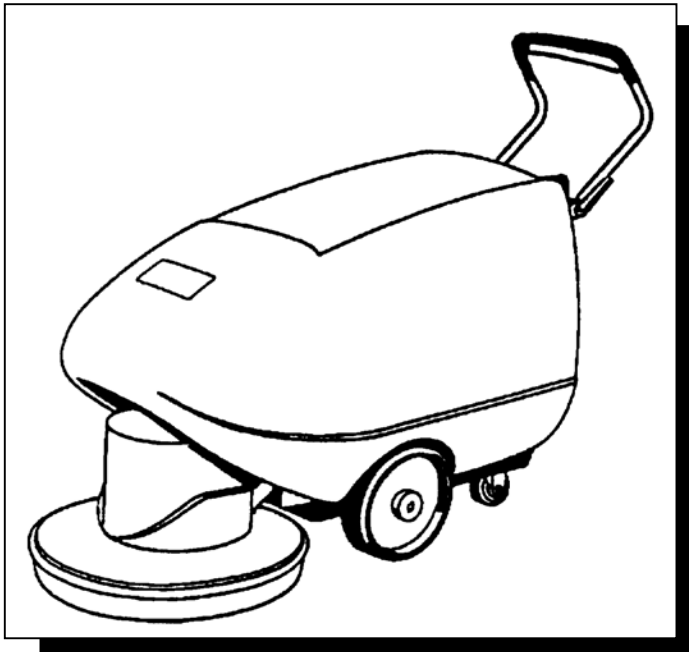


# LIGHTNING

BATTERY POWERED HIGH SPEED BURNISHER



Operating Instructions (ENG)  
Bedienungsanleitung (GER)

**MODEL:** L20  
10027100  
L20T  
10027110

**QUEST** ...for Continuous Improvement  
Windsor's Quality Management System is Certified ISO 9001.



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*Read these instructions before operating the machine.  
Bitte lesen Sie diese Anleitungen, bevor Sie die Maschine in Gebrauch nehmen*

## **MACHINE DATA LOG**

**MODEL** \_\_\_\_\_

**DATE OF PURCHASE** \_\_\_\_\_

**SERIAL NUMBER** \_\_\_\_\_

**SALES REPRESENTATIVE #** \_\_\_\_\_

Copyright 1995 Windsor Industries. Printed in USA

### **YOUR DEALER**

**Name:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Phone Number:** \_\_\_\_\_

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## HOW TO USE THIS MANUAL

This manual contains the following sections:

- HOW TO USE THIS MANUAL
- SAFETY
- OPERATIONS
- MAINTENANCE
- PARTS LIST

The HOW TO USE THIS MANUAL section will tell you how to find important information for ordering correct repair parts.

Parts may be ordered from authorized dealers. When placing an order for parts, the machine model and machine serial number are important. Refer to the MACHINE DATA box which is filled out during the installation of your machine. The MACHINE DATA box is located on the inside of the front cover of this manual.

MODEL _____
DATE OF PURCHASE _____
SERIAL NUMBER _____
SALES REPRESENTATIVE # _____
<small>Copyright 1995 Windsor Industries, Printed in USA</small>

The model and serial number of your machine is on the bottom back-end of the machine.

The SAFETY section contains important information regarding hazard or unsafe practices of the machine. Levels of hazards is identified that could result in product or personal injury, or severe injury resulting in death.

The OPERATIONS section is to familiarize the operator with the operation and function of the machine.

The MAINTENANCE section contains preventive maintenance to keep the machine and its components in good working condition. They are listed in this general order:

- Batteries
- Maintenance
- Shunt Adjustments
- Shaft Adjustment
- Lubrication
- Troubleshooting

The PARTS LIST section contains assembled parts illustrations and corresponding parts list. The parts lists include a number of columns of information:

- **REF** – column refers to the reference number on the parts illustration.
- **PART NO.** – column lists the part number for the part.
- **PRV NO.** - reference number.
- **QTY** – column lists the quantity of the part used in that area of the machine.
- **DESCRIPTION** – column is a brief description of the part.
- **SERIAL NO. FROM** – column indicates the first machine the part number is applicable to. When the machine design has changed, this column will indicate serial number of applicable machine. The main illustration shows the most current design of the machine. The boxed illustrations show older designs.
- **NOTES** – column for information not noted by the other columns.

*NOTE: If a service or option kit is installed on your machine, be sure to keep the KIT INSTRUCTIONS which came with the kit. It contains replacement parts numbers needed for ordering future parts.*

*NOTE: The number on the lower left corner of the front cover is the part number for this manual.*

## IMPORTANT SAFETY INSTRUCTIONS

**When using an battery powered appliance, basic precaution must always be followed, including the following:**

**READ ALL INSTRUCTIONS BEFORE USING THIS MACHINE.**



**WARNING:** To reduce the risk of fire, electric shock, or injury:

**Use only** indoors. Do not use outdoors or expose to rain.

**Use only** as described in this manual. Use only manufacturer's recommended components and attachments.

If the machine is **not working properly**, has been dropped, damaged, left outdoors, or dropped into water, return it to an authorized service center.

**Do not** operate the machine with any openings blocked. Keep openings free of debris that may reduce airflow.

This machine **is not** suitable for picking up hazardous dust.

**Machine can cause a fire** when operating near flammable vapors or materials. Do not operate this machine near flammable fluids, dust or vapors.

**This machine is suitable for commercial use, for example in hotels, schools, hospitals, factories, shops and offices for more than normal housekeeping purposes.**

Maintenance and repairs **must be done** by qualified personnel.

If foam or liquid comes out of machine, **switch off immediately**.

**Disconnect** battery before cleaning or servicing.

Before the machine is discarded, the batteries **must be removed** and properly disposed of.

Make sure all warning and caution labels **are legible and properly attached** to the machine.

**During operation**, attention shall be paid to other persons, especially children.

**Before use** all covers and doors shall be put in the positions specified in the instructions.

**When leaving unattended**, secure against unintentional movement.

**The machine shall only** be operated by instructed and authorized persons.

**When leaving unattended**, switch off or lock the main power switch to prevent unauthorized use.

**Only chemicals recommended** by the manufacturer shall be used.

**This appliance has been designed** for use with the brushes specified by the manufacturer. The fitting of other brushes may affect its safety.

**Do not** use on surfaces having a gradient exceeding 2% unless the optional parking brake is installed on the machine.

## SAVE THESE INSTRUCTIONS

## HAZARD INTENSITY LEVEL

The following symbols are used throughout this guide as indicated in their descriptions:

### HAZARD INTENSITY LEVEL

There are three levels of hazard intensity identified by signal words -**WARNING** and **CAUTION** and **FOR SAFETY**. The level of hazard intensity is determined by the following definitions:

#### **WARNING**

**WARNING** - Hazards or unsafe practices which COULD result in severe personal injury or death.

#### **CAUTION**

**CAUTION** - Hazards or unsafe practices which could result in minor personal injury or product or property damage.

#### **FOR SAFETY: To Identify actions which must be followed for safe operation of equipment.**

Report machine damage or faulty operation immediately. Do not use the machine if it is not in proper operating condition. Following is information that signals some potentially dangerous conditions to the operator or the equipment. Read this information carefully. Know when these conditions can exist. Locate all safety devices on the machine. Please take the necessary steps to train the machine operating personnel.

#### **FOR SAFETY:**

DO NOT OPERATE MACHINE:

Unless Trained and Authorized.

Unless Operation Guide is Read and understood.

In Flammable or Explosive areas.

In areas with possible falling objects.

#### **WHEN SERVICING MACHINE:**

Avoid moving parts. Do not wear loose clothing; jackets, shirts, or sleeves when working on the machine. Use Windsor approved replacement parts.

#### **WARNING**

Batteries emit hydrogen gas. Explosion or fire can result. Keep sparks and open flame away. Keep solution tank in raised position when charging. Keep sparks and flames away from the batteries. Do not smoke around batteries.

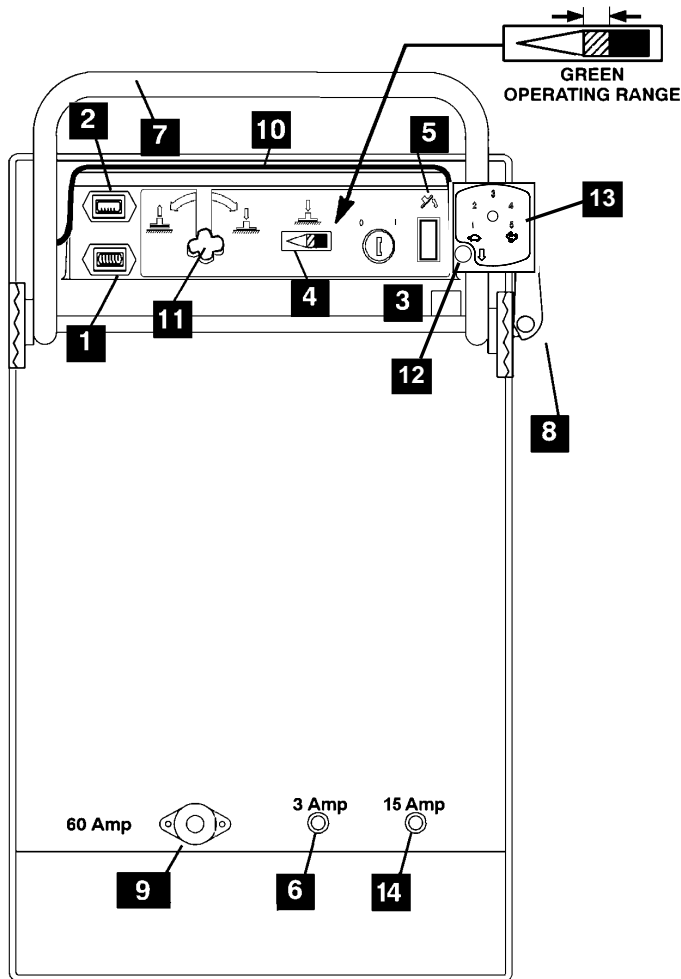
#### **WARNING**

Disconnect batteries before working on machine. Only qualified personnel should work inside machine. Always wear eye protection and protective clothing when working on or near batteries. Avoid skin contact with the acid contained in the batteries.

#### **WARNING**

Never allow metal to lie across battery tops.

## COMPONENTS/CONTROLS

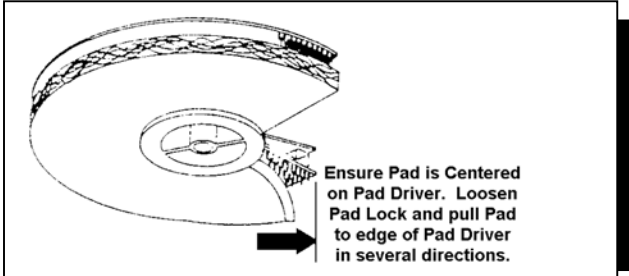


1. **Hour Meter.** Records machine use time.
2. **Battery Condition Light.** Indicates the charge condition of batteries.
3. **Main Power Switch.** Turns On and Off the machine.
4. **Pad Pressure Meter.** "Green Area" indicates correct pad pressure range.
5. **Burnishing Head Switch.** Raises and lowers burnishing head.
6. **3 Amp Circuit Breaker.** Thermal circuit breaker protects lift mechanism. Press to reset.
7. **Main Handle.**
8. **Handle Adjustment Lever.**
9. **Breaker.** 60 amp magnetic circuit breaker, protects pad driver motor. Press to reset.
10. **Pad Motor Switch Bar.** Raising bar turns on pad driver motor.
11. **Pad Adjustment Knob.** Rotating knob adjusts pad pressure.
12. **Reverse Button (Traction model only).** Propel bar must be squeezed and button pushed for reverse travel.
13. **Speed Control (Traction model only).** Knob rotated left to right for slow to fast speed.
14. **15 Amp Circuit Breaker (Traction model only).** Protects transaxle.

## MACHINE OPERATION

### PRE-RUN MACHINE INSPECTION

1. Disconnect the battery charger. (See *battery charging procedure*).
2. Close the cover.
3. To raise the deck: Turn on the main power switch and press the burnishing head switch.
4. Turn or install a new burnishing pad as needed.  
**NOTE:** Pad lock has left hand threads. To loosen turn clockwise.



5. Check wheels and other pivot points for proper lubrication.

---

### OPERATING THE MACHINE

1. If using a machine that is already set up, check to make sure the pad is properly installed.
2. Adjust the operating control handle to a comfortable position using the handle lock lever.
3. Turn on the main power switch.
4. Lower or raise deck by pressing burnishing head switch.
5. The pad motor will only run when the burnishing head is lowered to within 3 inches of the floor.
6. The drive controls are shown on page 3-1.
7. The pad pressure is adjusted using the knob at center of panel. The operator monitors the amp draw using the meter located on the control panel and ensures that the needle remains in the "green" operating range. (See page 3-1, #4 & 11).

### CAUTION

To prevent possible damage to the floor surface, always keep the machine moving while the pad is spinning.

8. When the pad motor switch bar is squeezed, the pad motor runs.
9. Return the machine to the battery charger when the battery light indicator light is amber. Do not operate machine when indicator is flashing red.

### FILTER BAG

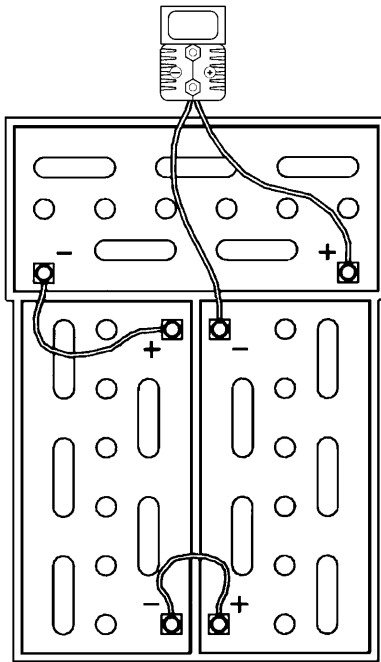
The filter bag is accessed under the cover.

### DUST CONTROL SKIRT

Replace skirt (**86007290 – PRV NO. 730017**) when worn, torn, or damaged in any way that allows dust to escape.



## BATTERY INFORMATION



### CHARGE BATTERIES IN A WELL-VENTILATED AREA WITH DECK DOWN AND COVER OPEN.

1. Use a 36 volt, 20 amp maximum output, D.C. charger that turns itself off, when batteries are fully charged. The charger must have a connector that matches the machine battery connection.
2. Read the instructions and warnings provided by the battery charger manufacturer.
3. Set the charger in a well-ventilated area on a level surface. Make sure cords will easily reach outlets on both machine and wall.
4. **Connect charger to D.C. outlet on machine first.**
5. Connect the A.C. power cord to properly grounded wall socket. **NEVER MAKE THE A.C. CONNECTION FIRST, HAZARDOUS SPARKS MAY RESULT.**
6. After the batteries are completely charged disconnect the charger from the A.C. wall socket.
7. Once the charger is disconnected from the A.C. wall socket, it is safe to disconnect the charger from the machine.
8. When the batteries are fully charged, check the electrolyte level by removing the caps on top of the batteries. If necessary fill the cells with distilled water as shown in the diagram below. Be careful not to overfill cells.

### BATTERY MAINTENANCE

1. When cleaning batteries use a solution of baking soda and water. (Do not allow cleaning fluid to enter inside battery cells.)
2. Keep a proper electrolyte level in battery cells.
3. Wipe down the battery tops at least once a week. If a cell should accidentally overflow, clean immediately.
4. Test battery condition with a hydrometer at least once a week.
5. Ensure that all connections are tight and that all corrosion is removed.
6. Every 4 to 6 months remove batteries from the machine and clean the battery compartment.

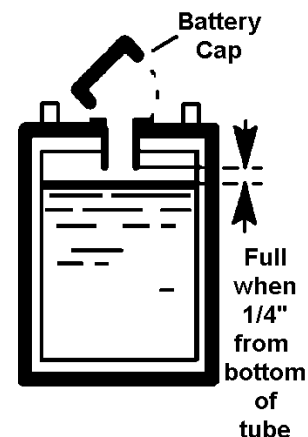
### BATTERY CHARGING PROCEDURE

Charge the batteries once the amber charge level light comes on. The amber light indicates that there is about 20% charge left in the batteries. **Do not let the batteries completely drain before charging.** Avoid charging the batteries before the amber light comes on. The machine will run for hours on fully charged, well maintained batteries.

### **WARNING:**

**DO NOT SMOKE, HAVE OPEN FLAMES, OR SPARKS NEAR BATTERIES AT ANY TIME.**

**WEAR EYE PROTECTION AND PROTECTIVE CLOTHING WHEN WORKING WITH BATTERIES.**



## MAINTENANCE

### WEEKLY MAINTENANCE

1. Use a hydrometer to check the condition of each battery cell.
2. Check battery cable clamps. Ensure clamps are tight on battery terminals.
3. Clean tops of batteries with a wet cloth and a solution of water and baking soda. Wipe battery tops dry after cleaning.
4. Check pad lock for looseness or damage.
5. Check filter and filter seals. Airflow should be unobstructed through filter.
6. Ensure that the pivot points and casters are properly lubricated.
7. Tighten any loose screws or nuts.

### 4 TO 6 MONTH MAINTENANCE

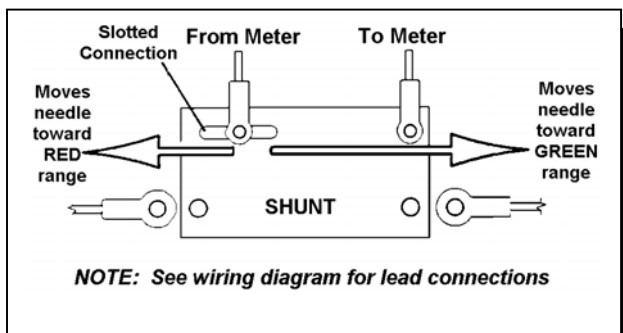
1. Remove batteries-clean battery tray and battery compartment.
2. Clean battery cable clamps and battery terminals.
3. Check the carbon motor brushes in the pad driver motor.
4. Use a vacuum to remove lint or dust build-up from motor windings.
5. Grease axles.

### AT THE END OF EACH WORK PERIOD:

1. Wipe down the exterior of the machine.
2. Lower the deck.
3. Open the cover.
4. Charge the batteries. (See battery charging procedure on page 4-1.)

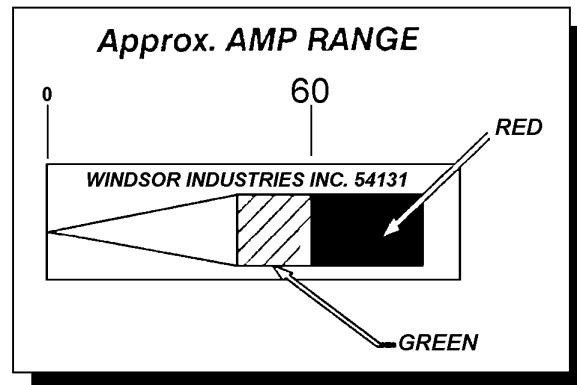
### SHUNT ADJUSTMENT

This pad pressure meter adjustment is factory set. Over the course of time it may become necessary to adjust this setting using the slotted connection on the shunt.



### SHUNT ADJUSTMENT (Cont.)

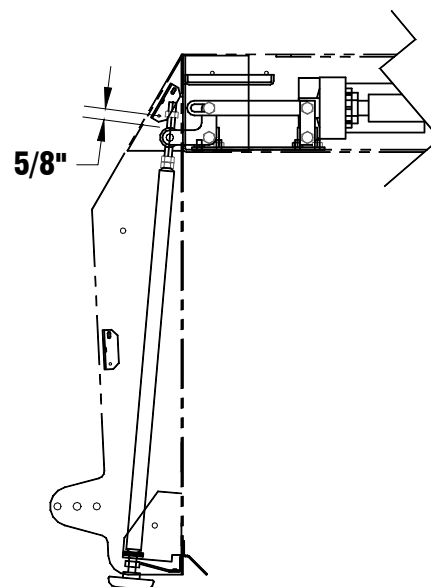
Check the amp range when nuisance tripping of the circuit breaker indicates that the shunt may be out of adjustment.



1. Connect a DC ampere meter to the positive battery lead. Running the machine with a pad, lower the pad to the floor until it is operating at 55-60 amps.
2. Moving the wire in the slot, adjust the pad pressure meter until the needle sets at the line between the green and red areas.
3. Check the other points indicated in the diagram above. The high end should trip the circuit breaker. Replace the pad pressure meter if the approximate amp ranges shown cannot be set.

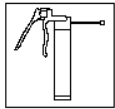
### SHAFT ADJUSTMENT

If shaft is replaced make sure it is adjusted correctly upon installation.

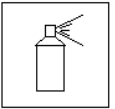


## LUBRICATION & SERVICE SCHEDULE

The following symbols found throughout the manual indicate items requiring lubrication:



APPLY GREASE



USE SPRAY LUBRICANT



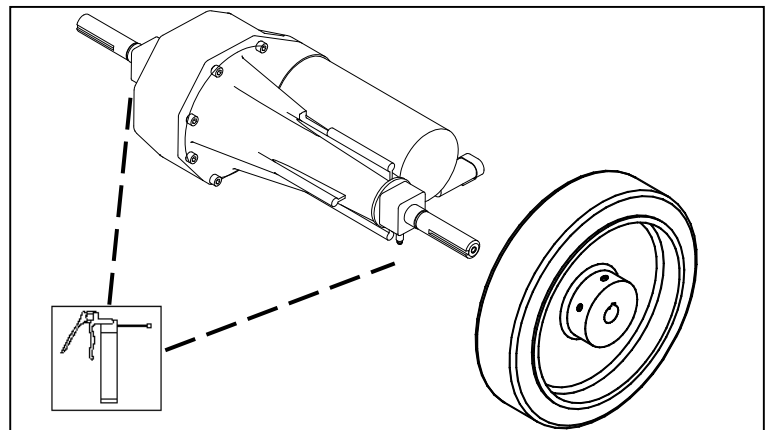
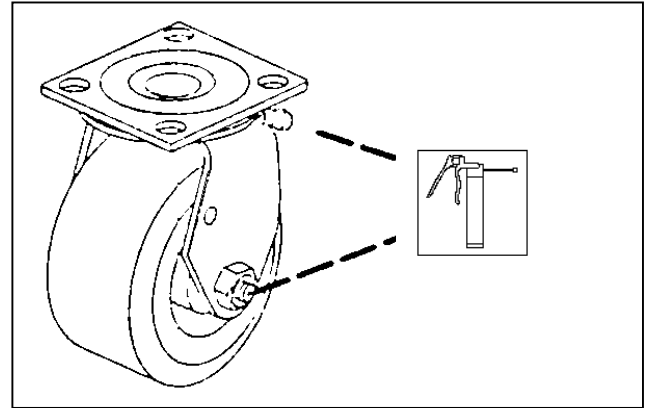
USE ANTI-SEIZE WHEN REPAIRING



PERMANENT (RED) THREAD LOCK TIGHT

### AXLE GREASING:

1-2 STROKES OF MOBILTEMP®78 OR COMPATIBLE CLAY-BASED OR CALCIUM-BASED GREASE.



**CAUTION:** Do not use pressure washers to clean sealed gear boxes or bearings. If it becomes necessary to clean under machine with a pressure washer; Ensure all items noted are re-lubricated

## SERVICE SCHEDULE

MAINTENANCE	DAILY	MONTHLY
Check batteries after charging; add water if necessary	*	
Check pad wear to prevent buildup of chemicals	*	
Check pad driver system for damage	*	
Check bag/filter	*	
Check handles, switches, and knobs for damage	*	
Store with pad off the floor	*	
Check batteries for corrosion, cracks and evidence of overheating		*
Check all bearings for noise		*
Check skirt/bumpers for damage and replace as necessary		*
Grease wheels and casters (if appropriate)		*
Check potentiometer (speed control) for adjustment		*
Check overall performance of machine		*

## MACHINE TROUBLESHOOTING

PROBLEM	CAUSE	SOLUTION
No power to machine	Poor Cable Connection	Clean battery cable clamps of any corrosion and tighten. Test voltage at points G to B should be from 34 to 38 VDC.
	Faulty Main Power Switch	With the main power switch turned on, test voltage at points D to B should be from 34 to 38 VDC. If there is no voltage remove leads and check switch for continuity. Replace if necessary
Pad motor won't run	Circuit breaker has tripped	Reset circuit breaker (H).
	Actuator Safety Switch	With main power on, pad lowered to floor, switch bar pulled up, test voltage at L (wire #2) to B (rear panel) should be 34 to 38 VDC. If not, check and adjust or replace safety switch as necessary.
	Faulty Relay	With main power on, pad lowered to floor and drive handle squeezed: Test voltage at points F to B and A to B should be from 34 to 38 VDC. When the relay is working it should make a clicking noise as the drive handle is squeezed. Replace relay if the test voltage F to B is OK. If test voltage F to B is not OK, check all wiring to pad motor relay.
Deck lift mechanism not working	Circuit breaker has tripped	Reset circuit breaker (J).
Deck switch not working		With main switch on, test voltage at C (5) to C (2) should be 34 to 38 VDC. If not check circuit breaker (J) and main power switch. If the test voltage at C (5) to C (2) is 34 to 38 VDC, the voltage at deck switch C (3) to C (6) should be 34 to 38 VDC when the deck switch is pressed to raise/lower the pad. If not, replace deck switch.
Deck actuator not working		If the deck switch tested OK, but the deck lift actuator still is not working, disconnect the white and black wires to actuator (K) and apply 36 VDC directly to actuator. If the actuator does not respond, replace actuator.
Handle switch not working		Check power from E (wire #1) to B. Check switch continuity.
Drive Controls	Circuit breaker has tripped.	Check if power at wire #26. If yes, but breaker has no power at wire 28 either reset breaker (Q) or replace.
	Bad switch (es).	Check continuity at handle switch for non-traction model. Check continuity at propel switch or pad motor switch for traction model. Replace as necessary.
	Loose connection.	Check all connections of propel circuit especially at M, N, P, R, S & T. Check transaxle connection at U.
	Faulty potentiometer.	With the drive motor disconnected at V, test the output voltage to the drive motor. The output voltage at V should vary from 0 to 36V at R & S as the control lever is squeezed. Resistance of the potentiometer can be tested at the leads 4 & 1 found at the potentiometer T. The resistance should vary from 0-50K ohms.
	Faulty drive control board.	Voltage at T1 (P) to T2 (N) should be from 34 to 38VDC. If the voltage at T1 is good but the propel motor won't respond, and all the tests above have been done, replace the drive control board.

## ***TROUBLESHOOTING.***

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
<b>Drive controls cont.</b>	Faulty motor.	Squeeze the control lever and test the voltage at U (wire #27 & 28). When the output voltage varies with the control lever but the motor does not respond and all the tests above have been done, replace the motor.
<b>Machine will not propel</b>	Loose Connection.	With main power on, test voltage at terminal 30 (X) on Relay should be 34 to 38 VDC. With switch on, check voltage to wire side of resistor (Y). Should be 34 to 38 VDC.
	Bad Relay.	With main power on, test voltage at terminal 87 (Z) should be 34 to 38 VDC.
	Faulty Resistor.	With main power on, test voltage at terminal 85 (AA) should be 22 to 26 VDC.