

# OPERATION AND MAINTENANCE MANUAL WITH PARTS LIST

MODEL:	E 4-50
SERIAL NO.:	76000-81495
YEAR:	1984-1986
MANUAL NO.:	ME-450-01

## - IMPORTANT -

READ AND FOLLOW INSTRUCTIONS GIVEN  
IN SAFETY & OPERATIONS AND THOSE  
SECTIONS RELATED TO YOUR SERVICE  
AND REPAIR RESPONSIBILITIES



## **TAYLOR-DUNN**

*Commercial and Industrial Vehicles Since 1949*

2114 W. Ball Rd., Anaheim, CA 92804 (714)956-4040 Fax (714)956-0504  
Mailing Address: P.O. Box 4240, Anaheim, California 92803

## TABLE OF CONTENTS

CONTENTS	SECTION	ILLUSTRATION
INSPECTION CHECKLIST & INTRODUCTION	A	
OPERATION INSTRUCTIONS	B	
WARRANTY	C	
MAINTENANCE GUIDE CHECKLIST	D	
LUBRICATION DIAGRAM	E	Figure 1
TROUBLE SHOOTING CHECKLIST	F	
WIRING DIAGRAM	G	Figure 2
PARTS ORDERING PROCEDURE	H	
RECOMMENDED SPARE PARTS LIST	I	

### MAINTENANCE PROCEDURES, SERVICE AND ADJUSTMENTS PARTS ILLUSTRATIONS AND LISTINGS

FRONT AXLE STEERING & TIRES	J1	Figure 3 or 4
REAR AXLE, MOTOR AND BRAKES	J2	Figure 5
MECHANICAL CONTROL LINKAGE	J4	Figure 7
FORWARD/REVERSE SWITCH	J5	Figure 8
SPEED CONTROL & MAIN POWER SWITCHING	J6	Figure 9
SPEED CONTROL & MAIN POWER SWITCHING AND GENERAL ELECTRICAL SYSTEM	J7	Figure 10A
BATTERIES & CHARGER	J8	
BODY & TRIM PARTS	J9	Figure 11
D.C. MOTOR	J2M	Figure 5M
PWR TRON SUPPLEMENT		

- IMPORTANT INFORMATION -

This vehicle conforms to applicable portions of ANSI B56.8 (American National Standard Personnel and Burden Carriers). This manual is designed for use by Vehicle Operators and Service Personnel alike. Throughout the manual, there are various WARNINGS, CAUTIONS and NOTICES which must be carefully read to help reduce the possibility of personal injury. Maintenance personnel must understand that if a service procedure or method is used that is not recommended by Taylor-Dunn, it then becomes the personal responsibility of the person performing the work to first satisfy himself that neither his safety, the safety of others, or the safety of the vehicle will be endangered.

Definitions of the three terms are as follows:

WARNING - There is a potential for injury to yourself or others.

CAUTION - There is a potential for damage to the vehicle.

NOTE - Specific information clarifying or giving the reason for a particular maintenance or service procedure.

Before operating your Taylor-Dunn vehicle, it is your responsibility to read, understand and follow the safety and operating instructions contained in this manual to help ensure your safety and comfort. If this car is to be used for rental purposes, it is your responsibility to explain to the operator about the various controls and vehicle operating characteristics. Equally important is the operators need to know the basic rules required for safe operation of the vehicle in day to day usage. Sections 5 and 6 of ANSI B56.8 have been inserted in Section B, page 3 of this manual for your specific operating guidelines.

1. Vehicle is to be operated only by qualified persons and only in designated areas.
2. Vehicle will not be started until all occupants are seated.
3. Occupants must remain seated while vehicle is in motion.
4. Arms, legs and feet must be kept inside while vehicle is in motion.
5. Slow down when making a turn.
6. Drive slowly straight up and down inclines.
7. Set parking brake before leaving vehicle.
8. Forward/Reverse lever must be in the correct position for direction of travel desired.

**WARNING:** Failure to comply with above instructions could result in injury to the vehicle occupants, bystanders and to property.

INSPECTION, SAFETY AND INTRODUCTION  
ARRIVAL INSPECTION CHECKLIST

Visual inspection should be made to determine that the truck has remained in good condition during transit. If any damage is found, the details should be noted on the delivery receipt immediately. After delivery the truck should be most carefully checked for HIDDEN DAMAGE. Any concealed damage not noted on the delivery receipt should be reported, in writing, to the delivering carrier within 48 hours.

The following checklist has been prepared to aid you during arrival and inspection of your vehicle.

- a. Open all packages and examine any accessories which may be shipped detached from vehicle.
- b. Examine wiring for visible evidence of damage, check all connections to insure that none have loosened during transit.
- c. Check all battery connections and eletrolyte level in each cell.
- d. Inspect battery charger in accordance with manufacturers installation instructions.
- e. Check tires for damage and proper inflation. Check wheel lugs to insure their being tight.
- f. If vehicle is equipped with hydraulic brakes, check hydraulic lines for evidence of damage.
- g. Check brake fluid level in master cylinder.
- h. Examine entire vehicle for damage such as dents or cracks.
- i. Check operation of controls to see that they are working freely.

Upon completion of the visual inspection, an operational test should be made after reading the remainder of Section A and operating instructions contained in Section B.

NOTE: Occasionally you may receive a "Power Traction" equipped vehicle with the oil level below the oil level point. This is a perfectly normal situation and is not harmful to the unit. It occurs during vehicle transit when oil drains from the chain case into the drive axle housing. A short period of normal operation will restore the chain case oil level to the proper point. To hurry the process, drive the vehicle in reverse for a few minutes then proceed with normal operation.

## INSPECTION AND INTRODUCTION

### INTRODUCTION

This vehicle is primarily designed as a rider type electric tractor, for use in warehouse and industrial plants on smooth floors. It is not designed for outside use, over rough ground or up steep ramps. Its compact design and short turning radius are ideally suited for narrow aisles. The Standard Model operates at 2 to 5 M.P.H. with a normal draw bar pull of 225 to 350 lbs.. The heavy Duty Model operates at 2 to 6 M.P.H. with a normal draw bar pull of 500 lbs. to 700 lbs., depending upon motor size and operating voltage. The frame is constructed of heavy steel plate. All components are ruggedly designed and mounted to the main frame. Access panels are provided at strategic points for ease of maintenance and service.

#### MODEL NO.

The following Model Numbers are covered by this manual:

3450E, 3451E, 3452E, 3453E, 3457E and 3458E

#### SERIAL NO.

The Serial Number of your unit is stamped into the angle frame member, between battery compartment and control console 4" from the left side. The Model Number and Serial Number are on a nameplate riveted to the dash panel adjacent to Forward/Reverse Switch. When ordering parts or referring to your unit, please use these numbers. Replacement parts can be purchased directly from your local authorized dealer.

### OPERATING INSTRUCTIONS

The controls on your Taylor-Dunn vehicle have been designed and located for convenience of operation and efficient performance. Before driving your vehicle for the first time, familiarize yourself with each of the controls. Read the following instructions and with power OFF, operate each control. By following this suggestion you will attain a "feel" for their operation prior to traveling under power for the first time.

#### STEERING

The steering wheel and steering system is similar to automotive types. Turn the steering wheel to the right (or clockwise) for a right turn and left (or counterclockwise) for a left turn.

#### BRAKE-AUTOMATIC (DEADMAN)

The foot treadle is a combination brake and accelerator. It is designed for right foot operation and pivots near the center. Applying pressure with your heel controls the braking action. The greater the pressure applied with your heel the greater the braking action.

A heavy spring control is incorporated with the treadle linkage and automatically returns the treadle to a brake applied position whenever the foot is removed. (Refer to Safety Interlock for additional instructions.)

#### ACCELERATOR PEDAL

The same foot treadle is the accelerator control. Applying toe pressure to depress the treadle turns power on to the drive motor. The amount of power delivered to the motor is controlled by the amount the treadle is depressed. Full power when fully depressed, and minimum power when partially depressed.

#### SAFETY INTERLOCK & BRAKE PRESSURE RELEASE (Foot Control)

The pedal located on the left floor board controls the electric safety interlock. Power to the drive motor remains disconnected until the pedal is depressed. Releasing the pedal immediately shuts off all power to the drive motor.

A second function of the pedal is to hold the automatic deadman brake spring pressure in a released position while operating the tractor. This feature has been added to reduce fatigue from constant heavy treadle pressure. To release spring pressure first depress accelerator treadle to full on position, next depress interlock pedal with left foot. Return accelerator treadle to off position. You will be able to feel the ease with which the accelerator now operates. Removing the left foot from the pedal immediately resets the brake spring pressure for positive braking action.

#### FORWARD - REVERSE SWITCH

The forward - reverse switch is located on the console adjacent to steering wheel. It is operated by its handle. To place in forward position push handle in forward direction. To place in reverse position pull handle to rear towards reverse direction. The forward-reverse switch also incorporates a safety interlock feature. Placing the switch in a neutral position even momentarily disconnects power to the drive motor. To restore power to the drive motor it is necessary to return the accelerator treadle to neutral. This feature protects the drive from being switched to reverse while operating at full speed in the forward direction, or vice versa.

#### STANDARD OPTIONAL ACCESSORIES

##### HORN BUTTON

The horn button is located to the right of steering wheel. Depressing button sounds horn. Releasing button will immediately silence horn.

##### LIGHT SWITCH

The light switch that controls headlamps and taillamps is located in the control console. It is labelled for On-Off positions.

##### BATTERY CHARGER

Refer to Section J-8 for proper instructions to operate your battery charger.

##### SPECIAL ACCESSORIES

Refer to the appropriate section of this manual for separate operating instructions pertaining to any special feature or accessory your vehicle may have.

AMERICAN NATIONAL STANDARD  
PERSONNEL AND BURDEN CARRIERS

OPERATING RESPONSIBILITIES

ANSI B56.2-1981

SECTION 5

OPERATING RULES AND PRACTICES

501 OPERATOR QUALIFICATIONS

Only trained and authorized operators shall be permitted to operate a Personnel and Burden Carrier. Operators of Personnel and Burden Carriers shall be qualified as to visual, auditory, physical, and mental ability to safely operate the equipment according to Section 5 and all other applicable parts of this standard.

502 PERSONNEL AND BURDEN CARRIER OPERATORS' TRAINING

(a) The carrier owner, lessee, or employer of the carrier operator shall conduct an operators' training program for the carrier operators.

(b) Successful completion of the operators' training program shall be required by the owner, lessee, or employer of the carrier operator before operation of the Personnel and Burden Carrier by any operator.

(c) An effective operator's training program should center around user company's policies, operating conditions, and their Personnel and Burden Carrier. The program shall be presented complete to all new operators and not condensed for those claiming previous experience.

(d) Information on operator training is available from several sources, including carrier manufacturers.

(e) The carrier owner, lessee, or employer of the carrier operator should include in the operators' training program the following:

(1) Careful selection of the operators, considering physical qualifications, job attitude, and aptitude

(2) Emphasis on safety of stock, equipment operator, and other employees.

(3) General safety rules contained in this standard and the additional specific rules determined by the carrier owner, lessee, or employer of the carrier operator in accordance with this standard, and why they were formulated

(4) Introduction of equipment, control locations and functions, and explanation of how they

work when used properly and when used improperly; and ground and floor conditions, grade, and other conditions of the environment in which the Personnel and Burden Carrier is to be operated

(5) Operational performance tests and evaluations during, and at completion of, the program

(6) Rules of the employer and any applicable labor contract governing and dealing with discipline of employees for violation of employer's rules, and including safety rules

503 OPERATOR RESPONSIBILITY

Operators of Personnel and Burden Carriers shall abide by the following safety rules and practices in 504, 505, 506, and 507.

504 GENERAL

(a) Safeguard the pedestrians at all times. Do not drive carrier in a manner that would endanger anyone.

(b) Riding on the carrier by persons other than the operator is authorized only when personnel seat(s) are provided. Do not put any part of the body outside the outer perimeter of the carrier.

(c) When a Personnel or Burden Carrier is left unattended, stop carrier, place directional controls in neutral, apply the parking brake, stop the engine or turn off power, turn off the control or ignition circuit, remove the key if provided, and block the wheels if machine is on an incline.

(d) A Personnel and Burden Carrier is considered unattended when the operator is 25 ft (7.6 m) or more from the carrier which remains in his view, or whenever the operator leaves the carrier and it is not within his view. When the operator of a Personnel and Burden Carrier is dismounted and within 25 ft (7.6 m) of the carrier still in his view, he still must have controls neutralized, and brakes set to prevent movement.

(e) Maintain a safe distance from the edge of ramps and platforms.

(f) Use only approved Personnel and Burden Carriers in hazardous locations.

(g) Report all accidents involving personnel, building structures, and equipment.



AMERICAN NATIONAL STANDARD  
PERSONNEL AND BURDEN CARRIERS

ANSI B56.2-1981

(h) Operators shall not add to, or modify, the Personnel and Burden Carrier.

(i) Fire aisles, access to stairways, and fire equipment shall be kept clear.

(j) Operators and personnel shall be warned of the hazards of long hair and loose clothing.

#### 505 TRAVELING

(a) Observe all traffic regulations, including authorized plant speed limits. Under normal traffic conditions keep to the right. Maintain a safe distance, based on speed of travel, from the carrier or vehicle ahead; and keep the Personnel and Burden Carrier under control at all times.

(b) Yield the right of way to pedestrians, ambulances, fire trucks, or other carriers or vehicles in emergency situations.

(c) Do not pass another carrier or vehicle traveling in the same direction at intersections, blind spots, or at other dangerous locations.

(d) Keep a clear view of the path of travel, observe other traffic and personnel, and maintain a safe clearance.

(e) Slow down and sound the audible warning device at cross aisles and other locations where visibility is obstructed.

(f) Ascend or descend grades slowly.

(g) Use extra caution when operating on grades. Never turn on any grade, ramp, or incline; always travel straight up and down.

(h) Under all travel conditions the carrier shall be operated at a speed that will permit it to be brought to a stop in a safe manner.

(i) Make starts, stops, turns, or direction reversals in a smooth manner so as not to shift the load, overturn the carrier, or both.

(j) Do not indulge in stunt driving or horseplay.

(k) Slow down when approaching, or on, wet or slippery surfaces.

(l) Do not run carrier onto any elevator unless specifically authorized to do so. Approach elevators slowly, and then enter squarely after the elevator car is properly leveled. Once on the elevator, neu-

tralize the controls, shut off power, and set brakes. It is advisable that all other personnel leave the elevator before a carrier is allowed to enter or leave.

(m) Avoid running over loose objects on the roadway surface.

(n) Prior to negotiating turns, reduce speed to a safe level, turning hand steering wheel or tiller in a smooth, sweeping motion.

#### 506 LOADING

(a) Handle only stable or safely arranged loads. When handling off-center loads which cannot be centered, operate with extra caution.

(b) Handle only loads within the capacity of the Personnel and Burden Carrier as specified on the nameplate.

(c) Handle loads exceeding the dimensions used to establish carrier capacity with extra caution. Stability and maneuverability may be adversely affected.

#### 507 OPERATOR CARE OF MACHINE

(a) At the beginning of each shift during which the Personnel and Burden Carrier will be used, the operator shall check the carrier condition and inspect the tires, warning devices, lights, battery, controller, brakes, and steering mechanism. If the carrier is found to be in need of repair, or in any way unsafe, or contributes to an unsafe condition, the matter shall be reported immediately to the designated authority, and the carrier shall not be operated until it has been restored to safe operating condition.

(b) If during operation the carrier becomes unsafe in any way, the matter shall be reported immediately to the designated authority, and the carrier shall not be operated until it has been restored to safe operating condition.

(c) Do not make repairs or adjustments unless specifically authorized to do so.

(d) The engine shall be stopped and the operator shall leave the carrier while refueling.

(e) Spillage of oil or fuel shall be carefully and completely absorbed or evaporated and fuel tank cap replaced before starting engine.

AMERICAN NATIONAL STANDARD  
PERSONNEL AND BURDEN CARRIERS

ANSI Z55.3-1981

(f) Do not operate a carrier with a leak in the fuel system or battery.

(g) Do not use open flames for checking electrolyte level in storage batteries or liquid level in fuel tanks.

SECTION 6

MAINTENANCE PRACTICES

601 INTRODUCTION

Personnel and Burden Carriers may become hazardous if maintenance is neglected. Therefore, maintenance facilities, trained personnel, and procedures shall be provided,

602 MAINTENANCE PROCEDURES

(a) Maintenance and inspection of all Personnel and Burden Carriers shall be performed in conformance with the manufacturer's recommendations and the following practices.

(b) A scheduled preventive maintenance, lubrication, and inspection system shall be followed.

(c) Only qualified and authorized personnel shall be permitted to maintain, repair, adjust, and inspect Personnel and Burden Carriers.

(d) Before leaving the Personnel and Burden Carrier, stop carrier, place directional controls in neutral, apply the parking brake, stop the engine or turn off power, turn off the control or ignition circuit, and block the wheels if carrier is on an incline.

(e) Before undertaking maintenance or repair on carrier, raise drive wheels free of floor or disconnect battery, and use chocks or other positive carrier positioning devices.

(f) Block chassis before working under it.

(g) Before disconnecting any part of the engine fuel system of a gasoline or diesel powered carrier with gravity feed fuel systems, be sure shutoff valve is closed, and run engine until fuel system is depleted and engine stops running.

(h) Before disconnecting any part of the engine fuel system of LP gas powered carriers, close the LP gas cylinder valve and run the engine until fuel in the system is depleted and the engine stops running.

(i) Carriers shall be kept in a clean condition to minimize fire hazards and facilitate detection of loose or defective parts.

(j) Modifications and additions which affect capacity and safe machine operation shall not be performed by the customer or user without manufacturer's prior written authorization: where authorized modifications

(i) Operation to check performance of the Personnel and Burden Carrier shall be conducted in an authorized area where safe clearance exists.

(j) Before starting to operate the carrier:

(1) Have operator in the operating position.

(2) Depress clutch (or brake pedal on automatic transmissions and electric carriers).

(3) Place directional controls in neutral.

(4) Start engine or switch electric carrier to "on" position.

(5) Check functioning of directional and speed controls, steering, warning devices, and brakes.

(k) Avoid fire hazards and have fire protection equipment present in the work area. Do not use an open flame to check level or leakage of fuel, electrolyte, or coolant. Do not use open pans of fuel or flammable cleaning fluids for cleaning parts.

(l) Properly ventilate work area.

(m) Handle LP gas cylinders with care. Physical damage, such as dents, scrapes, or gouges, may dangerously weaken the tank and make it unsafe for use.

(n) Brakes, steering mechanisms, control mechanisms, warning devices, lights, governors, guards, and safety devices shall be inspected regularly and maintained in a safe operating condition.

(o) Special Personnel and Burden Carriers or devices designed and approved for hazardous area operation shall be inspected to ensure that maintenance preserves the original approved safe operating features.

(p) Fuel systems shall be checked for leaks and condition of parts. Action shall be taken to prevent the use of the carrier until the leak has been corrected.

(q) The Personnel and Burden Carrier manufacturer's capacity, operation, and maintenance instruction plates, tags, or decals shall be maintained in legible condition.

(r) Batteries, motors, controllers, limit switches, protective devices, electrical conductors, and connections shall be inspected and maintained in conformance with good practice.

have been made, the user shall ensure that capacity, operation, warning, and maintenance instruction plates, tags, or decals are changed accordingly.

(u) Care shall be taken to assure that all replacement parts are interchangeable with the original parts and of a quality at least equal to that provided in the original equipment.

VEHICLE OWNER AND OPERATOR'S GUIDELINES

OPERATING YOUR VEHICLE

To put your vehicle into operation, unlock forward/reverse switch by turning keyed lock counter clockwise. Select direction you wish to travel by moving handle of forward/reverse switch into position. Release parking brake, slowly depress accelerator pedal until vehicle is moving at the desired speed. Steer vehicle as required utilizing the foot brake and accelerator to control your speed as desired.

CAUTION: DO NOT "hold vehicle at a standstill on a hill or incline using accelerator only. Continued "stalled" condition as described will damage motor and electrical controls. Use either your foot brake or hand brake to hold the vehicle on a hill safely.

CAUTION: When you leave your vehicle, it is best to always place forward/reverse switch in neutral position. Set parking brake to prevent vehicle from rolling free, and lock and remove key.

Drive safely and enjoy your Taylor-Dunn vehicle.

## TAYLOR-DUNN LIMITED 90 DAY WARRANTY

TAYLOR-DUNN MANUFACTURING COMPANY (TDMC), warrants each new Taylor-Dunn vehicle for ninety (90) days according to the following terms:

This warranty provides coverage for the original retail purchaser only and becomes effective on the date of the original retail purchase.

Any part of the Taylor-Dunn vehicle manufactured or supplied by TDMC and found in the reasonable judgment of TDMC to be defective in material or workmanship will be repaired and/or replaced at the business location of an authorized Taylor-Dunn distributor only without charge for parts and labor. The Taylor-Dunn vehicle (including any defective part) must be delivered to an authorized Taylor-Dunn distributor within the warranty period.

All costs of a service call regarding warranty-related repairs and/or replacements on the Taylor-Dunn vehicle at the owner's location, the labor performed by the distributor at the owner's location, all costs of delivering the Taylor-Dunn vehicle to the distributor for warranty work and the costs of returning the Taylor-Dunn vehicle back to the owner after repair or replacement will be paid for by the owner. Proof of purchase will be required by the authorized Taylor-Dunn distributor to substantiate any warranty claim. All warranty work must be performed by an authorized Taylor-Dunn distributor.

TDMC does not provide a warranty related to SCR's, tires, batteries, chargers, or other parts not of their manufacture as such parts are usually warranted separately by their respective manufacturers.

This warranty does not include service items subject to normal wear such as brake linings, seals, belts, light bulbs and fuses.

This warranty does not provide coverage for any Taylor-Dunn vehicle that has been subject to misuse, neglect, negligence, accident, or operated in any way contrary to the operating or maintenance instructions as specified in the TDMC operator's manual. The warranty does not apply to any Taylor-Dunn vehicle that has been altered or modified so as to adversely affect the vehicle's operation, performance or durability or that has been altered or modified so as to change its intended use. In addition, the warranty does not extend to repairs made necessary by normal wear, or by the use of parts or accessories which in the reasonable judgment of TDMC are either incompatible with the Taylor-Dunn vehicle or adversely affect its operation, performance or durability.

Repairs or replacements qualifying under this warranty will be performed by an authorized Taylor-Dunn distributor following delivery of the vehicle to the distributor's place of business. TDMC's responsibility in respect to claims is limited to making the required repairs or replacements. No claim of breach of warranty shall be cause for cancellation of the contract of sale of any Taylor-Dunn vehicle.

TDMC assumes no liability or responsibility for loss of use of the Taylor-Dunn vehicle, loss of time, inconvenience, or other damage, consequential or otherwise, including, but not limited to, all costs for delivering the Taylor-Dunn vehicle to the distributor and all costs of returning the vehicle back to the owner, mechanic's travel time, telephone or telegram charges, trailering or towing charges, rental of a like vehicle during the time warranty repairs are being performed, travel, lodging, loss or damage to personal property, or loss of revenue.

TDMC reserves the right to change or improve the design of any vehicle without assuming any obligation to modify any TDMC vehicle previously manufactured.

All implied warranties are limited in duration to the ninety (90) day warranty period. Accordingly, any such implied warranties

including merchantability, fitness for a particular purpose, or otherwise, are disclaimed in their entirety after the expiration of the ninety (90) day warranty period. TDMC's obligation under this warranty is absolutely and exclusively limited to the repair or replacement of defective parts, and TDMC does not assume, or does not authorize anyone to assume for them, any other obligation.

This warranty applies to all TDMC vehicles sold in the United States.

### WARRANTY SERVICE

To make a claim under warranty, contact an authorized Taylor-Dunn distributor immediately upon realizing a problem exists. We recommend having the warranty work performed by the distributor who originally sold you the vehicle; however, warranty work can be obtained from any authorized Taylor-Dunn distributor. Remember, your Taylor-Dunn vehicle must be delivered to an authorized distributor within the warranty period, and all warranty work must be performed only by an authorized Taylor-Dunn distributor. Your proof of purchase will be required by the dealer to verify any warranty claim.

### Examples of Items Not Covered by Warranty

Provisions of the warranty will not apply to:

Normal service requirements occurring during the warranty period, such as adjustment and cleaning or wear of a drive belt, drive chain, brake or rheostat.

Normal service work over and above the repair and replacement of defective parts. Vehicles subject to misuse, neglect, negligence, or accident.

Vehicles that have been altered or modified so as to adversely affect their operation, performance or durability or to change their intended use.

Repairs made necessary by the use of parts or accessories which are either incompatible with the vehicle or adversely affect its operation, performance or durability.

Vehicles not operated or maintained in accordance with the instructions in the Taylor-Dunn Operator's Manual.

Periodic checking, lubricating the vehicle or service check-up.

All costs of delivering the vehicle to the distributor and all costs of returning the vehicle back to the owner, mechanic's travel time, trailering or towing charges, or rental of a like vehicle during the time warranty repairs are being performed.

This warranty applies only to the original retail purchaser. Second-owner or subsequently owned vehicles are not covered under the warranty.

### Owner's Obligation and Responsibility

Normal maintenance service and replacement of service items are the responsibility of the owner and as such are not considered defects in material or workmanship with the terms of this warranty. Individual operating habits and usage may contribute extensively to the need for maintenance service.

Consult with your authorized Taylor-Dunn distributor for advice on proper maintenance and care of your vehicle. Proper maintenance and care will be very helpful in keeping your overall operating costs at a minimum.

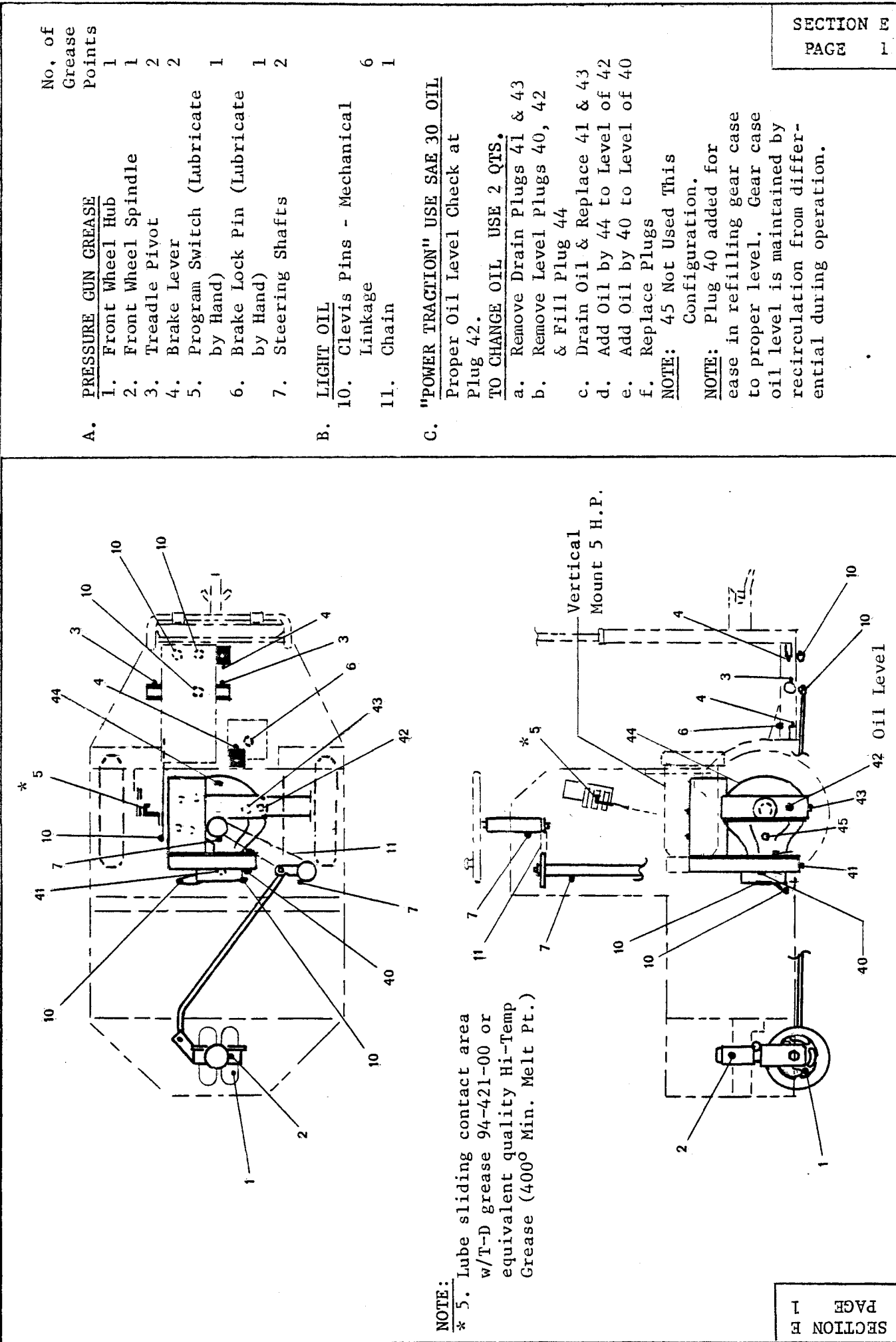
To assure warranty coverage, it is the owner's responsibility to maintain all components in proper adjustment and to service the vehicle as specified in the Taylor-Dunn Vehicle Operator's Manual. It is the owner's responsibility to provide proper lubrication for all components and provide correct recommended battery maintenance, to maintain the battery liquid level and charge as specified, as well as maintain the correct pressure in the tires of the vehicle.

MAINTENANCE GUIDE CHECKLIST

This checklist is provided for your convenience as a guide for servicing your vehicle. If followed you will enjoy a good running and trouble free unit. It has been set up for average normal use. More frequent service is recommended for extreme or heavy usage. If desired your Taylor-Dunn dealer will gladly perform these services for you as he has expert service men in the field for this purpose. Do not hesitate to call your Service Manager if any questions arise.

MAINTENANCE	REFER SECTION	EVERY WEEK	EVERY MONTH	EVERY 3 MONTHS	EVERY YEAR
Check and fill batteries. If necessary fill with distilled water only	J8	X	X	X	X
Clean off all dirt and grease on and between power bars and J hook. Lube sliding contact area with T-D Grease 94-421-00 or equivalent quality hi-temp grease (400 Min. Melt Pt.)	J7	X	X	X	X
Check rheostat adjustment	J7	X	X	X	X
Check all contact points on open contactors.	J6		X	X	X
Adjust Motor Mount & Chain (Refer to Chart Section J2)					
Lubricate all zerk fittings	E		X	X	X
Lubricate all moving parts without zerk fittings. Use all-purpose engine oil.	E		X	X	X
Wash off batteries with water, (Use soda if necessary).	J8		X	X	X
Check all wire connections. Be sure they are all clean and tight.	J7		X	X	X
Check service and adjust manual/automatic brake (Deadman Type).	J2		X	X	X
Check steering chain adjustment	J1		X	X	X
Check rear axle differential oil level (refer to lubrication diagram).	J2 & E		X	X	X
Check, clean, forward/reverse switch	J5		X	X	X
Check brake lining for wear, adjust brake band (replace when necessary).	J2		X	X	X
Check motor brushes. Blow out carbon dust. (Replace if necessary).	J2			X	X
Check and adjust front wheel bearings and fork spindle bearings.	J1			X	X
Drain differential and refill with SAE 30 oil (refer to lubrication diagram).	J2 & E				X
Repack front wheel bearing and front fork spindle bearings (use wheel bearing grease).	J1 & E				X

CAUTION: Never bend the brake band anchor bolt. Any bending of the bolt may result in unexpected failure of the bolt and complete loss of Drive Line braking Action.



- A. PRESSURE GUN GREASE**
- |                                       |                      |
|---------------------------------------|----------------------|
| 1. Front Wheel Hub                    | No. of Grease Points |
| 2. Front Wheel Spindle                | 1                    |
| 3. Treadle Pivot                      | 1                    |
| 4. Brake Lever                        | 2                    |
| 5. Program Switch (Lubricate by Hand) | 2                    |
| 6. Brake Lock Pin (Lubricate by Hand) | 1                    |
| 7. Steering Shafts                    | 2                    |
- B. LIGHT OIL**
- |                                      |   |
|--------------------------------------|---|
| 10. Clevis Pins - Mechanical Linkage | 6 |
| 11. Chain                            | 1 |

- C. "POWER TRACTION" USE SAE 30 OIL**
- Proper Oil Level Check at Plug 42.
- TO CHANGE OIL USE 2 QTS.**
- Remove Drain Plugs 41 & 43
  - Remove Level Plugs 40, 42 & Fill Plug 44
  - Drain Oil & Replace 41 & 43
  - Add Oil by 44 to Level of 42
  - Add Oil by 40 to Level of 40
  - Replace Plugs
- NOTE:** 45 Not Used This Configuration.

**NOTE:** Plug 40 added for ease in refilling gear case to proper level. Gear case oil level is maintained by recirculation from differential during operation.

NO.		DESCRIPTION	LENGTH	QUAN.	REVISED DATE	REVISION
TOL. FRAC. ±		DEC. ±				
SCALE		NONE				
DRAWN BY		REA				
DATE		7-22-81				

**FIGURE 1**

**SECTION E**

**"POWER-TRACTION" LUBRICATION DIAGRAM**

**MODEL "E"**

**TAYLOR DUNN MFG. CO.**  
 2114 West Ball Rd.  
 Anaheim, Calif.

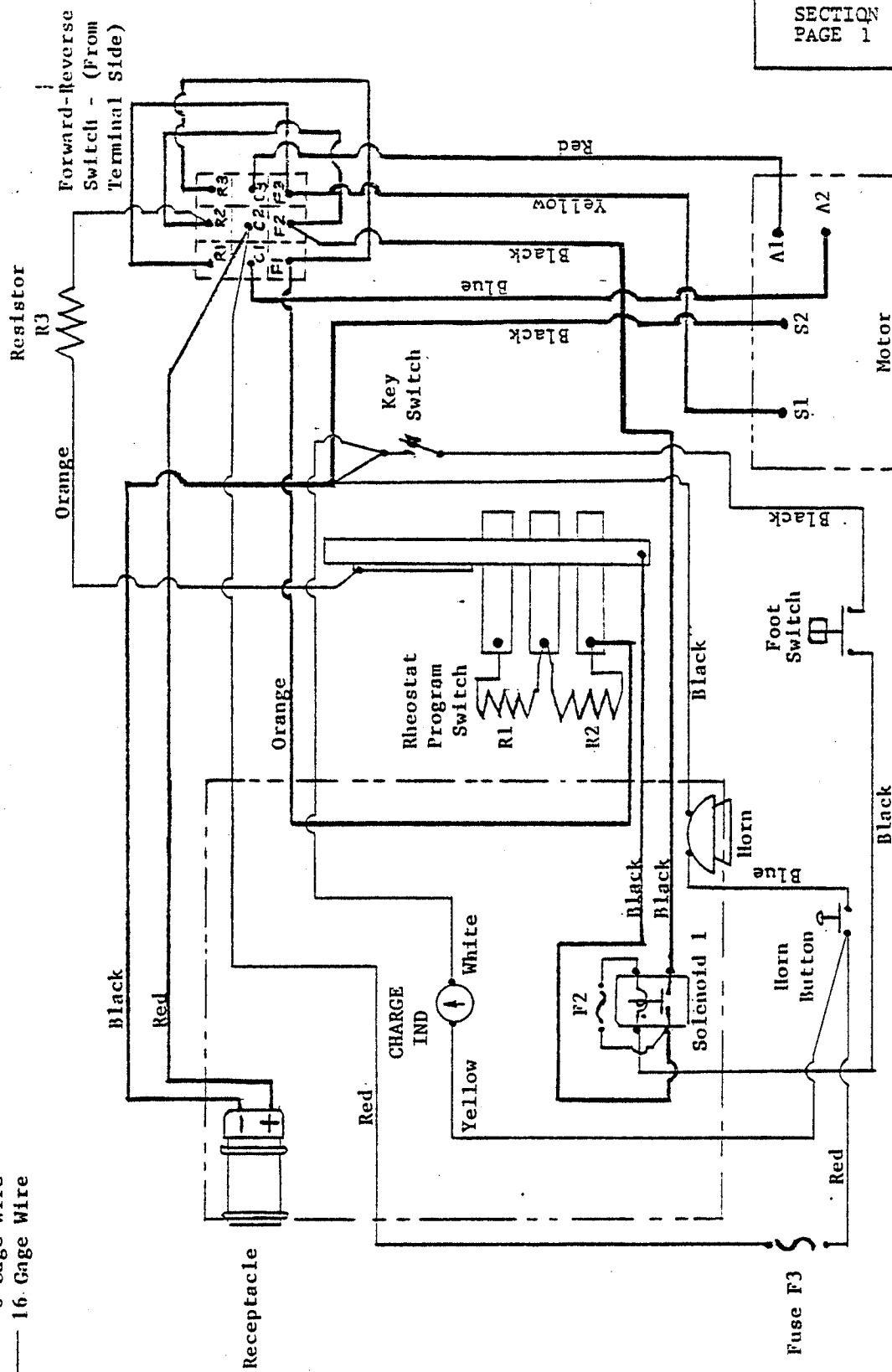
TROUBLE SHOOTING PROCEDURES

<u>SYMPTON</u>	<u>PROBABLE CAUSE</u>	<u>CORRECTIVE ACTION</u>
1. <u>Steering:</u>		
(a) Pull in one direction	1. Check for bent fork	Replace or straighten
(b) Hard steering	1. Bad or frozen bearing in fork spindle collar.	Replace
(c) Sloppy or loose steering	1. Loose spindle bearing 2. Loose wheel bearing 3. Loose chain tension	Adjust Adjust Adjust
2. <u>Brakes:</u>		
(a) Soft brakes	1. Check for worn lining  2. Alignment of brake band 3. Oil on brake lining  4. Dirt on brake lining 5. Bind in linkage 6. Weak spring	Adjust or replace when 1/8 or less of lining left. Realign Find oil source and correct, wash brake band. Clean Loosen or realign Replace
(b) No brakes	1. Broken band 2. Broken connection in linkage 3. Broken axle	Replace Replace Replace
3. <u>Drive Axle:</u>		
(a) No power	1. Discharged batteries 2. Check rheostat for contact 3. Check motor brushes for contact 4. Poor contact on forward-reverse switch or contacts 5. Check for loose wire 6. Check continuity through motor 7. Blown fuse 8. Defective solenoids (SI) 9. Defective interlock switch	Recharge or replace Adjust or replace bars Clean or replace Repair or replace Tighten or replace Repair or replace Replace Replace Repair or replace
(b) Erratic operation	1. Rheostat making poor contact 2. Motor brushes 3. Check motor commutator for burning or wear 4. Check for loose wiring 5. Badly worn drive sprockets 6. Defective solenoid (S2-S3-S4) 7. Contactor making poor contact	Adjust or replace Clean or replace Turn or replace Tighten Adjust or replace sprockets and chain Replace Repair or Replace

<u>SYMPTOM</u>	<u>PROBABLE CAUSE</u>	<u>CORRECTIVE ACTION</u>
(c) Jerky Starting	<ol style="list-style-type: none"> <li>1. Resistor coil burned open</li> <li>2. Resistor shorted together</li> <li>3. Poorly adjusted rheostat</li> <li>4. Badly worn J-Hook</li> <li>5. Dirt between power bars causing shorts.</li> <li>6. Defective Solenoid (S2-S3)</li> <li>7. Contactor making poor contact.</li> </ol>	<p>*Replace Spread apart Re-adjust Replace J-Hook and bars Clean</p> <p>Replace Repair or replace</p>
(d) Takes off in forward or reverse without accelerator depressed	<ol style="list-style-type: none"> <li>1. Dirt shorting out rheostat bars.</li> <li>2. Check rheostat adjustment</li> <li>3. Short in wiring circuit</li> <li>4. Defective Solenoid (S2, S3 or S4) and defective interlock switch.</li> <li>5. 2-Defective Solenoids (S1 &amp; S2) (S1 &amp; S3) (S1 &amp; S4).</li> </ol>	<p>Clean re-adjust or replace bars.</p> <p>Correct Replace</p> <p>Replace</p>
(e) Lack of power or slow operation.	<ol style="list-style-type: none"> <li>1. Dragging brake</li> <li>2. Tight front wheel bearings</li> <li>3. Rheostat not making contact on high speed bar.</li> <li>4. Loose connection in wiring</li> <li>5. Partially burned out motor or thrown lead.</li> <li>6. Weak batteries.</li> <li>7. Bind or drag on differential</li> <li>8. Deadman automatic brake linkage not properly adjusted.</li> <li>9. Defective Solenoid (S4)</li> <li>10. Contactor (High Speed) not making contact.</li> </ol>	<p>Re-adjust Re-adjust Re-adjust or replace bars. Tighten Replace or re-solder or thrown lead. Replace Repair. Re-adjust. Replace Repair or replace</p>
(f) Thump or grinding noise in drive axle	<ol style="list-style-type: none"> <li>1. Motor bearing</li> <li>2. Loose motor on base</li> <li>3. Worn sprockets</li> <li>4. Defective bearing in differential.</li> <li>5. Defective gears in differential.</li> <li>6. Slack drive chain</li> </ol>	<p>Replace Tighten Replace sprocket and chain. Replace Replace Adjust (refer Section J2).</p>



— 0 Gage Wire  
 — 16 Gage Wire



SECTION G  
 PAGE 1

SECTION G  
 PAGE 1

NO. DESCRIPTION		LENGTH	QUAN.	REVISED DATE	REVISION
TOL. FRAC.	+	DEC.	+		
SCALE					
DRAWN BY	CG				
DATE	8-18-80				

FIGURE 2

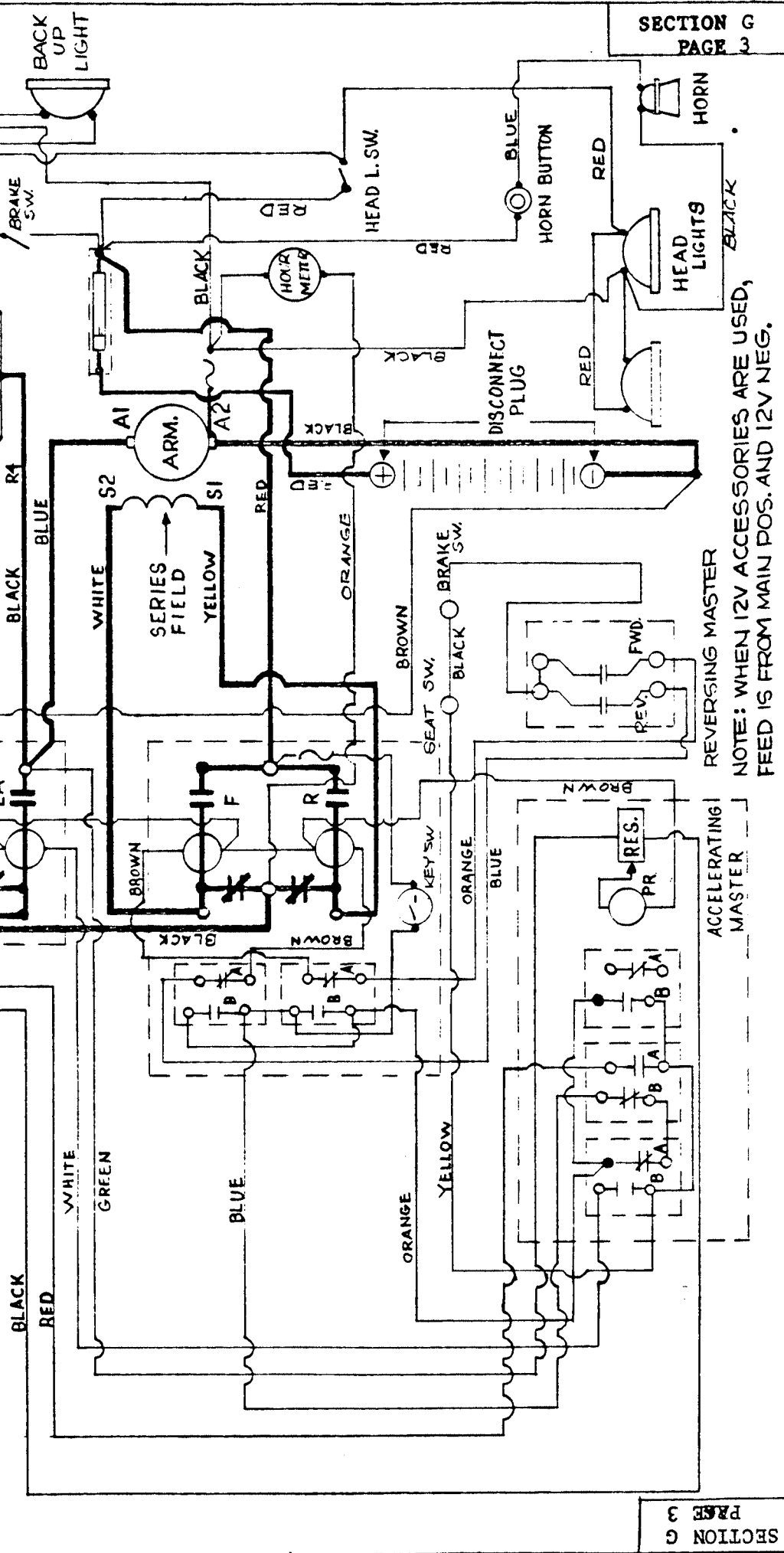
SECTION G


WIRING DIAGRAM - MODEL E 450 & 451 WITH RHEOSTAT SPEED CONTROL AND SOLENOID INTERLOCK

SERIAL 21983 & UP

TAYLOR DUNN MFG. CO.  
 2114 West Ball Rd.  
 Anaheim, Calif.

	A	B	A	B	A	B
0	X				X	
1		X		X		
2		X	X			
3		X				X
4		X				X



NO.		DESCRIPTION		LENGTH		QUAN.		REVISED DATE		REVISION	
TOL. FRAC.		+ DEC. +		FIGURE 2B		WIRING DIAGRAM CONTACTOR CONTROL				TAYLOR DUNN MFG. CO. 2114 West Ball Rd. Anaheim, Calif.	
SCALE		NONE									
DRAWN BY		REA									
DATE		2-26-76									

PARTS ORDERING PROCEDURE

Parts may be purchased from your local authorized Taylor-Dunn Dealer.

When ordering parts, be sure to specify the complete model no. and serial no. of the unit. Also specify the full Taylor-Dunn part number, description of part, and quantity of parts required. You will find a complete listing of part numbers and descriptions in the following pages of this manual. When ordering parts for the drive motor, also include the specifications found on the motor nameplate. Be sure to give complete shipping and billing address on all orders. Example:

- 1 - Part no. 86-501-98 Ball Joint (Left Hand Thread)
- 1 set of 4 - Part no. 70-124-00 Motor Brushes for Baldor Motor, 3½ H.P.,  
36 Volt, Specification No. 28-1408-11704

Above parts for Model 1248B Truck, Serial No. 15039.

Parts ordered under warranty must be placed with your authorized Taylor-Dunn Dealer.

Be sure to include original invoice number, date of shipment of vehicle, and vehicle serial no.

NOTE: On Contracts with National Federal Government Agencies, Defense General Supply Agency, and United States Post Office Department, orders for all warranty parts must be placed directly with the Taylor-Dunn factory in Anaheim, California.

TAYLOR-DUNN MFG. CO.  
2114 W. BALL ROAD,  
ANAHEIM, CALIF. 92804.

PHONE: 714 - 956 - 4040

TELEX: 65-5393

SUGGESTED SPARE PARTS LIST

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QUANTITY OF 1 - 20 UNITS
<u>REFER TO FIGURE NO.3 FRONT AXLE, FORK &amp; STEERING</u>			
3-5	87-074-00	Grease Fitting $\frac{1}{2}$ "-28 Straight	6
3-7	45-307-00	Grease Seal	1
3-11	13-904-00	Tire, Wheel, Hub Bearings	1 or 2
3-14	45-308-00	Grease Seal	2
3-15	87-071-00	Grease Fitting (3/16" Drive)	6
3-32	80-400-00	Ball Bearing -3/4"	4
3-35	30-400-00	Link - Master #40	5
<u>REFER TO FIGURE NO. 5 POWER TRACTION DRIVE AXLE</u>			
5-3	41-997-00	Drain And Level Plug (1/8" Pipe)	1
5-11	41-163-11	Axle Assembly With Axle, Retainer Ring, Retainer Plate, And Bearing (14-1/8" Long) Left Side	1
5-11	41-162-11	Axle Assembly With Axle, Retainer Ring, Retainer Plate And Bearing (11-5/8" Long) Right Side.	1
5-13	45-042-00	Gasket (Housing To Differential Carrier)	1
5-42	80-702-00	"O" Ring - Drive Pinion Bering Retainer	1
5-45	41-996-00	Plug - (Level) 1/2" With Recessed Top	1
5-50	45-021-00	Gasket Gear Case To Pinion Bearing Assembly	1
5-57	41-989-00	Plug (Filler Level And Drain) $\frac{1}{2}$ " N.P.T.	1
5-63	45-331-00	Oil Seal - Gear Case To Pinion	2
5-64	41-532-61	Brake Drum (Splined)	1
5-66	41-661-61	Full Brake Band For 6" Drum	2
5-73	85-060-00	Compression Spring 5/8" O.D. X 2 $\frac{1}{2}$ " Long	1
5-83	45-002-00	Gasket - Gear Case Cover	1
5-86	45-503-00	Oil Seal (Baldor Motor)	1
5-86	45-506-00	Oil Seal (G.E. Motor)	1
5-87	70-054-00	Motor 2.25/3.5 H.P. 24/36 Volt 1800/2800 R.P.M.	1
5-87	70-126-00	Motor Brushes - Baldor	8
5-87	70-101-00	Motor Brushes - G.E. Motor, 24 & 36 Volt	4

SUGGESTED SPARE PARTS LIST

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QUANTITY 1 - 20 UNITS
5-98	13-959-10	Tire Cast Iron Wheel 17 X 4½ X 12-1/8 Solid Xtra Cushion All Service Tire (Five ½" Holes on 4½" Bolt Circle).	2
5-98	13-952-10	Tire Cast Iron Wheel 16 X 4 X 12-1/8 Solid Cushion Tire (Five ½" Holes on 4½" Bolt Circle).	2
5-106	45-044-00	Gasket - Rear Axle Bearing	2
5-122	80-703-00	"O" Ring Motor Mount Seal	1
<u>REFER TO FIGURE NO. 7 MECHANICAL CONTROL LINKAGE.</u>			
7-5	88-180-15	Hex Head Cap Screw (Pivot Screw) 5/8" x 1-3/4" N.C.	2
7-7	87-071-00	Grease Fitting - 3/16" Drive	6
7-8	96-772-00	Pin - Clevice 3/8" x 1"	6
7-9	98-601-00	Rubber Bumper	2
7-10	96-762-00	Clevis - 3/8" Cast	2
7-13	86-520-00	Rod End, 3/8" Spherical Bearing	1
7-18	85-280-00	Spring - 1-3/8" O.D. x 7-3/4" Long (Extension)	1
7-30	85-034-00	Spring Compression 7/16 O.D. X 2	1
7-31	96-314-00	Accelerator Plunger (Contactor Control)	1
<u>NOTE: REFER TO SECTION J6, PAGE 11 FOR SUGGESTED SPARE PARTS LIST OF CONTACTOR SPEED CONTROL.</u>			
<u>NOTE: REFER TO SECTION J6, PAGE 10 FOR SUGGESTED SPARE PARTS LIST OF SCR SPEED CONTROL.</u>			
<u>REFER TO FIGURE NO. 10 RHEOSTAT PROGRAM SWITCH</u>			
10-2	61-834-51	Insulating Board for J-Hook - 2 Hole Pattern	1
10-5	61-832-00	Sliding J-Hook Bar	1
10-12	61-836-00	Pressure Bar	1
10-13	61-831-00	Power Bar	3
10-15	61-837-26	Three Speed Program Switch Complete - 12 Volt	1
10-17	85-034-00	Spring - Compression - 7/16 O.D. x 2 Long	1
10-24	61-837-27	Three Speed Program Switch Complete - 24 Volt	1
10-26	78-214-51	Resistor Coil - 24 Volt (Part of 61-837-26)	2
10-27	78-214-00	Resistor Coil - 12 & 24 Volt (Part of 61-837-26 & 7)	3
<u>REFER TO FIGURE NO. 10B - MAIN POWER SWITCHING &amp; GENERAL ELECTRICAL</u>			
10B-1	71-070-00	Switch - Forward/Reverse Toggle Type	1
10B-6	75-231-00	Jumper Cable - 101/4" Long	8
10B-7	71-501-00	Horn Button	1
10B-12	78-010-00	Fuse Holder - Secondary Circuit	2

SUGGESTED SPARE PARTS LIST

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QUANTITY OF 1 - 20 UNIT
10B-15	72-510-00	Solenoid 12 Volt Complete With Hardware	2
10B-15	72-511-00	Solenoid 24 Volt Complete With Hardware	2
10B-21	73-004-00	Horn 12 Volt	1
10B-21	73-001-00	Horn 24 Volt	1
10B-21	73-002-00	Horn 36 Volt	1
10B-22	71-122-10	Switch - Floor Mount Safety Interlock	1
10B-27	76-020-00	Receptacle - 175 A. - Anderson Type SB6313	1
10B-29	79-823-00	Fuse - Inline 20 Amp (Std. Pkg. of 5)	1
10B-31	79-824-00	Fuse - Inline 30 Amp (Std. Pkg. of 5)	1
		<u>REFER TO FIGURE NO. 11 BODY &amp; TRIM PARTS</u>	
11-16	97-809-51	Hitch Pin - Hook, Pin & Eye Type	1
11-19	95-901-00	Knob - Knurled Plastic Handle - 5/16 N.C.	2
-----	72- 074-00	Bulb, Sealed Beam, Headlamp, 36 Volt for 36 Volt Headlight W/O Voltage Dropping Resistor	1
-----	72-073-00	Bulb, Sealed Beam, Headlamp, 28 Volt for 24 Volt Headlight & 36 Volt Headlight with Voltage Dropping Resistor	1

MAINTENANCE PROCEDURES  
REFER TO FIGURE 3  
FRONT AXLE, FORK, STEERING, AND TIRES

Your front wheel assembly consists of a ruggedly designed fork mounted with 2 Timken Roller Bearings. The front wheel is mounted on a 3/4" axle and turns on 2 Timken Roller Bearings. Grease fittings are provided at bearing points for proper lubrication.

The front wheel is a rugged design with solid rubber tire molded directly to wheel for long trouble free life.

The steering linkage consists of a steering wheel and shaft mounted on ball bearings. Mechanical advantage for smooth easy steering is obtained through roller chain and sprockets between the steering shaft and jack shaft. An automotive type drag link is provided between the jack shaft and fork for reliable trouble free steering. Heavy spherical bearing rod ends provide smooth operation and also serve as the drag link adjustment. The roller chain will require an occasional adjustment for proper tension. Refer to Service and Adjustment instructions in this section of the manual.

Refer to maintenance guide and lubrication diagrams (sections D & E) for normal care of your front wheel and steering assembly.

SERVICE AND ADJUSTMENT  
FRONT AXLE, FORK, STEERING AND TIRES  
REFER TO FIGURE NO. 3

Adjustment of Wheel Bearings

1. Adjust wheel bearings by holding 1 axle nut and tightening the other until drag is felt on wheel. Then back off nut approximately 1/4 turn. Wheel should turn free but not have excess play in bearings.

Removal of Wheel & Axle Assembly

1. Remove 1 axle nut by holding nut on one end of axle and unscrewing nut on opposite end.
2. Slide axle from fork & wheel, being careful to catch spacers and wheel as they come free.
3. Wheel bearings may be flushed, cleaned and repacked without removing from hub, unless severely damaged or embedded with foreign material.
4. To remove wheel bearings and seals:
  - A. Pull seals from hub.
  - B. Remove taper roller bearings.
  - C. If necessary, press bearing races from hub with suitable press or with flat punch by hitting back and forth one side to other.

Re-Assembly of Wheel & Axle

1. Press bearing races into hub with suitable press, taking care that they are seated against stops within the hub.
2. Generously lubricate wheel bearings with wheel bearing grease and insert into bearing races.
3. Press or tap seals into place. (Proper position is when face of seal is flush with end of hub). Note: It is recommended that new seals be installed whenever bearings are removed from wheel hub, or whenever seals are worn or damaged. Worn or damaged seals allow dirt and foreign matter to enter wheel bearings, shortening bearing life.
4. Install wheel & hub assembly into fork by starting axle through one side of fork, inserting 1 spacer then sliding axle through wheel bearings. Insert other spacer and slide axle through remainder of fork assembly.
5. Install locknut.
6. Adjust wheel bearings as outlined above.
7. Wheel hub has 1 zerk fitting for grease lubrication.

Adjustment of Fork Spindle Bearings

1. Adjust by tightening nut until drag is felt on spindle bearings. Loosen about 1/4 turn or until spindle rotates free but does not have any play in bearings. Note: Any excessive play in spindle bearings can lead to bearing failure due to shock effect when vehicle encounters bumps or uneven terrain.



### Removal of Fork & Spindle

1. Remove battery
2. Remove locknut & bolt to release rod end at fork arm.
3. Remove dust cap.
4. Remove lock nut on spindle end.
5. Slide fork and spindle out of housing.
6. Remove bearings and dust seals.
7. A puller is required to remove bearing races from housing.

### Re-Assembly of Fork & Spindle

1. Bearing races may be pressed into position by using a 1/2" X 6" bolt. Place a disc or bar of suitable size over bolt then one bearing race, pass this assembly through housing. Place other bearing race, a suitable disc or bar and then the nut. Tightening the nut and bolt will draw the two bearing races into position without damage.
2. Generously pack bearings with wheel bearing grease. Assemble one dust seal and bearing in lower part of housing. Refer to figure 3 for proper location. Slide fork spindle through housing and insert upper bearing and washer.
3. Install spindle nut.
4. Adjust fork spindle bearings as previously outlined.
5. Replace dust cap on fork spindle.
6. Replace rod end, bolt & locknut. Tighten locknut to 25 ft. - lb.
7. Replace battery.

Note: There is one zerk fitting located on the fork spindle bearing housing which requires lubrication every 1 to 3 months. Refer to Lubrication Diagram and Maintenance Guide Section D & E.

### Replacement of Rod Ends

1. Remove locknut & bolt to release rod end from steering arm.
2. Loosen sleeve clamp.
3. Either measure position of rod end or count number of threads exposed from sleeve. Remove rod end by unscrewing from sleeve. Note that one end will be left hand thread and the opposite rod end will be right hand thread. Install new rod end and position same as the one removed.
4. Replace bolt & locknut. Before tightening securely, try steering action by turning wheel from stop to stop. If necessary, adjust rod end in sleeve so that wheel will travel equally in both directions from straight ahead position.
5. Tighten sleeve clamps and tighten rod end stud locknuts to 25 ft. - lb.

### Adjustment of Steering Chain

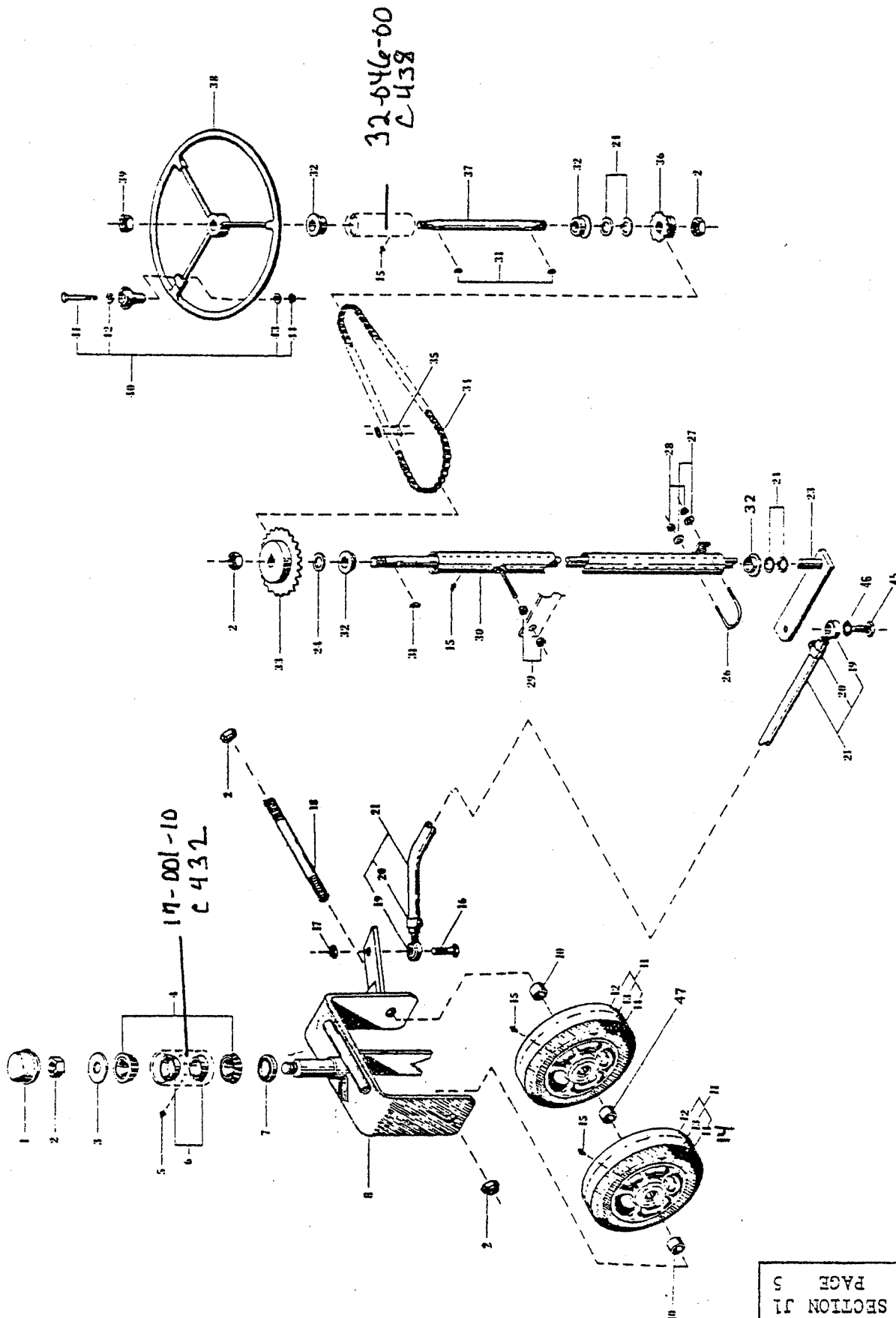
1. Loosen inner nut on adjustment stud located on upper portion of jack shaft tube.
2. Adjust outer nut to remove chain slack and apply a slight tension to chain. DO NOT apply excessive tension to chain as undue bearing and chain wear will result.
3. Retighten inner nut to lock adjustment stud in position.

TROUBLE SHOOTING CHECK LIST

REFER TO FIGURE 3 & 4

POWER STEERING CONTROLS

<u>SYMPTOM</u>	<u>PROBABLE CAUSE</u>	<u>CORRECTIVE ACTION</u>
1. Pump Motor Does Not Run	1. Circuit Breaker Off 2. Circuit Breaker Tripped  3. Broken Wire or Loose Connection 4. Defective Motor 5. Micro Switch Defective 6. Improper Micro Switch Adjustment 7. Defective Contactor	Turn On Check for short circuit Repair & Reset Repair Repair or Replace Replace Adjust Repair or Replace
2. Pump Runs But Power Assist Not Working	1. Hydraulic Fluid Level Low 2. Broken Hydraulic Line 3. Defective Valve or Pump 4. Pump Strainer Completely Blocked 5. Defective Cylinder	Refill Repair or Replace Repair or Replace Clean Repair or Replace
3. Power Assist Erratic	1. Defective Valve or Pump 2. Defective Cylinder 3. Dirt in Hydraulic System 4. Improper Micro Switch Adjustment 5. Mechanical Linkage Loose	Repair or Replace Repair or Replace Flush entire System Adjust Tighten or Repair
4. Power Assist One Direction Only	1. Defective Control Valve 2. Defective Cylinder 3. Improper Micro Switch Adjustment	Repair or Replace Repair or Replace Adjust
5. Abnormal Noise	1. Hydraulic Fluid Level Low 2. Defective Pump	Refill Repair or Replace



SECTION J1  
PAGE 5

LENGTH QUAN. REVISED DATE REVISION

NO. DESCRIPTION

TOL. FRAC. DEC. ±

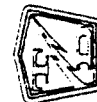
SCALE NONE

DRAWN BY REA

DATE 5-27-77

FIGURE 3  
SECTION J1

FRONT FORK & STEERING  
MODEL E - STD. & M.D.



TAYLOR DUNN MFG. CO.  
2114 West Ball Rd.  
Anaheim, Calif.

SECTION J1  
PAGE 5

FIGURE NO. 3  
FRONT AXLE, FORK & STEERING

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
3-1	92-105-00	Dust Cap	1
3-2	88-229-81	Lock Nut 3/4" N.C. (Hex)	4
3-3	88-228-60	Washer 3/4" Flat	1
3-4	80-011-00	Bearing - Tapered Roller 1 1/2"	2
3-5	87-074-00	Grease Fitting 1/2"-28 Straight	1
3-6	80-102-00	Bearing Race for 1 1/2" Tapered Bearing	2
3-7	45-307-00	Grease Seal	1
3-8	14-083-10	Fork for 8" x 2.50 Tire & Wheel (Single)	1
3-8	14-084-10	Fork for 8" x 2.50 Tire & Wheel (Dual)	1
3-10	16-406-00	Spacer - Wheel 3/4" I.D. x 7/16" Long	2
3-11	13-904-00	Tire, Wheel, Hub, Bearings - 8 x 2 1/2	1 or 2
3-12	80-105-00	Bearing Race for 3/4" Tapered Bearing	2
3-13	80-015-00	Bearing - Tapered Roller 3/4"	2
3-14	45-308-00	Grease Seal	2
3-15	87-071-00	Grease Fitting (3/16" Drive)	3
3-16	88-180-15	Hex Head Cap Screw 5/8" x 1 3/4" N.C.	1
3-17	88-189-82	Nut 5/8" - Thin Pattern Flexlock	1
3-18	88-220-27	Axle Bolt 3/4" x 5 1/2" (Single)	1
3-18	15-010-00	Axle Bolt 3/4" x 9 1/2" (Dual)	1
3-19	86-521-98	Rod End - Spherical Bearing - 5/8 N.F. Left Hand	1
3-19	86-521-99	Rod End - Spherical Bearing - 5/8 N.F. Right Hand	1
3-20	86-510-00	Clamp - Ball Joint	2
3-21	18-041-12	Sleeve - Steering Adjustment 22 1/2" with 30° Bend	1
3-21	18-050-00	Sleeve - Steering Adjustment 36" with 30° Bend	1
3-23	20-146-00	Jack Shaft 3/4" x 35" with Lever	1
3-24	88-228-61	3/4 SAE Washer	3
3-26	96-102-00	"U" Bolt 5/16 N.C.	1
3-27	88-088-62	Lock Washer 5/16"	2
3-28	88-089-80	Hex Nut 5/16" N.C.	2
3-29	88-149-80	Hex Nut 1/2" N.C.	2
3-30	32-047-00	Sleeve Only - Jack Shaft	1
3-31	97-100-00	Woodruff Key - 3/16"	3
3-32	80-400-00	Ball Bearing - 3/4"	4

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
3-33	30-010-00	Sprocket 32T #40 Chain 3/4" Bore	1
3-34	30-246-00	Chain - #40 31½" Long	1
3-35	30-400-00	Link - Master #40	1
3-36	30-002-00	Sprocket 11T #40 Chain 3/4" Bore	1
3-37	20-145-00	Shaft - Steering 3/4" x 1½" w/Taper	1
3-38	19-007-00	Steering Wheel	1
3-39	88-199-82	Nut 5/8" N.F. (Hex-Jam)	1
3-41	88-100-17	Hex Head Cap Screw 3/8" x 2½" N.C.	1
3-42	88-108-61	Washer - 3/8" S.A.E.	1
3-43	88-108-62	Lockwasher	1
3-44	88-109-80	Hex Nut 3/8" N.C.	1
3-45	99-317-00	Bolt, 5/8 x 1½ N.C.	1
3-46	88-188-62	Lockwasher 5/8"	1
3-47	16-406-10	Spacer, wheel - 1" OD x .095 Wall x 3/4" Long	1

MAINTENANCE PROCEDURES

REFER TO FIGURE 5

"POWER TRACTION" REAR AXLE, MOTOR AND BRAKES

Your "Power Traction" direct drive assembly is a highly efficient unit. Great care was taken in its design to promote long life with a minimum of maintenance. It employs an automotive type differential unit which operates within an enclosed housing. The gears, bearings, etc. are lubricated from within by oil which when maintained at its proper level insures complete coverage of all moving parts. This oil level should be checked on a regular basis as outlined in the Maintenance Guide (Section D) and lubrication diagrams (Section E) of this manual. If the oil level is allowed to drop below normal limits serious damage to the differential and drive unit will result.

An adjustable motor mount has been provided to extend normal chain life. Refer to Section J2 Page 7 for proper adjustment procedures. It is important to adhere to the adjustment schedule included on Page 8. Failure to do so will seriously effect normal chain life.

The electric motor will provide many hours of trouble free service. It is provided with sealed ball bearings which are pre-lubricated for their lifetime.

Periodically, the motor brushes should be inspected and cleaned. The carbon dust and dirt should be blown out of motor. When brushes are worn they should be replaced. Approximately 3000 hours operating life may be expected from a new set of brushes. To determine when to replace worn brushes, proceed as follows:

1. For motors equipped with brushes having end pigtails and side hooks, replace brush when hook is within 1/16" from bottom of hook slot.
2. For motors equipped with brushes having side pigtails only, replace brush when pigtail is within 1/16" from bottom of pigtail slot.

NOTE: When one brush is replaced in a motor, it is considered good maintenance practice to replace all brushes.

Inspect commutator for roughness or undue wear as arcing and shortened brush life will result from this condition.

Check wiring terminals for cleanliness and tightness. A loose connection will cause burning of the respective terminal and can induce motor failure.

Refer to Maintenance Guide (Section D) and Service and Adjustment (Section J2) for further recommendations on motor care.

The mechanical brake assembly located on the differential pinion shaft will require a periodic inspection for lining wear and consequently periodic adjustment. Refer to Service and Adjustment Section J2 of this manual for proper procedures.

A few drops of oil on the clevis pin and pivot pins of the mechanical linkage is recommended on a monthly basis. Great care must be taken that no oil is allowed to contact the brake band or drum as it will seriously impair the braking ability. If the braking surfaces become oily or contaminated for any reason it will be necessary to remove the brake band and clean all parts thoroughly. Refer to the appropriate section of this manual for the correct procedure to follow.

If your vehicle is equipped with hydraulic brakes refer to Section J3 for their care and adjustment.

A periodic tightening of all bolts and nuts, especially the spring mounting "U" bolts should be made.

The normal life of the shock absorber unit is approximately 2 years.

SERVICE AND ADJUSTMENTS  
REFER TO FIGURE 5  
"POWER TRACTION" REAR AXLE, MOTOR AND BRAKES

Adjustment of Brake (Minor) To Compensate For Normal Lining Wear. Important Note.

Observe position of Brake Lever Arm. It must be 1/16" to 1/4" from Gear Case Cover with brake pedal and hand brake fully released.

If brake lever arm is not in the correct position, due to improperly adjusted cables or brake rods, then it will be necessary to perform a complete major brake adjustment as itemized under next section "Adjustment of Brakes (Complete)".

Note: If brake lever arm is in the correct position as described above, it will not be necessary to touch cable or rod adjustments.

1. Adjust brake band anchor bolt and nut, tightening it until brake pedal travels approximately half way to floorboard engaging brake sufficiently to stop vehicle. Vehicles equipped with automatic (deadman) brake requires the treadle to operate the braking action within the last 1/4 of its stroke.
2. Adjust centering screws, centering band around drum to bring band as close to drum as possible without brake dragging. Lock centering screw. If band is too far from brake drum, brakes will grab in the forward direction.

CAUTION: Never bend the brake band anchor bolt. Any bending of the bolt may result in unexpected failure of the bolt and complete loss of Drive Line braking Action.

Adjustment of Brake (Complete Except for Automatic (Deadman) Brake Refer to Section J4

1. Loosen clevis and locknut on foot brake, cable (or rod) and adjust length to position brake lever arm 1/16" to 1/4" from gear case cover as described above. It may be necessary on vehicles equipped with other control cables such as handbrake cables to disconnect them so they will not interfere with this first important adjustment.
2. Adjust brake band as outlined in steps 1 and 2 and CAUTION note above.

3. Adjust hand parking brake lever knob on end of handle, turning counterclockwise until it stops. Place lever in locked position. Then loosen clevis locknut on cable or rod on underside of parking brake lever and adjust cable or rod (by shortening) until brake band engages drum properly. Lock clevis nut.

NOTE: Brake band and brake cable must be adjusted first as outlined above.

4. Try completely releasing hand lever to be certain brake band is completely released. Additional brake holding power can be applied by turning knob on end of handle in clockwise direction.

NOTE: Turning knob in clockwise direction increases travel of brake cable but decreases leverage of brake lever. Therefore, if it is adjusted too far clockwise the lever will be difficult to operate. You compensate for this condition by shortening hand brake rod as outlined above. Caution: If you shorten rod too far, you will not allow the brake band to completely release. Obviously the ideal condition is midway between the two extremes described above.

5. If vehicle is equipped with hydraulic wheel brakes, refer to Section J3 for service and adjustment.
6. If vehicle is equipped with brake-accelerator lock, refer to Section J4 for service and adjustment.
7. If vehicle is equipped with Automatic (Deadman) brake, refer to Section J4 for service and adjustment.

Removal Of Brake Assembly And Drum

1. Remove cotter pin and clevis pin, disconnecting cable from brake lever arm, (Note location of clevis). Remove lever arm return spring.
2. Remove 4 bolts holding brake mounting assembly and slide assembly off drum.
3. Band and drum may now be cleaned, inspected, and if necessary parts may be replaced as needed.
4. Brake band lining is bonded to the band for long dependable service. When it wears to approximately 1/16" thickness the band should be replaced.
5. If the brake drum is scored, it should be removed and turned. It is recommended that a brake drum that has been severely scored or damaged should be replaced with a new drum.
6. Inspect seal in gear case cover. If worn or damaged, replace with new one. It is recommended that new seal be pre-soaked in light oil for several hours before installation. Use small amount of oil resistant sealer on seal opening in cover when pressing seal into place.
7. Re-assemble drum and spacer on pinion shaft. Tighten to 100 lb. ft. torque.
8. Replace brake assembly in the reverse order to which it was removed.
9. Adjust brake band and cables as outlined on page 2.

Removal Of "Power Traction" Rear Axle & Drive Assembly From Chassis.

1. Disconnect one battery lead to prevent accidental engagement of power while servicing unit.
2. Clearly mark motor leads to insure their proper location when re-assembling.
3. Remove motor leads.
4. Pull clevis pin and disconnect brake cable from brake arm.
5. Remove lower bolt from shock absorber. (Only vehicles equipped with shock absorbers).
6. Disconnect hydraulic brake line at hose end. (Only vehicles equipped with hydraulic brakes.)

Note: Steps 7 and 8 refer to vehicles with spring suspension.

7. Remove "U" Bolt clamp and nuts attaching spring to frame.
8. Remove spring eye anchor bolts.
9. Remove 4 bolts attaching power traction assembly to frame (Only on unsprung type vehicles).
10. Remove axle and drive assembly from chassis.
11. Install axle and drive assembly in the reverse order of removal, taking care that support pads and rubber bushings are in good condition. (Replace if worn or damaged).
12. Check brake adjustments as previously outlined on page 2.
13. On models equipped with hydraulic brakes, it will be necessary to bleed the air from brake system. Follow procedure outlined in Hydraulic Brake Section J3 of this manual.



Disassembly Of "Power Traction" Rear Axle

1. Remove unit from chassis. (As previously outlined)
2. Remove wheels and drain oil from housing.
3. Lock drive shaft brake by pulling brake lever. Remove pinion nut and pull off brake drum.
4. Remove four bolts and spring and lift off brake assembly.
5. Remove remaining nuts and bolts, and remove drive case cover.
6. Remove 3 nuts and washers and remove motor and mount plate. (If motor requires further service, refer to appropriate Section J2 of this manual.)
7. Remove chain and pinion sprocket. Observe location of spacers on shaft. Refer to Figure 5 for their correct location.
8. Remove five bolts holding back plate and remove from carrier housing.
9. On hydraulic brake models, remove brake drums, disconnect hydraulic line, remove brake shoe return springs (orange color) and remove wheel cylinders.
10. Remove four bolts on each end holding axle retainer (and brake backing plate on hydraulic brake models) and pull both axles.
11. Remove nuts around differential carrier housing and remove carrier from axle housing. (Note position of clip for proper reassembly of brake spring.)
12. Mark one differential bearing cap and bearing support to insure proper assembly. Remove adjusting nut locks, bearing caps, and adjusting nuts. Lift differential out of carrier.
13. Remove drive gear from differential case.
14. Drive out differential pinion shaft retainer and separate the differential pinion shaft and remove gears and thrust washers.
15. Remove drive pinion retainer from carrier. Remove O-ring from retainer.
16. Remove pinion locating shim. Measure shim thickness with micrometer.
17. If the drive pinion pilot bearing is to be replaced, drive the pilot end and bearing retainer out at the same time. When installing, drive the bearing in until it bottoms. Install a new retainer with the concave side up.
18. Press the pinion shaft out of front bearing cone and remove spacer.
19. Remove pinion bearing cone.
20. Do not remove pinion bearing cups from retainer unless they are worn or damaged. The flange and pilot are machined by locating on these cups after they are installed in the bores. If new cups are to be installed, make sure they are seated in the retainer by trying to insert a .0015" feeler gauge between cup and bottom of bore.

Re-Assembly of Power Traction Rear Axle

1. Differential Case: Place a side gear and thrust washer in the differential case bore. LUBRICATE ALL PARTS LIBERALLY WITH AXLE LUBRICANT DURING ASSEMBLY. With a soft faced hammer, drive pinion shaft into case only far enough to retain a pinion thrust washer and pinion gear. Place the second pinion and thrust washer in position. Drive the pinion shaft into place. Be careful to line up pinion shaft retainer holes. Place second side gear and thrust washer in position and install differential case cover. Install retainer. A pinion or axle shaft spline can be inserted in side gear spline to check for free rotation of differential gears. Insert two 7/16" x 2" bolts through differential flange and thread them three or four turns into the drive gear as a guide in aligning the drive gear bolt holes. Press or tap the drive gear into position. Install and tighten the drive gear bolts evenly and alternately across the gear to 60-65 lb. ft. torque.
2. If the differential bearings have been removed, use a suitable press to install them.
3. Pinion and Retainer: Install pinion rear bearing cone on the pinion shaft. Install spacer with shims on the shaft. Place the bearing retainer on the pinion shaft, and install the front bearing cone.
4. Lubricate both bearings with differential oil. Place spacers, sprocket and brake drum on spline with nut and washer and tighten to 100 lb. ft. torque.

NOTE: The bearing should spin free but have no play. If tight or loose, adjust with .005" and .019" shims.

5. Shim Selection: Manufacturing tolerances in the pinion bore dimensions and in the best operating position of the gears make an adjustment shim necessary. This shim is placed between the pinion retainer and the carrier, Fig. 5. An increase in the thickness of the shim moves the pinion AWAY from the drive gear. Manufacturing objectives are to make axles requiring a .0015" shim and if a new assembly is being built, a .0015" shim should be used for a tentative build-up. Shims are available in .010" to .021" thicknesses in steps of .001". Pinions and drive gears are marked, when matched, with the same number. Following the number on the pinion is a minus (-) or (+) followed by a number. If the pinion is marked "-1" it indicates that a shim .001" thinner than a standard shim for this carrier is required. A minus number means the pinion should be moved closer to the drive gear and a thinner shim is required. A plus number means the pinion should be moved farther from the drive gear and a thicker shim is required. A pinion marked zero (0) is a standard pinion. To select a shim, measure the original shim with a micrometer. Note the dimensional mark on the original pinion. Compare the mark on the original pinion with the mark on the new pinion to determine how the original shim should be modified. For example, if the original shim is .015" and the original pinion is marked "-1", the new pinion requires a +1 shim. Therefore, the new pinion requires a .002" thicker shim, and a .017" shim should be used. If the new pinion is marked the same as the old pinion, no shim change is required.

6. After the proper selection of shims, insert "O" ring seal and pinion retainer assembly into differential carrier. Tighten 5 retainer bolts to 50 lb. ft. torque. (Note: The 5 bolts will have to be removed later to install back plate assembly.)
7. Install differential case, bearing cups, adjusting nuts, and bearing caps being sure that each cap is located in the same position from which it was removed. (Use marks as guide)
8. ADJUST bearing nuts so that differential case will be free to revolve. It is very important that there will be no bearing play or looseness, as this will inevitably lead to gear noise and wear. Gear backlash must be set at the same time to a tolerance of .005" to .009". Note: It will be necessary to release some of the cap bolt tension in order to allow the bearing to move while making the adjustments. If the caps are too loose an error will result when trying to set backlash and bearing clearance. Therefore double check your setting after the cap bolts have been tightened. If necessary make corrections in your settings until the specified tolerances are maintained after the cap bolts have been tightened.
9. Install nut locks.
10. Install differential carrier assembly in axle housing using new gasket and gasket sealer.
11. Install axles, brake assemblies (on models with hydraulic brakes), bearing retainers, and gaskets. Note: Axles are equipped with special sealed bearings. Should there be evidence of seal leakage, it is recommended that the bearing be replaced. It is also recommended that gasket located between bearing and bearing seat in axle housing be replaced at the same time. Refer to Figure 5.
12. Remove pinion nut, spacers, brake drum, and sprocket. Remove 5 bolts from pinion bearing retainer.
13. Install gasket (use gasket sealer) and back plate assembly. Tighten 5 bolts to 50 lb. ft. torque.
14. Install spacers, sprockets and chain in the reverse order to which they were removed. Take care that 3/16" woodruff key is in proper position and all spacers are in original position. Tighten 3/4" motor shaft nut to 75 lb. ft. torque (if sprocket was removed from motor).
15. Install motor and motor mount plate with "O" ring. Do not tighten 3 nuts until final adjustment is made. Be sure motor terminals are located in the same position as when motor was removed.
16. If seal is worn or damaged in gear case cover, replace with new seal. It is recommended that new seal be pre-soaked in light oil for several hours before installation. When pressing new seal into cover use small amount of oil resistant sealer on seal opening in cover.
17. Install cover gasket and cover.
18. Install brake drum and pinion nut. Tighten to 100 lb. ft. torque.
19. Install brake assembly in the reverse order to which it was removed.
20. Replace wheels and fill chain and differential housing with approximately 2 qts. SAE 30 oil.
21. Replace unit in chassis following steps 11 to 13 outlined in Section titled Removal Of "Power Traction" Rear Axle.
22. Adjust motor mount plate (as outlined in Motor Adjustment Section following) to proper chain tension.

Adjustment of Drive Chain Tension - Power Traction

1. Disconnect one battery lead to prevent accidental engagement of power while servicing vehicle.
2. Tighten three motor mount nuts.
3. Loosen and unscrew each nut exactly one full turn.  
Note: This procedure is very important for if the nuts are too loose or too tight an error will result in the final adjustment which will seriously reduce the life of the chain.
4. Loosen adjusting set screw lock nut. Using standard socket set screw wrench turn set screw clockwise until tight. (If a torque wrench is available tighten to 80 inch lbs. torque). Without a torque wrench bear in mind that a standard socket set screw wrench is approximately 4" long. An average person will only be able to develop the required torque necessary if he tightens it as far as possible with his hands and does not use any extended handle on the wrench.
5. After developing the required torque, unscrew the adjusting screw exactly 2-1/2 turns. It is also very important to be exact on this adjustment.
6. Tighten locknut. DO NOT allow adjusting screw to move while tightening locknut.
7. Be certain that motor has moved all the way back and adjusting screw is in contact with back plate. If necessary tap motor lightly to assure this condition.
8. Tighten three motor mount nuts securely.

Perform this adjustment procedure regularly as listed below to assure long and trouble free life from your "Power Traction" Drive.

Scheduled Adjustment	After	Comments
1st Adjustment	1 Month	New unit or after installing new chain
2nd Adjustment	3 Months	Normal running conditions
3rd Adjustment	6 Months	Normal running conditions
Thereafter	Every 6 Mo.	Normal running conditions

Remove Motor - Power Traction

1. Remove rear axle and drive assembly from chassis as described in Steps 1 through 10 in Subsection titled "Removal of Power Traction Rear Axle and Drive Assembly from Chassis."
2. Drain oil from gear case by removing drain plug.
3. Unhook brake spring.
4. Remove pinion nut, washer, and brake drum.
5. Remove all bolts and nuts around gear case cover.
6. Remove gear case cover.
7. Remove three nuts and washers, and remove motor and mounting plate.
8. If replacing motor, remove nut, washer, sprocket, and spacers. Also remove motor mounting plate. NOTE: Observe location of motor terminals in relation to motor mounting plate for proper positioning when re-assembling.

### Install Motor in "Power Traction" Drive

It is not necessary to remove motor mount plate when performing minor motor repairs. Therefore, follow Step 1 only when replacing motor with new one.

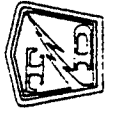
1. Clean motor surface and install mounting plate with four flat head screws. Tighten to 30 lb. ft. torque. Stake head in place with center punch.  
Note: It is important to locate the motor mount plate in relation to the motor terminal so that the motor terminals will be in an accessible location when drive is completely assembled.
2. Place "O"Ring into motor mount plate opening and attach motor and plate to back-plate.
3. Re-assemble drive in the reverse order to that of removal.
4. Adjust motor mount to obtain proper chain tension.
5. Refill gear case with SAE 90-140 oil.
6. Connect Motor leads as follows: (IMPORTANT!!)
  - a.) Check that each motor terminal stud nut is tightened securely but not over-tightened as this could bend or twist the terminal post and cause an electrical short within the motor.
  - b.) Install motor leads on correct motor terminal post.
  - c.) Install a second nut on each terminal post and finger tighten.
  - d.) To avoid bending, twisting or breaking-off a terminal post, use a thin pattern 9/16" wrench to hold the bottom nut from moving while tightening the top nut. Carefully tighten the top nut so as to make a good connection between the terminal post and motor lead.

### Motor Repairs

Unless the maintenance man is properly qualified, it is advisable that repair work be done at a qualified service station. When ordering parts, give complete name plate data.

NOTE: Refer to Section J2M for Motor Disassembly.

TAYLOR DUNN MFG. CO  
2114 West Ball Rd.  
Anaheim, Calif.



"POWER TRACTION" (UNSPRING)  
REAR AXLE, MOTOR & BRAKES

FIGURE 5  
SECTION J2

LENGTH QUAN. REVISED DATE REVISION 10-8-82

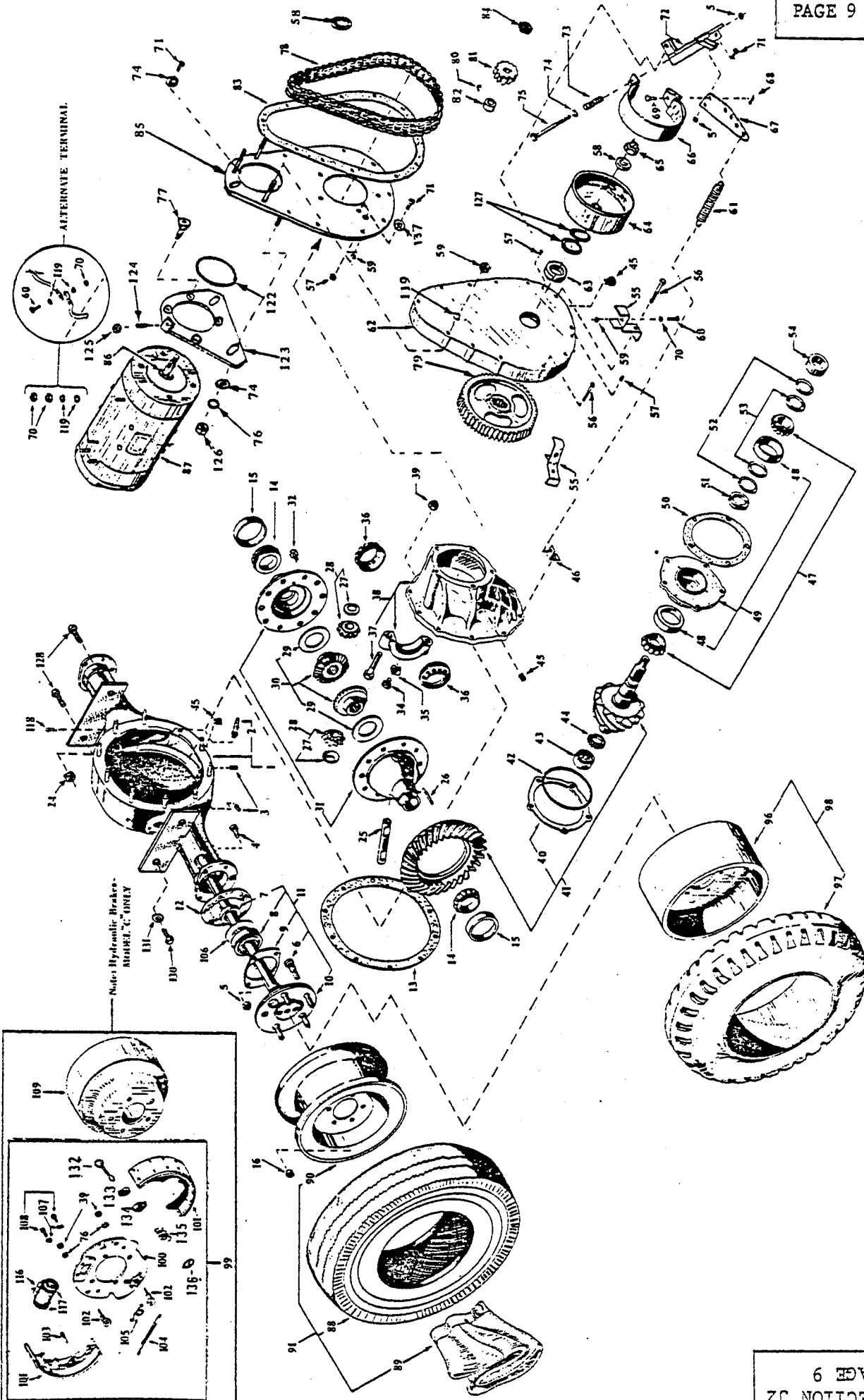
NO. DESCRIPTION

TOL. FRAC. DEC. ±

SCALE NONE

DRAWN BY AREA

DATE 1-24-73



POWER TRACTION DRIVE AXLE  
REFER TO FIGURE 5

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
5-1	41-290-00	Housing, Drive with Studs for 1.281 ID x 2.834 OD Drive Axle Ball Bearing 80-505-00	1
5-1	41-290-13	Housing, Drive with Studs for 1.530 ID x 3.150 OD Drive Axle Ball Bearing 80-503-00	1
5-2	96-330-00	Bolt Differential Carrier to Housing	10
5-3	41-997-00	Drain and Level Plug (1/8" Pipe)	
5-4	88-100-11	Screw, Hex Head Cap 3/8 x 1 NC. Use with 41-290-00 Drive Housing	0 or 8
5-4	88-120-11	Screw, Hex Head Cap 7/16 x 1 NC. Use with 41-290-13 Drive Housing	0 or 8
5-5	88-109-81	Nut, Lock 3/8 NC. Use with 41-290-00 Drive Housing	0 or 10
5-5	88-129-81	Nut, Lock 7/16 NC. Use With 41-290-13 Drive Housing	0 or 10
5-6	96-331-00	Bolt - 1/2" N.F. (Spec.) Rear Hub	10
5-7	32-509-00	Ring, Retainer for 80-505-00 Drive Axle Ball Bearing	2
5-7	32-515-00	Ring, Retainer for 80-503-00 Drive Axle Ball Bearing	2
5-8	80-505-00	Bearing, Ball, Drive Axle 1.281 ID x 2.834 OD for 41-290-00 Drive Housing	2
5-8	80-503-00	Bearing, Ball, Drive Axle 1.530 ID x 3.150 OD for 41-290-13 Drive Housing	2
5-9	32-511-00	Plate, Retainer, for use with Drive Axle Ball Bearing	2
5-9	32-514-00	Plate, Retainer, for use with 80-503-80 Drive Axle Ball Bearing	2
5-11	41-163-11	Assembly, Axle Shaft 13-1/8 Long, Axle Flange Face to Splined End, 28 Teeth on Spline, with 80-505-00 Bearing, 32-511-00 Retainer Plate, 32-509-00 Retainer Ring, 45-044-00 Gasket and Lug Nuts. Use with 41-290-00 Drive Housing	0 or 1
5-11	41-162-11	Assembly, Axle Shaft 10-11/16 Long, Axle Flange Face to Splined End, 28 Teeth on Spline, with 80-505-00 Bearing, 32-511-00 Retainer Plate, 32-509-00 Retainer Ring, 45-044-00 Gasket and Lug Nuts. Use with 41-290-00 Drive Housing	0 or 1
5-11	41-163-21	Assembly, Axle Shaft 13-1/4 Long, Axle Flange Face to Splined End, 28 Teeth on Spline, with 80-503-00 Bearing, 32-514-00 Retainer Plate, 32-514-00 Retainer Ring 45-045-00 Gasket, 45-301-00 Oil Seal and Lug Nuts. Use with 41-290-13 Drive Housing	0 or 1

POWER TRACTION DRIVE AXLE  
REFER TO FIGURE 5

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
5-11	41-162-21	Assembly, Axle Shaft 10-13/16 Long, Axle Flange Face to Splined End, 28 Teeth on Spline with 80-503-00 Bearing, 32-514-00 Retainer Plate, 32-515-00 Retainer Ring, 45-045-00 Gasket, 45-301-00 Oil Seal and Lug Nuts. Use with 41-290-13 Drive Housing.	0 or 1
(Not Shown)	45-301-00	Seal Oil Used with 41-163-21 and 41-162-21 Axles only.	0 or 1
5-12	32-512-00	Spacer Retainer used with 80-505-00 Axle Ball Bearing (Used only without Hydraulic Brakes)	1
5-13	45-042-00	Gasket (Housing to Differential Carrier)	1
5-14	80-511-00	Tapered Roller Bearing, LM 501349, I.D. 1.625. Use w/80-127-00 Bearing Race	2
5-14	80-512-00	Tapered Roller Bearing, LM 603049, I.D. 1.7812. Use w/80-128-00 Bearing Race	2
5-14	80-513-00	Tapered Roller Bearing, LM 102949, I.D. 1.7812. Use w/80-129-00 Bearing Race	2
5-15	80-127-00	Tapered Bearing Race, LM 501310, O.D. 2.891. Use w/Bearing 80-511-00	2
5-15	80-128-00	Tapered Bearing Race, LB 60311, O.D. 3.0625. Use w/Bearing 80-512-00	2
5-15	80-129-00	Tapered Bearing Race, LM 102910, O.D. 2.8910. Use w/Bearing 80-513-00	2
5-16	97-236-00	Nut, 1/2" N.F. (Lug)	10
5-24	97-236-00	Nut, 1/2" N.F. (Lug)	4
5-25	41-700-00	Differential Pinion Shaft	1
5-26	41-701-00	Pin	1
5-27	41-702-00	Thrust Washer - Differential Pinion Shaft	2
5-28	41-703-00	Differential Shaft Pinion Kit (Two Differential Gears and Two Thrust Washers)	1
5-29	41-704-00	Thrust Washer-Differential Side Gear	2
5-30	41-705-00	Differential Side Gear Kit (Two Differential Side Gear and Two Thrust Washers)	1
5-31	41-712-00	Differential Gear Case Assembly (Small Carrier Bearing 1.628" I.D.)	1
5-31	41-713-00	Differential Gear Case Assembly (Large Carrier Bearing 1.784" I.D.)	1
5-32	96-243-00	7/16 x 7/8 N.F. Hex Head Bolt	10
5-33		Intentionally Left Blank	
5-34	88-080-04	Hex Head Cap Screw 5/16" x 3/8" N.C.	2
5-35	41-706-00	Nut Lock, Differential Bearing Adjustment w/30° Angle Tab. Use w/41-707-00 or 41-708-00 Diff. Bearing Adjustment Nuts	2
5-35	41-706-50	Nut Lock, Differential Bearing Adjustment w/Right Angle Tab w/Last Bend 1/2" Long. Use w/41-707-50 Diff. Brg. Adjustment Nut	2
5-35	41-706-51	Nut Lock, Diff. Brg. Adjustment w/Right Angle Tab W/Last Bend 1/4" Long. Use w/41-708-50 Diff. Brg. Adj. Nut	2



POWER TRACTION DRIVE AXLE  
REFER TO FIGURE 5

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
5-36	41-707-00	Nut, Differential Bearing Adjustment, 2-15/16 OD 2 Oblong Locking Holes, Use LM 501349 Bearing	2
5-36	41-707-50	Nut, Differential Bearing Adjustment, 2-15/16 OD Round Locking Holes. Use LM 102949 Bearing	2
5-36	41-708-00	Nut, Differential Bearing Adjustment 3-1/8 OD Oblong Locking Holes. Use LM 603049 Bearing	2
5-36	41-708-50	Nut, Differential Bearing Adjustment 3-1/8 OD Round Locking Holes. Use LM 603049 Bearing	2
5-38	41-709-00	Differential Carrier Assembly (For Small Carrier Bearing 1.784" I.D.)	1
5-38	41-710-00	Differential Carrier Assy. (For Large Carrier Bearing 1.784" I.D.)	1
5-39	88-119-80	Nut, 3/8" N.F. (HEX)	14
5-40	41-711-00	Shim-Drive Pinion Bearing	1 to 3
5-41	31-235-00	Ring and Pinion Gear Set 2.75 Ratio	1
5-41	31-236-00	Ring and Pinion Gear Set 3.10 Ratio	1
5-41	31-237-00	Ring and Pinion Gear Set 3.25 Ratio	1
5-41	31-238-00	Ring and Pinion Gear Set 3.50 Ratio	1
5-41	31-239-00	Ring and Pinion Gear Set 5.43 Ratio	1
5-41	31-234-00	Ring and Pinion Gear Set 3.00 Ratio	1
5-42	80-702-00	"O" Ring-Drive Pinion Bearing Retainer	1
5-43	80-555-00	Ball Bearing-Rear, Pinion Pilot	1
5-44	41-714-00	Driving Pinion Pilot Bearing Retainer	1
5-45	41-996-00	Plug (Level) 1/2" with Recessed Top	1 or 3
5-46	91-509-00	Spring Clip	0 or 1
5-47	80-554-00	Tapered Roller Bearing-Pinion Shaft	2
5-48	80-125-00	Tapered Bearing Race-Pinion Shaft	2
5-49	41-715-10	Pinion Bearing Case Assy. & Bearing Races	1
5-50	45-021-00	Gasket Gear Case to Pinion Bearing Assy.	1
5-51	16-415-00	Spacer Pinion Shaft (.440" Thick)	1
5-52	16-410-00	Spacer Pinion Shaft (.018" Thick)	2 to 6
5-53	16-411-00	Spacer Pinion Shaft (.005" Thick)	2 to 6
5-54	16-414-00	Spacer Sprocket (.500" Thick)	1
5-54	16-417-00	Spacer Pinion Shaft (.340" Thick)	1
5-55	41-371-00	Brake Alignment Bracket	2
5-56	88-080-20	Hex Head Cap Screw 5/16" x 3" NC	9
5-57	41-989-00	Plug (Filler Level and Drain 1/4" N.P.T.)	2
5-58	88-228-61	Washer 3/4" S.A.E.	2
5-59	88-089-81	Lock Nut 5/16" N.C.(hex)	14
5-60	88-080-11	Hex Head Cap Screw 5/16" x 1" N.C.	2
5-61	85-270-00	Extension Spring 1-1/4" OD x 4-3/8" Free Length	0 or 1

FIGURE 5  
POWER TRACTION DRIVE AXLE

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
5-62	43-201-00	Gear Case Cover	1
5-63	45-331-00	Oil Seal-Gear Case To Pinion	1
5-64	41-532-00	Brake Drum (Splined)	1
5-65	97-250-00	Nut-Pinion 3/4"-20 Extra Fine Thread	1
5-66	41-661-00	Full Brake Band for 6" Drum	1
5-66	41-660-00	Brake Band (1/2 Band) For Drive Shaft Brake	1
5-67	50-656-00	Brake Lever Arm	1
5-68	88-517-11	Cotter Pin 3/32" x 1"	1
5-69	96-771-00	Clevis Pin 3/8" x 3/4" Face to Hole	1
5-70	88-089-80	Nut - 5/16" N.C. (Hex)	10
5-71	88-101-13	Hex Head Cap Screw 3/8" x 1 1/2" N.C., Grade 5	5
5-72	41-372-00	Brake Mounting Bracket	1
5-73	85-060-00	Compression Spring 5/8" O.D. x 2 1/2" Long	1
5-74	88-108-60	Washer 3/8" Flat Cut	4
5-75	88-100-24	Hex Head Cap Screw 3/8" x 4" N.C.	1
5-76	88-108-62	Lockwasher 3/8"	7
5-77	88-103-09	Flat Head Socket Cap Screw 3/8"x 3/4" NC	4
5-78	30-506-00	Chain-36 Links (For 42 Tooth Sprocket)	1
5-78	30-507-00	Chain-41 Links (For 59 Tooth Sprocket)	1
5-78	30-508-00	Chain-48 Links (For 81 Tooth Sprocket)	1
5-78	30-320-11	Chain, Double Strand, #35 Roller, 96 Pitches 36" Long, One Piece, Used With 15-81 Ratio Double Tooth Sprockets	1
5-78	30-320-12	Chain, Double Strand #35 Roller, 84 Pitches 31 1/2" Long, One Piece, Used With 15-60 Ratio Double Tooth Sprockets	1
5-79	30-070-10	Sprocket, 81 Tooth For #35 Double Strand Roller Chain, F2 Splined Hub	1
5-79	30-070-11	Sprocket, 60 Tooth For #35 Double Strand Roller Chain, F2 Splined Hub	1
5-79	30-091-00	Sprocket-42 Tooth With Splined Hub	1
5-79	30-092-00	Sprocket-59 Tooth With Splined Hub	1
5-79	30-093-00	Sprocket-81 Tooth With Splined Hub	1
5-80	97-100-00	Woodruff Key - 3/16"	1
5-81	30-070-00	Sprocket, 15 Tooth For #35 Double Strand Roller Chain, 3/4" Bore, 3/16 Keyway	1
5-81	30-080-00	Sprocket-15 Tooth x 3/4" Bore	1
5-82	17-110-10	Shaft Collar-3/4" With Keyway	1
5-83	45-002-00	Gasket-Gear Case Cover	1
5-84	88-239-82	Jam Nut-3/4" N.F. (Hex)	1
5-85	44-352-53	Gear Case Back Plate (Angle Motor Mount) Adjustable	1
5-85	44-352-52	Gear Case Back Plate (Vertical Motor Mount) Adjustable	1
5-86 and 5-87		SEE SECTION J2M	1

FIGURE 5  
POWER TRACTION DRIVE AXLE

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
5-88	10-074-00	Tire, 4.80 x 8, Four Ply Super Rib	2
5-88	10-078-00	Tire, 4.80 x 8, Six Ply Steel Guard	2
5-88	10-075-00	Tire, 4.80 x 8, Four Ply Super Rib-Tubeless	2
5-88	10-076-00	Tire, 4.80 x 8, Four Ply Knobby-Tubeless	2
5-89	13-989-00	Valve Stem for Tubeless Tire	2
5-89	11-030-00	Tube -4.80 x 8"	2
5-90	12-011-00	Wheel for 4.80x 8 & 500 x 8 Tire (Five 1/2" Holes on 4 1/2" Bolt Circle)	2
5-90	12-012-00	Wheel for 4.80x 8 Tubeless Tire (Five 1/2" Holes on 4 1/2" Bolt Circle)	2
5-91	13-731-00	Tire, Tube & Wheel, 4.80 x 8, Four Ply Super Rib Tire (Five 1/2" Holes on 4 1/2" Bolt Circle)	2
5-91	13-738-00	Tire, Tube & Wheel, 4.80 x 8, Six Ply Steel Guard Tire (Five 1/2" Holes on 4 1/2" Bolt Circle)	2
5-91	13-734-00	Tire & Wheel, 4.80 x 8, Four Ply Super Rib-Tubeless Tire (Five 1/2" Holes on 4 1/2" Bolt Circle)	2
5-96	12-054-00	Wheel for 16 1/2" x 11 1/2" Solid Cushion Tire (Five 1/2" Holes on 4 1/2" Bolt Circle)	2
5-96	12-050-00	Wheel for 16 x 4 x 12 1/8" or 17 x 4 1/2 x 12 1/8" Solid Cushion Tire. (Five 1/2" holes on 4 1/2" Bolt Circle)	2
5-97	10-261-00	Tire, Solid Xtra Cushion, All Service 16 1/2 x 4 x 11 1/2"	2
5-97	10-256-00	Tire, Solid Xtra Cushion, All Service 17 x 4 1/2 x 12 1/8"	2
5-97	10-250-00	Tire, Solid Cushion, Smooth 16 x 4 x 12 1/8" 12 1/8	2
5-98	13-954-10	Tire & Cast Iron Wheel 16 1/2 x 4 x 11 1/2" Solid Extra Cushion, All Service Tire (Five 1/2" Holes on 4 1/2" Bolt Circle)	2
5-98	13-959-19	Tire Cast Iron Wheel 17 x 4 1/2 x 12 1/8" Solid Extra Cushion, All Service Tire (Five 1/2" Holes on 4 1/2" Bolt Circle)	2

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
5-98	13-952-10	Tire Cast Iron Wheel 16 X 4 X 12-1/8 Solid Cushion Tire (Five 1/2" Holes On 4 1/2" Bolt Circle)	2
5-99	41-346-98	Brake Backup Plate Assembly With Shoes (Left Side)	1
5-99	41-346-99	Brake Backup Plate Assembly With Shoes (Right Side)	1
5-100	41-346-10	Brake Backup Plate Only (Left Side)	1
5-100	41-346-11	Brake Backup Plate Only (Right Side)	1
5-101	41-640-00	Brake Shoes 7" Internal Expanding (Set For 1 Wheel)	2 Set
5-102	42-003-00	Brake Adjustment Cam (7" Hydraulic Brake)	4
5-103	85-207-00	Spring Extension 3/8" X 1-3/8" Free Length (Red)	4
5-104	85-208-00	Spring Extension 1/2" X 4 1/2" Free Length (Orange)	2
5-105	85-411-00	Spring Torsion 1 1/2" Diameter (Blue)	2
5-106	45-044-00	Gasket - Rear Axle Bearing	2
5-107	88-068-62	Washer - 1/2" Lock	4
5-108	88-060-06	Hex Head Cap Screw 1/2" X 1/2" N.C.	4
5-109	41-514-00	Brake Drum (7")	2
5-116	99-506-98	Wheel Cylinder (7" Brake - Left)	1
5-116	99-506-99	Wheel Cylinder (7" Brake - Right)	1
5-117	99-506-61	Wheel Cylinder Repair Kit (7" Brake)	2
5-118	88-527-11	Cotter Pin 1/8" X 1" (Axle Vent)	1
5-119	88-088-61	Washer 5/16" SAE	11
5-122	80-703-00	"O" Ring Motor Mount Seal	1
5-123	70-454-00	Motor Mount Plate	1
5-124	88-067-11	Socket Set Screw 1/2" NC X 1"	1
5-125	88-069-80	Nut 1/2" NC (Hex)	1
5-126	88-109-80	Nut 3/8" NC (Hex)	3
5-127	16-400-00	Spacer 1 1/2" I.D. X .125" Thick	0 - 1 Or 2
5-128	88-140-14	Hex Head Cap Screw 1/2" X 1 1/2" NC	3 Or 4
5-130	88-180-11	Hex Head Cap Screw 5/8 X 1 1/2" NC (Model E)	1
5-131	88-188-62	Lock Washer 5/8" (Model E)	1
5-132	41-695-00	Pin, Brake Shoe Anchor	4
5-133	41-697-00	Washer (Rubber) 7/16 O.D. x 1/8 I.D. x 3/32 Thick	4
5-134	88-068-61	Washer, 1/4 SAE	4
5-135	85-050-00	Spring, Compression, 1/2 O.D. x 1" Long (Fuschia)	4
5-136	41-696-00	Cup, Brake Shoe Anchor	4
5-137	88-108-63	Lockwasher, 3/8, Internal Tooth	5

MOTOR MAINTENANCE, SERVICE AND ADJUSTMENT  
ELECTRIC MOTORS  
REFER TO FIGURE 5H

Detailed service procedures covering maintenance of bearing brushes and commutator are covered in this section. DO NOT PERFORM THIS PROCEDURE WHILE BATTERIES ARE BEING CHARGED.

Maintenance of electric motors should be referred to personnel with experience and equipment. Should it be necessary for you to order replacement parts for your motor, IT IS NECESSARY TO INCLUDE COMPLETE NAMEPLATE DATA WITH ORDER.

MOTOR MAINTENANCE - BRUSH INSPECTION AND REPLACEMENT

1. Remove cover, exposing brush assemblies. Lift brush from holder for inspection.
2. If brushes are worn, remove, install new brushes. Use fine sandpaper to "seat in" new brushes to commutator. To determine when to replace worn brushes, proceed as follows:
  - a. For motors equipped with brushes having end pigtails and side hooks, replace brush when hook is within 1/16" from bottom of hook slot.
  - b. For motors equipped with brushes having side pigtails only, replace brush when pigtail is within 1/16" from bottom of pigtail slot.

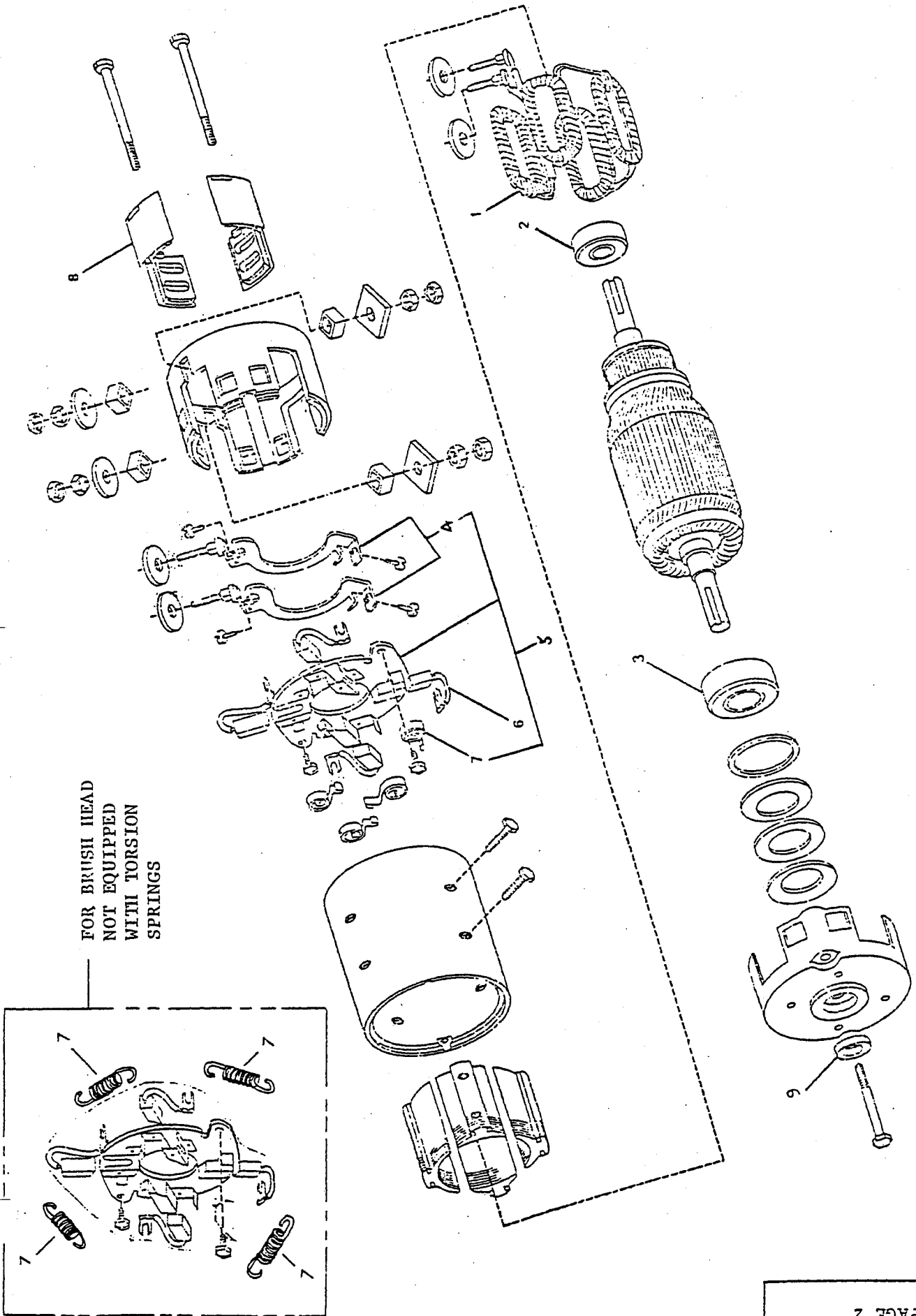
NOTE: When one brush is replaced in a motor, it is considered good maintenance practice to replace all brushes.

3. Check operation of each brush to assure that brush slides freely and does not bind in holder.
4. Replace cover.

MOTOR DISASSEMBLY AND REASSEMBLY

1. Remove motor from vehicle as described in section J2.
2. Determine if witness marks on end bell and stator housing are present. If not, mark end bell and housing to assure proper relation of brushes and commutator when reassembling.
3. Remove cover, exposing brush assemblies. Lift brushes from brush holder.
4. Remove bolts holding end bells and remove end bell and rotor. (Pull from shaft extension end). Take care not to damage any coils or armature wires when handling motor parts.
5. Press or pull old bearings off by using bearing press or bearing puller. Do not damage shaft while removing bearings.
6. Install new bearings onto shaft by gentle pressure or tapping with proper tool on inner race only. Bearing will be damaged if pressed or driven by outer race or seals.
7. If the commutator is worn or "burned" it should be turned, the mica undercut and the commutator polished.
8. Oil bearing housing lightly to aid in reassembly.
9. Reassemble motor taking care that all parts are kept clean.
10. Install brushes and "seat in" with fine sandpaper.
11. Check operation of each brush to assure that brush slides freely in holder.
12. Replace cover.
13. Reassemble to vehicle as described in preceding subsection.

NOTE: If motor terminal studs were removed for inspection, refer to section J2, Page 8, item 6, for correct procedure to avoid damaging studs.



ELECTRIC MOTORS  
REFER TO FIGURE 5M

For D.C. Motor replacement parts, IT IS NECESSARY TO INCLUDE COMPLETE MOTOR NAME PLATE DATA WITH THE ORDER.

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY.
Replacement parts for G.E. Motor 5BC48JB503, 5BC48JB531, 5BC48JB550 and 5BC48JB582			
5M-1	70-201-00	Field Coil Set (not used on G.E. Motor 5BC48JB582)	1
5M-1	70-202-00	Field Coil Set (For G.E. Motor 5BC48JB582)	1
5M-2	80-200-00	Ball Bearing - Commutator End	1
5M-3	80-504-00	Ball Bearing - Pulley End	1
5M-4	70-195-00	Set of two armature terminal & brush pair connectors, <u>not used</u> on motor 5BC48JB550 with suffix letter "C" or "D". Two required per motor. (included in 70-188-00)	2
5M-4	70-196-00	Armature terminal & brush pair connector, <u>used only</u> with motor 5BC48JB550 with suffix letter "C" or "D". Two required per motor. (included in 70-184-00).	2
5M-5	70-184-00	Brush holder, without brushes, including brush springs, armature terminal & brush pair connectors. <u>Used only</u> on motor 5BC48JB550 with suffix letter "C" or "D".	1
5M-5	70-188-00	Brush holder, without brushes, including brush springs, armature terminal & brush pair connectors. <u>Not used</u> on motor 5BC48JB550 with suffix letter "C" or "D".	1
5M-6	70-101-00	Motor Brush	4
5M-7	85-412-00	Brush Spring, Torsion	4
5M-8	30-801-00	Brush Inspection Cover	4
5M-9	45-506-00	Oil Seal	1
5M-10	70-210-62	Motor Terminals Insulator Kit	1

Replacement parts for G.E. Motors 5BC48JB251 & 5BC48JB265

5M-2	80-200-00	Ball Bearing, Commutator End	1
5M-3	80-504-00	Ball Bearing, Pulley End	1
5M-5	70-185-00	Brush Holder Assy.	1
5M-6	70-100-00	Motor Brush	4
5M-7	85-401-00	Brush Spring, Extension	4
5M-9	45-506-00	Oil Seal	1

Replacement Parts For G.E. Motor 5B6A8JB726

70-204-00	Field Coil Set	1
80-209-00	Ball Bearing, Commutator End	1
80-504-00	Ball Bearing, Pulley End	1
70-172-00	Brush Holder Assy. <u>With</u> Brush Springs But <u>Without</u> Brushes	1
85-412-00	Spring, Brush	4
70-104-00	Armature Terminal & Brush Pair Connector	2
45-506-00	Oil Seal	1

Brush Measurement Procedure For 726 Motor

With new brushes, A 1/16" drill rod can be inserted approximately .76" into brush measurement holes. Brushes should be replaced when rod can be inserted 1.56" into hole. This leaves approx. 1/8" allowable wear remaining.

FIG. I.D.

NO.	T-D PART NO.	DESCRIPTION	QTY.
Replacement Parts for G.E. Motor 5BC48JB67B & 5BC48JB114			
5M-2	80-205-00	Ball Bearing, Commutator End	1
5M-3	80-204-00	Ball Bearing, Pulley End	1
5M-6	70-100-00	Motor Brush Assy	4
5M-7	80-401-00	Brush Spring, Extension	4
Replacement Parts for T.D. Motor 388P3816 & Baldor 45-39W03, 45 39W16, 45-39W19			
5M-2	80-200-00	Ball Bearing, Commutator End	1
5M-3	80-504-00	Ball Bearing, Pulley End	1
5M-5	70-187-00	Brush Head Assy, Complete with Brushes	1
5M-6	70-101-00	Motor Brush	4
5M-8	30-803-00	Brush Inspection Cover	4
5M-9	45-506-00	Oil Seal	1
Replacement Parts for G.E. Motor 5BCG56EA17			
5M-2	80-201-00	Ball Bearing, Commutator End	1
5M-3	80-504-00	Ball Bearing, Pulley End	1
5M-5	70-189-00	Brush Holder Assy	1
5M-6	70-101-00	Motor Brush Assy	4
5M-7	85-412-00	Brush Torsion Spring	4
Replacement Parts for G.E. Motor 5BC49JB122			
5M-2	80-200-00	Ball Bearing, Commutator End	1
5M-3	80-504-00	Ball Bearing, Pulley End	1
5M-4	70-185-00	Brush Holder	1
5M-6	70-100-00	Motor Brush	4
5M-7	85-401-00	Brush Extension Spring	4
5M-9	45-506-00	Oil Seal	1
Replacement Parts for G.E. Motor 5BC49JB305			
5M-1	70-203-00	Field Coil Set	1
5M-2	80-200-00	Ball Bearing, Commutator End	1
5M-3	80-504-00	Ball Bearing, Pulley End	1
5M-4	70-195-00	Armature Terminal to Brush	2
5M-5	70-188-00	Brush Holder assembly	1
5M-6	70-101-00	Motor Brush	4
5M-7	85-412-00	Brush Extension Spring	4
5M-8	30-802-00	Brush Inspection Cover	4
5M-9	45-506-00	Oil Seal	1
5M-10	70-210-62	Motor Terminals Insulator Kit	1



FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY.
Replacement Parts for Taylor-Dunn Motor 388P381A			
5M-2	80-204-00	Ball Bearing, Commutator End	1
5M-3	80-205-00	Ball Bearing, Pulley End	1
5M-5	*70-187-00	Brush Head Assy. Complete with Brushes *Not supplied as original equipment on <u>A</u> series motor but must be used as replacement part.	1
5M-6	*70-102-00	Motor Brush with Wire Hook *Replacement part for original <u>A</u> series motor <u>NOT</u> converted to new brush head assy. 70-187-00.	4
5M-6	70-101-00	Motor Brush for <u>A</u> series motor converted to new brush head 70-187-00.	4
5M-7	*85-413-00	Brush Torsion Spring *Replacement part for original <u>A</u> series motor <u>Not</u> converted to new brush head assy. 70-187-00.	4
5M-9	45-506-00	Oil Seal	1
5M-8	30-802-00	Brush Inspection Cover	1

MAINTENANCE PROCEDURES  
REFER TO FIGURE 7  
MECHANICAL CONTROL LINKAGE

The mechanical control linkage operates the various controls and mechanism located throughout your vehicle.

The foot treadle is a combination brake and accelerator control. It pivots near it's center and operates the program switch through a lever and link located on the front portion of the treadle. The treadle and pivot shaft are an integral unit. The brake control lever is fixed to the pivot shaft and through it's linkage operates the brake lever arm and brake band.

The treadle assembly being an integral unit, simultaneously operates the release of braking action while motor power is being applied and conversly disconnects motor power when braking action is applied.

The automatic (deadman) brake lever system couples to the treadle brake linkage. A heavy spring and spring tension control lever supplies the brake apply power when the foot is lifted from the treadle.

The safety interlock and brake pressure release pedal is located for left foot operation. It is designed to lock the spring pressure control lever in the released position when foot pressure is applied to the pedal. Depressing the pedal also engages the safety interlock switch which completes the control circuit for running position. Releasing the pedal applies automatic brake spring pressure and disconnects the power to the motor.

The various mechanical linkage components are located under the operator's platform, with the exception of the accelerator link, which is located within the control console.

All wear points should be lubricated monthly using pressure gun grease at the four points equipped with zerk fittings, and all purpose engine oil at other points. Refer to Maintenance Guide Section D and Lubrication Diagram Section E.

For service and adjustments refer to the following sections:

- Section J2      For brake band service and adjustments.
- Section J4      For treadle and automatic brake linkage service and adjustment.
- Section J6      For accelerator program switch service and adjustments, H.D. Model
- Section J7      For accelerator program switch service and adjustments, Std. Model

SERVICE AND ADJUSTMENTS  
REFER TO FIGURE 7  
MECHANICAL CONTROL LINKAGE

Adjustment of Automatic (Deadman) Brake Linkage

1. With power disconnected depress treadle fully and place wooden block or wedge at rear of treadle to lock into position.  
Note: Front tip of treadle (toe end) should measure  $\frac{1}{2}$ " to 1" below surface of operator's platform.
2. Observe position of program switch "J" hook. Correct position is when "J" hook and high speed contact bar are in exact alignment. If "J" hook is not correctly aligned loosen two bolts attaching insulator board to accelerator link. Adjust "J" hook position by sliding assembly within slotted holes provided in accelerator link. If slot is not sufficient to provide alignment then place assembly in approximate center of slots tighten bolts and re-adjust blocking on treadle to move "J" hook into alignment.
3. Observe position of brake lever bell crank, located under operator's platform. Spring should be just touching angle frame member at the point where it is hooked to bell crank. If not in correct position loosen clevis lock nut, (treadle to bell crank link) remove clevis and adjust length of link to bring bell crank into proper position.
4. Replace clevis and tighten lock nut.
5. Remove clevis pin and clevis from brake lever arm (on "Power Traction" Drive) and adjust brake rod length so that brake lever arm is a maximum of 1/16" from gear case cover. It is preferable to have the brake lever arm just making contact with the gear case cover as this provides an additional stop in the control linkage.
6. Remove block or wedge releasing treadle to normal off position.
7. Adjust brake band as outlined in Section J2, Page 2, so that brake is applied during last quarter of treadle travel. Be certain that Program Switch is in the off position prior to application of brake. Normal condition will provide approximately 1" of "J" hook travel beyond the off position, prior to brake engagement and will increase as the lining wears.
8. To compensate for normal lining wear, adjust only the brake band as outlined above and in Section J2, Page 2.

Removal Of Brake Lever Bell Crank Or Spring Pressure Control Lever.

1. Disconnect power by removing battery plug.
2. Unhook spring.
3. To remove bell crank it is necessary to remove clevis pin, clevis and spherical rod end on brake rod and brake link attached to bell crank.
4. Remove 5/8" pivot screw from the lever which is to be removed and lift lever out of vehicle.

Re-Install Brake Lever Bell Crank Or Spring Pressure Control Lever.

1. The levers should be installed in the reverse order to which they were removed.  
Note: The pivot screw is threaded through the tapped hole in the lever. The clearance between the lever and the pivot block is provided by threading

the pivot screw approximately 1/8" to 3/16" beyond the lever before allowing the screw to engage the threads in the pivot block. Extending the screw more or less from the lever before entering the pivot block will provide more or less clearance as needed.

2. It is important that both levers must swing freely without binding after the pivot screw has been locked into position. Lock pivot screw by tightening the head of the screw against the lock washer and lever.
3. If the levers have been damaged or bent it may be necessary to remove and straighten or possibly replace them. Should the levers bind against the chassis or the spring it will interfere with the automatic brake action.

#### Adjustment of Treadle Return Spring Pressure (Vehicles Without Spring Release)

1. Located under the Operator's platform, is the brake spring control lever. It is equipped with 2- $\frac{1}{2}$ " adjusting bolts and lock nuts. These bolts hold the lever in position to provide suitable operating spring pressure.
2. Lengthening the bolt nearest the center frame member and shortening the opposite bolt moves the lever towards the left side of the vehicle. This INCREASES the brake spring pressure. Adjusting the lever in the opposite direction towards the center of the vehicles DECREASES the brake spring pressure.
3. It is recommended that the lever be adjusted to provide sufficient return pressure so vehicle program switch will return to neutral when treadle is released. If spring pressure is too great, it will be more difficult to operate treadle and brakes will be applied severely when treadle is released. If spring pressure is too light program switch may not return to neutral and vehicle will continue to run with power on when treadle is released.

#### Adjustment Of Walk-Along Control Linkage.

##### Note:

Adjustments of walk-along controls should be made after all other control linkage adjustments are completed.

1. Adjust clevis on accelerator link so that control handle swings freely throughout full operating range of treadle and is in a comfortable position to operate.



TAYLOR DUNN MFG. CO.  
2114 West Ball Rd.  
Anaheim, Calif.

MECHANICAL CONTROL LINKAGE  
MOL. & E. STD. & H.D.

FIGURE 7  
SECTION J4

NO.	DESCRIPTION	LENGTH	QUAN.	REVISED DATE	REVISION
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SECTION J4  
PAGE 4

TOL. FRAC.	+	DEC.	+
SCALE	NONE		
DRAWN BY	DEA		
DATE	7-70		

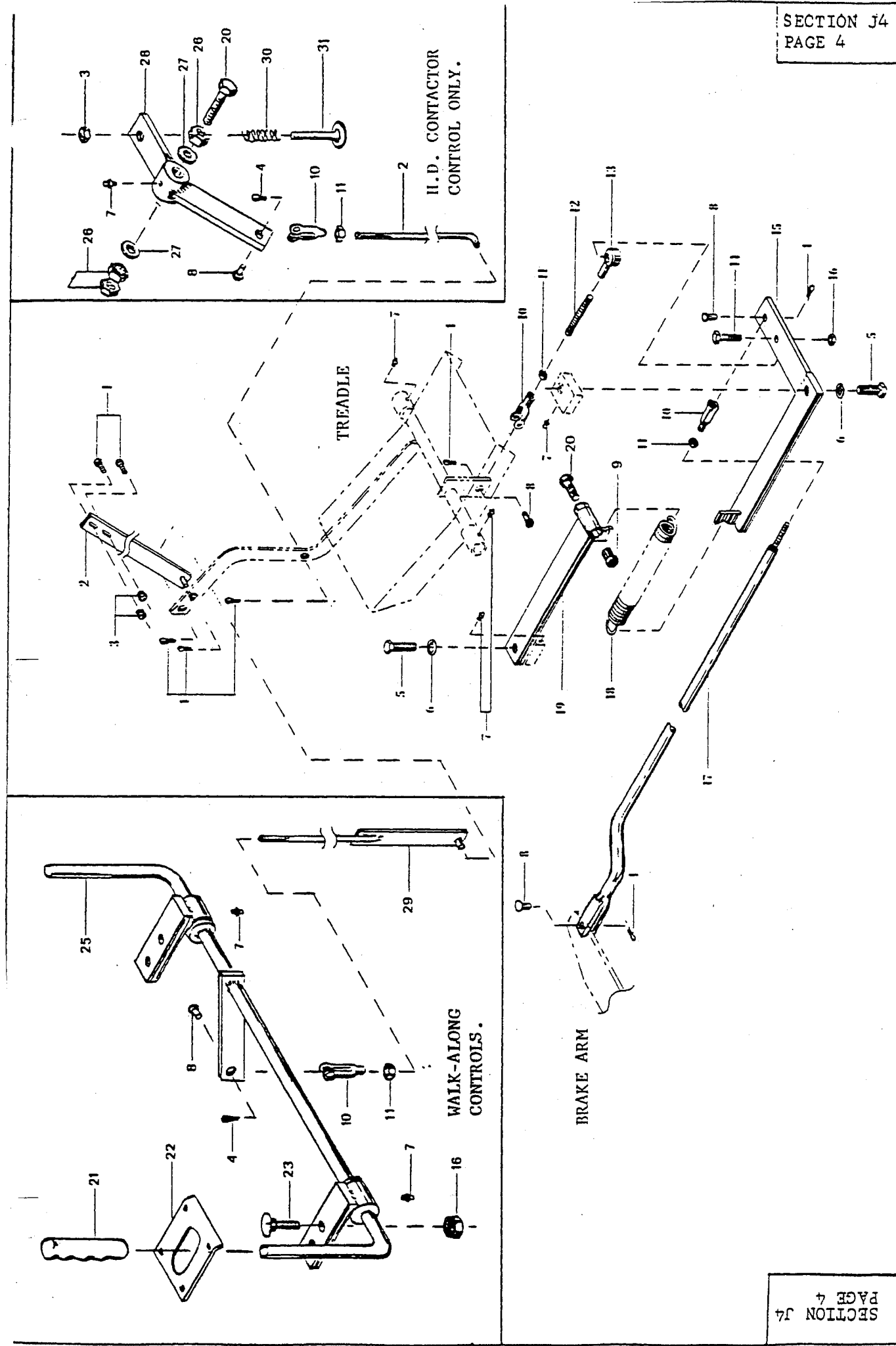


FIGURE NO. 7  
MECHANICAL CONTROL LINKAGE

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	Q. RE
7-1	88-060-09	Hex Head Cap Screw $\frac{1}{2}$ " x $\frac{3}{4}$ " N.C.	2
7-2	50-628-00	Accelerator Link $\frac{1}{8}$ " x 1" x $12\text{-}\frac{3}{4}$ "	1
7-2	50-123-00	Accelerator Rod $\frac{3}{8}$ " (NF) - Contactor Control	1
7-3	88-069-86	Nut - $\frac{1}{2}$ " N.C. Flexlock	1 or
7-4	88-519-09	Cotter Pin $\frac{3}{32}$ " x $\frac{3}{4}$ "	4
7-5	88-180-15	Hex Head Cap Screw (Pivot Screw) $\frac{5}{8}$ " x $1\text{-}\frac{3}{4}$ " N.C.	2
7-6	88-188-62	Lock Washer $\frac{5}{8}$ "	2
7-7	87-071-00	Grease Fitting - $\frac{3}{16}$ " Drive	4 or
7-8	96-772-00	Pin - Clevis $\frac{3}{8}$ " x 1"	3 or
7-9	98-601-00	Rubber Bumper	0 or
7-10	96-762-00	Clevis - $\frac{3}{8}$ " Cast	2 or
7-11	88-119-80	Nut - $\frac{3}{8}$ N.F. Hex	2 or
7-12	50-028-00	Rod - $\frac{3}{8}$ " N.F. x $1\frac{1}{2}$ "	1
7-13	86-520-00	Rod End, $\frac{3}{8}$ " Spherical Bearing	1
7-14	88-100-14	Hex Head Cap Screw $\frac{3}{8}$ " x $1\frac{1}{2}$ " N.C.	1
7-15	50-647-00	Brake Lever Bell Crank	1 or
7-16	88-109-81	Locknut $\frac{3}{8}$ " N.C. Hex	1 or
7-17	50-027-00	Brake Rod - $\frac{3}{8}$ " Pipe with $\frac{3}{8}$ " N.F. End 28" Long	1
7-18	85-280-00	Spring - $1\text{-}\frac{3}{8}$ " O.D. x $7\text{-}\frac{3}{4}$ " Long (Extension)	1
7-19	50-648-00	Brake Lever - Spring Pressure Control	0 or
7-19	50-646-00	Brake Spring Control Lever	0 or
7-20	88-140-14	Hex Head Cap Screw $\frac{1}{2}$ X $1\frac{1}{2}$ N.C.	1
7-20	96-316-00	Hex Head Cap Screw $\frac{1}{2}$ x 3 N.C.	1
7-21	98-350-00	Hand Grip	2
7-22	50-645-00	Cover Plate	2
7-23	88-102-11	Carriage Bolt $\frac{3}{8}$ X 1 N.C.	4
7-25	50-644-00	Handle Assembly	1
7-26	88-149-80	Nut $\frac{1}{2}$ N.C. (Hex)	3
7-27	88-148-60	$\frac{1}{2}$ Washer	2
7-28	50-642-00	Accelerator Lever (Contactor Control)	1
7-29	50-629-00	Accelerator Link (Walk-Along Control)	1
7-30	85-034-00	Spring Compression $\frac{7}{16}$ O.D. X 2	2
7-31	96-314-00	Accelerator Plunger (Contactor Control)	1

MAINTENANCE PROCEDURES

REFER TO FIGURE 8

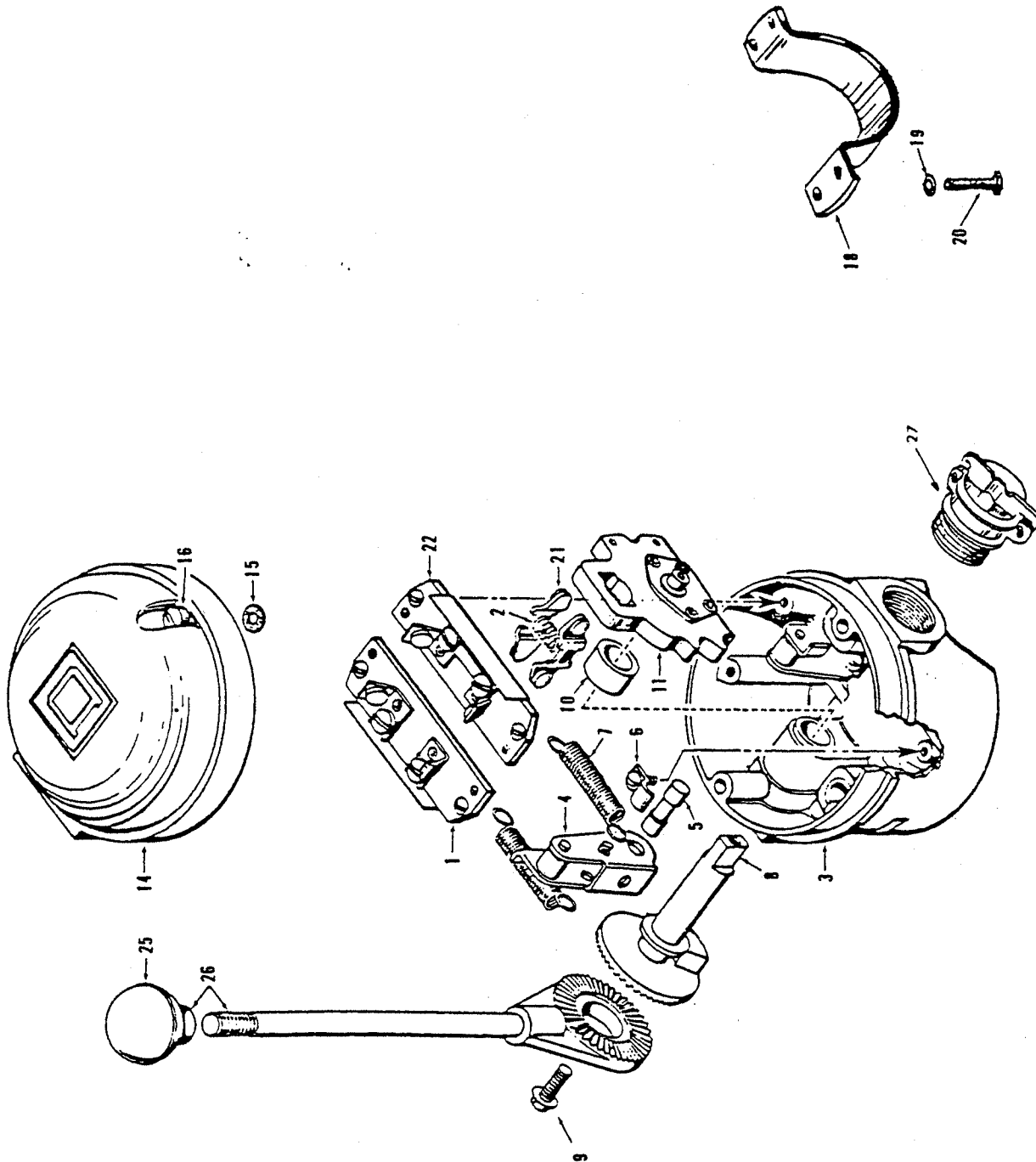
FORWARD-REVERSE SWITCH

The forward-reverse switch on your vehicle serves the same purpose as does the transmission selector lever in your automobile. It should be treated with the same respect, for abusive treatment will shorten it's life.

It will require very little maintenance if properly used.

Maintenance:

All parts of this switch are readily accessible and may be inspected by removing Cover. Contacts are silver and are not harmed by discoloration and slight pitting. DO NOT FILE THEM as dressing merely wastes contact material. Replacement is necessary only when silver has worn thin. Movable contacts may be removed by pressing together, tilting 90° and sliding from the contact carrier. Stationary contact assemblies may be removed by loosening the four screws which fasten them to the enclosure.



LENGTH QUANTITY REVISED DATE REVISION

FORWARD AND REVERSE  
SWITCH

FIGURE 8

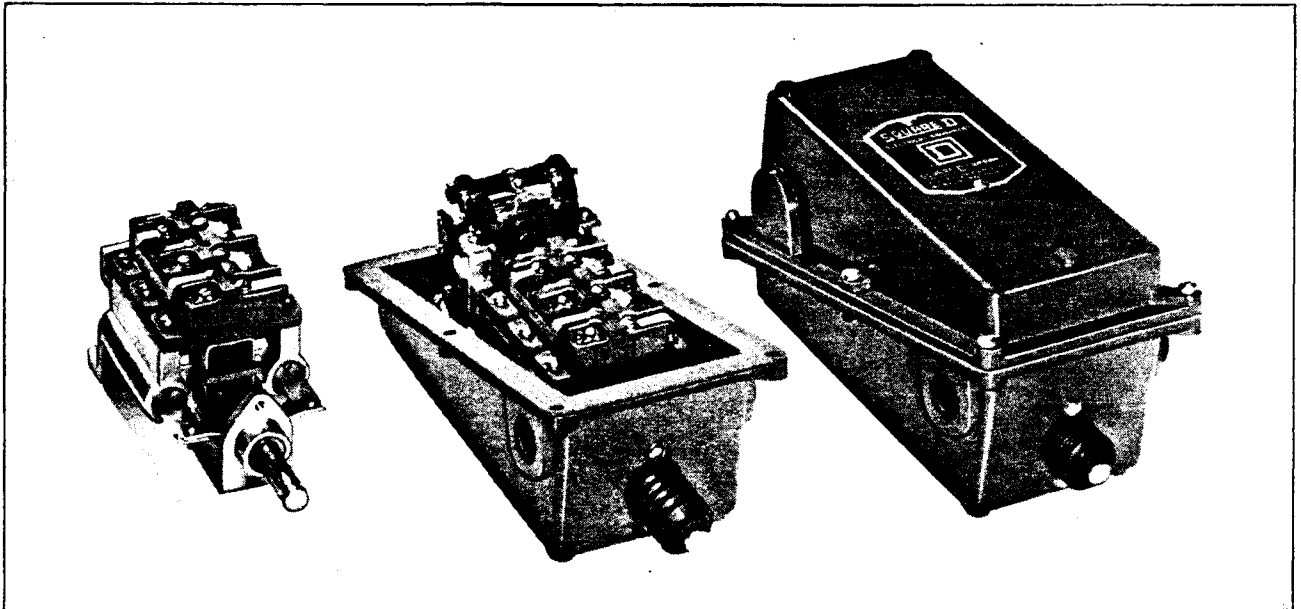
NO.	DESCRIPTION
TOL. FRAC.†	DEC.†
SCALE	NONE
DRAWN BY	REA



FIGURE 8  
FORWARD AND REVERSE SWITCH

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
8-1	71-080-54	Terminal Board Assembly	1
8-2	71-080-57	Contact Finger Spring..	1
8-3	71-080-61	Housing And Bearing Assembly	1
8-4	71-080-62	Roller Arm Assembly	2
8-5	71-080-66	Hinge Pin	2
8-6	71-080-65	Clip	2
8-7	71-080-64	Heavy Positioning Spring For 6" Or Longer Handle	1
8-8	71-080-67	Operating Shaft Assembly	1
8-9	88-040-06	10/32 x 1/2 Hex Head Cap Screw	1
8-10	71-080-63	Spacer	1
8-11	71-080-59	Movable Contact Carrier Assembly	1
8-14	71-080-53	Cover	1
8-15	71-080-55	Washer, Corprene	2
8-16	88-047-11	10/32 x 1/2 Fillister Head Machine Screw	2
8-18	71-080-60	Switch Clamp	1
8-19	88-048-62	#10 Lock Washer	4
8-20	88-014-09	6/32 x 3/4 Round Head Machine Screw	4
8-21	71-080-58	Contact Finger Assembly	2
8-22	71-080-56	Terminal Board Assembly (With Connector)	1
8-25	71-080-51	Operating Knob	1
8-26	71-080-52	Operating Lever Assembly	1
8-27	75-430-00	Connector - Romex/Conduit 1/2"	1

MAINTENANCE PROCEDURES  
REFER TO FIGURE 9A  
SPEED CONTROL PROGRAM SWITCH



**APPLICATION** — The accelerating master switch for truck control is a manually operated pilot device to control magnetic contactors, which in turn, control the traction motor of an electric truck. It provides either three or four individual speeds and may have time delay acceleration and plugging control.

The switch can be changed from four speed to three speed operation by placing a spacer (21) on the cam shaft (20).

**INSTALLATION** — The enclosed type switch has three mounting holes and is provided with mounting pads to prevent distortion of the case when mounting. The two lower mounting holes become more accessible if the operating cam shaft (20) is pressed in. When the open switch mechanism is mounted in the standard enclosure or on the user's mounting bracket, the two mounting screws on the shaft end of the switch should be fully tightened first. When mounting the open type unit, boot (19) should be used to prevent dust from entering into the front bearing of the switch.

The plugging magnet (35) is polarized correctly for negative battery to armature when the resistor center tap is connected to the left hand coil terminal. For positive battery to armature, reverse the plugging coil connection.

The entire plugging magnet assembly (item #35) can be added or replaced. Installation consists of engaging Bakelite latches (item #39) in spring guides (item #5) and fastening plugging unit to die cast base (item #8) with two #8-32 screws. Since plugging units have been factory tested for proper release, while installed on a test master switch, field adjustment should not be necessary. Factory units are normally adjusted for armature release at a coil voltage 10%-25% of nominal battery system voltage, however, this range is not critical. Units that may release outside of this range, including those that release at zero volts, may still provide adequate plugging protection, since operational adjustment is provided by means of the variable resistor mounted on the plugging unit. Proper setting of this resistor is covered in 119AS.

The probable causes of **LOW** release voltage are:

1. Return spring guides do not engage Bakelite latches simultaneously at point of release. This can be corrected by loosening the (4) #6-32 screws that fasten the Bakelite latches (item #39) to the armature assembly (item #38). Then depress the cam shaft (item #20) until the armature assembly seals. While holding the armature assembly sealed with one finger, release the camshaft and tighten the (4) #6-32 screws while the return spring guides are holding the latches in proper alignment.
2. Magnetic particles accumulated on pole face of armature assembly. Remove with air hose. If unit has been stored too long in a humid location, some corrosion may form at point of contact between armature assembly and core of magnet coil. This can be removed with a fine grade of emery cloth and blown clean. If armature assembly is removed, it should be marked and installed exactly as removed.

The probable cause of **HIGH** release voltage is mechanical binding in the device that prevents the return springs from exerting adequate release force on the latches. This condition can be corrected by cleaning and lubricating. Factory devices are lubricated with a small quantity of light silicone oil to assure proper operation at low temperature.

**MAINTENANCE** — The cam operated snap switch, Class 9007 Type AO-4, may be replaced when necessary simply by removing connectors (6) and (7) and the mounting screws. **DO NOT CHANGE** the setting of the adjusting screws (9). If it becomes necessary to replace the roller arm and yoke assembly (10) careful setting of the adjusting screw (9) should be made. This setting should be .056 inches measured from the top of the adjusting screw to the mounting surfaces of the AO-4 snap switch with the operating shaft (20) fully extended.

If fine filings or foreign materials are found on the pole faces of the plugging magnet (35), they should be removed with an air hose to insure consistent operation.

The two operating shaft bearings are "Oilite" bushings and require no further lubrication. The piston ring (26) is a graphite impregnated synthetic rubber material that is self lubricating and requires no additional lubrication of any kind.

If an increase in timing between speeds occurs, it may be an indication that dashpot and piston require cleaning. Remove dashpot and 3 colored adjusting screws from dashpot. (Note that screws are of different lengths and must be re-assembled in their respective holes). Wash dashpot thoroughly in solvent and blow out adjusting screw holes with air hose. Wipe piston, piston ring, and adjusting screws with solvent dampened cloth. Reassemble and adjust screws to give desired timed acceleration.

### ADJUSTMENTS

**Timing** — Timing of the switch may be varied by means of the adjusting screws on the top end of the dash pot. This dash pot is an air escapement device using the air in front of the piston to flow through an orifice to reach the rear side of the piston. Ports are arranged with controlling adjustments to control the timing between off and 2, 2 and 3, 3 and 4. These are found in order starting at the right rear of the switch and proceeding counter-clockwise. The right rear adjusting screw (red) controls the timing before reaching speed 2. This time is set at the factory for approximately .2 second which is required to provide sufficient time for the directional contactor to close, and establish its holding circuit before the switch reaches position 2. It is recommended that this screw be left as shipped from the factory. The left rear adjusting screw (white) is for the time between speeds 2 and 3, and the front adjusting screw (black) is for the timing between speeds 3 and 4. These are factory set at approximately .6 second and should be adequate for average applications without further adjusting.

**Plugging Control** — The potentiometer type resistor provided in connection with the plugging arrangement must be adjusted to obtain the proper plugging sequence. Adjustment is obtained by what amounts to changing the amount of armature resistance in the circuit. This is effected by moving the tap point at which the coil is connected to include a small portion of the starting resistance, thereby making the IR drop greater and causing the latch to release sooner. Where the scheme of connection is with the **negative battery to armature**, more severe plugging is obtained by moving the slider to the right and for less severe plugging it is moved toward the left.

For normal operation on a level floor, the slide on the adjustable resistor must be set to provide sufficient PR coil voltage to insure release of the permanent magnet under **both** of the following minimum voltage conditions.

1. Truck stalled. With the traction armature stalled, there is no generated counter voltage to aid the normal voltage drops in the release of the permanent magnet and latch assembly.
2. Battery in a low state of charge. A low battery results in reduced armature current and thereby also lowers the voltage drops that are used to release the permanent magnet.

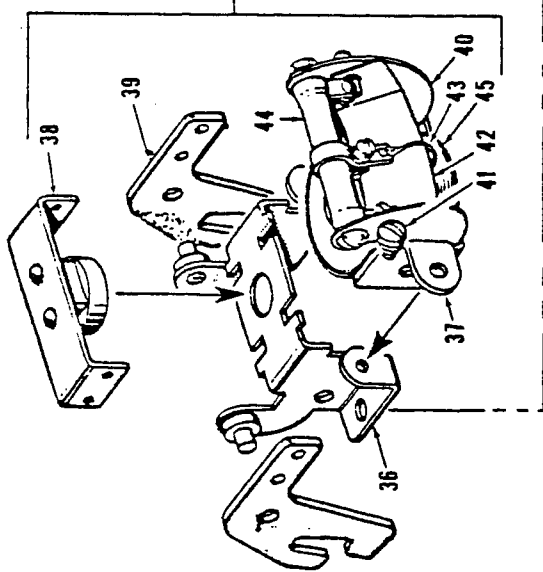
**First Speed Latch** — A recommended method of making this adjustment is to block the drive wheels off the floor and hold them in a stalled condition with the service brake. If a brake switch is employed, it will have to be temporarily jumpered. Battery charge is assumed to be in the upper 50%, however compensation is made to assume that release voltage will still be adequate when the battery reaches its lowest useable state of charge.

Clips a DC voltmeter across the terminals of coil PR. The negative lead should be attached to the right hand coil terminal when viewing the device from the front with operating end of camshaft down. With the truck stalled in 1st speed, determine the resistor slide position that produces minimum voltage at the coil. Increase this voltage gradually by moving the slide until release is obtained. Note: This voltage on the meter, and increase it further by approximately 25% to compensate for the effect of a discharged battery. During these adjustments, make certain that the accelerator pedal linkage is clear of the camshaft end so that the spring guides are exerting full pressure against the bakelite latches.

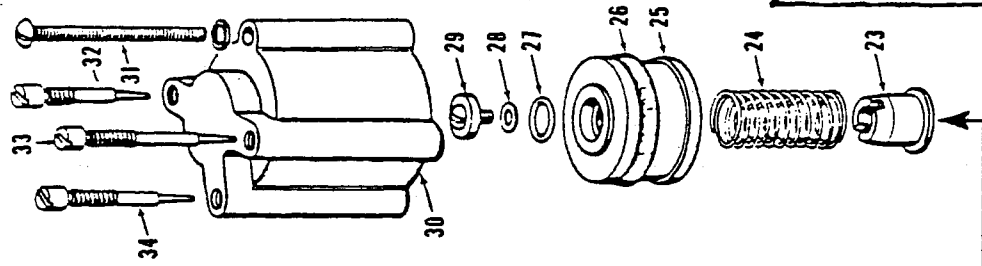
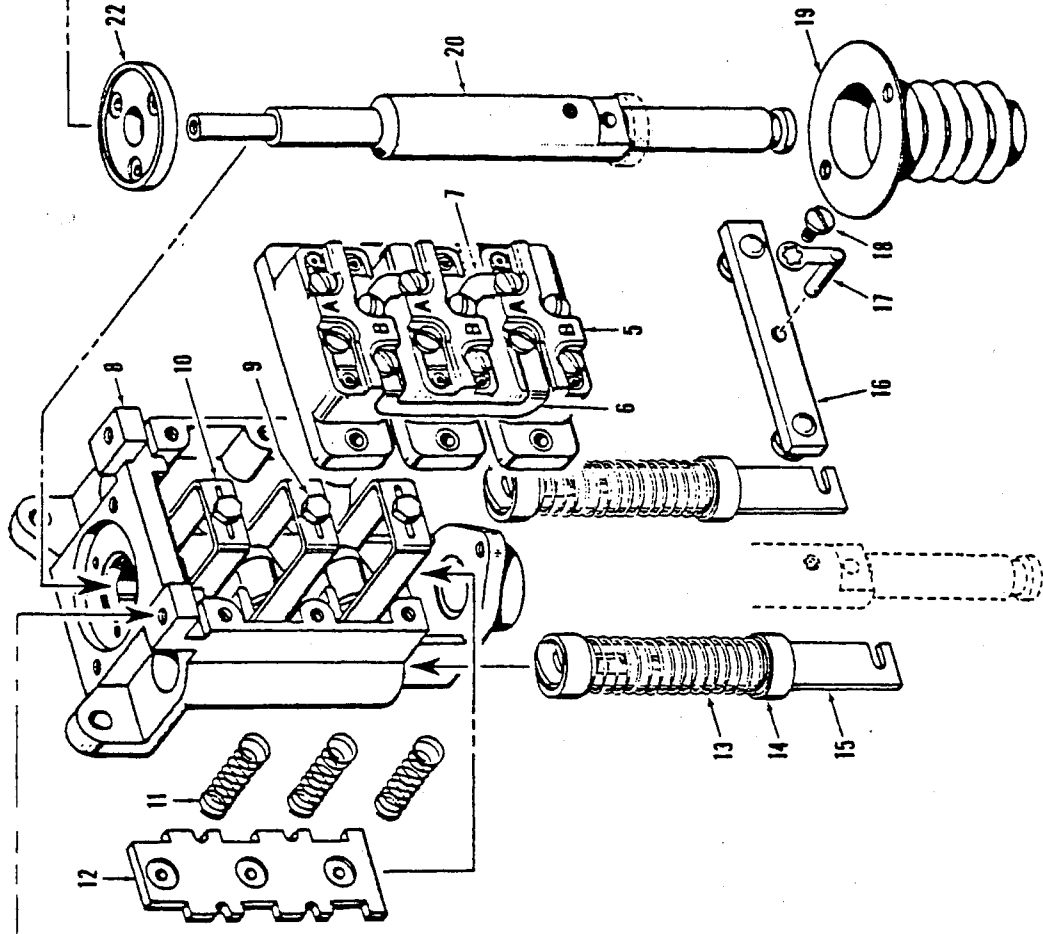
This adjustment will provide positive release under all level floor operating conditions, along with lowest speed latch release during plugging. If a more rapid reversal is desired, increase the release voltage by further movement of the resistor slide. This will provide an earlier latch release in the plugging cycle.

**Second Speed Latch** — Method of adjustment is same as for 1st speed latches, however master switch must be allowed to feed out through 2nd speed and latch in its normal position.

**Ramp Operation** — If the latched speed point of the master switch results in insufficient torque to move or hold the truck on a ramp, then the resulting backward drift may prevent latch release. Ramp drift is similar to plugging, in that it produces a reverse polarity counter voltage. This condition can usually be compensated for by setting the resistor slide to provide more release voltage than is required in a stalled condition. The actual setting can best be determined by trial on the ramp, and should be done with a fully loaded truck. Second speed latches are less likely to allow ramp drift since they provide a latched speed point having increased torque.



35



SECTION J6  
PAGE 3

SECTION J6  
PAGE 3

NO. DESCRIPTION  
TOL. FRAC. + DEC. -  
SCALE NONE  
DRAWN BY REA  
DATE 6-25-69

FIGURE 9A

SPEED CONTROL  
SWITCH



TAYLOR DUNN MFG. CO.  
2114 West Ball Rd.  
Anaheim, Calif.

FIGURE NO. 9A  
SPEED CONTROL SWITCH

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
9A-0	61-910-00	Program Switch Complete	1
9A-1	61-910-84	Cover Assembly	1
9A-2	61-910-86	Box	1
9A-3	61-910-85	Gasket	1
9A-4	61-910-87	Plastic Pipe Plug	1
9A-5	61-910-51	Precision Snap Switch	3
9A-6	61-910-52	Long Connector	2
9A-7	61-910-53	Short Connector	2
9A-8	-----	Base And Bearing Assembly	1
9A-9	61-910-54	Snap Switch Adjusting Screw	3
9A-10	-----	Roller Arm And Yoke Assembly	3
9A-11	61-910-55	Operating Spring	3
9A-12	61-910-56	Operating Spring Support	1
9A-13	61-910-57	Return Spring	2
9A-14	61-910-58	Slotted Bushing	4
9A-15	61-910-59	Return Spring Guide	2
9A-16	61-910-60	Coupling Assembly	1
9A-17	61-910-61	Keeper Assembly	1
9A-18	88-010-02	6-32 x 1/4 Hex Head Cap Screw	1
9A-19	61-910-62	Boot	1
9A-20	-----	Cam Shaft	1
9A-22	61-910-63	Bearing	1
9A-23	61-910-64	Valve Spring Guide	1
9A-24	61-910-65	Valve Spring	1
9A-25	61-910-66	Piston	1
9A-26	61-910-67	Piston Rings	1
9A-27	61-910-68	O Ring	1
9A-28	61-910-69	Seal Washer	1
9A-29	61-910-70	Valve Cap	1
9A-30	61-910-71	Dash Pot Assembly	1
9A-31	88-024-16	8-32 x 2 Round Head Machine Screw	2
9A-32	61-910-73	Timer Adjusting Screw (Red)	1

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QT RE
9A-33	61-910-74	Timer Adjusting Screw (Black)	1
9A-34	61-910-75	Timer Adjusting Screw (White)	1
9A-35	61-910-76	Plugging Magnet Class 9003	1
9A-36	-----	Outside Pole Frame Assembly	1
9A-37	-----	Center Pole Frame Assembly	1
9A-38	-----	Armature Assembly	1
9A-39	61-910-77	Latch	2
9A-40	61-910-78	Liner	1
9A-41	61-910-79	Terminal	2
9A-42	61-910-80	Resistor Lead Insulator	1
9A-43	61-910-81	Flexible Lead Assembly	1
9A-44	61-910-82	Resistor	1
9A-45	61-910-83	Magnet Coil	1

MAINTENANCE AND SERVICE INSTRUCTIONS

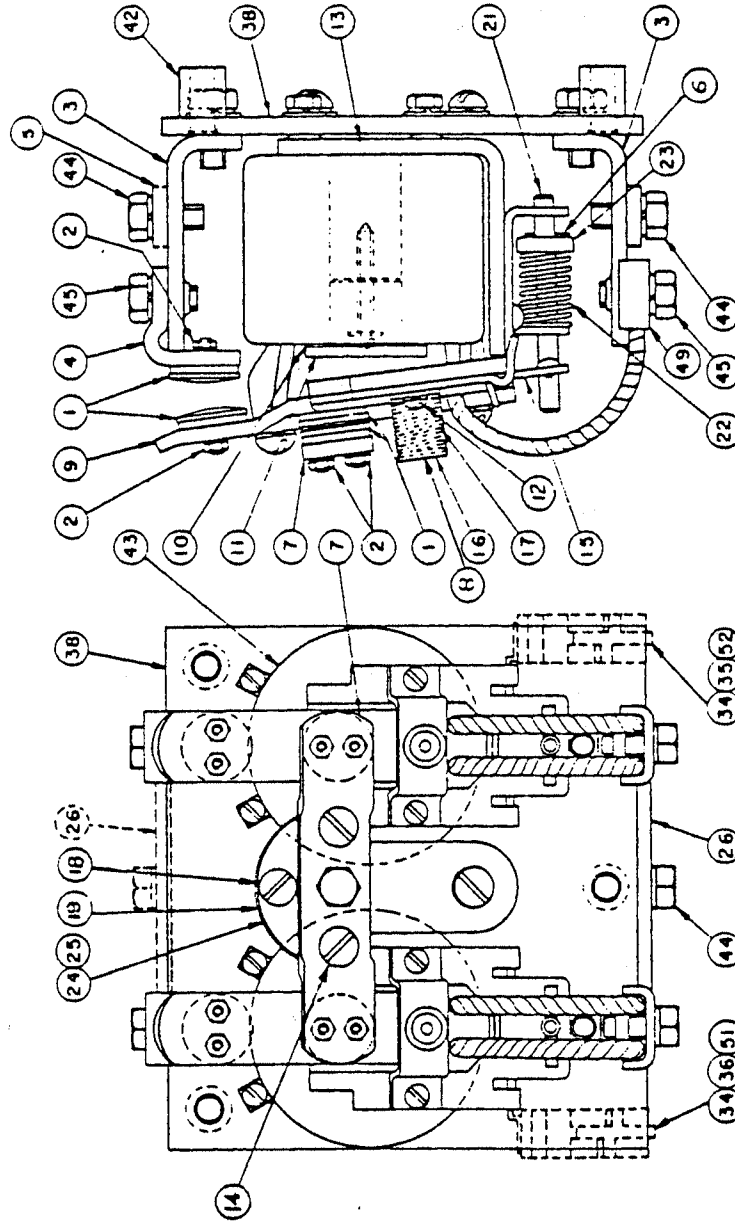
REFER TO FIGURE 9B

200 AMP CONTACTOR

1. Darkening of contacts does not indicate burning; this darkening is normal. Burning is judged by actual loss of contact material or droplets of molten contact material being displayed. The contact itself may be used until the contact material has been almost completely worn away; however, it is sometimes advisable to replace tips when, in the opinion of the maintenance department, there is not enough tip material remaining to last until the next regular maintenance check. The silver alloy portion of the tip is usable contact material. The remainder is unusable copper backing that serves to anchor the mounting studs.
2. Contacts should not be filed for the purpose of removing discoloration of minor surface irregularities. Such action wastes contact material and introduces a contact surface which is susceptible to sticking. A discolored appearance is normal in the proper operation of the contact. Occasionally, on direct current service, a cone and crater may develop. To insure continuous service of such contacts, remove the cone only with a file - do not use sandpaper or emery cloth - but avoid any further filing.
3. When replacing the contact tips, the special combination nut and conical lock washer must be used to fasten the tip to the finger. The recommended tightening torque is 20-24 lb. inches.
4. When replacing contact fingers, do not remove silver plating from the aluminum contact finger. If plated surface under tip is damaged, a new finger must be used. Do not file or sandpaper this area.
5. Contact finger springs should be replaced when tips are changed. With armature seated, contact tip pressure should be approximately 2 lbs. or more on normally open tips. Normally closed tips should have a contact pressure of 1 lb. 8 oz.
6. With new tips, the contact gap at the center of the tips should be  $\frac{23}{64}$  inches plus or minus  $\frac{1}{16}$  inch for normally open contacts and  $\frac{7}{32}$  inches plus or minus  $\frac{1}{32}$  inch for normally closed contacts. Minimum contact follow-up is  $\frac{1}{16}$  of an inch as measured between the contact finger and the top of the armature lever, with armature sealed to magnet core. If follow-up is below minimum value (with new tips), add brass follow-up spacer (Square D part No. 2507-X26) between normally open contact post and panel.



TAYLOR DUNN MFG. CO.  
2114 West Ball Rd.  
Anaheim, Calif.



MAIN POWER  
CONTACTORS

FIGURE 9B

NO. DESCRIPTION  
TOL. FRAC. + DEC. -  
SCALE NONE  
DRAWN BY REA  
DATE 6-25-60

NO.	DESCRIPTION	TOL.	FRAC.	+	DEC.	-



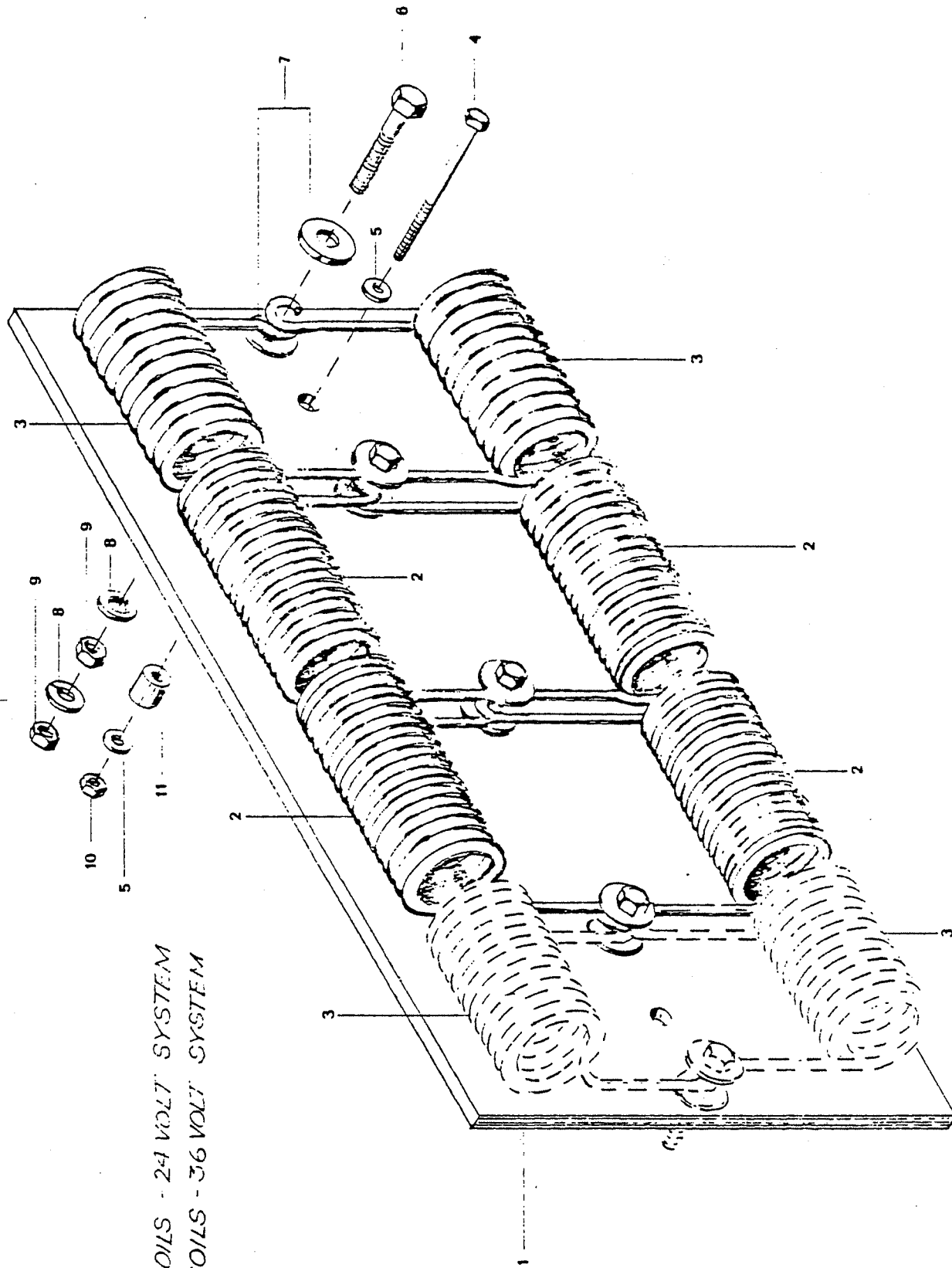
MAIN POWER CONTACTORS  
Figure 9B

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
9B-0	71-200-00	Contact, Two Pole, 200 Amp, w/o Interlock, Type VO-12	1
9B-0	71-200-10	Contact, Two Pole, 200 Amp, w/Interlock Type Vo-13	1
9B-1	71-200-52	Replaceable Contact Tip Assembly	8
9B-2	71-200-54	Keys #8 - 32	16
9B-3	71-200-55	Contact Post	4
9B-4	71-200-53	Contact Support	2
9B-5	88-088-62	5/16 Lock Washer	14
9B-6	88-507-06	1/16 x 1/2 Cotter Pin	2
9B-7	71-200-68	Contact Support	1
9B-8	88-034-06	10/24 x 1/2 Long Machine Screw	4
9B-9	71-200-51	Contact Finger and Lug Assembly	2
9B-10	71-200-66	Spring Washer	2
9B-11	71-200-65	Pole Face Assembly	2
9B-12	88-074-08	1/4 x 5/8 NF Round Head Machine Screw	2
9B-13	71-200-57	Magnet Frame Assembly	2
9B-14	88-048-62	#10 Lock Washer	6
9B-15	71-200-62	Armature Assembly	2
9B-16	71-200-64	Spring Guide	2
9B-17	71-200-63	Finger Spring	2
9B-18	88-097-09	5/16 x 3/4 NF Slotted Head Cap Screw	4
9B-19	88-067-10	1/4 x 7/8 NC Slotted Head Cap Screw	2
9B-21	71-200-61	Return Spring Guide	2
9B-22	71-200-60	Return Spring	2
9B-23	71-200-59	Cup Washer	2
9B-24	71-200-67	Contact Support Plate	1
9B-25	71-200-56	Stationary Contact Support	1
9B-26	71-200-58	Connector	1
9B-34	71-200-69	Interlock	2
9B-35	71-200-70	Interlock Lever, Right Hand	1
9B-36	71-200-71	Interlock Lever, Left Hand	1
9B-38	71-200-74	Panel Assembly	1
9B-42	71-200-75	Spacer	4
OB-43	71-200-76	Magnet Coil	1
9B-44	88-080-06	5/16 x 1/2 NC Hex Head Cap Screw	3
9B-45	88-097-08	5/16 x 5/8 NF Slotted Head Cap Screw	10
9B-49	71-200-77	Clip	2
9B-51	71-200-72	Interlock Mounting Plate-Left Hand	1
9B-52	71-200-73	Interlock Mounting Plate-Right Hand	1



RESISTOR COIL BOARD ASS'Y.  
24 OR 36 VOLT

FIGURE 9C  
SECTION J6



NO.	DESCRIPTION	LENGTH	QUAN.	REVISED DATE	REVISION
-----	-------------	--------	-------	--------------	----------

TOL. FRAC. +	DEC. -
SCALE	NONE
DRAWN BY	REA
DATE	7-7-70

FIGURE NO. 9C

RESISTOR COIL BOARD ASSEMBLY

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
9C-1	78-222-10	Resistor Coil Board Assembly - 36 Volt	1
9C-1	78-222-11	Resistor Coil Board Assembly - 24 Volt	1
9C-1	78-222-00	Coil Mounting Board Only	1
9C-2	78-222-52	Resistor Coil #6 Wire - 18 Turns	4
9C-3	78-222-51	Resistor Coil #5 Wire - 12 Turns	2 Or 4
9C-4	88-060-18	Hex Head Cap Screw $\frac{1}{4}$ " x $2\frac{1}{2}$ " N.C.	2
9C-5	88-068-60	Washer $\frac{1}{4}$ " Flat	4
9C-6	88-100-14	Hex Head Cap Screw $\frac{3}{8}$ " x $1\frac{1}{2}$ " N.C.	2
9C-6	88-100-15	Hex Head Cap Screw $\frac{3}{8}$ " x $1\frac{3}{4}$ " N.C.	2 Or 3
9C-7	88-108-60	Washer $\frac{3}{8}$ " Flat	8 Or 10
9C-8	88-108-62	Lockwasher $\frac{3}{8}$ "	8 Or 10
9C-9	88-108-80	Nut $\frac{3}{8}$ " N.C. (Hex)	8 Or 10
9C-10	88-069-87	Nut $\frac{1}{2}$ " N.C. (Fastite)	2
9C-11	96-002-00	Spacer $\frac{5}{16}$ " I.D. x $\frac{5}{8}$ " Long	2

CONTACTOR SPEED CONTROL  
SUGGESTED SPARE PARTS LIST

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QUANTITY C 1 - 20 UNI
<u>REFER TO FIGURE 8 FORWARD AND REVERSE SWITCH</u>			
8-1	71-080-54	Terminal Board Assembly	1
8-2	71-080-57	Contact Finger Spring	1
8-7	71-080-64	Heavy Positioning Spring For 6" Or Longer Handle	1
8-8	71-080-67	Operating Shaft Assembly	1
8-21	71-080-58	Contact Finger Assembly	2
8-22	71-080-56	Terminal Board Assembly (With Connector)	1
8-26	71-080-52	Operating Lever Assembly	1
<u>REFER TO FIGURE NO. 9A SPEED CONTROL SWITCH</u>			
9A-3	61-910-85	Gasket	1
9A-5	61-910-51	Precision Snap Switch	3
9A-11	61-910-55	Operating Spring	3
9A-13	61-910-57	Return Spring	2
9A-16	61-910-60	Coupling Assembly	1
9A-17	61-910-61	Keeper Assembly	1
9A-19	61-910-62	Boot	1
9A-24	61-910-65	Valve Spring	1
9A-30	61-910-71	Dash Pot Assembly	1
9A-35	61-910-76	Plugging Magnet Class 9003	1
<u>REFER TO FIGURE NO. 9B MAIN POWER CONTACTORS</u>			
9B-1	71-200-52	Replaceable Contact Tip Assembly	8
9B-2	71-200-54	Keps #8 - 32	16
9B-10	71-200-66	Spring Washer	2
9B-17	71-200-63	Finger Spring	2
9B-22	71-200-60	Return Spring	2
9B-34	71-200-69	Interlock	2
9B-43	71-200-76	Magnet Coil	1
<u>REFER TO FIGURE NO. 9C RESISTOR COIL BOARD ASSEMBLY</u>			
9C-2	78-222-52	Resistor Coil #6 Wire - 18 Turns	4
9C-3	78-222-51	Resistor Coil #5 Wire - 12 Turns	2 Or 4

MAINTENANCE PROCEDURES  
REFER TO FIGURE 10A  
SPEED CONTROL PROGRAM SWITCH

The program switch is a three speed, sliding open bar type, which controls the speed of your vehicle by controlling the resistance in the motor circuit.

The three flat copper bars and a movable J-Hook are the major parts in the switch. With proper adjustment and lubrication the switch will give many months of trouble free use. It doesn't take much grease to do the job, but it should be done weekly. Monthly the space between the bars should be cleaned with a piece of wood or plastic or steam cleaned if possible. When J-Hook is worn to 1/8" thickness, replace J-Hook and power bars.

Refer to Service and Adjustment Section J7 of this manual for proper adjustment and service procedures.

It is recommended that all terminal connections be checked and tightened at least once a month. Care should also be taken at each inspection to insure that proper contact is maintained between J-Hook and power bars.

J-Hook and accelerator linkage should work freely allowing return spring to always return J-Hook to neutral bar when accelerator is released.

Refer to Lubrication Diagram Section E for proper lubrication.

MAINTENANCE PROCEDURES  
REFER TO FIGURE 10B  
GENERAL ELECTRICAL SYSTEM

Your electrical system has been installed with care, utilizing quality materials for safe trouble free service. Proper fuses have been located where necessary to prevent unsafe overloads and protect the wiring from being damaged from short circuits.

Little care will be required, except for an occasional visual inspection for loose connections or some unusual condition causing the insulation to be rubbed off on a wire.

Normal replacement parts such as solenoids, fuses, switches, etc. have been arranged for simple changing by plug in devices or conveniently located terminals.

Caution: A blown fuse is usually indicative of a short circuit or faulty device. Care should be exercised to remove the faulty condition before replacing fuse. DO NOT place larger capacity fuses or "jumpers" to over-come the condition as serious wiring damage can occur.

Refer to the following sections for more detailed information on the main power and electrical components:

- Section F - Trouble Shooting Procedures
- Section G - Wiring Diagram
- Section J2 - Motor
- Section J6&J7- Speed Control And Main Power Switching
- Section J8 - Batteries And Charger.

SERVICE AND ADJUSTMENT  
REFER TO FIGURE 10A  
SPEED CONTROL PROGRAM SWITCH

Caution: Whenever service work is to be performed on the electrical system disconnect the battery by unplugging power leads.

Adjustment Of J-Hook Pressure Bar

1. Adjust J-Hook pressure bar by disconnecting J-Hook from accelerator link and sliding J-Hook near the anchor bolt at neutral bar end. Anchor bolt is held in position by 2 nuts. Loosen 1 nut and adjust the other until J-Hook may be moved with a minimum of effort but not allowed to "jiggle" freely. At the opposite end of the pressure bar, adjust the spring pressure to maintain snug contact between J-Hook and power bars. Too much spring pressure will tend to make the J-Hook bind and stick. Too little pressure will promote poor contact, causing burning and pitting to occur. Re-connect operating arm to accelerator link and check operation of switch. J-Hook should slide smoothly with very little noise. If noticeable clicking noises occur as J-Hook passes over power bars, it is usually indicative of poor J-Hook alignment. If necessary bend or twist connecting strap until J-Hook contacts power bars in a flat and smooth manner.

Caution: Everytime adjustments are made to program switch, always check the operation of the accelerator treadle. The J-Hook MUST return completely to neutral bar when treadle is released from any position. Lubricate as outlined in Section E.

Adjustment Of J-Hook Travel.

1. With power disconnected, depress treadle fully and place wooden block or wedge at rear of treadle to lock into position.  
Note: Front tip of treadle (toe end) should measure  $\frac{1}{2}$ " to 1" below surface of operator's platform.
2. Observe position of program switch J-Hook. Correct position is when J-Hook and high speed contact bar are in exact alignment. If J-Hook is not correctly aligned then refer to Section J4, Page 2 and follow adjustment of Automatic (Deadman) Brake Linkage.

Replacement Of J-Hook.

1. With power disconnected, remove 2 bolts attaching J-Hook to connecting strap.
2. Slide J-Hook to full on position and open pressure bar by pulling against spring pressure.
3. Roll J-Hook out from between pressure bar and power bars.
4. Replace J-Hook following reverse procedure.

Replacement Of Program Switch.

1. Note location of wires connected to switch and mark accordingly, to insure their return to original location on re-assembly.
2. Remove wires at respective terminals.
3. Remove bolts connecting J-Hook insulator to operating link.
4. Remove 3 bolts holding switch to bracket and remove switch.
5. Replace switch in the reverse manner to which it was removed.
6. Check and adjust program switch as outlined above.

### Replacement Of Power Bars.

1. With power disconnected, remove terminal bolt and holding bolts.
2. Slide bar out of program switch.
3. Clean switch thoroughly and install new bar.

Note: Power bars tend to wear at the same rate, except when 1 bar may become excessively burned because of poor contact. When replacing with new power bars, it is important that all bars be of the same thickness. Binding and sticking will occur when bars are not of uniform thickness.

It is recommended that power bars be replaced as a set rather than individually to avoid the above condition.

Minor high points may be removed with a file to produce smooth switching action.

4. Follow adjustment procedures previously outlined.

### Servicing Solenoids.

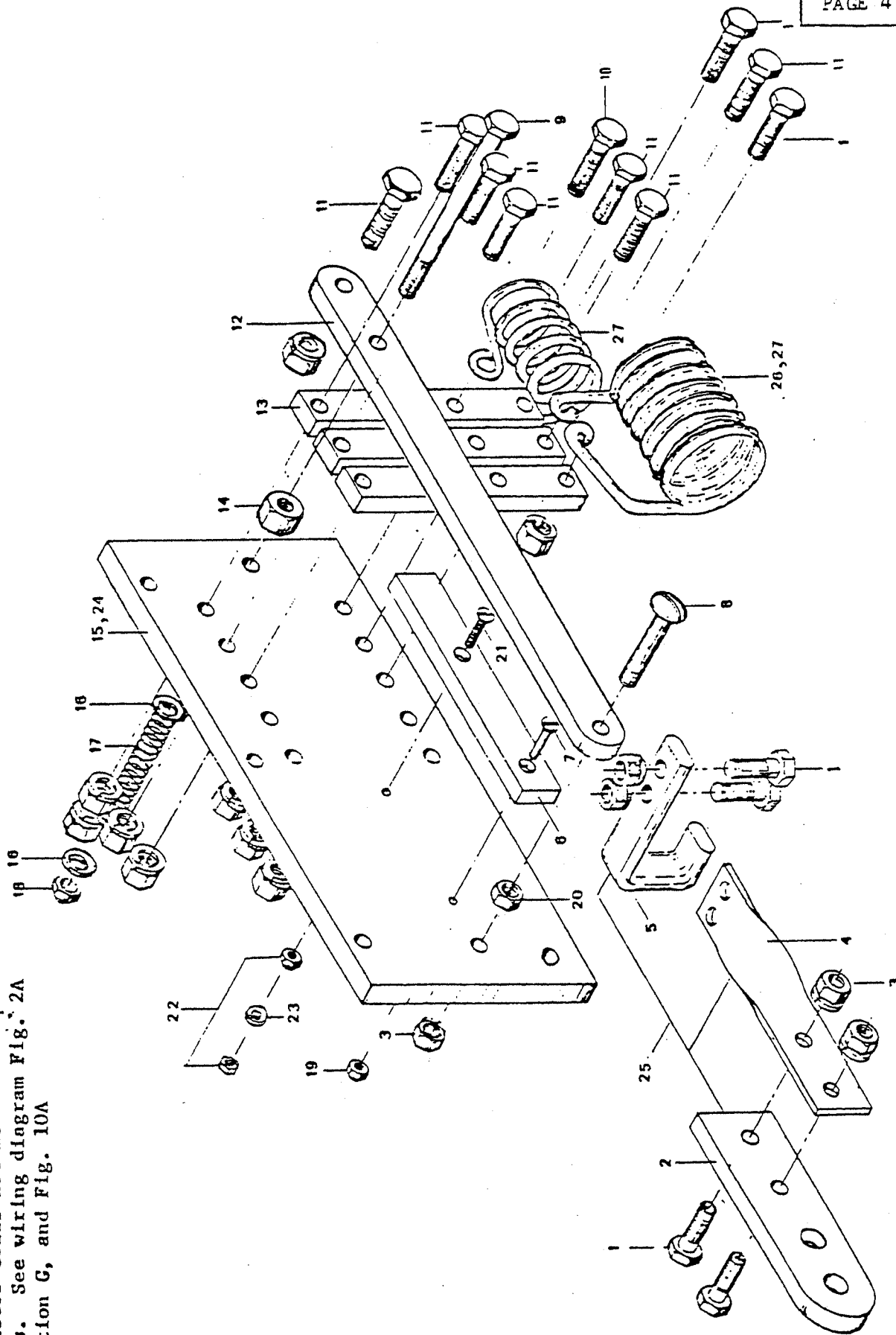
The solenoid contactors are completely enclosed and will not require any internal servicing throughout their normal life. It is recommended however to check the terminal connections periodically. If a terminal connection becomes loose, sufficient heat will be generated to cause permanent damage.

The control system utilizes a solenoid (four in past models) for interlock control features. Refer to wiring diagram Figure 2 (2A for past models) and trouble Shooting Procedures, Section F, for assistance in locating defective solenoid.

### Locating Defective Solenoid.

1. Solenoid #1 (located at bottom of panel) is the safety interlock solenoid. It is controlled by the safety interlock switch (left pedal), program switch neutral position, the forward/reverse switch center contacts and fuse #2.
- Fig. 2 or Fig. 2A Test for presence of voltage at solenoid #1 coil terminals with accelerator treadle in neutral position, safety interlock pedal depressed and forward/reverse switch placed in either forward or reverse position. Absence of voltage indicates failure of 1 or more of the above listed components. If voltage is present yet vehicle will not run in any speed position, solenoid #1 is defective and will require replacement.
- Fig. 2A only Solenoids #2, 3 and 4 are controlled by the program switch and solenoid #1. Absence of voltage at solenoid coil terminal with program switch in appropriate position (i.e. J-Hook on first power bar check solenoid #2, second power bar check solenoid #3, etc.) indicates failure of program switch, control wires, or solenoid #1.
- Presence of voltage at coil yet vehicle will not run in that speed is indicative of defective solenoid.
- Note: Other factors such as broken wires, loose connections, burned out resistor coils etc. will produce similar conditions as defective solenoids and therefore should be corrected before replacing solenoid needlessly.

Note: For vehicles up to Serial No. 21983  
Resistor Coils not mounted on power  
bars. See wiring diagram Fig. 2A  
Section G, and Fig. 10A

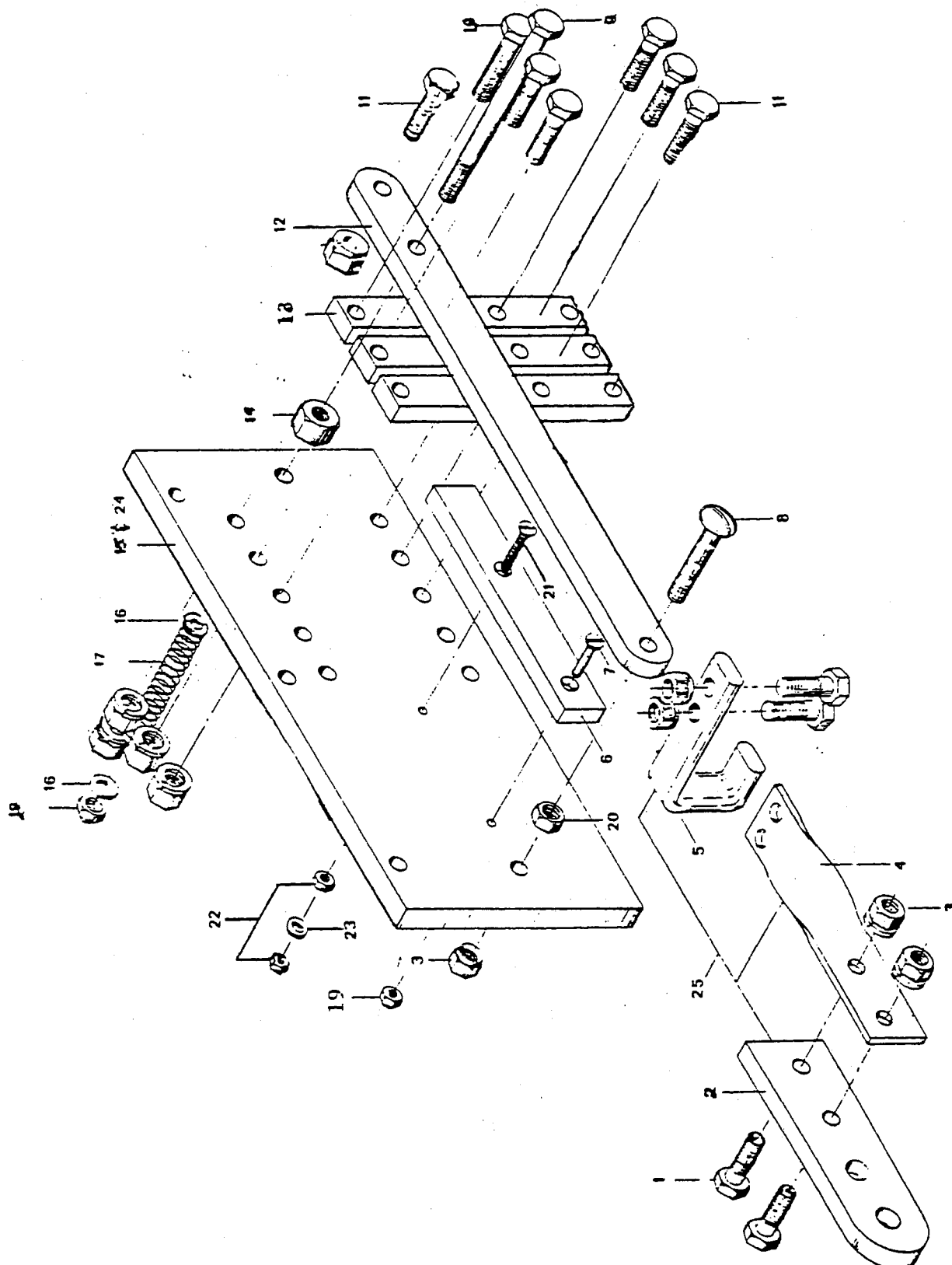


NO.	DESCRIPTION	LENGTH/QUAN.	REVISED DATE	REVISION
TOL. FRAC. + DEC. -	Figure 10 Section J7	Rheostat program switch & J-hook Model E 450 & 451 Serial 21983 & up		
SCALE				



FIGURE NO. 10  
RHEOSTAT PROGRAM SWITCH  
SERIAL 21983 & UP

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
10-1	88-060-09	Hex Head Cap Screw $\frac{1}{2}$ x $\frac{3}{4}$ " N.C.	6
10-2	61-834-51	Insulating Board for J-Hook - 2 hole pattern	1
10-3	88-069-87	Nut $\frac{1}{2}$ " NC Fastite	14
10-4	61-833-00	J-Hook twisted connector strap	1
10-5	61-832-00	Sliding J-Hook Bar	1
10-6	61-835-13	Neutral Bar	1
10-7	88-026-10	Flat Head Machine Screw 8-32 x $\frac{7}{8}$ "	1
10-8	88-065-14	Truss Head Machine Screw $\frac{1}{2}$ " x $1\frac{1}{2}$ " NC	1
10-9	88-060-22	Hex Head Cap Screw $\frac{1}{2}$ " x $3\frac{1}{2}$ " NC	1
10-10	88-060-14	Hex Head Cap Screw $\frac{1}{2}$ " x $1\frac{1}{2}$ " (Terminal Bolt)	1
10-11	88-060-11	Hex Head Cap Screw $\frac{1}{2}$ " x 1"	7
10-12	61-836-00	Pressure Bar	1
10-13	61-831-00	Power Bar	3
10-14	88-109-80	Nut- $\frac{3}{8}$ " NC (Hex)	1
10-15	61-837-26	Three Speed Sliding Bar Program Switch complete 12 volt-Serial No. 21983 & Up (Does not include J-Hook Assembly)	1
10-16	88-068-60	Washer $\frac{1}{2}$ " Flat	2
10-17	85-034-00	Spring-Compression $\frac{7}{16}$ " OD x 2" Long	1
10-18	88-069-86	Nut- $\frac{1}{2}$ " NC Flexlock	1
10-19	88-029-86	Nut, 8-32 Flexlock	1
10-20	88-069-80	Nut, $\frac{1}{2}$ " NC (Hex)	1
10-21	88-026-11	Flat Head Machine Screw 8-32 x 1"	1
10-22	88-029-80	Nut - 8-32 (Hex)	2
10-23	88-028-62	Lockwasher -#8	1
10-24	61-837-27	Three speed sliding bar program switch-complete- 24 V.-Serial No. 21983 & Up (does not include J Hook assembly)	1
10-25	61-832-15	Sliding J-Hook Assembly (includes J-Hook in- sulating Board & Strap)	1
10-26	78-214-51	Resistor Coil-#5 wire-12turns-24 volt only Serial No. 21983 & Up	1
10-27	78-214-00	Resistor Coil-#5 wire-5 turns-12 volt & 24 volt Serial No. 21983 & Up	2 or 1

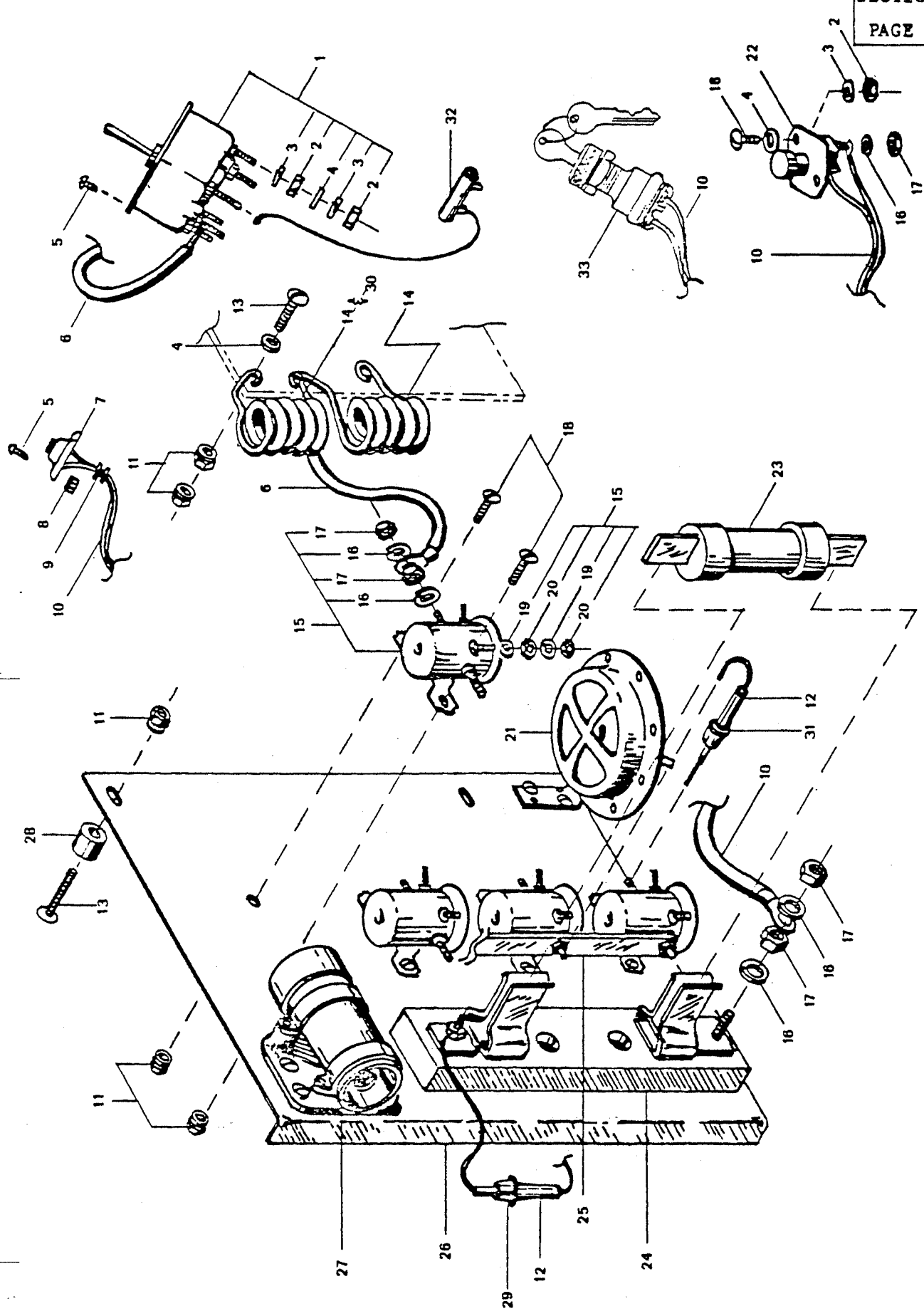


SECTION J7  
PAGE 6

NO.	DESCRIPTION	LENGTH	QUAN.	REVISED DATE	REVISION
TOL. FRAC. + DEC. -	SCALE NONE	PROGRAM SWITCH & J 1100K			
DRAWN BY RE4	FIGURE 10A SECTION J7	MODEL E 450 & 451			
		TAYLOR DUNN MFG. CO. 2114 West Ball Rd.			

FIGURE NO. 10A  
SPEED CONTROL PROGRAM SWITCH  
UP TO SERIAL NO. 21983

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
10A - 1	88-060-09	Hex Head Cap Screw $\frac{1}{2}$ x $\frac{3}{4}$ " N.C.	4
10A - 2	61-834-51	Insulating Board for J-Hook - 2 hole pattern	1
10A - 3	88-069-87	Nut $\frac{1}{2}$ " NC Fastite	13
10A - 4	61-833-00	J-Hook twisted connector strap	1
10A - 5	61-832-00	Sliding J-Hook Bar	1
10A - 6	61-835-13	Neutral Bar	1
10A - 7	88-026-10	Flat Head Machine Screw 8-32 X $\frac{7}{8}$ "	1
10A - 8	88-065-14	Truss Head Machine Screw $\frac{1}{2}$ " X $1\frac{1}{2}$ " NC	1
10A - 9	88-060-22	Hex Head Cap Screw $\frac{1}{2}$ " X $3\frac{1}{2}$ " NC	1
10A - 10	88-060-14	Hex Head Cap Screw $\frac{1}{2}$ " X $1\frac{1}{2}$ " (Terminal Bolt)	1
10A - 11	88-060-11	Hex Head Cap Screw $\frac{1}{2}$ " X 1"	6
10A - 12	61-836-00	Pressure Bar	1
10A - 13	61-831-00	Power Bar	3
10A - 14	88-109-80	Nut - $\frac{3}{8}$ " NC (Hex)	1
10A - 15	61-837-23	Three Speed Sliding Bar Program Switch complete (includes Resistor Coils, see Figure 10B) 12 Volt	1
10A - 16	88-068-60	Washer - $\frac{1}{2}$ " Flat	2
10A - 17	85-034-00	Spring - Compression $\frac{7}{16}$ " OD X 2" Long	1
10A - 18	88-069-86	Nut - $\frac{1}{2}$ " NC Flexlock	1
10A - 19	88-029-86	Nut - 8-32 Flexlock	1
10A - 20	88-069-80	Nut - $\frac{1}{2}$ " NC (Hex)	1
10A - 21	88-026-11	Flat Head Machine Screw 8-32 X 1"	1
10A - 22	88-029-80	Nut - 8-32 (Hex)	2
10A - 23	88-028-62	Lockwasher - #8	1
10A - 24	61-837-24	Three Speed Sliding Bar Program Switch Complete (Includes Resistor Coils, See Fig. 10B) 24 Volt	1
10A - 25	61-832-15	Sliding J-Hook Assembly (includes J-Hook insulating Board & Strap)	1



LENGTH QUAN. REVISED DATE REVISION

MAIN POWER SWITCHING & GENERAL  
ELECTRICAL  
MODEL E

FIGURE 10B  
SECTION 107

TAYLOR DUNN MFG. CO.  
2114 West Ball Rd.  
Anaheim, Calif.



NO.	DESCRIPTION
TOL. FRAC.	DEC. +
SCALE	NONE
DRAWN BY	REA

FIGURE NO. 10B  
MAIN POWER SWITCHING & GENERAL ELECTRICAL

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
10B- 1	71-070-00	Switch - Forward/Reverse Toggle Type	1
10B- 2	88-069-80	Nut - ½" NC (Hex)	18
10B- 3	88-068-62	Lockwasher ½"	20
10B- 4	88-068-60	Washer ½" Flat	11 to 16
10B- 5	88-024-06	Round Head Machine Screw 8-32 X ½	4
10B- 6	75-231-00	Jumper Cable , 10-1/2" Long	3 to 8
10B- 7	71-501-00	Horn Button	1
10B- 8	88-029-86	Nut 8-32 Flexlock	2
10B- 9	98-603-00	Rubber Grommet	1
10B- 10	75-066-00	Wiring Harness - Power & Controls (After Ser. 21983)	1
10B- 10	75-064-00	Wiring Harness Power & Controls (Up to Ser. 21983)	1
10B- 11	88-069-87	Nut - ½ NC Fastite	20
10B- 12	78-010-00	Fuse Holder - Secondary Circuit	2
10B- 13	88-065-14	Truss Head Machine Screw ½ X 1½" NC	4 to 7
10B- 14	78-214-00	Resistor Coils #5 Wire X 5 Turns up to Ser. 21983 - See Fig. 10 for after #21983	(2 For 12 Volt) (1 For 24 Volt)
10B- 15	72-510-00	Solenoid 12 Volt Complete With Hardware	1 or 4
10B- 15	72-511-00	Solenoid 24 Volt Complete With Hardware	1 or 4
10B- 16	88-088-62	Lockwasher 5/16	4 to 16
10B- 17	88-089-80	Nut 5/16 NC (Hex)	4 to 16
10B- 18	88-065-08	Truss Head Machine Screw ½ X 5/8 NC	11 to 17
10B- 19	88-048-62	Lockwasher #10	4 to 16
10B- 20	88-049-80	Nut 10-32 (Hex)	4 to 16
10B- 21	73-000-00	Horn 12 Volt	1
10B- 21	73-001-00	Horn 24 Volt	1
10B- 21	73-002-00	Horn 36 Volt	1
10B- 22	71-122-10	Switch - Floor Mount Safety Interlock	1
10B- 23	78-000-00	Fuse - 200 Amp (Not Used in Later Models)	0 or 1
10B- 24	78-100-00	Fuse Holder - 200 Amp (Not Used in Later Models)	0 or 1
10B- 25	78-107-00	Copper Buss Bar (Not Used in Later Models)	0 Or 1
10B- 26	71-616-00	Panel - General Electrical	1
10B- 27	76-020-00	Receptacle - 175 Amp - Anderson Type SB6313	1
10B- 28	96-002-00	Spacer - 5/8 O.D. X 5/8 Long	4
10B- 29	79-823-00	Fuse - Inline 20 Amp (Std. Pkg. of 5)	1
10B- 30	78-221-53	Resistor Coil #5 Wire X 12 Turns (24 V. Up to 21983)	1
10B- 31	79-824-00	Fuse - Inline 30 Amp (Std. Pkg. of 5)	1
10B- 32	78-304-00	Resistor, 2 OHM 100 Watt - 12 volt Model	1
10B- 32	78-302-00	Resistor, 10 OHM 50 Watt - 24 Volt Model	1
10B- 33	71-120-00	Switch Ignition Key	1

FIGURE NO. 10B  
OPTIONAL ACCESSORIES

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY REQ
	72-005-00	Headlight - sealed beam 4" - 12 volt	1
	72-006-00	Headlight - sealed beam 4" - 24 volt	1
	72-007-00	Headlight - sealed beam 4" - 36 volt	1
	72-035-00	Light - Tail - 12 volt	1
	72-032-00	Light - Tail - 24 volt or 36 volt	1
	78-303-00	Resistor For 36 volt Taillight	1
	74-000-00	Hour Meter	1
	75-202-00	Wire #0 (Per Foot)	
	75-204-00	Wire #4 (Per Foot)	
	75-208-00	Wire #8 (Per Foot)	
	75-218-00	Wire #16 (Per Foot)	
	75-302-00	Connector #0 Wire	
	75-304-00	Connector #4 Wire	
	75-308-00	Connector #8 Wire	
	75-318-00	Connector #16 Wire	
	75-402-53	Terminal Lug #0 Wire 5/16" Hole	
	75-404-54	Terminal Lug #4 Wire 1/4" Hole	
	75-404-54	Terminal Lug #4 Wire 5/16" Hole	
	75-408-52	Terminal Lug #8 Wire 3/16" Hole	
	75-408-53	Terminal Lug #8 Wire 1/4" Hole	
	75-418-51	Terminal Lug #16 Wire #6 Hole	
	75-418-52	Terminal Lug #16 Wire 3/16" Hole	
	75-418-53	Terminal Lug #16 Wire 1/4" Hole	
	72-074-00	Bulb, Sealed Beam, Headlamp, 36 Volt for 36 Volt Headlight W/O Voltage Dropping Resistor	
	72-073-00	Bulb, Sealed Beam, Headlamp, 28 Volt for 24 Volt Headlight & 36 Volt Headlight with Voltage Dropping Resistor	
	73-004-00	Horn 12 Volt	1
	73-001-00	Horn 24 Volt	1
	73-002-00	Horn 36 Volt	1
	74-009-00	Charge Indicator (36 V)	1
	74-009-10	Charge Indicator (24 V)	1

MAINTENANCE PROCEDURES  
BATTERIES

WARNING: Lead acid batteries continuously emit highly explosive gasses. Flame or sparks must be kept away from the batteries at all times.

This emission is greatly increased during the charging process. Any area in which charging batteries are confined must be well ventilated, and flame or sparks must be kept out of the charging area and away from ventilator openings. DO NOT disturb battery connections while batteries are being charged.

The lead acid battery (or batteries) will furnish all power required by your vehicle. Two types are generally employed. The electric vehicle type battery pack, commonly used, can be expected to have a life of approx. 2 years, or 350 to 400 cycles. One cycle is the discharging and charging of the battery within proper limits. The heavy duty industrial type of battery has a life of approx. 7½ years, or 1800 cycles, with appropriate use and care.

It cannot be over emphasized how important good maintenance procedures and careful care of your batteries will affect their useful life. It is therefore recommended that a comprehensive maintenance program be established and adhered to throughout the life of your vehicle. A 5 point program is outlined below to assist you in understanding and establishing good battery care.

1. CORRECT CHARGING

Poor charging practices are responsible for more short battery life than any one other item. The charging equipment must be properly maintained and adjusted to give a charge which the battery will accept with maximum efficiency. Two things are involved in correct charging. These are the charging rate in amperes and the termination of the charge at the correct time. No amount of overcharging will increase the battery capacity or raise the specific gravity above its full charged condition.

Overcharging will reduce battery life. Undercharging will cause poor vehicle performance, and shorten the life of all electrical components, including the batteries. Refer to Service and Adjustment, Section J8, for proper methods to determine charge condition.

2. DISCHARGING - CAPACITY

Batteries are commonly rated in ampere hours at the six hour discharge rate to a final voltage of 1.75 per cell. They will deliver additional capacity in an emergency, but should not be required to do so regularly. The best way to avoid discharging is to prepare a rigid schedule for charging batteries which will insure against their being discharged beyond the limits of their capability.

3. WATERING

Water must be replaced from time to time. The frequency and quantity depends upon the watering space above the plates and the amount of gassing which the battery does on charge. Only approved or distilled water should be added to the battery. Water should be added after hydrometer or voltmeter readings have been taken. The liquid level within the battery raises as the gassing occurs. Thus filling after charging minimizes over-filling. However, the water level should cover the plates prior to charging.

MAINTENANCE PROCEDURES  
BATTERIES

4. CLEANING

Batteries pick up various kinds of dirt and dust, depending on their surroundings and the type of service they are subject to. This is usually dry dirt, which can readily be blown off with low pressure air or brushed off. However, if cells are overfilled and electrolyte collects on the covers, the top of the battery becomes wet and stays wet, since the acid in the electrolyte does not evaporate. This moist surface in combination with certain kinds of dirt becomes electrically conductive and permits stray currents to flow externally over the top of the battery. These currents cause corrosion of cell posts, nuts, connectors and steel trays, which eventually become troublesome and expensive to repair.

When wet dirt accumulates on top of the battery, remove it by washing the battery with a strong solution of baking soda and hot water (1 lb. of soda to 1/2 gallon of water). A convenient brush to use is one having flexible bristles like an old paint brush. Continue the application of the soda solution until all fizzing stops, which indicates that the acid has been neutralized. Then rinse thoroughly with clear water.

Wet covers can be an indication of overfilling, leaky seals at posts and covers or of excessive gassing during charge. When observed the cause should be determined and the abusive conditions corrected.

5. RECORDS

A battery record system is recommended for all vehicles. It is considered essential for large operations, and where minimum battery operating cost is desired. A properly supervised record system can be made to detect and call attention to such operating irregularities as:

- a. Overcharging
- b. Undercharging
- c. Overdischarging
- d. Excessive Water Consumption
- e. Cleanliness
- f. Worn Out Batteries
- g. Excessive Current Consumption on Trucks

It is not advisable to allow a battery to stand for a long period of time in a low state of charge. Doing so subjects the battery to excessive plate erosion and in cold climate conditions the electrolyte will freeze at a much higher temperature. For example, a fully charged battery will not freeze at temperatures near 60° below zero. Yet a battery in a very low state of charge may freeze at temperatures around 10° to 15° above zero.

A battery not in use maintains small amounts of chemical action which slowly tends to dissapate the charged condition. It is wise to re-charge a battery not in use every 1 to 2 months. If possible store the battery in a cool place, as the self discharge rate is increased with warmer temperatures.



BATTERY MAINTENANCE RECORD										VEHICLE NO.:			
Battery No.	Cell No.	Date		Gravity Before Charge	Gravity After Charge	Date		Gravity Before Charge	Gravity After Charge	Date		Gravity Before Charge	Gravity After Charge
		Water OK or Low				Water OK or Low				Water OK or Low			
1	1												
	2												
	3												
2	1												
	2												
	3												
3	1												
	2												
	3												
4	1												
	2												
	3												
5	1												
	2												
	3												
6	1												
	2												
	3												

1. CAUTION: Batteries emit explosive gasses. During normal operation the concentration of these gases is rarely sufficient to be considered dangerous unless flame or sparks occur in the battery compartment close to the vent holes in the battery caps. It is important that this not be allowed to occur at any time. During the charging process, emissions are greatly increased. Any area in which charging batteries are confined must be well ventilated, and flame, sparks, or lighted cigarettes must be kept out of the charging area and away from ventilator openings associated with the charging area. Battery connections must not be disturbed while batteries are being charged.
2. Do not fill an uncharged battery. Bring water level up to just cover the plates, and complete filling after battery is fully charged. Use distilled water. Fill only to level indicated on battery.
3. Batteries which require unusually frequent watering may indicate overcharging. Review charging practices and/or adjustment of transformer taps in charger.
4. Gravity should be kept between 1175 (30% charged) and 1260 (100% charged), and gravity readings of all cells should be within a 10 point range. When they are not, an equalizing charge should be applied. Refer to information under "Charging Time Chart" in Charger Handbook.
5. Periodically check for loose terminal posts or loose connections to terminal posts, but not while battery are being charged.
6. Keep tops of batteries clean, and free of moisture, grease, and acid films. Any of these can cause current leakage.
7. Keep weekly (or oftener) record as shown in above sample chart, for a new vehicle or when charging results seem unsatisfactory, until satisfactory charging continues for a four week period, then keep record on a monthly basis.

SERVICE AND ADJUSTMENTS  
CHARGER AND BATTERIES

CHARGER

Refer to Operating and Service Handbook, included in this manual for correct use and service to your charger. The correct charging rates and operation of your charger is included in the handbook.

The A series of chargers requires a pre-selection of charging time needed every time it is used.

Refer to chart included in appropriate handbook.

The T series of charger is equipped with an automatic timer device which will control and shut off the charger automatically when the battery is fully charged.

Refer to operating instructions in the handbook.

Any major repairs to charger should be conducted by a qualified serviceman only.

BATTERIES

To determine whether or not a battery is properly charged, a measuring device known as a hydrometer should be used. A hydrometer consists of a glass tube or body with a rubber bulb at one end and a small spout at the other. Inside the tube is a graduated float.

The float will reach a point of equilibrium relative to the specific gravity of the fluid in which it floats.

The electrolyte within your battery becomes heavier as it is charged, therefore a higher specific gravity reading indicates a higher charge condition of your battery.

The specific gravity reading will range from 1100 for fully discharged condition to 1260 for fully charged condition on the electric vehicle type of battery.

On the heavy duty industrial type of battery, the specific gravity reading will be approximately 1275 to 1285 for fully charged condition.

Note: Because of the difference in the electrolyte the specific gravity will range slightly higher on the industrial type of battery. No amount of overcharging will raise the specific gravity above 1260 on the electric vehicle type of battery. Actually overcharging will only injure the plates and shorten battery life.

When testing battery charge condition with hydrometer, always return electrolyte solution to the same cell from which it was removed. DO NOT MIX electrolyte from one cell to another.

Refer to Charger Handbook for additional information on battery testing and charging methods.

## OPERATING & SERVICING HANDBOOK

### SERIES "SA" BATTERY CHARGERS

#### INSPECTION

Inspect the charger immediately upon receipt. If there is any indication of shipping damage, call the carrier for an inspection and file a damage claim.

#### CHARGING CHARACTERISTICS

The CHRISTIE Series "SA" Charger provides charging characteristics as recommended by industrial battery manufacturers. The initial charging rate is determined by the state of charge of the battery and the rated capacity of the charger. All chargers are designed to bring a specified capacity battery to 100% charge in 8 hours. Chargers are furnished with a 24-hour timer so they may be used to charge a higher capacity battery if longer charging time is available. Normally a discharged battery of the proper rating is 80% charged in about 5 hours. As the battery reaches this point, the charge rate drops quickly to a slow finishing rate to safely complete the charge. On a partially discharged battery, the charge rate will drop to the finishing rate much sooner. Do not discharge batteries too much (see battery manufacturers' recommendations) as it will cause the charger to start charging at a rate higher than normal and may blow a fuse.

#### INSTALLATION

The charger is designed for convection cooling, which means that it depends upon the free circulation of air. The charger should not be placed in any location where ventilation through the unit is restricted. Severe damage may result.

Locate the charger as near as possible to the main power source. Check the nameplate of the charger to be certain that it can be operated from the a-c power source you have available. Most chargers are manufactured to operate from two different a-c voltages. The charger has been set at the factory for the voltage marked on the tag attached to it. To change the a-c voltage setting, remove the front panel\* and reconnect as shown on the wiring diagram furnished with this booklet.

**CAUTION:** Be sure to disconnect the charger from the a-c source before making adjustments.

Verify that the number of cells shown on the nameplate correspond with the number of cells in the battery you intend to charge. On 18-cell chargers that have an adjustment for different cell groups (15, 16 and 18 cells), be sure that the adjustment link is set for the correct number of cells. This adjustment is also on the terminal board behind the front panel and instructions for settings are shown on the wiring diagram.

Each charger is provided with d-c output cables, 10 ft. long. The cables are marked + for positive and - for negative. It is recommended that a polarized charging plug be installed for connection to the battery.

#### INITIAL OPERATION

With the timer in the "off" position, connect to the battery, observing correct polarity. If any sparking occurs at the d-c plug, check the polarity of the cables. Set the timer to the desired charging time, normally 8 hours. Observe that the pilot light turns on and the ammeter indicates that the charger is charging.

It is recommended that the battery be given an equalizing charge of 12 hours once weekly.

The charger can be used to charge a battery of higher capacity than its 8-hour rating if longer charging time is available. As a rule-of-thumb, the charger should not be used on a battery with an ampere hour rating of more than 9 times the d-c rated output of the charger (for a 100 amp charger -  $9 \times 100$ , or 900 AH). Approximate charging time can be estimated from relationship of the AH capacity of the battery to be charged with the 8-hour AH rating of the charger as shown on the nameplate. Exact charging time should be determined by periodic hydrometer checks to be sure battery is getting charged.

If the a-c input voltage varies considerably from the nominal voltage shown on the nameplate (i.e., actual voltage 210 v when nameplate shows 230 v), the charger will not give optimum performance without proper output adjustment. These adjustments are also made on the terminal board behind the front panel\* and instructions are shown on the wiring diagram. **CAUTION:** Be sure to disconnect the charger from the a-c source before making adjustments.

The need for adjustment may be determined in one of the following ways:

1. With an accurate d-c voltmeter, measure the d-c open circuit voltage (output voltage with the charger turned on but without the battery connected) at the ends of the d-c cables. For correct charging, the proper setting should be 2.45 volts per cell for a 16-hour charge or 2.55 volts per cell for an 8-hour charge (i.e., 12 cell battery would be set for  $12 \times 2.55 = 30.6$  v).
2. With the battery discharged to approximately 11.50 specific gravity, connect the charger and turn the timer on. Charging current as observed on the ammeter should not exceed the d-c output rating of the charger.
3. With the battery fully charged, connect the charger and turn the timer on. After charger has been on 1 hour, charging current as observed on the ammeter should be about 4 amp per hundred ampere hour battery rating (i.e., 500 AH battery -  $5 \times 4 = 20$  amp).

\*NOTE: On smaller chargers access to the terminal board is through a panel in the rear of the unit.

About a week after the charger has been in use we recommend that the battery be checked with a hydrometer. Immediately after charging readings of 1250 or higher would indicate a fully charged battery. If the battery is not fully charged, move the output adjustment to the next higher setting. The adjustment should not be raised to a point where the charge rate exceeds the rated capacity of the unit. Where this condition exists, more time must be allowed to charge the battery fully. If the battery uses an excessive amount of water it is an indication that it is being overcharged and the output adjustment should be moved to the next lower setting.

Once properly installed and adjusted the charger needs no further adjustment.

## TROUBLE SHOOTING & REPAIR INSTRUCTIONS

### AC LINE FUSES BLOW

1. With the unit unplugged and timer turned ON, check for continuity between each a-c input prong and the ground prong. If continuity is found, a short circuit exists and must be removed. If all conditions are open, proceed as follows:
  - 1.1 Disconnect the transformer leads from both diodes and check each diode by measuring for continuity between the diode input and the heat sink. If either diode shows continuity in both directions, it is shorted and should be replaced. Reconnect diodes after completion of tests.
  - 1.2 Remove adjustment lead from both coarse and fine adjustment taps of terminal board and operate unit. If fuse blows, replace contactor. (NOTE: Smaller models do not have a contactor. See wiring diagram.)
  - 1.3 Reconnect adjustment leads and disconnect timer motor. If fuse blows, replace transformer.
  - 1.4 If fuses do not blow in steps 1.2 and 1.3, replace timer.

### OUTPUT FUSES BLOW

2. Verify that the circuit of the battery under charge is not shorted.
3. Check diodes as in step 1.1.

### TIMER DOES NOT TURN UNIT OFF

4. With charger unplugged, test for an open across contactor CB1. A shorted condition indicates a faulty contactor. (NOTE: Smaller models do not have a contactor. See wiring diagram.)
5. If the test of step 4 is normal and the pilot light illuminates when time is OFF, replace timer.
  - 5.1 If timer does not return to "OFF" position after preset time has elapsed, replace timer.

### LOW OR NO CHARGING CURRENT

6. Verify that the battery being charged is not the cause of failure. Check battery and charger for open, burned or corroded connections. Also verify that the battery is not already fully charged.
7. Verify that the electrical service is operating properly.
8. Turn the charger ON and verify that the pilot light illuminates and the transformer hums. If these conditions are normal, proceed as follows:
  - 8.1 If the pilot light does not illuminate but the transformer hums, replace the pilot light and proceed to step 9.
  - 8.2 If both conditions are not normal, there is an open in the circuit. To isolate the problem, perform a systematic check of input circuits following the wiring diagram furnished for this unit. Disconnect the charger from the a-c power source before conducting these tests.
  - 8.3 If the checks of the input circuits fail to isolate the problem, the contactor is probably defective and requires replacement (NOTE: Smaller models do not have a contactor. See wiring diagram.)
9. If the pilot light illuminates and the transformer hums, isolate the problem by conducting the following checks:
  - 9.1 Check the d-c output fuse.
  - 9.2 Check the ammeter, shunt and meter leads.
  - 9.3 Disconnect the transformer leads from both diodes and perform the checks listed in the OUTPUT CIRCUIT TEST CHART below.

NOTE: Each step assumes all the foregoing steps give the proper indication. All steps must indicate continuity.

### OUTPUT CIRCUIT CHART

Test Point 1	Test Point 2	Source of Trouble for Improper Indication
-DC prong	Output side of fuse	-DC lead open
-DC prong	Transformer side of fuse	Fuse open
-DC prong	Each side of suppressor diodes CR1	Transformer open
+DC prong	Output side of meter	+DC lead open
+DC prong	Choke side of meter shunt R1	Meter and shunt open (replace both)
+DC prong	Heat sink	Choke L1 open

10. Check each diode by measuring for continuity between the diode input and the heat sink. A good diode will indicate continuity with the tester connected one way and will indicate an open when the tester leads are reversed.
11. Reconnect the diodes after completion of all of the above tests.

This exploded view diagram illustrates the assembly of a mechanical device, likely a small refrigerator or freezer. The central component is the main cabinet (1), which features a door with a handle and a latch mechanism (7, 8). The interior includes a wire shelf (13) and a base (14). The door is equipped with a hinge (4, 5) and a latch (6). The front panel (11) is secured with screws (19) and features a control knob (7) and a pressure gauge (8). The back panel (17) is secured with screws (15, 16) and features a control knob (7) and a pressure gauge (8). The bottom panel (21) is secured with screws (22). The side panel (2) is secured with screws (12). The top panel (10) is secured with screws (10). The diagram also shows various internal components, including a compressor (15), a condenser coil (14), and a fan (12). The assembly is shown in a disassembled state, with dashed lines indicating the alignment of the parts.

- When ordering replacement parts, give model and serial number of charger.

### INSPECTION OF BATTERIES AND ASSOCIATED CIRCUITS

An inspection of batteries and associated circuits is required to assure that the batteries are being properly charged. For this inspection we recommend the use of a hydrometer and a continuity tester.

1. Verify that all connections within the unit to be charged are clean and tight.
2. Check battery for loose terminal posts.
3. Test for continuity between all battery terminals and the charging receptacle.
4. Verify that the top of battery is free of moisture, grease and acid film, which may cause terminal corrosion and current leakage.
5. After the battery has been recharged, test each individual cell in battery with the hydrometer to verify that all specific gravity readings are within 10 points of each other.
6. Using the hydrometer, pull out acid from a cell and then vigorously expel the acid back into the cell to cause a violent stirring action. Immediately draw out another sample of acid and visually inspect it to see if it contains a brownish sediment (indicates positive plates are deteriorated).
7. When testing battery condition with hydrometer, always return electrolyte solution to the same cell from which it was removed. DO NOT MIX electrolyte from one cell to another.

### IMPORTANT FACTS ON BATTERIES AND CHARGERS

To determine whether or not a battery is properly charged, a measuring device known as a hydrometer is used. A hydrometer measures the specific gravity of a liquid and a battery hydrometer is graduated to measure the specific gravity of battery electrolyte. The electrolyte in your battery becomes heavier as it is charged, therefore, a higher specific gravity reading indicates a higher charge condition of your battery. The specific gravity reading will range from 1150 for a completely discharged battery to 1280 for a fully charged battery. (Full charge gravity may vary with different battery manufacturers.) Both overcharging and undercharging can cause a premature failure of a battery. Overcharging destroys the positive plates. Consistent undercharging causes a buckling of the plates.

Do not discard a good battery as being defective because its specific gravity does not show an increase immediately upon applying a charge. Batteries require a charging period of several hours before they show any increase in the specific gravity. Do not charge a battery if the electrolyte temperature could rise above 120 degrees F. This could damage both battery and charger. As a rule-of-thumb, the electrolyte temperature during normal charging will rise about 25 degrees above the temperature in the charging area.

Failure to keep the battery electrolyte to the proper level will result in a crumbling (abnormal sulfation) of the plates and cause failure of the battery. Distilled water must be added to the battery regularly to make up for the loss due to evaporation. Prior to charging the electrolyte level should cover the battery plates. Fill the battery to the proper level only after it has been fully charged.

### WARRANTY

CHRISTIE ELECTRIC CORP. agrees to correct any defects in workmanship or material which may develop under proper and normal use by repair or replacement, F.O.B. Los Angeles, California, for a period of one year from date of purchase. The purchaser assumes full responsibility for proper installation and installation adjustments. Parts or equipment claimed defective must be returned to the factory, transportation prepaid, for inspection. If found defective, parts or equipment will be repaired or replaced and returned, transportation collect, to the purchaser. We undertake no responsibility for work done, or expense incurred in connection with repairs or replacements except on specific authority of Christie Electric Corp.

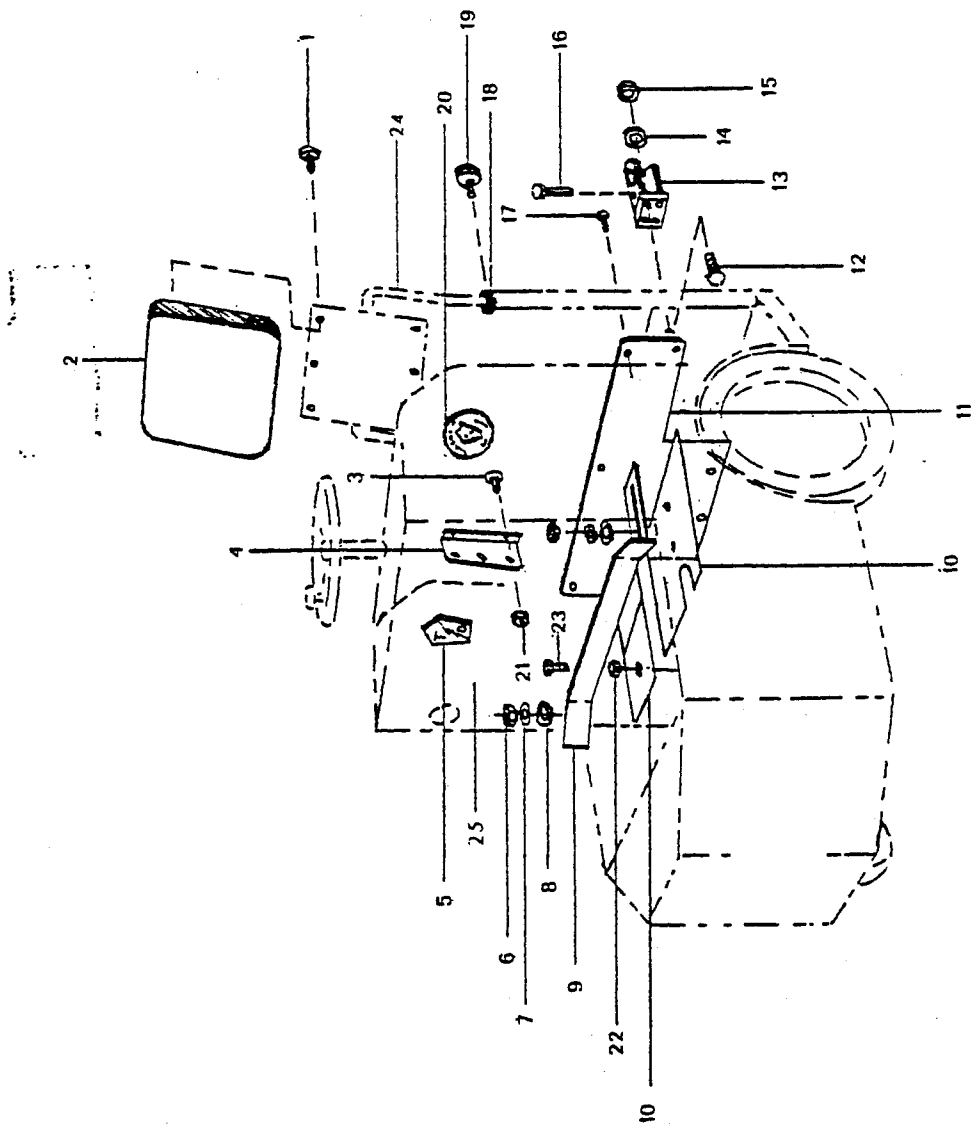
In no event does Christie Electric Corp. assume any liability for consequential damages or for loss, damage or expense directly or indirectly arising from the use of these products. There are no warranties, either expressed or implied other than those provided herein.

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ELECTRIC CORP

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TAYLOR DUNN MFG. CO.  
2114 West Ball Rd.



LENGTH	QUAN.	REVISED DATE	REVISION
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BODY & TRIM PARTS

FIGURE 11

NO.	DESCRIPTION
TOL. FRAC. +	DEC. -
SCALE	NONE

FIGURE NO. 11  
BODY & TRIM PARTS.

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
11-1	88-837-09	Pan Head Sheet Metal Screw #14 X 3/4"	6
11-2	90-144-00	Cushion - Back Rest 13" X 16-3/4"	1
11-3	88-065-11	Truss Head Machine Screw 1/2" X 1" NC	2
11-4	71-615-00	Bracket - Program Switch Mounting	1
11-5	94-201-00	Emblem (Taylor-Dunn)	1
11-6	88-109-80	Nut - 3/8" NC (Hex)	2
11-7	88-108-62	Lockwasher 3/8"	2
11-8	88-108-60	Washer 3/8" Flat	2
11-9	77-863-00	Battery Clamp - Adjustable	1
11-10	71-614-00	Dirt Protective Panels (Set of 3)	1 set
11-11	71-617-00	Rear Panel - Motor Compartment	1
11-12	88-140-14	Hex Head Cap Screw 1/2" X 1 1/2" NC	4
11-13	97-809-00	Hitch - Hook, Pin & Eye Type	1
11-13	97-804-00	Hitch - Pintle Type	1
11-13	97-808-00	Hitch - Automatic Coupling	1
11-14	88-148-62	Lockwasher - 1/2"	4
11-15	88-149-80	Nut - 1/2" NC (Hex)	4
11-16	97-809-51	Hitch Pin - Hook, Pin & Eye Type	1
11-17	88-025-06	Truss Head Machine Screw 8-32 X 1/2"	10
11-18	17-113-00	Collar - 1-1/16"	2
11-19	95-901-00	Knob - Knurled Plastic Handle - 5/16 N.C.	2
11-20	94-301-00	Decal (Taylor-Dunn)	2
11-21	88-069-87	Nut - 1/2" N.C. Fastite	2
11-22	88-068-62	Lockwasher 1/2"	4
11-23	88-060-06	Hex Head Cap Screw 1/2" X 1/2" N.C.	4
11-24	90-159-00	Backrest with Cushion Mounting Plate	1
11-25	71-618-00	Console Cover for Vehicles with Battery Receptacle Mounted on Rt. Side of Console	1
11-25	71-618-10	Console Cover for Vehicles with Battery Receptacle Mounted to Console Upper Panel	1



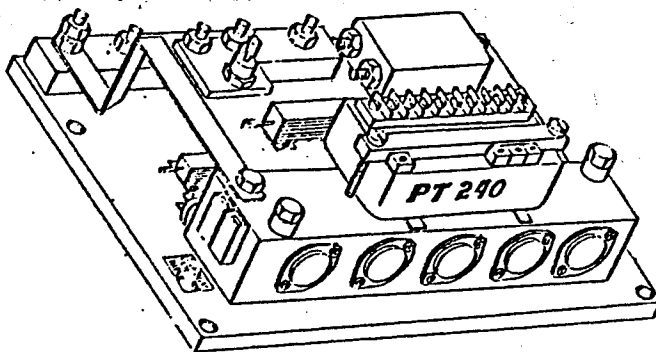
# PWR-TRON 240, 350 & 480

## TABLE OF CONTENTS

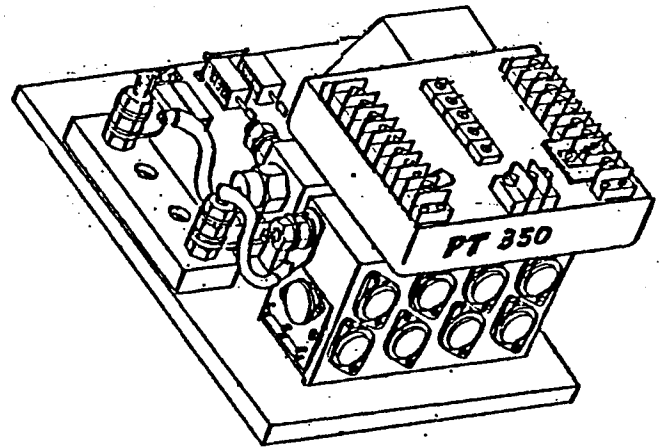
CONTENTS	PAGE	NUMBER
INTRODUCTION	1	
GENERAL/FEATURES	2	
CURCUITS AND OPERATION	3	
OPERATION	4	
PREVENTIVE MAINTENANCE	5	
ACCELERATOR MODULE	6 & 7	
PWR-TRON 240 ASSEMBLY & PARTS LIST	8	
PWR-TRON 350 ASSEMBLY & PARTS LIST	9	
PWR-TRON 480 ASSEMBLY & PARTS LIST	10	
SOLENOID PANEL ASSEMBLIES (24 & 36 VOLTSØ	11	
CONTACTOR PANEL (48 VOLT)	12	
COMBINED CONTROL & POWER SCHEMATIC (FIG. 1)	13	
CONTROL CIRCUIT SCHEMATIC (FIG. 2)	14	
POWER CIRCUIT SCHEMATIC (FIG. 3)	15	
POTENTIOMETER CHECK & ACCELERATOR LINKAGE ADJ.	16,17,18	
CONTINUITY AND POWER CHECK	19	
PWR-TRON 240 TRIMPOT ADJUSTMENTS	20	
PWR-TRON 350/480 TRIMPOT ADJUSTMENTS	21	
TROUBLE SHOOTING STEPS	22 & 23	
RECOMMENDED SPARE PARTS	24	

INTRODUCTION

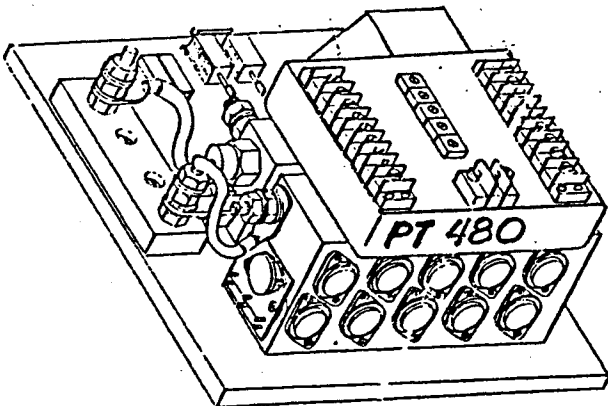
This supplement has been prepared for the purpose of familiarizing the owner with the operational features of the Taylor-Dunn PWR-TRON solid state speed controls. The PWR-TRON 240, 350 and 480 is developed and available only from Taylor-Dunn and is warranted for one full year. Modifications to the control unit, drive or power system will void the warranty.



24 OR 36 VOLTS  
RECOMMENDED FOR  
USE UP TO 6 HP  
MOTORS  
(INTERMITTENT)



24 OR 36 VOLTS  
RECOMMENDED FOR  
USE UP TO 10 HP  
MOTORS  
(INTERMITTENT)



48 VOLTS ONLY

## PWR-TRON 240, 350 AND 480

GENERAL

The PWR-TRON unit is readily accessible when the seat on Model R's is raised, or in other models, under the deck board. The PWR-TRON unit performs two functions; forward-reverse and acceleration via mechanical linkage to the foot pedal. You will notice the PWT-TRON unit is a transistorized supply that regulates the voltage fed from the battery through the accelerator module to provide the necessary signal to the motor. This gives the operator full control of the vehicle at all speeds and braking under all conditions.

FEATURES

Some of the inherent advantages over conventional (resistor type) speed controls are:

1. Increased range; 30% (mileage may vary).
2. Positive current limit; increases motor and battery life.
3. No maintenance to PWR-TRON required.
4. Power matched to motor; providing maximum power output during towing or hauling.
5. Thermal protection to prevent over heating and damage to PWR-TRON.
6. Unit is protected from incorrect battery hookup.
7. "Low" battery protection through solenoid drop out.
8. "Built-in" motor short protection; prevents run away currents and high temperatures, should a motor short occur.
9. Controlled acceleration for smooth starting; no more jack rabbit starts.
10. Plug braking; while accelerator is fully depressed, reverse direction switch, vehicle will automatically slow down, then accelerate in reversed direction. Note, by letting up on the accelerator then re-accelerating, a smoother control will be achieved.
11. Modular construction provides simplicity in trouble shooting, parts replacement and servicing in the field.
12. Each unit has a thermocouple that shuts off power at 160 degrees F which is the operational limit of the PWR-TRON. The unit automatically resets when it has cooled to approximately 130 degrees F.

## PWR-TRON 240, 350 &amp; 480

\* CIRCUITS AND OPERATION

There are two circuits included in the operation of the PWR-TRON, the control circuit and the power circuit.

The control circuit (light gauge wire) includes key switch, micro-switch, MS-1, potentiometer; R1, activated by the accelerator arm on back of accelerator module, the PWR-TRON solid state controller, forward reverse switch and solenoid panel.

The power circuit (heavy gauge wire) includes the batteries, forward reverse switch and motor.

The two circuits operate as follows: (refer to Fig.1)

CONTROL CIRCUIT (see Fig. 2)

Forward operation. Turn key switch to "ON" position and forward-reverse switch to forward position, MS-1 is closed providing a current path to the forward solenoid coil and closing forward contact on the forward-reverse switch. As the accelerator is depressed, the potentiometer, R1, will increase the current, moving the vehicle forward.

Reverse operation. Turn key switch to "ON" position and forward-reverse switch to reverse position, MS-1 is closed providing a current path to the reverse solenoid coil and closing the reverse contact on the forward-reverse switch. As the accelerator is depressed, the potentiometer, R1, will increase the voltage, moving the vehicle in reverse.

POWER CIRCUIT (see Fig. 3)

Forward operation . When the control circuit is energized and the solenoid contacts are closed, the current flow is then channeled through the PWR-TRON and then to the power wiring. Motor speed is controlled by voltage output from the PWR-TRON. The PWR-TRON is varied by the potentiometer, R1, in the control circuit.

Reverse operation. The same circuit is used as forward operation except the forward-reverse switch is moved to reverse current flow through the motor.

\* Circuits of Figures 1, 2 and 3 are the same for PT240, PT350 and PT480.

## OPERATING YOUR PWR-TRON 240, 350 AND 480 EQUIPPED VEHICLE

To put your vehicle into operation, turn ignition key to "ON". Select direction you wish to travel by moving forward/reverse switch to desired position. Release parking brake, slowly depress accelerator pedal until vehicle is moving at desired speed.

You will notice your vehicle has a smooth transistion from start to high speed operation. This is a built-in characteristic of the PWR-TRON speed control, avoiding "jack-rabbit" starts.

"Plug braking" is an additional feature of the PWR-TRON. It is not necessary to come to a complete stop before reversing the vehicle. It is only necessary to reverse the vehicle while it is in motion and accelerator is fully depressed. The vehicle will automatically slow to an immediate stop and reverse itself to full acceleration. "Plug braking" should be done in an obstruction free area until the operator gets the feel for this maneuver. This maneuver does not damage the PWR-TRON. It is recommended when starting the vehicle to be sure to always turn ignition key on first then select direction of travel with the forward reverse switch, before depressing the accelerator pedal.

## PWR-TRON 240, 350 & 480 PREVENTIVE MAINTENANCE

### WARNING

BEFORE WORKING ON THE PWR-TRON UNITS OR ANY PART OF THE VEHICLE ELECTRICAL SYSTEM, DISCONNECT BOTH THE MAIN POSITIVE AND NEGATIVE BATTERY LEADS. PLACE THE FORWARD/REVERSE LEVER IN NEUTRAL, TURN OFF AND REMOVE. ALWAYS SET PARKING BRAKE.

No regular maintenance is required.

Be sure ignition key is on before depressing accelerator pedal. DO NOT depress pedal then turn on key. This is unsafe operation.

### CAUTION

Do not steam clean or spray with water.

Make sure all wire connections are secure.

There are three modules as part of this system, solenoid panel, accelerator module and PWR-TRON module. These are all easily removable for replacement and service.

Only qualified service personnel should perform any replacement, adjustments or servicing of the PWR-TRON module, solenoid panel or the accelerator module. This will avoid the possibility of voiding your warranty on the PWR-TRON 240, 350 or 480.

When returning vehicle to pre-service configuration make certain batteries are properly connected to avoid damage.

## ACCELERATOR MODULES PT240, 350 AND 480

### GENERAL FEATURES

All accelerator modules parts list are identical for all vehicles except for the rotor. This difference is noted on the following drawings and parts list. The orientation of the accelerator are is shown mounted in the "OFF" position for all vehicles. All parts lists figures are identified in order of assembly. Whenever a re-assembly is necessary a potentiometer check is required before adding pulleys and belts.

### MICRO-SWITCH CHECK

Using a VDM, with micro-switch in "ON" position. Red wires should read Zero OHMS and OFF position will read infinity.

POT. PIN	WIRE #
A	YELLOW #1
B	BLACK #2
C	GREEN #3

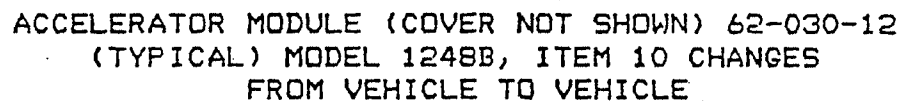
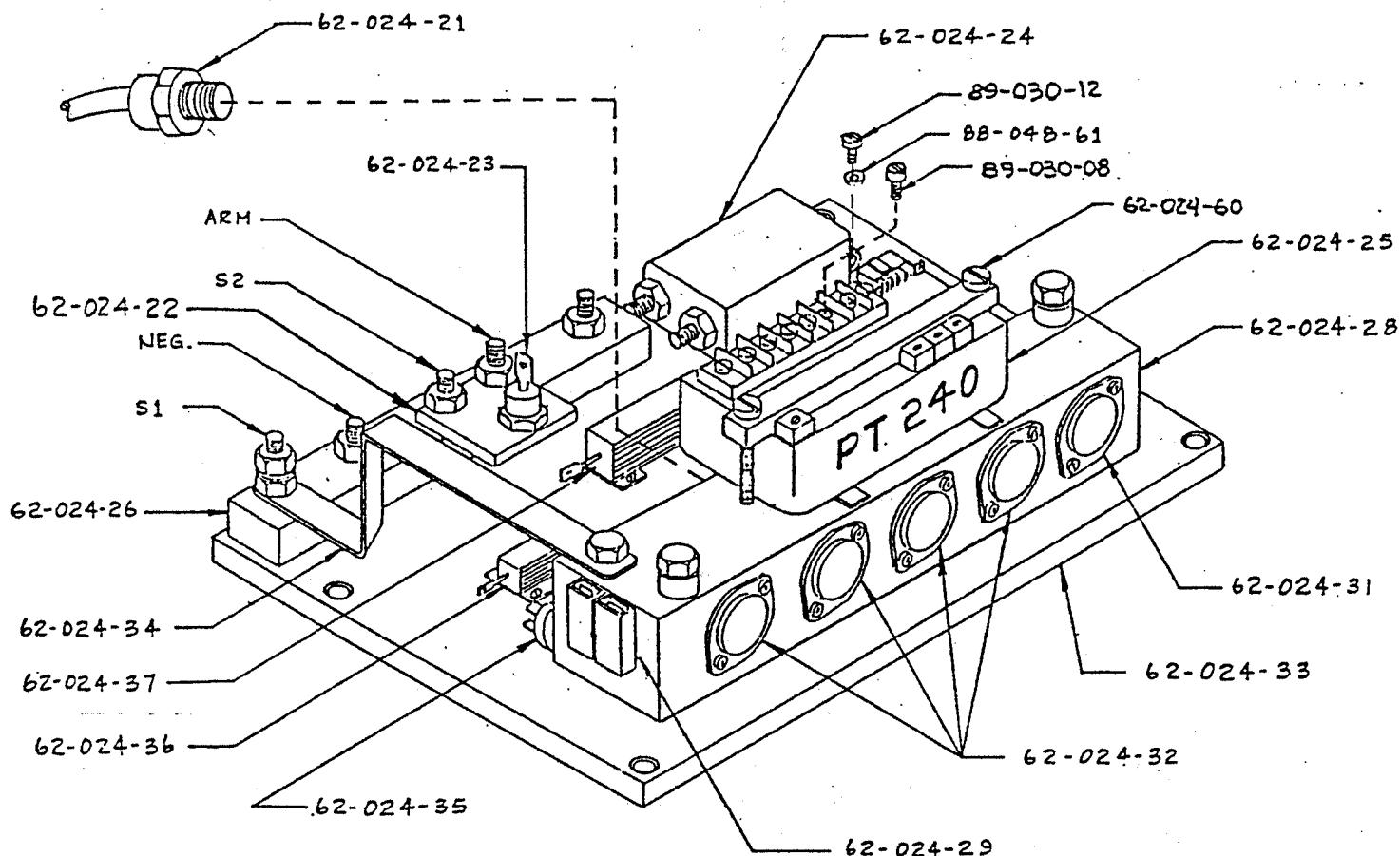


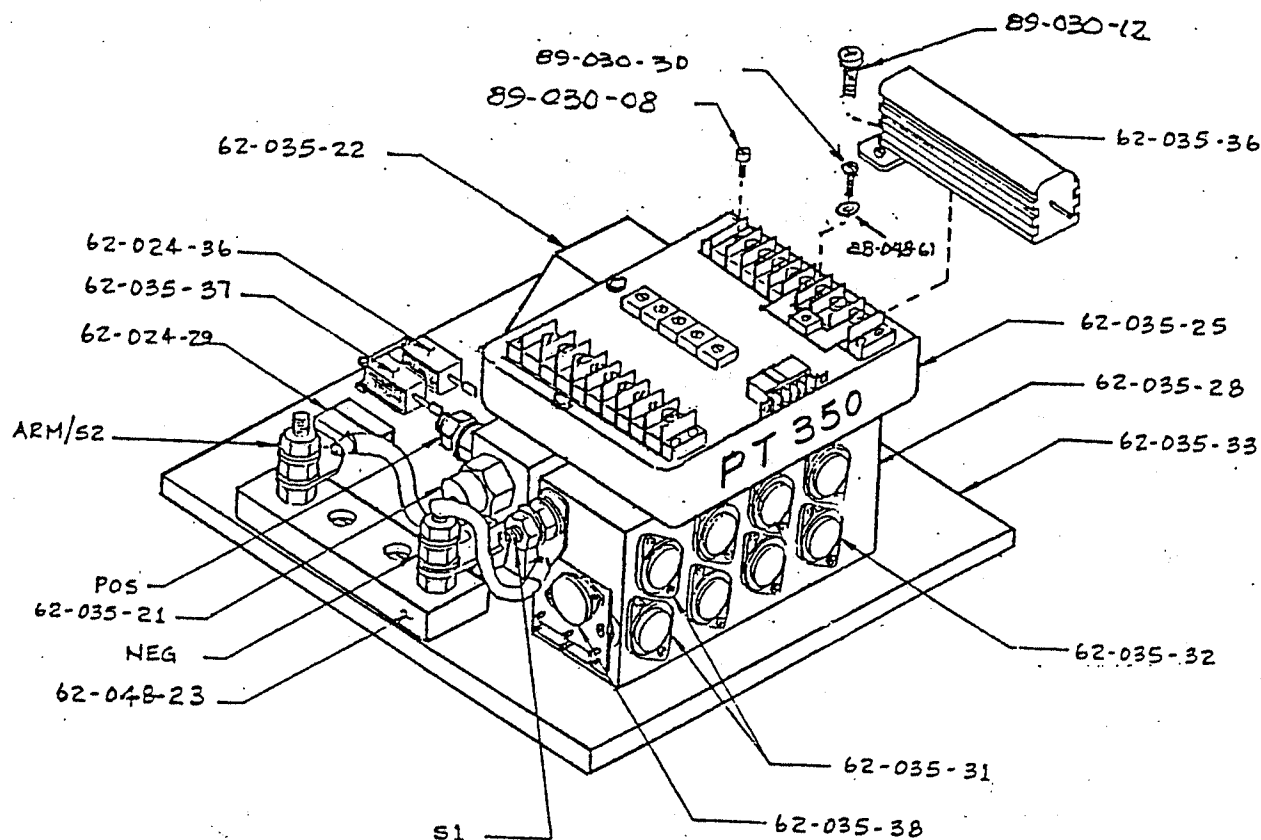
FIG. NO.	PART NO.	DESCRIPTION	QTY.
1	62-861-55	Plate, Pot. Mtg. Accel Module	1
2	71-127-00	Switch, Micro	2
3	88-055-11	Screw, 4-40 X 1-1/4 Truss Hd.	2
4	78-350-55	Potentiometer	1
5	97-190-00	Washer, Potentiometer	1
6	97-202-00	Nut, Potentiometer	1
7	88-009-81	Washer, 4-40 Lock	2
8	62-030-61	Sprocket 18T .0800	1
9	32-220-10	Bushing, 1/2 ID, Brass	1
*10	62-030-32	Rotor, Accel. Module (1248B)	1
11	97-099-10	Key, Woodruff	1
12	88-239-80	Nut, 3/4 NF Hx. Hd. Nut	1
13	88-229-62	Washer, 3/4 Lock	1
14	62-861-50	Plate, Backing, Accel. Module	1
15	62-030-50	Cam, Micro Sw. 1 In. Rad.	1
16	16-512-10	Spacer, 1/4 ID X 29/32 St. Tubing	2
17	88-060-14	Screw, 1/4 X 1-1/2	2
18	88-069-81	Nut, 1/4 Lock	2
19	75-140-00	Harness, Accel. Module	1
20	97-180-30	Washer, 1/2 In ID X 1/32 Thk.	1
21	88-840-08	Ring, Snap 1/2 Ext. Fleet Pk.	1
22	62-030-51	Sprocket, 80T .0800	1
23	62-030-53	Belt, .0800 12 In 150 T	1
24	88-088-62	Nut, 5/16 NC, Lock	1
	62-030-58	Cover (Not Shown)	1
*	62-030-34	Rotor, Accel. Module (Model C)	1
*	62-030-35	Rotor, Accel. Module (Model E)	1
*	62-030-31	Rotor, Accel. Module (374 R)	1
*	62-030-44	Rotor, Accel. Module (R 3-80)	1
*	62-030-33	Rotor, Accel. Module (B 2-10)	1
*	62-030-36	Rotor, Accel. Module (SS 5-34)	1
*	62-030-37	Rotor, Accel. Module (Model SC)	1





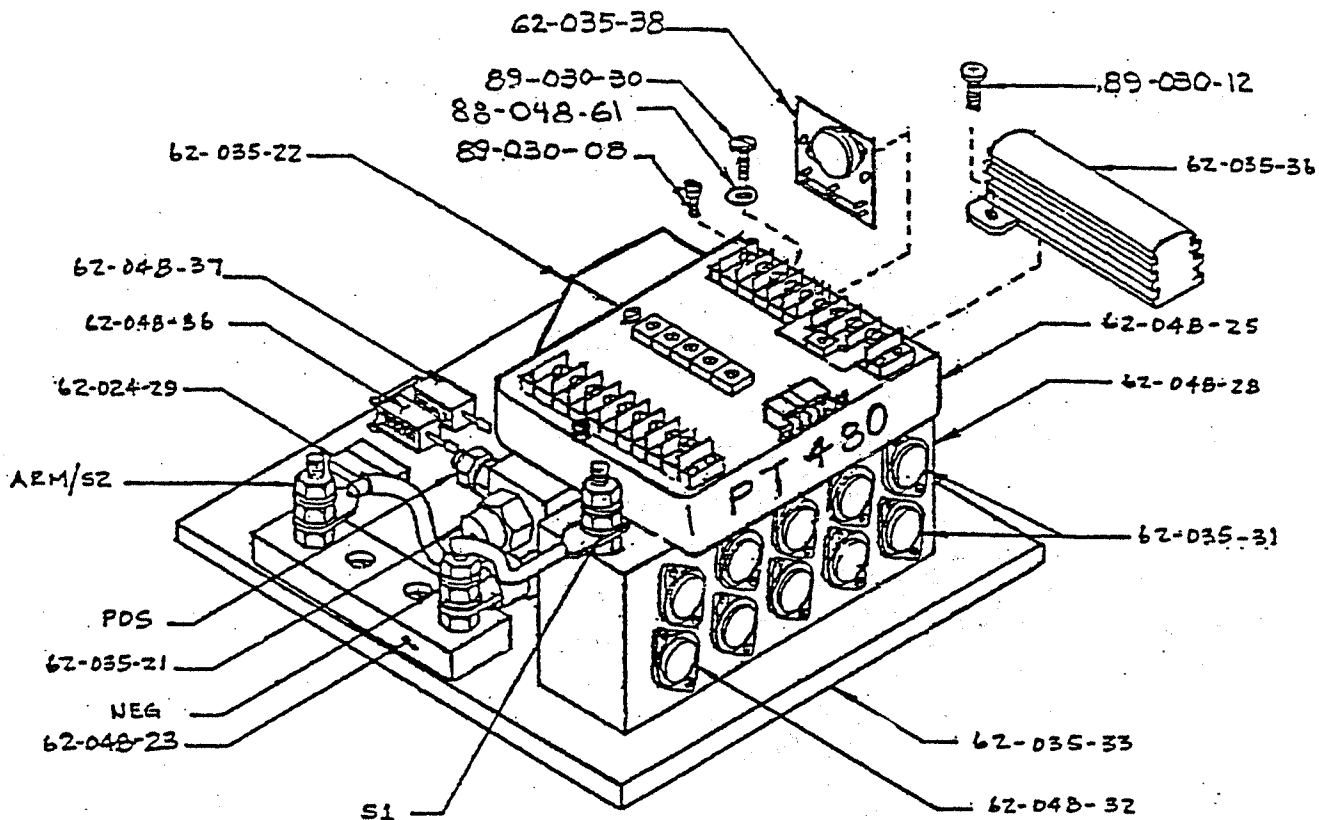
PT240 SPEED CONTROLLER AND PARTS LIST  
(PT240 TYPICAL FOR ALL 24 & 36 VOLT VEHICLES)

PART NO.	DESCRIPTION	QTY.
62-024-21	Diode, Flywheel	1
62-024-22	Heat Sink, Diode, Plugging	1
62-024-23	Diode, Plugging	1
62-024-24	Capacitor	1
62-024-25	Logic Unit	1
62-024-28	Transistor Block	1
62-024-31	Transistor Driver	1
62-024-32	Transistor Power	(set) 4
62-024-33	Base, PT240	1
62-024-29	Switch Key (24V & 36V)	1
62-024-35	Switch, Thermal	1
62-024-36	Resistor, 70 OHM	1
62-024-37	Resistor, 1/2 OHM	1
62-024-34	Bar, Buss	1
62-024-26	Block, Terminal	1
89-030-12	Screw, 3 MM x 12 MM	7
89-030-08	Screw, 3 MM x 8 MM	10
62-024-60	Kit, Logic Bar & 2 Screws	2
88-048-61	Washer, # 10 SAE	7



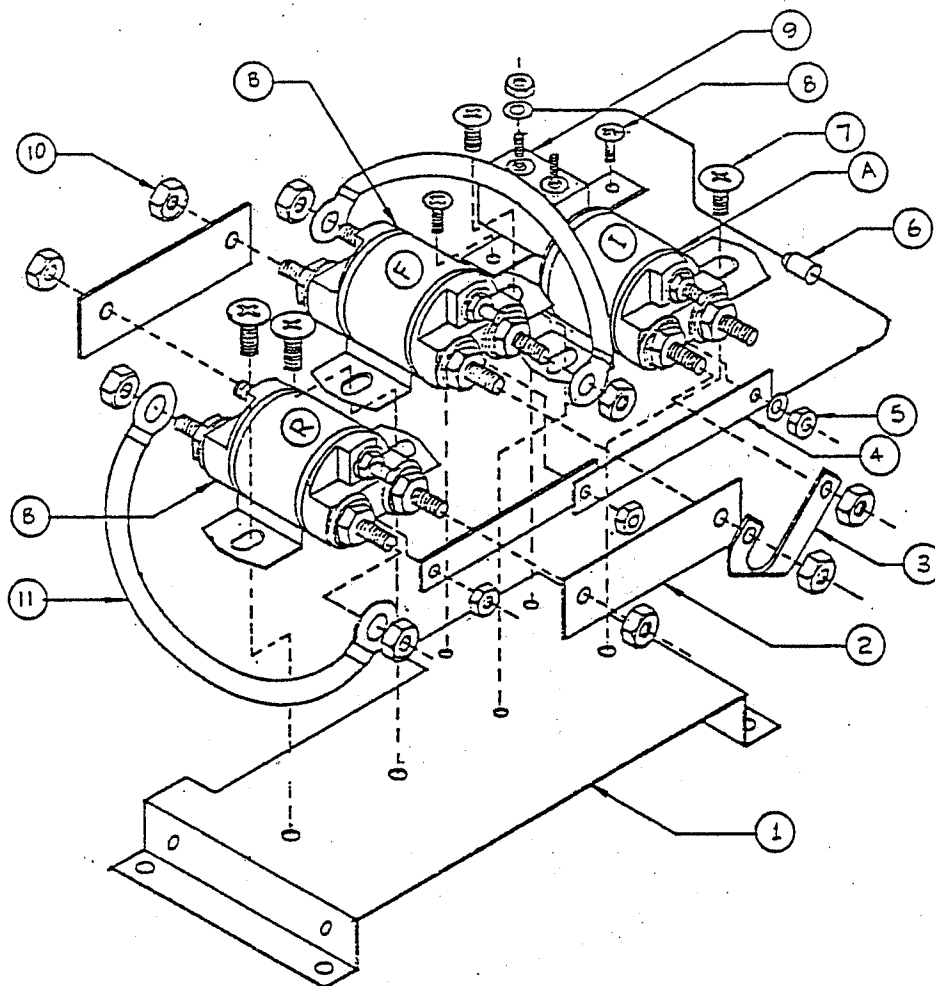
PWR-TRON 350 SPEED CONTROLLER, 24/36 VOLTS

<u>PART NO.</u>	<u>PT350</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
62-035-21		Diode, Flywheel	1
62-035-21		Diode, Plugging	1
62-035-22		Capacitor	1
62-035-25		Logic Unit	1
62-035-28		Block, Transistor	1
62-035-33		Base Plate	1
62-035-32		Transistors, Power (set of 6)	1
62-035-31		Transistors, Driver	2
62-035-38		Transistor Assy. Driver, Driver	1
62-048-23		Block Terminal	1
62-024-29		Key Switch	1
62-024-36		Resistor, 10 W 70 OHM	1
62-035-36		Resistor, 50 W .5 OHM	1
62-035-37		Resistor, 10 W 18 OHM	1
89-030-08		Screw, 3 MM x 8 MM	25
89-030-12		Screw, 3 MM x 12 MM	10
88-048-61		Washer, # 10 SAE	3
89-030-30		Screw, 3 MM x 30 MM	3



## PWR-TRON 480 SPEED CONTROLLER, 48 VOLTS

<u>PART NO.</u>	<u>PT480</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
62-035-21		Diode, Flywheel	1
62-035-21		Diode, Plugging	1
62-035-22		Capacitor, Filter with Nuts	1
62-048-25		Logic Unit	1
62-048-28		Block, Transistor	1
62-048-32		Transistor, Power (set of 8)	1
62-035-31		Transistor, Driver	2
62-035-38		Transistor Assembly Driver/Driver	1
62-035-33		Plate, Base	1
62-048-23		Block, Terminal	1
62-049-29		Input, Key Switch	1
62-035-36		Resistor, 50 W .5 OHM	1
62-048-36		Resistor, 10 W 150 OHM	1
62-048-37		Resistor, 10 W 1K5 OHM	1
89-030-08		Screw, 3 MM x 8 MM	25
88-030-12		Screw, 3 MM x 12 MM	10
89-030-30		Screw, 3 MM x 30 MM	3
88-048-61		Washer #10 SAE	3



\*SOLENOID PANEL ASSEMBLIES

72-560-00, 24V PANEL ASS'Y

1 72-560-10, 36V PANEL ASS'Y

A) 72-501-24 SOLENOID, SPST 24V

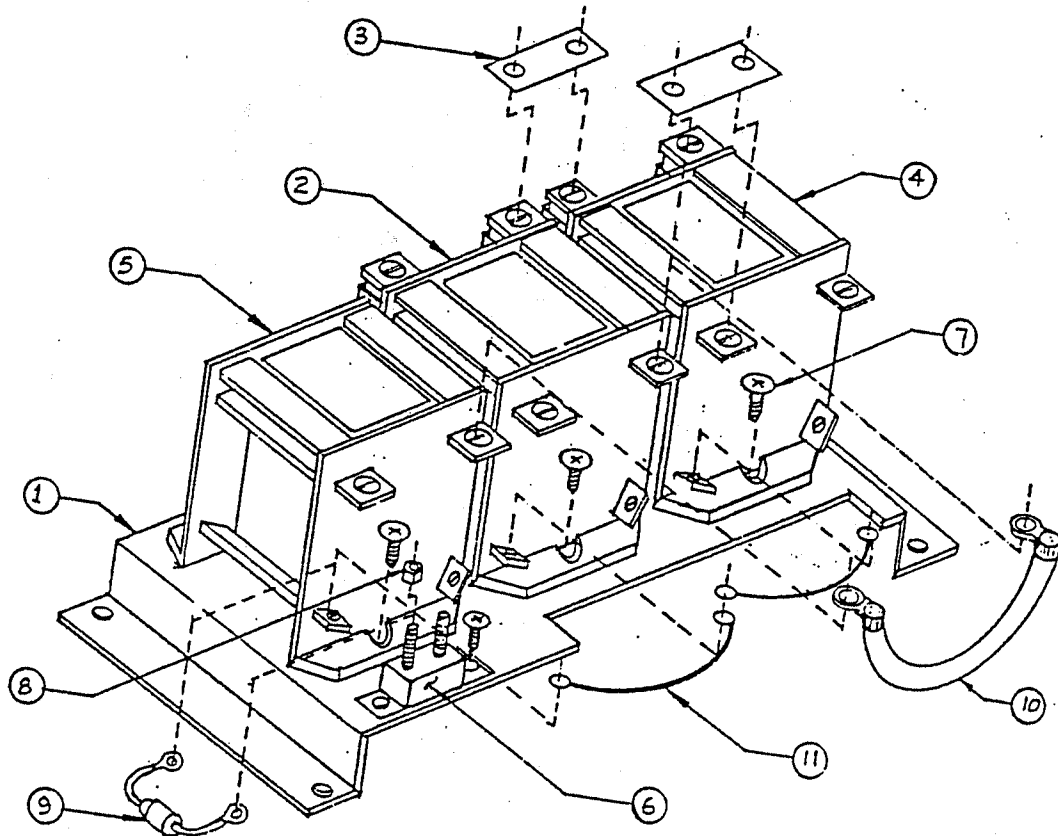
1 A) 72-501-36 SOLENOID, SPST 36V

B) 72-501-25 SOLENOID, SPDT 24V

1 B) 72-501-37 SOLENOID, SPDT 36V

\*THE SOLENOID PANEL ASSY IS TYPICAL FOR  
PT240 AND PT350 AND ARE INTERCHANGEABLE  
DEPENDING ON VOLTAGE REQUIREMENTS

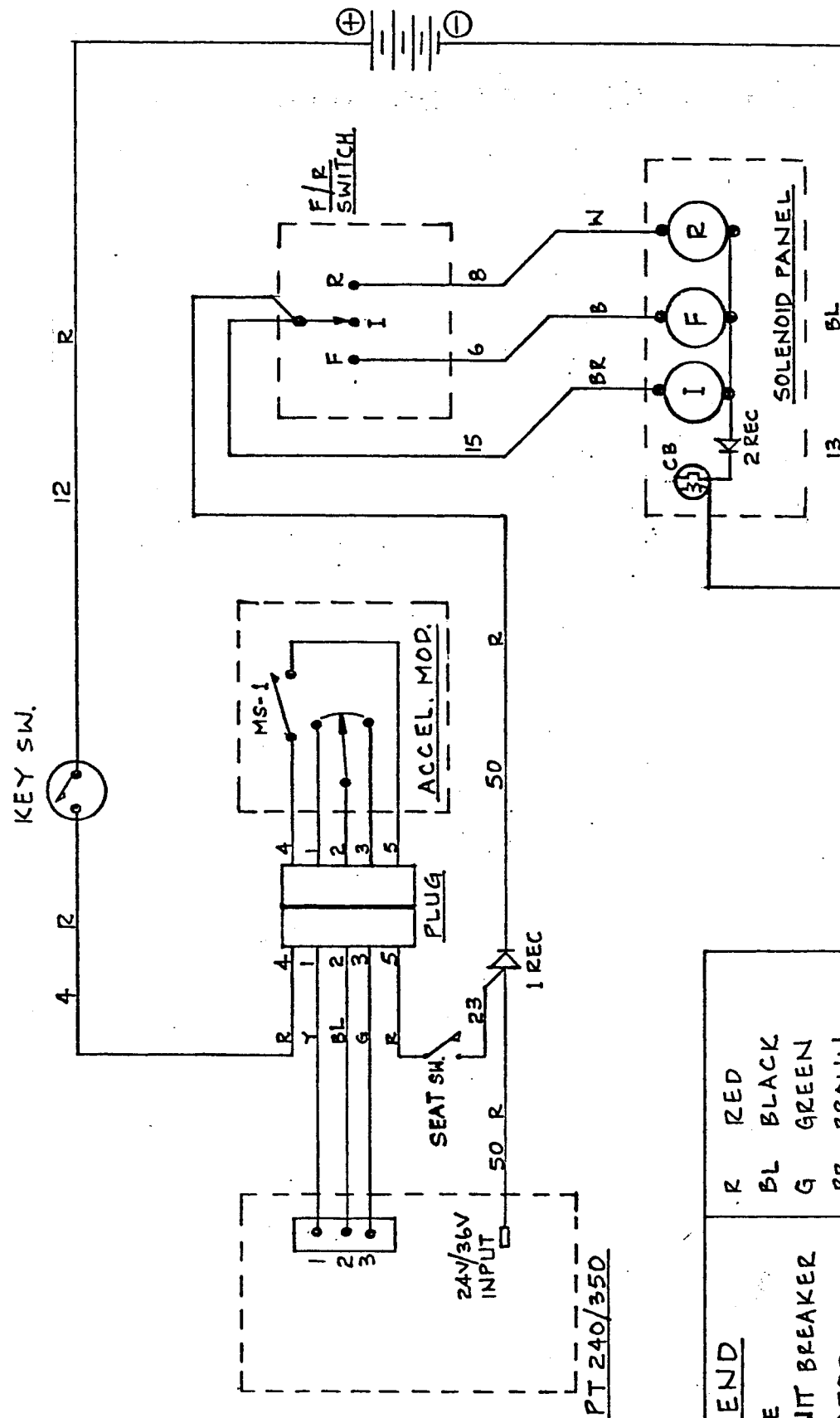
<u>FIG NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
1.	72-560-50	Panel, Solenoid Mtg	1
2.	61-838-51	Bar, Buss 2 X 5/8 CU	2
3.	61-838-20	Buss, Curved	1
4.	61-838-50	Bar, Buss 3 X 3/8 CU	2
5.	88-048-62	Nut	4
6.	75-224-10	Jumper, 5-1/4 IN, 18GA, W/Diode	1
7.	88-838-06	Screw, #14 X 1/2 Pan Head Sheet Metal	4
8.	88-818-06	Screw, #8 X 1/2 Pan Head Sheet Metal	2
9.	79-840-00	Circuit Breaker, 10 AMP	1
10.	88-089-91	Nut, Hex Jam, 5/16NC, Thin	9
11.	75-235-20	Jumper, Red, 4-1/4, 4 GA	2
	72-560-51	Cover, Solenoid Panel (Not Shown)	1



CONTACTOR PANEL ASSEMBLY 48V (72-560-20)  
(FOR USE WITH PT 480 ONLY)

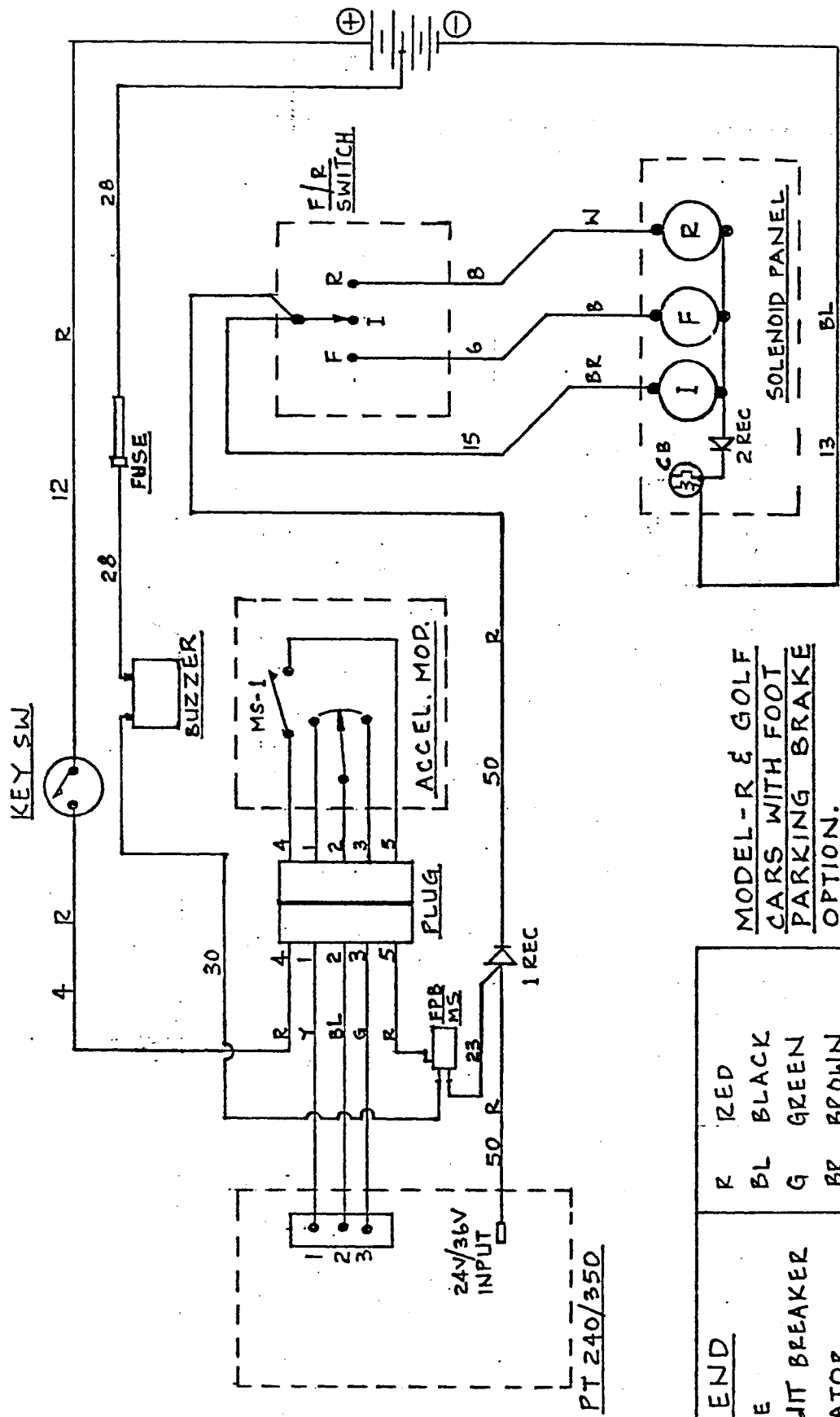
FIG. NO.	PART NO.	DESCRIPTION	QTY.
1	72-560-52	Panel, Contactor Mtg.	1
2	71-306-71	Contactor, Rev. 75 AMP 48V SPDT	1
3	61-838-52	Buss Bar, Copper, 1/2 X 1	2
4	71-306-70	Contactor, FWD. 75 AMP 48V DPST	1
5	71-306-72	Contactor, ISO. 75 AMP 48V SPST	1
6	79-840-00	Circuit Breaker, 10 AMP Auto	1
7	88-818-06	Screw, 8 X 1/2 Pan Hd. Type B Thd.	8
8	88-049-80	Nut, 10-32 Hex	2
9	75-224-15	Jumper, With Diode	1
10	75-235-11	Jumper, 4 Ga. 2-1/2 In. Long	1
11	75-224-20	Jumper, 3 Inch 18 Ga. Black	2





PWR-TRON 240/350 CONTROL SCHEMATIC

<u>LEGEND</u>	
REC	DIODE
CCB	CIRCUIT BREAKER
I	ISOLATOR
F	FORWARD
R	REVERSE
R	RED
BL	BLACK
G	GREEN
BR	BROWN
Y	YELLOW
W	WHITE



MODEL-R & GOLF  
CARS WITH FOOT  
PARKING BRAKE  
OPTION.

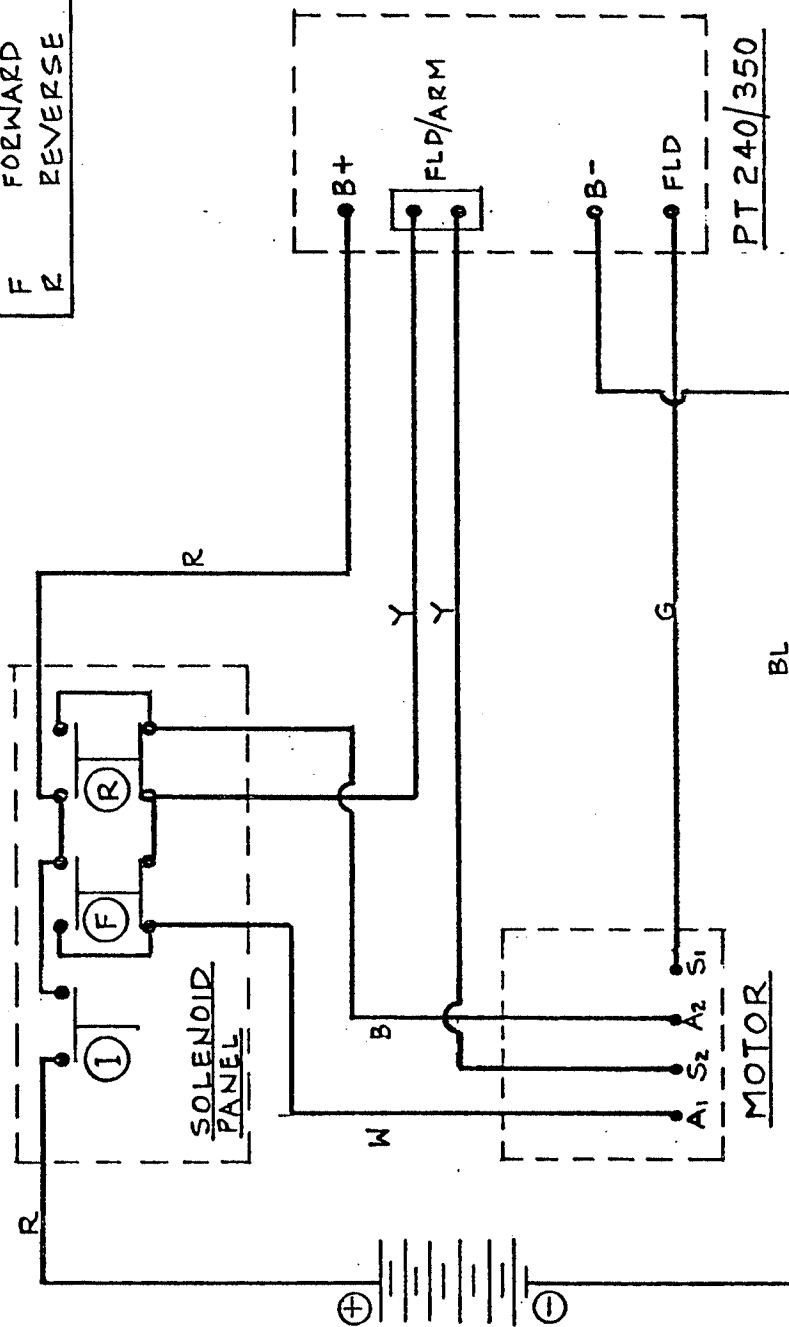
LEGEND	
REC	DIODE
CB	CIRCUIT BREAKER
I	ISOLATOR
F	FORWARD
R	REVERSE
R	RED
BL	BLACK
G	GREEN
BR	BROWN
Y	YELLOW
W	WHITE

PWR-TRON 240/350 CONTROL SCHEMATIC FIG. 3

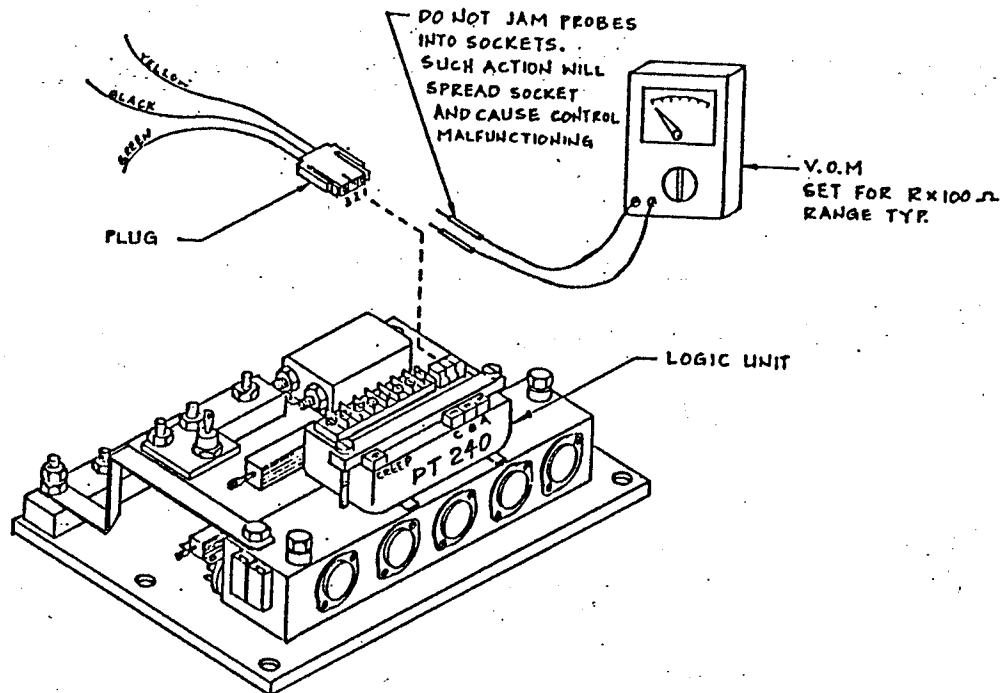


LEGEND

B+	BATTERY POS.	R	RED
B-	BATTERY NEG.	BL	BLACK
FLD	FIELD	B	BLUE
ARM	ARMATURE	Y	YELLOW
I	ISOLATOR	G	GREEN
F	FORWARD	W	WHITE
R	REVERSE		



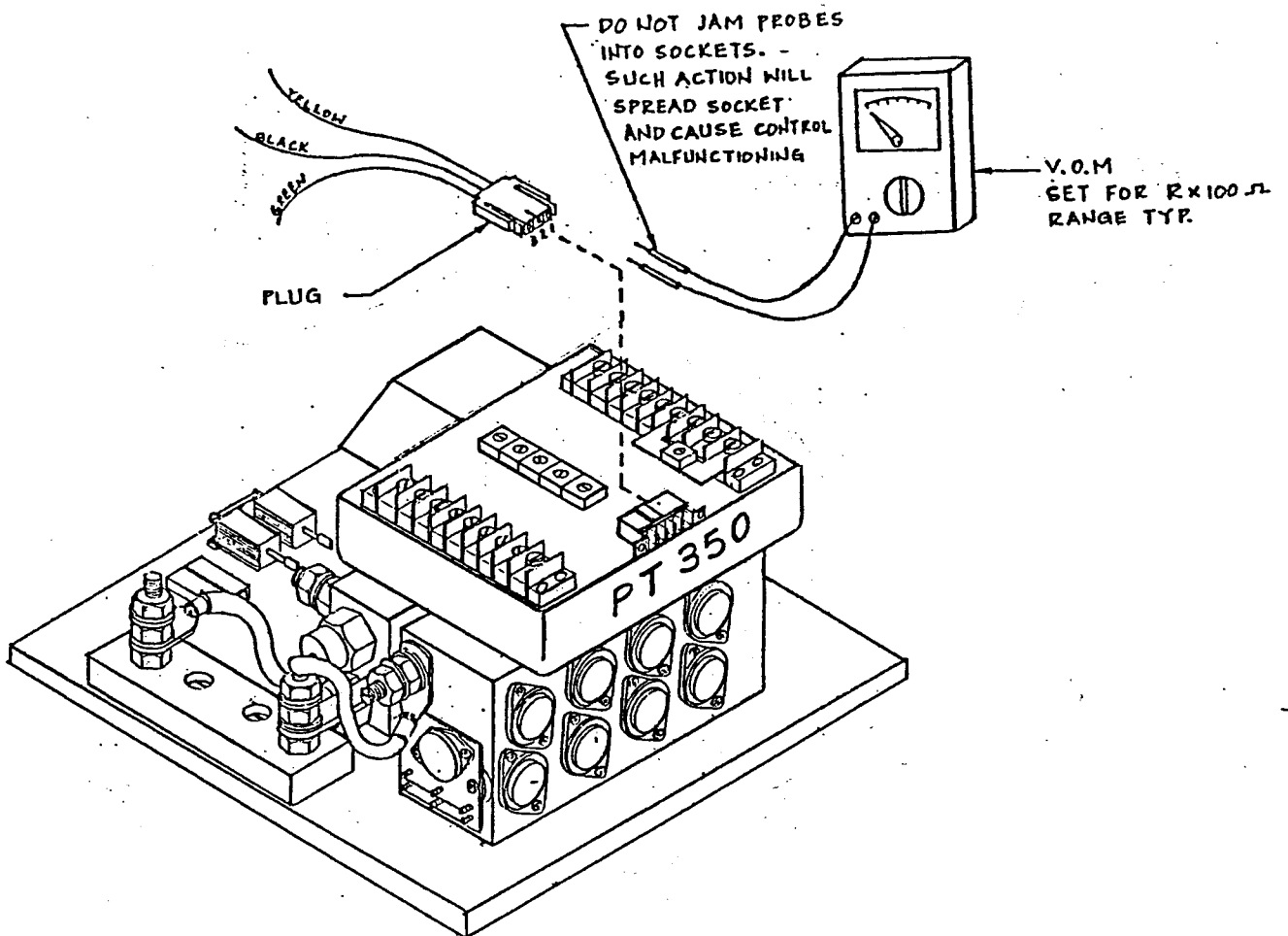
PWR-TRON 240/350 POWER SCHEMATIC FIG 4



### PWR-TRON 240 24/36 VOLTS

#### POTENTIOMETER CHECK & ACCELERATOR LINKAGE ADJUSTMENT

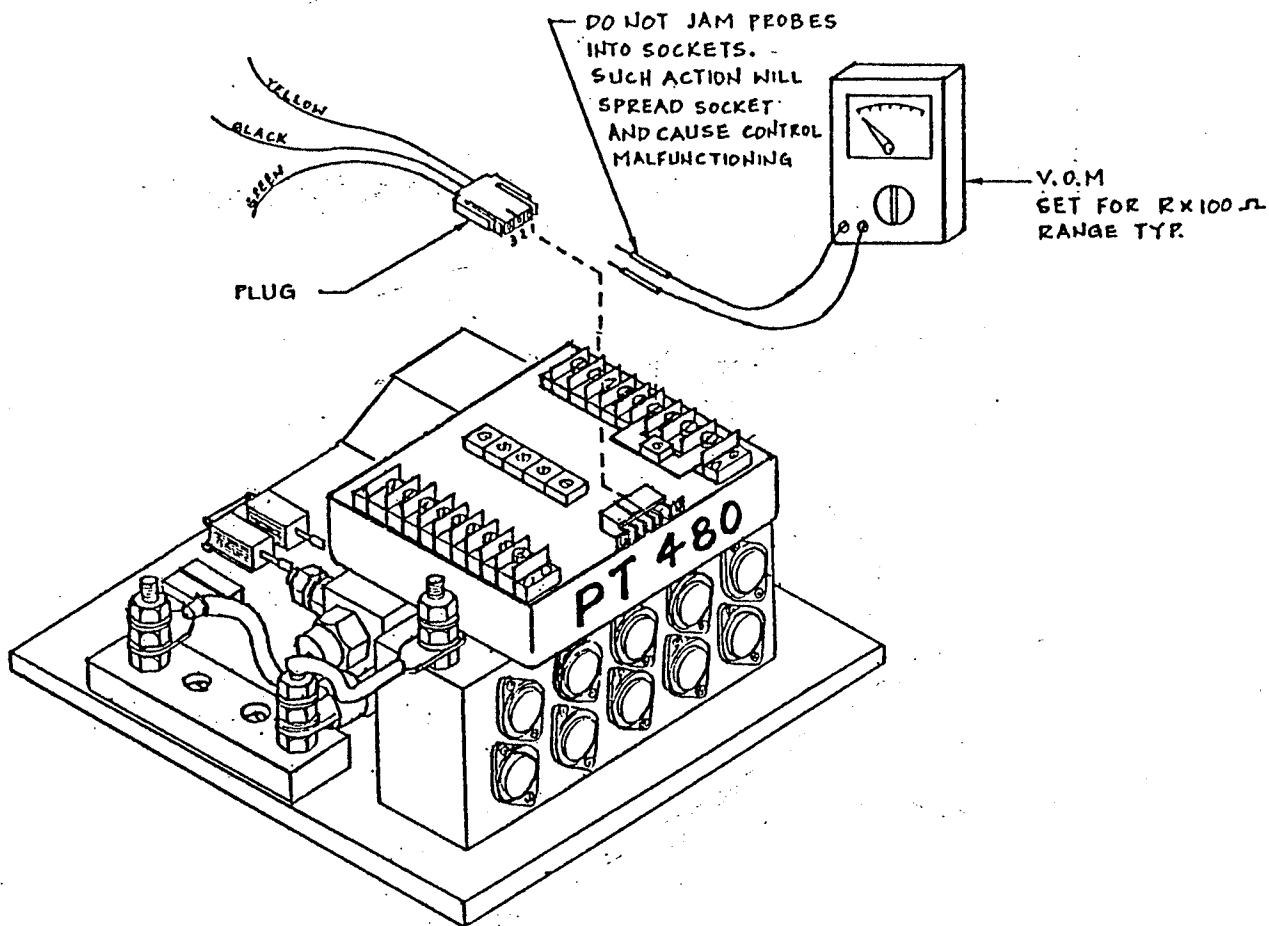
1. Disconnect plug (with yellow, black and green wires) at PWR-TRON logic.
2. Read 4K to 5K ohm on V.O.M. between sockets 1 and 2 (yellow and black wires) with accelerator pedal in off position.
3. With accelerator pedal full depressed, read 0 - 300 ohm on V.O.M. between sockets 1 and 2 (yellow and black wires). Adjust the accelerator pedal stop and/or accelerator linkage to achieve the above readings.
  - \* DO NOT rely on return stop inside the accelerator module. It is only a safety feature, not designed for constant foot/pedal return pounding.
4. Reconnect plug to PWR-TRON 240 logic unit.



PWR-TRON 350 24/36 VOLTS

POTENTIOMETER CHECK & ACCELERATOR LINKAGE ADJUSTMENT

1. Disconnect plug (with yellow, black and green wires) at PWR-TRON logic unit.
2. Read 4K to 5K ohm on V.O.M. between sockets 1 and 2 (yellow and black wires) with accelerator pedal in off position.
3. With accelerator pedal fully depressed, read 0 - 300 ohm on V.O.M. between sockets 1 and 2 (yellow and black wires). Adjust the accelerator pedal stop and/or accelerator linkage to achieve the above readings.
- \* DO NOT rely on return stop inside the accelerator module. It is only a safety feature, not designed for constant foot/pedal return pounding.
4. Reconnect plug to PWR-TRON 350 logic unit.



PWR-TRON 480 .48 VOLTS

## POTENTIOMETER CHECK &amp; ACCELERATOR LINKAGE ADJUSTMENT

1. Disconnect plug (with yellow, black and green wires) at PWR-TRON logic unit.
2. Read 4K to 5K ohm on V.O.M. between sockets 1 and 2 (yellow and black wires) with accelerator pedal in off position.
3. With accelerator pedal fully depressed, read 0 - 300 ohm on V.O.M. between sockets 1 and 2 (yellow and black wires). Adjust the accelerator pedal stop and /or accelerator linkage to achieve the above readings.
- \* DO NOT rely on return stop inside the accelerator module. It is only a safety feature, not designed for constant foot/pedal return pounding.
4. Reconnect plug to PWR-TRON 480 logic unit.

CONTINUITY AND POWER CHECK

NOTE: VEHICLE DRIVE WHEELS MUST BE JACKED UP OFF FLOOR FOR FOLLOWING TEST.

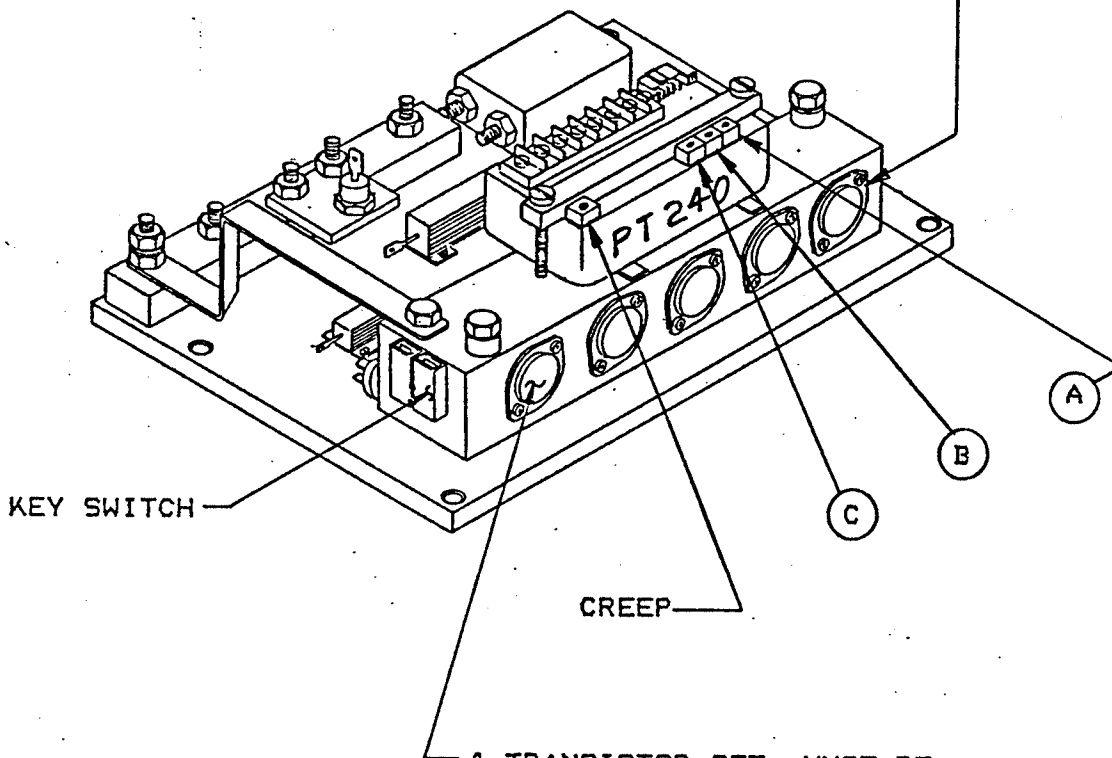
CAUTION: THIS IS A FACTORY CHECKOUT PROCEDURE AND SHOULD ONLY BE MADE BY A QUALIFIED MECHANIC.

After the PWR-TRON system has been installed, a preliminary power check is required, prior to fine tuning of the PWR-TRON. The vehicle should be ready for basic operation at this time.

Lift green lead at S1 (refer to combined circuit diagram) and place a light (24, 36 or 48V) in series with S1 and field pole on PWR-TRON. Place forward/reverse switch in forward. Initiate accelerator slowly, light should come up to maximum brilliance at full acceleration. Repeat same step for reverse. If problems are encountered, see "Trouble Shooting" section. Also check acceleration rate by quickly depressing accelerator full. Light should come to full brilliance in 3 seconds. (Caution, do not perform plugging with light attached.

When both steps are completed satisfactorily, place vehicle on floor, prepared for operation and fine tuning of the PWR-TRON unit. Proceed to page on "Trimpot Adjustment".

DRIVER TRANSISTOR (AMPLIFIER  
FOR TRANSISTOR SET) APPLY  
SILICONE SEALANT AROUND EDGE



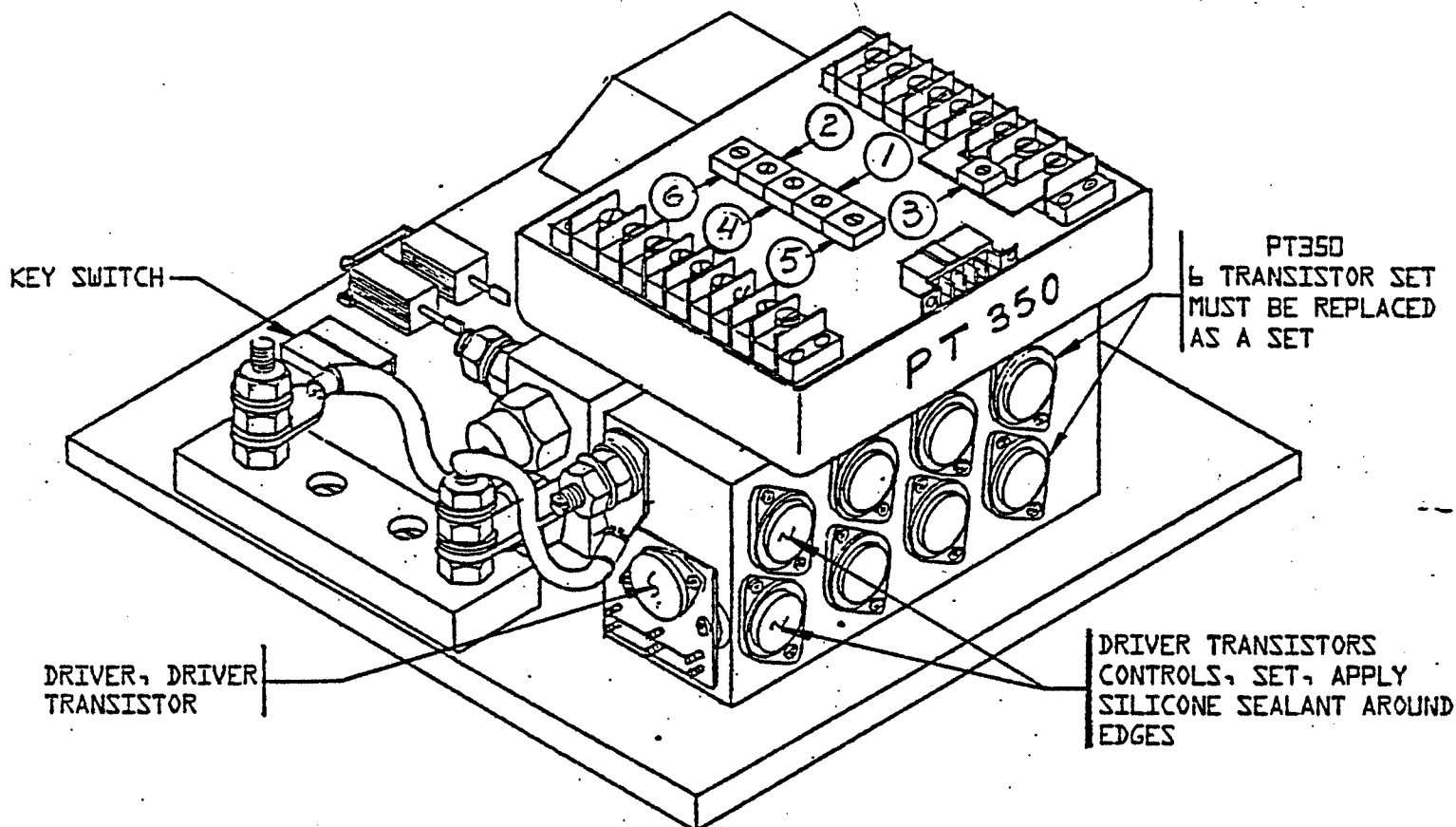
4 TRANSISTOR SET. MUST BE  
REPLACED AS A MATCHED SET

PWR-TRON 240 TRIMPOT ADJUSTMENTS

PERFORM ALL TRIMPOT ADJUSTMENTS IN ORDER SHOWN

- A. ACCELERATOR - Turn full direction of arrow
  - B. Plugging - Turn full opposite direction of arrow to start.  
Turn up 1/8 in direction of arrow
  - C. CURRENT LIMITER - Turn full direction of arrow
- CREEP - Adjust trimpot so motor whines but does not turn when  
accelerator switch is first closed.

AFTER ALL POTS HAVE BEEN FINAL ADJUSTED, COAT POTS  
WITH WHITE SILICONE SEALANT.



PT 350/480 TRIMPOT ADJUSTMENTS  
PT480 IS 48V ONLY

Perform all trimpot adjustments in the order shown. All braking is done last.

1. CURRENT LIMITER - Turn full direction of arrow
2. ACCELERATOR - Turn full direction of arrow
3. MAX BRAKE - Turn full opposite direction of arrow
4. BRAKE - Turn full opposite direction of arrow to start. Turn up 1/8 in direction of arrow
5. VOLTS ADJ. - Adjust trimpot so "solenoid clicks" on and motor whines when accelerator switch is first closed
6. LOW SPEED MAX - Option feature, no adjustment required

AFTER ALL POTS HAVE BEEN ADJUSTED, COAT POTS WITH WHITE SILICONE SEALANT.

**TROUBLE SHOOTING**  
(USE COMBINED CIRCUIT FOR CORRECTIVE ACTION)

<u>SYMPTOM</u>	<u>PROBABLE CAUSE</u>	<u>CORRECTIVE ACTION</u>
1. Vehicle goes forward does not move in reverse	Motor to solenoid wired wrong or bad solenoid	(See combined circuit) B neg from CB may be wired to field on PWR-TRON. Wire to B neg. if required, replace reverse solenoid.
2. Vehicle goes Rev/Fwd instead of Fwd/Rev	Wires reversed at Fwd/Rev switch	Route white wire from Fwd switch to motor. A1 and blue wire from reverse switch to motor, A2
3. Vehicle does not accelerate properly, full on, when checked with light	Solenoid GND connected to field input (green)	(see combined circuit) move to B neg. (same action as item no. 1
4. Catastrophic transistor failure during plugging	Motor/bat. lead to pos. (B+) on control omitted or mis-connected	(see combined circuit) * Replace transistor re-wire B+
5. Vehicle operates then stops. Motor whine present. <u>WARNING: Do not operate. Release accelerator immediately.</u> Continued operation could cause logic damage.	Plugging diode failure; 1. Yellow leads not properly connected. 2. Motor leads over 5' long 3. Incorrect diode	Route yellow leads to field terminal on PWR-TRON unit. Check plugging diode. Replace if necessary
6. Vehicle does not give smooth acceleration when viewed with test light.	Check accelerator module Potentiometer wired in-correctly. (yellow, black green)	Reroute yellow, black, and green wires per combined circuit diagram.
7. Test light indicates acceleration but turns off at full speed.	Cam reversed on accelerator module	Remove accelerator module. Remove accelerator arm/shaft, re-install cam. correctly
8. No output from control	Batteries <u>not</u> connected or improperly connected Key switch input not connected/key-off micro switch not connected (no solenoids on)	First, check key is on. Make certain trim-pot has not been turned too far. (into "overtravel" area)



TROUBLE SHOOTING (CONTINUED)  
(USE COMBINED CIRCUIT FOR CORRECTIVE ACTION)

<u>SYMPTOM</u>	<u>PROBABLE CAUSE</u>	<u>CORRECTIVE ACTION</u>
9. No apparent output motor whines.	Grade or load is too great. Motor armature or field short.	See item 1. One direction missing, same action as item no. 1.
10. Vehicles "growls" during acceleration	PWR-TRON B+ to reverse solenoid (red lead) wired wrong.	(See combined circuit) Red lead from B+ tied to outside post. Rewire red lead to reverse terminal post as on reverse solenoid.
11. Vehicle shudders and shakes	Battery voltage too low	Check batteries re-charge as necessary
12. Vehicle stalls, sits and whines	Bad accelerator pot or due to pulley turning free on pot shaft.	Apply "Super Glue" to pulley. If pot is O.K. and pulley is not loose on shaft, then adjust plugging pot 1/4 turn.

\* Transistors must be replaced as matched sets: See respective page for speed controller.

SUGGESTED SPARE PARTS LIST  
PWR-TRON SPEED CONTROLLER SYSTEM

T-D PART NO.	DESCRIPTION	QTY. NO. OF CARTS		
		REQ. 1-20	21-50	50-UP
62-024-00	PT-240 Speed Controller	1	1	2
62-024-21	Flywheel Diode	1	2	4
62-024-23	Plugging Diode	1	2	4
62-024-31	Drive Transistor	1	2	4
62-024-32	Power Transistor	1(set)	2	4
62-024-22	Capacitor	1	1	2
62-024-33	Thermal Switch	1	1	2
62-024-36	Resistor, 70 OHM 10W	1	1	2
62-024-37	Resistor, 1/2 OHM 25W	1	1	2
62-024-10	Cover PT-240	1	2	4
72-501-24	Solenoid SPST 24V	1	1	2
72-501-25	Solenoid SPDT 24V	2	2	4
72-501-36	Solenoid SPST 36V	1	1	2
72-501-37	Solenoid SPDT 36V	2	2	4
79-840-00	Circuit Breaker	1	1	2
61-838-20	Buss, Curved	1	1	2
75-235-11	Jumper, 2 In x 4 Ga. Red.	1	1	2
75-235-20	Jumper, 4-1/4 In X 4 Ga. Red	2	2	4
75-224-10	Jumper, 18 Ga w/diode	1	2	4
72-560-51	Cover, Solenoid Panel	1	2	4
62-030-11	Accel Module (R 3-74)	1	1	2
62-030-12	Accel Module (1248 B)	1	1	2
62-030-13	Accel Module (B 2-10)	1	1	2
62-030-14	Accel Module (R 3-80)	1	1	2
62-030-31	Rotor Accel Module (R 3-74)	1	1	2
62-030-32	Rotor, Accel Module (1248B)	1	1	2
62-030-33	Rotor, Accel Module (B 2-10)	1	1	2
62-030-44	Rotor, Accel Module (R 3-80)	1	1	2
62-030-58	Cover, Accel Module	1	2	4
62-035-00	PT350 Speed Controller	1	1	2
62-035-21	Flywheel Diode	1	2	4
62-035-21	Plugging Diode	1	2	4
62-035-31	Driver Transistors	1	2	4
62-035-32	Power Transistors	1 (set)	2	4
62-035-24	Capacitor	1	1	2
62-035-10	Cover, PT350	1	2	4
62-035-38	Driver, Driver Transistor	1	2	4
62-048-00	PT480 Speed Controller	1	1	2
62-048-31	Driver Transistors	1	2	4
62-048-32	Power Transistors	1	2	4
62-048-36	Resistor 150 OHM 10W	1	1	2
62-048-37	Resistor 1K5 OHM 10W	1	1	2
62-048-38	Driver, Driver Transistor	1	2	4
72-560-20	Contactor Panel Assembly	1	1	2
71-306-70	Contactor, Fwd. 75A 48V DPST	1	1	2
71-306-71	Contactor, Rev. 75A 48V SPDT	1	1	2
71-306-72	Contactor, Iso. 75A 48V SPST	1	1	2

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WE WANT OUR MANUALS TO BE USEFUL AND CORRECT. IF YOU DISCOVER AN ERROR OR WISH TO SUGGEST CHANGES, PLEASE FILL OUT THIS SHEET AND MAIL IT TO TAYLOR-DUNN.

MANUAL NO. \_\_\_\_\_ SERIAL NO. \_\_\_\_\_ DATE: \_\_\_\_\_

\* AN ERROR(S) EXISTS ON THE FOLLOWING SECTION(S) AND PAGE(S) NO.

SECTION \_\_\_\_\_ PAGE NO. \_\_\_\_\_ LINE OR ITEM \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\* **EXAMPLE:** Section 13, Page 5, Item 5.  
PART NO. 41-350-55 KIT, CYLINDER REPAIR SHOULD BE PART NO. 41-350-66.

MAIL TO: TAYLOR-DUNN  
ATTN: ENGINEERING  
2114 W. BALL ROAD  
ANAHEIM, CA 92804

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