

# **MAINTENANCE INSTRUCTIONS**

## **AND**

# **PARTS LIST**

|                    |                                  |
|--------------------|----------------------------------|
| <b>Model:</b>      | <b>P with contractor control</b> |
| <b>Serial No.:</b> | <b>25822 - 53150</b>             |
| <b>Year:</b>       | <b>1973 &amp; UP</b>             |
| <b>Manual:</b>     | <b>MP-249-95</b>                 |

**- IMPORTANT -**

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



**TAYLOR-DUNN®**  
Commercial and Industrial Vehicles Since 1949

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MODEL P W/SCR CONTROL  
SERIAL NO. 25822 TO 53150  
YEAR RANGE 1973 TO 1979  
MP-249-95

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

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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 and 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 page 3 of this manual for your specific operating guidelines.

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

WARNING: FAILURE TO COMPLY WITH ABOVE INSTRUCTIONS COULD RESULT IN INJURY TO THE VEHICLE OCCUPANTS, BYSTANDERS AND TO PROPERTY.

INSPECTION, SAFETY, AND INTRODUCTION  
ARRIVAL INSPECTION CHECK LIST

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

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

- A. Open all packages and examine any accessories which may be shipped detached from vehicle.
- B. Examine wiring for visible evidence of damage. Check all connections to insure that none have loosened during transit.
- C. Check all battery connections and electrolyte level in each cell.
- D. Inspect battery charger in accordance with manufacturers installation instructions.
- E. Check tires for damage and proper inflation. Check wheel lugs to insure their being tight.
- F. If vehicle is equipped with hydraulic brakes, check hydraulic lines for evidence of damage.
- G. Check brake fluid level in master cylinder.
- H. Examine entire vehicle for damage such as dents or cracks.
- I. Check operation of controls to see that they are working freely.

Upon completion of the Visual Inspection and review of the safety recommendations on Page 2 of SECTION A, an operational test should be made. Refer to operating instructions in SECTION B.

## INSPECTION AND INTRODUCTION

### INTRODUCTION

This unit is designed as an in plant tractor, to tow trailers. This tractor is designed to tow trailers in and around buildings and yards on smooth concrete or paved surfaces. It is designed to be powered by an electric motor that uses storage batteries as a power source. The operator rides on the vehicle in a sitting position. This vehicle is not designed to be driven on the public highways. It is not designed to be driven downhill or towed in excess of 10 M.P.H.

The tractor has a heavy steel exterior plate frame with internal members. All components are bolted to this frame.

#### MODEL NUMBER:

The following model numbers are covered by this manual - 3249P and 3250P.

#### SERIAL NUMBER:

The serial number of your unit is stamped into the top edge of the frame member, to the left of the seat. The model number and serial number are on a nameplate riveted to the dash panel steering support shelf forward of the steering column. In ordering parts or referring to your unit, please use these numbers. Replacement parts can be purchased directly from your local authorized dealer or direct from the factory in Anaheim, California.

## OPERATING INSTRUCTIONS

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

### STEERING

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

### KEY LOCK

Your vehicle is equipped with a keyed lock located in the dash panel. It is designed to lock the switch in the neutral position only. The key will remove from the lock in the locked position (neutral) only.

### BRAKE - AUTOMATIC (DEADMAN)

The drivers seat operates the automatic "Deadman" brake. The weight of the person moves the seat down and operates the brake release linkage. The brake is automatically applied when the seat is vacated. In conjunction the power to the drive motor is disconnected as the brake is applied.

### 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 column. It is operated by the handle. To place in forward position push the handle forward. To place in reverse position pull the handle backward towards rear.

#### 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. It also controls the amount of power delivered to the motor. When driving your vehicle you will be able to feel full power when accelerator is fully depressed and minimum power when only partially depressed. 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 at center of steering wheel. Depressing button sounds horn. Releasing button will immediately silence horn.

#### LIGHT SWITCH

The light switch that controls headlamps and taillamps is located in the dash panel. It is labelled for ON-OFF positions.

#### BATTERY CHARGER

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

#### SPECIAL ACCESSORIES

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



### OPERATING YOUR VEHICLE

To put your vehicle into operation, turn key clockwise. Next select direction by moving handle forward or backward. Slowly depress the accelerator pedal to go in desired direction and speed selected. For greatest efficiency it is recommended that you travel at the fastest speed that you can safely maintain. You will find that your vehicle will consume almost as much current at low speed as it does at higher speeds. Therefore, without taking any unnecessary risk traveling at the faster speed will deliver more miles per battery charge than continual use in the lower speed range.

#### CAUTION:

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

When you leave your vehicle, it is best to always place forward-reverse switch in neutral position. The deadman brake will prevent vehicle from rolling free. Lock and remove key.

Drive Safely and enjoy your Taylor-Dunn Vehicle.

## TAYLOR-DUNN LIMITED 90 DAY WARRANTY

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

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

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

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

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

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

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

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

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

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

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

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

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

### WARRANTY SERVICE

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

### Examples of Items Not Covered by Warranty

Provisions of the warranty will not apply to:

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

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

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

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

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

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

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

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

### Owner's Obligation and Responsibility

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

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

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

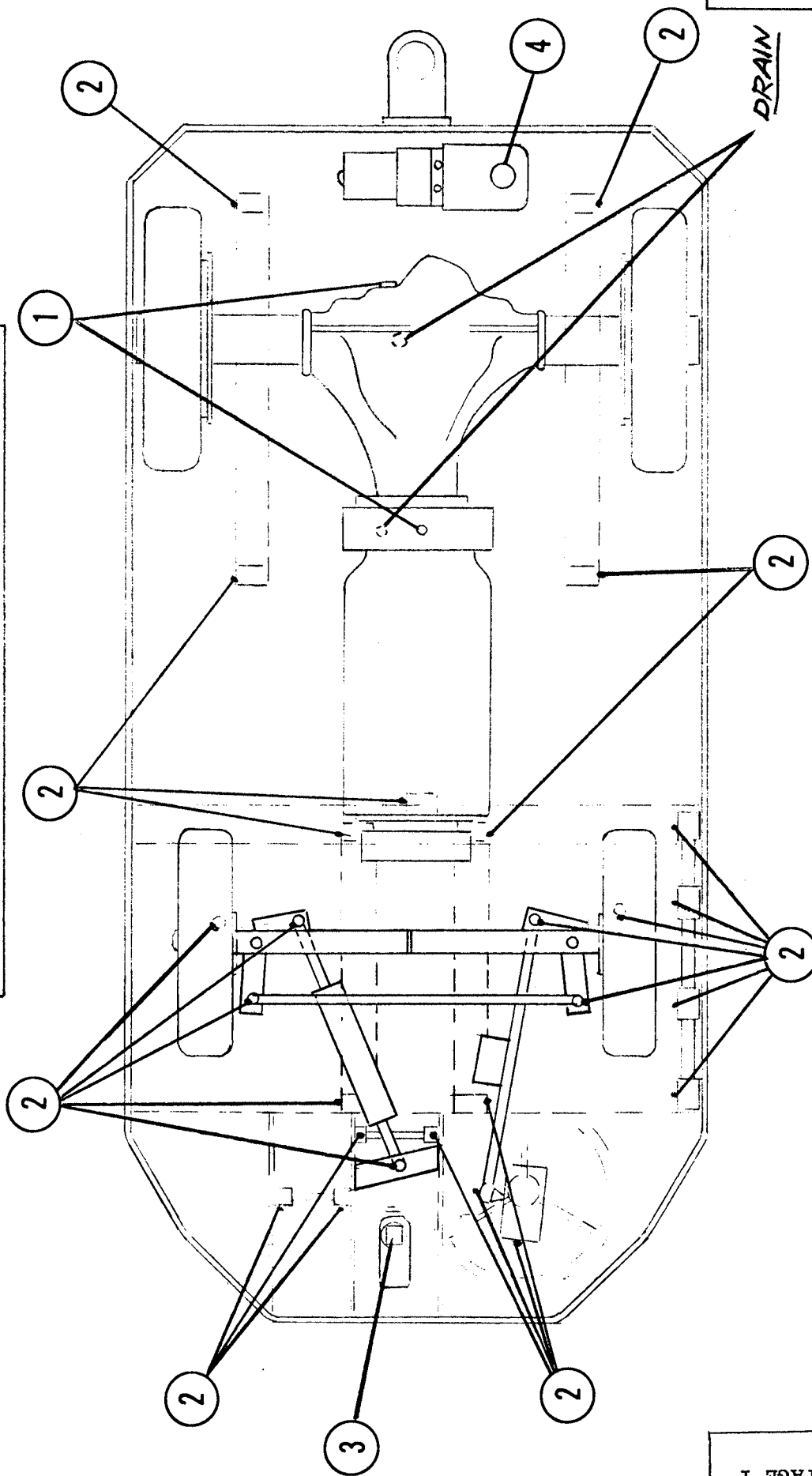
MAINTENANCE GUIDE CHECKLIST

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

| MAINTENANCE SERVICE  | REFER<br>SECTION | EVERY<br>WEEK | EVERY<br>MONTH | EVERY 3<br>MONTHS | EVERY<br>YEAR |
|--|------------------|---------------|----------------|-------------------|---------------|
| Check and fill batteries. If necessary fill with distilled water only.                   | J8               | X             | X              | X                 | X             |
| Check all contact points on contactor and replace when necessary.                        | J6               |               | X              | X                 | X             |
| Lubricate all zerk fittings.   | E                |               | X              | X                 | X             |
| Lubricate all moving parts without zerk fittings. Use all purpose engine oil.            | E                |               | X              | X                 | X             |
| Wash off batteries with water, (Use soda if necessary).                                  | J8               |               | X              | X                 | X             |
| Check all wire connections. Be sure they are all clean and tight.                        |                  |               | X              | X                 | X             |
| Check service and adjust deadman brake.  | J2               |               | X              | X                 | X             |
| Check hydraulic brake system for leaks, also check brake fluid level in master cylinder. | J3               |               | X              | X                 | X             |
| Check rear axle differential oil level (Refer to lubrication diagram).                   | J2 & E           |               | X              | X                 | X             |
| Check, clean and adjust forward reverse switch.  | J5               |               | X              | X                 | X             |
| Check motor brushes. Blow out carbon dust. (Replace if necessary).                       | J2               |               |                | X                 | X             |
| Check and adjust front wheel bearings and fork spindle bearings.                         | J1               |               |                | X                 | X             |
| Check brake lining for wear, adjust brake shoes (hydraulic).                             | J2 & J3          |               |                | X                 | X             |
| Drain differential and refill with SAE 140 oil (Refer to lubrication diagram).           | J2 & E           |               |                |                   | X             |
| Repack front wheel bearings (use wheel bearing grease).                                  | J1 & E           |               |                |                   | X             |

# LUBRICANTS

- ① SAE 140 MULTI-SERVICE GEAR LUBE
- ② PRESSURE GUN GREASE
- ③ BRAKE FLUID SAE 70RI
- ④ AUTO. TRANS. FLUID TYPE AQ-ATF



SECTION-E  
PAGE 1

SECTION-E  
PAGE 1

LENGTH | QUAN. | REVISED DATE | REVISION

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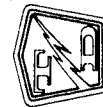
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LUBRICATION CHART  
MODEL 3249-P HEAVY DUTY

FIGURE 1  
SECTION E



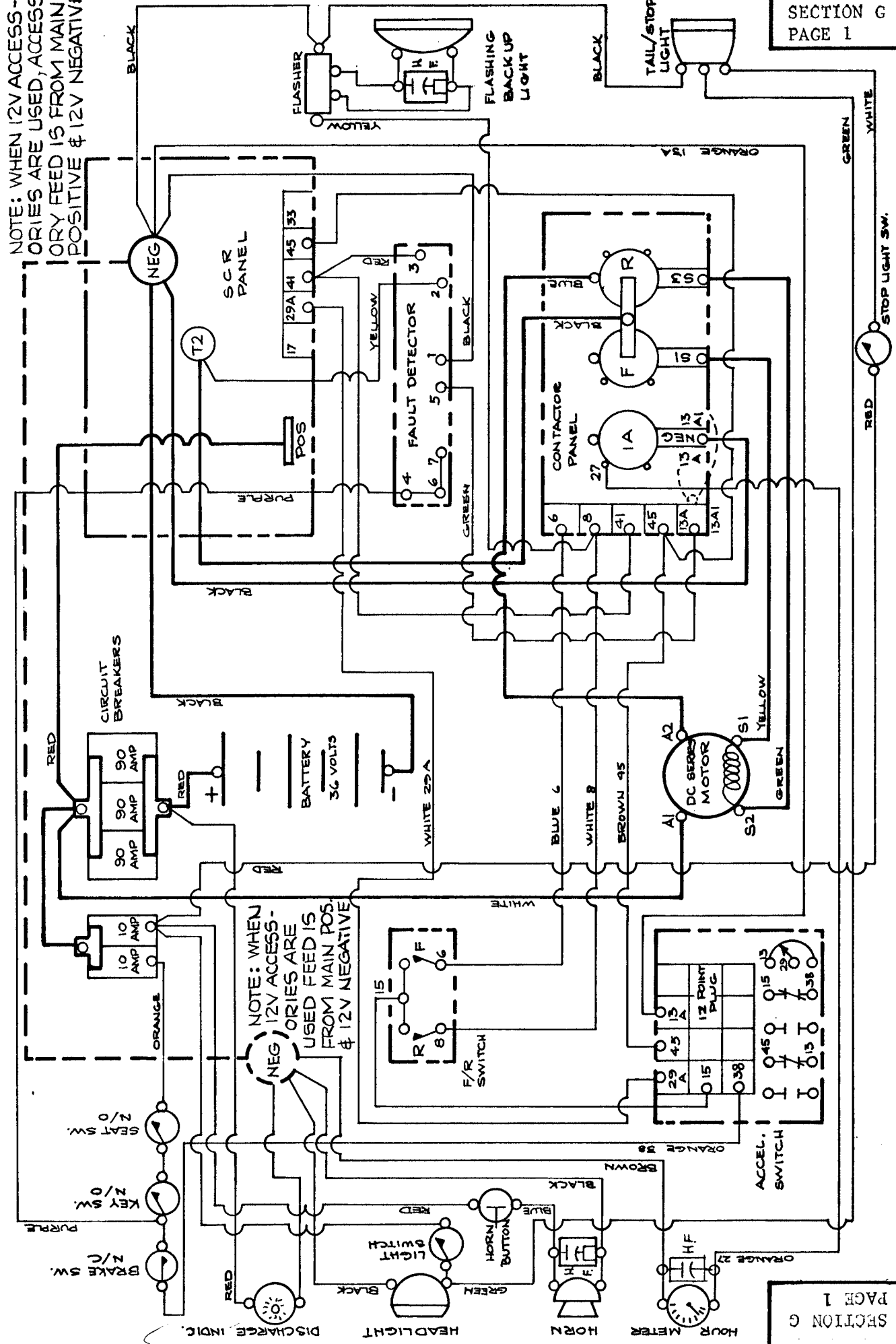
TAYLOR DUNN MFG. CO.  
2114 West Ball Rd.  
Anaheim, Calif.

TROUBLE SHOOTING PROCEDURES

| <u>SYMPTOM</u>   | <u>PROBABLE CAUSE</u>                     | <u>CORRECTIVE ACTION</u>                          |
|--|---|---|
| 1. <u>STEERING:</u>  |   |   |
| A. Pull in one direction   | 1. Check for bent steering linkage        | Replace or straighten                             |
| B. Hard Steering   | 1. Bad or frozen bearing in spindle       | Replace   |
| C. Sloppy or loose steering  | 1. Loose spindle bearing                  | Adjust  |
|  | 2. Loose wheel bearing                    | Adjust  |
| D. Power Steering Malfunction  | 1. Refer to Power Steering - Section J1   |   |
| 2. <u>BRAKES:</u>  |   |   |
| A. Soft Brakes   | 1. Check for worn lining                  | Adjust or replace when 1/8 or less of lining left |
|  | 2. Alignment of brake shoes               | Realign   |
|  | 3. Oil on brake lining                    | Find oil source and correct, wash brake band      |
|  | 4. Dirt on brake lining                   | Clean   |
|  | 5. Bind in linkage                        | Loosen or realign                                 |
|  | 6. Weak spring                            | Replace   |
|  | 7. Air in hydraulic brake                 | Bleed brakes                                      |
|  | 8. Bad seals in brake cylinders           | Replace   |
| B. No Brakes   | 1. Broken shoe                            | Replace   |
|  | 2. Broken connection in linkage           | Replace   |
|  | 3. Break in hydraulic line                | Repair  |
|  | 4. Seal failure in brake cylinder         | Replace   |
| 3. <u>DRIVE AXLE:</u> On units equipped with SCR controls, refer to Section J6 for Trouble Shooting and Service Adjustments. |   |   |
| A. No Power  | 1. Discharged batteries                   | Recharge or replace                               |
|  | 2. Check Circuit Breakers                 | Reset   |
|  | 3. Check contactor for contact            | Replace contacts                                  |
|  | 4. Check motor brushes for contact        | Clean or replace                                  |
|  | 5. Poor contact on forward reverse switch | Replace contact                                   |
|  | 6. Check for loose wire                   | Tighten or replace                                |
|  | 7. Check continuity through motor         | Repair or replace                                 |

| <u>SYMPTOM</u>  | <u>PROBABLE CAUSE</u>  | <u>CORRECTIVE ACTION</u>   |
|---|--|--|
| B. Erratic Operation  | <ol style="list-style-type: none"> <li>1. Contact making poor contact</li> <li>2. Motor brushes</li> <li>3. Check motor commutator for burning or wear</li> <li>4. Check for loose wiring</li> </ol>   | <p>Replace contacts</p> <p>Clean or replace<br/>Turn or replace</p> <p>Tighten</p>   |
| C. Jerky Starting   | <ol style="list-style-type: none"> <li>1. Resistor coil burned open</li> <li>2. Resistor shorted together</li> <li>3. Bad contactor, contacts</li> </ol>   | <p>Replace</p> <p>Spread apart</p> <p>Replace</p>  |
| D. Takes off in forward reverse without accelerator depressed | <ol style="list-style-type: none"> <li>1. Burned together contacts on contactor</li> <li>2. Short in wiring circuit</li> <li>3. Burned forward reverse switch</li> </ol>   | <p>Replace</p> <p>Correct</p> <p>Replace</p>   |
| E. Lack of power or slow operation                            | <ol style="list-style-type: none"> <li>1. Dragging brake</li> <li>2. Tight front wheel bearings</li> <li>3. Contactor not making contact on high speed bar</li> <li>4. Loose connection in wiring</li> <li>5. Partially burned out motor or thrown lead</li> <li>6. Weak batteries</li> <li>7. Bind or drag on differential</li> </ol> | <p>Re-adjust</p> <p>Re-adjust</p> <p>Re-adjust or<br/>replace contacts</p> <p>Tighten</p> <p>Replace or re-solder</p> <p>Replace</p> <p>Repair</p> |
| F. Thump or grinding noise in Drive Axle                      | <ol style="list-style-type: none"> <li>1. Motor bearing</li> <li>2. Defective bearing in differential</li> <li>3. Defective gears in differential</li> </ol>   | <p>Replace</p> <p>Replace</p> <p>Replace</p>   |

NOTE: WHEN 12V ACCESSORIES ARE USED, ACCESSORY FEED IS FROM MAIN POSITIVE & 12V NEGATIVE



SECTION G  
PAGE 1

LENGTH | QUAN. | REVISED DATE | REVISION

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



WIRING DIAGRAM  
MODEL 3249P TRACTOR  
WITH SCR MODEL 290

FIGURE 2  
SECTION G

NO. DESCRIPTION

TOL. FRAC. ± DEC. ±

SCALE None

DRAWN BY REA

DATE 2-26-76

SECTION G  
PAGE 1

PARTS ORDERING PROCEDURE

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

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

1 - Part No. 86-501-98 Ball Joint (Left Hand Thread)

1 - Set of 4 - Part No. 70-124-00 Motor Brushes for Baldor Motor,  
3½ H.P., 36 Volt, Specification No. 28-1408-11704

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

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

Be sure to include original invoice number, date of shipment of vehicle, and vehicle serial 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 W. Ball Road  
Anaheim, California 92804  
Phone: 714-956-4040  
Telex: 65-5393



SUGGESTED SPARE PARTS LIST

| FIG. I.D.<br>NO.   | T-D PART NO. | DESCRIPTION  | QUANTITY OF<br>1-20 UNITS |
|--|--------------|--|---------------------------|
| REFER TO FIGURE 4 FRONT AXLE, STEERING & TIRES           |              |  |                           |
| 4-2  | 71-501-00    | Horn Button (Standard)   | 1                         |
| 4-7  | 96-320-00    | Lug Bolt   | 10                        |
| 4-16   | 45-338-00    | Oil Seal   | 2                         |
| 4-21   | 32-213-00    | Bushing (Nylon) (Same on Rear Axle)  | 14                        |
| 4-22   | 88-171-20    | Shackle Bolt (Non Lubricated Type)(Same On Rear Axle)  | 14                        |
| 4-23   | 16-870-00    | Shackle Strap (Punched Hole)   | 5                         |
| 4-24   | 16-871-00    | Shackle Strap  | 5                         |
| 4-36   | 88-179-81    | Lock Nut 9/16" NF (Hex)  | 6                         |
| 4-45   | 13-952-10    | Tire and Demountable Cast Iron Wheel - 16 x 4 x 12-1/8 Solid Cushion Tire (Five 1/2" Holes On 4-1/2" Bolt Circle On Wheel) | 2                         |
| 4-35   | 87-000-00    | Grease Fitting 1/8" - 27 THD. (Straight)   | 4                         |
| REFER TO FIGURE 3 & 4 ON UNITS WITH POWER STEERING       |              |  |                           |
| 3-1  | 99-530-00    | Control Valve (Power Steering)   | 1                         |
| 3-2  | 99-530-51    | Kit - Control Valve Repair   | 1                         |
| 3-5  | 99-587-00    | Hydraulic Hose (Order Per Ft.)   | 30 Ft.                    |
| 3-6  | 99-568-00    | Hose Ends - 1/4"   | 8                         |
| 3-7  | 99-567-00    | Adapter 90° 1/4" MPT x 1/4" FPT  | 4                         |
| 3-8  | 99-522-00    | Cylinder (Power Steering)  | 1                         |
| 3-9  | 99-522-51    | Kit - Cylinder Repair  | 1                         |
| 3-12   | 99-592-00    | Pump Assembly (Includes Pump Motor & Reservoir)  | 1                         |
| 3-13   | 99-592-52    | Gasket - Pump Reservoir  | 2                         |
| 3-14   | 99-592-53    | Clamp Ring - Reservoir   | 1                         |
| 4-52   | 50-202-00    | Rod - Micro Switch Actuating   | 1                         |
| 4-53   | 71-625-00    | Cam - Micro Switch Actuating   | 1                         |
| 4-54   | 71-626-00    | Cover - Micro Switch   | 1                         |
| 4-56   | 71-130-00    | Micro Switch   | 2                         |
| 4-57   | 88-014-13    | Round Head Machine Screw 6-32 x 1-1/4"   | 4                         |
| 4-61   | 88-019-80    | Hex Nut 6-32   | 4                         |
| REFER TO FIGURE 5 FULL FLOATING REAR AXLE-MOTOR & BRAKES |              |  |                           |
| 5-51   | 13-957-10    | Tire & Demountable Wheel 18 x 5 x 14 Solid Cushion Tire (Tractors With 18" Tires Only)                                     | 2                         |
| 5-51   | 13-958-10    | Tire & Demountable Wheel 21 x 5 x 15 Solid Xtra Cushion Tire (Tractors With 21" Tires Only)                                | 2                         |

SUGGESTED SPARE PARTS LIST

| FIG. I. D.<br>NO.   | T-D PART # | DESCRIPTION                            | QUANTITY OF<br>1-20 UNITS |
|---|------------|--|---------------------------|
| 5-44  | 45-010-00  | Motor Gasket                           | 2                         |
| 5-45  | 45-507-00  | Shaft Oil Seal                         | 2                         |
| 5-46  | 70-059-00  | Motor, 5H.P., 2600 RPM, 36 Volt        | 1                         |
| 5-47  | 70-126-00  | Motor Brushes, Set of 8                | 1-4                       |
| 5-47  | 80-203-00  | Ball Bearing Front And Rear            | 4                         |
| NOTE: REFER TO SECTION J2 PAGE 12 for SUGGESTED<br>SPARE PARTS LIST of DIFFERENTIAL, & BRAKE ASSEMBLY |            |  |                           |
| REFER TO FIGURE 6 HYDRAULIC BRAKE SYSTEM  |            |  |                           |
| 6-2   | 71-110-00  | Brake Switch                           | 2                         |
| 6-6   | 99-510-00  | Master Cylinder                        | 1                         |
| 6-6   | 99-510-61  | Kit - Master Cylinder Repair           | 2                         |
| 6-7   | 99-554-00  | Flexible Hose                          | 1                         |
| 6-10  | 99-552-01  | 1/4 Tubing 18" Long With Ends          | 1                         |
| 6-11  | 99-552-02  | 1/4 Tubing 114" Long With Ends         | 1                         |
| 6-12  | 99-553-00  | Tubing Ends                            | 6                         |
| REFER TO FIGURE 7 - MECHANICAL CONTROL LINKAGE  |            |  |                           |
| 7-3   | 85-280-00  | Spring Deadman Brake Return            | 1                         |
| 7-4   | 85-295-00  | Spring Accelerator Return              | 1                         |
| 7-7   | 96-762-00  | 3/8 Clevice                            | 3                         |
| 7-8   | 96-772-00  | 3/8 Clevice Pin                        | 3                         |
| 7-11  | 98-200-00  | Pad Rubber Brake Pedal                 | 1                         |
| 7-12  | 98-253-00  | Pad Accelerator Pedal                  | 1                         |
| 7-14  | 85-270-00  | Brake Return Spring                    | 1                         |
| 7-22  | 85-060-00  | Spring                                 | 1                         |
| 7-24  | 41-520-10  | Brake Drum                             | 1                         |
| 7-25  | 41-650-00  | Brake Band                             | 1                         |
| 7-37  | 88-014-13  | Round Head Machine Screw 6-32 X 1-1/4" | 6                         |
| 7-38  | 88-019-80  | Nut 6-32 (Hex)                         | 6                         |
| 7-41  | 71-130-00  | Micro Switch (Standard)                | 2                         |

NOTE: REFER TO SECTION J6 Page 10 FOR SUGGESTED  
SPARE PARTS LIST OF SCR SPEED CONTROL

NOTE: REFER TO SECTION J6 PAGE 11 FOR SUGGESTED  
SPARE PARTS LIST OF CONTACTOR SPEED CONTROL

SUGGESTED SPARE PARTS LIST

| T-D PART #                           | DESCRIPTION   | QUANTITY OF<br>1-20 UNITS |
|--------------------------------------|---|---------------------------|
| <u>GENERAL ELECTRICAL SYSTEM</u>     |   |                           |
| 71-100-00                            | Light Switch  | 2                         |
| 71-120-00                            | Key Switch  | 1                         |
| 72-034-00                            | Stop and Taillight - 36 Volt  | 1                         |
| 73-002-00                            | Horn - 36 Volt  | 1                         |
| 74-000-00                            | Hour Meter  | 1                         |
| 75-071-00                            | Wire Harness - Light and Accessories  | 1                         |
| 75-072-00                            | Wire Harness - Power  | 1                         |
| 76-024-00                            | Battery Receptacle, Anderson EC 5816B (300 Amp)   | 1                         |
| 76-022-00                            | Battery Receptacle, Anderson N-150 (150Amp)   | 1                         |
| 76-020-00                            | Battery Receptacle, Anderson SB 6313 (175 Amp)  | 1                         |
| 78-010-00                            | Fuse Holder with Fuse   | 1                         |
| 79-823-00                            | Fuse Buss type 20 Amp   | 1                         |
| 72-007-00                            | Headlight Or Backup Light 36 Volt   | 3                         |
| 77-200-00                            | Hydrometer  | 2                         |
| 77-201-00                            | Battery Filler  | 1                         |
| 72-500-00                            | Solenoid 200 Amp  | 1                         |
| 79-842-00                            | Circuit Breaker 10 Amp (1 pole)   | 3                         |
| 79-843-00                            | Circuit Breaker 90 Amp (2 pole)   | 2                         |
| <u>GENERAL BODY &amp; TRIM PARTS</u> |   |                           |
| 97-307-00                            | Battery Compartment Lid Safety Lock   | 1                         |
| 97-306-00                            | Battery Compartment Lid Latch   | 2                         |
| 97-809-00                            | Hitch (Pin & Eye)   | 1                         |
| 97-808-00                            | Hitch Automatic Coupling  | 1                         |
| 97-809-51                            | Hitch Pin   | 2                         |
| 72-073-00                            | Bulb, Sealed Beam, Headlamp, 28 Volt for Use with 36 Volt Headlamp with Voltage Dropping Resistor | 1                         |
| 72-074-00                            | Bulb, Sealed Beam, Headlamp, 36 Volt for Use with 36 Volt Headlamp w/o Voltage Dropping Resistor  | 1                         |

MAINTENANCE PROCEDURES  
REFER TO FIGURE 4

FRONT AXLE, STEERING AND TIRES (4 WHEEL MODEL)

Your front axle and wheel assembly consists of an axle mounted on 2 leaf springs with automotive spindles, steering worm, and steering linkage. It has been designed for rugged dependable service with little maintenance requirements, other than lubrication and an occasional check of all nuts and bolts for tightness. Your wheels revolve on Timken Roller Bearings and the spindles are mounted with heavy kingpins.

Zerk type grease fittings have been provided to insure proper amounts of lubricant reaching wear points.

It is recommended that you follow the maintenance guide and lubrication diagrams for normal maintenance of the assembly. They are located in Sections D and E of this manual.

The maintenance guide is set up for average use. If the vehicle is subject to long hours of running and heavy work loads the frequency of lubrication and service should be increased accordingly.

Refer to the Service and adjustment Section J1 of this manual for guidance when performing major repairs and adjustments.

If your vehicle is equipped with 4 wheel hydraulic brakes, refer to the service and adjustment Section of this manual under Hydraulic Brake Section J3 for their proper care and adjustments.

The steering worm gear box and steering linkage is similar to those used on autos. It requires very little attention.

Refer to maintenance guide and lubrication diagrams (Sections D & E) for normal care.

If service and adjustments are required, refer to appropriate section of this manual.

Vehicles equipped with power steering utilize an electric pump unit controlled by the steering action. The control valve and power cylinder are located in the steering linkage. (Refer to Fig. 3 & 4). The pump unit fluid level will require a periodic inspection to maintain the proper fluid level. (Refer to Section E Lubrication Diagram). The control valve and power cylinder requires no maintenance. A periodic check should be made of the hydraulic lines and fittings for signs of leakage or damage.

Refer to Service and Adjustment section of the Power Steering System in the manual, Section J1 for all service requirements. A trouble shooting check list is included in the power steering section to assist in servicing your unit.

SERVICE AND ADJUSTMENT  
REFER TO FIGURE 4  
FRONT AXLE, FORK, STEERING AND TIRES

Wheel hub removal and adjustments:

1. Jack up front of vehicle until wheel is free from ground.
2. Remove dust cap.
3. Remove cotter pin and unscrew spindle nut.
4. Remove outer washer and bearing.
5. Remove wheel hub.
6. Before re-assembly wash and clean thoroughly the bearings, spindle and hub assembly. Inspect bearings for wear or damage. Examine inner seal. Replace damaged or worn parts. Seal condition is important on models with brake assembly as grease will leak onto brake shoes and affect stopping ability.
7. Generously pack bearings with wheel bearing grease.
8. Re-assemble parts in reverse order of removal.
9. ADJUST wheel bearings by tightening spindle nut until bearing drag is felt. Back off approximately 1/4 turn until wheel turns freely, but does not have play in bearings. Important Note: On models utilizing front wheel hydraulic brakes, drum must be clean and dry when re-assembling. Be certain that brake shoes do not come in contact with brake drum when adjusting wheel bearings. A false feel of drag will occur and you will be unable to adjust bearings properly.
10. Install cotter pin and dust cap.
11. Wheel hub has 1 zerk fitting for grease lubrication.
12. Shackle bolts and spring "U" bolts should be kept tight for best steering control and least amount of wear.

REMOVE AND INSTALL KING PINS AND BUSHINGS

1. Remove wheel and hub from spindle. See preceding subsection.
2. Remove ball joints from steering arms. Remove cotter pin and nut, rap stud sharply with soft hammer, or soft block and regular hammer, to loosen tapered stud from steering arm.
3. Remove 7/8 lock nut which retains spindle and steering arm assembly to kingpin.
4. Remove king pin from axle. If it is necessary to force the pin from the axle, use a soft rod, such as bronze or aluminum.
5. Remove spindle and steering arm assembly, and thrust bearing, from axle yoke.
6. Press bushings from spindle and steering arm assembly.
7. Thoroughly clean bushing housing and king pin before installing new bushings.
8. Press bushings into sleeve. It may be necessary to ream the bushings after they are installed in the sleeve because of slight distortion which may occur during the process of pressing them into place. If proper press and reamer are not available, most automotive supply houses and repair shops have capacity to perform this service.
9. Reassemble in reverse order. Lightly oil king pin and tap into place in axle. Where it is necessary to use force to assemble components, use a soft hammer or punch.
10. After reassembly, tighten ball joints securely. Lubricate bushings and king pin through grease fitting. Adjust wheel bearings as described in preceding subsection. Align front end as described in subsection titled "Align Front End: Adjust Toe-In".

13. Perform trial lubrication on each bushing to be certain grease will travel through bushing for proper lubrication.
14. Place dust seal cap in socket with crown facing outward. Expand into place by hammering lightly on center of crown to flatten and lock into seal sockets.
15. Replace ball joints and tighten securely.
16. Replace cotter pins.
17. Replace wheels.
18. Check and adjust "Toe In".

#### ADJUSTMENT Of "Toe In"

To adjust toe in, jack front end of tractor off ground. With a pencil, make a mark around center of tread of tire by holding pencil point against tire and turning wheel. Mark both front wheels. Let truck down on ground. Loosen lock nuts on each end of tie rod shaft so that portion of shaft between tie rod ends will turn. Next, in as straight a forward position as possible, measure between marks on wheels, both front and rear side of wheel, then turn tie rod shaft until measurement is the same on both front and rear side of wheel. Retighten lock nuts on each end of tie rod. Camber and caster are set at factory and so will not need resetting in the field.

#### Replace ball joint:

1. Remove cotter pin and nut.
2. Loosen sleeve clamp.
3. Rap ball joint stud sharply with soft hammer or soft block and regular hammer, to loosen tapered stud from steering arm.
4. Either measure position of ball joint or count number of threads exposed from sleeve. Remove ball joint by unscrewing from sleeve. Note that one end will be left hand thread and the opposite ball joint will be right hand thread.
5. Install new ball joint and position same as the one removed.

#### Replacement of steering worm:

1. Pry steering wheel cap up to expose locknuts holding horn button in place.
2. Remove 2 horn button screws.
3. Remove wiring from horn button and slide out of steering tube through bottom.
4. Remove lock nut and with suitable puller, remove steering wheel.
5. Remove "U" bolt on steering tube.
6. Remove forward-reverse switch from column.
7. Remove ball joint at pitman arm.
8. Remove 2 steering worm holding bolts and slide steering worm assembly from bottom of vehicle.
9. Remove lock nut holding pitman arm on shaft.
10. Mark position of pitman arm and remove from worm shaft.
11. If installing new steering worm it is important to place the pitman arm in the same relative position on the new unit as it was on the old unit. Failure to do this will result in a misalignment of the steering linkage and a limitation of steering in one direction.
12. Install steering worm in the reverse manner to which it was removed outlined in steps 1 to 8.
13. When installing steering wheel rotate the steering shaft until the front wheels are in a straight ahead position. Then place the steering wheel on the shaft aligning it in a central position.
14. Adjust any minor misalignment by loosening the steering link sleeve clamps and adjusting the steering link until the front wheel and steering wheel are both in position.
15. Check that you will be able to turn the steering mechanism equally in both directions. If you cannot it means the pitman arm was not properly installed and it will be necessary to replace it in the proper position.
16. Lubricate steering worm through zerk fitting located on worm housing. Refer to Lubrication Diagram and Maintenance Guide Sections D & E.

TROUBLE SHOOTING CHECK LIST

REFER TO FIGURE 3 & 4

POWER STEERING CONTROLS

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

SERVICE AND ADJUSTMENT  
REFER TO FIGURE 3 & 4

POWER STEERING CONTROLS & LINKAGE

HOW TO FILL & MAINTAIN HYDRAULIC OIL LEVEL

Maintain oil level 1/2" to 3/4" below fill opening when wheels are turned all the way to the left. Fill opening is located on top of pump unit. It is a combination Vent and Cap.

Whenever the hydraulic system is drained or service work is performed which necessitates the disconnecting of lines, the oil reservoir must be filled and the steering wheel turned 6 or 8 times through the full travel. This will bleed air from the system. Always check oil level after this is done and add as necessary to return oil level to normal.

Use a good grade of automatic transmission fluid. Type A bearing an AQ-ATF mark. (Refer to Section E).

REMOVAL OF PUMP UNIT FROM VEHICLE

1. Turn off circuit breaker
2. Disconnect motor terminal wires (mark their location).
3. Disconnect 2 hoses at pump swivel connectors. (Be sure to mark hoses so they will be returned to proper fitting. Refer to Figure 3).
4. Remove 4 bolts attaching base to frame and remove pump from vehicle.
5. Re-install pump in reverse order of removal.

CLEANING RESERVOIR & STRAINER

1. Remove vent-filler cap and dump oil out.
2. Remove bolt and clamp ring from reservoir.
3. Remove reservoir, clean thoroughly.
4. Remove suction strainer and clean thoroughly.
5. Re-assemble in reverse order taking care to place gasket in proper position and tighten clamp ring securely. If gasket is damaged replace with new one. Always position reservoir so that vent-filler cap is on top.

SERVICE OR REPLACEMENT OF MOTOR

1. Remove pump unit from vehicle.
2. Remove 2(two) through bolts attaching motor to pump and remove motor.
3. When re-installing motor be sure to align the slotted coupling member with the flat ends of pump and motor shaft. Return motor to position facing terminals in same direction and tighten motor through bolts securely.
4. Replace unit in vehicle.
5. Fill reservoir and bleed air out of system.

ADJUST Pump pressure to 400 - 450 P.S.I.

A suitable pressure gage with a range of 750 to 1000 P.S.I. is required. (Refer to Figure 3).

1. Remove cap over adjustment screw and back adjustment screw out several turns.
2. Disconnect pressure line at pump pressure port and install pressure gage in port of pump.
3. Start pump and adjust pressure screw in until pressure rises to 400-450 P.S.I.
4. CAUTION do not run pump for more than 30 seconds at a time.
5. Replace cap over adjustment screw and tighten.
6. Check pressure reading to be sure it hasn't changed. Tightening cap may affect pressure setting slightly, if so, follow step 3 thru 6 until pressure setting is correct.
7. Remove gage and replace hose.
8. Bleed air from system and check oil level.



#### REMOVAL OF CONTROL VALVE

1. Remove cotter pins and nuts from ball joints attaching drag link and Control Valve assembly to pitman arm and steering lever.
2. Disconnect 2 wires from micro switch unit and 4 hoses from Control Valve.
3. Rap ball joint stud sharply with soft hammer or soft block and regular hammer to loosen tapered stud from steering arm or pitman arm.  
Note: Mark their respective location for correct replacement.
4. Mark position of micro switch rod clamp with scribe.
5. Loosen rod clamp and spread open.
6. Loosen drag link sleeve clamp.
7. Either measure position of Control Valve or count number of threads exposed from sleeve. Unscrew Control Valve from sleeve taking care not to damage micro switch rod.
8. If installing new valve remove ball joint following steps 6 and 7.

#### REASSEMBLY

1. Install ball joint returning it to original position.
2. Screw Control Valve into sleeve returning it to original position.
3. Align micro switch rod clamp to scribe marks and tighten into place.
4. Tighten clamps on ball joint and drag link.
5. Replace unit in vehicle following reverse procedure to that of removal.
6. Bleed air from system and check oil level.
7. Adjust micro switch as outlined in micro switch adjustment paragraph, (Page 9).

No adjustments are required in the Control Valve. Because of the exceedingly close tolerances between some of the internal parts it is not practical to service the valve body or spool separately. Leakage at either end of the valve indicates worn or damaged packing which should be replaced as outlined in the following instructions. Cleanliness through the entire servicing procedure cannot be over-emphasized. Parts should be cleaned with a suitable solvent, washed and dried. Use extreme caution in the handling of all parts. The precision edges on these parts are vitally important to smooth operation. When reassembling lubricate all seals and 'O' rings with SAE 10 oil.

#### REPLACING ALL SEALS AND PACKING

1. Remove dust seal, unlock end cover and reducer-end cover by straightening lock rings which have been pressed into slots in end cover and reducer-end cover. Unscrew end cover and reducer-end cover (use of strap wrench will prevent damage to exterior finish). Remove lock rings from each end of valve body assembly. Remove glands and springs.
2. To remove spool. (Note relation of threaded end of valve spool to ports in valve body before removing spool. This is important for reassembly.) Remove one 'O' ring.

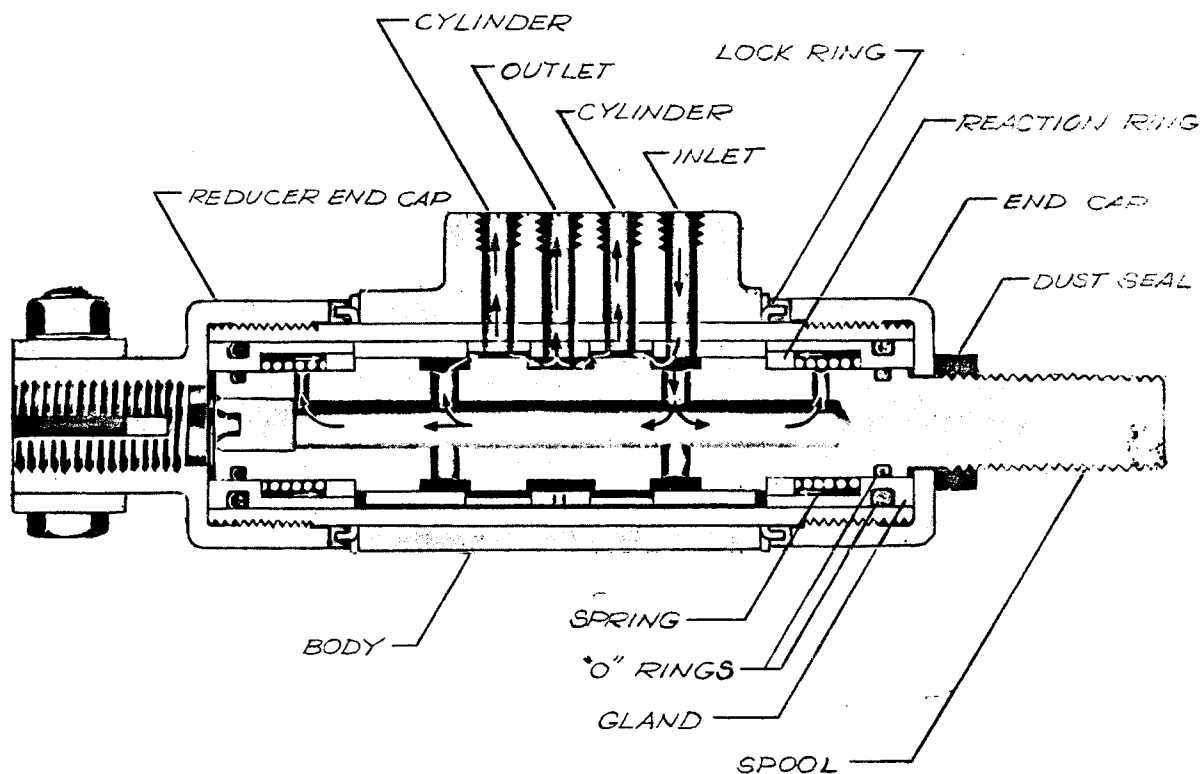
contd.

### REPLACING ALL SEALS AND PACKING (contd)

3. Pull spool from valve body. When pulling spool one reaction ring will probably remain in body. The other ring probably will remain on the spool. Remove remaining 'O' ring from spool. Match reaction rings with their respective glands. Remove 'O' rings from glands.

### RE-ASSEMBLY

1. Slide spool in body. Be sure spool is inserted in same position it was in before disassembly. Use care to prevent damage to sealing edges. After spool has been pushed through the body, assemble one reaction ring then assemble one 'O' ring seal on spool.
2. Assemble remaining reaction ring and 'O' ring seal on spool. Assemble springs on each end of spool. Assemble 'O' rings on glands. Now assemble glands as matched to their respective reaction rings.
3. Assemble lock rings over each threaded end of valve body assembly, inserting lugs of ring into milled slots of valve body.
4. Assemble end cap and reducer-end cover until tight fit has been accomplished. Lock the end cap and reducer-end cover by driving lock ring into one of the milled slots of the cap and reducer-end cover. Assemble dust seal.



#### REMOVAL OF POWER CYLINDER

1. Remove cotter pins and nuts from ball joints at each end of cylinder.
2. Disconnect two (2) hose at cylinder swivel connectors. (Be sure to mark hoses so they will be returned to proper fitting. Refer to Figure 3).
3. Rap ball joint stud sharply with soft hammer or soft block and regular hammer to loosen tapered stud from steering arms.
4. Loosen ball joint clamps.
5. Either measure position of ball joint or count number of threads exposed from sleeve. Remove ball joint by unscrewing from sleeve. Note that one end will be left hand thread and the opposite ball joint will be right hand thread.
6. Install cylinder in the reverse order to which it was removed. ADJUST cylinder position if necessary by rotating entire cylinder with clamps loosened prior to connecting hoses. Correct position is when the wheel spindles will travel to full left or right turn position and contact stops. Cylinder stroke is slightly greater than the travel required and should not bottom out before the wheel spindles reach their respective stops.
7. It will be necessary to bleed air from system and check oil level after cylinder lines are reconnected to cylinder fittings.

#### REPLACING SEALS AND PISTON RINGS ON POWER CYLINDER

1. Drain hydraulic fluid by running piston rod from end to end.
2. Remove cover.
3. Insert punch in hole along side cylinder barrel to disengage lock ring from its groove, and remove lock ring.
4. Pull on piston rod end to remove rod and internal parts from cylinder barrel. When removing the parts from the piston rod, slide them off the piston end of the rod.
5. Remove piston rod nut, piston and rings.
6. Remove bearing.
7. Remove O-ring seal and back-up ring from bearing.
8. Remove piston seal and inner O-ring seal from bearing.
9. Wash all parts in cleaning solvent and inspect for damage or wear.  
NOTE: As all parts are machined to very close limits, use extreme care in handling. Damaged sealing edges or burrs will not permit the unit to function properly.

#### REASSEMBLY OF POWER CYLINDER

1. Assemble inner O-ring seal and piston rod seal in bearing.
2. Assemble back-up ring and O-ring seal to bearing and slide over piston rod down toward threaded end of rod.
3. Assemble rings on piston, then install piston to rod.
4. Install piston nut and torque to 225-230 ft-lbs. If tightening nut without use of torque wrench, be careful of over-tightening as this may cause piston to swell and prevent assembly in barrel.
5. Using a piece of shim stock .010" thick wrapped around piston and rings, slide complete piston rod assembly into cylinder barrel. Push assembly into cylinder as far as possible and removing shim stock.

REASSEMBLY OF POWER CYLINDER (Cont'd.)

6. Insert bearing into cylinder barrel, taking precautions not to damage bearing O-ring seal against hydraulic line fitting hole in cylinder. To assist in pushing O-ring past this hole, use a piece of wood having a round edge to work the O-ring past the edge.
7. Install lock ring in its groove.
8. Pull back on piston rod until bearing contacts edge of snap ring.
9. Install end plate and secure with lockwashers and screws.

REPLACEMENT OF MICRO SWITCH

1. Remove cover.
2. Disconnect wires to micro switch.
3. Remove 2 screws holding micro switch to mounting bracket.
4. Reinstall new micro switch and adjust as described in the following subsection.

ADJUST Micro Switch actuating cam.

1. Turn pump circuit breaker to OFF position.
2. Remove cover.
3. Loosen Micro switch retaining screws, loosen cam set screw and positioning nuts.
4. Hole in cam is eccentric. Orient cam on guide rod with long side of cam downward.
5. With valve in neutral position, adjust cam and switch so that switch roller barely contacts edges of cam groove. Tighten switch to mounting plate and tighten cam to guide rod.  
Note: To rotate cam, it is necessary only to loosen set screw. This increases or decreases the interference of cam and limit switch in both directions of vehicle travel, without affecting cam alignment.  
To realign cam, it is necessary to loosen the set screw and the positioning nuts, and move the cam forward (or rearward), which will decrease interference of cam and limit switch in one vehicle travel direction, while increasing it in the other direction.
6. Test Operation. Note: The operation of the pump is intermittent when the system is properly adjusted. Continuous operation indicates that the system is improperly adjusted, and will cause premature pump failure.

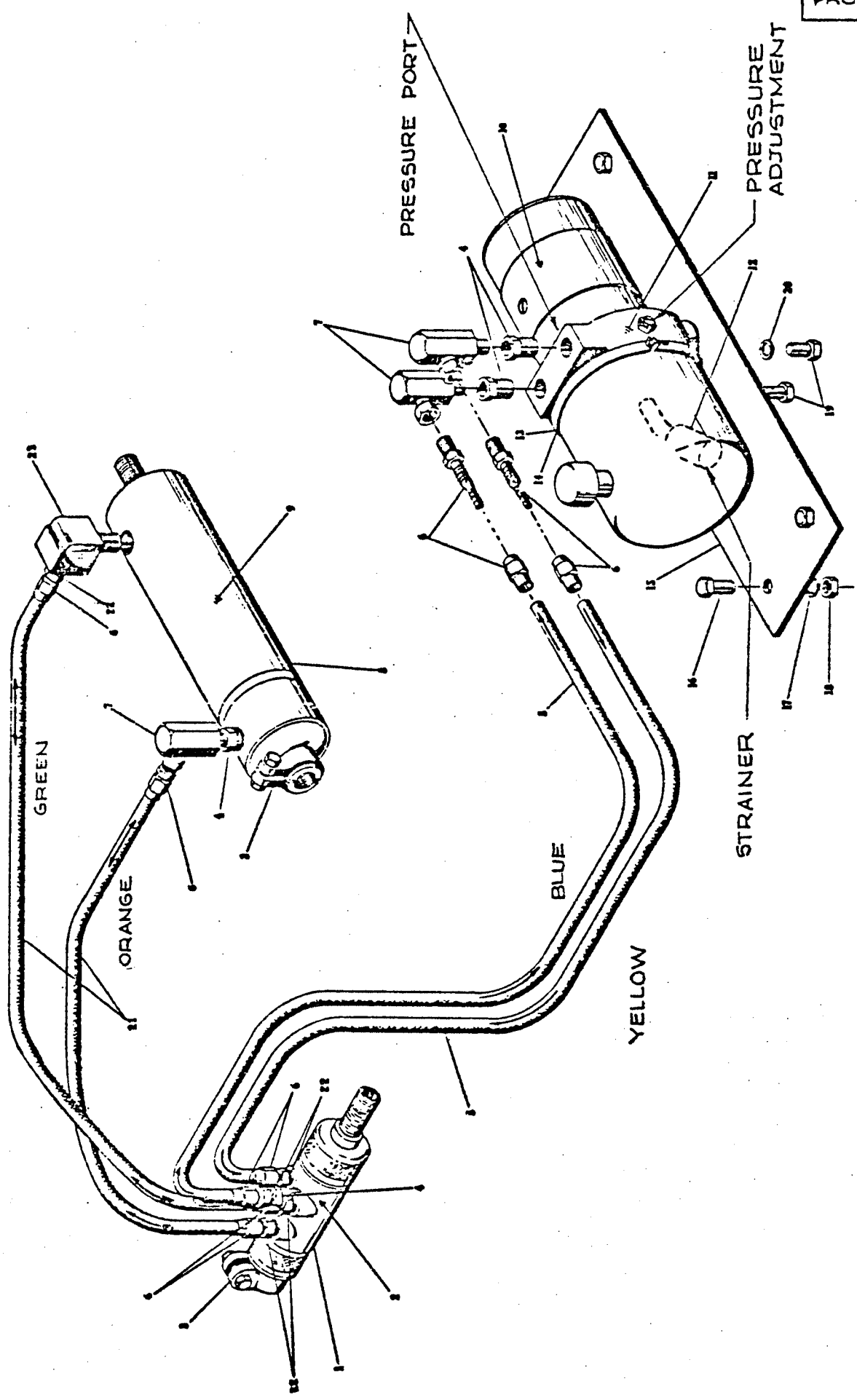
With the front wheels on the ground, turn the steering wheel in both directions. As soon as the road wheels start to turn, the pump should start. When the road wheels stop turning, the pump should stop. If steering wheel is turned very slowly, the pump should turn on and off intermittently until the road wheels stop turning.

If the pump fails to turn on when the steering wheel is turned in either direction, the cam set screw must be loosened and the cam rotated to provide increased contact with the limit switch.

If the pump remains on when the steering wheel is not being turned, then the cam must either be rotated or realigned or both, to reduce contact with the limit switch when there is no steering wheel motion.

If the system operates properly in one turning direction, but not the other, then the cam must be realigned, and may need to be rotated, with respect to the limit switch.

7. When satisfactory adjustments are obtained, secure all fasteners and replace cover.



LENGTH QUAN. REVISED DATE REVISION

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

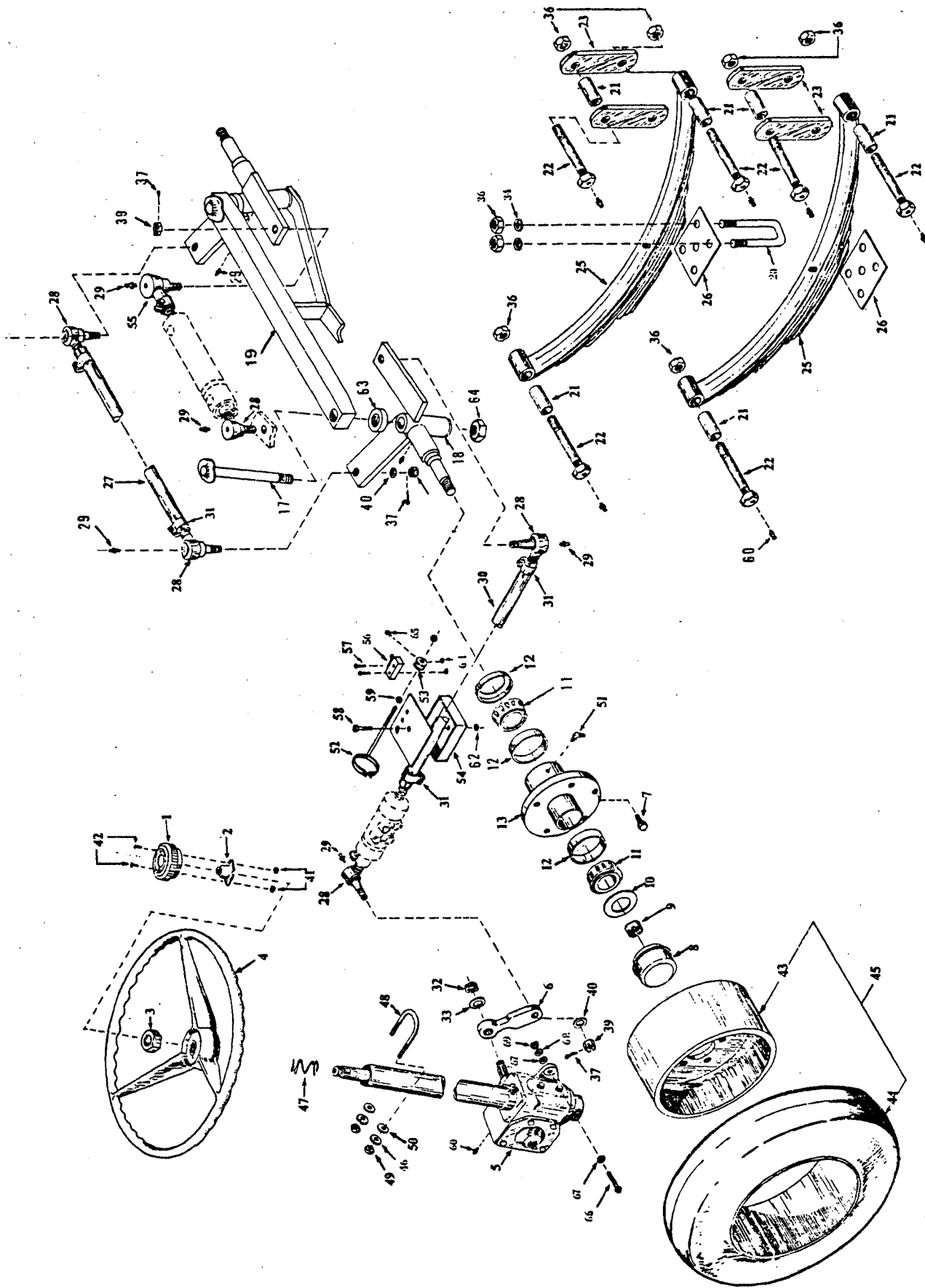
POWER STEERING  
ASSEMBLY MOD. P

FIGURE 3  
SECTION J1

|           |             |
|-----------|-------------|
| Q.        | DESCRIPTION |
| DL. FRAC. | DEC. 1      |
| SCALE     | NONE        |
| DRAWN BY  | EDB         |

FIGURE 3  
POWER STEERING HYDRAULIC COMPONENTS

| FIG. I.D. | T-D PART NO. | DESCRIPTION                                     | QTY.<br>REQ. |
|-----------|--------------|---|--------------|
| 3-1       | 99-530-00    | Control Valve (Power Steering)                  | 1            |
| 3-2       | 99-530-51    | Kit - Control Valve Repair                      | 1            |
| 3-3       | 99-522-52    | Clamp Ball Joint (Large)                        | 2            |
| 3-4       | 99-577-00    | Bushing-Reducer 3/8" NPT X 1/4" NPT             | 5            |
| 3-5       | 99-587-00    | Hydraulic Hose (Order Per Ft.)                  | 30 Ft.       |
| 3-6       | 99-568-00    | Hose Ends - 1/4"                                | 8            |
| 3-7       | 99-567-00    | Adapter 90° 1/4" MPT X 1/4" FPT                 | 4            |
| 3-8       | 99-522-00    | Cylinder (Power Steering)                       | 1            |
| 3-9       | 99-522-51    | Kit - Cylinder Repair                           | 1            |
| 3-10      | 99-592-54    | Motor - Power Steering Pump (Specify Voltage)   | 1            |
| 3-11      | 99-592-51    | Pump - Power Steering                           | 1            |
| 3-12      | 99-592-00    | Pump Assembly (Includes Pump Motor & Reservoir) | 1            |
| 3-13      | 99-592-52    | Gasket - Pump Reservoir                         | 1            |
| 3-14      | 99-592-53    | Clamp Ring - Reservoir                          | 1            |
| 3-15      | 99-593-00    | Bracket - Pump Mounting                         | 1            |
| 3-16      | 88-080-11    | Hex Head Cap Screw 5/16" NC X 1"                | 4            |
| 3-17      | 88-088-62    | Lock Washer 5/16"                               | 4            |
| 3-18      | 88-089-80    | Hex Nut 5/16" NF                                | 4            |
| 3-19      | 88-100-09    | Hex Head Cap Screw 3/8" NC X 3/4"               | 2            |
| 3-20      | 88-108-62    | Lock Washer 3/8"                                | 2            |



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

| NO.                      |  | DESCRIPTION        |  | LENGTH                        | QUAN. | REVISED DATE | REVISION |
|--------------------------|--|--------------------|--|-------------------------------|-------|--------------|----------|
| TOL. FRAC. $\frac{+}{-}$ |  | DEC. $\frac{+}{-}$ |  | FRONT AXLE ASSEMBLY<br>MOD. P |       |              |          |
| SCALE                    |  | NONE               |  |                               |       |              |          |
| DRAWN BY                 |  | EDB                |  |                               |       |              |          |
| DATE                     |  | 10-15-73           |  |                               |       |              |          |

FIGURE 4  
FRONT AXLE, POWER STEERING

| FIG. I.D.<br>NO. | T-D PART NO. | DESCRIPTION   | QTY. |
|------------------|--------------|---|------|
| 4-1              | 19-004-10    | Cap with Horn Button Hole (Str. Whl.)                                     | 1    |
| 4-2              | 71-501-00    | Horn Button (Std.)  | 1    |
| 4-3              | 88-259-82    | Jam Nut 13/16 NF (Hex)  | 1    |
| 4-4              | 19-003-00    | Steering Wheel  | 1    |
| 4-5              | 18-307-13    | Steering Worm Assembly, including Worm, Shaft & Jacket Tube Assembly      | 1    |
| 4-5              | 18-307-51    | Steering Column Shaft & Worm Assembly                                     | 1    |
| 4-5              | 18-307-52    | Steering Column Jacket Tube Assembly                                      | 1    |
| 4-6              | 18-104-00    | Lever - Steering  | 1    |
| 4-7              | 97-236-00    | 1/2" Tapered Lug Nut  | 10   |
| 4-8              | 92-104-00    | Dust Cap with Grease Fitting  | 2    |
| 4-9              | 88-239-85    | Castle Nut 3/4 NF (Hex)   | 2    |
| 4-10             | 88-228-00    | 3/4 SAE Washer  | 2    |
| 4-11             | 80-017-00    | Tapered Roller Bearing  | 4    |
| 4-12             | 80-103-00    | Tapered Bearing Race  | 4    |
| 4-13             | 12-124-00    | Front Hub with Bearing Races - Five 1/2" NC Holes on 4-1/2" Bolt Circle   | 2    |
| 4-16             | 45-338-00    | Oil Seal  | 2    |
| 4-17             | 21-015-00    | King Pin with Formed Washer   | 2    |
| 4-18             | 14-161-98    | Front Wheel Spindle Only (Left)   | 1    |
| 4-18             | 14-161-99    | Front Wheel Spindle Only (Right)  | 1    |
| 4-19             | 15-067-11    | Front Axle Bar, Yoke and Yoke Anchor                                      | 1    |
| 4-20             | 96-121-00    | U Bolt - Front Axle   | 4    |
| 4-21             | 32-313-00    | Bushing (Nylon)   | 6    |
| 4-22             | 96-244-00    | Shackle Bolt with Grease Fitting  | 6    |
| 4-23             | 16-870-00    | Shackle Strap   | 4    |
| 4-25             | 85-503-00    | Leaf Spring Unit (21-3/4" Centers) 9 Leaf                                 | 2    |
| 4-26             | 16-867-00    | Spring Pad  | 2    |
| 4-27             | 18-053-10    | Steering Adjustment Sleeve Assembly with Ball Joints and Clamps (18" Lg.) | 1    |
| 4-28             | 86-501-98    | Ball Joint (Left Hand Thread)   | 2    |



FIGURE 4  
FRONT AXLE, POWER STEERING (Cont.)

| FIG. I.D.<br>NO. | T D PART NO. | DESCRIPTION  | QTY. |
|------------------|--------------|--|------|
| 4-28             | 86-501-99    | Ball Joint (Right Hand Thread)   | 2    |
| 4-29             | 87-074-00    | Grease Fitting 1/4-28 Thread (Straight)  | 6    |
| 4-30             | 18-051-00    | Steering Adjustment Sleeve with Switch Bracket (Pwr. Str.)                             | 1    |
| 4-30             | 18-041-00    | Steering Adjustment Sleeve (Used without Pwr. Str.)                                    | 1    |
| 4-31             | 86-510-00    | Ball Joint Clamp   | 4    |
| 4-32             | 88-279-82    | Jam Nut 7/8 NF (Hex)   | 1    |
| 4-33             | 88-268-62    | Lock Washer 7/8"   | 1    |
| 4-34             | 88-168-62    | Lock Washer 9/16"  | 8    |
| 4-36             | 88-169-81    | Lock Nut 9/16" NC (Hex)  | 14   |
| 4-37             | 88-527-11    | Cotter Pin 1/8" x 1"   | 6    |
| 4-39             | 88-159-85    | Castle Nut 1/2" NF (Hex)   | 6    |
| 4-40             | 88-188-61    | Washer 5/8" S.A.E.   | 6    |
| 4-41             | 88-029-81    | Lock Nut 8-32 (Hex)  | 2    |
| 4-42             | 88-025-08    | Truss Head Machine Screw 8-32 X 5/8"   | 2    |
| 4-43             | 12-050-00    | Wheel for 16 x 4 x 12-1/8 Solid Cushion Tire<br>(Five 1/2" Holes on 4-1/2 Bolt Circle) | 2    |
| 4-44             | 10-250-00    | Tire - Solid Cushion - 16 x 4 x 12-1/8   | 2    |
| 4-45             | 13-952-10    | Tire & Demountable Cast Iron Wheel - 16 x 4 x 12-1/8<br>Solid Cushion Tire             | 2    |
| 4-46             | 88-088-62    | Lock Washer 5/16"  | 2    |
| 4-47             | 85-122-00    | Spring Compression (Str. Column) 1-1/8" O.D. x 1"                                      | 1    |
| 4-48             | 96-102-00    | "U" Bolt for Steering Column Shaft   | 1    |
| 4-49             | 88-089-80    | Nut 5/16" NC (Hex)   | 2    |
| 4-50             | 88-088-60    | Washer 5/16" Flat  | 2    |
| 4-51             | 87-075-00    | Grease Fitting 1/4" Drive (65° Angle)  | 2    |
| 4-52             | 50-202-00    | Rod - Micro Switch Actuating   | 1    |
| 4-53             | 71-625-00    | Cam - Micro Switch Activating  | 1    |
| 4-54             | 71-626-00    | Cover - Micro Switch   | 1    |
| 4-55             | 86-505-00    | Ball Socket (Female)   | 1    |
| 4-56             | 71-130-00    | Micro Switch   | 1    |
| 4-57             | 88-014-13    | Round Head Machine Screw 6-32 x 1-1/4"   | 2    |
| 4-58             | 88-060-14    | Hex Head Cap Screw 1/4" NC x 1-1/2   | 1    |

FIGURE 4  
FRONT AXLE, POWER STEERING (Cont.)

| <u>Q. I.D.</u><br><u>NO.</u> | <u>T-D PART NO.</u> | <u>DESCRIPTION</u>                   | <u>QTY.</u> |
|------------------------------|---------------------|--------------------------------------|-------------|
| 4-59                         | 88-099-80           | Hex Nut 5/16 NF                      | 2           |
| 4-60                         | 87-071-00           | Grease Fitting (3/16 Drive) Straight | 9           |
| 4-61                         | 88-019-80           | Hex Nut 6-32                         | 2           |
| 4-62                         | 88-069-87           | Hex Nut (Fastite) 1/4" N.C.          | 1           |
| 4-63                         | 80-309-00           | Thrust Bearing                       | 2           |
| 4-64                         | 88-279-81           | 7/8 Lock Nut                         | 2           |
| 4-65                         | 88-010-02           | 6-32 x 1/4 Hex Head                  | 1           |
| 4-66                         | 88-120-15           | Hex Head Cap Screw 7/16 x 1-3/4 NC   | 2           |
| 4-67                         | 88-128-60           | Washer 7/16" Flat                    | 4           |
| 4-68                         | 88-128-62           | Lock Washer 7/16"                    | 2           |
| 4-69                         | 88-129-80           | Nut 7/16" NC (Hex)                   | 2           |

MAINTENANCE PROCEDURES  
REFER TO FIGURE 5  
"FULL FLOATING" REAR AXLE, MOTOR AND BRAKES

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

Although little or no adjustment of this unit will normally be required, refer to Service and Adjustment Section J2 of this manual if the need arises.

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

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

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

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

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

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

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

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

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

The vehicle is equipped with hydraulic brakes, be sure to refer to Section J3 for their care and adjustment.

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

SERVICE AND ADJUSTMENTS  
REFER TO FIGURE 5

"FULL FLOATING" REAR AXLE, MOTOR AND BRAKES

Removal of "Full Floating" rear axle and drive assembly from chassis.

1. Disconnect battery connector to prevent accidental engagement of power while servicing unit.
2. Clearly mark motor leads to insure their proper location when re-assembling.
3. Remove motor leads.
4. Pull clevis pin and disconnect brake rod from brake arm.
5. Loosen locknut and release spring tension by unscrewing turn buckle.
6. Disconnect hydraulic brake line at hose end.
7. Remove shackle bolts and nuts attaching spring to frame.
8. Remove spring eye anchor bolts.
9. Remove axle and drive assembly from chassis.
10. Install axle and drive assembly in the reverse order of removal, taking care that shackles and bushings are in good condition.  
(Replace if worn or damaged).
11. Check brake adjustments following procedures outlined in brake section J2 or J3 of this manual.
12. On models equipped with hydraulic brakes, it will be necessary to bleed the air from brake system. Follow procedure outlined in Hydraulic Brake Section J3 of this manual.

DISASSEMBLY OF "FULL FLOATING" REAR AXLE

Axle Shaft, Remove-

Raise vehicle and place stands under housing.  
Remove axle shaft stud nuts and lockwashers.  
Strike the center of the axle shaft flange with a hammer and drift to loosen the tapered dowels, remove the dowels.  
Remove the axle shaft from the housing.

Bearing or Oil Seal, Replace

1. Remove the outer seal from the axle shaft flange studs.
2. Bend the lockwasher tab away from the locknut and remove locknut, lockwasher and adjusting nut.
3. With a wheel jack, raise the wheel to the point that all wheel weight is removed from the wheel bearings.
4. Remove the outer bearing cone and pull the wheel straight off the axle.
5. With a piece of hard wood which will just clear the outer bearing cup drive the inner bearing cone and inner seal out of the wheel hub.
6. Clean all the old grease or axle lubricant out of the wheel hub.

NOTE: If axle lubricant is found in a wheel hub that has an outer seal, it means the seal or sealing has failed and should be replaced.

7. Inspect the bearing races and rollers for pitting, galling and erratic wear pattern. Inspect the rollers for end wear.
8. If bearing cups are to be replaced, drive them out with a drift.
9. Check for proper seating of new cups by trying to insert a .0015 inch feeler gauge between the cup and the hub.
10. A ring of wheel bearing grease as high as the cup should be placed in the hub on each side of both cups. These rings form a dam which prevents thinned grease from flowing out of the bearing.
11. Pack each bearing cone and roller assembly.
12. Place the inner bearing in the wheel hub and install a new hub inner seal.
13. Adjust the wheel jack so the wheel can be installed straight on the housing without damaging the inner seal.
14. Install the outer bearing and start the bearing adjuster nut.
15. Turn the adjuster nut in and torque the nut to 50 to 80 ft. lbs. while rotating the wheel.
16. With the bearing rollers firmly seated, back off the nut  $\frac{3}{8}$  of a turn and install the lockwasher.
17. If the adjusting nut is equipped with a locking dowel, make sure that the dowel enters the lockwasher hole which closely aligns with the dowel.
18. If the lockwasher is equipped with tabs, run the locknut against the lockwasher and bend a tab over the adjusting nut.
19. Torque the locknut to 100-150 ft. -lbs.

Axle Shaft, Install

1. Install the seal and gaskets on the axle shaft studs.
2. Install the axle shaft, tapered dowels, lockwashers and axle shaft flange nuts.
3. Adjust the brakes.

Rear Axle Assembly, Replace-

Inasmuch as the axle tubes are pressed into the differential carrier to form a one-piece housing; the rear axle assembly must be removed from the chassis when it becomes necessary to overhaul the unit.

1. Raise vehicle from floor and support with stand jacks under frame side rails.

SERVICE & ADJUSTMENTS

"FULL FLOATING" REAR AXLE - Cont'd.

2. Remove rear axle unit from chassis as previously outlined.

NOTE: When replacing rear axle unit in vehicle it will be necessary to bleed air from hydraulic brake system.

Differential Carrier, Disassemble-

1. Remove axle shafts as outlined previously, axle shafts may be pulled out only far enough to clear differential side gears.
2. Drain lubricant and rear cover.
3. Make sure differential side bearing caps and axle housing are marked, then remove the side bearing caps.
4. Pry differential from housing.
5. Remove side bearing cups.
6. Pull off side bearing and adjusting shims, tagging shims for identification on reassembly.
7. Unfasten ring gear from case.
8. Drive out differential pinion shaft pin and pull out the shaft, pinions, and side gears.
9. Hold companion flange from turning and remove flange nut.
10. Remove motor and gear case plate.
11. Remove driven gear from pinion shaft.
12. Remove pinion from carrier by tapping on front end with soft hammer.
13. Remove pinion shaft bearings from carrier, keeping separate the shim pack at each bearing.

Pinion & Bearings, Replace-

If the original ring gear and pinions are being used in the original carrier, use the original shim packs at each bearing. If a new pinion or differential carrier is installed, note the markings on the end of the pinion gear and on the differential carrier to obtain the correct thickness of shimming to be used with these parts. The shims behind the rear bearing establishes the correct pinion depth.

1. Press the rear pinion bearing cup to the housing with the proper thickness of shims. Press the rear pinion bearings on the shaft.
2. Install the front bearing cup and shims and front bearing.

3. Install the companion flange and, while holding the flange from turning, tighten nut to torque load of 200-220 lb. ft.
4. Check the pinion bearing pre-load with a spring scale and heavy cord wrapped around the companion flange. Pull on the spring scale. The torque required to rotate the pinion is 2-5 inch lbs. If not within these limits, add or remove shims from behind the front bearing to obtain the proper pre-load.
5. Remove the companion flange and install a new oil seal (well soaked). Reinstall the companion flange and tighten the nut to a torque load of 200-220 lb. ft.
6. Replace driven gear on pinion flange and replace motor and gear case plate with gear case bolts.

Ring Gear, Replace-

1. Install guide pins in every other hole in the ring gear. These pins can be made from 1½" long capscrews with heads cut off and ends slotted.
2. Make sure back face of ring gear and face of cases are free of dirt and burrs and slip gear over pilot diameter of case.
3. Install every other ring gear bolt. Draw them up evenly and snugly so ring gear face is flush with face of case.
4. Remove guide pins and install remaining bolts.

Differential Carrier, Assemble-

The differential bearings are adjusted by shims. These shims also establish the ring gear position with the pinion. Therefore, backlash must be checked whenever a bearing adjustment is made.

The correct bearing adjustment is one which will provide a .001-.002" pinch fit when the differential unit is assembled into the carrier. To make the adjustment, install the bearing cones without shims and place the assembly in the housing with the bearing cups. Force the unit to one side and check the clearance between the bearing cup and differential case with a feeler gauge. When the clearance is determined, select shims of this amount plus .001-.002" extra to establish the proper load. Remove the differential bearings again and divide the shims into two packs of equal thickness and install on each side and replace bearings. Reinstall the unit in the carrier. This operation is made easier by cocking the bearing cups slightly when the differential is placed in the housing and then tapping them lightly with a mallet. However, when installing the differential in the housing, be sure the ring gear

teeth mesh with the pinion teeth before tapping the bearings in place. After the bearing cups are firmly in place, install the bearing caps. The bearing caps and gasket surface of the housing are marked with a horizontal numeral and on the other side by a vertical numeral. The position of the numerals should correspond when reinstalling the bearing caps.

Ring Gear & Pinion Backlash, Adjust-

Mount a backlash gauge indicator on the carrier and start checking for the correct backlash between the right gear and pinion. If the backlash is not within the limits of .004" to .011" it will be necessary to change the arrangement of the shims back of the bearings. Make correction in backlash bearing in mind that shims removed from one side must be installed on opposite side so that the total shim thickness of the right and left side will remain unchanged, and the bearing adjustment undisturbed.

Gear Replacement (Spur Gear Reduction)-

Remove five 5/16 bolts and nuts and the three 3/8 bolts. This will allow the gear case to come apart. To remove the pinion gear, remove nut and use gear puller to pull gear. Replace new gear and lock down with nut. To replace driven gear, remove bolt and slide off splined shaft. To replace new gear slip over spline and lock nut down.

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

DISASSEMBLY OF MOTOR FOR MINOR REPAIRS

1. Remove motor from vehicle as previously outlined.
2. Remove cover exposing brush assembly.
3. Lift brushes out of brush holder.
4. Remove bolts holding end bells and remove end bell and rotor. (Pull from shaft extension end). Take care not to damage any coils or armature wires when handling motor parts.
5. Press or pull old bearings off by using bearing press or bearing puller. Do not damage shaft while removing bearings.
6. Install new bearings onto shaft by gentle pressure or tapping with proper tool on inner race only. Bearing will be damaged if pressed or driven by outer race or seals.
7. On "Full Floating" model replace motor seal in shaft extension end bell housing.
8. If the commutator is worn or "burned" it should be turned, the mica undercut, and the commutator polished.
9. Oil bearing housing lightly to aid in re-assembly.
10. Re-assemble motor taking care that all parts are kept clean.
11. Install brushes and seat in with fine sand paper.
12. Be sure brushes work freely, replace covers, and re-install motor into drive assembly.

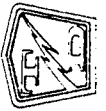


SERVICE AND ADJUSTMENT  
REFER TO FIGURE 7  
DEADMAN MECHANICAL BRAKE ASSEMBLY

REMOVAL OF BRAKE ASSEMBLY AND DRUM.

1. Remove cotter pin and clevis pin, disconnecting brake rod from brake lever arm. (Note location of clevis).
2. Remove spring tension by unscrewing turnbuckle.
3. Remove bolts and cotter pin holding brake band assembly, and slide assembly off drum.
4. Band and drum may now be cleaned, inspected, and if necessary parts may be replaced as needed.
5. 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.
6. If the brake drum is scored it should be removed and turned. It is recommended that a brake drum that has been severely scored or damaged should be replaced with a new drum.
7. To remove drum, unscrew nut, and pull drum from motor shaft.
8. Re-assemble drum on motor shaft and tighten.
9. Replace brake assembly in the reverse order to which it was removed.
10. ADJUST brake band anchor bolt and nut, tightening it until the lever arm is within 1° to 2° of being vertical.
11. ADJUST Turnbuckle to attain a spring length of 9½" measured between spring loops at their point of contact with hooks.
12. ADJUST Seat brake rod using clevis adjustment until there is 5" measured between seat stop and seat deck.  
Note: As brake lining wears the spring will contract in length and the seat will rise in position. Compensate for lining wear by adjusting brake band anchor bolt.
13. If vehicle is equipped with hydraulic wheel brakes, refer to Section J3 for service and adjustment.
14. Once a month lubricate four (4) bushings on seat hinge assembly.

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



REAR AXLE,  
MOTOR AND BRAKES

FIGURE 5  
SECTION J2

LENGTH QUAN. REVISED DATE REVISION

| NO.          | DESCRIPTION |
|--------------|-------------|
| TOL. FRAC. ± | DEC. ±      |
| SCALE        | NONE        |
| DRAWN BY     | REA         |
| DATE         | 8-12-71     |

ASSY, LEFT 41-352-98  
ASSY, RIGHT 41-352-99

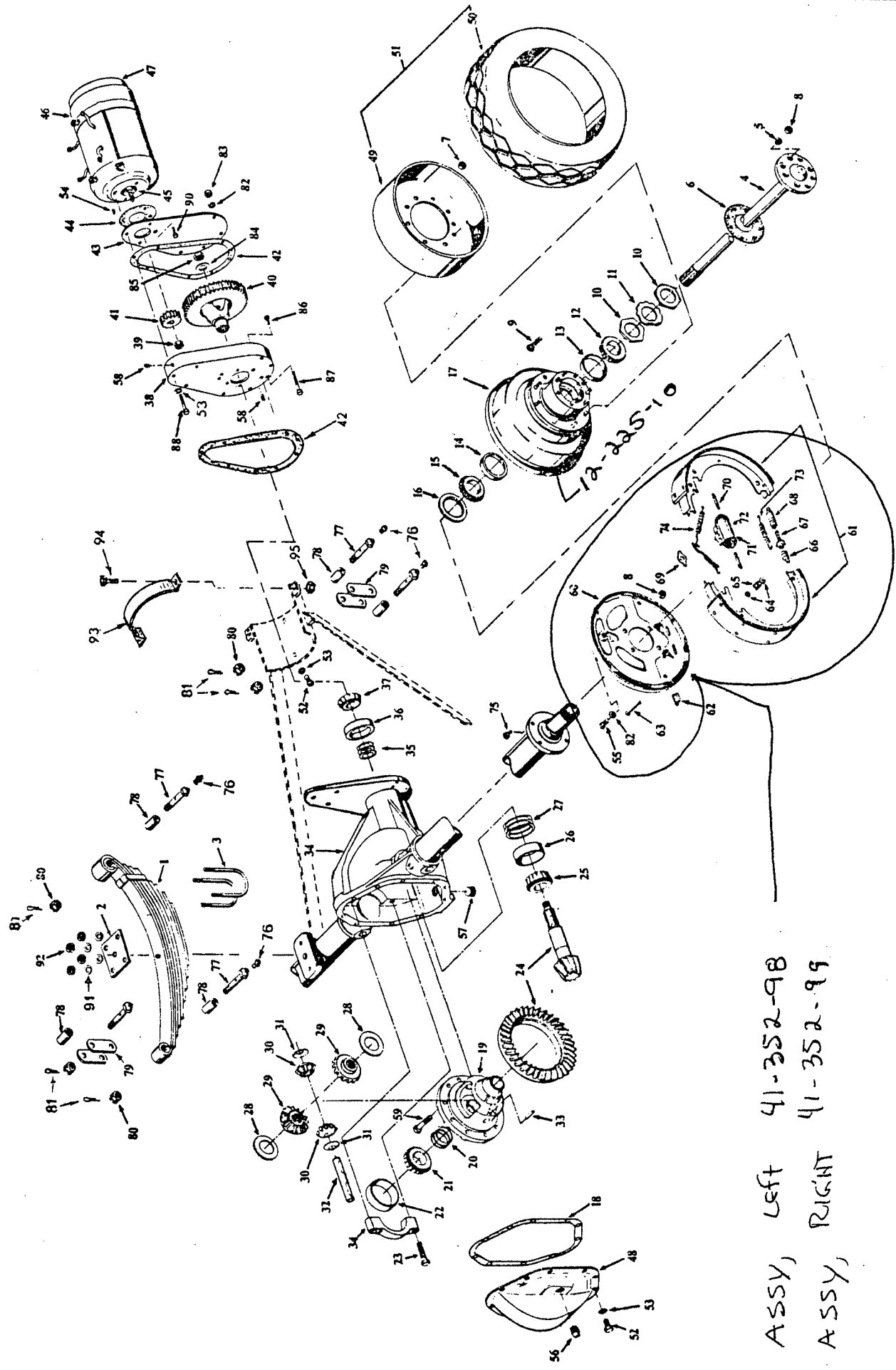


FIGURE 5  
"FULL FLOATING" REAR AXLE - MOTOR AND BRAKES

| FIG. I.D.<br>NO. | T-D PART NO. | DESCRIPTION  | QTY. |
|------------------|--------------|--|------|
| 5-1              | 85-503-00    | 9 Leaf Spring Assembly                             | 2    |
| 5-2              | 16-867-00    | Spring Plate                                       | 2    |
| 5-3              | 96-111-00    | U-Bolt   | 4    |
| 5-4              | 41-150-00    | Axle, Rear   | 2    |
| 5-5              | 95-450-00    | 7/16 ID Tapered Dowel                              | 16   |
| 5-6              | 45-043-00    | Gasket, Axle To Hub                                | 2    |
| 5-7              | 97-236-00    | 1/2 NF Lug Nut                                     | 16   |
| 5-8              | 88-139-81    | 7/16 NF Lock Nut                                   | 24   |
| 5-9              | 96-332-00    | Wheel Stud   | 16   |
| 5-10             | 41-870-00    | Hub Outer Bearing Lock Nut                         | 4    |
| 5-11             | 41-871-00    | Hub Outer Bearing Lock Washer                      | 2    |
| 5-12             | 80-529-00    | Hub Outer Bearing                                  | 2    |
| 5-13             | 80-134-00    | Hub Outer Bearing Race                             | 2    |
| 5-14             | 80-135-00    | Hub Inner Bearing Race                             | 2    |
| 5-15             | 80-530-00    | Hub Inner Bearing                                  | 2    |
| 5-16             | 45-337-00    | Hub Seal   | 2    |
| 5-17             | 12-225-00    | Hub Assembly With Drum Bearing Race And Studs      | 1    |
| 5-18             | 45-041-00    | Gasket   | 1    |
| 5-19             | 41-873-52    | Differential Carrier Assembly                      | 1    |
| 5-20             | 41-874-51    | Shim (.003 Thick) Carrier Bearing                  | 1 To |
| 5-20             | 41-874-52    | Shim (.005 Thick) Carrier Bearing                  | 1 To |
| 5-21             | 80-531-00    | Tapered Roller Bearing (Carrier)                   | 2    |
| 5-22             | 80-136-00    | Bearing Race (Carrier)                             | 2    |
| 5-23             | 88-140-17    | 1/2 X 2-1/4 NC Hex Head Cap Screw                  | 4    |
| 5-24             | 31-243-00    | Ring And Pinion Gear Set, 6.17 Ratio               | 1    |
| 5-25             | 80-532-00    | Tapered Roller Bearing (Rear Pinion)               | 1    |
| 5-26             | 80-137-00    | Bearing Race (Rear Pinion)                         | 1    |
| 5-27             | 41-876-51    | Pinion Bearing Shim (.003 Thick)                   | 1 To |
| 5-27             | 41-876-52    | Pinion Bearing Shim (.005 Thick)                   | 1 To |
| 5-28             | 41-877-00    | Differential Gear Washer (Axle)                    | 2    |
| 5-29             | 41-878-00    | Differential Gear (Axle)                           | 2    |
| 5-30             | 41-879-00    | Differential Gear (Pinion)                         | 2    |
| 5-31             | 41-880-00    | Differential Gear Washer (Pinion)                  | 2    |
| 5-32             | 41-881-00    | Differential Gear Shaft                            | 1    |
| 5-33             | 88-707-14    | Pin (Differential Shaft Lock)                      | 1    |
| 5-34             | 41-883-10    | Housing, Complete With Gears Less Axles And Brakes | 1    |

| FIG. I.D.<br>NO. | T-D PART NO.                                 | DESCRIPTION  | QTY.<br>REQ. |
|------------------|--|--|--------------|
| 5-35             | 41-884-51                                    | Shim (.003 Thick) (Pinion Bearing Shaft)                     | 1            |
| 5-35             | 41-884-52                                    | Shim (.005 Thick) (Pinion Bearing Shaft)                     | 1            |
| 5-36             | 80-138-00                                    | Front Pinion Bearing Race                                    | 1            |
| 5-37             | 80-533-00                                    | Front Pinion Bearing   | 1            |
| 5-38             | 43-200-51                                    | Gear Case  | 1            |
| 5-39             | 97-241-00                                    | 3/4 NF Hex Head Jam Nut                                      | 1            |
| 5-40             | 31-202-10                                    | 84 Tooth Spur Gear   | 1            |
| 5-40             | 31-206-10                                    | 67 Tooth Spur Gear   | 1            |
| 5-41             | 31-229-00                                    | 17 Tooth Gear (Goes With 84 Tooth Gear)                      | 1            |
| 5-41             | 31-232-00                                    | 17 Tooth Gear (Goes With 67 Tooth Gear)                      | 1            |
| 5-42             | 45-000-00                                    | Gear Case Gasket   | 2            |
| 5-43             | 44-350-00                                    | Gear Case Cover  | 1            |
| 5-44             | 45-010-00                                    | Motor Gasket   | 1            |
| 5-45             | 45-507-00                                    | Shaft Oil Seal   | 1            |
| 5-46             | 70-059-00                                    | Motor, 5 H.P., 2600 RPM, 36 Volt - Baldor                    | 1            |
| 5-47             | 70-061-00                                    | Motor, 5 H.P., 2800 RPM, 36 Volt - G.E.                      | 1            |
| 5-47             | 70-126-00                                    | Motor Brushes, Set Of 8                                      | 1            |
| 5-47             | 80-203-00                                    | Ball Bearing Front And Rear                                  | 2            |
| 5-48             | 41-872-00                                    | Carrier Cover  | 1            |
| 5-49             | 12-055-00                                    | Cast Wheel For 18 X 5 X 14 Solid Cushion Tire                | 2            |
| 5-49             | 12-056-00                                    | Cast Wheel For 21 X 5 X 15 Solid Extra Cushion Tire          | 2            |
| 5-50             | 10-262-00                                    | Tire, Solid Cushion 18 X 5 X 14 (Smooth)                     | 2            |
| 5-50             | 10-263-00                                    | Tire Solid Xtra Cushion 21 X 5 X 15 (A.W.)                   | 2            |
| 5-51             | 13-957-10                                    | Tire & Demountable Wheel 18 X 5 X 14 Solid Cushion Tire      | 2            |
| 5-51             | 13-958-10                                    | Tire & Demountable Wheel 21 X 5 X 15 Solid Xtra Cushion Tire | 2            |
| 5-52             | 88-100-08                                    | 3/8 X 5/8 NC Hex Head Cap Screw                              | 12           |
| 5-53             | 88-108-62                                    | 3/8 Lock Washer  | 12           |
| 5-54             | 97-100-00                                    | 3/16 Woodruff Key  | 1            |
| 5-55             | 88-080-09                                    | 5/16 X 3/4 NC Hex Head Cap Screw                             | 4            |
| 5-56             | 41-994-00                                    | Fill And Drain Plug-Square Head                              | 1            |
| 5-57             | 41-885-00                                    | Fill And Drain Plug-Recessed Head - Magnetic                 | 1            |
| 5-58             | 41-997-00                                    | Fill and Drain Plug  | 2            |
| 5-59             | 88-150-12                                    | 1/2 X 1-1/8 NF Hardened Hex Head Cap Screw                   | 12           |
| 5-60             | <u>41-341-98</u>                             | Left Side Backing Plate                                      | 1            |
| 5-60             | <u>41-341-99</u>                             | Right Side Backing Plate                                     | 1            |
| 5-61             | 41-674-00                                    | Front Brake Shoe   | 2            |
| 5-61             | <del>41-675-00</del><br><del>41-669-00</del> | Rear Brake Shoe  | 2            |
| 5-62             | 41-684-00                                    | Brake Adjustment Hole Cover                                  | 2            |

| FIG. I.D.<br>NO. | T-D PART NO. | DESCRIPTION                                       | QTY.<br>REQ. |
|------------------|--------------|---|--------------|
| 5-63             | 41-676-00    | Anchor Rod Brake Shoe Backing Plate               | 4            |
| 5-64             | 41-677-00    | Retainer Washer, Brake Shoe Backing Plate Anchor  | 8            |
| 5-65             | 85-070-00    | Spring Brake Backing Plate Anchor (Fuchsia Color) | 4            |
| 5-66             | 41-678-00    | Brake Adjustment Socket                           | 2            |
| 5-67             | 41-679-00    | Brake Adjustment Screw                            | 2            |
| 5-68             | 41-680-00    | Brake Adjustment Nut                              | 2            |
| 5-69             | 41-681-00    | Top Shoe Retainer Plate                           | 2            |
| 5-70             | 41-683-00    | Wheel Cylinder Push Rod                           | 4            |
| 5-71             | 99-503-99    | Wheel Cylinder Right Side                         | 1            |
| 5-72             | 99-503-98    | Wheel Cylinder Left Side                          | 1            |
| 5-73             | 85-209-00    | Bottom Shoe Spring (Brown Color)                  | 2            |
| 5-74             | 85-211-00    | Top Shoe Spring (Red Color)                       | 4            |
| 5-75             | 41-682-00    | Backing Plate Mounting Bolt                       | 8            |
| 5-76             | 87-071-00    | Grease Fitting - 3/16 Drive Type                  | 8            |
| 5-77             | 96-244-00    | Shackle Bolt                                      | 8            |
| 5-78             | 32-213-00    | Nylon Bushing                                     | 8            |
| 5-79             | 16-870-00    | Shackle Strap                                     | 6            |
| 5-80             | 88-169-81    | Lock Nut - 9/16" NC (Hex)                         | 8            |
| 5-81             | 88-527-11    | Cotter Pin - 1/8" x 1"                            | 8            |
| 5-82             | 88-088-62    | 5/16 Lock Washer                                  | 5            |
| 5-83             | 88-089-80    | 5/16 NC Hex Head Nut                              | 5            |
| 5-84             | 88-268-61    | 7/8 SAE Washer                                    | 1            |
| 5-85             | 88-279-81    | 7/8 NF Hex Head Lock Nut                          | 1            |
| 5-86             | 88-167-09    | 3/8 X 3/4 Dowel Pin                               | 2            |
| 5-87             | 88-080-20    | 5/16 X 3 NC Hex Head Cap Screw                    | 5            |
| 5-88             | 88-100-20    | 3/8 X 3 NC Hex Head Cap Screw                     | 3            |
| 5-89             | 88-108-62    | 3/8 Lock Washer                                   | 3            |
| 5-90             | 88-103-09    | 3/8 X 3/4 NC Socket, Flat Head Cap Screw          | 1            |
| 5-91             | 88-168-62    | 9/16 Lock Washer                                  | 8            |
| 5-92             | 88-179-81    | 9/16 NF Hex Head Nut                              | 8            |
| 5-93             | 50-457-00    | Motor Anchor Strap - G.E.                         | 1            |
| 5-93             | 50-456-00    | Motor Anchor Strap - Baldor                       | 1            |

"FULL FLOATING" REAR AXLE  
SUGGESTED SPARE PARTS LIST

| FIG. I. D.<br>NO.                            | T-D PART # | DESCRIPTION  | QUANTITY OF<br>1-20 UNITS |
|--|------------|--|---------------------------|
| REFER TO FIGURE 5, "FULL FLOATING" REAR AXLE |            |  |                           |
| 5-4  | 41-150-00  | Axle, Rear   | 2                         |
| 5-5  | 95-450-00  | 7/16 ID Tapered Dowel  | 16                        |
| 5-6  | 45-043-00  | Gasket, Axle To Hub  | 2                         |
| 5-7  | 97-236-00  | 1/2 NF Lug Nut   | 16                        |
| 5-16   | 45-337-00  | Hub Seal   | 2                         |
| 5-17   | 12-225-00  | Hub Assembly With Drum Bearing Race And Studs  | 1                         |
| 5-18   | 45-041-00  | Gasket   | 1                         |
| 5-42   | 45-000-00  | Gear Case Gasket   | 2                         |
| 5-44   | 45-010-00  | Motor Gasket   | 1                         |
| 5-45   | 45-502-00  | Shaft Oil Seal   | 1                         |
| 5-46   | 70-059-00  | Motor, 5 H.P., 2600 RPM, 36 Volt   | 1                         |
| 5-47   | 70-126-00  | Motor Brushes, Set Of 8  | 1                         |
| 5-47   | 80-203-00  | Ball Bearing Front And Rear  | 2                         |
| 5-51   | 13-957-10  | Tire & Demountable Wheel 18X 5 X 14 Solid Cushion Tire (Tractor With 18" Tire Only)      | 2                         |
| 5-51   | 13-958-10  | Tire & Demountable Wheel 21X 5 X 15 Solid Xtra Cushion Tire (Tractor With 21" Tire Only) | 2                         |
| 5-56   | 41-885-00  | Fill And Drain Plug-Square Head  | 1                         |
| 5-57   | 41-886-00  | Fill And Drain Plug-Recessed Head  | 1                         |
| 5-58   | 41-997-00  | Fill Plug  | 2                         |
| 5-61   | 41-674-00  | Front Brake Shoe   | 2                         |
| 5-61   | 41-675-00  | Rear Brake Shoe  | 2                         |
| 5-62   | 41-684-00  | Brake Adjustment Hole Cover  | 2                         |
| 5-63   | 41-676-00  | Anchor Rod Brake Shoe Backing Plate  | 4                         |
| 5-64   | 41-677-00  | Retainer Washer, Brake Shoe Backing Plate Anchor   | 8                         |
| 5-65   | 85-070-00  | Spring Brake Backing Plate Anchor (Fuchsia Color)  | 4                         |
| 5-70   | 41-683-00  | Wheel Cylinder Push Rod  | 4                         |
| 5-71   | 99-503-99  | Wheel Cylinder Right Side  | 1                         |
| 5-72   | 99-503-98  | Wheel Cylinder Left Side   | 1                         |
| 5-73   | 85-209-00  | Bottom Shoe Spring (Brown Color)   | 2                         |
| 5-74   | 85-211-00  | Top Shoe Spring (Red Color)  | 4                         |

MAINTENANCE PROCEDURES  
REFER TO FIGURE 6 AND 7  
HYDRAULIC BRAKE SYSTEM

Your hydraulic brake system consists of an automotive master cylinder, located under the left front floorboard. It is operated by the brake foot pedal and control linkage.

Each rear wheel is fitted with a 12" brake assembly ;and rugged brake drum. On 4 wheel brake models the front wheels are equipped with 7" brake assembly.

Refer to Maintenance Guide Section D and Lubrication Diagram Section E 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.

A visual inspection of the hydraulic system is recommended on a monthly basis to detect any signs of leakage. Repairs 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 J3 of this manual for proper procedures to follow.

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

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 (There will be 2 lines on 4 wheel brake system).
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.

BLEED AIR FROM BRAKE SYSTEM

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

If fluid level is allowed to fall too 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. (Refer to Adjustment Section J3 of this manual).
2. Fill master cylinder to top with approved brake fluid or, if available, attach brake bleeder tank to master cylinder.
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 a clear stream appears.
- 3Alt. It is necessary to utilize 2 people to bleed brake system when bleeder tank is not available. 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

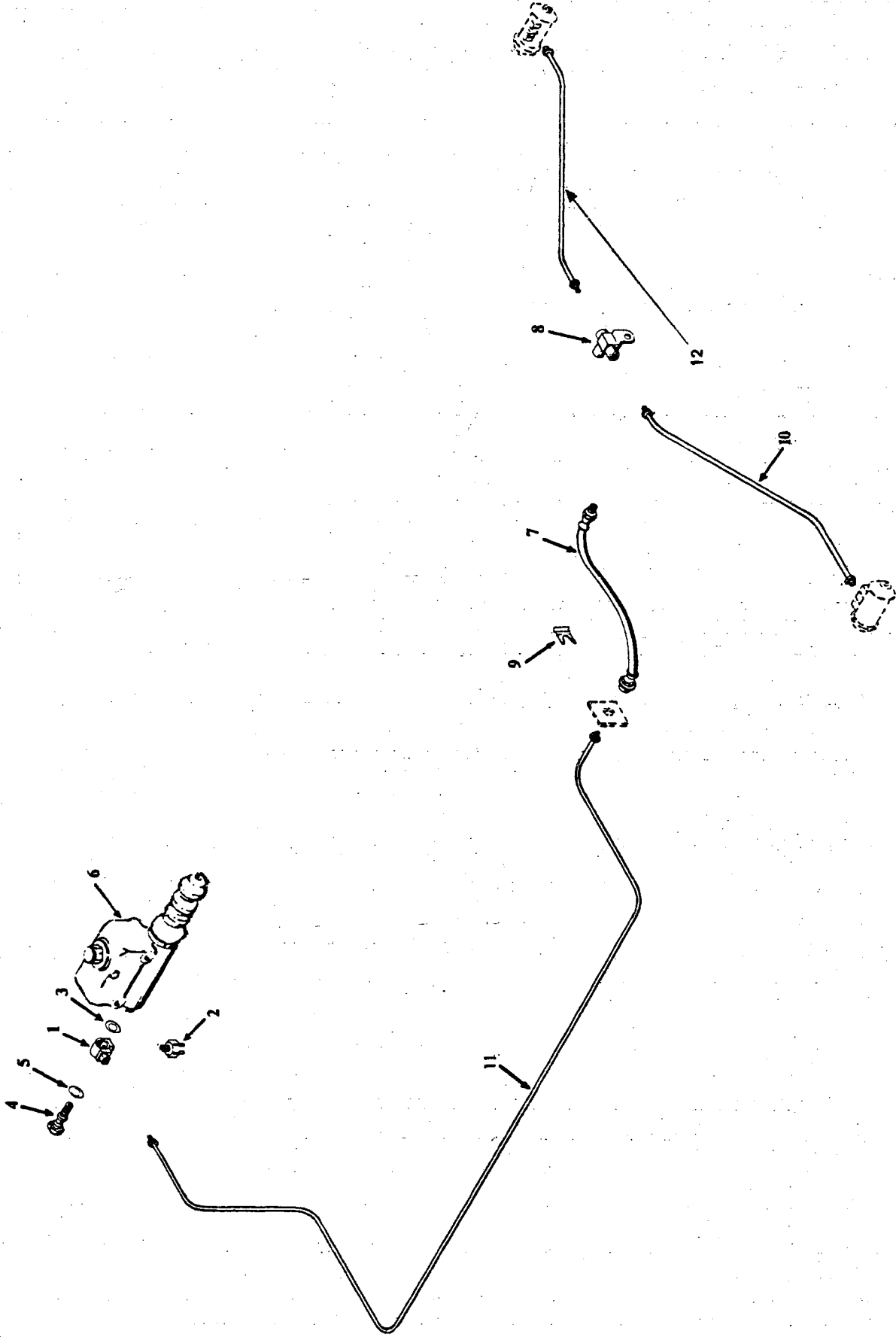
1. Remove wheel lugs, wheel and brake drum.
2. Unhook springs and remove brake shoes, Brake shoes should be replaced when lining is worn to rivet heads.
3. To remove wheel cylinder, disconnect hydraulic line.
4. Remove 2 wheel cylinder bolts from backing plate and remove wheel cylinder.
5. If installing replacement kit, clean wheel cylinder thoroughly.
6. Remove dust caps and piston parts.
7. Examine cylinder walls. If scored or rough, remove with fine hone.
8. Install new kit assembly.
9. Replace wheel cylinder and brake shoes in reverse order to which they were removed.
10. Replace brake drum. (If brake drum is badly scored, replace with new one).
11. Replace wheel.
12. Adjust brake shoes and bleed hydraulic system.

ADJUST BRAKE SHOES. (Refer to Figure 5).

1. Jack wheels clear of floor.
2. Remove adjusting hole covers.
3. Insert screwdriver or special adjusting tool in slot of backing plate to engage star wheel adjusting screw.
4. Move outer end of tool toward axle, expanding brake shoes to a point where the wheel drags heavily.
5. Then back off by turning adjustment star in opposite direction slightly until wheel is just free of drag.
6. Repeat procedure on opposite wheel.
7. Depress brake pedal several times and check to be sure wheel still revolves free of drag and desired pedal travel is obtained.
8. If wheel drags, repeat adjustments as previously outlined, until satisfactory results are obtained.
9. If wheel (or wheels) are free of drag, but pedal has too much travel, check adjustments as previously outlined. If necessary, bleed hydraulic system.



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REVISION

REVISED DATE

QUANTITY

LENGTH

NO.

DESCRIPTION

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SCALE NONE

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DATE 10-21-71

FIGURE 6  
SECTION J3

HYDRAULIC  
BRAKE SYSTEM

FIGURE 6  
HYDRAULIC BRAKE SYSTEM

| FIG. I.D.<br>NO. | T-D PART NO. | DESCRIPTION                                    | QT<br>RE |
|------------------|--------------|--|----------|
| 6-1              | 99-555-00    | Fitting - Used With Stoplight                  | 1        |
| 6-1              | 99-581-00    | Fitting - Used Without Stoplight               | 1        |
| 6-2              | 71-110-00    | Brake Switch                                   | 1        |
| 6-3              | 99-571-00    | Washer   | 1        |
| 6-4              | 99-579-00    | Bolt   | 1        |
| 6-5              | 99-572-00    | Washer   | 1        |
| 6-6              | 99-510-00    | Master Cylinder                                | 1        |
| 6-6              | 99-510-61    | Kit - Master Cylinder Repair                   | 1        |
| 6-7              | 99-554-00    | Flexible Hose                                  | 1        |
| 6-8              | 99-569-00    | Fitting  | 1        |
| 6-9              | 99-576-00    | Clip   | 1        |
| 6-10             | 99-617-51    | Steel Brake Line $\frac{1}{4}$ " X 51" (Left)  | 1        |
| 6-10             | 99-617-52    | Steel Brake Line $\frac{1}{4}$ " X 51" (Right) | 1        |
| 6-11             | 99-614-51    | Steel Brake Line $\frac{1}{4}$ " X 20"         | 1        |
| 6-12             | 99-553-00    | Tubing Ends - $\frac{1}{4}$ "                  | 6        |

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 D and Lubrication Diagram Section E for proper application of lubricants.

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.

The automatic deadman brake system consists of the pivoted seat assembly. The operating cable or rods. The brake apply spring, adjustable tension device and its connecting linkage.

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

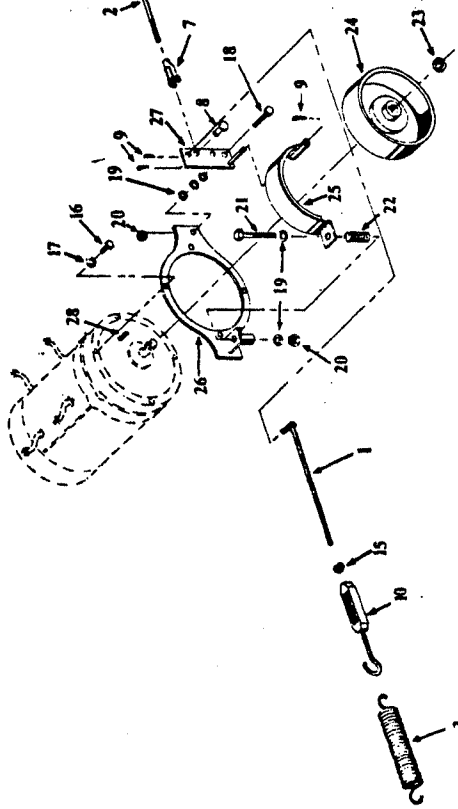
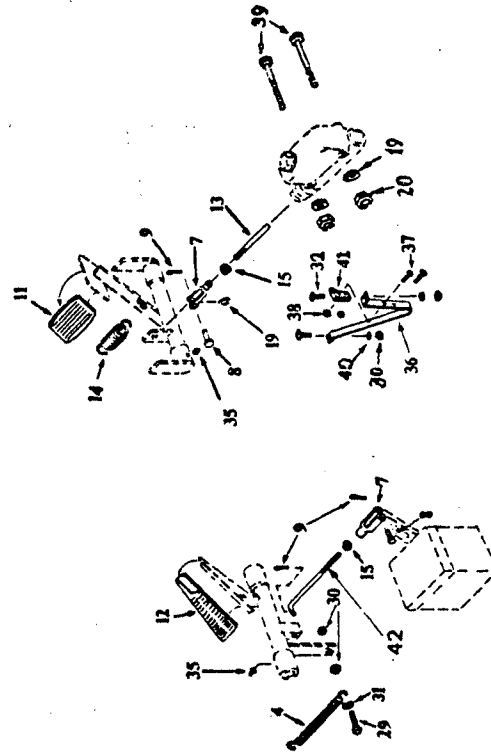
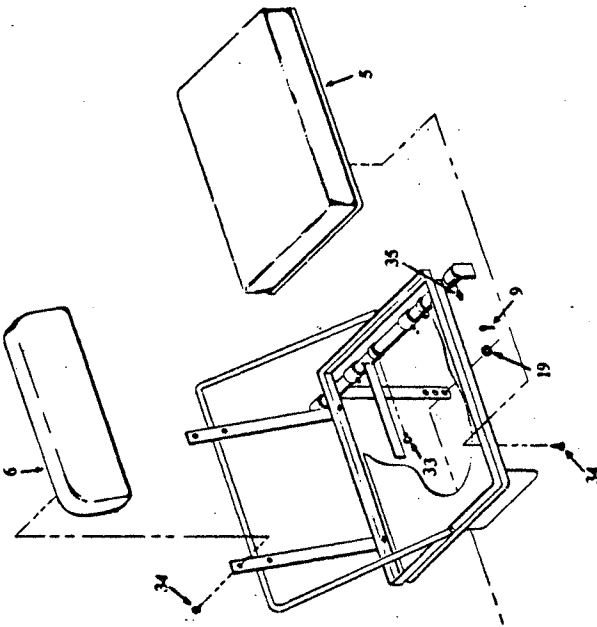
For service and adjustments refer to the following sections:

Section J2 - For hand brake and mechanical brake or "Deadman" brake service and adjustments.

Section J3 - For Master cylinder and push rod adjustments and service.

Section J6 - For accelerator service and adjustments.

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LENGTH QUAN. REVISED DATE REVISION

MECHANICAL CONTROL LINKAGE  
MODEL P

FIGURE 7  
SECTION J4

NO. DESCRIPTION

TOL. FRAC. ± DEC. ±

SCALE NONE

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DATE 12-16-70

FIGURE 7  
MECHANICAL CONTROL LINKAGE

| FIG. I.D.<br>NO. | T-D PART NO. | DESCRIPTION                                   | QTY.<br>REQ. |
|------------------|--------------|---|--------------|
| 7-1              | 50-024-00    | 3/8 Rod With Special Pin 8-1/2" Long          | 1            |
| 7-2              | 50-023-00    | 3/8 Rod 11-1/2" Long Plus 1" Bend             | 1            |
| 7-3              | 85-280-00    | Spring Deadman Brake Return                   | 1            |
| 7-4              | 85-295-00    | Spring Accelerator Return                     | 1            |
| 7-5              | 90-001-00    | Seat Cushion                                  | 1            |
| 7-6              | 90-000-00    | Seat Backrest                                 | 1            |
| 7-7              | 96-762-00    | 3/8 Clevice                                   | 3            |
| 7-8              | 96-772-00    | 3 /8 Clevice Pin                              | 3            |
| 7-9              | 88-527-11    | 1/8 X 1 Cotter Pin                            | 7            |
| 7-10             | 96-926-00    | Turnbuckle                                    | 1            |
| 7-11             | 98-200-00    | Pad Rubber Brake Pedal                        | 1            |
| 7-12             | 98-253-00    | Pad Accelerator Pedal                         | 1            |
| 7-13             | 50-009-00    | Master Cylinder Push Rod                      | 1            |
| 7-14             | 85-270-00    | Brake Return Spring                           | 1            |
| 7-15             | 88-119-80    | 3/8 NF Hex Head Nut                           | 3            |
| 7-16             | 88-100-11    | 3/8 X 1 NC Hex Head Cap Screw                 | 4            |
| 7-17             | 88-108-62    | 3/8 Lock Washer                               | 4            |
| 7-18             | 88-100-13    | 3/8 X 1-1/4 NC Hex Head Cap Screw             | 1            |
| 7-19             | 88-108-60    | 3/8 Cut Washer                                | 10           |
| 7-20             | 88-109-81    | 3/8 NC Lock Nut                               | 4            |
| 7-21             | 88-100-24    | 3/8 X 4 NC Hex Head Cap Screw                 | 1            |
| 7-22             | 85-060-00    | Spring  | 1            |
| 7-23             | 88-239-82    | 3/4 NF Jam Nut                                | 1            |
| 7-24             | 41-520-10    | Brake Drum                                    | 1            |
| 7-25             | 41-650-00    | Brake Band                                    | 1            |
| 7-26             | 70-452-00    | Brake Mounting Plate                          | 1            |
| 7-27             | 42-001-51    | Brake Cam                                     | 1            |
| 7-28             | 97-100-00    | 3/16 Woodruff Key                             | 1            |
| 7-29             | 88-060-11    | 1/4 X 1 NC Hex Head Cap Screw                 | 2            |
| 7-30             | 88-069-80    | 1/4 NC Hex Head Nut                           | 4            |
| 7-31             | 88-068-60    | 1/4 Cut Washer                                | 3            |
| 7-32             | 88-065-09    | 1/4 X 3/4 Machine Screw Truss Head            | 2            |
| 7-33             | 88-067-11    | 1/4 X 1 Thumb Screw                           | 2            |
| 7-34             | 88-837-09    | #14 X 3/4 Phillips Pan Head Sheet Metal Screw | 8            |
| 7-35             | 87-071-00    | Zerk Grease Fitting                           | 8            |
| 7-36             | 71-609-00    | Bracket - Micro Switch Brake Pedal Interlock  | 1            |

| FIG. I.D.<br>NO. | T-D PART NO. | DESCRIPTION                                    | QTY.<br>REQ. |
|------------------|--------------|--|--------------|
| 7-37             | 88-014-13    | Round Head Machine Screw 6-32 X 1-1/4"         | 2            |
| 7-38             | 88-019-80    | Nut 6-32 (Hex)                                 | 2            |
| 7-39             | 88-100-20    | Hex Head Cap Screw 3/8" NC X 3"                | 2            |
| 7-40             | 88-068-62    | Lock Washer 1/4"                               | 2            |
| 7-41             | 71-130-00    | Micro Switch (Standard)                        | 1            |
| 7-42             | 50-015-00    | Accelerator Rod - 3/8" X 3-3/4" Long Plus Bend | 1            |



MAINTENACE PROCEDURES

REFER TO FIGURE 8

FORWARD-REVERSE SWITCH

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

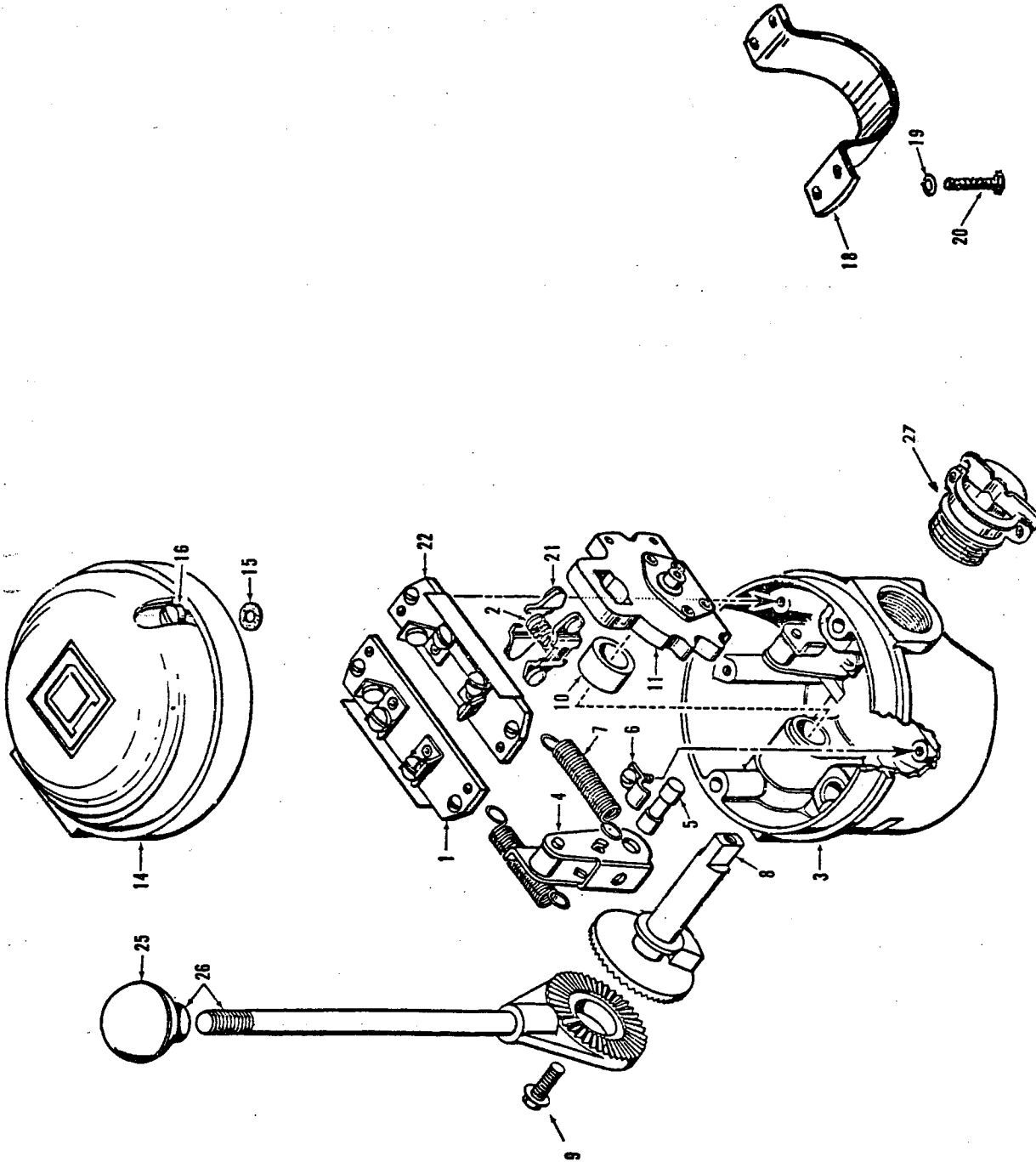
It will require very little maintenance if properly used.

Refer to Service and Adjustment Section J5 of this manual for replacement procedures.

It is recommended that an occasional small quantity of lubricant be placed on the detent ball and spring of the switch. Refer to Figure 8.



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FORWARD AND REVERSE  
SWITCH

FIGURE 8

TOL. FRAC. + DEC. -

SCALE NONE

DRAWN BY REA

DATE 8-12-71

FIGURE 8  
FORWARD AND REVERSE SWITCH

| FIG. I.D.<br>NO. | T-D PART NO. | DESCRIPTION                                      | QTY.<br>REQ. |
|------------------|--------------|--|--------------|
| 8-0              | 71-080-00    | Forward-Reverse Switch (Complete)                | 1            |
| 8-1              | 71-080-54    | Terminal Board Assembly                          | 1            |
| 8-2              | 71-080-57    | Contact Finger Spring                            | 1            |
| 8-3              | 71-080-61    | Housing And Bearing Assembly                     | 1            |
| 8-4              | 71-080-62    | Roller Arm Assembly                              | 2            |
| 8-5              | 71-080-66    | Hinge Pin  | 2            |
| 8-6              | 71-080-65    | Clip   | 2            |
| 8-7              | 71-080-64    | Heavy Positioning Spring For 6" Or Longer Handle | 1            |
| 8-8              | 71-080-67    | Operating Shaft Assembly                         | 1            |
| 8-9              | 88-040-06    | 10/32 x 1/2 Hex Head Cap Screw                   | 1            |
| 8-10             | 71-080-63    | Spacer   | 1            |
| 8-11             | 71-080-59    | Movable Contact Carrier Assembly                 | 1            |
| 8-14             | 71-080-53    | Cover  | 1            |
| 8-15             | 71-080-55    | Washer, Corprene                                 | 2            |
| 8-16             | 88-047-11    | 10/32 x 1/2 Fillister Head Machine Screw         | 2            |
| 8-18             | 71-080-60    | Switch Clamp                                     | 1            |
| 8-19             | 88-048-62    | #10 Lock Washer                                  | 4            |
| 8-20             | 88-014-09    | 6/32 x 3/4 Round Head Machine Screw              | 4            |
| 8-21             | 71-080-58    | Contact Finger Assembly                          | 2            |
| 8-22             | 71-080-56    | Terminal Board Assembly (With Connector)         | 1            |
| 8-25             | 71-080-51    | Operating Knob                                   | 1            |
| 8-26             | 71-080-52    | Operating Lever Assembly                         | 1            |
| 8-27             | 75-430-00    | Connector - Romex/Conduit 1/2"                   | 1            |

FIGURE 8  
DIRECTIONAL SELECTOR SCR

| FIG I. D.<br>NO. | T-D PART NO. | DESCRIPTION                            | QTY.<br>REQ. |
|------------------|--------------|--|--------------|
| 8-0              | 71-090-00    | Directional Selector Assembly Complete | 1            |
| 8-1              | 71-090-51    | Bottom Assembly                        | 1            |
| 8-2              | 71-090-52    | Clamp                                  | 2            |
| 8-3              | 71-090-53    | Ball (Detent)                          | 1            |
| 8-4              | 71-090-54    | Spring (Detent)                        | 1            |
| 8-5              | 88-067-06    | Socket Set Screw 1/4 NC X 1/2          | 1            |
| 8-6              | 71-090-55    | Shaft                                  | 1            |
| 8-7              | 71-090-56    | Lock Ring                              | 2            |
| 8-8              | 71-090-57    | Switch Unit                            | 2            |
| 8-9              | 88-015-08    | Truss Head Machine Screw 6-32 X 5/8"   | 4            |
| 8-10             | 88-018-61    | Washer (Flat) 6-32                     | 4            |
| 8-11             | 88-018-62    | Lockwasher 6-32                        | 4            |
| 8-12             | 88-024-04    | Round Head Machine Screw 8-32 X 3/8    | 4            |
| 8-13             | 88-028-62    | Lockwasher 8-32                        | 4            |
| 8-14             | 88-060-06    | Hex Head Cap Screw 1/4" NC X 1/2"      | 4            |
| 8-15             | 88-068-62    | Lockwasher 1/4"                        | 4            |
| 8-16             | 71-090-58    | Cover                                  | 1            |
| 8-17             | 71-090-59    | Handle Assembly                        | 1            |
| 8-18             | 71-090-60    | Stop                                   | 1            |

MODEL C-290 SCR CONTROL

SPEED CONTROL & MAIN POWER SWITCHING

|                                      |            |
|--------------------------------------|------------|
| TITLE SHEET                          | PAGE 1     |
| OPERATING & MAINTENANCE INSTRUCTIONS | SUPPLEMENT |
| SCR PANEL FIGURE 9A                  | PAGE 2     |
| PARTS LIST for FIGURE 9A             | PAGE 3 & 4 |
| SERVICE INSTRUCTIONS for Contactors  | SUPPLEMENT |
| CONTACTOR PANEL FIGURE 9B            | PAGE 5     |
| PARTS LIST for FIGURE 9B             | PAGE 6 & 7 |
| ACCELERATOR MASTER SWITCH FIGURE 9C  | PAGE 8     |
| PARTS LIST for FIGURE 9C             | PAGE 9     |
| RECOMMENDED SPARE PARTS LIST         | PAGE 10    |

NO. DESCRIPTION

TOL. FRAC. + DEC. +

SCALE NONE

DRAWN BY AEA

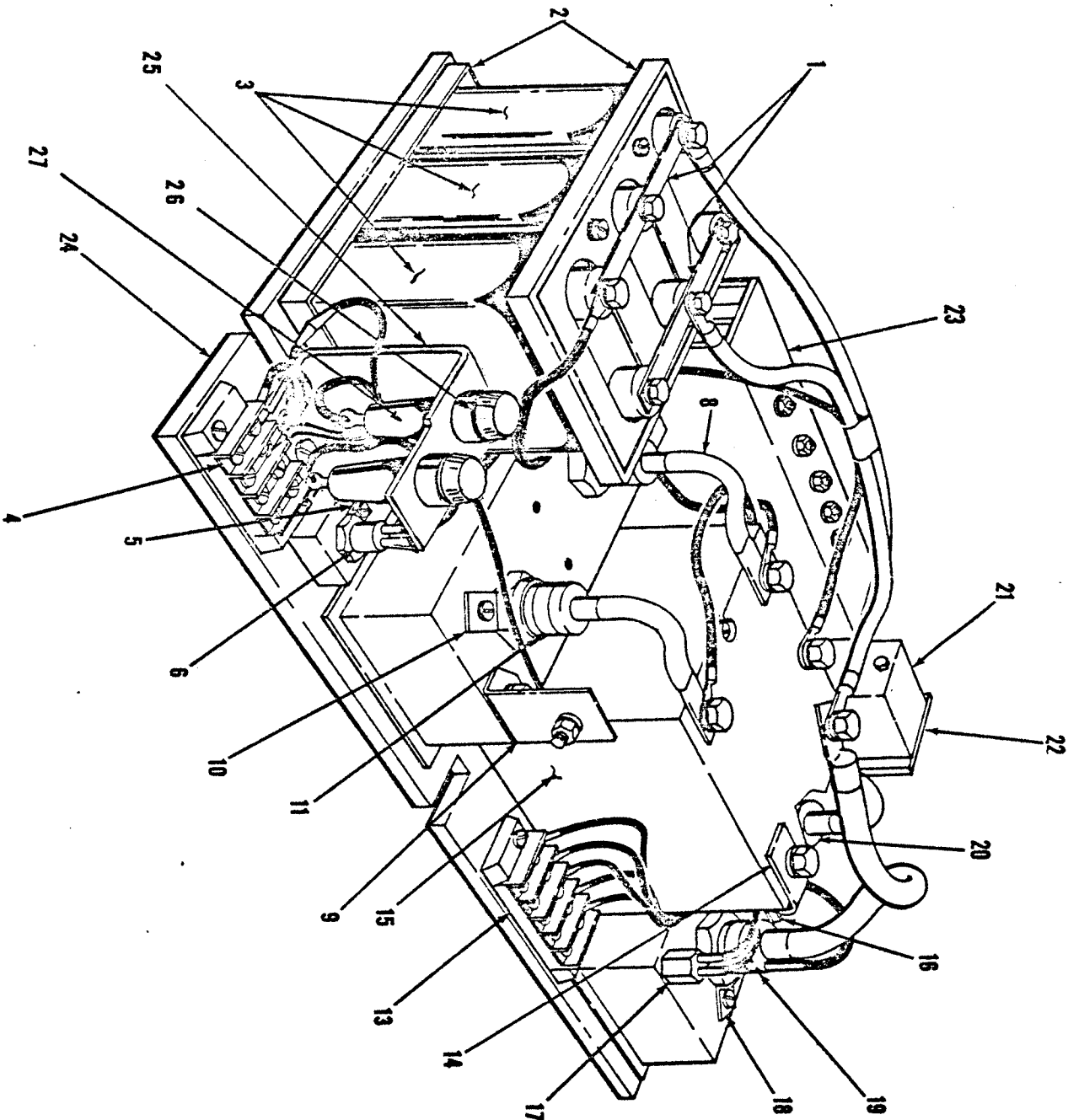
DATE 3-10-76

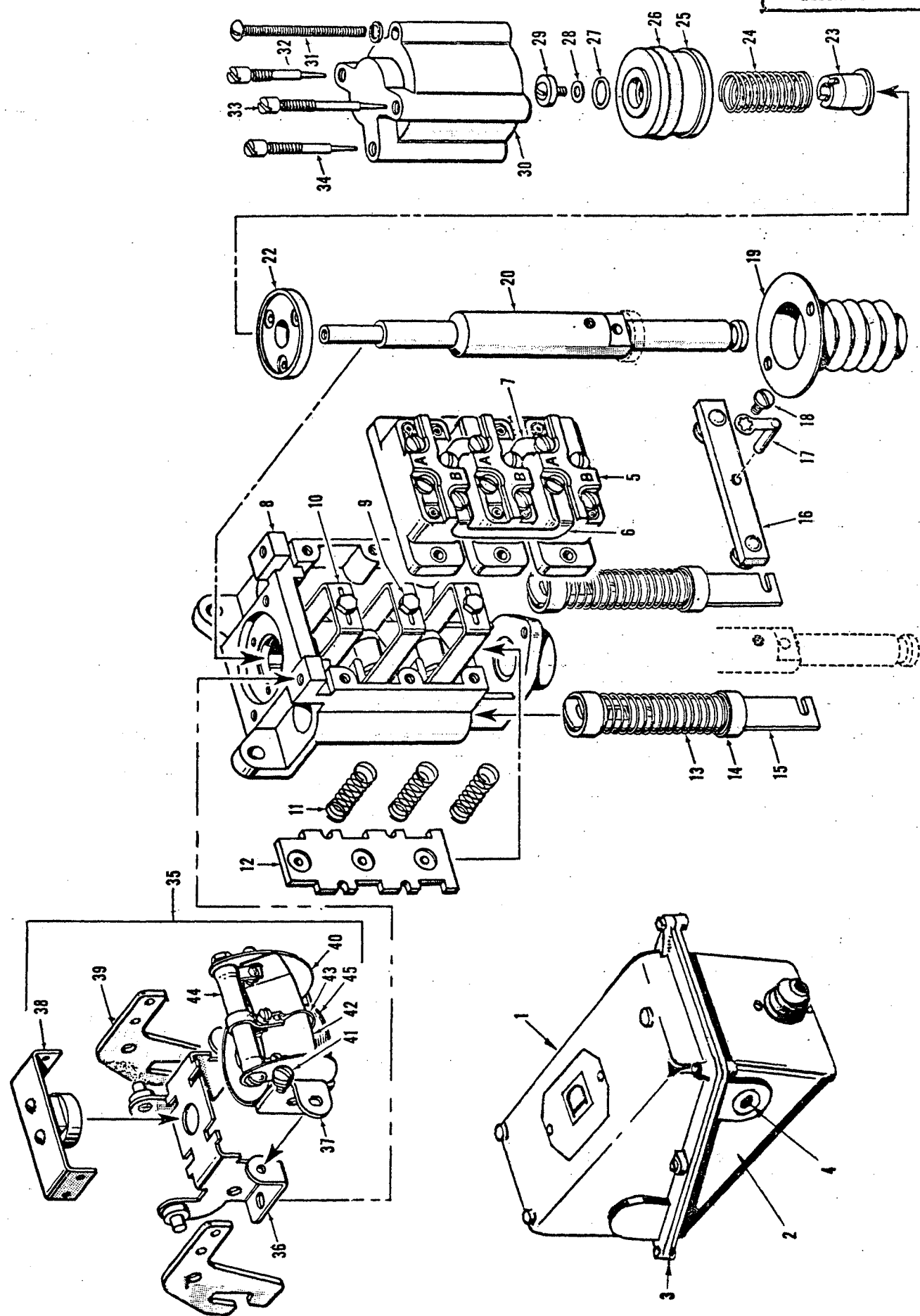
LENGTH QUAN. REVISED DATE REVISION

FIGURE 9A

CONTROL ASSEMBLY-SCR

C-290





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Anaheim, Calif.



SPEED CONTROL  
SWITCH

FIGURE 9A

| NO. DESCRIPTION |      | LENGTH | QUAN. | REVISED DATE | REVISION |
|-----------------|------|--------|-------|--------------|----------|
| TOL. FRAC.      | DEC. |        |       |              |          |
| SCALE           | NONE |        |       |              |          |
| DRAWN BY        | REA  |        |       |              |          |

FIGURE NO. 9A  
SPEED CONTROL SWITCH

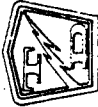
| FIG. I.D.<br>NO. | T-D PART NO. | DESCRIPTION                       | QTY.<br>REQ. |
|------------------|--------------|-----------------------------------|--------------|
| 9A-0             | 61-910-00    | Program Switch Complete           | 1            |
| 9A-1             | 61-910-84    | Cover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



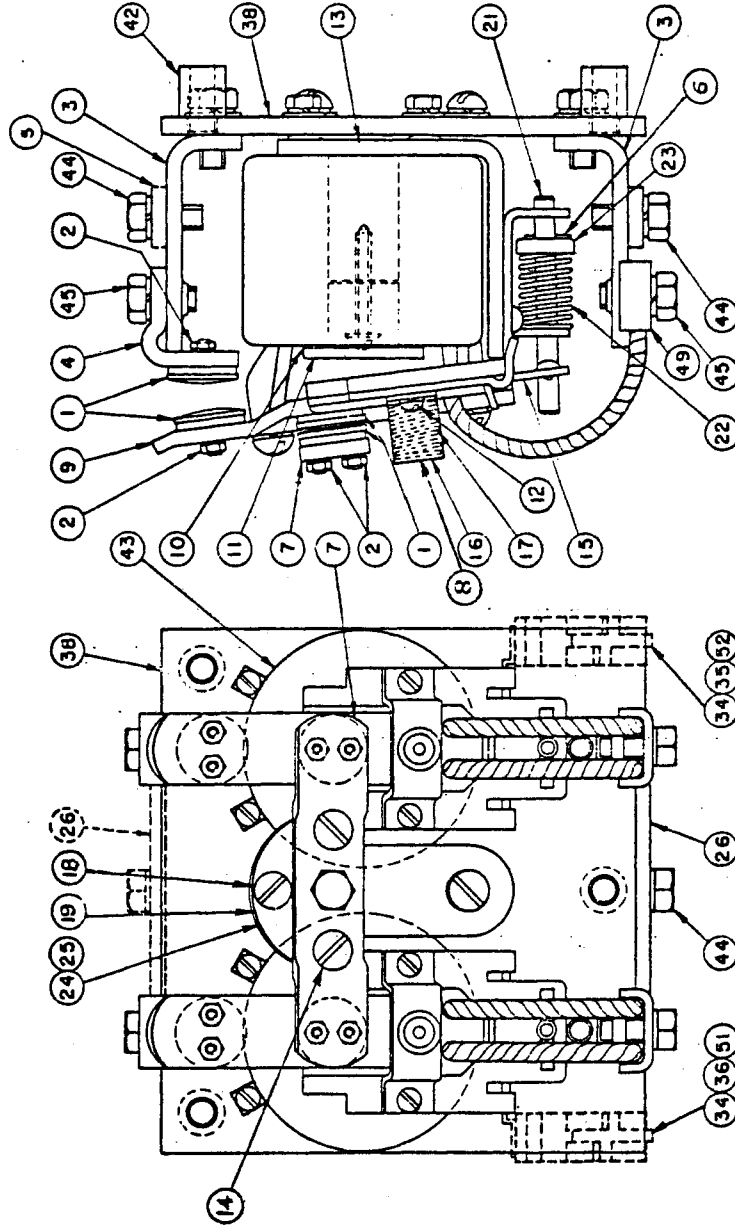
| FIG. I.D.<br>NO. | T-D PART NO. | DESCRIPTION                   | QTY<br>REQ |
|------------------|--------------|-------------------------------|------------|
| 9A-33            | 61-910-74    | Timer Adjusting Screw (Black) | 1          |
| 9A-34            | 61-910-75    | Timer Adjusting Screw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

FIGURE 9B  
SCR 200 AMP CONTACTOR PANEL

| FIG. I. D.<br>NO. | T-D PART NO. | DESCRIPTION                                     | QTY.<br>REQ. |
|-------------------|--------------|---|--------------|
| 9B-1              | 71-311-51    | Operating Coil                                  | 3            |
| 9B-2              | 71-311-52    | Base (2 Pole)                                   | 1            |
| 9B-3              | 71-311-54    | Retaining Ring (Operating Coil)                 | 3            |
| 9B-4              | 71-311-55    | Spring Washer (Operating Coil)                  | 3            |
| 9B-5              | 71-311-56    | Magnet Frame With Core                          | 3            |
| 9B-6              | 71-311-57    | Armature Assembly With Tip Guide (2 Pole)       | 2            |
| 9B-7              | 71-311-58    | Armature Guide                                  | 3            |
| 9B-8              | 88-045-04    | Truss Head Machine Screw 10-32 X 3/8            | 8            |
| 9B-9              | 71-311-59    | Armature Support                                | 3            |
| 9B-10             | 71-311-60    | Spring (Armature) Compression                   | 3            |
| 9B-11             | 71-311-61    | Spring Seat                                     | 3            |
| 9B-12             | 71-311-62    | Screw - Adjusting Compression Spring            | 3            |
| 9B-13             | 71-311-63    | Fulcrum   | 3            |
| 9B-14             | 71-311-86    | Stop Washer For Armature (1 Pole)               | 2            |
| 9B-15             | 71-311-87    | Post - Stop (1 Pole)                            | 2            |
| 9B-16             | 88-045-04    | Truss Head Screw 10-32 X 3/8                    | 2            |
| 9B-17             | 71-311-88    | Spacer - Support Post To Magnet Frame           | 2            |
| 9B-18             | 71-311-64    | Contact Tip                                     | 10           |
| 9B-19             | 71-311-65    | Spring - (Movable Contact) Compression          | 3            |
| 9B-20             | 71-311-84    | Insulation - Back Of Base (1 Pole)              | 1            |
| 9B-20             | 71-311-53    | Insulation - Back Of Base (2 Pole)              | 1            |
| 9B-21             | 71-311-67    | Support - Movable Contact Tip                   | 3            |
| 9B-22             | 71-311-68    | Support - Stationary Contact Tip                | 3            |
| 9B-23             | 71-311-69    | Shim - Support To Base                          | 9            |
| 9B-24             | 71-311-70    | Retaining Pin - Compression Spring              | 3            |
| 9B-25             | 71-311-71    | "E" Ring - Retaining Pin                        | 3            |
| 9B-26             | 71-311-72    | Shunt - Movable Contact Tip                     | 3            |
| 9B-27             | 88-060-06    | Hex Head Cap Screw 1/4" NC X 1/2"               | 3            |
| 9B-28             | 88-080-06    | Hex Head Cap Screw 5/16" NC X 1/2"              | 3            |
| 9B-29             | 71-311-73    | Terminal  | 3            |
| 9B-30             | 71-311-75    | Support - Bracket (2 Pole)                      | 1            |
| 9B-31             | 71-311-74    | Bracket - Stationary Contact Tip (2 Pole)       | 1            |
| 9B-32             | 71-311-77    | Spacer - Connection Screw (2 Pole)              | 1            |
| 9B-33             | 71-311-78    | Connection Screw - Plate (2 Pole)               | 1            |
| 9B-34             | 71-311-79    | Connection Strip - Stationary Contacts (2 Pole) | 1            |
| 9B-35             | 71-311-76    | Plate - Stationary Contact Tip (2 Pole)         | 1            |



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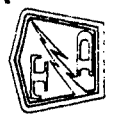
MAIN POWER  
CC FACTORS

FIGURE 9B

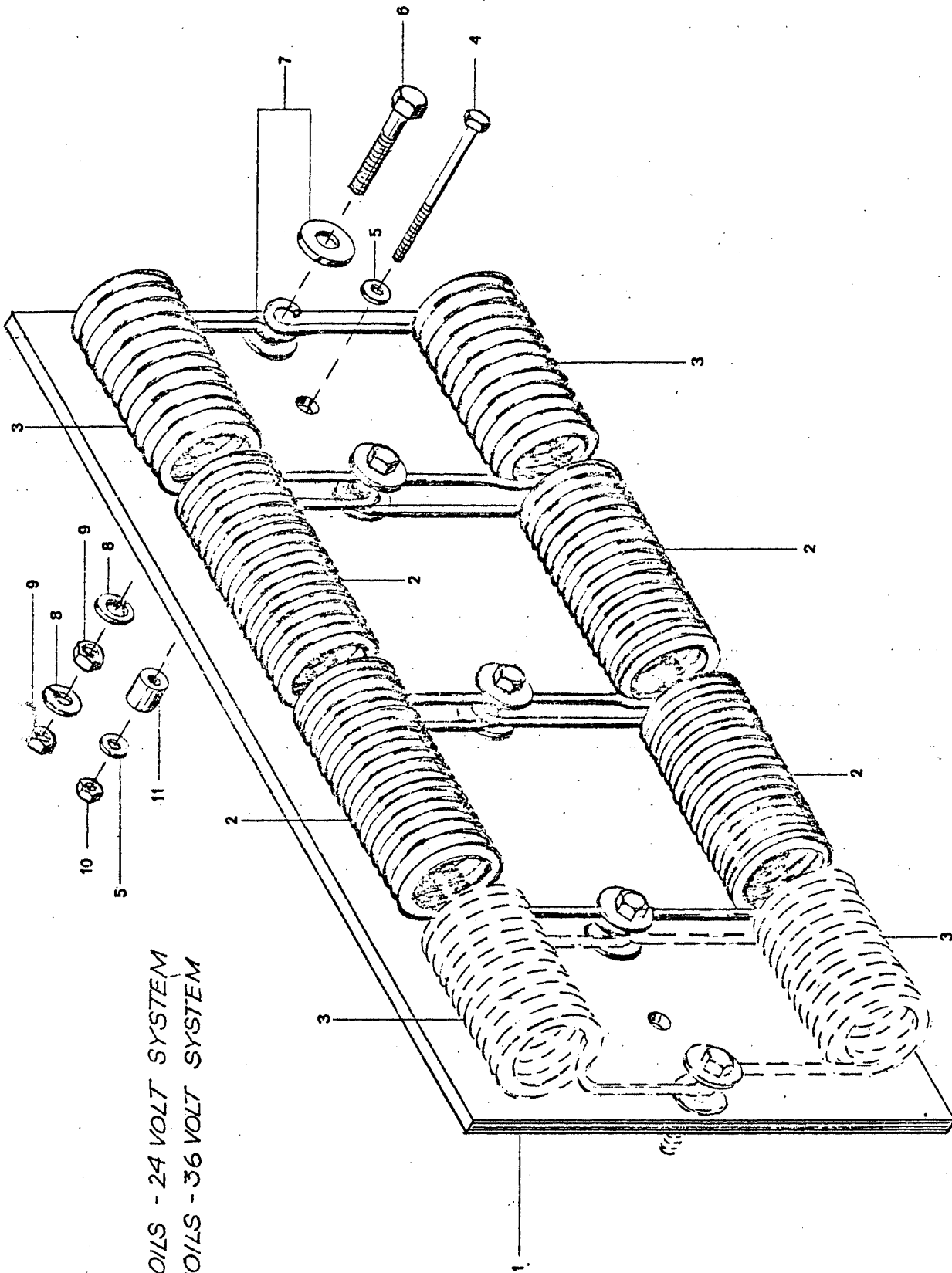
|            |             |
|------------|-------------|
| NO.        | DESCRIPTION |
| TOL. FRAC. | DEC.        |
| SCALE      | NONE        |
| DRAWN BY   | F 14        |
| DATE       | 6-20-69     |

MAIN POWER CONTACTORS

| FIG. I.D.<br>NO. | T-D PART NO. | DESCRIPTION                                     | QTY.<br>REQ. |
|------------------|--------------|---|--------------|
| 9B-0             | 71-200-00    | Contactor, Two Pole, 200 Amp, Without Interlock | 1            |
| 9B-0             | 71-201-00    | Contactor, Two Pole, 200 Amp, With Interlock    | 1            |
| 9B-1             | 71-200-52    | Replaceable Contact Tip Assembly                | 8            |
| 9B-2             | 71-200-54    | Keys #8 - 32                                    | 16           |
| 9B-3             | 71-200-55    | Contact Post                                    | 4            |
| 9B-4             | 71-200-53    | Contact Support                                 | 2            |
| 9B-5             | 88-088-62    | 5/16 Lock Washer                                | 14           |
| 9B-6             | 88-507-06    | 1/16 x 1/2 Cotter Pin                           | 2            |
| 9B-7             | 71-200-68    | Contact Support                                 | 1            |
| 9B-8             | 88-034-06    | 10/24 x 1/2 Long Machine Screw                  | 4            |
| 9B-9             | 71-200-51    | Contact Finger And Lug Assembly                 | 2            |
| 9B-10            | 71-200-66    | Spring Washer                                   | 2            |
| 9B-11            | 71-200-65    | Pole Face Assembly                              | 2            |
| 9B-12            | 88-074-08    | 1/4 x 5/8 NF Round Head Machine Screw           | 2            |
| 9B-13            | 71-200-57    | Magnet Frame Assembly                           | 2            |
| 9B-14            | 88-048-62    | #10 Lock Washer                                 | 6            |
| 9B-15            | 71-200-62    | Armature Assembly                               | 2            |
| 9B-16            | 71-200-64    | Spring Guide                                    | 2            |
| 9B-17            | 71-200-63    | Finger Spring                                   | 2            |
| 9B-18            | 88-097-09    | 5/16 x 3/4 NF Slotted Head Cap Screw            | 4            |
| 9B-19            | 88-067-10    | 1/4 x 7/8 NC Slotted Head Cap Screw             | 2            |
| 9B-21            | 71-200-61    | Return Spring Guide                             | 2            |
| 9B-22            | 71-200-60    | Return Spring                                   | 2            |
| 9B-23            | 71-200-59    | Cup Washer                                      | 2            |
| 9B-24            | 71-200-67    | Contact Support Plate                           | 1            |
| 9B-25            | 71-200-56    | Stationary Contact Support                      | 1            |
| 9B-26            | 71-200-58    | Connector                                       | 1            |
| 9B-34            | 71-200-69    | Interlock                                       | 2            |
| 9B-35            | 71-200-70    | Interlock Lever, Right Hand                     | 1            |
| 9B-36            | 71-200-71    | Interlock Lever, Left Hand                      | 1            |
| 9B-38            | 71-200-74    | Panel Assembly                                  | 1            |
| 9B-42            | 71-200-75    | Spacer  | 4            |
| 9B-43            | 71-200-76    | Magnet Coil                                     | 1            |
| 9B-44            | 88-080-06    | 5/16 x 1/2 NC Hex Head Cap Screw                | 3            |
| 9B-45            | 88-097-08    | 5/16 x 5/8 NF Slotted Head Cap Screw            | 10           |
| 9B-49            | 71-200-77    | Clip  | 2            |
| 9B-51            | 71-200-72    | Interlock Mounting Plate-Left Hand              | 1            |
| 9B-52            | 71-200-73    | Interlock Mounting Plate-Right Hand             | 1            |



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6 COILS - 24 VOLT SYSTEM  
8 COILS - 36 VOLT SYSTEM

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RESISTOR COIL BOARD ASS'Y.  
24 OR 36 VOLT

FIGURE 9C  
SECTION J6

NO. DESCRIPTION

TOL. FRAC. ± DEC. ±

SCALE NONE

DRAWN BY FEA

DATE 7-7-70

FIGURE NO. 9C  
RESISTOR COIL BOARD ASSEMBLY

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

CONTACTOR SPEED CONTROL  
SUGGESTED SPARE PARTS LIST

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

MAINTENANCE PROCEDURES  
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, flasher 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 G - Wiring Diagram
- Section J2 - Motor
- Section J5 - Forward-Reverse Switch
- Section J6 - Speed Control And Main Power Switching
- Section J8 - Batteries And Charger



## 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 to 400 cycles. One cycle is the discharging and charging of the battery within proper limits. The heavy duty industrial type of battery has a life of approximately 7-1/2 years, or 1800 cycles, in appropriate use and with proper care.

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

#### 1. CORRECT CHARGING

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

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

#### 2. DISCHARGING - CAPACITY

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

#### 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.

#### 4. CLEANING

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

When wet dirt accumulates on top of the battery, remove it by washing the battery with a strong solution of baking soda and hot water (1 pound of soda to 1/2 gallon of water).

A convenient brush to use is one having flexible bristles like an old paint brush. Continue the application of the soda solution until all fizzing stops, which indicates that the acid has been neutralized. Then rinse thoroughly with clear water.

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

#### 5. RECORDS

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

- A. Overcharging
- B. Undercharging
- C. Overdischarging
- D. Excessive Water Consumption
- E. Cleanliness
- F. Worn Out Batteries
- G. Excessive Current Consumption On Trucks

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

A battery not in use maintains small amounts of chemical action which slowly tends to 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            |                       |                      | 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 | 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 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, 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 a 10 point range. When they are not, an equalizing charge should be applied. Refer to information under "Charging Time Chart".
- 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 above sample chart, for a new vehicle or when charging results seem unsatisfactory, until satisfactory charging continues for a four week period, then keep record on a monthly basis.

## OPERATING & SERVICING HANDBOOK

### SERIES "SA" BATTERY CHARGERS

#### INSPECTION

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

#### CHARGING CHARACTERISTICS

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

#### INSTALLATION

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

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

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

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

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

#### INITIAL OPERATION

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

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

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

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

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

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

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

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

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

## TROUBLE SHOOTING & REPAIR INSTRUCTIONS

### AC LINE FUSES BLOW

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

### OUTPUT FUSES BLOW

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

### TIMER DOES NOT TURN UNIT OFF

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

### LOW OR NO CHARGING CURRENT

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

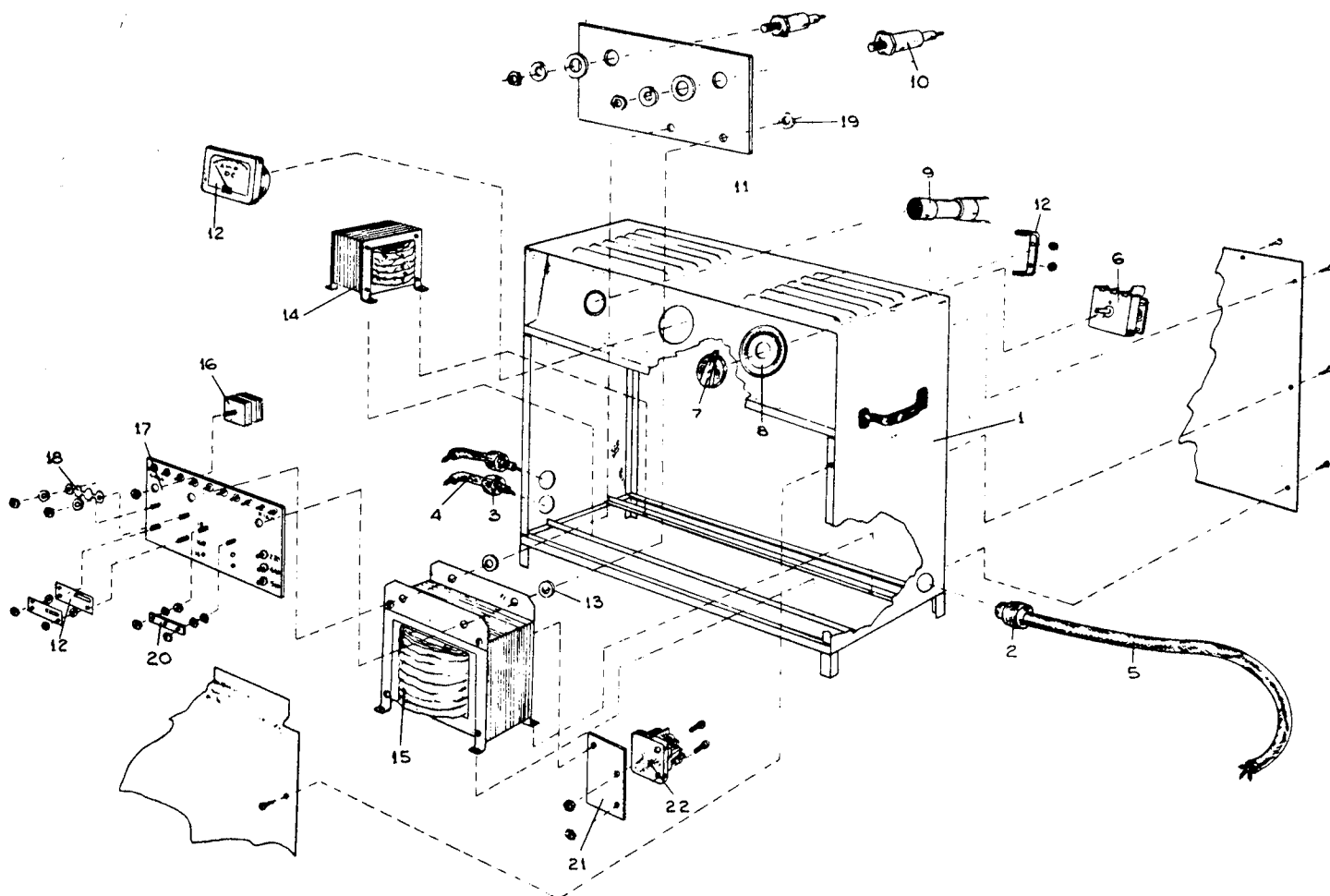
NOTE: Each step assumes all the foregoing steps give the proper indication. All steps must indicate continuity.

### OUTPUT CIRCUIT CHART

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

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

# EXPLODED DIAGRAM (typical unit)



- |                |                            |
|----------------|----------------------------|
| 1 Cabinet      | 12 Ammeter and Shunt       |
| 2 Bushing, AC  | 13 Insulator Washer (3/4") |
| 3 Bushing, DC  | 14 Choke                   |
| 4 Cord, DC     | 15 Transformer             |
| 5 Cord, AC     | 16 Surge Suppressor        |
| 6 Timer        | 17 Terminal Panel          |
| 7 Control Knob | 18 Fuse (link)             |
| 8 Timer Dial   | 19 Insulator Washer (3/8") |
| 9 Pilot Light  | 20 DC Adjustment Bar       |
| 10 Diode       | 21 Contactor Bracket       |
| 11 Heat Sink   | 22 Contactor               |

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

### INSPECTION OF BATTERIES AND ASSOCIATED CIRCUITS

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

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

### IMPORTANT FACTS ON BATTERIES AND CHARGERS

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

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

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

### WARRANTY

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

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

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ELECTRIC CORP

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- \* AN ERROR(S) EXISTS ON THE FOLLOWING SECTION(S) AND PAGE(S) NO.  
SECTION \_\_\_\_\_ PAGE NO. \_\_\_\_\_ LINE OR ITEM \_\_\_\_\_

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

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