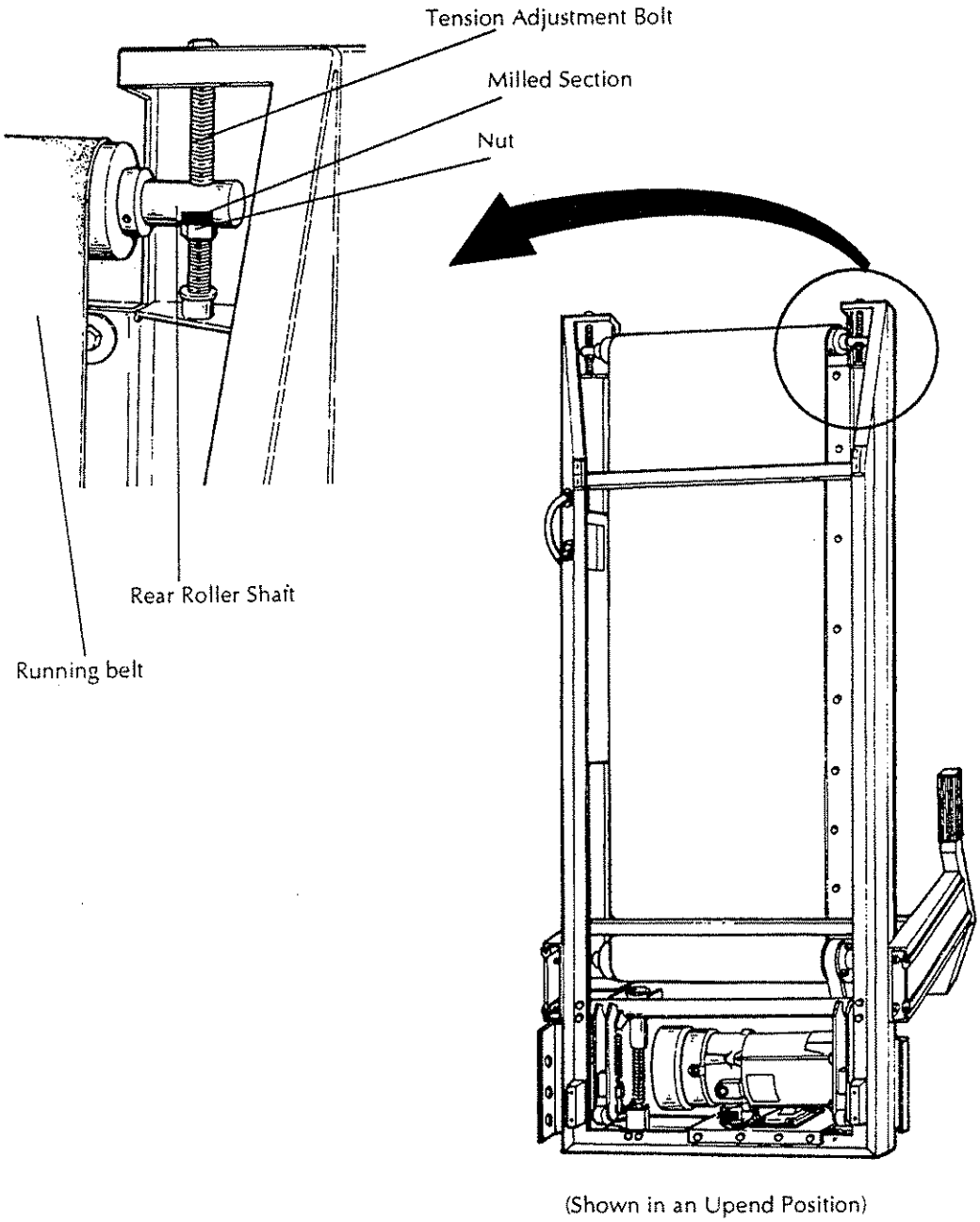


Figure 3-7: Removing/Replacing the Rear Roller Assembly

6. Remove the running deck. Refer to Figure 3-8 and complete the following:

Note: To prevent the running deck from falling while the treadmill is upend, its top two bolts are not removed until Step 6d.

   a. Remove all bolts securing the running deck *except* its top two bolts closest to the rear roller.
   b. Loosen, but *do not* remove, the running deck's top two bolts.
   c. Lower the rear of the treadmill and place it into its normal operating position.
   d. Remove the running deck's top two bolts. The running deck is now free to be removed from the treadmill frame by lifting it up and sliding it either to the left or the right, maneuvering it out from beneath the running belt.

7. Examine the rear and front rollers for signs of wax or other foreign material build-up. Clean these rollers as necessary. Surface buildup on either roller may be removed using a non-metallic (e.g. wood or plastic) scraper.
8. Examine the running deck for signs of abnormal wear, such as excessive furrowing, scraping, cracking, fissures, or burnt/insufficient wax.

Note: The running deck cannot *be refinished if the birch veneer (top layer) has worn through to the plywood underlayment. If this situation exists, replace the entire deck.*

Does the running deck require refinishing? Yes/No

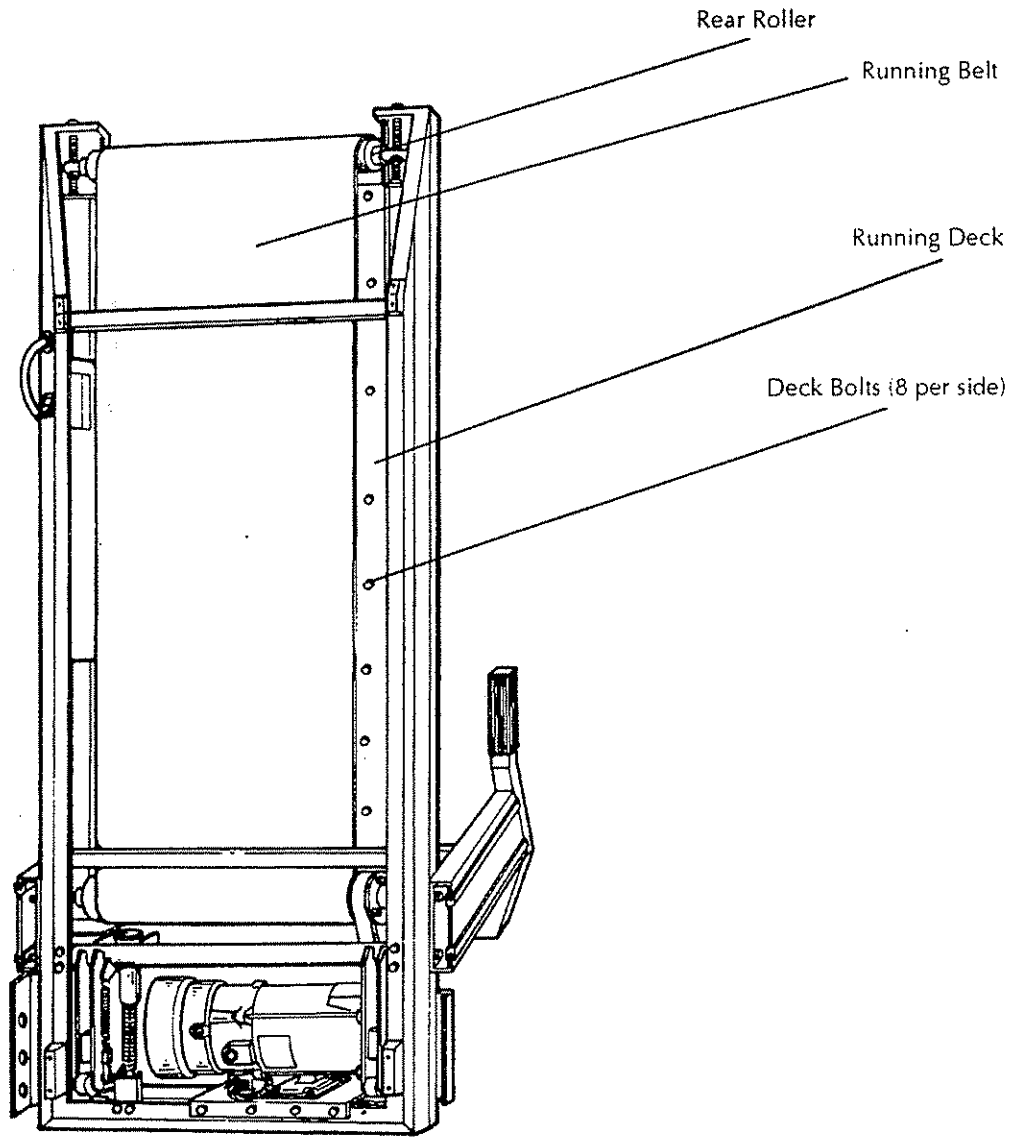
If the answer is Yes, refer to the *Refinishing the Running Deck* section (later in this chapter).

If the answer is No, continue with Step 9.

9. Install the running deck. Refer to Figure 3-8 and complete the following:
   a. Slide the deck, veneer side UP, into the treadmill. Position the deck between the upper and lower sections of the running belt.
   b. Insert and hand-tighten the running deck's top two bolts closest to the rear roller.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEPS 9C AND 11.

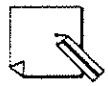
   c. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 3-4.
   d. Insert and tighten all remaining deck bolts. Ensure that all running deck bolts are adequately tightened.



(Shown in an Upend Position)

Figure 3-8: Removing/Replacing the Running Deck

10. Install the rear roller assembly. Refer to Figure 3-7 and complete the following:
    a. Slide the rear roller through the running belt.



Note: Make sure that the "milled" section of the rear roller shaft is facing toward the front of the treadmill during Step 10b. See Figure 3-7.

    b. Support the rear roller with one hand. With the other hand carefully install first the left and then the right tension adjustment bolt.
11. Lower the rear of the treadmill and place it into its normal operating position.
12. Install the front hood cover. Refer to Figure 3-3 and complete the following:
    a. Place the front hood cover into its operating position.
    b. Secure the cover using the four Button-head screws.
13. Place the two safety guards into their operating positions. Secure them to the chassis frame using the four Phillips-head screws. See Figure 3-3.
14. Plug the treadmill's power cord into the AC source outlet.
15. Adjust the running belt's tension and tracking. Refer to the *Adjusting the Running Belt* section (later in this chapter).

This completes the procedure for servicing PM message M4.

M5: LUBRICATE ELEVATION

This PM message is generated every 5,000 miles (8047 km) and indicates that the treadmill's elevation assembly (leadscrew) requires lubricating.

Proper leadscrew lubrication will lessen the effects of friction on the elevation motor (AC) system by allowing the leadscrew to turn smoothly.

Note: The treadmill's elevation must be at 0% grade before the lubrication procedure can be performed. This ensures that the elevation leadscrew is fully extended.

To lubricate the leadscrew, complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.

Note: If the treadmill must be moved to another work area, refer to the Positioning the Treadmill *section (earlier in this chapter).*

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEPS 2 AND 5.

2. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 3-4.
3. Remove all accumulated dirt and grease from the leadscrew using a clean, dry cloth. See Figure 3-9.
4. Using a small bristle brush, apply a liberal amount of lithium grease in and around the leadscrew threads. See Figure 3-9.
5. Lower the rear of the treadmill and place it into its normal operating position.

This completes the procedure for servicing PM message M5.

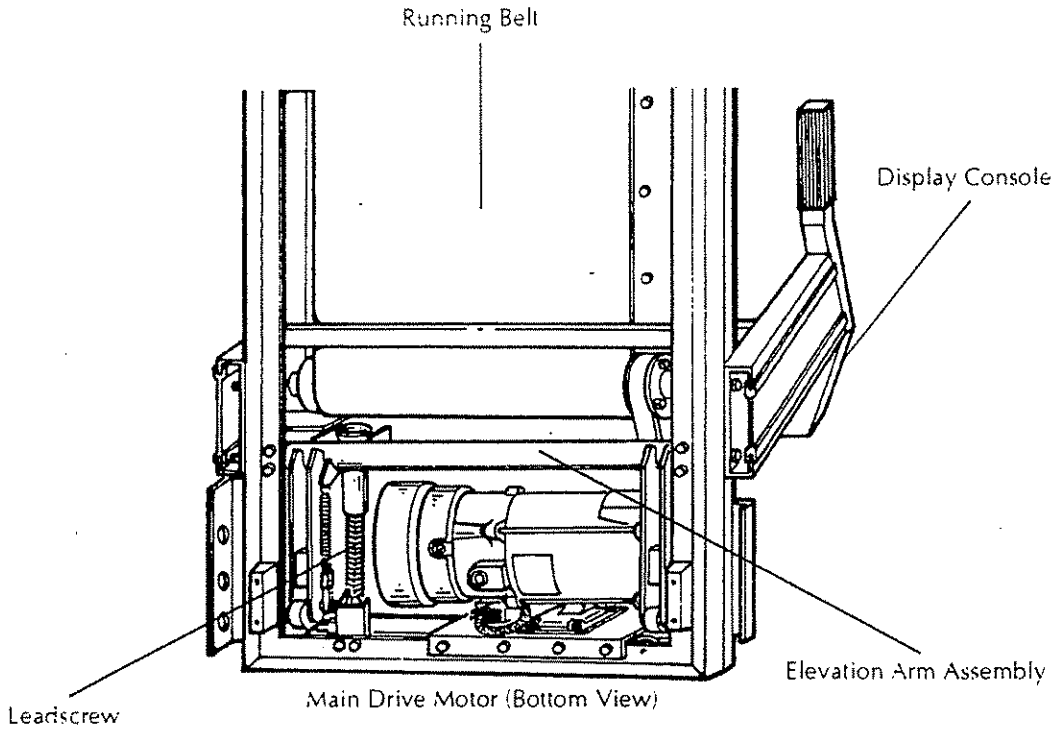


Figure 3-9: Lubricating the Elevation Assembly

Refinishing the Running Deck

The treadmill's running deck is built to withstand many miles of rigorous commercial and residential use, but it is still subject to the normal wear associated with friction.

Although wear does take place, the life span of the deck can be substantially increased and additional wood damage minimized through refinishing.

To refinish the running deck, complete the following:

1. Remove the running deck from the treadmill (if applicable). Complete Steps 1 through 6 contained in the *M4: CHECK DECK WEAR* section (earlier in this chapter).
2. Examine the deck to ensure that it can be refinished. The deck cannot be refinished if its top birch veneer has worn through to the plywood underlayment.

   Can the running deck be refinished? Yes/No

   If the answer is No, install a new running deck. Complete Steps 9 through 15 contained in the *M4: CHECK DECK WEAR* section (earlier in this chapter).

   If the answer is Yes, continue with Step 3.
3. Prepare the running deck's top surface by completing the following:
   a. Sand the deck, using a medium to course grade of sandpaper, to remove:
      - impregnated surface wax
      - surface wax
      - friction burn marks
      - additional wear patterns
   b. Using a clean dry cloth, wipe any residual sawdust and dirt particles from the sanded deck surface.
   c. Sand the deck, using a fine grade of sandpaper, to remove any remaining imperfections and residual wax.

Has the top layer been sanded through to the second layer? Yes/No

If the answer is Yes, install a new running deck. Complete Steps 9 through 15 contained in the *M4: CHECK DECK WEAR* section (earlier in this chapter).

If the answer is No, continue with Step 3d.

   d. Using a "tack cloth," wipe any residual sawdust and dirt particles from the sanded deck surface. Make sure the deck is flat and smooth to the touch. Repeat Step 3c as necessary.

Note: The iron setting used during Step 4 should be enough to heat the wood and melt the applied wax, but not hot enough to cause burning.

CAUTION: Use of wax not approved by TROTTER will void the treadmill warranty. Waxes other than those specified by TROTTER may create excessive friction and heat which could prematurely wear the running belt and deck.

4. Wax the running deck surface by completing the following:
    a. Move an iron (set to high) slowly and evenly over the surface of the deck. This action preheats the wood and allows it to absorb more of the applied wax.

Note: A single bag of carnauba wax flakes can refinish four or five running decks. Restrict the amount of flakes used on a single deck to approximately a quarter of the wax flake bag.

    b. Working from the center outward, sprinkle some yellow carnauba wax flakes onto the deck's surface. Using enough heat to melt the wax without burning, spread the wax using the iron.
    c. Reheat the running deck several times. Heating the surface will maximize its absorbency.
    d. Spread the wax over the entire running deck's top surface in an even thin coat. Avoid areas of excessive wax build up.
    e. Cool the running deck for approximately 5 minutes and then position it, at a slight angle, against a wall, bench or solid support.
    f. Working from the top of the deck, move a hot iron downward to remove any excess wax from the deck's surface. A cloth placed beneath the running deck will protect the floor and collect any removed wax.

Allow the deck to cool (room temperature) and its wax coating to harden. After cooling, continue the procedure with Step 5.

5. Install the refinished running deck. Complete Steps 9 through 15 contained in the *M4: CHECK DECK WEAR* section (earlier in this chapter).

This completes the procedure to refinish the treadmill's running deck.

Adjusting the Running Belt

The treadmill's running belt has been set properly at the factory, but may require adjustments during its break-in period (belt stretch), whenever it has been removed for treadmill servicing, or if there are problems with its tracking.

The two most common adjustments associated with the running belt are tension and tracking. These adjustment procedures are described in the following paragraphs.

Adjusting Belt Tension

The treadmill's running belt must be adjusted whenever it slips or hesitates during operation.

To adjust the running belt's tension, refer to Figure 3-10 and complete the following:

1. Turn the left tension adjustment bolt clockwise 1/4-turn.
2. Turn the right tension adjustment bolt clockwise 1/4-turn.

CAUTION: Do not over-tighten the tension adjustment bolts. Over-tightening can create excessive pressure on the front and rear roller bearings. This pressure could cause premature roller bearing wear and eventual failure. If excessive roller pressure is suspected, turn each tension adjustment bolt counterclockwise by an equal amount.

3. Start the treadmill using the normal power-up procedure.
4. Test the running belt for slippage or hesitation by firmly pressing one foot down on the moving belt.

Does the belt slip or hesitate? Yes/No

If the answer is Yes, repeat Steps 1 through 4.

Note: If, after repeating Steps 1 through 4 a maximum of four times, the belt tension cannot be adjusted properly, the problem may be a loose main drive belt. Refer to Chapter 4, Corrective Maintenance.

If the answer is No, consider the adjustment a success.

This completes the procedure to adjust the running belt's tension.

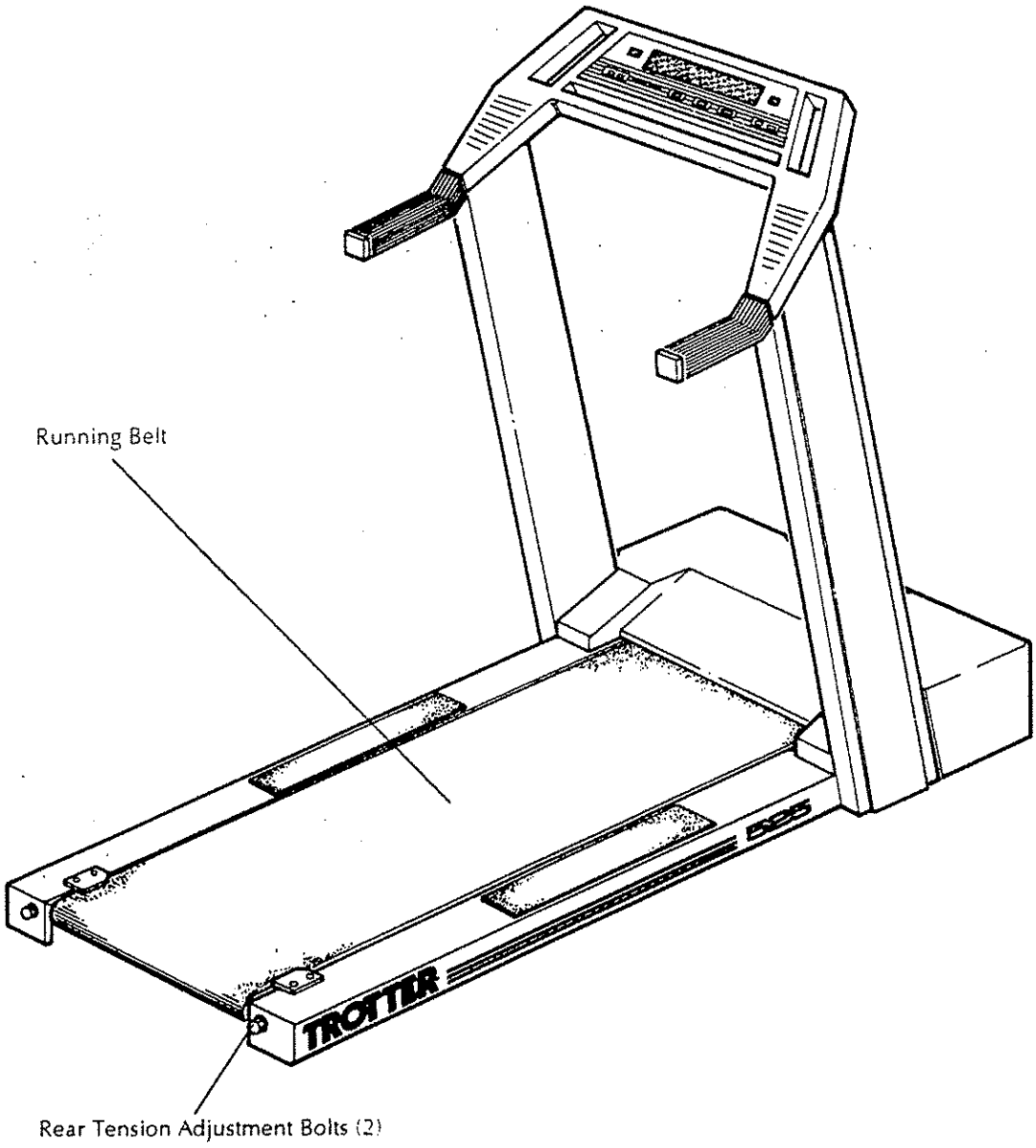


Figure 3-10: Adjusting the Running Belt

Adjusting Belt Tracking

The treadmill's running belt must be adjusted whenever it operates consistently off-center. Steps required to realign the running belt are very similar to those used to adjust the belt's tension.

Occasionally a belt centering problem may be corrected by ensuring that:

- the floor is level. An uneven floor may cause the belt to run off-center. Slide the rear of the treadmill to the left or right 90° and determine, by operating, if this corrects the condition.
- the running belt's tension is properly adjusted. If adjustments are required, refer to the *Adjusting Belt Tension* section (earlier in this chapter).

To center the running belt, refer to Figure 3-10 and complete the following:

1. Start the treadmill using the normal power-up procedure.
2. Increase speed to approximately 6 MPH (10 KMH).
3. Determine to which side (right or left) the running belt is tracking.

If the belt is tracking to the left, turn the left tension adjustment bolt clockwise 1/4-turn. Wait approximately one minute for this action to take effect.

If the belt is tracking to the right, turn the left tension adjustment bolt counterclockwise 1/4-turn. Wait approximately one minute for this action to take effect.

4. Determine if the running belt has been centered.

Is the belt centered? Yes/No

If the answer is No, repeat Step 3 until centering takes place.

If the answer is Yes, increase belt speed to 10 MPH (16 KMH) and verify that the belt is centered and running smoothly. If a tracking problem still exists, repeat Steps 3 and 4.

This completes the procedure to center the running belt.

4

Corrective Maintenance

Introduction

The information contained in this chapter is used to provide TROTTER service personnel with the information necessary to perform successful corrective maintenance on the Model 525 treadmill.

The following steps outline the troubleshooting approach exercised in this chapter.

a. Determine that a problem exists.
b. Analyze the symptoms associated with the problem.
c. Isolate the faulty component(s) through troubleshooting.
d. Replace the faulty component(s).
e. Check the equipment to verify its operational status.
f. Return the repaired equipment to the customer.

Notes:
1. Model 525 information presented in this chapter is applicable to all 60 Hz/115 VAC and 50 Hz/230 VAC treadmills.
2. Unless noted, the 60 Hz relay box assembly has been used for illustrative purposes.

Before continuing with the *Troubleshooting Overview* section, review the following *Handling Precautions.*

Handling Precautions

Many of the electrical components contained on the upper circuit board are susceptible to damage from a discharge of static electricity. While handling this board, use an ElectroStatic Discharge (ESD) grounding kit (if available). See Figure 4-1.

The purpose of the grounding kit is to eliminate the potential voltage (static) difference between you and the equipment. A typical kit consists of a work surface mat, coil wrist strap, and a grounding cord.

WARNING: DO NOT USE AN ESD KIT WHEN WORKING ON ELECTRICALLY LIVE EQUIPMENT (E.G., RELAY BOX, MOTORS, OR POWER SUPPLIES). IT IS UNSAFE TO BE GROUNDED WHEN WORKING ON THESE HIGH VOLTAGE DEVICES.

To install the ESD kit, refer to Figure 4-1 and complete the following:

1. Unfold the ESD work mat and lay it out on a smooth surface such as a desk or tabletop.
2. Attach the coil wrist strap to the work surface mat.
3. Slide the wrist strap over your hand and around your wrist. Make sure that the cloth contacts your skin directly. Tighten as required.
4. Attach the grounding cord to the work surface mat.

Note: Make sure that the equipment being grounded is turned off and has its AC power cord plugged into a grounded source outlet. This ensures a common power and chassis ground.

5. Attach the alligator clip (grounding cord) to an unpainted *metallic* surface area of the equipment chassis being grounded.

This completes the procedure for installing the ESD kit.

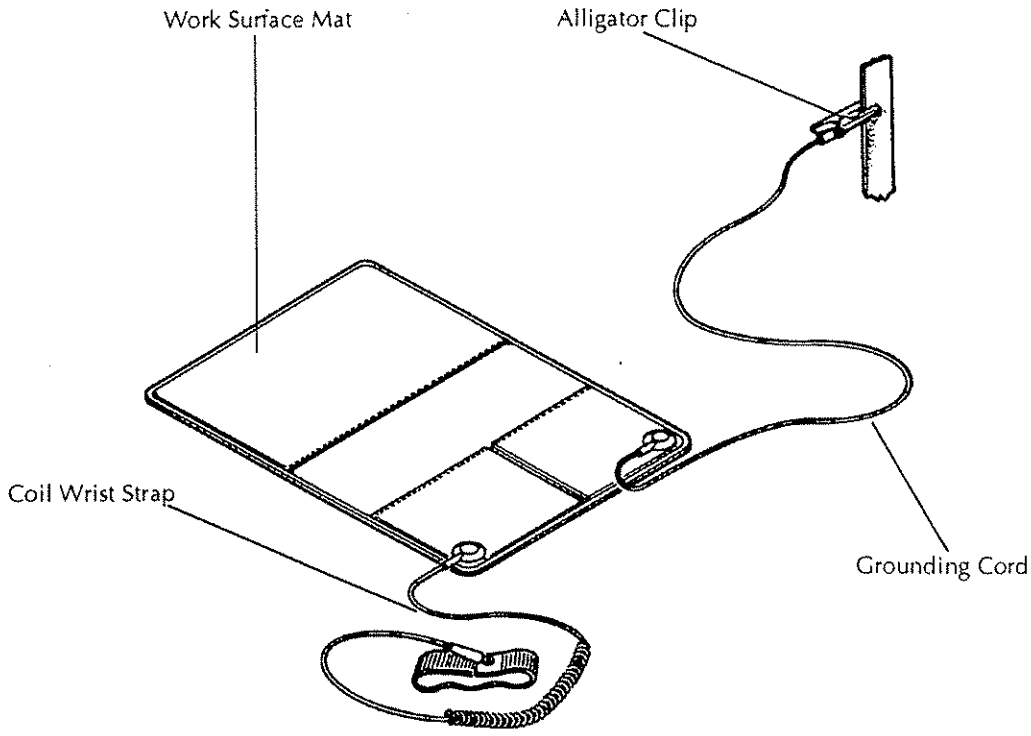


Figure 4-1: ElectroStatic Discharge Kit

Accessing the Relay Box Components

When facing the display console, the relay box assembly is located below and to the left of the running deck, and houses several field replaceable electrical components. See Figure 4-2.

To access the relay box components, refer to Figure 4-2 and complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEP 2.

2. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position.
3. Remove the two Phillips-head screws securing the cover panel to the relay box assembly. Set the cover panel aside.

Note: To install the relay box cover panel, reverse Steps 1 through 3.

This completes the procedure for accessing the relay box components.

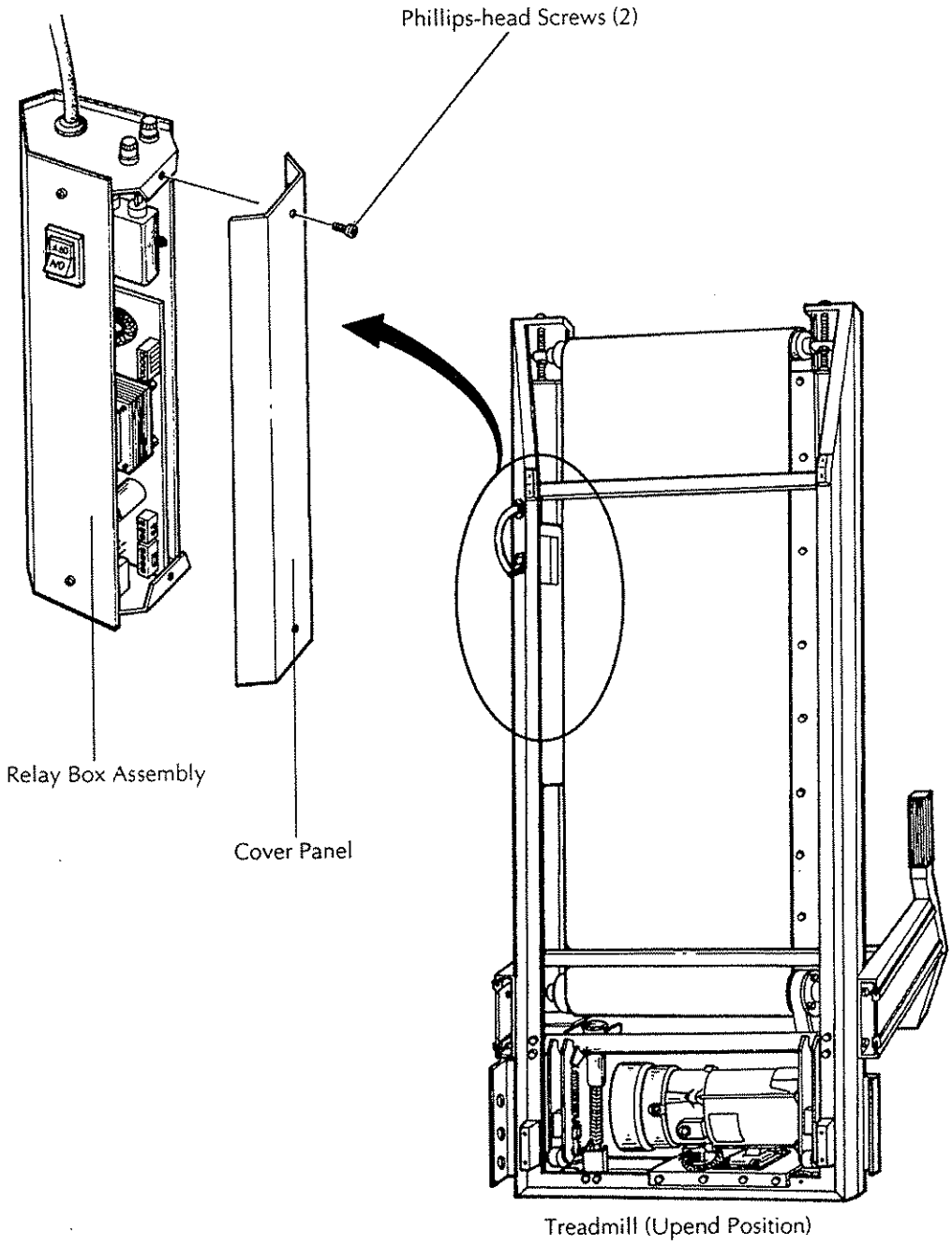


Figure 4-2: Relay Box Assembly (Access)

Accessing the Front Hood Cover Assemblies

The main drive motor, LC filter (inductor [choke] and capacitor), elevation motor (AC), and elevation assembly are all housed beneath the front hood cover. This cover is located in front of the display console's support stanchions. See Figure 4-3.

To access those electro-mechanical items housed beneath the front hood cover, refer to Figure 4-3 and complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.
2. Remove the four Button-head screws securing the front hood cover to the treadmill's chassis.
3. Lift the cover off the front roller and main motor assemblies. Set the cover aside.

Note: To install the front hood cover, reverse Steps 1 through 3.

This completes the procedure for accessing those assemblies located beneath the front hood cover.

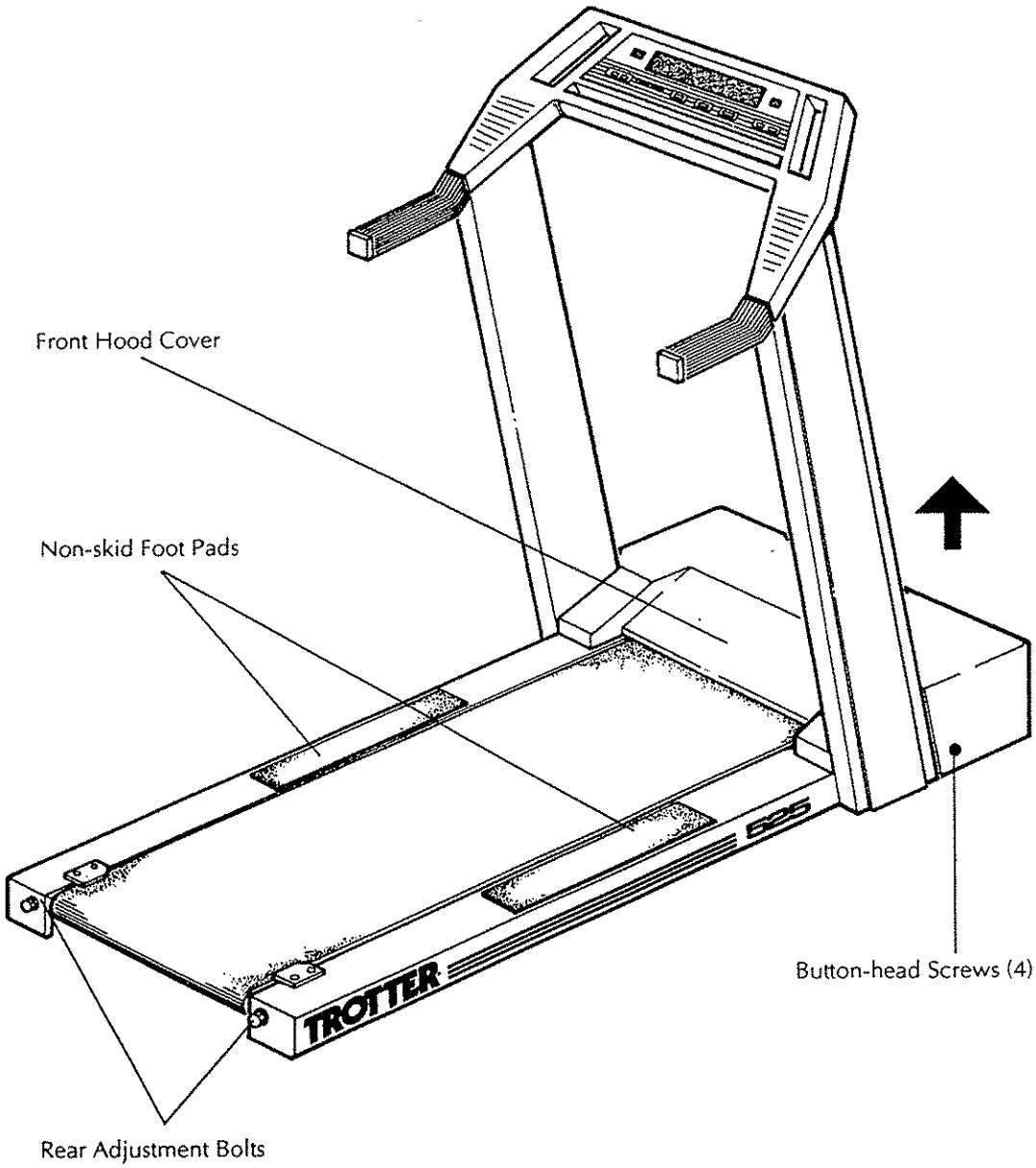


Figure 4-3: Front Hood Cover (Access)

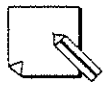
Troubleshooting Overview

Performing successful corrective maintenance requires troubleshooting in a systematic and logical manner. This approach has been incorporated into the various flowcharts and support illustrations used throughout this chapter.

These flowcharts provide a sequential and logical approach towards fault isolation, identification, and correction of problems associated with the treadmill.

Instructions and reference information are contained within the flowcharts.

To categorize the type of problem and begin the isolation and corrective maintenance process, refer to Figure 4-4, Main Troubleshooting Flowchart.



Note: For additional technical and functional information on the various processes and components discussed in the following troubleshooting procedures, refer to Chapter 2, Principles of Operation *and* Chapter 6, Technical Specifications.

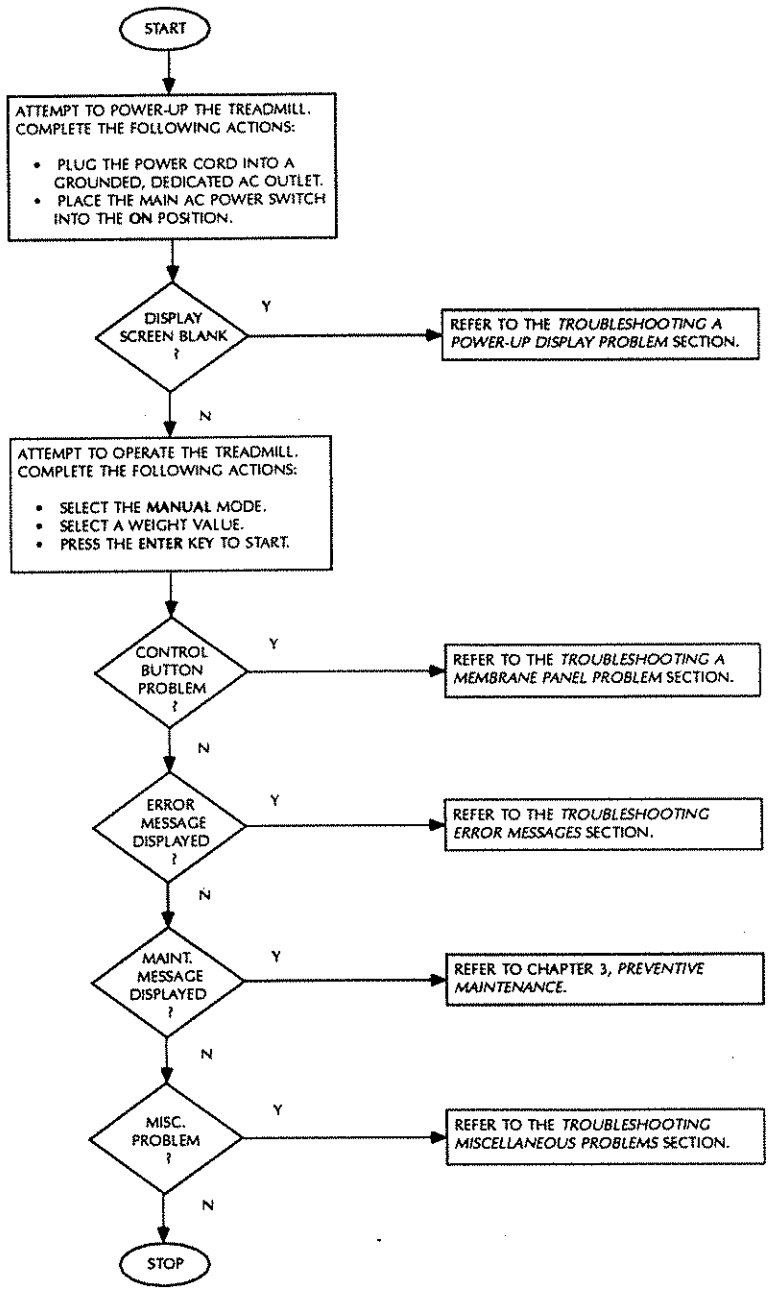


Figure 4-4: Main Troubleshooting Flowchart

Troubleshooting a Power-Up Display Problem

Initially when power is first applied to the equipment (main AC switch placed into the ON position) a series of messages will scroll across the display panel. These messages continue to display until the system detects a response (pressing a membrane panel control button) from the operator.

A power-up problem is indicated whenever these messages are not seen after power has been applied.

Possible causes of a power-up display problem are listed below:

- faulty AC source outlet or lack of line power
- faulty main AC switch
- faulty AC line filter
- faulty treadmill fuse (F1 or F2)
- faulty lower circuit board
- faulty SCR module
- faulty DMD-to-relay box cable
- faulty upper circuit board (DMD)

To troubleshoot a power-up display problem, follow the flowchart contained in Figure 4-5, No Display at Power-Up Flowchart.

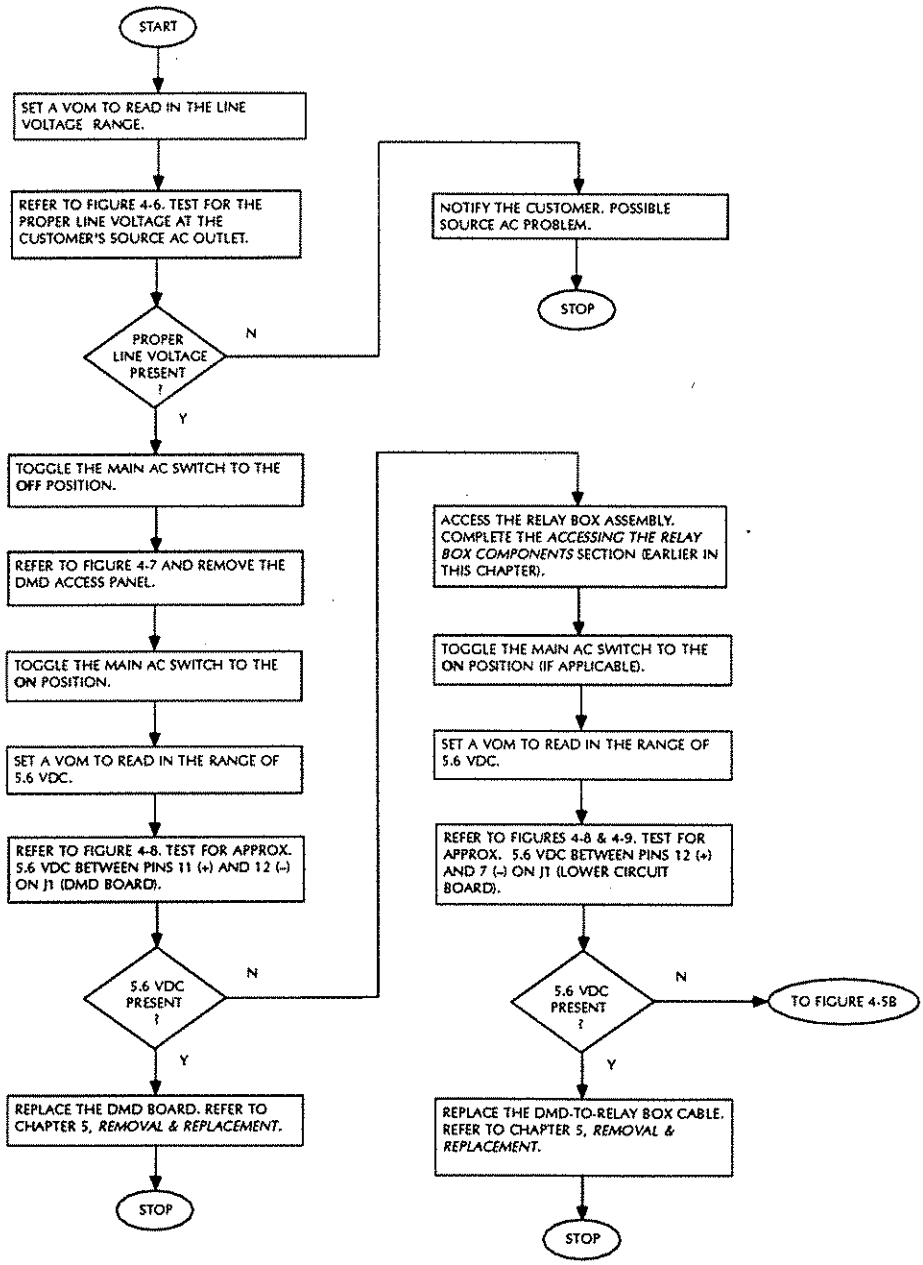


Figure 4-5A: No Display at Power-Up Flowchart

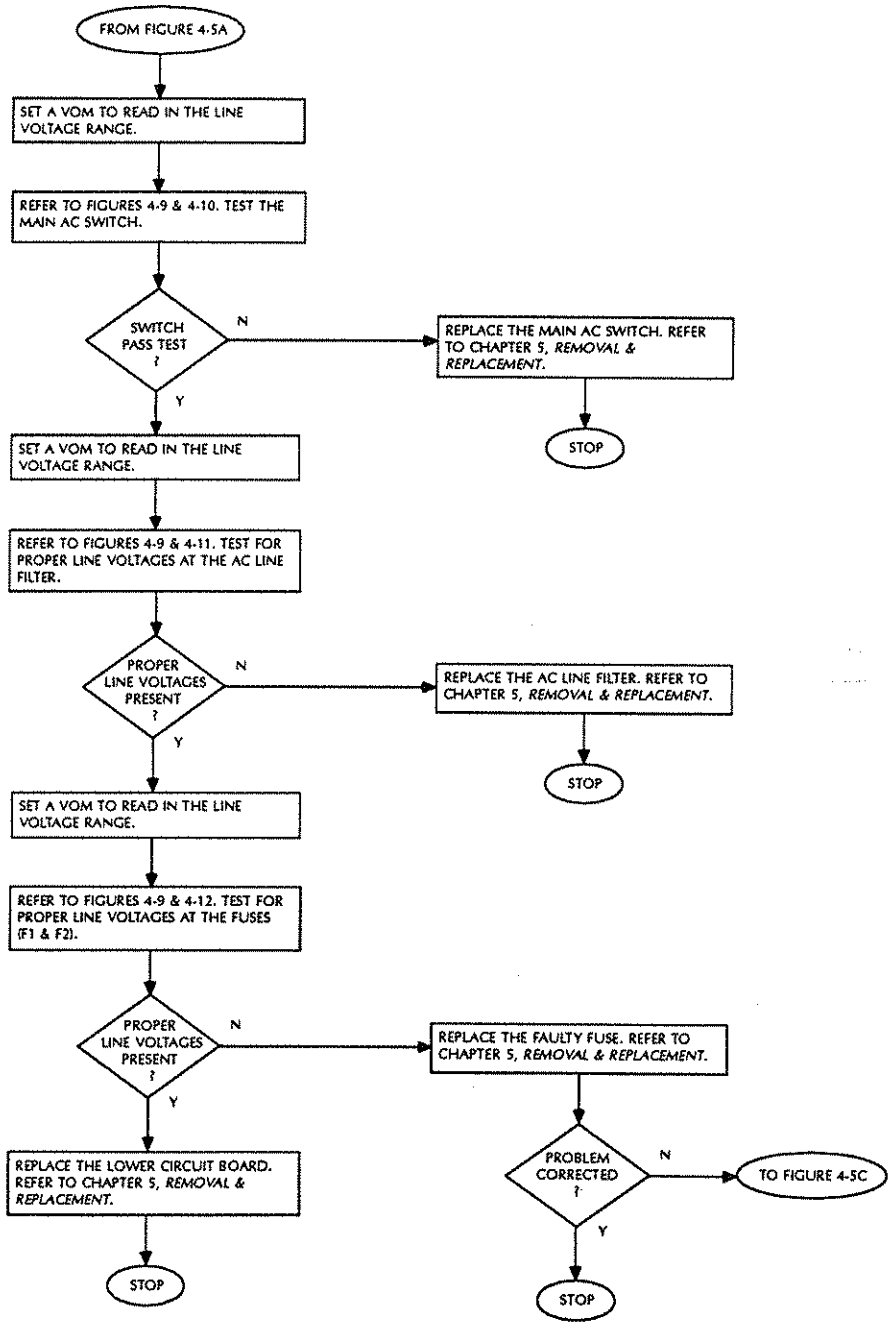


Figure 4-5B: No Display at Power-Up Flowchart (Cont.)

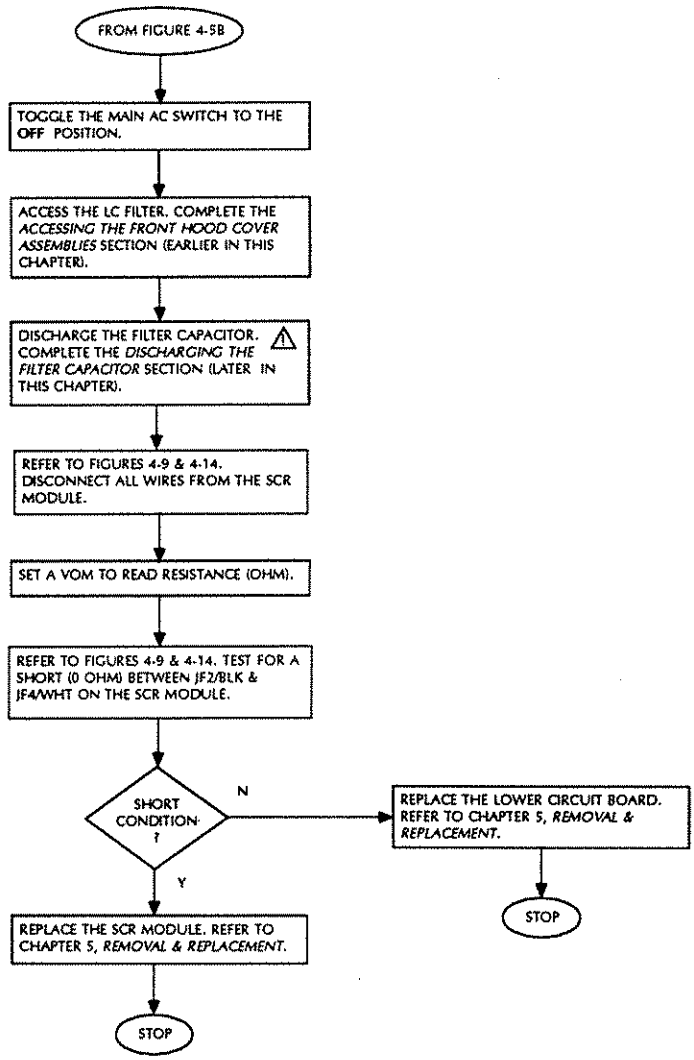
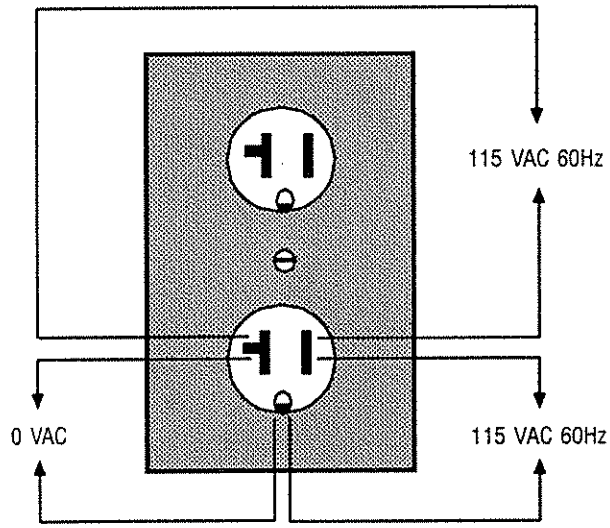
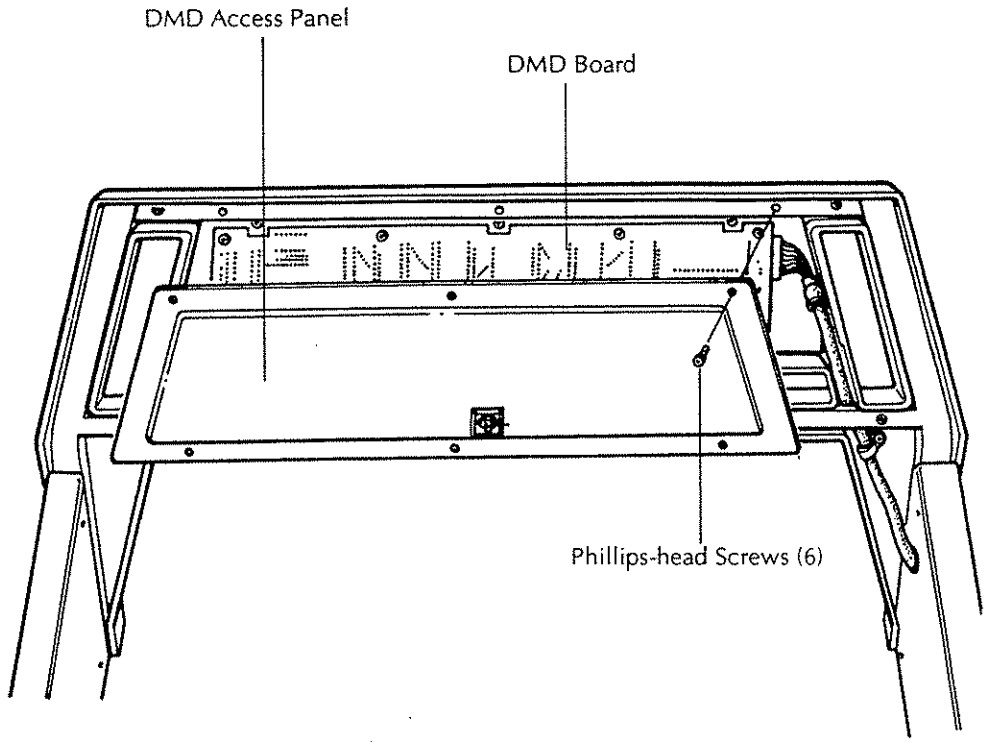


Figure 4-5C: No Display at Power-Up Flowchart (Cont.)



50 Hz, 230 VAC electrical outlet configurations will vary from country to country. Consult your local electrical code for information on specific source AC configurations.

Figure 4-6: AC Source Outlet (115 VAC, 60 Hz)



Display Console (Rear View)

Figure 4-7: Display Console (DMD Access)

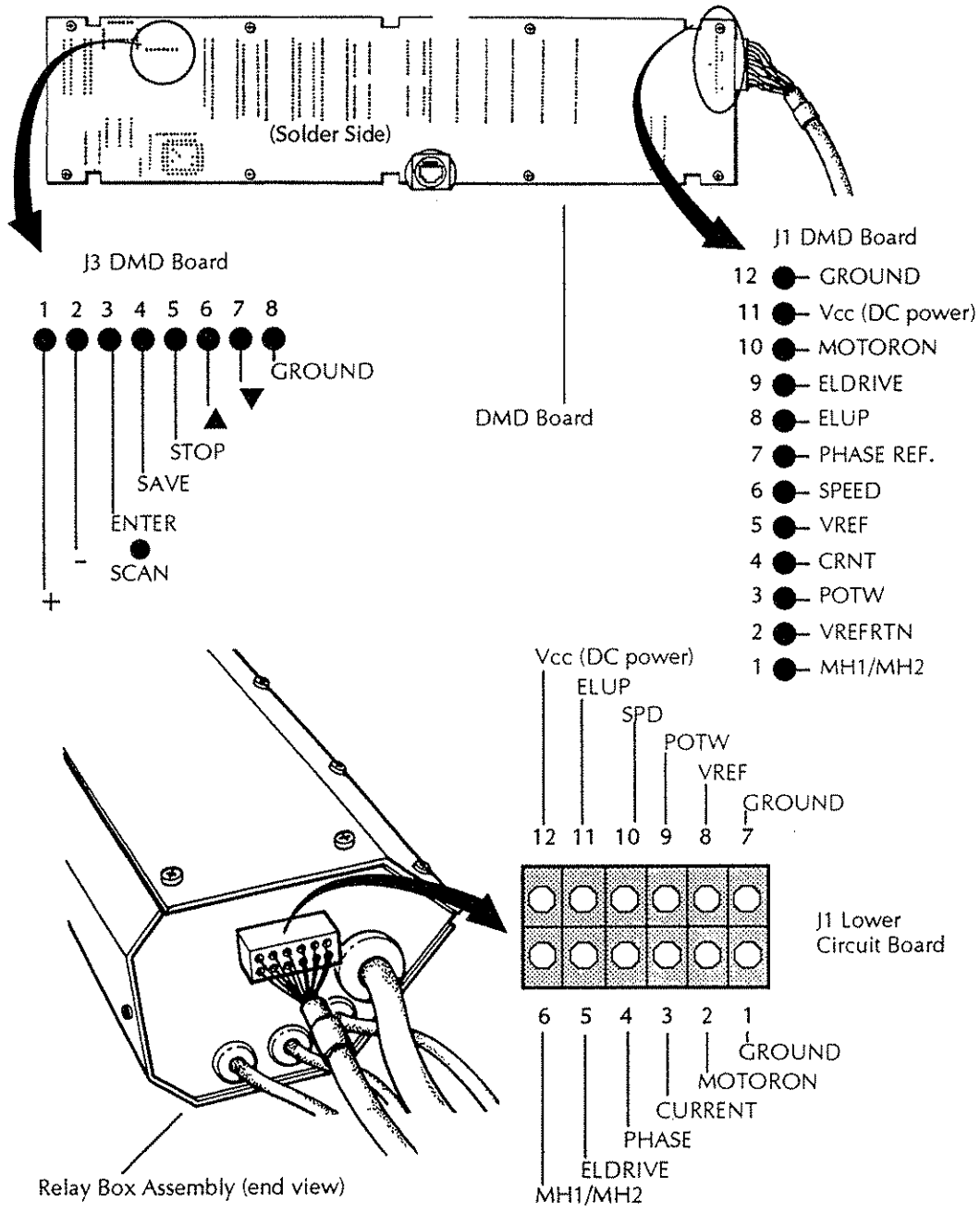


Figure 4-8: DMD Board and DMD-to-Relay Box Cable Signals

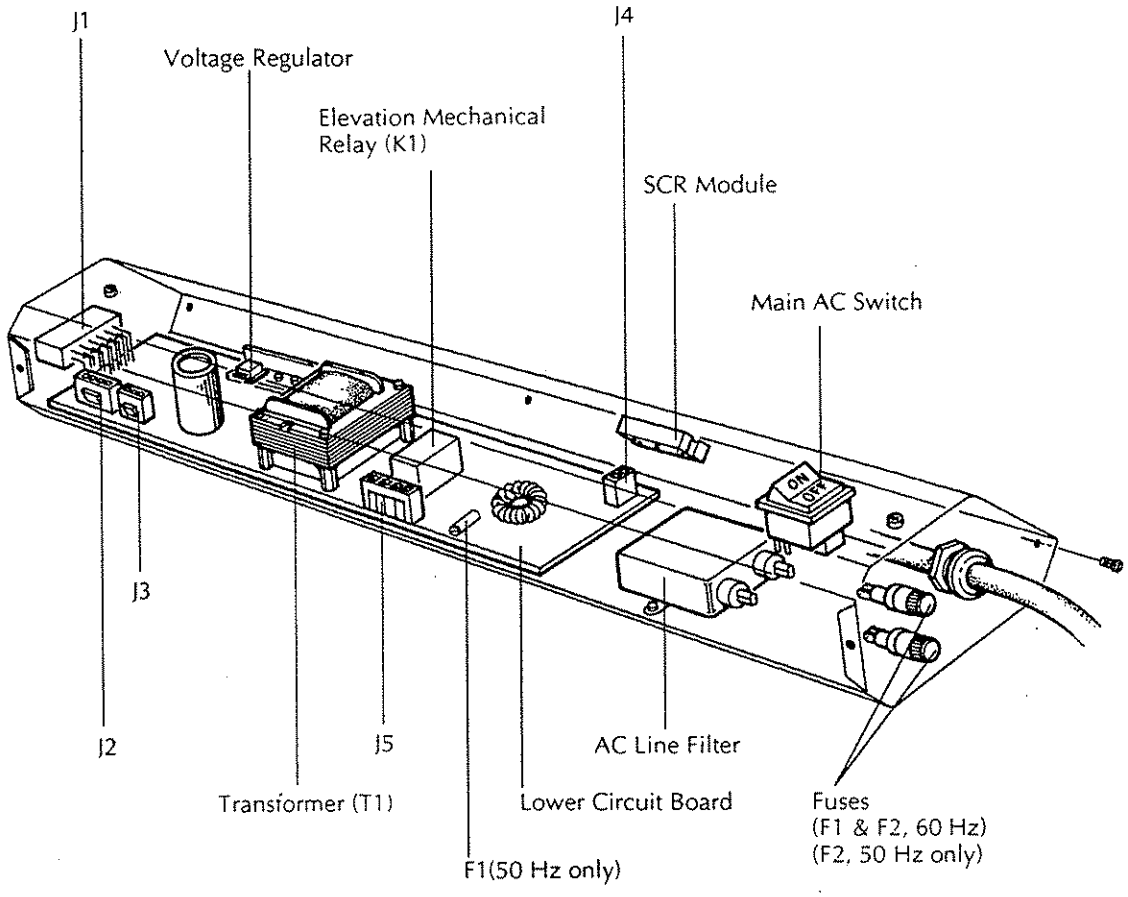


Figure 4-9: Relay Box Assembly (Internal View)

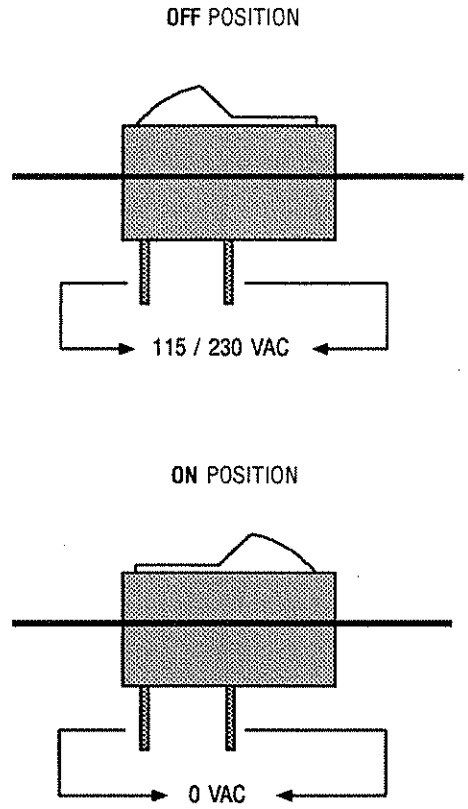
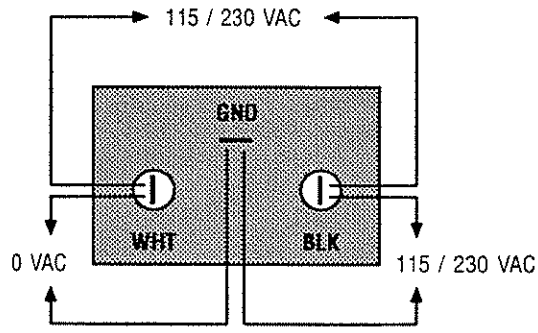
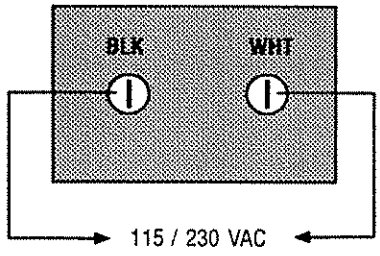


Figure 4-10: Main AC Switch



LINE (END VIEW)



LOAD (END VIEW)

Figure 4-11: AC Line Filter (End Views)

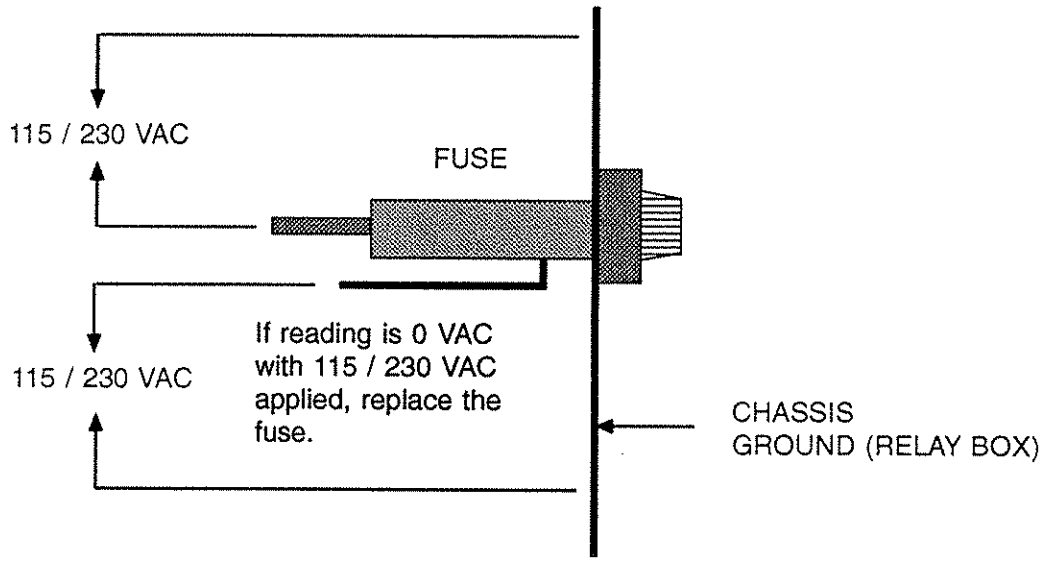


Figure 4-12: Relay Box Fuse (F1 or F2)

Discharging the Filter Capacitor

The filter capacitor *must* be discharged whenever electrical components (e.g., SCR module, main drive motor [DC] brushes) attached to the capacitor are tested and/or replaced.

WARNING: THE LC FILTER CAPACITOR, ONCE CHARGED, CONTAINS A POTENTIALLY HARMFUL AMOUNT OF STORED VOLTAGE/CURRENT. USE EXTREME CAUTION WHEN DISCHARGING THIS FILTER COMPONENT. NEVER TOUCH BOTH EXPOSED TERMINALS WITH YOUR FINGERS.

To discharge the filter capacitor, refer to Figure 4-13 and complete the following:

1. *Carefully* pull back each of the capacitor terminal's rubber "boots."
2. Grip the insulated handle of a screwdriver. Using the screwdriver's metal shaft, momentarily touch the capacitor's two terminals. *Do not* touch the screwdriver's metal shaft while performing this step.
3. Slide each rubber "boot" back over its respective terminal.

This completes the procedure for discharging the filter capacitor.

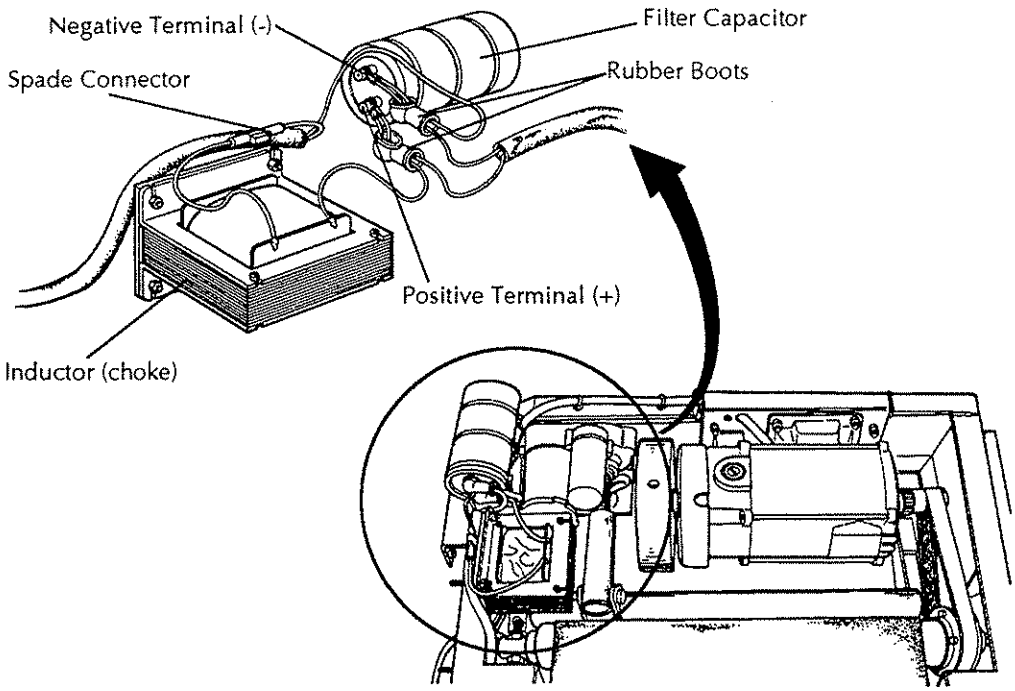


Figure 4-13: LC Filter (Inductor/Capacitor)

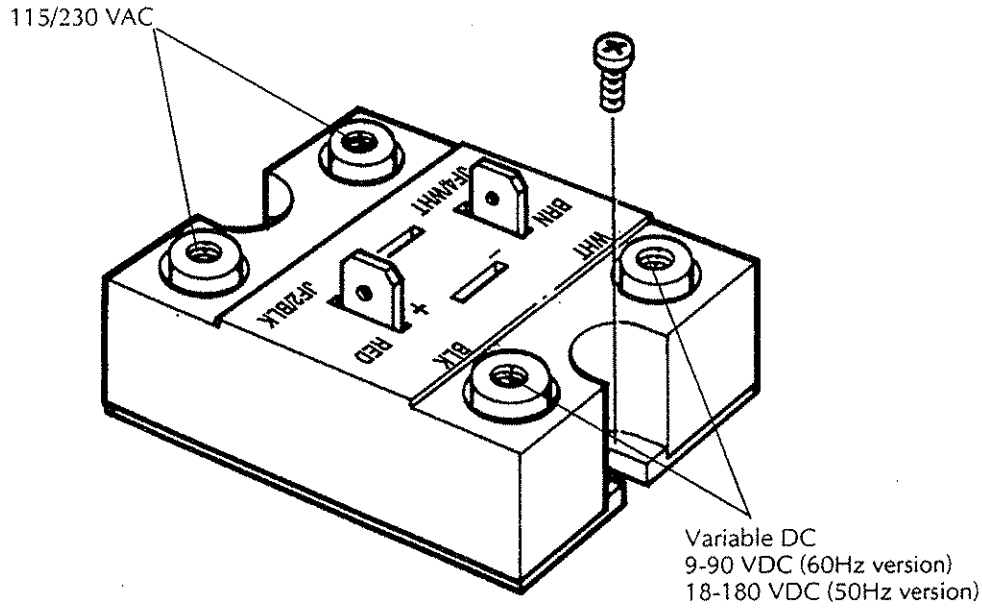


Figure 4-14: SCR Module

Troubleshooting a Membrane Panel Problem

A problem with the membrane panel is indicated whenever a control button is pressed and its corresponding function is not performed or does not have the intended system effect.

Possible causes of a membrane panel problem are listed below:

- faulty membrane panel
- faulty upper circuit board (DMD)

To troubleshoot a membrane panel problem, complete the flowchart contained in Figure 4-15, Membrane Panel Troubleshooting Flowchart.

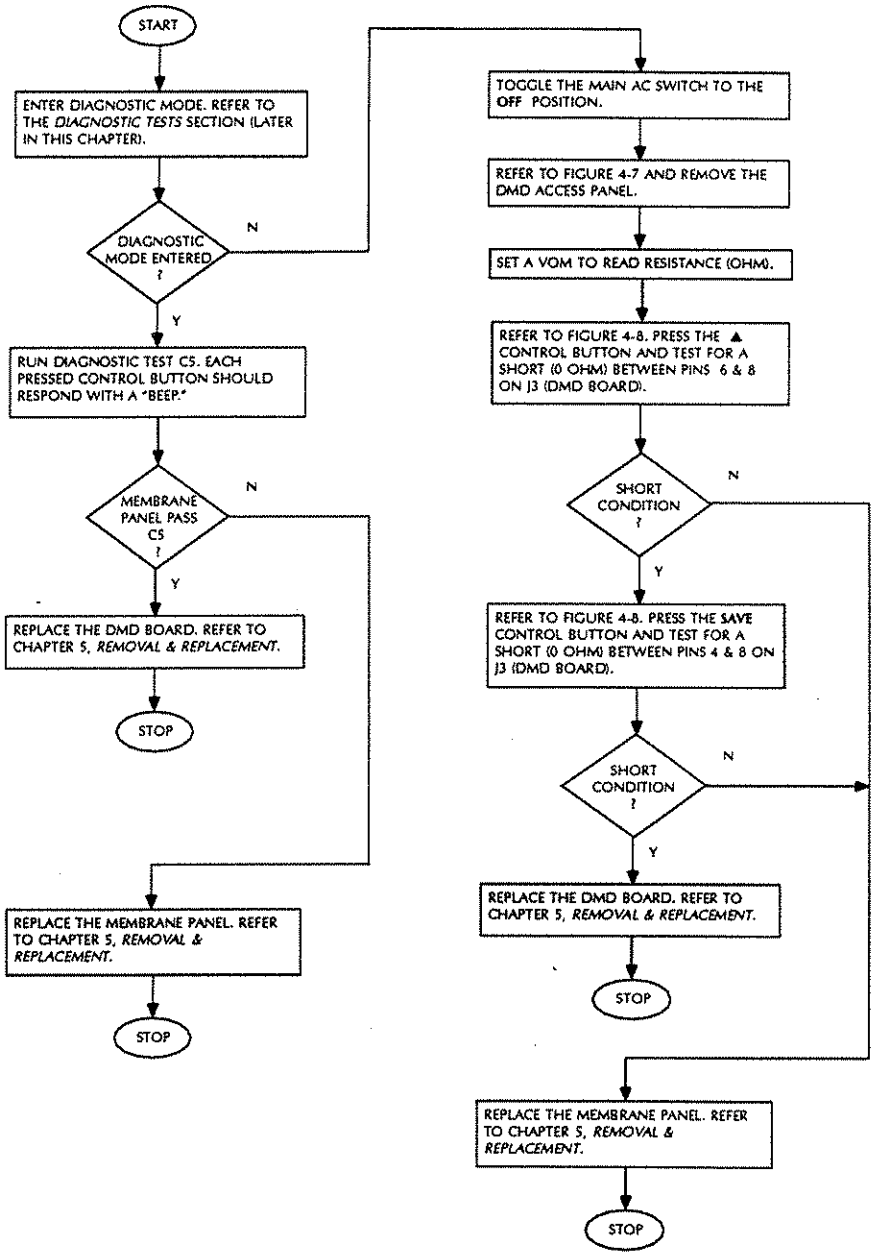


Figure 4-15: Membrane Panel Troubleshooting Flowchart

Troubleshooting Error Messages

Error messages are system generated whenever a problem develops which could cause damage to the treadmill if operations were allowed to continue. These error messages interrupt the operation in progress and initiate an immediate equipment shutdown.

The shutdown consists of the treadmill's speed and incline returning to zero and the appropriate error message being displayed.

CAUTION: Error conditions must be properly corrected before the treadmill is allowed to return to operational service.

To troubleshoot a problem involving an error message, refer to its description and complete all corrective maintenance instructions provided.

ERROR 1: NO SPEED SIGNAL AT STARTUP

This error message can occur during start up and indicates that the microprocessor on the upper circuit board (DMD) did not receive an indication of main drive motor (DC) rotary movement in the form of a speed signal.

Possible causes of this error message are listed below:

- faulty speed sensor
- faulty lower circuit board
- faulty DMD-to-relay box cable connections
- faulty SCR module
- faulty DC filter inductor (choke)
- faulty main drive motor (DC) brushes, brush holders or brush caps
- faulty upper circuit board (DMD)

Note: Toggle the main AC switch OFF and then ON to clear the error message.

To troubleshoot an ERROR 1 condition, complete the flowchart contained in Figure 4-16, Error 1 Troubleshooting Flowchart.

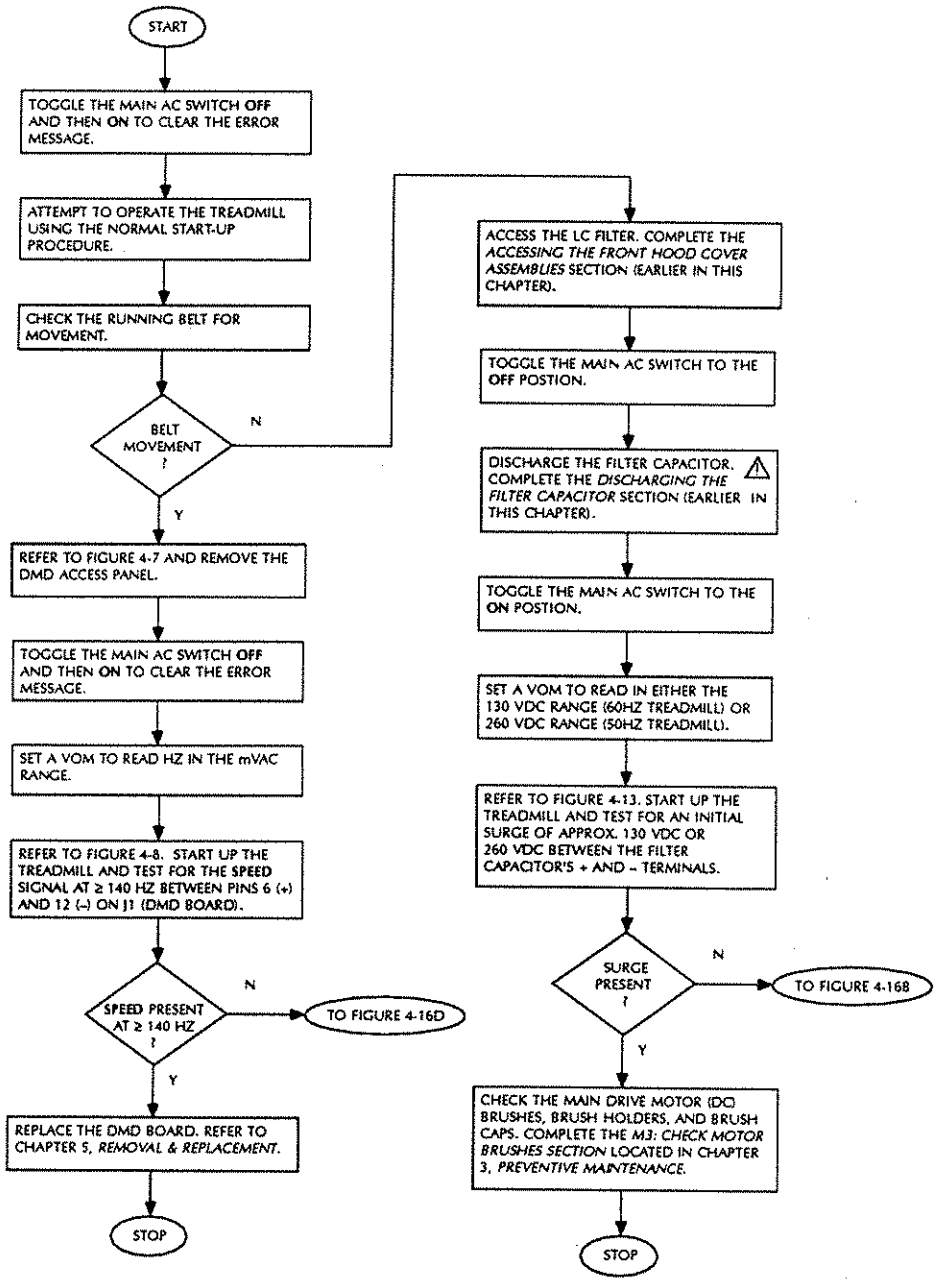


Figure 4-16A: Error 1 Troubleshooting Flowchart

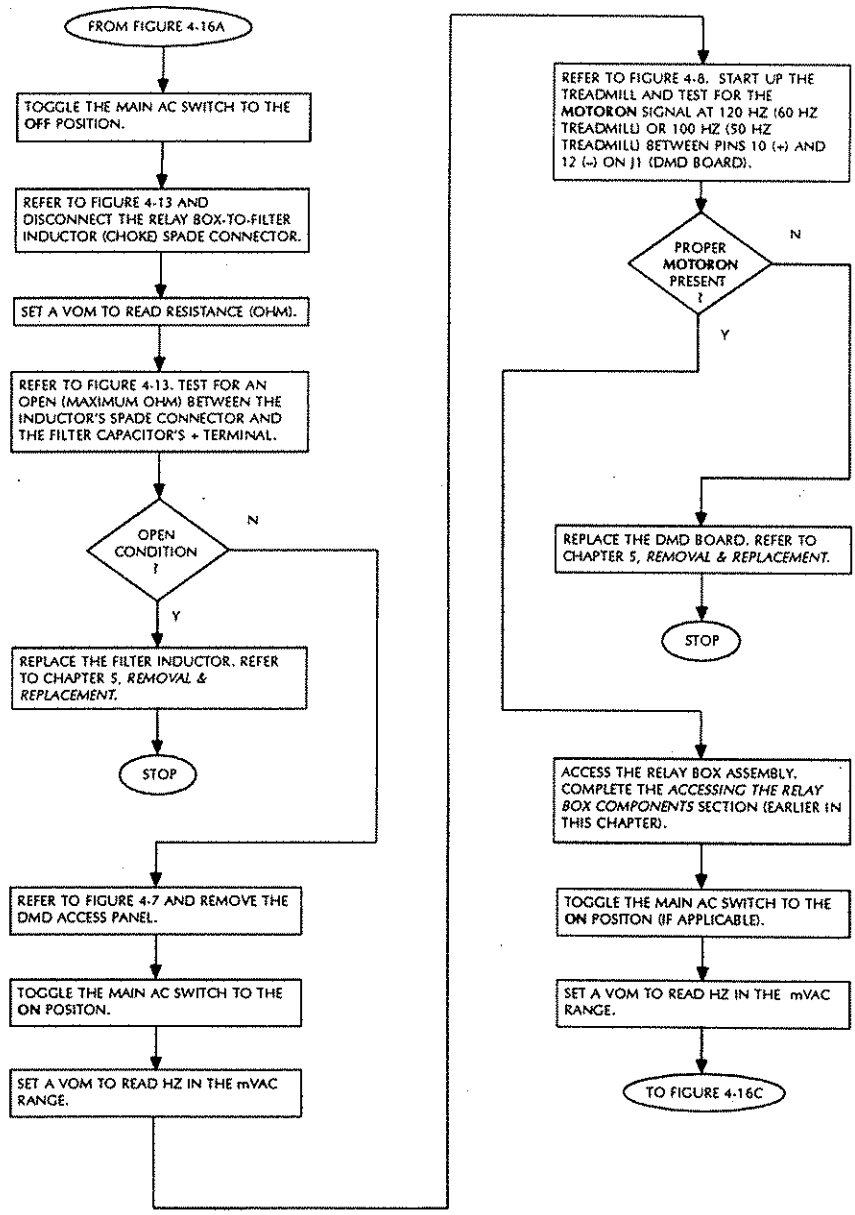


Figure 4-16B: Error 1 Troubleshooting Flowchart (Cont.)

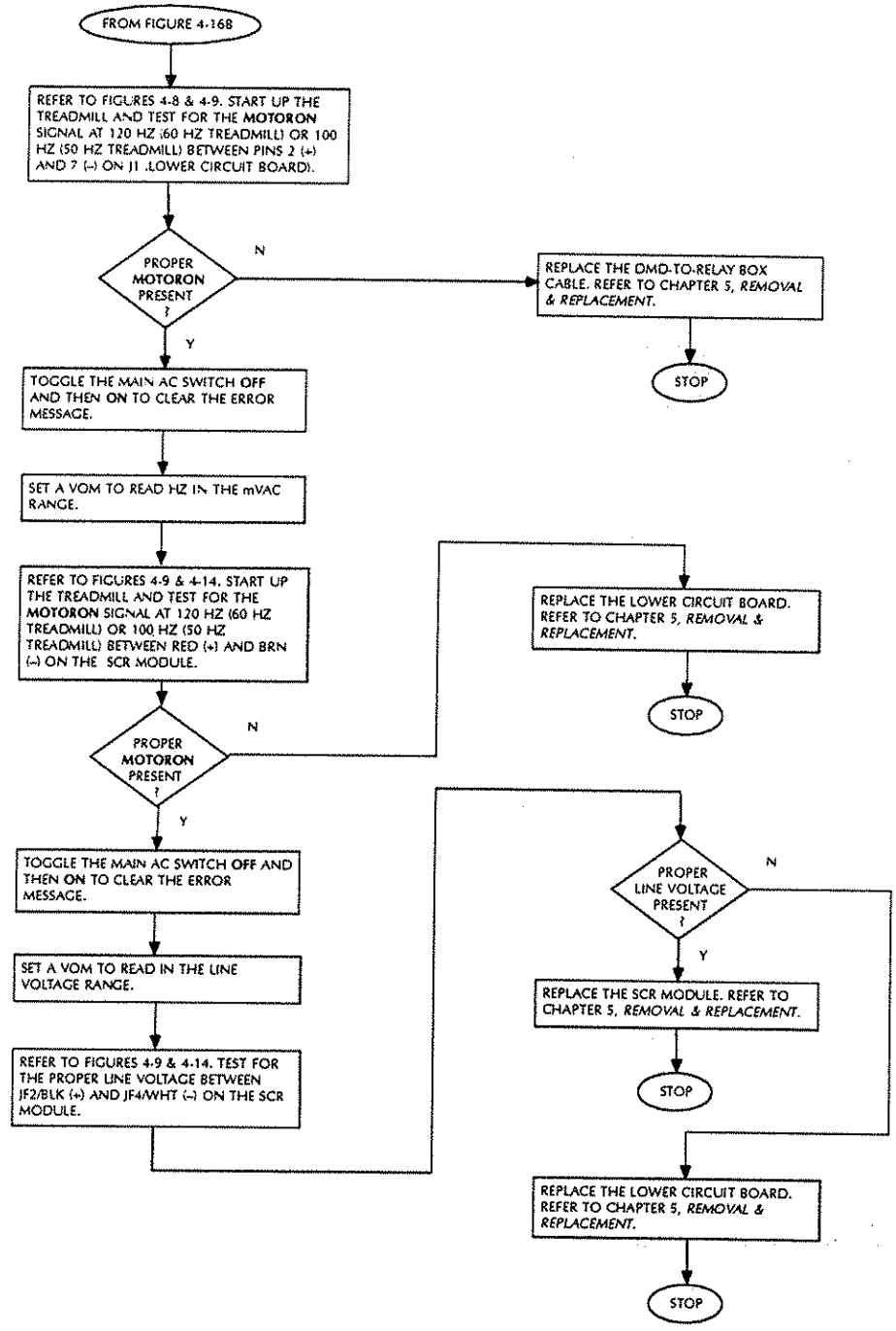


Figure 4-16C: Error 1 Troubleshooting Flowchart (Cont.)

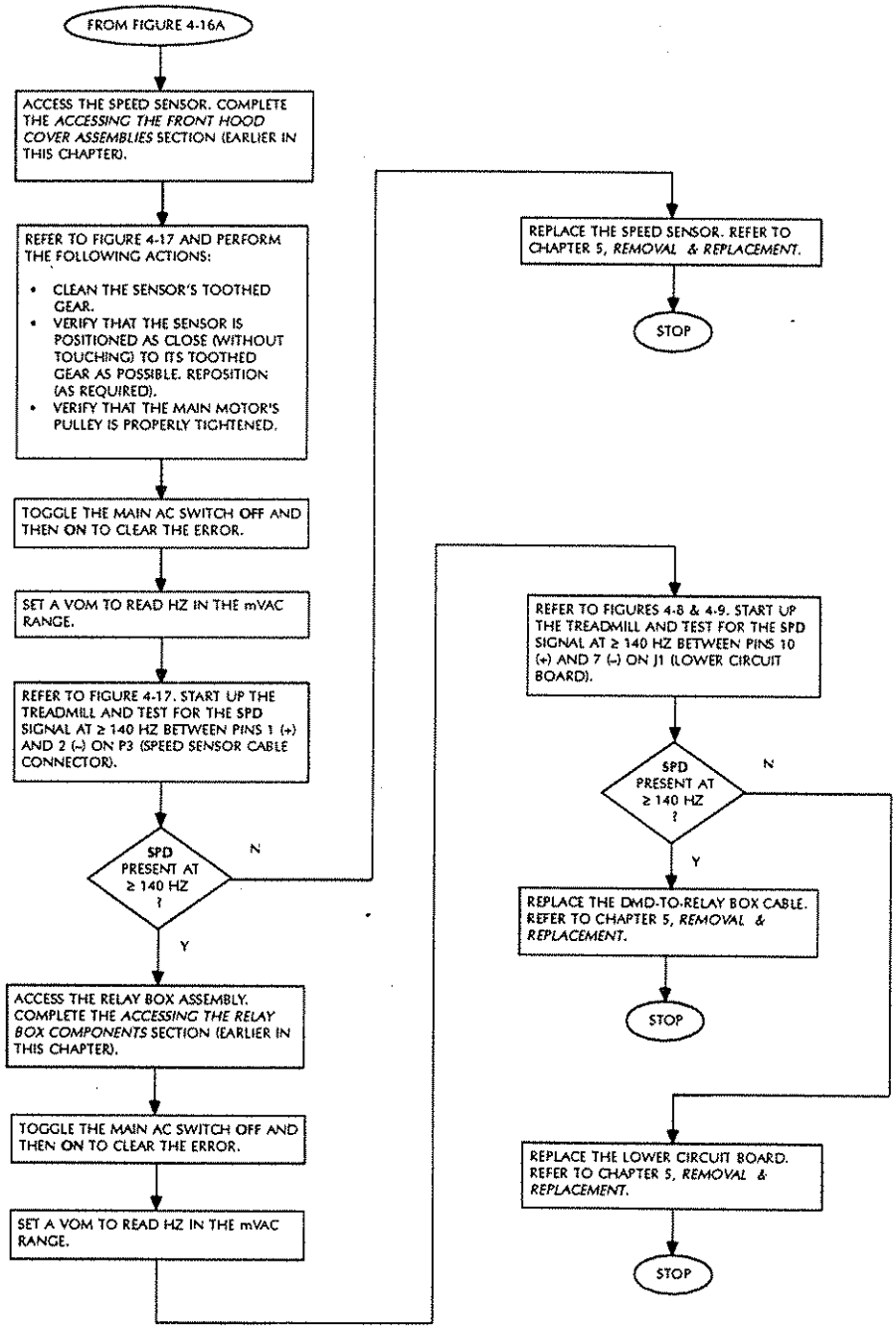


Figure 4-16D: Error 1 Troubleshooting Flowchart (Cont.)

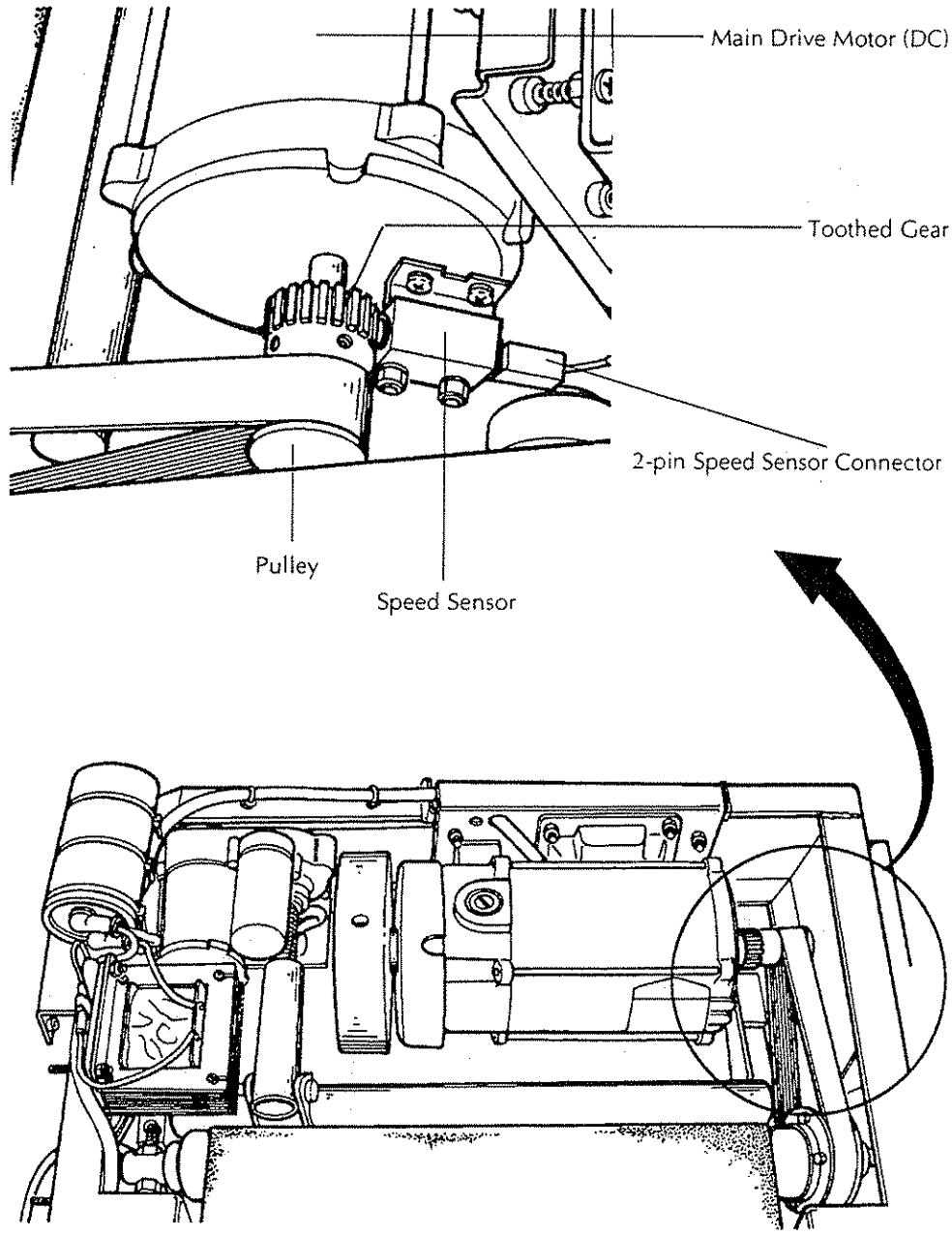


Figure 4-17: Main Drive Motor (DC) & Speed Sensor

ERROR 2: EXCESSIVE CURRENT DRAW

This error message can occur after the treadmill has started and indicates that the treadmill is drawing an excessive amount of current.

Possible causes of this error message are listed below:

- faulty DMD-to-relay box cable connections
- worn running deck and/or running belt
- excessive friction between the running belt and its deck
- faulty DC filter capacitor
- faulty main drive motor (DC) brushes, brush holders or brush caps
- weakened permanent magnets in the main drive motor (DC)

Note: Toggle the main AC switch OFF and then ON to clear the error message. If this action doesn't clear the error message, reseat the DMD-to-relay box connectors. If the error message reappears, replace the microprocessor (refer to Chapter 5, Removal & Replacement*) before completing the ERROR 2 troubleshooting flowchart contained in Figure 4-18.*

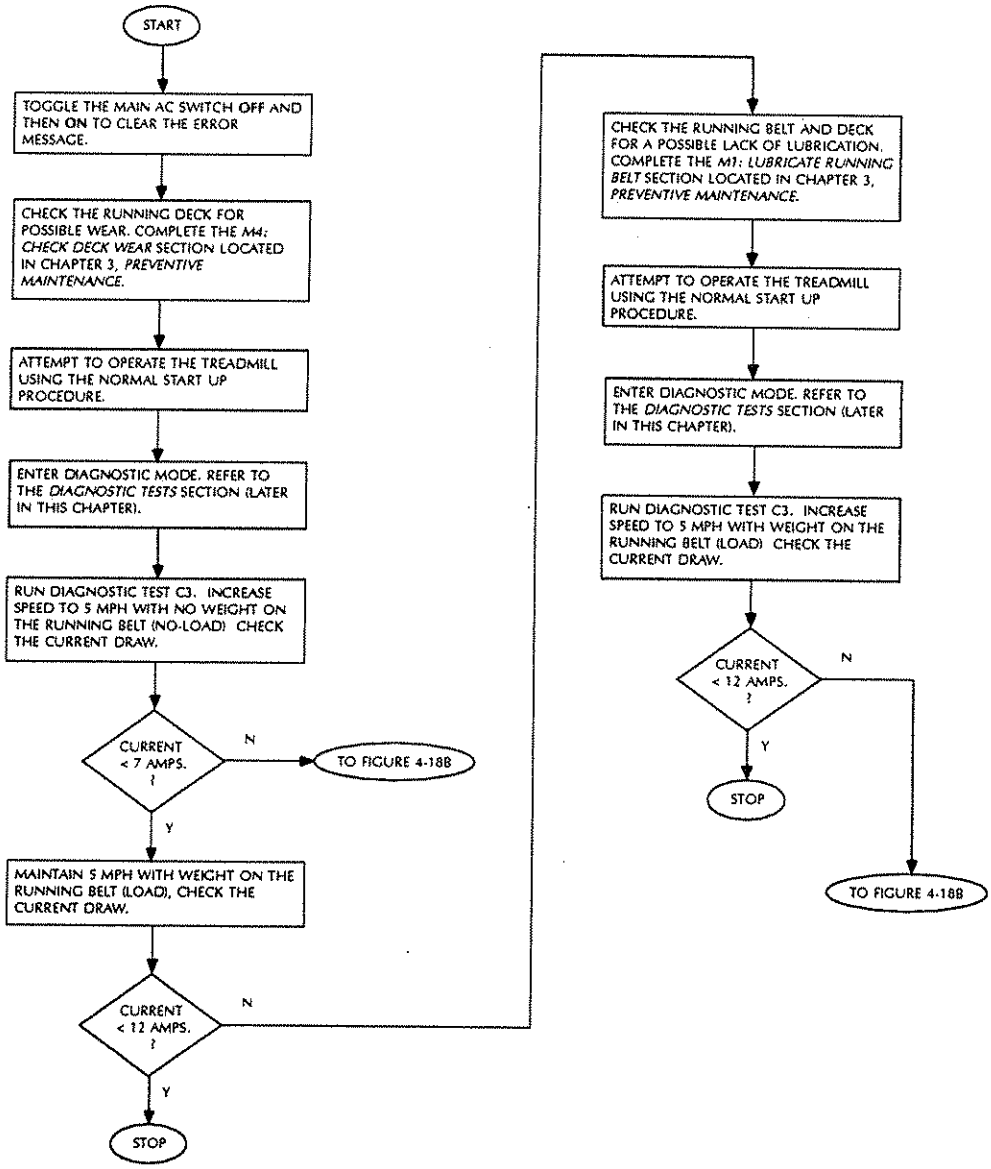


Figure 4-18A: Error 2 Troubleshooting Flowchart

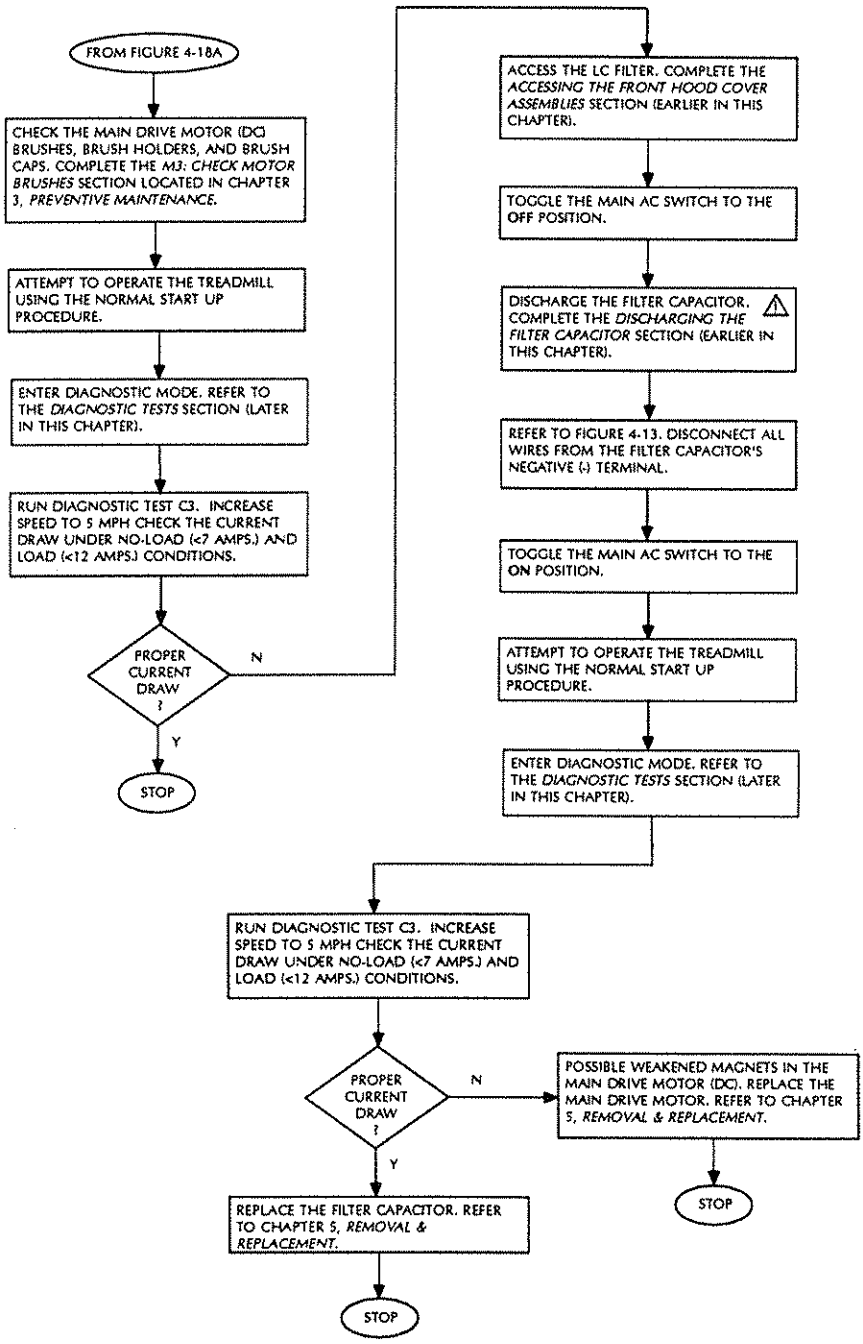


Figure 4-18B: Error 2 Troubleshooting Flowchart (Cont.)

ERROR 3: LOSS OF SPEED SIGNAL

This error message can occur after the treadmill has started and indicates that the microprocessor on the upper circuit board (DMD) is not receiving a motor speed signal from the speed sensor.

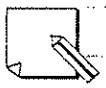
Possible causes of this error message are similar to those which cause an Error 1 condition.

Note: Toggle the main AC switch OFF and then ON to clear the error message.

To troubleshoot an ERROR 3 condition, complete the flowchart contained in Figure 4-16, Error 1 Troubleshooting Flowchart.

ERROR 11: GENTRON MISFIRE

This error message indicates that the SCR module has failed to conduct the applied AC signal while its SCR gates were enabled.



Note: Toggle the main AC switch OFF and then ON to clear the error message.

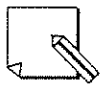
Corrective maintenance consists of replacing the SCR module. Refer to *Chapter 5, Removal & Replacement.*

ERROR 50: OVERSPEED

This error message indicates a problem with the speed control circuitry. It can occur if the treadmill attempts to increase or decrease speed beyond the set or programmed speed by a margin of +/– 1 MPH.

Possible causes of this error message are listed below:

- faulty cable connections
- source AC line spikes or brownouts
- faulty SCR module
- faulty main drive motor (DC) brushes, brush holders or brush caps
- excessive friction between the running belt and its deck
- faulty DC filter capacitor
- dirty or improperly adjusted speed sensor
- faulty lower circuit board



Note: Toggle the main AC switch OFF and then ON to clear the error message.

To troubleshoot an ERROR 50 condition, complete the flowchart contained in Figure 4-19, Error 50 Troubleshooting Flowchart.

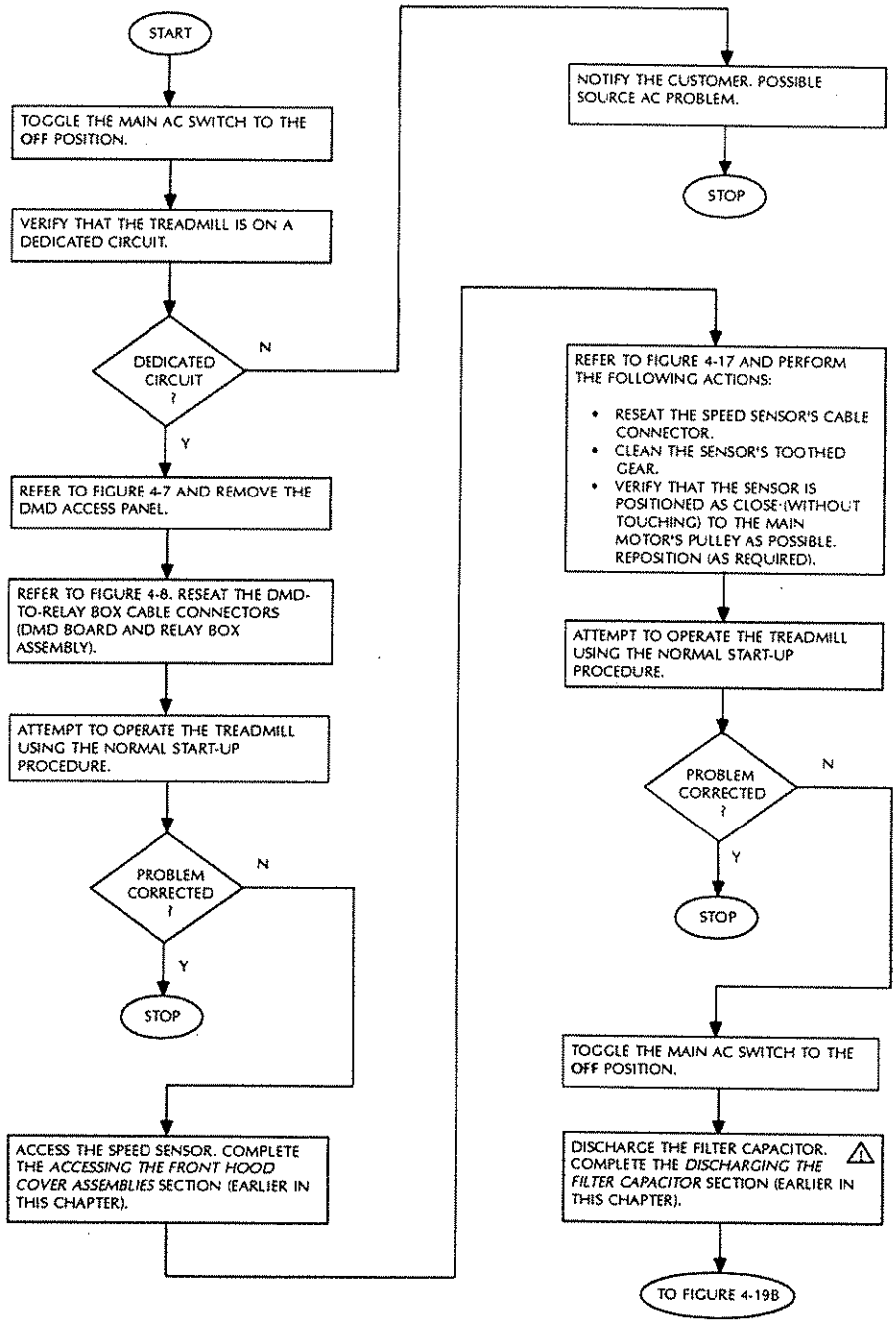


Figure 4-19A: Error 50 Troubleshooting Flowchart

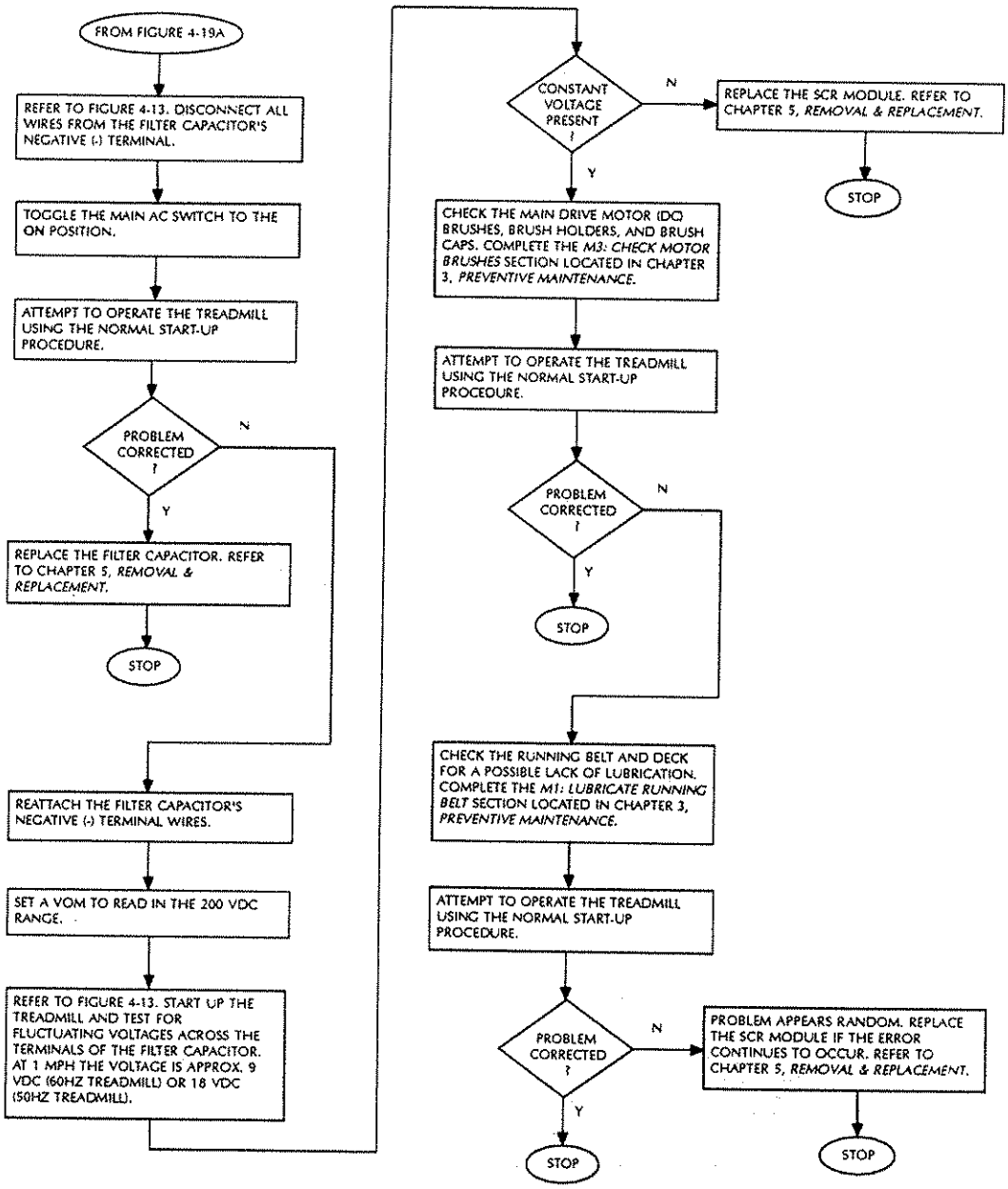


Figure 4-19B: Error 50 Troubleshooting Flowchart (Cont.)

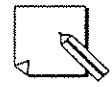
ERROR 70: LOSS OF NVRAM INFORMATION

This error message indicates that the historical performance information previously stored in Non-Volatile Random Access Memory (NVRAM), physically located in the EEPROM, has been erased. This could be caused by a static discharge to the EEPROM or by some other random occurrence.

The EEPROM will continue to store new NVRAM information, but lost performance data cannot be re-entered into memory.

Occasional ERROR 70 messages may appear, such as after the first power up following the installation of a new EPROM or if the treadmill has undergone a change in software versions, but corrective maintenance action is only warranted when lost data occurs without an apparent reason.

Note: Toggle the main AC switch OFF and then ON to clear the error message.



Corrective maintenance consists of replacing the affected EPROM. Refer to *Chapter 5, Removal & Replacement.*

Troubleshooting Miscellaneous Problems

To troubleshoot a miscellaneous problem, refer to its list of causes and complete all corrective maintenance instructions provided.

Running Belt

Possible causes of a running belt problem are listed below:

- symptoms associated with an ERROR 1 condition
- incorrect Poly "V" belt tension and/or damage
- faulty main drive motor (DC) brushes, brush holders or brush caps
- incorrect running belt tension and/or damage
- excessive friction between the running belt and its deck
- faulty front and/or rear roller assemblies
- faulty DC filter capacitor
- faulty speed sensor
- faulty SCR module

To troubleshoot problems involving the running belt, complete the flowchart contained in Figure 4-20, Running Belt Troubleshooting Flowchart.

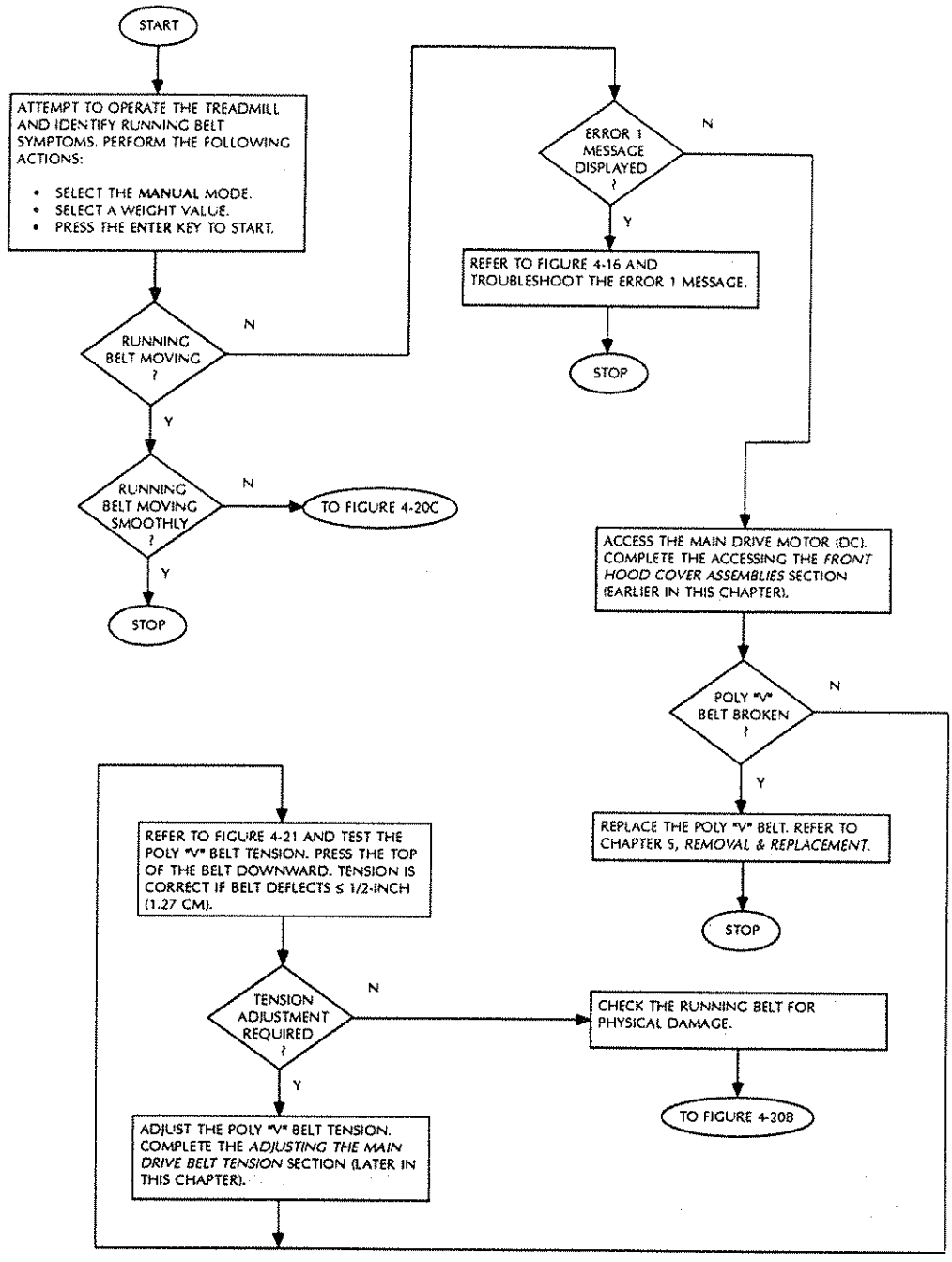


Figure 4-20A: Running Belt Troubleshooting Flowchart

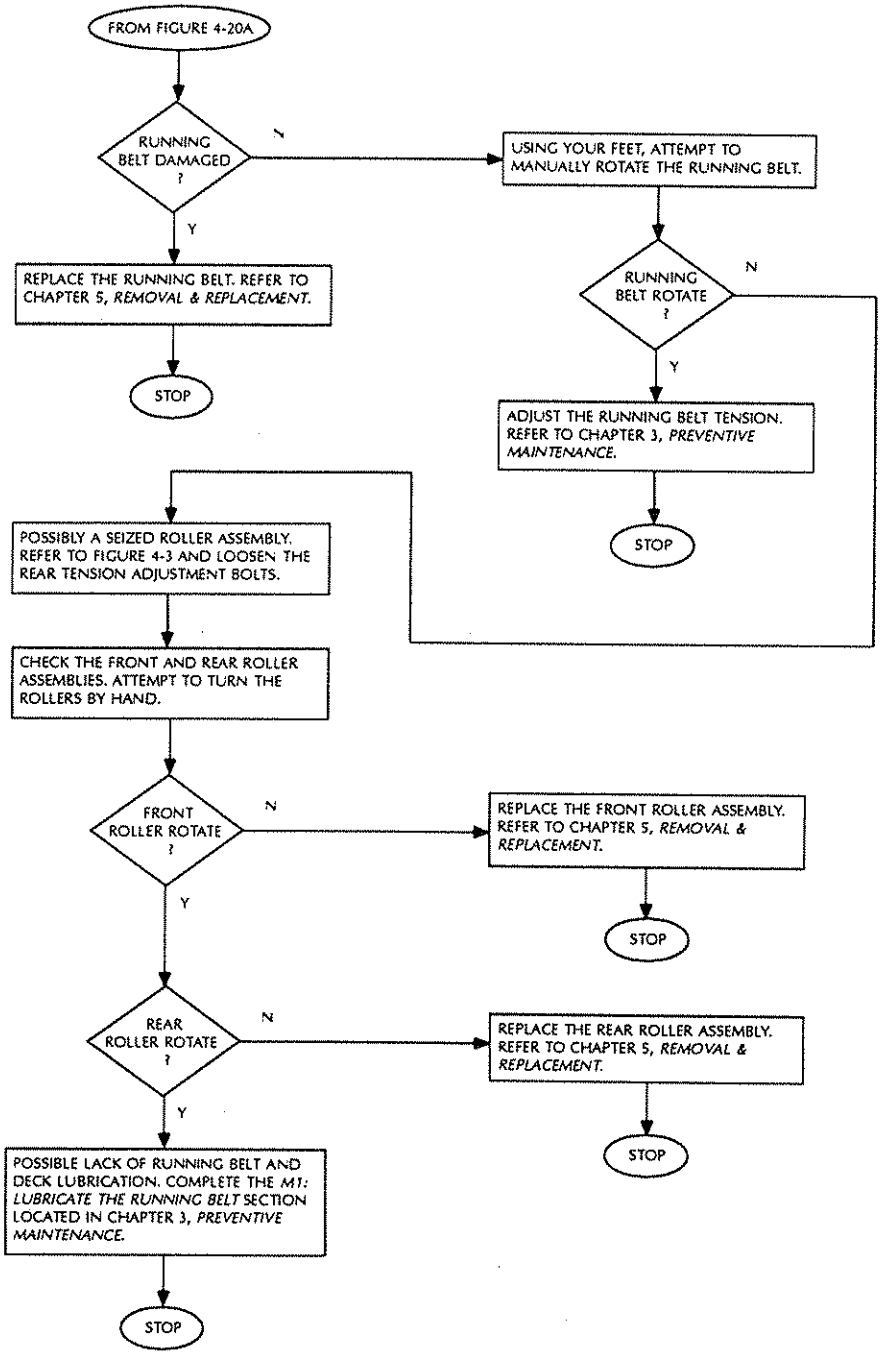


Figure 4-20B: Running Belt Troubleshooting Flowchart (Cont.)

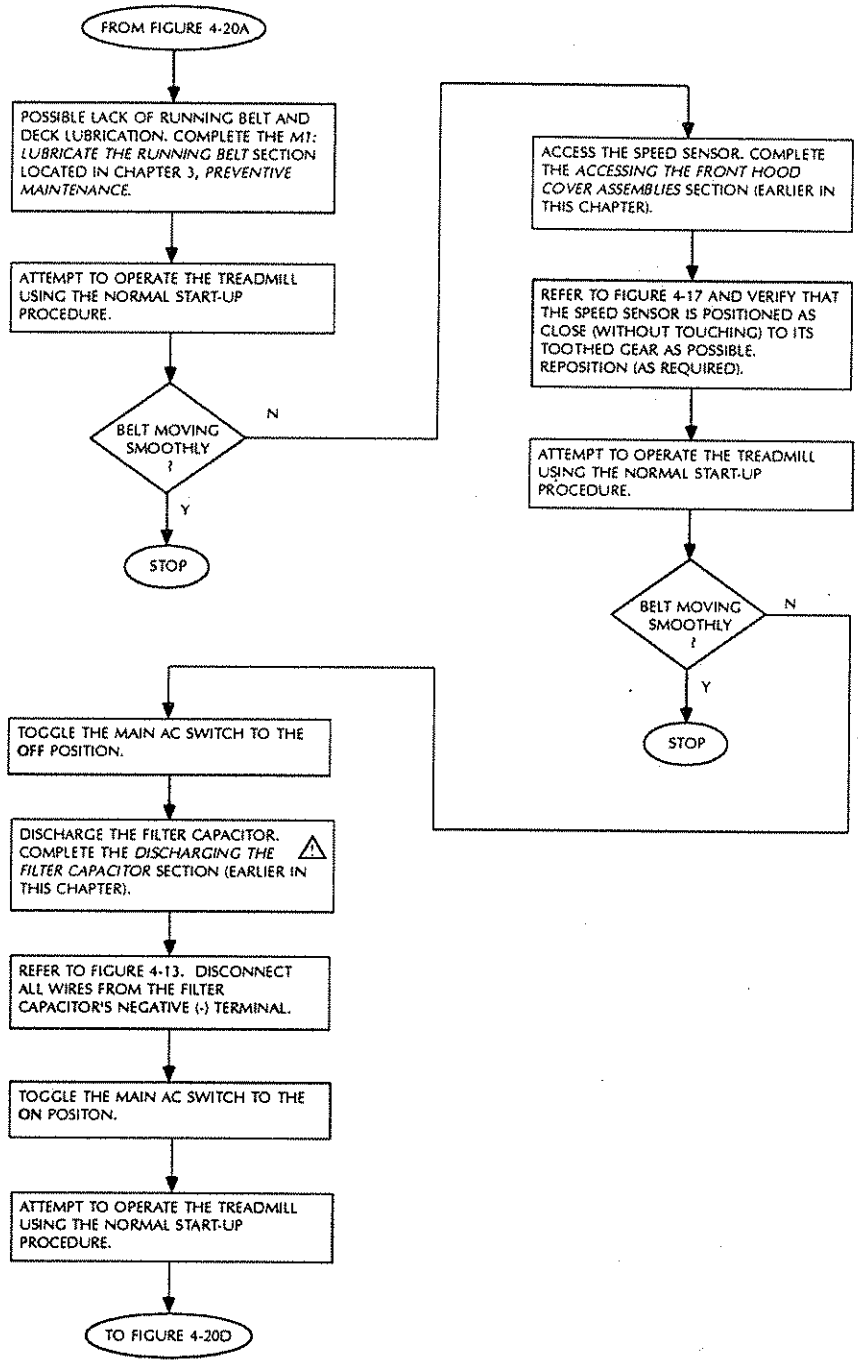


Figure 4-20C: Running Belt Troubleshooting Flowchart (Cont.)

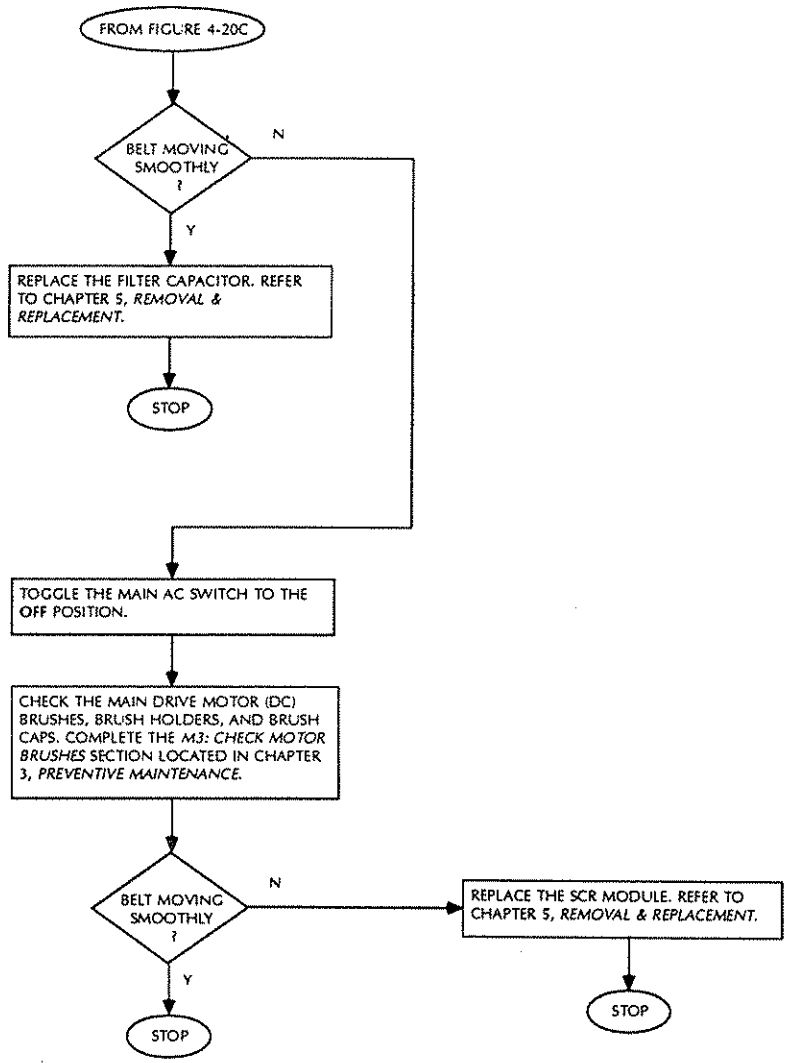


Figure 4-20D: Running Belt Troubleshooting Flowchart (Cont.)

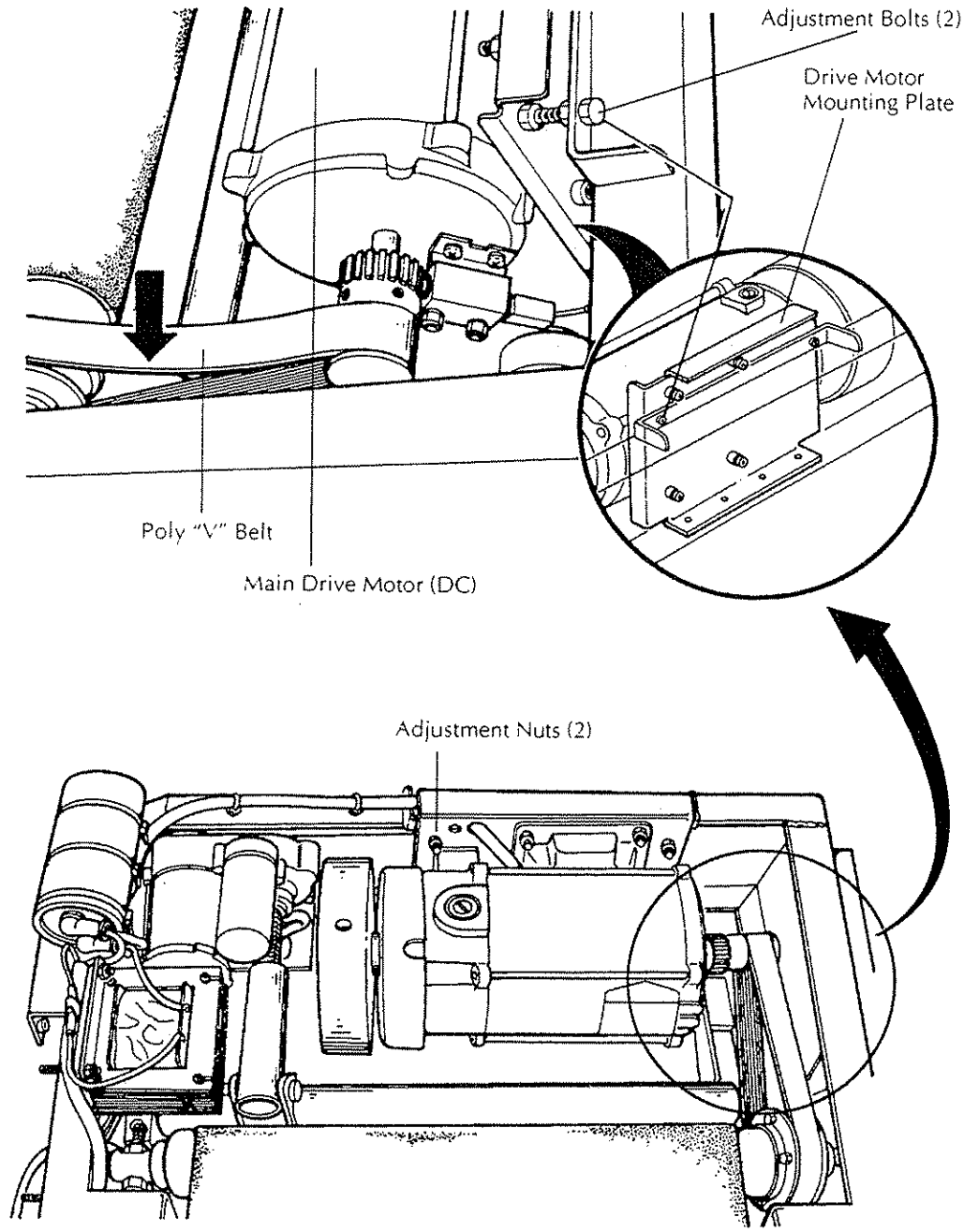


Figure 4-21: Main Drive Motor (DC) and Poly "V" Belt

Adjusting the main drive belt tension - The main drive belt (Poly "V") will occasionally loosen due to mechanical vibrations and/or belt stretching. A loose belt can cause the running belt to slip or stop, and cause pulleys on the main drive motor (DC) and the front roller assembly to prematurely wear.

To adjust the main belt's tension, complete the following:

1. Toggle the main AC power switch to the OFF position.
2. Remove the front hood cover. Refer to Figure 4-3 and complete the following:
   a. Remove the cover's four Button-head screws.
   b. Lift the cover off the front roller and main drive motor assemblies. Set the cover aside.
3. Loosen the adjusting nut that secures each end of the two adjustment bolts. These bolts are located on the upper portion of the drive motor mounting plate. See Figure 4-21.
4. Turn each of the two adjustment bolts a quarter-turn clockwise. See Figure 4-21.
5. Press down on the top of the Poly "V" belt and test its tension.

   If the belt depresses more than 1/2-inch (1.27 cm), then repeat Step 4. Loosen the nuts securing each of the two adjustment bolts as required.

   If the belt depresses 1/4-inch (.635 cm) - 1/2-inch (1.27 cm), then continue the procedure with Step 6.

CAUTION: Do not overtighten the main drive belt. Over-tightening can cause excessive pressure on the front roller bearings and the main drive motor shaft.

6. Tighten the nuts securing each of the two adjustment bolts. See Figure 4-21.
7. Install the front hood cover. Refer to Figure 4-3 and complete the following:
   a. Place the front hood cover into its operating position.
   b. Secure the cover using the four Button-head screws.
8. Toggle the main AC power switch to the ON position.

This completes the procedure for adjusting the Poly "V" belt tension.

Display

Possible causes of a display problem are listed below:

- faulty DMD-to-relay box cable connections
- low voltage to display
- faulty membrane panel
- faulty DMD LED blocks
- faulty upper circuit board (DMD)

To troubleshoot problems involving the display, complete the flowchart contained in Figure 4-22, Display Troubleshooting Flowchart.

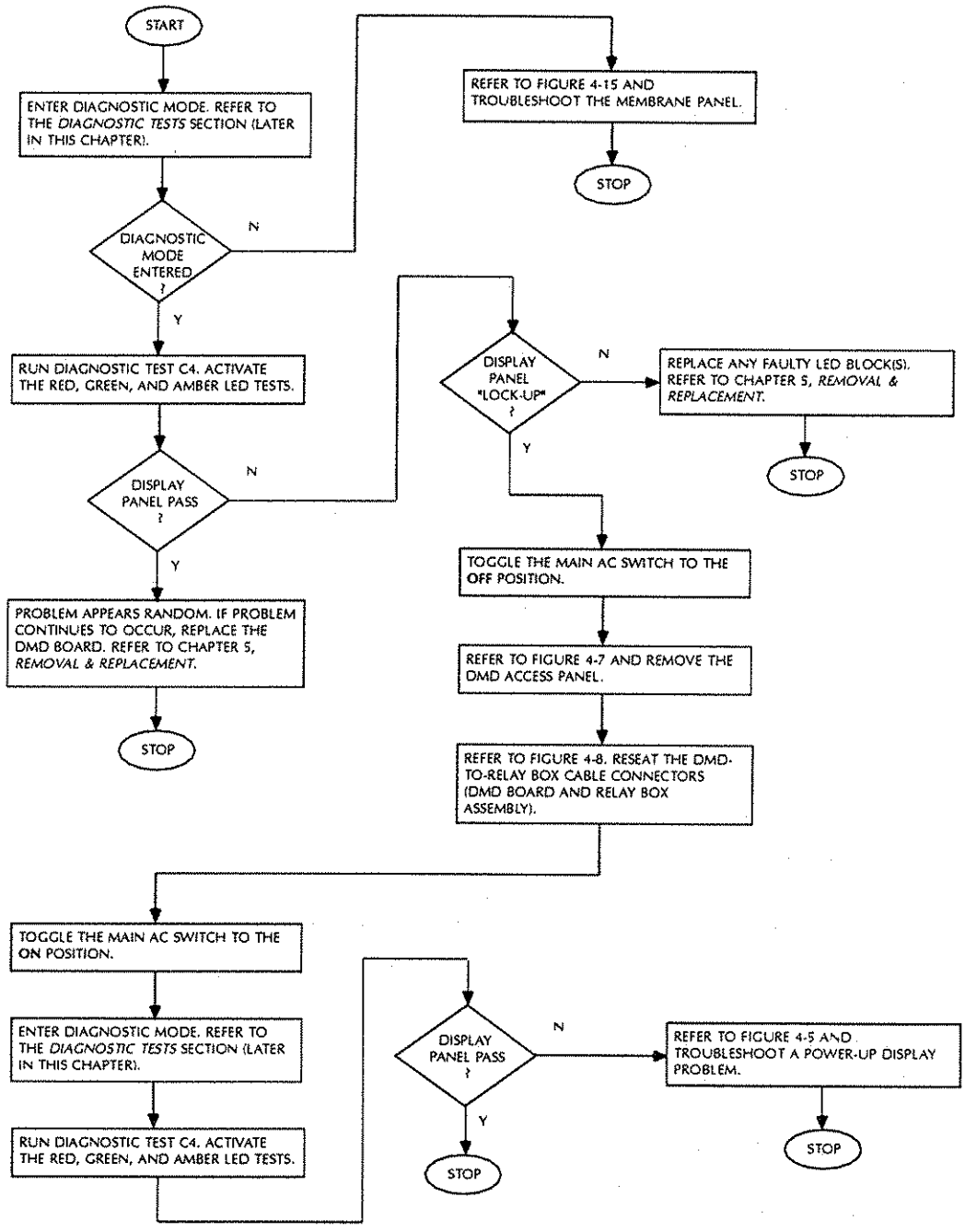


Figure 4-22: Display Troubleshooting Flowchart

Elevation

Possible causes of an elevation problem are listed below:

- faulty calibration
- faulty membrane panel
- faulty upper circuit board (DMD)
- faulty lower circuit board
- faulty elevation motor (AC)
- faulty cable connections

To troubleshoot problems involving elevation, complete the flowchart contained in Figure 4-23, Elevation Troubleshooting Flowchart.

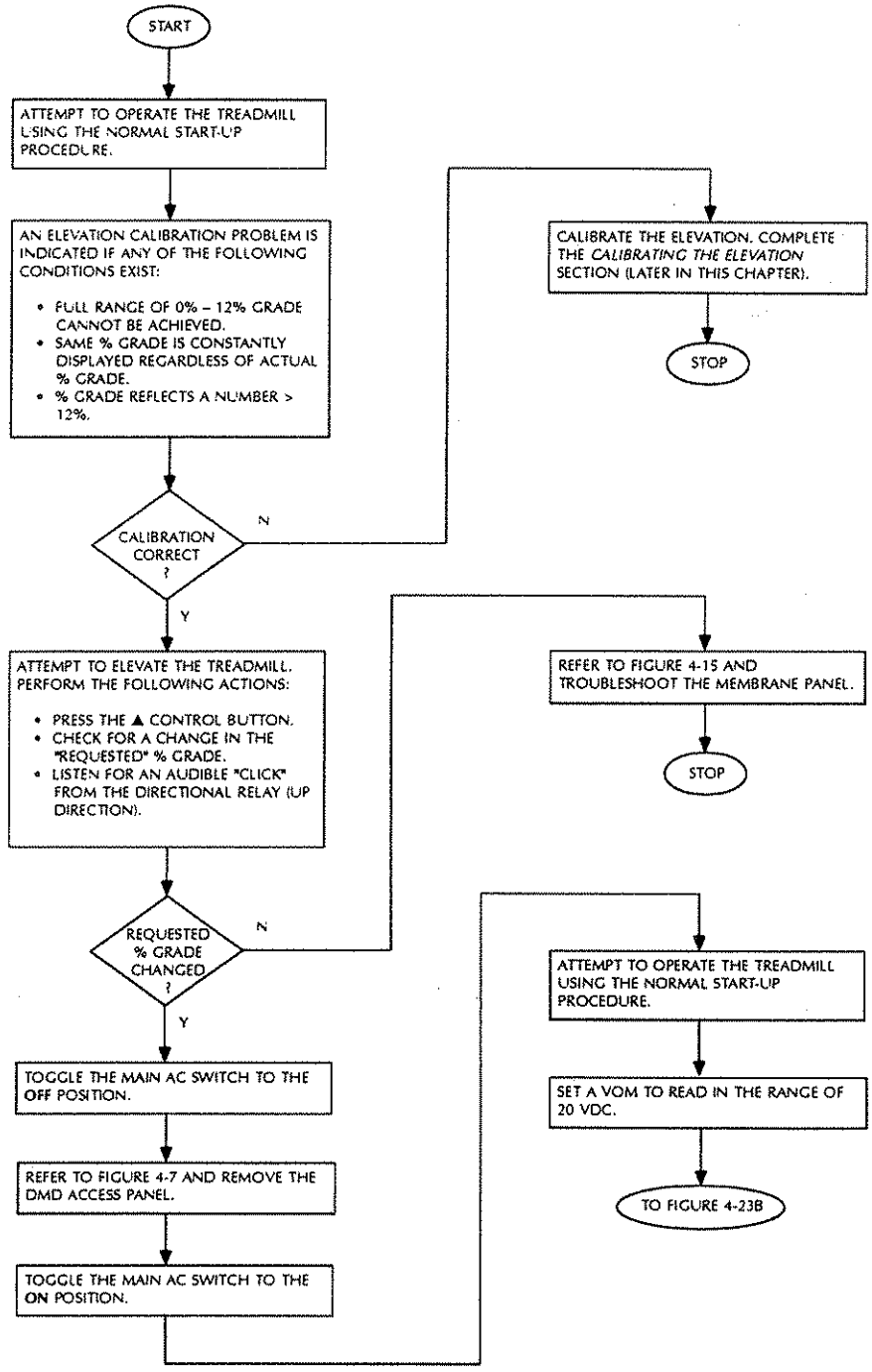


Figure 4-23A: Elevation Troubleshooting Flowchart

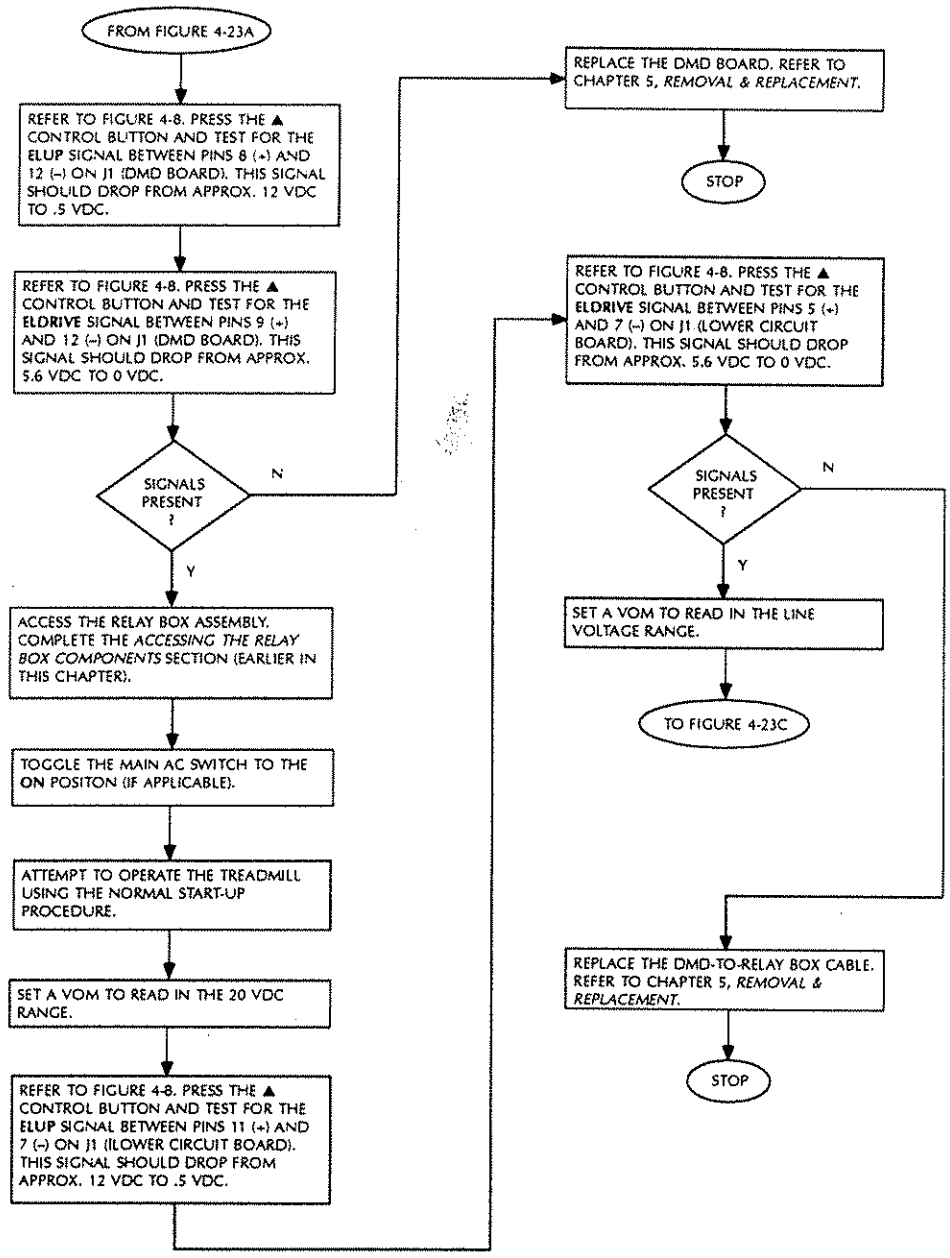


Figure 4-23B: Elevation Troubleshooting Flowchart (Cont.)

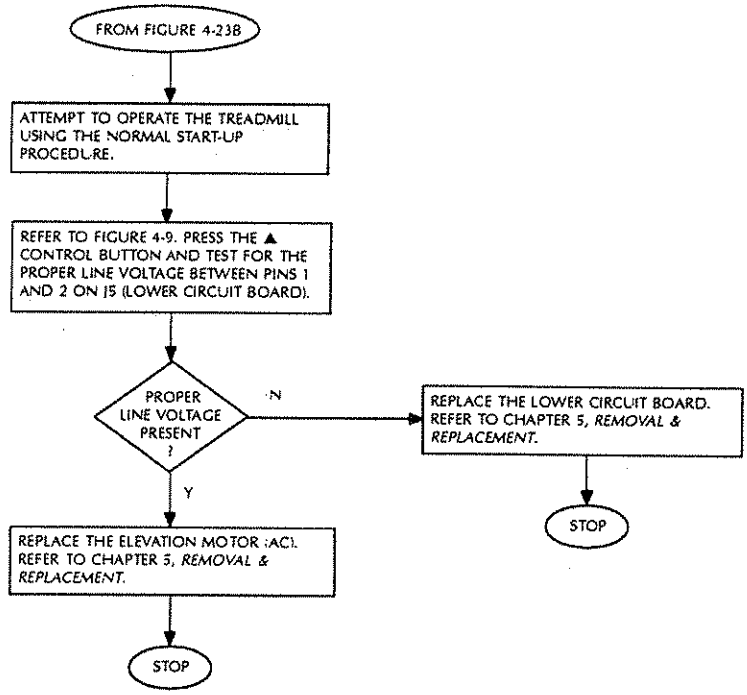


Figure 4-23C: Elevation Troubleshooting Flowchart (Cont.)

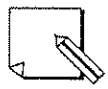
Calibrating the elevation - To calibrate the Model 525 treadmill's elevation, complete the following:

1. Toggle the main AC power switch to the ON position.

Note: To ensure a more accurate calibration, stand on the treadmill's non-skid foot pads while performing each of the following steps. See Figure 4-3.

2. Place the treadmill in calibration mode by simultaneously pressing the **ENTER • SCAN** and the **STOP** control buttons. Continue to press these buttons (approximately 5 – 10 seconds) until a number is displayed.

*Note: If, while holding down the two control buttons, the message, "***SELECT MODE: MANUAL ▲ PROGRAM ▼** *" is displayed, press* **STOP** *and repeat Step 2.*



3. Establish a 0% minimum grade reference point by completing the following:
   a. Press the ▼ control button until the elevation motor is stopped by the activation of its lower-limit switch.
   b. Press the ▲ control button and then quickly release it after the elevation motor begins to start. This action deactivates the lower-limit switch and allows the treadmill's software to control lower elevation.
   c. Check the clearance between the elevation wheels and the floor. Repeat Step 3b (as required) until this clearance is approximately 1/16-inch (0.15875 cm). See Figure 4-24.
4. Press and hold the **ENTER • SCAN** control button. While holding in this button, press the ▼ control button until a 0 (zero) is displayed.
5. Establish a 12% grade reference point. Refer to Figure 4-24 and complete the following:
   a. Press the ▲ control button until the elevation motor is stopped by the activation of its upper-limit switch.
   b. Press the ▼ control button and then quickly release it after the elevation motor begins to start. This action deactivates the upper-limit switch and allows the treadmill's software to control upper elevation.
6. Press and hold the **ENTER • SCAN** control button. While holding in this button, press the ▲ control button until a 12 (twelve) is displayed.

7. Verify that the treadmill has been properly calibrated by completing the following:
   a. Lower the treadmill's elevation to 11% grade by pressing the ▼ control button.
   b. Raise the treadmill's elevation to 12% grade by pressing the ▲ control button. Ensure that when the treadmill stops that the display reads 12% grade. If this value is not displayed, power-down the treadmill and repeat Steps 1 through 7.
   c. Lower the treadmill's elevation to 0% grade by pressing the t control button. If the 0% grade value is not displayed, power-down the treadmill and repeat Steps 1 through 7.
8. Exit calibration mode by pressing the **STOP** control button.

This completes the procedure for calibrating the elevation.

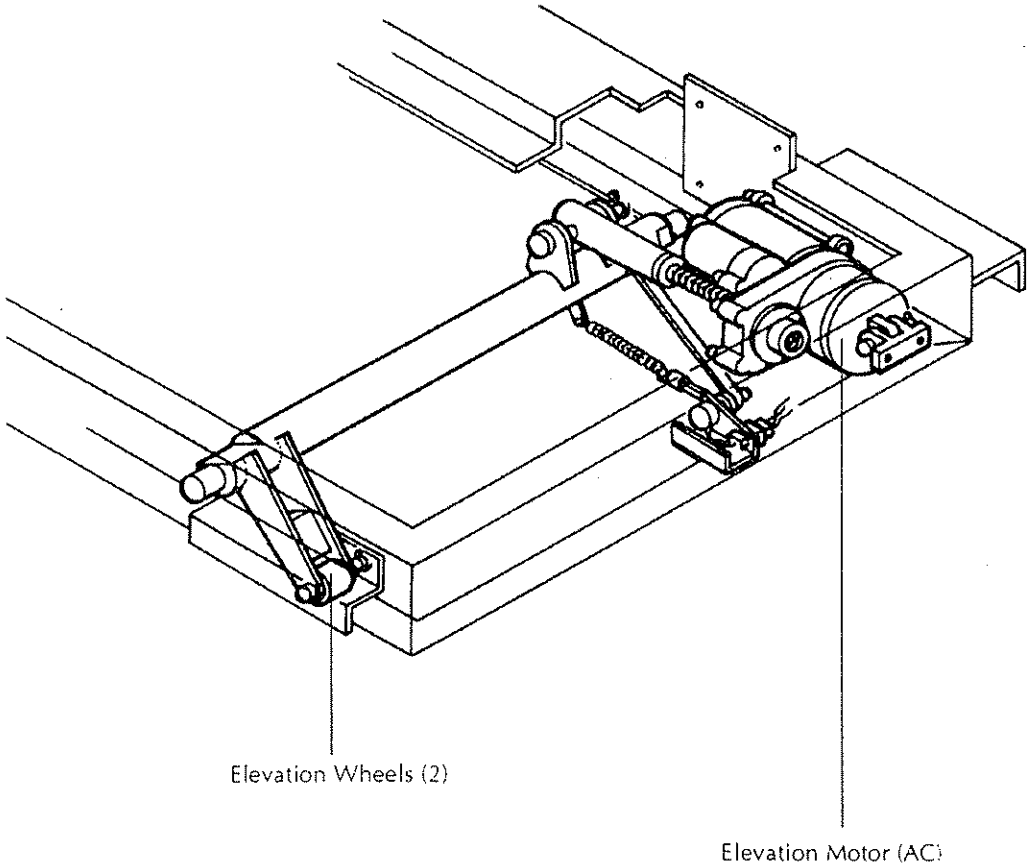


Figure 4-24: Elevation Assembly

Diagnostic Tests

Diagnostic tests are pre-programmed routines. These routines are invoked through the display console, and test or provide data on the various treadmill subsystems.

Diagnostic tests available on the Model 525 are listed below:

C1: PROGRAM REVISION LEVEL
C2: ACTUAL SPEED
C3: CURRENT DRAW
C4: LED TEST
C5: OVERLAY TEST
C6: RS232 PORT CHECK
C7: TONE GENERATOR CHECK
C8: SPEED SENSOR COUNT
C9: INCLINE VOLTAGE
C10: TOTAL MILEAGE
C11: TOTAL HOURS
C12: ERROR LOG
C13: NUMBER OF STARTS
C14: PROGRAM LOCKOUT
C15: LANGUAGE
EXIT

To enter the diagnostic mode, simultaneously press the **SAVE** and ▲ control buttons. The message "DIAGNOSTIC TESTS... PRESS ▲ OR ▼ TO SELECT" should appear.

The message scrolls across the display from right to left, repeating every three seconds. This display sequence continues until either the ▲ or the ▼ control button is pressed. If neither of these control buttons is pressed within five minutes, the display will turn off.

Pressing the ▲ control button displays the first diagnostic test menu choice:

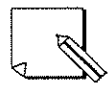
"C1...PROGRAM REVISION LEVEL."

To scroll through the diagnostic menu choices in sequential order, repeatedly press the ▲ control button. To scroll through the menu choices in reverse order, press the ▼ control button.

Pressing the **ENTER** control button, while a diagnostic test menu choice is displayed, activates that selected test.

To exit the diagnostic test mode, first return to the diagnostic menu by pressing the **ENTER** control button and then press either the ▲ or ▼ control button until the message, **"EXIT... PRESS ENTER"** is displayed. Pressing the **ENTER** control button, while the exit message is displayed, exits the diagnostic test mode and returns the treadmill to its previous state.

Pressing the **STOP** control button at anytime causes the treadmill's running belt to stop (if applicable), and the microprocessor to exit the diagnostic mode and enter the pause mode.



Note: If you were in the middle of a program before entering the diagnostic test mode, you will be returned to the exact spot in the program where you left off. The speed, elevation, and time will all return to where they were before you entered the diagnostic test mode. You will not lose any of the accumulated program information and the elapsed time will not have changed.

Each of the diagnostic tests are discussed in the following paragraphs.

C1: PROGRAM REVISION LEVEL

This test displays microprocessor configuration information. Displayed configuration information consists of the treadmill's model number (for which the microprocessor is intended), followed by the revision level of the main program. An example of this readout is below:

525 10 MPH 12% r1.52

The display panel will output C1 test results until you press **ENTER** which returns the display to the diagnostic menu choices.

C2: ACTUAL SPEED

This test displays the actual speed of the main drive motor (DC) in Miles Per Hour (MPH) or Kilometers Per Hour (KMH) in hundredths. An example of this readout is below:

5.02 MPH

The C2 test can be used in determining whether the Model 525 is able to maintain a requested "set" speed.

For example, increasing the set speed at the control panel should cause the actual speed to equally increase.

The display panel will output C2 test results until you press **ENTER** which returns the display to the diagnostic menu choices.

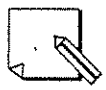
C3: CURRENT DRAW

This test displays the current amperes being drawn by the treadmill. An example of this readout is below:

4 AMP

The C3 test may be used to determine if, in response to requests for speed or elevation changes, the main drive motor's current draw is satisfactory.

For example, whenever the treadmill's "set" speed is raised or lowered, a corresponding increase or decrease in current draw should be observed.



Note: Current draw may momentarily appear higher or lower while the system attempts to match set speed or elevation (based on running load). Once set speed has been achieved, current values will level.

The display panel will output C3 test results until you press **ENTER** which returns the display to the diagnostic menu choices.

C4: LED TEST

This test allows the operator to illuminate each column of dot matrix block LEDs on the display panel independently, in both the red and green frequency. The center four rows of dot matrix LEDs can also be illuminated in amber. The C4 test may be used to locate faulty LEDs.

Upon entering this test, each vertical column, in turn, is illuminated in the red frequency, moving from left to right. These same columns illuminate in the green frequency when they return, moving from right to left. To test the four center rows in the amber frequency, which will act as a test for adequate voltage supply to the DMD board, press a combination of the + or – control button and the ▲ or ▼ control button. Failure of this test normally indicates a faulty DMD-to-relay box assembly cable connection.

Faulty individual or block LEDs can be easily identified running the C4 test.

The display panel will output C4 test results until you press **ENTER** which returns the display to the diagnostic menu choices.

C5: OVERLAY TEST

This test generates a tone signal whenever a control button is pressed. The test helps to isolate a defective control button.

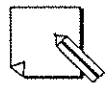
To begin the test, the control button **ENTER** is pressed. After the message **"START"** is displayed, pressing any control button will cause a tone to be generated, provided that the key is functioning properly.

The overlay test will continue until the **ENTER** button is pressed a second time. Pressing the button a second time causes a tone to be generated and the display to be returned to the diagnostic menu choices.

C6: RS232 PORT CHECK

This test checks the RS232 port, located at the rear of the display panel console. Displayed test results are limited to **"OK"** or **"FAILED."**

To conduct this test properly, the RS232 test wire fixture must be plugged into the connector at the back of the console. Without the wire fixture in place, test results always indicate (display) **"FAILED."**



Note: Test wire fixtures are not currently available for the Model 525 treadmill.

The display panel will output C6 test results until you press **ENTER** which returns the display to the diagnostic menu choices.

C7: TONE GENERATOR CHECK

This test checks the tone generator located on the upper circuit board (DMD).

To begin the test, the control button **ENTER** is pressed. After the message **"START"** is displayed, the system generates seven electrical signals. These signals are sent to the tone generator which should produce seven tones, if functioning properly.

A faulty tone generator can be easily identified running the C7 test.

The system automatically exits the C7 test following the generation of its last test tone and returns the display to the diagnostic menu choices.

C8: SPEED SENSOR COUNT

This test displays the actual number (pulse count in Hz) of gear teeth passing the speed sensor. The toothed gear is mounted on the main drive motor shaft. The speed count should increase proportional to speed.

Examples of *approximate* speed counts for each MPH are listed below:

AT 1 MPH THE COUNT IS APPROXIMATELY 115
AT 2 MPH THE COUNT IS APPROXIMATELY 230
AT 3 MPH THE COUNT IS APPROXIMATELY 345
AT 4 MPH THE COUNT IS APPROXIMATELY 460
AT 5 MPH THE COUNT IS APPROXIMATELY 575
AT 6 MPH THE COUNT IS APPROXIMATELY 690
AT 7 MPH THE COUNT IS APPROXIMATELY 805
AT 8 MPH THE COUNT IS APPROXIMATELY 920
AT 9 MPH THE COUNT IS APPROXIMATELY 1035
AT 10 MPH THE COUNT IS APPROXIMATELY 1150

The display panel will output C8 test results until you press **ENTER** which returns the display to the diagnostic menu choices.

C9: INCLINE VOLTAGE

This test displays the actual output DC voltage from the elevation potentiometer. The voltage should increase proportional to an increase in elevation grade.

Examples of *approximate* voltage values for each % grade are listed below:

AT 0% GRADE, THE VOLTAGE IS APPROXIMATELY 0.1 VDC
AT 1% GRADE, THE VOLTAGE IS APPROXIMATELY 0.4 VDC
AT 2% GRADE, THE VOLTAGE IS APPROXIMATELY 0.8 VDC
AT 3% GRADE, THE VOLTAGE IS APPROXIMATELY 1.2 VDC
AT 4% GRADE, THE VOLTAGE IS APPROXIMATELY 1.6 VDC
AT 5% GRADE, THE VOLTAGE IS APPROXIMATELY 2.0 VDC
AT 6% GRADE, THE VOLTAGE IS APPROXIMATELY 2.3 VDC
AT 7% GRADE, THE VOLTAGE IS APPROXIMATELY 2.7 VDC
AT 8% GRADE, THE VOLTAGE IS APPROXIMATELY 3.1 VDC
AT 9% GRADE, THE VOLTAGE IS APPROXIMATELY 3.5 VDC
AT 10% GRADE, THE VOLTAGE IS APPROXIMATELY 3.9 VDC
AT 11% GRADE, THE VOLTAGE IS APPROXIMATELY 4.3 VDC
AT 12% GRADE, THE VOLTAGE IS APPROXIMATELY 4.7 VDC

The display panel will output C9 test results until you press **ENTER** which returns the display to the diagnostic menu choices.

C10: TOTAL MILEAGE

This test displays the mileage accumulated, to date, on the treadmill. The value displayed is in miles regardless of mode (English or Metric).

The display panel will output C10 test results until you press **ENTER** which returns the display to the diagnostic menu choices.

C11: TOTAL HOURS

This test displays the number of hours accumulated, to date, on the treadmill.

The display panel will output C11 test results until you press **ENTER** which returns the display to the diagnostic menu choices.

C12: ERROR LOG

This test allows you to review the last five error messages the treadmill has experienced. Pressing + or – scrolls through the stored error messages.

The display panel will output C12 test results until you press **ENTER** which returns the display to the diagnostic menu choices.

C13: NUMBER OF STARTS

This test logs and displays the number of treadmill startups. The C13 test can be reset to zero by pressing the + or – control button.

The display panel will output C13 test results until you press **ENTER** which returns the display to the diagnostic menu choices.

C14: PROGRAM LOCKOUT

This program, when activated, limits the total time allowed per workout session. The total time limit can be set in five minute increments up to a maximum of 95 minutes.

Note: Selecting a time limit deactivates the program mode of operation.

If the display panel indicates "**OFF**" the lockout feature has not been activated. A display of "**ON**" indicates that the feature has been activated. To set or change a time limit, first press the ▲ control button then either the ▲ or ▼ control button to increase or decrease the existing time limit.

To deactivate the time limit and activate program mode of operation, press the ▼ control button.

The display panel will output C14 test results until you press **ENTER** which returns the display to the diagnostic menu choices.

C15: LANGUAGE

Upon entering this diagnostic mode, pressing the +, – speed control buttons allows the DMD display language readout to switch from English or Spanish or if applicable, between French and German.

5

Removal and Replacement

Introduction

The information contained in this chapter is used to provide TROTTER service personnel with the information necessary to successfully remove and replace faulty Model 525 treadmill components.

Before continuing with the *Removal & Replacement* section, review the following *Handling Precautions.*

Note: Unless noted, the 60 Hz relay box assembly has been used for illustrative purposes.

Handling Precautions

Many of the electrical components contained on the lower circuit board are susceptible to damage from a discharge of static electricity. While handling this board, use an ElectroStatic Discharge (ESD) grounding kit (if available). See Figure 5-1.

The purpose of the grounding kit is to eliminate the potential voltage (static) difference between you and the equipment. A typical kit consists of a work surface mat, coil wrist strap, and a grounding cord.

WARNING: DO NOT USE AN ESD KIT WHEN WORKING ON ELECTRICALLY LIVE EQUIPMENT, (E.G., RELAY BOX, MOTORS, POWER SUPPLIES). IT IS UNSAFE TO BE GROUNDED WHEN WORKING ON THESE DEVICES.

To install the ESD kit, refer to Figure 5-1 and complete the following steps:

1. Unfold the ESD work mat and lay it out on a smooth surface such as a desk or tabletop.
2. Attach the coil wrist strap to the work surface mat.
3. Slide the wrist strap over your hand and around your wrist. Make sure that the cloth contacts your skin directly. Tighten as required.
4. Attach the grounding cord to the work surface mat.

Note: Make sure that the equipment being grounded is turned off and has its AC power cord plugged into a grounded source outlet. This ensures a common power and chassis ground.

5. Attach the alligator clip (grounding cord) to an unpainted *metallic* surface area of the equipment chassis being grounded.

This completes the procedure for installing the ESD kit.

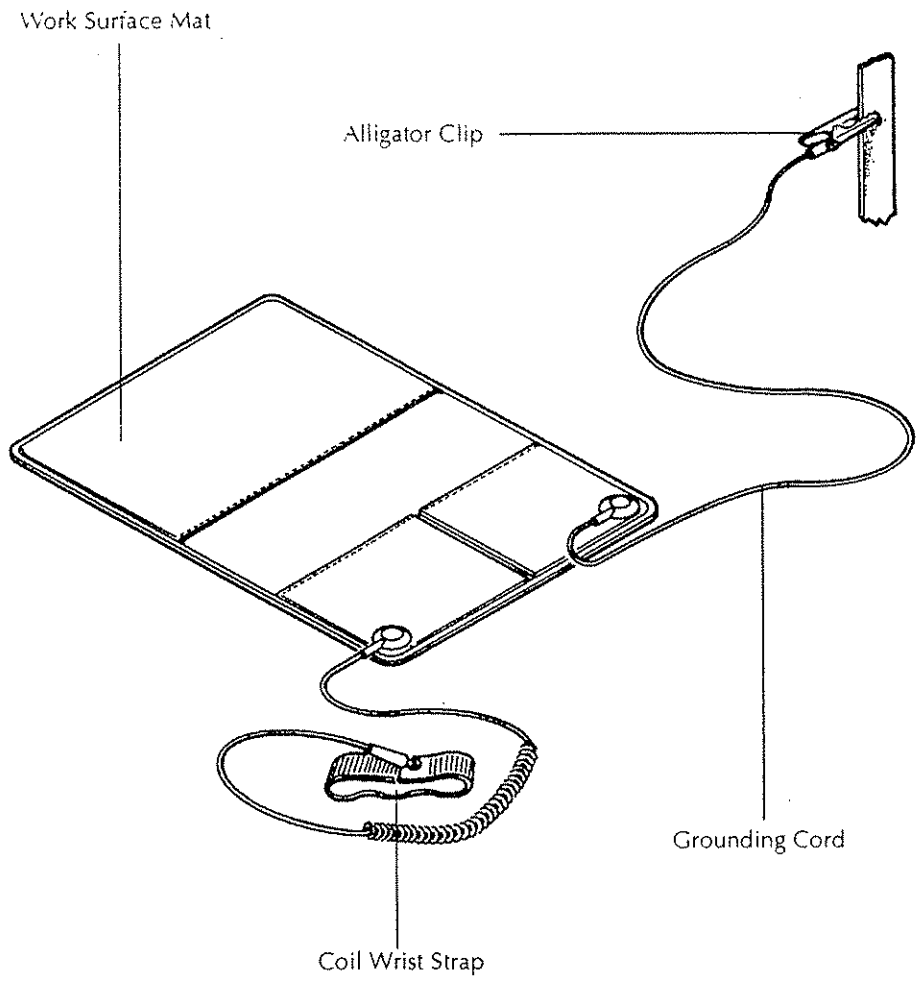


Figure 5-1: ElectroStatic Discharge Kit

Accessing the Relay Box Components

To access the relay box assembly components, complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEP 2.

2. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 5-2.
3. Support the relay box assembly with one hand. With the other hand loosen and remove the two Button-head screws securing the relay box to the treadmill's chassis. See Figure 5-2.

Note: Do not *abruptly twist the relay box assembly during the performance of Step 4. Such action may cause damage to its attached cables and cable connectors.*

4. Maneuver the relay box assembly out of the treadmill's chassis. Position the relay box as close to the treadmill as its cables will allow. See Figure 5-2.
5. Remove the five Phillips-head screws securing the two sections of the relay box assembly. See Figure 5-3.

   Separate, within cable limits, the two sections of the relay box assembly.

Note: To assemble and install the relay box assembly, reverse Steps 1 through 5.

This completes the procedure for accessing the relay box components.

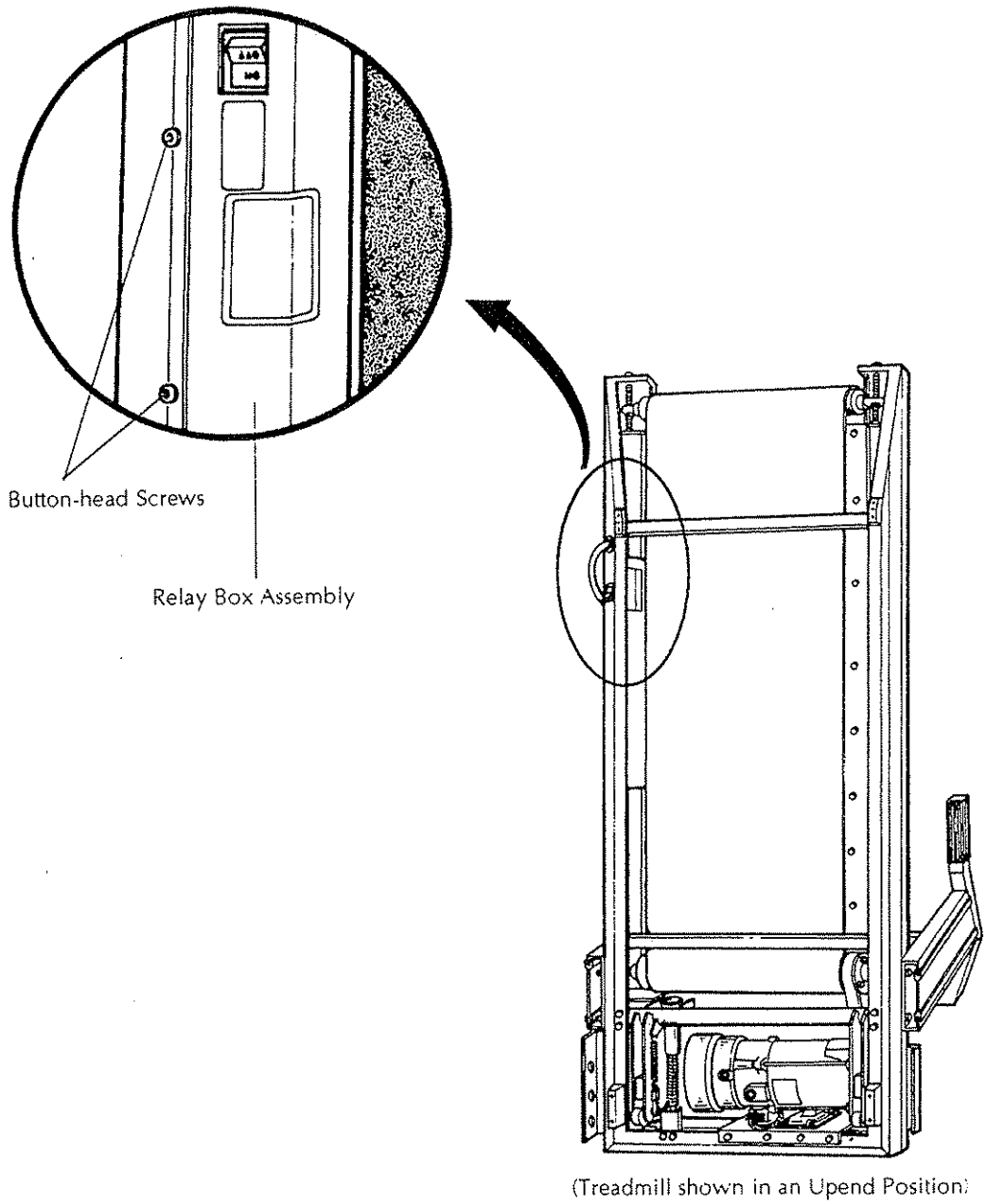


Figure 5-2: Removing the Relay Box Assembly

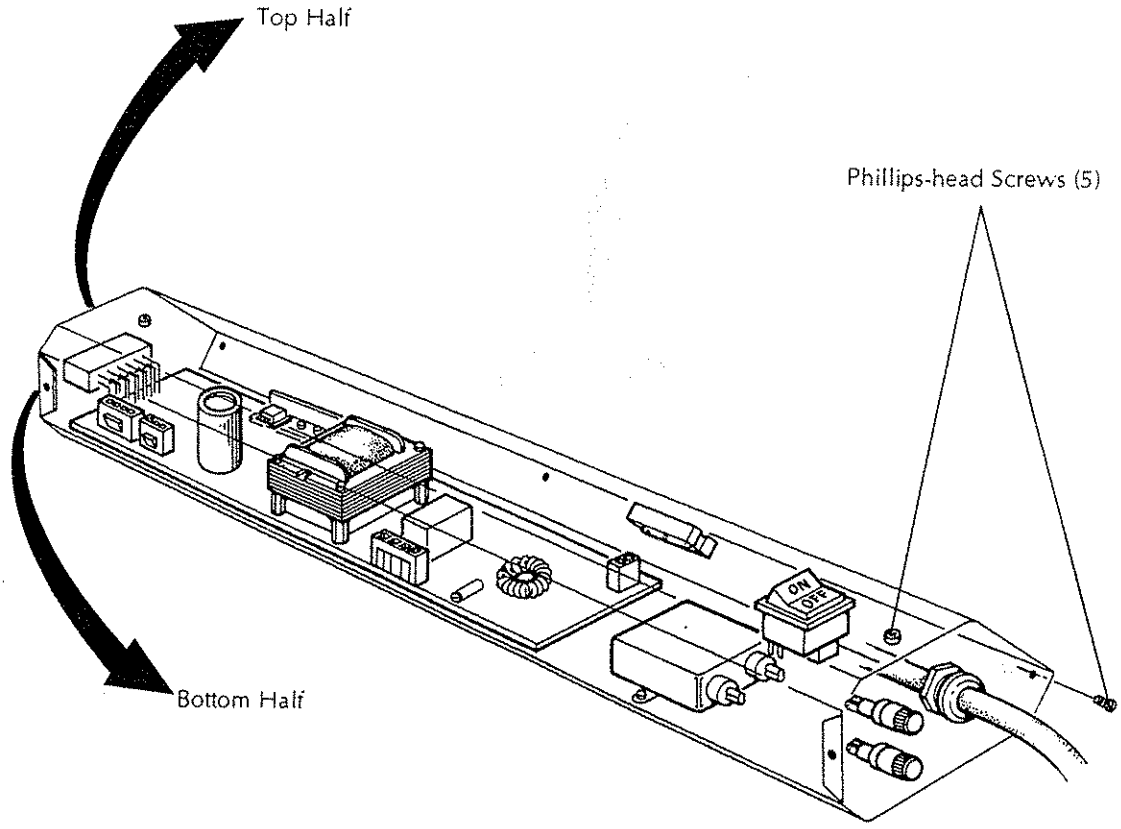


Figure 5-3: Separating the Relay Box Sections

Removal & Replacement Procedures

This section provides removal and replacement procedures for all field replaceable items associated with the Model 525 treadmill.

To replace a faulty treadmill item, refer to its removal and replacement procedure and perform all indicated steps.

Main AC Switch

To replace the main AC switch, complete the following:

1. Access the main AC switch. Complete the *Accessing the Relay Box Components* section (earlier in this chapter).
2. Label and disconnect the four wires (spade connectors) from the AC switch. See Figure 5-4.
3. Press in on the the AC switch's four retaining clips and simultaneously pull the switch free from the relay box. See Figure 5-4.
4. Install a new main AC switch. Reverse Steps 1 through 3.
5. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the main AC switch.

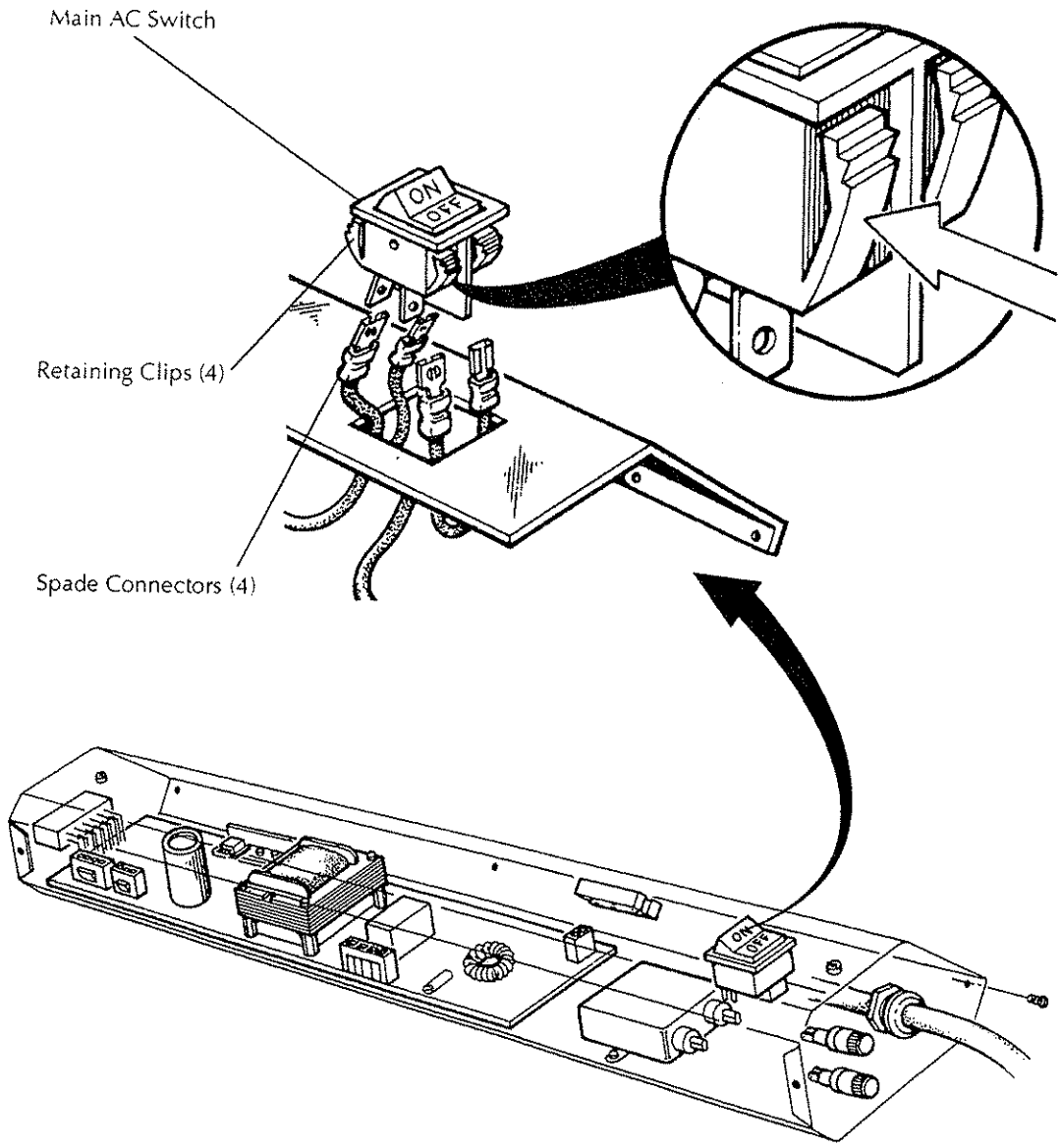


Figure 5-4: Replacing the Main AC Switch

AC Line Filter

To replace the AC line filter, complete the following:

1. Access the AC line filter. Complete the *Accessing the Relay Box Components* section (earlier in this chapter).
2. Label and disconnect the five wires (spade connectors) from the AC line filter. See Figure 5-5.
3. Remove the two Phillips-head screws securing the AC line filter to the relay box. See Figure 5-5.

The AC line filter is now free to be removed from the relay box assembly.

4. Install a new AC line filter. Reverse Steps 1 through 3.
5. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the AC line filter.

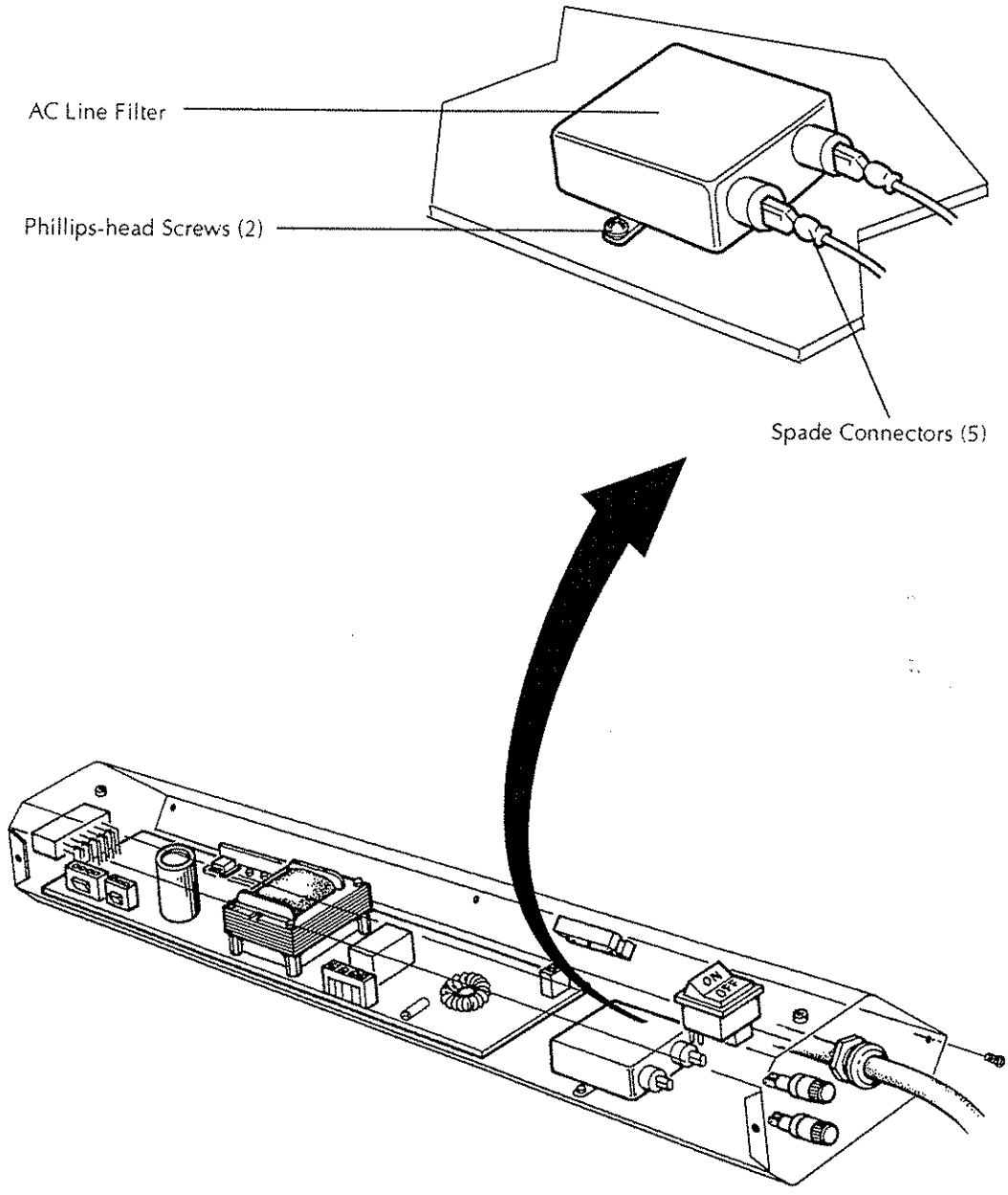


Figure 5-5: Replacing the AC Line Filter

SCR Module

To replace the SCR module, complete the following:

1. Remove the front hood cover. Refer to Figure 5-6 and complete the following:
    a. Remove the cover's four Button-head screws.
    b. Lift the cover off the front roller and main motor assembly. Set the cover aside.
2. Discharge the LC filter capacitor. Refer to Figure 5-7 and complete the following:

WARNING: THE LC FILTER CAPACITOR, ONCE CHARGED, CONTAINS A POTENTIALLY HARMFUL AMOUNT OF STORED VOLTAGE/CURRENT. USE EXTREME CAUTION WHEN DISCHARGING THIS FILTER COMPONENT. NEVER TOUCH BOTH EXPOSED TERMINALS WITH YOUR FINGERS.

    a. *Carefully* pull back each of the capacitor terminal's rubber "boots."
    b. Grip the insulated handle of a screwdriver. Using the screwdriver's metal shaft, momentarily touch the capacitor's two terminals. *Do not* touch the screwdriver's metal shaft while performing this step.
    c. Slide each rubber "boot" back over its respective terminal.
3. Access the SCR module. Complete the *Accessing the Relay Box Components* section (earlier in this chapter).
4. Label and disconnect the two gate wires (slide connectors marked BRN – and + RED) from the SCR module. See Figure 5-8.
5. Label the remaining four wires attached to the SCR module. Remove the Phillips-head screws securing these wires to the SCR module. See Figure 5-8.
6. Remove the two Phillips-head screws used to secure the SCR module to the relay box. See Figure 5-8.

The SCR module is now free to be removed from the relay box assembly.

Note: Before installing a new SCR module, ensure that the old heat sink conductive paste is thoroughly removed and that a fresh even coat is applied.

7. Apply a new coat of heat conductive paste 0.0787-inch (2 mm) thick to the metal base of the SCR module.
8. *Gently* press the SCR module against the area of the relay box it will occupy.
9. Lift the SCR module off the housing panel and examine its base. No metal should be visible and the paste should resemble a honeycomb pattern. Repeat Steps 7 and 8 as required.
10. Complete the SCR module installation by reversing Steps 1 through 6. If possible, tighten the SCR module to its housing panel to 10 inch pounds.
11. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the SCR module.

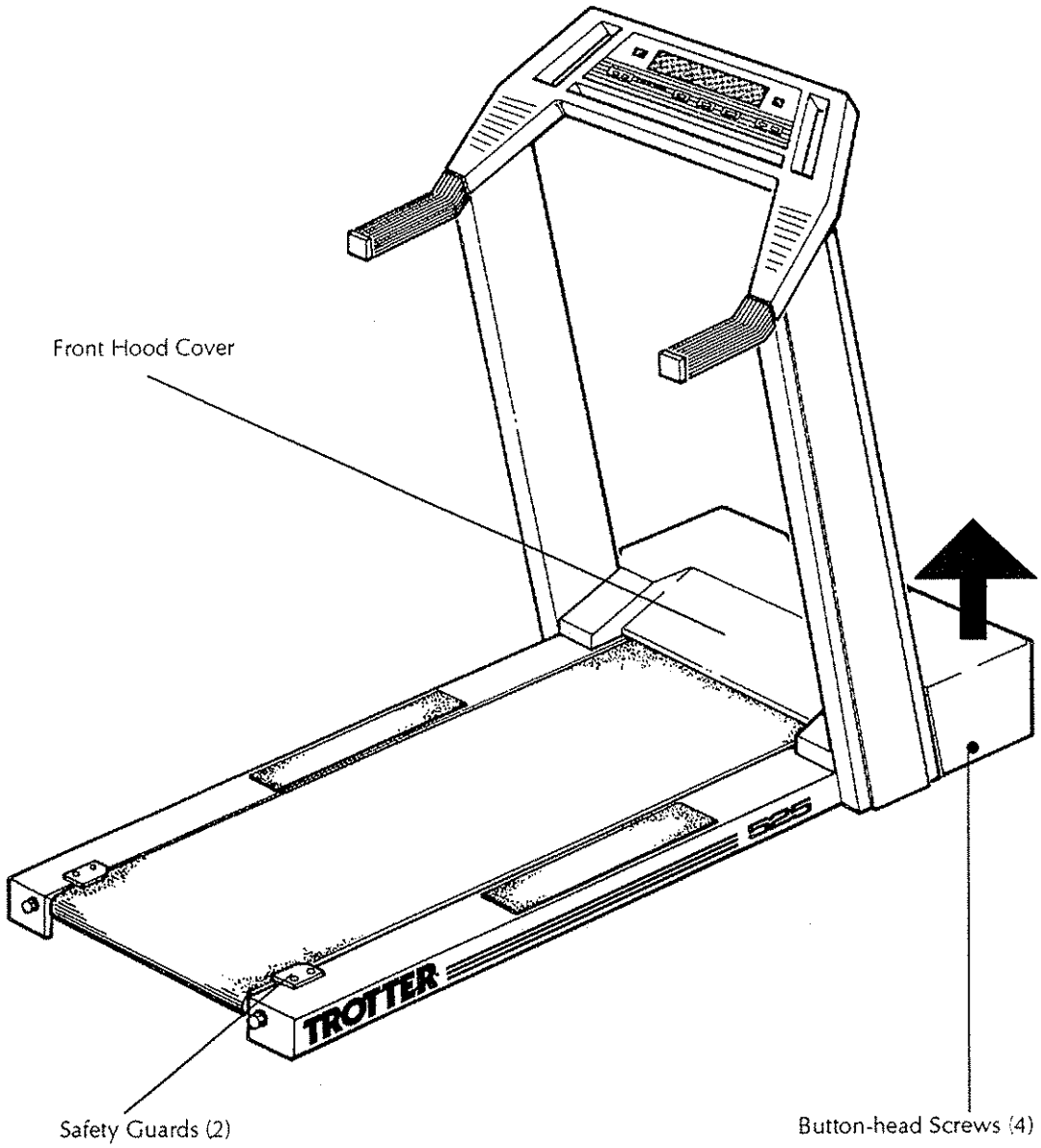


Figure 5-6: Removing/Replacing the Front Hood Cover

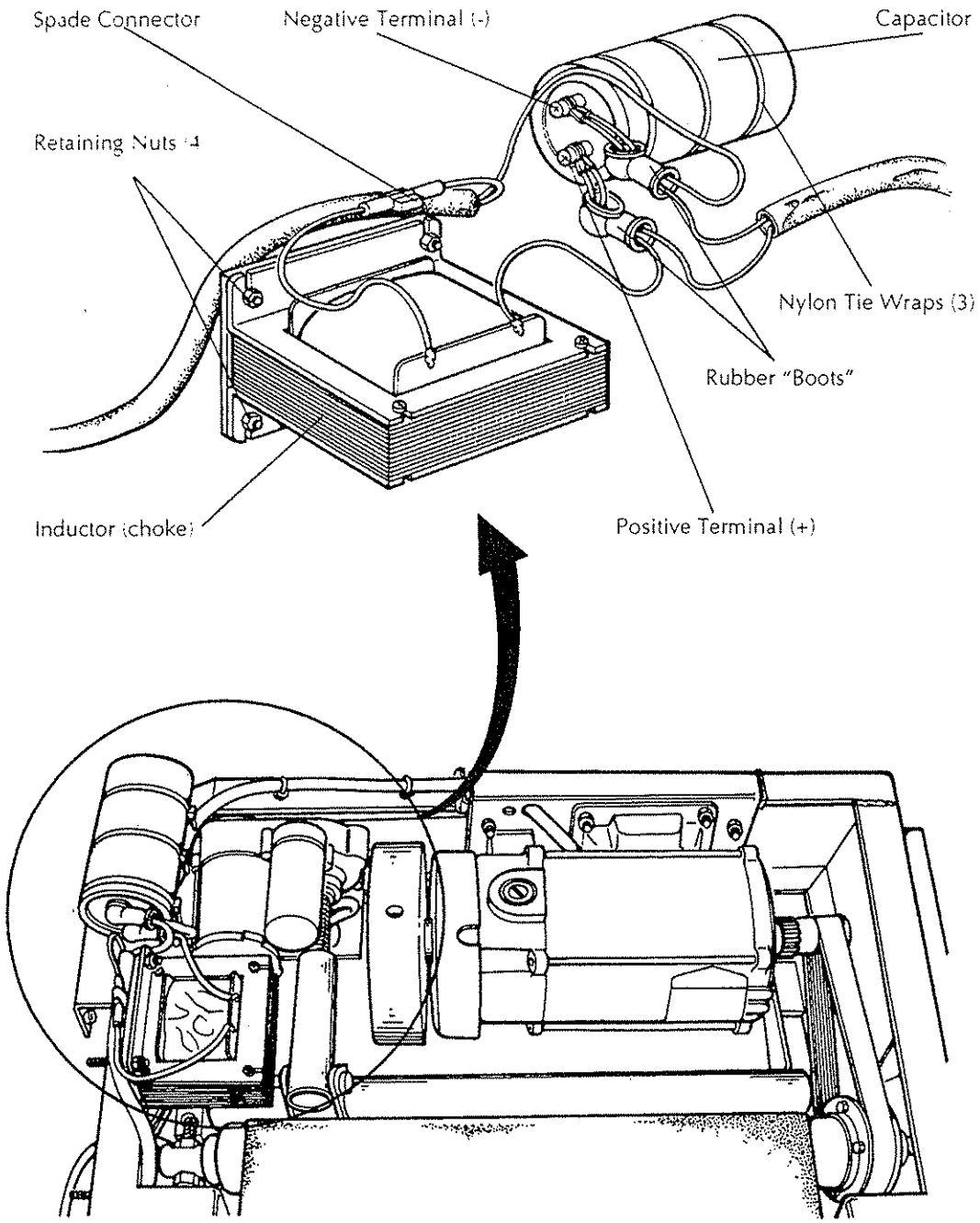


Figure 5-7: LC Filter (Inductor/Capacitor)

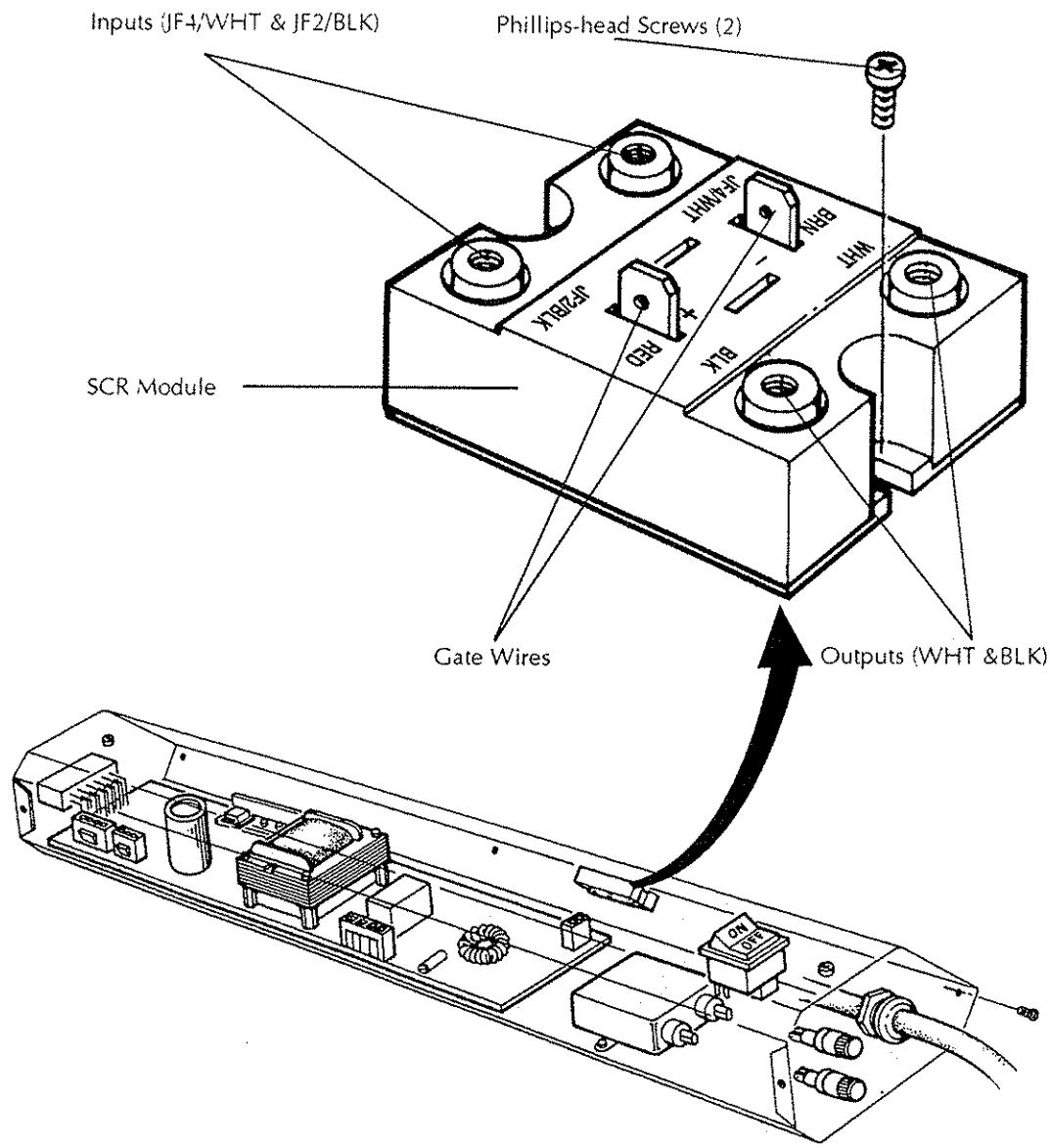


Figure 5-8: Replacing the SCR Module

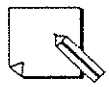
Lower Circuit Board

To replace the lower circuit board, complete the following:

1. Access the lower circuit board. Complete the *Accessing the Relay Box Components* section (earlier in this chapter).
2. Label and disconnect all cable connectors attached to the lower circuit board. See Figure 5-9.
3. Remove the seven Phillips-head screws securing the lower circuit board to stand-off posts mounted on the relay box. See Figure 5-9.

The lower circuit board is now free to be removed from the relay box assembly.

Note: Before installing a new lower circuit board, ensure that any old heat sink conductive paste is thoroughly removed from the voltage regulator (See Figure 5-9) and that a fresh, light, even coat is applied.



4. Install a new lower circuit board. Reverse Steps 1 through 3.
5. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the lower circuit board.

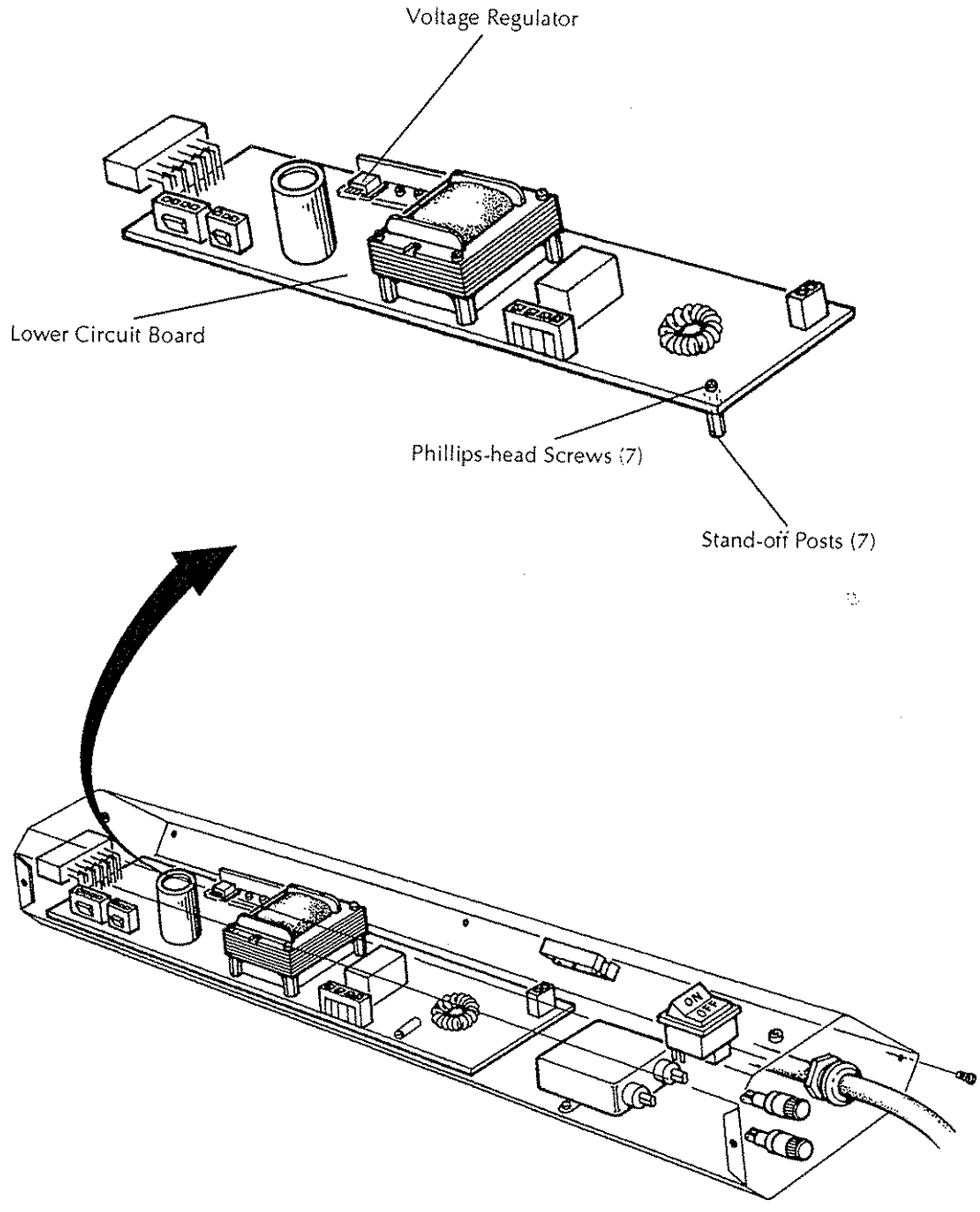


Figure 5-9: Replacing the Lower Circuit Board

Relay Box Fuse (F1 or F2)

To replace a relay box fuse (F1 or F2), complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEP 2.

2. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 5-2.
3. Locate the relay box assembly and the fuse that requires replacing. See Figure 5-10.

Note: Replacing the F1 fuse on the 50 Hz model requires removing the relay box's side access panel. See Figure 5-10.

4. To remove an F1 or F2 externally mounted fuse, grasp its fuse cap. Firmly press in and turn the fuse cap counterclockwise until it disengages from the holder. See Figure 5-10.

   To remove the F1 lower circuit board mounted fuse, use a small flat blade screwdriver and turn the fuse cap counterclockwise until it disengages from the holder. See Figure 5-10.

   Separate the fuse from its cap.

Note: Make sure that the rating (voltage/current) of the new fuse matches the rating of the old fuse it replaces.

5. Install a new fuse. Reverse Steps 1 through 4.
6. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing a relay box fuse.

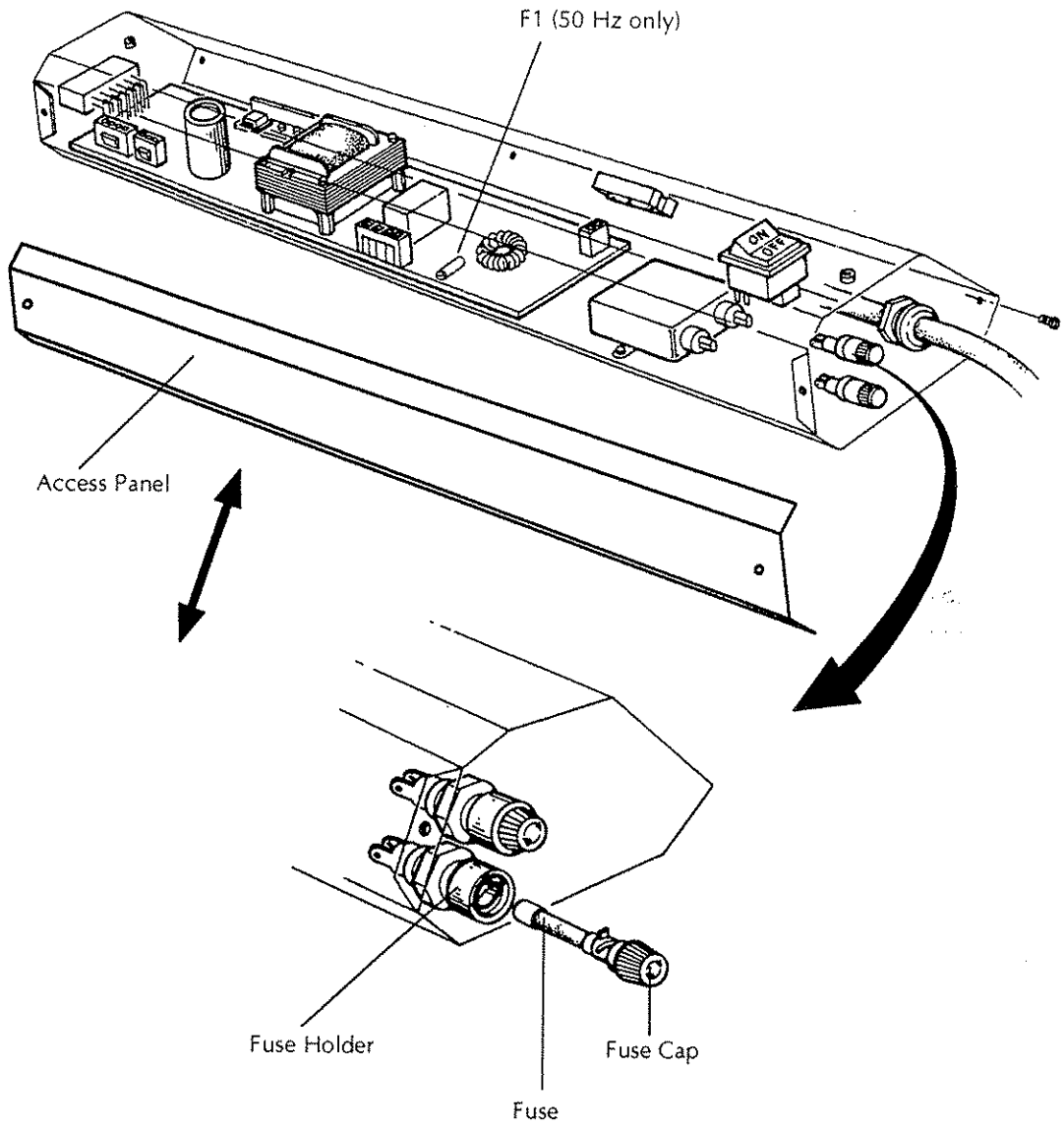


Figure 5-10: Replacing a Relay Box Fuse (F1 or F2)

Front Hood Cover

To replace the front hood cover, complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.
2. Remove the four Button-head screws securing the front hood cover to the treadmill's frame. See Figure 5-6.
3. Lift the cover off the front roller and main motor assemblies. Set the cover aside.
4. Install a new front hood cover. Reverse Steps 1 through 3.
5. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the front hood cover.

Stanchion Insert

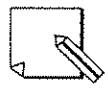
To replace a stanchion insert, complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.
2. Tilt the treadmill onto its side. Make sure that the insert to be removed is facing up. See Figure 5-11.

Note: Observe the angled top of the insert. This allows it to conform to the shape of the display console. See Figure 5-11.

3. Remove the two Phillips-head screws securing the bottom of the insert to its stanchion. See Figure 5-11.
4. Pull the insert out of its stanchion. See Figure 5-11.

Note: Observe the grooved edges of the insert as it is removed. The stanchion must be properly fitted into these grooves during installation.



5. Install a new stanchion insert. Reverse Steps 1 through 4.
6. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing a stanchion insert.

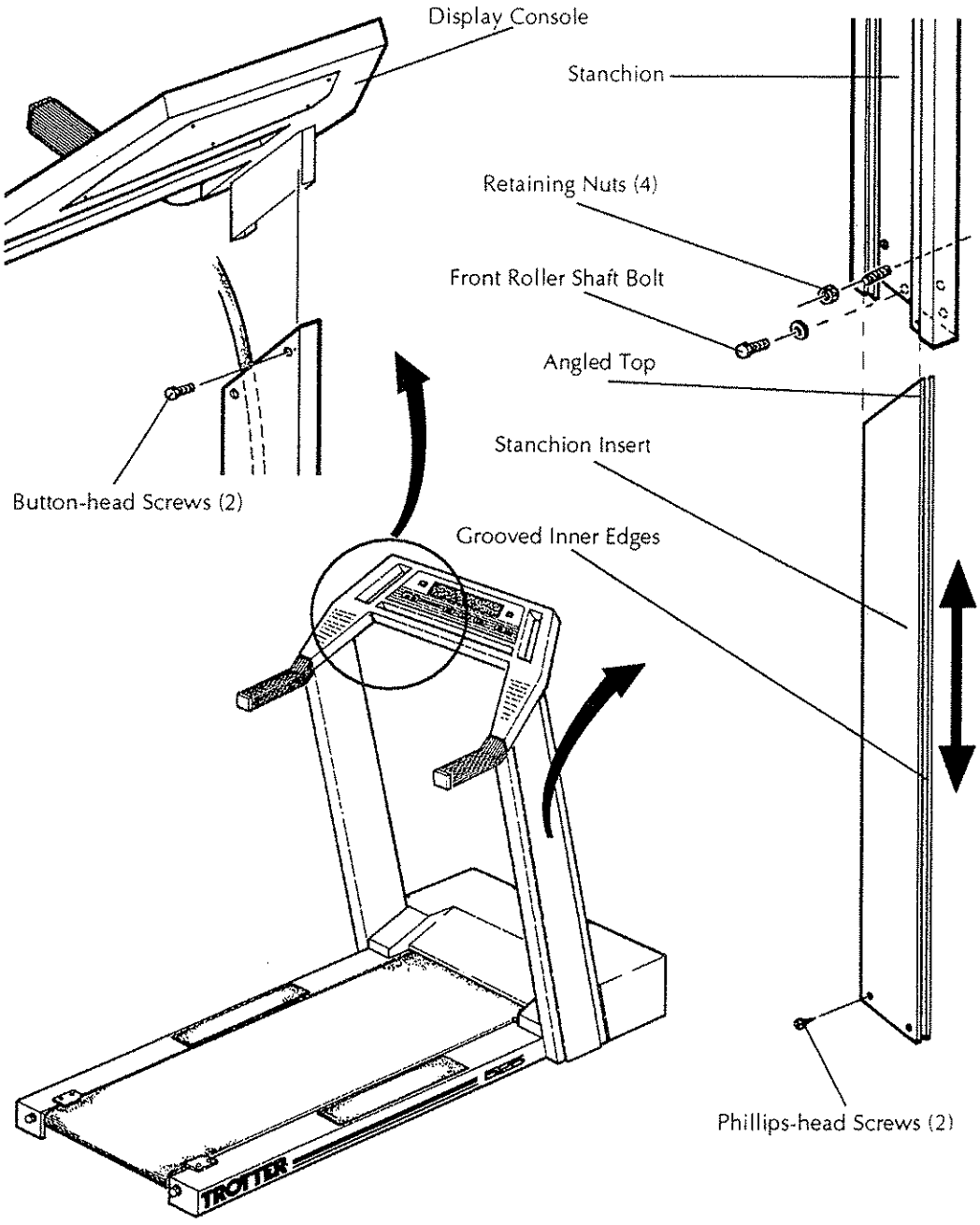


Figure 5-11: Replacing a Stanchion Insert and Stanchion

Stanchion

To replace a stanchion, complete the following:

1. Remove the insert from the faulty stanchion. Complete the removal procedure contained in the *Stanchion Insert* section (earlier in this chapter). Allow the treadmill to remain on its side.
2. Remove the four retaining nuts securing the lower portion of the stanchion to the treadmill frame. See Figure 5-11.
3. Remove the two Button-head screws securing the upper portion of the stanchion to the display console. See Figure 5-11.

CAUTION: Use caution when separating the display console from its stanchion during Step 4. Stress damage to the opposite stanchion and its internal cable (left stanchion only) could occur if the separation is too wide.

4. *Carefully* separate (lift up) the end of the display console from its stanchion and remove the stanchion. See Figure 5-11.
5. Install a new stanchion. Reverse Steps 1 through 4.
6. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing a stanchion.

Rear Roller

To replace the rear roller, complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEP 2.

2. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 5-12.
3. Remove the rear roller assembly. Refer to Figure 5-12 and complete the following:
   a. Support the rear roller with one hand. With the other hand loosen and remove the rear tension adjustment nut and bolt from each end of the roller shaft.
   b. *Carefully* remove the rear roller by sliding it through the running belt.

During installation, the "milled" sections of the rear roller shaft must be facing toward the front of the treadmill.

4. Install a new rear roller. Reverse Steps 1 through 3.
5. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the rear roller.

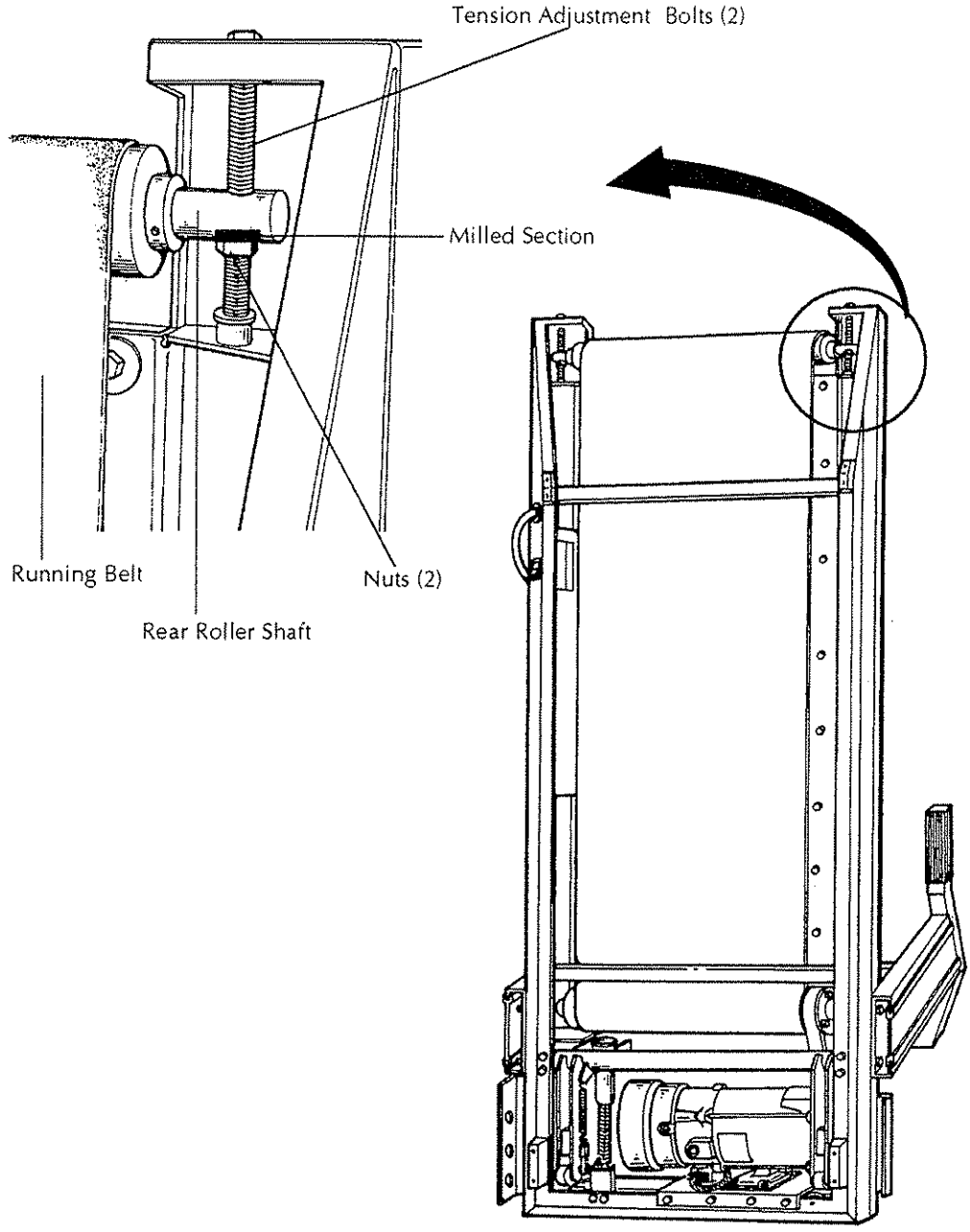


Figure 5-12: Replacing the Rear Roller

Front Roller

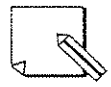
To replace the front roller, complete the following:

1. Remove the rear roller assembly. Complete the removal procedure contained in the *Rear Roller* section (earlier in this chapter).

   Lower the rear of the treadmill and place it into its normal operating position.
2. Remove the treadmill's right (facing the display console) stanchion insert. Complete the removal procedure contained in the *Stanchion Insert* section (earlier in this chapter).

   Lower the rear of the treadmill and place it into its normal operating position.
3. Remove the front hood cover. Complete the removal procedure contained in the *Front Hood Cover* section (earlier in this chapter).

Note: Tension on the Poly "V" drive belt must be decreased before the front roller can be removed.



4. Remove the two tension adjustment nuts securing the upper portion of the motor mounting plate to the treadmill frame. See Figure 5-13.

   Tilt the main drive motor (DC) forward, towards the rear of the treadmill, and remove the Poly "V" belt from the drive motor pulley. See Figure 5-13.
5. Support the front roller sheave with one hand. With the other hand loosen and remove the front roller shaft bolt securing the roller shaft to the right stanchion. See Figure 5-11.
6. Loosen the inside nut located on the front roller's tension adjustment bolt. See Figure 5-13.
7. Lift the left side of the front roller until its "milled" shaft has cleared the tension adjustment bolt. See Figure 5-13.

The front roller is now free to be removed from the treadmill by lifting it up and sliding it through the running belt. See Figure 5-13.

8. Install a new front roller. Reverse Steps 1 through 7.
9. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the front roller.

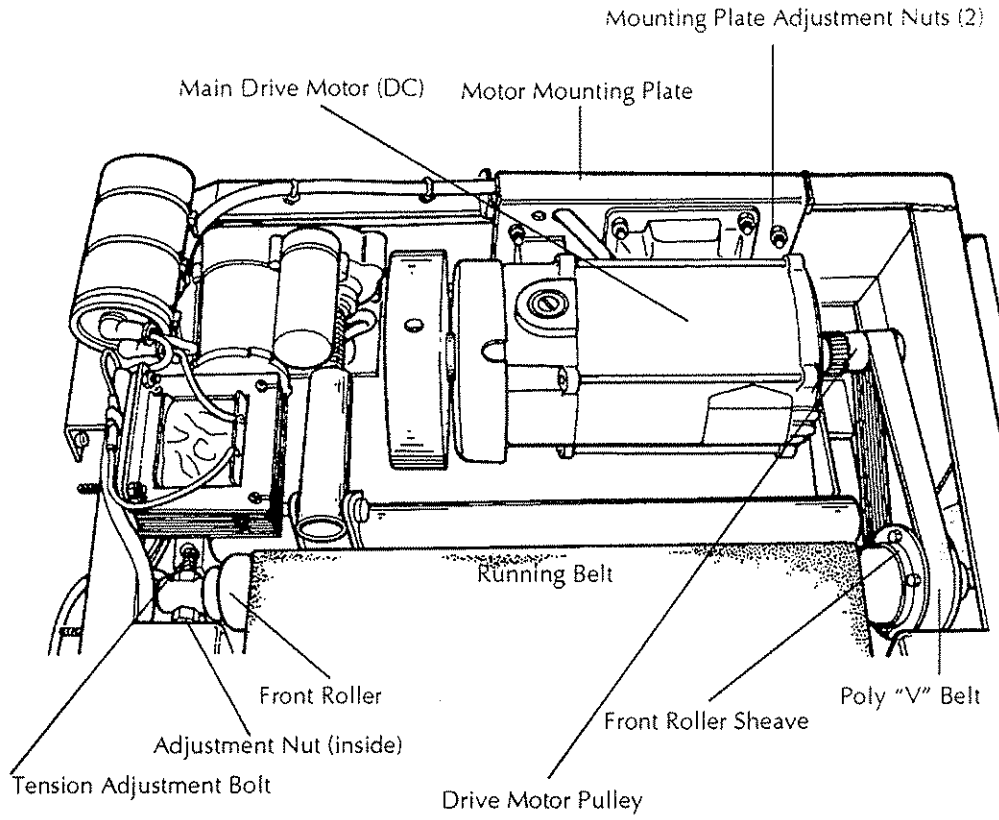


Figure 5-13: Replacing the Front Roller

Running Deck

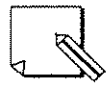
To replace the running deck, complete the following:

1. Remove the rear roller assembly. Complete the removal procedure contained in the *Rear Roller* section (earlier in this chapter). Lower the rear of the treadmill and place it into its normal operating position.
2. Remove the four Phillips-head screws securing the two safety guards to the chassis frame. See Figure 5-6. Set the safety guards aside.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEPS 3 AND 5.

3. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 5-14.

Note: To prevent the running deck from falling while the treadmill is upright, its top two bolts are not removed until Step 6.

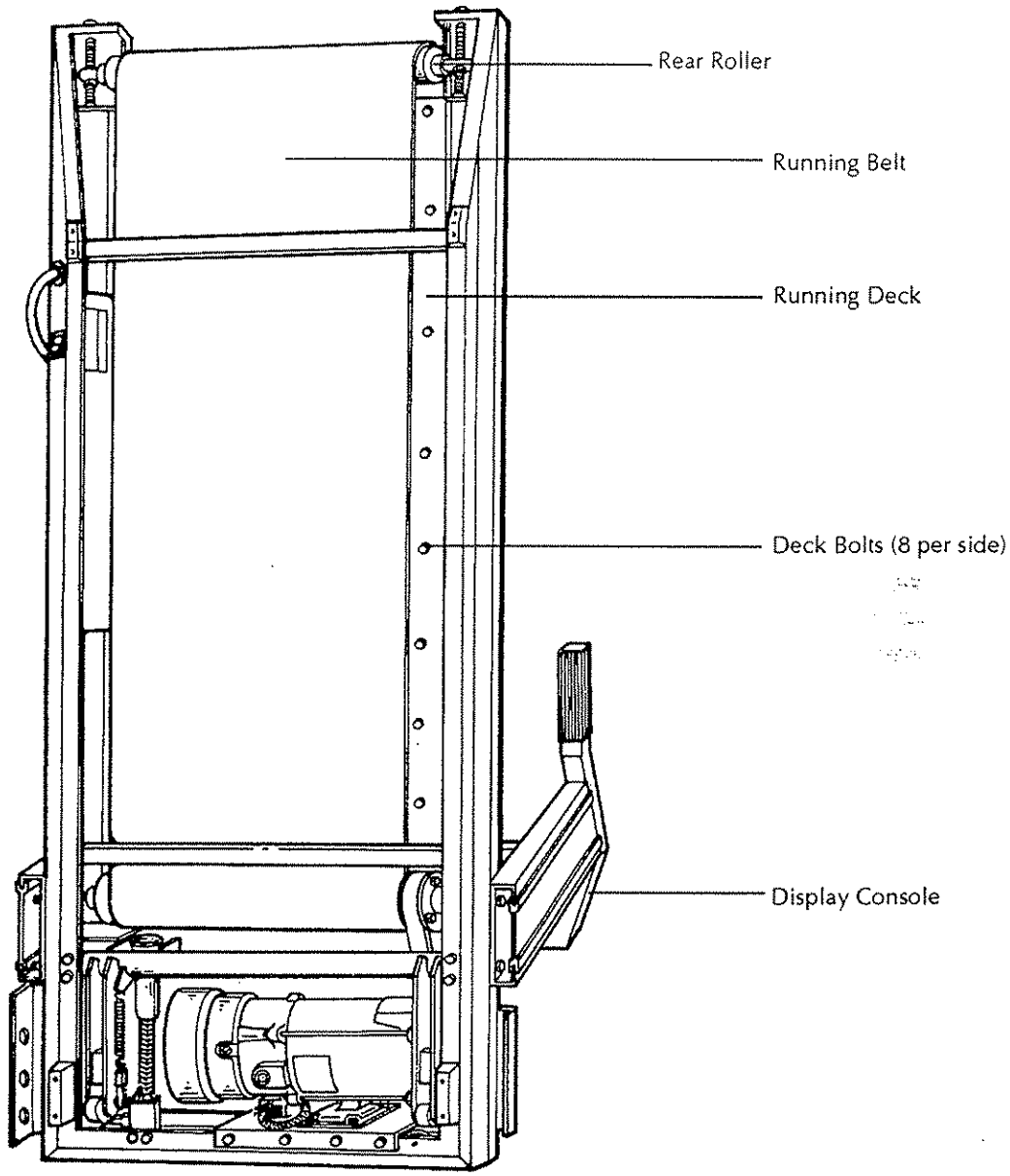


4. Remove all bolts securing the running deck except its top two bolts closest to the rear roller. See Figure 5-14.
5. Loosen, but *do not* remove, the running deck's top two bolts. See Figure 5-14.
   Lower the rear of the treadmill and place it into its normal operating position.
6. Remove the running deck's top two bolts. See Figure 5-14.

The running deck is now free to be removed from the treadmill frame by lifting it up and sliding it either to the left or to the right, maneuvering it out from beneath the running belt.

7. Install a new running deck. Reverse Steps 1 through 6.
8. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the running deck.



(Shown in Upend Position)

Figure 5-14: Replacing the Running Deck/Belt

Running Belt

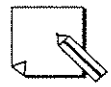
To replace the running belt, complete the following:

1. Remove the front and rear roller shafts. Complete the removal procedure contained in the *Front Roller* section (earlier in this chapter).
2. Remove the four Phillips-head screws securing the two safety guards to the chassis frame. See Figure 5-6. Set the safety guards aside.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEPS 3 AND 5.

3. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 5-14.

Note: To prevent the running deck from falling while the treadmill is upright, its top two bolts are not removed until Step 6.



4. Remove all bolts securing the running deck except its top two bolts closest to the rear roller. See Figure 5-14.
5. Loosen, but *do not* remove, the running deck's top two bolts. See Figure 5-14.
   Lower the rear of the treadmill and place it into its normal operating position.
6. Remove the running deck's top two bolts. See Figure 5-14.
7. Remove the running deck from the treadmill frame by lifting it up and sliding it either to the left or to the right, maneuvering it out from beneath the running belt.
8. Remove the running belt by lifting it clear of the treadmill frame.
9. Install a new running belt. Reverse Steps 1 through 8.
10. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the running belt.

LC Filter Capacitor

To replace the LC filter capacitor, complete the following:

1. Remove the front hood cover. Complete the removal procedure contained in the *Front Hood Cover* section (earlier in this chapter).
2. Discharge the LC filter capacitor. Refer to Figure 5-7 and complete the following:

WARNING: THE LC FILTER CAPACITOR, ONCE CHARGED, CONTAINS A POTENTIALLY HARMFUL AMOUNT OF STORED VOLTAGE/CURRENT. USE EXTREME CAUTION WHEN DISCHARGING THIS FILTER COMPONENT. NEVER TOUCH BOTH EXPOSED TERMINALS WITH YOUR FINGERS.

   a. *Carefully* pull back each of the capacitor terminal's rubber "boots."
   b. Grip the insulated handle of a screwdriver. Using the screwdriver's metal shaft, momentarily touch the capacitor's two terminals. *Do not* touch the screwdriver's metal shaft while performing this step.
3. Label and remove all cables connected to the filter capacitor's two terminals. See Figure 5-7.
4. Remove (cut) the three nylon tie wraps securing the filter capacitor to the treadmill frame. See Figure 5-7.

The filter capacitor is now free to be removed from the treadmill.

5. Install a new filter capacitor. Reverse Steps 1 through 4.
6. Verify system performance. Complete the *Conducting System Checkout* section (later in this chapter).

This completes the procedure for replacing the LC filter capacitor.

LC Filter Inductor (Choke)

To replace the LC filter inductor (choke), complete the following:

1. Elevate the treadmill to its maximum elevation (approximately 12% incline).
2. Unplug the treadmill's power cord from the AC source outlet. This action prevents the treadmill from resetting its elevation and allows access to the inductor's two lower retaining nuts.
3. Remove the front hood cover. Complete the removal procedure contained in the *Front Hood Cover* section (earlier in this chapter).
4. Discharge the LC filter capacitor. Refer to Figure 5-7 and complete the following:

WARNING: THE LC FILTER CAPACITOR, ONCE CHARGED, CONTAINS A POTENTIALLY HARMFUL AMOUNT OF STORED VOLTAGE/CURRENT. USE EXTREME CAUTION WHEN DISCHARGING THIS FILTER COMPONENT. NEVER TOUCH BOTH EXPOSED TERMINALS WITH YOUR FINGERS.

a. *Carefully* pull back each of the capacitor terminal's rubber "boots."
b. Grip the insulated handle of a screwdriver. Using the screwdriver's metal shaft, momentarily touch the capacitor's two terminals. *Do not* touch the screwdriver's metal shaft while performing this step.

5. Separate the filter inductor's spade connector. See Figure 5-7.
6. Label and disconnect all cables connected to the filter capacitor's positive (+) terminal. See Figure 5-7.
7. Remove the upper two nuts securing the filter inductor to the treadmill frame. See Figure 5-7.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEP 8.

8. Position the treadmill onto its left side to access the lower portion of the filter inductor.
9. Loosen, but *do not* remove, the lower two nuts securing the filter inductor to the treadmill frame. See Figure 5-7.

   Position the treadmill into its normal operating position.

Lift up and remove the filter inductor from the treadmill.

10. Install a new filter inductor. Reverse Steps 1 through 9.
11. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the LC filter inductor.

Speed Sensor

To replace the speed sensor, complete the following:

1. Remove the front hood cover. Complete the removal procedure contained in the *Front Hood Cover* section (earlier in this chapter).
2. Disconnect the speed sensor's 2-pin connector. See Figure 5-15.
3. Remove the two Phillips-head screws securing the speed sensor to the main drive motor housing. See Figure 5-15.

The speed sensor is now free to be removed.

4. Install a new speed sensor. Reverse Steps 1 through 3.
5. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the speed sensor.

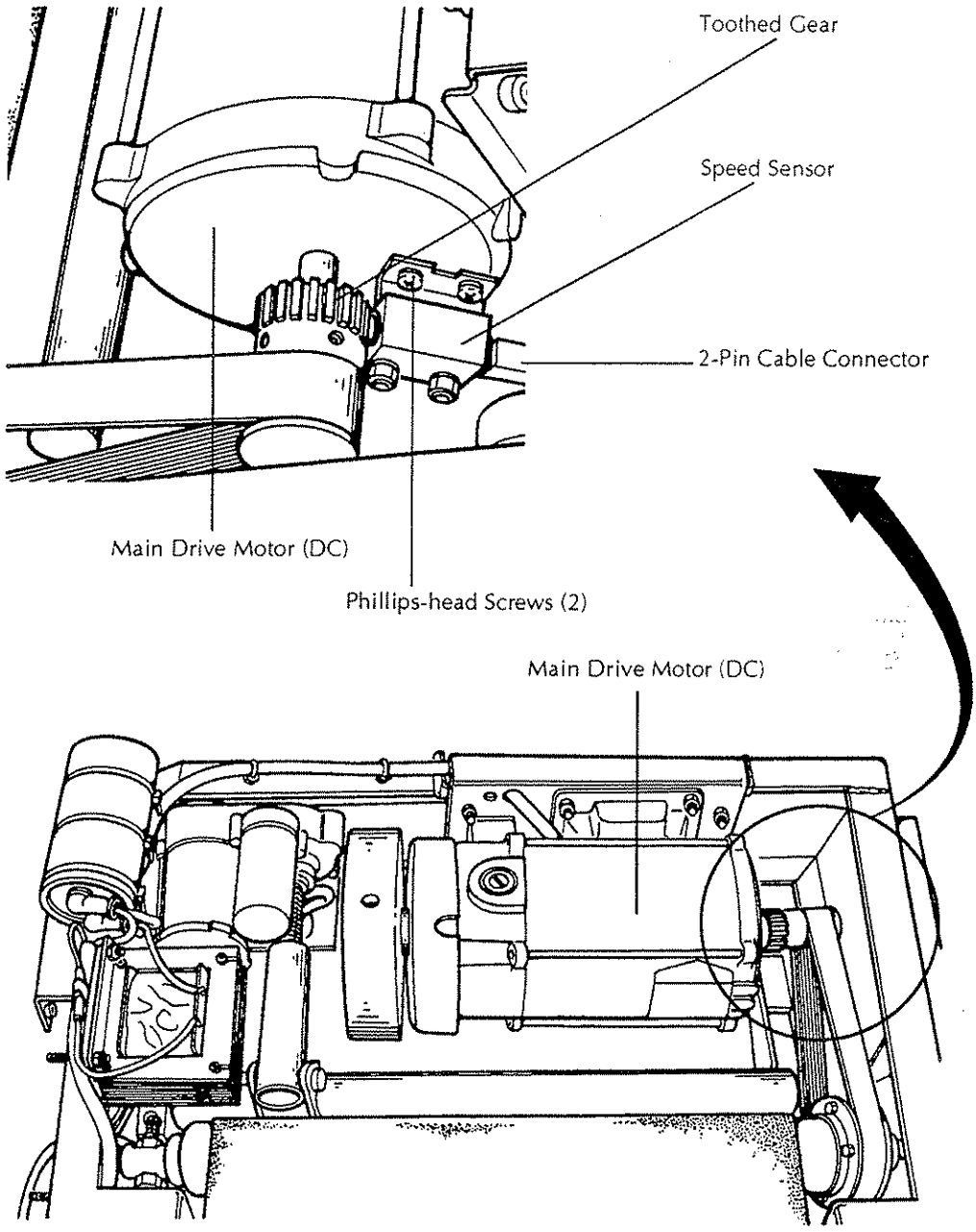


Figure 5-15: Replacing the Speed Sensor

Main Drive Motor (DC)

To replace the main drive motor (DC), complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEPS 2 AND 3.

2. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 5-14.
3. Remove the four retaining bolts securing the lower portion of the motor mounting plate to the treadmill frame. See Figure 5-16.

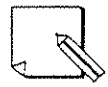
   Lower the rear of the treadmill and place it into its normal operating position.
4. Remove the front hood cover. Complete the removal procedure contained in the *Front Hood Cover* section (earlier in this chapter).
5. Discharge the LC filter capacitor. Refer to Figure 5-7 and complete the following:

WARNING: THE LC FILTER CAPACITOR, ONCE CHARGED, CONTAINS A POTENTIALLY HARMFUL AMOUNT OF STORED VOLTAGE/CURRENT. USE EXTREME CAUTION WHEN DISCHARGING THIS FILTER COMPONENT. NEVER TOUCH BOTH EXPOSED TERMINALS WITH YOUR FINGERS.

   a. *Carefully* pull back each of the capacitor terminal's rubber "boots."
   b. Grip the insulated handle of a screwdriver. Using the screwdriver's metal shaft, momentarily touch the capacitor's two terminals. *Do not* touch the screwdriver's metal shaft while performing this step.
   c. Slide each rubber "boot" back over its respective terminal.
6. Disconnect the speed sensor's 2-pin connector. See Figure 5-15.
7. Remove the two Phillips-head screws securing the speed sensor to the main motor housing. See Figure 5-15.

   Set the speed sensor aside.
8. Remove the two adjustment nuts securing the upper portion of the motor mounting plate to the treadmill frame. See Figure 5-16.
9. Tilt the main motor forward, towards the rear of the treadmill, and remove the Poly "V" belt from its pulley. See Figure 5-16.
10. Remove (cut) the nylon tie wraps securing the main motor's power cord to the treadmill frame. See Figure 5-16.
11. Lift the main motor (DC) from the treadmill frame. Set the main motor aside.

Note: The mounting plate, power cord, flywheel, and pulley are not considered part of the main drive motor. These items must be removed and re-installed onto the new main drive motor.



12. Remove the four nuts securing the mounting plate to the main motor. See Figure 5-17. Set the mounting plate aside.
13. Loosen the two hex screws securing the pulley to the main drive motor's shaft. See Figure 5-17. Slide the pulley off the drive shaft and set it aside.

Note: Separating the flywheel from the main drive motor's shaft, during Step 14, may require a gear puller.

14. Loosen the single hex screw securing the flywheel to the main drive motor's shaft. See Figure 5-17. Slide the flywheel off the drive shaft and set it aside.
15. Remove the two flat-head screws securing the cover panel to the main drive motor's power junction box. See Figure 5-17. Set the cover panel aside.
16. Loosen the outside cable clamp attached to the power junction box. See Figure 5-17.
17. Label and separate each of the incoming power wires from the main drive motor wires. See Figure 5-17. Pull the power cable through the opening in the junction box.
18. Install a new main drive motor. Reverse Steps 1 through 17.
19. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the main drive motor (DC).

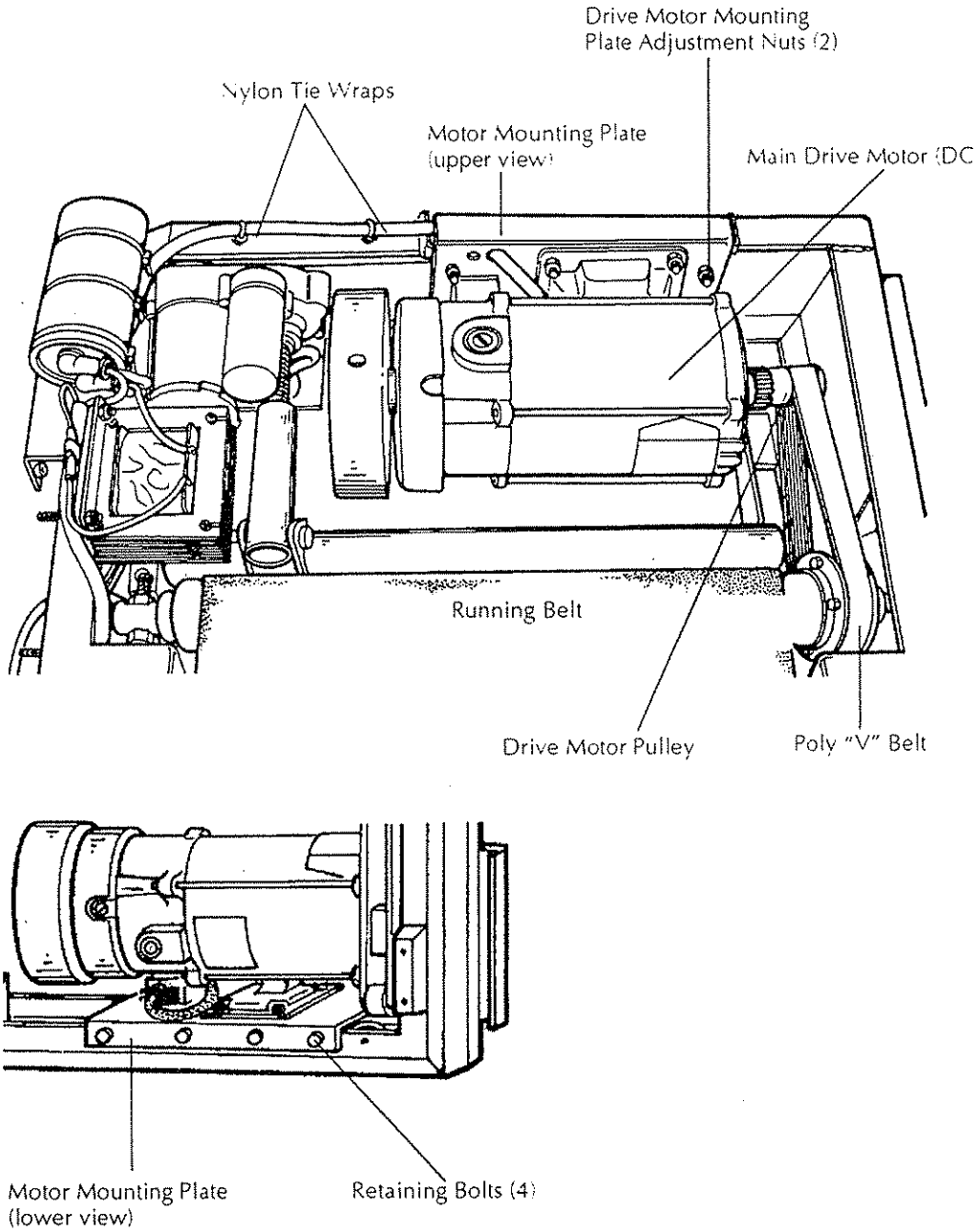


Figure 5-16: Replacing the Main Drive Motor (DC)

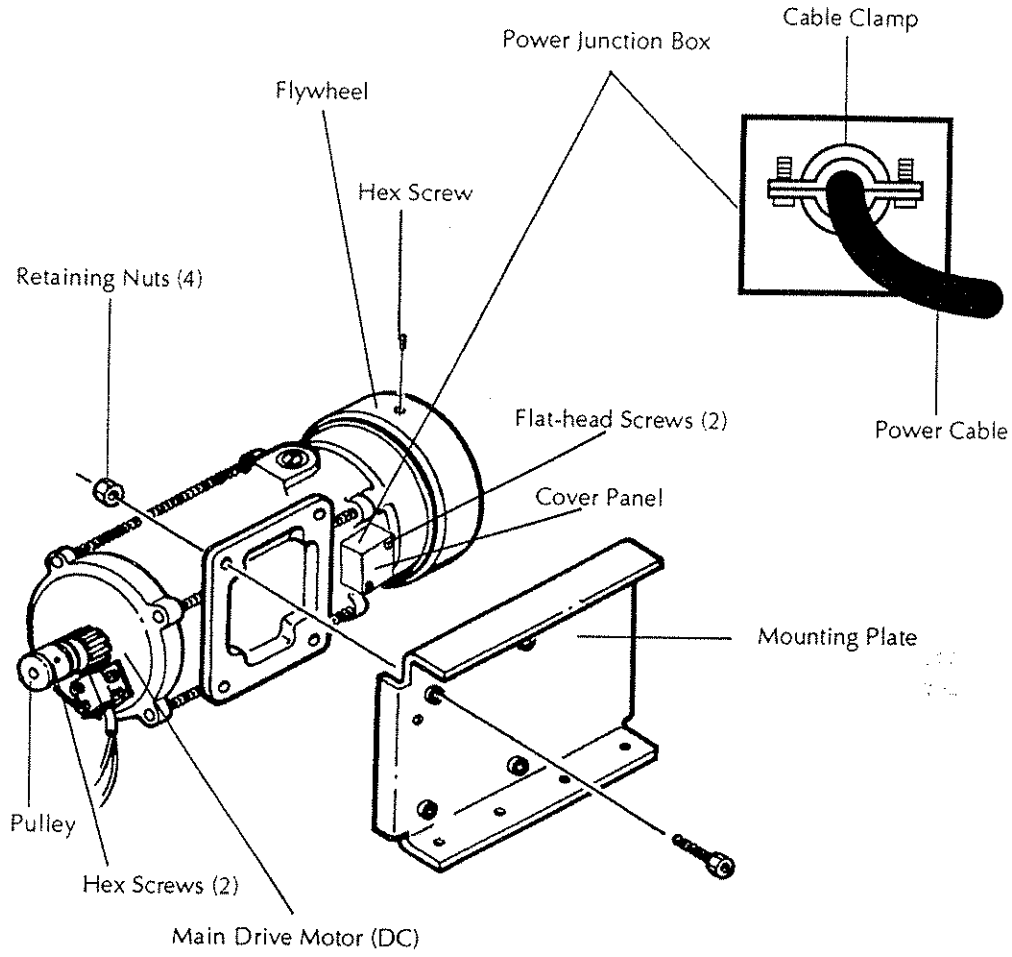


Figure 5-17: Replacing the Main Motor's Ancillary Components

Main Drive Motor (DC) Brush Assemblies

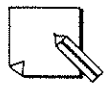
To replace the main motor (DC) brush assemblies, complete the following:

1. Remove the front hood cover. Complete the removal procedure contained in the *Front Hood Cover* section (earlier in this chapter).
2. Discharge the LC filter capacitor. Refer to Figure 5-7 and complete the following:

WARNING: THE LC FILTER CAPACITOR, ONCE CHARGED, CONTAINS A POTENTIALLY HARMFUL AMOUNT OF STORED VOLTAGE/CURRENT. USE EXTREME CAUTION WHEN DISCHARGING THIS FILTER COMPONENT. NEVER TOUCH BOTH EXPOSED TERMINALS WITH YOUR FINGERS.

   a. *Carefully* pull back each of the capacitor terminal's rubber "boots."
   b. Grip the insulated handle of a screwdriver. Using the screwdriver's metal shaft, momentarily touch the capacitor's two terminals. *Do not* touch the screwdriver's metal shaft while performing this step.
   c. Slide each rubber "boot" back over its respective terminal.
3. Determine which brush assembly is being replaced, upper or lower. See Figure 5-18.

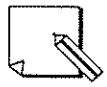
Note: It is recommended that both the upper and lower main drive motor brushes be replaced as a pair. This will ensure even commutator contact and brush wear.



To replace the upper brush assembly, complete Steps 4 through 9.

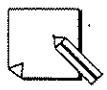
To replace the lower brush assembly, complete Steps 10 through 14.

Note: The main motor's brush caps are made of plastic and can be easily damaged. Use the TROTTER brush cap removal tool when removing and installing brush caps during Steps 4 and 11.



4. Unscrew and remove the main motor's upper brush cap, using the brush cap removal tool. See Figure 5-18.
5. *Carefully* pull out the brush assembly from the main motor brush holder. See Figure 5-18.
6. Examine the brush cap, brush, spring, and contact disc for signs of wear such as arcing, pitting, or burning. Replace any item which shows signs of excessive wear and/or is cracked or broken. See Figure 5-18.

Notes:
1. The motor brush must be replaced if it has worn to less than 1/2-inch (1.27 cm) in length.



2. Install the original brush (if applicable) into the holder in its original position. Reversing the brush could cause a "ticking" sound during operation until it has evenly worn.

7. Slide the motor brush (new or original) into the motor brush holder. Make sure that the brush wire doesn't become entangled in the spring. See Figure 5-18.
8. Install the brush cap. Refer to Figure 5-18 and complete the following:
   a. Place the brush cap on top of the brush contact disc. *Gently* press down and screw the cap into the brush holder, making sure that it is not over-tightened.
   b. Back off (unscrew) the brush cap 1/4-turn. This action will align the spring coil which may have become trapped under the cap.
   c. Fully tighten the brush cap, making sure that it is not over-tightened.
9. Install the front hood cover. Refer to Figure 5-6 and complete the following:
   a. Place the front hood cover into its operating position.
   b. Secure the cover using the four Button-head screws.

   Continue with Step 13.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEPS 10 AND 12.

10. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 5-14.
11. Unscrew and remove, using the brush cap removal tool, the main motor's lower brush cap. See Figure 5-18.
12. Remove and examine the main motor's lower brush cap. Repeat Steps 5 through 8.

    Lower the rear of the treadmill and place it into its normal operating position.
13. Plug the treadmill's power cord into the AC source outlet.
14. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the lower brush assembly.

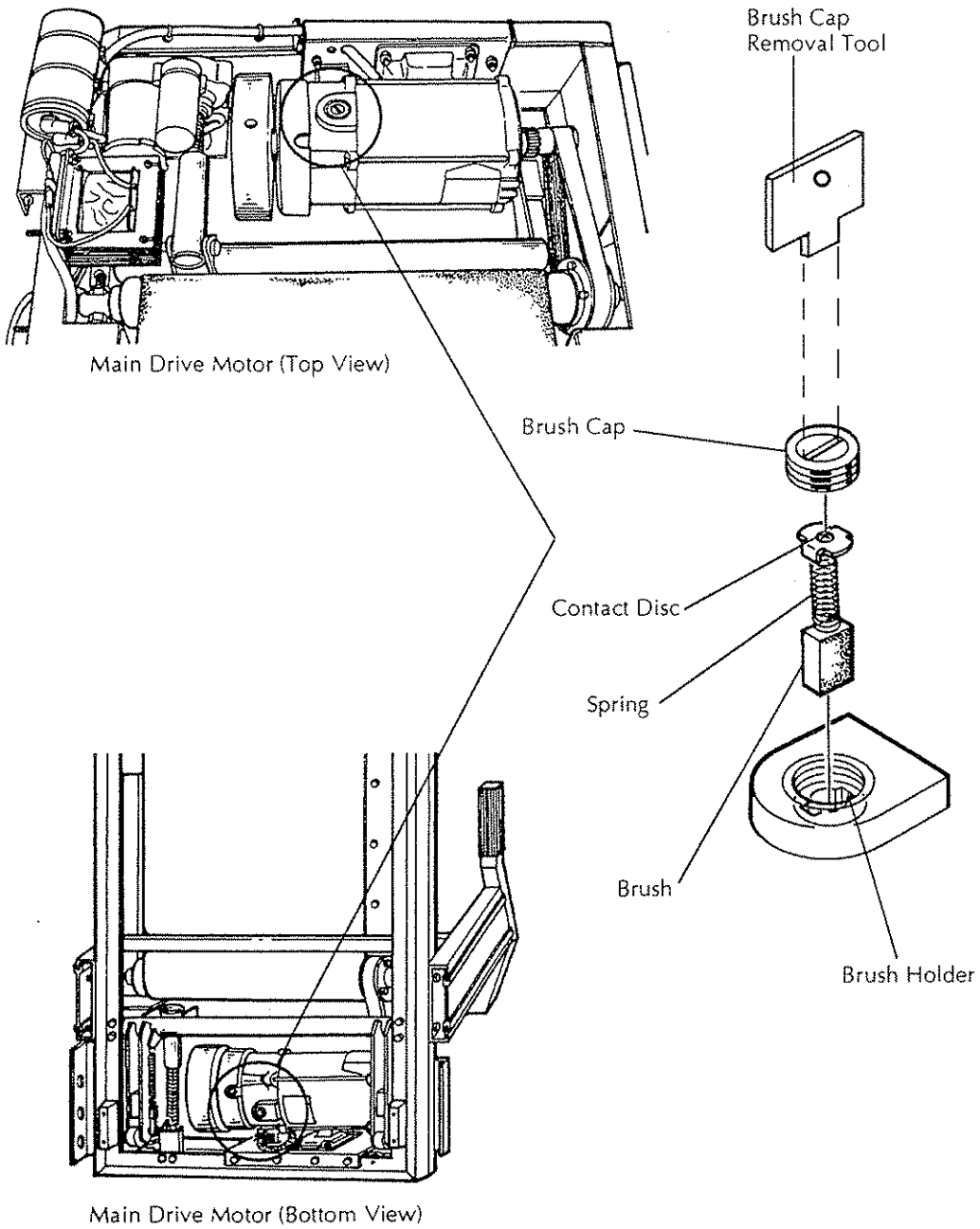


Figure 5-18: Replacing the Main Motor's Brush Assemblies

Poly "V" Drive Belt

To replace the Poly "V" drive belt, complete the following:

1. Remove the front roller. Complete Steps 1 through 7 contained in the *Front Roller* section (earlier in this chapter).
2. Slide the front roller to the left (facing forward) until the Poly "V" belt clears the front roller sheave. See Figure 5-13.

The Poly "V" belt is now free to be removed.

3. Install a new Poly "V" drive belt. Reverse Steps 1 and 2.
4. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the Poly "V" drive belt.

Elevation Motor (AC)

To replace the elevation motor (AC), complete the following:

1. Remove the LC filter inductor (choke). Complete the removal procedure contained in the *LC Filter Inductor (Choke)* section (earlier in this chapter).
2. Remove the hairpin and clevis securing the elevation motor to the treadmill frame. See Figure 5-19.
3. Remove the hairpin and clevis securing the leadscrew' tube nut (cylinder) to the elevation arm assembly. See Figure 5-19.

Lift up and remove the elevation motor from the treadmill.

Note: The leadscrew and tube nut (cylinder) are considered part of the elevation motor and are replaced with the elevation motor.

4. Disconnect the elevation motor's 4-pin connector.
5. Install a new elevation motor. Reverse Steps 1 through 4.
6. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the elevation motor.

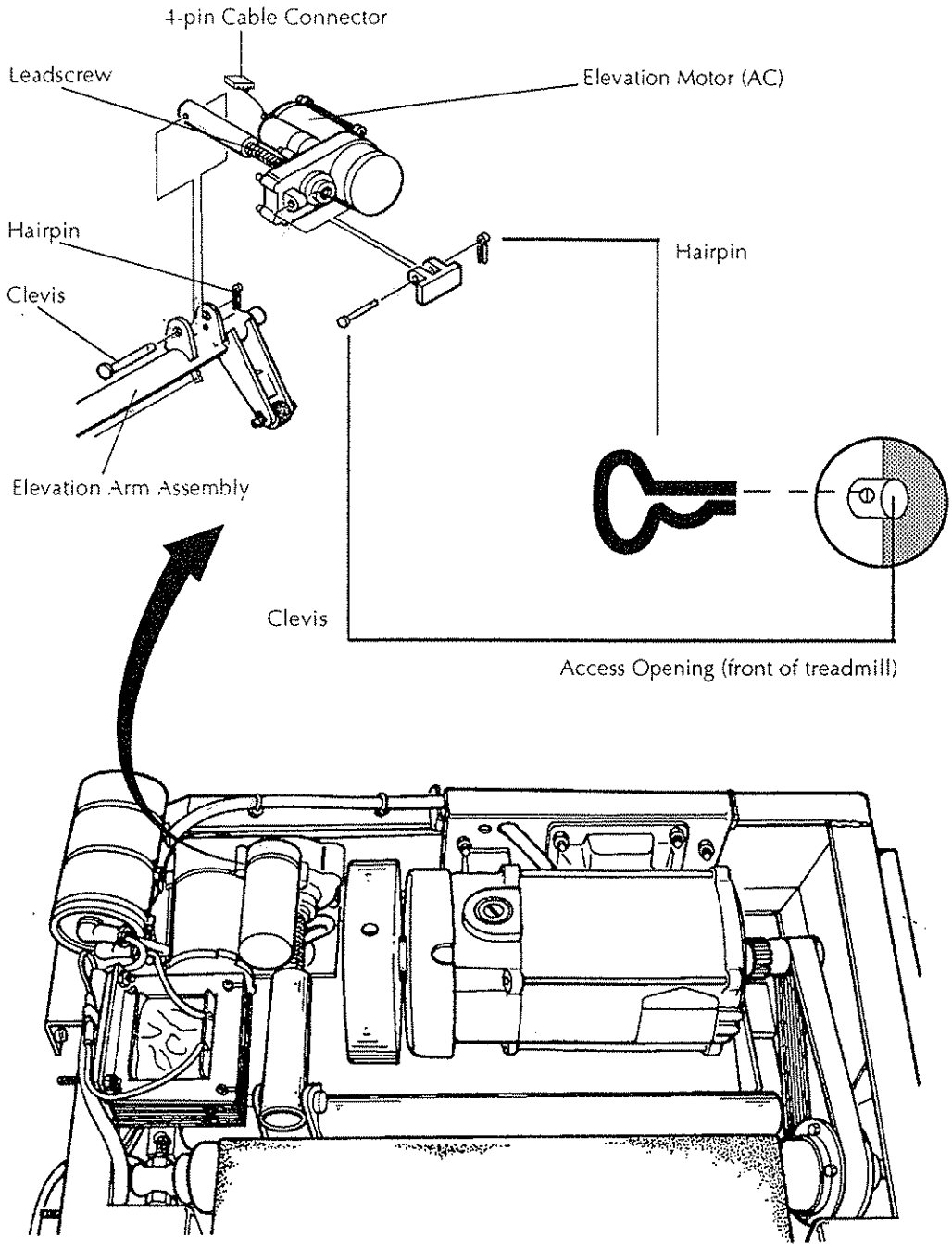


Figure 5-19: Replacing the Elevation Motor (AC)

Elevation Arm Assembly

To replace the elevation arm assembly, complete the following:

1. Remove the front hood cover. Complete the removal procedure contained in the *Front Hood Cover* section (earlier in this chapter).
2. Remove the hairpin and clevis securing the leadscrew's tube nut (cylinder) to the elevation arm assembly. See Figure 5-19.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEP 3.

3. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 5-14.
4. Disconnect the sensor belt's tension spring from the elevation arm assembly. See Figure 5-20.
5. Remove the retaining nut and bolt securing the sensor belt to the elevation arm assembly. See Figure 5-20.
6. Remove the four nuts and bolts that secure the two aluminum pivot blocks to the treadmill frame at each end of the elevation arm assembly See Figure 5-20.
7. Slide the two aluminum blocks off the arm assembly. See Figure 5-20. Set these two blocks aside.

The elevation arm assembly is now free to be maneuvered out of the treadmill frame.

Note: The elevation arm and its attached elevation wheels are replaced as a single unit.

8. Install a new elevation arm assembly. Reverse Steps 1 through 7.
9. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the elevation arm assembly.

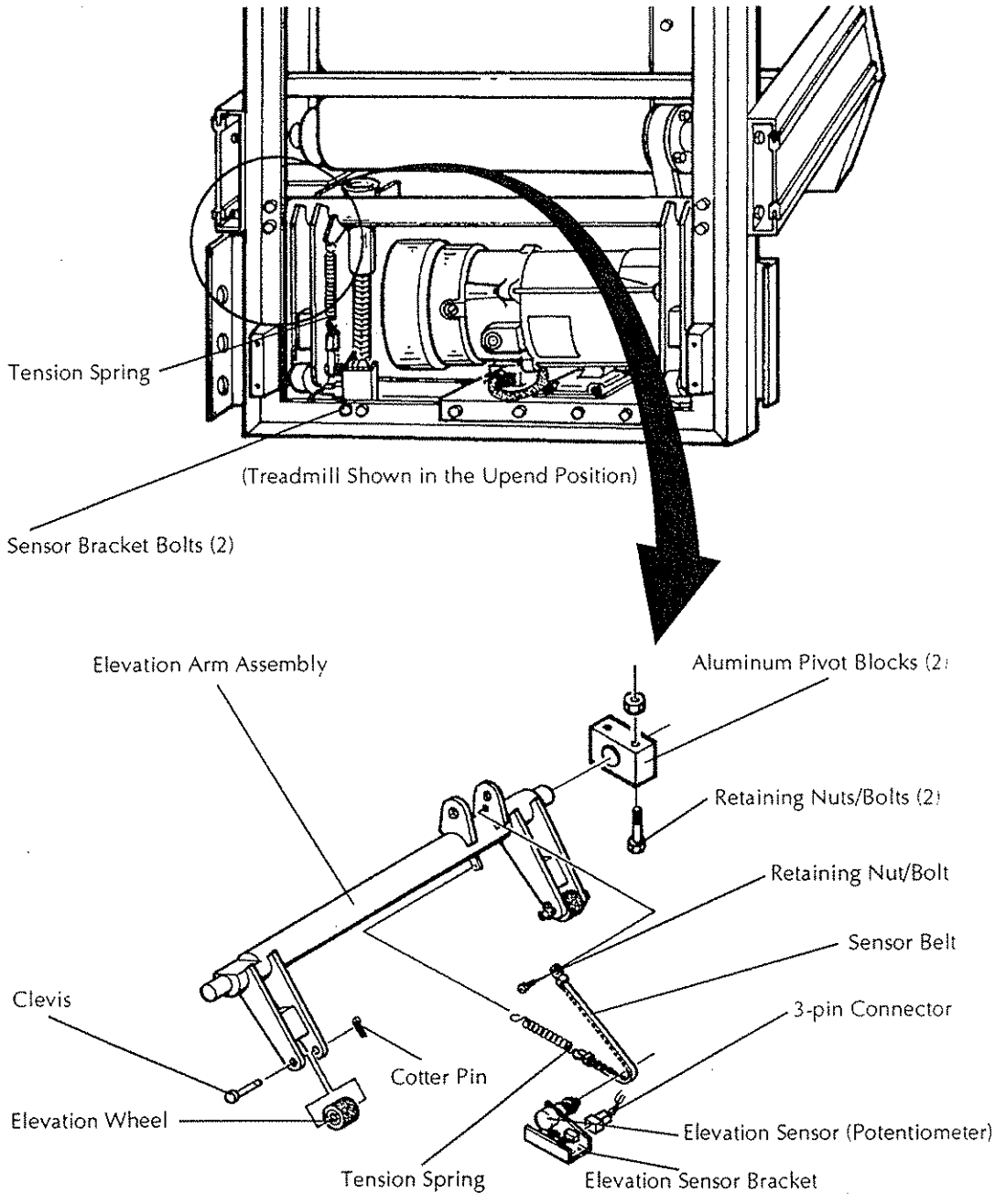


Figure 5-20: Replacing Elevation Assembly Components

Elevation Wheel

To replace an elevation wheel, complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEP 2.

2. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 5-14.
3. Remove the cotter pin and clevis securing the wheel to its elevation arm. See Figure 5-20.

The elevation wheel is now free to be removed.

4. Install a new elevation arm wheel. Reverse Steps 1 through 3.
5. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing an elevation arm wheel.

Elevation Sensor Belt

To replace the elevation sensor (potentiometer) belt, complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEP 2.

2. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 5-14.

Note: Observe the position of the sensor potentiometer and the sensor belt. It is important that these positions be maintained after the sensor belt is replaced. To assist during re-installation, place a mark at the 12 o'clock position on the potentiometer.

3. Remove the nut and bolt securing the sensor belt to the elevation arm assembly. See Figure 5-20.
4. Separate the sensor belt from its tension spring. See Figure 5-20.

The elevation sensor belt is now free to be removed.

5. Install a new elevation sensor belt. Reverse Steps 1 through 4.
6. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the elevation sensor belt.

Elevation Sensor (Potentiometer)

To replace the elevation sensor (potentiometer), complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.

WARNING: DUE TO THE WEIGHT OF THE TREADMILL, IT IS RECOMMENDED THAT TWO PEOPLE PERFORM STEP 2.

2. Lift the rear of the treadmill and stand it on its front end. The display console should be resting on the floor in this position. See Figure 5-14.

Note: Observe the position of the sensor potentiometer and the sensor belt. It is important that these positions be maintained after the sensor belt is replaced. To assist during re-installation, place a mark at the 12 o'clock position on the potentiometer.

3. Disconnect the sensor belt's tension spring from the elevation arm assembly. See Figure 5-20.

   Slip the belt off the sensor potentiometer. See Figure 5-20.
4. Disconnect the elevation sensor's 3-pin connector. See Figure 5-20.
5. Remove the two bolts securing the elevation sensor bracket to the treadmill frame. See Figure 5-20.

Note: The elevation sensor (potentiometer) and its mounting bracket are replaced as a single unit.

The elevation sensor is now free to be removed from the treadmill.

6. Install a new elevation sensor. Reverse Steps 1 through 5.
7. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the elevation sensor.

DMD-to-Relay Box Assembly Cable

To replace the DMD-to-relay box assembly cable, complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.

CAUTION: The DMD board is susceptible to damage from a discharge of static electricity. Before replacing the DMD-to-relay box assembly cable, review and complete the* Handling Precautions *section (earlier in this chapter).

2. Remove the six Phillips-head screws securing the DMD board's cover panel. See Figure 5-21. Set the cover panel aside.
3. Remove the seven Phillips-head screws securing the display console molding to the handrail assembly. See Figure 5-21.
4. Remove the Phillips-head screw securing the DMD-to-relay box assembly cable clamp. See Figure 5-21.
5. Disconnect the keyed cable connector J1 from the DMD board. See Figure 5-21.

CAUTION: Use caution when separating the display console from the handrail assembly during Step 6. Stress damage to the plastic molding could occur if the separation is too wide.

6. *Carefully* lift up the display console molding until the separation between it and the handrail assembly is enough to pull the J1 cable connector through to the area of the cable clamp. See Figure 5-21.
7. Remove the left (side covering the cable being removed) stanchion insert. Complete the removal procedure contained in the *Stanchion Insert* section (earlier in this chapter).
8. With the treadmill on its side, disconnect the DMD-to-relay box assembly cable from the relay box. See Figure 5-21.

The cable is now free to be removed from the treadmill.

9. Remove the DMD-to-relay box assembly cable by feeding it from the relay box through the stanchion and out the display console.
10. Install a new DMD-to-relay box assembly cable. Reverse Steps 1 through 9.
11. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the DMD-to-relay box assembly cable.

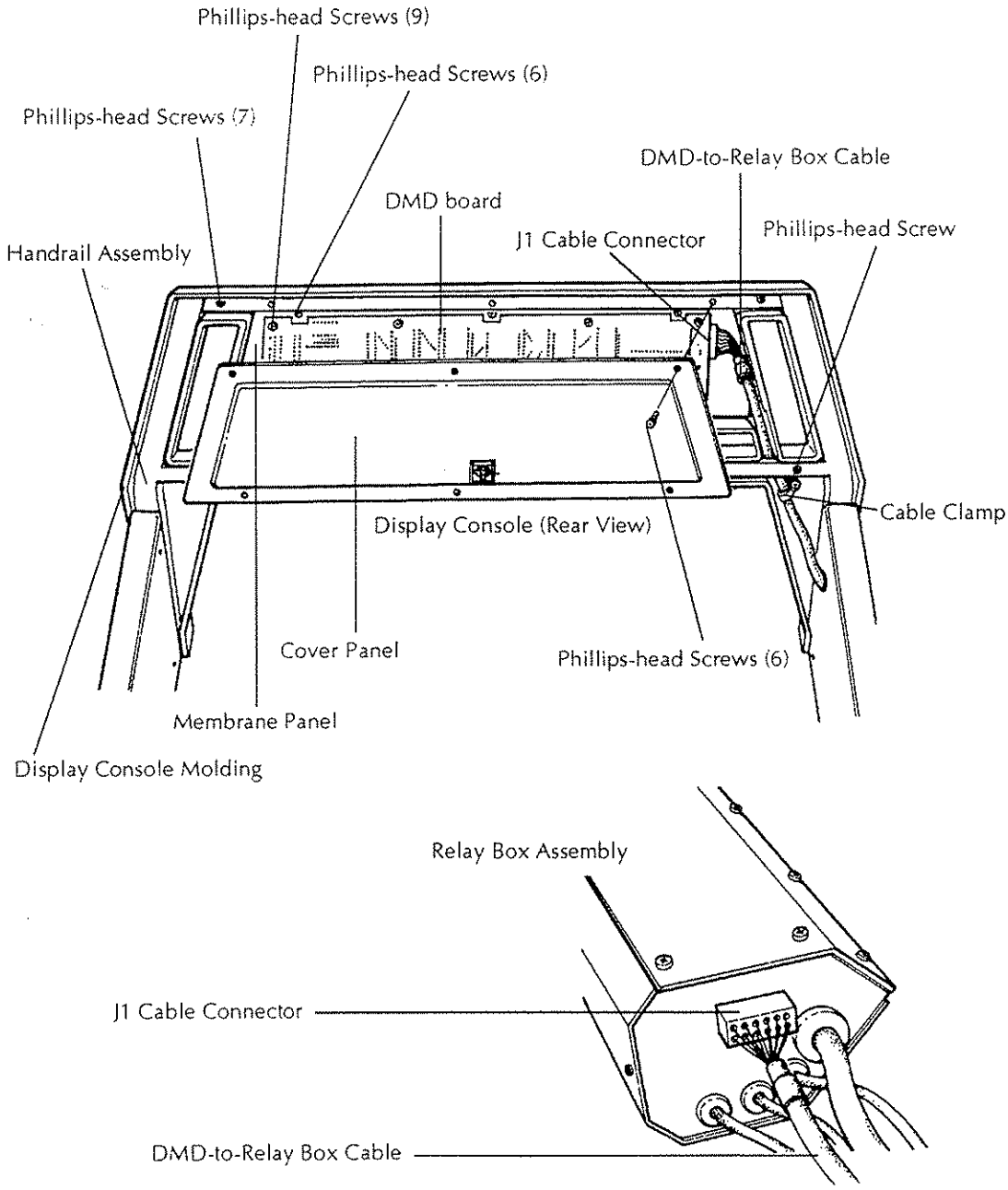


Figure 5-21: Replacing the DMD-to-Relay Box Cable

Upper Circuit Board (DMD)

To replace the upper circuit board (DMD) board, complete the following:

1. Unplug the treadmill's power cord from the AC source outlet.

CAUTION: The DMD board is susceptible to damage from a discharge of static electricity. Before replacing the DMD board, review and complete the* Handling Precautions *section (earlier in this chapter).

2. Remove the six Phillips-head screws securing the DMD board's cover panel. See Figure 5-21. Set the cover panel aside.
3. Disconnect the keyed cable connector J1 from the DMD board. See Figure 5-21.
4. Support the DMD board with one hand. With the other hand remove the six Phillips-head screws securing the membrane panel to the display console. See Figures 5-21 and 5-22.

CAUTION: The DMD board and the membrane panel are connected through a ribbon cable. Do not allow this cable to become strained during Step 5.

5. Remove the nine Phillips-head screws securing the DMD board to the membrane panel assembly. See Figures 5-21.
6. *Gently* separate the DMD board and the membrane panel. Disconnect the DMD-to-membrane panel ribbon cable from the connector on the DMD board. See Figure 5-22.

The DMD board is now free to be replaced.

7. Install a new DMD board. Reverse Steps 1 through 6.
8. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the DMD board.

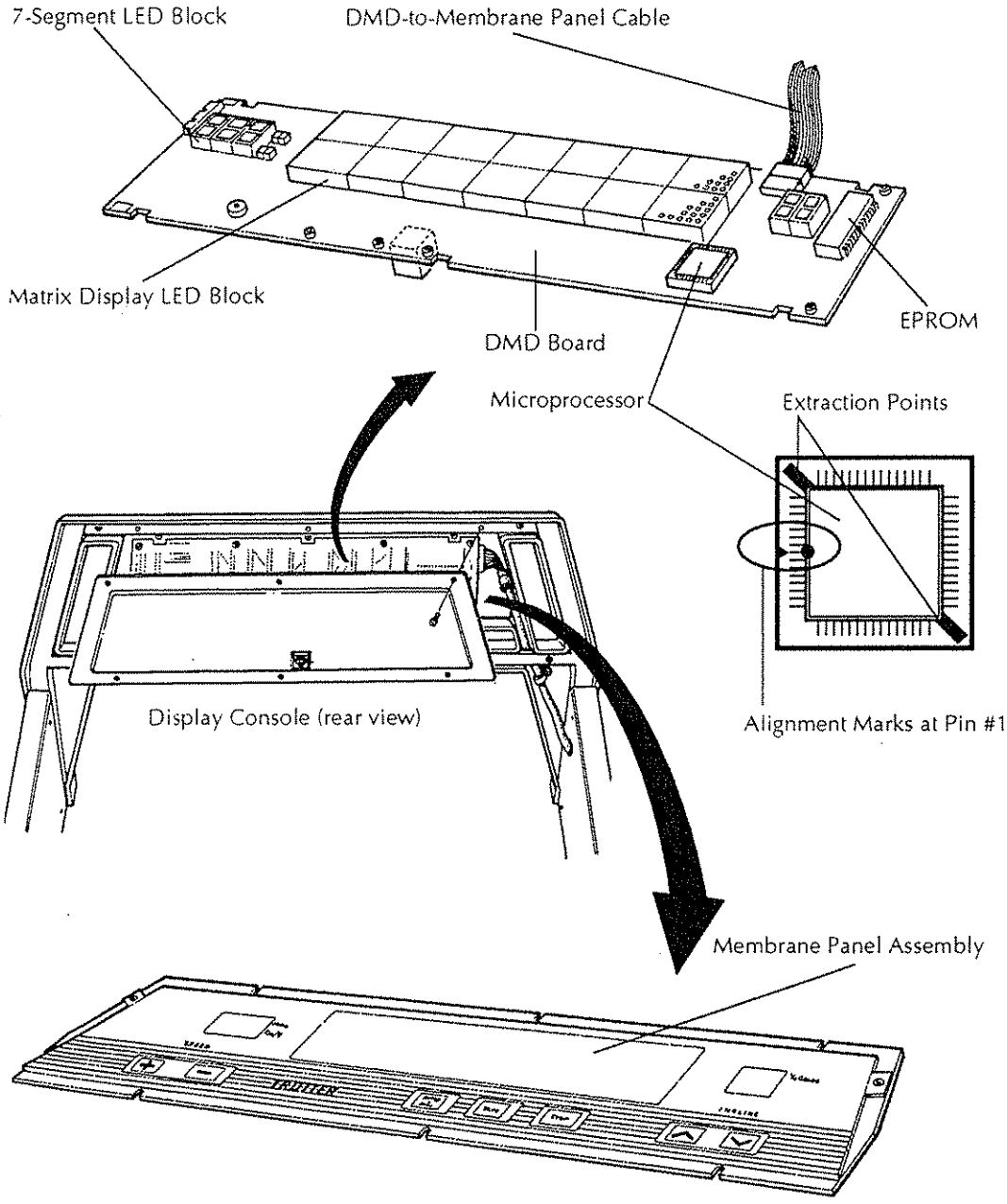


Figure 5-22: Replacing Display Console Components

Membrane Panel

To replace the membrane panel, complete the following:

1. Remove the upper circuit board (DMD). Complete the removal procedure contained in the *Upper Circuit Board (DMD)* section (earlier in this chapter).

CAUTION: The DMD board is susceptible to damage from a discharge of static electricity. Before replacing the membrane panel, review and complete the* Handling Precautions *section (earlier in this chapter).

The membrane panel is now free to be replaced.

2. Install a new membrane panel. Reverse Step 1.
3. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the membrane panel.

Microprocessor

To replace the microprocessor, complete the following:

1. Remove the upper circuit board (DMD). Complete the removal procedure contained in the *Upper Circuit Board (DMD)* section (earlier in this chapter).

CAUTION: The microprocessor is susceptible to damage from a discharge of static electricity. Before replacing the microprocessor, review and complete the* Handling Precautions *section (earlier in this chapter).

2. *Carefully* remove the microprocessor from the DMD board, using the Plastic Leaded Chip Carrier (PLCC) extraction tool. See Figure 5-22.

CAUTION: The microprocessor must be properly oriented with its mounting socket during installation. To orientate, align the "dot" engraved on the microprocessor with the arrow engraved on its mounting socket. See Figure 5-22.

CAUTION: The microprocessor pins and its mounting socket connectors can be easily bent. To prevent bending during installation, make sure that these pins/connectors are aligned properly during Step 3.

3. Install a new microprocessor. Reverse Steps 1 and 2.
4. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the microprocessor.

EPROM

To replace the DMD board's EPROM, complete the following:

1. Remove the upper circuit board (DMD). Complete the removal procedure contained in the *Upper Circuit Board (DMD)* section (earlier in this chapter).

CAUTION: The DMD board is susceptible to damage from a discharge of static electricity. Before replacing the EPROM, review and complete the* Handling Precautions *section (earlier in this chapter).

2. *Carefully* remove the EPROM from the DMD board, using an Integrated Circuit (IC) puller. See Figure 5-22.

CAUTION: The EPROM pins can be easily bent. To prevent bending during installation, make sure that these pins are aligned properly during Step 3.

3. Install a new EPROM. Reverse Steps 1 and 2.
4. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing the EPROM.

7-Segment LED Block

To replace a 7-segment LED block from the DMD board, complete the following:

1. Remove the upper circuit board (DMD). Complete the removal procedure contained in the *Upper Circuit Board (DMD)* section (earlier in this chapter).

CAUTION: The DMD board is susceptible to damage from a discharge of static electricity. Before replacing the LED block, review and complete the* Handling Precautions *section (earlier in this chapter).

2. *Carefully* remove the LED block, using a small flat-blade screwdriver, from the DMD board. See Figure 5-22.

CAUTION: The 7-segment LED block pins can be easily bent. To prevent bending during installation, make sure that these pins are aligned properly during Step 3.

3. Install a new 7-segment LED block. Reverse Steps 1 and 2.
4. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing a 7-segment LED block.

Matrix Display LED Block

To replace a matrix display LED block from the DMD board, complete the following:

1. Remove the upper circuit board (DMD). Complete the removal procedure contained in the *Upper Circuit Board (DMD)* section (earlier in this chapter).

CAUTION: The DMD board is susceptible to damage from a discharge of static electricity. Before replacing the LED block, review and complete the* Handling Precautions *section (earlier in this chapter).

2. *Carefully* remove the LED block, using a small flat-blade screwdriver, from the DMD board. See Figure 5-22.

CAUTION: The matrix display LED block pins can be easily bent. To prevent bending during installation, make sure that these pins are aligned properly during Step 3.

3. Install a new matrix display LED block. Reverse Steps 1 and 2.
4. Verify system performance. Complete the *Conducting a System Checkout* section (later in this chapter).

This completes the procedure for replacing a matrix display LED block.

Conducting a System Checkout

The treadmill *must* be successfully checked before it can be turned over to the customer following any corrective maintenance or the replacement of a faulty component.

Notes:
1. If the treadmill fails to successfully complete the system checkout, refer to Chapter 4, Corrective Maintenance.
2. For a detailed description of treadmill operations, refer to Chapter 2, Principles of Operation.

To check out the treadmill, complete the following:

1. Plug the treadmill's power cord into the AC source outlet.
2. Place the treadmill's main AC power switch into the ON position.
   Upon power-up, the system:
   - performs a brief self-test ending in a momentary "beep."
   - displays the AC power source frequency "**50HZ** or **60HZ.**"
   - displays the message, "**TEST DRIVE A TROTTER 525 PERSONAL TRAINER.**"
   - displays the various pre-programmed workout routines available.

3. Press any display console control button. The system prompts with:

   SELECT MODE : MANUAL ▲ PROGRAM ▼ MAN ▲ PRG ▼

4. Press the ▲ display console control button. The system prompts with:

   SET WEIGHT + OR –

   The system will default to 160 lb. (72 kg). Pressing the + or – control button adjusts the displayed number to reflect the user's actual weight.

5. Enter the user's weight value and press the **ENTER/SCAN** control button. After the weight value has been entered, the system will:
   - perform a displayed countdown, "**3...2...1....**" As each number is displayed it is accompanied by an audible "beep."
   - apply power to the main drive motor; setting belt speed to 1 MPH. This figure should be reflected on the display console's speed display.
6. Test the treadmill's running belt for proper tracking and alignment.
7. Enter a variety of speed and elevation commands, including the maximum speed of 10 MPH and maximum elevation of 12% grade, using the display console's command buttons. Make sure that "requested" values appear on the dot matrix display and that "actual" values appear on the 7-segment LED blocks.
8. Press the display console's **STOP** control button.

This completes the procedure for checking out the treadmill system.

Part Numbers

The following table provides a description and number for each Model 525 field replaceable part.

Description	Part Number
Belt, running - regular length, 109-inch	BD-10111
Belt, drive motor - Poly "V"	BD-10187
Spray belt/deck lubricant, for running belt, 16 oz.	CH-00987
DMD-to-relay box assembly cable	AW-10829
Display console (console assembly) w/cable and handrails	AC-10001
Console, gray plastic, front	PL-10644
Console, gray plastic, back	PL-10614
Side stanchion insert, gray plastic, left	PL-10183
Side stanchion insert, gray plastic, right	PL-10184
Control panel, Dot Matrix Display (DMD) board	AD-11370
Membrane panel assembly - overlay	AF-10877
EPROM, program chip, 60Hz / 50Hz	EC-11372
Deck, wood, waxed - regular, 47.4-inch	DK-09688
Deck hardware, flat washer, 1/4-inch	HW-00431
Deck hardware, lock washer, 1/4-inch	HW-00180
Deck hardware, bolt, 1/4-20 x 3/4-inch	HS-00633
Deck hardware, bolt, 1/4-20 x 1-inch	HS-00489
Deck wax, 1 bag	HX-10487
Main drive motor, 60Hz, w/o power cord, pulley & wiring	MR-10235
Main drive motor, 50Hz, w/o power cord, pulley & wiring	MR-10502
Main motor, 60Hz, power cord, pulley, Speed sensor & base	AM-11329
Main motor, 50Hz, power cord, pulley, Speed sensor & base	AM-11484

DESCRIPTION	PART NUMBER
BRUSH FOR DC MOTOR, 60HZ (SET OF TWO)	HX-10300-1
BRUSH FOR DC MOTOR, 50HZ (SET OF TWO)	HX-10300-3
FILTER CAPACITOR, 60HZ	CA-10432
FILTER CAPACITOR, 50HZ	CA-10504
NYLON TIE WRAPS (FILTER CAPACITOR)	EH-10437
FILTER INDUCTOR (CHOKE) ASSEMBLY W/WIRE HARNESS, 60HZ	AX-09848
FILTER INDUCTOR (CHOKE) ASSEMBLY W/WIRE HARNESS, 50HZ	AX-11450
MAIN MOTOR FLYWHEEL, NOT KEYED	FW-09392
MAIN MOTOR MOUNTING PLATE (TENSION ADJUSTMENT PLATE)	FS-11325
MAIN MOTOR PULLEY, 1.5-INCH	PW-11177
ELEVATION MOTOR, 60HZ	AM-11383
ELEVATION MOTOR, 50HZ	AM-11364
BELT ASSEMBLY FOR ELEVATION SENSOR, 10.3-INCH	HX-00516
ELEVATION ASSEMBLY ROD, STRUTS & WHEELS (ARM ASSEMBLY W/WHEELS)	AE-11330
POTENTIOMETER ASSEMBLY (BRACKET, GEAR, POTENTIOMETER & WIRING)	AX-09669
POTENTIOMETER, 1 K OHM	RE-10200
POTENTIOMETER GEAR	GR-09276
FRAME FOOT	HX-08570
FRAME FOOT, MOUNTING SCREW, #10-32 X 7/8-INCH	HS-00763
FRAME FOOT, MOUNTING NUT, #10-32	HN-00401
FRONT ROLLER (W/O SHEAVE)	AL-09872
GRAY PLASTIC FRONT HOOD COVER	PL-10175
FRONT ROLLER SHEAVE, 4.5-INCH	FW-09280
FRONT ROLLER, TRACKING ADJUSTMENT BOLT, 3/8 - 16 X 3-INCH	HS-10435
HANDRAIL, FOAM RUBBER GRIPS	HX-10203
HANDRAIL, ENDCAPS	HX-10179

Description	Part Number
Label, belt CAUTION	DE-00931
Left stripe	DE-11189-1
Right stripe	DE-11189
Tape, side "525," 1 each	DE10620
Tape, wing walk, foot placement, 3.5 x 20-inch	DE-10202
Bottle touch up paint, dark gray (frame)	PT-10880
Rear roller, 2.5-inch	AL-09620
Rear roller, bronze washer	HB-00188
Rear roller, nut: 1/2 - 13	HN-10029
Rear roller, nylon bushing	HW-00590
Rear roller, gray safety cover guard	FS-09246
Relay box assembly, 60Hz	AR-10915
Relay box assembly, 50Hz	AR-10901
Relay box (lower circuit board), 60Hz	AD-10912
Relay box (lower circuit board), 50Hz	AD-10899
Relay box fuse, 25 amp, 60Hz	EF-10042
Relay box fuse, 16 amp, 50Hz	EF-10517
Relay box fuse, 3 amp, 60Hz	EF-10043
Relay box fuse, 1.6 amp, 50Hz	EF-10673
Relay box fuse holder screw-on cap	EF-00285
SCR module	CR-10890
SCR module - heat sink compound, 8 oz.	CH-00909
SCR module - heat sink compound, 4 gram	CH-10296
AC line filter (Corcom)	EC-10910
Line power cord, 115 VAC (w/o connectors)	AW-10938
Line power cord, 230 VAC (w/o connectors)	WR-10367
Speed sensor assembly	AX-09837

6

Technical Specifications

Introduction

The information contained in this chapter is used to provide TROTTER service personnel with supplemental technical reference information in the form of schematics.

The following table provides schematic descriptions, figure numbers, and page numbers for each circuit found on the lower circuit board.

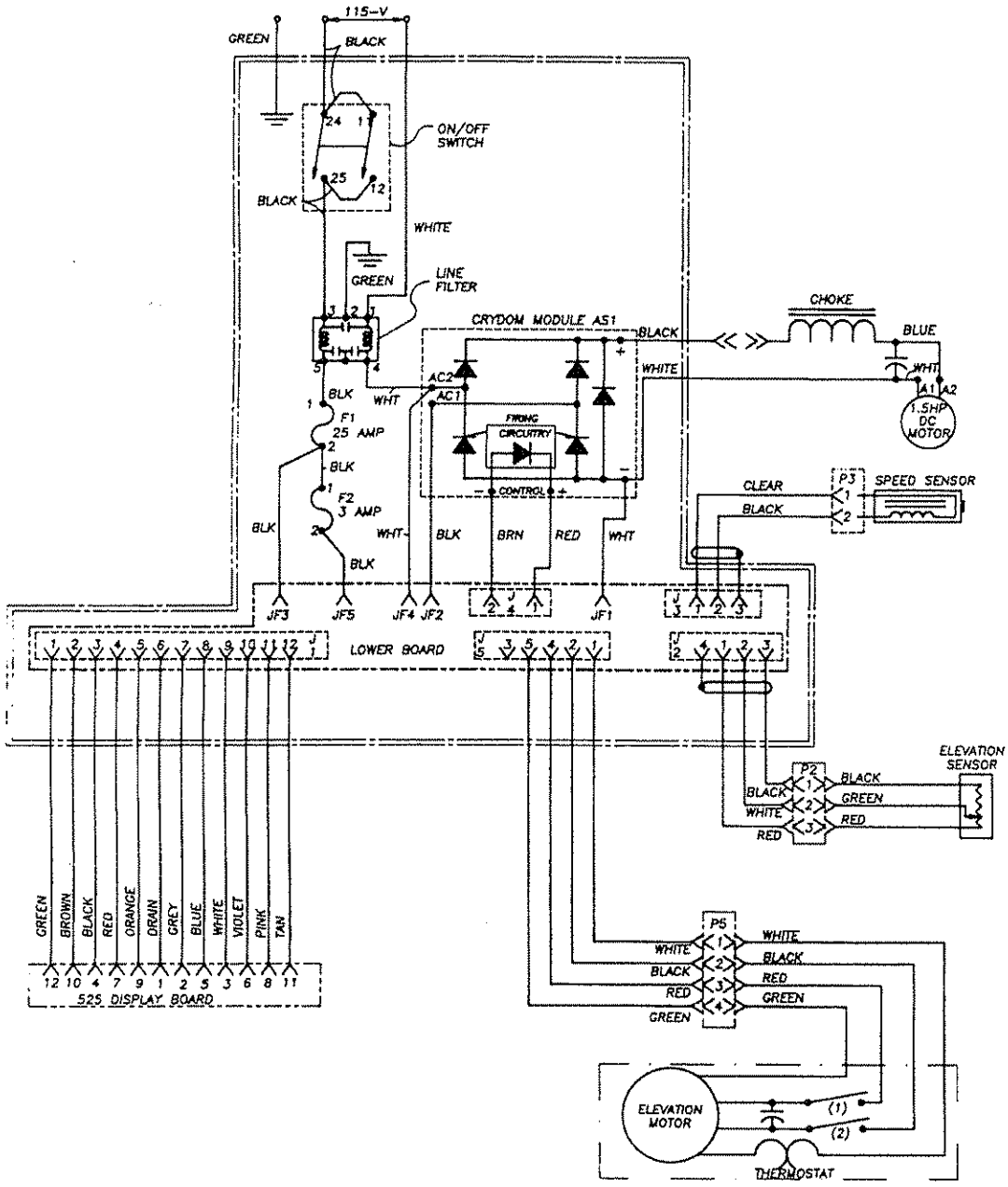


Figure 6-1: System Schematic (60 Hz)

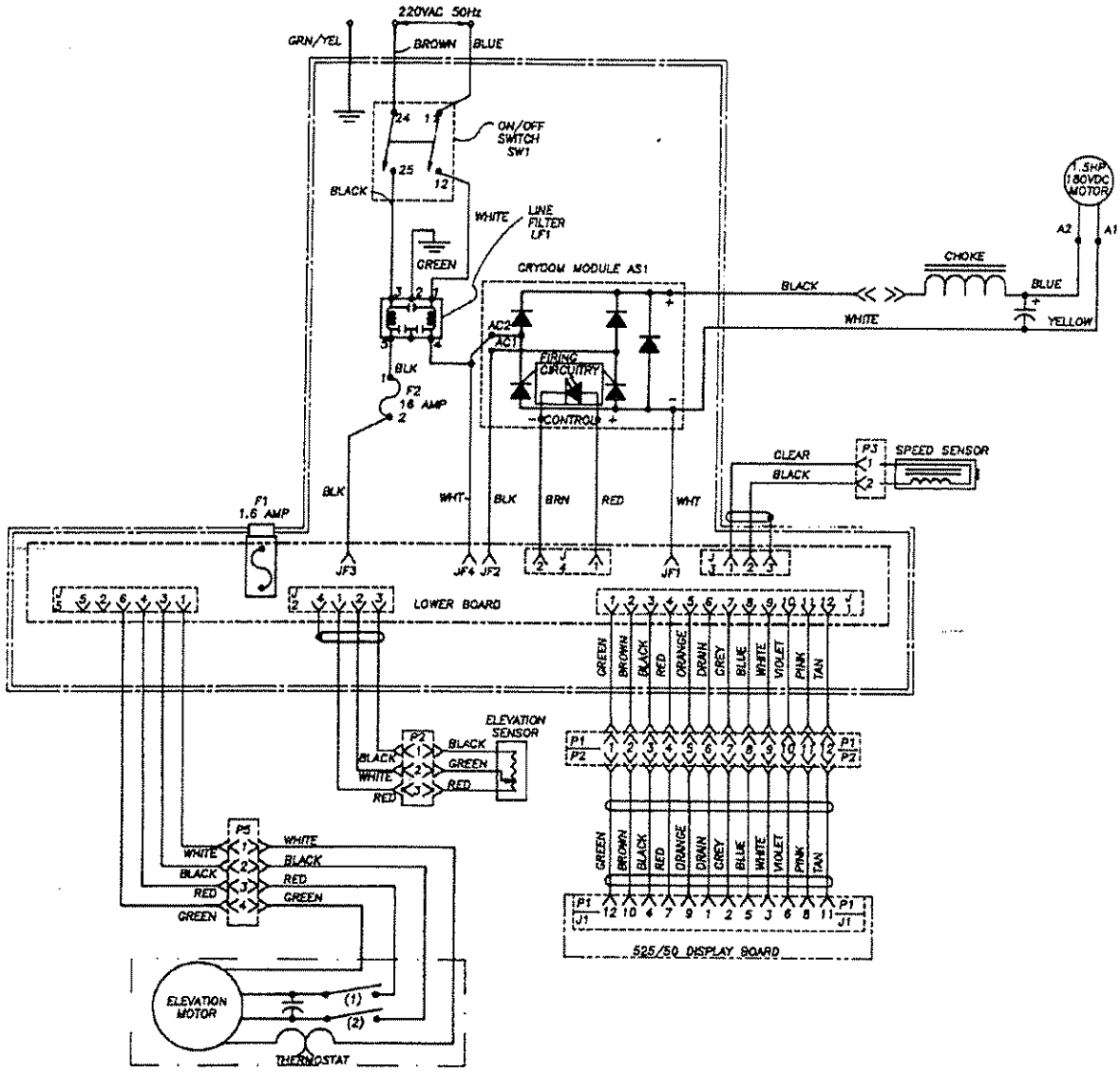


Figure 6-2: System Schematic (50 Hz)

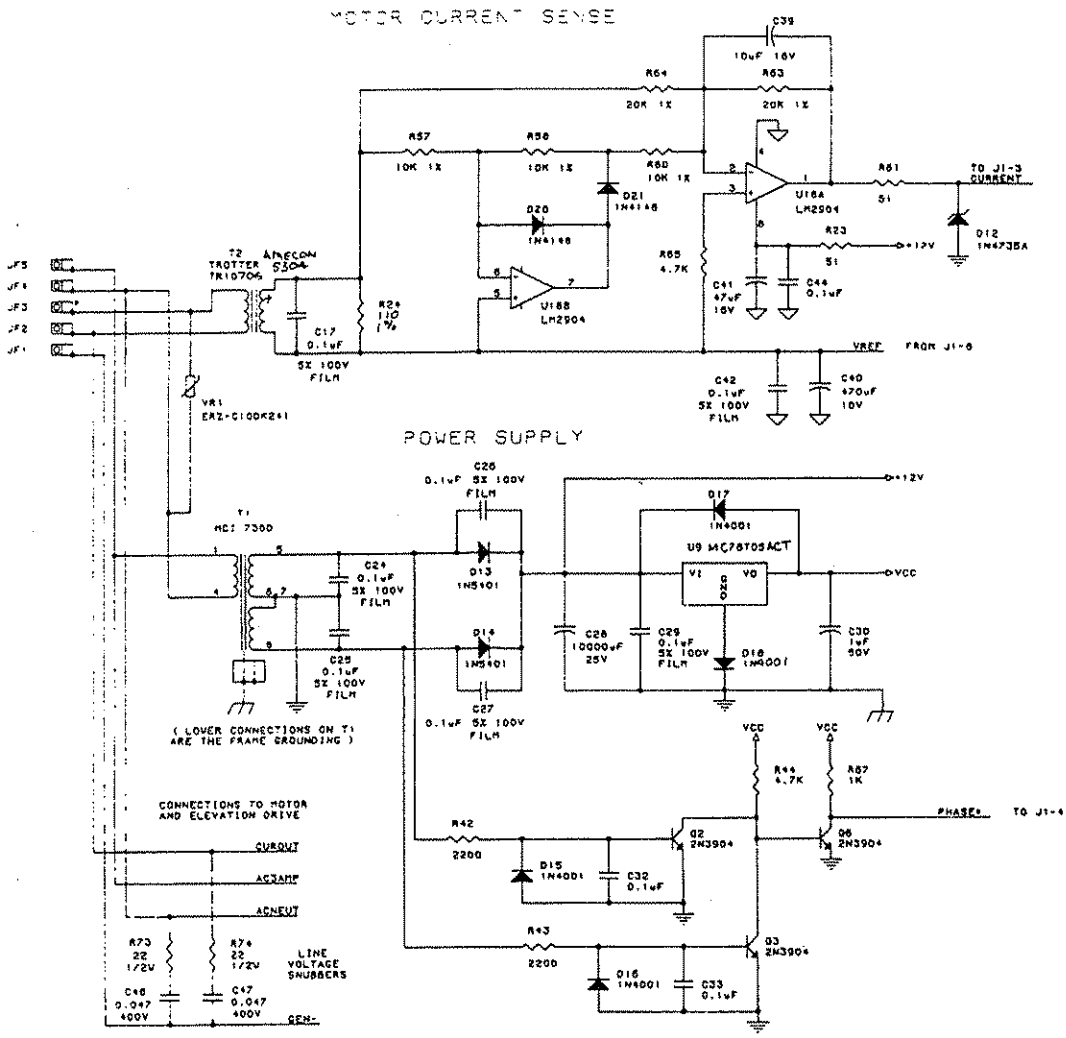


Figure 6-3: Power Supply and Motor Current Sense (60 Hz)

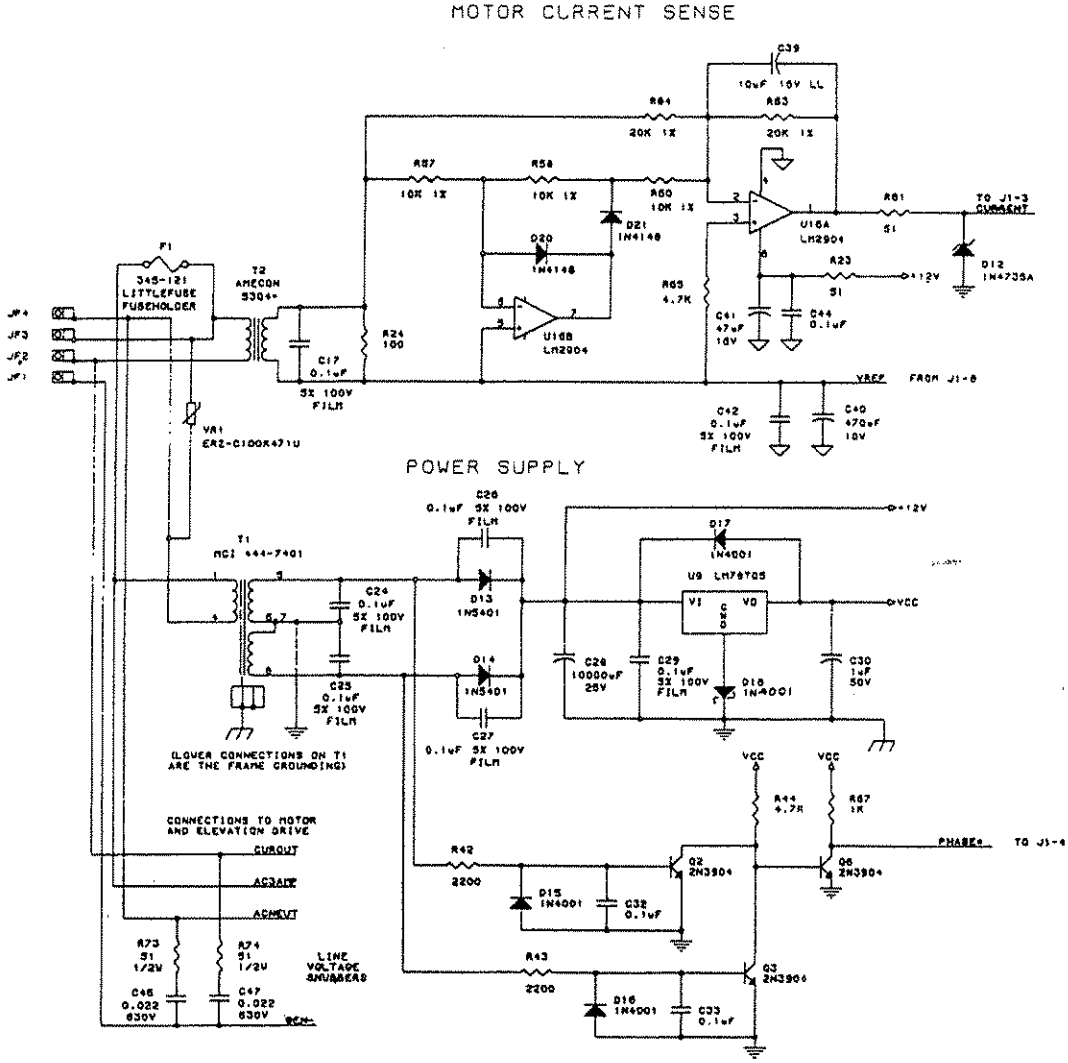
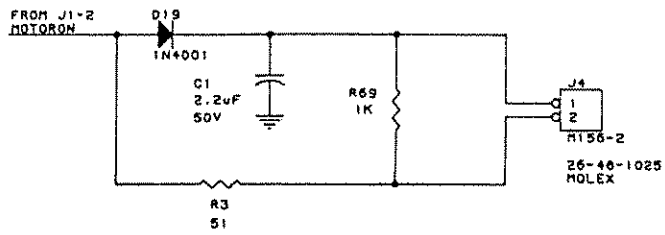


Figure 6-4: Power Supply and Motor Current Sense (50 Hz)

SCR Drive (60Hz)



SCR Drive (50Hz)

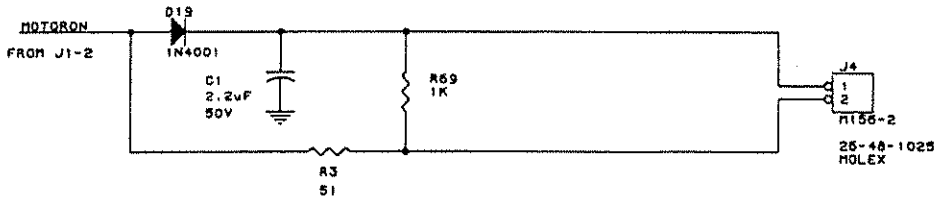
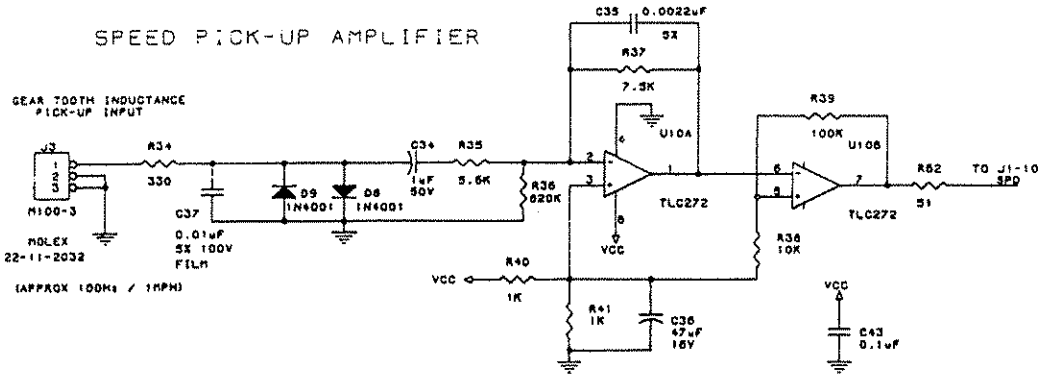


Figure 6-5: SCR Drive (60 Hz/50 Hz)

Speed Pick-up Amplifier (60Hz)



Speed Pick-up Amplifier (50Hz)

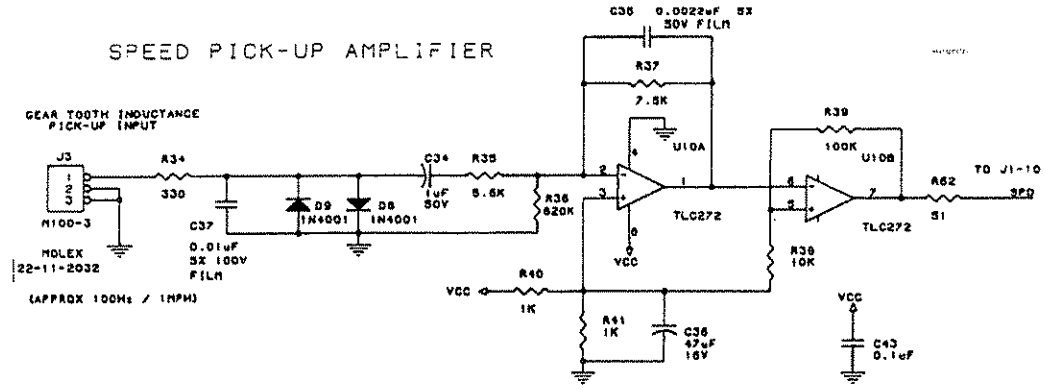


Figure 6-6: Speed Pick-up Amplifier (60 Hz/50 Hz)

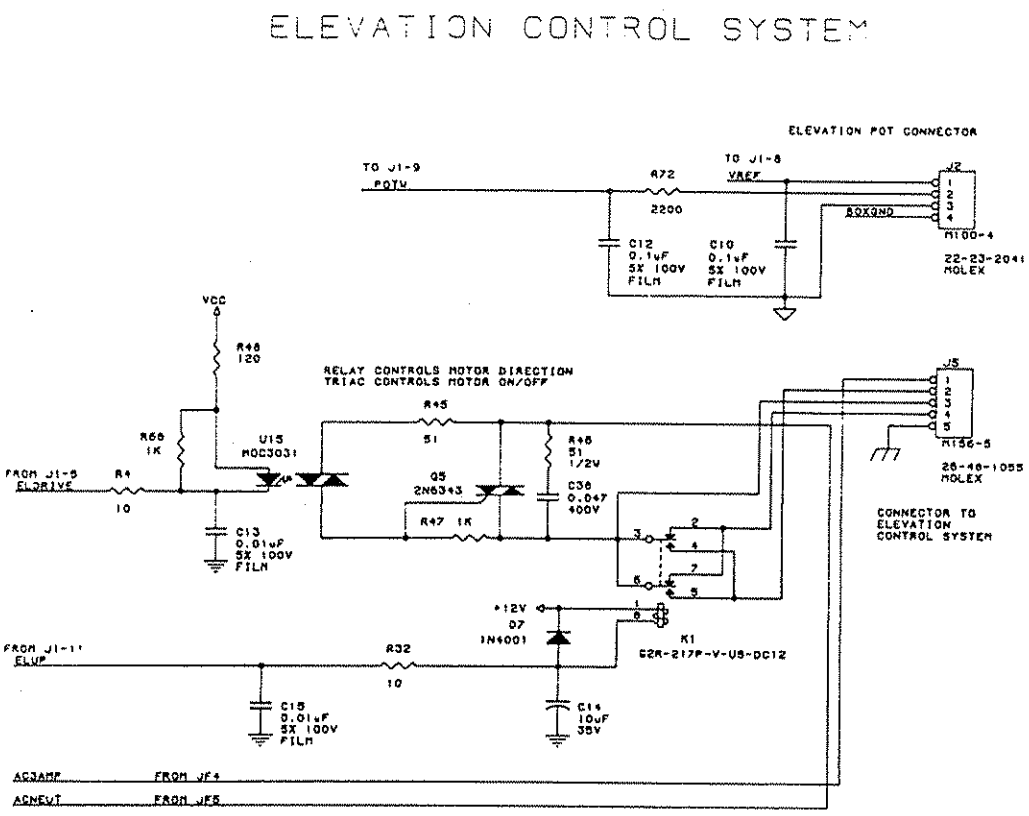


Figure 6-7: Elevation Control System (60 Hz)

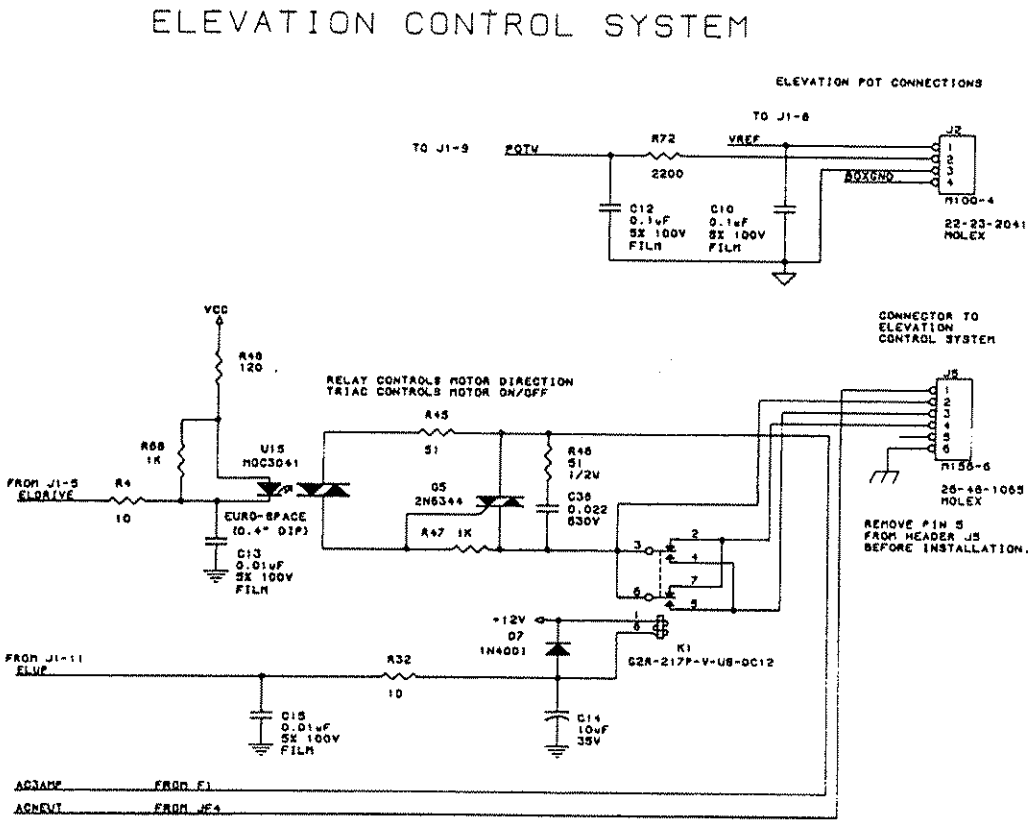
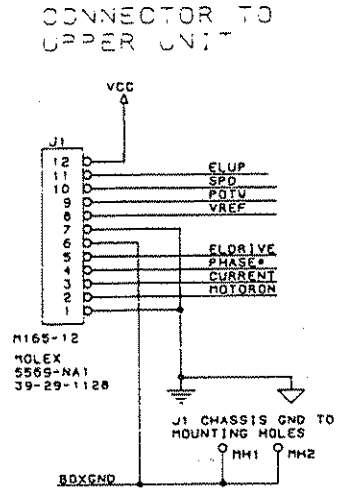


Figure 6-8: Elevation Control System (50 Hz)

Connector J1 (60Hz



Connector J1 (50Hz

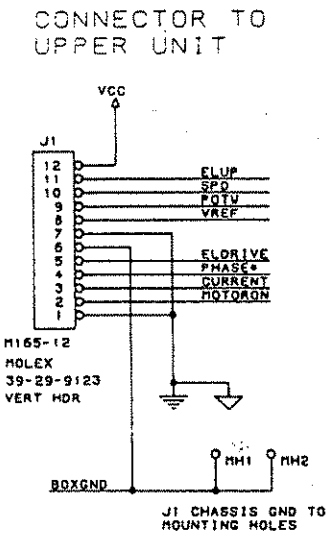


Figure 6-9: Relay Box-to-DMD Cable Connector J1 (60 Hz/50 Hz)