

**OPERATION
AND
MAINTENANCE
MANUAL
WITH
PARTS LIST**

MODEL: C4-32,C4-33,C4-38
SERIAL NO: 87492 to 94314
MANUAL NO: MC-432-~~03~~

03

****IMPORTANT****

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



TAYLOR-DUNN[®]
Commercial and Industrial Vehicles Since 1949

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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. ANSI B56.8 applies to only those vehicles with Serial Numbers dated after July 31, 1982.

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 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.

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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 has loosened during transit.
- C. Check all battery connections and electrolyte level in each cell.
- D. Inspect battery charger in accordance with manufacturer's installation instructions.
- E. Check tires for damage and proper inflation. Check wheel lugs to insure tightness.
- 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 a thorough review of Sections 1, 2, and 3.

The safe and satisfactory use of any vehicle is a responsibility shared by many persons.

As the manufacturer, we feel that it is our responsibility to emphasize vehicle characteristics and make safety recommendations regarding those characteristics. That is the primary purpose of this portion of the manual.

Persons who operate this vehicle need to be aware of, and to observe, the safe driving rules established in their locality, and need also to be aware of the vehicle operating characteristics and safety recommendation of the manufacturer, to assist them in exercising the judgement necessary to prevent injury to themselves or to others.

IMPORTANT: Persons who service and maintain the vehicle need to be aware of how their activities relate to safe vehicle operation, and of potential hazards involved in the service and maintenance processes; to assist them in applying sensible judgement to those processes.

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.

MODEL C
INSPECTION, SAFETY, AND INTRODUCTION SAFETY

MAINTENANCE: Many operating characteristics relate to maintenance in ways which are not readily obvious. Those maintenance characteristics most closely related to vehicle operating safety are indicated in Sections 4 and 5.

CAUTION: Also to be considered is the safety of personnel who perform service and maintenance duties. Two characteristics need special emphasis.

1. This electric vehicle does not "idle" noisily, is never "out of gear" and is set into motion whenever the battery to the motor circuit is closed, intentionally or otherwise. Whenever practical disconnect battery leads to avoid unintentional starting of the motor during servicing or maintenance.
2. Batteries emit gasses which can be explosive, especially while they are being charged. Personnel who are involved with servicing vehicles, or maintaining vehicles, need to be made familiar with this hazard. A detailed explanation is contained in Section 17.

CAUTION:

1. When performing maintenance on any part of the vehicle electrical system disconnect main battery leads, place forward/reverse switch in neutral. Remove key from key lock in dash panel.
2. Never replace a circuit fuse with one having a higher rating than the original equipment fuse. Fuses have been selected to provide full circuit protection for all operating conditions. A FUSE WILL ONLY BLOW DUE TO A SHORT-CIRCUIT. Therefore, always locate and correct the cause of short-circuit before replacing a blown fuse. Using a fuse of higher rating is an UNSAFE PRACTICE and could cause serious damage to equipment.
3. Intentional or unintentional mis-use of controls could result in an accident.

INSPECTION, SAFETY AND INTRODUCTION

INTRODUCTION

This vehicle is designed to be driven on smooth surfaces in and around industrial plants, nurseries, institutions, motels, mobile home parks and resorts. It is not designed to be driven on the public highways. It is not designed to go in excess of 15 m.p.h. on level surfaces or downhill. Speeds in excess of this may result in steering difficulty and possible loss of vehicle control. Vehicle is not designed to be towed in excess of 15 m.p.h.

MODEL NUMBER: The following model numbers are covered by this manual:
C 4-32, C 4-33, C 4-38

SERIAL NUMBER: The model and serial number are on a nameplate located on the inside face of cowl. In ordering parts or referring to your unit, please use these numbers. Replacement parts can be purchased directly from your local authorized dealer. Models covered by this manual begin with serial number 87492. Additional serial numbers covered by this manual are 86231 and 86132.

MODEL C
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.

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

KEYSWITCH: Your vehicle is equipped with a keyed switch located on the right side of the steering support tray. It is designed to lock in the off position only. The key will remove from the key switch in the locked position (off) only.

PARK BRAKE (HAND): The hand parking brake is located in the right center of floor board. To engage hand brake, grasp top lever and pull towards rear, all the way, until hand lever stops. To release brake, push hand lever all the way forward.

SERVICE BRAKE (FOOT): The brake pedal is designed and located for right foot operation. It is the pedal located to the left of accelerator pedal. It functions the same as the brake pedal in your automobile. Depressing the pedal applies the braking action. The greater the effort applied to the pedal with your foot, the greater the braking action to your vehicle. Removing your foot from the pedal allows immediate release of the braking action to your vehicle.

FORWARD/REVERSE SWITCH: The forward/reverse switch is located on the steering support shelf. It is a rocker type switch. Depressing the upper part places the vehicle in forward. Depressing the lower portion full downward places the vehicle in reverse. Center position is off.

CAUTION: The forward/reverse switch serves the same purpose as the transmission in your automobile. Treat it with the same respect and care. DO NOT SHIFT from forward to reverse or vice-versa while the vehicle is in motion. Shifting while in motion, especially near top speed, causes great strain to your vehicle and may cause severe damage, complete loss of power and could cause an accident.

ACCELERATOR PEDAL: The accelerator pedal is located to the right of the brake pedal. It is designed for right foot operation similar to your automobile. Depressing the pedal turns the power on to the motor. You will notice your vehicle has a smooth transition from start to high speed operation. This is a built in characteristic of the PWR-TRON II speed control, avoiding "jack rabbit" starts. You will have the same control of power in both directions of travel. Your forward/reverse switch determines the direction of travel and your accelerator pedal controls the speed.

HORN BUTTON: The horn button is located on the steering support tray. Depressing the button sounds the horn. Releasing the button will immediately silence the horn.

LIGHT SWITCH: The light switch that controls headlamps and taillamps is located on the steering support shelf. It is labelled for on/off positions.

BATTERY CHARGER: Refer to Section 18 for proper instructions to operate your battery charger.

OPERATING INSTRUCTIONS

STANDARD OPTIONAL ACCESSORIES

WINDSHIELD WIPER: On vehicles equipped with electric windshield wipers the control switch is located on the steering support tray. It is labelled for on/off position.

DIRECTION SIGNALS: On vehicles equipped with directional turn signals control is located on the steering column. Move the control lever to the direction you will be turning your steering wheel to signal the direction you intend to turn your vehicle. Indicating lamps are located within the turn signal control for your convenience.

The directional signal also serves as an emergency flasher control by pulling the control lever outward away from steering column when in neutral position.

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

VEHICLE OWNER AND OPERATOR'S GUIDELINES

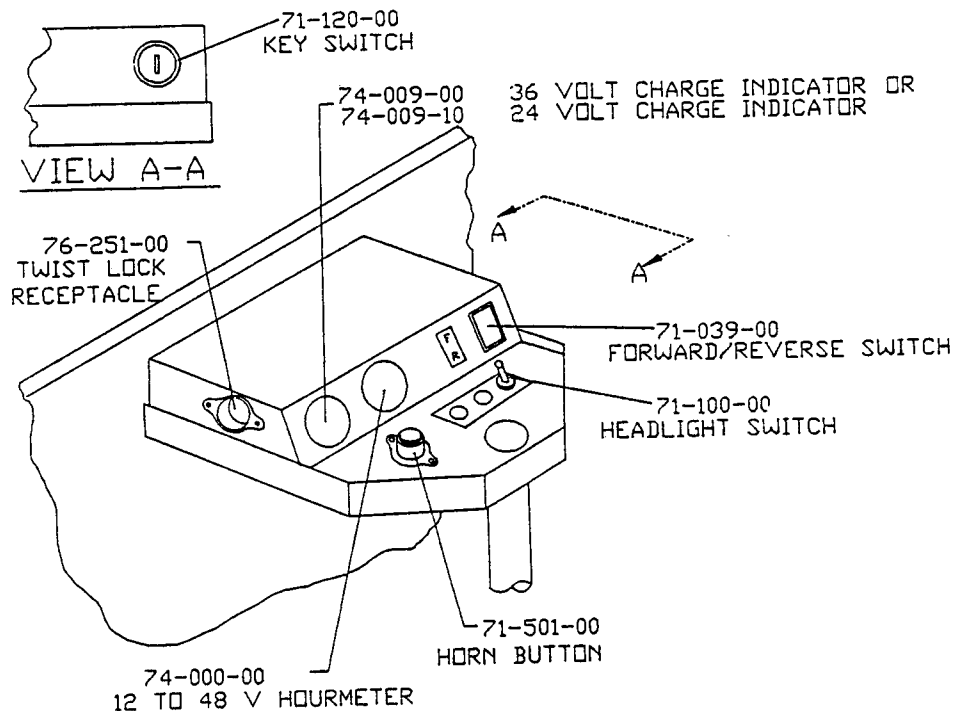
OPERATING YOUR VEHICLE

To put your vehicle into operation, turn key switch on by turning the key clockwise. Select direction you wish to travel by depressing the forward/reverse switch for selected direction of travel. 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, LOCK AND REMOVE KEY.

DRIVE SAFELY AND ENJOY YOUR TAYLOR-DUNN VEHICLE.



OPERATING RESPONSIBILITIES
AMERICAN NATIONAL STANDARD PERSONNEL AND BURDEN CARRIERS
ANSI B 56.8-1981
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 employee 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 by any operator.

(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.

OPERATING RESPONSIBILITIES (continued)
ANSI B56.8-1981

504 GENERAL

(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.

(h) Operators shall not add to, or modify, the Personnel or 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 limit. 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, neutralize 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.

OPERATING RESPONSIBILITIES (continued)
ANSI B56.8-1981

506 LOADING

(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 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.

(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.

MAINTENANCE PRACTICES (continued)
ANSI B56.8-1981

602 MAINTENANCE PROCEDURES (continued)

(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) 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 transmission and electric carriers).

(3) Place directional controls in neutral.

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

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

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

(t) 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 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.

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.

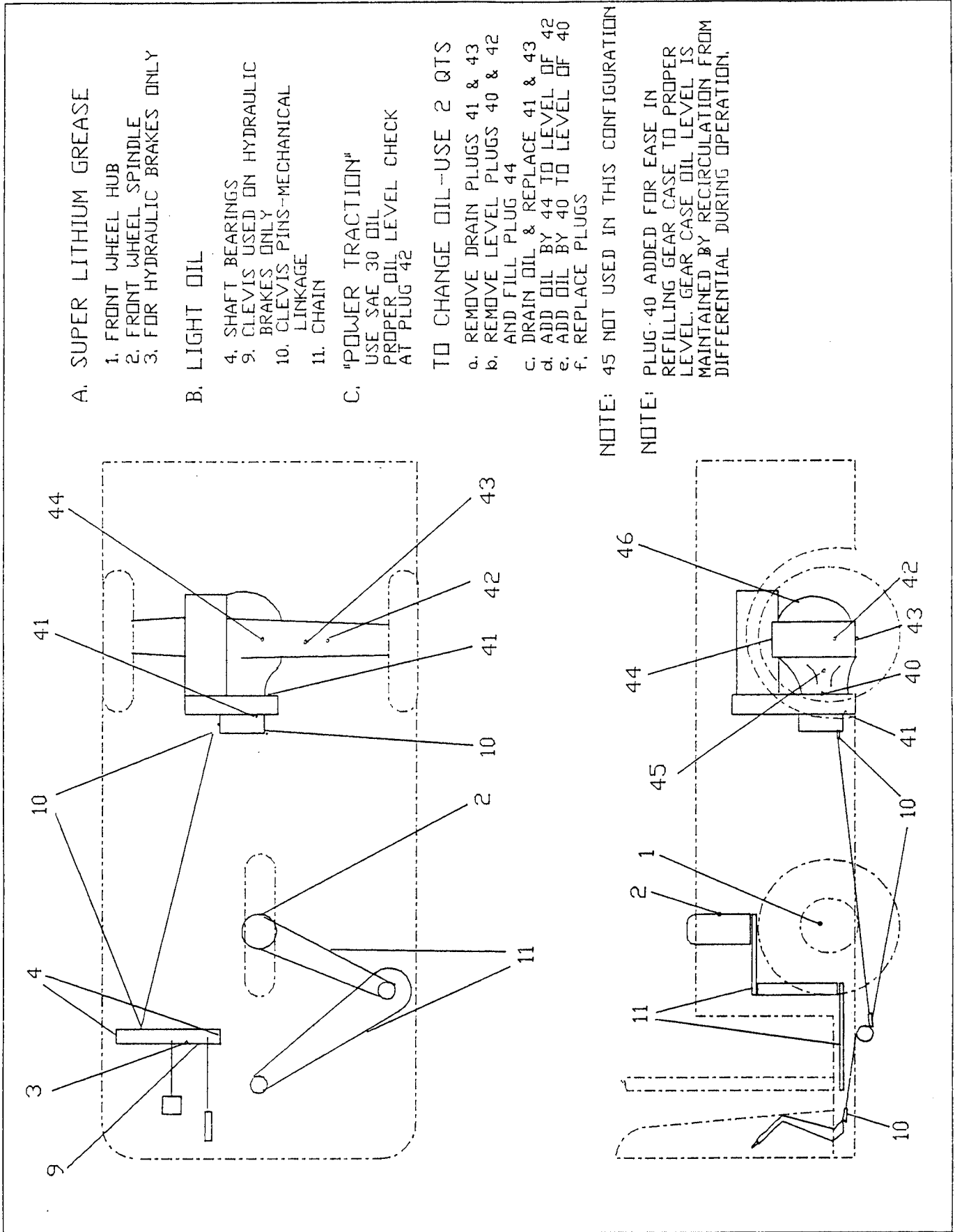
MAINTENANCE GUIDE CHECKLIST

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 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.

CAUTION: When performing maintenance on any part of the electrical system, disconnect battery leads, place forward/reverse switch in neutral, turn key to off position and remove from switch. Set parking brake.

MAINTENANCE SERVICE	REFER SECTION	EVERY MONTH	EVERY 3 MONTHS
Check and fill batteries. If necessary fill with distilled water only.	17	X	
Check tire pressure	10	X	
Adjust motor mount & Chain (Refer to chart Section 11)	11	X	
Lubricate all zerk fittings	5	X	
Lubricate all moving parts without zerk fittings. Use all purpose engine oil.	5	X	
Wash off batteries with water. (Use soda if necessary).	17	X	
Check all wire connections. Be sure they are all clean and tight.		X	
Check service and Adjust parking and manually operated brake.	11	X	
CAUTION: <u>Never bend the brake band anchor bolt.</u> Any bending of the bolt may result in <u>unexpected failure</u> of the bolt and <u>complete loss</u> of drive line braking action.			
Check hydraulic brake system for leaks, also check brake fluid in master cylinder.	13	X	
Check rear axle differential oil level (refer to lubrication diagram).	5, 11	X	
Check steering chain adjustment.	10	X	
Check motor brushes. Blow out carbon dust. (Replace if necessary).	12		X
Check and adjust front wheel bearings and fork spindle bearings.	10		X

POWER TRACTION
LUBRICATION DIAGRAM



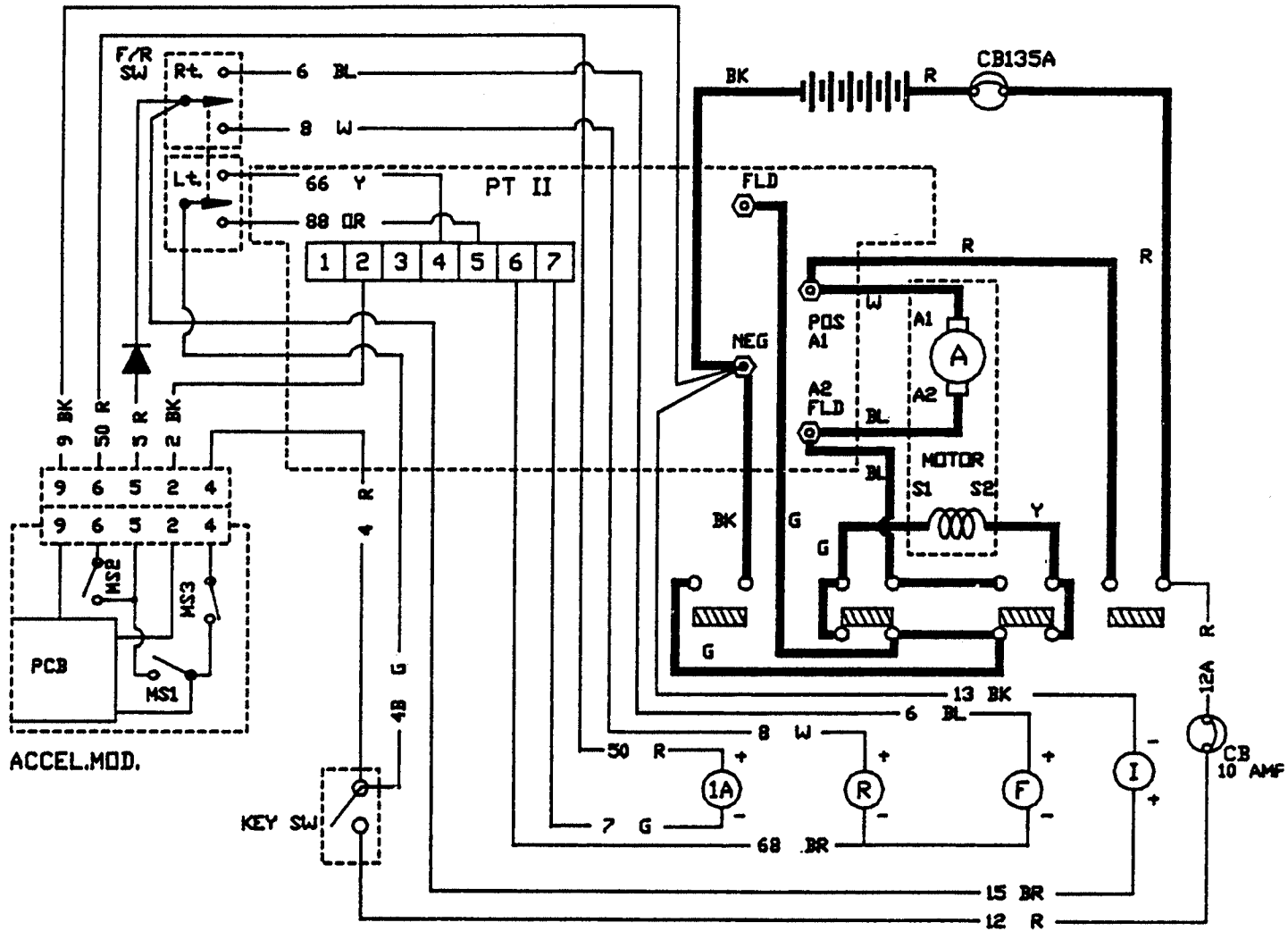
TROUBLE SHOOTING PROCEDURES

<u>SYMPTOM</u>	<u>PROBABLE CAUSE</u>	<u>CORRECTIVE ACTION</u>
1. Steering:		
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 2. Low tire pressure	Replace Inflate to recommended pressure
c. Sloppy or loose steering	1. Loose spindle bearing 2. Loose wheel bearing 3. Loose steering chain	Adjust Adjust Adjust
2. Brakes:		
a. Soft brakes	1. Check for worn lining 2. Alignment of brake shoes 3. Oil on brake lining 4. Dirt on brake lining 5. Bind in linkage 6. Weak spring 7. Air in hydraulic brake lines 8. Bad seals in brake cylinders	Adjust or replace when 1/16 or less of lining left Realign Find oil source and correct, replace brake band Clean Loosen or realign Replace Bleed brakes Replace
b. No brakes	1. Broken shoe 2. Broken connection in linkage 3. Broken Axle 4. Break in hydraulic line 5. Seal failure in brake cylinder	Replace Replace Replace Repair Replace
3. Drive Axle:		
a. No power	1. Discharged batteries 2. Check motor brushes for contact 3. Check for loose wire 4. Check continuity through motor	Recharge or replace Clean or replace Tighten or replace Repair or replace
b. Lack of power or slow operation	1. Dragging brake 2. Tight front wheel bearing 3. Loose connection in wiring 4. Partially burned out motor or thrown lead 5. Weak batteries 6. Bind or drag in differential 7. Motor brushes 8. Badly worn drive sprockets or pulleys	Adjust Adjust Tighten Replace or resolder Repair Clean or Replace Adjust or replace chain and/or sprockets.

TROUBLE SHOOTING PROCEDURES (continued)

<u>SYMPTOM</u>	<u>PROBABLE CAUSE</u>	<u>CORRECTIVE ACTION</u>
c. Thump or grinding noise in drive axle	1. Motor bearing 2. Loose motor on base 3. Worn Sprockets 4. Defective bearing in differential 5. Defective gears in differential 6. Slack drive chain	Replace Tighten & adjust Replace Sprocket and chain Replace Replace Adjust, See Section 11

MODEL C
GENERAL WIRING DIAGRAM



LEGEND

BK	BLACK	CB	CIRCUIT BREAKER
BL	BLUE	MS	MICRO SW.
BR	BROWN	F	FORWARD
G	GREEN	R	REVERSE
OR	ORANGE	I	ISOLATOR
R	RED	Rt.	RIGHT
V	VIOLET	Lt.	LEFT
W	WHITE		
Y	YELLOW		

WIRING SCHEMATIC, MODEL "C"

NOTE: ALL CONTROL WIRING 18 GAUGE CONTROL HARNESS 75-146-23
ALL POWER WIRING 6 GAUGE POWER HARNESS 75-147-23

PARTS ORDERING PROCEDURE

Parts may be purchased from your local authorized Taylor-Dunn Dealer. When ordering parts, be sure to specify the complete model number and serial number of this unit. Also specify the full Taylor-Dunn 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 name plate. Give complete shipping and billing address on all orders.

- 1 - Part Number - 86-501-98 - Ball Joint (Left Hand Thread)
- 1 - Part Number - 71-039-10 - Switch on/off, single pole,
single throw with seal.

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 number.

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 MANUFACTURING COMPANY
2114 West Ball Road
Anaheim, California 92804

Phone: (714) 956-4040
Telex: 65-5393

SUGGESTED SPARE PARTS LIST

T-D PART NO.	DESCRIPTION	QTY. 1-20 UNITS
REFER TO FIGURE NO. 3 FRONT FORK AND STEERING		
80-400-00	BALL BEARING - 3/4 INCH	2
97-100-00	WOODRUFF KEY - 3/16 INCH	4
87-071-00	GREASE FITTING (3/16 INCH DRIVE)	3
88-229-81	LOCK NUT 3/4 INCH N.C. (HEX)	2
30-400-00	LINK - MASTER #40	4
96-900-00	TURNBUCKLE	2
87-074-00	GREASE FITTING 1/4 INCH -28 STRAIGHT	1
45-307-00	GREASE SEAL	1
45-308-00	OIL SEAL (FRONT WHEEL)	2
87-050-00	GREASE FITTING 1/4 INCH - 28 THREAD (90 DEGREES)	1
13-734-00	TIRE AND WHEEL - 400 X 8 FOUR PLY SUPER RIB TUBELESS	1
	TIRE (FIVE 1/2 INCH HOLES ON 4-1/2 INCH BOLT CIRCLE	1
REFER TO FIGURE NO. 5 POWER TRACTION DRIVE AXLE		
41-997-00	DRAIN AND LEVEL PLUG (1/8 INCH PIPE)	1
41-163-10	AXLE ASSEMBLY WITH AXLE, RETAINER RING, RETAINER PLATE, AND BEARING (14-1/8 INCHES LONG) LEFT SIDE	1
41-162-10	AXLE ASSEMBLY WITH AXLE, RETAINER RING, RETAINER PLATE, AND BEARING (11-5/8 INCHES LONG) RIGHT SIDE	1
45-042-00	GASKET (HOUSING TO DIFFERENTIAL CARRIER)	1
80-702-00	"O" RING - DRIVE PINION BEARING RETAINER	1
41-996-00	PLUG - (LEVEL) 1/2 INCH WITH RECESSED TOP	1
45-021-00	GASKET GEAR CASE TO PINION BEARING ASSEMBLY	1
41-989-00	PLUG (FILLER LEVEL & DRAIN) 1/4 INCH N.P.T.	1
45-331-00	OIL SEAL - GEAR CASE TO PINION	2
41-532-00	BRAKE DRUM (SPLINED)	1
41-661-00	FULL BRAKE BAND FOR 6 INCH DRUM	2
85-060-00	COMPRESSION SPRING (5/8 INCH O.D. X 2-1/2 INCH LONG	1
45-002-00	GASKET - GEAR CASE COVER	1
45-506-00	OIL SEAL (GE MOTOR)	1
70-049-00	MOTOR 4.5/6.0 H.P. 24/36 VOLT 1800/2800 R.P.M.	1
70-054-00	MOTOR 6.75/10 HP 24/36 VOLT 1800/2800 R.P.M.	1
70-101-00	MOTOR BRUSHES - G.E. MOTOR, 24/36 VOLT	4
13-734-00	TIRE AND WHEEL - 400 X 8 FOUR PLY SUPER RID - TUBELESS	2
	TIRE (FIVE 1/2 INCH HOLES ON 4-1/2 INCH BOLT CIRCLE	
41-640-00	BRAKE SHOES 7 INCH INTERNAL EXPLANDING (SET FOR 1 WHEEL)	2 (SETS)
45-044-00	GASKET - REAR AXLE BEARING	2
80-703-00	"O" RING MOTOR MOUNT SEAL	1
88-067-11	SOCKET SET SCREW 5/16 INCH X 1	1
45-045-00	GASKET, REAR AXLE, LARGE BEARING	2
REFER TO FIGURE 6 HYDRAULIC BRAKE SYSTEM		
99-510-51	RUBBER BOOT (MASTER CYLINDER)	1
99-510-61	KIT - MASTER CYLINDER REPAIR	1
99-571-00	WASHER - COPPER SMALL HOLE	1
99-572-00	WASHER - COPPER LARGE HOLE	1
99-506-61	KIT - WHEEL CYLINDER REPAIR	1

SUGGESTED PARTS LIST CONTINUED

T-D PART NO.	DESCRIPTION	QTY. 1-20 UNITS
REFER TO FIGURE 7 MECHANICAL CONTROL LINKAGE		
96-772-00	CLEVIS PIN 3/8 X 1 INCH	2
96-762-00	CAST CLEVIS 3/8	1
88-527-11	COTTER PIN 1/8 INCH X 1	6
85-233-00	SPRING - 11/16 INCH O.D. X 6-3/8 FREE LENGTH	1
96-813-00	ADJUSTABLE CABLE ASSEMBLY (31-1/4 TO 28-1/4)	1
85-270-00	SPRING-EXTENSION 1-1/4 O.D. X 4-3/8 INCH FREE LENGTH	1
REFER TO GENERAL ELECTRICAL SECTION 16		
71-100-00	LIGHT SWITCH	1
71-110-00	BRAKE LIGHT SWITCH (HYDRAULIC OPERATED)	1
71-111-00	BRAKE LIGHT SWITCH (MECHANICAL OPERATED)	1
72-072-00	4 INCH SEALED BEAM HEADLIGHT (12 VOLT)	1
72-022-00	STOP AND TAILLIGHT FIXTURE, 4 INCH RUBBER MOUNT (12 VOLT)	2
71-900-00	FLASHER (12 VOLT)	1
71-501-00	HORN BUTTON	1
75-231-00	JUMPER CABLE - 8 INCHES LONG	4
78-010-00	SECONDARY FUSE AND HOLDER (INLINE TYPE)	1
79-823-00	FUSE - BUSS TYPE 20 AMP	5
74-052-00	WINDSHIELD WIPER BLADE	1
REFER TO BATTERY AND CHARGER SECTIONS 17 & 18		
76-012-00	CHARGING RECEPTACLE, 30 AMP, 3 PRONG	1
76-020-00	RECEPTACLE - CHARGING - ANDERSON TYPE SB6313	1
77-200-00	HYDROMETER	1
77-201-00	BATTERY FILLER	1
79-819-00	FUSE, 30 AMP - SCREW TYPE	6

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

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

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, jack shaft, and fork for reliable trouble free steering. 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 4 and 5) for normal care of your front wheel and steering assembly.

TIRE CARE:

Tire pressure is governed by how you want your vehicle to ride and the terrain to which it is most commonly used upon.

Slightly lower pressure will assist traction on soft terrain without undue wear.

The chart listed below will assist you to determine the correct tire pressure for your needs. The higher range of pressure is recommended for heavy loads:

TIRE INFLATION CHART								
TIRE SIZE	TYPE	TIRE LOAD RATING		MAXIMUM	5 MPH	10	15	
		LOAD RANGE	RATING	(COLD) INFLATION P.S.I.	MAXIMUM LOAD POUNDS	MPH	MPH	MPH
4.80-8/400-8	HIGHWAY TREAD	A	2	35	640	505	470	
4.80-8/400-8	HIGHWAY TREAD	B	4	70	960	760	710	
4.80-8/400-8	STEELGUARD	C	6	100	1220	960	895	

THE INFLATION AND LOAD RATINGS MOLDED ON HIGHWAY TREAD TIRES,
PER FEDERAL STANDARD FMVSS-119, ARE FOR MAXIMUM HIGHWAY SPEED
AND DO NOT APPLY TO THIS LOW SPEED VEHICLE.

- TAYLOR-DUNN MANUFACTURING COMPANY -

CAUTION: Do not over-inflate tires as this will promote increased wear. Under inflation especially on hard surfaces also promotes undue wear and should be avoided.

Adjustment of wheel bearings:

- To adjust wheel bearings, tighten one of the two axle nuts until bearing drag barely occurs. Back the axle nut off 1/4 turn. The wheel should turn freely without noticeable end play.

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

Removal of tire wheel and axle assembly:

1. Remove one of the two axle nuts.
2. Slide the axle out of the fork and wheel hub. Remove axle, wheel, and tire assembly from fork.
3. Tire may be changed or repaired without removing wheel from hub.
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 a flat punch.

Re-assembly and adjustments:

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. Insert the axle through the fork, spacers and wheel hub.
5. Tighten the axle nuts until bearing drag barely occurs. Back one axle nut off 1/4 turn. The wheel should turn freely without noticeable end play.
6. The axle should be centered in the fork. If not, adjust the nuts up to center the axle. Check for proper bearing adjustment.
7. Wheel hub has one zerck fitting for periodic lubrication.

Adjustment of fork spindle:

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.

Adjustment of steering chains:

1. Remove locking wire from chain tightener.
2. With wrench turn center of turnbuckle type tightener drawing the chain taut with slight tension. Do Not apply excessive tension to chain as undue bearing and chain wear will result.
3. Replace locking wire on tightener.

Removal of fork and spindle:

1. Remove seat unit.
2. Release chain tension
3. Remove chain master link, then remove chain. Note relative position of chain tightener to fork sprocket for reassembly.
4. Remove dust cap.
5. Remove lock nut on spindle end.
6. Slide fork and spindle out of housing.
7. Remove bearings and dust seals.
8. A puller is required to remove bearing races from housing.

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

Reassembly of fork and spindle

1. Bearing races may be pressed into position by using a 1/2 inch x 6 inch 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 housing.
6. Replace chain taking care to locate the chain turnbuckle midway between the sprockets when wheel is in straightforward position. **Note: Wheel must be in straightforward position before placing chain on sprockets.**
7. Adjust chain tension, removing all slack. **Note: Excessive chain tension will tend to overload bearings in spindle and jack shaft. Chain should be taut for best steering control but not overstressed. Replace the locking wire on the turnbuckle.**
8. Replace seat unit.

Adjustment of steering shaft and jack shaft bearings

1. Adjustment is required only when steering shaft assemblies have been dismantled and reassembled.
2. Adjust free end play of each shaft from 1/64 inch to 1/16 inch by turning locknut located at each shaft end until desired results are obtained.

Replacement of steering sprockets or bearings

1. Release chain tension.
2. Remove chain master link, then remove chain (or chains). **NOTE: Relative position of turnbuckle to sprocket for proper reassembly.**
3. Remove one locknut from shaft end by holding nut on one end and unscrewing the nut on opposite end. **NOTE: On steering column shaft the steering wheel bore is tapered and keyed.**
4. Remove sprocket and woodruff key.
5. Slide jack shaft (or steering shaft) from assembly. Take care to note spacer location and when reassembling to return spacers to their original location.
6. Pull bearing from its seat in the end of the jack shaft housing (or steering column).
7. Clean all parts thoroughly.
8. Tap or press in new bearings seating the flange against the housing.
9. Re-assemble all parts in the reverse order to which they were removed, taking care to align steering wheel and fork as previously outlined.
10. Adjust shaft end play as described above.
11. Adjust chain tension as previously outlined.
12. Each assembly has a grease fitting for proper application of lubricants.

DRAWING
FRONT FORK AND STEERING

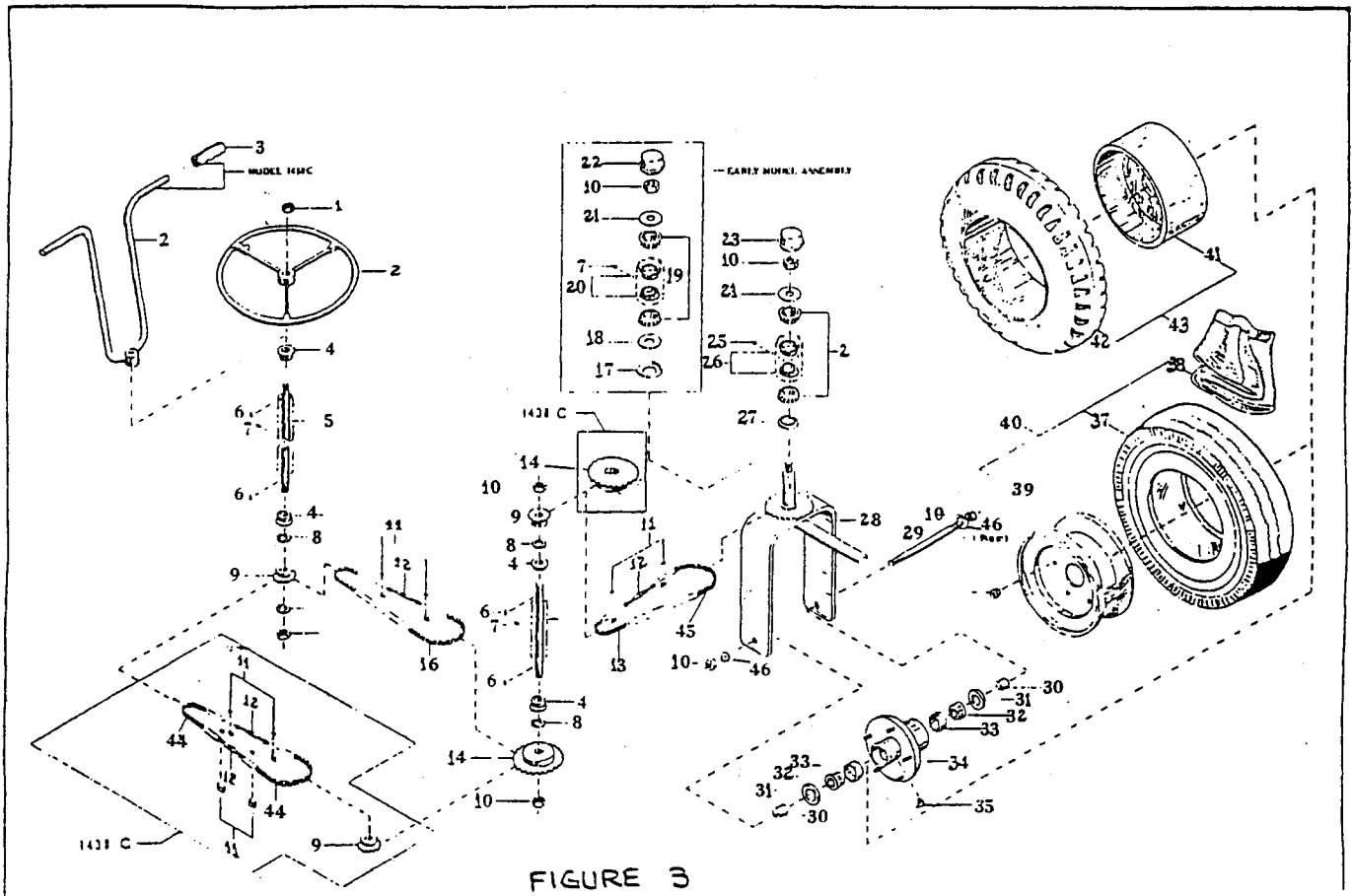


FIGURE 3

MODEL C
FRONT AXLE STEERING AND TIRES
REFER TO FIGURE 3

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
3-1	88-192-82	NUT, 5/8 INCH NF (HEX JAM)	1
3-2	19-007-20	STEERING WHEEL	1
3-3	19-122-00	HANDLE BAR - STEERING MODEL C 4-38 ONLY	1
3-4	80-400-00	BALL BEARING - 3/4 INCH	4
3-5	20-010-00	SHAFT-STEERING 3/4 INCH X 32-1/2 INCH WITH TAPER	1
3-6	97-100-00	WOODRUFF KEY - 3/16 INCH	1
3-7	87-071-00	GREASE FITTING (3/16" DRIVE TYPE - STRAIGHT)	2 OR 3
3-8	16-405-00	SPACER 3/4" ID X 1/8 THICK	0 OR 4
3-9	30-002-00	SPROCKET 11 T #40 CHAIN 3/4 BORE	2
3-10	88-229-81	LOCK NUT 3/4 INCH N.C. (HEX)	6
3-11	30-400-00	LINK - MASTER #40	4 OR 6
3-12	96-900-00	TURNBUCKLE	2 OR 3
3-13	30-241-00	CHAIN - #40 - 29-1/4 INCH LONG	1
3-14	30-005-00	SPROCKET 22T #40 CHAIN 3/4" BORE	1
3-15	20-144-00	SHAFT - JACK 3/4 INCH X 13 INCHES LONG	1
3-16	30-245-00	CHAIN - #40 - 36-1/2 INCHES LONG	1
3-17	80-704-00	DUST RING FOR 1-1/4 INCH BEARING	1
3-18	80-804-00	DUST WASHER FOR 1-1/4 INCH BEARING	1
3-19	80-010-00	TAPERED ROLLER BEARING 1-1/4 INCH ID	2
3-20	80-100-00	TAPERED BEARING RACE	2
3-21	88-228-60	WASHER 3/4 INCH FLAT	1
3-22	92-105-00	DUST CAP	1
3-23	92-105-00	DUST CAP	1
3-24	80-011-00	BEARING - TAPERED ROLLER 1-1/4 INCH	2
3-25	87-074-00	GREASE FITTING 1/4 INCH -28 STRAIGHT	1
3-26	80-102-00	BEARING RACE FOR 1-1/4 INCH TAPERED BEARING	2
3-27	45-307-00	GREASE SEAL	1
3-28	14-082-10	FORK	1
3-29	15-010-00	AXLE BOLT 3/4 INCH X 9-1/4 INCHES	1
3-30	16-010-00	SPACER 3/4 INCH ID X 1-1/4 INCH LONG	2
3-31	45-308-00	OIL SEAL (FRONT WHEEL)	2
3-32	80-015-00	TAPERED ROLLER BEARING 3/4 INCH ID	2
3-33	80-105-00	TAPERED BEARING RACE FOR 3/4 INCH ID BEARING	2
3-34	12-120-00	WHEEL HUB	1
3-35	87-050-00	GREASE FITTING 1/4 INCH -28 THREAD (90 DEGREE)	1
3-36	97-236-00	LUG NUT 1/2 INCH TAPERED	5
3-37	10-078-00	TIRE, 400 X 8 SIX PLY STEEL GUARD	1
3-37	10-075-00	TIRE, 400 X 8 FOUR PLY SUPER RIB - TUBELESS	1
3-38	13-989-00	VALVE STEM FOR TUBELESS TIRES	1
3-38	11-030-00	TUBE - 400 X 8	1
3-39	12-012-00	WHEEL FOR 400 X 8 TUBELESS TIRE (FIVE 1/2 INCH HOLES ON 4-1/2 INCH CIRCLE)	1
3-40	13-734-00	TIRE AND WHEEL - 400 X FOUR PLY SUPER RIB - TUBELESS TIRE (FIVE 1/2 INCH HOLES ON 4-1/2 INCH BOLT CIRCLE)	1
3-41	12-054-00	WHEEL FOR 16-1/4 X 11-1/4 SOLID CUSHION TIRE (FIVE 1/2 INCH HOLES ON 4-1/2 INCH BOLT CIRCLE)	1
3-41	12-050-00	WHEEL FOR 16 X 4 X 12-1/8 INCH SOLID CUSHION TIRE (FIVE 1/2 INCH HOLES ON 4-1/2 INCH BOLT CIRCLE)	1
3-42	10-261-00	TIRE - SOLID EXTRA CUSHION ALL SERVICE 16 X 4 X 11-1/4	1
3-42	10-250-00	TIRE - SOLID CUSHION, SMOOTH 16 X 4 X 12-1/8 INCH	1
3-43	13-954-10	TIRE AND CAST IRON WHEEL 16-1/4 X 4 X 11-1/4 SOLID EXTRA CUSHION ALL SERVICE TIRE	1

FRONT AXLE STEERING AND TIRES
REFER TO FIGURE 3

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
3-43	13-952-10	TIRE CAST IRON WHEEN 16 X 4`X 12-1/8 SOLID CUSHION TIRE (FIVE 1/2 " HOLES ON 4-1/2 INCH BOLT CIRCLE	1
3-44	30-247-00	CHAIN - #40 - 16-1/2 LONG (MODEL C 4-38 ONLY)	2
3-45	30-244-00	CHAIN - #40 - 32-1/2 LONG (MODEL C 4-38 ONLY)	1
3-46	88-228-61	WASHER, SAE 3/4 INCH	2

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 ensures complete coverage of all moving parts. This oil level should be checked on a regular basis as outlined in the Maintenance Guide (Section 4) and Lubrication Diagrams (Section 5) 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 11 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. (Consult Section 12 for maintenance and parts listing)

Periodically, the motor brushed should be inspected and cleaned. The carbon dust and dirt should be blown out of the 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 4 and Service and Adjustment, Section 11 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 11 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 replace the brake band. 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 12 for their care and adjustment.

MAINTENANCE PROCEDURES (continued)
REFER TO FIGURE 5

SERVICE AND ADJUSTMENTS

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 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 - Refer to Section 13 for Hydraulic Brakes.

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.

MAINTENANCE PROCEDURES (continued)
SERVICE AND ADJUSTMENTS

4. Try completely releasing hand lever to be certain brake band is fully 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 13 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 glazed or scored, it should be removed and turned. It is recommended that a brake drum that has been severely scored or damaged or less than 5.850 diameter 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 (see item 18, Section 11, page 7) on pinion shaft.
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 and Drive Assembly From Chassis

1. **CAUTION:** Disconnect both main battery leads to prevent accidental engagement of power while servicing unit.
2. Clearly mark motor leads to ensure their proper location when re-assembling.
3. Remove motor leads.
4. Pull clevis pin and disconnect brake cable from brake arm.
5. Disconnect hydraulic brake line at hose end. (Only vehicles equipped with hydraulic brakes).
6. Remove 4 bolts attaching power traction assembly to frame.

SERVICE AND ADJUSTMENT (continued)

Removal of "Power Traction" Rear Axle and Drive Assembly From Chassis

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

7. Remove Axle and drive assembly from chassis.
8. Install axle and drive assembly in the reverse order of removal.
9. Check brake adjustments as previously outlined.
10. On models equipped with hydraulic brakes, it will be necessary to bleed the air from brake system. Follow procedure outlined in Hydraulic Brake Section 12 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 then 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 Section 11 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 re-assembly of brake spring).
12. Mark one differential bearing cap and bearing support to ensure proper assembly. Remove adjusting nut locks, bearing caps, and adjusting nuts.
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.

SERVICE AND ADJUSTMENT

Disassembly of "Power Traction" Rear Axle

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 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 inside 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 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, Figure 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 the 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.

MAINTENANCE PROCEDURES (continued)

Re-Assembly of Power Traction Rear Axle

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 a new bearing and new bearing retainer ring be pressed onto the axle shaft, and new gasket be installed between the bearing and bearing seat in the housing. 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 74 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 sealer on seal opening in cover.
17. Install gear case cover to backplate and pinion shaft. Assemble, but do not tighten, retaining bolts and nuts.

MAINTENANCE PROCEDURES (continued)

Re-Assembly of Power Traction Rear Axle

18. **NOTE:** Slide brake drum onto pinion shaft and into seal. Apply Permatex to base of shaft washer nut. Tighten to 100 ft. lb. torque. Stake nut in two places. Position gear case cover so that seal pressure is uniform around hub of brake drum. Tighten gear case cover retaining bolts and nuts.
19. Install brake band, brake band anchor bracket, and brake band centering brackets to gear case cover, and tighten retaining bolts.
20. Replace wheels and fill chain and differential housing with approximately 2 quarts SAE 30 oil.
21. Replace unit in chassis following steps 11 to 13 outlined in Section 11 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 Motor Mount to Tension Chain

1. Tighten three motor mount nuts.
2. 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 effect the life of the chain.

3. 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 in 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.
4. 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.
5. Tighten locknut, DO NOT allow adjusting screw to move while tightening locknut.
6. 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.
7. 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	HOURS RUNNING	COMMENTS
1st Adjustment	0	New Unit or After Installing New Chain
2nd Adjustment	Next 100 Hrs.	Normal Running Conditions
3rd Adjustment	Next 150 Hrs.	Normal Running Conditions
4th Adjustment	Next 250 Hrs.	Normal Running Conditions
Thereafter	Every 400 Hrs.	Normal Running Conditions

MAINTENANCE PROCEDURES (continued)

Removal of Motor for Minor Repairs

1. **CAUTION:** Disconnect both main battery leads to prevent accidental engagement of power while servicing unit.
2. Drain oil from gear case by removing drain plug.
3. Unhook brake spring.
4. Remove all bolts & nuts around gear case cover.
5. Remove brake band assembly with brake cables attached. Place assembly on floor under chassis.
6. Remove pinion nut, washer & brake drum.
7. Remove gear case cover.
8. Clearly mark motor leads to ensure their proper location when re-assembling. Remove motor leads.
9. Remove 3 nuts & washers and remove motor & mount plate.
10. If replacing motor, remove nut, washer, sprocket, and spacers. Also remove motor mount plate. **NOTE:** Observe location of motor terminals in relation to motor mount plate.

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. Strike head in place with centerpunch. **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 30 oil.
6. **Connect Motor leads as follows: (IMPORTANT!!)**
 - a. Check that each motor terminal stud nut is tightened securely but not overtightened as this could bend or twist the terminal post and cause an electrical short within the motor.
 - b. Install motor leads on correct motor terminals 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.

MAINTENANCE PROCEDURES (continued)

Motor Repairs

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

Disassembly of Motor

1. Remove cover, exposing brush assembly.
2. Lift brushes out of brush holder.
3. 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.
4. Press or pull old bearings off by using bearing press or bearing puller. Do not damage shaft while removing bearings.
5. Install new bearings onto shaft by gentle pressure or tapping with proper tool or inner race only. Bearing will be damaged if pressed or driven by outer race or seals.
6. On "Power Traction" Model, replace motor seal in shaft extension end bell housing
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 to re-assembly.
9. Re-assemble motor taking care that all parts are kept clean.
10. Install brushes and seat in with fine sand paper.
11. Be certain that brushes slide freely, and do not stick or bind in their holders.
12. Replace covers.

DRAWING
POWER TRACTION (UNSPRUNG)
REAR AXLE, MOTOR AND BRAKES

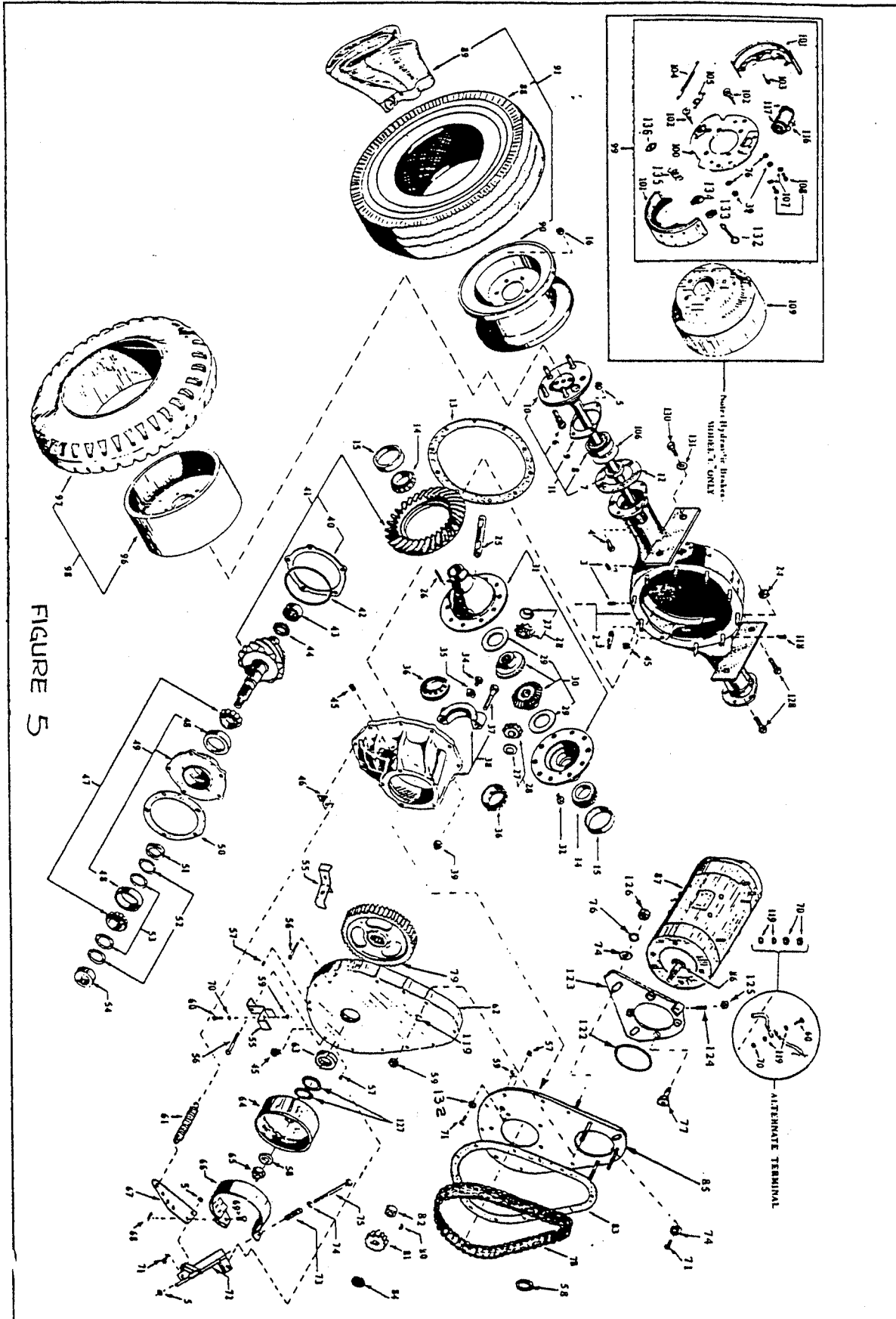


FIGURE 5

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 3.15 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 INCH PIPE)	1
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	3/8 N.C. LOCK NUT. 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	RETAINER RING, FOR 80-505-00 DRIVE AXLE BALL BEARING	2
5-7	32-515-00	RETAINER RING, FOR 80-503-00 DRIVE AXLE BALL BEARING	2
5-8	80-505-00	BALL BEARING, DRIVE AXLE 1.281 ID X 2.834 OD FOR 41-290-00 DRIVE HOUSING	2
5-8	80-503-00	BALL BEARING, DRIVE AXLE 1.530 ID X 3.150 OD FOR 41-290-13 DRIVE HOUSING	2
5-9	32-511-00	RETAINER PLATE, REAR AXLE BALL BEARING	2
5-9	32-514-00	RETAINER PLATE FOR USE WITH 80-503-80 DRIVE AXLE BALL BEARING	2
5-10		DOES NOT APPLY	
5-11	41-163-11	AXLE SHAFT ASSEMBLY, 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	AXLE SHAFT ASSEMBLY, 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	AXLE SHAFT ASSEMBLY 13-1/4 LONG, AXLE FLANGE FACE TO SPLINED EDN, 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
5-11	41-162-21	AXLE SHAFT ASSEMBLY 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 AXLES ONLY	0 OR 1
5-12	32-512-00	RETAINER SPACER (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-CARRIER (Small 1.628 ID)	2
5-14	80-512-00	TAPERED ROLLER BEARING-CARRIER (Large 1.784 ID)	2
	80-503-00	LARGE BEARING MUST USE:	
	32-515-00	RETAINER RING	

POWER TRACTION DRIVE AXLE
REFER TO FIGURE 5

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
5-14	80-513-00	TAPERED ROLLER BEARING LM 102949 I.D. 1.7812 USE WITH 80-129-00 BEARING RACE	2
5-15	80-127-00	TAPERED BEARING RACE-CARRIER (SMALL)	2
5-15	80-128-00	TAPERED BEARING RACE-CARRIER (LARGE)	2
5-15	80-129-00	TAPERED BEARING RACE LM102910 O.D. 28910. USE WITH BEARING 80-513-00	2
5-16	97-236-00	NUT, 1/2 INCH N.F. (LUG)	10
5-17			
5-18			
5-19			
5-20		ITEMS 17 THROUGH 23 DO NOT APPLY	
5-21			
5-22			
5-23			
5-24	97-236-00	NUT, 1/2 INCH 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 GEARS AND TWO THRUST WASHERS)	1
5-31	41-712-00	DIFFERENTIAL GEAR CASE ASSEMBLY (SMALL CARRIER Bearings 1.628 INCH I.D.)	1
5-31	41-713-00	DIFFERENTIAL GEAR CASE ASSEMBLY (LARGE CARRIER BEARINGS 1.784 INCH I.D.)	1
5-32	96-243-00	Hex Head Cap Screw 7/16 INCH X 7/8 INCH	10
5-33		DOES NOT APPLY	
5-34	88-080-04	Hex Head Cap Screw 5/16 INCH X 3/8 INCH NC	2
5-35	41-706-00	LOCK NUT, DIFFERENTIAL BEARING ADJUSTMENT WITH 30 DEGREES ANGLE TAB. USE WITH 41-707-00 DIFFERENTIAL BEARING ADJUSTMENT NUTS	2
5-35	41-706-50	LOCK NUT, DIFFERENTIAL BEARING ADJUSTMENT WITH RIGHT ANGLE TAB WITH LAST BEND 1/2 INCH LONG. USE WITH 41-707-50 DIFFERENTIAL BEARING ADJUSTMENT NUT	2
5-35	41-706-51	LOCK NUT, DIFFERENTIAL BEARING ADJUSTMENT WITH ANGLE TAB W/LAST BEND 1/2 INCH LONG. USE WITH 41-707-50 DIFFERENTIAL BEARING ADJUSTMENT NUT	2
5-36	41-707-00	NUT, DIFFERENTIAL BEARING ADJUSTMENT 3-1/8 INCH- 16 Thread (For Small Carrier Gearing 1.628" I.D.)	2
5-36	41-707-50	NUT, DIFFERENTIAL BEARING ADJUSTMENT, 2-15/16 O.D ROUND LOCKING HOLES, 11/16 THICK. USE WITH 1.784 I.D. CARRIER BEARING	2
5-36	41-708-00	NUT-DIFFERENTIAL BEARING ADJUSTMENT 3-5/16"-16	2
5-36	41-708-50	NUT-DIFFERENTIAL BEARING ADJUSTMENT 3-1/8" O.D., ROUND LOCKING HOLES.	2
5-37		DOES NOT APPLY	
5-38	41-709-00	DIFFERENTIAL CARRIER ASSEMBLY (FOR SMALL CARRIER BEARING 1.628" I.D.)	1
5-38	41-710-00	DIFFERENTIAL CARRIER ASSEMBLY (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

POWER TRACTION DRIVE AXLE (continued)
REFER TO FIGURE 5

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
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 INCH 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 RACE	2
5-49	41-715-10	PINION BEARING CASE ASSEMBLY & BEARING RACES	1
5-50	45-021-00	GASKET GEAR CASE TO PINION BEARING ASSEMBLY	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" N.C.	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
5-62	43-201-00	GEAR CASE COVER	1
5-63	45-331-00	OIL SEAR - 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 INCH 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 3/18" x 1-1/4" N.C. GR. 5	5
5-72	41-372-00	BRAKE MOUNTING BRACKET	1
5-73	85-060-00	COMPRESSION SPRING 5/8" OD 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 INCH	7
5-77	88-103-09	FLAT HEAD SOCKET CAP SCREW 3/8" x 3/4" N.C.	4

NOTE: The twin roller chain is very different in looks from the side bar chain in that the twin roller chain rides on sprockets having double rows of teeth whereas the side bar type chain rides on sprockets having a single row of teeth.

5-78	30-506-00	CHAIN, 36 LINKS (FOR 42 TOOTH SPROCKET)	1
5-78	30-507-20	CHAIN, 41 LINKS (FOR 59 TOOTH SPROCKET)	1
5-78	30-508-20	CHAIN, SILENT, 96 PITCH (FOR 81 TOOTH SPROCKET)	1
5-79	30-091-00	SPROCKET, SILENT CHAIN, 42 TOOTH WITH SPLINED HUB	1
5-79	30-092-00	SPROCKET, SILENT CHAIN, 59 TOOTH WITH SPLINED HUB	1
5-79	30-093-00	SPROCKET, SILENT CHAIN, 81 TOOTH WITH SPLINED HUB	1
5-80	97-100-00	WOODRUFF KEY - 3/16 INCH	1
5-81	30-080-00	SPROCKET - 15 TOOTH x 3/4" BORE	1
5-81	30-081-00	SPROCKET - 14 TOOTH x 3/4" BORE	1
5-82	17-110-10	SHAFT COLLAR - 3/4" WITH KEYWAY	1

POWER TRACTION DRIVE AXLE (continued)
REFER TO FIGURE 5

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
5-83	45-002-00	GASKET - GEAR CASE COVER ..	1
5-84	88-239-82	JAM NUT - 3/4" N.F. (HEX) FOR 15 TOOTH SPROCKET	1
5-85	44-352-52	GEAR CASE BACK PLATE (VERTICLE MOTOR MOUNT) ADJUSTABLE	1
5-85	44-352-53	GEAR CASE BACK PLATE (ANGLE MOTOR MOUNT) ADJUSTABLE	1
5-86		SEE MOTOR SECTION 12	
5-87		SEE MOTOR SECTION 12	
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 INCHES	2
5-90	12-012-00	WHEEL FOR 4.80 X 8 TUBELESS TIRE (FIVE 1/2 INCH HOLES ON 4-1/2 INCH BOLT CIRCLE.	
5-91	13-731-00	TIRE, TUBE & WHEEL, 4.80 X 8, FOUR PLY SUPER RIB TIRE (FIVE 1/2 INCH HOLES ON 4-1/2 INCH BOLT CIRCLE)	2
5-91	13-738-00	TIRE, TUBE & WHEEL, 4.80 X 8, SIX PLY STEEL GUARD TIRE (FIVE 1/2 INCH HOLES ON 4-1/2 INCH BOLT CIRCLE)	2
5-91	13-734-00	TIRE & WHEEL, 4.80 X 8, FOUR PLY SUPER RIB TUBELESS TIRE (FIVE 1/2 INCH HOLES O 4-1/2 BOLT CIRCLE)	2
5-92			
5-93			
5-94		ITEMS 92 THROUGH 95 DO NOT APPLY	
5-95			
5-96	12-054-00	WHEEL FOR 16-1/4 INCH X 11-1/4 INCH SOLID CUSHION TIRE (FIVE 1/2 INCH HOLES ON 4-1/2 INCH BOLT CIRCLE)	2
5-96	12-050-00	WHEEL FOR 16 X 4 X 12-1/8 INCH OR 17 X 4-1/2 X 12-1/8 INCH SOLID CUSHION TIRE. (FIVE 1/2 INCH HOLES ON 4-1/2 INCH BOLT CIRCLE)	2
5-97	10-261-00	TIRE, SOLID XTRA CUSHION, ALL SERVICE 16-1/4 X 4 X 11-1/4 INCHES	2
5-97	10-265-00	TIRE, SOLID XTRA CUSHION, ALL SERVICE 17 X 4-1/2 X 12-1/8 INCHES	2
5-97	10-250-00	TIRE, SOLID CUSHION, SMOOTH 16 X 4 X 12-1/8 INCH	2
5-98	13-954-10	TIRE AND CAST IRON WHEEL 16-1/4 X 4 X 11-1/4 INCH SOLID EXTRA CUSHION, ALL SERVICE TIRE (FIVE 1/2 INCH HOLES ON 4-1/2 INCH BOLT CIRCLE	2
5-98	13-959-19	TIRE CAST IRON WHEEL 17 X 4-1/2 X 12-1/8 INCH SOLID EXTRA CUSHION, ALL SERVICE TIRE (FIVE 1/2 INCH HOLES ON 4-1/2 INCH BOLT CIRCLE	2
5-98	13-952-10	TIRE CAST IRON WHEEL 16 X 4 X 12-1/8 INCH SOLID CUSHION TIRE (FIVE 1/2 INCH HOLES ON 4-1/2 INCH BOLT CIRCLE	2
5-99	41-346-98	BRAKE BACKUP PLATE ASSEMBLY WITH SHOES (RIGHT SIDE)	1
5-99	41-346-99	BRAKE BACKUP PLATE ASSEMBLY WITH SHOES (LEFT 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 2 FOR ONE WHEEL)	2

POWER TRACTION DRIVE AXLE (continued)
REFER TO FIGURE 5

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
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) (NOT USED WHEN ITEMS 5-128 THROUGH 5-132 ARE USED)	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, 1-1/4" DIAMETER (BLUE)	2
5-106	45-044-00	GASKET - REAR AXLE BEARING SMALL	2
5-106	45-045-00	GASKET - REAR AXLE BEARING LARGE	2
5-107	88-068-62	WASHER - 1/4" LOCK	4
5-108	88-060-06	HEX HEAD CAP SCREW 1/4" x 1/2" N.C.	4
5-109	41-514-00	BRAKE DRUM (7")	2
5-110			
5-111			
5-112			
5-113		ITEMS 110 THROUGH 115 DO NOT APPLY	
5-114			
5-115			
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
5-120		ITEMS 120 AND 121 DO NOT APPLY	
5-121			
5-122	80-703-00	"O" RING MOTOR MOUNT SEAL	1
5-123	70-454-00	MOTOR MOUNT PLATE	1
5-124	88-087-11	SOCKET SET SCREW 5/16" NC x 1	1
5-125	88-069-80	NUT 1/4" NC (HEX)	1
5-126	88-109-80	NUT 3/8" NC (HEX)	3
5-127	13-400-00	SPACER 1-1/4 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
5-129		DOES NOT APPLY	
5-130	88-180-11	HEX HEAD CAP SCREW 5/8" X 1-1/2" NC	1
5-131	88-188-62	LOCK WASHER 5/8"	1
5-132	41-695-00	PIN, BRAKE SHOE ANCHOR	4
5-133	41-697-00	WASHER, RUBBER 7/16 OD X 1/8 ID X 3/32 THICK	4
5-134	88-068-61	WASHER, 1/4 SAE	4
5-135	85-050-00	SPRING, COMPRESSION, 1/2 OD 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 5M

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.
Brush Measurement Procedure for 726 And 754 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 approximately 1/8" allowable wear remaining.
2. If brushes are worn, remove and install new brushes. Use fine sand paper 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 pigtail 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.

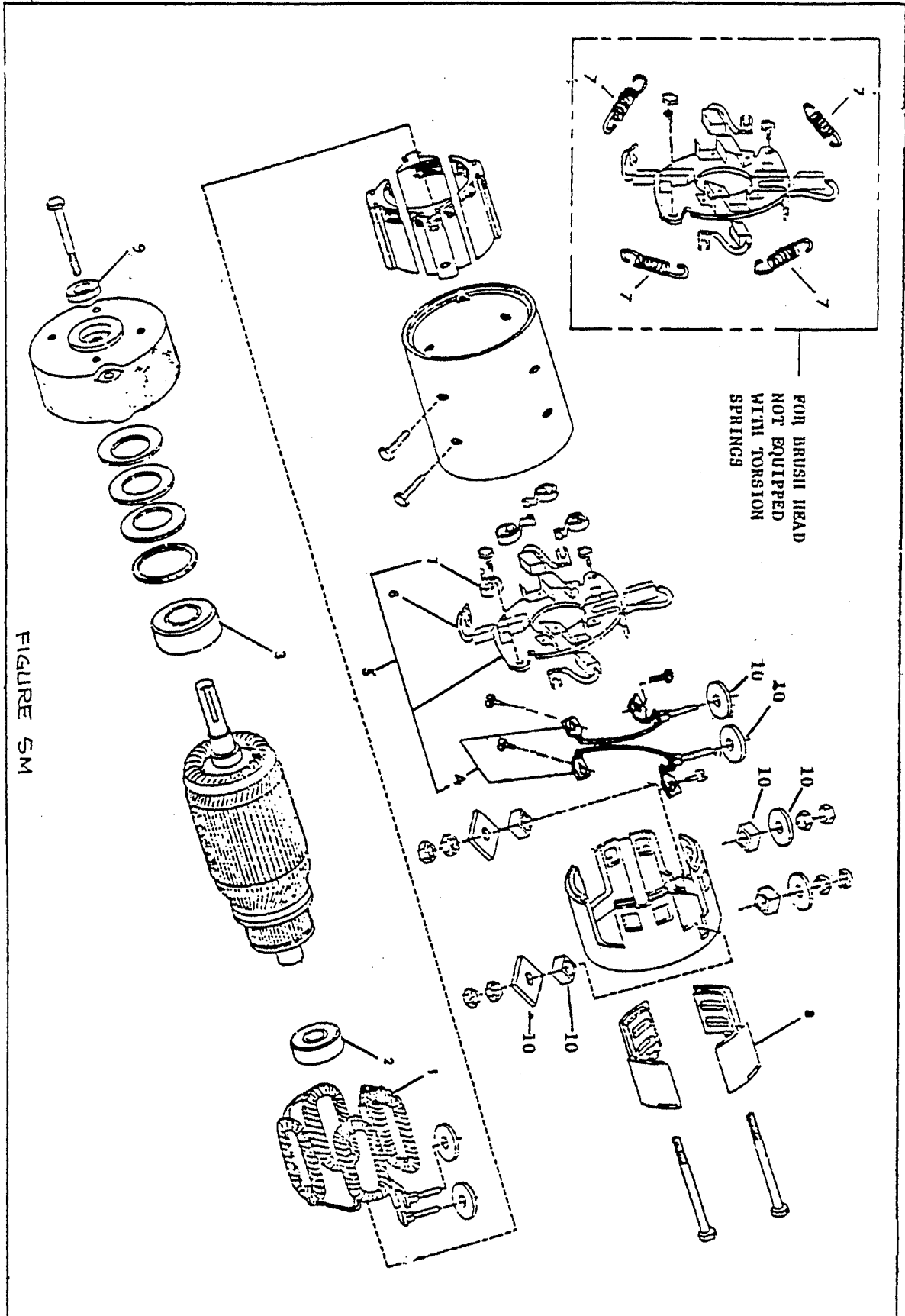
MOTOR DISASSEMBLY AND RE-ASSEMBLY

1. Remove motor from vehicle as described in Section 11.
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 bearing 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 re-assembly.
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 11, for correct procedure to avoid damaging studs.

DRAWING - MOTOR PARTS - G.E. MOTORS

FIGURE 5M



ELECTRIC MOTORS (continued)
REFER TO FIGURE 5M

FIG. I.D. NO.	T-D PART NO.	DESCRIPTION	QTY. REQ.
Replacement Parts for G.E. Motor 5BC48JB754 (4.5 / 6.0 H.P. Motor) Taylor-Dunn Part Number 70-049-00			
5M-1	70-205-00	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-5	70-172-00	Brush Holder Assembly (without brushes)	1
5M-6	70-104-00	Brush Assembly	2
5M-7	85-412-00	Spring, Brush Extension	4
5M-8	70-250-00	Gasket, Terminal	4
5M-9	45-506-00	Oil Seal	1
5M-10	70-210-62	Insulator Kit, Motor Terms	1

10 HP OPTION WITH PT 290

Replacement parts for G. E. Motor 5BCJB399 (6.7 / 10 H.P Motor)
Taylor-Dunn Part Number 70-054-00

5M-1	70-188-00	Brush Holder (Without Brushes)	1
5M-2	85-412-00	Spring, Flat Torsion with Curved End	4
5M-3	70-105-00	Brush Assembly	4
5M-4	80-200-00	Ball Bearing, Commutator	1
5M-5	80-504-00	Ball Bearing, Pulley End	1
5M-6	70-203-10	Field Coil Set (4 Coils)	1
5M-7	45-508-00	Oil Seal	1
5M-8	70-210-62	Gasket, Terminal	4

MAINTENANCE PROCEDURES HYDRAULIC BRAKE SYSTEM
REFER TO FIGURE 6

Your hydraulic brake system consists of an automotive master cylinder operated by the brake foot pedal and control linkage.

Each rear wheel is fitted with a brake assembly and rugged brake drum.

Refer to Maintenance Guide Section 4 and Lubrication Diagram Section 5 for proper lubrication and frequency of inspection.

Master cylinder fluid level should be checked monthly. Add fluid as needed to maintain level $3/8$ " to $1/2$ " from top of fill port. Use only approved hydraulic brake fluid, DOT #5.

A visual inspection of the hydraulic system is recommended on a monthly basis to detect any signs of leakage. Repair should be made immediately if leakage is discovered.

A spongy action on brake pedal or a low engagement point on pedal usually indicates air entrapment or the need of shoe adjustment. Refer to Service and Adjustment Section 13 of this manual for proper procedures to follow.

SERVICE AND ADJUSTMENT HYDRAULIC BRAKE SYSTEM
REFER TO FIGURE 6 & 7

The loss of brake pedal action may be due to a defective master cylinder. It can usually be detected by signs of fluid leakage at master cylinder or by the action of the brake pedal. When foot pedal pressure is applied you will feel the brakes engage, yet, the pedal will continue to travel downward. A ruptured hydraulic line or a defective wheel cylinder will produce the same action. You can determine the cause by the location of brake fluid leakage.

MASTER CYLINDER REPAIR OR REPLACE

1. Remove cotter pin, clevis pin, and remove push rod. (It will slide out of master cylinder socket).
2. Disconnect hydraulic line at cylinder.
3. Remove 2 holding bolts and lift master cylinder out of chassis.
4. Cylinder should be thoroughly cleaned.
5. Remove boot and locking ring.
NOTE: Piston parts are under spring pressure, take care that they do not pop out when you remove lock ring.
6. Remove piston and cup assembly.
7. Inspect cylinder wall. If scoring or roughness is present it must be removed with a fine hone.
8. Taking care that all parts are kept clean, install new piston and cup assembly kit. A diagram is furnished with each kit. It is also recommended that parts are coated with a small amount of brake fluid prior to assembly.
9. Replace lock ring and boot.
10. Install cylinder in chassis in reverse order to which it was removed.
11. ADJUST push rod by loosening locknut and shortening or lengthening the rod so that when brake pedal is fully raised the push rod should be within 1/16" of contacting piston socket. A good way to be certain is to remove clevis pin. While lightly holding rod against socket (DO NOT PUSH HARD ENOUGH TO MOVE PISTON) observe the alignment of clevis and hole. When correct you will have to pull rod approximately 1/16" out of socket to insert clevis pin.
12. Tighten locknut and install cotter pin.

NOTE: Anytime that any part of the hydraulic system is disconnected or replaced, its necessary to bleed air from system.

If fluid level is allowed to fall to low in master cylinder reservoir, air will be pumped into system. Consequently the system will have to be bled to remove air. To bleed air from system, follow procedure outlined next.

1. For best results brake shoes should be properly adjusted prior to bleeding system.
2. Fill master cylinder to top with approved brake fluid or, if available, attach brake bleeder tank to master cylinder.

SERVICE AND ADJUSTMENT HYDRAULIC BRAKE SYSTEM (continued)
REFER TO FIGURE 6 & 7

MASTER CYLINDER REPAIR OR REPLACE (continued)

3. When using bleeder tank, loosen air bleeder valve (located at each wheel cylinder), one at a time, allow fluid to flow until air pockets and bubbles stop and clear stream appears.
3. ALTERNATE: If bleeder tank is not available, it is necessary to utilize 2 people to bleed brake system. One person will operate brake pedal and add fluid to master cylinder as needed. The other person will operate bleeder valves. While one person applies brake pedal pressure, loosen bleeder valve. Fluid and air will be forced out on the downward stroke of the pedal. Person operating pedal must hold it down at the end of its stroke while the other person closes bleeder valve. If pedal is raised while bleeder valve is open air will be drawn back into the system. By coordinating the movements of the 2 people, air will be bled out on each downward stroke of the pedal. It is wise to refill master cylinder after every 3 or 4 strokes to insure against any air being drawn in because of the reservoir level being too low. Usually 2 to 4 strokes per wheel cylinder is sufficient to remove air from system.
4. Remove brake bleeder tank if used. Fill master cylinder 3/8" to 1/2" of top and replace cover.

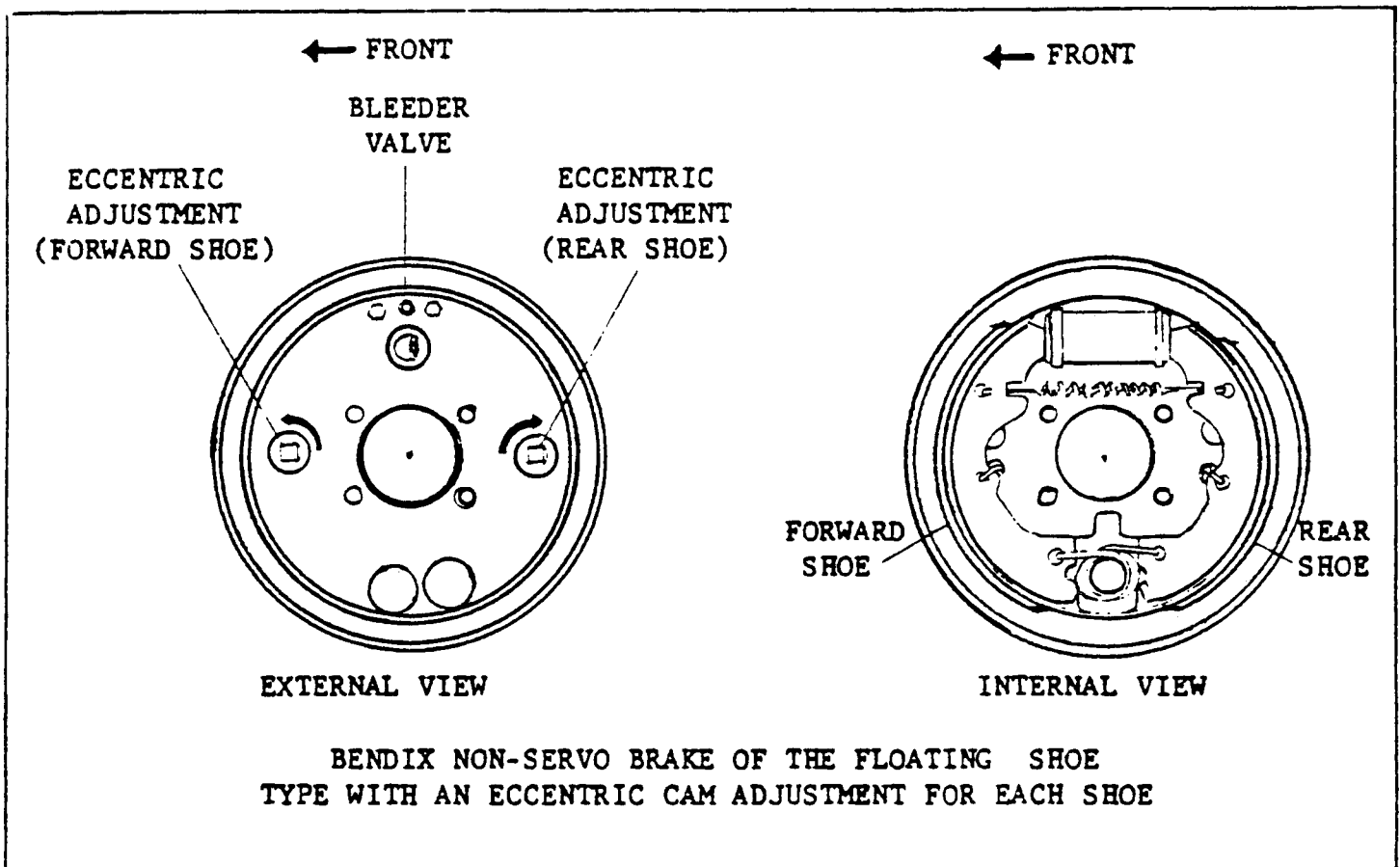
REPLACING WHEEL CYLINDERS OR BRAKE SHOES

1. Remove wheel lugs, wheel and brake drum.
2. Unhook springs and remove brake shoes. (refer to diagram). Brake shoes should be replaced when lining is worn to rivet head.
3. To remove wheel cylinder, disconnect hydraulic line.
4. Remove 2 wheel cylinder bolts from backing plate and remove wheel cylinder.
5. When installing replacement kit, clean wheel cylinder thoroughly.
6. Remove dust caps and piston parts.
7. Examine cylinder wheel. If scored or rough, remove with fine hone.
8. Install new kit assembly. Lubricate new parts with brake fluid.
9. Replace wheel cylinder and brake shoes in reverse order of removal.
10. Replace brake drum. (If brake drum is badly scored, replace with new one.)
11. Replace wheel.
12. Bleed hydraulic system and adjust brake shoes.
 - A. Loosen both locknuts on eccentric adjusting studs (refer to diagram).
 - B. Turn forward shoe adjustment stud away from wheel cylinder (as indicated by arrows in diagram) until heavy drag is felt while revolving wheel. (Wheel must be raised clear of floor).

SERVICE AND ADJUSTMENT HYDRAULIC BRAKE SYSTEM (continued)
REFER TO FIGURE 6 & 7

ADJUST BRAKE SHOES - REAR WHEEL BRAKES (continued)

- C. Then back off by turning adjustment stud in opposite direction slightly until wheel is just free of drag.
- D. Repeat procedure on rear brake shoe.
- E. Tighten locknuts, being careful to hold stud with wrench so as not to disturb adjustment.
- F. Depress brake pedal several times and check to be sure wheel still revolves free of drag and desired pedal travel is obtained.
- G. If wheel drags, repeat adjustments as previously outlined, until satisfactory results are obtained.
- H. If wheel (or wheels) are free of drag, but pedal has too much travel, check adjustments as previously outlined. If necessary, bleed hydraulic system.



DRAWING HYDRAULIC BRAKE SYSTEM

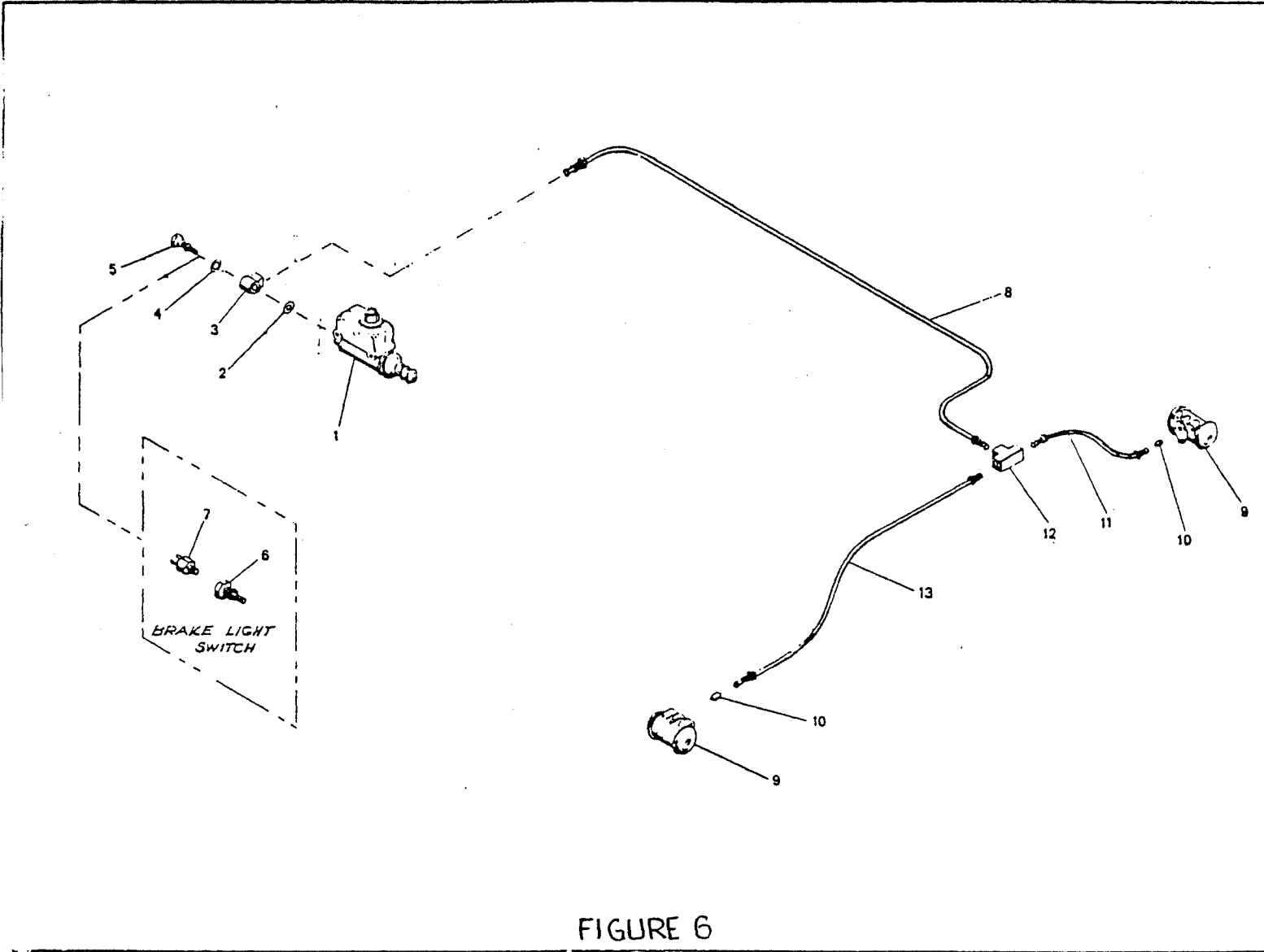


FIGURE 6

FIGURE NO. 6
HYDRAULIC BRAKE SYSTEM

FIG.ID	T-D PART NO.	DESCRIPTION	QTY.
6-1	99-510-00	MASTER CYLINDER	1
6-1	99-510-51	RUBBER BOOT (MASTER CYLINDER)	1
6-1	99-510-61	KIT - MASTER CYLINDER REPAIR	1
6-2	99-571-00	WASHER - COPPER SMALL HOLE	1
6-3	99-566-00	FITTING - 3/16 TUBE SINGLE OUTLET	1
6-4	99-572-00	WASHER - COPPER LARGE HOLE	1
6-5	99-579-00	BOLT - MASTER CYLINDER FITTING	1
6-6	99-578-00	BOLT - MASTER CYLINDER FITTING FOR BRAKE LIGHT	1
6-7	71-110-00	SWITCH - BRAKE LIGHT (HYDRAULIC)	1
6-8	99-608-54	FORMED STEEL BRAKE LINE 3/16" X 60"	1
6-9	99-506-98	WHEEL CYLINDER (7" BRAKE LEFT)	1
6-9	99-506-99	WHEEL CYLINDER (7" BRAKE RIGHT)	1
6-9	99-506-61	KIT WHEEL CYLINDER REPAIR	1
6-10	99-574-00	SPACER ADAPTOR FOR WHEEL CYLINDER	2
6-11	99-600-51	FORMED STEEL BRAKE LINE 3/16" X 6"	1
6-12	99-564-00	TEE FITTING	1
6-13	99-604-51	FORMED STEEL BRAKE LINE 3/16 X 20	1

MAINTENANCE PROCEDURES
REFER TO FIGURE 7 MECHANICAL CONTROL LINKAGE

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

The accelerator system consists of the operating pedal and pivot shaft assembly, the connecting rods and adjusters and the return spring. All wear points should be lubricated monthly for normal service. Refer to Maintenance Guide section 4 and Lubrication Diagram Section 5 for proper application of lubrication.

The handbrake system consists of the hand operating lever, pivot shaft, connecting rod, and adjuster and the mechanical brake operating cable. **(NOTE: that on vehicles equipped with mechanical brakes only, this cable serves as the operating cable for the foot brake system as well.)**

The footbrake system consists of the foot pedal, pivot shaft, brake operating cable as mentioned above the return spring, and the master cylinder and push rod assembly on vehicles equipped with hydraulic brakes.

All wear points should be lubricated monthly. Refer to Maintenance Guide Section 4 and Lubrication Diagram Section 5 for proper application of lubricants.

For service and adjustments refer to the following sections:

- Section 11 - For hand brake and mechanical brake service and adjustments
- Section 13 - For master cylinder and push rod adjustments and service

DRAWING FIGURE 7
MECHANICAL CONTROL LINKAGE

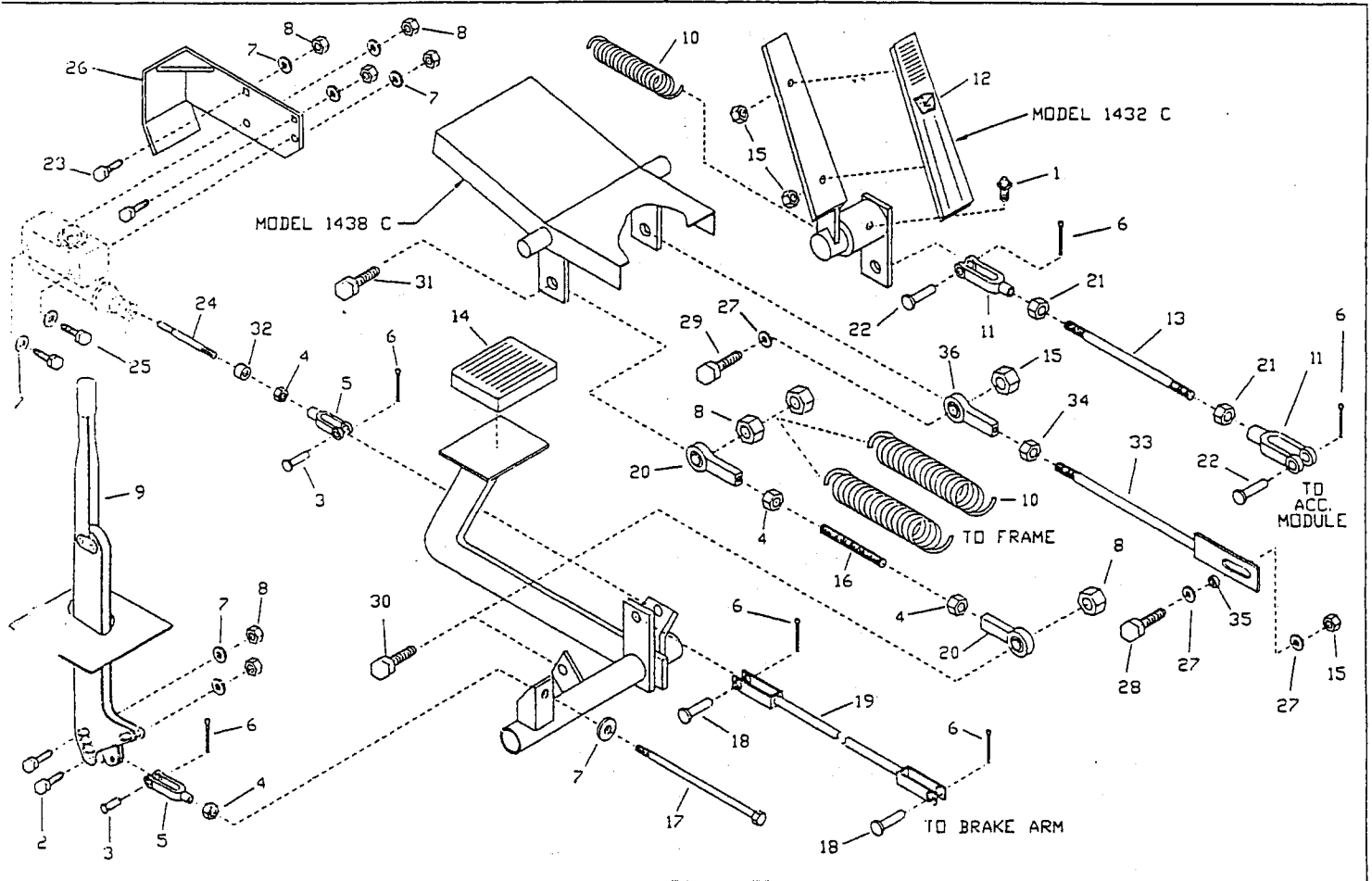
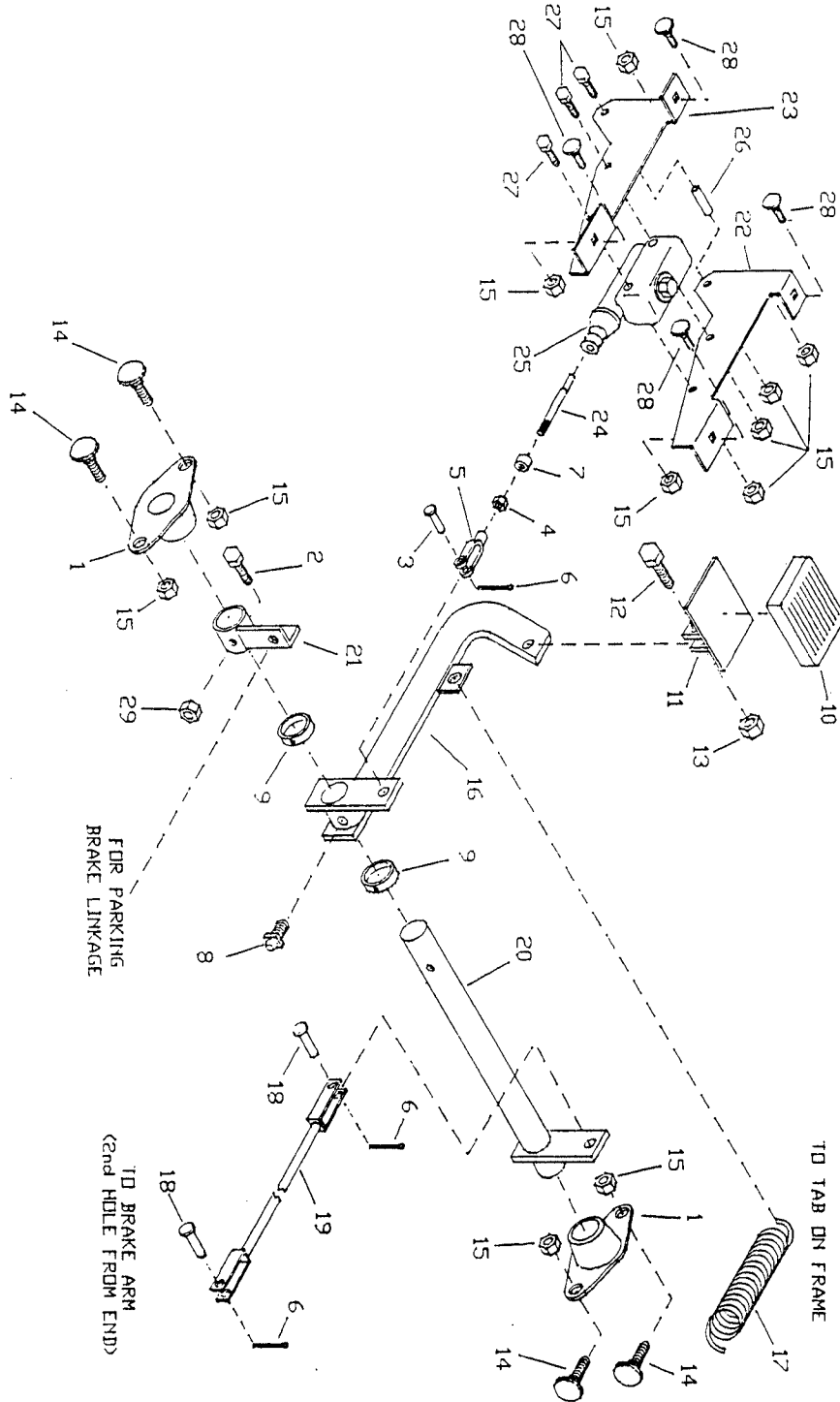


FIGURE NO. 7
MECHANICAL CONTROL LINKAGE
(SEE FIG. 7)

FIG. I.D.	T-D PART NO.	DESCRIPTION	QTY.
7-1	87-071-00	GREASE FITTING 3/16" DRIVE TYPE (STRAIGHT)	5
7-2	88-100-14	HEX HEAD CAP SCREW 3/8" X 1-1/2 NC	2
7-3	96-772-00	CLEVIS PIN 3/8 X 1"	2
7-4	88-119-80	NUT 3/8 " NF (HEX)	4
7-5	96-762-00	CAST CLEVIS 3/8	2
7-6	88-527-11	COTTER PIT 1/8" X 1"	6
7-7	88-108-60	WASHER 3/8" FLAT	6
7-8	88-109-81	LOCK NUT 3/8 NC (HEX)	7
7-9	51-340-00	HAND PARKING BRAKE LEVER WITH SPACERS	1
7-10	85-295-00	SPRING - 9/16" OD X 4-7/8 FREE LENGTH	3
7-11	96-763-00	CAST CLEVIS, 5/16"	2
7-12	98-254-00	ACCELERATOR PAD	1
7-13	50-011-10	ACCELERATOR LINKAGE ROD 5/16 X 7	1
7-14	98-200-00	RUBBER BRAKE PEDAL PAD	1
7-15	88-069-87	1/4" NC LOCKNUT	4
7-16	50-026-00	ROD, ALL THREADS 3/8" X 3"	1
7-17	88-111-34	HEX HEAD CAP SCREW 3/8 X 9" N.F.	1
7-18	96-771-00	CLEVIS PIN 3/8" X 3/4"	2
7-19	96-813-00	ADJUSTABLE CABLE ASSEMBLY (31-1/4 TO 28-1/4)	1
7-20	86-520-00	ROD END, FEM, 3/8 N.F. X 3/8 HOLE	2
7-21	88-089-80	HEX HEAD NUT, 5/16 NC	2
7-22	96-773-00	CLEVIS PIN, 5/16	2
7-23	88-100-13	HEX HEAD CAP SCREW 3/8 X 1-1/4" NC	2
7-24	50-009-00	MASTER CYLINDER PUSH ROD 3/8 X 5-3/8	1
7-25	88-100-20	HEX HEAD CAP SCREW 3/8 X 3"	2
7-26	99-515-00	MOUNTING BRACKET, (MASTER CYLINDER)	1
7-27	88-068-61	WASHER 1/4 SAE	3
7-28	88-060-13	HEX HEAD BOLT 1/4" X 1-1/4"	1
7-29	88-060-11	HEX HEAD BOLT 1/4" X 1"	1
7-30	88-100-13	HEX HEAD BOLT 3/8" X 1-1/4"	1
7-31	88-100-15	HEX HEAD BOLT 3/8" X 1-3/4"	1
7-32	17-104-00	COLLAR, 3/8" SHAFT	1
7-33	50-123-10	ACCELERATOR ROD, 3/8 DIAMETER X 22-1/2	1
7-34	88-069-80	HEX HEAD NUT, 1/4 N.C.	1
7-35	16-589-00	SPACER, 3/8 OD X 1/4 ID X 3/16 LONG	1
7-36	86-503-99	ROD END	1

MODEL C WITH HYDRAULIC BRAKES
Figure No. 8

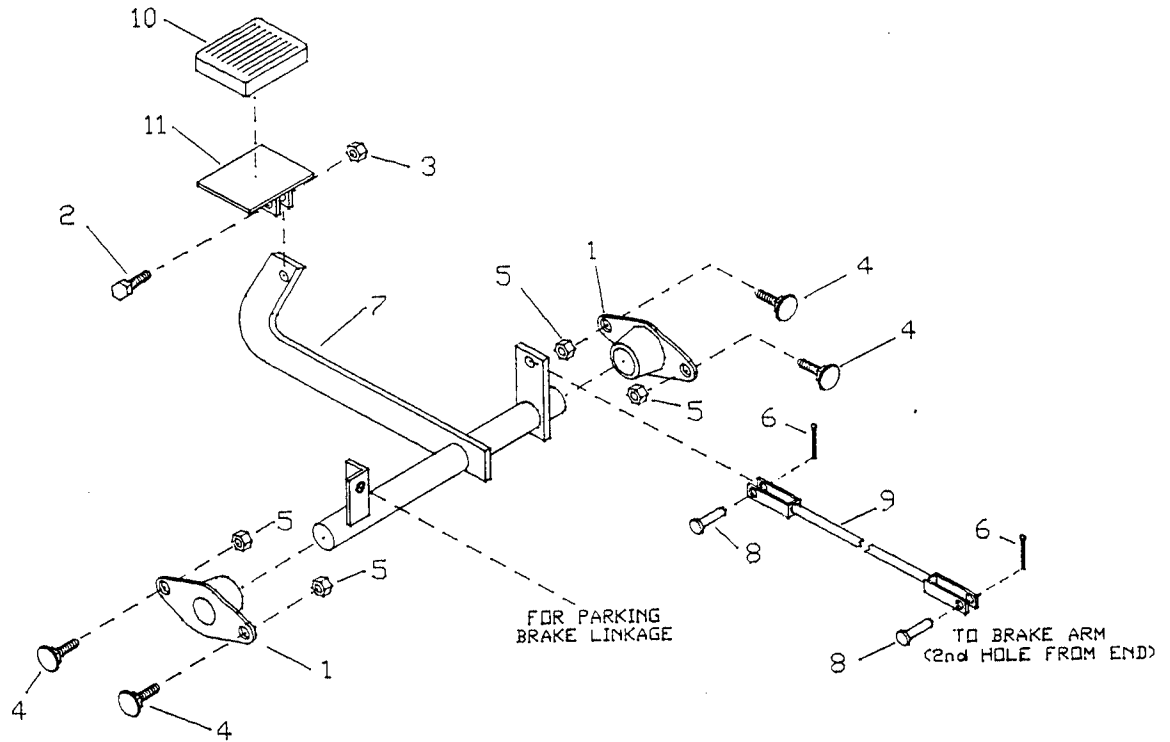


NOTE: HOLES IN FLOORBOARD MUST
BE DRILLED OUT TO 1/2" TO
MOUNT MASTER CYL. BRACKETS

MODEL C WITH HYDRAULIC BRAKES

FIG. I.D.	T-D PART NO.	DESCRIPTION	QTY.
8-1	88-410-20	BEARING, 2 BOLT FLANGE, 3/4 BRAKE SHAFT	2
8-2	88-060-16	HEX HEAD CAP SCREW, 1/4 X 2 NC	1
8-3	96-772-00	CLEVIS PIN, 3/8 X 1	1
8-4	88-119-80	HEX HEAD NUT, 3/8 NF	1
8-5	96-762-00	CAST CLEVIS, 3/8	1
8-6	88-517-11	COTTER PIN, 3/22 X 1	3
8-7	17-104-00	COLLAR, 3/8 SHAFT	1
8-8	87-071-00	GREASE FITTING, 3/16 DRIVE TYPE	1
8-9	17-110-00	COLLAR, 3/4	2
8-10	98-200-00	RUBBER BRAKE PEDAL PAD	1
8-11	01-432-98	BRAKE PEDAL WELDMENT	1
8-12	88-080-11	HEX HEAD CAP SCREW, 5/16 X 1 NC	1
8-13	88-089-81	HEX HEAD LOCK NUT, 5/16	1
8-14	88-102-11	CARRIAGE BOLT, 3/8 X 1 NC	4
8-15	88-109-87	FASTITE NUT, 3/8 NC	11
8-16	01-432-73	WELDMENT, ARM, HYD. BRAKE	1
8-17	85-233-00	SPRING EXTENSION, 11/16 OD X 6-1/4	1
8-18	96-771-00	CLEVIS PIN, 3/8 X 3/4	2
8-19	96-813-00	ADJ CABLE ASSY, 28-1/4 TO 31-1/4	1
8-20	01-432-74	WELDMENT, SHAFT, HYD BRAKE	1
8-21	01-432-72	WELDMENT, PARK BRAKE TAB	1
8-22	99-515-04	MOUNT, MASTER CYLINDER, RIGHT	1
8-23	99-515-05	MOUNT, MASTER CYLINDER, LEFT	1
8-24	50-009-00	MASTER CYLINDER PUSH ROD, 3/8 X 5-3/8	1
8-25	99-510-00	MASTER CYLINDER	3
8-26	01-432-82	PIPE, 3/8 X 2-1/4, PAINT BLACK	1
8-27	88-101-20	HEX HEAD CAP SCREW, 3/8 X 3 NC	3
8-28	88-102-09	CARRIAGE BOLT, 3/8 X 3/4 NC	4
8-29	88-069-81	HEX HEAD LOCKNUT, 1/4 NC	1

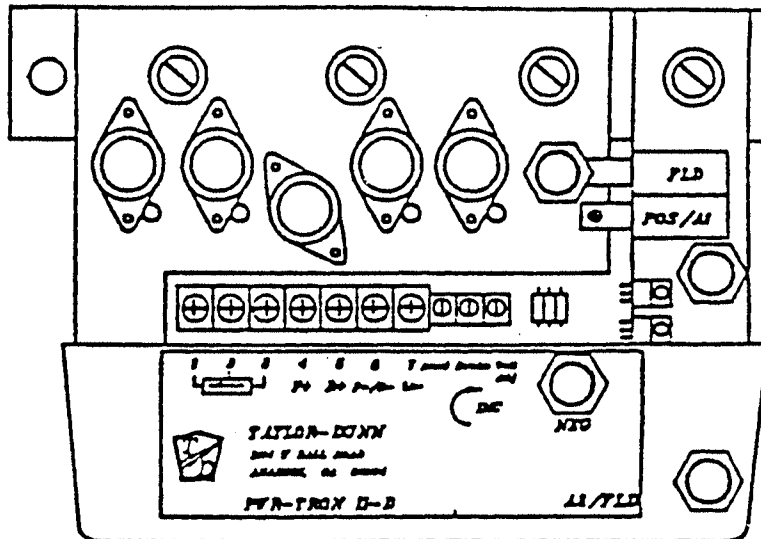
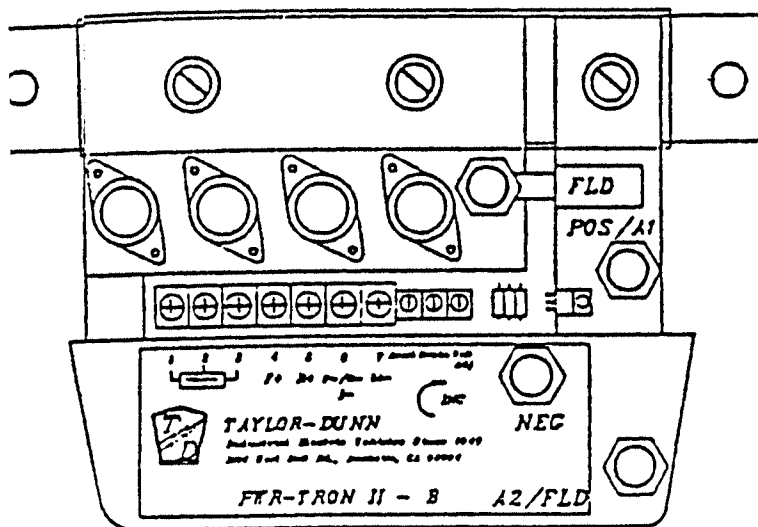
MODEL C WITH MECHANICAL BRAKES
Figure No. 9



MODEL C WITH MECHANICAL BRAKES
Figure No. 9

FIG. I.D.	T-D PART NO.	DESCRIPTION	QTY.
9-1	80-410-20	BEARING, 2 BOLT FLANGE, 3/4 BRAKE SHAFT	2
9-2	88-080-11	HEX HEAD CAP SCREW, 5/16 X 1 NC	1
9-3	88-089-11	HEX HEAD LOCK NUT, 5/16 NC	1
9-4	88-102-11	CARRIAGE BOLT, 3/8 X 1 NC	4
9-5	88-109-87	FASTITE NUT, 3/8 NC	4
9-6	88-517-11	COTTER PIN, 3/32 X 1	2
9-7	01-432-70	WELDMENT, BRAKE SHAFT, MECHANICAL BRAKE	1
9-8	96-771-00	CLEVIS PIN, 3/8 X 3/4	2
9-9	96-813-00	ADJ. CABLE ASSY, 28-1/4 TO 31-1/4	1
9-10	98-200-00	RUBBER BRAKE PEDAL PAD	1
9-11	01-432-98	BRAKE PEDAL WELDMENT	1

PWR-TRON II INTRODUCTION



PWR-TRON II - B

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

PWR-TRON II - D

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

INTRODUCTION

PWR-TRON II is a transistorized motor control designed specifically for use on electric vehicles. Its essential function is to regulate the power fed from battery to motor so as to provide full control of the vehicle speed under all operating conditions.

The PWR-TRON II unit is connected in between the motor and the battery. Power feed to the motor is regulated by switching the motor on and off at high speed. By adjusting the ON time with respect to the OFF time the average voltage applied to the motor can be varied. This switching is done using power transistors.

PWR-TRON II ELECTRIC VEHICLE CONTROL

FEATURES

Current Limit - Cold current limit is 220A, for type B, 290A for type D.

Thermal Roll-Back - Continuous overloading will reduce the current limit progressively above 150 degrees F (65 degrees C).

Acceleration Limit - Built in acceleration ramp to prevent jack-rabbit starts (can be factory set for various applications, or may be adjustable).

Automatic Plug Braking - Built in plugging control to give smooth reversals and prevent operator injury or equipment damage with inadvertent direction changes.

Bypass Enables and Time Delay - Built in circuitry give on-demand bypass (1A) facility and plugging hold-off.

Special Feature - Faulty transistor detection helps prevent vehicle runaway or dangerous starts.

Add-on Protection - Suppression diodes for the Forward/Reverse and By-pass Contactor Coils are incorporated in the PWR-TRON II unit. If the vehicle has other contactors for power steering, pumps, etc., these coils must also be suppressed by fitting a diode across them.

The PWR-TRON II unit may have a number of adjustments enabling a control to be custom set for a particular installation. The adjustments do not override any of the safety functions, hence the control unit will not be damaged by incorrect setting of the following functions:

Acceleration - The rate of acceleration can be preset by means of the ACCEL trimpot on the logic. This cannot be overridden by rapid depression of the accelerator.

Brake - The brake control adjusts the deceleration rate in the plug braking mode. As protection to the motor and other electrical devices, the braking effect is kept low. The vehicle should be stopped using the service brake.

Volts Adjust/Low Speed - This trimmer is used to adjust for different supply voltages and when incorrectly set, will cause a delay between the operation of the accelerator and the movement of the vehicle and may cause instability during plug braking mode.

GENERAL

The PWR-TRON unit is readily accessible under the deckboard. The PWR-TRON unit performs two functions; power control for speed and acceleration rate control for smooth operation. The PWR-TRON unit is a transistorized controller that regulates the power from the battery. An accelerator module provides a signal to the PWR-TRON proportional to the desired power output of the control. This gives the operator full control of the vehicle power and speed.

MODEL C
PWR-TRON II

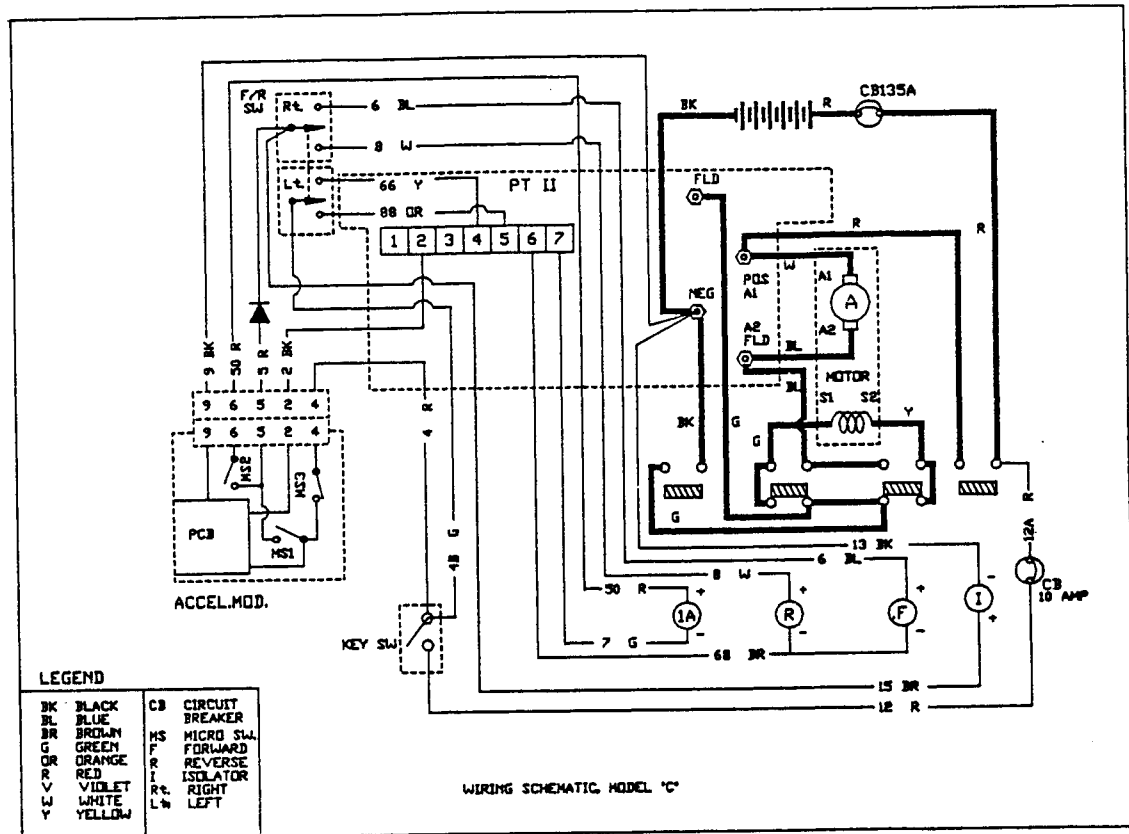


Figure 1

CIRCUITRY AND OPERATION

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

The control circuit includes; 75-146-23, (control harness, light gauge wire) key switch, solid state accelerator module, the PWR-TRON solid state controller, forward-reverse switch and solenoid panel.

The power circuit includes; 75-147-23, (power harness, heavy gauge wire) the batteries, 135 AMP circuit breaker, solenoids and motor.

CONTROL CIRCUIT (See Figure 1, Shown in light lines)

Forward Operation. 1) Turn key to "ON" position and move forward-reverse switch to forward position. 2) As the accelerator is depressed, a cam, MS1 closes providing a current path to the forward solenoid coil and closing forward contact on the forward-reverse switch. 3) The magnetic sensor on the PCB board will increase the PWR-TRON signal voltage moving vehicle forward when the accelerator is depressed.

Reverse Operation. 1) Turn key to "ON" position and move forward-reverse switch to reverse position. 2) As the accelerator is depressed, a cam, MS1 closes providing a current path to the reverse solenoid coil and closing reverse contact on the forward-reverse switch. 3) The magnetic sensor on the PCB board will increase the PWR-TRON signal voltage moving vehicle in reverse when the accelerator is depressed.

PWR-TRON II

POWER CIRCUIT (See Figure 1, Shown in Heavy lines)

Forward Operation. When the control circuit is energized and the isolator and forward solenoid contacts are closed current flow is then channeled through the PWR-TRON II and then to the power wiring. Motor speed is controlled by output from the PWR-TRON II.

Reverse Operation. The same circuit is used as forward operation except the reverse solenoid contact (not forward) is closed to reverse current flow through the motor.

When the accelerator is fully depressed, a microswitch (MS-2) is closed which activates the bypass solenoid (1A). This provides full battery potential to the motor.

OPERATING YOUR PWR-TRON II.

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 transition from start to high speed operation. This is a built-in characteristic of the PWR-TRON II speed control, avoiding "jack-rabbit" starts.

"Plug braking" is an additional feature of the PWR-TRON. It is a safety feature that makes it unnecessary to come to a complete stop before reversing the vehicle. When reversed, the vehicle will automatically slow to a stop and reverse itself to full acceleration. This maneuver does no damage to the PWR-TRON II. However, stopping the vehicle should be done with the service brake. Also, 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 II PREVENTIVE MAINTENANCE

WARNING: BEFORE WORKING ON THE PWR-TRON UNITS OR ANY PART OF THE VEHICLE SYSTEM, DISCONNECT BOTH THE MAIN POSITIVE AND NEGATIVE BATTERY LEADS. PLACE THE FORWARD-REVERSE LEVER IN NEUTRAL, TURN OFF AND REMOVE KEY. 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 II 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 II module, solenoid panel or the accelerator module. This will avoid the possibility of voiding your warranty on the PWR-TRON

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

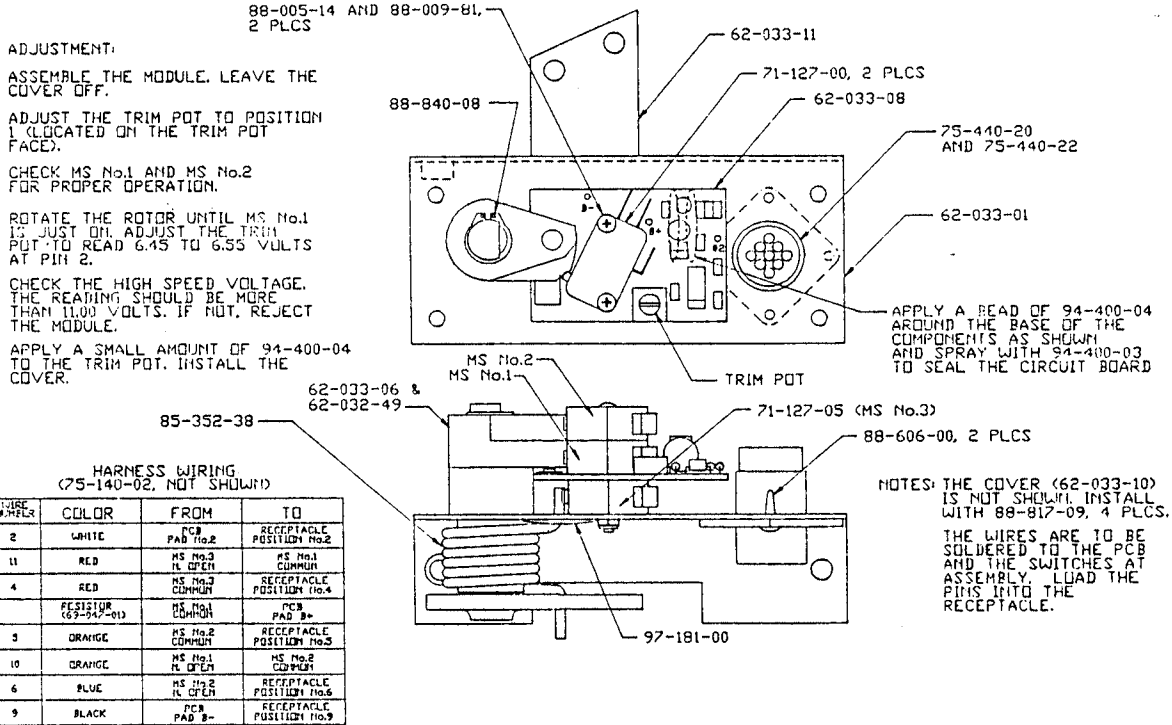
1. REPAIR OR REPLACEMENT OF INDIVIDUAL COMPONENTS

If replacement of semi-conductors, i.e. transistors becomes necessary, the following points must be rigidly adhered. The serviceman is advised that in the event of uncertainty over repair procedures, it is better to change the complete control unit, rather than risk further damage with an improper repair.

- (a) Transistors - These are available as a factory approved spare consisting of a matched set of transistors. Only factory approved spares must be used. Replacement of individual transistors invalidates warranty.
- (b) Insulation - The wire insulation material (fiberglass reinforced teflon) must be kept absolutely clean. The electrical isolation between heatsink and baseplate must be checked with an Ohm meter after assembly. Check that the resistance is greater than 1 Megohm (1,000,000 Ohms).
- (c) Wiring - The positions of all wires and lugs should be noted and marked prior to removal so that there is no confusion on re-assembly.
- (d) Component Polarity - Transistors can be damaged by quite modest currents incorrectly applied and are destroyed by reverse currents. If replacing transistors, ensure that polarity is correct.
- (e) Connections - Check all connections for tightness on completion.
- (f) Final Checks - Prior to the first switch on, check battery polarity. Use test light to ensure safety.

* **NOTE:** Any controllers that will be used in ambient temperature above 104 degrees F or 40 degrees C should be brought to the attention of the truck manufacturer.

MODEL C
ACCELERATOR MODULE



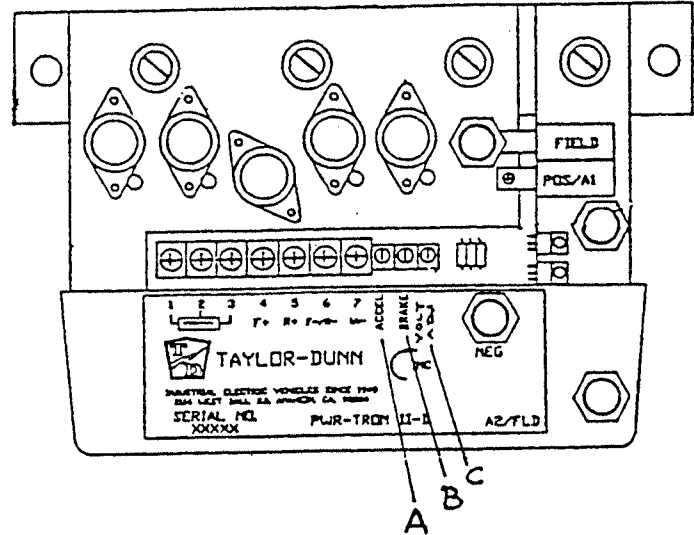
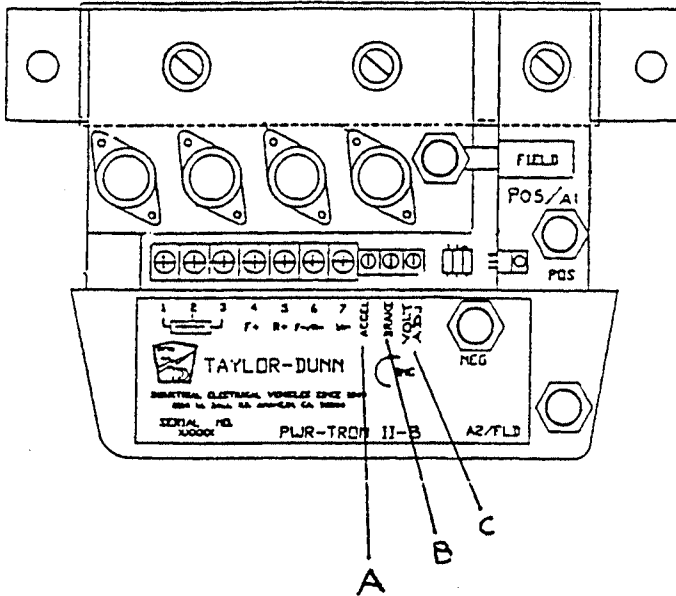
ACCELERATOR MODULE, SOLID STATE 62-033-00
FIGURE 2

GENERAL FEATURES

This item is a solid state module, factory adjusted. The accelerator module mounts directly to the accelerator pedal or treadle. Should it become necessary to adjust the solid state accelerator, remove the accelerator from the vehicle.

Double Check Battery Polarity Severe damage will result if the battery polarity is reversed.

It is always good practice to use the test light (part number 62-027-00) in series with the motor, prior to initial turn on. This will indicate any abnormalities in the control.



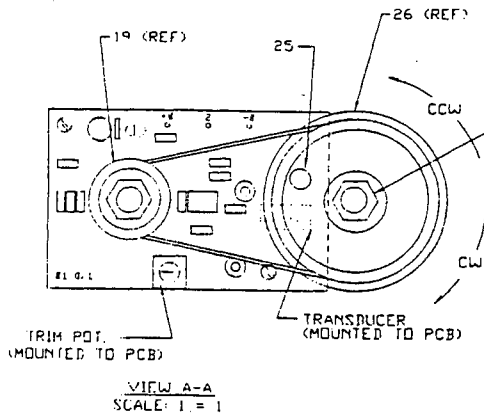
PWR-TRON II - B

PWR-TRON II - D

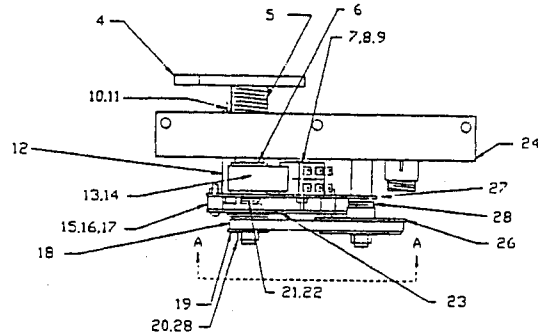
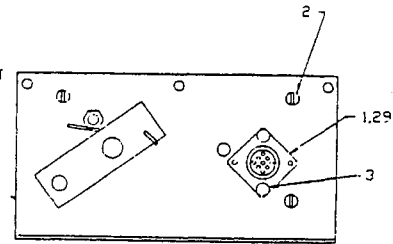
PWR-TRON II TRIMPOT ADJUSTMENTS

- A. ACCELERATOR - Turn full direction of arrow
- B. BRAKE - Turn full opposite direction of arrow to start. Turn up 1/4 in direction of arrow.
- C. VOLTS ADJUST - 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.



TIGHTEN THIS NUT SUCH THAT THE PULLEY WILL ROTATE.



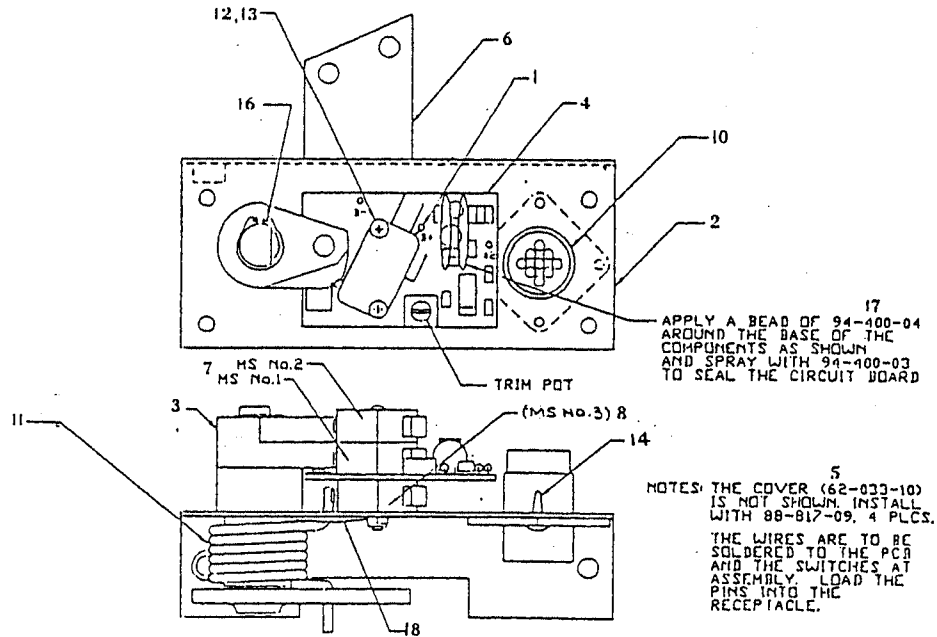
WIRE HARNESS (NOT SHOWN) 75-140-01

COLOR	FROM	TO
WHITE	PCR PAD No.2	RECEPTICAL POSITION No.2
RED	MS No.1 COMMON	RECEPTICAL POSITION No.1
RED	MS No.1 COMMON	PCR PAD P+
ORANGE	MS No.1 N. OPEN	RECEPTICAL POSITION No.5
ORANGE	MS No.1 N. OPEN	MS No.2 COMMON
BLUE	MS No.2 N. CLOSED	RECEPTICAL POSITION No.6
BLACK	PCR PAD P-	RECEPTICAL POSITION No.9

MODEL C
ACCELERATOR, MAGNETIC 62-032-15

FIG. I-D	T-D PART	DESCRIPTION	QTY.
1	75-440-20	RECEPTACLE, SQUARE FLANGE, 9	1
2	88-817-09	PAN HEAD METAL SCREW, #8 X 3/4	4
3	88-606-00	CLIP, CANOE, .125 X .16 GRIP	2
4	62-032-34	ROTOR, MAGNETIC ACCELERATOR	1
5	85-352-36	SPRING, TORSION, .840 ID LEFT	1
6	32-240-45	BUSHING, 1/2 ID X 7/8	1
7	71-127-00	SW, SNAP ACTION, MINIATURE	2
8	88-005-11	TRUSS HEAD SCREW, 4-40 X 1-1/4	2
9	88-009-81	LOCKNUT, 4-40	2
10	88-060-18	HEX HEAD SCREW, 1/4 X 2-1/2 NC	1
11	88-069-81	LOCKNUT, 1/4 NC	1
12	16-512-10	SPACER, .257 ID X .405 OD X .900	2
13	62-030-50	CAM, 11 INCH ROD, TWO MICROSWITCHES	1
14	97-099-10	KEY, WOODRUFF, 1/8 X 1/2	1
15	88-014-08	ROUND HEAD SCREW, 6-32 X 5/8	2
16	88-019-86	FIBRE INSERT, LOCKNUT 6-32	2
17	16-000-01	SPACER, 5/32 ID X .295 LONG	2
18	62-030-47	BELT, 126 T, .080 PITCH	1
19	62-030-49	PULLEY, 32T, .080 PITCH	1
20	88-089-81	5/16 NC LOCK NUT	2
21	97-180-30	WASHER, NYLON 1/2 ID X 1/32 THICK	1
22	88-840-08	RING SNAP 1/2 EXT	1
23	62-032-88	PCB, MAGNETIC ACCELERATOR, TB W/COMP	1
24	62-032-47	ASSEMBLY, PLT, BACKING, MAGNETIC ACCELERATOR	1
25	62-032-49	MAGNET, 1/4 DIAMETER X 3/8 LONG	1
26	62-032-51	PULLEY, 80T, .08 PITCH, DRILLED	1
27	62-032-55	PLATE, SUPPORT, PCB	1
28	88-088-61	5/16 SAE WASHER	3
29	75-440-22	SEAL, RECEPTACLE, 9 POSITION AMP	1
*	62-030-58	COVER REMOVED FOR CLARITY	

"STAND-UP" MODEL C
ACCELERATOR

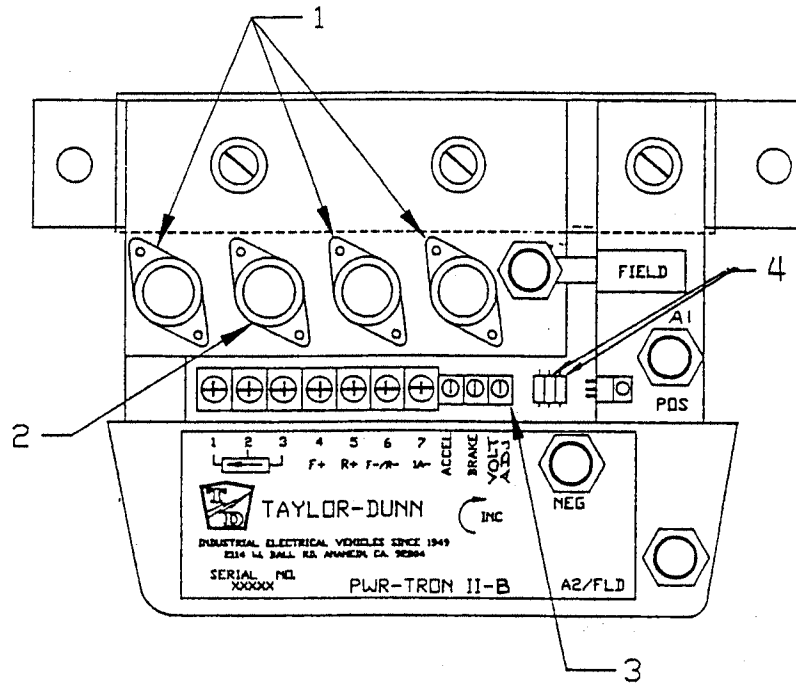


HARNESS WIRING - 9 (75-140-02, NOT SHOWN)

WIRE NUMBER	COLOR	FROM	TO
2	WHITE	PCB PAD NO. 2	RECEPTACLE POSITION NO. 2
11	RED	MS NO. 3 N. OPEN	MS NO. 1 COMMON
4	RED	MS NO. 3 COMMON	RECEPTACLE POSITION NO. 4
5	RESISTOR (69-047-01) ORANGE	MS NO. 1 COMMON	PCB PAD B+
10	ORANGE	MS NO. 2 COMMON	RECEPTACLE POSITION NO. 5
6	ORANGE	MS NO. 1 N. OPEN	MS NO. 2 COMMON
6	BLUE	MS MO. 2 N. OPEN	RECEPTACLE POSITION NO. 6
9	BLACK	PCB PAD B-	RECEPTACLE POSITION NO. 9

ACCELERATOR (SOLID STATE) MODULE (COVER NOT SHOWN) 62-033-00

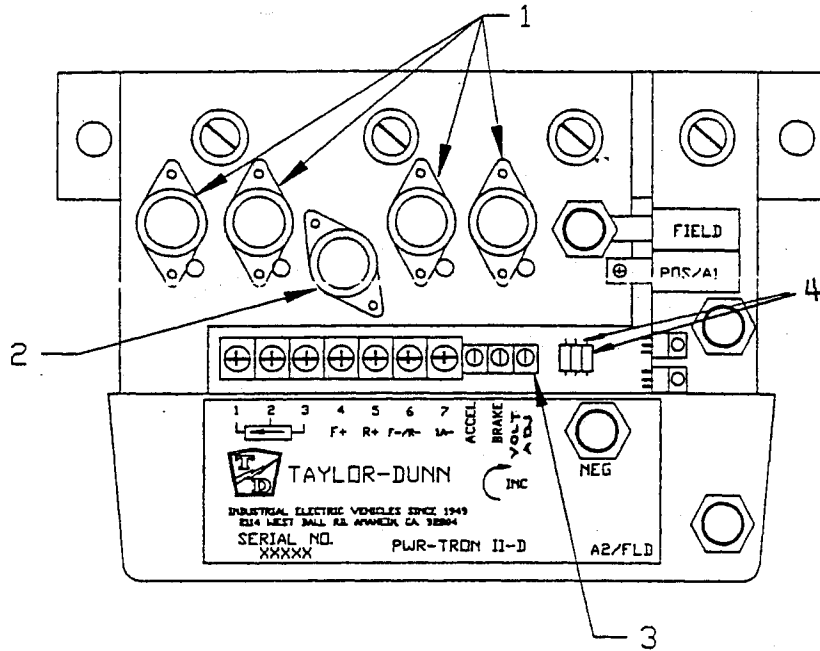
FIG ID	T-D PART	DESCRIPTION	QTY.
1.	69-047-01	RESISTOR 47 OHMS, 1 WATT	1
2.	62-033-01	ASSEMBLY, BACKING PLATE	1
3.	62-033-05	ASSEMBLY, CAM W/MAGNET	1
4.	62-033-08	PCB WITH COMPONENTS	1
5.	62-033-10	COVER, SOLID STATE ACCELERATOR (NOT SHOWN)	1
6.	62-033-11	WELDMENT, ROTOR, SOLID STATE ACCELERATOR	1
7.	71-127-00	SW, SNAP ACTION MINIATURE	2
8.	71-127-05	SWT. SNAP ACTION, SHORT LEVER	1
9.	75-140-02	HARNESS, SOLID STATE AC	1
10.	75-440-20	RECEPTACLE, SQUARE FLANGE, 9	1
11.	85-352-38	SPRING, TORSION, SOLID STATE	1
12.	88-005-14	4-40 X 1-1/2 MACHINE SCREW	2
13.	88-009-81	4-40 LOCK NUT	2
14.	88-606-00	CLIP, CANOE, .125 X .16 GRIP	2
15.	88-817-09	#8 X 3/4 PAN HEAD SCREW (FOR COVER MOUNTING)	4
16.	88-840-08	RING SNAP 1/2 EXT	1
17.	94-400-02	SEALANT, SILICONE, BLACK	1
18.	97-181-00	WASHER, 22 GA SST .141 X .875	1



PARTS LIST

PWR-TRON II MODEL 220 PART NO. 62-022-00

FIG. ID	T-D PART	DESCRIPTION	QTY.
1	62-022-32	POWER TRANSISTORS (3)	1 (SET)
2	62-022-31	DRIVER TRANSISTOR	1
3	69-020-30	TRIMPOT, 20K OHM (3/8 SQUARE)	3
4	69-056-92	RESISTOR, 5.6 OHM, 1/2 WATT (2)	1 (SET)



PARTS LIST

PWR-TRON II MODEL 290, PART NO. 62-029-00

FIG. ID	T-D PART	DESCRIPTION	QTY.
1	62-029-32	POWER TRANSISTORS (4)	1 (SET)
2	62-029-31	DRIVER TRANSISTOR	1
3	69-029-31	TRIMPOT, 20 K OHM (3/8 SQUARE)	3
4	69-056-92	RESISTOR, 5.6 OHM 1/2 WATT (2)	1 (SET)

MODEL C
SOLENOID INSTALLATION

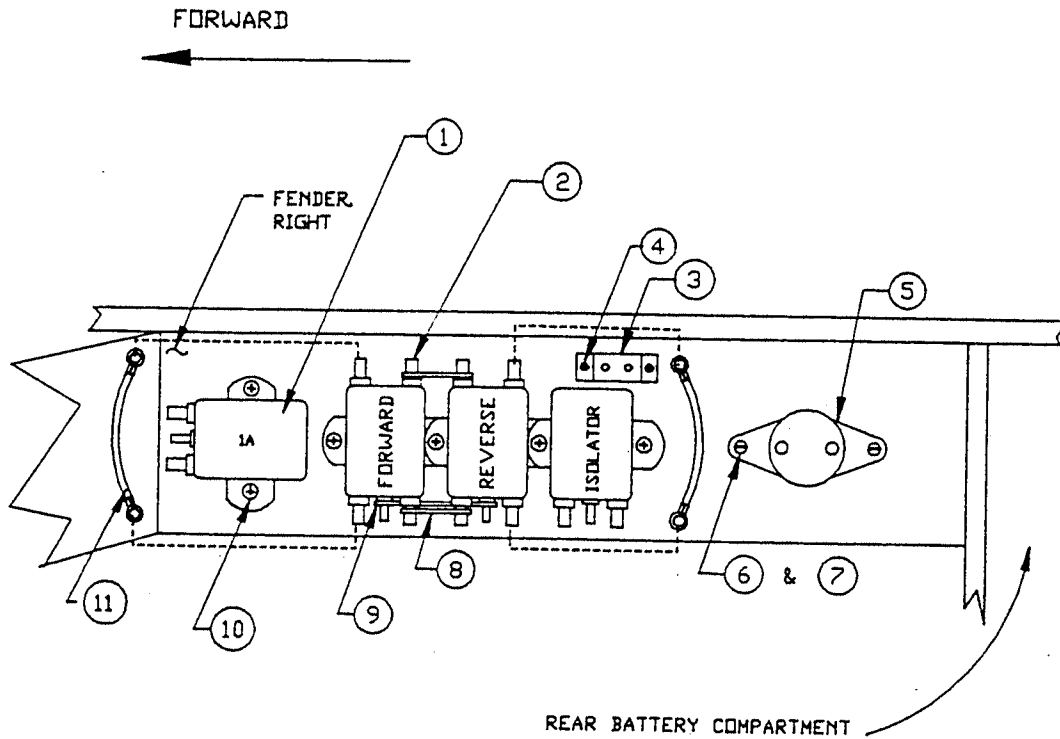


FIG.ID	T-D PART	DESCRIPTION	QTY.
1	72-501-24	SOLENOID SPST 24V, 100 A	2
	72-501-36	SOLENOID SPST 36V, 100 A	2
2	72-501-25	SOLENOID SPDT 24V, 100 A	2
	72-501-37	SOLENOID SPDT 36V, 100 A	2
3	79-840-00	CIRCUIT BREAKER, 10 A, AUTO	1
4	88-818-06	#8 X 12 PAN HEAD SCREW TYPE B	2
5	79-844-00	CIRCUIT BREAKER, KLIXON CDLA-135	1
6	88-045-11	#10-32 X 1 TRUSS HEAD MACHINE SCREW	2
7	88-049-86	#10-32 FLEX LOCK NUT	2
8	61-838-51	BUSS BAR, 5/8 X 1-3/8 HC	2
9	61-838-50	BUSS BAR, CU 3/8 X 2-1/2 HC	1
10	88-838-06	#14 X 1/2 PAN HEAD SCREW TYPE A	6
11	75-235-20	JUMPER, 4 GAGE, 4-1/4 LONG	2

TROUBLE SHOOTING

Before proceeding with any trouble shooting, read the manual; understand the basic principles of operation and be familiar with component testing and replacement procedures. The PWR-TRON II controller, when operating correctly, will emit a clear whistle, the frequency of which is related to the frequency of the ON/OFF chopper action. The pulsing of the equipment is too fast to measure with conventional equipment and the following fault procedure is based on the use of simple tools.

TOOLS AND EQUIPMENT REQUIRED

- (a) Test light, part number 62-027-00
- (b) Clip leads.
- (c) Multimeter

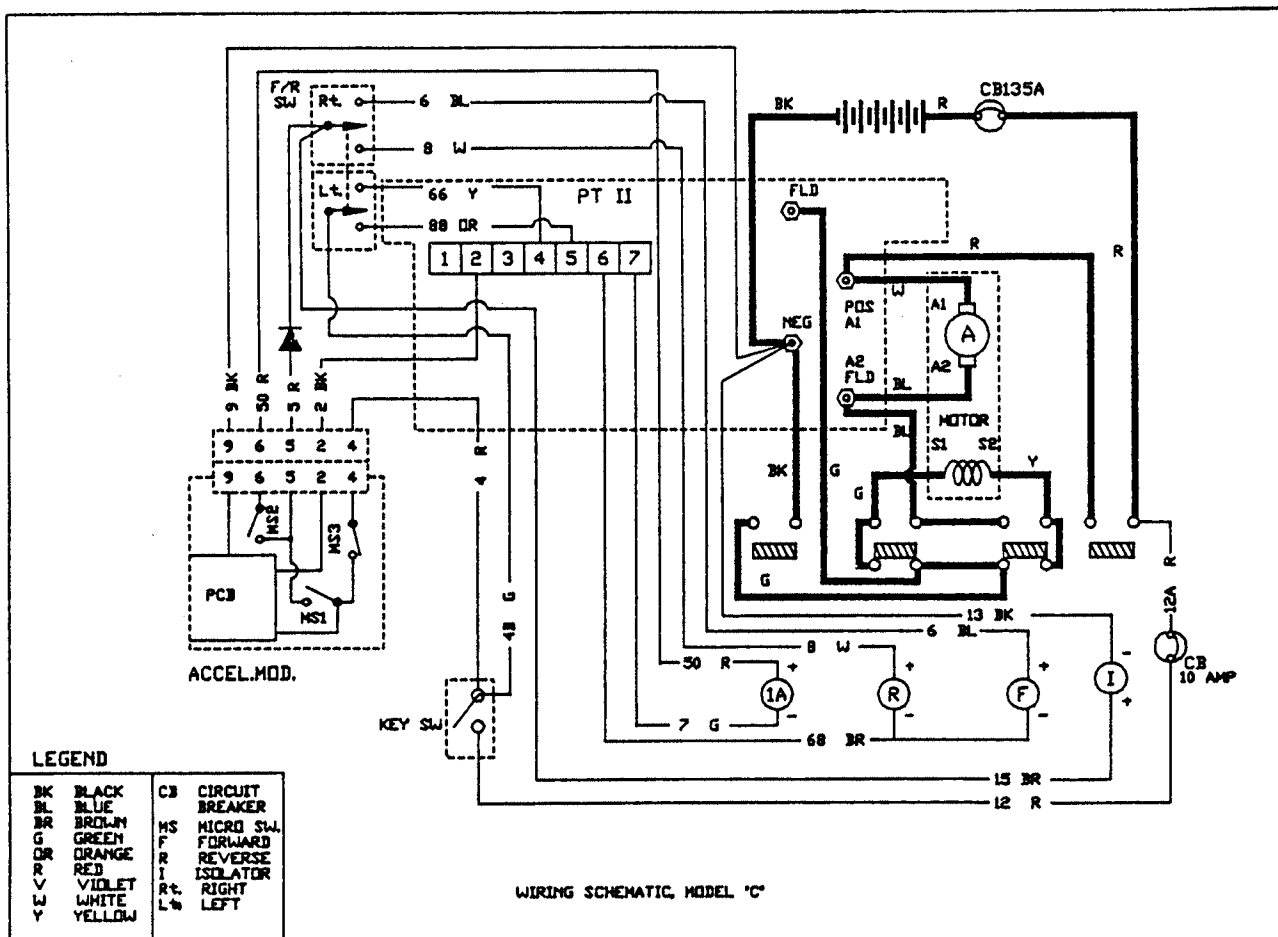
PHYSICAL INSPECTION

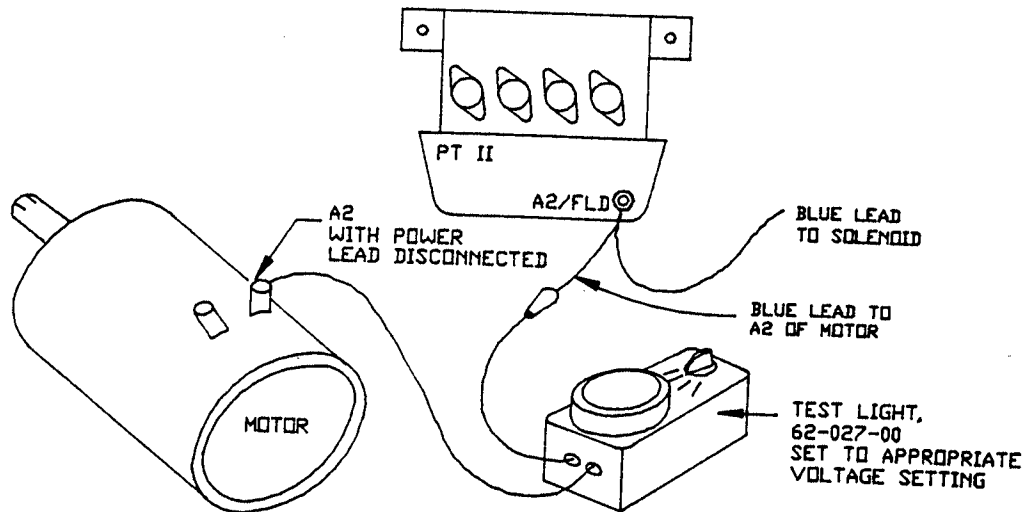
Check controller for physical damage, loose or broken wiring, evidence of component overheating, etc. Pay particular attention to adjustment of accelerator switch and potentiometer operation.

Prior to touching any electrical components **DISCONNECT BATTERY AND CONNECT TEST LIGHT IN SERIES WITH MOTOR ARMATURE.** (See Continuity & Power Check next page).

Reconnect battery as needed for carrying out any specific tests.

PWR-TRON II SCHEMATIC





CONTINUITY AND POWER CHECK

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

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

After the PWR-TRON II 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 blue lead at A2 on motor (refer to Figure 1) and place test light in series with A2/FLD pole on PWR-TRON II. 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" in this 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 II unit. Proceed to the page on "Trimpot Adjustment".

TROUBLE SHOOTING

<u>SYMPTOM</u>	<u>POSSIBLE CAUSE</u>
1. Vehicle will not reach full speed	Check that the accelerator is set up correctly and the voltage swing at logic pin 2 is correct (6.3 volts to 11 volts) Check acceleration setting on PWR-TRON II.
2. Vibration or roughness when braking	Incorrectly adjusted BRAKE TRIMPOT. See Trimpot Adjust in this section.
3. Weak and uneven braking forward and reverse.	Incorrectly adjusted BRAKE TRIMPOT. See Trimpot Adjust in this section.
4. Very strong braking	Incorrectly adjusted BRAKE TRIMPOT. See Trimpot Adjust in this section. Armature and Field connections interchanged. Armature and Field cables not independently routed back to controller.
5. Strong braking on freshly charged battery	BRAKE TRIMPOT set too high.
6. Delay between operation of accelerator and motion of vehicle	CREEP TRIMPOT not set properly.
7. Vehicle accelerates when key switch is on. No accelerator movement is necessary	CREEP TRIMPOT not set properly. Accelerator stop rest (mono directional) /center off rest position (Bi-directional) or linkages not correctly set up. Microswitch in accelerator not adjusted correctly.

TROUBLE SHOOTING

LOW OR NO MOTOR TORQUE

NO TEST VOLTAGES, FIRST PLACE TEST LIGHT IN SERIES WITH THE MOTOR.

<u>SYMPTOM</u>	<u>POSSIBLE CAUSE</u>
1. Solenoids do not operate. No voltage at solenoid coils.	Check power and control fuses. Replace if defective. Check for power at both sides of key switch. Check for power at both sides of direction switch. Check for power at both sides of brake switch. Check for flat or reversed battery.
If there is voltage at requested solenoid coil.	Check that there is no short between FLD and NEG, e.g. shorted transistor, welded bypass contacts. Check that battery voltage is reaching terminals 4 (Forward), 5 (Reverse) as relevant.
2. Solenoid close. No power and no transistor whistle when speed is wound up.	Check circuit breaker. Battery voltage should appear at both ends of fuse. Check battery volts. Check accelerator circuit and operation of speed pot - To do this, place test light in series with the armature and wind the speed up and down with accelerator pedal. The voltage at logic terminal 2 should move from 6.3 volts to 11 volts. If it stays at 6.3 volts the fault is in the accelerator wiring. If voltage stays high, accelerator may be bad or it has lost negative lead to battery. Check motor circuit. If the voltage at FLD terminal is lower than B+ then examine the motor circuit for worn brushes, sticking brushes, loose cable connections, etc. Also low voltage may indicate loss across contactor (solenoid) tips. Check resistance.
3. Solenoids close, little or no power. High frequency whistle.	Check motor circuit for short circuits. Check for loose connections. Check for interchanged armature and field connections.
4. Solenoids close. Vehicle accelerates to full speed but lacks power.	Check battery voltage under load. Check voltage on transistor heatsink, FLD. If low to full speed but lacks power (approx. 2 volts) when accelerating, check motor circuit. If high, check for loose connections.

TROUBLE SHOOTING

SYMPTOM

POSSIBLE CAUSE

FULL MOTOR TORQUE AVAILABLE - GENERAL FAULTS

TO TEST VOLTAGES, FIRST PLACE TEST LIGHT IN SERIES WITH ARMATURE.

- | | |
|---|---|
| 1. Solenoid closes and full speed. | Check accelerator circuit and voltage at pin 2. Should swing from 6.3 to 11 Volts with depression of accelerator. |
| 2. Unequal braking in either direction, or unequal power in each direction. | Misadjusted motor brushes. Rotate brush gear to give equal braking in each direction.
Dirty or burned direction solenoid contacts. |

TROUBLE SHOOTING

STANDARD LOGIC VOLTAGES MEASURED WITH RESPECT TO B-

TO TEST VOLTAGES, FIRST PLACE LIGHT BULB IN SERIES WITH ARMATURE.

LOGIC TERMINAL

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>CONDITION</u>	<u>VOLTAGE*</u>
1.	Speed Pot Reference	Key switch open Key switch and solenoid closed	0V ~ 11V
2.	Speed Pot Signal	Key switch open Key and solenoid closed, slow speed Key and solenoid closed, fast speed	0V ~ 6.3 V ~ 11V
3.	Speed Pot Reference	Key switch open Key switch and solenoid closed	0V 6V
4.	Forward Solenoid Coil Positive	Key switch closed, forward selected Key switch closed, reverse selected	B+ ~ 0V
5.	Reverse Solenoid Coil Positive	Key switch closed, reverse selected Key switch closed, forward selected	B+ ~ 0V
6.	Forward/Reverse Solenoid Coil Negative	Key switch closed, direction not selected Key switch closed, direction selected. For <.5 sec., brief rise to After .5 sec., falls back to	~ 0V ~ 7V ~ 0
7.	Bypass Solenoid Coil Negative	Key switch closed, direction selected. Faulty transistor Key switch & direction solenoid closed. Bypass requested Key switch & direction requested solenoid closed. ** Bypass requested for ~ 3 secs. after ~ 3 secs.	B+ ~ 0V B+ ~ 0V
NEG.	Battery Negative	All	0
POS/A1	Battery Positive	After key switch & solenoid closed	B+
A2/FLD	Armature & Forward/Reverse Solenoid Normally Closed	Key switch & solenoid closed - Vehicle at rest Key switch & solenoid closed - Vehicle at full speed	B+ ~ 2V
FLD	Field, i.e. Forward/Reverse Solenoid Normally Open	Key switch open Key switch closed and solenoid open	0V B+

*B+ = Battery Positive - Voltages are measured with respect to Battery Negative.

** = This delay is set by Acceleration Trimpot.

MODEL C
SUGGESTED SPARE PARTS LIST
PWR-TRON II SPEED CONTROLLER SYSTEM

T-D PART NO.	DESCRIPTION	1-20 QTY. REQ.	21-50 QTY. REQ.	50-UP QTY. REQ.
61-838-50	BUSS BAR, 3/8 X 2-1/2	1	1	2
61-838-51	BUSS BAR, 5/8 X 1-3/8	1	1	2
62-022-31	DRIVER TRANSISTOR	1	2	4
62-022-32	POWER TRANSISTOR	1 (SET)	2 (SET)	4 (SET)
62-024-00	PT 220 SPEED CONTROLLER	1	1	2
62-029-00	PT 290 SPEED CONTROLLER	1	1	2
62-029-31	DRIVER TRANSISTORS	1	2	4
62-029-32	POWER TRANSISTOR	1 (SET)	2 (SET)	4 (SET)
62-030-58	COVER, ACCELERATOR MODULE	1	2	4
62-032-15	ACCELERATOR MODULE, MAGNETIC	1	1	2
62-033-00 *	ACCELERATOR MODULE, SOLID STATE	1	1	2
69-056-92	RESISTOR, 5.6 OHM 1/2 W	1	1	2
72-127-00	MICRO SWITCHES	0	2	4
72-127-05	MICRO SWITCHES	0	2	4
72-235-20	JUMPER, 4-1/4 IN X 4 GAGE RED	2	2	4
72-501-24	SOLENOID SPST 24 VOLT	1	1	2
72-501-25	SOLENOID SPDT 24 VOLT	2	2	4
72-501-36	SOLENOID SPST 36 VOLT	1	1	2
72-501-37	SOLENOID SPDT 36 VOLT	2	2	4
79-840-00	CIRCUIT BREAKER	1	1	2
79-844-00	CIRCUIT BREAKER	1	1	2

NOTE: Stand-up Model 'C'
Uses a solid state accelerator, all other PWR-TRON II items are the same.

MAINTENANCE PROCEDURES
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 light bulbs, fuses, flashers, 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 overcome 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 7 - Wiring Diagram
- Section 11 - Motor
- Section 15 - Speed Control
- Section 17 - Batteries
- Section 18 - Chargers

GENERAL ELECTRICAL PARTS

T-D PART NO.	DESCRIPTION	QTY.
71-100-00	LIGHT SWITCH	1
71-110-00	BRAKE LIGHT SWITCH (HYDRAULIC OPERATED)	1
71-111-00	BRAKE LIGHT SWITCH (MECHANICAL OPERATED)	1
71-130-00	MICRO SWITCH	1
71-141-00	TURN INDICATOR SWITCH, 7 WIRE	1
71-603-00	PLATE SWITCH COVER ON-OFF (KEYED IGNITION SWITCH)	1
71-900-00	FLASHER (12 VOLT)	1
72-005-00	CHROME HEADLIGHT FIXTURE WITH 4" SEALED BEAM BULB	1
72-022-00	STOP & TAILLIGHT FIXTURE, 4" RUBBER MOUNT (12 VOLT)	2
72-051-00	TURN LIGHT FIXTURE (12 VOLT) AMBER 4" RUBBER MOUNT	2
72-072-00	4" SEALED BEAM HEADLIGHT BULB (12 VOLT)	1
74-000-00	HOUR METER	1
74-009-00	CHARGE INDICATOR (36V)	1
74-009-10	CHARGE INDICATOR (24V)	1
74-050-00	WINDSHIELD WIPER MOTOR	1
74-051-00	WINDSHIELD WIPER ARM	1
74-052-00	WINDSHIELD WIPER BLADE	1
75-077-00	WIRING HARNESS FOR POWER AND CHARGING RECEPTACLE	1
75-078-00	WIRING HARNESS FOR LIGHTS AND HORN	1
75-204-00	WIRE #4 (PER FOOT)	
75-208-00	WIRE #8 (PER FOOT)	
75-218-00	WIRE *16 (PER FOOT)	
75-231-00	BATTERY JUMPER #6 WIRE (10-1/2" LONG)	4
75-404-53	TERMINAL LUG #4 WIRE 1/4" HOLE	
75-404-54	TERMINAL LUG #4 5/16" HOLE	
75-408-52	TERMINAL LUG #8 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	
76-352-00	RECEPTACLE - FLASHER	1
78-010-00	SECONDARY FUSE & HOLDER (INLINE TYPE)	1 TO 3
79-823-00	FUSE - BUSS TYPE 20 AMP	1 TO 3

MAINTENANCE PROCEDURES BATTERIES

WARNING: Lead acid batteries continuously emit highly explosive gases. 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 approximately 2 years, or 350 or 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 approximately 7-1/2 years, or 1800 cycles, with appropriate use and care.

It cannot be overemphasized 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. CURRENT CHARGING

Poor charging practices are responsible for more short battery life than any 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 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 continued

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 service 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 soda solution until all fizzing stops, which indicates that the acid has been neutralized. Then rinse thoroughly with clear water.

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 degrees below zero. Yet a battery in a very low state of charge may freeze at temperatures around 10 to 15 degrees above zero.

A battery not in use maintains small amounts of chemical action which slowly tends to dissipate 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			Date			Date		
		Water OK or Low	Gravity Before Charge	Gravity After Charge	Water OK or Low	Gravity Before Charge	Gravity After Charge	Water OK or Low	Gravity Before Charge	Gravity After Charge
1	1									
	2									
	3									
2	1									
	2									
	3									
3	1									
	2									
	3									
4	1									
	2									
	3									
5	1									
	2									
	3									
6	1									
	2									
	3									

- CAUTION:** Batteries emit explosive gases. 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 anytime. 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.
- 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.
- Batteries which require unusually frequent watering may indicate overcharging. Review charging practices and/or adjustment of transformer taps in charger.
- Gravity should be kept between 1175 (30% charged) and 1260 (100% charged), and gravity readings of all cells should be within 10 point range. When they are not, an equalizing charge should be applied. Refer to information under "Charging Time Chart" in Charger Handbook.
- Periodically check for loose terminal posts or loose connections to terminal posts, but not while batteries are being charged.
- Keep tops of batteries clean, and free of moisture, grease, and acid films. Any of these can cause current leakage.
- Keep weekly (or oftener) record as shown in 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.

BATTERIES AND CHARGER ACCESSORIES

T-D PART NO.	DESCRIPTION	QTY.
74-005-00`	Charger Indicator (12 Volt - Push to Test	1
75-231-00	Battery Jumper #6 Wire (10-1/4" Long)	5
75-234-00	Battery Jumper #6 Wire (18-1/2" Long)	1
75-240-00	3 Prong Plug and Cord (For Lift-Out and Roll-out Battery Boxes)	1
75-241-00	3 Prong Receptacles for Plug and Cord	1
76-003-00	Charging Plug, 30 Amp, 3 Prong	1
76-013-00	Charging Receptacle, 30 Amp, 3 Prong	1
76-020-00	Charging Receptacle and Plug, Anderson Type SB #6313 175 Amp	1 or 3
77-031-00	6 Volt, 190 A.H. Battery	4 or 6
77-042-00	6 Volt, 217 A.H. Battery	4 or 6
72-042-20	6 Volt, 220 A.H. Battery	4 or 6
77-044-00	6 Volt, 230 A.H. Battery	4 or 6
77-047-00	6 Volt, 244 A.H. Battery	4 or 6
77-048-00	6 Volt, 250 A.H. Battery	4 or 6
77-200-00	Hydrometer	1
77-201-00	Battery Filler	1
77-903-00	Battery Hold Down Stop (Roll-out Battery Box)	1 or 2
77-904-00	Battery Hold Down Channel (Roll-out Battery Box)	1 or 2
77-965-00	Battery Box Dolly (For Roll-Out Battery Box)	1 or 2
77-969-00	Battery Box Only (lift Out for 250 A.H. Batteries)	1 or 2
77-970-00	Battery Box Only (Roll-Out for 170 A.H. 217 A.H. and 250 A.H.)	1 or 2

CHARGER MAINTENANCE, SERVICE AND ADJUSTMENT

TAYLOR-DUNN / LESTER-MATIC
BATTERY CHARGER

Line voltage compensation achieved by flux oscillator circuit applied to battery chargers by Lester in 1962 for high reliability "Minute Man" missile standby applications. Compensates automatically for AC supply voltage variations 105-128 volts. Supply voltage variation + 10% from 117 volts = + 1% maximum battery voltage variation, decreasing to + 1/2% at finish rate with constant electrolyte temperature. No taps or rate controls to set.

Automatic taper of charge rate for superior battery life through good equalization of cells and low water use rate.

Silicon diodes with inherent surge protection operated at a conservative percentage of their rating.

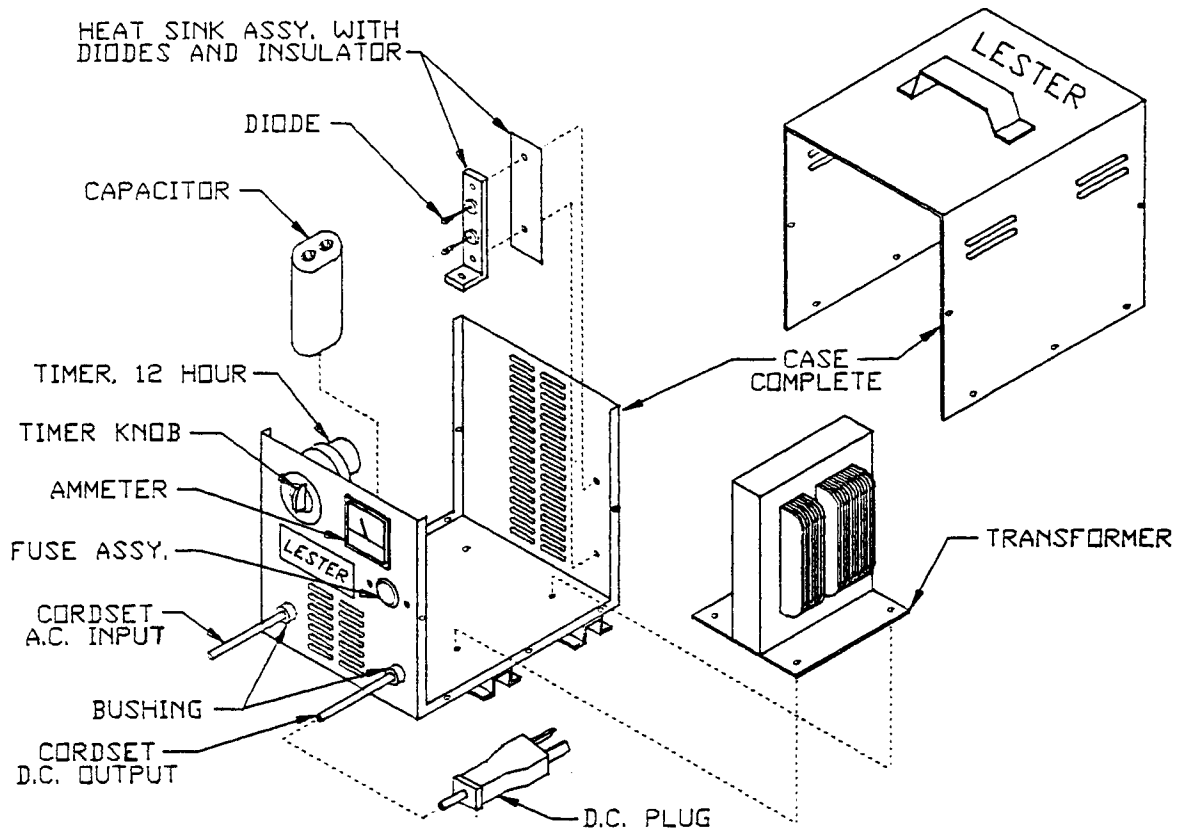
Convection cooled design for maximum reliability and minimum maintenance.

LESTRONIC II BATTERY CHARGERS

The all new automatic Lestronic chargers eliminate over and undercharging for new, old or defective batteries, whether hot or cold. Precise charging is achieved by patented Electronic Timer, utilizing state of the art integrated circuits.

Charger turns on automatically by simply connecting D.C. cord to batteries. The ammeter indicates charge rate. The charge rate tapers gradually to a finish rate of 5 to 10 amps. The Electronic Timer monitors the rate of voltage change during the charge period. When this rate levels off, the charger automatically shuts off.

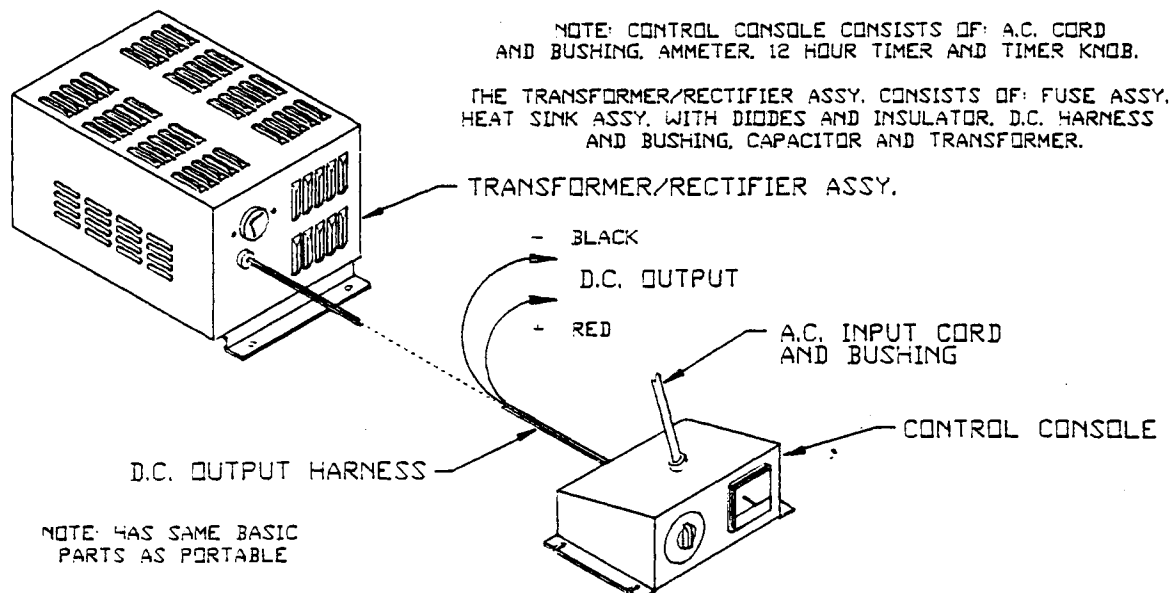
CHARGERS - COMPONENT IDENTIFICATION



PORTABLE LESTER CHARGER
 (TYPICAL) FOR COMPONENT IDENTIFICATION
 SEE PARTS LIST FOR PORTABLE CHARGERS

NOTE: CONTROL CONSOLE CONSISTS OF: A.C. CORD AND BUSHING, AMMETER, 12 HOUR TIMER AND TIMER KNOB.

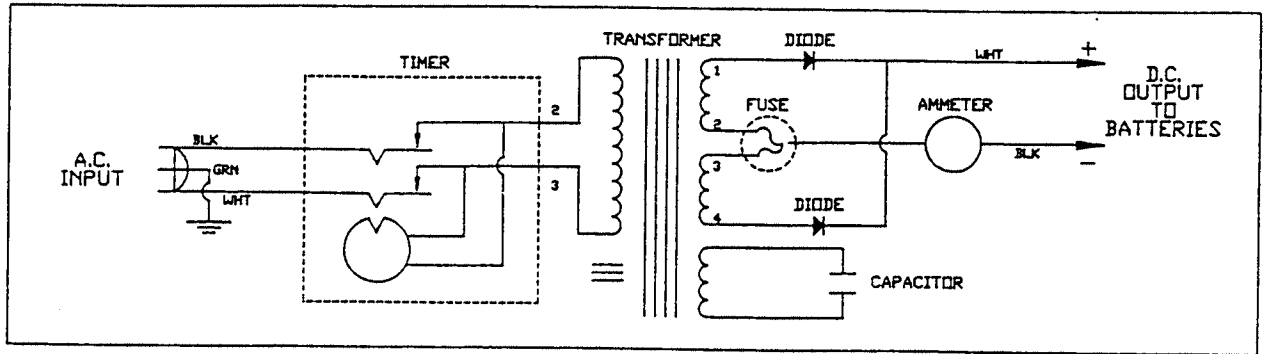
THE TRANSFORMER/RECTIFIER ASSY. CONSISTS OF: FUSE ASSY., HEAT SINK ASSY. WITH DIODES AND INSULATOR, D.C. HARNESS AND BUSHING, CAPACITOR AND TRANSFORMER.



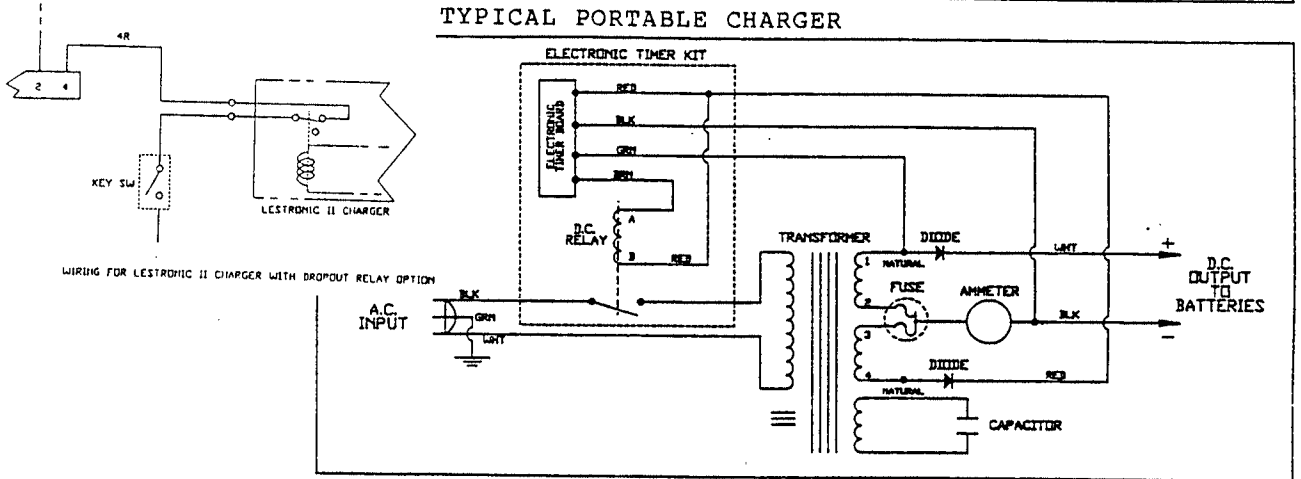
NOTE: HAS SAME BASIC PARTS AS PORTABLE

BUILT-IN LESTER CHARGER
 (TYPICAL) FOR COMPONENT IDENTIFICATION
 SEE PARTS LIST FOR BUILT-IN CHARGERS

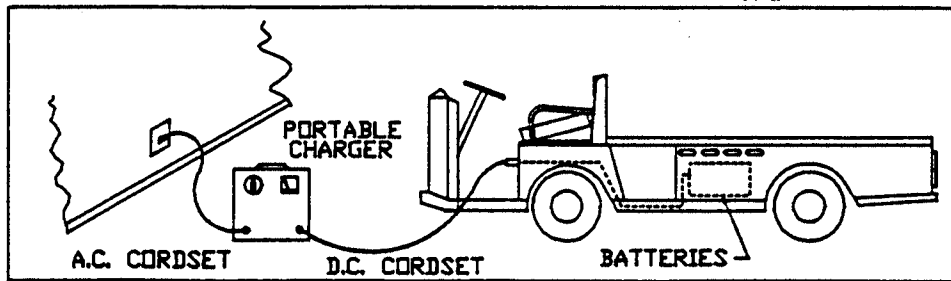
CHARGER SCHEMATICS



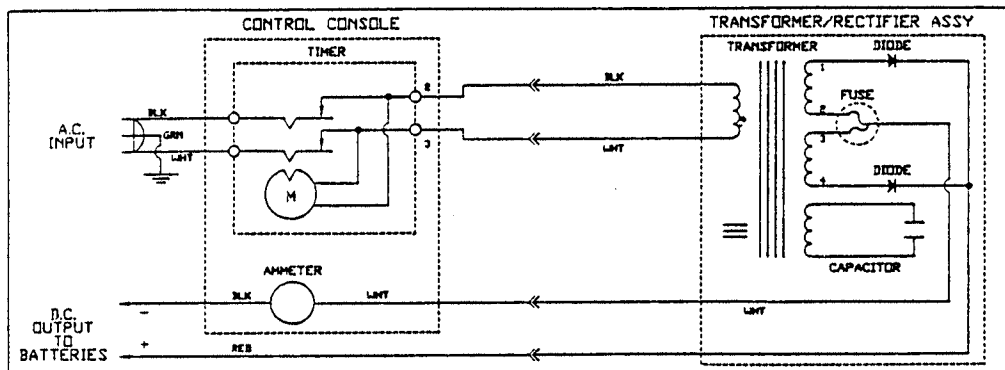
TYPICAL PORTABLE CHARGER



TYPICAL PORTABLE ELECTRONIC TIMER CHARGER (LESTRONIC II)



TYPICAL DIAGRAM DURING CHARGING



TYPICAL FOR ALL BUILT-IN CHARGERS

OPERATION OF "LESTER MATIC" BATTERY CHARGERS

INTRODUCTION

The Lester-Matic battery charger is a highly reliable, line compensting unit. When used according to instructions, the Lester-Matic will tend to lengthen battery life with less frequent additions of water.

INITIAL INSTALLATION:

Circuit breaker or fuse protection in the AC line to which the charger is to be plugged shoud allow at least 15 amps per charger. When it is necessary to use an AC extension cord to the charger, use a three conductor No. 12 AWG cord with ground, and keep as short as possible. Instructions printed on the cover of the charger are for daily reference.

NORMAL OPERATION:

The state of discharge of the batteries will be slightly different every time they are put on charge, but the Lester-Matic varies automatically the initial charge rates, and taper of charge rate over the charge period. Thus momentary initial charge rate will vary from 18-30 amps, dropping quickly to a lower value, and then tapering gradually over the charge period to a finish rate of 1-4 amps (in the green shaded area of the ammeter dial) for the last 1-3 hours. When batteries are slightly discharged, the ammeter needle will be in the green shaded area for 7-8 hours, but the specific gravity will not rise to full charge until the cells have been equalized. The normal charging with the ammeter needle in the green shaded area is important to achieve equalization of all battery cells, every time the batteries are charged. Since the taper of the charging rate (in amps, as indicated by the ammeter needle) is controlled by the rising voltage of the batteries being charged, proper performance of the charger and resulting good battery life is dependent upon the following factors.

1. An Adequate AC line to handle the power required (see "Initial Installation")
2. All cells of the batteries must be good, rising to approximately 2.5 DC volts per cell while still on charge or near the end of a 12-hour charging period. When in doubt, check each cell with a single voltmeter while still on charge. If a low reading is obtained; check the low cells with a temperature corrected hydrometer. NOTE: Hydrometer float must be thoroughly clean to obtain accurate specific readings.
3. All electrical connections of the vehicle must be clean and tight.
4. Batteries should be charged just enough to bring them to full charge because overcharging is harmful. The state of charge can be tested accurately in each cell with a hydrometer or cell tester (voltmeter), but to simplify maintaining a fleet of cars, which normally require charging at least once a day, the following "CHARGING TIME CHARTS" can be used for daily charging. Set timer knob to desired charging time shown in chart. Charger shuts off automatically at end of set period.

CHARGING TIME CHART

GOLF CAR USE	CHARGING TIME
9 Holes or Less	7 Hours
18 Holes or More	12 Hours
COMMERCIAL USE	
Less than 1 Hour	7 Hours
More than 1 Hour	12 Hours

OPERATION OF "LESTER-MATIC" BATTERY CHARGERS (continued)

If a golf car is used only occasionally, it is recommended that a refresher charge be given prior to using the car.

Commercial cars, not used in golf course operation, should be charged after use each day, or as charge becomes low as indicated by hydrometer or voltmeter test.

The necessity of adding water more frequently than two or three weeks, and/or hot battery cases at the end of the charging cycle, indicates the finish rate is too high, due to one or both of the following:

1. One or more bad cells in the batteries.
2. Batteries are starting to age to a point where hours of charge should be reduced gradually to obtain prolonged battery life.

STORAGE:

Charger may be left connected to the batteries and should be turned on for the 12-hour period once a month. In extremely cold conditions it may be necessary to charge more frequently. Check with your battery manufacturer. After each charge cycle the charger should be checked to ensure that it has turned off. Severe overcharging and possible damage to the batteries could result if the charger remains on for prolonged periods of time.

CAUTION:

THIS CHARGER IS FOR USE ONLY ON BATTERY SYSTEMS OF THE TYPE AND CAPACITY SPECIFIED ON THE CHARGER NAMEPLATE. USE OTHERWISE WILL DAMAGE CHARGER AND/OR BATTERIES.

Due to the electrical characteristics of this charger, it is possible to improperly hook up batteries and not blow the fuses when charging. When installing batteries, be sure polarity is correct. With a DC voltmeter, check terminal voltage and polarity at the car receptacle.

CAUTION:

When working near capacitor terminals be sure charger is turned off. With charger "on" transformer capacitor voltage is approximately 640 volts. Use care. Before performing service, disconnect AC and DC leads. Discharge capacitor before servicing.

STEP BY STEP OPERATING PROCEDURES

1. Provide adequate ventilation for both batteries and charger. The convection-cooled Lester-Matic requires an unobstructed flow of cooling air for proper operation.
2. Connect DC plug (portable unit) to vehicle receptacle.
3. Turn timer to "ON" for well discharged batteries or to "7" for lightly discharged batteries. Charger shuts off automatically at end of set period.
4. To determine approximate full charge at start of days use, turn timer knob to "1". Drop of ammeter needle to 1-4 amps in 15 minutes or less indicates full charge.
5. ALWAYS TURN TIMER TO "OFF" BEFORE DISCONNECTING CHARGER FROM BATTERIES.

PROPER CARE OF MOTIVE POWER BATTERIES

NEW BATTERIES

1. Brand new batteries should be given a 12 hour charge before their first use, because it is difficult to know how long vehicle batteries have been in storage without a charge since new.
2. Limit use of brand new batteries between charges for first 5 cycles. New batteries and older batteries which have been in storage are not capable of their rated output until they have been discharged and charged a number of times.
3. During the first month of new batteries, particularly when night-time temperatures are below 60 F, give them an extra 12 hour charge once a week. The ampere-hours of energy that batteries can deliver and their charge acceptance varies directly with battery temperature.
4. All batteries that still taper down into the 1-4 amps area of the ammeter toward end of charge should be given the full 12 hours of charge. All cells in a set of batteries do not react identically to the same discharge and charge current. In a normal 12 hours charge the last 3 to 5 hours at low finish charge rate equalize the cells for better battery life.
5. When batteries age to the point where charge rate no longer tapers into the 1-4 amps area of the ammeter, reduce the hours of charge progressively to 10 hours, 8 hours, and finally down to 6 hours near the end of useful life. As batteries age, their on-charge voltage at end of charge period drops progressively, thereby causing a high finish charge rate in amperes and resultant higher water use rates.

VERIFY BATTERIES ARE CHARGED

1. Turn on the timer first thing in the morning and check to see if charger ammeter needle jumps smartly to 15 amps or more and then tapers into the 1-4 amps area within 15 minutes. This will provide a very simple means of verifying that the batteries were truly charged the night before. It also shows aging batteries whose finish charge rate will not taper into the ammeter 1-4 amps area.
2. Add water carefully to proper level in cells as required after they have been fully charged. Do not fill them so high that they bubble over while charging. New batteries require very little additional water, whereas very old batteries may need additional water two or three times a week. Water (electrolyte) level in battery cells settles when batteries are discharged and rises during charge. The probability of overfilling can be reduced by adding water when batteries are fully charged.

PREVENTIVE MAINTENANCE

1. When night air temperatures fall below 65 degrees F, batteries charged in unheated areas should be placed on charge as soon after use as possible. Under such condition a 4 hour equalize charge once a week in the early afternoon will improve state of charge and battery life.
2. Keep tops of batteries and battery hold-downs clean and dry. Tops of batteries and battery hold-downs must be kept clean at all times to prevent voltage leakage and flow of current between the batteries and the vehicle frame.

PROPER CARE OF MOTIVE POWER BATTERIES (continued)

WARNING

LEAD ACID BATTERIES CONTINUOUSLY EMIT HIGHLY EXPLOSIVE GASES. DURING NORMAL VEHICLE OPERATION THE CONCENTRATION OF THESE GASES IS A POTENTIAL HAZARD TO BE CONSIDERED DANGEROUS WHEN 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. LIGHTED CIGARETTES MUST NOT BE BROUGHT CLOSE TO THE BATTERY COMPARTMENT.

DURING THE CHARGING PROCESS, EMISSIONS ARE GREATLY INCREASED.

ANY AREA IN WHICH CHARGING BATTERIES ARE CONFINED MUST BE WELL VENTILATED, ANY 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.

MALFUNCTIONS SYMPTOMS AND THEIR REMEDIES

1. The Lester-Matic charger is designed with as few parts as possible. Since each component can be tested individually, trouble shooting is a simple task. The following is a list of symptoms with their associated test procedures and remedies.

NO TRANSFER HUM AND AMMETER DOES NOT REGISTER

In the event no hum is detected from the transformer, check the AC cord to be sure it is securely plugged into a live AC outlet. When three-prong to two-prong adapters are used, they tend to work loose giving a poor connection. If the cord connection is secure and still no hum is noticed, a continuity test of the AC circuit is necessary. Turn the timer to "ON" and, with a suitable continuity tester, check circuit across the AC plug prongs (Figure 1). CIRCUIT SHOULD BE COMPLETE. If not complete, individually check the AC cord, timer primary transformer coil, and all connections.

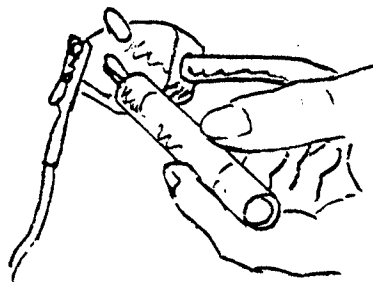


FIGURE 1

TRANSFORMER HUMS BUT NO AMMETER INDICATION

Inspect the DC plug connection to the vehicle receptacle and also check to ensure that the batteries are connected properly to the receptacle. If there is still no ammeter indication, a continuity test of the charger DC circuit must be performed. Turn the time to "OFF" and disconnect the AC and *DC plugs. Perform the following tests, using a low voltage tester, to check the continuity of the DC circuit.

MALFUNCTION SYMPTOMS AND THEIR REMEDIES (continued)

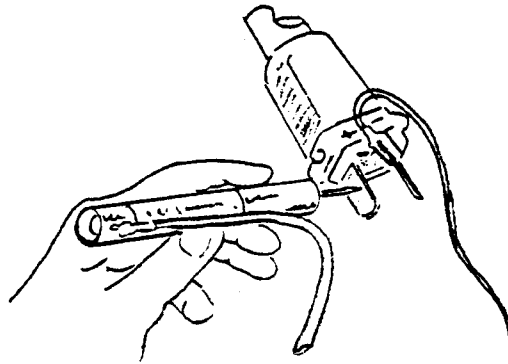
TRANSFORMER HUMS BUT NO AMMETER INDICATION (continued)

* For built-ins, disconnect AC plug and DC leads to battery to isolate charger.

(a) Connect tester clip to negative (-) blade and probe to positive (+) blade (Figure 2). CIRCUIT SHOULD BE COMPLETE. If not complete, first check the DC fuse link.

If one or both fuses have blown, the link will be broken and usually the clear plastic fuse cover will be discolored. Refer to "Fuse Link Blowing" for test procedures. If fuses are good, individually check the fuse connections, DC cord, and diode connections (each may be checked with the continuity test light).

NOTE: On built-in charger the red lead is (+) and black lead is (-) on DC output.



Typical plug.
Check same
polarity on
other plugs.

FIGURE 2
D.C. PLUG CHECK FOR PORTABLE CHARGERS ONLY

(b) If the circuit in Figure 2 is complete, reverse test light leads as shown in Figure 3. CIRCUIT SHOULD NOT BE COMPLETE. If circuit is complete, check DC cord for a "short" between the two wires. More probably, one or both diodes have "shorted". Refer to "Fuse Link Blowing" part (b) for continuity test of diodes.

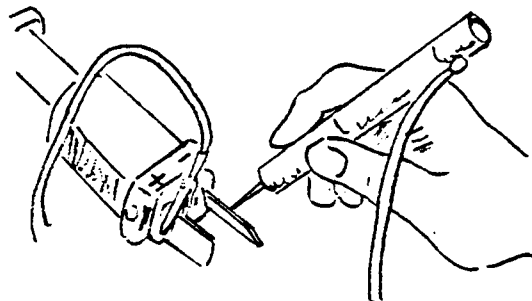


FIGURE 3
D.C. PLUG CHECK FOR PORTABLE CHARGERS ONLY

CAUTION: Discharge capacitor before proceeding with (c).

MALFUNCTION SYMPTOMS AND THEIR REMEDIES (continued)

- (c) If (a) Figure 2 and (b) Figure 3 check good, assume the capacitor is shorted. Remove one wire from a capacitor terminal and place continuity tester clip to one terminal and probe to other. If circuit is complete, capacitor is "shorted" and must be replaced.

CHARGER DC FUSE LINK(S) BLOWS

This condition is caused by:

- (a) Reverse polarity between charger and batteries, such as incorrect installation of batteries, wiring of DC receptacle or charger plug.
- (b) A short circuit failure of one or both diodes. First disconnect one diode. Using a low voltage continuity tester check each diode as shown in Figure 4. Then reverse the tester leads and check each diode again. If the diode conducts current in both directions the diode is shorted and must be replaced. Replace either the entire heat-sink assembly or the defective diode. When replacing a single diode be sure the new diode is pressed squarely into the hole and does not extend beyond the rear surface of the heat-sink plate.

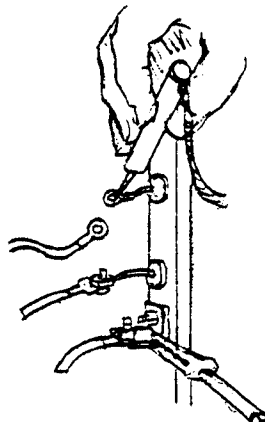


FIGURE 4

- (c) If (a) and (b) fail to reveal the malfunction, check wiring of both charger and vehicle against their respective wiring diagrams.

CHARGER OUTPUT IS LOW

The most probable cause is one diode shorting and blowing one fuse. Refer to "Fuse Link Blowing" part (b) to check the diodes. If a diode is shorted both the heat sink and fuse assemblies must be replaced.

CHARGER DOES NOT TURN OFF

In models equipped with timers, this is due to an inoperative timer. In this case replace timer assembly.

AC LINE FUSE OR CIRCUIT BREAKER BLOWS

If this occurs when charger is turned on without being plugged into the vehicle, the AC cord, timer motor coil, or the transformer may be shorted. To check the AC cord, ensure that the timer is "OFF" and connect the continuity tester across the AC plug prongs. If circuit is complete the AC cord is shorted and must be replaced. To check the timer motor coil, disconnect the white timer motor wire and connect continuity tester to the motor coil leads. If the lamp glows, the coil is shorted. To test the transformer, disconnect secondary leads #1 and #4. If the AC fuse or breaker still blows, the transformer is shorted internally and must be replaced.

MODEL C CHARGERS

RECOMMENDED REPLACEMENT PARTS FOR CHARGERS

	PORTABLE	BUILT-IN	PORTABLE	BUILT-IN	BUILT-IN
TAYLOR-DUNN PART NO.	79-304-00	79-304-05	79-305-00	79-305-05	79-306-10
LESTER MODEL NO.	36LC25T12	36LC25-3T12	36LC25 PORTABLE LES.II	36LC25 LES.II	W/INTERLK 36LC408E7 LES.II
	115/60 9611	115/60 7660	115/60 7850	115/60 9655	115/60 7090
DROP OUT RELAY					79-809-00
TRANSFORMER	79-664-28	79-664-16	79-644-27	79-644-31	
CAPACITOR	79-902-00	79-902-00	79-902-00	79-902-00	79-902-00
HEAT SINK ASSEMBLY W/DIODES	79-749-13	79-749-11	79-749-13	79-749-13	79-749-10
DIODE REPLACEMENT	79-745-10	79-745-10	79-745-10	79-745-10	79-745-11
FUSE ASSEMBLY	79-831-00	79-831-00	79-831-00	79-831-00	79-831-11
BUSHING FOR CORDSETS	79-530-00	79-530-00	79-530-00	79-530-00	79-530-00
HOUSING		79-599-10			
TIMER	79-805-60	79-805-60	79-805-63	79-805-63	79-805-67
KNOB, TIMER	79-806-00	79-806-00			
AMMETER	79-851-10	79-851-10	79-851-10	79-851-10	77-852-00
CORDSET, A.C.		79-575-10			

MODEL C CHARGERS

RECOMMENDED REPLACEMENT PARTS

TAYLOR-DUNN PART NO.	PORTABLE 79-300-00	BUILT-IN 79-300-05	PORTABLE 79-301-00	BUILT-IN 79-301-05	BUILT-IN 79-306-11
LESTER MODEL NO.			PORTABLE LES. II 24LC25 115/60 9510	BUILT-IN LES. II 24LC25 115/60 10505	W/INTLK LES. II 24LC25 115/60
TRANSFORMER/RECTIFIER ASSEMBLY, COMPLETE					
TRANSFORMER	79-644-10	79-644-11			
CAPACITOR	79-902-00	79-902-00	79-902-00	79-902-00	79-902-00
HEAT SINK ASSEMBLY, WITH DIODES	79-749-11	79-749-11	79-749-11	79-749-11	79-749-11
DIODE REPLACEMENT	79-745-10	79-749-10	79-745-10	79-745-10	79-745-10
FUSE ASSEMBLY	79-831-00	79-831-00	79-831-00	79-831-00	79-831-00
CONTROL CONSOLE ASSEMBLY COMPLETE	N/A	N/A	N/A	N/A	N/A
BUSHING, FOR CORDSETS	79-530-00	79-530-00			79-530-00
HOUSING	N/A	79-599-10	N/A	N/A	N/A
TIMER	79-805-60	79-805-60	79-805-64	79-805-64	79-805-66
KNOB, TIMER	79-806-00	79-806-00	N/A	N/A	N/A
AMMETER	79-851-10	79-851-10		77-852-10	77-852-00
CORDSET, A.C.	76-003-00	79-575-10		77-575-10	79-575-10

MODEL C CHARGERS

RECOMMENDED REPLACEMENT PARTS
EXPORT CHARGERS 36V.DC

	PORTABLE	BUILT-IN	PORTABLE	BUILT-IN
TAYLOR-DUNN PART NO.	79-304-90	79-304-95	79-305-90	79-306-95
LESTER MODEL NO.	36LC25T12 230/50 8876	36LC25-3T12 230/50 7655	36LC40-4T12 230/50 7645	36LC40-4T12 230/50 7640
TRANSFORMER	79-664-17	79-664-18	79-644-21	79-644-22
CAPACITOR	79-902-10	79-902-00	79-902-00	79-902-00
AMMETER	79-856-00	79-856-00	79-852-00	79-852-00
TIMER	79-805-11	79-805-11	79-805-62	79-805-11
KNOB, TIMER	79-806-00	79-806-00	79-806-00	79-806-00
HEAT SINK ASSEMBLY W/DIODES	79-749-00	79-749-11	79-749-10	79-749-10
DIODE REPLACEMENT	79-745-10	79-745-10	79-745-11	79-745-11
FUSE ASSEMBLY	79-831-00	79-831-00	79-831-10	79-831-11
CORDSET, A.C.	79-575-20	79-575-20	79-575-20	79-575-20
CORDSET, D.C.	79-566-10		79-567-10	
BUSHING FOR CORDSETS A.C.	79-530-00	79-530-00	79-530-00	79-530-00
BUSHING FOR CORDSETS D.C.	79-530-00		79-531-00	

MODEL C CHARGERS

RECOMMENDED REPLACEMENT PARTS FOR CHARGERS
EXPORT CHARGERS 24V.DC

TAYLOR-DUNN PART NO.	PORTABLE 79-300-90	BUFLT-IN 79-300-95	PORTABLE 79-302-90
LESTER MODEL NO.	24LC25T12 230/50 8875	24LC25-3T12 230/50 7670	24LC40-4T12 230/50 7665
TRANSFORMER	79-664-12	79-664-13	79-644-15
CAPACITOR	79-902-10	79-902-00	79-902-00
AMMETER	79-851-10	79-851-10	79-852-00
TIMER	79-805-62	79-805-62	79-805-62
KNOB, TIMER	79-806-00	79-806-00	79-806-00
HEAT SINK ASSEMBLY W/DIODES	79-749-00	79-749-11	79-749-10
DIODE REPLACEMENT	79-745-10	79-745-10	79-745-11
FUSE ASSEMBLY	79-831-10	79-831-00	79-831-10
CORDSET, A.C.	79-575-20	79-575-20	79-575-20
CORDSET, D.C.	79-566-10		79-567-10
BUSHING FOR CORDSETS A.C.	79-530-00	79-530-00	79-530-00
BUSHING FOR CORDSETS D.C.	79-530-00		79-530-00

RECOMMENDED SPARE PARTS

COMPONENTS	SPARES FOR VEHICLES	
	1 - 20	20 OR MORE
TRANSFORMERS	1	2
CAPACITORS	1	2
AMMETERS	1	2
TIMERS	1	2
KNOB - TIMER	2	5
HEAT SINK ASSEMBLY	1	2
DIODES	2	4
FUSE ASSEMBLY	2	4
CORDSET A.C.	2	4
CORDSET D.C.	2	4
HOUSING, CONTROL CONSOLE	2	1

MAINTENANCE PROCEDURES

BODY AND TRIM

Your vehicle has been finished with several coats of durable enamel.

It will require the same care as you would give your automobile. The chrome trim is also resistant to corrosion and will extend the life of the finish and maintain lasting beauty.

For identification of Body and Trim parts available for repair and replacement, refer to the following pages in this section.

DRAWING - BODY & TRIM PARTS

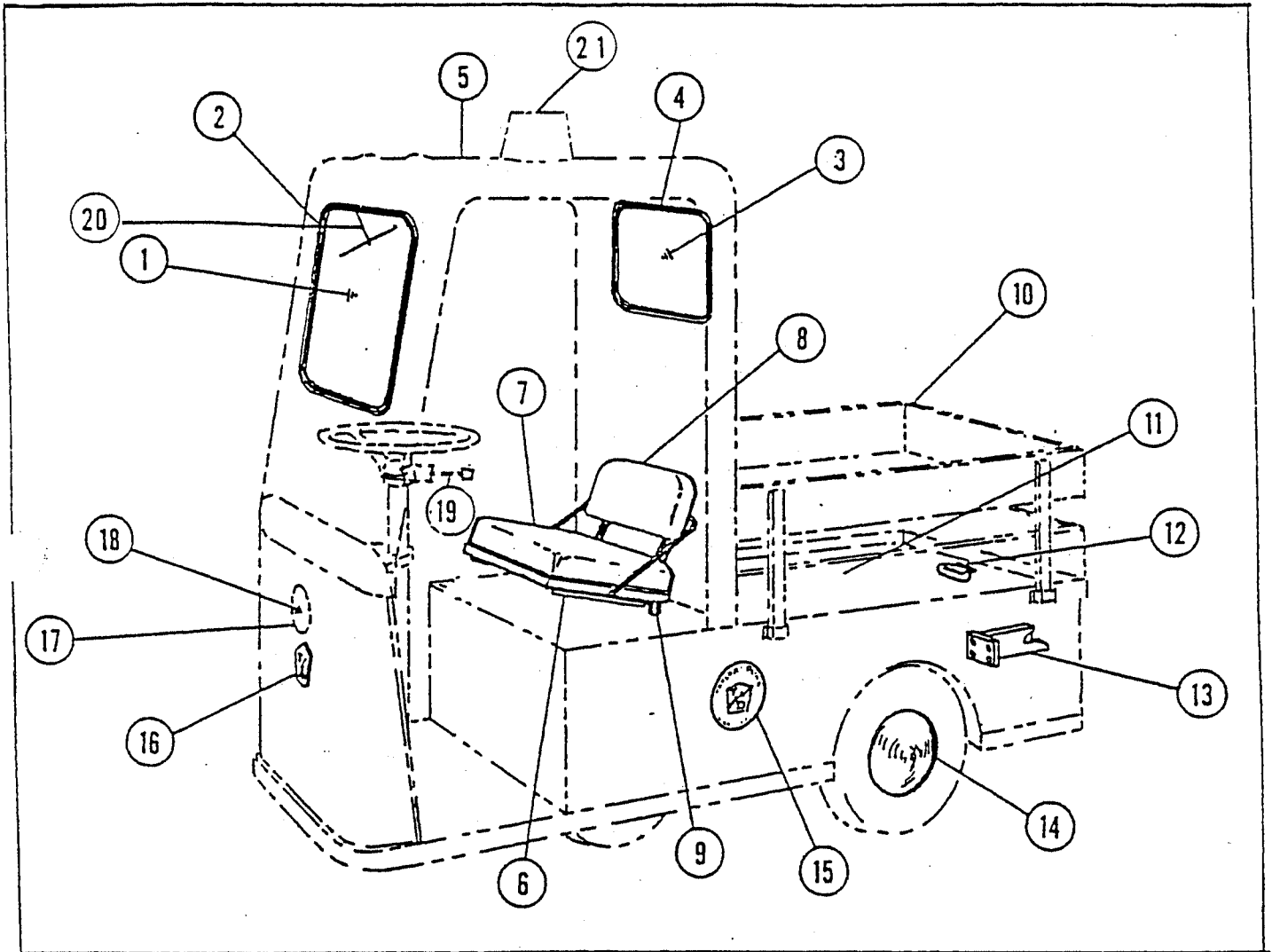


FIG. I. D.	T-D PART NO.	DESCRIPTION	QTY.
10-1	90-811-00	WINDSHIELD, SAFETY GLASS (19-1/2 X 21-1/2)	1
10-2	98-312-00	WINDOW CHANNEL, FRONT 79 INCHES LONG	1
10-3	90-851-00	REAR WINDOW, SAFETY GLASS (12 X 18)	1
10-4	98-314-00	WINDOW CHANNEL, REAR (57 INCHES LONG)	1
10-5	91-005-00	FIBERGLASS CAB - WITHOUT WINDOW GLASS (WHITE)	1
10-5	90-903-00	SIDE CURTAINS LESS STEEL FRAME FOR CAB	1 PR.
10-5	90-913-98	SIDE CURTAINS STEEL FRAME LESS #91-802-00 HGE. L	1
10-5	90-913-99	SIDE CURTAINS STEEL FRAME LESS #91-802-00 HGE R	1
10-5	91-802-00	HINGE, SIDE CURTAIN DOOR FRAME	4
10-5	97-313-51	SHAFT - 5/16 SQ. NC THREAD FOR CURTAIN DOOR LATCH	2
10-5	97-313-52	PLATE - DOOR LATCH (INNER & OUTER)	4
10-5	97-313-53	HANDLE - DOOR LATCH (INNER & OUTER)	4
	92-201-00	4 X 8 MIRROR	1
	92-202-00	MIRROR BRACKET	1
	88-065-08	TRUSS HEAD MACHINE SCREW 1/4 X 5/8 NC	
	88-068-62	LOCK WASHER 1/4 INCH	
	88-069-87	NUT FASTITE 1/4 INCH NC	
	88-069-83	NUT ACORN 1/4" NC	
10-6	90-100-00	JUMP SEAT FRAME (LESS CUSHIONS)	1
10-7	90-001-00	SEAT CUSHION	1
10-8	90-000-00	SEAT BACK REST	1
10-9	90-100-51	SUPPORT ROD - JUMP SEAT FRAME	2
	88-837-09	PAN HEAD SHEET METAL SCREW #14 X 3/4	8
	88-107-09	SQUARE HEAD SET SCREW 3/8 X 3/4 NC	Ø OR C
10-10	90-550-10	STAKE SIDES & END ASSEMBLY (14" HIGH STAKES WITHOUT CAB)	1
10-10	90-550-11	STAKE SIDES & END ASSEMBLY (14" HIGH STAKES WITH CAB)	1
10-10	90-540-00	STAKE SIDE, SIDE GATE HOOK	4
10-10	90-543-00	1-1/2 X 3/4 CHANNEL STAKES - 17" LONG	6
10-10	90-547-00	1-1/2 X 3/4 CHANNEL STAKES - 21" LONG	6
10-10	90-546-00	1-1/2 X 3/4 CHANNEL STAKES - 27" LONG	6
10-10	90-548-00	1-1/4 X 3/4 CHANNEL STAKES - 39" LONG	6
10-10	90-544-00	2" X 1" STAKE POCKETS	6
	88-065-13	TRUSS HEAD MACHINE SCREW 1/4 X 1-1/4 NC	44
	88-065-11	TRUSS HEAD MACHINE SCREW 1/4 X 1" NC	24
10-11	90-420-00	DECKBOARD 1/2" PLYWOOD (29-3/8 X 48)	1
10-12	95-510-00	DECK HANDLE	1
10-13	97-804-00	HITCH PINTLE TYPE	1
10-14	92-000-00	CHROME WHEEL COVER 8" FOR 400 X 8 WHEEL	2
10-15	94-301-00	TAYLOR-DUNN DECAL	2
10-16	94-201-00	TAYLOR-DUNN EMBLEM	1
10-17	72-022-51	RUBBER RING	Ø OR 2
10-18	30-805-00	PLATE, LIGHT COVER	Ø OR 2
10-19	74-161-61	KIT, TURN SIGNAL	1
10-20	74-050-62	KIT, WINDSHIELD WIPER	1
10-21	72-023-00	ROTATING AMBER BEACON	1
	71-650-00	3" RED REFLECTOR	1
	94-371-00	SERIAL NUMBER PLATE (PLEASE STATE SERIAL NO.)	1
	94-410-00	SEAT CLEANER (1 QUART) MIXES 5 TO 1 W/WATER	1
	95-950-00	PAINT - 1/2 PINT CAN (SPECIFY COLOR)	
	95-951-00	PAINT - 1 PINT CAN (SPECIFY COLOR)	
	95-952-00	PAINT - 1 QUART CAN (SPECIFY COLOR)	

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